Semi-Annual Index of

THE IRON AGE

July—December, 1923

VOL. CXII

192472
17. 11. 24

THE IRON AGE PUBLISHING CO.
239 West 39th Street
NEW YORK

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THE IRON AGE

New York, July 5, 1923

ESTABLISHED 1855

VOL. 112, No. 1

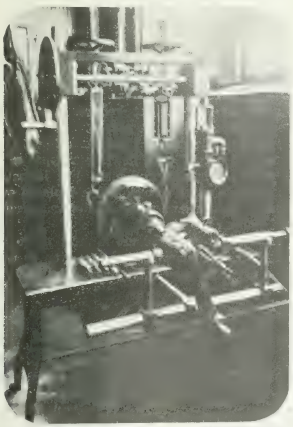
Economies in a Railroad Repair Shop

Using Special Testing Appliances—Reclaiming Worn Steel and Tools—Acetylene Welding Equipment—Cost Keeping Machines Employed

BY L. S. LOVE

SUPPLEMENTING an article in THE IRON AGE of March 29 emphasizing the way production methods of the large modern manufacturing plant have been successfully introduced in the shops of an important Eastern railroad and continuing an article in the issue of May 10, in which was outlined what that railroad had done to expedite repairs by practices deserving of adoption by other railroads, are offered the accompanying reproductions of photographs to show some of the other economies effected by that railroad. The following brief explanations will serve in conjunction with the illustrations.

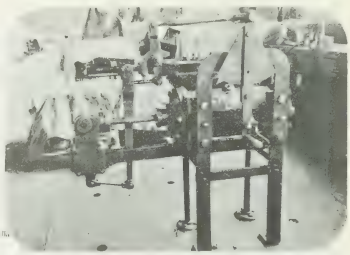
To facilitate lining up, a special trammel with micrometer adjustment was developed for use in laying out rods and shoes and wedges. This consists of a shaft with two sliding pointers, each with a binder screw. One pointer is mounted on a sleeve which binds to the shaft. The pointer on this sleeve is moved by a screw collar which is graduated and when the pointer is set to the proper point, it is held with a binder screw.



To Test Air Motors a Brake Is Employed with Gage and an Air Meter for Estimating the Horsepower Developed in Relation to the Consumption of Air

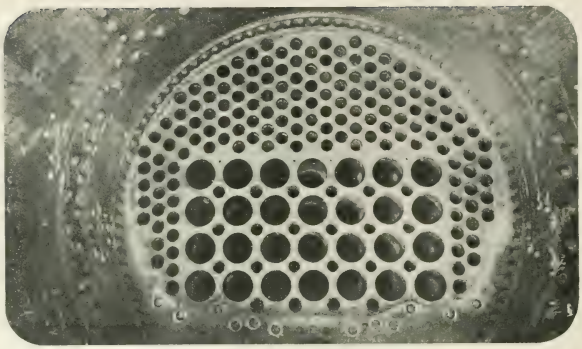


For Air Hammers the Device Measures the Force and Number of Blows in Relation to the Air Consumption. Defective pneumatic tools are repaired or scrapped



A Stand was Built for Testing the Performance of Reversing Valve Gears Before Applying to the Locomotives

To secure full efficiency, pneumatic tools are tested periodically. Air motors are run against a brake with gage and air meter and the horsepower is calculated. This is checked against air consumption. Air ham-



Oxy-Acetylene Welding Is Used in Repairing Frames Which Have Been Cracked, Doing the Work Without Delaying Regular Repairs. Piston rods worn in the fit are built up by welding and returned and fitted. Crucibles are made of ¼-in. boiler plate and welded and lined with Hytempite. In welding the front flue sheet, the old sheet is cut out with the flame, leaving the sheet angle and rivets in place

mers are tested for force of blow as compared with air consumption. If motors or hammers show too high air consumption for power delivered, they are repaired or scrapped, depending upon the general condition they are in. A special stand has also been built for testing valve motions before they are mounted on the locomotive.

In the rearrangement of the shop, approximately 3 tons of tool steel was reclaimed from obsolete and worn out tools in the toolroom. This was possible with the modern checking system which showed which tools were of use and which not. Flat twist drills were converted for use in taper hole spindles by using a taper shank slotted to receive the flat drill; a collar shrunk on held the drill in place. Old punches instead of being thrown away are turned down and used in a supplementary punch holder with backing disks to make up the required length. Inserts are made of high-speed alloy.

It was formerly the custom to employ four men with obsolete equipment to flange flue sheets and boiler work. A modern flanging machine makes it possible to do work in one-third of the former time with one man and two helpers.

An obsolete type of link grinder has been replaced by a modern machine which is showing economy of operation in greater production and more accurate work. For the drilling of telltale holes the old method of one staybolt at a time in a single spindle drill has been replaced with a specially built 12-spindle horizontal machine; the feed to the spindles is actuated by cams.

A modern heat treating department with oil bath, pyrometers, etc., has supplanted with very satisfactory results the old slipshod manner of forging and heat treating tools. Time is saved and loss in hardening practically eliminated.

Driving boxes of the driving wheels of locomotives and other parts require facing or relining with babbitt metal or bronze. A tilting furnace for the brass work was built of scrap material. For pouring babbitt metal on faces of truck and driving box hubs a jig has been developed, which eliminates necessity for machining afterward. This casting jig or table has a center section which is adjustable vertically and can be set so that the babbitt is poured to the exact thickness desired.

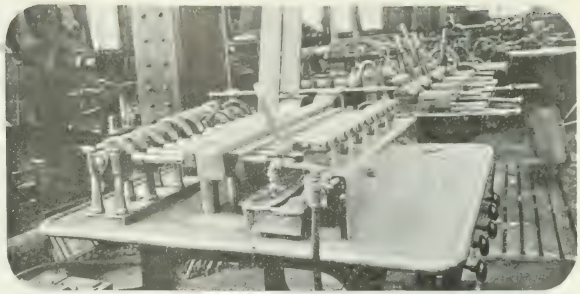
Rather than employ new forging to replace axles with worn journals, a reforging process has been developed, which enables the shop to re-turn the axle for one requiring a smaller wheelfit and journal. This method, it is found, saves $25 per axle. Those axles which are not suitable for reforging are sent to be turned and cut for knuckle pins, etc.

A considerable saving has been effected in the replacement of forged tools in various types of machine tools with tool holders and bits. For instance, a set of slotter tools which cost $750 was replaced with a set of modern tool holders using high-speed inserts, at a cost of $90 per machine set.

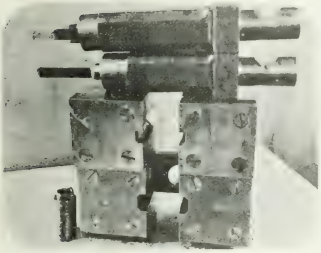
Considerably increased use is made of forging machines, which are showing economy even to the extent of their use in forging valve motion rod ends. Grease



In the Old Method of Flanging Sheets the Services of Four Men Were Required. By installing the machine shown immediately opposite on page 3, the work is done in one-third the time with one man and two helpers, besides saving considerable floor space



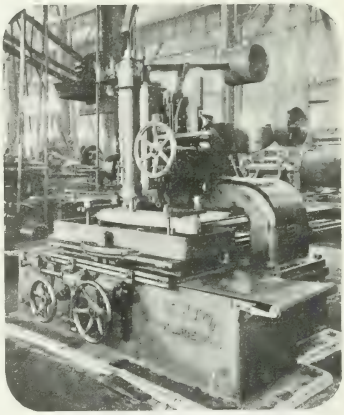
A Special Machine with 12 Spindles Actuated in the Feed by Cams Has Been Built for Drilling Tell-Tale Holes in Stay Bolts



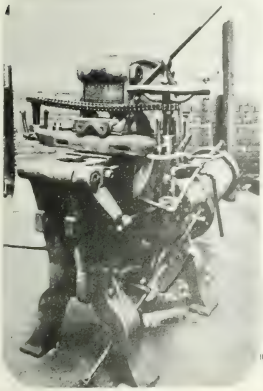
Large as Well as Small Parts Are Made in Forging Machines, Even to the Extent of Making Valve Motion Rod Ends. The illustrations show dies and plungers for forging grease cup plugs. A machined plug is shown at the left



Frame Shank Twist Drills Were Converted for Use in Standard Machines by Insertion in a Taper Shank With Collar Shrunk on to Hold in Place



Modern Valve Link Grinder for Producing Links Correctly and More Economically than Possible With the Machine Formerly Used

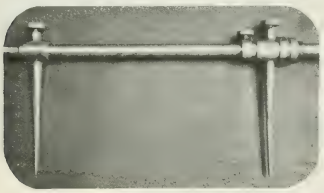




Bodies of Old Punches are Saved by Using High-Speed Steel Inserts. This is one illustration of the conservation made of high-speed steel

cup plugs and many other parts are forged by machine.

Locomotive frames and other parts which crack or break in service are welded without delay to regular repairs. Acetylene welding is also used for building up worn parts. An example is a piston rod on which the crosshead fit was worn. This was built up by welding, re-turned and re-fitted to the the crosshead. Considerable saving is made on large tools by the use of acetylene welding. Planer tools and others are made with a high-speed insert welded to a machinery steel shank.



Special Design of Trammel with Micrometer Adjustment for Use in Laying Out Rods, Wedges and the Like

The railroad utilizes scrap boiler plate for the making of crucibles. Several sheets of ¼-in. plate are formed and welded together ready to be lined with fire resisting cement. These crucibles save the company $15 each.

Many other uses for acetylene welding have been found practicable. Back and front flue sheets are welded into boilers. In a number of cases old engines are equipped with superheaters. In such cases old flue sheets are cut out with the acetylene flame without removal of the old angles and rivets, the new sheet is placed back of the angle left from the old and welded into place. This practice has made considerable savings in labor and time of engines in the shop.

Accounting machines and addressing machines are used for making up payrolls. Special cards have been devised for use in this shop for combining the records of the periodograph and accounting machine on each operator's time card or on the job card.

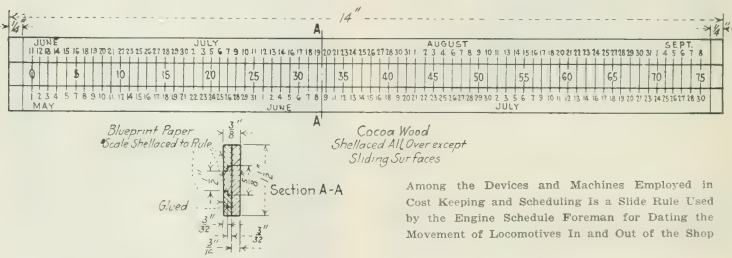
When a mechanic starts on a job, he is given a card bearing a description of the job, number of pieces and his name. He takes this card to the periodograph, which stamps the particular interval of the pay period in the space provided and punches a hole in the margin of the card. When the job is finished, the periodograph registers the period in which it was finished and punches another hole in the margin.

It might be mentioned for the information of those not familiar with the action of this machine, that each hour is divided into tenths for convenience in figuring decimals. The pay period may start Monday morning and run all week, or the clock may be set to start a new pay period each day. Non-working time, such as the lunch period, is automatically eliminated. The point worked out was the combining of the two tickets on one card, placing the periodograph marginal holes out of the field of the accounting machine, thereby eliminating the necessity of a transfer card or transcribed record. Time is saved, mistakes in transcribing are eliminated and card stock is saved.

When the job is completed the card goes to the punching machine for amounts to be punched in and it is then run through the accounting machine for figuring. On a job ticket, for example, the elapsed time is 12 periods or 1.2 hours, the man's rate is 40½c per hr., or 48c. for cost of job. This is all punched in the various columns at the right of the ticket ready for the accounting machine.

The payroll time card shows the man's name and number and his occupation. It shows his rate, the number of hours worked, the total amount of his pay and gratuity for that period. This is all punched into the card for use in the accounting machine. This card is also a combination of two machine tickets, that of the periodograph and accounting machine.

A device for further reducing clerk hire and eliminating possibility of mistakes in deducting non-working time was a slide rule for scheduling locomotives in the shop so that with minimum effort the delivery promise could be made. It has been shown conclusively in this shop that modern factory accounting methods are available for and effective in the railroad repair shop.



Among the Devices and Machines Employed in Cost Keeping and Scheduling Is a Slide Rule Used by the Engine Schedule Foreman for Dating the Movement of Locomotives In and Out of the Shop

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Alaskan mine production in 1922 was $19,506,365, an increase of $2,600,000 over that of 1921, says an announcement made today by the Geological Survey. This increase, according to Alfred H. Brooks, Chief Alaskan Geologist, is entirely due to a larger copper output. Since mining first began at Juneau in 1880, the territory produced minerals to a total value of $497,985,278, which has come chiefly from gold and copper deposits. The copper production for 1922 was nearly 39 per cent greater than that of 1921 and there was a revival of prospecting for copper.

In the course of instructions sent from Washington to the Collector of Customs at Portland, Me., last Thursday, Assistant Secretary of Treasury McKenzie Moss stated that the department is of the opinion that provision in paragraph 203 of the Fordney-McCumber tariff act covers limestone which has been crushed to varying sizes so as to be suitable for use in steel making, road building, etc. This provision carries a duty of 5c per lb. and is applicable on limestone "crude or crushed but not pulverized."

Fuel Oil for Air-Furnace Melting

Equipment at Samson Tractor Co. Plant at Waukesha Described—Costs of Oil and Coal Operation Compared

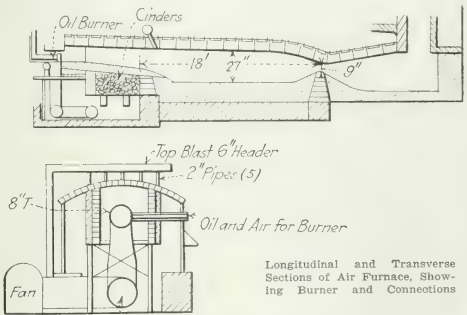
BY D. I. DOBSON*

INCREASING cost of good melting coal, high freight rates, diminishing supply, etc., are causing malleable foundries to consider other fuels than West Virginia coal as a melting medium. The extreme simplicity of converting air furnaces to fuel oil, ease of handling it and lowered melting costs have been attractive to malleable foundrymen. Unfortunately, some pioneers in this field have been unsuccessful in obtaining uniformly good heats. Oil fuel has thus received at the outset a reputation of being tricky, excessively oxidizing and uncertain.

As early as April, 1921, this company experimented with fuel oil for melting purposes. For the past six months four furnaces have been operated successfully with oil. One furnace has been in constant operation since June, 1921.

The Burner

When selecting a type of burner, it is well to consider how atomization of the oil is to be effected. Here the question of economical atomization and efficient melting should be weighed and balanced. The individual plant will find various factors which will influence the type of burner selected. In general, we may say broadly that there are three classes of burners, though under these classifications are many types, some of which are difficult to place in any one group.



Longitudinal and Transverse Sections of Air Furnace, Showing Burner and Connections

In the high-pressure burners, atomization is effected with steam or compressed air. If steam, it must be dry; it will be efficient at 25 to 65 lb. pressure, depending largely upon the temperature of the oil and its degree Baumé, or more specifically its viscosity. High pressures are to be avoided on the atomizing agent, for they necessitate high oil pressures and are not economical.

A high-pressure burner will operate equally well with compressed air as the atomizing agents, giving a reaction somewhat different from steam. With steam, a certain nozzle velocity may be obtained which will throw the flame, while with compressed air any increase of nozzle velocity is offset by more rapid combustion. The inability to throw the flame with compressed air is often puzzling to one accustomed to using steam.

With low-pressure burners atomization is partly mechanical. Such burners are operated most economically when electric power is cheap. They present the disadvantage that more than one burner must be used on a furnace, since they are restricted to smaller orifices and consequently lower capacities.

Under the third classification may be grouped all purely mechanical atomizers. This type of burner is usually so designed as to break up the oil by forcing it through small orifices while imparting a swirling motion to it. High temperatures are usually maintained on the oil, 250 deg. Fahr. being not uncommon. This is not a disadvantage, for the lower grades of oil and even tar may be burned if heated to such a degree.

Converting the Air Furnace

The only change necessary upon the air furnace is the conversion of the combustion chamber. The fire box must be filled in on top of the grates with ashes, cinders, broken fire-brick or any other available material. Two inner walls may then be constructed on top of this filler to form a v-shaped combustion chamber, 10 to 12 in. wide at the burner end, and spreading to the full width of the furnace at a point slightly in advance of the front bridge. The burner may be introduced inclined toward the iron, horizontally, or inclined up away from the iron. This company has experimented with the burner inclined rather sharply toward the iron, but has obtained the best results with but a slight inclination toward the bath, with the burner about 2½ ft. above the surface of the molten iron. The floor of the combustion chamber is, of course, filled with fire sand, and conforms in slope with the pitch of the burner.

To lengthen the combustion chamber somewhat we have built on a small box-shaped addition. It is supported by 3-in. channels with 1-in. steel stringers bolted to the furnace plates at one end, and 1½-in. pipe-uprights at the other. With this addition our combustion chambers measure a trifle over 8 ft. from burner to front bridge.

Operation

The oil flame is different from the coal flame in several respects; in the manner in which combustion occurs and the shape of the flame produced. It may be compared favorably with a gas flame. There is first of all a zone of free air surrounded by gases of hydro-carbons, next a zone of combination and then a zone of completed combustion. These zones, of course, grade into each other, but may be shortened or lengthened at will by supplying more or less air through the front blast.

Our practice here is to start with the front blast set at its maximum. This causes combustion to take place early and gives a hot fire at the front of the furnace, though the flame is quite short. The iron starts to drip in front within 35 to 45 min. on a cold furnace, and within 20 to 30 min. after recharging.

Oil is fed so that at no time is there a great amount of smoke coming from the top of the stack. After the iron starts to drip, the blast is cut to lengthen the

*Samson Tractor Co. plant, Waukesha, Wis. The paper was prepared for the convention of Wisconsin Foundrymen's Association, April 4 and 5.

flame. The hottest zone of the fire is thus worked gradually through the length of the furnace. Care must be taken not to move the blast too quickly, however, or the melting will be hung up in the part skipped over. Dampers have been installed on the top of each stack to aid in maintaining a uniform pressure in the furnace when reducing the amount of air of the front blast.

Air for combustion is here delivered by a fan, the tip diameter of which is 42 in. and width of blades 12 in. It runs at 1050 r.p.m. The air is discharged through an opening 13 in. in diameter. The top blast is taken off this 13-in. pipe by a 6-in. pipe and top blast air is delivered through five 2-in. pipes from a 6-in. header.

Some poking and skimming are necessary on the part of the operator, though his work is light when compared with that of the coal fireman. A good illustration of the comparative work is that during the hottest weather of last August one man operated a furnace, while on similar occasions heretofore three firemen have been used.

Equipment

The equipment necessary for the use of fuel oil consists of tanks for storage, pumps and feed pipes. It is best to have both a feed line and a return line. The oil in excess of that required for the burner may thus be returned to the tank. Provision should be made to circulate as much oil as is burned. In that way line pressure will be constant, and pumps may be operated on lower pressures.

Oil must be heated in cold weather. Steam coils may be inserted in the tanks for heating purposes, though care must be used to prevent leaks in the coil, for water in the oil line is disastrous to the heat. Each storage tank should have a drain valve on one end, and should be given a slight pitch toward the drain. Water accumulates from fuel oil as it stands.

A return line is also of service during cold weather, for by keeping the oil circulating slowly at night it is possible to prevent the oil in the feed pipes from becoming gummy. This company is using fuel oil from 18 to 25 deg. Baumé. Such an oil flows freely at 70 deg. Fahr., though better satisfaction is obtained when it is heated to 100 deg. Fahr. or higher.

We have found an oil pressure gage and an air pressure gage to be useful to the operator at the furnace. Indication is thus readily given in case of trouble either at the pump or compressor. Other miscellaneous equipment at each furnace includes an oil meter, strainer, pressure regulator, and a draing valve for letting out water, should it by any chance get into the line.

We have worked with the conviction that a furnace has a rated capacity in gallons of oil per hour. Such capacity is that which will give at least 15 per cent carbon dioxide over the rear bridge. Carbon dioxide may be determined by an ordinary Hays apparatus or apparatus of similar type. The amount of flame over the bridge is good indication of correct operation.

Effect Upon the Elements

Silicon.—Loss in silicon varies from 30 to 35 points on an initial heat to 20 to 25 points on a second heat.

	Average of 25 First Heats Silicon			Average of 20 Second Heats Silicon		
	In	Out	Loss	In	Out	Loss
Average.....	1.26	0.93	0.33	1.23	1.00	0.23
Minimum.....	1.27	1.07	0.20	1.21	1.04	0.17
Maximum.....	1.25	0.85	0.40	1.20	0.89	0.31

Manganese.—Loss of managanese averages 15.8 points. Some difficulty is experienced in keeping manganese low enough, since the fuel adds but little sulphur to the iron, and only small amounts of manganese sulphide are carried away by the slag. This condition is perhaps best remedied by buying pig iron high in silicon and low in manganese. The high sulphur will help lower the manganese, and at the same time aids in forming a better manganese-sulphur ratio. Our sulphurs average about 0.040 per cent.

Phosphorus.—Is unchanged.

Carbon.—From 10 to 20 points more carbon is oxidized by an oil fire than by a coal flame. The effect is to lower the amount of sprue which may be charged. However, we have maintained carbons constantly from 2.30 per cent to 2.50 per cent while charging an average of 48 per cent sprues and gates, etc., for the past eight months. This figure might be increased to 55 per cent if necessary by charging about one per cent petroleum coke on the bottom of the furnace with each cnarge.

Costs

From 5500 to 6000 gal. of oil is consumed on each of our furnaces per week of 11 heats. Th capacities of the furnaces are 11 and 12 tons. The amount of oil used varies little in proportion to the charge, but may in some instances be at the minimum figure while operating the furnace at capacity. Our best record for oil consumption was the melting of 781.6 tons of iron with 43,674 gal. of oil, an average of 55.8 gal. per ton. This was made over a three weeks' period and includes the total melt of three furnaces.

Our average for four furnaces for the past four months is approximately 65 gal. per ton. This means a fuel cost of about $3.50 per ton of metal melted. A comparison with coal on this basis would be about as follows on these furnaces:

Based on 10-Ton Heat

	Oil	Coal	
Fuel cost	$35.00	$38.90	
Operation	3.00	5.40	(One operator on oil, two firemen on coal)
		1.75	(One laborer hauling coal)
		0.25	(Ash removal)
Total	$38.00	$46 30	

A saving is made also on maintenance of the furnace. We have found by comparison of 8-ton heats over a period of 203 oil heats, and 126 coal heats, the maintenance cost was $3.01 per heat in the case of oil, and $6.56 per heat while firing with coal.

An average of six bungs are relined each 11 heats. The life of side walls is about 40 per cent longer. Bungs over the combustion chamber last from two to three months, though the very first five bungs will stand up over a year. The life of the throat and the bungs over the rear end of the furnace is slightly longer, though we possess no reliable data as to length of service. Bungs near the stack have not been relined during the time we have been operating on oil.

Jubilee Exposition in Gothenburg

GOTHENBURG, SWEDEN, June 11.—The exhibits of iron and steel manufactures, which form a striking feature of the export section of the Tercentennial Jubilee Exposition in Gothenburg, have impressed the visitors by their number, completeness, and variety. The guiding principle of this fair has been to exhibit the industry as a whole, rather than individual firms. In Machinery Hall one is struck by such contrasts as, for example, a 6½-ton crank shaft for a Diesel engine wrought from a single piece of iron weighing 27 tons and a hair spring so tiny that one must use a magnifying glass to tell what it is. Ball bearings, roller bearings, an 11-in. coast defense gun, steamship propellers, steam turbines, cream separators, surgical instruments, micrometers, cutlery, etc., illustrate the variety of exhibits of Swedish manufacturers. The State Testing Institute shows machines for testing and there are special exhibits also of the Swedish Metallographic Institute and of the Iron Institute. The Gothenburg Jubilee Exposition will continue until Sept. 30.

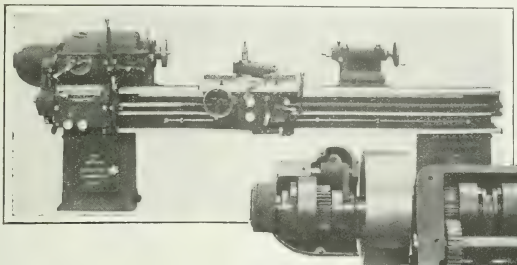
Bids submitted by Belgian producers were low on 10 locomotives for the Sorocabana Railroad and also on rails for the Sul Mineira line in Brazil, according to a report received by the Department of Commerce from Commercial Attaché W. L. Schurz, Rio de Janeiro. Bids of Swedish makers were low on 10 locomotives for the Central of Brazil Railroad, while on cars for this line bids of Belgian manufacturers were low.

New 18-In. Geared Head Engine Lathe

The 18-in. geared head engine lathe illustrated, having apron control for 16 changes of spindle speed with forward or reverse motion, has been placed on the market by the Mueller Machine Tool Co., Cincinnati. All changes are made without stopping the driving pulley.

The long lever shown in front of the head controls four changes of speed from the main driving shaft through friction clutches only one of which can be operated at one time, as the forks are on two shafts and a steel pinion meshes with a rack on either shaft by means of a gate selector, shown in the insert. The four changes are transmitted directly to the spindle with the back gear pinion withdrawn from the spindle gear and with the sliding clutch collar on the spindle engaged.

The small lever at the right of the long lever operates both the spindle clutch and the back gear pinion alternately. The lever shown on the left controls a double and a single-jaw clutch on the back gear shaft in such a manner that only one clutch can be engaged at a time. A spring is provided so the operating lever may be set where required, although the jaws are not meshed. When disengaging any of the jaw clutches the action is positive. Thus multiplying the triple back-gear speeds by those on the first driving shaft gives 12 speeds in addition to the four obtained without back gears, making 16 speeds in all. The three gears and clutch on spindle are on one quill and revolve on the spindle.



Geared Head Engine Lathe Having an Apron Control for 16 Changes of Spindle Speed With Forward or Reverse Motion. The reversing attachment is a separate unit. The arrangement of the head may be noted from view below

All keys are milled integral with their shafts, and bearings are bronze bushed and self oiling. Jaw clutches are of nickel steel and hardened. The gears have a 20-deg. pressure angle and stub tooth form.

The reversing attachment is a separate unit, which is bolted to the head and supports the first driving shaft in two radial ball bearings. The driving pulley has an internal gear on the left side of it and a friction clutch on the right, which engages the first driving shaft for right-hand drive. For left-hand drive a pinion engages with the internal gear and delivers power across to the friction gear shown, causing an opposite motion to that of the pulley. A sliding collar controls the two friction clutches operated by a fork and a lever below the attachment which is connected under the lathe head to the levers and lower splined shaft in front of the bed. Thus the lever shown at the right of the carriage has full control of starting, stopping and reversing the lathe spindle. A number of adjustable dogs on a flat bar attached to the front of the lathe bed trip the automatic feed at any desired position.

The lathes are also available equipped for motor drive, in which case the motor is bolted to the rear of the cabinet leg under the headstock.

With a capacity of 14,000 tons of ore, the Charles M. Schwab, the largest steel vessel ever built on the Great Lakes, was launched by the American Shipbuilding Co. at Cleveland, June 30. The ship is 600 ft. long and of a width permitting passage through the "Soo" locks.

Rates on Bit-Steel Billets Disapproved

WASHINGTON, July 3.—In a decision announced last Wednesday, the Interstate Commerce Commission made a finding of unreasonableness in connection with rates on bit-steel billets, in carloads, from Pittsburgh to Tulsa and Muskogee, Okla., awarded reparation and ordered the carriers to establish new rates not later than Aug. 23. The decision was based on a complaint made by the Oklahoma Iron Works. The rate applied by the railroads was fifth class, this grade of billets being classified as forgings because the billets used in making oil well drilling bits were rounded at one end by hammering and not merely by rolling. It was contended by the complainants that the rounding of one end was done to make the billets easier to handle but that it did not make them any more valuable. The commission disagreed with this point of view.

Protest against the rates was made largely on the ground that in shipping carloads of steel drill bits from Pittsburgh to Okmulgee and Sapulpa, Okla., for instance, the shippers of the bits were able to get their product at a cost of $1.30 for transportation, while the complainants paid $1.555 and $1.455 to Tulsa and Muskogee, respectively. The commission said the value of the billets was approximately 9.75c. per lb., while the bits were worth from 16.75c. to 22c. per lb. The commission found the rates unreasonable to the extent that they exceeded 87c. in the future.

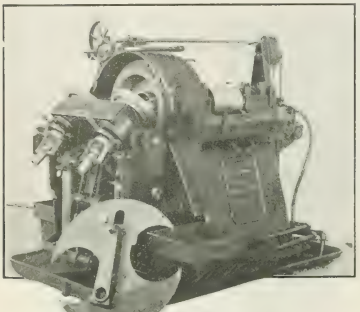
The United States Supreme Court has taken under advisement the request of the State of West Virginia for a rehearing of the natural gas cases brought against West Virginia by Ohio and Pennsylvania. In a decision of June 11, the Supreme Court held that West Virginia could not restrict the exportation of its natural gas and held to be an interference with interstate commerce the State law creating a commission to regulate the flow of gas across State lines. The mandate of the Supreme Court to carry out its decision will remain in abeyance until after the the regular fall term begins on Oct. 1.

A. W. Heinle, metal-rolling engineer, Pittsburgh, has added new data to his self-explanatory chart on alloy steel guide round and other rolled shapes.

Duplex Rotary Grinding Machine

The duplex rotary grinder illustrated, designed to surface automatically thrust washers, clutch disks and other parts that can be singly or collectively chucked within a diameter of 12 in., has been placed on the market by Williams, White & Co., Moline, Ill. The machine is a production unit and is a development of the Osterholm automatic surface grinding machine described in THE IRON AGE of July 28, 1921. Heavy construction is a feature emphasized.

The machine automatically completes a cycle after the work is chucked and the machine started. The illustration shows the grinder in the loading position, the rotary chucks being at rest. When the machine is started the first fractional rotation of the cam advances the abrasive wheel toward the work at a rate determined by the shape of the cam. The heavy cutting may be done in the first part of the cycle, allowing ample time in the remainder of the cycle for the wheel to cut itself free, true the surface ground and develop a surface of the desired quality. Upon completion of the cycle the chucks drop automatically to a loading position and the machine stops. The automatic features



Duplex Rotary Grinder for Surfacing Thrust Washers, Clutch Disks and Similar Parts. The machine as shown is in the loading position

are said to permit operation of the machine by comparatively unskilled labor, one operator attending two or more machines in cases where the combined chucking and unloading time is considerably less than the operating time.

Provision has been made for adequately cooling the work, the liquid being pumped through the wheel spindle and an additional stream through each of the work spindles. The water brought through the wheel spindle cascades over the rim of the wheel at a rate sufficient to prevent the wheel from loading, the water brought through the wheel spindles at the rear of the work having a tendency to keep the temperature of the work down, preventing burns and warping. When the machine is operating the wheel chamber is practically sealed.

Either mechanical rotary chucks, pneumatically or hand operated, or magnetic chucks may be used. Mechanical chucks are recommended because with them such parts as thrust washers can be ground with accurately parallel sides in two operations. Expanding or contracting collets are operated through toggle links by means of the handles shown.

Cylinder wheels 20 in. in diameter and 8 to 4 in. deep, according to the height of work to be ground, are employed. The depth and rim thickness are varied to suit the parts to be ground. The wheel is advanced to compensate for loss in grinding and dressing by means of a handwheel graduated in thousandths, located on top of the water guard. The wheel dresser is mechanically driven and is always in place.

The duration of the cycle of the machine to accommodate area to be surfaced is varied by means of change gears at the left-hand side of the grinder. A three-step change gear arrangement is also provided for varying the speed of the spindles. Lubrication of the machine is by means of ring and chain oilers supplied from suitable oil wells.

Work 12 in. in diameter by 4 to 8 in. high may be ground. The spindle speed is 900 to 1000 r.p.m., and three geared chuck speeds, from 8 to 12 r.p.m., are available.

Iron and Steel Census of 1921

Census figures for the entire industry manufacturing iron and steel and their products show a total of 16,571 establishments with 1,030,248 wage earners in 1921, and a total production valued at $5,592,204,380. About one-quarter of the wage earners, one-third of the products and one-twenty-fifth of the number of establishments represent the iron and steel industry proper, while the remainder comprise a great variety of metal working industries in which iron and steel are the principal basic materials.

Chief among these latter will be found foundries and machine shop products, structural steel work coming next and engines operated by steam, gas and water following. The chief industries represented are tabulated below in order of the value of products.

Iron and Steel and Their Products—1921

Industry	Number of Establishments	Wage-earners	Value of Products	Production per "Man"
Total	16,571	1,030,248	$5,592,204,380	$5,428
Crude iron and steel rolled products	628	254,213	1,901,430,596	7,480
Iron and steel, blast furnaces	134	18,698	419,771,244	22,450
Iron and steel, steel works and rolling mills	494	235,515	1,481,659,352	6,290
Other iron and steel products	15,943	776,035	3,690,773,784	4,755
Foundry and machine shop products	9,013	321,363	1,565,526,944	4,872
Structural iron and steel work*	1,021	32,897	250,085,446	7,602
Engines, steam, gas and water	296	35,567	199,498,575	5,609
Tools and cutlery	1,042	41,131	145,697,169	3,537
Textile machinery and parts	421	31,025	128,934,896	4,156
Steam and hot-water heating	274	30,808	127,366,887	4,134
Hardware	430	33,802	116,688,661	3,452
Locomotives†	22	16,583	102,023,358	6,152
Stoves and hot-air furnaces	357	24,531	101,572,793	4,140
Stoves, gas and oil	155	7,921	42,712,676	5,392
Wire‡	61	14,832	99,945,814	6,739
Other wire work	413	11,485	66,384,507	5,780
Forgings	240	16,740	83,151,126	4,967
Pumps, all	221	12,186	69,962,413	5,741
Plumbers' supplies	220	16,670	69,118,794	4,146
Machine tools	348	21,307	67,729,362	3,179
Wrought pipe*	57	8,728	56,662,278	6,492
Cash registers and calculating machines	49	9,786	53,652,943	5,482
Cast iron pipe*	70	12,496	44,321,548	3,547
Typewriters and supplies	75	13,381	41,789,990	3,123
Bolts, nuts, washers and rivets*	125	10,148	35,773,454	3,525
Sewing machines and attachments	36	12,569	35,608,297	2,833
Steel springs, car and carriage*	126	5,358	31,750,373	5,926

*Aside from production of steel works or rolling mills.
†Not made by railroad companies.
‡Not including wire departments of rolling mills.

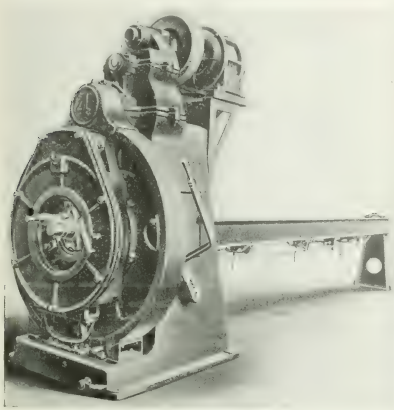
The Copper and Brass Research Association has just added to its membership the Engels Copper Mining Co., Granby Consolidated Mining, Smelting & Power Co., Dallas Brass & Copper Co., Merchant & Evans Co., T. E. Conklin Brass & Copper Co., J. M. & L. A. Osborn Co., and Richards & Co., Ltd. The present membership of the association comprises 26 copper mining companies and 15 copper and brass fabricating and distributing companies.

The Pacific Coast has recently purchased straighteners for steel angles. One for 6 x 6 x ¾-in. angles goes to the Pacific Steel Co. and another for 4 x 4 x ½-in. angles to the Judson Mfg. Co., San Francisco. Both were built by Kane & Roach, Syracuse, N. Y.

Machine for Shearing Steel, Brass and Aluminum Pipe and Tubing

A machine for shearing pipe and tubing of steel, brass, copper and aluminum, said to be applied with particular perfection on the thinner wall sizes, has been placed on the market by the Tube Shear Co., Marquette Building, Chicago. Shearing up to the last inch is a feature claimed. The machine is intended also to provide economical equipment for the trimming of the tubular sections produced in the field of deep-drawing and stamping.

The principle of operation is one of shearing over an arbor with a non-rotating ring blade. This principle obviates the necessity of chucking or holding the tubing, as neither the blade nor the tubing rotate. The action



Heavy-Duty Tube Shear. The principle of operation is one of shearing over an arbor with a non-rotating ring blade; chucking or holding the work is unnecessary. A view of the machine with cover plate removed is at the right. Accessibility of the shearing knives is a feature, and the advantage of shearing up to the last inch leaving no waste ends is also emphasized

of the blade is one of concentrically shearing about the circumference of the tube and holds the tube and knife in a fixed relative position. A further advantage in this method is claimed in the design of the machine, as the load sustaining shear blocks are bearing directly in the plane of shear.

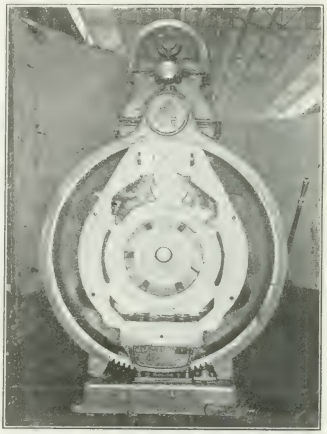
The illustrations are of the heavy duty type machine, the lighter type machine having similar features except that the shearing head runs continuously and at a higher speed. The machine is a back-geared, single revolution shear, operated by a treadle through positive clutch mechanism, in a similar way to any standard plate or bar shear. It has a fixed stroke and two main adjustments, one for the knife and the other for the knife alinement. The stroke is governed by the maximum wall thickness of tubing for which the machine is designed. It need be no greater than the wall, as it is not necessary for the knife to pass completely through the wall of the tubing.

The shearing angle is established through the difference in diameter between the ring blade and the outside diameter of the tube, and is controlled by the main knife adjustment, not by the stroke. The main knife adjusting mechanism is located on the shear-head in line with the stroke-actuating member, and governs the eccentricity of operation of the ring shear-block.

The adjustment for the knife alinement is carried through to the tail end of the arbor, and is accessible from the front of the machine, while the arbor itself is detachable without affecting this alinement feature. The comparative flexibility of the arbor, due to its length, is compensated for by supports, which position automatically as tube is being fed out. The rolls on which the tube travels are adjustable for various diameters. Stop and feed mechanisms are also adjustable for shearing various lengths and for feeding different diameters.

A feature claimed for the tube shear is the accessibility of the shearing knives, which are plain hardened rings, free from bolt holes or irregular surfaces, and are simple members to machine, harden, regrind, or replace. Suitable provision is made for adjustment for wear.

The principle is considered practical on tubing with wall thickness not in excess of 10 per cent of the diameter. Shearing up to the last inch, leaving no waste end, is a feature of the machine, possible because the chucking is eliminated.



Pennsylvania Silica Brick Prices Reduced

PITTSBURGH, July 2.—Effective today, leading Pennsylvania makers of silica brick reduced prices $2 per 1000 to a basis of $45. So far there has been no change in Chicago or Birmingham brands. The reduction comes as a result of the fact that demands for several weeks past have been progressively smaller and also to bring the regular price more in line with those of some makers, who lacking much of a backlog of orders, have been going as much as $5 per 1000 below the regular price to get enough business to keep their plants going. Sales have been made at $42 and this price or even less can be done since demand is light in keeping with narrowing activities of the principal consuming industries.

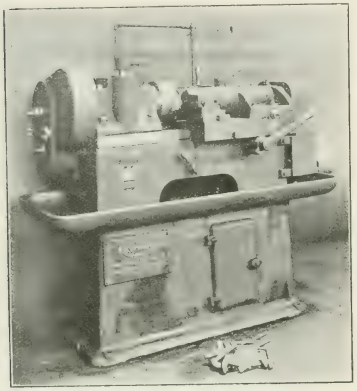
As yet, there has been no change in clay fire brick or the other kinds of refractories, but business is slow and dwindling order books usually mean more pressure for business and declining prices. The great bulk of the present bookings in fire clay brick are priced well under those now quoted, and evidently users are well supplied, since there have been several cancellations, some of them being rather big. Quotations are given on page 49.

Statistics gathered by the National Metal Trades Association show a slight decrease in employment in Detroit and Milwaukee. The aggregate working force of firms reporting on June 14, at Detroit, was 228,658, a net decrease of 1313 in two weeks. The total number of employees at 50 metal-working shops in Milwaukee during the month of May was 19,631, a decrease of 330 as compared with April.

Machine for Threading Pipe Wrench Jaws

Maximum production in milling threads upon the jaws of pipe wrenches is claimed for the Coulter duplex hob thread milling machine illustrated, which has been recently placed on the market by the Automatic Machine Co., Bridgeport, Conn. A production of 85 14-in. wrench jaws, completely threaded, in an hour is claimed from the first machine built, greater production being expected when the operator becomes more familiar with the machine and when the permissible speed of the cutters and feeds have been determined.

The threading of wrench jaws has been done in many different ways and is considered difficult to perform and severe on the machines employed because



of the interrupted surface to be threaded, the section being rectangular in form with edges curved to a diameter equal to its width.

In addition to the rigidity, weight, proper bearing surfaces, large milling spindles, milling arbor supports, quick chucking and automatic stop features, the use of two hob milling cutters is a feature emphasized. These are mounted parallel to each other, directly opposite, so that in operation the work makes only one-half revolution to complete the threading direct from the rough trimmed jaw forging.

Power from the single pulley drive is transmitted to the work spindle and milling spindle through spiral gears. Variations in feed are made by means of change gearing. The lead or pitch of the thread is governed by a lead cam having a wide face. A bronze shoe fastened adjustably to the milling spindle carriage is held against the cam by a weight. The parallel milling spindles may be adjusted independently or as a unit so that it is possible to set each cutter exactly the same distance from the center of the work, thus controlling the size of the work. A lever operated tail center is located between the steel milling spindle housing and operated by the hand lever on the right front of the machine, clamping with the handle on top.

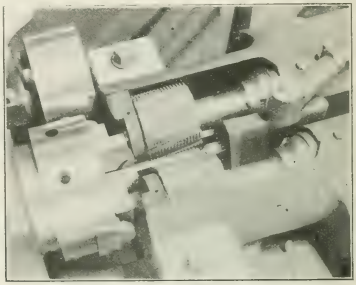
The small handle in the front, directly under the chuck, is for starting the machine. The handle on top of the work spindle is for operating the chuck through a plunger in the center of the spindle, engaging two tool-steel levers fulcrumed in the steel chuck body and acting on the master jaws into which are fitted adjustable work holding jaws. Between the jaws and at right angles, a form jig is fitted to support and aline the head-end of the work without centering.

The base is equipped with an oil pan, as shown, under which space is provided for oil storage and for a cabinet. Oil pump and piping are provided.

Tennessee Company Will Build Railroad to Connect Plants

BIRMINGHAM, ALA., July 2.—It is agreed in industrial circles that the construction by the Tennessee company of a five mile standard gage gravity railroad from the Red Mountain ore mines direct to blast furnaces at Bessemer and Ensley will result in a great economy in assemblage of raw material. The official announcement of Vice-President H. C. Ryding follows:

The Tennessee Coal, Iron & Railroad Co. will construct a single line standard gage rail from the Wenonah division of the ore mines on Red Mountain in a straight line across Jones and 'Possum Valleys to connect with the existing tracks in the vicinity of the Fairfield Steel works and the Fairfield Coke works. The length of this track will be approximately five miles. Red ore will be transported over this line from



Duplex-Hob Thread Milling Machine for Pipe Wrench Jaws. Use of two hob milling cutters is a feature. They are mounted parallel to each other and directly opposite, as shown above, so that only one-half a revolution of the work is required to complete the threading of a rough-trimmed forging

all of the Tennessee county mines on Red Mountain to the furnaces at Ensley and Bessemer.

The plan of this railroad track has been determined upon with particular reference to safety, speed and economy in operation. It will be elevated along the entire route across Jones and 'Possum Valleys, public roads, street railways and railroad tracks being spanned with suitable bridges, thus completely eliminating danger of grade crossings. The trains, therefore, will run through direct from Red Mountain to Fairfield without a single stop, with resulting economy in operation.

Construction will be undertaken at once and will be carried on at an economical rate until date of completion.

The road will traverse thickly settled communities and will cost several millions of dollars. It is a five-year old plan.

Report of Great Northern Iron Ore Properties

The trustees of the Great Northern Iron Ore Properties have published their sixteenth annual report, which covers the calendar year 1922. The shipments and receipts of ore under "old leases" were 1,759,794 tons in 1922, the average royalty being 18.8064c. Of the above total, 1,024,794 tons came from the Mahoning mine and the remainder from the Stevenson, Leetonia, Utica and Sweeney mines. Shipments and receipts under leases made in 1913 and subsequent years amounted in 1922 to 3,796,410 tons. The total receipts of the year were $4,465,035.29 and the disbursements to certificate holders were $4,500,000, or $3 per share. Salaries and other expenses were $84,685.19. The total distribution to certificate holders in the years 1907 to 1922 inclusive was $43,125,000.

The plant of the Wood Turret Machine Co., Brazil, Ind., was recently offered for sale by the Brazil Trust Co., receiver, but failed to sell, and will be readvertised in the near future.

American Society for Testing Materials

Annual Convention Discusses Magnetic Testing and Fatigue of Metals—Chemical Requirements for Cast Iron —Changes in Specifications

NEW information on the magnetic testing of steel, further developments in the endurance properties and fatigue resistance of steels and non-ferrous alloys, and a topical discussion on the necessity for chemical specifications for cast iron were some of the leading features of the twenty-sixth annual convention of the American Society for Testing Materials, held last week at Haddon Hall, Atlantic City, June 25 to 29. The usual reports of standing committees involving some new specifications, particularly those for steel castings, as well as changes in standing specifications were as usual part of the regular procedure.

The largest attendance in the history of the society had been registered at the end of the first two days, with 458 men and 138 women present. For attendance at all the society's activities, a registration of 1000 was estimated. Not only the increased membership of the society, but the popularity of the place of meeting largely explain the attendance and enthusiasm of these gatherings. An interesting program was carried out, the leading features being recounted here.

Magnetic Analysis and Fatigue of Metals

Probably the most interesting session as regards new information divulged was the one on corrosion, fatigue of metals and magnetic analysis, on Tuesday morning, June 26, at which D. M. Buck, chief chemist American Sheet & Tin Plate Co., Pittsburgh, presided. Besides the regular committee reports, always presented at this session, two important subjects engaged major attention. One was that of magnetic analysis, and the other the endurance properties of steels and non-ferrous alloys.

New Magnetic Inspection Method

Keen interest in the former subject was awakened by the presentation by A. V. de Forest, research engineer American Chain Co., Bridgeport, Conn., of a paper entitled "A New Method of Magnetic Inspection." The author delivered a very brief description of his new method, characterizing it as a rapid one for determining the different effects of two different factors entering into the treatment of steel, brought about by a suitable combination of two independent magnetic readings. The new apparatus is a distinct advance in the realm of non-destructive test and inspection. The apparatus is portable and employs commercial alternating current which can be used for commercial inspection of suitable objects.

He exhibited the apparatus and gave numerous examples of the method by which it works. So far as the subject has been studied, the new method has been applied to a study of the different magnetic effects of the quenching and drawing process on 1 per cent tool steel and 18 per cent tungsten high-speed steel. It is claimed possible by means of the apparatus to determine the steps through which a tool has already gone to arrive at a certain condition, and to differentiate between the quenching and drawing history of the piece. It is limited to small differences, but one variable, such as quenching or drawing, can be entirely cut out, while determining the other. In other words, a separation can be made between the effects of different variables which enter into the quality of the finished product and, under favorable circumstances, a single measurement can be adjusted to read the desired combination of several factors influencing a complex property such as strength, hardness or brittleness.

Dr. C. W. Burrows, New York, congratulated Mr. de Forest and his collaborators for their contribution to the subject of magnetic analysis. In his opinion, the author had emphasized one vital point: That magnetic analysis to be useful must recognize more than one variable because various metals have many magnetic characteristics. Doctor Burrows was emphatic in the opinion that magnetic analysis is comparable in its magnitude with chemistry and that when we appreciate the various magnetic characteristics, we may then expect to reach the best that is attainable. "Magnetic analysis applied to steel undoubtedly has a future similar to that of the microscope."

F. P. Fahy, consulting engineer, New York, stated that he had followed from its inception the work of Mr. de Forest. The value of magnetic analysis, he described, lies in its ability not only to interpret the final condition of a piece of steel but the steps taken to reach that condition. At present operators in this field are limited to the number of factors which they can identify, but more is expected to be possible later. Mr. Fahy stated that the idea is too general that magnetic analysis is a special subject, and that therefore it is difficult to stimulate interest in it. He believed that there are many organizations which have men capable to go on with such work and he requested the members to examine the apparatus as far as possible and to apply it in their own organizations so as to stimulate interest in this important subject. "If magnetic analysis lags, it is because not enough investigators are working upon it."

In response to a question as to whether the non-uniformity of structure of certain steels, particularly of larger section, presented any difficulty, Mr. de Forest said that it was possible, by using various frequencies of current, to analyze the various layers of a cross section and thus lump the entire field.

Magnetic Properties and Analysis

Following this paper the report of committee A-6 on magnetic properties was presented by Doctor Burrows, its chairman. Because of the development of a number of new methods for magnetic testing in recent years, the committee reported it to be desirable to revise the standard methods so as to permit the use of any method which yields results of satisfactory accuracy. The committee submitted for publication as tentative new specifications (A 34—23 T) as a revision of the standard methods of tests for magnetic properties of iron and steel, adopted in 1918, so as to permit the use of any method which yields results which are within the specified limits of accuracy.

There was also presented at this time the report of committee A-8 on magnetic analysis, which stated that the chief activities since the last annual report have centered upon the work of its sub-committee on the testing of twist drills, organized in 1920 with the aim of correlating the magnetic and cutting properties of a definite tool of high-speed steel of typical analysis.

An abstract of the report of the committee was read as printed and the statement made that the committee as a whole considers the work thus far carried out as only a survey to determine what appears to be the best method of approach to the solution of a problem of very considerable importance. So far as the committee has gone, no single magnetic characteristic may be taken as indicative of the quality of the drill as a whole. It was felt possible, however, that a magnetic test

procedure may be evolved which will take into account more than one physical property of the material and give at least a partial solution to the problem. The report was presented by the chairman, F. P. Fahy.

Endurance Properties of Steels

In an exhaustive paper of 46 pages, copiously illustrated with tables and diagrams, the subject, "Endurance Properties of Steel: Their Relation to Other Physical Properties and to Chemical Composition," was discussed by D. J. McAdams, Jr., metallurgist United States Naval Engineering Experiment Station, Annapolis, Md.

The scope of this paper is exceedingly large and further describes an investigation, part of which was published in 1921. In the continuation of this work a great variety of carbon and alloy steels of various compositions, heat-treated in various ways, have been used. Static tension and torsion and impact tests were made on each kind of material. The tests of specimens of the rotating cantilever type, as previously described, have been continued. Alternating torsion tests and impact endurance tests have also been made. The entire work represents several years' investigation. As a result of repeated impact tests, the relationship of repeated impact to single impact and to endurance properties is indicated by graphs which are discussed.

Referring to the results of the tests, the author gives consideration to the following subjects: Relationship of endurance properties to static tension and torsion properties; relationship of endurance properties to impact properties; influence of chemical composition and heat-treatment; influence of non-metallic inclusions; influence of form and surface finish of a machinery part and types of steel best adapted for various kinds of service.

The fact was noted that Doctor Adams' results check those made at the University of Illinois by Prof. H. F. Moore, long identified with such work. He stated that the paper brings out other results which were not known. He characterized the endurance range investigation as valuable and called attention to the fact that, in the relationship between tensile strength and endurance limit, unusually delicate values have been obtained. As to the reversed torsion tests, these checked his own work. In the realm of non-ferrous metals, Professor Moore said that the investigator must adopt an entirely different attitude and that, for instance, in monel metal the endurance ratios are different. In a test on this metal he stated that the endurance limit was not reached until Feb. 12, 1921, in a test which was started Nov. 18, 1919, and in which the repeated reversals of stress exceeded 1,000,000,000.

Fatigue of Duralumin, Elektron and Other Alloys

Another interesting paper in this same line of investigation was presented in abstract by its author, R. R. Moore, chief physical testing branch, engineering division, U. S. Air Service, McCook Field, Dayton, Ohio, whose subject was "Resistance of Manganese Bronze, Duralumin and Elektron Metal to Alternating Stresses." The paper gives the results of investigations made at McCook field. The principal part of the work concerns duralumin bar stock as rolled, annealed and tempered, and similar investigations on manganese bronze and elektron metal are included. The tests were on rotating beam machines of the same type as those used at the University of Illinois, and with the same type of specimen. In addition to having established an endurance limit for duralumin the following other important points are covered:

1. Evidence that the endurance limit of non-ferrous metals cannot be determined by applying 10,000,000 repetitions of stress as is the case with most steels. This is borne out by tests in which failures have been obtained at 30, 50, 80 and even 100 million repetitions of stress.

2. Results of long time tests, that is, 200 to 400 million repetitions of stress.

3. Polishing of specimens at the critical section.

4. Difficulties encountered in adapting this type of machine and specimen (which were primarily designed for steel) to light aluminum alloys.

The endurance limits of the metals tested by the author are as follows:

	Lb. per Sq. In.
Manganese bronze	15,000
Elektron metal	17,000
Duralumin "as received"	14,000
Duralumin "as received" tempered at 925 deg. Fahr.	12,000
Duralumin "as received" annealed at 700 deg. Fahr.	10,860

"The endurance limits of the non-ferrous metals tested, insofar as they were investigated here, do not bear any definite relation to other physical properties."

In discussing Mr. Moore's paper, R. L. Templin, Aluminum Co. of America, New Kensington, Pa., stated that the chemical analysis of the materials, given by the author, were not the same as called for by Government specifications, and that the static results obtained could not result from material of the analysis indicated. As to fatigue limits, Mr. Templin said it was difficult to determine these in the case of non-ferrous metals, and that they had in their laboratory three specimens which had been under test for a long time. On June 18 one had undergone 545,500,000 repetitions of stress at 4000 lb. per sq. in., another was still going at 702,168,000 repetitions of stress at 6000 lb. per sq. in., and another at 555,244,000 repetitions of stress at 8000 lb. per sq. in. As to elektron metal, Mr. Templin said that its elastic limit is appreciably, and sometimes considerably, above the proportional limit, and that this fact may have some bearing on its fatigue properties.

Two committee reports were presented at this session, one that of committee A-5 on corrosion of iron and steel, and the other, that of committee B-3, on corrosion of non-ferrous metals and alloys. The latter presented by its chairman, E. C. Lathrop, was largely a progress report.

The report of committee A-5 consisted mostly of reports of various sub-committees on the inspection of exposed samples of various kinds of sheet steel at Fort Sheridan, Ill., Pittsburgh and Annapolis. Work at the Pittsburgh location was reported as completed on March 3, 1923, and attention was called to the beneficial effect of copper in all the various types of metal exposed. That a few of the light gage samples have failed at some of the locations as against no failures for the heavy gage was called to attention. It is also noted that the copper added to the steels does not appear to be a factor in rust resistance when the metals are totally and continuously submerged in running water.

Session on Cast Iron, Coke and Heat Treatment

The session Tuesday afternoon devoted to wrought and cast iron, coal and coke, and heat treatment, with Past-President G. H. Clamer in the chair, was enlivened by a topical discussion on the subject, "Is It Desirable to Include Chemical Requirements in Specifications for Cast Iron?" A fairly spirited discussion followed the presentation of the affirmative and negative side of this question, the affirmative by Robert Job, vice-president Milton Hersey Co., Ltd., Montreal, Canada, and the negative by Dr. Richard Moldenke.

Chemical Specifications for Iron Castings

Mr. Job contended that, in general, chemical specifications are necessary in conjunction with physical requirements, because our present knowledge as to physical tests is often insufficient to definitely determine their meaning in terms of actual serviceability of the castings under practical working conditions. He contended that supplementary chemical tests have by practical experience been proved necessary to secure efficient service from the castings, owing to the lack of knowledge referred to. He cited, in particular, cast iron car wheels, the service value of which cannot be correctly regulated by physical tests. Wheels may pass all the usual physical tests and still be far from satisfactory as to quality. For example, it has been observed that when the percentage of combined carbon exceeds a certain proportion, undue brittleness is present and the wheel is liable to fail.

Steam cylinders for locomotives were cited as an-

other illustration of the necessity for chemical specifications. Mr. Job contended that this iron is totally different from chilled wheel metal. In the valuation of this iron, physical tests are extremely useful, but few consumers, said Mr. Job, would have the hardihood to pin their faith merely to physical tests and, as a result of practical experience, chemical composition is being held within certain limits. Iron castings used for evaporation pans and also metal for grate bars were cited by Mr. Job as being cases where chemical specifications are necessary to supplement the physical.

A Plea for the Negative

In presenting the negative side of this discussion, Doctor Moldenke contended that the tendency of specifying the chemical analysis for iron castings, in addition to prescribing physical tests, is strongly deprecated, except for fixing maxima for specifically injurious elements. He contended that where chemical analysis in specifications has been tried, the limits of the individual elements have had to be made so wide in order not to exclude suitable castings, no useful purpose could be served.

Doctor Moldenke referred to the society of automotive engineers, which went into this subject thoroughly and found that to include all the compositions of castings coming under each separate line of work, for which special specifications were to be prepared, would mean that the limits for the several elements in cast iron would have to be made so wide that nothing of use would be attained, and the project was abandoned. Another reason was pointed to as consisting in the fact that the history of the development in foundry practice has shown that present-day compositions of castings are considerably different from those which were considered necessary some years back, and silicon was cited as a good example of this. There is no reason, however, said Doctor Moldenke, why a certain line of compositions which a foundryman finds gives him good results should not be given in the specifications issued under the head of "recommended practice," but not as an essential requirement. Where maxima for certain elements may be specified, it is known definitely that when a given maximum percentage of an element is exceeded, failure may result, and that it is wise to apply this limit. The case of sulphur in cast iron water pipe was given as an example.

The speaker's conclusion was that it is unwise to add to the troubles of the foundryman by imposing upon him chemical requirements in addition to physical ones. Either one or the other should be imposed, but not both. If the consumer wants a given composition, the foundryman can furnish it, but then the consumer is responsible for the physical characteristics but, if the consumer wants the castings for his service requirements, the foundryman should be unhindered in working out the problem so long as the service requirement tests are met.

That physical requirements do not always give the consumer what he wants and that test bars cast separate do not represent the metal in the castings, was the contention of H. E. Diller, of *Foundry*, Cleveland. W. P. Putnam, president Detroit Testing Laboratories, Detroit, in a written discussion stated that chemical composition is desirable for some castings, but for others it is unjust to the foundrymen, who should be permitted to produce castings to meet physical requirements.

In a written discussion George K. Elliott, chief metallurgist Lunkenheimer Co., Cincinnati, showed that there was a great deal of virtue in what both Doctor Moldenke and Mr. Job had contributed, and he made a plea not to saddle the foundrymen with additional burdens. Broadly speaking, he thought they should be untrammeled, although there are exceptions. He pointed to the fact that new conditions are constantly arising, brought about by such agencies as the electric furnace and the air furnace, and a plea was made for dynamic tests. In a broad sense he advocated that limits for carbon and silicon be not imposed, but that mechanical and physical specifications be required.

A forceful argument for chemical specifications for chilled iron wheels was delivered by H. J. Force, Delaware, Lackawanna & Western Railroad Co., Scranton, Pa., taking as a text the fact that experience has shown that an average of 900 cast iron wheels have broken each year, entailing through accidents a loss to railroads and traveling public of over $100,000,000. He held that the use of chemical specifications would eliminate a large percentage of this unfortunate showing. He stated that the American Railway Association had asked recently for comprehensive chemical specifications for cast iron wheels and that the Chilled Iron Wheel Association had also recommended such specifications. In the case of 45,000 wheels which had been made to chemical specifications in his own experience, failures had been practically nothing. In wheels which had failed it had been found that the combined carbon ran as high as 1.25 to 1.45 per cent in face of the fact that it is generally recognized that this should not exceed 0.75 per cent. He advocated the latter as a chemical specification for combined carbon, together with low manganese and not too high a phosphorus content, including also a high total carbon.

Dr. Moldenke agreed that certain chemical specifications were all right for wheels, but not for general castings.

Coal and Coke

The report of the new committee, known as committee D-5 on coal and coke, a combination of the two committees formerly dealing with coal and coke, and reporting separately, presented at this session, stated that experimental work has been conducted on a method for determining the fineness of pulverized coal and that a method for the determining of the percentage by volume of cell-space of lump coke has been standardized. Combustibility tests have been conducted on different cokes in an experimental furnace and an analysis of about 100 boiler tests on semi-bituminous coals in regard to clinker trouble as related to laboratory tests of ash fusibility have been made. Specifications for gas and coking coals have been prepared and progress has been made in the standardization of anthracite sizes.

"The Properties of Metallurgical Coke" was the title of a paper by G. St. J. Perrott and A. C. Fieldner, associate physical chemist, Southern Experiment Station, U. S. Bureau of Mines, Tuscaloosa, Ala., and supervising fuels chemist, U. S. Bureau of Mines, Pittsburgh, respectively. The paper reviews briefly a study of the physical properties of coke in relation to its production and utilization, being conducted by the Southern Experiment Station, and discusses the history of coke testing, describing the work of the bureau in connection with the shatter test, the tumbler barrel test, combustibility and the rate of oxidation of cokes by carbon dioxide. An interesting phase of the paper is the report of an investigation of the hearth combustion zone at 11 blast furnaces operating on cokes, varying widely in physical characteristics. There is also discussed the relation between results of testing methods and the performance of coke in the blast furnaces.*

Tool Temperatures and Cutting Resistance

"The Significance of Tool Temperatures as a Function of the Cutting Resistance of Metals" was discussed by H. A. Schwartz, manager of research, National Malleable Castings Co., and W. W. Flagle, engineer of tests, research department of the same company. An instrument for recording the changes of temperature of the drill or other cutting tool in action is described. In this paper, it is stated by the authors that the life of a given tool is a function of its working temperature, and hence that the temperatures reached under given cutting conditions in varying materials are an indication of their machinability or cutting hardness. The paper contains data covering typical commercial ferrous-alloys and some relations are shown between the energy per cubic inch of metal removed,

*Much of the information in this paper was covered in THE IRON AGE, June 28, page 1829.

temperature and rate of removal, which suggest the utility of the pyrometer in place of a tool dynamometer. The authors suggest the further study of the behavior of tool steels at various temperatures.

The progress reports of committee A-2 on wrought iron, of committee A-3 on gas iron, and of committee A-4 on the heat treatment of iron and steel were presented by their respective chairmen.

Session on Steel and Research

The question as to the extent to which the American Society for Testing Materials should enter into the subject of research in engineering materials was one of the principal topics discussed at the steel meeting on Wednesday morning, June 27. Vice-President Guilliaem Aertsen presided. The subject was brought before the society by a statement, on behalf of the executive committee, by the president of the society, Dr. George K. Burgess.

Pointing to the fact that most of the society's work up to this time has been the formulation of specifications and methods of testing, Doctor Burgess said that the executive committee had been seriously considering the research possibilities of the organization. Referring to the re-organization of committee E-1 on methods of testing, a plan has been under consideration of a similar committee on research. Such a committee might act as a steering committee on research, looking over activities in that field. The speaker asked for an expression of sentiment from various members as to the policy to be followed.

The discussion was opened by Past President Arthur M. Talbot, chairman of the committee on research of the American Society of Civil Engineers. Voicing his approval of the statements made, Doctor Talbot said that, besides the society's valuable contributions to the knowledge of engineering materials and to specifications, he believed that further information was available from many of its members and that the suggestion for the appointment of such a committee was a valuable one. Dr. W. K. Hatt, a member of the National Research Council, expressed his approval of the plan and outlined in a general way the functions of such a committee, pointing out that there are many research organizations in the country, in universities, industrial plants and elsewhere, and that an economy of energy was to be desired.

Another member of the National Research Council, W. M. Corse, presented a brief but clear statement of the work of that organization, which he declared was ready to cooperate with any committees such as the one suggested. Mr. Corse called attention to the publication of the international critical tables in the form of a volume of 2000 pages, which he characterized as a most important project, particularly from a research point of view.

The Steel Committee's Report

The most important recommendation of the annual report of committee A-1 on steel was the presentation of sub-committee VII on steel castings which recommended a complete revision of the standard specifications for steel castings (A 27-21) in which two classes of castings are provided for, as in the present specifications: Class A with chemical analysis only, and class B having both chemical and physical properties satisfied. In the chemical requirements of the new specifications no change has been made in class B castings, but the carbon for class A has been raised from 0.30 to 0.45 per cent maximum to bring this in agreement with current practice. No change has been made in the tensile strength or yield point requirements for the three grades of class B castings but the ductility requirements for elongation and reduction of area have been raised in all three grades in order to bring these into line with the results now being obtained by modern practices.

Reference to special requirements for castings for railroad rolling stock have been eliminated, since these are now covered by specifications for carbon steel castings for railroads (A 87-22 T). The use of the term "annealing" has been dropped and "heat treatment" substituted, with the requirement that heat treatment shall be in accordance with the society's standard practice, unless otherwise specified by purchasers. These are the principal differences from the present specifications, other changes consisting merely of changes in words to clarify the meaning. There was no contest over this part of the report, which was adopted as in the case of all other committee reports.

Two new sub-committees of committee A-1 on steel had been appointed in the year: Sub-committee XX on plate tolerances, and sub-committee XXI on steel for welding.

Ladle Test Ingots

An interesting appendix to the report of committee A-1 is a complete recital of the investigation of ladle test ingots, made by sub-committee XXI. The report is full of interest and concludes with the following summary:

1. Aluminum treated ingots show approximately 19 per cent less segregation in carbon than the regular ingots.

2. The effect of aluminum treatment on the chemical homogeneity of phosphorus and sulphur is slight.

3. All types of ingots investigated are satisfactory when aluminuin treatment is used.

4. Ingots treated with aluminum, due to improved soundness, permit of greater convenience in locating drill holes, and in securing drillings of uniform size free from scale or oxide.

Sulphur and Phosphorus in Steel

The subject of phosphorus and sulphur in steel, which was a feature of annual meeting last year, came before the meeting this year in the form of a preliminary report of the joint committee, which was presented by Doctor Burgess. Nothing was preprinted, but a set of tables in the form of blue prints was available for inspection, which showed the progress of the investigation thus far, which deals with sulphur in three heats of basic open-hearth steel, typifying plate, forging and rail steels. For each heat eight ingots with added sulphur of contents 0.04 to 0.15 per cent were secured. Doctor Burgess explained some of the work as far as it has gone, the investigation paralleling quite closely that of rivet steel, presented a year ago. He also stated that the complete report on rivet steel would be ready for publication a little later and that it presented some interesting relations between the oxygen and sulphur contents. The present investigation on plate steels he reported as about 50 per cent completed. Further elaboration of the tables was given by Mr. Richardson.

J. R. Onderdonk, Baltimore, Md., stated that recently it had been necessary for his company to reject some rivet bar stock which ran 0.13 to 0.14 per cent sulphur after it had been made into rivets. It developed a little later that in order to obtain certain car bodies it was necessary to use these rivets until others could be obtained to replace them. The singular experience in the use of these was that no trouble developed in their fabrication in the regular way.

Gases in Metals

"Gases in Metals" by Louis Jordan, chemist U. S. Bureau of Standards, Washington, was the subject of an interesting paper, which discusses this subject in a broad way and brings up to date the progress which has been made. Briefly the author stated that

"it is a natural assumption that metals prepared and treated in the same manner and having identical chemical compositions should possess the same properties and qualities. Such a condition is, in some instances, apparently not true. In such cases judgment as to similarity of chemical composition is almost always based on results of analyses which are incomplete in that the kinds and amounts of the gases present in the metals are not considered.

"Many methods for the determination of gases in metals have been suggested. Three methods involving complete fusion of the metal in vacuo were judged to be the most promising for the determination of the total gas. A comparison of these methods indicates that direct fusion of metal with the addition of an alloy of antimony and tin does not yield so much oxygen as fusion of the same metal in contact with carbon.

"The relations between solubility of gases in metals and temperature are somewhat different from the usual concep-

tions of the solubility of gases in ordinary liquids, such as water. Many observations lead to the conclusion that gases are dissolved in metals chiefly, if not entirely, in the intercrystalline cement.

"Several examples of the supposed dependence of properties or quality of metals on their gas content are familiar in the metallurgy of pig iron, cast iron, steels, and non-ferrous metals. The application of analytical methods for gases in metals to studies of deoxidation processes has already given interesting results.

Methods of Testing

The second report since its reorganization two years ago of committee E-1 on methods of testing was presented at this session. Details of the reorganization were part of last year's annual report.

It will be recalled, says the report, that the committee has adopted a procedure in considering the methods of test prepared by the various standing committees, which in brief is a study of methods from the broad viewpoint of the test as a type of test that may be made upon a wide variety of materials and comprising eventually, the formulation of fundamental considerations that govern the various kinds of testing. Obviously, the development of such a broad program is a question of time, and while gratifying progress is being made along certain lines, the committee at the same time is endeavoring to pass as promptly as possible upon tentative methods of test as they are submitted by the standing committees. The committee calls attention to its statement of a year ago that it does not intend to withhold indefinitely approval of tentative methods that standing committees may desire to see advanced to the status of standard, pending a study of the fundamental principles underlying the various kinds of tests involved in specific methods. The committee does, however, reserve the privilege of reviewing methods thus advanced to standard and submitting criticisms at some future time.

The policy of studying methods from a broad viewpoint will lead to the organization of permanent sub-committees to consider tests of a certain type. Certain of these sub-committees have been organized. It is gratifying to observe that careful preparation of methods of test by the standing committees has been very much in evidence during the past year. Several committees have carefully reviewed methods submitted a year ago and a number of new methods representing considerable study and effort are being brought forward this year.

New Testing Apparatus and Methods

In the realm of new testing apparatus, two papers were presented. L. B. Tuckerman, engineer physicist U. S. Bureau of Standards, presented a paper entitled, "Optical Strain Gages and Extensometers," and exhibited some of the apparatus described. The author discussed the interferometer strain gages and their possible importance in standardization. He described the characteristic types of optical lever systems available with advantages and disadvantages of each and a new optical system and a new instrument.

"New Developments in Electric Telemeters" was a paper presented by O. S. Peters and R. S. Johnston, electrical engineer and engineer physicist, respectively, U. S. Bureau of Standards. The authors described a carbon resistor suitable for many engineering measurements including the measurement of strains, such as are encountered in steel structures under either steady or live rods. They also described some remote-reading and remote-recording features and gave data on field and laboratory tests. Some of the advantages to be obtained from the use of the instruments described are: The remote-reading feature which enables records to be taken in places which are inaccessible during tests; simultaneous readings or records on a single strip of paper of phenomena occurring at a number of widely separated points; true reproductions of vibratory strains and pressures obtainable up to several hundred cycles per second, and great savings of time where large numbers of strain or pressure measurements are to be taken in field or laboratory tests.

The annual report of the executive committee was abstracted in THE IRON AGE, June 28.

Non-Ferrous Metals and Alloys

The usual session on non-ferrous metals and alloys was held on Monday evening, June 25, as the first session of the convention, with President Burgess the chairman. The subject which awakened the most interest was the report of committee B-2 on non-ferrous metals and alloys, presented by its chairman, Prof. William Campbell, Columbia University. He announced that during the last year no new specifications have been prepared, but a number of tentative standards were recommended for advancement to standard, namely, those on pig lead (B 29—22 T); copper wire, standard sizes, (B 42—22 T); brass pipe, standard sizes, (B 43—22 T); chemical analysis of brass ingots, (B 45—22T); analysis of bronze bearing metals, (B 46—22 T), and chemical analysis of nickel, (B 42—21 T). Two new sub-committees were formed during the year, one on lead pipe and one on metallic fluxes and deoxidizers.

Test Bars for Non-Ferrous Metals

The report of progress on the study of preparations and methods of casting test specimens for castings received considerable attention from those present. The sub-committee, which has been at work on this subject for the last year, recommended a special form of test bar for comparative test requirements. A diagram of this bar is given in the original report. Of the eleven manufacturers of cast material which have agreed to make a series of comparative tests, some have already reported part of their results, but since these tests were made by the use of a test bar, slightly different from that now recommended by the committee, these tests are not reported.



GUILLIAEM AERTSEN, the new president of the society, was for many years connected with the Midvale Steel Co., Philadelphia. He has been during the past year or two sales representative of the Midvale Steel & Ordnance Co. in its Chicago office and now represents the Bethlehem Steel Corporation in that city

In connection with the report of the foregoing committee, a paper was presented entitled "Methods of Casting Test Specimens of Gun Metals" by E. H. Dix, Jr., chief metallurgical branch, engineering division, air service, McCook Field, Dayton, Ohio. The paper includes results of a series of experiments performed to obtain a satisfactory method for casting test specimens of the alloy referred to. From the results the author recommends a simple method of casting test specimens which are claimed easy to cast, which require a small amount of metal and are easy to cut from the gates, which require no machining and which will give uniform and dependable results. Usually good results were stated by the author to have been obtained on aluminum alloys, as well as upon gun metal.

Exception was taken by several present to the test bar recommended by the committee, and the opinion was quite generally expressed that no form of test bar really represents the metal in a casting. G. H. Clamer, Ajax Metal Co., Philadelphia, and past president of the society, stated that the question of a test bar representing the metal in the casting was an old one which had been agitated for some years and on which very little progress had been made so far as conclusive information is concerned.

Compression Testing of Babbitt Metals

A paper entitled "The Influence of the Ratio of Length to Diameter in the Compression Testing of Babbit Metals" by John R. Freeman, Jr., and Paul F. Brandt, physicist and laboratory assistant respec-

tively, Bureau of Standards, Washington, describes an investigation in which three series of compression tests were made on two representative white metal bearing alloys, a typical tin base and a typical lead base alloy, in which the length of the specimen was varied. The results of the test show that, within the experimental error of the test methods, the unit deformation of a Babbitt metal in compression is independent of the ratio of length to diameter for specimens 1 in. in diameter and between 1 and 3 in. in length.

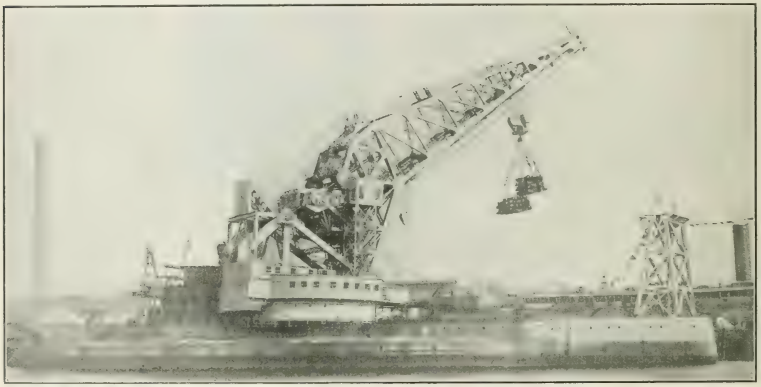
Reports of regular committees included the one by committee D-14 on screen wire cloth, presenting tentative specifications for non-ferrous screen wire cloth; the report of committee E-4 on metallography which submitted revisions of tentative definitions of terms and presented a recommended practice for photography as applied to metallography. The report of committee B-1 on copper wire submitted a revision of standard specifications of hard-drawn copper wire and new tentative specifications for hard-drawn copper trolley wire, for soft rectangular copper wire and for hot-rolled copper rods for wire drawing.

At this session the announcement of the election of new offices was made as follows: Guilliaem Aertsen, Bethlehem Steel Co., Chicago, president; W. H. Fulweiler, chemical engineer, United Gas Improvement Co., Philadelphia, vice-president.

Largest Sea Going Crane

The United States Navy crane ship No. 1 shown in the accompanying illustration is noteworthy as one of the largest floating cranes, and as the only large seagoing crane ever constructed. As in the case of other structures of unusual size the difficulties of design and construction encountered were numerous.

A description of this crane, which was built by the Wellman-Seaver-Morgan Co., Cleveland, was given in THE IRON AGE of Feb. 17, 1921, shortly after the contract was placed. It is a 250-ton revolving unit mounted on the old battleship Kearsarge, and is of the luffing jib type. The jib may be lowered into the cradle provided at the stern of the vessel, and when in this position the ship may be navigated from port to port to serve different navy yards. The ship as refitted will be capable of handling and transporting two three-gun turrets complete with their guns.



United States Crane Ship No. 1, Notable as One of the Largest Floating Cranes and the Only Sea Going Crane Ever Constructed. It has a 250-ton revolving unit of the luffing jib type. The jib is lowered into the cradle at the stern when the ship is navigated

In converting the Kearsarge the hull was changed very little. A foundation was built for the crane and it was necessary to increase the water line breadth by the construction of large bulges on the outside of the hull to prevent excessive lists when handling heavy loads. The rebuilt ship has a length of 368 ft. and 92 ft. beam.

The capacities and arrangement of the main and auxiliary hoists are as outlined in the previous description. The crane is operated by eight General Electric Co. motors, each having a rated capacity of 110-hp., two for the main hoists, one for the auxiliary trolley, one for the auxiliary hoist, and two each for luffing and rotating. The speed of the main hoist is 6 ft. per min., loaded, and 16 ft. per min. empty. It requires 25 min. to luff from high to low position and 9 min. for rotating one revolution.

The crane runway consists of four rings of 150-lb. rails spaced in pairs over the webs of the foundation girders. It revolves on 46 double-tread cast steel wheels approximately 30 in. in diameter arranged in pairs, each pair being carried in a cast steel equalizing frame. The main crane structure is built upon two main box girders 10 ft. deep, 75 ft. long and having webs spaced 30 in. apart. The counterweight compartment contains 500 tons of armor plate.

The jib is L-shaped and is hinged to the main girder at a point 15 ft. forward from the center of rotation. The hinge pins forming this support are of hollow forged steel 30 in. in diameter and 3 ft. 9 in. long. The jib is made up of two trusses 26 ft. apart at the hinge point and gradually converging to 10 ft. at the point where the main hoist sheaves are fixed. The overhanging leg of the L is about 136 ft. long and supports the auxiliary trolley runway through its entire length. From its lowest position when resting in the cradle to its highest working position the jib turns about its hinge pins through an angle of nearly 60 deg. This movement is accomplished by luffing screws of chrome nickel steel 15 in. in diameter and 28 ft. long and operating through upper and rear nuts. The luffing nuts are of manganese bronze 5 ft. long by 26 in. in diameter and weigh about 5000 lb. each.

The drums of the main hoist are 86 in. in diameter and 8 ft. 4 in. long arranged in tandem, each drum having a driving gear meshing with a common pinion carried on a shaft between the drums. The ropes are 2 in. in diameter of extra flexible monitor plow steel. The main hoist drive consists of one spur gear and one herringbone gear reduction to the hoisting motor. All the operations are controlled by one operator by means of levers located in the elevated cab at one side of the jib.

Meeting of British Foundry Institute

Core Sands and Binders, and Both American and British Steel Foundry Practices Discussed at Manchaster, England

MANCHESTER, ENGLAND, June 15.—The twentieth annual conference of the Institute of British Foundrymen was held in Manchester on June 13, 14 and 15. Oliver Stubbs, who filled the presidential chair for the notably successful year of 1921-1922, was elected president for the ensuing year.

The Lord Mayor of Manchester presented the Oliver Stubbs medal, awarded for high service to the institution, to H. Sherburn of Warrington. R. O. Patterson was elected senior vice-president and next year's conference will be held in Newcastle-on-Tyne. Mr. Stubbs' presidential address was a review of the year's work and he also emphasized the importance of research work and touched on the research organizations of America and Germany.

Oil for Sand Cores and Binders

At the technical session on June 13 a paper was read by Professor Campion and J. McEachen, Kirkentilloch, on "Oil Sand Cores and Binders." It caused an interesting and profitable discussion. The paper gave particulars of experiments with 12 different binders, but as neither the makers' names were mentioned nor the base of the binders, the information given was regarded as almost valueless. Professor Campion explained that the tests had been undertaken because the makers of corebinders could not give exact information.

The authors, both in the paper and in their introductory remarks, stated that river sand was better than sea sand for coremaking, but several speakers contended that sea sand was cleaner, sharper and stronger, and that gas was better than coke for drying. There was much discussion as to the best drying temperature. It was stated that the best way to use any oil binder was first to emulsify the oil with water by stirring until it had the appearance of balm and then mix with the sand. This gave a more uniform sand.

The best contribution to the discussion was by H. M. Lane, an American foundry engineer of international reputation, who gave the results of 15 years' research which cost over £6,000. Mr. Lane said the subject was one of colloid chemistry. It was most important, he said, that core sand should not have both clay and oil, because together they fight. With regard to alleged difficulty in getting uniform results from the same mixture, Mr. Lane said that he had 50 cores made every day from the same mixture for 100 continuous days and on testing these cores he found them in every way uniform. Uniformity was quite possible if the baking temperature were properly controlled. Quick drying of cores was most satisfactory and coarse sand required the minimum quantity of oil. Sand grains should be nearly round to get the maximum strength. In Mr. Lane's opinion, dry sand was not so important if the moisture content were constant, and he thought wind driven sand was in every way most satisfactory for oil sand cores.

Another speaker, following Mr. Lane, said that it would be a great help to small foundrymen if basic principles could be explained and one or two standard tests laid down. Every foundryman should carry out research work with sand deposits near his foundry, because it was better to use local material than to spend money bringing sand from a distance.

Making Steel Castings in United States

At the session on June 14 the first papers to be presented were on the manufacture of steel castings in England and America. In his paper, "The Manufacture of Steel Castings in the United States," Major R. A. Bull, research director of the U. S. Electric Steel Founders Research Group, which, in Major Bull's absence, was presented by H. Cole Estep, reviewed modern American practice, and made it very clear that the electric furnace is making steady headway in America and that crucible steel is almost a thing of the past.

In 1921 there were only 824 net tons of crucible steel castings made in America, whereas ten years previously more than 23,000 tons were produced. The open-hearth furnace is still the most important furnace for steel melting. These open-hearth furnaces are necessarily subdivided according to the basic or acid nature of the furnace bottom. The tonnage of steel castings being made today in the United States from basic open-hearth furnaces is not appreciably different from those produced from acid open-hearth furnaces. Despite the progress being made by the electric furnace the open-hearth furnace is admirably adapted for the major portion of the tonnage of steel casting made in America.

The development of the electric steel furnace industry in the United States has been of extraordinary interest. The present total capacity of the foundries making electric steel castings is probably 250,000 net tons per year or roughly 13 per cent of the total steel foundry capacity. The first electric furnaces to make steel for castings in America were installed in 1908, when 55 tons of such castings were produced. In 1920 the output had grown to 173,819 net tons.

There are probably 300 steel foundries being operated in America and the combined capacity of these is estimated at nearly 2,000,000 tons per year. The widest variety of uses is represented by the consumption just now of probably 75 per cent of the industry's total capacity of about 5000 tons each working day.

Appeal for British Steel Castings Investigation

In the paper on steel castings manufacture in England, F. A. Melmoth made an appeal for a prolonged scientifically controlled investigation into the behavior of mild steel in sand molds and the influence of the various elements on such behavior. Very few steel foundries are in such a position as to be able to afford a full scientific control and the necessary exhaustive investigations. The only hope, therefore, is in some form of communal research organization or in one such as the British Cast Iron Research Association, which, it is safe to say, is now dealing in an organized scientific manner with the solution of problems which have existed during the whole history of cast iron and have often been dealt with previously by rule of thumb or haphazard assumption. No such organization exists where steel castings are concerned, and the formation of such an organization or the future extension of the scope of the organization mentioned to include steel castings, would prove a great boon to the small steel foundries.

Several speakers urged the importance of heat treatment to get good physical results, and altogether better tensile and binding strengths. The matter of fluidity of the molten metal was also discussed and there was much difference of opinion. Dr. Percy Longmuir expressed the opinion that engineers should always specify the work the castings had to do. It was prejudice that was against the basic process, although the electric process was in most cases basic. The casting temperature, said Dr. Longmuir, should depend upon the size of the castings. Aluminum had a tendency to oxidize and to reduce the mechanical and physical properties of steel, but silicon and manganese must be added to the steel in excess for good mechanical properties. The converter gives a high degree of fluidity. Doctor Longmuir, who is research director

of the British Cast Iron Research Association, made the interesting announcement with regard for the need of a fluidity test, that investigations are in hand.

Carbon and Sulphur in Foundry Irons and Castings

A paper entitled "Notes on Carbon in Foundry Irons and Castings" was presented by M. Siegle, professor of metallurgy, Nancy, France. The author had drawn largely from Professor Turner's "Metallurgy of Irons" and several other authorities, German as well as English. The author's remarks on remelting were of interest. A mixture of iron when melted in the cupola seems to leave the average carbon content unchanged. On the other hand, when the iron is remelted in a reverberatory furnace there is always a certain loss of carbon by oxidation due to the oxidizing atmosphere. The importance of this loss depends on several factors. It will be increased if melting is slow or if the area of the bath is large in proportion to the depth. The extreme case of the reverberatory furnace is furnished by the puddling furnace in which the metal is stirred and exposed to the oxidizing atmosphere until the whole of the carbon is burned out, leaving almost carbon free iron.

R. Buchanan, Professor Reid and Doctor Longmuir took part in the discussion on this paper in turn. Doctor Longmuir said the carbon content should be as low as possible. The influence of sulphur is overrated and not so harmful as it is usually considered to be. While chemical analysis is good, it will not solve some problems. Mr. Buchanan said the structure of cast iron was as important as its chemical constitution. The blast furnace has enormous influences outside of chemical analysis, but what these influences are we do not yet know. He agreed that the influence of sulphur is much exaggerated and it gave the necessary combined carbon if a good test were required.

This discussion completed the technical work of the conference, which included visits to the chain making works of Hans Renold, Ltd., Burnage, the Derbyshire Silica Fire Brick Co., Ltd., and a trip on the ship canal from Manchester to Liverpool, a vessel and special facilities being provided by the Manchester Ship Canal Co.

CONSUMPTION OF COAL

Decrease in May—Stocks June 1 Equal to Supply for Forty Days

The chart of the National Association of Purchasing Agents covering the most recent data on coal shows that during May the industrial consumption of hard and soft coal in the United States and Canada was approximately 2,127,000 tons less than during the month of April. As these figures are based entirely on industrial consumption of coal, they reflect a decrease in business of 5 per cent during the month of May.

For April the association recorded a decrease in business for that month of 10 per cent, and during the first quarter of the present year it recorded an increase in business of 9.63 per cent.

The stocks of hard and soft coal in commercial consumers' bins on June 1 were 4,647,800 tons greater than on May 1.

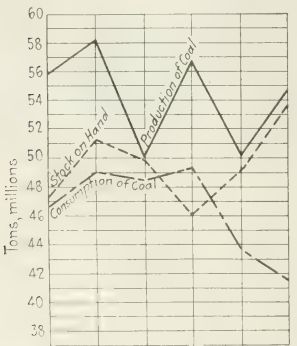


Chart of Coal Production, Consumption and Stocks in First Five Months of 1923

Expressed in number of days, the supply on June 1 was sufficient to meet the industrial requirements of the United States and Canada for 40 days. On May 1 the stocks were sufficient for 30 days, and on April 1, sufficient for 29 days.

The estimated total production of hard and soft coal in the United States during May was 4,526,000 tons greater than during April.

The lines on the chart showing the consumption and stocks of coal are drawn from data supplied from all parts of the United States and Canada by commercial consumers of coal, and represent all branches of business and industry. The line showing the production of coal is drawn from figures tabulated and given out by the U. S. Geological Survey.

The figures indicated by the lines on the chart include both bituminous and anthracite coal, and cover the total stocks in the hands of commercial consumers, the total tonnage consumed and the total production by months. (Coal consumed by the householder and his stocks are not included).

Stocks on Hand	Net Tons
April 1, 1923	46,167,000
May 1, 1923	49,022,000
June 1, 1923	53,669,800
Consumption	
Month of March	49,327,000
Month of April	43,659,000
Month of May	41,532,000
Production	
Month of March	56,674,000
Month of April	50,209,000
Month of May	54,735,000

(Of the May production 46,076,000 tons was soft coal and 8,659,000 tons was hard coal.)

Estimated Production of Coal for Two Weeks Ending June 2 and 9

	Bituminous	Anthracite
June 2	10,091,000 net tons	1,606,000 net tons
June 9	10,708,000 net tons	2,046,000 net tons

The figures shown for stocks and consumption are estimates based on reports supplied monthly by the consumers.

Comment of Chairman Kuehn

Mark Kuehn, chairman of the National fuel committee of the association, commenting on present conditions, says:

"Although the consumers increased their stocks approximately 4,647,800 tons during the month of May, the additional purchases for stock were judiciously made, and in a manner so as not to disturb the market. This extra tonnage was put in stock for next winter and at the same time almost 4,000,000 tons were laid on the upper lakes docks without stiffening the market; in fact, the soft coal market showed further weakness, and somewhat lower prices were recorded.

"The bituminous market continues to show downward tendencies, and it is possible that still lower price levels will prevail during July. This will offer further opportunity to place additional coal in storage at favorable prices, to the extent that additional coal is stored during the next two months it will relieve the maximum demand upon the railroads expected during the months of September, October and November."

Production on a New High Level

Greater Activity in March, April and May Than at Any Time in the Past—Approximately 10 Per Cent Above the Peak of 1920—Slight Easing Off Expected

BY SIDNEY G. KOON

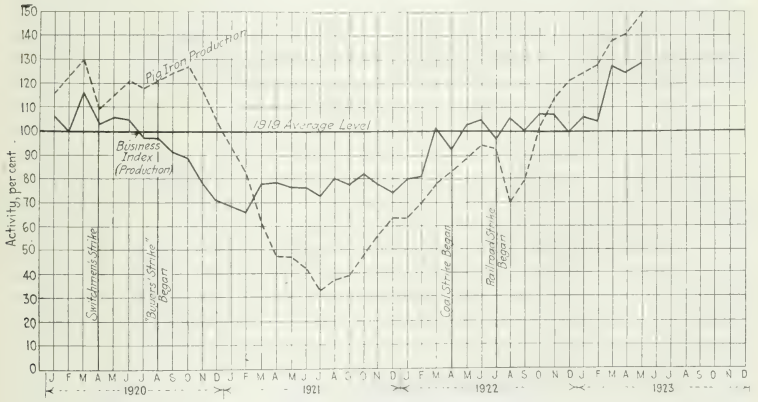
UNPRECEDENTED production of automobiles, buildings, and iron and steel during the past few months has shoved the curve of industrial productivity for the United States far above any level previously reached. A portion of this is essentially a seasonal matter, particularly in building construction and output of automobiles. Inasmuch, however, as all of the ten groups of items covered in the study show increases, and most of them heavy increases, in the March to May period, as compared with preceding periods, the effect of seasonal variation was not solely determinant.

Caution is still being preached and there are not those wanting who predict an early end of the wave of prosperity now flooding the country. This view, however, is by no means universal and recognized authorities look for a continuation of the present high level of activity all through the remainder of the year. The efforts of Secretary Hoover and others to stabilize certain forms of activity in such a way that their peaks will not be superimposed upon the general peak of the curve of business activity ought, if made effective, to extend considerably the era of prosperity before the next business crisis comes upon us. By the same token this effort, looking toward filling in the valleys of the business curve by means of activity artificially deferred from the more feverish period, should maintain a more even distribution of production, a more even employment of labor and of capital and a considerably lessened duration and severity of depression.

As explained in previous reviews on this subject, which have been published at three-month intervals during the past year, the curve is made up on a basis of quantity of production, without any reference to the question of prices. Only in so far as the price level affects the quantity (by curtailing production on the plea that prices are too high) does it get into the equation at all. The 21 separate items covered in the ten groups are as follows:

1—Pig iron.
2—Building construction.
3—Textiles: cotton and wool.
4—Fuel: anthracite and bituminous coal and petroleum.
5—Vehicles: automobiles and trucks.
6—Leather: belting and sole leather.
7—Lumber: yellow pine, Douglas fir and Northern hardwood.
8—Steel ingots.
9—Non-ferrous metals: copper, lead and zinc.
10—Newsprint paper.

All figures are expressed in their relation to the average monthly output of the calendar year 1919. Each unit which enters the makeup of the curve represents an element of production, although in some instances, as in textiles, it is a question of consumption of the mills. The separate items under each group are averaged and then the direct average taken of the ten group figures.



Productive Activity in the United States Set a New High Record in the Three Spring Months of This Year. As always, the curve of activity in basic commodities such as pig iron shows fluctuations much greater than with manufactured products in general

Compared with the level of 100 for the average month of 1919 and with the high point of 115.7 for March, 1920, the figures for March, April and May of this year, subject to slight revision as fuller details become available, are 127, 124 and 129. The slight recession in April is accounted for by the shorter month, particularly as that shortened month had five Sundays. These figures may be compared again with the levels, running between 100 and 108, through the greater part of the preceding twelve months, and broken only by the temporary setbacks due to the coal and railroad strikes and to the December holidays. The present change has been abrupt, as the curve clearly shows.

How long activity can continue on the new high level is decidedly problematic. In some lines, particularly iron and steel and automobiles, present output is closely up to the capacity of the plants. In fact, the

great rate of forcing of the past year makes it necessary in the near future to curtail operations long enough, in many cases, to get long deferred repairs made. In other cases, such as building construction, we seem to be practically up against the limit of labor supply. Shortage of men, skilled in various branches of constructive activity, is reflected in unprecedented wages and bonuses made imperative by demands which can be enforced only because skilled men to take the places of strikers are lacking. Considerations such as these lead to the belief that activity during the next few months will be less than in the three spring months, not because of slackening demand so much as because of physical inability to continue the pace.

Alongside the curve of productive activity (or business index) has been placed a companion curve of pig iron production. Pig iron does not directly enter the main curve, its place being taken by steel, which is closer to the final consumption point. Being essentially a basic material, the fluctuations in the pig iron curve are far more abrupt and of much greater intensity than in the principal curve. This phenomenon has been observed many times, when comparing basic materials with materials more closely associated with everyday consumption.

In spite of the tremendous activity shown by the curve, wholesale prices are lower than has been the case for some time. The average for May, as reported by the Bureau of Labor Statistics, Washington, is 56 per cent above the average of 1913. This compares with 59 per cent, prevailing through the two months preceding, and with a general level between 55 and 60 per cent for a number of months. Among the items making up the 56 per cent, both building materials and cloths and clothing stand at the top of the list, with an excess over 1913 of more than 100 per cent. Fuel and lighting and furniture and furnishings are from 87 to 90 per cent above pre-war. Metals and metal products at 52 per cent above 1913 are closest of all to the general average. Food and farm products are about 40 per cent above the pre-war level, while chemicals and drugs and a group of miscellaneous items are lowest of all.

It must be emphasized, as has been done repeatedly before, that the boom characteristics of the present situation differ materially from those of 1920. Banking conditions are easy compared with the stringency which then existed. Manufacturers and others are buying more conservatively and more closely to actual needs, instead of stocking up enormous quantities and duplicating orders wholesale in an effort to secure delivery. There has been little evidence in the present movement either of duplication of orders or of the cancellations which accompany that type of market.

Consequently, being on a much more healthy basis in every particular which exerts a major influence upon the situation, the present wave of activity may be expected to continue with only slightly diminished force for several months to come. There should be no sharp curtailment such as we had in the fall of 1920—no buyers' strike on such enormous proportions as then—and if the deferred construction of Government buildings can be well apportioned, when the inevitable depression begins to make itself manifest, we should have such a gradual easing off of the curve of activity that a crisis similar to those in the past may be largely avoided, thus reducing the depth and extent of the depression in the curve, easing up the unemployment problem inseparable from that period and resulting in immense benefit to the country as a whole.

Under-Swing Cut-Off Saw

A high-speed under-swing cut-off saw, which among other applications may be employed in pattern shops for cutting off lumber as it comes from the racks or lumber pile, has been placed on the market by the Oliver Machinery Co., Grand Rapids, Mich.

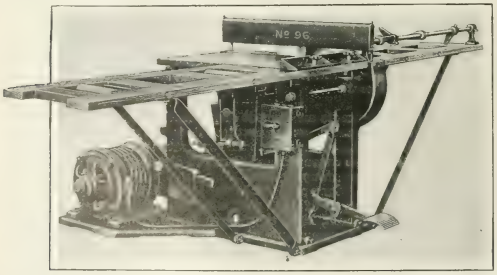
The machine, designated as the No. 96, is shown in the illustration. It represents a departure from the machines hitherto built by the company, which have been of the swing cut-off type, suspended either from the wall or ceiling.

Either belt or motor drive may be applied. Operation is by means of a treadle, pressure on which brings the saw forward. When pressure on the treadle is relieved the saw goes back, quick return being aided by a spring arrangement on the treadle. Operation by the treadle permits the operator to use both hands in handling the material to be cut and does not tire the operator as much as the hand-pull saw.

With a 16-in. saw 2-in. material up to 22 in. wide or 4-in. material up to 16 in. wide may be cut. The main part of the table is of cast iron, 22 in. wide, 36 in. long and 33 in. high from the floor. The two extensions or auxiliary tables are of hard maple fitted with two rollers and the right-hand section has a positive stop gage with three adjustable stops. The forward and back stroke of the saw arbor is adjustable for a short or long stroke, and the spring mechanism mentioned above prevents jerking and jarring on both forward and return adjustment of the saw.

A countershaft is part of the equipment of the belt-driven machine. For the motor drive the sole plate is extended and a 3 or 5 hp. 1800- or 1200-r.p.m. motor mounted on it, and belted through the idler to the saw arbor. A cast iron sawdust chute with rear outlet surrounds the lower part of the saw, and a U-shaped guard, adjustable for thickness of stock, covers the upper part of the saw. A miter gage and a ripping fence may be furnished as extras. With these gages ripping up to 18 in. wide and cross cutting up to 22 in. wide may be done.

The floor space occupied by the machine is approximately 4 x 10 ft. and the weight, crated for shipment, 1000 lb. and 1100 lb. for the belt and motor-driven machine respectively.



Under-Swing Cut-Off Saw With Self Contained Motor Drive. Pressure on the treadle brings the saw forward and quick return of the saw is aided by a spring arrangement on the treadle. Treadle operation is intended to permit the operator to use both hands in handling the material to be cut. With a 16-in. saw, 2-in. material up to 22-in. wide or 4-in. material up to 16-in. wide may be cut. The floor space occupied is approximately 4 x 10 ft.

Steel Making in United States Last Year

Production of Steel Ingots and Castings, Finished Forms of Rolled Iron and Steel, and Miscellaneous Iron and Steel Products —Compiled by the American Iron and Steel Institute

PRODUCTION OF STEEL INGOTS AND CASTINGS.

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES.

Years	Open-hearth			Bessemer	Crucible	Electric	Miscellaneous	Total Gross tons
	Basic	Acid	Total.					
1908	7,140,425	696,304	7,836,729	6,116,755	63,631	.....	6,132	14,023,247
1909	13,417,472	1,076,464	14,493,936	9,330,783	107,355	13,762	9,185	23,955,021
1910	15,292,329	1,212,180	16,504,509	9,412,772	122,303	52,141	3,194	26,094,919
1911	14,685,932	912,718	15,598,650	7,947,554	97,653	29,105	2,844	23,676,106
1912	19,641,502	1,139,221	20,780,723	10,327,901	121,517	18,309	2,853	31,251,303
1913	20,344,626	1,255,305	21,599,931	9,545,706	124,226	30,180	3,831	31,300,874
1914	16,271,129	903,555	17,174,684	6,220,846	89,899	24,009	3,622	23,513,030
1915	22,308,725	1,370,377	23,679,102	8,287,213	113,782	69,412	1,527	32,151,036
1916	29,616,658	1,798,769	31,415,427	11,059,039	129,692	168,918	604	42,773,680
1917	32,087,507	2,061,386	34,148,893	10,479,960	126,713	304,543	499	45,060,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329	44,462,432
1919	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952	34,671,232
1920	31,375,723	1,296,172	32,671,895	8,883,087	72,265	502,152	3,533	42,132,932
1921	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945	19,783,797
1922	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	.....	35,602,926

PRODUCTION OF STEEL INGOTS.

1908	6,985,420	539,532	7,524,952	6,096,196	55,360	.....	519	13,677,027
1909	13,111,467	781,429	13,892,896	9,296,969	94,672	13,456	786	23,298,779
1910	14,858,353	782,805	15,641,158	9,354,437	107,671	50,821	.....	25,154,087
1911	14,419,306	608,153	15,027,459	7,890,753	83,623	27,227	417	23,029,479
1912	19,197,504	712,371	19,909,875	10,259,151	100,967	14,147	542	30,284,682
1913	19,884,465	805,250	20,689,715	9,465,200	103,655	20,973	587	30,280,130
1914	15,936,985	633,382	16,570,367	6,154,964	78,683	15,458	312	22,819,784
1915	21,975,622	968,148	22,943,770	8,194,737	99,026	46,348	331	31,284,212
1916	29,011,146	1,227,832	30,238,978	10,916,248	120,234	126,048	302	41,401,917
1917	31,528,939	1,406,798	32,935,737	10,320,688	122,882	239,632	261	43,619,200
1918	31,970,691	1,347,870	33,318,561	9,215,392	113,782	403,068	219	43,051,022
1919	25,405,347	780,827	26,186,174	7,172,743	62,563	272,942	373	33,694,795
1920	30,926,393	759,102	31,685,495	8,778,107	70,536	346,956	298	40,881,392
1921	14,864,607	290,750	15,155,357	3,977,129	6,877	84,404	317	19,224,084
1922	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	.....	34,568,418

PRODUCTION OF STEEL CASTINGS.

1908	155,005	156,772	311,777	20,559	8,271	.....	5,613	346,220
1909	306,005	295,035	601,040	33,814	12,683	306	8,399	656,242
1910	433,976	429,375	863,351	58,335	14,632	1,320	3,194	940,832
1911	266,626	304,565	571,191	57,101	14,030	1,878	2,427	646,627
1912	443,998	426,850	870,848	68,750	20,550	4,162	2,311	966,621
1913	460,161	450,055	910,216	80,506	17,571	9,207	3,244	1,020,744
1914	334,144	270,173	604,317	65,882	11,186	8,551	3,310	693,246
1915	333,103	402,229	735,332	92,476	14,756	23,064	1,196	866,824
1916	605,512	570,937	1,176,449	142,791	9,351	42,870	302	1,371,763
1917	558,568	654,588	1,213,156	159,272	3,834	64,911	234	1,441,407
1918	505,880	634,950	1,140,830	160,844	1,330	108,296	110	1,411,410
1919	313,965	448,555	762,520	98,819	1,009	111,510	2,579	976,437
1920	449,330	537,070	986,400	104,980	1,729	155,196	3,237	1,251,542
1921	217,957	216,488	434,445	38,809	736	85,095	628	559,713
1922	425,981	404,767	830,748	47,733	1,045	154,982	.....	1,034,508

PRODUCTION OF FINISHED ROLLED IRON AND STEEL BY LEADING PRODUCTS, GROSS TONS, 1922.

Products.	Iron.	Steel	Total
Rails	.....	2,171,776	2,171,776
Plates and sheets	40,845	7,927,552	7,968,397
Nail and spike plate	154	21,815	21,969
Wire rods	665	2,654,076	2,654,741
Structural shapes	1,789	2,716,979	2,718,768
Merchant bars	317,665	3,660,993	3,978,658
Bars for reinforced concrete work	696	575,120*	575,816
Skelp, flue, and pipe iron or steel	218,868	2,640,227	2,859,095
Hoops	.....	222,139	222,139
Bands and cotton-ties	2,678	268,423	271,101
Long angle splice bars, tie-plate bars, etc.	59,644	546,044*	605,688
Rolled sheet piling, not including fabricated	.....	13,220	13,220
Railroad ties	.....	14,811	14,811
Rolled forging blooms, forging billets, etc.	186	326,117	*326,303
Blooms, billets, sheet bars, etc., for export	.....	11,299	11,299
All other finished rolled products	261,907	1,776,313	2,038,223
Total..... Gross tons.	905,097	25,546,907	26,452,004

ALLOY STEEL INGOTS AND CASTINGS.

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS.

Years.	Ingots.	Castings.	Total	Years.	Ingots.	Castings.	Total.
1909	158,978	23,002	181,980	1916	1,306,157	56,455	1,362,615
1910	538,462	29,357	567,819	1917	1,576,896	67,529	1,644,335
1911	425,169	56,290	481,459	1918	1,721,367	66,485	1,787,852
1912	589,392	103,109	692,501	1919	1,433,816	45,372	1,481,188
1913	625,430	88,927	714,357	1920	1,591,939	68,353	1,660,292
1914	577,107	69,846	646,953	1921	769,293	40,255	809,548
1915	923,251	97,896	1,021,147	1922	1,614,392	59,104	1,673,496

Similar statistics are not available prior to 1909.

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS, BY PROCESSES, GROSS TONS, 1922.

Processes	Ingots.	Castings.	Total.
Open-hearth steel—basic	1,341,807	1,792	1,343,599
Open-hearth steel—acid	66,285	26,438	92,723
Bessemer steel	89,234	13,064	102,298
Crucible steel	9,407	50	9,457
Electric and miscellaneous steel	107,659	17,760	125,419
Total.. Gross tons	1,614,392	59,104	1,673,496

In 1922 there were 138 works in 23 States and the District of Columbia which made alloy steel ingots or castings.

ROLLED IRON AND STEEL.

In 1922 the production of all kinds of iron and steel rolled into finished forms shows an increase of 11,677,998 tons, or 79.04 per cent., as compared with 1921.

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, 1887–1922.

Years	Iron and steel rails	Plates and sheets	Nail plate	Wire rods	Structural shapes	All other finished rolled	Total. Gross tons.
1887	2,139,640	603,355	308,432	.....	.....	2,184,279	5,235,706
1888	1,403,700	609,827	289,891	279,769	.....	2,034,162	4,617,349
1889	1,522,204	716,496	259,409	363,851	.....	2,374,968	5,236,928
1890	1,885,307	809,981	251,828	457,099	.....	2,618,660	6,022,875
1891	1,307,176	678,927	223,312	536,607	.....	2,644,941	5,390,963
1892	1,551,844	751,460	201,242	627,829	453,957	2,579,482	6,165,814
1893	1,136,458	674,345	136,113	537,272	387,307	2,104,190	4,975,685
1894	1,021,772	682,900	108,262	673,402	360,305	1,795,579	4,642,211
1895	1,306,135	991,459	95,085	791,130	517,920	2,487,845	6,189,574
1896	1,122,010	965,776	72,137	623,986	495,571	2,236,361	5,515,841
1897	1,647,892	1,207,286	94,054	970,736	583,790	2,497,970	7,001,728
1898	1,981,241	1,448,301	70,188	1,071,683	702,197	3,239,760	8,513,370
1899	2,272,700	1,903,505	85,015	1,036,398	850,376	4,146,425	10,294,419
1900	2,385,682	1,794,528	70,245	846,291	815,161	3,575,536	9,487,443
1901	2,874,639	2,254,425	68,850	1,365,934	1,013,150	4,772,329	12,349,327
1902	2,947,933	2,665,409	72,936	1,574,293	1,300,326	5,383,219	13,944,116
1903	2,992,477	2,599,665	64,102	1,503,455	1,085,813	4,952,185	13,207,697
1904	2,284,711	2,421,398	61,601	1,699,028	949,146	4,597,497	12,013,381
1905	3,375,929	3,532,230	64,542	1,808,688	1,660,519	6,398,107	16,840,015
1906	3,977,887	4,182,156	54,211	1,871,614	2,118,772	7,383,828	19,588,468
1907	3,633,654	4,248,832	52,027	2,017,583	1,940,352	7,972,374	19,864,822
1908	1,921,015	2,649,693	45,747	1,816,949	1,083,181	4,311,608	11,828,193
1909	2,923,845	4,234,346	63,746	2,335,685	2,275,562	7,711,506	19,644,690
1910	3,636,031	4,545,484	45,294	2,241,830	2,266,890	8,475,750	21,621,279
1911	2,822,790	4,488,049	48,522	2,450,453	1,912,367	7,316,990	19,039,171
1912	3,327,915	5,875,080	45,331	2,653,553	2,846,487	9,908,475	24,656,841
1913	3,502,780	5,751,037	37,503	2,464,807	3,004,972	10,030,144	24,791,243
1914	1,945,095	4,719,246	38,573	2,431,714	2,031,124	7,204,444	18,370,196
1915	2,204,203	6,077,694	31,929	3,095,907	2,437,003	10,546,188	24,392,924
1916	2,854,518	7,453,980	30,088	3,518,746	3,029,964	15,493,093	32,380,389
1917	2,944,161	8,267,616	22,864	3,137,138	3,110,000	15,585,921	33,067,700
1918	2,540,892	8,799,135	18,310	2,562,390	2,849,969	14,385,058	31,155,754
1919	2,203,843	7,372,814	12,832	2,538,476	2,614,036	10,359,543	25,101,544
1920	2,604,116	9,337,680	20,577	3,136,907	3,306,748	13,941,835	32,347,863
1921	2,178,818	4,260,574	14,573	1,564,330	1,272,624	5,483,087	14,774,006
1922	2,171,776	7,968,397	21,969	2,654,741	2,718,768	10,916,353	26,452,004

IMMIGRANTS COMING

Some Relief Promised Iron and Steel Companies Which Have Labor Shortage

WASHINGTON, July 3.—Rush of immigrants to the United States with the beginning of the new fiscal year, last Sunday, means in the opinion of officials of the Department of Labor, that quotas under the 3 per cent law will probably be filled from all countries with the possible exception of certain ones, such as Germany and Russia, long before the year comes to a close. The total number admissible is 357,803. Iron and steel manufacturers and other employers are looking to the incoming immigration as a source of some relief from the labor shortage, though it is understood that they do not consider that the problem is so serious as it was said to be recently. The number of workers that will be obtained from immigrants now entering the United States is not expected to be great, but it is observed that some of them are of a high type. This is particularly true with respect to the immigration from the United Kingdom. It is said that the immigration movement from England, Scotland and Wales is unprecedented and that a large number of them are skilled, some of them in the iron and steel industry, but because of unemployment in those countries, concluded to come to the United States. As a matter of fact, the opinion prevails generally here that protests recently made in the House of Commons against alleged bad treatment of British subjects at Ellis Island was largely a veiled attempt to discourage emigration from Great Britain to the United States and really was not due to sincere apprehension about treatment of British subjects at the New York immigration station.

Following is a statement of the Bureau of Immigration showing the number of aliens admissible during the new fiscal year from some of the more important countries, so far as a source of possible workers for the iron and steel and allied industries are concerned:

Country or Region of Birth	Number Admissible Annually	Number Admissible Monthly
Austria	7,342	1,468
Belgium	1,563	313
Bulgaria	302	61
Czechoslovakia	14,357	2,871
Denmark	5,619	1,124
Esthonia	1,348	270
Finland	3,921	784
France	5,729	1,146
Germany	67,607	13,521
Great Britain and Northern Ireland	77,342	15,468
Irish Free State	3,063	613
Greece	5,747	1,149
Hungary (including Sopron district)	42,057	8,411
Italy	1,540	308
Lithuania (including Memel region and part of Pinsk region)	2,629	526
Netherlands	3,607	721
Norway	12,202	2,440
Poland (including Eastern Galicia and part of Pinsk region)	30,977	6,195
Portugal (including Azores and Madeira Islands)	2,465	493
Rumania	7,419	1,484
Russia, European and Asiatic (excluding the barred zone)	24,405	4,881
Sweden	20,042	4,008
Switzerland	3,752	750
Jugoslavia	6,426	1,285

JAPAN BUYS BELGIAN RAILS

Government Railroads Award 5000 Tons—Tin Plate Still Pending—Foreign Iron Prices High

NEW YORK, June 28.—Export business continues light with continued reports of competition from Continental dealers. Japan is about the only market that continues active in large purchases and some small merchant buying. The Chinese market is unchanged, buyers still offering to pay several dollars a ton less than sellers demand for second-hand plates and similar material. The dullness in wire shorts that has been evident for several weeks, as a result of the refusal of Chinese buyers to come within several dollars of the price quoted by American sellers, seems to have been broken. One exporter in New York with good connections in China reports the sale of about 50 tons of wire shorts at $59 per ton, c.i.f. China.

The two tenders for rails for the Imperial Government Railways have both been awarded. The first, which called for about 1650 tons of 100-lb. rail, was placed with Suzuki & Co., New York; the second, bids on which were opened on June 28, is reported to have been partly placed with a Belgian mill. The original tonnage was 8000 tons of 60-lb. rails. It is reported that 5000 tons was awarded at £9 18s, c.i.f. Japanese port, September-October-November-December delivery, which figuring the American quotation on a basis of $43 per ton, Pittsburgh, or about $56, c.i.f. Japan, is about $10 per ton lower.

The inquiry of the Nippon Oil Co. for a total of 37,500 boxes of tin plate is said to have been postponed, the buyer having asked the mills to make prices firm until July 1 or 2. In addition to these tonnages, there is still pending the 800 tons of structural steel for the First National Bank of Osaka, which may be fabricated in Japan of foreign material. Japanese fabricators would enjoy a certain advantage in submitting bids, as, in addition to the lower freight on plain material because of the smaller space occupied, there is a tariff of about 2.80 yen per ton more on steel that has been fabricated. There are a few small inquiries current from Japan for light gage black sheets, small lots of tin plate, bars and copper wire bars.

Foreign pig-iron prices, although still declining are too high to compete successfully on the Atlantic seaboard. One fairly large importer of Continental pig iron when conditions are favorable reports a recent quotation of $29.50 per ton, c.i.f. Atlantic port, duty paid, for a foundry iron analyzing 2.50 to 3 per cent silicon and phosphorus less than 1 per cent. On a slightly lower silicon, 1.80 to 2.50 per cent, with phosphorus less than 1 per cent, this importer is quoting $29.25 per ton, c.i.f. Atlantic port, duty paid. On both grades July shipment is offered.

An importer, who made a contract with a Hamburg, Germany, furnace for foundry iron, prior to the Ruhr occupation, reports the final shipment, about 760 tons, will arrive in July. An importer of Scotch foundry iron is quoting about $32 per ton, c.i.f. Atlantic port, for No. 3. Recent reports of arrivals of low-priced Continental pig iron are believed by importers to be small lots being shipped by some French furnaces to complete old contracts, upon which shipment was suspended following the occupation of the Ruhr.

The value and growth of research is emphasized in the annual report of the Engineering Foundation, which was founded eight years ago by Ambrose Swasey, president Warner & Swasey Co., Cleveland. Appreciation of research is said to be growing among engineers, industrialists and business men. That research pays in many ways and that support of research is necessary to the prosperity and the continued existence of civilized peoples is being perceived, it is said, even by persons remote from laboratories. The choice is between research and retrogression, says the report.

Freight cars to the number of 9876 were placed in service between May 15 and June 1, according to reports of the American Railway Association. This brought the total for the first five months of the year to 65,660 cars. On June 1 there were on order 107,079 additional cars. Between May 15 and June 1, 161 new locomotives were placed in service, making 1697 in five months. An additional 2041 were still on order June 1.

Machine tool manufacturers in the Cincinnati district will pay higher prices for castings as a result of an increase of $1 per day granted to molders in the union foundries, and which undoubtedly will become effective in open shops. The increased cost ranges from 20 to 50c per 100 lb.

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ESTABLISHED 1855

THE IRON AGE

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 843 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Hotwell St., S.W.1

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: Park Building. Boston: 409 Exchange Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Distribution of Steel

Steel production statistics for 1922, just issued by the American Iron and Steel Institute, are given fully elsewhere in this issue. Ingot output amounted to 34,568,418 tons, this being under the production in three war years and one post-war year, while it was 14 per cent above the two best pre-war years, 1912 and 1913. Production of steel castings was 1,034,508 tons, making a similar comparison with past years. Ingots and castings combined were 35,602,926 tons, or much more than double the output in any year prior to 1905.

Production of rolled steel was 25,546,907 tons, which is 74 per cent of the ingot production reported. The usual proportion is about 76 per cent. Rolled iron amounted to 905,097 tons, the smallest tonnage for many years apart from 1921, making a total of rolled material of 26,452,004 tons.

The distribution of steel in the various rolled forms was quite in accordance with the percentages given in the summary on page 99 of the Annual Review Number of THE IRON AGE, Jan. 4, 1923, under the caption "Where Steel Went in 1922." Rails were set at 8 per cent, and now turn out to have been 8.5 per cent. Wire products we estimated at 10 per cent, and rods now prove to have been 10.4 per cent, actual wire products of course falling somewhat short of this. Shapes were set at 11 per cent and are now seen to be 10.6 per cent; while tin plate was put at 5 per cent and comes out 5.05 per cent.

In a year that showed a total production of steel somewhat under that of four other years and over that of all other years one could not expect any particular commodity to distinguish itself by being particularly high or particularly low. Welded tubular goods, however, do make quite a showing, in that the production in 1922 stood second to the production of one year only, 1920, the 2,732,236 tons produced comparing with 3,002,725 tons in 1920. The total includes merchant pipe, black and galvanized, oil country goods, O.D. pipe and boiler tubes. Galvanized merchant pipe made a new record, the 390,140 tons exceeding even the output in 1920. This was, of course, a reflection of the building boom.

Black sheets did even better than tubular goods, as they broke their best previous record, the 2,917,236 tons exceeding by a small margin the 2,886,401 tons that had been recorded for 1920. There was a decrease in sheets 12 gage and heavier, whereby sheets 13 gage and lighter showed a material increase—from 2,519,072 tons in 1920 to 2,616,210 tons in 1922. Their increase in 1922 over 1913 was no less than 78 per cent, whereas rolled steel in general increased only 10 per cent. The chief influence, of course, was that the manufacture of automobiles increased much more than the production of other things involving steel.

The trade was probably not prepared to see galvanized sheet production run as heavy last year as it is now seen to have done, for the 1920 records were cleanly beaten, the 941,960 tons of flat galvanized sheets representing 13 per cent gain and the 73,979 tons of formed products galvanized showing 15 per cent gain.

Tin plate, often considered cognate with sheets, made no particular showing in 1922, the 1,287,671 tons of production being under that of 1917, 1918 and 1920.

Radically Different Attitudes

The Federal Council of Churches, with its usual sense of justice and charity in judging the methods and motives of people in the steel industry, has sent to the press a statement in which, referring to the report of the committee of the American Iron and Steel Institute on the twelve-hour day, it says:

> It was assumed that the appointment of an investigating committee a year ago meant that the industry was about to yield to the urgent request of the President of the United States. It now appears that this action was only a gesture.

The truth is that there is not a particle of evidence to indicate that the investigation which was carried on with great thoroughness for over a year, under the direction of the committee of the institute, was insincere. A real effort was made to ascertain the facts relating to long hours in the industry and the members of the committee made the report which they thought ought to be made. Whether the clerical gentlemen agree with the report or not, they have no right to declare that the investigation was "only a gesture."

The attitude of some of the church critics is

in striking contrast with that of men in the steel industry who, although they have introduced the three-shift plan in their own plants, have not felt called upon to condemn the report of the institute committee or to make any unfavorable criticism of the investigation. They realize that changes which can be brought about easily under certain conditions are almost if not quite impossible under other conditions. One steel manufacturer who has been instrumental in introducing the short day in his plant has written THE IRON AGE a letter explaining his position, saying:

We felt it unfair to the industry as a whole to attempt to exploit our accomplishments in a situation such as had arisen. Irrespective of the report of the American Iron and Steel Institute committee, Judge Gary and his associates deserve support for their splendid contribution toward the stability of the industry. We appreciate the monumental task the industry has before it in changing established policies, and far be it from us to tell the others what they can do under the conditions under which they are working. We want always to do just what is best for the largest number and not try to exploit our own accomplishments at the expense of others.

That letter shows the real Christian spirit and we commend it for the consideration of all, whether churched or unchurched, who feel called upon to publish their views in regard to the committee's report.

A "Misinformed" Critic

Of all the criticism of the Iron and Steel Institute's committee on the twelve-hour day one is unique for injecting real humor into an otherwise very serious discussion. Here it is, as taken from its editorial setting in *Chemical and Metallurgical Engineering*, the title telling us that "Messrs. Gary et al Are Misinformed":

We do not hesitate to say that before the present situation can be remedied, it is absolutely necessary for the "reformers" to recognize the fact that the real men in the industry would not tolerate any condition which they knew was sapping their workers—no matter what the dividend situation or profit and loss account might be. The trouble is they do not know! They get the basis of their opinion from officials, welfare workers, industrial investigators, or common spies, all "insiders." Little of this so-called "information" is in turn based on sincere, impartial investigation by a person who has risen from the ranks of the night shift, or even capable of imagining himself in the worker's job.

Of the nine members of the institute committee, seven have had to do directly with mill operations and six of them date their connection with the steel industry from boyhood years. James A. Farrell was a manual worker in iron and steel plants at 15 and can count years of arduous labors under the twelve-hour turn. Alva C. Dinkey was an Edgar Thomson water boy at 13 and worked from one mill and shop job to another in the years between 1879 and 1893, when he became electrician at the Homestead steel works. E. G. Grace started in the switching yards of the Bethlehem Steel Co. and has been in the thick of blast furnace and mill operations for more than 20 years. John A. Topping's mill and office experience in an Ohio River iron town began when he was 18 and continued for 22 years up to his removal to Pittsburgh as an officer of the American Sheet Steel Co. James A. Campbell as a mill superintendent worked alongside his men for years at Youngstown and has lived with the twelve-hour turn unnumbered days and nights and Sundays. Willis L. King entered the employ of Jones & Laughlin when he was 18 and for more than 50 years his daily employment has been alongside blast furnaces and steel mills. James A. Burden comes of a family which for more than a century has carried on blast furnace and rolling mill operations on the same site. L. E. Block, as chairman of the Inland Steel Co., has made an intimate study of the eight-hour and twelve-hour turns in steel works, and is classed among the men in the industry who are sharply differentiated from the "absentee owner." Judge Gary, the committee's chairman, with the background of a long legal and judicial career, would be likely to show ability in dividing fact from fancy.

By and large, the committee might be expected to know quite a little about what goes on inside steel works and rolling mills and what the worker has thought and now thinks of the twelve-hour turn. Furthermore, there is reason to know that the statements contained in the report were based on a canvass of fact and sentiment covering the entire industry—small companies as well as large —and that there was no failure to get real information "from the inside." Most of the members need only call on memory to bring up a realistic picture from "the ranks of the night shift."

Further Advance in Magnetic Testing

More than a year ago, in comment in these columns on a development in magnetic testing made public at a meeting of steel treaters in New York, it was said:

This principle may be applied in the not distant future to other properties of steel. The designers of the apparatus [for determining the case hardness of chain] are making just such predictions and assert that it will be possible to correlate the tensile strength and ductility by magnetic tests as easily as the case hardness of steel.

Before the American Society for Testing Materials at Atlantic City last week the same investigators presented the latest results of their highly important work. While the new apparatus they exhibited does not correlate tensile strength and ductility, it is doing something fully as important, namely, determining the different magnetic effects of the quenching or the drawing process on high-speed or other tool steel. The value of such a non-destructive test is obvious. In this case it interprets not only the final condition of the tool but the various heat-treating steps which led to that condition. If the history of a tool which does unusually satisfactory work can be set down accurately in this way, there is a better basis for improved practice than has been attainable heretofore.

An authority on magnetic analysis, discussing the work of the inventor, observes that this form of testing is comparable in its scope with the science of chemistry and that its place in the steel industry will be similar to that of the microscope when the various magnetic characteristics of steels are known and investigated. Fulfillment of

this prediction will be delayed at least by the lack of workers in the field. A plea is made for more interest in the subject, and it is pointed out that it is not so complicated as appears on the surface. It scarcely can be gainsaid that more research in this field by competent analysts will mean much to the progress of metallurgy.

CORRESPONDENCE

The Effects of Vanadium on Steel

To the Editor: In your issue of June 7 I note with special interest the letter of Dr. B. D. Saklatwalla. While in thorough agreement with him on very many points I venture somewhat to join issue with him on some other points, or at least to suggest their qualification. In citing the example of vanadium steel he says:

> It is not the vanadium doing the treating or so called scavenging that imparts to the steel the better physical qualities. It is the vanadium that has escaped the so called treating or scavenging that does the useful work. . . . . The truth of the matter is that vanadium is a carbide forming element and that it brings about the physical properties in steel by its action on the carbide.

My own contention is that the ameliorating action of vanadium on steels is exerted along three separate lines, in which combined powers of action it is absolutely unique among alloys. Its scavenging action is undoubtedly preferential, and is "stronger" than that of the usual cleansing agent, inasmuch as it undoubtedly cleanses "oxygen-clean" steel from the majority of its nitrogen content. And nitrogen is a deadly enemy to good properties of ferrite. I therefore cannot agree with the doctor when he describes the scavenging action of vanadium as "an economical evil in steel making." The moral is of course that vanadium should never be added to steel which has not been cleansed as well as possible by normal means, when the amount of vanadium used in the further scavenging—which should be denitrogenizing rather than deoxidizing—is a small proportion only of that added. The ferrite (whether structurally free or alloyed in pearlite) is thus *indirectly toughened* by the scavenging action of vanadium. It is worthy of note that vanadium-scavenged products, being very fusible, readily rise to the slag from the main mass of steel; the danger of non-metallic inclusions is thus greatly reduced.

In the second place there can be no doubt that a very small amount of vanadium enters into solid solution in the ferrite, *directly toughening* it.

The remainder, and it should be the vast majority, of the vanadium added enters into the composition of the carbides, as Doctor Saklatwalla states, and thus *strengthens* them. In order to get good and constant results these carbides must always be truly complex and not mixed; if the latter, trouble is bound to ensue. The question of non-dissociation, at normal steel making temperature, of one or more of the original components of the alloy used has been in my experience a fruitful source of such trouble.

I am not aware that anybody has claimed anywhere that vanadium is preeminent among the elements in its powers of combining with oxygen. In fact, study of the heats of formation of various metallic oxides, and in practice the comparative ease with which many exothermic reducing reactions upon vanadium oxide can be obtained, shows that it is not. To denitrogenize steel is the chemical attribute of but few of the elements; to denitrogenize it with a fusible product is, as far as I know, the unique attribute of vanadium.

One recognizes and acknowledges with gratitude the very valuable work of Doctor Saklatwalla in the technology of vanadium, but as one of the early commercial workers with the element I beg to put before your readers my views where they do not "march" with his.

J. KENT SMITH.

Sheffield, England, June 18.

GERMAN PRICES SHARPLY UP

Fall in Exchange Rate Partially Met by Increase in Mark Pegging—One Ton of Sheets Now 7,800,000 Marks

(*By Cablegram*)

BERLIN, GERMANY, July 2.—Foundry iron No. 1 has been advanced by the Pig Iron Association to 3,198,000 m. per metric ton ($18.68 per gross ton, at 0.575c. per 1000 m.), compared with 2,682,000 m. ($23.16, at 0.85c. exchange) last week and with 774,000 m. ($12.97, at 1.65c. exchange) five weeks ago.

Steel has been advanced about 40 per cent by the Stahlbund. Ingots are now 3,382,000 m. ($19.75), compared with 2,415,000 m. ($20.85) last week and with 1,271,000 m. ($21.30) five weeks ago.

Steel bars are now quoted at 4,800,000 m. (1.25c. per lb.), compared with 3,400,000 m. (1.31c. per lb.) last week and with 1,755,000 m. (also 1.31c per lb.) five weeks ago.

Thin steel sheets have been advanced to 7,800,000 m. (2.03c. per lb.), compared with 5,460,000 m. (2.11c. per lb.) last week and with 2,818,000 m. (also 2.11c per lb.) five weeks ago.

[Note: Ten years ago, 7,800,000 m. would have bought a 4000-ton cruiser.—Editor.]

SALE COMPLETED

Youngstown Sheet & Tube Co. Announces Taking Over of Chicago Company

The Youngstown Sheet & Tube Co. has officially taken over the Steel & Tube Co. of America, according to an announcement by James A. Campbell, president of the former company, in connection with an offering of $40,000,000 in 20-year 6 per cent debenture gold bonds, $33,000,000 of which is to be used to reimburse the Youngstown company for expenditures made in acquiring the Steel & Tube properties.

Although the Youngstown Sheet & Tube Co. acquired the Steel & Tube Co. of America under a contract dated Jan. 6, 1923, the completion of the transaction was held up by a temporary injunction, which has recently been vacated by order of a Delaware court. One of the minority stockholders interested in the former proceeding has stated its intention to appeal from the decision of the Delaware court, but counsel for the Youngstown company has advised that such action probably will not succeed in view of the findings of the lower court.

The published statement of the combined assets of the Youngstown Sheet & Tube Co., these assets also including the properties of the Brier Hill Steel Co., recently acquired, shows that the physical properties have a book value of $118,464,000 as of Dec. 31, 1922. Current earnings for the first four months of this year available for depreciation and interest are $9,836,000.

The Youngstown Sheet & Tube Co. will now have an annual ingot producing capacity of 3,060,000 gross tons, representing nearly 6 per cent of the total estimated ingot capacity of the country. The company has 17 blast furnaces with an annual capacity of 2,720,000 gross tons, its steel-producing equipment consists of 40 open-hearth furnaces and five Bessemer converters, while its finishing mills will be able to produce annually 760,000 tons of pipe, 714,000 tons of skelp, 258,400 tons of sheets, 645,000 tons of plates, 2,360,000 tons of semi-finished steel, 225,000 tons of bars, shapes, hoops, bands and bolt and nut rods, 126,000 net tons of wire and 1,350,000 kegs of nails.

Further details of the company's ore reserves, coal properties, etc., will be found on page 167 of THE IRON AGE of Jan. 11, 1923.

Consumption of Steel in Western States

Comparison Made with Production—Hearing of Pittsburgh Basing Point Complaint Continued at Chicago and Milwaukee

CHICAGO, June 30.—Steel production and consumption figures were filed with the Federal Trade Commission by witnesses for the United States Steel Corporation at hearings held here during the week and also at Milwaukee on Friday. These statistics were offered to complete previous testimony given at the sessions of the Pittsburgh base case which were held here earlier in the year prior to the hearings held in the South and the East. It will be recalled that trade reports prepared by salesmen of the Illinois Steel Co. organization were entered to show the steel consumption of users throughout the West and that the production figures of the Illinois Steel Co. were also offered. The testimony during the past week has covered production and shipments by Western independent mills, as well as consumption by certain customers who were not covered by the trade reports.

Among the mill officers who testified were George W. Niedringhaus, president National Enameling & Stamping Co., St. Louis; W. D. Truesdale, secretary and treasurer Inland Steel Co., Chicago; A. C. Joachim, accounting department, Steel & Tube Co. of America, Chicago; J. E. Russell, secretary Interstate Iron & Steel Co., Chicago; H. G. Moore, vice-president and general sales manager Keystone Steel & Wire Co., Peoria, Ill.; F. A. Eisele, general auditor Laclede Steel Co., St. Louis; and John L. Dunlap, assistant auditor American Steel & Wire Co. In most cases these figures covered production of the principal finished steel products for the five years, 1918 to 1922 inclusive, as well as shipments of those products to points east of a line 30 miles east of the Indiana-Illinois State line and shipments west of that line. The purpose of all this testimony is apparently to show that consumption in Western territory exceeds production. Statistics for the five years, 1918 to 1922 inclusive, showing consumption of the principal finished steel products, were filed by the following witnesses: T. H. Robinson, purchasing agent Moline Plow Co., Moline, Ill.; Emil Szebastad, record clerk, purchasing department, J. I. Case Threshing Machine Co., Racine, Wis., P. S. Fuller, J. I. Case Plow Works Co., Racine, Wis.; C. Heggie, president Scully Steel & Iron Co., Chicago; Phillip Robinson, Gary Screw & Bolt Co., Gary, Ind. Charles Moffatt, manager Statistical Bureau, Illinois Steel Co., also submitted reports of consumption for certain customers. Harry J. Miller, operating department, American Steel & Wire Co., Chicago, and H. G. Hestan, statistician American Sheet & Tin Plate Co., Pittsburgh, also filed statements showing shipments of semi-finished steel to their Western plants by the Illinois Steel Co. and Eastern plants of the Steel Corporation. Objection was raised to these figures on the grounds that the picture would not be complete until shipments of semi-finished steel from the Illinois Steel Co. and Minnesota Steel Co. to Eastern finishing plants were also included.

An Interesting Viewpoint

The objection raised to the data offered by Mr. Dunlap of the American Steel & Wire Co., brought out an interesting viewpoint. Mr. Dunlap's statement showed shipments of all wire products from the company's plants east of a line drawn north and south 30 miles east of the Illinois-Indiana State line to points west, and vice versa. It was pointed out by the commission attorneys that this statement would not be complete unless distribution was shown by States and that the dividing line used was purely arbitrary. It will be recalled that a principal argument of the respondent is that Pittsburgh is the center of surplus production and that therefore the law of supply and demand dictates that base prices gravitate to that city. Apparently the view of the commission attorneys is that it is improper to include all plants west of Pittsburgh as far as the line 30 miles east of the Indiana State line as component parts of the Pittsburgh district. Another witness who testified was Harold E. Gregg, order and shipping department, Illinois Steel Co., Chicago. He pointed out that the Carnegie Steel Co. and the Jones & Laughlin Steel Co. both roll certain special sections of bars and shapes which are not rolled by the Illinois Steel Co., and that at the same time the Illinois Steel Co. produces certain sections which are not rolled by the two Pittsburgh companies.

Effect of Barge Movement

The effect of river barge shipments on the Pittsburgh basing point practice was illustrated in Mr. Moore's testimony when it was pointed out that both the Jones & Laughlin Steel Corporation and the Pittsburgh Steel Co. had on occasion sold wire products for water delivery to Louisville and other Southern points at prices below the established Pittsburgh market plus the railroad freight.

Witnesses at Milwaukee included T. Hanson, director of purchases A. O. Smith Corporation; E. T. Mason, secretary Ladish Drop Forge Co.; H. A. Merz, vice-president in charge of purchases Milwaukee Bridge Co.; George J. Steiner, assistant purchasing agent Worden-Allen Co.; C. E. Stone, assistant to the vice-president Chain Belt Co.; H. C. Banks, superintendent Interstate Drop Forging Co.; Clarence Heil, purchasing agent The Heil Co.; C. A. Irwin, president Milwaukee Rolling Mill Co.; W. A. Berenson, purchasing agent Federal Pressed Steel Co.; Walter P. Geschke, purchasing agent Pawling & Harnischfeger Co.; F. E. Haker, assistant manager purchasing department Allis-Chalmers Mfg. Co. All of these companies filed figures of their consumption of steel for the five-year period previously defined. Objection was raised to adding the tonnage used by the automobile parts makers to the consumption statistics for the Chicago territory.

Monday's Hearing at Chicago

CHICAGO, July 2.—The hearing in the Pittsburgh basing point case before the Federal Trade Commission on Monday marked another step in the efforts of the Steel Corporation to show that steel consumption exceeds production in the Chicago district. William G. Gray of the American Iron and Steel Institute filed with the commission a detailed statement of the productive capacity of all individual steel mills classified by districts, showing capacity in ingots, in total finished rolled products, in rails, plates, shapes, bars, including bands, hoops and bar size shapes, sheets and light plates, black plate, tubular products, wire rods, plain wire and surplus rods. E. D. Graff, Joseph T. Ryerson & Son, testified as to the tonnage of bars, bands, hoops, plates and structural shapes invoiced by the companies of Chicago and St. Louis plants, the total being 138,203 tons for 1918, and 136,470 tons for 1919, 165,836 tons for 1920, 60,202 tons for 1921, and 132,563 tons for 1922, or an average for the five years of 126,655 tons. Objection was raised to adding these totals to the consumption figures for the Chicago district on the grounds that much of this steel has already been recorded in the trade reports of consumption for manufacturing users submitted in evidence by salesmen of the Steel Corporation.

A number of witnesses testified to their inability to get their complete requirements in steel from Western mills during certain periods, particularly during 1922 and the early months of 1923.

Iron and Steel Exports Best in 11 Months

May Imports Slightly Below April—First Simultaneous Publication of Exports and Imports Since Last Fall—Pig Iron Imports Still Heavy

WASHINGTON, July 3.—Becoming available simultaneously for the first time since the Fordney-McCumber Tariff Act went into effect on Sept. 22, 1922, figures of the Bureau of Foreign and Domestic Commerce on exports and imports of iron and steel for May, 1923, show a substantial increase in the former and a slight decrease in the latter, when compared with April. Exports of iron and steel in May totaled 203,389 gross tons, valued at $22,720,355, an increase of 25,918 tons over April. Imports in May amounted to 75,885 tons, valued at $2,900,561, a decline of 2018 tons under April. Machinery exports in May were valued at $23,425,442, an increase of only $31,188 over April. Imports of machinery in May were valued at $1,378,275. Metal working machinery exports in May aggregated 7698 in number, with a value of $478,456, as against 7138 with a value of $435,418 in April.

Exports of Iron and Steel
(In Gross Tons)

	May		Eleven Months Ended May	
	1922	1923	1922	1923
Pig Iron	2,897	1,848	26,334	28,931
Ferromanganese	41	503	966	3,438
Ferrosilicon	42	94	405	886
Scrap	12,804	3,809	52,136	35,702
Ingots, blooms, billets, sheet bar, skelp	13,091	12,824	49,949	103,725
Iron and steel bars	26,544	15,408	83,106	151,193
Alloy steel bars*	174	210	4,444	2,414
Wire rods	1,367	4,035	37,558	21,754
Plates, iron and steel	14,879	11,229	110,007	97,947
Sheets, galvanized	9,187	12,773	71,544	102,080
Sheets, black steel	24,619	12,137	275,505	91,311
Sheets, black iron	884	1,421	5,918	10,440
Hoops, bands, strip steel	2,539	4,286	22,001	35,525
Tin plate, terne plate, etc.	6,291	13,328	70,391	76,468
Structural shapes, plain material	18,132	11,646	107,224	99,973
Structural material, fabricated	1,242	6,436	20,901	80,917
Steel rails	23,812	30,847	196,490	221,540
Rail fastenings, switches, frogs, etc.	3,011	5,263	18,587	35,027
Boiler tubes, welded pipe and fittings	15,589	18,292	143,139	152,905
Cast iron pipe and fittings	2,709	3,035	24,691	42,914
Plain wire	12,836	13,814	72,567	83,502
Barbed wire and woven wire fencing	7,791	8,917	33,538	74,436
Wire cloth and screening*	142	109	452	1,454
Wire rope and cable*	547	538	....	5,307
Wire nails	5,797	4,788	46,611	30,204
All other nails and tacks	816	749	6,213	7,753
Horseshoes	109	61	653	941
Bolts, nuts, rivets and washers, except track	1,313	1,382	12,752	16,764
Car wheels and axles†	686	1,835	....	15,441
Iron castings†	922	506	4,504	9,050
Steel castings†	264	947	....	2,763
Forgings†	187	248	....	2,341
Machine screws	17	....	75	....
Total	230,062	203,389	1,498,993	1,645,146

*Not reported separately prior to January, 1922.
†Previous to January, 1922, reported by value only.

Imports of Scrap by Countries of Origin
(In Gross Tons)

	May, 1923	Eleven Months Ended May, 1923
Sweden	15	216
England	357	12,650
Scotland	1,250	2,127
Canada	12,721	152,396
Mexico	10	305
Cuba	4,227	31,693
Other Sour		11,398
Total	18,580	210,785

Exports of iron and steel in May were the largest of any single month since June of last year, when they amounted to 212,295 tons, but were 26,673 tons less than the same month of 1922, with a total of 230,062 tons, or what was considered a pre-war monthly average.

For the 11 months ended with May of this year, exports amounted to 1,645,146 tons, valued at $178,609,083, showing an increase over the corresponding period of last year, with a total of 1,498,993 tons. The heavier export movement in May was due largely to increased shipments of steel rails, the largest item of export in the month, with a total of 30,847 tons, and to fair increases in exports of black steel sheets, plain structural material, boiler tubes and welded pipe and plain wire. There were moderate declines in exports of iron and steel bars, plates and galvanized sheets. Exports of steel bars amounted to 14,280 tons and of iron bars to 1128 tons. Of the rail exports in May, Japan was the largest buyer, taking 13,653 tons, while Cuba ranked second,

Exports, January, 1922, to May, 1923, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,213,732	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
Fiscal year 1921	4,168,619	129,541	82,549
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	203,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	145,640	1,791	9,353
September	129,475	5,203	6,810
October	133,924	1,553	8,364
November	127,782	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922	1,986,297	30,922	107,201
January, 1923	123,190	2,482	10,563
February	133,802	2,786	7,733
March	163,920	2,881	11,416
April	177,471	1,844	11,247
May	203,389	1,843	12,824
Eleven months	1,645,146	28,931	103,725

*Calendar years.

Metal Working Machinery Exports

	April, 1923		May, 1923	
	Number	Value	Number	Value
Lathes	81	$66,001	67	$57,133
Boring and drilling machines	131	107,432	135	42,106
Planers, Shapers and slotters	14	20,554	8	17,256
Bending and power presses	26	4,142	24	27,038
Gear cutters	11	9,724	9	17,787
Milling machines	19	26,320	22	24,914
Thread-cutting and screw machines	42	27,362	84	71,476
Punching and shearing machines	69	10,235	30	14,167
Power hammers	19	8,168	18	8,150
Rolling machines	3	1,096	3	3,000
Sharpening and grinding machines	3,073	69,678	3,767	112,779
Chucks, centering, lathe, drill and other metal-working tools	2,833	25,800	2,435	27,080
Pneumatic portable tools	817	58,956	1,095	55,565
Total	7,138	$435,418	7,697	$478,456

Machinery Exports
By Value

	May, 1923	May, 1922	Eleven Months Ended May 1923	May 1922
Locomotives	$228,167	$151,911	$7,250,757	$4,958,1
Other Steam Engines	137,095	12,695	741,128	389,5
Boilers	75,252	60,483	1,661,576	1,142,8
Accessories and Parts	83,734	78,275	*1,749,109	1,042,8
Automobile Engines	616,128	879,878	3,421,168	4,759,3
Other Internal Combustion Engines	348,740	625,724	3,955,103	4,121,6
Accessories and Parts for	234,292	270,611	*1,116,771	2,675,257
Electric Locomotives	10,900	210,009	*1,339,190	2,819,283
Other Electric Machinery and Apparatus	876,791	636,756	14,816,210	6,324,400
Excavating Machinery	238,759	145,796	*701,892	1,449,775
Concrete Mixers	39,541	74,509	365,061	959,083
Road Making Machinery	82,406	182,538	*414,539	1,284,463
Elevators and Elevator Machinery	353,384	500,258	*1,653,758	4,210,062
Mining and Quarrying Machinery	564,998	583,177	*4,793,919	7,019,579
Oil Well Machinery	335,013	402,836	*3,146,283	4,302,195
Pumps	425,405	598,786	5,072,419	6,089,916
Lathes	66,604	87,138	961,285	642,282
Boring and Drilling Machinery	69,424	42,106	*266,448	547,667
Planers, Shapers and Slotters	17,590	17,256	*98,741	219,138
Bending and Power Presses	15,806	27,038	*207,794	160,179
Gear Cutters	6,174	17,787	*22,446	142,812
Milling Machines	25,255	24,914	*107,053	407,329
Thread Cutting and Screw Machines	17,668	71,476	*71,649	329,389
Punching and Shearing Machines	12,610	14,167	*75,884	123,700
Power Hammers	13,188	8,150	*52,827	130,146
Rolling Machines	16,270	3,000	*23,919	148,105
Sharpening and Grinding Machines	83,104	112,779	763,411	844,885
Other Metal Working Machinery and Parts of	313,721	398,765	6,173,976	5,050,247
Textile Machinery	1,520,512	886,458	16,083,407	8,828,184
Sewing Machines	501,674	709,582	5,036,771	7,602,920
Shoe Machinery	79,748	113,034	915,494	1,104,804
Flour-Mill and Gristmill Machinery	97,703	51,643	956,338	971,973
Sugar-mill Machinery	184,276	125,818	3,897,737	3,444,272
Paper and Pulp Mill Machinery	120,701	94,297	2,357,270	1,843,658
Sawmill Machinery	33,569	35,656	546,869	532,977
Other Woodworking Machinery	88,996	74,941	983,213	1,333,536
Refrigerating and Ice Making Machinery	177,877	198,171	1,700,700	1,874,321
Air Compressors	285,430	179,754	1,749,526	2,269,319
Typewriters	1,137,402	1,252,905	9,384,316	11,598,041
Power Laundry Machinery	69,060	94,297	510,809	873,358
Typesetting Machines	432,816	237,000	3,041,174	3,294,586
Printing Presses	266,703	340,334	4,467,217	3,858,836
Agricultural Machinery and Implements	1,770,222	5,019,875	18,443,379	33,534,881
All Other Machinery and Parts	7,328,250	8,059,122	83,262,574	86,835,975
Total	*$19,425,878	$23,425,442	‡$222,558,476	$232,686,603

*January 1 to May 31, 1922.
†July 1 to December 31, 1922.
‡Revised.

taking 5325 tons. Japan also was the heaviest buyer in May of tin plate, taking 4339 tons out of the total of 13,328 tons, and of galvanized wire, taking 4482 tons. Canada was the largest buyer of plates, galvanized sheets, black steel sheets and barbed wire, and took first place as the principal market for iron and steel products for both May and the 11-month period.

The greatest item of increase in May in machinery exports was agricultural machinery, which had a value

Imports of Iron and Steel in the United States
(In Gross Tons)

	May, 1922	May, 1923	Eleven Months Ended May 1922	Eleven Months Ended May 1923
Pig iron	4,476	39,764	34,622	625,253
Ferromanganese	5,213	8,651	17,624	102,401
Ferrosilicon	588	1,331	9,493	16,929
Scrap	7,292	18,390	40,969	210,785
Steel ingots, blooms, billets, slabs and steel bars	2,056	699	16,389	24,775
Rails and splice bars	2,962	2,945	22,519	20,547
Structural shapes	237	737	1,371	9,976
Boiler and other plates*	....	1	....	1,504
Sheets and saw plates	34	139	305	983
Bar iron	49	826	2,651	9,626
Tubular products*	....	440	....	2,999
Castings and forgings*	....	358	....	1,429
Nails and screws*	....	127	....	726
Tinplate	84	542	292	9,852
Bolts, nuts, rivets and washers*	....	43	....	164
Wire rods	102	30	1,156	2,481
Round iron and steel wire*	....	230	....	2,331
Flat wire and strip steel*	....	88	....	729
Wire rope and insulated wire, all kinds*	....	41	....	420
Total	23,093	75,885	147,391	1,043,910
Manganese ore	46,517	12,734	212,879	270,472
Iron ore	29,707	263,792	130,501	1,978,571
Magnesite	14,557	20,921	69,050	114,291

*Not reported separately previously to Sept. 22, 1922.

Imports of Machinery and Vehicles

	May, 1922	May, 1923	11 Months Ended May 1922	11 Months Ended May 1923
Metal working machine tools and parts	$25,328	$35,484	$173,291	$340,493
Agricultural machinery and implements	354,680	406,009	1,508,139	2,513,288
Electrical machinery and apparatus*	.....	234,777	....	400,683
Other power generating machinery*	.....	60,052	.....	1,856,759
Other machinery	304,193	296,060	2,981,637	2,326,637
Vehicles, except agricultural	159,712	345,893	1,536,213	1,973,556
Total	$840,823	$1,378,275	$6,199,280	$9,410,416

*Not reported previous to Sept. 22, 1922.

of $5,019,875, as against $3,982,878 in April. The principal increases of machine tool exports related to thread cutting and screw machines and sharpening and grinding machines. There was a decided drop in exports of boring and drilling machines.

The import movement of pig iron has been of a fluctuating character. While April imports, amounting to 36,371 tons, showed a sharp decline under those of March, with a total of 72,344 tons, imports of May rose above those of April and amounted to 39,764 tons. Of the total pig iron imports of 625,253 tons for the 11 months, 281,917 tons come from England, which provided 25,116 tons of the May iron imports. It is interesting in this connection to observe that British India supplied 3025 tons in May, in view of comment in the trade regarding this movement which has developed recently. For the 10 previous months, imports of pig iron from British India were only 1000 tons.

Declines in imports of scrap and tin plate largely

Imports of Iron and Steel into Countries of Origin
(In Gross Tons)

	May, 1923	Eleven Months Ended May, 1923
England	25,116	281,917
Canada	7,787	43,711
British India	3,025	4,055
Germany	2,000	22,584
Belgium	1,522	58,707
France	132	95,894
China	100	702
Sweden	79	863
Scotland	....	109,914
Netherlands	....	2,537
Austria	....	299
Cuba	....	4,100
Total	39,764	625,253

Imports of Iron and Steel in Gross Tons
(Monthly Averages)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl.	26,506	†14,132	....	....
1914 to 1918, incl.	23,351	4,645	3,281	‡47,155
1919 to 1921, incl.	23,901	5,708	3,710	37,115
1922	58,545	21,954	9,117	21,294
January, 1923	120,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	36,371	7,221	14,071
May	75,885	39,764	10,482	12,734
Five months average	89,553	53,641	8,217	9,014

*Not included in "total imports."
†Includes ferroalloys.
‡Average for three years, 1916 to 1918, only.

Imports of Manganese Ore by Countries of Origin
(In Gross Tons)

	May, 1923		May, 1923
Brazil	6,285	Turkey in Europe	923
British West Africa	3,211	British India	750
Cuba	1,543	Germany	22

Iron and Steel Exports by Countries of Destination
(In Gross Tons)

	May, 1923	Eleven Months Ended May, 1923
Plates		
Canada	10,197	77,829
Japan	166	1,656
S. America	120	1,010
China	....	2,858
Australia	12	3,209
Galvanized Sheets		
Canada	1,438	30,436
Cuba	1,822	8,468
Argentina	1,158	8,254
Japan	614	3,715
Mexico	625	5,511
Colombia	448	4,736
Central America	432	3,767
China	254	1,815
Australia	335	1,978
Philippine Islands	204	9,433
Dutch East Indies	85	1,006
Tin Plate		
Japan	4,339	22,791
Canada	3,769	22,163
China	2,012	5,029
Argentina	863	3,889
Italy	502	2,768
Cuba	311	2,944
Black Steel Sheets		
Canada	3,722	50,257
Japan	5,613	29,780
Argentina	1,136	3,864
Steel Rails		
Japan	17,973	87,095
Cuba	5,325	35,339
Canada	1,083	26,685
Honduras	2,054	9,493
Kwantung	1,996	3,441
Chosen	....	11,679
Galvanized Wire		
Japan	4,482	12,755
Argentina	2,108	16,117
Canada	1,793	13,836
Chile	1,598	5,719
Brazil	793	6,759
Australia	313	3,500
Barbed Wire		
Canada	1,551	5,776
Argentina	1,538	11,479
West Indies	1,368	8,940
Brazil	1,040	12,711
Australia	487	8,225
Colombia	451	5,222

explain the decrease in the total for that month when compared with April. Moderate increases, however, were made in imports of ferromanganese and ferrosilicon. Of the 2945 tons of steel rail imports, Canada provided 1923 tons; France, 600 tons, and Germany, 422 tons.

Imports of iron ore in May, with a total of 363,792

Imports of Iron Ore by Countries of Origin
(In Gross Tons)

	May, 1922	May, 1923	May, 1922	Eleven Months Ended May, 1923
Spain	5,822	64,676	21,580	136,858
Sweden	12,590	138,642	40,407	571,179
Canada	95	2,059	3,835	4,324
Cuba	11,200	55,712	58,347	572,300
Other countries	....	102,703	6,332	693,910
Total	29,707	363,792	130,501	1,978,571

tons, were more than double those of April, with a total of 171,459 tons. The vast increase in imports of iron ore is shown by the fact that for the 11 months ended with May of this year they amounted to 1,978,571 tons, as against only 130,501 tons for the same period of last year. The greatest single source of these imports for the 11 months of the present year was Cuba, which supplied 572,300 tons, although Sweden ranked a close second, with a total of 571,179 tons, and led in May, with a total of 138,642 tons.

The Interstate Commerce Commission has sent notice to the railroads requesting that in the future traffic and rate committees and publishing officials arrange to publish changes in rates effective on different dates throughout the month instead of the present practice of usually making them effective on the first or fifteenth. The commission said that it will be its purpose also to follow this practice in naming effective dates in its decisions. The purpose is to bring about better tariffs and more orderly procedure. It is declared that under the existing practice offices and printing houses work often under pressure in an endeavor to meet the dates, and errors occur which result in the filing of numerous sixth section (short notice) applications immediately prior to these dates.

The Alabama Co., Birmingham, Ala., has declared a dividend of 15 per cent payable on the $600,000 of first preferred 6 per cent stock. This is to meet two past years' dividends which were not paid. The Alabama Co. is now operating two blast furnaces and is well sold through the third quarter.

BELGIAN MARKET LESS ACTIVE

Buyers Resist High Price Levels—Export Demand Unsatisfactory

BRUSSELS, BELGIUM, June 20.—Although the trend of the Belgian iron and steel market remains firm, the fever of the last two weeks has somewhat abated, and the volume of business transacted at today's Brussels Bourse shows a considerable decrease from last week's operations. Since the reversal of the tendency took place, at the beginning of June, sellers have pushed up prices as vigorously as they could and it was natural to expect some reaction on the part of purchasers. This is exactly what happened today, when purchasers made an effort to release the market from the pressure of high prices, and to this end they have been withholding orders.

On the other hand, the export demand, in spite of the depreciation of Belgian currency, is far from being really active and British producers, notably, are avoiding import of Belgian products into Great Britain by offering prices much below those officially quoted. For instance, British hematite pig iron, nominally quoted £5 15s. f.o.b, is sold, in certain cases, at £5 6s. to £5 9s.

However, some good orders in Belgian products from America and Spain have been reported. Pig iron, as well as steel and iron products, are closing firm. Sheets are more neglected.

Today's current quotations, with exchange at 18.78 fr. per dollar, are as follows, at producing works or f.o.b. Antwerp:

	Fr. Per Metric Ton
Chill-cast foundry pig iron, No. 3 P. L.	450 to 480
Ordinary basic pig iron	410 to 415
Chill-cast foundry pig iron, No. 3 P. L., from Luxemburg or Lorraine, f.o.b. Antwerp	470
Semi finished steel (basic):	
Ingots	450 to 500
Blooms	500 to 525
Billets	550 to 575
Sheet bars	575 to 600
Skelp	825

Luxemburg steel works are quoting the following prices, f.o.b. Antwerp:

	Fr. per Metric Ton
Ingots	500
Blooms	550
Billets	600
Sheet bars	625

Lorraine steel works are quoting the same prices as the Luxemburg works, (all basic quality), except for sheet bars, which they offer at 610 to 625 fr., f.o.b. Antwerp.

	Fr. per Metric Ton
Merchant bars	625
Merchant bars from Lorraine, f.o.b. Antwerp, (French currency)	580
Merchant bars from Luxemburg, f.o.b. Antwerp	650
Rails	520 to 620
Beams	600 to 625
Angles	625
Rods	750 to 775
Wire rods	800
Hoops	900
Merchant iron: No. 2	600 to 625
Merchant iron: No. 3	625 to 650
Iron for making bolts	625 to 650
Iron for making horseshoes	725 to 775
Sheets: 5mm. and over	670 to 675
3 mm.	725
2mm.	750
1½ mm.	950
1 mm.	960 to 975
0.5 mm.	1,050

Above for basic quality; 25 to 30 fr. more for open-hearth.

	Fr. per Metric Ton
Galvanized wire	1,250 to 1,300
Barbed wire	1,350
Plain wire	1,000 to 1,100
Paris nails (pointes de Paris)	1,150
Structural steel, erected	1,250

The Hunter Crucible Steel Co., which recently acquired the plant of the Electric Steel & Forge Co., Cleveland, is making a number of changes to that plant, due to a change in the product. The new company will make alloy and carbon tool steels. A 30-pot crucible furnace and a car type annealing furnace are being installed. An extension 60 x 100 ft. to the main building with a 20-ft. leanto is being built to provide room for a warehouse and for shipping and inspection departments.

Interesting Events Relating to Labor

Addresses of President Harding and Attorney-General Daugherty and Action of Miners Cause Much Comment at the National Capital

BY L. W. MOFFETT

WASHINGTON, July 3.—Whether by chance or design, events concerning labor and capital developed the latter part of last week in a series of interesting instances. One followed so closely upon the heels of the other that casual observation might lead to the belief that they were timed for the occasion. Whether any of them were directly and purposely connected is speculative only, but in any case simultaneous development of some events in this field was merely a coincidence. This chain of events stretched from the Atlantic seaboard through Washington to Indianapolis and to Butte and Helena, Mont. It began at Indianapolis.

In that city last Thursday, Attorney-General Daugherty had Judge Anderson of the United States District Court nolle indictments against 226 coal operators, officials of the United Mine Workers and mining companies on the charge of conspiracy to violate the Sherman anti-trust law. Then followed publication of a letter from Chairman John Hays Hammond of the Federal Fact Finding Coal Commission warning anthracite coal miners in session at Scranton, Pa., that "public sentiment will not tolerate the suspension of its anthracite coal supply with the beginning of the fall and winter season." Almost at the same time, President Samuel Rea made a sharp answer to criticism of the Railroad Labor Board of the Pennsylvania Railroad for the alleged failure of the latter to abide by the decision of the board. Mr. Rea in effect declared that the Pennsylvania Railroad was following the precepts of a Supreme Court decision and was thoroughly within its constitutional rights in the handling of its labor problems. On Friday members of the United Mine Workers at Scranton, soon after receipt of the letter from Mr. Hammond, unanimously adopted demands to be presented in the immediate future to the coal operators for a two-year contract with a 20 per cent increase in the scale of wages.

Old Demand Repeated

This is virtually the same demand which developed the strike of last year when the miners returned to work after almost six months of idleness without an increase in wages, but maintaining the scale under which they had stopped work. They have, however, for the present refrained from taking action on the question of suspension of operations in case negotiations with coal operators run beyond Aug. 31, when the present contract expires.

At the same time this action of the United Mine Workers was taken, the most important and significant development took place at Butte and Helena. At those points, hotbeds of I. W. W'ism, President Harding delivered addresses that were rather startling. In a way, they were construed as a challenge to both capital and labor and likewise a defense of both, particularly of organized labor. The President served notice that he was prepared to defend organized labor against "those who hoped that the Administration would lend itself to their program of breaking down organized labor and sending it back to the era of individual bargaining for the individual job." The President then immediately followed this statement with the assertion that "on the labor side of the line were those who hoped by exorbitant demands, and an attitude of uncompromising insistance, to force the nationalism of some of our most important industries and services." The President declared that "between these two extreme groups, and confident that we had behind us the overwhelming public opinion of the Nation, we have tried to hold the scales even—to prevent on the one side the destruction of organized labor and, on the other side, to frustrate those programs which look to the ultimate destruction of private capital and the nationalization of all the national instrumentalities of production."

The President and the Railroads

The inference was given that the President in his reference to attempts to break down organized labor may have had the open shop movement in mind generally but that he particularly had in view what he apparently considers unjustified disregard by some of the railroad lines with respect to decisions of the Railroad Labor Board. At least it was interesting to observe that the President's statement came so quickly after that of President Rea. The President had previously during his present trip denoted irritation at the attitude of the Pennsylvania Railroad and it is even said that when he left Washington for the West he broke a precedent of many years by traveling over the Baltimore & Ohio Railroad instead of the Pennsylvania.

Students of economic conditions as affected by relations between capital and labor are firmly convinced that the events of last week constitute a series of elements that will crystallize into an Administration policy of far-reaching importance. Obviously there has been talk of the political phase of the matter as well.

Tracing over the events in the order named, these observers have given them certain interpretations that are interesting. The action of the Department of Justice in having indictments dismissed against the United Mine Workers Union and coal operators was not a genuine surprise, although accepted as being a curious turn of affairs. It will be recalled that previously the present Administration sought this action but was held up apparently because Judge Anderson was not then in accord with the idea. Attorney-General Daugherty, however, last week expressed confidence that a verdict of "not guilty" would be the inevitable result of trial of the case. It will be remembered that the indictments were returned during the final days of the Wilson Administration at the earnest behest of former Attorney-General A. Mitchell Palmer.

Mr. Daugherty's Strong Language

It was charged that coal operators and members of the union were guilty of conspiracy in taking up negotiations regarding wages, working hours, etc. The operators and members of the union retorted that they had been indicted for the precise thing which they had been asked to do during the war days by the Wilson Administration to stimulate production. It is said that Attorney-General Daugherty conceived that it would be inconsistent under this circumstance to seek an indictment. At the same time, it is considered strange that the Attorney-General in his statement last week before the court made a stinging statement in which he charged directly that many of the alleged controversies between organized miners and operators were pure fakes, which, he said, in substance, had as their object the fleecing of the public. It is felt that the Attorney-General himself was curiously inconsistent in asking for the dismissal of a formal charge of conspiracy when in the same breath he made the same charge in a more sweeping and blunt manner than ever made before by a high Government officer. The upshot, it is pointed out, is that the Government has left a public odium on the operators and miners, and that it should either prove its case or give them a clean bill of health.

It was reported that one of the purposes of seeking dismissal of the indictments was to "tranquilize" the coal industry. Apparently, if this were the object, it was partly defeated by the statement of the Attorney-General himself, and further weakened by the resumption by the anthracite miners of excessive wage demands. The letter of Chairman Hammond of the Coal Commission, may, it is said, have been an influence in at least preventing the miners from going to the limit of threatening immediate strike, if negotiations are not completed with coal operators before expiration of the existing wage contract. The turn of events taken by the anthracite miners naturally carries significance with respect to the bituminous coal labor situation inasmuch as the United Mine Workers represent both fields, though obviously there are different conditions applying in the two.

As a sidelight, it was a matter of interest that President John Lewis of the United Mine Workers delivered a tirade against W. Z. Foster and his ilk, who were dubbed as "international buzzards." This outbreak is not held to have been particularly significant. It is recalled with some amusement, that organized labor which now castigates Foster and his communistic followers so severely, worked under the Foster leadership during the days of the 1919 steel strike. Now that Mr. Foster is pretty nearly down and out, organized labor is delivering a few well-directed kicks at him and the radical policies he represents.

The President's speeches in Montana no doubt will be a source of a great deal of comment. They are construed as meaning that he has become irritated over what he considers to be excessive performances of capital on the one side and labor on the other and that he sought vigorously to admonish both, and to make it clear that he would not yield to either.

American Foundrymen to Visit the Paris Congress

British and French Associations Arranging on an Elaborate Scale for the Reception of Visitors from the United States— Tours of British, French and Belgian Plants

THE tour now being arranged by the American Foundrymen's Association in connection with the International Foundrymen's Congress and Exhibition which will be held in Paris in September, under the auspices of the Association Technique de Fonderie, is growing in importance as the plans of those in charge are further developed. H. Cole Estep, chairman of the association committee on international relations, has sent out from London an itinerary of the tour, with details so far as they have been arranged of the meetings that are to be held both in Great Britain and on the Continent. While the invitation to American foundrymen was extended on behalf of the French association, the British portion of the tour includes events of particular interest, as will be seen from the program given below. Already a number of representatives of the foundry trade have announced their intention of going and it is expected that the party will be increased by later acceptances.

The tentative list of those who will make the tour includes the names of V. E. Minich, American Foundry Equipment Co., New York; Stanley G. Flagg, Jr., and G. H. Clamer, Philadelphia; C. E. Hoyt, Chicago, secretary American Foundrymen's Association; J. S. McCormick and Q. S. Snyder, Pittsburgh; Jesse L. Jones, East Pittsburgh, Pa.; Dr. Richard Moldenke, Watchung, N. J.; John Hill, Cincinnati; C. S. Gilbert, Toronto. A number of those named will be accompanied by their wives and other members of their families.

The arrangements for the tour are in charge of Thomas Cook & Sons, under the direction of Stanley G. Flagg, Jr., Philadelphia, vice-chairman of the committee on international relations of the American Foundrymen's Association.

The different branches of the Institute of British Foundrymen and of the French and Belgian foundrymen's associations are making elaborate arrangements for the entertainment of the American delegation. Opportunities will be given to visit many of the most prominent European foundries and other manufacturing plants and to study European methods under the best auspices.

In London the Iron and Steel Institute will be one of the hosts. Another feature will be the visit to the shipping, engineering and machinery exhibition at Olympia, London.

The proceedings of the convention at Paris, Sept. 12-15, will include a discussion of international specifications for cast iron and papers on gray iron, steel and malleable foundry practice. Sessions will be held in English as well as in French.

Itinerary of the Tour

(In a few cases the arrangements are tentative and in others some slight changes may be made at a later date).

1923		
August		
Saturday	18	Leave New York in SS. Leviathan.
Friday	24	Arrive Southampton, proceeding immediately to London via special boat train.
Saturday	25	Trip by motor car to Windsor, inspection of the castle and tea, by invitation of London local committee.
Sunday	26	No arrangements.
Monday	27	Plant visitation London district. Dinner dance in the evening to which all members of the American delegation will be invited by the Iron and Steel Institute and London branch of the Institution of British Foundrymen.
		BRITISH TOUR
Tuesday	28	3:30 p.m. (probably). Leave for Sheffield from St. Pancras Station. 7:06 p.m. Arrive Sheffield. Royal Victoria Station Hotel.
Wednesday	29	Plant visitation at Sheffield, with reception and dinner in the evening by Sheffield branch, Institution of British Foundrymen.
Thursday	30	Excursion by motor to the Peak District and the Dukeries, Haddon Hall, Blythe, Edinstowe, Ollerton, Budby, Worksop and Anston.
Friday	31	2:22 p.m. Leave Sheffield. 5 p.m. Arrive Manchester. Midland Hotel. Dinner of welcome given by the National Ironfounding Employers' federation at the Midland Hotel.
September		
Saturday	1	Excursion visiting Smithfield Market, University, Royal Infirmary, Whitworth Institute, Trafford Park, Salford Docks, Manchester Docks, Town Hall, Albert Square, Cathedral, Royal Exchange, Art Gallery, and Ship Canal.
Sunday	2	Probably will be devoted to a visit to Chester, an English city first settled by the Romans.
Monday	3	Plant visitation Manchester district.
Tuesday	4	2:50 p.m. Leave Manchester. 4:50 p.m. Arrive Birmingham. Queen's Hotel.

Wednesday	5	Plant visitation Birmingham district, with reception in the evening by Birmingham and Coventry branches of Institution of British Foundrymen.
Thursday	6	Plant visitation Coventry district.
Friday	7	Excursion by motor car to Kenilworth, Guy's Cliff, Warwick Castle, Stratford-on-Avon, Memorial Theatre, Harvard House, Trinity Church and Anne Hathaway's Cottage, etc. 4:24 p.m. Leave Leamington. 5:55 p.m. Arrive London. Cecil Hotel.
Saturday	8	London; no arrangements.
Sunday	9	London; no arrangements.
Monday	10	London. Official visit to Shipping, Engineering and Machinery Exhibition, Olympia.
Tuesday	11	2 p.m. Leave London for Paris with Institution of British Foundrymen party, via Dover-Calais. 9:40 p.m. Arrive Paris. Lutetia and other hotels.

INTERNATIONAL FOUNDRYMEN'S CONGRESS

Wednesday	12	9 a.m. Registration of visitors, distribution of badges, and reception at the Ecole des Arts et Metiers, Boulevard de l'Hopital. 10 a.m. Opening ceremony by the secretary for technical education of the French Government, followed by a technical session. 3 p.m. Visit to the exhibition of foundry and shop equipment and the school foundries and workshops.
Thursday	13	9 a.m. Technical session in English, with papers by members of A.F.A. and I.B.F. 2:30 p.m. Plant visitation, Paris district.
Friday	14	9 a.m. Technical session. 1 p.m. Luncheon at the Eiffel tower, visit to the tower machinery. 3 p.m. Visit to Paris foundries.
Saturday	15	9 a.m. Final technical session. 1 p.m. Meet at the pleasure boat *Le Touriste,* on which luncheon will be served, for excursion to St. Gervais and visit to the forest and castle. 5:30 p.m. Return to Paris. 7:30 p.m. Interallied Foundrymen's banquet.
Sunday	16	No arrangements.
Monday	17	Paris, sightseeing.

CONTINENTAL TOUR

Tuesday	18	5 p.m. Leave Paris, Gare de l'Est. Dinner on train. 9:42 p.m. Arrive Nancy. Grand and other hotels.
Wednesday	19	Plant visitation Nancy district, including trip to a salt mine.
Thursday	20	Leave Nancy by motor car for American battle fronts via Mousson, St. Mihiel and Verdun to Metz. Hotel Royal and other hotels.
Friday	21	10:57 a.m. Leave Metz; lunch on train. Arrive Namur 4:54 p.m., leave Namur 5:50 p.m. 7:55 p.m. Arrive Liege. Hotel de Suede and other hotels.
Saturday	22	9 a.m. Visit to Cockerill Works, the Conduit d'Eau plant, and Fabrique Nationale works in separate parties. 2 p.m. Visit to the forts of Liege with a reception by the colonel commanding. Reception and dinner in the evening by Belgian Foundrymen's Association.
Sunday	23	9:26 a.m. Leave Liege. 10:35 a.m. Arrive Brussels. Motor char-a-banc to meet train for three-hour drive around city. Hotel Metropole.
Monday	24	8:52 a.m. Leave Brussels. 11:19 a.m. Arrive Lille. Hotel Bellevue and other hotels. 1 p.m. Leave by train for visitation to Croix works of International Harvester Co. of America.
Tuesday	25	9:10 a.m. Leave Lille. 12:10 p.m. Arrive Paris. Hotel Wagram.
Wednesday	26	Leave Paris by boat train for Cherbourg and embark on White Star Line SS. Homeric.
October Tuesday	2	Due to arrive in New York.

Judge Gary's Position on Seven-Day Week and Twelve-Hour Day

Judge Elbert H. Gary, chairman United States Steel Corporation, in a letter to H. L. Bowlby, general secretary of the Lord's Day Alliance of the United States, dated June 23, replying to an inquiry as to his attitude toward the six-day week, said:

"Immediately after the armistice was signed we entirely discontinued the seven-day week, and since that time have been operating on the six-day basis. I am not aware of any infringement. If we should learn of any a remedy would be promptly provided.

"We do not believe in the seven-day week. Also, we are actually opposed to the twelve-hour day and are hoping that in the comparatively near future that will be eliminated."

Pratt & Letchworth Co. Merged with Dayton Malleable Iron Co.

BUFFALO, July 2.—Sale of the Pratt & Letchworth Co., Buffalo, to the Dayton Malleable Iron Co. became effective today. The Pratt & Letchworth foundry is the oldest in Buffalo and has an annual output of 40,000 tons of malleable, gray iron and steel castings. The present officers will be continued. The original business of the company was the manufacture of carriage and saddlery hardware and later it entered the manufacture of railroad equipment. About 1500 men are employed. John C. Bradley is chairman of the board of directors. Under the terms of the transaction, stockholders in the Pratt & Letchworth Co. surrender their shares for stock in the Dayton company. The sale was announced in THE IRON AGE May 31, page 1607.

Large Foundry Additions to Plant of Cadillac Motor Car Co.

DETROIT, July 2.—Plans have been completed for the erection of three large foundry units to be added to the main plant of the Cadillac Motor Car Co., Detroit, a division of the General Motors Corporation, according to an announcement June 30 by H. H. Rice, president of the Cadillac company. The new foundries will be utilized for the production of gray iron, aluminum and brass castings used in the Cadillac car. Construction is expected to start in the near future and the new additions will have a capacity equal to the main plant production and will also match that plant in its layout and efficiency.

De Bardeleben Coal Company Organized

BIRMINGHAM, Ala., July 3.—De Bardeleben Coal Corporation is the name of the merger of the Empire, Corona and De Bardeleben Coal companies in Alabama. Henry T. De Bardeleben is president, Wilton H. Fies vice-president and operating manager and G. M. Bowers secretary and treasurer. They occupied such offices with the De Bardeleben company that has been absorbed. Cassatt & Co., Drexel & Co. and other investment bankers have underwritten $4,000,000 of 6½ per cent bonds to fall due at the rate of $200,000 each per annum from 1924 to 1949. The estimated value of the absorbed properties is stated at $7,678,000. Annual coal production for five years has averaged 1,114,000 tons and average net earnings of merged companies in same period have been $1,052,000 per annum. The coal is available both for river and rail shipment and the merged companies already have exceptional bunkerage and export facilities at Mobile, New Orleans and Pensacola besides shipping to Galveston and Houston out of Mobile. The proceeds of the bonds will be applied in part in payment of the absorbed properties. The new company was incorporated in Delaware and has taken out an Alabama charter with $3,000,000 of capital stock here.

JUNE PIG IRON OUTPUT

Less Than May But Larger Than April —Decline from May 2484 Tons Per Day

Eight Furnaces Blown In and Seven Blown Out—Net Gain of One

According to data collected largely by telegraph, the blast furnace production of the country in June shows a moderate halt in the rapid advance which has characterized the trend in the last few months. While the total last month is less than the May total it is interesting to note that it is larger than the April output, with which it can properly be compared, as they are both 30-day months. Although the daily output in June was less than that of May by about 2 per cent, it was about 3800 tons per day larger than the April rate.

Production of coke and anthracite pig iron for the 30 days in June amounted to 3,668,413 gross tons, or 122,280 tons per day, as compared with 3,867,694 tons, or 124,764 tons per day in May, a 31-day month. The April total, a 30-day month, was 3,549,736 tons, or 118,324 tons per day. The June increase over April was therefore 118,677 tons or 3856 tons per day, both 30-day months. There were eight furnaces blown in and seven blown out, a net gain of one, which compares with a net gain in May of 11 and in April of 14.

The total number of furnaces in blast on July 1 was 322, as compared with 321 on June 1 and 310 on May 1. The capacity of the 322 furnaces operating on July 1 is estimated at about 125,000 tons per day, as compared with 125,100 tons per day for the 321 furnaces in blast on June 1.

The ferromanganese production in June was 19,719 tons, or close to the average output for the preceding five months. The spiegeleisen output last month was the heaviest this year at 18,289 tons, or nearly twice the quantity made in May.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from June, 1922, is as follows:

Daily Rate of Pig Iron Production by Months. Gross Tons

	Steel Works	Merchant	Total
June, 1922	62,534	16,167	78,701
July	62,295	15,297	77,592
August	45,672	12,914	58,586
September	58,856	13,935	67,791
October	66,060	19,032	85,092
November	72,177	22,813	94,990
December	75,179	24,398	99,577
January, 1923	79,991	24,190	104,181
February	80,884	26,251	106,135
March	87,917	25,792	113,673
April	90,145	28,179	118,324
May	96,029	28,735	124,764
June	96,978	31,304	122,280

The figures for daily average production, beginning with January, 1917, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921	1922	1923
Jan.	101,642	77,799	106,525	97,264	77,945	53,063	104,181
Feb.	94,473	82,835	105,006	102,720	69,187	58,214	106,935
Mar.	104,882	103,648	99,685	108,900	51,468	65,675	113,673
Apr.	111,165	109,607	82,607	91,237	39,713	69,070	118,324
May	110,238	111,175	68,002	96,312	39,394	74,409	124,764
June	109,002	110,793	70,495	101,451	35,494	78,701	122,280
July	107,820	110,354	78,340	98,931	27,889	77,592	.....
Aug.	104,772	109,341	88,496	101,529	30,780	58,586	.....
Sept.	104,800	110,907	84,000	104,310	32,850	67,791	.....
Oct.	106,550	112,482	60,115	106,212	40,215	85,092	.....
Nov.	106,859	111,802	79,745	97,830	47,183	94,990	.....
Dec.	92,997	110,762	84,944	87,222	53,196	99,577	.....
Year	104,619	105,496	83,789	99,492	45,325	73,645	.....

Among the furnaces blown in during June were the following: The new No. 2 Northern furnace of the Witherbee-Sherman Co., in New York, and the Musconetcong furnace in New Jersey; "D" furnace of the Bethlehem Steel Co. in the Lehigh Valley; one Temple furnace in the Schuylkill Valley; the Sheridan furnace of the Lavino Furnace Co., in the Lebanon Valley; the Sharpsville furnace in the Shenango Valley; the fourth River furnace in northern Ohio and the Sheffield furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama.

The furnaces blown out or banked during June were the following: The Ella furnace of E. W. Mudge & Co. in the Shenango Valley; the Rebecca furnace in the Shenango Valley; the Norton furnace in Kentucky; the Hannah furnace of the Republic Iron & Steel Co. in the Mahoning Valley; one Central furnace of the American Steel & Wire Co. in northern Ohio, and the Napier and Standard furnaces in Tennessee.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for June and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York	250,625	266,658	235,553	226,668
New Jersey	26,033	24,605	18,758	12,551
Lehigh Valley	91,078	93,493	87,366	83,690
Schuylkill Valley	120,704	123,061	108,744	97,065
Lower Susquehanna and Lebanon Valleys	64,372	64,609	46,682	44,558
Pittsburgh district	737,773	789,330	769,672	790,708
Shenango Valley	164,962	169,708	146,032	136,502
Western Pa	198,606	221,369	199,177	180,926
Maryland, Virginia and Kentucky	89,164	107,613	103,245	109,253
Wheeling district	149,067	157,071	146,303	134,026
Mahoning Valley	378,196	383,068	362,843	383,469
Central and Northern Ohio	289,453	309,261	298,797	318,774
Southern Ohio	74,798	77,402	80,344	51,186
Illinois and Indiana	617,502	646,913	556,223	534,680
Mich., Minn., Mo., Wis. and Colo	157,579	160,456	144,723	140,354
Alabama	239,200	248,310	241,674	254,239
Tennessee	19,901	23,267	23,600	24,219
Total	3,668,413	3,867,694	3,549,736	3,523,868

The fluctuations in pig iron production for 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1919—Gross Tons

	1919	1920	1921	1922	1923
Jan.	3,302,260	3,015,181	2,416,292	1,644,951	3,229,604
Feb.	2,940,168	2,978,879	1,937,257	1,629,991	2,994,187
Mar.	3,090,243	3,375,907	1,595,522	2,035,920	3,523,868
Apr.	2,478,318	2,739,797	1,193,041	2,072,114	3,549,736
May	2,103,056	2,985,682	1,221,221	2,306,679	3,867,694
June	2,114,853	3,043,540	1,064,833	2,361,023	3,668,413
½ year	16,033,808	18,138,986	9,428,166	12,050,683	20,833,502
July	2,428,541	3,067,043	864,555	2,405,365	.....
Aug.	2,743,388	3,147,402	954,193	1,816,170	.....
Sept.	2,487,965	3,129,323	985,529	2,033,720	.....
Oct.	1,863,558	3,292,597	1,246,676	2,637,844	.....
Nov.	2,292,350	2,934,908	1,415,481	2,949,703	.....
Dec.	2,633,268	2,703,855	1,469,086	3,036,898	.....
Year*	30,582,878	36,414,114	16,543,686	26,880,383	.....

*These totals do not include charcoal pig iron. The 1922 production of this iron was 224,731 tons.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month,

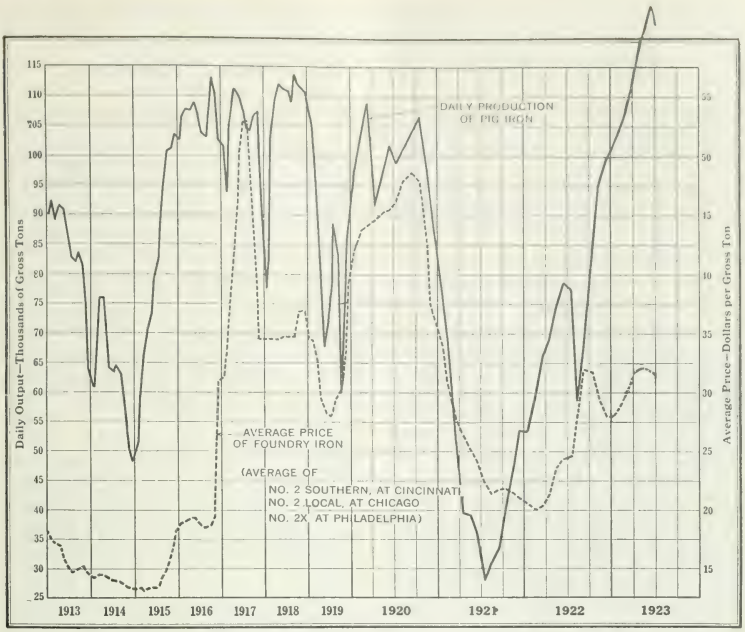


Diagram of Pig Iron Production and Prices

together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production		Spiegeleisen and Ferromanganese			
			1922		1923	
	1922	1923	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	1,306,045	2,479,727	6,874	1,230	19,358	12,056
Feb.	1,311,170	2,259,154	3,610	4,930	21,383	3,657
Mar.	1,629,982	2,724,305	11,600	2,095	20,730	13,832
Apr.	1,707,902	2,704,360	14,998	4,211	20,808	7,440
May	1,879,180	2,976,892	15,432	4,902	19,568	9,533
June	1,876,033	2,729,294	18,273	4,817	19,719	18,289
6 mos.	9,710,312	15,873,732	70,787	22,185	121,566	64,807
July	1,931,138	.....	18,873	7,176	.....	.....
Aug.	1,415,832	.....	11,402	7,925	.....	.....
Sept.	1,615,696	.....	10,681	4,285	.....	.....
Oct.	2,047,873	.....	9,193	12,283	.....	.....
Nov.	2,165,295	.....	12,232	4,192	.....	.....
Dec.	2,330,545	.....	17,007	10,591	.....	.....
Total	21,216,691	.....	151,175	68,587	.....	.....

Amendments made by the biennial session of the Wisconsin Legislature to the State workmen's compensation act and approved by the Governor have the effect of increasing the cost to employers 9.5 per cent over the former cost. Benefits to injured workmen are subject to an increase of 13.5 per cent on an average. The maximum weekly compensation is increased from $16.90 to $18.20, and the maximum amount payable for a single injury is raised to $16,380, which is in the case of a person 30 years old or under who is permanently disabled totally.

Shipments to Pacific Coast

BIRMINGHAM, ALA., July 2.—The movement of Birmingham iron and steel products to the Pacific Coast via Mobile and latterly via Pensacola still continues regular in volume as well as variety. Practically all Pacific ports are touched. A cargo of a vessel leaving Mobile recently was as follows: For Los Angeles, 334 tons of pig iron, 56 tons of sanitary pipe, 48 tons of pressure pipe, 150 tons of nails and wire; for Oakland, 983 tons of pig iron; for San Francisco, 48 tons of hoop steel, 117 tons of pressure pipe, 161 tons of sanitary pipe and 146 tons of nails and wire; for Tacoma, 530 tons of cast iron pipe; for Seattle, 398 tons of wire and nails, 87 tons of cast iron pipe and 100 tons of pig iron; for Honolulu via San Francisco, 50 tons of pressure pipe and 58 tons of sanitary pipe. On the same day, the following cargo left for Japan: For Dairen, 3000 tons of rails; for Kobe, 15,000 lb. of splice bars, 10,000 lb. of spikes and 2300 lb. of bolts and nuts. The same day Buenos Ayres took 125 tons of wire and Havana 16 tons of barbed wire.

Fewer holders of United States Steel Corporation common stock were reported at the closing of the books for the June dividend, the number having diminished 1059 from the March figure, 94,198. This compares with 78,944 in May, 79,353 in February and the high mark of 107,439 reported in the last quarter of 1921. Since the date last noted, the number of common stockholders has fallen off every quarter, excepting the first quarter of this year. Preferred holders numbered 78,944 in May and 79,353 in February.

Iron and Steel Markets

SUSTAINED CONSUMPTION

Pig Iron and Steel Ingot Output Slightly Less

Further Decline in Primary Materials—Less Lake Ore Needed—Mill Shutdowns Limited

The steel trade enters upon the second half of 1923 with production of pig iron only 2 per cent and that of steel ingots about 5 per cent below the year's peak reached in May. There is no measurable change in the large volume of product moving into consuming channels. Prices of the important forms of finished steel are at a stand, but buyers are getting better delivery promises and are keeping orders close to known needs.

As has been the case for several weeks, primary materials are giving ground, fresh declines being reported in coke, pig iron and scrap.

Pig iron figures for June, received on the first business day of July, show an output last month of 3,668,413 tons, or 122,280 tons a day, against 3,867,694 tons in the 31 days of May, or 124,764 tons a day. Eight furnaces blew in last month and seven blew out, 322 furnaces being active on July 1, against 321 one month previous.

Humidity cut down the output in June, and a further slight falling off is looked for in July, as several furnaces are going out for relining. Active capacity June 1 was 125,100 tons a day and was practically unchanged on July 1.

A number of sheet mills are closed down this week; some few will be idle next week also. The Steel Corporation's shutdowns are limited at most plants to July 4, and this is the program also of most independent companies.

Generally speaking, labor shortage and weather conditions are offsetting in part the tendency of some rolling mills to catch up with their orders. Final specifications on second quarter contracts came in freely last week, indicating that consumers want what they have bought.

The week's fabricated structural steel contracts were brought up to the average of recent weeks by unusual purchases, totaling 11,500 tons, for oil tanks. Private projects continue noteworthy among structural inquiries. Some recent bids on fabricated work indicate that plain material was figured considerably below the 2.50c. basis.

That business in finished steel was better in June than in May was due chiefly to rail and other railroad buying. The gain shows no change of attitude by manufacturer buyers, who mostly placed small tonnages for specified purposes and definite deliveries.

The sheet market is inactive and the concession of $1 a ton on black sheets continues. The mill shutdowns will bring supply and demand into closer relation. The automobile companies are buying body sheets rather more freely, some for third quarter and some for shorter periods. The Ford Motor Co.'s July schedule is 7040 cars a day, or 176,000 cars for 25 working days.

A good deal of tin plate inquiry has come up for July and August shipment, including one lot of 500,000 boxes and another of 100,000 boxes.

Variations in bolt, nut and rivet prices are still a feature, with evidences of weakness in several quarters.

In the pig iron market, on limited sales, price recessions are general. Basic iron has declined $1.50 to $25.50, Valley, and 2500 tons was sold at $25.25. Prices on both foundry and steel making grades are down $1 at Chicago and on resales charcoal iron has been sold $3 below furnace quotations. In Buffalo, Cleveland and eastern Pennsylvania quotations on foundry grades have receded, while in the South $25, Birmingham, still prevails.

Lake iron ore shipments were heavy in June, reaching 9,499,500 tons, making the total 16,185,482 tons to July 1. But with the expected curtailment in pig iron production in the Middle West some furnaces will not take as much ore as they planned early in the season. In consequence, mining operations will not be pushed and the 1923 Lake Superior output is now estimated at nearer 55 million tons, whereas 60 millions was the early season figure.

Of the recent rail awards by the Imperial Government Railways of Japan about 5000 tons is reported to have gone to a Belgian mill at £9 18s c.i.f. Japan, or not far from $46.

It takes 7,800,000 marks this week to buy a ton of sheets in Germany, or as much as would have bought a 4000-ton cruiser ten years ago, but at current exchange this is only 2.03c. per pound. Sharp advances in German iron and steel prices on July 2 did not offset the fall in exchange and the steel bar quotation, for example, is equivalent to 1.25c. per pound and No. 1 foundry iron to $18.68 per gross ton.

For nine weeks THE IRON AGE finished steel composite price has stood at 2.789c. per lb.—within 1½ per cent of the highest point in 28 months.

Lower than it has been since the first week of February last, THE IRON AGE pig iron composite price is now at $26.79 per gross ton, against $27.79 last week. It is now more than $4 below its high point in March and April.

Pittsburgh

Steel Prices Maintained—Pig Iron, Coke and Scrap Are Weak

PITTSBURGH, PA., July 2.—Continued weakness in the primary materials, coke, scrap and pig iron, still is without influence on steel prices, which generally are well maintained. June business in finished steel products was better than that for the previous month, but the gain reflected no change of attitude on the part of buyers toward the market, as it was made up chiefly of small tonnages for a specific purpose and for a specified delivery. Indeed, buyers have continued to move with extreme caution with regard to their future requirements, and it is noted that they have not ex-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 2, 1923	June 26, 1923	June 5, 1923	July 3, 1922
No. 2X, Philadelphia*	*$29.76*	$30.76	$30.76	$27.64
No. 2, Valley furnace†	26.50	26.50	29.00	24.00
No. 2, Southern, Cin'ti†	29.05	29.05	29.55	22.55
No. 2, Birmingham, Ala.†	25.00	25.00	25.50	18.50
No. 2 foundry, Chicago*	*29.00*	30.00	32.00	24.00
Basic, del'd, eastern Pa.	*28.00*	28.14	28.14	25.75
Basic, Valley furnace	*25.50*	27.00	27.50	25.00
Valley Bessemer, del Pitts.	29.27	29.27	30.77	26.77
Malleable, Chicago*	*29.00*	30.00	32.00	24.00
Malleable, Valley	26.50	26.50	29.00	24.50
Gray forge, Pittsburgh	27.77	27.77	30.27	25.27
L. S. charcoal, Chicago	36.65	36.65	36.65	31.65
Ferromanganese, furnace	125.00	125.00	130.00	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets Pittsburgh	42.50	42.50	43.00	35.00
O.-h. billets, Pittsburgh	42.50	42.50	45.00	35.00
O.-h. sheet bars, P'gh.	42.50	42.50	4500	35.00
Forging billets, base, P'gh.	47.50	47.50	55.00	40.00
O.-h. billets, Phila.	47.67	47.67	50.17	40.17
Wire rods, Pittsburgh	51.00	51.00	51.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	2.45	2.45	2.45	1.70
Light rails at mill	2.25	2.25	2.25	1.70

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.72	2.72	2.72	1.925
Iron bars, Chicago	2.50	2.50	2.60	1.80
Steel bars, Pittsburgh	2.40	2.40	2.40	1.70
Steel bars, Chicago	2.60	2.60	2.60	1.75
Steel bars, New York	2.74	2.74	2.74	2.04
Tank plates, Pittsburgh	2.50	2.50	2.50	1.70
Tank plates, Chicago	2.80	2.80	2.80	1.75
Tank plates, New York	2.84	2.84	2.84	2.04
Beams, Pittsburgh	2.50	2.50	2.50	1.70
Beams, Chicago	2.70	2.70	2.70	1.75
Beams, New York	2.84	2.84	2.84	2.04
Steel hoops, Pittsburgh	3.30	3.30	3.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	July 2, 1923 Cents	June 26, 1923 Cents	June 5, 1923 Cents	July 3, 1922 Cents
Sheets, black, No. 28, P'gh.	3.85	3.85	3.85	3.15
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.15
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.40
Wire nails, Pittsburgh	3.00	3.00	3.00	2.40
Plain wire, Pittsburgh	2.75	2.75	2.75	2.25
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.05
Tin plate, 100-lb box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material Per Gross Ton:				
Carwheels, Chicago	*$21.00*	$21.50	$22.50	$18.50
Carwheels, Philadelphia	22.00	22.00	23.00	17.50
Heavy steel scrap, P'gh.	*20.00*	20.50	21.50	17.50
Heavy steel scrap, Phila.	17.50	17.50	18.00	15.00
Heavy steel scrap, Ch'go.	*17.25*	17.50	18.50	15.00
No. 1 cast, Pittsburgh	*22.50*	23.50	25.00	19.00
No. 1 cast, Philadelphia	*21.00*	22.00	23.00	17.50
No. 1 cast, Ch'go (net ton)	21.50	21.50	22.00	17.00
No. 1 RR. wrot. Phila.	21.00	21.00	23.00	17.00
No. 1 RR. wrot. Ch'go. (net)	15.00	15.00	16.00	13.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.75	$4.75	$4.75	$8.50
Foundry coke, prompt	5.50	5.50	5.75	9.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*15.00*	15.12½	15.25	13.75
Electrolytic copper, refinery	*14.50*	14.75	14.75	13.50
Zinc, St. Louis	**5.75**	5.70	6.40	6.35
Zinc, New York	**6.10**	6.05	6.75	5.70
Lead, St. Louis	*6.55*	6.70	7.05	5.55
Lead, New York	*6.85*	7.00	7.30	5.75
Tin (Straits), New York	*38.50*	40.37½	41.87½	....
Antimony (Asiatic), N. Y.	**6.95**	6.75	7.00	5.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price July 2, 1923, Finished Steel, 2.789c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

June 26, 1923,	2.789c.
June 5, 1923,	2.789c.
July 3, 1922,	2.169c.
10-year pre-war average,	1.689c.

Composite Price July 2, 1923, Pig Iron, $26.79 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

June 26, 1923,	$27.79
June 5, 1923,	28.46
July 3, 1922,	24.19
10-year pre-war average,	15.72

perienced much trouble in finding accommodation on early delivery orders without the necessity of having to bid prices up to get them.

The pig iron market still is unsettled because buyers apparently are looking for lower prices before there is a turn in the other direction. On a sale of 1500 tons of basic to a Sharon, Pa., consumer price of $25.50, Valley furnace, a decline of $1.50 from the nominal quotations of previous weeks, was developed.

Sharply lower prices again have been reached on old material, while the coke market now is at a parity on both spot and contract tonnages of furnace grades. A contract was made following our last report at $5, but since then another one has been made at $4.75.

This week will be marked by a considerable suspension of sheet mill activities in this and nearby districts, manufacturers having decided upon this week as a good one to make mill repairs as well as to afford the crews a vacation. The Jones & Laughlin Steel Corporation, however, plans a suspension lasting only over the Fourth of July in most departments. McKeesport Works, National Tube Co. will be down from the day before the holiday until the end of the week. Other plants of this company will be in operation except on the holiday, and the general plan of the Steel Corporation is merely to suspend for the day. Loss of steel production probably will not be as great as that in the finished products, since it is in the finishing mills, where the suspension will be most extensive.

Pig Iron.—Various reports are current as to the price paid by the National Malleable Casting Co. on 3000 tons of basic iron for its Sharon, Pa., plant. One report is that the iron, or some of it, was purchased at $25.76, delivered, which would figure back to $25, furnace, but this report could not be confirmed. On 1500 tons, it is known the price was $25.50. This business is the only important test the market has had on basic grade since a week ago, and buyers are not convinced that it developed as low a price as may yet be done. Such business as has been done in other grades has been at the prices of a week ago. The market still lacks activity, and as there is a good deal of iron piled on furnace yards in Pittsburgh and nearby districts, and as most of the merchant furnaces will have completed present orders by Aug. 1, it must still be regarded as a situation more favorable to buyers than sellers, especially if to those circumstances may be added the fact third quarter coke tonnages have lately

been placed as low as $4.75, at ovens. W. P. Snyder & Co. report the average price of basic iron from Valley furnaces in June as $26.57 against $28.056 for May, and of Bessemer at $28.50, against $30.10 in May.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$25.50
Bessemer	27.50
Gray forge	26.00
No. 2 foundry	26.00
No. 3 foundry	26.00
Malleable	26.50
Low phosphorus, copper free	25.00

Ferroalloys.—Demands are almost entirely for single carloads, but prices hold steady in the lack of selling pressure. General quotation on ferromanganese is $125, seaboard or furnace, for either domestic or imported material, but we note one sale of 50 tons of the latter for August delivery at $120. Resale lots of 50 per cent ferrosilicon are coming on the market at less than quotations, but makers to date have not gone under $87.50, delivered, and some still are asking $90, though that price now is regarded as practically unobtainable. There is little interest in spiegeleisen or in Bessemer ferrosilicon and silvery iron in this district. Prices of the latter have not changed, but may be expected to follow the decline in pig iron. A resale offering of about 400 tons of English ferromanganese is available at $118 c.i.f. Baltimore. Prices are given on page 49.

Semi-Finished Steel.—Demand is very limited, as non-integrated manufacturers are well covered against their immediate requirements and as third quarter contracts are coming out rather slowly, it is evident that these interests expect to be able to do as well or better on prices a little later on. A number of users of wire rods have not yet placed their third quarter business, and this also is true of several makers of sheets. The first half of this month will be marked by a rather low rate of finishing mill operations; this is reflected in the demand and meanwhile the integrated manufacturers, expecting to keep their steel works going, will have steel which must be sold or piled. They want to sell, and accordingly it is easy to secure billets, sheet bars and slabs for early delivery at $42.50. An inquiry for a sizable tonnage of forging billets, against which $47.50 to $50 has been quoted, still is open. There is almost no open market demand for skelp, and while makers are holding to 2.45c., that figure finds little actual basis in sales. Prices are given on page 49.

Wire Products.—The market is quieter, even on nails and plain wire, which have enjoyed a more sustained demand than the other products under this heading. The Steel Corporation subsidiary is not a free seller yet, but buyers find it easier to get a place on its books than was the case recently. There also is some modification of the sales policy of independents, who hitherto have been entertaining new business only to the extent of completed orders. Stocks in consuming and distributing hands vary considerably, but average up to normal in most parts of the country. There are no intimations of any price concessions. Prices are given on page 48.

Steel Rails.—Users of light rails still are buying moderately, and while they do not get a lower price than 2.25c., base, for sections rolled from billets or standard rail crops, they do not have to go above that price. The move of the leading Eastern independent maker to set up an extra of $2 a ton over base for 110 to 130-lb. rails found no support from other makers, and the order has been rescinded. The price of standard rails, therefore, remains at $43 per gross ton for all weights.

We quote 25- to 45-lb. sections, rolled from new steel, 2.25c. base; relaid from old rails, 2.15c. to 2.25c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Tubular Goods.—The fact that some makers of steel pipe now are in a position to make fairly prompt deliveries on line pipe is resulting in a number of orders for this class of goods. Most of the business is in small lots, but it helps the mill schedules, which were beginning to suffer in some cases from the light new buying. A Youngstown and a Pittsburgh mill will share with British and Canadian makers in a 250-mile gas line from Alberta, Can., recently placed by the Northwest Utilities Co., Toronto, Can. This line has been under consideration since before the war. About 25,000 tons is involved, about a third of which will be supplied by nearby mills. June orders and specifications for pipe, notably in merchant pipe, showed a gain over those for May, but remained below the shipments on old orders. The general situation is easier as to delivery promises, but not with regard to prices. In fact, one mill is said to be asking a premium of $2 a ton for quick shipment of standard pipe. Discounts are given on page 48.

Sheets.—Current business is light, although there continues to be a good deal of pressure for deliveries upon the mills, which have taken contracts for the present quarter. This pressure is especially heavy from the automotive industry, which, contrary to expectations and predictions, has not yet slowed down appreciably, at least not so far as the makers of the popular cars are concerned. Suspension by independent sheet mills is general this week. Shutdowns run all the way from one to two weeks. It is figured that the drop in production will compensate for any loss of business and bring supply and demand more nearly in line than they were recently. The leading interest plans to shut down only for the holiday, but will lose more than a day's production, since the men are likely to absent themselves on the day or two afterward. Prices show no particular change. They are given on page 48.

Tin Plate.—There is a demand of considerable proportions for material for shipment this month and next, but none of the mills seems interested, as production has been kept in check by labor and weather conditions and most manufacturers believe they will be fortunate to get out such tonnage as they already have for the current quarter. One early delivery inquiry is for 100,000 boxes, while another is for 500,000 boxes. The price, $5.50 per base box, is a fixture.

Bolts, Nuts and Rivets.—Pressure for shipments on old and low-priced orders is a good deal heavier than the new demands. Buyers are not satisfied that present prices will hold and accordingly are cautious. Prices and discounts are given on page 48.

Cold-Finished Steel Bars and Shafting.—Only by a considerable stretch of imagination could this product be called active; yet there is a very fair amount of business, usually for early and specified delivery, buyers showing little inclination to buy beyond their known requirements. Contracts for third quarter tonnages have been fairly well up to the second quarter average, but buyers in few cases are specifying beyond the present month. An Eastern maker is reported to be taking business at 3.15c. base, Pittsburgh, but mills in this territory are adhering to 3.25c. base. Ground shafting is unchanged at 3.65c. base, f.o.b. mill, carload lots.

Hot-Rolled Flats.—Most makers of hoops and bands have sufficient business to be rather disinterested in more except at full prices. The few not thus situated, however, find it difficult to secure orders except by making attractive prices, and they are reported to have gone as low at 3.05c., base, in their quest for business. The market for hot-rolled strips also is irregular, with some well filled up and holding firmly to 3.30c., base, but with others in need of orders and going as low as 3c., base, to get them. The monthly carrying charge of 1c. per bundle per month on cotton ties went on yesterday. It now develops that the Steel Corporation price on hoops and bands never has gone above $3.15, base, and that is its present quotation. It is not in a position, however, to take on business for early delivery. Prices are given on page 48.

Cold-Rolled Strips.—Specifications from the automotive industry are light at the moment, and general demand is not sufficient to fully engage capacity. The market still is quotable at 5c. to $5.25c., base, Pittsburgh, the lower price being that of the Steel Corporation, but which is being met by some independent mills.

Track Fastenings.—Eastern makers of small spikes are going as low as $3.50 base, 100 lb., to get orders for small railroad spikes, but local makers show a dis-

position to stock production rather than meet that price. Demand for this size of spike is very light, owing to the coal situation, which is so dull and depressed as to discourage full operations, to say nothing of fresh development work. Makers are well supplied with business in other products under this heading, and are not yet in need of more to the extent of being willing to cut prices. Quotations are given on page 49.

Iron and Steel Bars.—Current demands for steel bars are moderate, because consumers are getting such good deliveries against old orders, and these generally at well below today's prices. The Steel Corporation still is far behind its orders and unable to make very prompt shipments against new business, but this is not the condition of the independents, some of whom can ship in two or three weeks and on orders for a single size of bar, have been known to make deliveries within a week. There is little sign of forward buying; indeed, on such business as is coming out, the steel is for a specific requirement and for delivery on a specified date. Too many makers are open for such business for buyers to be obliged to pay a premium for such service. The top and bottom on the market is 2.40c., base, Pittsburgh. With the extra of 15c. per 100 lb. for cold-finishing quality bars, makers of cold-finished bars claim that screw stock quality rods are cheaper by $1 per ton. The leading interest, besides imposing an extra $3 per ton for hot-rolled bars for cold finishing, also has issued a new card of extras for size, cutting, etc., materially advancing these extras over the old card, the new list being dated July 1. No change is noted in iron bar prices.

We quote soft steel bars, rolled from billets, at 2.40c., base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—Prices are pretty solidly maintained at 2.50c. base, Pittsburgh, by local mills. The only change in the situation as compared with a month or so back is that this price carries a better delivery than it did then, although local mills claim to have several weeks' business in sight. New demands are moderate, probably because the mills now are delivering fairly well against old and low-priced business. It is claimed that low-priced material must be available, since recent bids on fabricated jobs have indicated that the plain material has been figured in at well below today's prices. Prices are given on page 48.

Plates.—Tank builders are showing a lively interest in small tonnage for early delivery; they are figuring on a number of oil storage tanks, need for which has developed as a result of the decline in crude oil prices. A number of sales running from 300 to 1000 tons have been made to these interests at the regular market base of 2.50c., Pittsburgh; this price has been paid readily enough, but with the proviso that delivery should be made in three to four weeks. The Steel Corporation is not catching up with its obligations to be able to promise this kind of delivery. Prices are given on page 48.

Coke and Coal.—Prices of contract furnace coke have receded further since a week ago, with business for third quarter having been done in the week under review at $5 per net ton, at ovens, and even $4.75. Operators have pretty well abandoned the $5.25 price and are now seeking $5; in view of business at a lower price, that figure really is a negotiation price. Spot furnace coke still takes a range of $4.75 to $5; the market is a little stronger in this direction, due to the fact that makers of inferior grades, who have been creating much competition, have largely withdrawn from the market. Spot foundry coke is quoted from $5.50 to $6 and on last half contracts about $1 higher. The coal market still is weak, with mine run steam coal readily obtainable at $1.75 to $2 per net ton at mines and gas and coking coal mine run grade, at $2.25. Slack grade has stiffened slightly in price, steam slack now being priced at $1.15 to $1.25 and gas slack at $1.40 to $1.50.

Old Material.—Downward tendency of prices still is unchecked. Such mill buying as is noted is for very small tonnages, and there are so many dealers with material they must move that the prices are almost wholly in buyers' favor. Bids on turnings and borings are extremely low, and consumers are not badly enough in need of supplies to respond to efforts of dealers to get even 25c. a ton more. We note a sale of 500 tons of machine shop turnings to a Pittsburgh district dealer at $12, delivered, but this price is below the real market, which at present is around $14.50 to $15. It is believed that the tonnage at the lower price was shipped without an order, and $12 was the best price that could be obtained to get a mill to take it in. This class of material is readily obtainable at $15, and probably can be bought at $14.50. Sales of heavy melting steel made during the week were at $20 to $20.50, but it is doubtful whether even the lower price now could be obtained, and some dealers are expressing a willingness to take on business as low as $19. Most recent sales of compressed sheets to mills have been at $19, but the anxiety among dealers for orders since has resulted in a quotation as low as $18. Pennsylvania Railroad scrap list again for July aggregates close to 50,000 tons; other railroad lists are expected to be heavy and a further drop in prices is forecast.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$20.00 to $20.50
No. 1 cast, cupola size	22.50 to 23.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	20.00 to 21.00
Compressed sheet steel	18.50 to 19.00
Bundled sheet sides and ends	16.50 to 17.00
Railroad knuckles and couplers	22.00 to 22.50
Railroad coil and leaf springs	22.00 to 22.50
Low phosphorus standard bloom and billet ends	24.00 to 24.50
Low phosphorus plates and other grades	22.00 to 23.50
Railroad malleable	22.00 to 22.50
Steel car axles	22.50 to 23.00
Cast iron wheels	20.50 to 21.00
Rolled steel wheels	22.00 to 22.50
Machine shop turnings	14.50 to 15.00
Heavy steel axle turnings	16.00 to 16.50
Short shoveling turnings	16.00 to 16.50
Cast iron borings	16.00 to 16.50
Heavy breakable cast	18.00 to 18.50
Stove plate	15.00 to 15.50
Sheet bar crop ends	22.00 to 23.00
No. 1 railroad wrought	16.00 to 16.50

Labor Conditions in Pennsylvania—Students Working in Mills

HARRISBURG, PA., July 2.—The semi-monthly report of the employment division of the Pennsylvania State Department of Labor and Industry for the first half of June is authority for the statement that several hundred students have been placed in semi-skilled and unskilled positions in iron and steel mills of the Harrisburg district to help relieve the shortages therein. These youths were placed through the department's junior employment plan. The shortage of mechanics is reported to be less serious than the shortage of mill workers, who are declared to be leaving the trades because of objections to 12-hr. days.

The Philadelphia district reports that a ship building firm of that section is experimenting with Chinese laborers as rivet heaters. Automobile mechanics are reported to be particularly scarce.

Scranton reports that the settlement of the strike in the Ashley shops of the Central Railroad of New Jersey has resulted in about 400 men returning to work. This is said to have relieved the situation materially in Wilkes-Barre, but conditions remain unchanged in Scranton.

The demand for workmen, particularly those of the skilled classes, is reported to be increasing steadily. In several instances district offices report production is being handicapped because of the shortage of workers, both of the skilled and unskilled class. Erie reports a slight decrease in the number of iron and steel workers for the first half of June. The decrease is said to be scarcely noticeable and is believed to be only a temporary situation, for the demand for workers of all classes continues strong.

Chicago

Contracts for Oil Tanks Feature the Market—Pig Iron Declines

CHICAGO, July 3.—Heavy purchases of oil storage tanks are the center of interest in an otherwise featureless market. Lettings reported here involve a total of 11,400 tons of plates. Besides the orders mentioned in the plate paragraph, the Humble Pipe Line Co., Houston, Tex., has placed 10 80,000-bbl. tanks, requiring 3000 tons with the Chicago Bridge & Iron Works for erection at Navarro, Tex., and the Magnolia Petroleum Co. has evenly divided an order for 20 tanks, involving 4000 tons between the United Iron Works and the Petroleum Iron Works. The Humble company is understood to have awarded a total of 35 tanks, but the distribution outside of the 10 placed with the local fabricator has not been learned.

Notwithstanding the revival of tank demand, the finished steel market is essentially quiet and shipments from mills continue to exceed new bookings. Local prices on plates, shapes and soft steel bars remain firm and unchanged. Production is holding up well, but local mills will shut down over July 4. A bar iron mill has gone down for several days for repairs, but this is the only important interruption in output reported.

Pig Iron.—Local iron has taken the third consecutive drop of $1 a ton in as many weeks and is now quoted at $29, base, furnace. The market is quiet and weak and it is probable that an attractive tonnage could be placed at a still lower figure. Southern Foundry appears to have dropped definitely to $25, base, Birmingham. While a number of producers continue to quote $26 to $27, base, no sales are reported above $25. Inquiries are light and few sales have been made. A local buyer has closed for 3000 tons of malleable for last half delivery to a plant outside of this city, but located in the Chicago district. A Wisconsin melter has closed for 500 tons of foundry for second half shipment. A southern Michigan melter who asked for figures on 1000 tons of malleable for delivery from the middle of August over the remainder of the year has withdrawn from the market without buying. While resale offerings are not heavy, they are sufficiently numerous to affect prices adversely. This is particularly true of charcoal iron, which is reported to have been quoted at as low as $33.15, delivered, Chicago. Jackson County silvery has declined $1 a ton, and electrolytic material is moving at from $1 to $2 less. A Michigan melter who closed for 600 tons of 8 per cent silvery is understood to have bought electrolytic at a $2 concession. An Indiana melter is inquiring for 400 tons of charcoal and another user in the same State is in the market for a carload of low phosphorus. A northern Illinois plant is asking for figures on 600 to 900 tons of 2.75 to 3.25 per cent silicon, high phosphorus foundry, for last half shipment.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago..	$36.65
Northern coke, No. 1, sil. 2.25 to [illegible]	29.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	29.00
Malleable, not over 2.25 sil.	29.00
[illegible]	29.00
[illegible]	29.00
Southern No. 2	31.01
[illegible]	
copper free	$36.60 to 37.60
Silvery, sil. 8 per cent (nominal)	43.29

Ferroalloys.—Ferromanganese is now available for last half shipment at $120, seaboard, but we note a sale of spot material at $2.50 higher.

We quote 80 per cent ferromanganese, $127.56 to 130.06 for all deliveries; 50 per cent ferrosilicon, $92.50, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Plates.—Tank buying continues to be the feature of an otherwise quiet market. The Sinclair Crude Oil Purchasing Co. has placed five 80,000-bbl. tanks for Oklahoma, involving 1500 tons, with the Graver Corporation. The Humphreys Oil & Gas Co. has awarded 20 55,000-bbl. tanks, requiring 2660 tons, for erection in Texas, to the Youngstown Boiler & Tank Co. The Cosden Co., Tulsa, Okla., has ordered two 55,000-bbl. tanks, involving 260 tons, from the Kansas City Structural Steel Co. Additional tank business is in prospect, particularly for the Powell field in Texas. Tank fabricators have placed with one local mill 5400 tons of plates for fourth quarter shipment and an additional lot of 500 tons for the same delivery is pending. Prices are firm and unchanged.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Rails and Track Supplies.—The Nickel Plate is about to enter the market for an as yet undetermined tonnage of rails for 1924 delivery. Little new business in track fastenings has been booked, but attractive business is in prospect, including an inquiry for 5000 kegs of spikes and another lot of several thousand kegs of spikes and bolts which has not yet actually come up for figures. Great interest is manifested in rolled steel wheels, current inquiries from 12 roads totaling 10,000 wheels.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—Outside of oil storage tank awards noted in the paragraph on plates, little activity has developed in the fabricating field during the week. Buyers continue to press the mills for deliveries against old commitments and there are notably few cancellations and suspensions. New orders, however, are light.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—While soft steel bars continue to be the most active of the finished commodities, orders and inquiries are confined to relatively small tonnages and mill shipments still exceed bookings. The caution of buyers is attributed to the sustained weakness of the stock market. Local mill prices are firm, but it is reported that concessions have been made from the Pittsburgh base price of 2.40c. Bar iron continues quiet, with little business of consequence moving at over 2.50c. mill, Rail steel bars are firm and in fairly good demand.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.50c. to 2.60c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3.15c. base; hoops, 4.55c.; bands, 3.95c.

Sheets.—The attitude of mills is firmer and concessions have practically disappeared. New business is light, however. Cooler weather during the past week has enabled local producers to operate on a slightly improved scale.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Cast-Iron Pipe.—Inquiries are light, but awards for the week involve a fair total. The Lynchburg Foundry Co. will furnish 800 tons for Mount Greenwood, Ill. The National Cast Iron Pipe Co. will supply 450 tons for Gridley, Ill., 200 tons for Arlington Heights, Ill., and 100 tons for Frankfort, Ind. Alliance, Ohio, has awarded 200 tons to America Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $58.20 to $59.20; class A and gas pipe, $5 extra.

Wire Products.—New business continues to come from manufacturing users in good volume, but demand from jobbers, particularly those in agricultural sections, has declined sharply. Pressure for shipments of wire nails is still heavy, indicating sustained activity in the building industry. There is a steady increase in

orders for woven wire fence, which is sold on future dating. Prices are steady, although there are unverified reports of shading by a small Ohio river producer. For mill prices, see Finished Iron & Steel, f.o.b. Pittsburgh, page 48.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.95 per 100 lb.; cement coated nails, $3.25 per keg.

Bolts and Nuts.—Orders and specifications are exceedingly light and here and there prices are being shaded. The discounts generally observed are those shown on page 48 except that for delivery in this territory they are f.o.b. Chicago.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Reinforcing Bars.—Tonnage placed during the week forms a fair aggregate, although falling behind the recent average. Much of the business now developing is railroad and highway work, and in view of that fact the postponement of considerable road construction is a source of some concern. Prices are fairly well maintained, although concessions continue to be made on attractive jobs. Lettings include:

Northern Pacific Railroad, Phalen Creed sewer, St. Paul, Minn., 500 tons to Kalman Steel Co.

Chicago & North Western Railroad, third quarter requirements, 500 tons to Truscon Steel Co.

Chicago, Milwaukee & St. Paul, office building, Southport Avenue, Chicago, 150 tons to Corrugated Bar Co.

Illinois highway work, 110 tons to Kalman Steel Co.

Underwriters Laboratories, Building No. 6, Chicago, 165 tons to Barton Spiderweb System Co.

Great Northern Railroad, 110 tons to Concrete Steel Co.

School building, Dubuque, Iowa, 100 tons to Kalman Steel Co.

Covenant Club building, Chicago, 100 tons to Truscon Steel Co.

Stockman's Bank & Trust Co. building, Chicago, 100 tons to Concrete Steel Co.

Gimbel Bros.' store addition, Milwaukee, 100 tons to Concrete Steel Co.

Science Hall for Marquette University, Milwaukee, 156 tons to Corrugated Bar Co.

Office building for Delmic Realty Co., Milwaukee, 120 tons to Concrete Engineering Co.

Theater building for Griffis Estate, Janesville, Wis., 100 tons to Concrete Engineering Co.

Pending work includes:

Stewart-Warner Speedometer Corporation, plant addition, Chicago, 700 tons.

Second unit of Pittsburgh Plate Glass Co. plant at Milwaukee, 300 tons. Bids in.

Apartment hotel building, 840 Sheridan Road, Chicago, for Edelson & Pavlin, 165 tons.

Pennsylvania Railroad, foundations for subways, Garfield Avenue and Fifty-sixth Street, Chicago, 150 tons.

Chicago Union Station, headhouse and concourse, 250 tons, general contract awarded to John Griffiths & Son Co.

Fair Store addition, Chicago, 700 tons.

Coke.—By-product foundry coke has been reduced to $13.50, delivered, Chicago switching district, and $14.25, delivered to Milwaukee consumers. Beehive foundry coke is still weak and one large local melter has closed for 10 carloads from Connellsville.

Old Material.—Buying by dealers who had contracts to fill before the expiration of the month was a sustaining influence during the week, but the general tendency of the market continues in a downward direction. There has been little consumer buying, although a steel works whose specifications for heavy melting are not so rigid as those of other mills, bought 4000 tons at $17 per gross ton. At the same time, dealers paid as high as $18 to fill orders taken at higher prices. By far the largest consumer of heavy melting and allied grades has cancelled all overdue orders regardless of price. This action is interpreted as indicating that the mill is well supplied with raw material by its own blast furnaces and will use much less scrap than it purchased during the early months of the year. With this interest out of the market, Chicago prices may drop to a lower level in relation to those of other centers than has been the case for some time, owing to the necessity for the Western supply of scrap to find an outlet. Railroad offerings include the Pennsylvania, Southwestern Region, 7000 tons; Pennsylvania, Northwestern Region, 2300 tons; Chicago & Alton, 1500 tons and the New York Central, a blind list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$22.00 to $22.50
Cast iron car wheels	21.00 to 21.50
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	21.00 to 21.50
Rails for rolling	18.00 to 18.50
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	17.50 to 18.00
Frogs, switches and guards cut apart	17.25 to 17.75
Shoveling steel	17.00 to 17.50
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheets	15.50 to 16.00
Axle turnings	15.00 to 15.50
	Per Net Ton
Iron angle and splice bars	23.00 to 23.50
Steel angle bars	16.00 to 16.50
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	26.00 to 26.50
Steel car axles	20.00 to 20.50
No. 1 busheling	14.00 to 14.50
No. 2 busheling	11.50 to 12.00
Cut forge	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	19.00 to 19.50
Coil springs	20.50 to 21.00
No. 1 machinery cast	21.50 to 22.00
No. 1 railroad cast	19.75 to 20.25
No. 1 agricultural cast	19.75 to 20.25
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	10.00 to 10.50
Cast borings	12.50 to 13.00
Short shoveling turnings	12.50 to 13.00
Stove plate	15.00 to 15.50
Grate bars	13.50 to 14.00
Brake shoes	14.50 to 15.00
Railroad malleable	20.50 to 21.00
Agricultural malleable	20.00 to 20.50

Engineers Will Investigate Appointment of Non-Technical Man

WASHINGTON, July 2.—Protesting against the alleged policy of the change recently made by Secretary of the Interior Hubert Work in substituting a non-technical man for a technical man in the reclamation service, the Federated American Engineering Societies through Secretary L. W. Wallace has addressed a letter to the Secretary of the Interior asking reasons for the change. It was pointed out that the society would make an exhaustive investigation as a public service and as a matter of going on record as being opposed for all time against the alleged policy adopted by Secretary Work. This is one of the first great concerted moves ever taken by engineers of the country in an effort to prevent inroads on the technical service of the Government. The letter of Secretary Wallace relates to the appointment of former Gov. D. W. Davis of Idaho as director of the reclamation service in place of Arthur Powell Davis, described by the engineering societies as "an eminently successful employee for 35 years." The societies represent 50,000 engineers and technical experts who make up the 28 organizations affiliated with the Federated American Engineering Societies. It was declared that the appointment of non-technical men in connection with technical service of the Government may well endanger the whole national scheme of reclamation. Secretary Work has declared that the former director resigned, but friends of the latter claim the Secretary asked for his resignation.

The Bethlehem Steel Co. is moving its Philadelphia offices this week from the Morris Building to the Widener Building, occupying a part of the space occupied by the general sales offices of the Midvale Steel & Ordnance Co.

The Brady Foundry Co., Chicago, has been sold at auction to David Evans, president Chicago Steel Foundry Co. It is understood that Mr. Evans plans to resell the plant, having no intention of operating it.

Birmingham

Most Pig Iron Makers Quoting $27—Few Sales Made—Pipe Business Active

BIRMINGHAM, ALA., July 3.—At turn of the half year all but one iron maker were insisting on $27 for spot and third quarter iron. The one-stack maker offering iron at $25 was within very little of having sold capacity for third quarter, being credited with a total of 15,000 to 18,000 tons of recent bookings, which, added to what was already on books, is understood to have placed him in the same position statistically as the other makers. No furnace now has much third quarter iron to offer and two have none. Sales at $27 were larger last week, one maker booking over 2000 tons, with one lot of 700 tons. An inquiry for 800 tons for third quarter and one for like amount for fourth quarter were received and $27 quoted. There were no cancellations and some requests for anticipation of shipments. A feature of the week was shipment of 334 tons to Los Angeles, 983 to Oakland and 100 to Seattle. Little or none is being taken north.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00 to $27.00
Basic	26.00
Charcoal, warm blast	34.00

Cast Iron Pipe.—Pressure pipe makers enjoy a steady influx of business, adding to their swamped condition. The base remains at $49. The National Cast Iron Pipe Co. is expected to commence making de Lavaud pipe in its new plant next month. The Pacific Coast takes large quantities steadily. The sanitary pipe market is nominally at $70, with fair business coming in.

Finishing Mills.—Japan took 3000 tons of rails via Mobile last week. The Illinois Central order of 60,000 tons of rails for itself and the Central of Georgia is expected to be filled for the greater part by the Tennessee company. New wire mill business is easing down except as to bars and nails. Bars are quoted 2.70c. f.o.b. Birmingham.

Coal and Coke.—Coke is bringing $8 on contracts and $8.50 to $9 for spot.

Old Material.—Deliveries on old business are heavy, but new business in steel scrap is light. Prices are "wobbly," but no real marking down has been done.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Old steel rails	$18.00 to $20.00
No. 1 steel	16.00 to 18.00
No. 1 cast	23.00 to 24.00
Car wheels	23.00 to 24.00
Tramcar wheels	22.00 to 23.00
Stove plate	17.00 to 18.00
Cast iron borings	12.00 to 13.00
Machine shop turnings	12.00 to 13.00

Buffalo

More Inquiries for Pig Iron, but Very Few Transactions Are Recorded

BUFFALO, July 3.—A greater number of inquiries, without any marked change in the placement of tonnage, sums up the present situation. Several desirable inquiries are out; the Gould Coupler Co. inquiry put out last week calls for monthly deliveries of 500 tons and is for basic and malleable iron. An inquiry for 500 tons and another for 250 tons of foundry, for New York and New England delivery, are noted. All interests in position to quote are uniformly asking $27 for silicon 1.75 to 2.25 and $27.50 for silicon 2.25 to 2.75. A number of melters are closing for the week and because of the labor situation curtailment in melting in several foundries has been unusual. Sellers continue to find considerable iron being carried over from second quarter and in a few cases these tonnages will be sufficient for all of July melting and part of August.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$28.00
No. 2X foundry, 2.25 to 2.75 sil.	27.50
No. 2 plain, 1.75 to 2.25 sil.	27.00
Basic	26.50
Malleable	26.50
Light Superior Charcoal	0.75

Finished Iron and Steel.—Bar buyers have been more active and other products, which have been in good demand throughout the latest period of quietness, continue to be sought in much the same brisk way. Sheet demand has been rather irregular and while prices hold firm, a number of consumers have not placed business up to expectations. Rumors of weakness in black sheets have disappeared and the ruling price is 3.85c. Sales of 3.75c. may have been made, but the instances are few. The 2.40c. price on bars is uniform. Canvass of some of the larger users does not reveal any weakening nor is any expected. While more business has been placed, none is for anything more than actual needs and no forward buying has developed. Pipe allotments are still in effect.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Two large consumers of heavy melting steel are expected in the market and in view of the present weakness will probably hold out for especially advantageous prices. No. 1 machinery cast scrap is especially weak because of the dull situation in pig iron. The entire market is lifeless, but July railroad lists may stimulate activity.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$20.50 to $21.50
Low phos., 0.04 and under	25.00 to 26.00
No. 1 railroad wrought	19.00 to 20.00
Car wheels	21.00 to 22.00
Machine and shop turnings	14.00 to 15.00
Cast iron borings	17.00 to 18.00
No. 1 busheling	18.00 to 19.00
Stove plate	18.00 to 19.00
Grate bars	17.00 to 18.00
Bundled sheet stampings	15.00 to 16.00
No. 1 machinery cast	23.00 to 24.00
Hydraulic compressed	18.50 to 19.50
Railroad malleable	24.00 to 25.00

Boston

Disregard of Pig Iron Differentials Shown the Past Week

BOSTON, July 2.—Scattered inquiries for pig iron in this territory the past week, ranging from car lots to 650 tons and in the aggregate amounting to approximately 2000 tons, resulted in a general disregard of differentials by furnaces and their representatives making quotations. This policy served to check rather than stimulate buying, consequently actual sales were the smallest for any weekly period this year. Eastern Pennsylvania iron, silicon 2.25 to 2.75, was offered at $28 furnace or $31.65 delivered, and silicon 3.25 to 3.75 at the same delivered price. Buffalo interests offered the same grades of iron at $28 furnace. Virginia silicon 3.25 to 3.75 was offered at $33.42 and $33.92 delivered, or 51c. a ton more than Buffalo delivered.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$31.65 to $33.65
East. Penn., sil. 1.75 to 2.25	31.65 to 32.65
Buffalo, sil. 2.25 to 2.75	32.91 to 33.91
Buffalo, sil. 1.75 to 2.25	32.91 to 33.91
Virginia, sil. 2.25 to 2.75	33.42 to 34.42
Virginia, sil. 1.75 to 2.25	33.42 to 33.92
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Warehouse Business.—No material decrease in the number of orders received daily by warehouses is reported, but the tonnage involved in the average individual order is smaller than a month ago and considerably so when contrast is made with April records. Warehouse stocks as a rule are well balanced, yet not excessive, as is attested by recent orders placed with mills for bars, shapes, plates, sheets and tin plate for

third quarter delivery. Stocks of wire nails are larger than noted before this year. Some sizes are still short, however. Of all warehouse products, bolts and nuts appear to be the least active.

Coke.—The New England Coal & Coke Co., followed by the Providence Gas Co., has reduced by-product foundry coke 50c. a ton to $13.50 delivered within the $3.10 freight rate zone. The market for such fuel is now $2.50 a ton below the 1923 peak price and on the same basis as a year ago. Large consumers of foundry coke have begun to order more freely for stocking purposes. A still further increase in the movement from ovens to consumer is expected this month, inasmuch as many foundries will have taken inventories as of June 30. The demand for domestic coke also is on the mend, consequently New England ovens presumably will continue to operate on their present production scale throughout the summer.

Old Material.—Business in old material has dwindled to small proportions. The practice of Pennsylvania mills of rejecting a large percentage of everything shipped out of New England in a measure accounts for the inactivity of the market here. Chemical borings possibly led in activity the past week. Car lots were purchased at prices running as high as $15.75 shipping point. Some activity is noted in No. 1 machinery cast, dealers paying around 90c. per 100 lb. on cars. Brokers are bidding $11 on cars for mixed borings and turnings, but holders apparently are not anxious to let go at that figure. Practically all heavy melting steel bought was applied to old contracts and involved only a few hundred tons.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$23.50 to $24.50
No. 2 machinery cast	21.50 to 22.50
Stove plate	13.00 to 14.00
Railroad malleable	25.00 to 25.50
Street car wheels	23.00 to 24.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.00 to $14.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	13.00 to 13.50
Wrought pipe (1 in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	11.00 to 11.50
Cast iron borings, rolling mill	11.50 to 12.50
Cast iron borings, chemical	14.50 to 15.75
Blast furnace borings and turnings	11.00 to 11.25
Forgeable scrap and bundled skeleton	11.00 to 11.50
Shafting	19.00 to 20.00
Street car axles	19.00 to 20.00
Rails for rerolling	15.50 to 16.00

St. Louis

Pig Iron Melters Not Interested—Coke and Old Material Weak

ST. LOUIS, July 3.—The end of the last half of the year finds the pig iron market easy, with melters showing no interest in their future requirements. A few orders were placed during the week, one for 300 tons, the remainder mostly for carloads. Some Southern iron is still being sold at $25, Birmingham, but the larger furnaces are still quoting $27. Stocks in hands of the furnaces in the Birmingham district are said to be the lowest they have ever been, one authority placing them at 30,000 tons for the 28 furnaces. The biggest factor in the Chicago market has made a price of $29 there for Northern iron, and there have been persistent, authoritative reports of sales being made as low as $28, Chicago, to points outside of that industrial district.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $2.25 from Birmingham (coal and water), $5.17 from Birmingham all rail and $1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$31.16
Northern malleable, sil. 1.75 to 2.25	31.16
Basic	31.16
Southern fdy., sil. 1.75 to 2.25	30.17

Finished Iron and Steel.—Railroads continue to send out inquiries covering their requirements for last half, which are principally for forgings. The Missouri Pacific Railroad wheel requirements for that period will be 1500 wheels, and a St. Louis car builder has asked for prices on 150 axles for cars for a Los Angeles street car company. The Mississippi River & Bonne Terre Railroad is in the market for a small quantity of structural shapes and bars. A few inquiries have come from the railway supply companies. Fabricators are still well supplied with structural steel. Jobbers are buying hardly anything.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.35c.; hard pressed spokes, No. 16 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, [illegible] and larger rounds, shafting and screw stock, 3.35c.; iron tank rivets, 4.15c.; boiler rivets, 4.25c.; tank bolts, 60 per cent off list; machine bolts, 60-5 per cent off list; carriage bolts, 40-5 per cent off list; hot pressed nuts, square or hexagon, blank, $7.00 per 100; and tapped, $2.50 off list.

Coke.—Heavy offerings of Connellsville coke in this market have had a tendency to ease up the market. Some sales have been reported as low as $4.50 on lower grades, while standard grades have sold from $6.25 to $7.50. Contracts have been made for delivery at from $7 to $7.50.

Old Material.—The market for old materials is marked by the heavy offerings of railroads, which is helping to keep the market weak and prices down. Because of the weak market, the Chicago, Burlington & Quincy and Wabash railroads withdrew their lists. But other lines had heavy lists out, the largest being the Pennsylvania System, as follows; Central region, 14,000 tons, including 1981 tons of rails; lines west of Pittsburgh, 6900 tons, including 1350 tons of wheels, and the Chicago division, 2500 tons. The Chicago, Milwaukee & St. Paul list has 1500 tons; United Railways of St. Louis, 1000 tons, and the Southern Railway 60 scrap locomotives. Consumers are interested only in occasional bargains.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$19.00 to $19.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	18.00 to 18.50
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	19.00 to 19.50
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	17.00 to 17.50
Per Net Ton	
Heavy axles and tire turnings	17.75 to 18.25
Steel angle bars	17.25 to 17.75
Iron car axles	25.00 to 25.50
Steel car axles	19.00 to 19.50
Wrought iron bars and transoms	19.50 to 20.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	15.50 to 16.00
Railroad springs	19.00 to 19.50
Cast iron borings	12.50 to 13.00
No. 1 busheling	14.50 to 15.00
No. 1 railroad cast	17.00 to 17.25
No. 1 machinery cast	17.25 to 17.50
Railroad malleable	17.00 to 17.50
Malleable shop turnings	11.50 to 12.00
Champion bundled sheets	9.50 to 10.00

Detroit Scrap Market

DETROIT, June 30.—The recent award by one of the largest producers in the district of approximately 3000 tons of turnings, flashings, heavy melting steel, borings and regular hydraulic compressed for July delivery developed the fact that dealers are showing less inclination to store tonnage, as there were only about two-thirds as many bidders as on the usual monthly lettings. Prices are materially the same as quoted a week ago with turnings and flashings registering a decline of 50c. per ton.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$15.00 to $17.00
Shoveling steel	15.00 to 17.00
No. 1 machinery cast	18.00 to 20.00
Cast borings	12.00 to 13.00
Automobile cast scrap	22.00 to 24.00
Stove plate	15.00 to 17.00
Hydraulic compressed	14.00 to 15.00
Turnings	10.00 to 11.00
Flashings	10.00 to 11.00

Cincinnati

Sales of Moderate Tonnages of Pig Iron Develop Lower Prices

CINCINNATI, July 3.—A number of fair-sized sales were reported last week, developing lower prices on Northern irons, but no change in Southern quotations. An Indiana melter is reported to have closed for 1000 tons at a shade lower than $27, Ironton, basis, and a Southern Ohio melter is credited with the purchase of 500 tons at about the same figure. A car company in the district bought 500 tons of Northern, and an automobile parts manufacturer 500 tons of Tennessee iron at $25.50, Birmingham. A number of other sales included carload lots up to 100 tons. There is no activity in Bessemer, basic or silveries. Inquiry is light, though sellers report that melters are more willing to discuss pig iron requirements than for many weeks past, indicating more interest is being shown as stocks on hand get lower. The L. & N. Railroad will close this week on 1000 tons of Southern, and an inquiry is current from an Indiana manufacturer for 1000 to 2000 tons for fourth quarter.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$29.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	29.55
Ohio silvery, 8 per cent	40.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.27
Basic Northern	29.27
Malleable	29.27

Finished Material.—The market is going along in a very satisfactory way. While orders continue to be placed for small tonnages, some of the larger buyers have also contracted for third quarter, and specifications have been good. Plates, in particular, seem to be in demand for early shipment, though bars are also fairly active. Prices of the heavier products are being firmly maintained, and to date there have been no evidences of current prices being shaded. Some mills are quoting carload lots of bars at 2.45c., and making sales right along, but the generally accepted price is 2.40c., with 2.50c. for shapes and plates. Most of the larger buyers have covered their requirements of sheets for the third quarter, but fill-in tonnages are fairly numerous. More pipe buying is being done, probably due to the fact that mills can now make better delivery, and jobbers feel that it would pay them to lay in a stock while it is possible for them to do so, as pipe has been a very scarce article for many months past. There is little activity in wire products, as far as new business is concerned, but with most mills six to eight weeks behind on shipments, jobbers are pressing mills for deliveries. Nail prices seem to have become stabilized at $3.00 per keg, base, little more being heard of the $3.10 price for prompt delivery. No new inquiries have appeared for structural steel, and the only letting of importance was a warehouse at Indianapolis, 350 tons, to the Rochester Bridge Co.

Warehouse Business.—Some manufacturers apparently are having difficulty in getting shipments of steel bars, as local jobbers report a heavy demand out of stock. Business fell off during the past week, but this is attributed to the fact that many buyers were loath to place orders until their semi-annual inventory had been completed. Reinforcing bars are in good demand, as are sheets and plates. Prices are firmly maintained.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—There is little activity in the coke market and prices are still soft. Connellsville furnace coke is quoted at $5 for prompt shipment, and foundry at $5.50 up. New River coke can be had at $1 below last week's quotations from at least one operator. Wise County prices are unchanged.

Old Material.—There were a few small sales of borings and turnings reported, but otherwise the scrap market was very quiet, and undoubtedly lower prices than those quoted could be done. Railroad offerings are heavy. Some mills are holding up shipments.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $13.50
Iron rails	15.50 to 16.00
Relaying rails, 50 lb. and up	28.00 to 28.50
Rails for rolling	17.00 to 17.50
Heavy melting steel	16.00 to 16.50
Steel rails for melting	15.00 to 15.50
Car wheels	16.00 to 16.50
Per Net Ton	
No. 1 railroad wrought	12.50 to 13.00
Cast borings	11.00 to 11.50
Steel turnings	10.00 to 10.50
Railroad cast	17.00 to 17.50
No. 1 machinery cast	20.50 to 21.00
Burnt scrap	13.00 to 13.50
Iron axles	23.00 to 23.50
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	10.50 to 11.00

The Cincinnati office of THE IRON AGE has been moved from the Mercantile Library Building to Room 904, First National Bank Building.

New York

Pig Iron Weak and Dull—Price of By-Product Coke Reduced $1

NEW YORK, July 3.—Buying of the past week has been extremely light and prices are ragged. The largest tonnage reported closed was 500 tons of high silicon for third quarter delivery to a Connecticut melter. A number of inquiries ranging from 500 to 1000 tons, previously reported, have not been closed and the general attitude of buyers is one of waiting while the market sags. In eastern Pennsylvania the ordinary base is now $28, with No. 1 and No. 2X obtainable from some furnaces at the same price as No. 2 plain. It is understood that less than $28 can be done on No. 2 plain, but that on such sales the usual differentials are added for the high silicons. On Buffalo iron $28 is the maximum, with quotations ranging down to $27. On Virginia iron, prices are weaker and $27 could be done on a fair tonnage.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	30.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	30.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	30.27
Buffalo, sil. 1.75 to 2.25	31.91
No. 2X Virginia, sil. 2.25 to 2.75	$33.44 to 33.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44 to 32.94

Cast-Iron Pipe.—Prices remain firm and deliveries are generally extended well up to fall. Foundries report continued difficulty with labor, owing to warm weather. Private purchases are frequent. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.30; 4-in. and 5-in., $67.30; 3-in., $77.30, with $5 additional for Class A and gas pipe. A slight improvement is noted in soil pipe demand, although transactions are of limited size. Prices are becoming fairly well settled around the figure established by the recent decline of 5 points. One maker is reported to have marked a further decline of 5 points. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in. standard, 18 to 20¾ per cent off list; heavy, 28 to 30¾ per cent off list.

Warehouse Business.—After discount is made for seasonal quietness, most warehouses agree that business is holding a good pace, even against the coming holiday. There has been considerable cutting in prices on sheets but the opinion expressed is that this is only a temporary condition. A few dealers felt a measurable falling off in sheet business, and in some quarters it is believed that orders may be taken wisely at 4.35c. on No. 18 soft black sheets. There are no changes in prices on any of the ferrous materials. Mill prices hold firm in spring and tool steel, but there seems to

be an underlying softness. Buying is hand-to-mouth and mills are pretty well booked. Export buying is gaining but competition in prices is sharp. Inquiries are fairly numerous and, although they are for small lots, this continues to be a fairly active product. Brass and copper warehouses have dropped brass sheet, wire and rods ¾c., and sheet copper from ½c. to ¾c. This reduction was in order since previous prices were based on higher priced copper. Price quotations appear on page 66.

Ferroalloys.—Demand for ferromanganese is exceedingly light and confined to small lots for early shipment. It is stated that some of these are being satisfied with resale metal at a concession of about $5 from the contract price of $120, seaboard. There is almost no contracting for last half, but there is still some alloy available at the quotation of $125, seaboard. Demand for spiegeleisen is also light, with quotations unchanged. The almost stagnant conditions also obtain in the 50 per cent ferrosilicon market where demand is confined to small lots for early delivery. The policy of waiting which has prevailed in these markets for some time is even more accentuated as the markets enter the last half.

Finished Iron and Steel.—In some quarters an increase in buying activity is noted, but in general the situation remains unchanged in that new inquiry, though more than usual for the season, is dull. It is not unusual to find a mill taking business equal to shipments. Shipments continue heavy and suspensions or cancellations are unheard of. Railroads are buying steel for maintenance work. The New York Central took bids today on 5000 tons of plates, shapes, bars and other form of steel for third quarter needs; 14 or 15 companies bid for part or the whole of the work and of course for different delivery points, but apparently the prices in every case accorded with the current market. Generally speaking, prices are firm, though concessions are being made in bolts of 60 and 10 per cent instead of 50 and 10 per cent, and bar iron is on a parity with steel bars and has been quoted at a 2.35c. Pittsburgh basis.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c. to 2.84c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Old Material.—There is very little interest in the scrap market among either consumers or dealers. Beyond buying for orders in hand dealers are making no purchases, as there is no settled feeling that prices have yet reached bottom despite the steady decline during the past few months. It is to be expected that the larger dealers will begin accumulating stocks for speculative purposes as soon as prices have reached a point that is attractive to them, but there are no indications now that such a time has arrived. Dealers are paying about $13.50 to $14.00, f.o.b. cars, New York, for ordinary No. 1 melting steel for Pittsburgh and eastern Pennsylvania mills and about 50c. a ton higher for railroad steel. Other prices are about as they were a week ago.

Buying prices per gross ton, New York, follow:	
Heavy melting steel, yard	$13.50 to $14.00
Steel rails, short lengths, or equivalent	14.00 to 14.50
Rails for rolling	16.00 to 18.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	20.00 to 21.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	17.00 to 17.50
Wrought iron track	16.00 to 16.50
Forge fire	12.75 to 13.25
No. 1 yard wrought, long	15.50 to 16.00
Cast borings (clean)	12.75 to 13.25
Machine-shop turnings	12.00 to 12.50
Mixed borings and turnings	12.00 to 12.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	12.75 to 13.25
Locomotive grate bars	13.00 to 13.50
Malleable cast (railroad)	19.00 to 20.00
Cast-iron car wheels	18.00 to 19.00
Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:	
No. 1 machinery cast	$21.00 to $21.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	20.00 to 20.50
No. 1 heavy cast, not cupola size	18.00 to 18.50
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 16.50

Coke.—The price of by-product coke has been reduced $1 on foundry grades and is now quoted $11.34 and $11.41, Newark and Jersey City points. Standard foundry Connellsville coke for prompt shipment ranges from $5.50 to $6.25, ovens, and on contract, $6.75 to $7.50. Quotations on standard furnace range from $4.75 to $5.50 for prompt shipment. There is virtually no contracting.

Philadelphia

Foundry Pig Iron Declines $1—Less Strength in Some Finished Lines

PHILADELPHIA, July 3.—Foundry pig iron is down $1 a ton from the nominal quotations of a week ago; scrap is weak and lower; some finished steel products show less strength than a week or two ago, and there is an air of uncertainty at the beginning of the second half of the year as to what market and price developments will be. That the next two months will be uneventful seems to be a general conclusion, but there is a disposition in some quarters to believe that the early autumn will bring renewed activity.

There has been during the past month a greater degree of confidence in steel prices than in pig iron prices. The latter have definitely broken, but only sporadic cutting of finished steel products has developed, notably on structural shapes, which are available from one mill at 2.40c., Pittsburgh. Slight weakness has developed in bar iron, to the extent of about $1 a ton, while bolts, nuts and rivets are very weak and some makers will undoubtedly be obliged to revise third quarter contract figures to the basis now generally being quoted.

There will be partial shut-downs this week at some mills for repairs.

Ore.—Last week's receipts of iron ore at this port totaled 13,839 tons, of which 7289 tons came from Sweden and 6550 tons from Tunis. Five thousand tons of Brazilian manganese ore also arrived and 1500 tons of chrome ore from British India.

Semi-Finished Steel.—Quotations are at $42.50, Pittsburgh, for open-hearth rerolling billets, but Eastern mills seemingly are not ready to follow the minimum Pittsburgh price of $47.50 on forging billets.

Coke.—Blast furnace coke for prompt shipment is being quoted at $4.75 to $5, Connellsville, and on contract at $5.50, but not many contracts are being made. Foundry coke is to be had from $6 to $7.50, ovens, according to grade.

Ferroalloys.—Ferromanganese at $125, furnace or seaboard; spiegeleisen at $45, furnace, and 50 per cent ferrosilicon at $92, delivered, represent today's prices on principal alloys. Foreign ferrosilicon running a little under 50 per cent is to be had from $85 to $87.50, delivered.

Pig Iron.—Efforts to maintain a $29 base for foundry pig iron at eastern Pennsylvania furnaces have failed and the market is wide open, with no certainty as to what prices will be quoted on attractive inquiries, should any develop. The present level is $28, furnace, for No. 2 plain, with $1 differentials for higher silicon content, but it is feared that $1 differentials may not hold in view of the fact that Virginia and Buffalo furnaces are quoting 50c. differentials. The new prices are $1 down from those nominally quoted a week ago. The situation is viewed with misgivings by Eastern furnace interests, as no important share of the expected demand from consumers for third quarter iron has developed. One company with two large furnaces in blast, having about 35,000 tons of iron piled, will put out one of its furnaces probably within a week. Another company with two active furnaces is likely to let one of them go out soon, but has no definite plans. The volume of foundry iron business in the past week has been slightly greater than during the week previous, but it is by no means important enough to create optimism. A Virginia furnace company has authorized its agents to sell 7500 tons of iron for delivery at any time in second half at $27 base, furnace, with 50c. differentials, but it is intimated that in cases of mixed orders of two or more grades it is possible to obtain $27 quotations even on No. 2X and No. 1X. Foreign

iron is not being sold in appreciable tonnages, but it is a menace to Atlantic seaboard furnaces to the extent that it will keep Eastern iron at competitive levels. The only basic iron transaction of the week involved 2500 tons for early delivery. Basic is available at not more than $28, delivered. Gray forge is to be had at the same price. While foreign pig iron receipts are less frequent, 2000 tons came in last week from England.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$28.76 to $29.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	29.76 to 30.64
East. Pa. No. 1X, 2.75 to 3.25 sil.	30.76 to 31.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	32.17 to 32.67
Virginia No. 2X, 2.25 to 2.75 sil.	32.67 to 33.17
Basic delivered eastern Pa.	28.00
Gray forge	28.00 to 29.00
Malleable	30.14 to 30.64
Standard low phos. (f.o.b. furnace)	30.00 to 35.00
Copper bearing low phos. (f.o.b. furnace)	33.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.	
Continental foundry, 1.80 to 2.50 sil.	$29.00
Continental foundry, 2.50 to 3.25 sil.	30.00
Low phos. copper free, guar. not over 0.025 per cent phos.	$35.00 to 36.00
Continental, phos. 1.50; sil. 2 to 3	29.50

Plates.—The plate market holds firm at 2.50c., Pittsburgh, for fairly large lots and 2.55c. and 2.60c., Pittsburgh, for small lots. Railroad and oil tank work constitutes the major part of current demand. The spurt of buying which started about the middle of June was not long maintained, but last week brought a fair volume of last-minute specifications on second quarter commitments, and most of the mills have four to six weeks' business ahead, one or two slightly more than that. The Baldwin Locomotive Works is specifying freely on old contracts but is taking no new tonnage, as it has received no locomotive orders for several weeks.

Structural Material.—Structural shapes are available in attractive lots at 2.40c., Pittsburgh, from an Eastern mill, but the general level of quotations is 2.50c. The only important new work in this locality consists of 1900 tons for anchorage cable bents for the Delaware River bridge, bids closing July 18.

Bars.—Steel bars are fairly firm at 2.40c., Pittsburgh. Demand is light, but there were good specifications last week on second quarter contracts. Bar iron is weak at 2.40c., Pittsburgh, and there are intimations that 2.35c. can be done. A shipment of 1000 tons of Swedish bar iron was received here last week.

Warehouse Business.—The volume of warehouse buying is steadily maintained. Prices are unchanged, and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.85c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Bolts, Nuts and Rivets.—Eastern makers of bolts, nuts and rivets are finding it difficult to keep pace with the rapid decline in prices. Third quarter contracts were made on the basis of 50 and 10 per cent off list for large machine bolts, but since then some makers have added another 10 per cent and even 60 and 10 per cent off list has been reported. It is expected that Eastern makers will revise some of their contracts to the new level of prices.

Sheets.—Though black sheets are being rather freely cut to 3.75c., Pittsburgh, it is stated that some orders are still being booked at 3.85c. Blue annealed are fairly firm at 3c. and galvanized at 5c.

Strip Steel.—Hot-rolled is maintained at 3.30c., Pittsburgh, but cold-rolled strips are not firm at 5.25c., this price being shaded $5 a ton in some quarters.

Old Material.—Lower prices are recorded this week on several grades of scrap. Mills and foundries continue to obtain sufficient supplies for their needs, and there is no indication of accumulation by either consumers or dealers. A ship arriving here last week brought 1320 tons of scrap from Cuba.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.50 to $18.00
Scrap rails	17.50 to 18.00
Steel rails for rolling	20.00 to 21.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast iron car wheels	22.00 to 23.00
No. 1 railroad wrought	21.00 to 22.00
No. 1 yard wrought	19.00 to 20.00
No. 1 forge fire	16.00 to 17.00
Bundled sheets (for steel works)	16.00 to 16.50
No. 1 busheling	17.50 to 18.50
Mixed borings and turnings (for blast furnace use)	15.00 to 16.00
Machine shop turnings (for steel works use)	15.50 to 16.00
Machine shop turnings (for rolling mill use)	16.00 to 16.50
Heavy axle turnings (or equivalent)	17.50 to 18.50
Cast borings (for steel works and rolling mills)	16.50 to 17.00
Cast borings (for chemical plants)	17.00 to 19.00
No. 1 cast	21.00 to 22.00
Heavy breakable cast (for steel plants)	18.00 to 19.00
Railroad grate bars	17.50 to 18.50
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	21.00 to 22.00
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to 15.50
Shafting	24.00 to 26.00
Steel axles	24.00 to 26.00

Cleveland

Purchase of 2500 Tons of Basic at Low Price —Ore Shipments Heavy

CLEVELAND, July 2.—Ore shipments during June showed a marked increase, amounting to 9,499,501 gross tons, making shipments for the season up to July 1 16,185,482 tons. With the expected curtailment in pig iron production there is an easing in the demand for ore and some consumers will not take as much as they had planned earlier in the season. Consequently operations at the Lake Superior mines are not being pushed to the extent that they were and the shortage that has existed in the supply of mining labor is less in evidence. The season's ore movement is not expected to exceed 55,000,000 tons as compared with an estimate of 60,000,000 tons earlier in the year.

Coke.—The demand for foundry coke for the third quarter and last half has become more active, the number of contracts being placed at $7 to $7.50 for the better grades. Standard Connellsville foundry coke is quoted at $6.25 to $6.50 for prompt shipment.

Pig Iron.—The market shows more activity than for several weeks, as consumers are getting nearer the time that they will need some additional iron, but sales are mostly in small lots and the aggregate tonnage booked is not large. Prices have further declined, particularly in the Cleveland district, and the market continues weak. Locally prices have been marked down to a point at which Valley competition appears to be shut out with present Valley prices. The purchase of 2500 tons of basic iron was made by a Sharon, Pa., consumer at $26, delivered, or $25.24, Valley furnace. An Indianapolis melter has purchased 1500 tons of malleable iron from a southern Ohio furnace at $26.75. We also note the purchase of 500 tons of malleable by a Cleveland melter from a local furnace at $27.25 at furnace. The Westinghouse Electric & Mfg. Co. is reported to have purchased 500 tons of foundry iron for its Cleveland plant at $28, furnace, for both No. 1 and No. 2X. Two

lake furnaces that are not meeting the low prices have reduced their quotations $1 a ton to $29. In Buffalo foundry iron is being quoted at $27.50. Several inquiries are pending in lots up to a few hundred tons. Shipping orders continue good and there appears to be no falling off in the demand from the automobile industry.

Quotations below except on basic and gas plants [illegible] are delivered Cleveland and base iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.25 to $25.50
Northern No. 2 fdy., sil. 1.75 to 2.25	[illegible]
Southern fdy., sil. 1.75 to 2.25	31.00 to 31.50
Malleable	[illegible]
Ohio silvery, 8 per cent	27.50 to 28.00
Standard low phos., Valley furnace	[illegible]

Alloy Steels.—Alloy steels have become slightly more active than they have been for several weeks, but prices are not firm and have declined ¼ c. per lb. on some grades.

Semi-finished Steel.—With the reduced consumption, some customers are carrying over sheet bars purchased for the second quarter and are not expected to come in the market for a few weeks. There is practically no inquiry. The price appears to be well established at $42.50.

Sheets.—The Detroit automobile companies are buying automobile body sheets more freely, some for the third quarter and others for a shorter period. Generally the market is not active. Black sheets are still being shaded $1 a ton to 3.75c., but prices on blue annealed and galvanized sheets appear to be holding well.

Reinforcing Bars.—The demand is light. Prices are unchanged, with rail steel reinforcing bars quoted at 2.35c. for desirable orders and this could probably be shaded. A Pennsylvania freight house at Columbus, Ohio, will require 100 tons.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are closing considerable business in third quarter contracts. Rivet specifications are good and consumers generally are placing contracts at regular prices, which are firm.

Finished Iron and Steel.—A few buyers are attempting to bring out prices lower than 2.40c. for steel bars and 2.50c. for plates and structural material, but mills appear to be holding firmly to those prices. Local and Eastern mills are still getting 2.60c. for plates for early shipment. Specifications on contracts are good, but new demand is light. Deliveries show some improvement, particularly on some sizes of steel bars, but the labor shortage has become more acute because of the hot weather and some steel plants have been compelled to curtail production so that the improvement in deliveries is not as pronounced as it would be with a fair labor supply. Reports from the automobile industry in Detroit indicate that the manufacturers of low priced cars will keep up to maximum production at least through July, but some plants making high priced cars have curtailed operations. It is understood that the Ford Motor Co. has scheduled a production of 7040 cars per day for July and the Chevrolet company a production of 1700 cars. The Canton Car Co., Canton, Ohio, has taken car repair work for the Western Maryland Railroad, requiring 3000 tons of steel, including 1600 tons of plates and 1300 tons of shapes, which will probably go to a Pittsburgh district mill. The Lima Locomotive Co. has taken 10 locomotives for the Union Railroad, Pittsburgh, a Steel Corporation subsidiary. In the structural field, inquiry has improved somewhat.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 2.90c.; flats, squares and hexagons, 4.00c. bar iron and bands, 1 in. and wider and 2c. gage, or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Old Material.—With market support lacking, prices have again sharply declined on several grades and the situation continues very weak. Prices have now reached a point at which yard dealers are buying considerable scrap to lay down. The sales of 1000 tons of heavy melting steel to a dealer are reported at $17 but today only $16 was being offered, or a decline of $2 a ton during the week. We note the sale of several hundred tons of compressed sheet steel by a Cleveland to a Valley dealer at $16.10 shipping point. Cast borings and turnings are $1 lower and busheling has declined about $2. Machine shop turnings are down to around $13 and sales at that price are reported in Detroit for Cleveland delivery. A few car lots of automobile scrap brought $23. The price decline has not stimulated buying by the mills. The Pennsylvania Railroad System, Central Division, will take bids July 5 for approximately 13,000 tons of scrap.

Heavy melting steel	[illegible] to $18.00
Rails for rolling, nominal	21.00 to 22.00
Rails under 3 ft.	20.00 to 20.50
Low phosphorus melting	20.00 to 20.50
Cast borings	14.00 to 14.50
Machine shop turnings	12.00 to 12.50
Mixed borings and short turnings	13.00 to 13.50
Compressed sheet steel	16.00 to 16.50
Railroad wrought	14.50 to 15.00
Railroad malleable	22.00 to 23.00
Light bundled sheet stampings	12.75 to 13.00
Steel axle turnings, nominal	17.50 to 17.75
No. 1 cast	21.50 to 22.00
No. 1 busheling	12.00 to 12.50
Drop forge flashings	13.00 to 13.50
Railroad grate bars	15.00 to 15.50
Stove plate	16.00 to 16.50
Pipes and flues	12.50 to 12.75

STEEL STOCKS NEAR 1921 LOWS

Bethlehem Seven, Republic and Vanadium Four Points Above Previous Depression

Last week's drop in stock prices brought quotations on several active steel issues within a few points of the lows reached in the depression of 1921. Republic common at 44½ and vanadium at 28½ were both less than 4 points above their respective 1921 lows. The corresponding spread for Colorado Fuel & Iron common was 5½ and for Bethlehem common 6⅞ points. Replogle Steel at 14⅛ was almost 4 points below the bottom price of 1921 and is now more than 50 per cent below the figure of last March.

In the following table appear quotations on steel companies' common stock at their low point during their 1921 depression, at their highest prices since and at the lowest prices reached in last Tuesday's reaction.

	1921 Low	High Since	Tuesday's Low
U. S. Steel	70½	111½	90⅜
Bethlehem	41½	82½	48⅝
Republic	41⅛	78⅝	44½
Crucible	19	98⅝	61⅛
Sloss-Sheffield	32½	60	42¾
Colorado Fuel & Iron	22	37	27½
Replogle Steel	18	38½	14⅛
Gulf States Steel	25	104⅝	70⅜
United Alloy	19	41¾	31½
Vanadium	23½	52¾	28½

These recessions and the high prices of 1922 and early 1923 have obtained notwithstanding large current earnings and a good business outlook, which, although it had its bearish factors, has by no means been such as to destroy the optimism of the majority of producers. There appears to be an element in the present market movements which is beyond vision. The full significance of the abrupt decline in stock prices, future developments alone will disclose.

A committee on relations with collegiate schools of business, with R. W. Husband, associate dean of Dartmouth College, as chairman, has been appointed by the American Management Association. Better understanding of the purposes and methods of collegiate schools of business on the part of business and better understanding of the personnel needs of commerce and industry by schools of business is expected from the activities of the new committee.

The Mayville Iron Co. of Youngstown, Ohio, capitalized at $50,000, has been granted a charter in Wisconsin, in which State its headquarters will be at Mayville, the seat of the mines and blast furnaces of the original Northwestern Iron Co., which later became a division of the Steel & Tube Co. of America.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. ..... 2.50c.

Structural Material

Beams, channels, etc., base, per lb. ..... 2.50c.
Sheet piling ..... 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 2.40c.
Soft steel bars for cold finishing ..... $3 per ton over base
Reinforcing steel bars, base ..... 2.40c.
Refined iron bars, base, per lb. ..... 3.25c.
Double refined iron bars, base, per lb. ..... 4.55c. to 5.00c.
Stay bolt iron bars, base, per lb. ..... 8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. ..... 3.30c.
Hoops, light gage, under 1 in. wide ..... 3.50c.
Bands, base, per lb. ..... 3.25c. to 3.30c.
Strips, base, per lb. ..... 3.00c. to 3.30c.
Cotton ties, per bundle of 45 lb. $1.61

Cold-Finished Steels

Bars and shafting, base, per lb. ..... 3.25c.
Strips, base, per lb. ..... 5.00c. to 5.25c.

Wire Products

Nails, base, per keg $3.00
Galvanized nails, 1 in. and over ..... $2.25 over base
Galvanized nails, less than 1 in. base ..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. 2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg 3.45
Cement coated nails, base, per count keg 2.70
Woven fence, carloads (f.o.b. mill) ..... 67½ per cent off list
Woven fence, carloads (to retailers) ..... 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads ..... 60 per cent off list
Machine bolts, small, cut threads ..... 50 and 10 per cent off list
Machine bolts, larger and longer ..... 50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in. ..... 50 per cent off list
Smaller and shorter, rolled threads ..... 50 and 10 per cent off list
Cut threads ..... 50 per cent off list
Larger and longer ..... 50 per cent off list
Lag bolts ..... 60 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads ..... 50 and 5 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ x 4 in. ..... 45 per cent off list
Larger and longer sizes ..... 45 per cent off list
Hot pressed square or hex. nuts, blank ..... $3.50 off list
Hot pressed nuts, tapped ..... 3.25 off list
C.p.c. and t. square or hex. nuts, blank ..... 3.50 off list
C.p.c. and t. square or hex. nuts, tapped ..... 3.25 off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S. ..... 75, 10 and 5 to 75 and 5 per cent off list
⅞ in. and larger, U. S. S. ..... 70, 10 and 2½ to 70 and 2½ per cent off list
Small sizes, S. A. E. ..... 75, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger ..... 75, 10 and 2½ per cent off list
Stove bolts in packages ..... 75, 10 and 5 per cent off list
Stove bolts in bulk ..... 75, 10, 5 and 2½ per cent off list
Tire bolts ..... 50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws, ... 65 and 10 per cent off list
Milled set screws ..... 65 and 10 per cent off list
Upset cap screws ..... 75 per cent off list
Upset set screws ..... 75 per cent off list
Milled studs ..... 50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $3.25
Large boiler rivets, base, per 100 lb. 3.35
Small rivets ..... 60 and 10 to 60 and 5 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., per 100 lb.	$3.25 to 3.75
Spikes, ⅜ in.	2.25 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ¾ in. and larger, base, per 100 lb.	4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.	5.00 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, base, per 100 lb.	2.75

Welded Pipe

Butt Weld

Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	29½	½	2	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 3	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 in.	— 1
3¼ to 3⅞ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base ..... 83 per cent off list
Carbon 0.30 to 0.40, base ..... 81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼-in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box $5.50

Terne Plate

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. ..... 3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. ..... 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. ..... 5.35c.

Galvanized

No. 28 (base), per lb. ..... 5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb. ..... 5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. ..... 3.85c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.225	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.34	Pac. Coast, ship plates	1.20
Pac. Coast, ship plates	1.20	Birmingham	0.58
Birmingham	0.58	Memphis	0.56
Memphis	0.56	Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415		
New Orleans	0.67		

The minimum carload for most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 30c. to 40c.; sheets and tin plates, 40c. to 40c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 49c.; pipes not over 8 in. in diameter, 50c.; over 8 in. in diameter, 5c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6 1[illegible]
Old range non-Bessemer, 51½ per cent iron	6.00
Messabi Bessemer, 55 per cent iron	6.20
Messabi non-Bessemer, 51½ per cent iron	5.[illegible]

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c
Iron ore, Swedish, average 66 per cent iron	10.50c
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	48c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	45c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$125.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	125.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton	87.50 to 90.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	48.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	51.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	55.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	59.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	64.10
Silvery iron, 6 per cent, per ton, furnace	37.00
Silvery iron, 7 per cent, per ton, furnace	38.00
Silvery iron, 8 per cent, per ton, furnace	39.50
Silvery iron, 9 per cent, per ton, furnace	41.50
Silvery iron, 10 per cent, per ton, furnace	43.50
Silvery iron, 11 per cent, per ton, furnace	46.80
Silvery iron, 12 per cent, per ton, furnace	50.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.00 to $51.00	$43.00 to $46.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	45.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to	9.50
Silica Brick:		
Pennsylvania	42.50 to	45.00
Chicago		52.00
Birmingham		48.00
Ground silica clay, per net ton		10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	$47.50 to 50.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.45
Skelp, sheared, per lb.	2.45
Skelp, universal, per lb.	2.45

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled, base, per lb.	2.15c. to 2.20c.
Spikes, ⅜-in. and larger, base, per 100 lb.	$3.15 to $3.25
Spikes, ½-in., ⅜-in. and ⅝-in., base, per 100 lb.	3.25 to 3.75
Spikes, ⅜-in., base, per 100 lb.	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.25 to 5.50
Track bolts, ⅝-in. and larger, base, per 100 lb.	4.00 to 4.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb.	2.50c. to 2.60c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.40

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (1½% Nickel, 10 to 20 per cent Carbon)	$3.50 to $3.75
2300 (3½% Nickel)	5.50 to 5.75
2500 (5% Nickel)	8.00 to 8.25
3100 (Nickel Chromium)	4.50 to 4.75
3200 (Nickel Chromium)	6.25 to 6.50
3300 (Nickel Chromium)	8.25 to 8.50
3400 (Nickel Chromium)	7.25 to 7.50
5100 (Chromium Steel)	4.00 to 4.25
5200 (Chromium Steel)	8.25 to 8.50
6100 (Chromium Vanadium bars)	5.25 to 5.50
6100 (Chromium Vanadium spring steel)	5.00 to 5.25
9250 (Silico Manganese spring steel)	4.00 to 4.25
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.50 to 5.75
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.75 to 5.00
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.50 to 4.75
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq. the net ton bar price applies.

A report recently published by newspapers suggesting the possibility of new financing for the Algoma Steel Corporation, Sault Ste. Marie, Ont., with a reorganization of capitalization and the passing of control from the United States to Canada was declared by president W. H. Cunningham of the Lake Superior Corporation, of which the Algoma Steel Corporation is a subsidiary, to be "without foundation in fact in any way." He further stated that officials of the company had no cognizance of any scheme for new financing of change of control. He added that the steel plant was enjoying excellent business at the moment. Orders on hand would not carry very far ahead, but he hoped that more business would be booked in the early future. Labor conditions are satisfactory, between 3000 and 4000 men being employed at the present time. He stated that the corporation was very fortunate in its relations with labor, as the workmen are now showing greater efficiency than has been the case for some years previous.

British Iron and Steel Market

Lower Prices All Along the Line Except in Steel Hoops—Ruhr Fuel Supplies May Last Until October—Tin Plate Weak

(By Cable)

LONDON, ENGLAND, July 2.

There is no improvement in the pig iron market and none is probable until after the Scottish holidays. Neither domestic nor foreign buyers are yet ready to make fresh purchases. Prices are lower and makers doubtless are prepared to accept even less for firm business. There is new talk of furnaces being banked in the near future, unless the situation improves.

Pronounced weakness has developed in hematite. Makers' stocks are accumulating and fresh orders are scarce.

Finished iron and steel are dull, domestic consumers covering immediate requirements only, and many descriptions of steel are easier. There is some improvement in Continental inquiry but business is slow in maturing.

The Continental position is complex. Iron and steel makers are inclined to adopt a firm tone. There is some local revival of demand but British and overseas markets still are mainly quiescent. French and Luxemburg industrialists naturally are apprehensive as to fuel supplies when the surface stocks in the Ruhr shall have been exhausted. These probably are sufficient for two or three months, but the likelihood of a scarcity of coke later may definitely compel higher prices.

Tin plate market shows no change. There is some expectancy regarding the attitude of the price stabilization committee, in view of the continued lack of fresh orders and the possibility of a shortage of rolling work in the near future. Common merchant business is passing at slightly below works' prices.

Galvanized sheets are easier, with only a small Indian and Far Eastern demand.

Black sheets are characterized by fair Continental inquiry and some Indian interest, but actual business is small. The Continent apparently is securing a fair amount of available business. Prices are rather easier.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.58 per £1, as follows:

Durham coke, delivered	£2	1½s.				$9.50
Bilbao Rubio ore†	1	4				5.50
Cleveland No. 1 foundry	6	7				29.08
Cleveland No. 3 foundry	5	12½				25.76
Cleveland No. 4 foundry	5	10				25.19
Cleveland No. 4 forge	5	7½				24.62
Cleveland basic	6	0				27.48
East Coast mixed	5	12				25.65
Ferromanganese	18	0				$82 14
Ferromanganese*	20	0				91.60
Rails, 60 lb. and up	10	0	to £10	10s.		45.80 to $48.09
Billets	8	15	to	9	15	40.08 to 44.66
Sheet and tin plate bars, Welsh	9	2½				41.79
Tin plates, base box	1	3	to	1	3½	5.27 to 5.30
						C. per Lb.
Ship plates	9	15	to	10	5	1.99 to 2.10
Boiler plates	12	10	to	13	0	2.56 to 2.66
Tees	10	5	to	10	15	2.10 to 2.20
Channels	9	10	to	10	0	1.94 to 2.04
Beams	9	5	to	9	15	1.89 to 1.99
Round bars, ¾ to 3 in.	11	0	to	11	10	2.25 to 2.35
Galvanized sheets, 24 g.	18	0	to	18	5	2.68 to 2.73
Black sheets, 24 gage	13	10	to	13	15	2.76 to 2.81
Black sheets, Japanese specifications	15	5				3.12
Steel hoops	12	0	&	12	10*	2.45 & 2.56*
Cold rolled steel strip, 20 g.	17	7½				3.55
Cotton ties, Indian specifications	15	0				3.07

*Export price. †Ex-ship. Tees, nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Foundry pig iron:						
Belgium, July	£5	5s.				$24.05
France, July	5	5				24.05
Luxemburg, July	5	5				24.05
Billets:						
Belgium, July	6	10	to £6	12½		29.77 to $30.34
France	6	10				29.77
						C. per Lb.
Merchant bars:						
Belgium, July	7	10				1.53
Luxemburg, July	7	10				1.53
France	7	10				1.53
Joists (beams):						
Belgium, July	7	7½	to	7	10	1.51 to 1.53
Luxemburg	7	15				1.58
France	7	7½	to	7	10	1.51 to 1.53
⅛-in. plates:						
Belgium, July	7	15	to	7	17½	1.58 to 1.61
¼-in. plates:						
Luxemburg	7	7½				1.51
Belgium	7	10				1.53

RATE INCREASE STANDS

Higher Tariffs on Iron, Steel and Other Products to the South Not Suspended

WASHINGTON, July 3.—Surprise was occasioned by the vote of the Interstate Commerce Commission last Saturday not to suspend increased rates, effective on July 1, on iron and steel products from Ohio River crossings and from points of origin, including Youngstown, Ohio, and Pittsburgh, to southeastern and Carolina territories. Confidence had been felt by iron and steel manufacturers and other interested shippers that the rates would not be allowed to become operative at least until there had been an investigation and hearing.

Seldom has a case been the source of such a great volume of protests. Involving not only iron and steel products, it also increases rates on agricultural implements, grain and grain products, refrigerators, and furniture and those associated in these lines, together with jobbers. The railroad commissions of Mississippi and North Carolina and various chambers of commerce had made vigorous protest against the schedules. So vigorous and numerous were the objections that it had been taken almost for granted that suspension would be ordered. This feeling was heightened by the fact that a considerable number of the rates are higher than those suggested by the railroads and suspended by the commission with regard to rates on iron and steel and other products from Ohio River crossings made in relation to the rates from the crossing to Mississippi Valley destinations because they appeared higher than warranted by commission decisions in previous cases.

The rates becoming effective on July 1, as an example, mean an increase from 57c. to 67c. per 100 lb. on iron and steel products from Pittsburgh to New Orleans. In the suspended Mississippi Valley case, the rate from Pittsburgh to New Orleans proposed by the railroad was 66c., but the commission on that occasion held that this rate should not exceed 57c. In the present instance, the Mississippi Railroad Commission pointed out that the rate on iron and steel articles from St. Louis to Jackson, Miss., is increased from 38c. to 46c.; to Gulfport, from 40.5c. to 50c. and to Columbia, from 49.5c. to 60c. The Virginia Bridge & Iron Co. said that the proposal was to increase the rate on iron and steel from Pittsburgh to Memphis, Tenn., and used by the company from 38.5c. to 56c.

Among others who protested were the United States Steel Corporation, the Bethlehem Steel Co., the National Tube Co., the American Rolling Mill Co., and a number of merchant blast furnace interests.

Deeming the problem one for National and not State legislation, the Wisconsin Legislature has disposed of all proposed laws concerning the field of unemployment insurance. The so-called Huber bill, aiming to establish a system of unemployment compensation, was killed, and later the so-called Titus substitute, providing for an interim investigation, likewise was voted down. Employers of all classes in Wisconsin opposed the proposition vigorously as a further burden, making it extremely difficult for them to compete with employers in other States where no enactment of this character exists.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
June	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
27.....	15.12½	14.75	39.25	7.00	6.65	6.12½	5.77½
28.....	15.00	14.50	38.75	6.85	6.55	6.12½	5.77½
29.....	15.00	14.50	39.00	6.85	6.55	6.10	5.75
30.....	15.00	14.50	....	6.85	6.55	6.10	5.75
July 1.....	15.00	14.50	38.50	6.85	6.55	6.10	5.75

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, July 2.

All the markets are exceedingly quiet and quotations in most cases are lower and demand very light.

Copper.—Further weakness has developed in the electrolytic copper market and quotations are about ¼c. lower than a week ago at 14.75c., delivered. While some large producers are not quoting as low as this, the small amount of business offered is being easily taken care of at this level or even slightly lower. The volume of business is so light that it is difficult to state the exact minimum of the market. Consumers are maintaining a waiting attitude and producers are convinced that further concessions will not stabilize the market. Foreign demand is also exceedingly light. Lake copper is a little lower at 15c., delivered.

Copper Averages.—The average price of Lake copper for the month of June, based on daily quotations in THE IRON AGE, was 15.23c. The average price of electrolytic copper was 14.74c., refinery, or 14.99c., delivered.

Tin.—The market has been dull on some days and fairly active on others. On Thursday, June 28, in a moderately active market, 400 to 450 tons changed hands. Most of the sellers were those with London connections and the buying was about evenly divided between dealers and consumers. The latter are apparently becoming more interested and it is figured that about 66 per cent of the amount sold last week was bought by them. On Wednesday, June 27, about 200 tons was purchased by consumers. The premium on spot tin is diminishing with the passing of June and more liberal arrivals of the metal. Conditions may be such in the first few days of this month that this premium may disappear altogether, but may be re-established later. Deliveries into consumption in June were 5410 tons, with 2137 tons in stock and landing on June 30. About 150 tons of metal was sold on the New York Metal Exchange during the week. Spot Straits tin was quoted today at 38.50c., New York, and quotations in London were considerably lower at £176 15s. for spot standard, £177 17s. 6d. for future standard and £179 15s. for spot Straits. These London quotations are about £6 per ton lower than yesterday and £10 per ton lower than a week ago.

Lead.—The principal feature of interest in this market has been a reduction by the leading interest on Thursday, June 28, to 6.85c., New York, which is the general quotation. The outside market, as a result, has turned weaker, with St. Louis prices down to a basis nearly equal to New York, or 6.50c. to 6.60c., St. Louis. The entire market is very quiet and dull.

Zinc.—There is practically no demand for prime Western zinc and the market is exceedingly stagnant. One producer reports the sale of 200 tons at 5.75c., St. Louis, which probably represents the market. On this basis the New York quotation is 6.10c. There is a slight premium over these July prices of about five points per month for August and September, which is the principal difference between the market now and a week ago.

Nickel.—Quotations for shot and ingot metal are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c. per lb.

Antimony.—The market is a little stronger and quotations are a little higher at 6.90c., New York, duty paid, for Chinese metal in wholesale lots.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted in wholesale lots for early delivery by importers who can obtain the metal at 26.50c. to 27c. per lb., New York, duty paid. The leading domestic producer does not make public any quotations.

Old Metals.—The market is featureless and values are stationary. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.50
Copper, heavy and wire	13.50
Copper, light and bottoms	11.50
Heavy machine composition	11.25
Brass, heavy	8.75
Brass, light	7.00
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	6.25
Lead, tea	3.25
Zinc	4.50

Chicago

JULY 2.—Buying has again declined and, while there is some small future demand for copper, orders for the other metals are confined largely to spot deliveries. Copper, tin and lead are lower than a week ago, while zinc and antimony and the old metals remained unchanged. We quote in carload lots, Lake copper, 15.75c.; tin, 41c.; lead, 6.70c.; spelter, 5.80c.; antimony, 8.50c. in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.75c.; copper bottoms, 10c.; red brass, 8.50c.; yellow brass, 6.50c.; lead pipe, 5c.; zinc, 3.75c.; pewter, No. 1, 25c.; tin foil, 26.50c.; block tin, 32.50c. all buying prices for less than carload lots.

Canadian Scrap Market

TORONTO, ONT., July 2.—Both prices and demand are showing a weak tendency in the Canadian iron and steel scrap market. Dealers report slackness on the part of consumers in so far as placing contracts for third quarter is concerned, but it is pointed out that a limited demand exists for spot delivery. Steel plants are taking in small tonnages of heavy melting steel and turnings on spot account, but the greater part of dealers' shipments are contract business, which accounts for a good movement in scrap. The quiet state of the local market is also reflected in the export demand for scrap. Neither American nor European interests are entering the Canadian market for scrap at the present time and while dealers have some inquiries before them, no extensive buying is expected to materialize in the immediate future. While Toronto dealers have announced no further change in their buying prices, some downward revisions have been made in Montreal prices. In the Montreal market, dealers dropped their buying price on heavy melting steel from $15 to $13 per gross ton, and also report a reduction of $3 per ton in the price they are offering for No. 1 machinery scrap, this commodity now being purchased at $21 per net ton, Montreal. Iron and steel scrap prices are as follows:

Dealers' Buying Prices

	Toronto	Montreal
Gross Tons		
Steel turnings	$13.00	$14.00
Machine shop turnings	13.00	13.00
Wrought pipe	11.00	12.00
Rails	17.00	15.50
No. 1 wrought scrap	16.00	15.00
Heavy melting steel	16.00	13.00
Steel axles	18.00	18.00
Axles, wrought iron	21.00	24.00
Net Tons		
Standard car wheels	18.00	17.00
Malleable scrap	18.00	17.00
Stove plate	18.00	18.00
No. 1 machinery cast	22.00	21.00

TREND OF PRICES THIS YEAR

Averages at the End of June Show Only Slight Advance Over First of January

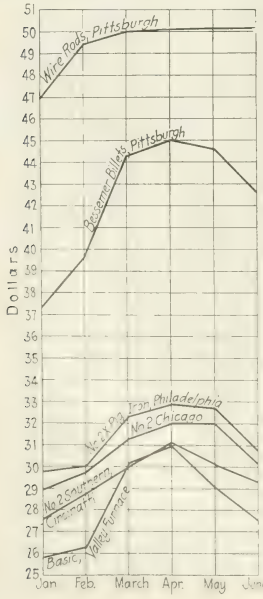
Notwithstanding the heavy demand for pig iron and finished steel in the early months of the year and the resultant rise in prices, the net result at the end of the first half is not an appreciable gain. According to the composite averages of THE IRON AGE prices, pig iron was only $1.83 per ton higher in the last week of June than in the first week of January, while finished steel prices were, on the average, only 0.343c. per 100 lb. higher at the end of the six months period than at the beginning.

That prices have so quickly settled back to a point close to what they were at the beginning of the year is due primarily to the very large production of both pig iron and steel during the half-year period. THE IRON AGE blast furnace figures for June, published on another page, show a total production for the six months of about 20,750,000 tons, probably 21,000,000 tons, including charcoal iron, while the indicated steel ingot production for the six months is about 23,500,000 tons. On a yearly basis, both of these production totals would establish records for the American iron and steel industry.

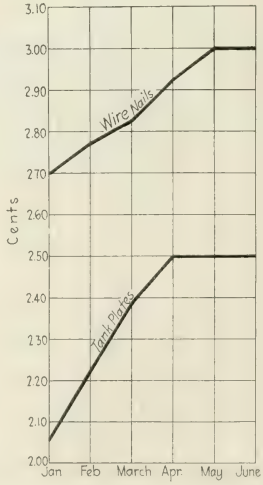
The month in which prices were highest on both pig iron and steel was April, and it was during that month that the volume of business began to show a decrease, resulting in slightly lower price averages in May and still lower in June. There has not been a change in THE IRON AGE composite price of steel in eight weeks, while the pig iron composite price has shown almost weekly downward revisions during the same period.

Prices of Leading Products for First Half of 1923

	Jan.	Feb.	March	April	May	June
No. 2X pig iron, Philadelphia	$29.76	$30.01	$32.295	$32.95	$32.76	$30.76
No. 2 Southern, Cincinnati	27.45	28.675	30.80	31.05	30.75	29.30
No. 2, Chicago	28.90	29.75	31.25	32.00	32.00	31.25
Basic, Valley furnace	25.80	26.25	30.125	31.00	29.00	27.50
Bessemer iron, Pittsburgh	29.27	29.83	32.02	32.77	31.87	30.27
Bessemer billets, Pittsburgh	37.30	39.625	44.375	45.00	44.60	42.62
Wire rods, Pittsburgh	47.00	49.375	50.00	50.25	51.00	51.00
	Cents	Cents	Cents	Cents	Cents	Cents
Steel bars, Pittsburgh	2.04	2.20	2.3875	2.50	2.40	2.40
Tank plates, Pittsburgh	2.06	2.25	2.3875	2.50	2.50	2.50
Beams, etc., Pittsburgh	2.06	2.20	2.3875	2.50	2.50	2.50
Wire nails, Pittsburgh (per 100 lb.)	2.70	2.775	2.825	2.925	3.00	3.00



The Accompanying Charts Illustrate the Sharp Rise in Steel and Pig Iron Prices During the First Half of the Year. In June Bessemer billets at Pittsburgh and all grades of pig iron recorded sharp declines, but prices of wire rods, wire nails and tank plates held steadily at the levels attained earlier in the year. The rise in wire nails was steady throughout the year until about June 1, while tank plates reached their peak about May 1 and held at the same price throughout May and June. Basic pig iron at Valley furnace has come the nearest of any commodity mentioned in the above table to getting back to a point close to its January level. This week's issue records a further decline in Valley basic, which brings it down to its first of the year price



Missouri Farm Produces High Grade Iron Ore

A 17,000-acre stock farm in the Missouri Ozarks purchased in 1920 by Leonard A. Busby, president the Chicago Surface Lines, Chicago, has been transformed into an iron mine with great possibilities. Contrary to the general belief that the iron ore in that region had been exhausted 30 years ago, mining engineers who have investigated the property believe the ore reserves to be very large. Recently the first daily shipment of 1000 tons of ore was made to the Granite City, Ill., plant of the St. Louis Coke & Iron Co. The ore is said to run 60 per cent in iron and under 5 per cent in silica. Mr. Busby has equipped his mine with modern machinery and hopes to increase the daily output to 3000 tons. The St. Louis Coke & Iron Co. has contracted for the entire production and has been receiving about 500 tons per day. The mine is only 85 miles from St. Louis.

PERSONAL

Samuel J. Reeves has been elected president of the Phoenix Iron Co., Philadelphia, manufacturer of structural shapes, with plant at Phoenixville, Pa., succeeding his father, the late David Reeves, who died Feb. 5, 1923. Samuel J. Reeves is the fourth generation of his family to serve as president of this company. W. H. Reeves, a brother of the late David Reeves, was elected chairman of the board of directors, a newly created position. G. C. Carson, Jr., who was treasurer, becomes vice-president of the Phoenix Iron Co. and president of the Phoenix Bridge Co., a subsidiary engaged in fabricated steel work. Other officers are F. P. Norris, vice-president Phoenix Bridge Co., and George Gerry White, secretary Phoenix Iron Co. Samuel J. Reeves, though still a young man, has been connected with the business for 18 years, having entered its employ upon his graduation from college. He worked through all departments and after learning the business thoroughly was elected vice-president in 1917. In 1918 he entered the Army and upon the conclusion of the war re-entered the employ of the Phoenix Iron Co. as vice-president and purchasing agent.

F. M. Feiker, formerly vice-president of the McGraw-Hill Co., Inc., and more recently on leave of absence as special agent to the Department of Commerce at Washington, after his return from that city, will be associated with the staff of the Society for Electrical Development, 522 Fifth Avenue, New York. He will retain a consulting relation to the McGraw-Hill Co., and he will continue in a similar capacity his relation to the problems of personnel and organization of the Department of Commerce at Washington.

George A. Coolclough, special export representative of the American Chain Co., Bridgeport, Conn., has sailed for England, where he will spend some time on business for the company. He will next proceed through other European countries, thence into South Africa.

F. A. Duttenhofer, purchasing agent Traylor Engineering & Mfg. Co., Allentown, Pa., has tendered his resignation to take effect not later than July 7.

George A. Orrok, chairman of the committee on publication and papers for the American Society of Mechanical Engineers, has gone to Europe on a business trip. He will not return until about the middle of August.

George E. Waller, office manager of the Wilson Foundry & Machine Co., Pontiac, Mich., has been appointed secretary of the company to succeed Earl W. MacKenzie, recently resigned. Mr. Waller will continue his duties as manager.

C. C. Rosser, who for many years has been connected with the Detroit Seamless Steel Tubes Co., has been appointed district sales manager, with offices at 1206 Guardian Building, Cleveland.

J. E. Hunter, vice-president Rochester Bridge Co., Rochester, Ind., has been elected president, succeeding Roy Dennison, resigned. This change followed a reorganization of the company.

W. H. Forbes, formerly Cleveland district sales manager of the United Alloy Steel Corporation, Canton, Ohio, has been appointed district sales manager of the Interstate Iron & Steel Co., Chicago, with headquarters at Cleveland.

E. J. Wilkie has been appointed northern sales manager of the Bucyrus Co., South Milwaukee, Wis., succeeding E. R. Weber, resigned. Mr. Wilkie has been associated with the company 14 years. He is given charge of sales in Wisconsin, Minnesota, North and South Dakota, Upper Michigan and Eastern Montana, and will continue to have headquarters at the main offices in South Milwaukee.

J. B. Nordholt of the Toledo Steel Castings Co., Toledo, Ohio, has been elected president of the National Ohio State University Association.

T. E. Schwening, superintendent, and William C. Doering, assistant superintendent Vitrified Wheel Co., Westfield, Mass., have resigned.

A. W. MacLaren, formerly general traffic manager of Morris & Co., and now vice-president of the Chicago Bearing Metal Co., Chicago, has been elected president of the Oklahoma Belt Railroad Co.

George G. Everitt, for 11 years associated with the Whitman & Barnes Mfg. Co.'s Eastern sales organization at New York, has been made manager of the New York office and warehouse, Church and Chambers Streets.

George H. Fristoe, sales manager Stocker-Rumely-Wachs Co., machine tool dealer, Chicago, has resigned to engage in other business. Mr. Fristoe has been connected with the company for over ten years, during the last four of which he has served as sales manager. Prior to becoming identified with Stocker-Rumely-Wachs Co., he was for seven years with the A. D. White Machinery Co., also of Chicago.

T. E. Geiger, formerly with the Hobart Bros. Co., Troy, Ohio, has taken over the management of the low voltage division of the Ideal Electric & Mfg. Co., Mansfield, Ohio. For several years he was factory manager of the Troy Wagon Works Co., Troy.

Percival Johnson, president Pulaski Iron Co., Philadelphia, will sail next week for Europe, to be gone most of the summer.

L. R. Louis, vice-president and sales manager of the Cleveland Cap Screw Co., Cleveland, has resigned, effective July 2. Prior to this connection he was assistant sales manager of the Foster Bolt & Nut Mfg. Co., Cleveland.

William Breeden, formerly general manager of sales of the Lackawanna Steel Co., has been appointed manager of steel sales for Peter A. Frasse & Co., Inc., in the Buffalo district, with offices at 52 Exchange Street, Buffalo.

H. A. Morlock has accepted the position of representative of Phillips Isham, New York, in the Philadelphia district, with office at 1503 Real Estate Trust Building. He was formerly connected with Shriver & Co.

OBITUARY

WILLIAM H. GIBBONS, Ardmore, Pa., formerly vice-president and treasurer of the Pulaski Iron Co., died suddenly at Plymouth, England, on June 20. He was born Sept. 14, 1852, a grandson of Martha Lukens, founder of the Lukens Steel Co., and after his graduation from Haverford College he entered the steel business with that company. He later became connected with the Parksburg Iron Co., Parksburg, Pa., eventually becoming president, a position which he held for a number of years. He was also president of the Eastern Steel Co. for a time, but his principal connection was with the Pulaski Iron Co., of which he was vice-president until the sale of the company about two years ago.

JAMES P. MARSH, formerly president of the James P. Marsh Co., manufacturer of steam specialities, 118 South Clinton Street, Chicago, died June 27, aged 82.

JOHN ECKERT, president Milwaukee Forge & Iron Co., Milwaukee, died June 22 after a long illness. He was 44 years of age.

CHARLES J. SCHLEGEL, for many years treasurer of Charles A. Schieren & Co., 30 Ferry Street, New York, died on June 25. Mr. Schlegel had been with the company for more than 40 years.

FABRICATED STEEL BUSINESS

Contracting for Oil Tanks Brought Tonnage of Awards to That of Recent Weeks

Oil tank work accounted for over two-thirds of the tonnage contracted for in fabricated steel work in the past week. Of the total of about 17,000 tons some 5000 tons covered the general bridge and building field and about half of this was for public work. New inquiries call for 11,000 tons, mostly for private enterprises. Awards include the following:

Public School No. 60, New York, 1600 tons, to Bethlehem Fabricators.

Highway bridge for Norwich, N. Y., 150 tons, to American Bridge Co.

Brooks Brothers, New York, 200 tons, to Hay Foundry & Iron Works.

Sub-station, Edison Co., Park Place, New York, 450 tons, to Hay Foundry & Iron Works.

Penn Traffic Co., Johnstown, Pa., store, 500 tons, to McClintic-Marshall Co.

Oliver school, Pittsburgh, 500 tons, to John Eichleay Jr. Co.

Humble Pipe Line Co., Houston, Tex., 10 80,000-bbl. tanks for Navarro, Tex., 3000 tons, to Chicago Bridge & Iron Works.

Magnolia Petroleum Co., 20 tanks, 4000 tons, divided equally between United Iron Works and Petroleum Iron Works.

Sinclair Crude Oil Purchasing Co., five 80,000-bbl. tanks for Oklahoma, 1500 tons, to Graver Corporation.

Humphreys Oil & Gas Co., 20 55,000-bbl. tanks with wooden roofs for Texas, 2660 tons, to Youngstown Boiler & Tank Co.

Cosden Co., Tulsa, Okla., two 55,000-bbl. tanks, 260 tons, to Kansas City Structural Steel Co.

Chicago & Alton, bridge No. 1112, over Mackinaw River, Lexington, Ill., 377 tons, to Strobel Steel Construction Co. (To be fabricated by Mt. Vernon Bridge Co.)

American Gas & Electric Co., New York, bridge span for power station at Philo, Ohio, 200 tons, to American Bridge Co.

Culver Military Academy, recreation building, Culver, Ind., 400 tons to Fort Pitt Bridge Works.

Terminal warehouse, Indianapolis, Ind., 375 tons to **Rochester Bridge Co.**

Edward Schuster & Co., Milwaukee, department store addition, 175 tons, to A. F. Wagner Iron Works.

St. Cosme bridge, Wayne County, Mich., 140 tons, to Wisconsin Bridge & Iron Co.

Modjeska theater, Milwaukee, 170 tons, to Lakeside Bridge & Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Apartment houses for Bing & Bing in New York, 2000 tons.

Duquesne Light & Power Co., Pittsburgh, 500 tons, for Dwight P. Robinson & Co., New York.

Theater, Pittston, Pa., 450 tons.

Tank work, Fort Arthur, Tex., for Stone & Webster Corporation, 300 to 400 tons.

Western Union office building, New Orleans, 600 tons.

First National Bank building, Davenport, Iowa, 700 tons, plans being drawn.

Illinois Central Railroad, viaduct at Forty-first Street, Chicago, 350 tons, bids to be taken.

St. Paul Gas Light Co., power plant, St. Paul, Minn., 500 tons, bids being taken.

Delaware River bridge, Philadelphia to Camden, N. J., 1900 tons for anchorage cable bents; bids close July 18.

Allerton Hotel, Cleveland, 1500 tons.

Akron Savings & Loan Co., Akron, Ohio, bank and office building, 1000 tons.

Niagara Falls Hotel, Niagara Falls, N. Y., 1000 tons.

San Francisco Market

Chinese Pig Iron Sellers Anxious to Establish Business on the Coast

SAN FRANCISCO, June 27.—Although business conditions continue good throughout central California, there is some hesitancy in making preparations for new construction in the building line, particularly class A and class B edifices, wherein large quantities of steel figure in the work. It is true that building permits are greater in number than at this time last year, but contractors point out that the number of steel frame structures now being planned is steadily growing less, because of the high cost of labor, more than the increased cost of materials. How long this condition will continue cannot be determined, but if it is maintained much longer and shows signs of expansion, it will have a very important bearing on the iron and steel industry. Prices for the present show little variation as compared with a month ago, but the trade position is so sensitive that it would not take much of a change to bring about lower prices.

Probably the largest piece of work for the near future is the Rodeo-Vallejo Ferry Co.'s steel bridge, which will span Carquinez Straits. It is stated that this structure will require 12,000 tons of steel. The bridge is being fabricated in an Eastern mill, and the first shipments are expected within the next 60 days. Pile drivers are now at work, and steam shovel work will begin shortly after the Fourth of July. Another good sized piece of work which will require a considerable steel tonnage is the new $2,000,000 Senator Hotel, for which ground is now being broken in Sacramento facing the State Capitol grounds.

Pig Iron.—Prices of foreign iron remain the same substantially, with the range from $35 to $38 per ton ex ship, duty paid. Domestic iron is almost at a standstill, and importers say it is a little early to quote prices for third quarter. One feature of the trade which is attracting a larger than usual measure of attention just now is the use of Chinese iron. There has been an uncertain quantity of Chinese iron imported during the past few months, and it is said to have been satisfactory. Chinese makers, in the hope of building up a larger trade on this coast, have asked for firm offers for round lot tonnages. As far as can be learned, however, no real business has been closed, a fact due probably to the unsteadiness of the market situation coupled with the uncertainties of what turn the Eastern markets may take. There are also some indications of business in both domestic and foreign iron, but in this case also it is doubtful whether any trade has been consummated, outside of a few small lots which are of no material importance.

Old Material.—Offerings are reported as just about sufficient to supply the present demand, which seems to be confined within rather narrow limits. Backwardness in buying appears to be a little more marked than a few weeks ago, but prices remain quotably the same as two weeks ago. There has been some foreign scrap coming to hand recently, and there will be more. A sailing vessel is now en route from Chili with 3000 tons gross mixed railroad iron, but the bulk of this is probably already spoken for.

Little Inquiry for Railroad Equipment

An inquiry for new cars and one for used cars and locomotives constitute the chief items of the week's developments in the railroad equipment field, and are as follows:

The Consolidated Purchasing Agency, American Short Line Railroad Association, McCormick Building, Chicago, is in the market for the following used equipment: Four 10-wheel locomotives, approximately 60 tons in weight; 3 Mogul locomotives, approximately 60 tons in weight; 8 Consolidation locomotives, approximately 72 tons in weight; all must have wheel centers not more than 50 in., steam pressure 160 to 200 lb.; 50 40-ton box cars, steel underframes preferred; 85 40-ton gondola cars, steel underframes preferred; 68 40-ton flat cars, steel underframes preferred; 3 steel-underframe passenger coaches (small type preferred); 10 8-wheel cabooses.

The Atchison, Topeka & Santa Fe is inquiring for 300 gondola cars.

Machinery Markets and News of the Works

RAILROADS LEAD IN JUNE

Buying by Industrial Companies Dull—Orders Largely for Single Machines

Pennsylvania Railroad and Santa Fe Inquire for Tools—Other Inquiries Noted

Companies sharing largely in recent railroad orders report good business for the month; for others, June was not outstanding as compared to some of the previous months of the year. During the past week, orders for the most part have been for single machines, although a number of fair-sized sales have been noted.

The Pennsylvania Railroad has an inquiry out for four punches and shears and the Santa Fe Railroad has sent out an inquiry for a number of tools in addition to those placed last week.

The Harbor Commissioners of Montreal have issued an inquiry for machine tool equipment and the Public Service Gas Corporation, Philadelphia, wants three engine lathes. The General Electric Co. is taking bids on miscellaneous equipment. The Standard Seamless Tube Co., Pittsburgh., is expected to buy a number of tools shortly.

Formal inquiry for tools for the new shop of the Railway Steel Spring Co. is expected before long and a few tools will probably be placed soon by the Pittsburgh Steel Products Co., in connection with extensions to its Allenport, Pa., plant.

The Elgin, Joliet & Eastern list may be closed soon, but the Burlington inquiry will probably not be disposed of for some time. It is reported that action on the Pere Marquette list has been postponed for a few weeks.

An award of the tools for which bids were taken by the Pittsburgh Board of Education is expected shortly. The Cicero, Ill., Board of Education has purchased six additional tools.

The Canadian National Railways were expected to close bids July 2 on seven tools. Purchases during the week include nine tools by a Mississippi railroad. The Ford Plate Glass Co., and the Toledo Machine & Tool Co., bought during the week, and the Joyce-Cridland Co., and the Delco Light Co., both of Dayton, Ohio, have made purchases. Sales of press brakes were made in the Cincinnati district.

Activity in used machinery is noted. In the Cleveland field the equipment of two or three Ohio plants has been purchased.

New York

NEW YORK, July 2.

COMPANIES specializing in shop equipment for railroads or plants doing railroad work have had a very satisfactory business in June, in fact, in one or two instances, it has been one of the best months of the year, but the same is not true of machine-tool companies making the standard lines of tools which are used only incidentally in railroad shops. One large machine-tool company reports that its June sales the country over were about half of the amounts done in the first three months of the year. Most of the buying the past week, as in the week before, has been done by the railroads or by companies doing railroad work.

The Florida East Coast Railroad closed for a 42-in. boring mill, an axle lathe, two small lathes, a shaper and other tools and flue equipment. The Virginian Railway bought a 500-ton, double car-wheel press. The Baldwin Locomotive Works, Philadelphia, placed an order for two 6-ft. radial drills. The Tennessee Central bought a slotter and the Chicago, Rock Island & Pacific a 53-in. boring mill. The Southern Pacific placed an order for a 90-in. driving wheel lathe and a quartering machine for one of its shops in California. The Central Railroad of New Jersey has closed for the eight or 10 tools for which it inquired a few weeks ago, and the Lehigh Valley Railroad is expected to buy six or eight tools within a week. No orders have been received here from the Norfolk & Western against its large list issued some weeks ago.

The Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has awarded contract to the Turner Construction Co., for a five-story addition to its plant at Yonkers, N. Y.

A. Lamberg & Co., 243 Center Street, New York, machinery dealer, has inquiries out for a power shear for soft metal cutting.

The Northern Union Gas Co., 1815 Webster Avenue, New York, has preliminary plans for new repair shops near its present works. Jardine, Hill & Murdock, 347 Madison Avenue, are architects.

Following the removal of its plant at the foot of Sands Street, Brooklyn, to its new location for the concentration of production, the E. W. Bliss Co., manufacturer of machinery, will discontinue all operations at the previous works and the property will be placed on the market. It consists of a number of buildings, totaling 200,000 sq. ft.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 17 for five electric grinders, schedule 1029, for the South Brooklyn Navy Yard.

The Stewart-Warner Speedometer Corporation, 551 West Fifty-second Street, New York, with headquarters at 1828 Diversey Parkway, Chicago, is completing plans for a three-story factory branch, 100 x 100 ft., on Sixty-fifth Street, near Columbus Avenue, with service station and repair department, to cost approximately $100,000.

The Electric Bond & Share Co., 71 Broadway, New York, operating electric light and power utilities, is disposing of a preferred stock issue of $2,750,000, a portion of the proceeds to be used for extensions.

The Fireproof Products Co., 426 Third Avenue, New York, has leased the building at Twelfth and Jackson Avenues, Long Island City, totaling 5000 sq. ft., now in course of erection, for a new plant.

The Robert Findlay Mfg. Co., 100 Lexington Avenue, Brooklyn, manufacturer of lighting fixtures, has plans for extensions in its three-story plant, to cost $25,000. J. D. Weiss, 175 Fifth Avenue, New York, is architect.

The Line Material Co., 50 Church Street, New York, manufacturer of electric equipment, with plant at South Milwaukee, Wis., has leased space in the building at 524-26 East 134th Street for a factory branch.

The Department of Public Works, Borough Hall, St. George, West New Brighton, N. Y., has plans for a one-story machine repair and service shop for municipal trucks and cars, 58 x 95 ft., on the Clove Road, to cost $40,000.

Manual training equipment will be installed in the new junior high school to be erected at Schenectady, N. Y., to cost about $200,000, for which ground will soon be broken. The Board of Education is in charge.

The Atlas Portland Cement Co., 25 Broadway, New York, has organized a subsidiary company, the Atlas Portland Cement Co. of Kansas, to take over the plant of the Western States Portland Cement Co., Independence, Kan. Exten-

The Crane Market

Business in cranes has not been particularly active during the past week and few new inquiries have appeared. The Third Avenue Railway System, New York, has asked for bids on a 10-ton, 31-ft. 3¾-in. span, double-hook overhead crane for lifting cars. The Railway Steel Spring Co., 30 Church Street, New York, has been receiving bids on two 15-ton, 80-ft., 6-in. span, double-hook overhead traveling cranes. The General Electric Co., which recently closed on a list of several overhead cranes, is inquiring for a small gantry crane for Schenectady, N. Y. Hugh L. Cooper & Co., 101 Park Avenue, New York, engineers, have closed with the Virginia Bridge & Iron Works, Roanoke, Va., on three large gantry cranes for handling concrete at the Wilson Dam, Florence, Ala.

Among recent purchases are:

Lockwood-Greene & Co., New York, a 5-ton, 3-motor and a 1-ton, 1-motor, overhead traveling cranes for the Jenkins Bros. plant at Bridgeport, Conn., from the Northern Engineering Works.

Otis Elevator Co., Yonkers, N. Y., four 5-ton, 47-ft. span cranes and a 5-ton, 48-ft. span, 3-motor overhead traveling crane for the Quincy Works of the company, Quincy, Ill., and a 7½-ton, 67-ft. 6-in. span overhead crane for the Yonkers works, from the Bedford Foundry & Machine Co., through Philip T. King, 30 Church Street, New York.

Interborough Rapid Transit Co., New York, a 4-ton, monorail hoist from the Shepard Electric Crane & Hoist Co.

West Penn Power Co., Pittsburgh, a 4-ton, 33-ft. 10-in. span, grab bucket crane with 2½-cu. yd. bucket from the Milwaukee Electric Crane & Mfg. Co.

Southern Pacific Co., 120 Broadway, New York, two large pile drivers from the Industrial Works.

Mead-Suydam & Co., Newark, N. J., a 1-ton, 12-ft. span, underhung hand power crane from the New Jersey Foundry & Machine Co.

Empire Steel Construction Co., Shreveport, Iowa, a 10-ton, 60-ft. span, 3-motor, overhead traveling crane, from Alfred Box & Co., Philadelphia.

Philadelphia Rapid Transit Co., Philadelphia, two 20-ton, 2-motor crane trolleys and two 5-ton, 28-ft. span, 3-motor, overhead traveling cranes from Alfred Box & Co.

Denver, Rio Grande & Western Railway Co., through Battey & Kipp, Chicago, engineers, 16 7½-ton, 1-motor, 17-ft. span overhead traveling cranes and two 7½-ton, 14-ft. span, 2-motor, overhead traveling cranes, from Alfred Box & Co.

Barber Asphalt Co., Maurer, N. J., has purchased a used 20-ton Brown-hoist locomotive crane for its Chicago plant.

National Cement Co., Birmingham, Ala., has purchased a used 20-ton industrial locomotive crane.

Westinghouse Electric Crane & Mfg. Co., Sharon, Pa., two 5-ton cranes from the Whiting Corporation and a 10-ton and 3-ton crane from the Northern Engineering Works.

Olean Electric Light & Power Co., Olean, N. Y., a 30-ton, 33-ft. span, 2-motor, overhead traveling crane, from the Milwaukee Electric Crane & Mfg. Co.

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sions and improvements will be made. Additional equipment will be installed.

The Brewer Dry Dock Co., Mariners Harbor, Richmond, N. Y., will build a one-story addition to its ship repair works, 50 x 62 ft., to cost about $17,000.

The Commercial Solvents Corporation, 17 East Forty-second Street, New York, has acquired a plant at Peoria, Ill., which it will remodel. The company recently arranged a fund of $1,000,000 for the erection of new works and will now apply this appropriation for the purchase of the existing plant and additional machinery.

Officials of the Adams Express Co., 51 Broadway, New York, have formed the Adams Express Armored Car Co., with capital of $1,000,000, to build steel-plate armored automobiles, as an extension of its branch heretofore known as the Adams Armored Car Service, with headquarters at 7 Hanover Street.

The Read Machinery Co., York, Pa., has leased property at 380-82 Canal Street, New York, for a factory branch.

Consolidation plans have been perfected by the reorganization committee of the Habirshaw Electric Cable Co., 10 East Forty-third Street, New York, and its subsidiaries, the Habirshaw Electric Cable Co., Inc., the Electric Cable Co., and the Bare Wire Co., under the first noted name. A preferred stock issue of $1,500,000 will be sold, the proceeds to be used for general plant work and financing. Both factories of the merged company at Yonkers, N. Y., and Bridgeport, Conn., will be continued in operation and improvements made. Malcolm D. Whitman is chairman of the committee.

The Garford Motor Truck Co., Long Island City, has disposed of its property at the Bridge Plaza, and has purchased the new factory at William and Thirteenth Streets, 100 x 200 ft., to operate in conjunction with the main plant at Lima, Ohio.

Power equipment, conveying and other machinery will be installed in the new three-story plant to be erected by the Elizabeth Daily *Journal*, Elizabeth, N. J., estimated to cost $150,000. C. Godfrey Poggi, 275 Morris Avenue, is architect.

The Armoboard Co., Central Avenue, Orange, N. J., manufacturer of concrete blocks, has acquired about 4 acres on Long Avenue, Hillside, Newark, with existing factory. The building will be remodeled and machinery installed. Plans are also being prepared for a new plant on adjoining property. The present works will be removed to the new location. James A. Birkholtz is head.

The Western Electric Co., 195 Broadway, New York, has revised plans for its new plant at Kearny, N. J., enlarging the projected works to cost $20,000,000, instead of $5,000,000. The plant will be completed within the next twenty-four months.

Manual training equipment will be installed in the new three-story high school to be erected at Park Avenue and Market Street, Paterson, N. J., estimated to cost $1,250,000, for which plans are being prepared by William T. Fanning, 5 Colt Street. For particulars regarding machine-tool equipment to be installed inquiries should be addressed to James F. Dunphey, secretary Board of Education, Paterson.

The plant of the Davis-Bournonville Co., Van Wagenen Avenue, Jersey City, N. J., manufacturer of welding equipment, has been sold to a number of industrial interests, and will be entirely vacated by the former owner.

The General Water Supply Co., Collingswood, N. J., has plans for a new electrically-operated pumping plant to cost in excess of $45,000. T. Yorke Smith is president.

The Whitall Tatum Co., 46 Barclay Street, New York, manufacturer of glass bottles, containers, etc., is perfecting plans for new buildings at Millville, N. J., to replace the structures destroyed by fire several months ago with loss of about $75,000. Automatic blowing machines and other equipment will be installed.

A manual training department will be installed in the new Alexander Hamilton junior high school to be erected at Westfield Avenue and Cherry Street, Elizabeth, N. J., estimated to cost $500,000, for which plans are being completed by Kilham, Hopkins & Greeley, 9 Park Street, Boston, architects.

A one-story power plant will be erected by the Goerke Co., 701 Broad Street, Newark, on Halsey Street, in connection with its new department store, to cost about $5,000,000. The installation will comprise three 150 hp. boilers, generator, pumps and auxiliary machinery. William E. Lehman, 738 Broad Street, is architect.

Power, conveying and other equipment will be installed in the three-story printing plant, 63 x 107 ft., to be erected by the American Colortype Co., 43-47 Halleck Street, Newark, estimated to cost $85,000. Headquarters of the company are at 1151 Roscoe Street, Chicago.

A refrigerating plant will be installed in the new meat-packing factory to be erected by the Greater Newark Packing Corporation, Newark, recently organized with a capital of $500,000. The company has purchased five acres on Plum Point Lane and will erect a plant to cost $150,000. The company is headed by Bernard J. Cummings and James H. O'Connell, and is represented by Michael J. Quigley, 738 Broad Street, attorney.

The Eagle Tool & Machine Co., 37 Freeman Street, Newark, N. J., is in the market for a hydraulic press of about 500 tons pressure for die forcing or hobbing.

The Seaboard Sand & Gravel Corporation, 26 Cortlandt Street, New York, will install machinery at its properties at Fort Jefferson, L. I., for digging, hoisting, conveying, etc., with power equipment, to cost in excess of $200,000. The company has over 800 acres and has recently secured a loan in the amount noted to be used in part for the installation. George W. Loft and W. Butler Duncan head the organization.

The Municipal Gas Co., Albany, N. Y., is perfecting plans for a one-story electric substation on Partridge street, to cost about $35,000.

The Culvers Hydro-Electric Co., Branchville, N. J., has acquired the plant and property of the Branchville Power, Water & Light Co. Permission has been secured for a stock issue of $90,000, a portion of the proceeds to be used for extensions and the installation of additional equipment.

The New York Edison Co., 130 East Fifteenth Street, New York, will commence the erection of a ten-story automobile service and storage building, 115 x 415 ft., with machine shop and parts department, at 708-20 First Avenue, to cost approximately $2,000,000 with equipment. Thomas E. Murray, 55 Duane Street, is engineer.

Power equipment, ovens, conveying and other machinery will be installed in the new five-story plant, 75 x 100 ft. to be erected by the Gottfried Baking Co., 534 East Seventy-second Street, estimated to cost $100,000. William H. Gompert, 171 Madison Avenue, is architect; L. S. Beardsley, 116 West Thirty-ninth Street, is engineer.

Philadelphia

PHILADELPHIA, July 2.

BIDS will soon be asked by the Steel Heddle Mfg. Co., Twenty-first Street and Allegheny Avenue, Philadelphia, manufacturer of textile machine equipment, for the erection of a new plant at Greenville, S. C. J. E. Sirrine & Co., Greenville, are engineers.

The Philadelphia & Reading Railway Co., Reading Terminal, Philadelphia, is planning the construction of a new mechanical coaling plant at Rutherford, Pa., with coal-crushing machinery and power equipment, estimated to cost $500,000.

Fire, June 27, destroyed a portion of the plant of the Darby Steel Equipment Co., 1927 North Germantown Avenue, with loss estimated at $20,000. It is planned to rebuild.

The new plant of the North Brothers Mfg. Co., Lehigh and American Streets, Philadelphia, manufacturer of tools, hardware, etc., will be five-stories and basement, 60 x 120 ft., on Somerset Street, to cost $90,000. The William Steele & Sons Co., Sixteenth and Arch Streets, is engineer and contractor.

The Delaware River Bridge Joint Commission, Widener Building, Philadelphia, will soon take bids for about 7000 tons of wire cable, 30-in. in diameter and smaller, for the new bridge between Philadelphia and Camden, estimated to cost $2,500,000, including installation. Bids will also be asked for steel anchorage bents for the cable installation, approximating 1700 tons of steel, to cost approximately $250,000.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is considering the installation of a traveling crane, about 5 tons capacity, at its machine shops, Erie, Pa.

The Philadelphia Commercial Museum, Thirty-fourth Street, is in receipt of an inquiry from San Luis Potosi, Mex., for an air compressor, with air hammers for breaking, trimming, etc., and from Kingston, Jamaica, for rock drills, automatic hammers and other tools used in limestone quarry operations.

The Ellwood Ivins Tube Works, Inc., Oaklane, Philadelphia, is having plans drawn for a two-story building, 25 x 55 ft. Andrew C. Borzner, 717 Walnut Street, is architect.

Manual training equipment will be installed in the three-story junior high school to be erected at Forty-seventh Street and Fairmont Avenue, Philadelphia, to cost in excess of $500,000, for which bids are being asked on a general contract. Irwin T. Catharine, Board of Education, is architect.

William A. Matsinger, 5851 Walnut Street, Philadelphia, has plans for a one-story iron and steel works at 5740-42 Westminster Street.

The Crossley Machine Co., Monmouth Street, Trenton, N. J., manufacturer of clay-working machinery, will commence the erection of a two-story addition.

Manual training equipment will be installed in the two-story and basement high school to be erected at Berwick Street and Seitz Avenue, Easton, Pa., for which bids will be received on a general contract until July 9. It will cost $350,000. William T. Michler, Draker Building, is architect.

The Barnes Foundry Co., Freeland, Pa., has acquired property at Jersey City, N. J., for a new plant and will remove to the new location.

The Borough Council, Delta, Pa., is planning for the immediate rebuilding of the portion of the municipal pumping plant destroyed by fire June 24 with loss of about $25,000, including equipment.

The Keystone Cabinet Co., Littlestown, Pa., recently organized with a capital of $50,000, is planning the operation of a factory to manufacture kitchen cabinets. Henry H. Ross heads the company and will act as general manager.

The Metropolitan Edison Co., Reading, Pa., has acquired the interest of the York Railways Co., York, Pa., in the York Haven Water & Power Co., York Haven, Pa. Plans are under consideration for extensions. The purchasing company is making improvements and repairs in its Reading generating station to cost $15,000. Plans are being perfected for the formation of five subsidiaries,, the Rockland, Alsace, Pike, District and Ruscomb Manor Electric companies, to operate plants and systems in neighboring districts.

The Davies & Thomas Co., Catasauqua, Pa., will install a new cupola at its foundry and make other improvements for the production of heavy castings.

D. D. Hammelbaugh, secretary Board of School Directors, Harrisburg, Pa., will receive bids until July 9 for the construction of a power house at the new senior high school, Sixth and Division Streets. C. Howard Lloyd, 701-A Telegraph Building, is architect.

The Wincroft Stove Works, Middletown, Pa., has acquired eight acres at Florin, Pa., as a site for a new plant. Plans are being drawn for a foundry and an assembling works and other buildings will be erected later. The removal of the present works is also under consideration.

The Salford Power & Light Co., Salford, Pa., now being organized, is planning the installation of an electric plant and system. The company is represented by Thomas J. Perkins, Allentown, Pa.

The Carlisle Gas & Water Co., Carlisle, Pa., will take over the plants and systems of the North Middleton & Carlisle Electric Co., and the West Pennsboro & Carlisle Electric Co. It is planned to make extensions and improvements and install additional equipment.

The Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, will make extensions and improvements in its power house at Thirteenth and Mount Vernon Streets to cost about $25,000.

New England

BOSTON, July 2.

NO machine tool business of volume was put through in this section the past week. Individual sales largely involved single machines and were few and far between. Prices at which some tools, classified as used equipment, sold put manufacturers at a disadvantage. For instance, a milling machine practically as good as new and listed around $2,800, sold for $1,100, while large grinding equipment in excellent condition also sold for less than half listed prices. In at least two instances buyers took the tools because of prices named and not because they will be put to immediate use. A large number of quotations are out on equipment, and dealers are confident much of this will be purchased during the month.

The crane market is relatively more active than the machine tool. Jackson & Moreland, Boston, engineers, have purchased a 16-ton crane with a 25 ft. span for the Utilities Power Co., Bristol, N. H., plant. The Hunt-Spiller Mfg. Corporation, South Boston, gunmetal castings, is still negotiating for two and possibly three cranes; the American Steel & Wire Co., Worcester, has a crane inquiry out, and a Massachusetts manufacturer of pipe fittings is asking prices on two small cranes.

The United States Electric Tool Co. has advanced prices on its product approximately 10 per cent.

Charles H. Jillson and Arthur Merriman, Plantsville, Conn., will engage in the manufacture of automobile bodies in the Randolph Cowles Building, Summer Street.

A loss estimated at $20,000, due to fire, was experienced recently by the Libow Spring Bed Co., Main Street, Springfield, Mass.

James E. Allen, 283 Essex Street, Lawrence, Mass., architect, is taking bids on a proposed school to be erected in Waverly Park, North Andover, Mass., which will contain a manual training department.

Bids will be asked about Aug. 1 on a three-story, 230 x 232 ft. high school to cost about $700,000 for Chelsea, Mass. It will contain machine and printing shops and a manual

training department. S. S. Eisenberg, 46 Cornhill, Boston, is the architect.

Contract has been awarded for the superstructure for a two-story, 50 x 76 ft. and 116 x 120 ft. addition by the General Electric Co., West Lynn, Mass. I. F. Baker is general superintendent.

Waste heat dryers and other equipment are required for the $250,000 manufacturing plant to be erected at Plaistow, N. H., by the Merrimac Clay Products Co., Inc., 53 State Street, Boston, the contract for the building of which has just been let.

Richards & Co., 200 Causeway Street, Boston, are the contractors for the Lowell school, Jamaica Plain, Boston. An award for furnishing and installing sheet metal working machinery has just been let by the city.

The Graton & Knight Mfg. Co., Worcester, Mass., manufacturer of mechanical belting, etc., will make extensions and improvements to cost about $50,000.

The Blackstone Valley Gas & Electric Co., Pawtucket, R. I., is having plans prepared for additions to its plant and system, to cost in excess of $2,000,000 with equipment.

The Bennett Wire Co., Water Street, Norwalk, Conn., will commence the construction of a one-story addition.

F. A. Jasset, 37 Crescent Street, Newton, Mass., operating a machine shop, is planning for the installation of a pipe-cutting and threading machine, second-hand.

The Merrimac Clay Products Co., 53 State Street, Boston, is having plans drawn for a new plant to cost about $250,000, including equipment. H. and J. R. Raeder, address noted, are engineers.

The Connecticut Co., 127 Church Street, New Haven, Conn., has acquired property on Capitol Avenue, Meriden, Conn., as a site for new car barns and shops, estimated to cost $150,000. The structure will replace a building destroyed by fire several months ago.

The Haverhill Electric Co., Haverhill, Mass., is arranging for a stock issue of $376,740, a portion of the proceeds to be used in connection with plant additions and improvements.

Pittsburgh

PITTSBURGH, July 2.

THE Westinghouse Electric & Mfg. Co. has begun to close against its requirements for the new transformer plant at Sharon, Pa., and an award of the tools for which bids were recently taken by the Pittsburgh Board of Education for the vocational department of the Westinghouse high school is expected shortly. Outside of these projects, machine tool business is still slack, although some improvement has been noted in inquiries the past few days. Formal inquiry for tools for the new shop of the Railway Steel Spring Co., Latrobe, Pa., is expected before long, and a few tools will probably soon be placed by the Pittsburgh Steel Products Co. in connection with extensions to its Allenport, Pa., plant.

The Allegheny Plate Glass Co., Glassmere, Pa., is taking bids on a general contract for a three-story and basement addition, 105 x 120 ft., estimated to cost $150,000. The Cruikshank Engineering Co., Fifth Avenue Arcade, Pittsburgh, is engineer.

Manual training equipment will be installed in the proposed two-story high school to be erected at Apollo, Pa., estimated to cost $100,000. J. D. Boyldston, secretary of the Board of Education, is in charge.

The Pond Creek Pocahontas Coal Co., 1 Broadway, New York, has preliminary plans for extensions and improvements in its properties at McDowell, W. Va., including the installation of electrical and mechanical equipment. An appropriation of $1,000,000 is being arranged for the project.

Fire, June 24, destroyed a portion of the plant of the Copper Clad Steel Co., Rankin, Pa., manufacturer of steel, welded copper and other metal products, with loss estimated at $75,000; the wire mill, 150 x 250 ft., was demolished. The foundry of the Acheson Mfg. Co., 100 x 150 ft., on adjoining site, was also destroyed, with like loss, including equipment. The latter company specializes in the manufacture of pipe, steam fittings, etc. Jacob Roth is president of the first noted company, and Fred Robertshaw is general manager at the Acheson works. Both companies are planning to rebuild.

The West Penn Power Co., West Penn Building, Pittsburgh, has concluded negotiations for the purchase of the Karns City Borough Electric Corporation and a number of other electric light and power utilities. The properties will be merged and extensions and improvements made. The company has also secured rights-of-way in Plum and Patton Townships for transmission line construction. A fund of $50,000,000 is being arranged by the sale of stock.

The National Engineering & Machine Co., Sharpsburg, Pa., has tentative plans for an addition to its plant, estimated to cost $50,000 with machinery. W. H. Caldwell is head.

The Allegheny County Steam Heating Co., 703 Chamber of Commerce Building, Pittsburgh, is planning the installation of coal-handling, unloading and conveying machinery at its new plant on Duquesne Way.

The Premier Red Ash Coal Co., Bluefield, W. Va., will commence the construction of a new steel tipple at its property on Coal Creek in the Clinch Valley district. Other electrical and mechanical equipment will be installed.

The Board of Education, Clarksburg, W. Va., has plans for an addition to the Triadelphia high school, to be equipped as vocational shops and other industrial service. It will cost $75,000.

Fire, June 24, destroyed a portion of the plant of the Lucinda Refining Co., Lucinda, Pa., with loss reported at $50,000 including equipment. It is planned to rebuild.

The Sharpsville Furnace Co., Sharpsville, Pa., is planning the installation of a lathe, boring mill, drill press and other machine shop equipment.

Baltimore

BALTIMORE, July 2.

BIDS will be received by the General Purchasing Officer, Panama Canal, Washington, until July 18, for one engine lathe, drill presses, bench grinder, blowers, valves, and other equipment, as specified in circular 1541.

The American Meter Co., 307-9 East Saratoga Street, Baltimore, has awarded contract to the West Construction Co., American Building, for a new seven-story plant, 37 x 83 ft., to cost $75,000, for which foundations will be laid at once.

The Robe Motor Corporation of Virginia, 4 Arcade Building, Norfolk, recently organized with a capital of $500,000, has plans for the first unit of a new works to manufacture six-cylinder automobiles and parts, to be 50 x 300 ft., located at Nansemond, Va. W. B. Robe is manager and will also act as construction engineer.

The Blue Lick Coal Co., Myersdale, Md., recently organized, is planning the installation of electrical, power and other machinery at its properties. Frederick and F. B. Rowe, both of Myersdale, and Clyde J. Rowe, Frostburg, Md., head the company.

McColl & English, Inc., Bennettsville, S. C., has inquiries out for a steam shovel, excavating, washing and screening machinery, and other equipment for its sand and gravel properties. A small locomotive will also be purchased.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until July 17, for two air compressors for the Boston and Philadelphia navy yards, schedule 1034.

T. J. Babington, Shelby, N. C., operating a foundry on North Lafayette Street, has acquired a site in another section of the city, and will soon break ground for a new plant.

The Common Council, Andrews, N. C., is perfecting plans for a hydroelectric power plant on the Hiawassee River, estimated to cost $300,000 with machinery.

The City Council, Hagerstown, Md., is planning the installation of an electrically-operated pumping plant in connection with new waterworks. G. L. Bean, 806 Abbott Building, Philadelphia, is engineer.

The Cement Products Mfg. Co., Roanoke, Va., will soon break ground for a new plant at Wasena, for the manufacture of tile blocks and other cement products. Presses, power equipment and other machinery will be installed.

B. W. Willis & Co., 13½ North Second Street, Richmond, Va., operating a machine works, are planning the installation of a lathe, drill press and other equipment.

E. E. Wollert & Son, Littleton, N. C., have plans in preparation for the rebuilding of the portion of their woodworking plant and power house recently destroyed by fire with loss of about $50,000. The company is in the market for a high speed planer and matcher, trimmer, edger, band resaw and other machinery, as well as shafting and transmission equipment.

The Kelly-Springfield Tire Co., Cumberland, Md., has closed its branch mill at Akron, Ohio, effective July 1, and will concentrate operations at its Cumberland works.

The Harvey Co., 113 South Street, Baltimore, contractors' equipment, has inquiries out for a 40 to 50-ton switching locomotive, standard gage.

Bids will be received by the Bureau of Yards and Docks, Navy Department, Washington, until July 18, for an electric

traveling bridge crane for the Puget Sound Navy Yard, specification 4861.

The Linde Air Products Co., 30 East Forty-second Street, New York, has awarded contract to the Savannah Steel Products Co., Savannah, Ga., for a new plant at Stiles Avenue and Gwinnett Street, to cost $75,000.

The Superior Anthracite Coal Corporation, Lynchburg, Va., is planning for the installation of a coal breaker at its properties in the Brush Mountain section, Montgomery County. Other equipment, including washing machinery, will also be installed. W. W. Coffey is president.

Fire, June 25, destroyed a portion of the plant of the Hickory Chair Mfg. Co., Hickory, N. C., with loss estimated at $125,000, including machinery. The finishing department was entirely demolished. It is planned to rebuild.

Manual training equipment will be installed in the proposed high school to be erected at Hopewell, Va., estimated to cost $100,000, for which plans will soon be prepared. R. K. Hoke, superintendent, Board of Education, is in charge.

The Winchester-Simmons Co., Oakland City, Atlanta, Ga., manufacturer of screens, etc., has awarded contract to the Massell Construction Co., Atlanta, for a three-story addition, to cost $125,000.

The Common Council, Blackstone, Va., is planning for the installation of pumping machinery and power equipment for waterworks service.

The King George County School Board, King George, Va., is planning the installation of an electric light and power plant for local school service.

Charles L. Cunningham & Co., 20-30 South Garrison Lane, Baltimore, manufacturers of window screens, etc., will install 700 hp. in motors at their plant.

Buffalo

BUFFALO, July 2.

PLANS are being considered by the Genesee Bridge Co., 666 Plymouth Avenue, Rochester, N. Y., for a structural steel and iron works to cost approximately $60,000.

The International Paper Co., 30 Broad Street, New York, has plans for a one-story addition to its pulp and paper mill at Niagara Falls, N. Y., 80 x 160 ft.

E. W. Sandberg, Andover, N. Y., is planning the establishment of works to manufacture commercial automobile bodies, primarily for motor trucks.

Fire, June 25, destroyed a portion of the plant of the Carthage Sulphite Pulp & Paper Co., Carthage, N. Y., with loss estimated at $200,000, including equipment. It is planned to rebuild.

The Little Falls Fibre Co., Little Falls, N. Y., is planning the construction of a new two-story factory at its Cohoes, N. Y., works, to be 60 x 140 ft., estimated to cost $175,000 with machinery.

Spencer, Kellogg & Sons, Inc., Niagara Square, Buffalo, operating an oil refinery at 1317 Elk Street, is disposing of a bond issue of $2,500,000, a portion of the proceeds to be used for extensions.

The Hornell Electric Co., 30 Canastota Street, Hornell, N. Y., will make extensions in its electric power plants at Hornellsville and Dansville, N. Y., and install additional equipment.

The Vacuum Oil Co., Exchange Street, Rochester, N. Y., will commence the construction of a new power house at Olean, N. Y., to cost about $95,000.

The Seaburg Mfg. Co., Steele Street, Jamestown, N. Y., is considering the installation of additional equipment at its woodworking plant, including sanders, power equipment, etc. V. B. Seaburg is head.

The Cinder Products Co., 832 St. Paul Street, Rochester, N. Y., is planning the installation of machinery and power equipment in a plant at Binghamton, N. Y., for the manufacture of brick. It is also proposed to install similar works at Jersey City, N. J.

The Buffalo General Electric Co., Electric Building, Buffalo, will soon take bids for a service works, machine shop and parts department at 990 Niagara Street, to be two-stories, 120 x 200 ft., estimated to cost $100,000 with equipment.

The C. A. Buffington Mfg. Co., Owego, N. Y., is planning the installation of equipment in a building to manufacture metal-bound folding chairs and similar specialties. R. G. Geller is one of the heads of the company.

The F. Hayes Co., Mill Street, Canastota, N. Y., operating a forge shop, is considering the installation of power machinery and other equipment.

W. N. Gokey, 1025 Washington Street, Jamestown, N. Y., is planning for the installation of a machine and repair shop in the new service works to be established for Studebaker automobiles.

Detroit

DETROIT, July 2.

CONTRACT has been awarded by the Lloyd Mfg. Co., North State Street, Menominee, Mich., manufacturer of children's vehicles and parts, to the F. J. Selmer Co., Green Bay, Wis., for a three-story addition, 70 x 400 ft., to cost about $75,000.

The Consumers' Power Co., Jackson, Mich., is disposing of a bond issue of $3,500,000, a portion of the proceeds to be used for extensions and improvements.

The C. G. Spring Co., Kalamazoo, Mich., manufacturer of automobile springs, has commenced the erection of two one-story additions, each 40 x 75 ft. One of the structures will be used as a steel-enameling department.

The Delta Chemical & Iron Co., Wells, Mich., is planning the installation of a lathe, shaper and other tools in its machine shop. The purchase of a steam-operated hammer, about 600 lb. capacity, second-hand, is also contemplated.

Fire, June 18, destroyed a portion of the plant of the Scott & Howe Lumber Co., Ironwood, Mich., with loss estimated at $80,000, including planing mill machinery, transmission and other equipment. It is planned to rebuild.

The Marinette & Menominee Paper Co., Riverside Avenue, Marinette, Wis., has tentative plans for a new two-story paper and pulp mill in the vicinity of Menominee, Mich., estimated to cost $125,000 with machinery.

The Economy Baler Co., 1254 North Main Street, Ann Arbor, Mich., is considering the erection of a one-story addition, 60 x 100 ft. W. G. Langford is head.

The Excello Tool & Mfg. Co., 1214 Beaubien Street, Detroit, specializing in the production of high-speed grinding spindles, has leased a portion of the building at Helen Avenue and East Grand Boulevard, totaling about 18,000 sq. ft., for a new plant. It is proposed to remove to the new location.

The Lincoln Motor Co., West Warren Street, Detroit, is arranging for the early installation of equipment in its addition now nearing completion, one-story, 250 x 1250 ft.

The Mueller Furniture Co., Grand Rapids, Mich., will commence the erection of a five-story addition to its plant.

The Mohawk Mining Co., Calumet, Mich., has commenced the erection of an addition to its milling plant, and will install new regrinding machinery, tables, power and other machinery.

Cleveland

CLEVELAND, July 2.

MACHINE tool business as a whole is holding up well for this season of the year. Buying is confined largely to single machines, but orders continue to come out in good volume and some of the dealers did more business in June than in May. During the week the Ford Plate Glass Co. and the Toledo Machine & Tool Co., Toledo, each purchased several machines. Some scattered single tool inquiry is coming from the railroads. No purchases have been made by the Nickel Plate Railroad against its recent list. Among new inquiries is one for 10 machines and another for six. The quantity of used machinery offered has increased owing to the recent purchases by dealers of the equipment of two or three Ohio plants.

The stockholders of the Defiance Machine Works, Defiance, Ohio, have adopted the refinancing and reorganization plan recently approved by the Federal Court. It provides for the issuance of $600,000 in bonds to pay outstanding indebtedness and to provide working capital. The following new directors were elected: S. O. Richardson, Jr., Libbey Glass Co., Toledo; Henry L. Thompson, president Bostwick Braun Co., Toledo, hardware jobbers; Charles E. Bunting, president Bunting Brass & Bronze Co., Toledo; Edward S. Marshall, Toledo, attorney; E. M. Hummer, receiver of the Defiance Machine Works; R. Carie May, and A. G. Caris, Defiance.

The Vig-Tor Axle Co., which recently acquired the plant of the Forest City Machine & Forge Co., Cleveland, is equipping it for the manufacture of automobile axles and expects to begin operations in about two weeks.

The Bernhard Boiler Co., Lima, Ohio, formerly located in Elyria, Ohio, has completed the equipment of its plant which is now under operation. J. P. Bernhard is president.

The Union Chain & Mfg. Co., Sandusky, Ohio, is in the market for the following equipment: A power press, equivalent to No. 21½ Bliss, with 3 in. stroke; also one equivalent

to No. 77½ Bliss, with 5 in. or 6 in. stroke; tool room lathe, 18 in. x 8 ft.; geared crank shaper, 24 in.; No. 2½ universal milling machine; No. 1 Norton universal tool and cutter grinder, and a radial drill press of capacity to take 2 in. drill.

Cincinnati

CINCINNATI, July 2.

WHILE buying of machine tools has fallen off somewhat, orders booked in June will make a fair volume. Several important railroad lists were closed that month which has helped to swell bookings. During the past week orders were mostly for single machines, but a number of fair sized sales was also reported. A Mississippi railroad serving a lumber region, bought six engine lathes, a crank planer, a boring mill and a radial drill to replace equipment recently destroyed by fire. The Joyce-Cridland Co., Dayton, bought against its recent list, and the Delco Light, Dayton, also was a purchaser of a number of small tools. Several sales of press brakes were reported by manufacturers in this district.

The Seaboard Air Line Railroad has issued a list of equipment including punching and shearing machinery, bushing presses, woodworking machinery, foundry equipment and air compressors. The Panama Canal Commission is inquiring for two milling machines and one planer.

Inquiries continue to come out in fair volume. The Canadian National Railways will close bids today on three engine lathes, three shapers and one radial drill. The Pennsylvania Railroad has an inquiry out for four punches and shears, and the Santa Fe is inquiring for a number of tools in addition to those placed last week. The Harbor Commissioners of Montreal have also issued an inquiry for machine tool equipment, and the Public Service Gas Corporation, Philadelphia, wants three engine lathes. The General Electric Co. is taking bids on miscellaneous equipment, also the Westinghouse Electric & Mfg. Co. for its transformer plant at Sharon. The Standard Seamless Tube Co., Pittsburgh, is expected to buy a number of tools shortly. It is reported that action on the Denver & Rio Grande Western, the Burlington and Pere Marquette lists has been postponed for a few weeks.

The Standard Sanitary Mfg. Co., Louisville, Ky., has awarded contract for a foundry and an enameling building, to cost $100,000. Work will start at once.

The Foster Stove Co., Ironton, Ohio, has awarded contract for an addition to its plant and work will be pushed so that it will be ready for occupancy about Aug. 15. Additional foundry equipment will be required.

Contracts will shortly be let for the erection of a plant for the Stiegelmeyer Mfg. Co., Seymour, Ind., manufacturer of automatic train control devices.

The Union Gas & Electric Co., Cincinnati, will build a transformer station on Jackson Street, contract having been let for the work.

Milwaukee

MILWAUKEE, July 2.

WHILE the first two weeks in June were less active in sales of machine tools than the average in May, business in the last half improved so much that the June average was brought up to about equal the previous month. Prospects for July business are considered favorable. Sales at present show railroad demand predominating, with the automotive industries manifesting greater interest once more. Locally, manufacturers of parts and units continue to buy new equipment, both for replacements and to bring about moderate increases in output. Foundry and machine shop operations in June represented a slight depreciation from the May average, but this is ascribed mostly to labor shortage.

The deep well pump department at Chippewa Falls, Wis., of the Western Pump Co., Davenport, Iowa, has been oblized to install a night shift to bring production nearer demand. The Western company acquired the entire interests of the Chippewa Pump Co. in March to round out its line of shallow well pumping equipment. No extension of the Chippewa plant is in immediate prospect, but it is believed likely that some additions to production equipment will be necessary before the end of summer.

Plans for a $500,000 terminal improvement to be made by the Chicago & North Western Railroad Co. at Madison, Wis., have been revealed by B. R. Kulp, division engineer, with the commencement of work in filling a large tract of marshland. Construction probably will begin about Oct. 1, and will include a general machine shop, 75 x 120 ft.; a steam generating plant with 500-hp. capacity; a 100-ft. cinder pit with electric hoist; a 24-stall roundhouse to replace the present 8-stall house; a "95-through" turntable; a 200-ton coal house, and a 75,000-gal. water reservoir.

The Connecting Link Mining Co., Cuba City, Wis., is taking bids on the construction and equipment of a new seven-cell jig mill costing $25,000 as the first step in replacing its mining and milling plant and power house, which were seriously damaged by fire June 11.

H. H. Mueller, Baraboo, Wis., has engaged Edward Tough, architect, Madison, Wis., to design a two-story garage and service building, 65 x 85 ft., of brick and steel construction, estimated to cost $25,000 complete. Bids will be taken after July 15.

The Chicago & North Western Railroad Co. has been granted a permit by the city of Milwaukee to construct a new coal hopper at the foot of Corcoran Street, to cost $35,000.

The Frankenburg Refrigerating Machinery Co., Milwaukee, has been organized with $50,000 capital to manufacture refrigerators, refrigerating machinery, etc. The identity of the principals is withheld, as are definite plans. Incorporators are Bernard V. Brady, G. A. Gessnert and A. G. Bouchard, associated attorneys, 97 Wisconsin Street, Milwaukee.

The Board of Education, Mineral Point, Wis., has engaged Edward Tough, Madison, Wis., as architect in charge of a new $200,000 high school. Provision will be made for vocational training departments.

Perry E. Haworth, Chicago, has bid in the property of the defunct Washkosh Mfg. Co., Oshkosh, Wis., manufacturer of domestic washing machines, and plans immediate resumption of production under the direction of Theodore Engelke, who was general superintendent for three years prior to the bankruptcy litigation. The factory now occupies leased quarters but Mr. Haworth plans the erection of a new building upon expiration of lease on May 1, 1924.

Chicago

CHICAGO, July 2.

THE few dealers who shared largely in recent railroad orders made excellent sales records for June, but for Chicago machine tool houses as a whole, the month was a poor one. This is explained by the sharp decline in purchases by industrial companies and other miscellaneous users. Here and there individual machines continue to be sold to perfect present manufacturing equipment, but practically no buying is being done for factory additions or new plants. No new railroad purchases are reported, although action on the Denver & Rio Grande Western list is imminent. The Elgin, Joliet & Eastern lists may also be closed soon, but the Burlington inquiry will probably not be disposed of for some time. The lack of interest in new equipment outside of railroad circles is perplexing in view of sustained industrial activity. The Cicero, Ill., Board of Education has purchased five engine lathes and a shaper in addition to the four lathes and the planer which was reported purchased a week ago.

The Electric Box & Switchboard Co., Inc., 564 West Monroe Street, Chicago, recently organized, took over the business of the Electric Steel Box Co., and added a switchboard department. The company now manufactures steel boxes for electrical work, switchboards and panel boards, and is not in need of new factory equipment at this time. Officers are H. L. Johnson, president; E. J. Lang, vice-president; and George Meyer, Jr., secretary-treasurer.

The Consolidated Purchasing Agency of the American Short Line Railroad Association, McCormick Building, Chicago, is in the market for the following used equipment: Three pile drivers, three General Electric gas-electric railroad motor cars, and four hydraulic wheel presses, 200 to 300 tons capacity.

The Iowa Foundry Co., Sioux City, Iowa, is erecting two additions, 55 x 55 ft. each, and new office quarters, 25 x 35 ft., giving the company a total ground space of 60 x 160 ft.

The directors of the American Sash Weight Foundry Co., Davenport, Iowa, have authorized the officers of the company

to exercise an option to purchase the foundry former owned by the Sears Tire & Equipment Co., on West Second Street.

The Fiber Conduit Co., Orangeburg, Ky., has purchased a 32-acre tract in Richmond, Ind., and has let contracts for two buildings to cost $200,000.

The Secretary of State of Illinois will receive bids July 5, on alterations and the construction of an addition to the State power plant on the Capitol grounds, Springfield, Ill.

The Elgin, Joliet & Eastern Railroad will build a car repair shop at Joliet, Ill., to replace the buildings recently destroyed by fire. It will be 300 x 500 ft. and will cost $500,000.

F. K. North, 1801 Diversey Parkway, Chicago, is inquiring for a Warner & Swasey gate valve seating machine in first-class condition.

The Donahue Steel Products Co., 204-8 North Jefferson Street, Chicago, is in the market for single and double end punches, threading machines, hammers, cold headers and thread rollers.

Indiana

INDIANAPOLIS, July 2.

TENTATIVE plans are being considered by the George Cutter Mfg. Co., 401 North Notre Dame Avenue, South Bend, Ind., manufacturer of electric lighting equipment, for a one or two-story addition. The company is operated by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

The Interstate Public Service Co., Warsaw, Ind., will build a new electrically-operated pumping plant to cost about $100,000.

W. L. Huffman, Elkhart, Ind., is planning the establishment of a new plant in another city for the manufacture of axles for motor trucks and will require new equipment.

Graham Brothers, Inc., Evansville, Ind., manufacturer of motor trucks has preliminary plans for a new unit to cost about $50,000. Russ & Karges, Furniture Building, are architects.

The Monroe Motors Corporation, Indianapolis, has been organized by officials of the Premier Motor Car Co., Olney Street and the Belt Railroad, to manufacture the Monroe automobile. The new company has acquired the rights of production from the Strattan Motors Corporation, which some months ago purchased the old Monroe motor car plant on Eleventh Street, and which will occupy the factory for the manufacture of Strattan automobiles. The new Monroe organization has leased a portion of the Premier plant and will install equipment. Fred L. Barrows, president Premier company, will also head the Monroe Motors Corporation, of which Berkeley Orr has been elected treasurer, and G. C. Patrick, engineer.

The Terre Haute, Indianapolis & Eastern Traction Co., Indianapolis, is perfecting plans for an addition to its generating plant on West Tenth Street, and the installation of new equipment.

The Indianapolis Pump & Tube Co., Kentucky Avenue and Drover Street, Indianapolis, has commenced the erection of a new plant at Greenwood, Ind. The present works will be removed to the new location later.

A power plant will be at the new sanitarium at Crown Point, Ind., estimated to cost $350,000, for which bids will be received on a general contract until Aug. 1. The Board of County Commissioners, Crown Point, is in charge. Karl D. Morris, Calumet Building, East Chicago, Ind., is architect.

Manual training equipment will be installed in the new consolidated high school to be erected at Miami, Ind., estimated to cost $100,000. The Bass & Knowlton Co., Hume-Mansur Building, Indianapolis, is architect.

The factory property of the Puritan Bed Springs Co., Indianapolis, along the White River, 100 x 500 ft., has been condemned for acquisition by the city. The company will seek a new site and remove its works in the near future. It is said that plans for enlargement are under consideration.

The Forse Machine Co., Anderson, Ind., has taken over property at Fourteenth and Fairview Streets, and will operate a plant for the manufacture of die-castings. W. H. Forse, Jr., is head.

Electric and steam power equipment, transmission machinery, conveying and other equipment will be installed in the three-story addition to be erected by the Progress Laundry Co., 420 East Market Street, Indianapolis, estimated to cost $110,000. Roy C. Shaneberger is president.

The McCord Spring Wheel Co., Alpha, Iron County, Mich., has been organized to manufacture automobile wheels. A small contract has been let, but unless plans are changed the company will do its own manufacturing. H. J. Veeser is treasurer.

The Gulf States

BIRMINGHAM, July 2.

PLANS are being arranged by the Valley Electric & Ice Co., Harlingen, Tex., for a new central power plant for service in the lower Rio Grande Valley. The initial installation will consist of two Diesel engines, oil-operated, generators, switchboard and auxiliary equipment. C. G. Mahler is head.

The Trinity & Brazos Valley Railway Co., Houston, Tex., has approved plans for additions to the car and locomotive repair shops at Teague, Tex., to cost $80,000 with equipment.

J. G. Leinecker, Sanford, Fla., has inquiries out for two double bolt cutters, 2-in. and 3-in. capacity, respectively, second-hand.

Ovens, power equipment, conveying and other machinery will be installed in the new seven-story and basement plant to be erected by the Brown Cracker & Candy Co., McKinney and Jefferson Streets, Dallas, Tex., estimated to cost $1,000,000, for which bids will be asked at once on a general contract. C. E. Barglebaugh & Co., Medical Art Building, are architects and engineers.

The Common Council, Hubbard, Tex., is planning the installation of electrically-operated pumping machinery at the municipal waterworks. Bonds for $55,000 are being arranged.

Sutton, Steele & Steele, Inc., 4215 Gurley Street, Dallas, Tex., manufacturer of ore machinery, concentrating equipment, etc., has filed plans for a new factory to cost $25,000, exclusive of machinery.

The Florida Nu-Tex Brick Co., Tampa, Fla., is planning the construction of a new plant in the vicinity of Miami, Fla., for the manufacture of concrete brick, etc. A power house will also be installed. The works will cost more than $50,000 with machinery. B. C. Cohn, Tampa, is one of the heads of the company.

The South West Portland Cement Co., Two Republics Building, El Paso, Tex., will take bids early in the fall for its plant on site recently acquired near Fort Worth, Tex. A power house and machine shop will be built. The works will cost approximately $500,000 with machinery. O. J. Binford is company engineer.

The Houston Lighting & Power Co., Houston, Tex., will use about $2,500,000 of its improvement fund of $4,500,000, recently arranged, for the construction of a new electric generating plant, for which plans will be drawn in the near future.

The Rockdale, Sandow & Southern Railroad Co., Rockdale, Tex., recently organized, is considering the erection of locomotive and car repair shops in connection with its proposed new line from Majorie to Sandow, Tex., and vicinity. E. A. and E. M. Camp, and J. T. Hale, all of Rockdale, head the company.

The Arab Gasoline Corporation, Eastland, Tex., has tentative plans for a new gasoline refinery near Eastland, estimated to cost $400,000 including machinery. Horace Butler is vice-president.

The Common Council, Vicksburg, Miss., is planning the installation of a number of electrically-operated pumping plants in connection with a land drainage and reclamation project on the waterfront. Miller-Butterworth Co., Southern Trust Building, Little Rock, Ark., is engineer.

The Roseland Veneer & Package Co., Roseland, La., is planning for extensions and improvements in its power house, including the installation of additional equipment. An addition will also be built to the saw mill and equipment installed.

The United States Export Chemical Co., Tampa, Fla., has been organized with a capital of $2,350,000, to build a commercial fertilizer and phosphate plant in the vicinity of Tampa, originally projected by the Chemical Construction Co., Charlotte, N. C., of which the president, Peter S. Gilchrist, will be chairman of the board of the new corporation. The initial mill will include a power house, pumping plant, machine shop and other buildings, and will cost $1,000,000 with machinery. Equipment will also be installed for phosphate production on land acquired at Plant City, Dover and Sidney, Fla. William Schneider, Plant City, is interested in the new company.

The Humble Oil Co., Corsicana, Tex., is planning the construction of an electrically-operated pumping plant at its property in the Beaton section, near Corsicana.

Manual training equipment will be installed in the new high school to be erected at Tuscaloosa, Ala., for which bonds of $250,000 have been voted. The Board of Education will soon select an architect.

The Sinclair Refining Co., 45 Nassau Street, New York, is perfecting plans for enlargements in its refinery at Houston, Tex., and purposes to more than triple the present

output of 8000 bbl. per day. It will cost in excess of $450,000 with machinery.

The Public Service Commission, Alabama, has denied permission to the Alabama Power Co., Birmingham, for its proposed hydroelectric generating plant on the Warrior River, near Tuscaloosa, Ala., to cost in excess of $600,000, and the project will be held in abeyance pending the selection of another site.

A machine shop and parts department will be installed in the new three-story service building, 100 x 176 ft., to be constructed by the L. D. Shackleford Motor Co., Miami, Fla., on Thirty-eighth Street, estimated to cost $125,000, including equipment.

The Central South

St. Louis, July 2.

PLANS are being considered by the Kansas City Refining Co., Second and Troy Streets, Kansas City, Kan., for the erection of an addition to its refinery, to cost about $100,000, including equipment. E. W. Goebell is manager.

The Century Electric Co., 1827 Pine Street, St. Louis, manufacturer of fans, motors, etc., is planning the construction of an addition and improvements in the present plant, to cost $400,000, with equipment.

The Electrical Appliance Co., 16 East First Street, Hutchinson, Kan., is planning for the installation of a lathe, emery wheel and stand, and other equipment. H. E. Davis is one of the heads of the company.

The Wood & Lane Co., 915 Olive Street, St. Louis, machinery dealer, has inquiries out for a 1500-kw. horizontal turbine, direct-connected to a 2300-volt generator, with surface condenser and other auxiliary power equipment; also for one 1000 kva. turbo-generator set, 2300 volts, complete with surface condenser, etc.; and for one 1000 kva., 2300-volt generator, direct-connected to a simple Corliss engine, with auxiliary equipment.

The Tennessee Electric Power Co., Lenoir City, Tenn., has acquired the local light and power plant, heretofore operated by R. M. Galloway, and plans for extensive additions, including the installation of new equipment.

A manual training department will be installed in the new two-story school to be erected at Millington, Tenn., for negro students, to cost about $75,000. Mahan & Broadwell, Memphis, Tenn., are architects.

A two-story and basement automobile service and machine shop, storage and warehouse, 300 x 500 ft., to cost $200,000, will be erected by the Famous Barr Co., Sixth and Olive Streets, St. Louis, operating a department store, for company trucks and cars.

The Fairfax Drainage District, Henry Reimer, chairman, 501 Federal Reserve Life Insurance Building, Kansas City, Kan., will install electrically-operated centrifugal pumps and auxiliary electrical equipment in connection with its new drainage works. A power house and electric transformer station will also be built. Horner & Wyatt, 306 McMillen Building, are consulting engineers.

The Ironton Stove & Mfg. Co., Ashland, Ky., is planning the erection of an addition. A portion of the structure will be used as a foundry and the remainder for an enameling works. The company recently increased its capital for expansion.

The Derby Oil & Refining Co., Wichita, Kan., has work under way on a second unit at its refinery, with capacity of 1200 bbl. a day, increasing the output to 6000 bbl. daily. It will cost in excess of $200,000, including equipment.

The Duncan Machinery Co., Dempster Building, Knoxville, Tenn., has inquiries out for a 50-ton steel derrick, 115 ft. mast and 100 ft. boom; also for a 10 to 15-ton stiff leg derrick, mounted on skids. The company is also in the market for a 2000-cu. ft. air compressor, electric-driven, second-hand.

J. W. Savoy, Sterling, Kan., operating a machine shop, is planning the installation of a power lathe, emery wheel and stand, and other equipment.

Bids will soon be called by Russel & Axon, 404 McDaniel Building, Springfield, Mo., consulting engineers, for a hydroelectric power plant on the Sac River, near Stockton, Mo., to cost $50,000. It will be operated for city service by G. B. Seward, Stockton, and associates, who are forming a company.

A. C. Parsons, superintendent of schools, Oklahoma City, Okla., is planning the installation of vocational shops in a number of city schools, to be equipped for machine shop, electrical and other instruction. C. W. Briles, State director of education, has authorized the expansion.

The Arkansas Light & Power Co., Arkadelphia, Ark., will make extensions and improvements in its power plant and system at Camden, Ark., to cost $100,000, including equipment. H. C. Couch is president.

Hugh Stephens, Trust Co. Building, Jefferson City, Mo., will install a machine shop in the new two-story building, 55 x 90 ft., estimated to cost $25,000.

The Sante Fe Oil & Refining Co., Ardmore, Okla., operating at the former refinery of the Chickasaw Refining Co., will commence the erection of an addition and install new process stills, refining and power equipment, estimated to cost $300,000.

The Continental Paper & Bag Mills, Inc., 16 East Fortieth Street, New York, has leased a building at Twelfth and Mulberry Streets, Kansas City, Mo., for a new plant to manufacture paper products.

The power plant of the Rogersville Electric Co., Rogersville, Tenn., has been leased by the Kitzmiller-Kenner Co., Rogersville. Plans are under way for the installation of a new steam-operated electric unit for increased output.

The Oliver Oil-Gas Burner & Machine Co., St. Louis, has leased a building at Seventh and Market Streets, and will install machinery for the manufacture of oil burners, gas-burning equipment, etc.

The American Crushed Rock Co., Thirty-sixth Street and Rainbow Avenue, Kansas City, Mo., is planning the installation of steam power equipment, drilling and other machinery.

The Chickasha Cotton Oil Co., office of general superintendent, Chickasha, Okla., is inquiring for a 550 to 700 hp. cross-compound Corliss engine, with or without condenser.

The Pacific Coast

San Francisco, June 26.

BIDS will be called within 30 to 60 days by the Atchison, Topeka & Santa Fe Railway Co., Kerckhoff Building, Los Angeles, for the construction of new boiler and erecting shops at San Bernardino, Cal., to cost about $350,000. R. B. Ball is chief engineer.

The General Petroleum Co., Los Angeles, has preliminary plans for a new oil storage and distributing plant on Terminal Island, San Pedro Harbor, to cost $1,250,000 with equipment. The company will also build a similar plant at Compton, near Los Angeles, where a 30-acre site has been purchased at Central Avenue and 128th Street, to have a capacity of 2,000,000 bbl.

The Utah Power & Light Co., Salt Lake City, Utah, is planning for a new hydroelectric power house on the Green River, near the Utah-Wyoming boundary, with initial capacity of about 60,000 hp., to cost $6,000,000, including steel tower transmission system.

The Grand Rapids Show Case Co., Grand Rapids, Mich., has purchased property in the Brooklyn district, Portland, Ore., between Twenty-second and Twenty-sixth Streets, and has authorized plans for a main three-story building, power house, machine shop and other structures, to cost approximately $150,000. Plans will be completed in the fall.

The Northwestern Electric Co., Vancouver, Wash., will commence the construction of an addition to its power house at Eighth and King Streets, estimated to cost $85,000.

The Williams Brothers Aircraft Co., 124 Van Ness Avenue, San Francisco, will soon call for bids for a new plant to manufacture airplanes and parts to cost about $30,000. R. R. Irvine, 736 Call Building, is architect.

The Ontario Motor Products Co., Ontario, Cal., care of the Chamber of Commerce, has completed arrangements for a local site, fronting on the line of the Southern Pacific Railroad, and will have plans drawn for new works to manufacture automobile equipment and to cost $50,000 with machinery. The company is now operating a plant at El Paso, Tex., and will remove the works to the Ontario site.

A one-story power house, 45 x 75 ft., will be erected by the Pacific Sash & Door Co., 3216 South Main Street, Los Angeles, in connection with other extensions. Noice & Merrill, 1326 Washington Building, are engineers.

The C. L. Best Tractor Co., San Leandro, Cal., manufacturer of farm tractors and parts, is disposing of a note issue of $600,000, a portion of the proceeds to be used for expansion. C. L. Best is president.

Electrically-operated pumping machinery will be installed in the proposed municipal water plant to be erected by the Common Council, Roseburg, Ore. Bonds for $35,000 have been approved for the installation.

The Western Sheet Glass Co., Torrance, Cal., recently organized to take over the plant and business of the Torrance Glass Co., has plans for extensions to cost approximately $1,000,000. A department will be equipped for the manufacture of wire glass. Adolph Sieroty is head.

W. T. Harrison, 861 East Taylor Street, Portland, Ore.,

has plans for the erection of a two-story foundry and machine shop on Twenty-eighth Street.

Canada

TORONTO, July 2.

BUSINESS closed for machine tools in the last week during June will show another record, according to local dealers and builders. Orders placed by the Toronto Transportation Commission, the Riverdale Technical School in Toronto and the technical school at Guelph, Ont., helped to swell bookings for the month. At present a brisk demand is reported for practically all classes of tools, machinery and equipment. The electrical trades are taking large quantities of equipment, and a good demand for machinery is reported from mining fields throughout the Dominion. The pulp and paper industry is also an active buyer.

W. H. Bamfield & Sons, Ltd., Pape Avenue, Toronto, is making improvements to its plant, and will install second-hand chilled iron rolls for rolling hot rolled steel. Other improvements are also proposed.

The Buck Stove Co., Brantford, Ont., will build an extension and install additional equipment for increasing its output of furnaces.

It is reported that contracts for machinery and equipment for the new drydock under construction at Esquimalt, B. C., for the Federal Government have not yet been awarded.

The Canadian Farm Implement Co., Medicine Hat, Alta., has taken over the business of the Alberta Foundry & Machine Co., at a cost of about $500,000. John E. Davies is president of the new concern.

Percy Owen, who has been manufacturing files in Detroit, is contemplating establishing a manufacturing plant in Windsor, Ont.

The wind and electric storm which passed over this district the early part of last week caused considerable damage to the plants of the International Iron Works and the Gibson Mfg. Co., at Guelph, Ont., and the plant of the Gummed Paper Co., Brampton, Ont., was damaged to the extent of about $80,000.

The recent fire at the plant of the Asbestos Corporation of Canada, Ltd., Thedford Mines, Que., caused damage to the extent of $400,000 to the buildings and $250,000 to the equipment and contents. The company intends to rebuild.

Tenders are in and will be awarded at an early date for the construction of an addition to the plant of the Howard Smith Paper Mills, Cornwall, Ont.

The Canadian Westinghouse Co., Hamilton, Ont., has called for bids for an addition to its plant to cost $1,200,000.

The plant, equipment and products of the plant of the Canadian Industrial Alcohol Co., Corbyville, Ont., were recently destroyed by fire with a loss of about $2,000,000.

The Garden City Paper Co., Merriton, Ont., is contemplating erecting a paper mill at St. Catherines, Ont., to cost $400,000. L. H. Gardiner is president.

The mill of the Powassan Sash & Door Factory at Powassan, Ont., was destroyed by fire June 24 with a loss estimated at $40,000.

The Macdonald Wire Goods Co., Ltd., Drummondsville, Que., is in the market for a butt welder equal to Federal 2-A, also ¾ in. automatic wire cutter and straightener. It also is inquiring for a four-slide wire forming machine and other wire working machinery.

Power Equipment Orders

The record of recent power equipment orders makes an impressive showing, in part as follows:

Washington Gas & Electric Co., Washington Court House, Ohio, Westinghouse underfeed stoker for a 504 hp. Heine boiler.

Appalachian Power Co., Glen Lyn, Va., Westinghouse underfeed stoker and a 1232-hp. Babcock & Wilcox boiler.

Carnegie Steel Co. Westinghouse underfeed stokers for its Mingo, Ohio, plant for two 1000-hp. boilers.

Virginian Power Co., Maxwell, Va., two 850-hp. Babcock & Wilcox boilers and two Westinghouse underfeed stokers.

City of Decatur, Ind., two 398-hp. Babcock & Wilcox boilers with Westinghouse underfeed stokers.

Keystone Glue Co., West Williamsport, Pa., three 400-hp. Keeler boilers with Westinghouse stokers.

Carnegie Steel Co., for Homestead, Pa., eight 834-hp. Stirling boilers with Westinghouse stokers.

Washburn Wire Co., New York, two 720-hp. fire-tube Springfield boilers with Westinghouse underfeed stokers.

Vacuum Oil Co., for Olean, N. Y., four Westinghouse stokers and four 763-hp. Babcock & Wilcox boilers.

Pennsylvania Railroad Westinghouse stokers for Altoona shops and two Heine 500-hp. boilers.

Brooklyn Edison Co., six Westinghouse underfeed stokers for its Bay Ridge plant.

Consolidated Water Power & Paper Co., Biron, Wis., Westinghouse stoker.

Northern States Power Co., extra long Westinghouse stokers for its St. Paul plant.

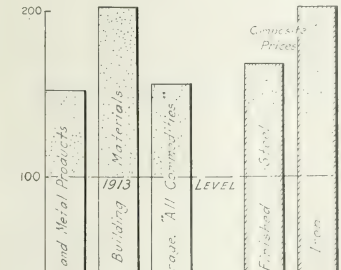
Wholesale Prices Lower in May Than in April

All Items Share in Decline, Except Food and Furniture, Which Are Stationary

FIGURES of the Bureau of Labor Statistics, Washington, show a drop of 3 per cent in commodity prices in May, compared with April. Except for fuel and lighting, all items are higher now than a year ago, the average increase being 5.4 per cent.

Compared with this, the composite price of finished steel has advanced 32.2 per cent within the year, and of pig iron, 27.4 per cent. One year ago the composite pig iron price was 7.4 per cent above the "all commodity" figure, while finished steel was 14.2 per cent below "all commodities."

In the chart are shown the May relative prices of all commodities, building materials and metals, from the Labor Bureau's figures, alongside the composite prices of finished steel and of pig iron, all referred to the 1913 average price as 100.



Index Numbers of Wholesale Prices, by Groups of Commodities
(1913 equals 100)

	1920 Peak	1922 May	1923 April	1923 May	Advance in One Year, Per Cent
Farm products	247	132	141	139	5.3
Food	248	138	144	144	4.3
Cloths and clothing	346	175	205	201	14.9
Fuel and lighting	281	216	200	190	—12.0
Metals and metal products	203	119	154	152	27.7
Building materials	300	160	204	202	26.3
Chemicals and drugs	213	122	136	134	9.8
House furnishings	275	176	187	187	6.3
Miscellaneous	208	116	126	125	7.8
All commodities	247	148	159	156	5.4

Plans of New Companies

Weeks-Merit-System, Inc., 228 Aborn Street, Providence, R. I., has been incorporated as successor to S. S. Weeks, who for the past four years has represented the Associated Engineering & Supply Co. of San Francisco as eastern distributor of the Merit automatic oil stoking system. Mr. Weeks will be president of the new corporation. The company is now manufacturing Merit System devices of new design only, the standard design being furnished for the present by the Westinghouse Pacific Coast Brake Co. The new company is enlarging its machine shop and eventually will manufacture all apparatus sold in this territory. The company can furnish automatic fire and draft control for any make or type of oil burner with any type of boiler with either natural or forced draft. It also has an automatic control for pulverized coal burning boilers.

The McIlvaine Air-craft Corporation, Ancon, C. Z., has been organized to manufacture aircraft parts. Its operations are still in the experimental stage and it is unlikely that it will be on a production basis for many months. C. A. McIlvaine, executive secretary of the Panama Canal, is head of the company.

The Mule Battery Mfg. Co., care of Albert Setzer, 153 Wendell Street, Providence, R. I., has been organized to manufacture electric storage batteries and equipment. The company is fully equipped to cope with present requirements, its only need being for raw materials.

The Sanford Rubber Works, Inc., Salisbury, Conn., has been incorporated with capital stock of $50,000 to manufacture rubber products, having taken over an established business. Manufacturing equipment and machinery will be installed for volume production. The company is now planning a sectional steel building.

Vrabeck & Kessler, engineers, 149 Broadway, New York, have been appointed New York district representatives of the Champion Engineering Co., Kenton, Ohio, builder of electric traveling cranes, sluice gates, penstocks, automobile turntables, hydraulic machinery. J. W. Spensley, representative of the Champion company in New York for a number of years, recently resigned to devote more time to sales of domestic and industrial oil-burners with the Brooklyn Oil Burner Co., Brooklyn, of which he was an organizer. J. S. Vrabeck was sales manager of the Sturtevant Mill Co., Chicago, for seven years and prior to that with the sales staff of the Allis-Chalmers Mfg. Co. H. H. Kessler was formerly with the Atlas-Portland Cement Co. and later with the Hardinge Conical Mill Co. In addition to representing the Champion Engineering Co., Vrabeck & Kessler are also sales agents for the Stearns Conveyor Co. and the Stedman Foundry & Machine Works, Aurora, Ill., chemical and fertilizer machinery.

The Haletone Mfg. Co., New York, recently incorporated with capital stock of $100,000, will manufacture vacuum equipment and other apparatus. It is now only in a formative stage and will not be active for some time. Its offices will later be located at 1133 Broadway. A. Schirmann, 547 East Eighty-fourth Street, New York, is secretary.

The Lehman Sewer Pipe Co., 26 Court Street, Brooklyn, N. Y., has been incorporated with capital stock of $50,000 to take over a business already established to manufacture pipe and kindred products. The business will follow along the same lines with a few changes. The incorporators are Charles F. Lehman, E. A. Mellon and R. J. Lilly.

The Combination Electric Switch Corporation, New York, has been incorporated with capital stock of $100,000 to manufacture electrical switches and parts. It is not yet permanently located, but the company expects to be in production in the near future. All manufacturing will be done by contract. Address care of P. A. Zizelman, 42 Broadway, New York.

The Union Metal Products Co., care of Samuel J. Taylor, 320 Salziel Building, Oakland, Cal., has been incorporated with capital stock of $500,000 to manufacture metal goods. Plans are not sufficiently developed to take up the method of manufacturing as yet.

The Memphis Oxygen Co., Memphis, Tenn., has been incorporated with capital stock of $75,000, to manufacture industrial oxygen and kindred products. The company has acquired a business well established in this line with a factory now in production. Business will be continued along the same lines. C. H. Reynoll heads the company.

The Heyer Products Co., 3 Valley Road, Montclair, N. J., has been incorporated with capital of 2004 shares of stock, no par value, to manufacture battery charging and testing equipment and automotive electric testing equipment. Most of the equipment has already been placed. These machines have been made for the past two years in small quantities and the company expects to enlarge its capacity considerably. B. F. W. Heyer heads the company.

The Fallkill Radio & Electrical Co., 286 Mill Street, Poughkeepsie, N. Y., has been incorporated with capital stock of $50,000, as a consolidation of the partnership of the Fallkill Engineering Co., and the Fallkill Radio & Electrical Co. Its activities will consist in the continuation and expansion of the existing machine business, together with general manufacturing of radio products. J. A. Purcell is president.

The Lamer-Brocke Steel & Wire Works, Inc., Johnstown, Pa., has been incorporated with capital stock of $25,000 to manufacture steel products, wire goods, etc. Its plant will be located at Seward, Pa., where equipment is now being installed. The company has bought the factory of the Johnstown Dry Grains Co. at 315 Powers Street, Johnstown, and will operate there. William H. Strauss heads the company.

The National Projector Mfg. Co., Inc., care of La Via Patents Co. Inc., 527 Grand Street, Brooklyn, N. Y., has been organized to manufacture mechanical equipment. No definite plans will be outlined until further developments which will require about two months.

The Schnabel Co., care of Ralph L. Smith, 582 Union Arcade Building, Pittsburgh, is being organized to manufacture automobile equipment and parts. It will acquire and continue the business of a company which has been established for several years. W. M. Schnabel, 210 Beltzhoover Avenue, heads the company.

The Hyle Oil Burner Co., 9 East Lexington Street, Baltimore, has been incorporated with capital stock of $50,000 to manufacture oil burners and kindred equipment. Manufacturing will be done by contract, the company maintaining an assembling plant in Baltimore. L. M. Levering, Jr., is president.

The Atkinson Automatic Timer Co., Cynthiana, Ky., was recently incorporated with capital stock of $20,000 to manufacture automatic timers for automotive use. Manufacturing will be done by contract. C. L. Atkinson heads the company.

Trade Changes

The Pittsburgh office, Reading Iron Co., F. M. English, district sales manager, has been moved from Room 608 to Room 1505, First National Bank Building, Pittsburgh.

S. W. Platt & Co., scrap iron and steel, have moved from Room 813 to Room 607, First National Bank Building, Pittsburgh.

The Colson Co., Elyria, Ohio, manufacturer of silent wheel trucks for hospitals and hotels, invalid chairs and bicycles, has leased the five-story building at 223 West Larned Street, Detroit, to be utilized as a distributing warehouse.

J. E. Haetten & Co., 50 Church Street, New York, new and second-hand machine tools, has acquired the Backer Machine Tool Supply Co., 30 Church Street. Charles Backer is now associated with the Haetten company.

The General Refractories Co. announces the opening of a New England sales office at 200 Devonshire Street, Boston, M. C. Sargent in charge. Mr. Sargent was formerly with Waldo Bros. & Bond Co. of Boston.

The Horne Mfg. Co. has been bought out by the Horne Electric & Mfg. Co., which is continuing the manufacture of radio apparatus and supplies, marine apparatus and supplies and railway supplies.

Manning, Maxwell & Moore, Inc., 119 West Fortieth Street, New York, on July 1 will be located at Pershing Square Building, 100 East Forty-second Street, New York.

The McWane Cast Iron Pipe Co. has opened district offices for the Southwest and Mexico at Dallas, Tex., J. L. Hill in charge. Statement is made that the plant has operated steadily since it began March 1, 1922, and its business has expanded with equal steadiness.

The Foss Machinery Co., 305 St. James Street, Montreal, Canada, has been appointed exclusive representative of the Sundstrand toolroom, manufacturing and engine lathes in that territory.

The Matlack Coal & Iron Co., Inc., 44 Beaver Street, New York, has been appointed exclusive American sales agent for the sale of imported iron ore controlled by the N. V. Handels en Transport Maatschappy Vulcaan of Rotterdam.

The Orton & Steinbrenner Co., 608 South Dearborn Street, Chicago, locomotive cranes, dipper shovels and grab buckets, announces a reorganization and the election of the following officers: F. A. Orton, president and general manager; E. B. Ayers, vice-president; Herbert Mertz, secretary and sales manager; Harry Shaffer, treasurer. No change in management or control is contemplated. The work is being advanced rapidly in the construction of its new machine shop, which will approximately double the present capacity.

The Oliver Machinery Co., Grand Rapids, Mich., has made a contract with the Canadian Fairbanks Morse Co., Ltd., to represent it exclusively throughout the Dominion for the sale of its woodworking machinery and machine tools.

The Colonial Supply Co., Pittsburgh, has been appointed exclusive distributer for Western Pennsylvania for the Latrobe Tool Co., Latrobe, Pa., high-speed drills and reamers.

The Pryibil-Genzlinger Machine Co., metal spinning lathes, woodworking machinery and supplies is now manufacturing in the factory at 22-26 Frost Street, Brooklyn, N. Y., and is in a position to make deliveries from stock. The company also manufactures all ball bearing wood-turning lathes. The members of the company were formerly executives of the P. Pryibil Machine Co., and considerable stock from that company has been purchased.

Elgin Motors, Inc., has succeeded to the business of the Elgin Motor Car Corporation formerly of Argo, Ill., and will manufacture the new Elgin car at 323 West Fifteenth Street, Indianapolis. J. H. McDuffee is president.

The Whiting Corporation, foundry equipment and railway specialties, Harvey, Ill., has opened a sales office at 1526 Jefferson County Bank Building, Birmingham, Ala. W. R. Hans in charge, to cover Alabama, Georgia, Tennessee and Northern Mississippi. Another office is being opened at 624 Penton Building, Cleveland. R. P. Dryer is in charge. This office will cover Ohio.

The Roller-Smith Co., 233 Broadway, New York, has appointed H. D. Baker, 525 Woodward Avenue, Detroit, as representative in Michigan, handling instruments, circuit breakers and radio apparatus. Mr. Baker has been associated with the company in various capacities for several years.

The West Coast Machinery Co., 1006 First Avenue South, Seattle, Wash., has been appointed representative of the Rockford Milling Machine Co., and the Rockford Tool Co. in this territory.

The Champion Engineering Co., Kenton, Ohio, builder of electric traveling cranes, caterpillar sluice gates and hydraulic machinery, has opened a sales office for the Chicago district at 431 South Dearborn Street, Chicago. W. B. McCracken, who has been in the operating department of the Champion company is in charge.

A completely equipped emergency service plant has been installed by the National Carbon Co., Cleveland, at the Arrott Building, Pittsburgh, where motor brushes, contacts, etc., can be secured on short notice. This is the third such plant to be installed in two years.

The Groner Co. Inc., has moved its business from Easton, Pa., to Phillipsburg, N. J., occupying the property formerly used by the Standard Process Steel Corporation. Increased facilities will expand its line to include gray iron, semi steel, brass, bronze and aluminum castings, machine work, and wood and metal patterns.

The Standard Inspection Co. has retained P. J. Freeman as consulting engineer and technical adviser on all contracts relating to concrete materials and construction, testing of power plants, pumping machinery, and special investigations. Mr. Freeman will occupy offices with the company at 311 Ross Street, Pittsburgh.

The Ott Gear Grinder Co., Detroit, has been incorporated with a capitalization of $25,000 for the purpose of manufacturing a new type of spur gear grinder. The company is operating at 6435 Benson Avenue, Detroit, and the following officers are actively engaged in the business; A. J. Ott, president; V. M. Ott, vice-president and Conrad L. Ott, secretary-treasurer.

Frazar & Co., exporters to the Far East, 30 Church Street, New York, have taken over the foreign business of Cowdrey & Winkhaus, which will be continued along the same lines as before. Loren M. Cowdrey has joined the Frazar organization and the business will be conducted under his supervision.

At a meeting of the directors of the Aultman & Taylor Machinery Co., Mansfield, Ohio, the following officers were elected; J. E. Brown, chairman of directors; J. U. Fogle, president; E. A. Harter, first vice-president; G. S. Heck, second vice-president and treasurer; B. Hurxthal, secretary.

The American Brass Co. has drawn the fires from its refinery department at Ansonia, Conn. Hereafter the work of this department will be done at the Perth Amboy, N. J., plant of the company. Space heretofore used for refining purposes at Ansonia will be utilized for other departments.

E. C. Atkins & Co., saw manufacturers, Indianapolis, Ind., have published a pocket-size booklet reprinting the constitution of the United States, which is being distributed to its customers and others gratuitously.

Industrial Financial Notes

The plant and other assets of the bankrupt Mitchell Motors Co., Inc., Racine, Wis., will be offered for sale at public auction at the plant on Wednesday, Aug 15, according to announcement made by Herbert F. Johnson, trustee. The report of the appraisers has been ordered filed not later than July 15. Schedules recently filed admit liabilities of approximately $4,000,000 while assets are nominally valued at $3,000,000.

At the first meeting of creditors of the Badger Metal Ware Co., Milwaukee, Ignatz Weiskopf was elected trustee. The second meeting will be held July 16. Schedules recently filed show liabilities of $35,000, with assets nominally valued at $83,000.

The Wheeling Steel Corporation has completed an $8,000,000 financing program to provide additional working capital to increase manufacturing capacity. The financing takes the form of three-year secured convertible 6 per cent notes dated July 1, next, which are convertible at any time, at par, at option of the holder into first and refunding 5½ per cent, series A bonds. The new paper was sold to investors at $100 and interest.

The Keystone Steel & Wire Co., Peoria, Ill., showed a net income of $726,318 after depreciation and depletion for the ten months ended April 30, 1923. These earnings are greater than those of any entire fiscal year in the history of the company.

The New York Stock Exchange has approved the application of the Pressed Steel Car Co. to list $6,000,000 5 per cent 10-year bonds issued Dec. 30, 1922. The bonds are convertible into common stock, par for par, after Jan. 1, 1924. Since 1916 the policy of the company has been to provide for an average of 10 per cent per year for machinery and equipment and an average of 5 per cent for building repairs and construction.

The American Car & Foundry Co. reports for the year ended April 30, 1923, a balance after taxes, renewals, preferred dividends, etc., of $4,113,610, equal to $13.71 a share on common stock, as compared with a balance of $4,483,320, or $14.94 a share, in the preceding year. Profit and loss surplus stood at $36,673,498 as against $36,159,888, as of April 30, 1922. Net earnings were $6,213,610 against $6,583,320. The company begins its new year with an amount of business on its books considerably in excess of that at the beginning of the preceding period.

Stockholders of the Detroit Steel Products Co. have approved a change in capitalization whereby the authorized capital stock will consist of $4,000,000 preferred stock of $100 par value and 250,000 shares of common stock no par value. Of this amount $2,132,600 preferred and 142,176 shares of common will be exchanged for the $3,544,400 common now outstanding.

The Wickwire Spencer Steel Corporation reports profit of $230,061 after costs and expenses for May, making a total of $1,321,500 for the five months period ended May 31. Sales during the month totalled $2,679,463. Surplus stands at $4,528,601.

For the six months ended May 31 the Hudson Motor Car Co. reports gross profits of $7,882,394 from sales and $148,469 from other income. Net income of $4,446,039 was transferred to surplus account, after deductions for expenses, depreciation and federal taxes. With a surplus of $5,289,475 on Dec. 1, 1922, the net income for the six months made a total of $9,735,514, from which $1,800,750 was appropriated for dividends during the period.

The board of directors of the Pere Marquette Railroad Co. recently voted to appropriate $1,500,000 for two new car ferries, which will operate between points on the Michigan and Wisconsin shores of Lake Michigan with headquarters of this service at Ludington, Mich.

The Bay Verte Machinery Supply Co., Green Bay, Wis., has changed its corporate style to the Bay Verte Machinery & Supply Co. The capital stock at the same time was increased to $50,000.

Crucible Steel Co. Pays Dividend on Common

The Crucible Steel Co. of America resumed payments on common stock June 18 by declaring a quarterly dividend of 1 per cent payable July 31. Payments on common stock were suspended Jan. 31, 1922. Horace S. Wilkinson, chairman of directors, reported unfilled tonnage at the highest point in two years. He expects that the normal in production will soon be reached. Net profit over the last six months was $1,677,390, and earnings for the last quarter were at the rate of $9 per share on common stock, after providing for the preferred.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.95c.	.....
Nos. 22 and 24	4.50c. to 5.00c.	5.25c.
No. 26	4.55c. to 5.05c.	5.30c.
No. 28	4.65c. to 5.15c.	5.40c.
No. 30	4.85c. to 5.35c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.75c. to 5.25c.
No. 16	4.90c. to 5.40c.
Nos. 18 and 20	5.05c. to 5.55c.
Nos. 22 and 24	5.20c. to 5.60c.
No. 26	5.35c. to 5.85c.
No. 27	5.50c. to 6.00c.
No. 28	5.65c. to 6.15c.
No. 30	6.10c. to 6.65c.

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¾c. to 20¾c.
High brass wire	20¼c. to 21¼c.
Brass rods	18 c. to 19 c.
Brass tube, brazed	27¾c. to 28¾c.
Brass tube, seamless	25½c. to 26½c.
Copper tube, seamless	27 c. to 28 c.

Copper Sheets

Sheet copper, hot rolled, 23½c. to 24½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.80	$6.55
		90 lb.	6.90	6.65
		100 lb.	7.00	6.75
IC	$11.00	$9.75	IC	7.15	6.90
IX	12.25	11.00	IX	8.15	7.90
IXX	13.50	12.25	IXX	9.15	8.90
IXXX	14.75	13.50	IXXX	10.15	9.90
IXXXX	16.50	14.75	IXXXX	11.15	10.90

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	43c.
Bar	50c. to 55c.

Copper

Lake ingot	17½c.
Electrolytic	17 c.
Casting	16¾c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	12c. to 13c.
Solder, ½ and ½ guaranteed	32c.
No. 1 solder	30c.
Refined solder	26½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	8c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	32c. to 33c.

Old Metals

Business is very quiet and the market is practically unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	14.50
Copper, heavy wire	13.50
Copper, light bottoms	11.50
Brass, heavy	8.50
Brass, light	5.50
Heavy machine composition	11.25
No. 1 yellow brass turnings	7.50
No. 1 red brass or composition turnings	9.00
Lead, heavy	6.25
Lead, tea	5.25
Zinc	4.25

THE IRON AGE

New York, July 12, 1923

ESTABLISHED 1855 VOL. 112, No. 2

Accounting for Foundry Overhead Expense

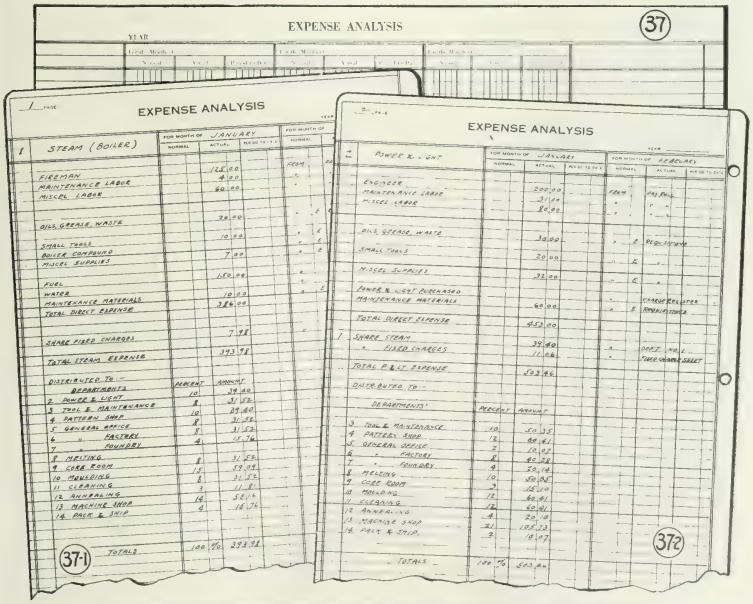
Attempt to Give Simplest Possible Method of Distributing General Expenses Equitably—Steam and Power Considered

BY F. C. EVERITT AND JOHNSON HEYWOOD*

WRONG costs frequently come from considering the overhead expense of the business as a whole; a fault largely due to old-fashioned accountants who lumped all figures and were interested only to find out at the end of the year how much money the business as a whole had made or lost. Modern cost finding aims to discover not only "how much," but "why." That requires that the figures be divided and subdivided so that the manager may know, say, that the final profit of $100,000 represents a loss of $20,000 on one line and a profit of $120,000 on another. He wishes also to know if the profit was made in spite of exceedingly inefficient methods in one manufacturing department which were more than offset by excellent methods in another.

The overhead expense is in effect a rental which each casting must pay for the manufacturing facilities which the business provides, and it should be plain

*Of Miller, Franklin, Basset & Co., Inc., New York. In the issue of April 26 was given the procedure for material cost accounting and in the issue of June 14 that for labor cost accounting.



How Departmental Expense Items Are Compiled and then Allocated to Other Departments

that one casting will use more of some of the facilities than will another. A compact, heavy, simple casting will properly carry only a slight proportion of the molding expense, although it may take a much larger share of the melting expense. A large, complicated but light casting will take more molding expense and less melting expense.

Each casting must be charged with its proper share of the overhead of each manufacturing department whose facilities it uses. To do that, the total overhead of each department must be gathered separately, and a way found by which to measure the proper share of each department's overhead which each casting should bear. It may be spread on the basis of the productive payroll dollar, productive hour, machine hour, weight of casting or in any of a number of other ways.

The test for a department—or as it is sometimes called "production center"—for cost purposes is: "Can the overhead expense of all operations in this department be justly spread on the same basis?" If not, further subdivision is necessary.

For instance, bench molding should not be charged with a part of the expense of heavy machine molding which requires constant crane services. The bench floor may perhaps be operated with an overhead of 75 per cent on the direct labor, while the heavy machine work with crane service may show an overhead of 200 per cent or be operated on the basis of expense per machine hour. If there are widely varying conditions due to the character of the work and the nature of the equipment, the molding floor must be divided into several departments.

Departments of a Foundry

The proper departments can be set up only after a thorough investigation by men familiar both with foundry practice and cost finding principles. The departments needed by a foundry will depend upon the kind of work done. The following are fairly typical of what most foundries require:

No.	Department Name	No.	Department Name
1	Steam (boiler)	9	Core room
2	Power and light	10	Molding
3	Tool and maintenance	11	Cleaning
4	Pattern shop	12	Annealing
5	General office	13	Machine shop
6	General factory	14	Packing and shipping
7	General foundry	15	Selling expense
8	Melting		

In a gray iron foundry, the annealing department would be left out. We include it here because it presents some difficult problems.

Other foundries might need such other departments as carpenter shop, blacksmith, electrical and so on. In the foundry whose departments have been listed, the pattern shop will handle all carpentry, while the blacksmith, electricians, plumbers, millwrights, etc., are included in the tool and maintenance departments. This combination is usual in medium-sized foundries, while in larger ones a division is quite necessary.

In a stove and range plant, the machine shop would be replaced by the departments for cast iron mounting, sheet metal mounting, pipe cutting, japanning, nickeling, punch press and forming and so on. In a plant where much testing is necessary, such as in the manufacture of radiators, boilers, etc., there would be such departments as first test, machining, assembling, second test, finishing, etc. In the malleable plant, the cleaning must be divided into hard iron cleaning, sand blasting, soft iron cleaning, testing and inspection, straightening, etc.

A steel foundry would be divided into the same departments as the gray iron foundry, although the detailed method of handling the melting department would be changed somewhat to suit the different method of melting.

For the electric steel foundry casting ingots, the core molding and cleaning departments would be omitted. The important departments to be added to the list are those for handling ingot molds, pouring and removing the ingots.

Let us show by a simple calculation how spreading overhead for the factory as a whole instead of by departments gives dangerously incorrect costs. Assume the not uncommon case of two foundries operated by a single concern, one doing all hand molding with no machine or crane equipment, the other all machine work with two cranes.

For hand molding the expense should be distributed on the productive labor dollar or the man hour; for the machine molding the distribution should be on the machine hour basis.

Incorrect Overhead Calculation Illustrated

If for the hand molding the labor cost is 80 cents an hour and the expense rate 100 per cent of the labor, the labor and expense cost for a casting, taking one hour to make, will be $1.60.

Suppose that five of these same castings can be made on the machine in one hour. If the machine hour rate is $4.65 for all of the expenses and the direct labor cost $1.75 per hour, the total labor and expense cost for five castings is $6.40 or $1.28 each. These are the correct methods of figuring the costs for each case.

Suppose, however, that the two shops lump their overhead and find that it is 150 per cent on the productive labor dollar. The cost for the hand molding by this method would seem to be: Direct molding labor per casting 80 cents plus 150 per cent overhead, giving a cost per casting of $2. This increases the apparent cost per casting by 40 cents because the first foundry is made to carry a part of the burden of the other which it should not be compelled to do. This incorrectly high cost may result in losing considerable business to foundries which know their real costs. Using this incorrect method in the machine molding will give an apparent cost per casting of 80 cents, which is 40 cents per casting less than the real cost, because part of the expense of this foundry is loaded upon the other. This may result in considerable unprofitable business flowing in as a result of the low price.

Gathering the overhead expense by departments does more than merely to make certain that the expense will be distributed to the various castings in the proper proportion. For one thing it makes it possible to tie in the costs with the general books of account, which cannot be done accurately when expense is lumped for the plant as a whole.

This method also reduces the bookkeeping greatly, for instead of a multitude of ledger accounts only a single one—manufacturing expense—is needed. The expense analyses for all of the departments, taken together, give a complete analysis of the controlling ledger account. At the same time they provide a definite control of efficiency.

There are, however, besides the items of expense which come from the manufacturing expense account, certain fixed charges that are part of the overhead expense. They are taxes, insurance and depreciation.

To gather these items the fixed charge sheet form 5 is used. The purpose of this form is to provide a means by which each department of the plant may be charged with its fair share of the fixed charges. Since taxes and insurance are paid at infrequent intervals, one-twelfth of the charge is carried to the expense analysis monthly.

So much has been written about rates of depreciation and the necessity for reflecting depreciation in the costs that we shall not stress the point here. The important thing about fixed charges is to make sure that each department bears all, but no more, of its fixed charges based upon the value of buildings and equipment which it contains. How this is done will be evident from a careful study of the fixed charge sheet, form 5.

Not all of the departments in the plant do productive work in getting out the casting. Such departments as the power department, which are called contributory departments, serve the productive departments, but the expense of them must ultimately get into the final cost of every casting made. Plainly it is not feasible to measure directly the amount of power which each casting has used. But we can measure closely the amount of power each productive department uses. So the expense of each contributory department is passed on to the productive departments in the proportion that each productive department

benefits from the service of the contributory department. Ultimately the productive departments absorb all of the expense of all of the contributory departments. And at last the total expense of the productive departments is absorbed by the castings. This, in brief, is the principle underlying the departmental expense analysis method of spreading overhead.

It has been found, however, that by drawing up the expense analyses in proper form they can be made to give information on operations which is invaluable as a means to control the manufacturing, to spot inefficiencies, and to suggest economies.

The expense analysis sheet which is actually used in the operation of any foundry cost system, is shown as form 37. It provides columns for the current month's expense and for the expense for the period to date. This set of columns is repeated for succeeding months so that constant comparison can be made to determine abnormal operating expenses and to correct bad tendencies quickly.

To save space a condensed form of analysis sheet is used in this article.

The items on the expense analysis come from the charge register, the fixed charge sheet and the summaries of supplies and of labor which were described in preceding articles.

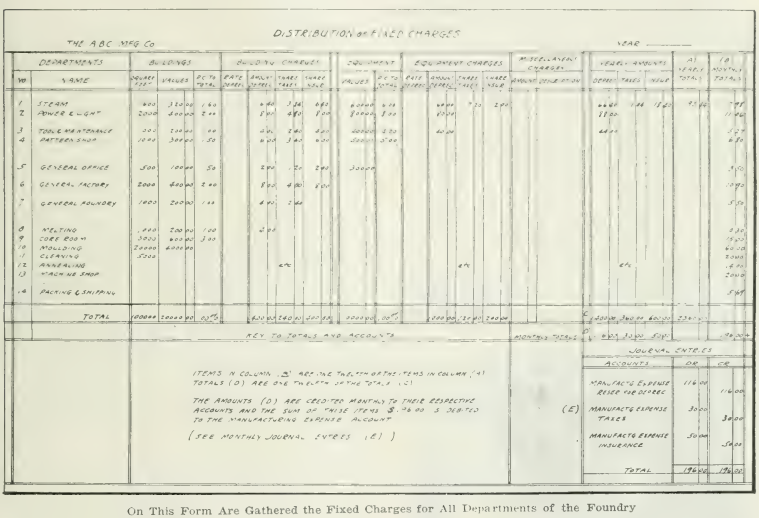
The expenses of each department start with the salary of the foreman or superintendent, the miscellaneous non-productive labor and the supplies which represent the largest expenditures. The sum of these items is the total direct expense for which the department head may be held strictly responsible since he can, to a degree, control it. Then come the shares of expense of the contributory departments from which that department benefits, and the share of fixed charges. Opposite each labor and expense item is a notation indicating its source.

The items listed on the expense analysis will not necessarily be the same for all foundries. Those shown are, however, typical. An item of expense that may be important for one foundry may be a minor item to another. For instance, the small foundry may group several items such as "oils, grease and waste," while in a large foundry the consumption of each may be so large that for close control it is desirable to show each item by itself. Minute subdivision does not pay unless the item is so large that worthwhile economies may be effected by the closer control.

Allocating Expenses of Steam Department

The contributory department "steam" comprises the boiler room. It supplies steam for power, heating and process work. Certain departments, however, receive no direct heat; they depend upon the by-product heat from the processes. Arriving at a basis for distributing the steam expense is an excellent example of the need of engineering knowledge as a basis for accurate costing.

The foundry may be heated with live steam with the engines exhausting to atmosphere. If the boiler is used for heating only, all steam is chargeable for this purpose. If the boiler is operated at high pres-



On This Form Are Gathered the Fixed Charges for All Departments of the Foundry

sure to furnish steam for testing purposes, a reducing valve may be introduced in the heating lines in order to furnish low pressure heating. If steam is furnished to the engine for power, and the exhaust steam used for heating, the engine takes out, theoretically, only about 5 per cent of the heat. For practical purposes we use 10 per cent to cover the losses from radiation and condensation in the piping and elsewhere.

Sometimes the power required to manufacture is small and the amount of exhaust steam delivered not sufficient to heat the plant. In this case enough additional steam for this purpose must be furnished direct. This may be necessary only during severe cold weather. Nevertheless these conditions determine the basis for distributing the expense of the department.

To determine how much steam is used by the engines an evaporative test of the boilers and an indicator test of the engines may be made. Such a test recently made on a plant which uses the exhaust steam for heating, showed that the engine used about 60 per cent of the steam produced. Since the engine practically turns only 10 per cent of the heat in the steam into power and passes on the rest of the heat, it is apparent that only 6 per cent of the steam department's expense can be charged to the light and power department. The other 94 per cent must be distributed direct to other departments.

The amount of steam required to heat any depart-

ment depends upon the cubical contents, the exposed wall, glass surface and type of construction. If the buildings are so constructed that the volume of each department is in fairly uniform proportion to the floor space, and the type of construction of all buildings is the same, the floor space may be used as a basis of distribution, considering, of course, those departments which do not require direct heating. An alternative method is to use the square feet of radiation and thus arrive at a percentage basis. No hard and fast rule can be laid down. The method to be used must be decided upon after a thorough examination of the heating installation and in conjunction with all other equipment which makes use of steam. The one chosen must be the one which will be most accurate.

Usually the power house requires, in addition to the 6 per cent of steam for power, about 4 per cent for heat, making a total of 10 per cent chargeable to power and light. By some one of the possible methods it will be decided how much steam is used by the other departments. Let us say that they have been found to be as follows:

No.	*Department*	*Per Cent*	*Amount*
2	Power and light	10	$39.40
3	Tool and maintenance	8	31.52
4	Pattern shop	10	39.40
5	General office	8	31.52
6	General factory	8	31.52

In that way the total expense of the steam department for the month—$393.98—is charged to the proper departments by posting the correct amount on their expense analysis sheets opposite the item "Share of steam."

The proportions given may serve very well for, say, the six months ending April 30. In some of the departments during the remaining six months little or no steam may be required. It may even be advisable to set a normal consumption of steam for heating for each month.

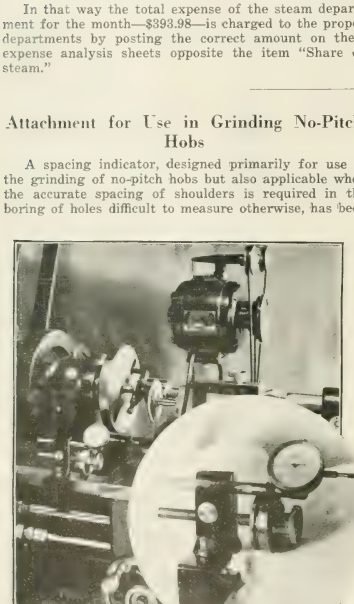
The expense analysis for the power and light department is shown as form 37-2. Power and light are used by all departments of the plant, so a basis must be found for charging each department with its share of the expense. The most accurate method is to meter the amount of current and air used by each department, but there are few foundries equipped with meters. Usually the accuracy gained by metering would not be worth the cost of the equipment in the small foundry.

A complete power test of the foundry when operating at normal capacity may be a satisfactory substitute for metering. When the horse power consumed by each department is known it is expressed as a percentage of the total horse power consumption of the entire factory and the light and power expense distributed to the departments on that basis. Since these results may soon become inaccurate with the change of manufacturing activities, it is often best—in order to avoid frequent tests—to base the departmental share of the power expense upon the power consumption rating given the various equipment and lighting units by their makers. The distribution is shown on the expense analysis of the power department.

(To be continued)

Attachment for Use in Grinding No-Pitch Hobs

A spacing indicator, designed primarily for use in the grinding of no-pitch hobs but also applicable when the accurate spacing of shoulders is required in the boring of holes difficult to measure otherwise, has been



Spacing Indicator Mounted on Lathe and Used In Grinding Of a No-Pitch Hob Having 11 Threads Per Inch. The insert shows construction of the device

placed on the market by the Precision & Thread Grinder Mfg. Co., 1 South Twenty-first Street, Philadelphia.

The device, which may be clamped to the ways of any lathe, is made up of a cast-iron base and clamp, a fine pitch screw and dial which is graduated to 0.0001 in. The dial is designed so that when making the first spacing, for example, 0.016 in. and 3/10th, the operation may be repeated by simply starting at the zero point each time. A dial indicator is mounted upon a sliding rod. The position of this is controlled by the fine pitch screw and dial above referred to.

The illustration shows the grinding of a no-pitch hob which is used for milling self-opening die-head chasers and has 11 threads per inch, spacing of 0.0909 in. being required from center to center of thread. To operate, starting at zero on the dial, revolve until the reading is 0.0909 in. The stop pin mounted on the carriage of the lathe is brought over until the needle on the dial indicator registers zero. Then release the dial on the screw and bring back to zero and repeat the operation.

The device was invented by W. H. Frick, vice-president and chief engineer of the company.

Coal Stocks at Steel Plants Show Slow Increase

WASHINGTON, July 10.—Steel plants had an average of 29 days' supply of coal on hand on June 1, 1923, while by-product coke plants had an average supply of 23 days on that date, according to a survey of commercial stocks of coal undertaken by the Bureau of the Census and the Geological Survey, under the authority of the Federal Fuel Distributor. The average of coal stocks at steel plants showed an increase of 11 per cent on June 1, when compared with March 1, the average supply on the latter day having been 26 days. The average on June 1 is made up of 27 days' supply of steam coal and 31 days' supply of gas coal. The supply on June 1 at the by-product coke plants was 12 per cent more than on March 1, when the average was 19 days. The average of 23 days on June 1 is made up of 21 days' supply of low volatile and 24 days' supply of high volatile coal.

Stocks of by-product coke increased 132 per cent during the period March 1-May 31, and the quantity on hand June 1 was 202,000 tons. In spite of this large increase the supply on June 1 was less than one-fourth that on March 1, 1922, when the reserve was heaviest.

On June 1, 1923, commercial consumers had in storage approximately 41,000,000 tons of soft coal. This was an increase over stocks on March 1, 1923, of 5,000,000 tons, and is the highest level recorded since March, 1922. Strictly comparable records for corresponding dates are not available except for June 1, 1920, when stocks were at the lowest point on record. The supply on June 1, 1923, was more than twice as large as that three years before and probably about the same as on June 1, 1921.

Institute Directors Act on Eight-Hour Day

Assure President Harding That Twelve-Hour Shift Will Be Abolished at Earliest Time Practicable—Judge Gary Gives His Views and Answers Questions

AT Tacoma, Wash., July 5, President Harding made public recent correspondence which he had had with Judge Elbert H. Gary, president of the board of directors of the United States Steel Corporation, in regard to the abolition of the twelve-hour day in the steel industry.

The President's letter to Judge Gary was as follows:

The White House, June 18, 1923.

My dear Judge Gary:

I have now had an opportunity of reading the full report of the commission of the Iron and Steel Institute on the question of the abolition of the twelve-hour day in the steel industry.

As I have stated before, I am of course disappointed that no conclusive arrangement was proposed for determination of what might be manifestly accepted as a practice that should be obsolete in American industry.

I still entertain the hope that these questions of social importance should be solved by action inside the industries themselves, for it is only such solutions that are consonant with American life and institutions.

I am impressed that in the reasoning of the report great weight should be attached to the fact that in the present shortage of labor it would cripple our entire prosperity if the change were abruptly made.

In the hope that this question could be disposed of I am wondering if it would not be possible for the steel industry to consider giving an understanding that before there shall be any reduction in the staff or employees of the industry through any recession of demand for steel products, or at any time when there is a surplus of labor available that then the change should be made from the two shifts to the three-shift basis.

I cannot but believe that such an undertaking would give satisfaction to the American people as a whole and would indeed establish pride and confidence in the ability of our industries themselves to solve matters where so conclusively advocated by the public.

With very cordial expression of personal regard, I am, very truly yours,

WARREN G. HARDING.

Response of the Directors

The letter from 15 of the 23 directors of the institute was as follows:

New York, June 27, 1923.

To the Honorable Warren G. Harding, President of the United States:

Dear Mr. President.—Careful consideration has been given to your letter of June 18 by the undersigned directors of the American Iron and Steel Institute, comprising all of those whose attendance could be secured at this time.

Undoubtedly there is a strong sentiment throughout the country in favor of eliminating the twelve-hour day and this we do not underestimate. On account of this sentiment, and especially because it is in accordance with your own expressed views, we are determined to exert every effort at our command to secure in the iron and steel industry of this country a total abolition of the twelve-hour day at the earliest time practicable. This means the employment of large numbers of workmen on an eight-hour basis and all others on a basis of ten hours or less without an unjustifiable interruption to operations.

The change cannot be effected overnight. It will involve many adjustments, some of them complicated and difficult, but we think it can be brought about without undue delay when, as you state it, "there is a surplus of labor available."

The iron and steel manufacturers generally of the United States, outside of the directors referred to, are expected to concur in the conclusion reached by the directors as above stated.

With highest regards, we are cordially yours,

Elbert H. Gary, John A. Topping, W. A. Rogers, W. H. Donner, W. J. Filbert, E. A. S. Clarke, James A. Farrell, E. G. Grace, Willis L. King, James A. Burden, L. E. Block, Severn P Ker, J. A. Campbell, A. C. Dinkey, Charles M. Schwab, Directors, American Iron and Steel Institute.

President Harding's Remarks

President Harding in addressing the meeting at Tacoma said:

"I have received a joint communication from the large majority of steel manufacturers of America in which they have undertaken to abolish the 12-hr. day in the American steel industry at the earliest moment that the additional labor required shall be available."

Will Heal Sore in Industry

Calling the 12-hour day an "anachronism in American life," the President told the audience the steps he had taken to induce the steel industry to adopt this big reform. "I wish to congratulate the steel industry," he said, "on this important step. It will heal a sore in American industrial life which has been the cause of infinite struggle and bitterness for over a generation, and it marks an accomplishment from the conscience of industry itself, a recognition of responsibility from employer to employee that gives us faith in rightful solutions of the many tangled problems that are the concomitant of the rapid growth of America. It is an example that I trust the few other continuous processes in industry which still maintain the 12-hr. shift may rapidly follow. I shall be proud indeed if my Administration were marked by the total passing of the 12-hr. working day in American life."

Judge Gary Comments on the Manufacturers' Action

Judge Gary on Friday of last week, complying with the request of newspaper men, talked with them in regard to the correspondence with the President on the 12-hr. day. Judge Gary said that he was pleased to read in the papers that the President had given to the press letters which had passed between the President and representatives of the steel industry. "There is," said Judge Gary, "one other letter that should be referred to. That is a letter from me to the President dated June 20. Upon receiving from the President his letter dated June 18 which he has given to the press I immediately wrote to him this letter:

My dear Mr. President:

I have just received and read your letter of June 18. I will immediately call a meeting of our committee (and probably including the whole membership of the directors of the institute residing in this country). Wednesday of next week is the earliest time that the attendance of all, or practically all, of them can be secured.

Be assured that the subject matter of your letter will be given the most careful consideration and with a spirit to cooperate with yourself to the fullest extent practicable.

With highest esteem, believe me,

Cordially yours,

ELBERT H. GARY.

June 20, 1923.

"I refer to that letter to show that there was no delay whatever in responding to the President's letter."

Judge Gary continuing, said: "The 12-hr. day was started by the men long before the United States Steel Corporation was organized. I do not believe the 12-hr. day in the steel industry could have heretofore been entirely abolished by consent of all or substantially all of the employers in that industry. Certain it is that

several and perhaps many of the employers, from the time of the President's dinner in May, 1922, have been using every reasonable effort to eliminate the 12-hr. day. And now that within 14 months practically all of the manufacturers of iron and steel in this country have positively agreed to the entire abolition of the 12-hr. day so soon as there is sufficient labor to permit it, I think we may say this is a wonderful achievement.

"Many of you here can bear witness to the fact that I have been opposed to it always, and for the reasons which have been published, and no other. Any single company or corporation could have made more rapid progress than has been made by the industry generally, but that would have been unavailing. And it has been recognized by everyone who has carefully studied the situation that in order to make an effort to eliminate the 12-hr. day successfully, there must be substantial unanimity in the whole industry. It was felt better to go slowly and go right than to go rapidly and to make the mistake of risking success.

"Just when the 12-hr. day will be substantially, and I hope entirely eliminated in the steel industry, cannot be now stated with certainty. But it can be said that efforts to get rid of the 12-hr. day will be very promptly made and that good progress will result and perfect success reached within a comparatively short time, provided the increases in the number of workmen which now seem apparent continue.

"I can't say exactly when the United States Steel Corporation or any other company will get rid of the 12-hr. day entirely, but I can positively state that they will commence to act in that direction very soon and be very diligent in their efforts.

President Very Earnest

"President Harding is and has been very earnest in his efforts to abolish the 12-hr. day in the iron and steel industry, and I am glad to see by his statement published this morning that he intends to do everything practicable to abolish the 12-hr. day in all other lines of industry. He is a very consistent and persistent President, and when he knows he is right, he is pretty strong. But he will get the full cordial support of the iron and steel industry in this undertaking.

"If you gentlemen would take the pains to read the statements which I have made from time to time, you would have a full and consistent record of our position with relation to the 12-hr. day, representing not only my own judgment but also that of my associate officers and associate members of the board of directors and finance committee of this corporation and also a substantial part of the steel industry of the United States, although not all of it. For many months, and I might say for several years, the steel industry has recognized the growing public sentiment which is quite different from what it was a few years ago; and in fact after the President's dinner one corporation I might mention brought about a reduction of the 12-hr. day to about 16 per cent throughout its whole organization, and some other companies did as well and others better. But the volume of the iron and steel business increased rapidly, the demand was very great, production was considered of high importance, and the percentage of the 12-hr. day, instead of continuing to grow smaller, began to increase, until I think on the average it is equal to about 25 per cent at the present time in this country, very much to my regret. But there will soon be an improvement in that situation, I think, because there are expected to be increases in the numbers of workmen. Men coming from the South, from Mexico, from the Philippines and Canada and from various countries abroad have already made some showing, although the present numbers of workmen are inadequate.

"We shall have some difficulty in making adjustments which will satisfy large numbers of our workmen. I mean by that that many, if not most of the foreigners who come to this country desire to work longer hours, even at the same rate per hour, and that is because by so doing they receive a larger daily allowance. We will have to make some adjustments that will be more or less expensive and possibly will result in some reductions of the quantities produced, though I hope not much, but as stated in our letter, we are determined to get rid of the 12-hr. day at the earliest practicable moment and for the reason that the public sentiment favors that, and especially because the President so desires.

"Of course, there are some men who do not agree with the large majority and who would like to work less hours. But so far as we know there are very few workmen who are willing to work less hours unless they receive the same amount per day that they were getting for the long hours. The inferences that have been made by a few that the workmen have been ill treated in the iron and steel industry during the last few years are without substantial foundation. Also the statements that have been made, though not often, I am glad to say, that the Steel Corporation is still working its men seven days a week, are absolutely untrue so far as we at these offices know or are informed.

War-Time Experience

"During the war we were requested by governmental representatives to produce as much steel as possible and keep our mills and furnaces running night and day for the seven days a week. The necessities of the Government for military purposes justified them. But so soon as Mr. Baker, the Secretary of War, gave notice that we need not continue seven days a week, we immediately gave positive instructions to discontinue and limit the work to six days per week by any one workman, and that rule has been strictly adhered to by our corporations.

"You understand that where furnaces are continuous they have to be kept going continuously. That is the only practicable way of keeping our furnaces in condition and of securing our production. But no one employee has been requested or permitted to work more than six days a week since the war so far as our instructions go and so far as our knowledge or information extends.

"Now I am going to allow you gentlemen to ask questions, provided your questions relate to the subject matter of our meeting. I do not want to take up any other item of business on this occasion. I have not time to do it."

"What is the reason for supposing that there will be more labor available in the near future?"

"I thought I answered that. It is because the workmen are coming from the South, the colored men, and the Mexicans from Mexico and the Filipinos from the Philippines and men from Canada, and immigration is increasing a little I think. I still think, as I said before, that the laws in relation to immigration should be amended, that we should have more here to take care of the business of this country. By that I do not mean that any labor which is not desirable for this country should be permitted to come nor that the numbers permitted should be large enough to interfere with the best interests of the laboring people of this country or any other interests nor extend beyond the actual necessities of the purchasing public of this country. But I think, and that is what I have attempted to say always when I have spoken on this subject, that this country cannot afford in its own interest to prohibit a sufficient number of workmen in this country to take care of the public necessities, which means a large consuming public, and of course, also, the export trade. That, however, is a matter of opinion and not for me to decide. I understand it is in accordance with President Harding's ideas."

"Don't you think that the reduction in the number of hours will possibly draw a good deal more American labor, who are unwilling to work at the present time on the 12-hr. day?"

"I do not, certainly not."

"You speak about Mexican and Philippine labor coming in. Does the Steel Corporation employ them only as they come in or are you bringing any in?"

Judge Gary: "We are not bringing any in."

"What is the effect of the shorter working day on the cost of steel products?"

"It will increase the cost more or less. I made an estimate at the institute of about 15 per cent, and I

think that is about right. Now of course we shall do everything possible to increase the use of machinery so as to enable us to get along with fewer workmen, but we have done everything we could do in that direction up to date."

"Your figures of 60,000 additional men needed—are they approximately correct still?"

"Yes, for the whole industry."

"An increase of 15 per cent in the cost of production, that will mean an increase in cost to the consumer?"

"That is what it ought to mean, provided there is not sufficient profit without it, and I am sorry to say that for the last few years there has not been enough profit."

"Would the steel industry then go on an 8-hr. basis for the continuous operating mills or would 10 hours still continue with some men, yard men and others?"

"Oh, yes, the continuous process works will go on an 8-hr. basis. You will notice our letter to the President was very specific."

"When the report of the committee was made public at the meeting, the inference seemed to be drawn that the committee was opposed to the abolition of the 12-hr. day?"

"Drawn by newspaper readers," replied Judge Gary. "And that was because they did not read the report carefully, that was the only reason. The report itself was very clear. I am very sorry to say that a great many wrong impressions were created in regard to that report. Our action now is entirely consistent with it."

"Your intention or the intention of the industry is to make it a straight 8-hr. day, not a basic 8-hr. day?"

"No, a straight 8-hr. day."

Washington Comment on President Harding's Announcement

WASHINGTON, July 10.—Apparently the announcement by President Harding at Tacoma, Wash., last Thursday, of the correspondence between himself and Judge Gary, regarding the total abolition of the 12-hr. day in the iron and steel industry, was intended as a climax of the Chief Executive's labor-and-capital speeches made during his Western tour. The outstanding theme of the President's addresses has dealt with the relationship between labor and capital and has denoted a sincere desire on the part of the President to bring the two more closely together. It has been pointed out that from its outset the present Administration has concentrated its efforts in this direction.

This was the purpose of the White House conference on May 18, 1922, with 48 leading iron and steel manufacturers, at which proposed abolition of the 12-hr. day was discussed. The President himself has made it manifest that this particular question is only one phase of an effort to bring about a profound change in social rather than in economic conditions in industry. The steel industry, being the largest manufacturing enterprise in the United States, evidently was selected first in the hope that if agreement could be reached with it to do away with the 12-hr. day, it would be a comparatively simple matter, if indeed it would not be almost automatic, to abolish the long work day in other industries. The President's remarks made in connection with the letter of Chairman Elbert H. Gary of the United States Steel Corporation, speaking as the head of the Committee of American Iron and Steel Institute Directors, which investigated the 12-hr. day problem, show that the President was greatly pleased with the reply to his own letter urging abolition of the 12-hr. day, when there is a surplus of labor.

Considerable interest was attached to the announcement made by Acting Secretary of Labor E. J. Henning that the substitution of an 8-hr. day would be helpful to the steel industry. It will be observed that the President, realizing the difficulties involved, has treated the matter largely from a social point of view. Mr. Henning, however, dealt with it from an economic point of view, and predicted that the 8-hr. day would reduce the overhead by speeding up production. The statement of Mr. Henning was not convincing. His contention that an 8-hr. day man can produce as much in the aggregate as he can if he works 12 hr., it is pointed out, certainly cannot be applied to blast furnaces and open-hearth furnaces, because obviously they can be charged and tapped and poured only when the heats are ready. Therefore, it has been pointed out, it is not a matter of substituting labor-saving machinery to hold down the increased cost arising from the abolition of the 12-hr. day, which Judge Gary has said will average 15 per cent and call for at least 60,000 additional employees.

Mr. Henning, referring to the surplus of labor, said he did not believe in an excess of labor, but would rather see a shortage of labor. He also declared that there is a surplus of labor now in the bituminous coal industry, and asserted that big industrial employers could obtain employees by going to immigration centers and choosing men suited for their particular work. The latter resort, it has been explained, would provide but little help when measured against the 60,000 additional employees that will be required upon the abolition of the 12-hr. day.

Proposed Steel Rates Suspended

WASHINGTON, July 10.—The Interstate Commerce Commission last Saturday entered an order suspending from July 15 until Nov. 12 tariffs of the Lehigh Valley Railroad, which would have the effect of reducing rates on finished iron and steel products from the Pittsburgh-Buffalo territories and related points to Roanoke, Va. The commission set July 16 as the date for the hearing in this proceeding. It will come before Examiner Wagner.

This is the first supplemental order in connection with general readjustment of rates proposed on iron and steel products from territories mentioned to Virginia cities. Unlike the case of the Lehigh Valley tariff on rates to Roanoke, new tariffs provide increased rates amounting to 1½ to 6c. per 100 lbs. This is brought about by changing from a commodity rate basis to the fifth class basis. For instance, the commodity rate from Pittsburgh to Newport News is 38c. while the fifth class rate is 40½c. This readjustment is in line with the change made some time ago in putting rates on iron and steel products on the Columbus-Baltimore basis, instead of on the previous basis providing a 3c. differential under the New York rate.

Proposed increased rates on plate and sheet iron and steel in carloads from St. Louis, Peoria, Chicago and St. Paul, and points taking the same rates to points in Kansas, Nebraska and Colorado, were held not justified in a decision handed down by the Interstate Commerce Commission last Saturday. Suspended schedules proposing these increased rates were ordered canceled. Typical of the proposed increase was the advance from 72.5c. to 79.5c. per 100 lb. on sheets and plates from St. Louis to Great Bend, Dodge City and Coolidge, Kan., and La Junta, Colo.

Electric Furnace Co. Changes Hands

The Electric Furnace Co., Salem, Ohio, of which T. F. Baily was formerly president, and which went into the hands of receivers a few months ago, has been purchased by F. A. Hoiles and R. F. Benzinger, Alliance, Ohio, and F. T. Cope of Salem. The new company expects to continue to manufacture Baily electric melting furnaces for non-ferrous metals, high temperature heating furnaces, and heat-treating and annealing furnaces. The officers of the new company are: F. A. Hoiles, president; R. F. Benzinger, vice-president, secretary and sales manager, and F. T. Cope, treasurer and general manager. The officers state that the new organization is entirely a new company, adequately financed.

Steel Corporation's Orders Decrease

Unfilled business on the books of the United States Steel Corporation as of June 30 amounted to 6,386,261 tons, or 595,090 tons less than reported for May 31. During May the unfilled business showed a decrease of 307,158 and during April of 114,823 tons, while increases of 119,343 tons, 373,213 tons and 165,073 tons were shown respectively in March, February and January. A year ago the unfilled tonnage was 5,635,531 tons, or 750,730 tons less than on June 30 last. Following is the unfilled tonnage as reported by months since January, 1920:

	1923	1922	1921	1920
Jan. 31	6,910,776	4,241,675	7,573,164	9,285,441
Feb. 28	7,283,989	4,141,069	6,933,867	9,592,081
March 31	7,403,332	4,494,148	6,284,765	9,892,075
April 30	7,288,509	5,096,913	5,845,224	10,359,747
May 31	6,981,351	5,254,228	5,482,487	10,940,465
June 30	6,386,261	5,635,531	5,117,868	10,978,817
July 31		5,776,161	4,830,324	11,118,463
Aug. 31		5,950,105	4,531,926	10,805,038
Sept. 30		6,091,895	4,580,670	10,374,804
Oct. 31		6,902,287	4,286,829	9,836,852
Nov. 30		6,340,242	4,250,542	9,021,481
Dec. 31		6,745,703	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, at 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Youngstown Sheet & Tube Co. Signs with Amalgamated

It is announced that the Youngstown Sheet & Tube Co. has signed an agreement with the Amalgamated Association of Iron, Steel and Tin Workers, covering the operation of the sheet mills acquired through purchase of the Brier Hill Steel Co. The Brier Hill company has always dealt with its organized sheet mill employees through the Amalgamated association, and the Sheet & Tube company decided to continue this policy with respect to the affected Brier Hill properties.

National Enameling & Stamping Co. Operations

The National Enameling & Stamping Co., Granite City, Ill., began operations July 2 in its new plate mill, which has a capacity of 20,000 tons a month of plates up to 90 in. wide and from ⅛ to 1¼ in. thick. The new mill requires 100 additional employees. George W. Niedringhaus, president of the company, said the six sheet mills and one 12-in. jobbing mill will have been completed and in operation within the next six weeks. These operations will require an addition of 600 to 700 employees. Mr. Niedringhaus also said that the company is contemplating enlarging its open-hearth department.

Waste of Gas by Beehive Ovens

WASHINGTON, July 10.—At the present time, under average conditions, the beehive coke ovens in the United States waste annually about 240 billion cubic feet of gas that could be used for public utility service, says Samuel S. Wyer, Associate in Mineral Technology, United States National Museum, in Bulletin 102, Part 8, entitled "Manufactured Gas in the Home."

Mr. Wyer continues: "Since the total annual manufactured gas sold is 326 billion cubic feet, this beehive coke oven waste is equivalent to nearly three-fourths of the gas sold. There is little wonder that the foreigner has referred to us as 'butchers' in connection with the misuse of our own resources.

"About one-half of this beehive coke oven waste, or 120 billion cubic feet annually, is wasted in the State of Pennsylvania. Since the manufactured gas used in the State is 27 billion cubic feet annually, this waste represents four and one-half times the manufactured gas made in the State.

"Much oil is now needlessly used in maintaining obsolete candle-power standards."

Of the total manufactured gas sold, 22 per cent is credited to industrial consumption, 57 per cent to domestic use, 18 per cent to lighting, the remaining 3 per cent being unclassified.

The bulletin states that the demand for natural gas is now greater than the available supply and less will be available each year. This rapid decline, it is declared, will make necessary the present natural-gas-using towns ultimately using manufactured gas if they are large enough to maintain a manufactured-gas plant. Many of the appliances now in use for natural gas are declared to be so crude and grossly inefficient that they cannot be used at all with manufactured gas and this will make a marked demand for better manufactured-gas appliances.

The New Rates to the South

BIRMINGHAM, ALA., July 9.—With the refusal of the Interstate Commerce Commission to suspend the realined commodity rates to and from the South, July 1, they went into effect, as stated in THE IRON AGE last week. The new rate on iron and steel products from Pittsburgh to Birmingham and Atlanta is 58c., compared with old rate of 69c. to Birmingham and 70½c. to Atlanta. The new rate to Mobile, Pensacola and New Orleans is 67c., compared with old rate of 51½c. The new rate to Memphis is 56c., compared with the old rate of 38½c. Birmingham's rate per ton is reduced by $2.20, that to Atlanta is reduced by $2.50, that to New Orleans, Pensacola and Mobile is raised $2.10, and that to Memphis is raised $3.50. Birmingham jobbers in wire mill products, hoop and band steel, etc., will get full benefit of the reductions, whether buying here or at Pittsburgh. Bars, structural steel and plates are sold in Birmingham on a local base, which is the equivalent of the Pittsburgh price plus about one-third of the freight rate. Bars remain quoted at 2.60c., Birmingham.

Preparation of Sponge Iron

Experimental work has been performed at the Northwest experiment station of the Bureau of Mines, Seattle, Wash., looking toward the possible use of other reducing agents than coal for the reduction of sponge iron. Results show that retort carbon and coke breeze were satisfactory as reducing agents but that from 1 to 1¼ parts by weight of these materials must be used per part of ore. In other words, although these reagents contain more carbon than coal, as much of them by weight must be used. Charcoal was found to be as satisfactory as coal from the reducing standpoint, but, on account of its low apparent specific gravity, too much of it is blown from the furnace to warrant its use as a reducing agent. The experiments proved that sawdust contained altogether too little fixed carbon and was too light in weight, so much of it being required to effect satisfactory reduction of the iron oxide that the capacity of the furnace is reduced too much to permit of its commercial operation. Hogged fuel has not been tried as yet, but it is expected that better results will be obtained with it than with either sawdust or charcoal.

Lake Ore Shipments in June

The movement of Lake Superior iron ore by water in June and for the season up to July 1 was considerably larger than that of the corresponding period in 1922. June shipments from upper lake docks amounted to 9,499,501 gross tons against 6,629,711 tons in June, 1922, an increase of 2,869,790 tons or 43.29 per cent. The total to July 1 was 16,185,482 tons or 7,834,305 tons in excess of the movement to July 1, 1922.

The shipments by ports for June, 1922 and 1923, and for the season were as follows:

	June, 1922	June, 1923	To July 1 1922	To July 1 1923
Escanaba	586,656	1,052,502	804,594	1,996,647
Marquette	324,419	513,280	394,544	801,949
Ashland	902,759	1,136,049	1,199,448	1,883,153
Superior	1,632,911	2,841,615	2,354,595	4,634,730
Duluth	2,017,801	2,846,759	2,253,863	4,874,059
Two Harbors	1,165,165	1,109,296	1,344,133	1,994,944
Total	6,629,711	9,499,501	8,351,177	16,185,482
Increase		2,869,790		

Duluth shipments this year have been more than in 1922 or 30.11 per cent of the total to July 1, as compared with 26.99 per cent a year ago. Escanaba and Marquette have contributed large increases also.

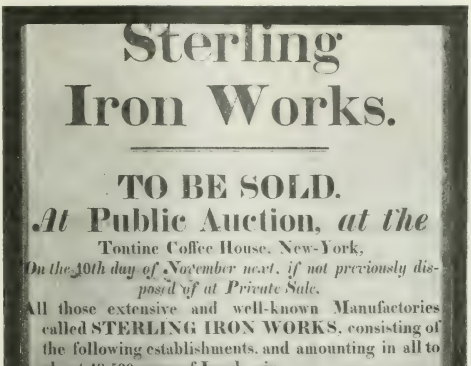
OLD IRON MINES CLOSED

Work Stops at Sterlington, N. Y., Where Operations First Began in 1760

The recent closing down of the old iron mines at Sterlington, N. Y., through the surrendering of the lease by the Bethlehem Steel Co., probably means the permanent abandonment of these mines, the owner, the Sterling Iron & Railway Co., 39 Broadway, New York, having no intention of continuing operations. The mines have been flooded and the machinery dismantled.

The Sterlington mine was first opened up in 1760, being one of the oldest, if not the oldest, ore mines in the United States. It is said that ore from these mines furnished the iron from which was forged the famous chain that was placed across the Hudson River during the American Revolution to bar British warships from going up the river.

In 1906 the property on which the Sterlington mines are located was purchased by the late E. H. Harriman for his Tuxedo estate. The site consisted of 22,000 acres and of this Mr. Harriman presented 10,000 acres to the State of New York as a part of Palisades Park. The Sterling Iron & Railway Co., the present owner of the mines, is a Harriman interest, being a subsidiary of the Merchants Shipbuilding Corporation, in which W. A. and E. R. Harriman are the principal stockholders.


Sterling
Iron Works.

TO BE SOLD.
At Public Auction, *at the*
Tontine Coffee House, New-York,
On the 10th day of November next, if not previously disposed of at Private Sale.
All those extensive and well-known Manufactories called STERLING IRON WORKS, consisting of the following establishments, and amounting in all to about 18,500 acres of Land, viz.

SOUTHFIELD FURNACE, situated in the town of Monroe and county of Orange, on the Turnpike road from New York to Albany about 42 miles from the former city and 14 from the North River, comprising a

a turnpike road, 25 miles from the North River, with a sufficient number of houses for workmen.

Also—TWO FORGES for making bar iron, about 40 miles from New-York, and 20 from the North River, in complete order, and now in operation, with a [illegible] supply of water, [illegible] barns, store-[illegible] houses

In 1917 the Sterlington mines were leased to the Ramapo Ore Co., a subsidiary of the Midvale Steel & Ordnance Co. for 50 years and expensive equipment was installed for removing the ore. From the middle of 1917, when the Midvale operations began, until just recently, when operations were discontinued, 700,000 tons of ore was removed. The lease became the property of the Bethlehem Steel Co. in the sale of the Midval properties to that company and was surrendered by the latter upon payment of a penalty which a clause of the lease provided for.

The ore reserves in the mines total about 7,000,000 tons, according to an officer of the Sterling Iron & Railway Co., but it is deemed unlikely that any further recovery of the ore will be carried on at least until such time as other ore properties, which can be mined at a lower cost, are seriously depleted. The Sterlington ore analyzes 56 per cent iron, 2.09 per cent phosphorus, 10.19 per cent silicon, 0.26 per cent manganese and 0.13 per cent sulphur.

An Old-Time Document

While preparations were under way to dismantle the old historic mine, an office was renovated at 31 Nassau Street, New York. An old document in a crude, wooden frame, once cherished by the former occupant of the office who had just died, was swept out with a pile of rubbish. Through the broken glass one could read, "Sterling Iron Works. To be Sold at Public Auction, at the Tontine Coffee House, New York."

That was in 1815. Southfield Furnace in Orange County was then a factor of considerable importance in American iron production. With the furnace went bridge, saw mill, grist mill, cord wood and stables. There was also in the sale a "steel furnace" and Sterling Furnace, "constructed equal to any in the United States," with a "supply of water that is never-failing, being derived from a large lake." On these lands it was said, "there were many inexhaustible veins and beds of ore of excellent quality either for casting or making bar iron, and is capable of making 500 tons of castings annually." So extensive were these properties (18,500 acres) that it was necessary to locate the furnaces, shops and other important points by giving their proximity to New York in miles and by stating the compass direction from the city. Attention was directed to "250 acres of meadow for mowing" and "1000 acres of land for tillage." In the last paragraph appears a monumental statement: "From the vast quantities of timber and ore contained in these tracts, it may be fairly presumed that these iron works will be the most permanent of any in this country."

Sterling Eagle steel which, it was said, had grown "into general use for all kinds of edge tools, saws, axes, scythes and files, . . . has been found not inferior to the most approved English or German steel. Three hundred tons of such steel may be manufactured yearly."

John W. Harrington, 31 Nassau Street, was attracted by the announcement as he passed the rubbish heap. After providing a new frame for it, Mr. Harrington asked THE IRON AGE to preserve it lest a similar fate again befall it. A section of the announcement is reproduced herewith.

Shipbuilding Declining

Total shipbuilding at the beginning of July was 316,000 gross tons less than three months ago and 410,000 tons less than at the beginning of the year, according to Lloyd's Register. The United States, which at the end of March was building 34,000 tons more of merchant ships than at the beginning of January, was building at the end of June 40,000 tons less than at the end of March. Of the 316,000 tons decrease for all countries combined in the last quarter, 154,000 tons was in the shipyards of Great Britain and Ireland, so that the British decrease was almost as great as that for all other nations together.

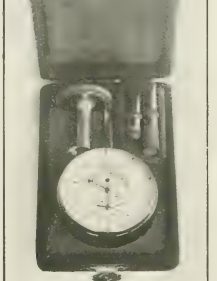
The following table shows, in gross register tons, the comparison between the two last quarters:

	June 30	March 31
Great Britain and Ireland.	1,337,759	1,492,138
United States	133,660	173,762
Other countries	1,072,437	1,194,172
World total.....	2,543,856	2,860,072

Direct-Reading Tachoscope

The accuracy of a speed indicator combined with the rapid reading rate usually associated only with tachometers of the centrifugal or magnetic types is claimed for the direct-reading tachoscope illustrated, which has been placed on the market by O. Zernickow, 15 Park Row, New York.

The instrument is a combined non-magnetic chronometer and revolution counter which shows the r.p.m. or ft. per min. speed in 6 sec. The standard time unit adopted is 6 sec., this unit being controlled by the precision watch movement fitted in the indicator. One and one-half seconds are allowed for starting and stopping the watch movement, which also automatically



Direct-Reading Tachoscope. The instrument is a combined non-magnetic chronometer and revolution counter and indicates r.p.m. or ft. per min. speeds in 6 sec. Accuracy and rapid reading are features. It is designed for speeds up to 30,000 r.p.m. The diameter of the dial is 2 in.

switches the counting mechanism in and out at the start and finish of the 6 sec. reading unit.

The lever with the button which projects from the case winds the watch mechanism. A single pressing of the button for each reading is sufficient, and the lever is designed to zero the counting mechanism from the previous readings, as well as winding the watch. This obviates the necessity of resetting the counter after taking a test, the last reading remaining on the dial until the indicator has been placed in position on the machine under test and a new reading required. Then the finger is pressed on the knob and permitted to slide over it so that it can fly back to its full extent, thus resetting the counter and winding the watch.

A black or a red disk is shown on the face of the counter, according to the direction of rotation and corresponding to that of the graduations to be used. One revolution of the large pointer equals 1000 revolutions or 333 1/3 ft. if the measuring disk is attached. One revolution of the small pointer equals 10,000 revolutions or 3333 1/3 ft. The instrument is designed for speeds up to 30,000 r.p.m., suitable pivots and bearings for this speed being provided.

The diameter of the dial is 2 in. The net weight is 6 oz. and the size of the case 4½ x 3 x 1¼in.

In a 32-page pamphlet Moody's Investor Service, 35 Nassau Street, New York, has presented a nation-wide survey of the electrical, gas, telephone, telegraph and electric railway systems of the United States, giving a large amount of information, mainly in tabulated form, as to the amount of service rendered, the rates for that service, the number of people employed, the capitalization and its remuneration, growth of utility service generally, fuel consumption, etc. In some instances these figures are carried back through as much as 20 years, while other pieces of information cover only specific years through a relatively short range. As a reference work this pamphlet has great value.

Readjustment of Coal Rates from Southern Ohio Ordered

WASHINGTON, July 10.—The Interstate Commerce Commission in a decision last week ordered an important readjustment of rates on coal from southern Ohio and the so-called inner and outer crescent, which embraces that portion of the Appalachian region extending over Pennsylvania through western Maryland, West Virginia and southwestern Virginia, into eastern Kentucky and Tennessee, to points in the lower Peninsula of Michigan, and Elkhart and Stroh, Ind. The commission condemned the existing differentials between southern Ohio on the one hand, the inner and outer crescents on the other, the Ohio intrastate rates, and the adjustment of rates to the destinations involved. The commission's order requires the carriers not later than Sept. 27 to increase the differentials as between southern Ohio and the inner crescent to 50c. per ton by reducing the rates 10c. from the Ohio mines. It also required the railroads to increase the differential between southern Ohio and the outer crescent from 60c. to 75c. by increasing the rates 5c. per ton from the outer crescent mines.

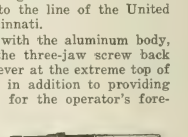
The commission found that the rates complained of from the Ohio and crescent districts were not unreasonable but were unduly prejudicial to the complaining points and unduly preferential of Detroit to the extent that such rates exceeded those to Detroit by more than the following amounts per net ton which took into consideration the general reductions of July 1, 1922: To Jackson, Mich., 10c.; Lansing, Mich., 30c.; Elkhart, Ind., 40c.; Battle Creek and Kalamazoo, Mich., 50c.; and Grand Rapids, 65c.

Among those participating in the case were the following iron and steel foundry interests: Albion Malleable Iron Co., McKinney Steel Co., Otis Steel Co., American Malleable Castings Association, American Rolling Mill Co., Central Steel Co., National Malleable Castings Co., and Toledo Furnace Co.

New Portable Electric Drill

A ¼-in. electric drill, designated as the "U. S. Automatic" has been added to the line of the United States Electric Tool Co., Cincinnati.

The handle, cast integral with the aluminum body, is on a straight line with the three-jaw screw back chuck. Locating the switch lever at the extreme top of the grip is a feature which, in addition to providing the most convenient position for the operator's fore-



Locating the Switch Lever at Extreme Top of Grip Is a Feature. The motor is of the universal type. Gears are of chrome-nickel steel

finger, is intended to form a grip support when in the "on" or running position.

The motor is of the universal type for operation on direct or alternating current circuits. S. K. F. ball bearings are used, and gears are of chrome-nickel steel, hardened, and run in grease. The weight of the machine is 5¾lb. and the size 10 x 4 in. A length of cable and a one-piece swivel attachment plug are regularly provided.

The machine may be converted into a grinder by using the company's bench base, arbor and wheel, and may be mounted on a drilling stand or post bracket to form a bench drill or bracket drill, respectively.

The new coke and by-product plant of the Weirton Steel Co., Weirton, W. Va., went into operation at midnight July 5, and the first coke was drawn July 6. The plant consists of 37 improved type Koppers ovens, and has a carbonizing capacity of 1000 tons of coal daily. A complete line of by-products will be produced.

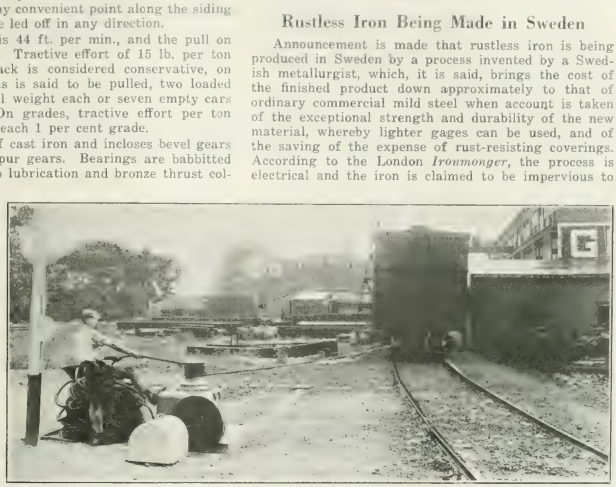
Electric Capstan for Spotting Cars

The electric capstan car puller illustrated, for use in "spotting" or locating cars to be loaded or unloaded and requiring but one man to operate, has been placed on the market by the Gifford-Wood Co., Hudson, N. Y.

In applying the device a rope is attached to the car to be pulled, given a few turns around the capstan head, and the switch is thrown. The free end of the rope is pulled in gently as it comes off. The machine may be located at any convenient point along the siding and the rope may be led off in any direction.

The rope speed is 44 ft. per min., and the pull on the rope is 2630 lb. Tractive effort of 15 lb. per ton on smooth level track is considered conservative, on which basis 175 tons is said to be pulled, two loaded cars of 75 tons total weight each or seven empty cars of 25 tons each. On grades, tractive effort per ton increases 20 lb. for each 1 per cent grade.

The housing is of cast iron and incloses bevel gears and a pair of cut spur gears. Bearings are babbitted and have grease cup lubrication and bronze thrust collars are provided on the vertical shaft. Accessibility is a feature. The housing is split and bolted together as shown, and the upper section with capstan and bevel gear may be lifted off, exposing all working parts. The base is held down by five bolts. The space occupied is 2 ft. 8 in. x 2 ft. 9 in., additional room being required for gear guard and motor housings.



Electric Capstan for Spotting Cars. The rope speed is 44 ft. per min. and pull on the rope 2630 lb. The tractive effort is 15 lb. per ton on smooth level track, on grades tractive effort per ton increases 20 lb. for each 1 per cent grade. A 5-hp. 1200 r.p.m. motor is required

The machine is shipped as a unit, less the motor and rope which are furnished by the user. A 5-hp. 1200-r.p.m. motor is recommended. The drive is direct, as shown, or a pulley may be provided in place of the outside gear for belt drive.

Extension Blocks on Boring Mill

The extension type of vertical boring and turning mill, in which the housings may be adjusted back from the table on parallel ways, is of course commonly known. By the adjustment of the housings work of larger diameter than the table may readily be turned or faced. This type of machine will not, however, bore a hub or other comparatively small hole in the center of such a large casting, as the machine heads will not extend over the center. To take care of this situation manufacturers of these machines are prepared to furnish a boring arm, which is mounted on a saddle on the rail, extending out over the center of the table at right angles to the face of the rail, and carrying an additional head for boring.

Such an extra on this type of machine is expensive where the amount of work calling for boring is limited in quantity. An example was recently encountered where the use of the extra equipment was avoided and the work handled satisfactorily by a very simple and inexpensive arrangement. The rail was removed from the housings and two extension blocks mounted, one on each housing, and bolted in place. The rail was then remounted on the front of the extension blocks, thereby being advanced nearer to the table center by the height of the blocks. As this increase in reach was not sufficient to place the tool in the correct cutting position, close to the transverse center line of the hole, the tool holder was turned in the bar until the tool was presented to the work at a point about midway between the two center lines. The feed mechanism of the machine was connected from the feed box to the end of the rail through suitable transfer links.

Rustless Iron Being Made in Sweden

Announcement is made that rustless iron is being produced in Sweden by a process invented by a Swedish metallurgist, which, it is said, brings the cost of the finished product down approximately to that of ordinary commercial mild steel when account is taken of the exceptional strength and durability of the new material, whereby lighter gages can be used, and of the saving of the expense of rust-resisting coverings. According to the London *Ironmonger*, the process is electrical and the iron is claimed to be impervious to rust and corrosion by means of acid and corrosive liquids and to be an economical substitute for mild steel. The name of the company is given as the Ferrolegeringer A. B., Trolhattan, Sweden. This company is stated to have been manufacturing ferrochromium and other alloys since 1913.

Neumann Bands in Steel

F. B. Foley, metallurgist of the Bureau of Mines, is investigating the occurrence of Neumann bands in specimens of mild steel subjected to impact by explosion. The disks of steel were placed on a lead block at varying distances from 50 gm. of 60 per cent straight nitroglycerin dynamite, at the explosives laboratory of the Bureau of Mines at Pittsburgh, and suspended vertically above the block and specimen. The effect of the explosion was to cup the steel disk and make a depression in the lead blocks; this effect grew less as the distance was increased. Microscopic examination at Rolla, Mo., showed that there was a decrease in Neumann bands as the distances between specimens and the explosive were increased. Photomicrographs have been taken. The specimens are now being prepared for running solubility tests in weak acids, in an attempt to discover whether or not the occurrence of Neumann bands affects the solubility of the metal.

A tablet in memory of Lucius J. Knowles, late president Crompton & Knowles Loom Works, Worcester, Mass., who died in London, in November, 1920, was unveiled July 4 at the Knowles Recreation Park. Approximately 3000 employees and members of their families, friends and guests witnessed the exercises. Lucius J. Knowles, son of Mr. Knowles, unveiled the tablet and John F. Tinsley, general manager of the works, delivered an address. Mr. Knowles was a leader in the textile machinery industry.

STEEL BUILDING STANDARD

Specification of American Institute of Steel Construction for Design, Fabrication and Erection

Standard specifications for structural steel for buildings, as adopted by the American Institute of Steel Construction, 1052 Leader-News Building, Cleveland, have been made available in pamphlet form and may be had at 25 cents a copy on application to the institute.

The institute has undertaken the development of a uniform practice in the design, fabrication and erection of structural steel. "Present conditions," according to the institute, "involve numerous code standards which make it impossible for engineers and architects to work in various cities on the same basis, and where no codes exist, it is difficult to obtain competitive quotations on a uniform base. Lack of standardization causes unnecessarily higher prices to the purchaser of steel.

"To correct these conditions, we have selected a committee from the leading talent to prepare a standard specification on the design, fabrication and erection of structural steel for buildings. They have been selected from the academic, architectural and the engineering professions, and have no direct financial connections with the steel industry."

They are George F. Swain, professor of civil engineering, Harvard University; Milo S. Ketchum, dean of the college of engineering, and director of the engineering experiment station of the University of Illinois; E. R. Graham, of Graham, Anderson, Probst & White, architects, Chicago; W. J. Thomas, chief engineer, George B. Post & Sons, architects, New York, and Wilbur J. Watson, president, Watson Engineering Co., Cleveland.

The specifications cover allowable stresses, rivets and bolts and rivet spacing and workmanship, painting, erection and inspection. Charts accompany the specification to serve in lieu of calculating the allowable stresses in compression of columns, in bending as of compression flanges laterally unsupported and in shearing as of web stiffeners. Material allowable must conform to the specifications of the American Society for Testing Materials, and as an appendix the A. S. T. M. standard has been incorporated in the pamphlet.

MORE COMMON LABOR

Supply in Pennsylvania Mills Increases—Skilled Workers Still in Demand

HARRISBURG, PA., July 10.—The end of the widespread shortage of common labor in Pennsylvania iron and steel mills has begun to appear, according to the semi-monthly labor report of the Pennsylvania Department of Labor and Industry for the period ending July 1. This is particularly noticeable in the eastern section of the State, which reports a "widespread change has developed during the past week in the common labor situation." The demand and supply have been virtually equalized in the central section of the State, but in the western part a slight shortage continues.

Erie has found a noticeable decrease in the demand for help. Not many are being laid off, but few shops are adding workers. Skilled workers are in demand there, but there are enough semi-skilled men.

The supply of skilled workers in the Harrisburg district is retarding production somewhat. Virtually all kinds of employees except common labor are in demand. Johnstown reports its metal industries working at capacity, although short of several hundred workers for all classes of duty.

An influx of workers of the skilled and semi-skilled type from other States is reported in the McKeesport district. The men, according to the report, expect to get more money for the same class of work in this district than they have been getting elsewhere.

Automobile mechanics are in special demand in the Philadelphia district. Coremakers and molders are in heavy demand. Able-bodied and intelligent men willing to learn machine molding can be placed readily. Night workers particularly are needed.

2,024,054 Automobiles Built in Six Months

Estimating the June production at 375,000, *Automotive Industries* places the total output for the year to date at 2,024,054 vehicles, of which 1,823,648 represents pleasure cars and 200,406 represents trucks. June provided the largest number of trucks, with an estimated total of 44,000, compared with 42,983 for May. Both May and April exceeded the estimated June production of passenger cars, the figures being 331,000 for June, 350,180 for May and 344,474 for April. These three months showed larger totals than any other month in the history of the industry. The production of the Ford Motor Co. is placed at 171,000 cars and trucks in June.

Except in 1920 and in 1922 no full calendar year showed as great a production of cars as has the first half of the present year. The largest previous half year was the second half of 1922, with 1,428,062 cars and trucks. The present half year's record exceeds that figure by 41.7 per cent.

The reduction of 4 per cent in June is considered a seasonal slump which became more pronounced as the month progressed. It had been anticipated that it would come in May, but heavy demand kept record production up to record figures until the middle of June.

Bounty Provision Applied to Imports of Some Products from Australia

WASHINGTON, July 10.—Application of the so-called bounty section of the Fordney-McCumber tariff act on imports of fencing wire, galvanized sheets, traction engines and wire netting coming either directly or indirectly from Australia is ordered in a Treasury decision announced yesterday. Pending certain information on the details of a bounty allowed by the Australian Government for the manufacture in Australia of these products, the Treasury Department is withholding the issuance of a declaration under the bounty section. Meanwhile collectors of customs have been instructed to assess the estimated additional duty equal to the bounty on these products, and to suspend liquidation of the entries until further instruction is given.

In the decision the Treasury states that it has received from the Department of State a copy of the Australian iron and steel products bounty act of 1922 which authorizes the Governor General of Australia to pay a bounty on these products when made in that country and delivered from the plants there on or after Sept. 4, 1922. The bounty provided on fencing wire combustion engines, the bounty ranges from £40 per tractor for those of 12 to 18 brake hp. to £70 per tractor for those of more than 35 brake hp. On other and galvanized sheets is £3 8s. per ton. On internal types of traction engines rates are to be fixed after an inquiry by the Australian Tariff Board and are to be based on the relative cost of production of internal engines.

Tractors are being used in increasing numbers in the mahogany industry of British Honduras. Those timberlands close to the water having been stripped, more modern methods of logging are now required. A large mahogany contractor in Honduras has invested nearly $100,000 in American-made tractors during the present season. Two British companies are making larger use of tractors in conjunction with logging railroads.

United States Production of Steel Ingots

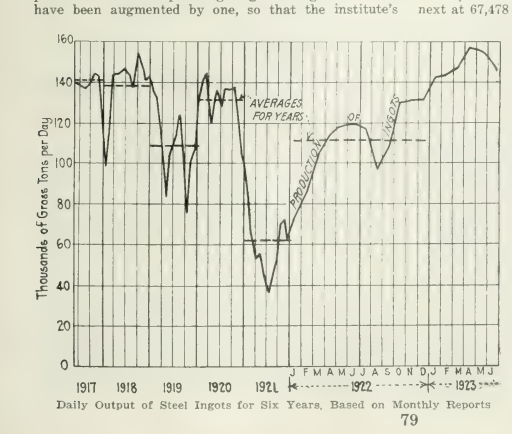
Monthly Figures of Total Output Based on Institute Figures for the Year—Daily Output Calculated Month by Month Since 1917

IN THE IRON AGE of July 13, 1922, page 71, appears the first extended presentation of the month by month ingot production figures of the United States, worked out on the basis of average production per day and covering the period from June, 1917, when the American Iron and Steel Institute first published its returns from a limited number of reporting companies. The 29 companies giving their figures in 1917 have been augmented by one, so that the institute's regular monthly reports have shown the production of 30 companies ever since the beginning of 1918. There was a lapse of four months—the last four of 1919—due to the steel strike of that year, during which period reports were not obtained.

Steel Ingot Output of United States

	Reported Tonnage	Apparent Total	Working Days	Gross Tons per Day
1917 (*a*)	4	43,619,200*	311	140,255
1918 (*b*)	35,922,291	43,051,022*	311	138,425
1919 (*c*)	4	33,694,795*	311	108,343
1920 (*d*)	34,432,252	40,881,392*	312	131,030
1921 (*e*)	16,826,946	19,224,084*	311	61,814
1922 (*f*)				
January	1,593,482	1,891,856	26	72,800
February	1,745,922	2,071,772	24	86,300
March	2,370,751	2,814,667	27	104,200
April	2,444,513	2,902,240	25	116,100
May	2,711,141	3,218,794	27	119,200
June	2,634,477	3,127,774	26	120,300
July	2,487,104	2,952,806	25	118,100
August	2,214,582	2,629,256	27	97,400
September	2,575,779	2,818,262	26	108,400
October	2,872,415	3,410,266	26	131,200
November	2,889,297	3,430,309	26	131,900
December	2,779,890	3,300,416	25	132,000
Year	29,116,453	34,568,418*	310	111,511
1923		(*g*)		(*g*)
January	3,644,629	3,823,260	27	141,600
February	3,294,264	3,454,918	24	144,000
March	3,888,675	4,046,854	27	149,900
April	3,760,897	3,944,412	25	(*h*)157,800
May	4,000,695	4,195,800(*h*)	27	155,400
June	3,574,567	3,748,890	26	144,200
6 months...	22,133,827	23,213,243	156	148,800

*Official total, reported by American Iron and Steel Institute.
†Reports began with figures for June, 1917.
‡No reports made for last four months, because of steel strike.
(*a*)—29 companies produced 85.25 per cent of the total.
(*b*)—30 companies produced 83.44 per cent of the total.
(*c*)—30 companies produced 85.12 per cent of the total.
(*d*)—30 companies produced 84.21 per cent of the total.
(*e*)—30 companies produced 87.53 per cent of the total.
(*f*)—30 companies produced 84.23 per cent of the total.
(*g*)—Estimates for 1923 are on the basis of reports from companies which, in 1922, furnished 95.35 per cent of the total ingot production.
(*h*)—The highest monthly and daily figures on record.



Daily Output of Steel Ingots for Six Years, Based on Monthly Reports

In publication last week in THE IRON AGE, page 21, of the total ingot figures for last year, makes it possible to translate the output of the 30 companies as reported month by month into the total ingot production of the country, on the assumption that the 84.23 per cent of the total, which these companies produced during the year, was a uniform percentage throughout the year. This assumption, of course, is purely arbitrary, because of the deviations from month to month which must have occurred. Nevertheless it is the best approach to the exact fact which it is possible to obtain, and hence may be relied upon as correct within a very small modicum of error.

Because this is, at the best, a close approximation, the daily tonnages are expressed with two final ciphers, and they may be taken confidently as probably correct within that margin.

Extending the same ratio between the output of the 30 companies and the output of all companies into the first six months of 1923, we get a further set of figures, as carried in the table. It is almost certain that, when the total figures for 1923 become available, these estimates will have to be modified. Until such time, however, they again represent the best approximation which it is possible to obtain, and cannot be far from the fact.

German Steel Exports and Imports for First Quarter

German exports of iron and steel for the first quarter of 1923, according to a recent issue of *Stahl und Eisen*, were 590,723 metric tons. There has been a constant decline this year, the January exports having been 236,709 tons; the February, 209,965 tons, and the March, 144,049 tons; the March figures are stated to be incomplete because of the Ruhr occupation. Bars, beams and hoops constituted the largest exports of the first quarter at 86,363 tons, with plates and sheets next at 67,478 tons. Wire, rails and blooms, billets and sheet bars have also been heavy.

Imports of iron and steel for the first quarter are returned as 496,379 tons. Those in January were 100,907 tons; in February, 288,267 tons, and in March, 107,205 tons. The largest single item in the first quarter was 122,074 tons of bars, beams and hoops, and the second was 119,304 tons of scrap. Other large items of importation are rails, plates and sheets, blooms, billets and sheet bars. Pig iron importations were 81,214 tons for the quarter. An interesting item is 115,625 tons of coke imported during the first quarter, as compared with only 3235 tons in the first quarter of 1922.

The Shea-Whelpley Construction Co., 407 National Building, Cleveland, organized to engage in contracting work, will specialize in blast furnace, open-hearth and rolling mill masonry construction. P. C. Shea becomes president and E. G. Whelpley, vice-president.

BOOK REVIEWS

Elementary Machine Shop Practice. By the Committee on Industrial Education of the National Metal Trades Association. Pages 118, 5¼ x 7½ in., illustrated. Published by the National Metal Trades Association, 1021 Peoples Gas Building, Chicago.

This volume, prepared on request of the association's membership, following the publication a year ago of the manual on "Apprenticeship in the Metal Trades" is intended to assist in teaching the machinists' trade and to aid those who desire to enter this field of activity. It is not an exhaustive treatise, and is for use where the instructor can demonstrate on the actual machine. Lathe and planer work have received the most attention.

Factors involved in taking up the machinists' trade and the nature and opportunities of this vocation are outlined in the introduction. A chapter on the engine lathe takes up briefly the laying out of work, lathe centers and tool holders, and another on cutting tools includes paragraphs on rake and clearance, the grinding of lathe tools and speeds and feeds. Several pages are devoted to basic lathe operations, and screw threads and thread cutting, including figuring of change gearing and operation of the carriage. A chapter on chuck work outlines the kinds and care of lathe chucks, machine work in a chuck, the use of the steady rest and follower rest. The planer, its construction and operation, and elemental planing operations are taken up in several pages and a chapter on milling machine work outlines the construction of machines of various types, milling cutters and various milling operations. Indexing, compound and differential, is included. Drilling machines and drilling, the shaper, and bench and vise work are subjects of other chapters.

The illustrations are line cuts and each machine is shown in clear outline and its various parts numbered. A bibliography on each subject is given at the end of chapters and a general bibliography at the end of the book. The volume is well arranged, simplified and concise, and may well be recommended for use in connection with apprenticeship courses.

Metal Statistics, 1923. Pages 512, 4 x 6 in. Published by the American Metal Market and Daily Iron and Steel Report, 81 Fulton Street, New York. Price $1.00.

Edited by C. S. J. Trench and B. E. V. Luty, this volume has the characteristics of its long line of predecessors, this being the sixteenth edition. As with previous editions, it is full of statistics of the metal industries of the United States and of the world, covering both production and price figures, in some cases over a long period of years. Imports and exports of metals and metallic products are also given in some detail.

As a handy compendium of information, this annual volume is looked for in many offices, as it contains in convenient form a large amount of information not elsewhere gathered together in the same compass. Each succeeding volume adds to the prestige already built up and naturally adds to the value of the book, because of the greater accumulation of data and the greater completeness of its presentation.

Pig iron prices from 1799 (charcoal); anthracite foundry iron from 1845; Bessemer iron from 1886 and other grades from 1891; iron rails from 1847; steel rails from 1870; billets from 1890; steel rods from 1887; tank plates from 1892 and shapes from 1894—these indicate the value of the work as a reference volume.

"Service to the Central Station Industry" is the title of a notable volume recently issued by the Associated Sangamo Electric Companies, Springfield, Ill. Its purpose, as stated in the foreword, is "to trace the development of the central station industry in a general way and establish the importance of electric meters to the industry." The first part of the book is devoted to a brief history of electrical science, from William Gilbert, who experimented with static electricity in the latter part of the sixteenth century, down to Faraday, Ferraris and Gramme in the nineteenth, showing briefly what the leading electrical experimenters contributed to the science. The text, which is presented in an unusually readable and artistic form, is supplemented by excellent plates of Gilbert, Galvani, Volta, Ampere, Ohm, Davy, Joule, Faraday and Maxwell. The second part of the book traces the history of the central station itself. Brief summaries of the development of arc lighting, incandescent lighting, the electric motor, transmission, the transformer, and a more detailed history of the meter, show how each of these branches of the science helped make the central station possible. Especially interesting is the description of the first central station, built on Pearl Street, New York, by Thomas A. Edison, and opened on Sept. 4, 1882. There follow ten pages of photographs of the interior and exterior of the Sangamo plant at Springfield.

New Books Received

Estimating the Cost of Buildings. By Arthur W. Joslin. Pages 228, 6 x 9 in.; illustrated. Published by the U. P. C. Book Co., Inc., 239 West Thirty-ninth Street, New York. Price, $2.

The Electrical Handling of Materials. Volume IV, Machinery and Methods. By H. H. Broughton. Pages 334, 8 x 10½ in.; 279 illustrations. Published by Messrs. Benn Brothers, Ltd., 8, Bouverie Street, London, E. C. 4, England.

Bulletin of Georgia School of Technology. Catalog 1922-1924 and Announcements 1923-1924. Pages 204, 6 x 9 in. Published by the Georgia School of Technology, Atlanta, Ga.

Youngstown Plants Resume After Fourth of July Holiday

YOUNGSTOWN, July 10.—Industrial operations in both the Mahoning and Shenango Valleys resumed this week, following the general suspensions over Independence Day. Sheet mill production was still considerably below normal this week, as a number of Valley interests suspended July 1 for two weeks, for overhauling and repairs.

Plants of the Newton Steel Co. and the Mahoning Valley Steel Co. are still inactive. Half of the sheet mills at the Niles works of the Republic Iron & Steel Co. have resumed.

The Trumbull Steel Co. reports operation of its sheet and tin plate departments at from 75 to 80 per cent., and other departments on a normal basis. A number of open-hearth furnaces of the Youngstown Sheet & Tube Co. are cold for repairs.

In the Mahoning Valley, all blast furnaces are pouring except the Hannah stack of the Republic Iron & Steel Co., banked due to the suspension of the company's Bessemer department at Youngstown, for overhauling.

The A. M. Byers Co., Pittsburgh, started the bar mill at its Girard plant during the week and increased the number of active puddle furnaces, but its plate mill remains on the inactive list.

Sheet mills at the Haselton plant of the Sharon Steel Hoop Co. largely resumed this week. Throughout the Valley, sheet operations are curtailed because of the heat engulfing the Middle West.

Gustave Kahn, general sales manager of the Truscon Steel Co., Youngstown, has returned to his desk following a visit to Los Angeles and San Francisco. The Pacific Coast has not yet experienced the letdown in building operations felt in the East, he states. The Truscon company is operating at capacity and will likely continue at a high rate, owing to large unfilled demand.

LARGE PIPE PRODUCTION

Cast Iron Makes New Record and Shops Are Very Busy This Year

Statistics compiled by the American Iron and Steel Institute show that the production of pipes and tubes for 1922 was very heavy. The production of wrought pipe and boiler tubes was 2,732,236 gross tons, the largest tonnage on record with the exception of that for 1920, when 3,002,725 tons was produced.

PRODUCTION OF WROUGHT PIPE AND BOILER TUBES, SHOWING IRON AND STEEL SEPARATELY, 1921–1922.

Kinds of pipe.	1921—Gross tons			1922—Gross tons.		
	Iron.	Steel	Total.	Iron.	Steel	Total.
Black, standard	45,337	685,459	730,796	87,154	973,906	1,061,060
Galvanized	20,937	246,122	267,059	30,852	359,288	390,140
Oil-country goods	29,026	862,969	891,995	33,223	1,106,611	1,139,834
O. D. and misc.	109	40,355	40,459	62	66,713	66,775
Boiler tubes	14,889	42,244	57,133	19,944	54,483	74,427
Total	110,293	1,877,149	1,987,442	171,235	2,561,001	2,732,236

In 1922 there were 25 active works, of which 19 made black, 14 made galvanized, 15 made oil country goods, 11 made O. D. and miscellaneous pipe, and 9 made boiler tubes.

PRODUCTION OF SEAMLESS STEEL TUBES, GROSS TONS, 1913–1922.

Years.	Hot finished.	Cold drawn.	Total.	Years.	Hot finished	Cold drawn.	Total.
1913	42,740	65,827	108,567	1918	142,308	150,586	292,894
1914	36,939	53,656	90,595	1919	75,864	121,505	197,369
1915	63,488	76,180	139,668	1920	132,091	159,479	291,570
1916	61,335	129,238	190,473	1921	59,663	58,221	117,884
1917	87,615	139,060	226,675	1922	120,652	137,183	257,835

PRODUCTION OF CAST-IRON PIPE AND FITTINGS, NET TONS.

Years	Gas and water.*	Soil and plumbers.	Total.	Years.	Gas and water *	Soil and plumbers	Total.
1913	1,010,016	256,229	1,266,245	1918	508,300	111,373	619,673
1914	938,297	222,483	1,160,780	1919	514,664	195,417	710,081
1915	956,372	258,498	1,214,870	1920	636,862	249,653	886,515
1916	934,626	279,707	1,214,333	1921	564,138	230,092	794,230
1917	748,173	250,928	999,101	1922	926,577	356,872	1,283,449

* Includes culvert pipe. Manufacturers able to separate their production report 17,645 tons of culvert pipe and fittings in 1922 and 11,317 tons in 1921.

The production of seamless steel tubes for 1922 was 257,835 tons, which had been exceeded only by the years 1920 and 1918 when the tonnages were respectively 291,570 and 292,894.

The production of cast iron pipe and fittings made a new record, the tonnage being 1,283,449, compared with only 794,230 in 1921, while the previous record was in 1913, when the production was 1,266,245 net tons. Cast iron pipe shops have been extremely busy this year and a leading manufacturer estimates that the production for the first half of this year has been fully 40 per cent larger than that for the same period last year.

Synthetic Gray Iron for Castings

Carburization tests to determine the feasibility of making synthetic gray iron in an indirect-arc rocking-type electric furnace have been made at Detroit by engineers of the Bureau of Mines. The results were very gratifying, an excellent quality of gray cast iron being produced in every test. The carbon content of the metal was under control. With this type of furnace it was found best to mix some gray iron scrap with the steel scrap in order to get the melting started at a lower initial temperature, and thus avoid overheating the roof. Test bars 1⅛ in. in diameter were made and broken on 12-in. centers. Deflections as high as 3.65 deg. and breaking strengths of 3000 lb. were obtained. On the evidence of these tests an inspector for one of the large automobile plants in Detroit placed a large order for castings specifying electric furnace iron and agreeing to pay a premium therefor.

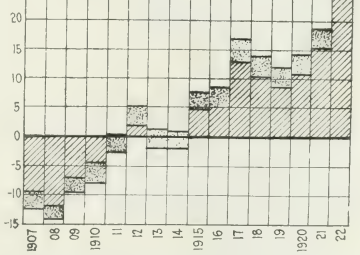
The newspaper reports indicating immediate construction of a new structural steel mill for the Algoma Steel Corporation, Sault Ste. Marie, Ont., are erroneous, according to a statement issued by A. Taylor, secretary of the company, who further stated that the project will not be under way for about six months. Financial arrangements in connection with the undertaking have not been completed.

Relation of Steel Production to Pig Iron Output

IN the chart will be found the year-by-year ratios, from 1907 to 1922, inclusive, of the steel ingot and casting production of the United States and the pig iron production. The diagram shows in no uncertain fashion how steel production has overtaken and passed the pig iron figures, in spite of an occasional setback. But more particularly it shows the very great excess of steel in 1922, due largely to the coal strike of that year, which made fuel for the production of iron scarce and forced the steel makers to use an exceptionally large proportion of scrap.

Two lines across the space devoted to each year indicate the ingots (lower line) and the combined ingots and castings (upper line). Thus, in 1922, the ingot tonnage alone exceeded the pig iron tonnage by 27 per cent, while the combined output of ingots and castings exceeded the pig iron figure by 30.8 per cent. Thus the space between the two horizontal lines represents the tonnage of castings as a percentage of the year's pig iron tonnage.

Except for 1912, no year prior to 1915 showed an ingot output as great as that of pig iron. Beginning with 1915, however, ingots have exceeded pig iron in a rapidly increasing ratio. In the four years, 1911 to 1914, inclusive, the total steel output—ingots plus castings—exceeded the pig iron output. Prior to 1911, however, even the addition of the castings to the ingots failed to bring the figure up to that of pig iron.



In 1922 Total Steel Production Exceeded Pig Iron Production by More Than 30 Per Cent, While Ingot Tonnage Alone Was 27 Per Cent Above Pig Iron Tonnage. The chart traces these two ratios for sixteen years. For the first half of 1923 these ratios have fallen heavily, being about 14 per cent for all steel and 10.5 per cent for ingots alone

THINGS WRONG IN INDUSTRY

Need of Attention to Ascertaining the One Best Way to Do Work

From a thought-provoking address made by Dr. Frank B. Gilbreth, consulting engineer of Montclair, N. J., before the graduating class of the Babson Institute, Wellesley Hills, Mass., June 18, have been taken the following epigrammatic extracts which will serve to focus attention on a thesis which has repeatedly been advanced by Dr. Gilbreth, namely that there is one best way to do work. The Wellesley Hills address was intended particularly to establish the topic of the "one best way for executives." Doctor Gilbreth speaks on the authority of twenty-seven years' practice, both as a construction engineer and contractor and also as a consulting engineer devoted particularly to management.

You will live to see a revolution in the methods of executives. No such changes have ever been made in several generations as you will see in your generation.

You will find that the antiquated apprentice system still exists in many of the great trades, although it is acknowledged that the journeymen teachers, while having more craft knowledge and craft skill than their employers, really know so little of their trades that any earnest student of motion study can make astonishing improvements in their methods.

You will find that trades can be and have been taught in one-fifth to one-tenth of the time now usually required, and that trade schools near this city are now proposing to prolong further the period of apprenticeship.

There are no records of the trades showing the one best way to do work that an ambitious youth may study during his periods of leisure or of unavoidable delay. His consultant and last word of authority is the biased and ignorant journeyman to whom he has been assigned as pupil.

So-Called Monotonous Work

You will find that many of our best magazines are ever ready to open their columns to writers who are without actual personal experience, who will describe the monotony that accompanies working under standardized conditions, which, as a matter of fact, affects only a worker who is capable of handling a grade of work above the type at which he is working.

You are supposed to disseminate information to counteract such illogical influences and conditions. You are supposed to know that there are all types of bodies and minds, and that there are many people who prefer to fill the jobs ordinarily considered to be monotonous, and comparatively few who desire to take the responsibility that accompanies the jobs that require planning before performance or new decisions constantly during performance. *There is no problem of monotony when one works at the highest type of work for which he is fitted.*

White Painted Interiors

You will find it the exception instead of the rule to paint all workrooms as white as possible. You will find a general belief that light reflected from white paint is too strong for the eyes, yet it can never equal the brightness of outdoors.

You will find that executives everywhere generalize and decide with too little data on the subject under consideration, and the percentage of organizations that have memonically classified their information and data, and have filed them so that they are instantly available, is very small.

You will find many concerns, who, with the honesty of ignorance, will agree upon time study rates which they "will never cut unless the method is changed," and who will then entirely omit the recording of the method which is timed.

You will find that the general practice is to guess instead of to measure.

You will find that relative merit and efficiency are seldom properly evaluated, due to the absence of individual records of performance. You will find better individual records of daily efficiency of cows on a dairy farm than you will find of workers in many organizations too large for the personal touch.

You will find little general recognition of the high cost of unnecessary fatigue, which has been conceded by experts to amount to more than 20 cents per day per worker. You should ever bear in mind that the costs from unnecessary fatigue become a part of the high cost of living and are borne by the entire public.

You will find that one of the chief causes of low outputs per worker is the failure of executives to furnish workers with the right materials, in the right conditions, at the right time and in the right quantity. The same condition prevails in causing low records of sales in our great retail stores. Conditions are so bad that they would be reformed at once if it were not for the fact that an organization is fairly safe if it is as efficient as its competitors.

Carnegie Steel Co. Issues New Card of Extras in Steel Bars and Small Shapes

Carnegie Steel Co. has issued, under date of July 1, a new card of extras on steel bars and small shapes, superseding its old card dated July 15, 1919. This old card, except for minor revisions, had been operative since 1908, and the steep increases shown are due to the fact that there has been a very heavy increase in costs, notably of labor, since it was compiled. The new card is the result of an exhaustive investigation into costs covering a long period and aims to help manufacturers to avoid losses entailed in the old list of extras.

While it is estimated that the average increase, as compared with the old card, is about $2 a ton, due to the fact that approximately 50 per cent of the tonnage is of the base sizes, carrying no extras, it is a fact that individual extras show large increases in several instances. This is particularly true of round, square and hexagon bars of 5/16-in. and smaller, which show increases of $7 to $15 a ton over the old extras. The minimum increase in size extras is $1 a ton. Quantity extras have been increased $1 to $3 a ton, and there now is a charge of $1 a ton for cutting other than by machine for lengths over 5 ft. Formerly there was no charge for cutting to that length. Charges for cutting other lengths have been advanced $1 to $2 a ton.

The new card probably will be adopted by other producers.

The new and old extras on rounds and squares and on hexagons are shown in the following table:

Rounds and Squares

	New	Old
3/4 to 3 1/2 in.	Base	Base
3/8 to 11/16 in.	.10c.	.05c.
7/8 in.	.15c.	.10c.†
1/2 in.	.20c.	.25c.††
5/16 in.	.30c.	.20c.
3/8 in.	.40c.	.25c.
11/16 in.	.55c.	.30c.
7/8 in.	.70c.	.35c.
15/16 in.	.85c.	.40c.
1 in.	1.00c.	.50c.
1 1/4 in.	1.25c.	.75c.
1 1/2 in.	1.50c.	1.00c.
2 in.	2.00c.	1.25c.
3 1/16 to 3 3/8 in.	.10c.	.075c.
3 7/16 to 4 1/8 in.	.15c.	.125c.
4 1/16 to 4 3/8 in.	.25c.	.15c.
4 7/16 to 5 1/2 in.	.35c.	.20c.
5 9/16 to 5 7/8 in.	.45c.	.25c.
5 15/16 to 6 3/8 in.	.55c.	.0375c.
6 1/16 to 6 3/8 in.	.65c.	.50c.
6 7/16 to 7 1/4 in.	.75c.	.625c.

Hexagons

3/4 to 3 1/16 in.	.25c.	.15c.*
3/8 to 11/16 in.	.40c.	.25c.
1/2 to 7/8 in.	.60c.	.35c.
7/8 in.	.80c.	.55c.
15/16 in.	1.00c.	.65c.
1 in.	1.20c.	.75c.
1 1/4 in.	1.50c.	1.00c.

†1/2 to 7/8 in.
††5/8 in.
*3/4 to 3 in.

The Fort Worth & Denver Railroad Co., Childress, Tex., is increasing the working force at its local car and locomotive shops.

Competitive Position of Colorado Mills

Trade Practices in Grain and Live Stock Markets Described in Hearing of Basing Point Complaint—Witnesses Testify to Shortage of Western Mill Production

IS the present position of the Colorado Fuel & Iron Co. in the steel trade analogous to that of the Chicago district mills under the Pittsburgh basing point practice? This question was brought to mind by the testimony of J. F. Welborn, president of the Colorado company, before the Federal Trade Commission at Chicago last week. His company's sales policy, he said, was to undertake to find out the delivered prices from other producing centers and thereupon to quote a price which would meet or beat that of competitors at points of consumption. In a steady market, trade paper quotations have been a reliable source of information, he commented, particularly in the last few years. In a weak market, he asserted, there are times when advice from buyers was more reliable as to low prices which were being quoted. In selling merchant bars, the situation has been complicated, especially in the last two years, by the existence of several independent price bases. Sometimes it has proved necessary to meet the delivered price from Chicago mills, at other times from Pittsburgh mills and then again from Birmingham producers. In making sales west of Pueblo, competition in merchant bars has to be met at Salt Lake, Los Angeles, San Francisco and Seattle. In fact, he added, his company has been practically eliminated from competition on the Pacific Coast by the producers at the points mentioned.

Policy as to Wire Products

In wire products the situation is less complicated. In this case, a Pittsburgh base is generally adhered to, and the distance which the Colorado mill is willing to go east in making sales is determined by the amount of freight it must sacrifice. It was apparent from Mr. Welborn's testimony that the net price obtained at the mills on these products varies greatly. To illustrate, a sale of wire nails at the plant doors would probably be made at a price approximating the Pittsburgh base price plus the full freight from Pittsburgh to Pueblo. In making sales east of Pueblo, the net price at the mill would steadily diminish as the freight from Pueblo to destination increased and the freight from Pittsburgh decreased. Mr. Welborn did not state whether sales were ever made at prices which would net the mill less than the quoted prices at Pittsburgh. He did assert, however, that his company supplied jobbers with wire and nails as far east as the interior of Nebraska, Kansas and Oklahoma. He also pointed out that his company met water competition on wire and nails on the Pacific Coast, but he did not explain to what extent the prices of these commodities when delivered by water on the coast differed from the Pittsburgh base prices plus the all-rail freight.

Mr. Welborn threw new light on the merchandising of rails when he declared that his company generally obtained a small differential on this product over the f.o.b. mill prices at Chicago and other points east of his plant.

Customers in Other Industries

In an effort to show that the method of selling steel has been a natural, normal economic development, not differing materially from merchandising practices in other industries, counsel for the United States Steel Corporation put on three witnesses to recount conditions in the live stock, hay and grain markets. The witnesses were G. E. Marcey, president, the Armour Grain Co., Chicago; Thomas W. Jerrems, Standard Live Stock Commission Co., Chicago, and George S. Bridge, a hay commission man, Chicago. In general, the tenor of this testimony was that prices for live stock, grain and hay are established by purchases and sales at Chicago, and that the net prices obtained by producers was equivalent to the Chicago market prices, minus the freight and handling charges. Objections raised by the commission attorneys, and sustained by the examiner, were on the ground that the testimony was irrelevant because it dealt with conditions in an entirely different industry and that furthermore there is no analogy between the sales methods in the produce and steel industry because, in the former case, an actual freight is paid by the seller, whereas in the latter instance an imaginary freight is frequently paid by the buyer. The examiner also pointed out that it was not competent to show that a practice existing in one industry was similar to those in others because a statute which would correct a practice in one instance would also apply to similar practices wherever found. As has been his custom in the case, however, the examiner admitted the testimony, taking note of the objections.

Influence of Panama Canal Traffic

In developing that portion of its case having to do with consumption in the Chicago district, counsel for the Steel Corporation introduced interesting testimony showing the effect of the Panama Canal on Chicago mills. Murray N. Billings, assistant traffic manager, Illinois Steel Co., and assistant Western traffic manager, Universal Portland Cement Co., Chicago, testified that there was practically no movement by water to the Pacific Coast between 1914 and 1920 because of slides in the Panama Canal and the withdrawal of vessels from coast-to-coast trade during the world war. This cessation of ocean shipping put steel competition on an all-rail freight basis, with the result that Chicago mills were able to obtain a larger net price at their mills for steel shipped to the Pacific Coast than their competitors east of them. As a result, domestic shipments from the Illinois Steel Co. to the coast materially increased during those years, reaching a peak of 178,000 tons in 1918. Before the close of 1920, however, ships returned to the intercoastal trade and water rates dropped materially, with the consequence that Chicago mills were largely eliminated from competition on the Pacific Coast. In 1922, in fact, domestic shipments from the Illinois Steel Co. to the coast totaled only 1400 tons. The purpose of this testimony apparently was to establish that during the years of the suspension of traffic through the Panama Canal, the Pacific Coast was a part of Chicago mill territory and should be considered as such in computing the consumption in that territory in relation to production.

Mr. Mills Tells of Great Demand

The remainder of the hearing during the week was devoted largely to the filing of steel production and consumption figures by Western mills and buyers, and to the taking of testimony to show that during the past year and a half Western users have been forced to purchase part of their requirements from mills east of Chicago, owing to the shortage of production by Western mills. Edwin S. Mills, general manager of sales, Illinois Steel Co., Chicago, testified as to the ability of his company to make deliveries from the last quarter of 1922 up to the present time. Beginning toward the latter part of 1922, he said, the demand for steel became so great that it exceeded the capacity of the company, and a great many customers were obliged to look elsewhere for tonnage, and that condition has practically obtained down to the present time. He related how his company had allocated among its customers what tonnage it was able to produce under the handicap of a fuel shortage, but called attention to

the fact that buyers were forced to obtain part of their needs from mills east of Chicago. He cited the Railway Steel Spring Co., with large plants in Chicago and St. Louis, which found it necessary to purchase in excess of 1000 tons of steel a month from Carnegie Steel Co. The great lengths to which the Illinois Steel Co. went in order to maintain production was indicated when Mr. Mills stated that during the last four months pig iron had been shipped from the Pittsburgh district to his company's plant.

Chicago Production Inadequate

C. A. Irwin, president, the Milwaukee Rolling Mill Co., Milwaukee, Wis., testified that his organization was able to obtain only 60 per cent of its sheet bars during 1922 and 1923 from Chicago mills. Under cross-examination it was brought out that out of the remaining 40 per cent the Milwaukee company was only able to get 10 per cent from sources east of Chicago. Throughout their cross-questioning attorneys for the commission attempted to demonstrate that mills east of Chicago were practically as heavily booked as those in the Chicago district, and that if Eastern mills were able to furnish part of the deficiency in supply in the Western market, it was due to the fact that they were less severely crippled by the fuel shortage.

T. Hansen, director of purchases, A. O. Smith Corporation, Milwaukee, Wis., testified that between Aug. 1, 1922, and March 1, 1923, the company used 100,000 tons of plates and hot-rolled strip. Of this amount 22,750 tons, mainly hot-rolled strip, were purchased from mills east of Chicago. All of the plates used were bought in the Chicago district except 2000 tons obtained from the Carnegie Steel Co.

Frank B. Baker, supply agent, Pullman Co., Chicago, stated that his organization had used 90,000 tons of plates, shapes and bars during the first six months of 1923, and that of this total 2700 tons, part of it Bethlehem special shapes, was bought from mills east of Chicago.

James E. MacMurray, president, Acme Steel Goods Co., Chicago, testified that he used about 70,000 tons annually of small billets, 1¾-in. square x 30 ft. long. During the last two or three years he has been forced to purchase more than half of his requirements outside of Chicago, owing to inability to obtain full deliveries against contracts with local mills.

In most cases the witnesses testified that the delivered prices on steel bought from mills east of Chicago were higher than those on steel purchased from Western sources.

Uses of Alloy Steel

John Brunner, manager, department metallurgy and inspection, Illinois Steel Co., described the company's facilities for making electric alloy steel and recounted the uses for different kinds of alloy steel.

Fred W. Waterman, manager, Gary Tube Co., Gary, Ind., testified that his plant, which is now under construction, will be completed in about a year. He stated that it was the aim to start the first mills in September, 1924. The works will have a capacity of about 34,000 tons of tubular goods per month, requiring from 45,000 to 55,000 tons of skelp. These figures, he pointed out, were computed at 87 per cent of theoretical capacity.

The hearing at Chicago was adjourned on Friday, July 6, and proceedings will be resumed at Washington on July 16, when the Steel Corporation will introduce summaries of Western consumption and production figures, with the possibility that it will offer additional testimony as to the methods of selling products in other industries. The attorneys for the commission expect to proceed with their rebuttal at Washington Aug. 6.

Demurrage Rules in Ore Shipments Held Not Unreasonable

WASHINGTON, July 10.—Holding that demurrage rules governing shipments of iron ore and other commodities frozen in transit were not unreasonable, the Interstate Commerce Commission last week dismissed the complaint of the Cambria Steel Co. et al, vs. the Director General, Pennsylvania Railroad et al. The complainants included the Cambria Steel Co., Johnstown, Pa., the Midvale Steel & Ordnance Co., the Alan Wood Iron & Steel Co., the E. & G. Brooke Iron Co., and the Birdsboro Steel Foundry & Machine Co. They had asked an extension of the 96-hr. free time on frozen shipments provided by the present rule. No number of days was suggested but attention was called to the free time of five days on coal shipped to tidewater. The companies criticized the present rule because it permits but one credit, even though a car is released within 24 hours, and asked that credits be allowed at the rate of one credit for each day of free time remaining after unloading. They also asked that the rule be amended to provide for no uncancelable debits on any car. The steel companies had challenged the reasonableness of rules and regulations in effect since Dec. 1, 1916, and also claimed that prior to Dec. 1, 1919, the rules and regulations were not plainly stated.

Large Production of Coal Tar in 1922

WASHINGTON, July 10.—Preliminary figures of the Geological Survey indicate that the production of coal tar and by-products from the by-product coke industry during the year 1922 was the greatest in the history of the industry. This statement is carried in the annual report on "Census of Dyes and other Synthetic Organic Chemicals" for the calendar year 1922, which the United States Tariff Commission has just sent to press. Production of the by-product coke was about 28,500,000 tons, which exceeded the production of both beehive and by-product coke during the previous year.

The production of tar is greatly in excess of the requirements of the dye and coal tar chemical industries. A large amount of the tar is burned and of the remaining portion refined only a part is purified to such final products as benzene, toluene, naphthalene and anthracene, owing to the strong demand for partly refined product, motor fuel, solvents, soft pitches and the like.

Puddlers' Wages Advanced

Puddlers in mid-western mills will receive an advance of $1.76 per ton for the July-August period, as compared with the tonnage rates paid in May and June, as a result of the bi-monthly settlement conducted at Youngstown. The new rate will be $13.88, whereas $12.12 was paid the past two months.

Examination of sales sheets covering shipments of bar iron for the 60-day period ending June 20 disclosed an average price of 2.50c. per lb., comparing with 2.35c., the average two months ago. In addition to the three-point advance as a result of the increase in the average selling price of bar iron, the base rate is increased $1, under terms of the new wage agreement reached between employers and employees at the recent conference in Atlantic City.

In consequence of the examination, finishing operatives will be advanced 7½ per cent for the ensuing two-months period.

Directly as the result of the failure of a radical taxation program in the State Legislature of Wisconsin, the Green Bay Foundry & Machine Co., Green Bay, Wis., on July 2 posted this notice in its plant: "Effective immediately, the wages of all employees of this company are increased from 10 to 25 per cent."

FOR GRINDING TRACK WORK

One Machine for Webs of Manganese Track Castings and Other for Tops

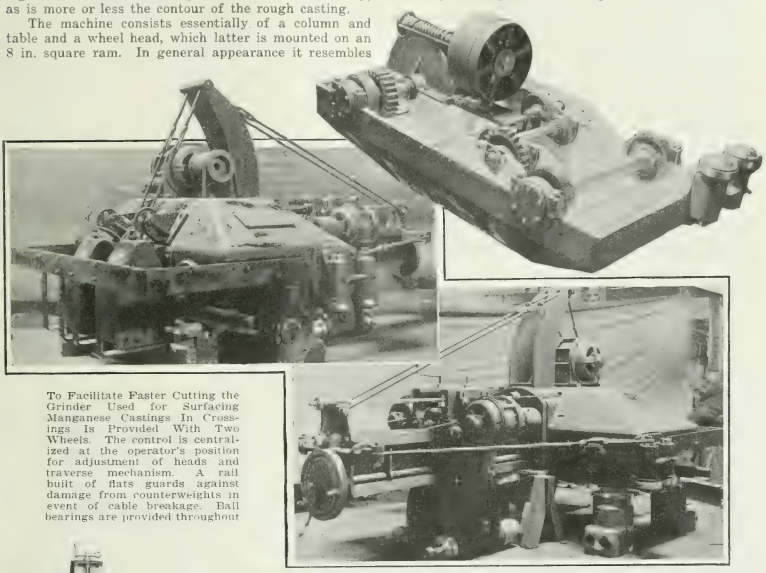
The costly method generally employed in the finishing of manganese castings incorporated in crossovers and other track work has brought forth the development of two new grinding machines for this work.

These machines are being made by the Automatic Machine Co., Bridegport, Conn. The first, built some time ago, is for grinding the web of the manganese casting to conform to the web of the tee head or girder rail, so that fish plates may seat securely. This machine has increased production four times, beside turning out work with the web ground flat instead of wavy, as is more or less the contour of the rough casting.

The machine consists essentially of a column and table and a wheel head, which latter is mounted on an 8 in. square ram. In general appearance it resembles somewhat a draw cut shaper used on locomotive cylinders and similar work. On the front end of the ram, which has a reciprocal motion, is mounted a compound saddle giving both cross and vertical adjustment. This saddle carries the wheel spindle, which is driven by belt from a motor on the rear end of the ram. The reciprocal motion is attained by a planer type drive. Work is mounted on a table which has vertical adjustment to accommodate different heights of work.

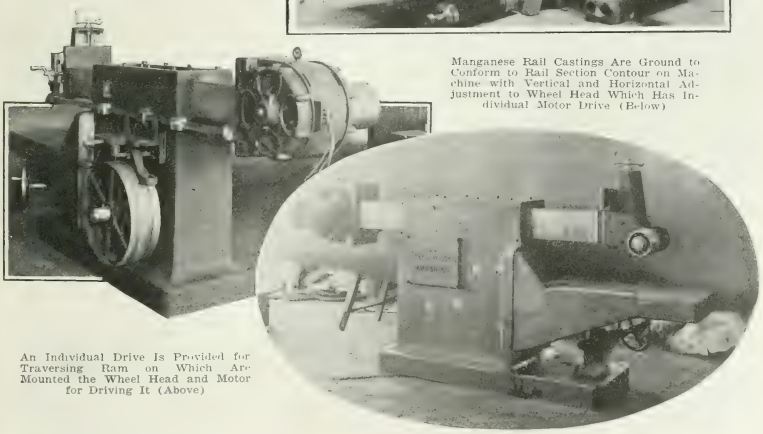
This first machine indirectly suggested the possibilities for the second, which has recently been completed and is designed for finishing off the tops of the manganese castings after the crossover has been completely assembled, making them flush with the rail head.

The operation of this machine may best be understood by starting with a description of the foundation.



To Facilitate Faster Cutting the Grinder Used for Surfacing Manganese Castings In Crossings Is Provided With Two Wheels. The control is centralized at the operator's position for adjustment of heads and traverse mechanism. A rail built of flats guards against damage from counterweights in event of cable breakage. Ball bearings are provided throughout

Manganese Rail Castings Are Ground to Conform to Rail Section Contour on Machine with Vertical and Horizontal Adjustment to Wheel Head Which Has Individual Motor Drive (Below)



An Individual Drive Is Provided for Traversing Ram on Which Are Mounted the Wheel Head and Motor for Driving It (Above)

I-beams are set in pairs in concrete, forming tee slots for bolting the work securely. In the concrete are also set two rails to carry the machine, one carrying a rack for the traversing of the grinder. The rail carrying the rack is finished on the tread only. The other rail is finished on top and both sides of the head.

The carriage of the grinding machine is a hood-shaped casting to which is mounted the arm bearing the grinding mechanism. Underneath this hood is the traversing mechanism driven by a motor mounted on top of the hood. The traverse bull gear is located near one corner close to one of the four load carrying wheels and receives its motion through a train from a worm and a worm wheel, the worm being on the driven shaft turned by belt from the motor. The worm is of steel, the wheel of cast iron, and they operate in an oil tight case. All other gears are of steel. Reversal is accomplished by a plate cam similar to that in a planer drive. The load carrying wheels on the four corners are chilled iron, ground. On the side of the hood opposite the bull gear are four guide rolls, two placed on each side of the wheels. These rolls are of tool steel and bear on the finished sides of the second rail as guides for the machine.

The arm carrying the grinder mechanism is a box casting about 6 ft. long by 14 in. sq., with ways machined on four sides. On this arm are mounted two saddles, one on each side, which carry the wheel spindles and motors for driving them. These saddles are firmly bolted together, surrounding the arm. Taper gibs are provided for taking up vertical wear. It is anticipated that lateral wear will be infinitesimal. Should any develop it may be compensated for by facing the joint between the two saddles and drawing them closer together, thus giving the original accurate fit.

On the wheelhead saddles are compound slides, one part of each of which is adjustable by screw vertically to set the individual wheelhead for height. The screw on the other slide is connected by pinion and intermediate gear with the slide screw on the other saddle, permitting the two heads to be adjusted vertically as a unit. Both saddles are counterbalanced by cables running to weights on the far side of the traverse carriage. The reason for two wheels, which are 16 in. by 3 in., is merely for faster cutting. Wheel spindles and all other rotating parts of the machine are carried in dust protected ball bearings.

Control is centralized at the end of the arm, where the operator is entirely out of harm's way. Here is a screw for adjusting the saddles horizontally on the arm, a shaft which operates through a bevel gear set, the universal vertical adjustment mentioned above, and the traverse control mechanism. The latter consists of a dial indicating length of stroke, having cast figures by feet from 0 to 10 on each side of center, permitting a maximum stroke of 20 ft. for the machine. A circular tee slot around the figures contains two adjustable dogs which are set to the proper figures for the stroke desired. Between these dogs is a lever mounted on a shaft connected with the traverse mechanism. This lever is tripped by the dogs alternately, producing the reciprocating motion to the whole machine, or the machine may be stopped or reversed by manual operation of this lever as in a planer.

The arm is stiffened by struts to a bracket on top of the carriage and also by one to each corner of the carriage. These side struts also serve as a fence to keep the operator out of the path of the machine.

MORE RAILS FOR JAPAN

Inquiries for 10,000 Tons—Nippon Tin Plate Purchase Postponed

Quietness characterizes export business, although a slight spurt in inquiries from Japan lends some promise of recovery. Continental competition dampens all efforts to make American products attractive at the present scale of prices. The dullness in wire shorts, evident for several weeks, still prevails, although one sale of about 50 tons was made last week at $59, c.i.f. China. An official prominent in this field believes there will be no respite until the market becomes stabilized.

Two rail inquiries have been received from independent Japanese buyers, one for 7000 tons of 75-lb. rails, the other for 3000 tons of 60-lb. rails. One exporter in New York with good connections in Japan reports improving business, stating that inquiries have been received for 12,000 boxes of tin plate, and also for several smaller quantities, including one of 300 and one of 200 boxes. Merchant business is practically nil.

It has been learned that the inquiry from the Nippon Oil Co. for 37,500 boxes of tin plate has been postponed indefinitely. The 800 tons of structural steel for the First National Bank of Osaka, which has been pending for some time, has been supplied mainly out of stock in Japan, but it is understood that a portion was placed in England. American competition in this product is handicapped by the tariff of 2.80 yen per ton. Business in copper wire is lean. There have been inquiries for bars and shapes but actual orders are negligible.

Preliminary specifications for the erection of an oil refinery in Argentina have been received. Bids will be opened Aug. 15. Parties to the Bandoeng agreement in the East Indies have dissolved the restriction on tin sales and will release stocks of fine tin accumulated in the Orient. The Government Iron Works at Yawata, Japan, has begun the manufacture of tin plate, according to local press notices forwarded to the Department of Commerce. As an adequate supply of tin has not been received, full capacity production cannot yet be undertaken. At present the Yawata product is inferior to imported tin plate, due to an inability to turn out iron sheets of a uniform thickness without flaws or cracks.

The State of San Luis Potosi, Mexico, has granted a concession for the construction of a tramway from Rio Verde to San Ciro, State of San Luis Potosi, a distance of about 25 miles. It is planned to use cars operated by gasoline motors or similar power and to construct a telephone line which shall extend the length of the tramway. It is understood that the Canadian Pacific Railway is planning the construction of a direct outlet for the Peace River country in Northern Alberta at an approximate cost of $30,000,000, and that survey parties are now engaged in preliminary work. According to an announcement in the Canadian Parliament, the Canadian National Railway construction program provides for a total expenditure of over $28,000,000, this amount to be expended on work ranging from coast to coast. A decree has been signed authorizing the Secretary of Communications, Mexico, to expend the amount necessary to construct a railroad branch line from Beristain, State of Hidalgo, on the Hidalgo & Northeastern Railroad to Fobero in the State of Vera Cruz. The line is to be 140 km. in length and estimated cost is 4,000,000 pesos (approximately $2,000,000).

Prices of foreign pig iron are still too high to attract much business on the Atlantic seaboard. However, one large importer now offers limited tonnage of French iron, equivalent to foundry No. 1, at $29, c.i.f. Atlantic port, and iron of 2.50 to 3 per cent silicon at 50c. less. Late September delivery is offered on both grades. An importer of Scotch foundry iron is quoting about $32 per ton, c.i.f. Atlantic port for No. 3.

Some good-sized inquiries for Caucasian and North African ore have been received but little interest is shown after quotations are noted.

The H. H. Franklin Mfg. Co., Syracuse, N. Y., manufacturer of Franklin automobiles, has reduced the working schedule at the plant from 6½ to 5 days a week. The present operating force will be maintained and there will be no reduction in the number of employees.

The Autocar Co., Ardmore, Pa., is arranging to give all of its 1600 employees a vacation with full pay.

BELGIAN MARKET HOLDS FIRM

More Blast Furnaces to Be Blown In—Export Business Better—Falling Exchange a Factor

ANTWERP, BELGIUM, June 20.—The iron and steel market has plenty of firmness. There is a well defined revival of business, both for home consumption and for export. Prices have gone generally higher and are maintained, so that we may conclude that orders, kept back during the last falling market (and there are plenty of them) will be offered now. It is generally known that some more blast furnaces will be blown in and production will become larger shortly. Most works, however, already have their share of the available orders; that is why we need not fear, unforeseen circumstances excepted, that prices may fall again in the near future.

This, however, may not be true for foreign buyers, who have also to reckon with the rate of exchange. For instance, four weeks ago we quoted 17.50 fr. for one dollar, whereas the same money is now worth 18.80 fr. In consequence the price expressed in francs may have been increased by 7½ per cent since that time, without being higher for an American purchaser.

Rails quoted a month ago at 650 fr. equaling $38.50, have now been offered on demand for export at 700 fr., being 50 fr. dearer. Notwithstanding this increase, they are cheaper for export business, as this price on the present rate of exchange is only about $37.

Other materials have been sold for exportation on the basis of 630 fr. or $34 for bar iron and for heavy beams and 700 fr. or $37 for heavy sheets, these prices being f.o.b. at Antwerp.

Ruling prices for home consumption, per metric ton, f.o.b. works, are as follows:

Commercial iron No. 2	600 fr.	$32.00
Commercial iron No. 3	625	33.20
Commercial iron No. 4	700	37.00
Heavy sheets	675	36.00
Thin sheets	950	50.50
Bars	625	33.20
Rails	620	33.00
Heavy beams	600	32.00
Open-hearth steel: Ordinary	600	32.00
Half hard	700	37.00
Mild	650	34.60
Special	900	48.00
Rounds	1,200	64.00
Spring steel	1,250	66.50
Thomas ingots	475	25.00
Blooms	525	28.00
Billets	575	30.60

Production for May was 166,100 tons of pig iron and 167,200 tons of steel ingots. Thirty-six furnaces were in action against 54 in the year 1913, when the total average monthly production was 207,000 tons of pig iron and 200,000 tons of steel. Besides this, 4600 tons of steel castings were produced directly from the furnaces, also about 134,000 tons finished steel and 13,500 tons finished iron. The average monthly production during 1913 was respectively about 5200 tons, 155,000 tons and 25,350 tons. The production of May has been influenced slightly by the railroad strike.

Belgian high phosphorus foundry pig iron is offered at an average price of 460 to 470 fr. rendered at consumers' works, or actually $25. This pig iron has an analysis as follows:

Silicon	2.5 to 3 per cent
Sulphur	0.05 per cent maximum
Manganese	0.5 per cent, about
Phosphorus	1.7 per cent, about

It was offered to American importers at prices such as $25.50, f.o.b. Antwerp. Luxemburg and Lorraine pig iron of the same grade has been offered during the last week at somewhat lower prices. These works, however, and especially the French works, have retired from the market. It seems that, seeing the prices going higher, they prefer to stock, for it is quite impossible that the purchases of the moment already have absorbed their whole production.

Export business for special Belgian foundry pig iron with lower phosphorus contents, i.e., 0.1 to 0.2 per cent, other elements nearer to American analysis, have been negotiated on prices such as 500 fr. per gross ton, f.o.b. Antwerp, which means today $26.80 and, with the actual liner rate of freight, $30 c.i.f. Atlantic ports and $31.50 c.i.f. Pacific ports.

English hematite pig iron is offered at £6 to £6 2s. c.i.f. Antwerp. No important business is booked for this material just now. The rate of exchange is too high and the most part of the small orders available are placed either with Belgian or French works, whose price is about 480 to 500 fr., or about $26.80 or £5 15s., whereas £6 for English hematite pig iron is now 515 to 520 fr. Notwithstanding the difference, some steel founders prefer to buy the higher English quality, even with the difference of price. Belgian steel pigs are sold at 420 fr. or $22.40.

This quality of pig iron has an average analysis as follows:

Silicon	1 per cent maximum
Sulphur	0.05 per cent
Manganese	1.5 per cent
Phosphorus	1.8 to 2 per cent

Good parcels of ferrosilicon, 10 to 12 per cent, are imported into Belgium from France. And £12, delivered at consumers' works, was paid for ferrosilicon, 45 per cent, of Scandinavian origin. We may conclude that the position of the market is favorable and that there is a good prospect of business, even for export.

Coal and Coke

The coal market does not change. Producers are more and more overwhelmed with orders. Prices will therefore certainly not go down for, although the arrivals of German coal and coke from the Ruhr are more numerous, we still have to buy large quantities of English coking coals, and the price is becoming higher and higher on account of the higher rate of exchange of English money.

This may perhaps have a repercussion on future prices of coke. It is, however, already the case for patent fuel, for which the price has had to be increased on account of the higher price of English pitch, caused by the same reason. In general, prices are as reported in our previous letter and with an upward tendency.

Japanese Market

TOKIO, JAPAN, June 25.—With the recent heavy drop in the quotation for American copper, the quotation in Japan also declined by yen 10, or to yen 48 or yen 49. Consequently dealers are making efforts to export to China. During April, about 500 tons were shipped. From Osaka there was no copper ingot shipped from late in February until the end of April but at the beginning of May, exports worth about yen 8000 were shipped. As long as the American copper market remains weak and Japanese copper is quoted at yen 47 or yen 48, shipments to China are likely to continue active.

An attempt on the part of iron merchants in Japan to boycott the Yawata (Government) Foundry is reported to give the impression of an artificial scarcity and thus to get large profits from German iron, which can now be imported at low rates. The governor of the foundry is unconcerned and says that large quantities of German goods are due to arrive in this country in June, July and August on old orders.

Imported aluminum is quoted at 52 to 53 sen per lb., having risen 2 or 3 sen since the end of last month. Japanese aluminum is lower in price and is quoted at yen 4 per kamme. The *Chugai Shogyo* predicts a fall in price.

Industrial Conference in Colorado

The third annual conference on "Human Relations in Industry" is to be held under the auspices of the Y. M. C. A. at Estes Park, Colo., July 27-29. Among the papers which will be read will be the following: "World Forces Affecting American Industry," Clarence H. Howard, president Commonwealth Steel Co., St. Louis; "The Man Next to the Men," M. C. Evans, the International Harvester Co., Denver; "The Eight-Hour Day in Minnequa Works," F. E. Parks, manager Minnequa Steel Works, the Colorado Fuel & Iron Co., Pueblo.

A school for industrial and business executives will be held from July 22 to 27.

BRITISH FOREIGN TRADE

May Exports Exceed 1913 Monthly Rate—Imports Smallest This Year

Exports of iron and steel from Great Britain in May continued the expansion recorded in April. At 435,630 gross tons they are not only the largest this year, but exceeded for the first time the monthly average in 1913 of 420,757 tons. They compare with 398,507 tons in April, at that time the largest since prewar records. Scrap is included in these figures. Imports in May were 114,134 tons, or the smallest for any month this year, comparing with 133,929 tons in April, the largest for 1923. In 1913 the imports were 195,264 tons per month.

Comparative data for both exports and imports, scrap being included, are as follows:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
January, 1923	376,028	133,182
February	324,460	130,008
March	380,156	126,988
April	398,507	133,929
May	435,630	114,132
Average per month, 1922	295,980	82,215
Average per month, 1921	144,885	152,734
Average per month, 1920	274,881	128,685
Average per month, 1919	188,519	50,801
Average per month, 1913	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month

	1913	1922	1922 May	1923 May
Pig iron	93,700	66,159	41,888	81,215
Ferroalloys			15,381	11,680
Steel rails	42,200	21,300	13,063	19,646
Steel plates	11,200	6,700	4,905	17,847
Galvanized sheets	63,500	43,600	46,258	52,911
Steel bars, rods, etc.	20,900	19,100	15,472	32,956
Tin plates	41,200	37,400	39,455	54,059
Black plates and sheets	11,700	18,700	20,900	38,372

Data as to importations of importance are as follows in tons per month:

	1913	1922	Jan.-May 1923
Iron ore	620,000	289,400	548,219
Manganese ore	50,100	28,109	40,522
Pig iron and ferroalloys	18,000	12,800	12,423

Exports of scrap iron and steel in May were 11,121 tons, or 11,653 tons per month for the first five months of this year, as compared with 12,880 tons per month in 1922. In 1913 there were 9600 tons per month.

Iron and Steel Exports

Figures of the Department of Commerce show that in the five months of calendar year ended May 31 steel rails form the largest item of iron and steel exports, amounting to 98,894 gross tons of the total of 809,397 tons. Boiler tubes and welded pipes were in second place, with 70,083 tons; steel bars coming next, with 69,488 tons. Galvanized sheets, iron and steel plates, plain structural shapes and semi-finished material followed in the order named, with other articles in lesser quantities. The main items are tabulated in gross tons.

Steel rails	98,894	Plain wire	39,220
*Rail fastenings, etc.	15,187	*Wire nails	14,565
Tubes and pipe	70,083	*Wire rope	2,708
Steel bars	69,488	*Other wire manufactures	5,956
*Alloy steel bars	677	Barbed wire and fencing	32,780
*Iron bars	8,007	Hoops, bands and strips	17,907
Galvanized sheets	56,832	Scrap	16,556
Plates	55,492	Pig iron	11,885
Structural shapes	53,859	*Ferroalloys	3,462
*Structural, fabricated	29,483	Cast iron pipe and fittings	11,431
Semi-finished	53,786	*Malleable iron pipe fittings	2,551
*Wire rods	13,623		
Black steel sheets	45,940		
*Black iron sheets	5,387		
Tin plate and terne plate	45,240		

*Not included in item next above.

B. M. O'Hara, assistant metallurgist, attached to the Mississippi Valley experiment station of the Bureau of Mines, Rolla, Mo., will undertake a study of briquettings of zinc ores prior to distillation in retorts. This study will be undertaken as the result of suggestions made at the meeting of the American Zinc Institute in May.

COPPER IN CHINA

Generally Dull Market in Both Ferrous and Non-Ferrous Metals

SHANGHAI, CHINA, June 23.—The pace of the steel and iron market in Shanghai in recent weeks has continued to be slow. Operations on the whole are considerably below previous expectations and new orders are unsatisfactory. Supplies of most metals are considered very low, but the desire to replenish is still absent, principally the result of internal disturbances and the lack of confidence in the situation.

Most of the Chinese dealers are inclined to look on. They are not disposed to take seriously the low ebb of the present stocks in Shanghai, Hankow and Tientsin. It would be interesting to watch how much improvement will come over things in general with the gradual settlement of the political troubles in various parts of the North.

The swing of business in iron and steel back to normal will be slow, but many anticipate a marked recovery by autumn. This is generally the period of the year in metals not only in Shanghai and China but in Japan and other parts of the Far East.

The demand for copper from the mints in China has received a setback. Outside of the mint in Hupeh, whose requirements at present average some thousand tons of electrolytic copper per month, the other mints seem to be out of the market now. The Hunan and Honan mints are conspicuous by their absence. The Hunan government, as is well known, is laboring under financial difficulties and, in addition to this, the political disturbances have served to restrict purchases. The Honan mint is reported to have ceased minting copper coins, while the Anking and Wuchow copper mints, as well, have suspended operations.

The Mukden mints are working, but their capacity is not known approximately. The same remark applies to the one in Canton. Supplies of the material in the hands of these mints are believed to be small.

The unfavorable rate of exchange is militating at present against a larger amount of copper being contracted by the working mints. The serious depreciation of copper coins and the fairly high price for electrolytic copper, today's rate being 15 cents f.o.b. New York, do not make for profitable business.

Very little business in either Hongkong or Straits tin is doing at the present moment. The rate in London has been ranging between £195 to £200 per ton. Stocks in Shanghai of Hongkong tin are estimated at about 700 slabs and of Straits tin some 20 tons. Buyers are holding off for lower levels. The merchants from the Shaoshing district are not showing any inclination to augment supplies.

Large quantities of pig iron have been going from China to Japan. The Japanese market is showing signs of decline. The steel market in Japan is still showing significant declines under the withering influences of the growing visible supplies. The Japanese Government Steel Works, which have been anxiously watched because of rumored intention to reduce prices, add much to the uneasiness of the market at Tokio and Osaka by reductions between 10 and 15 per cent. Large quantities of Czecho-Slovakian steel have been arriving in Japan recently and these are being felt acutely by the market there. Belgian iron has declined from yen 150 to yen 116, and there is a very uneasy feeling pervading the whole section.

The Detroit city council has authorized the awarding of the contract for four 24,000-kw. turbo-units, for the new Detroit powerplant, to the Westinghouse Electric & Mfg. Co. The cost of the new equipment is $1,254,000.

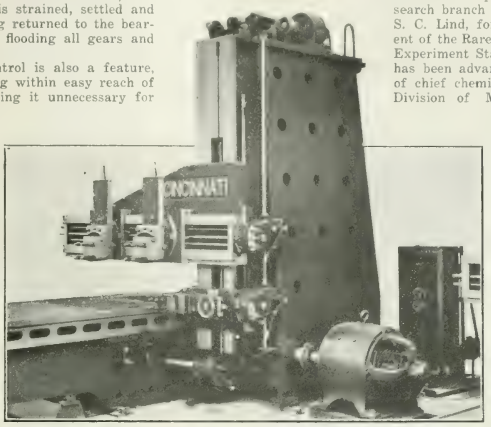
The Wisconsin State Legislature has passed a bill appropriating $9,900 to be used in the interests of the abolition of the Pittsburgh basing point practice in the sale of finished steel. The Wisconsin State Senate had previously killed a bill appropriating $10,000 for the same purpose.

New Large Open-Side Planer

Forced lubrication to the vees and gravity lubrication of bearings in the bed are among the features of the new 72-in. open side planer recently placed on the market by the Cincinnati Planer Co., Cincinnati. The oil is strained, settled and filered before being returned to the bearings, the clean oil flooding all gears and pinions.

Centralized control is also a feature, control levers being within easy reach of the operator, making it unnecessary for him to move out of his position except when setting up the work.

The construction of the machine may be noted from the illustration. The rail is mounted on a knee which is clamped to the column through two large T-slots. Instead of using an ordinary bolt head or short nut a sliding nut, of the same length as the bearing of the knee, is placed in the T-slot, assuring, it is said, a secure clamping surface. The bed is of box-type construction and of extra depth, which is intended to give strength where the greatest rigidity is required, and also to provide an extra long bearing for the column. The housing cheek of the bed is also of heavy construction and extends above the top of the table and a distance below the bottom of the bed, which provides greater area for bolting the column to the bed. Oil pockets cast integral with the bed are long enough to prevent oil dripping on the floor.



New 72 In. Open Side Planer Bearings in the bed are lubricated by gravity; vees have forced lubrication. Method of clamping the knee is among the features

The table is of standard box-type construction and has inner guides which have a bearing its full length. The right-hand side of the table is provided with a clamp to prevent lifting of the table from the vees when machining work that overhangs the opposite side of the machine. The column is braced and ribbed on the inside in a manner intended to prevent distortion and in addition to being bolted and dowelled to the bed, a large tongue cast integral with the bed fits a groove in the housing and further provides against moving of the column.

The rail is equipped with a power elevating device, and screws which raise and lower the rail are provided with ball bearings. The heads have rapid power traverse in all directions and are equipped with safety crank handles to prevent accident when throwing in the rapid traverse. When engaging the rapid traverse handle, the ordinary crank handle does not move. A limit stop prevents the rail from being raised beyond its maximum height.

Investigations on Liquid-Oxygen Explosives

Issued by the Bureau of Mines as technical paper No. 294, this volume contains 100 pages besides inserts carrying half-tones. It deals with the liquefaction of gases, their properties and tests of absorption and evaporation, as well as strength tests of explosives. There are a historical résumé of the general subject, a discussion of containers, a section devoted to the materials used and a warning as to dangers incident to the use of liquid-oxygen explosives. A comprehensive bibliography on liquid air completes the volume.

Changes in U. S. Bureau of Mines

WASHINGTON, July 10.—Resignation of Dr. R. B. Moore as chief chemist of the Bureau of Mines, effective July 1, has been followed by transfers and promotions of the personnel of the research branch of the bureau. Dr. S. C. Lind, formerly superintendent of the Rare and Precious Metals Experiment Station at Reno, Nev., has been advanced to the position of chief chemist and chief of the Division of Mineral Technology to succeed Dr. Moore.

During the past year G. St. J. Perrott and S. P. Kinney have conducted an intensive study of the combustibility of coke in blast furnaces. This work will hereafter be conducted by Mr. Kinney in connection with the operation of the experimental blast furnace at the North Central Experiment Station, Minneapolis, and at commercial furnaces in South Chicago, Ill., and Youngstown, Ohio. Mr. Perrott has been transferred to the Pittsburgh Experiment Station to direct chemical-physical work in connection with the liquid oxygen explosives investigations.

Dr. T. T. Read, formerly chief of the Division of Information Service in the Washington office, has been transferred to Duluth, Minn., and made superintendent of the North Central Experiment Station. The headquarters of Dr. Read were fixed at Duluth to permit of maintaining a closer contact with the mining phase of the work. T. L. Joseph has been made assistant superintendent of the North Central Experiment Station at Minneapolis. Oscar Lee has been transferred from Minneapolis to the Southern Experiment Station, Tuscaloosa, Ala., and placed in charge of the iron ore beneficiation work under the direction of Dr. W. R. Crane, superintendent of the station. C. G. Maier, formerly with the Department of Metallurgical Research of the University of Utah, has been appointed to the position at Berkeley made vacant by Dr. Bonner's resignation. Prof. Ernest A. Hersam of the University of California, who for the past year has studied metallurgical milling problems at the Massachusetts Institute of Technology in cooperation with that institute and with the American Institute of Mining and Metallurgical Engineers, has returned to his former position as an instructor at the University of California. John Blizard, who has had charge of the bureau's fuel work at its Pittsburgh station, has resigned to accept a position with a commercial concern in New York City, where he will be engaged on the design of super-heaters and heat transfer apparatus.

With the object of improving the export trade in Caucasian manganese ore, the Russian Soviet Government intends to amalgamate the two export organizations which are at present conducting the business—one at Poti in the Caucasus known as the Chemo, and one, the Export Buda at Kharkoff, in Southern Russia, for the ores from the Ukraine. The vessels of the Russian volunteer fleet, says the London *Ironmonger*, are to be used for carrying the ore to London with the object of saving freight.

IMPROVEMENT IN FRANCE

Increase in Orders but Not in Prices—American Coke Supplies

PARIS, FRANCE, June 29.—The iron and steel trade has been reversed since about the beginning of June, with an increase in the volume of orders. Prices, however, have not yet begun to move upward and a few occasional concessions on prices, counterbalanced by no less occasional increases, are even to be noted. It is generally believed that some improvement will take place in prices during the second half of August, at the latest, when business generally becomes active. Of course, if the adjusted price of coke were lowered as from Aug. 1, as there is some question of it, this would be reflected by the iron and steel prices.

The rise of the dollar and sterling is facilitating French exports and we are now able to make to Great Britain offers that stand a good chance of being accepted.

Coke.—The Société des Cokes de Hauts-Fourneaux has decided to maintain in July its adjusted coke prices for June, 180 fr. for P1 quality and 250 fr. for P2. Coke shipments from the Ruhr consigned to French blast furnaces from June 11 to June 19 have averaged 6700 metric tons per day, as against about 4500 tons in the first ten days of June, due partly to better railroad movements from the Ruhr to Creves, a fact creditable to the staff of French engineers.

The Société des Cokes de Hauts-Fourneaux has decided to suspend for the present its purchases of British and American coke, but individual concerns are, of course, at liberty to continue such purchases. Coke imports of France for May and the first five months of 1923 are:

From	In May 1923, Metric Tons	During the First Five Months of 1923, Metric Tons
Sarre	26,192	38,968
Great Britain	47,441	270,578
U. S.	76,696	87,726
Belgium	23,472	184,550
Netherlands	23,214	136,934
Germany	184,416	573,567
Czecho-Slovakia	1,051	28,311
Other Countries	143	146
Totals	382,625	1,321,780

We have been informed from Belgium that there is now standing at Antwerp a stock of 80,000 tons of American coke, in bad physical condition, which it will be very difficult to get rid of, even in mixtures. In Lorraine, the maximum proportion of American coke utilized in mixtures for blast furnaces is 10 to 15 per cent; it would, however, be increased to 25 per cent by the Belval works (Grand Duchy of Luxemburg) of the A.r.b.e.d.

Iron Ore.—The French production of iron ore is slowly increasing; but it certainly does not exceed the present demand. Present prices, f.o.t. mines, are: Algerian iron ores, holding 55 per cent of iron, are now offered at 23s., c.i.f. British ports.

Pig Iron.—The foundry iron maket is quiet but purchasers are now in general more willing to conclude forward contracts. Prices of chill-cast foundry pig iron, No. 3 P. L., are ranging from 375 to 400 fr. at furnaces, according to districts of production, grades and destinations; 10 fr. less for sand cast foundry pig iron, No. 3 P. R.

Hematite pig iron is being dealt in at 400 to 410 fr. at furnaces for foundry quality, with 10 to 15 fr. more for forge (affinage) quality. Malleable pig iron is quoted about 50 fr. above foundry hematite. In the Southeast of France we find synthetic pig iron (electrical process) at 420 to 430 fr. at furnaces.

Semi-Finished Steel.—Prices are weak at approximately the following level, at steel works, for basic quality: Blooms, 450 to 470 fr.; billets, 480 to 500 fr. It is even probable that for export lower prices than the above are being accepted.

Beams.—Demand, although moderate, is well maintained. Prices are steady at 580 to 600 fr. at mills in the East and Lorraine. Small shapes produced in the Haute-Marne district are quoted about 700 to 750 fr. at mills.

Rolled Merchant Products.—The situation as regards rolled merchant products is very irregular; while certain producers, well booked up, are declining to make any concessions, others, who are put to the necessity of replenishing their order books, are sometimes accepting prices as low as 550 fr. at mills. However, prices may, on the whole, be said to average between 580 to 620 fr., also at mills. Hoops are worth at mills 750 to 800 fr. in Meurthe-et-Moselle and 790 to 800 fr. in the Haute-Marne.

Plates and Sheets.—Plates and heavy sheets (5 mm. and over) are being dealt in at 650 to 670 fr. at mills, medium sheets at 900 fr. and light sheets at 950 to 1000 fr.

Castings.—Some producers have orders on hand for several months to come and the only complaint is about an insufficiency of labor supply. Prices are not yet very bright, but have improved, as recent purchases by public authorities clearly indicated.

Railroad Rolling Stock.—French constructors of rolling stock, which have a considerable capacity of production, need orders. French railroads are turning the fact to good account by obtaining from builders prices which, on the gold standard, are lower than the pre-war prices. It is thus that the P. L. M. Co. has recently purchased from French constructors 140 third-class passenger cars (three axle) at 90,000 fr. each, and 50 first class passenger cars at 124,000 fr. each.

Considers Specifications for Cast Iron Gas Pipe

The American Gas Association has submitted for the approval of the American Engineering Standards Committee three specifications for cast iron pipe and special castings.

These specifications were developed by the American Gas Institute in 1911, at which time the dimensions for bell and spigot castings were adopted. In 1913 the association adopted the dimensions for flanged castings, and specifications governing the manufacture of all cast iron pipe and specials, which were derived from an old standard adopted in 1905 by the American Gas Light Association. These again were based on seven years' experience with the standards designed by the Society of Gas Lighting in 1890. It is said that the specifications now under consideration are in general use for underground gas pipe throughout the United States.

The A. E. S. C. has appointed a large and thoroughly representative special committee to consider the application for the approval of these specifications, and sponsorship for future revisions under the regular procedure involving the organization of a representative sectional committee to consider and develop any changes required. The following are the members of this special committee:

S. G. Flagg, Jr., chairman, representative of American Society of Mechanical Engineers on A E S C.
F. A. Barbour, representing American Water Works Association.
E. A. Barrier, representative of the Fire Protection Group on A E S C.
W. Forstall, representing American Gas Association.
A. H. Hall, representative of the gas group on the A E S C, and representing the American Gas Association.
W. G. Hammerstrom, chief engineer Lynchburg Foundry Co., Lynchburg, Va.
H. Kely, representing Associated General Contractors of America.
N. F. S. Russell, representing the U. S. Cast Iron Pipe & Foundry Co.
R. Toensfelt, representing American Society for Municipal Improvements.
Walter Wood, president, R. D. Wood & Co.
C. D. Young, representative of American Society for Testing Materials on the A E S C.
F. A. McInnes, representing the New England Water Works Association.
F. F. Schauer, representing the Natural Gas Association of America.
A. W. Claussen, representing Underwriters' Laboratories.
J. C. Meloon, representing National Automatic Sprinkler Association.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Southland, *Treas.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Elliott Square. Washington: 26 Jackson Place N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Progressing Toward Three Shifts

The letter of fifteen directors of the American Iron and Steel Institute to President Harding is in harmony with the belief expressed by THE IRON AGE at the time the institute report on the twelve-hour day was submitted at the May meeting, that the declaration marked progress toward abolishing the long day. It was pointed out then that at no time in the history of the American steel industry had so small a percentage of workers been employed on twelve-hour turns, and that as a very considerable number of workers already had gone from twelve to eight-hour shifts, a continuation of the process when the labor supply would permit was to be expected.

The beginning of a further considerable change of hours promises to come more quickly than was generally expected, although a change of this kind cannot be made as soon as some uninformed persons imagine. We have in mind the experience of one company which for a number of years has had the three-shift plan in force in its steel plants. A year or so ago, it acquired another plant and almost immediately started to prepare for the eight-hour day. These efforts were received coldly by a number of the men. Some of the difficulties encountered are thus indicated in a recent letter from one of the officers of the company:

> I think I told you when I was in New York that I was very much disappointed over the attitude of the men at ———— with respect to the three-shift program; and it only goes to show how difficult it is to work out a proposition of that kind unless both management and the men are sincerely interested in working it out on a constructive and economic basis.
>
> On one turn we had four first helpers who were actually not interested at all. They said frankly that as far as they were concerned they got enough rest to suit them and if it meant earning any less money at all than they were earning on twelve hours, they did not want the three shifts. We finally did a little bit of manoeuvering and took two of these men off and put them on the opposite turn, putting in their places two men who were enthusiastically anxious to work out the three-shift program, with the result that the men who did want the change, assisted by the open-hearth superintendent, sold the opposition on the point that for their own good and the rest of the organization they ought to get in "the band wagon" and help instead of blocking a constructive move on the part of the company.

Owing to the opposition of the men it required five months longer than had been expected to work out the plan.

It should be said in this connection that for one company or two or three of the lesser steel companies to adopt the three-shift day is far different from a simultaneous movement in that direction throughout the industry. In fact, there can be no better compliance with President Harding's request than a policy of working toward the shorter day as fast as labor supply and other conditions will permit. The problem of housing alone is very difficult. If production continues at anything like the present proportions, the smaller companies or the isolated plants of the larger companies would be much better able to go to three shifts than the large group plants at the important centers of production, like Youngstown and Pittsburgh. The latter, in order to make the change, would require at one time many thousands of additional workers, since whatever one company at such centers does, must be done in like measure by all other producers in the same district.

The concluding paragraph of the report to the institute contained a number of provisos. It was declared that if labor should become sufficient to permit it, the members of the committee would favor entirely abolishing the twelve-hour day. That statement is included in even more positive form in the letter to the President, but the other provisos—that the purchasing public be satisfied with the selling prices which might result from the change and that the employees and industry generally including the farmers would approve—are very properly abandoned, and only one requirement, that of adequate labor supply, is named.

So far as resulting advances in steel prices are concerned, no accurate figures can be given. If it were simply a matter of adding 60,000 to the number of workers (that being the number mentioned by Judge Gary), it might be computed that about $3 a ton had been added to the cost of finished steel. But if the hourly rate of the men now working twelve hours a day is raised, that would involve the greater expense of increasing the hourly rate of all other furnace and mill work-

ers. However, fluctuations in market prices of steel, under the present régime, have been much greater in a single year than the added cost of the eight-hour day. The notable difference under the new régime would be that the low prices of times of slack demand would be several dollars a ton higher than they have been heretofore under such conditions. That would mean a permanent addition to the cost of steel buildings, bridges, railroad track and equipment, vessels, pipe lines and the scores of other uses to which bulk steel is put. The individual consumer would pay such additions in increased rent, transportation charges and the like, but might not be able to trace the added costs in the case of sheets, tin plate and wire products.

The question as to the attitude of the employees is more serious than that of prices and has not been fully determined. In spite of the demand for the eight-hour shift having been made (by labor union leaders) in the steel strike of 1919, it cannot be denied that large numbers of steel plant employees prefer the long hours unless they can make as much money in the short day. But if the change be not made (and it is not likely to be) until there is considerable unemployment, the men no doubt would be willing to accept decreased pay with the reduced hours, as they have done thus far in every case in which the three-shift day has been tried.

Psychology and the Cycle

As was suggested in these columns recently, much thought has been given of late to the possibilities of business controlling the cycle of business, instead of business submitting completely to control by the business cycle.

Various psychological reactions may occur as a result of discussion of the cycle, while the actual fact must also be considered that the operation of the cycle in the past has been due not entirely to physical and financial influences.

In the administering of food and other substances to the human body many disappointments and surprises have developed. Years ago, when it was learned that iron is an important element in the system, many persons swallowed iron in one form or another, but the most noticeable result was a deranged digestion.

In like manner, in administering to the human mind teachings concerning the business cycle there may be unexpected results if the psychology of the thing be not well considered. It may be proper in a time of activity to tell everybody to carry on moderately so as to avoid the familiar reaction into inactivity. But some men may absorb the statement as information instead of advice, accordingly preparing themselves for dull times and thus helping to bring about such a condition.

It cannot be denied, moreover, that the business cycle is to an undetermined extent a psychological phenomenon in itself. The cycle itself is no new discovery. It is the nomenclature, and the detailed analysis of conditions in the various stages, that are relatively new. Always it has been known that there is an ebb and a flow in business, a swing of the pendulum, and it has always been natural for men to say to themselves at one time, "This is too good to last," and at another time, "This is too bad to last."

To the extent that men have grown accustomed to look at the course of business in this general way, without studying economic and financial details as to why the condition is too good or too bad to last, to that extent will they be disposed, by their empiric formula, to "get on" or to "get off," thereby helping to produce the cyclical movement. That is purely psychological. It is not less but more important on that account than the individual facts in quantitative economics, for it applies in its way to the vast majority of human minds, whereas there are economic facts that apply much to some men and little to others.

The work of spreading and applying economic information is not discouraged by this consideration of the psychological influences. Indeed, it takes on new interest in view of the effects, for example, of some recent stock market developments which very generally were considered to be due more to a state of mind than to any unfavorable change in business conditions. Presently we may be better able to measure the effects of the simultaneous adoption of a policy of caution by many business men. At the moment opinion is divided on the question whether this has produced such a slowing of the pace as will lead to a further letting-up, or whether the heeding of the warnings so freely sounded has deferred the development of a new and unfavorable phase in the cycle.

Electric Steel in 1922

While no records were broken by American electric steel furnaces in 1922, the statistics for the year made public last week emphasize some interesting trends. A year ago it was pointed out that 1921 was the first year of marked increase both in the proportion of steel castings made electrically and in the quantity of electric alloy castings. The 1922 record practically duplicates the 15 per cent showing of 1921. In 1911, or 12 years ago, electric steel castings were only 1.2 per cent of the total. The 1922 output of 154,982 tons was next to the largest ever made.

Of the total electric alloy ingots and castings made in 1922, castings were 14.2 per cent of the total against 15.9 per cent in 1921 and only 4.8 per cent in 1920. Part of the gain in the last two years is due to the use of heat-treated alloy castings as substitutes for forgings. This development is, therefore, on a more permanent basis.

Taking the electric steel industry as a whole, the 1922 output, 346,039 tons of ingots and castings, ranks third in peace-time operations, and the year showed a net gain of 18 electric furnaces. In 1920 at 502,152 tons, electric steel was 1.2 per cent of the country's total; last year it was about 1 per cent. In 1916 the percentage was but 0.37, and 10 years ago it was less than 0.061 per cent. The electric ingot production last year was 191,057 tons, or 0.55 per cent of all steel ingots. This compares with 0.44 per cent in 1921, 0.85 per cent in 1920 and

0.93 per cent in 1918, the last year of the war, which made a record in electric steel.

Not only is the electric furnace likely to maintain its place in the foundry industry, but another forward step may be looked for when larger furnaces and cheaper electricity prepare the way for larger outputs of high-grade rolled products.

Large Stocks of Coal

The advice so often given at Washington and elsewhere, that coal consumers should carry stocks in order to improve the unfortunate situation that has existed in coal for several years, has not appealed to some men, who thought means should be found for regulating coal other than by the imposition of a burden upon the buyers. It is a condition and not a theory, however, that confronts the coal consuming public. If the coal problem can be solved much more easily in this way than in any other, then this solution should be applied.

As to the cost, ten years ago this would have seemed very high, but by comparison with the large extra cost coal consumers actually have borne in recent years the cost of carrying stocks appears small.

That the advice to stock coal has been heeded in recent months is shown plainly by the latest report of the Geological Survey. Subject to revision, the stocks of bituminous coal in the hands of commercial consumers on June 1 are given at 41,000,000 net tons. As stocks have run in the past this is a very large quantity. The stocks on Armistice Day were enormous, by the measures the trade then had, amounting to 63,000,000 tons. Unprecedentedly large provision was made by consumers against the strike scheduled for April 1, 1922, and the stocks on that date were also estimated at 63,000,000 tons, though they may have been somewhat more. The stocks reported for June 1 last are approximately two-thirds as great as the stocks on those two very unusual occasions.

There has not been even a little indorsement of an opinion that the coal problem will settle itself if the matter is let alone. The practically universal opinion is that some great remedy must be applied. There are various alternatives, nearly all of which have aroused strenuous opposition in most quarters. The proposal that consumers carry large stocks seems to be least opposed. The chief difficulty is that it requires team work. All consumers may not be disposed to cooperate. Publication of the fact that there are large stocks, as a total, may move individual consumers to feel that they do not need to do their part, that when other consumers have so much coal there will be enough for them even if the current offerings become small. There is opportunity, however, to apply moral suasion upon those who do not stock so much as others. There has been stocking without any particular effort at team work until very recently, so that there is room for much more to be done.

The majority of coal strikes in the past quarter century have had an eye single on the stocks of coal. In some cases a mining suspension occurred chiefly because of the stocks, which it was felt had to be liquidated before there could be a market for coal. A coal strike represents first a loss to the miners, who must afterwards gain more than they have lost, or there is a net loss on the whole transaction. The problem involved in stocking coal, then, is simply to stock enough to make the prospective loss so great that recouping is impossible.

During a period of stocking up in coal the market is steadied, which is not without its advantage to producer as well as to consumer. Coal prices have fluctuated less in the past three months than might have been expected, and undoubtedly the steadying influence has been the stocking. When prices showed a disposition to rise, consumers bought less. When they tended to fall, consumers supported the market.

Estimates of steel consumption by four leading automobile makers from 1918 to 1922 inclusive show a total of 82,774 tons of alloy steel bars in 1918, an increase to 196,783 tons in 1920 and then a recession to 149,873 tons in 1922, in spite of the record-breaking automobile output last year. While the automobile industry as a whole cannot be judged by these four companies, the figures tend to confirm the opinion that less alloy steel is being incorporated in these particular cars. The Ford Motor Co. in 1920 used 162,850 tons of alloy steel bars, but only 103,821 tons in 1922. Whatever the explanation in this particular case, it is a fact that the science of heat treatment has been so developed that many users of steel are finding that they can get the desired results from carbon steel, properly heat-treated, or at least can use less complicated alloy steels. One automobile company is now using a steel containing one alloying metal, whereas its former practice called for a steel carrying two such metals.

It has been stated that considerably more copper has been going into automobiles in the last year or two; that whereas in 1920 about 120,000,000 pounds of copper was credited to the automobile, 144,000,000 pounds was used in 1922. In 1921 the total was around 92,000,000 pounds and in 1919 about 97,000,000 pounds. If these figures are compared with the production of automobiles and trucks for the respective years, it will be found that per car produced very little if any more copper was used last year than in 1921, 1920 or 1919. The total of copper entering into motor car construction was at high point in 1922, but for the 2,659,064 cars and trucks made in that year 144,000,000 pounds of copper represents practically the same amount per unit as the 120,000,000 pounds which went into the 2,205,197 cars and trucks of 1920. Competition among automobile producers is such that, unless absolutely necessary, no increased cost will be incurred and the facts regarding copper are in line with that policy.

YOUNGSTOWN MERGER IN FORCE

Youngstown Sheet & Tube Co. Holds Steel & Tube Properties with Litigation Still Pending

YOUNGSTOWN, July 10.—Formal possession of the properties of the Steel & Tube Co. of America, located chiefly in the Chicago district, has been taken by the Youngstown Sheet & Tube Co., the purchaser. President James A. Campbell and General Superintendent William C. Reilly of the Youngstown independent have been in Chicago in consultation with Steel & Tube officials. For the present, the Steel & Tube operating organization will largely remain intact, but it is the intention to ultimately dissolve the corporate identity of the company.

The Sheet & Tube company is now engaged in plans to reduce Steel & Tube overhead, and effect operating economies, such as was done in the case of the Brier Hill Steel Co., purchased last spring. The Sheet & Tube company has ordered the suspension of one of the two Steel & Tube blast furnaces at Mayville, Wis.

The Allied Chemical & Dye Co., a minority stockholder in the Steel & Tube Co. of America, was granted a preliminary injunction in the Court of Chancery in Wilmington, Del., July 6, restraining the Steel & Tube company from distributing its assets among stockholders at the present time. A rule to show cause to the contrary has been issued by Chancellor Wolcott, returnable next Friday.

Announcement last week by the bankers' syndicate headed by the Bankers' Trust Co., New York, of the offering of $40,000,000 notes of the Sheet & Tube company, referred to the possibility of legal complications arising from the purchase. In event the sale should ultimately be set aside, it is the opinion of counsel that the purchase price, approximating $33,000,000, already paid by Sheet & Tube, must be refunded to the purchaser.

Mortgages against the combined properties of Sheet & Tube, following its purchase of Steel & Tube, aggregate $34,972,222. Physical properties after acquisition of Steel & Tube have a book value as of Dec. 31, 1922, of $118,464,000, after depreciation. This compares with a value of $188,606,000 found by independent appraisals in 1921.

Current earnings of the Sheet & Tube company for the first four months of this year, available for depreciation and interest, were $9,836,000. The company is now preparing a statement of earnings for the first half of this year.

Improvements Planned

Important improvements to the Steel & Tube properties are already being mapped out by the purchaser and a large sum will be expended to round out the plants so that they will fit in with Sheet & Tube production. Another blast furnace will likely be built at Indiana Harbor, a skelp mill will be added and additional open hearth furnaces.

Some of the Steel & Tube company's isolated properties will be disposed of, such as the Kalamazoo, Mich., plant of the Harrow Spring Co. (of which all the stock was owned by the Steel & Tube Co.) and the two blast furnaces and iron mines at Mayville, Wis. President Campbell states that the Indiana Harbor property, the blast furnaces at South Chicago, tube mills at Zanesville, Ohio, and a zinc property owned by Steel & Tube and included in the purchase, will be retained.

In concluding the transaction, President Campbell signed a single check for $33,000,000, representing the purchase price. In addition, the Youngstown company assumes bonds against Steel & Tube aggregating $22,000,000, making the total purchase price about $55,000,000.

President Campbell states that Sheet & Tube will likely make another careful survey of the Steel & Tube plants before proceeding with any enlargements. "We will probably build an additional, modern blast furnace at the Mark plant at an early date," he states. "We will likely sell such properties as the Harrow Spring Works in Kalamazoo, Mich., and the blast furnace property at Mayville, Wis. The Youngstown Sheet & Tube Co. is essentially a steel making and finishing company. We do not care to go very deeply into the pig iron business, or business not in line with our regular activities. I think we will keep the zinc properties which we acquired with Steel & Tube. They are good producers and valuable."

Purchase of the Steel & Tube plants gives the Youngstown Sheet & Tube Co. the western pipe manufacturing connection which it has desired for many years. Its entrance into the Chicago district was made necessary to meet the competition of the United States Steel Corporation, as the National Tube Co., a Corporation subsidiary, is completing a large tube plant at Gary, Ind.

It is announced that the Zanesville pipe mills of the Steel & Tube company will be supplied skelp from the Brier Hill plants.

CANADIAN IRON MARKET

Buyers Slow in Placing Orders—Light Movement from United States

TORONTO, ONT., July 10.—Notwithstanding that we have entered the third quarter Canadian melters are still withholding pig iron contracts for this period, and up to the present only a small number of consumers have made known their requirements. Some slight improvement, however, has made its appearance in the demand for spot iron and orders for one to two cars are coming forward in better volume than formerly. This reluctance on the part of melters to place contracts for third quarter is expected to have a detrimental effect on the production of pig iron during the next month or so.

Despite the fact that the demand for iron is small the daily melt continues about the same as it was a month ago, namely, from 60 to 80 per cent. This fact leaves the impression that the consumption of iron will continue on a fairly extensive scale, but that melters are somewhat inclined to wait and see just what price concessions may be made by producers before placing contracts for third quarter, and as a result the former are now content to buy on a hand-to-mouth basis.

No change in the number of furnaces blowing has been made and at the present time 10 furnaces are being operated in the Dominion.

Importations of pig iron have not improved. Small tonnages of special grade iron are coming into Canada from American furnaces, but no shipments have been made from Britain of late. During the past week Canadian furnaces announced a drop of $2.50 per ton in the price of various grades of pig iron effective both in Toronto and Montreal. Prices now quoted are as follows: No. 1 (2.25 to 2.75 silicon), $34.05; malleable, $34.05; No. 2 (1.75 to 2.25 silicon), $33.05, Toronto. Montreal prices are: No. 1 and malleable, $36.40; No. 2, $35.40. No change is announced in British iron, which is holding at $40 per ton, warehouse, Montreal, in lots from five tons upward for both Summerlee and Carron.

No Time Set for Hearing Merger Case

WASHINGTON, July 10.—The definite statement was made today at the office of the Federal Trade Commission that it has not set a date for hearing the Bethlehem-Midvale-Lackawanna merger case. The announcement of the commission grew out of published reports giving various dates as to the time of the hearing. It is believed that the commission soon will determine and announce the dates.

COAL COMMISSION REPORT

Keen Interest Shown—Operators Willing to Abandon 12-Hour Day

WASHINGTON, July 10.—The report of the Federal Coal Commission on the anthracite coal industry has created interest not only because of the recommendations it carries with respect to that industry, but also because of the possible bearing they may have on the report the commission is to make on Sept. 22, regarding the bituminous coal industry. Obviously there are sharply distinguishing characteristics existing in these two units of coal mining. For this reason, the recommendations in each instance might differ greatly in some respects, and an effort to anticipate the recommendations with respect to the forthcoming report would be idle.

It is observed with interest, however, that in the anthracite report, the commission has made some rather sweeping suggestions, though in view of growing public opinion against controversies in the industry, the recommendations have not been surprising. Among the important ones are those relating to limited Government regulation of the anthracite coal industry, with authority to be granted to the President in the event of strikes to take over the operation of the mines, transportation and marketing of the product. Recommendation also is made that both operators and miners should, if necessary, be forced to deal with each other and if there is no legal authority for such compulsion it will be recommended in the final report to be made in September. The report makes it plain that punitive legislation may be recommended later, this apparently depending on whether the next agreement between miners and operators, now being discussed at Atlantic City, shall show a cooperative spirit and a proper conception of the rights of the American people.

Do Not Show Clean Hands

The report makes pointed comment directed at both operators and miners as to the attitude of each side concerning the so-called open shop and the closed shop. It states that the open shop in a unionized mine is open to the union miner and closed to the non-union miner, while the open shop in the non-union mine is open to everybody save a union mine worker. In other words, the report says, neither side can show clean hands. Plans for devising new agreements to fit modern day operations are suggested. In this connection it is interesting to note that the recommendations would provide a penalty for the failure of either side to live up to its contract. It does not go so far as to urge incorporation of organized labor, but it does make it plain that the latter should be forced under the threat of penalty to carry out its contract. The report makes it clear that the anthracite industry, unlike the bituminous industry, is in the hands of only a comparatively few operators and, therefore, is more easily controlled and that anthracite is largely a product for household consumption rather than being used widely for industrial consumption, as bituminous coal is.

The report also points out alleged greatly increased profits to anthracite operators and dealers within the past few years, and as a means of relief suggests to consumers the practicability of using briquettes and coke as substitutes. Reexamination of freight rates on anthracite coal by the Interstate Commerce Commission is suggested.

Would Abandon Long Day

The anthracite operators yesterday replied to the 11 demands of the mine workers by conceding two and assuring open-mindedness on the other nine. On wage increases the operators indicated firm resistance.

The two concessions were the abolition of the 12-hr. day, involving about 3,000 men, and the requirement that the umpire of the Anthracite Board of Conciliation render decisions within 30 days.

A joint pledge to continue mining after Sept. 1, when the present contract expires, even though renewal of the scale had not been agreed upon, was proposed by the operators. The miners rejected it on the ground it would be unnecessary if the conferees applied themselves to the task at hand.

GERMAN PRICES RISE AGAIN

Increase of More Than 30 Per Cent in Steel and of 9 Per Cent in Foundry Iron—Exchange Rate About Balances the Difference

(By Radiogram)

BERLIN, GERMANY, July 9.—Foundry iron No. 1 has been advanced by the Pig Iron Association to 3,469,000m. per metric tons ($15.42 per gross ton at 0.4375c. per 1000m.), compared with 3,198,000m. ($18.68 at 0.575c. exchange) last week and with 774,000m. ($12.97 at 1.65c. exchange) six weeks ago.

Steel prices have been increased almost one-third by the Stahlbund. Ingots are now 4,437,000m. ($19.72), compared with 3,382,000m. ($19.75) last week and with 1,271,000m. ($21.30) six weeks ago.

Steel bars are now quoted at 6,300,000m. (1.25c. per lb.), compared with 4,800,000m. (also 1.25c. per lb.) last week and with 1,755,000 m. (1.31c. per lb.) six weeks ago.

Thin steel sheets have been advanced to 10,234,000m. (2.03c. per lb.), compared with 7,800,000 m. (also 2.03c. per lb.) last week and with 2,818,000m. (2.11c. per lb.) six weeks ago.

Sheet and Tin Mill Workers' Wages Are Advanced

Employees in sheet and tin mills operating under the sliding scale wage agreement of the Amalgamated Association of Iron, Steel & Tin Workers will receive a wage advance of 6 per cent, as a result of the bimonthly examination of sales sheets conducted July 9 at Youngstown.

For the first time, the tonnage rates of tin mill workers were based on the black sheet basis. The 6 per cent increase for tin mill employees is in addition to an approximate 9 per cent advance for June, when the tonnage rates of such operatives were brought up to the sheet scale level.

Examination of sales sheets revealed an average selling price of $3.60 per 100 lb. on Nos. 26, 27 and 28 gage black sheets shipped during the 60 days ending June 30 by Mid-Western mills. This compares with a $3.40 average disclosed two months ago.

The settlement was conducted between James H. Nutt, representing the Western Sheet & Tin Plate Manufacturers' Association, and M. F. Tighe of Pittsburgh, president of the Amalgamated association.

The new tonnage rates will apply for the July-August period, and represent a rate of 43½ per cent above the base.

Youngstown officials of the Ohio-Kentucky Fluorspar & Lead Corporation, with properties in Livingston County, Ky., recently completed an inspection of the holdings. The company is now installing a 100-ton mill which is expected to be in operation by next fall. Among those in the party were J. B. Kennedy, president of the company, Warren Williamson, treasurer, and John R. Rowland, a director.

Equipping open-hearth department cars with roller bearings goes on apace. In the past few weeks the Hyatt Roller Bearing Co., Newark, N. J., has been asked by seven of the notable steel companies of the country to supply its steel mill bearings for 136 ingot cars, including six double truck cars and 55 charging cars.

British Iron and Steel Market

Lower Prices Prevail, Particularly in Semi-Finished Steel—Ruhr Fuel Supplies Cause Concern, But More Furnaces Relighted

(By Cable)

LONDON, ENGLAND, July 10.

There is a small revival in the demand for pig iron, owing to the fact that the makers have been quoting lower prices, but consumers generally are reluctant to commit themselves.

The dock workers' strike is likely to affect fuel prices, if continued, thereby hampering further reduction in iron and steel prices and making probable the banking of furnaces. Palmer's Iron Works, Jarrow, already has blown out two furnaces.

Hematite is dull, though some fair sales have been made on German account. Prices are easier.

There is fair German demand for iron and steel, but prices still are unattractive. Thin plate makers are well booked up and some are not quoting for fresh sales. But orders for heavy material are wanted. Scotch plants have closed for the holidays.

Foreign ore is stagnant. Quotations are nominal, with best Rubio talked at 25s. ($5.70) ex-ship Tees.

Continental positions are difficult to judge. Iron makers apparently are apprehensive of a future fuel shortage and prices, in consequence, have a higher tendency. Little business is passing.

In Belgium the Société Anonyme John Cockerill has relighted one furnace at Seraing, near Liége. Both the Société Anonyme des Hauts-Fourneaux, Fonderies et Mines de Musson and the Société Anonyme des Hauts-Fourneaux du Sud de Châtelineau are preparing to blow in fresh furnaces. The total number of Belgian [blast] furnaces active July 1 was 38, as against 35 June 1.

In Germany, the French have seized the Krupp fuel stocks, amounting to 60,000 to 70,000 tons, at Segeroth. The steel works consequently is idle. Seizures also are reported at the Mannesmannrohren Werke at Düsseldorf. Reports have it that Ruhr iron ore stocks are sufficient for several months, but Swedish producers are endeavoring to transport fresh supplies into Dortmund by the Dortmund-Ems canal.

Tin plate is quiet. The minimum price is unaltered but merchant sellers' prices for forward delivery are lower.

Galvanized sheets are weak, with little substantial demand.

Japan has made a few purchases of thin specifications black sheets at £19 (3.87c. per lb.) f.o.b. Other markets are dull.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£2	1½s		$9 16
Bilbao Rubio ore†		4		1 37
Cleveland No. 1 foundry	6	0	to 6 5s.	27 36 to $28 50
Cleveland No. 3 foundry	5	10		25 08
Cleveland No. 4 foundry	5	5		23 94
Cleveland No. 4 forge	5	2½		23 37
Cleveland basic	5	10		25 08
East Coast mixed	5	10		25 08
Ferromanganese	18	0		82 08
Ferromanganese*	20	0		91 20
Rails, 60 lb. and up	9	10	to 10 0s	43 32 to 45 60
Billets	7	10	to 8 10	34 20 to 38 76
Sheet and tin plate bars, Welsh	9	2½		41 61
Tin plates, base box	1	3	to 1 3½	5 24 to 5 27

				C. per Lb.
Ship plates	9	15	to 10 5	1 98 to 2 09
Boiler plates	12	10	to 13 0	2 54 to 2 65
Tees	10	5	to 10 15	2 09 to 2 19
Channels	9	10	to 10 0	1 93 to 2 04
Beams	9	0	to 9 15	1 88 to 1 98
Round bars, ¾ to 3 in.	11	0	to 11 10	2 24 to 2 34
Galvanized sheets, 24 g.	17	15	to 18 0	3 61 to 3 66
Black sheets, 24 gage	13	10	to 13 15	2 75 to 2 80
Black sheets, Japanese specifications	15	5		3 10
Steel hoops	12	0	& 12 10*	2 44 & 2 54*

				C. per Lb.
Cold rolled steel strip, 20 g.	£17	0s		3 61
Corrugating Indian sheet specifications	15	0		3 0

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports. Delivery as Specified

Foundry pig iron:				
Belgium, July	127	6s	to 132	$27 34 to $28 41
France, July	7	5	to 7 15	27 34 to 28 41
Luxemburg, July	7	5	to 7 15	27 34 to 28 41
Billets:				
Belgium, July	6	10	to 6 12½	29 64 to 30 21
France	6	10		29 64

				C. per Lb.
Merchant bars:				
Belgium, July	7	10		1.53
Luxemburg, July	7	15		1.58
France	7	10		1.53
Joists (beams):				
Belgium, July	7	7½	to 7 10	1.50 to 1.53
Luxemburg	7	15		1.58
France	7	7½	to 7 10	1.50 to 1.53
⅜-in. plates:				
Belgium, July	8	5	to 8 10	1.68 to 1.73
⅞-in. plates:				
Luxemburg	7	7½		1.50
Belgium	7	10		1.53

Pig Iron Prices Easing and Output Likely to Decline—Steel Prices Slowly Falling

LONDON, ENGLAND, June 28.—The pig iron market shows no improvement so far as demand is concerned and prices have eased off. This may be regarded as a step in the right direction, in so far as it brings nearer the time when some general revival in the iron and steel industry may be possible, but from the point of view of pig iron producers it is not very satisfactory. Costs continue high, and there is continued talk of damping down of furnaces.

During the month of May the changes in rates of wages aggregated a reduction of nearly £100,000 in the weekly full-time wages of nearly 900,000 workmen, but an increase of over £90,000 in the wages of 700,000. The reductions were largely in the building trades, while the principal groups obtaining increases in wages were coal miners, in several important mining districts, and iron miners, blast furnace workers, puddlers, millmen and steel workers, who in certain areas secured advances under sliding scale agreements on account of the increased prices obtained for iron and steel products. In certain directions, therefore, a reduction in costs may follow the decline in selling prices, and, although it is always difficult to get a start made, the easier tendency in pig iron prices may possibly prove to be the beginning.

In the Middlesbrough district contracts are rapidly running out and Cleveland pig iron is now quoted at about 112s. 6d. for No. 3, while No. 1, which is relatively scarce, is quoted at about 125s. The make, however, in general, is in excess of current requirements, and stocks at makers' yards are showing a steady accumulation. The output of East Coast hematite is also in excess of the demand, and in the hope of preventing an accumulation of stocks, makers have been shading prices. East Coast mixed numbers stand at about 112s. 6d. per ton, the same as No. 3 foundry, and, indeed, at times it has actually been quoted lower than foundry iron. In the Manchester district the position is much the same, consumers of pig iron showing a reluctance to commit themselves at present prices, and although the figures asked have been shaded, buyers are evidently looking for much more drastic cuts in prices. The result is that it will soon be a question of blowing out some of the Midland furnaces if stocks are not to be accumulated.

In finished iron and steel there is no material alteration in the position. So far, the demand has not expanded, possibly owing to the fact that prices are so slow in coming down. Although continental material is offered at competitive prices, few orders seem to be placed in that direction either. In spite of this, however, the prices asked on the continent are rather harder than they were, owing apparently to the possible difficulties in securing fuel supplies, as well as to a slightly improved local demand.

Iron and Steel Markets

Output and Orders Less

July Promises Further Curtailment in Production

Pig Iron Still Declining—New Labor Developments

The week has brought evidence of lessened steel production, of continued decline in pig iron and scrap prices and of better supply of common labor. Orders on the books of the steel companies have fallen off somewhat, and new buying shows more marked effects of midsummer quiet.

Steel ingot output in June, at 3,748,890 tons, or 144,188 tons a day, was at a daily rate about 7 per cent less than that of 155,400 tons in May. From the high output of April, which represented 49,000,000 tons a year, there was a drop last month to a yearly rate of 45,000,000 tons.

The outlook now is for less production of both pig iron and steel ingots in July than in June. Steel works have only 25 working days this month, and the midyear rolling mill shutdowns and summer heat are further factors.

The reduction of 595,000 tons in the Steel Corporation's unfilled orders in June indicates the high rate of shipments to consumers in that month. It is significant that these large shipments were chiefly of material bought at less than today's prices. On the contrary, pig iron currently being shipped was bought at prices below those of today.

Finished steel prices continue to be well held, apart from the concessions in sheets, reinforcing bars and hot-rolled strip steel, but buyers are watching closely the new relation of capacity and consumption and are attaching more significance to the declines in pig iron, coke and scrap.

Three labor developments are attracting attention for their possible effect on the steel market. First is a slightly better supply of common labor, with less competition from building and road work. At the same time labor union leaders announce a new campaign to organize iron and steel workers, while several of the largest steel companies are arranging conferences of plant managers as the first step toward eight-hour shifts.

While the larger motor car makers are keeping close to their June schedules in output, they see ahead some slowing down and are taking in less steel, while drawing more on their stocks. Meanwhile producers of alloy steel are curtailing somewhat. Strip steel mills also are well caught up on automobile business.

Lake shipyards have several new inquiries for boats and the total pending would require 20,000 to 25,000 tons of steel.

Railroad equipment buying has reached the low point of the year. About 800 cars of all descriptions were placed and there are new inquiries for 650.

Fabricated steel has had an off week. Nineteen awards averaged less than 240 tons apiece, but a court house in Los Angeles, 7100 tons, brings the total to nearly 12,000 tons. Railroad bridgework was conspicuous both in the buying and in new inquiry. The largest new building project is that of the Ford Motor Co. at St. Paul, calling for 7500 tons of steel.

The recent wage settlement for Central Western iron mills gives puddlers $13.88 per ton for July and August, an advance of $1.76 over the May-June rate. The average bar iron price was found to be 2.50c., as against 2.35c. in the previous 60 days.

The new Carnegie card of extras for steel bars and small shapes, showing large increases for some sizes, is in harmony with the policy of making prices more nearly in line with costs. These have increased heavily, especially in labor, since the old card was issued in 1908.

Weakness in pig iron is more pronounced, with lower quotations in nearly all Northern centers and further concessions by Tennessee furnaces. Chicago prices again have fallen $1, making $4 within a month. On foundry irons prices have declined at least $1.50 in eastern Pennsylvania and more at Buffalo. Stocks on Alabama furnace yards increased about 13,000 tons in June. A blast furnace in Alabama, one in Wisconsin and one in Pennsylvania have blown out. The outlook is that others will soon go on the idle list rather than continue to pile iron.

Estimates of cast-iron pipe production for the first half of this year indicate an increase of 40 per cent over the first half of 1922. Last year's total production was 1,266,245 net tons. Labor shortage prevents full operation of some shops.

British makers, by united action, have reduced ferromanganese from $125 to $117.50, American Atlantic port, duty paid. This action recognizes the continued decline in pig iron prices here and the shrinkage in use of ferromanganese as steel output has fallen off.

Following almost immediately its purchases of round tonnages of rails, Japan is now in the market for 7000 tons of 75-lb. and 3000 tons of 60-lb. rails.

THE IRON AGE pig iron composite price, at $26.04 per gross ton, is $4.82 below the high point of last spring and 75c below last week's figure.

For the tenth successive week THE IRON AGE composite price for finished steel stands at 2.789c. per lb., compared with 2.446c. at the beginning of the year and 2.169c. one year ago.

Pittsburgh

Fair Business for Steel Makers—Pig Iron Prices Decline

PITTSBURGH, July 10.—While a fair amount of business is coming to steel makers in this district, it is generally for moderate sized lots and in all cases for early delivery. Buyers of steel evidently are satisfied that higher prices are not likely in the near future and there has been such a steep decline in pig iron and coke in the past six weeks, to say nothing of the heavy decline in scrap prices, they apparently sense the possibility of lower prices of finished material. The market has declined $6 a ton on basic pig iron since April and today's offering price of $19 for steel scrap represents a

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 10, 1923	July 2, 1923	June 12, 1923	July 11, 1922
No. 2X, Philadelphia†	$28.26	$29.76	$30.26	$27.61
No. 2 Valley furnace	*26.00*	26.50	28.00	21.00
No. 2, Southern, Cin'ti†	29.05	29.05	29.55	23.00
No. 2, Birmingham, Ala.†	25.00	25.00	25.50	18.00
No. 2 foundry, Chicago*	*28.00*	29.00	32.00	24.00
Basic-delivered, eastern Pa.	*27.00*	28.00	28.14	23.50
Basic, Valley furnace	*25.00*	25.50	27.50	24.00
Valley Bessemer, del P'gh.	*28.27*	29.27	30.77	26.77
Malleable, Chicago*	*28.00*	29.00	32.00	25.00
Malleable, Valley	*26.00*	26.50	29.00	24.00
Gray forge, Pittsburgh	*27.37*	27.77	30.27	24.27
L. S. charcoal, Chicago	36.65	36.65	36.65	31.65
Ferromanganese, furnace	*120.00*	135.00	130.00	87.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. sheet bars, P'gh	42.50	42.50	45.00	35.00
Forging billets, base, P'gh.	47.50	47.50	52.50	40.00
O.-h. billets, Phila.	47.67	47.67	50.17	40.17
Wire rods, Pittsburgh	51.00	51.00	51.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	*2.40*	2.45	2.45	1.70
Light rails at mill	2.25	2.25	2.25	1.75

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.67*	2.72	2.72	1.925
Iron bars, Chicago	2.50	2.50	2.60	1.80
Steel bars, Pittsburgh	2.40	2.40	2.40	1.70
Steel bars, Chicago	2.60	2.60	2.60	1.75
Steel bars, New York	2.74	2.74	2.74	2.04
Tank plates, Pittsburgh	2.50	2.50	2.50	1.70
Tank plates, Chicago	2.80	2.80	2.80	1.75
Tank plates, New York	2.84	2.84	2.84	2.04
Beams, Pittsburgh	2.50	2.50	2.50	1.70
Beams, Chicago	2.70	2.70	2.70	1.75
Beams, New York	2.84	2.84	2.84	2.04
Steel hoops, Pittsburgh	*3.15*	3.30	3.30	2.50

Sheets, Nails and Wire,	July 10, 1923	July 2, 1923	June 12, 1923	July 11, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.85	3.85	3.85	3.15
Sheets, galv., No. 28, P'gh	5.00	5.00	5.00	4.15
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.40
Wire nails, Pittsburgh	3.00	3.00	3.00	2.10
Plain wire, Pittsburgh	2.75	2.75	2.75	2.25
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.05
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$21.00	$21.00	$22.00	$19.50
Carwheels, Philadelphia	*20.00*	22.00	23.00	17.50
Heavy steel scrap, P'gh	*18.50*	20.00	21.50	17.50
Heavy steel scrap, Phila.	*17.00*	17.50	18.00	15.00
Heavy steel scrap, Ch'go.	17.25	17.25	18.00	15.50
No. 1 cast, Philadelphia	*20.50*	21.00	22.00	17.50
No. 1 cast, Pittsburgh	*21.50*	22.50	24.50	19.00
No. 1 cast, Ch'go. (net ton)	*20.50*	21.50	22.00	17.00
No. 1 RR. wrot. Phila.	*19.00*	21.00	23.00	17.00
No. 1 RR. wrot. Ch'go. (net)	15.00	15.00	15.50	13.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.75	$4.75	$4.75	$9.50
Foundry coke, prompt	5.50	5.50	5.50	10.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*14.87½*	15.00	15.25	14.00
Electrolytic copper, ref'y.	*14.25*	14.50	14.75	13.75
Zinc, St. Louis	**6.05**	5.75	6.15	5.52½
Zinc, New York	**6.40**	6.10	6.50	5.87½
Lead, St. Louis	*5.70*	6.55	7.00	5.50
Lead, New York	*6.00*	6.85	7.25	5.75
Tin (Straits), N. Y.	*38.25*	38.50	42.00	31.12½
Antimony (Asiatic), N. Y.	*6.75*	6.95	6.75	5.00

•The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price July 10, 1923, Finished Steel, 2.789c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 85 per cent of the United States output of finished steel

July 2, 1923,	2.789c.
June 12, 1923,	2.789c.
July 11, 1922,	2.169c.
10-year pre-war average,	1.689c.

Composite Price July 10, 1923, Pig Iron, $26.04 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

July 2, 1923,	$26.79
June 12, 1923,	28.46
July 11, 1922,	23.61
10-year pre-war average,	15.72

drop of $8 or more from the peak price of the forepart of the year.

The slump in the pig iron market is largely ascribed to selling of surplus production by the steel companies and it is now understood that those who have been selling, realizing the possible effect of declining pig iron prices upon the finished steel market, either are withdrawing from the market or are naming prices above those at which they recently were willing to sell. Today's prices are so unprofitable for a number of merchant pig iron producers that it is expected that at least one-half dozen furnaces will be banked or blown out in the next few weeks.

In the main, steel prices are well maintained. A new list of discounts on bolts and nuts has appeared, which reflects a reduction of 10 per cent from the former published quotations and on hot-rolled flats, hoops, bands and hot-rolled strips, 3.30c. base is merely an "official" quotation. The fact that bars may be had at 2.40c., base, for very prompt delivery and plates at 2.50c. for shipment in four or five weeks gives these quotations the appearance of being delivery premium prices. There is not enough forward buying of these products to determine what the market is for deferred delivery. It is claimed here that there is no shading of the regular prices on sheets, and reports that black sheets are selling at 3.75c., base, cannot be verified.

The Carnegie Steel Co. last week issued a new card of extras on steel bars substantially advancing all extra charges and the American Sheet & Tin Plate Co. has revised and advanced the extras on the heavy base weights of tin plate. Those revisions are the result of a check-up of individual costs and reflect the changes in costs which have occurred since the old cards were compiled several years ago.

Plant operations generally are at a higher rate this week than they were last week, but remain somewhat below those of the last week of June. Sheet mill operations, which fell off most during the holiday week, have increased on an average about 10 per cent. There has been no material decline in ingot production, but this month will show up smaller in pig iron production due to the fact that several blast furnaces were banked over the holiday and at least one half dozen furnaces will go out of production between now and the end of the month.

The scrap market shows further sharp recessions due to the absence of mill buying and the anxiety of dealers to find a place for material they must move. The coke market is no lower than it has been, but does not show much rallying power since production is more than ample and there is the threat that much tonnage will be thrown back upon the market as the result of blast furnace suspension.

Pig Iron.—The past week has seen further declines in all grades, basic foundry and malleable grades being off 50c. a ton, while Bessemer is offered at $26.50 as compared with last week's quotation of $27.50. There has been one sale of a round lot of basic at $25, Valley furnace. Details other than the price are withheld, but the tonnage involved is understood to be at least 2000 tons, the purchaser being a furnace interest anxious to catch up with its obligations. Another sale also at $25, Valley furnace, to the steel foundry of a local car builder involves 1000 tons. There are reports that sales of basic have been made as low as $24.50 and even $24, but confirmation cannot be had. Sales of Bessemer iron, usually in small lots, have been at $27, Valley furnace, but there are definite offers by producers now at $26.50, Valley furnace. While occasional sales of foundry iron are reported as high as $27, Valley furnace, for the base grade, the prevailing market is $26 and brokers claim they are able to buy as low as $25.50. Valley furnace interests are quoting malleable iron at $26, and claim to have made sales at that figure, although there is a tonnage of this grade laying on the yard of a western Pennsylvania furnace that is available at $25.50. The Valley maker of low phosphorus iron still is quoting $35, furnace, but this price cannot now be obtained since an Eastern furnace has sold through its local agents approximately 500 tons at $30 and $29 furnace, or $34.42 to $35.42 delivered, as against $36.77, the delivered price at Pittsburgh on $35 at the Valley. The Shenango Furnace Co. this week will bank one of its two active furnaces because of the exhaustion of storage space, and the Claire furnace, at Sharpsville, Pa., will be banked, starting about July 15, for a period of about six weeks, while new blowing engines are connected up. Fannie furnace of M. A. Hanna Co., West Middlesex, Pa., will go out of blast before the end of the month, and the stack of the Clinton Iron & Steel Co., Pittsburgh, also is mentioned as an early addition to the idle list, as is also the Dover furnace, M. A. Hanna Co., Canal Dover, Ohio.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$25.00
Bessemer	$26.50 to 27.00
Gray forge	25.50
No. 2 foundry	26.00
No. 3 foundry	25.50
Malleable	26.00
Low phosphorus, copper free (nominal)	35.00

Ferroalloys.—Business in all ferroalloys still is very light and prices, though unchanged, are merely nominal. Domestic producers of ferromanganese some time ago disposed of considerable tonnage to middlemen in the belief that the tonnage had been sold to consumers. It now develops that these purchases, made generally around 110, were speculative and as many of them have not yet been specified against, they constitute something of an obstacle to fresh business at the price now quoted by producers. Some resale British material also is available at well below the current price, but generally, British producers are better sold up than those of this side of the water, one explanation being that the Steel Corporation, a short time ago, when it was having difficulty in bringing in ore, bought between 30,000 and 40,000 tons of British ferromanganese as a protection against shortage. We note one sale of a round lot of spiegeleisen at $45, furnace, for 19 to 21 per cent material, but general demand for this alloy is light, since important consumers are well covered by contracts and deliveries are free against these contracts. There has been no official announcement of a reduction in Bessemer ferrosilicon or silvery irons, but sales at below the quoted schedules are reported from other districts. Demand for 50 per cent ferrosilicon has grown so limited that sales now are possible only at the contract base of $82.50, delivered. We note a sale of a carload at that price to a local car builder. Prices are given on page 113.

Semi-Finished Steel.—It has just come out that the third quarter price of sheet bars of the Steel Corporation to those makers of tin plate which it continues to serve is $42.50, the same price as was announced a few weeks ago by independent producers. No other price is quotable on sheet bars at the moment because open market activities are extremely limited and naturally producers are not disposed to force sales since this would make necessary an adjustment in the contract price. Rolling billets and slabs also are quoted at $42.50, but this price is largely untested, as inquiries are extremely few. Efforts to obtain more than $50 base for forging billets usually are unsuccessful. While there is not much competition for business in the latter form of steel on account of the extra labor involved, one company appears willing to take tonnages at $47.50 and there are no current inquiries so urgent in character as to lead buyers to pay more. The skelp market is virtually at a standstill, as important consuming interests are getting plenty of material on contracts from their regular sources of supply. We quote skelp at 2.40c. to 2.45c., but these are asking rather than sales prices, notwithstanding that sheared plates still command 2.50c. There has been no weakening as yet in prices of wire rods, although orders for third quarter delivery are below those for the second quarter with most makers. Production has declined almost as much as the demand, and makers are encouraged to hold firmly by the thought that recent revision of extras for bars is going to mean a demand for rods as a substitute. Buyers argue that rod prices do not reflect the decline which has taken place in billets, but makers point out that rods have eased off from $55 base to $51. Prices are given on page 113.

Wire Products.—Business has quieted down considerably since last accounts and with makers making a steady reduction in their obligations and likely to be cleaned up on them by Sept. 1, they are more anxious for business than they were recently. They are not yet making contracts except in a few instances with large customers, preferring to take on specified orders. There is no sign of agricultural buying as yet and mid-year inventories are keeping down demands from other sources. A better market is expected within the next 30 days and if the new extras on bars recently announced by the Steel Corporation find general adoption and adherence, it is believed that there will be considerable substitution of wire for the smaller sizes of bars. There are no suggestions of shading of the regular prices on wire products which are given on page 112.

Nuts, Bolts and Rivets.—Some makers of bolts and nuts have come out with a new lists of discounts which, while reflecting a reduction of 10 per cent, actually amount to a confirmation of the prices which were really being quoted privately. It is claimed that the former quotations still are in effect on small lot business. The new discount on bolts is 50, 10 and 10 per cent off list for large machine bolts. Business is just fair, as buyers still have much low-priced material coming to them on old orders and want to be satisfied that prices are at bottom before committing themselves further. Prices on rivets are unchanged, but concessions are appearing on attractive specifications. Prices and discounts are given on page 112.

Steel Rails.—Demand for light rails still is dull, but this fact does not seem to affect prices any. Makers rolling these sections from billets or standard rail crops still are quoting 2.25c. base. Those rolled from old rails are priced $1 to $2 per ton less.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2.15c. to 2.20c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Track Fastenings.—Small spikes still are very slow of sale, but a good, steady business is being done in large spikes and other products under this heading. We note no change in prices. They are given on page 112.

Iron and Steel Bars.—Buyers are getting such good deliveries on old and low priced contracts that their present needs are very moderate and they are having little trouble in getting them covered promptly at 2.40c. base. We hear of no shading of this price, although the new card of extras virtually means 2.50c. base since it involves an average increase of about $2 a ton. It is reported that as low as 2.25c. base has been quoted on reinforcing bars, but mills here disclaim having made any such quotations. Iron bars are sustained more because makers are obliged to pay more for labor than because of the big demand.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Hot-Rolled Flats.—Although the Steel Corporation is not a factor in early supplies of hoops and bands, its price of 3.15c. base for the ordinary gages and widths has an influence on what buyers are willing to pay. Independent makers still regard 3.30c. as the regular base on hoops, bands and hot-rolled strips, but it is admitted that not much business is on the books at that figure and it has lately become merely an asking price on hot-rolled strips, some makers of which in their anxiety for business, have gone as low as 3c. base. Prices are given on page 112.

Structural Material.—Aside from the fact that mills are making better delivery promises as they catch up with their old obligations, the situation is unchanged. We note no deviation from the regular market price of 2.50c. base for large structural shapes. The market for fabricated steel is weaker than that in plain material in that the shops are giving away part of the advantage of current receipts of plate material, prices of which are much below those now quoted. Prices are given on page 112.

Plates.—There continues to be a lively inquiry for moderate sized tonnages, chiefly in connection with oil storage tank inquiries, and a fair amount of business is being closed at 2.50c. base. Pittsburgh. Some of the tank builders cannot promise deliveries as promptly as they are desired and plate business therefore is not as heavy as the inquiries. Prices are given on page 112.

Tubular Goods.—Pressure for deliveries of material already ordered, particularly in the case of standard pipe, shows no abatement, but buying is decidedly lighter. It is now possible to make deliveries of steel line pipe in three and four weeks, and promises of delivery on oil well goods are not nearly as deferred as they were recently. The South Penn Oil Co. has an inquiry out for 31,000 feet of 8-in. line pipe.

Sheets.—Buyers generally are well covered by contracts or orders with the mills, and since deliveries are well up to quotas and there are no hitches, buying is very limited. Cancellations and suspensions are virtually unknown, and another surprise to the trade is that in the face of a light demand there is practically no shading of regular prices. There has been some recovery in mill operations which are about 10 per cent in the case of the independent companies. Prices are given on page 112.

Tin Plate.—Signs multiply that there is going to be a shortage of supplies before the summer is over. Most makers took all the third quarter business they figured they could complete and now find that on account of the hot weather and shortage of labor they are falling behind in their deliveries. Food container requirements are exceptionally heavy this year, and there are a good many inquiries for tonnages to supplement original orders. Mills are not accumulating many stock items and such material does not promise to be of much help in piecing out the general supply. The American Sheet & Tin Plate Co. recently announced the adoption of extras on heavy base weights of tin plate which provides for a charge of $1.15 for the first cross (20 lb.), over 100 lb. base, an increase of 25c., and for each additional cross there is now a charge of 85c., as against 65c. in the old list of extras. It has been found that the old charges did not cover the extra weight of metal and the new card has been adopted to correct this condition. Independent makers have adopted the new card.

Cold-finished Steel Bars and Shafting.—There is a fairly good business, but it is almost entirely for moderate sized lots for early delivery, buyers showing practically no inclination to anticipate their requirements, although the new card of extras, recently adopted by the leading makers of hot-rolled bars, if generally observed, is likely to mean higher prices for cold-finished bars. An Eastern maker still is quoting 3.15c. base, but local makers continue to hold to 3.25c. base. Ground shafting remains at 3.65c. base, f.o.b. mill, for carload lots.

Coke and Coal.—Curtailment of beehive oven coke production has not yet been sufficient to cause any strengthening in prices. Furnaces which did not contract for their third quarter requirements now seem disposed to buy for shorter periods, because of the uncertain pig iron situation. There is some anxiety on the part of several producers for business and while they are quoting $5 for either July or third quarter business, the most recent business for these periods was at $4.75 and it is believed that price still can be done. The spot market on furnace coke also is quotable at $4.75 to $5, although lately it has been a little hard to pick up strictly standard coke at the lower figure. Foundry coke still ranges from $5.50 to $6 per net ton at ovens for spot and $6.50 to $7 on last half contracts. There has been some revising on early third quarter contracts for furnace coke, whereby purchasers will be called upon to pay $6 instead of $7, the price originally agreed upon; it is claimed this reduction will not help the pig iron producer and that eventually the contracts carrying a price above $5 will be reduced to that figure. The coal market remains very dull and prices are soft. Mine run steam coal still is priced at $1.75 to $2 per net ton at mines for spot delivery, while mine run gas and coking coal is at about $2.25. Steam slack is firmer at $1.25, but gas slack is a drug on the market at $1.40.

Old Material.—Only appraisals of the value of old material can be made this week since mill buying has virtually ceased and with no sales of consequence upon which to base them, quotations represent what might be done. We make sharp reductions in prices of all grades. Heavy melting steel is quoted at $18.50 to $19 as compared with $20 and $20.50 last week and a corresponding cut is made in other so-called open-hearth grades. Steel plants are well stocked and purchases are restricted by the fear of getting supplies at a price above the ultimate bottom. Recent sale of machine shop turnings in this district at $12, although it represented a "distress" tonnage, which had to be moved regardless of the price, seems to have fixed the price idea of the leading consumers of this grade at $12. Dealers are unable or unwilling to go below $13; so on the basis of bids and offers the market is quotable on this material at from $12 to $13. Norfolk & Western Railway will receive bids until noon, July 18, on 9150 gross tons of old material.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$18.50 to $19.00
No. 1 cast, cupola size	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 20.00
Compressed sheet steel	17.50 to 18.00
Bundled sheet sides and ends	16.00 to 16.50
Railroad knuckles and couplers	21.50 to 22.00
Railroad coil and leaf springs	21.50 to 22.00
Low phosphorus standard bloom and billet ends	23.50 to 24.00
Low phosphorus plates and other grades	22.50 to 23.00
Railroad malleable	19.00 to 19.50
Steel car axles	22.00 to 22.50
Cast iron wheels	20.50 to 21.00
Rolled steel wheels	21.50 to 22.00
Machine shop turnings	12.00 to 13.00
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.50 to 16.00
Cast iron borings	15.50 to 16.00
Heavy breakable cast	17.50 to 18.00
Stove plate	15.00 to 15.50
Sheet bar crop ends	22.00 to 23.00
No. 1 railroad wrought	15.00 to 15.50

Chicago

Buying of Steel Is Light, but Specifying Is Heavy—Pig Iron Prices Lower

CHICAGO, July 10.—Buying of finished steel is light, but users are specifying fully against their contracts. With very few requests for cancellations or suspensions, local mills with their comfortable back-logs are not greatly concerned about the limited amount of new business. It is to be noted that the market is not entirely devoid of encouraging features and as the customarily quiet summer season passes, bookings are expected to pick up again.

Prospects for further oil storage tank business are bright and continued rail buying is looked for. Fabricating awards for the week were numerous, though individually small, and a plant for the Ford Motor Co. at St. Paul, on which early action is expected, involves 7500 tons. Local prices on finished steel are generally firm and will probably remain unchanged in view of the satisfactory condition of the mills' order books.

Summer weather conditions are commencing to affect mill operations adversely, the output of finished products for the Inland Steel Co. having dropped to 65 per cent of capacity. The Illinois Steel Co., on the other hand, is producing steel at the rate of 97 per cent of ingot capacity and is still operating all of its 27 steel works blast furnaces.

Pig Iron.—The market is weak and exceedingly quiet, and local iron is now quoted at $28 to $28.50, furnace. Producers apparently prefer to curtail their operations rather than pile iron, one of the Mayville furnaces having been blown out last week. Heretofore one of the most encouraging aspects of the market has been the sustained consumption of iron in this territory, but recent advices indicate that certain classes of melters, notably jobbing foundries, implement manufacturers and sanitary ware makers, are reducing their operations. Among the few sales reported may be mentioned 300 tons of foundry bought by a northern Illinois melter for last half delivery and 250 tons of foundry purchased by a Wisconsin user for third quarter. Little interest has been manifested in Southern iron, but it is intimated that an attractive inquiry might bring out a concession from the present minimum of $25, base Birmingham. Although a few resale lots of charcoal have moved at concessions, producers are holding firmly to $33.50, base furnace. No sales at that price are reported, however. An inquiry from Kentucky calls for 150 tons of Lake Superior charcoal.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago..	$36.65
Northern coke, No. 1, sil. 2.25 to 2.75	$28.50 to 29.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	28.00 to 28.50
Malleable, not over 2.25 sil.	28.00 to 28.50
Basic	28.00 to 28.50
High phosphorus	28.00 to 28.50
Southern No. 2	31.01
Low phos., sil. 1 to 2 per cent, copper free	$36.00 to 37.00
Silvery, sil. 8 per cent (nominal)	43.29

Ferroalloys.—Foreign producers are now offering ferromanganese at $117.50, seaboard. No sales are reported here.

We quote 80 per cent ferromanganese, $125.06 to $130.06 for all deliveries; 50 per cent ferrosilicon, $92.50, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Structural Material.—While fabricators are booking less tonnage in the aggregate, lettings for the week were numerous, ranging from 100 to 400 tons each. Among prospective projects the new Ford Motor Co. plant at St. Paul stands out prominently. This work will involve 7500 tons and bids on the general contract will be taken July 12.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Plates.—Oil tank business continues to be a feature of the market. A local tank builder is inquiring for 10,000 tons of plates and a Southwestern fabricator who is in the market for several thousand tons has been unable to obtain desired delivery from Chicago mills. Railroad car buying is still light, but for orders placed during the past week it is expected that at least 5000 tons of material will be bought here. Prices are firm and unchanged.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—Demand for soft steel bars shows no change, with buying limited, but with specifications as free as ever. Local mills have comfortable backlogs, so that prices are expected to remain steady at present levels. New business in bar irons continues to fall short of shipments, but prices are fairly well maintained at a minimum of 2.50c., Chicago mill, and occasional orders are taken at as high as 2.60c. Bookings in hard steel bars, while not heavy, are sufficiently large to hold prices firmly to the 2.30c. level.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.50c. to 2.60c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3.15c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—New orders showed a slight increase during the week and when added to specifications against contracts constituted a very satisfactory tonnage for the dull season of the year. Demand for nails is still heavy in the large manufacturing centers, although it has declined in the agricultural districts. Production is substantially unchanged and prices are firm. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 112.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.95 per 100 lb.; cement coated nails, $3.25 per keg.

Cast-Iron Pipe.—There continues to be a scarcity of small sizes and prices are strong, ranging from $52 Birmingham, up. The situation in the larger diameters, however, is steadily growing easier and prices are accordingly more flexible. The United States Cast Iron Pipe & Foundry Co. has taken orders for 3000 tons of 30-in. for Long Beach, Cal., 800 tons of county work, Painesville, Ohio, and 300 tons of six-to 12-in. for Little Chute, Wis. Joliet, Ill., has postponed action on 300 tons of 6- to 10-in.. Minneapolis takes bids today on 2000 tons of 6-to 16-in. Chicago will receive tenders on 570 tons of 8-in. July 16. Wilmette, Ill., has let the general contract for one mile of 12-in., but the pipe has not yet been bought by the successful bidder. The same is true of three miles of 6- and 8-in. for Homewood, Ill.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $58.20 to $59.20; class A and gas pipe, $5 extra.

Bolts and Nuts.—Specifications against third quarter contracts are fairly numerous, although involving small amounts. New business in aggregate still falls short of output and prices are not altogether steady. Shading cannot be characterized as general, however, being of a sporadic nature. Ruling discounts are those shown on page 112, except that for delivery in this territory they are f.o.b. Chicago.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Reinforcing Bars.—There have been a number of large lettings during the week, foremost among them being 1300 tons for a medical school and hospital at the University of Rochester, Rochester, N. Y., which will be constructed by a Chicago contractor. Sellers are encouraged by the buoyancy of building activity, but are somewhat concerned because of a decline in the

number of small orders, the aggregate of which was great in the early months of the year. The price situation is substantially unchanged.

Awards include:

Medical school and hospital for University of Rochester, Rochester, N. Y., 1300 tons to Corrugated Bar Co.

Power plant, South Bend, Ind., 500 tons to Kalman Steel Co.

Stewart-Warner Speedometer Corporation, plant addition, Chicago, 700 tons to Barton Spiderweb System Co.

State reformatory building, Pendleton, Ind., 150 tons to Corrugated Bar Co.

Northwestern Packing Co. plant, Chicago, 100 tons to Truscon Steel Co.

Illinois State bridge work, 100 tons to Kalman Steel Co.

School building, Ely, Minn., 200 tons to Corrugated Bar Co.

Veterans' hospital, St. Cloud, Minn., 250 tons to Cowin & Co., Inc.

Sheets.—New business is light, probably too light to develop any weakness in prices if there be any. It is apparent that local mills, which are booked through the third quarter, have taken care of the requirements of a large portion of the users in this territory.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Old Material.—Outside of a purchase of 10,000 tons of heavy melting by a local mill at a reported price of $17.75 delivered, there has been no activity to speak of in the market. Prices are weak, but few declines have been recorded, probably because of the small amount of trading. Railroad offerings include the Great Northern, 1500 tons, and the Chicago Great Western 750 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$22.00 to $22.50
Cast iron car wheels	21.00 to 21.50
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	21.00 to 21.50
Rails for rolling	18.00 to 18.50
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	17.25 to 17.75
Frogs, switches and guards cut apart	17.25 to 17.75
Shoveling steel	17.00 to 17.50
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheets	15.00 to 15.50
Axle turnings	14.50 to 15.00

Per Net Ton

Iron angle and splice bars	22.50 to 23.00
Steel angle bars	16.00 to 16.50
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	26.00 to 26.50
Steel car axles	19.50 to 20.00
No. 1 busheling	13.50 to 14.00
No. 2 busheling	11.00 to 11.50
Cut forge	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	19.00 to 19.50
Coil springs	20.50 to 21.00
No. 1 machinery cast	20.50 to 21.00
No. 1 railroad cast	19.25 to 19.75
No. 1 agricultural cast	19.25 to 19.75
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	10.00 to 10.50
Cast borings	12.50 to 13.00
Short shoveling turnings	12.50 to 13.00
Stove plate	15.00 to 15.50
Grate bars	13.00 to 13.50
Brake shoes	14.00 to 14.50
Railroad malleable	20.50 to 21.00
Agricultural malleable	20.00 to 20.50

Warehouse Prices.—Local jobbers' quotations are unchanged, although it is expected that the extras on bars and bar size shapes will be advanced in conformity with the increases in the extras recently made by the mills.

Rails and Track Supplies.—The Illinois Central has made a tentative reservation of rolling space for 60,000 tons of rails. About half of the tonnage, which will go to the road's Southern lines and to its subsidiary, the Central of Georgia, will be rolled by the Tennessee mill, while the remainder will be produced here. The Burlington is in the market for approximately 40,000 tons, and a number of other lines, including the Nickel Plate and the Pennsylvania, are estimating their requirements for 1924, although they have not yet reached the point of putting out inquiries. The Pere Marquette, which has been in the market for about 5000 tons, may buy relayers. There are a considerable number of miscellaneous orders and inquiries for track supplies, most of them small. One inquiry from a Western road, however, calls for 5000 kegs of spikes. Orders for fully 10,000 rolled steel wheels have been closed or are at the point of being closed by the Gary mill.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Buffalo

Some Improvement in Inquiry for Pig Iron, but Not in Sales

BUFFALO, July 10—A few sellers of pig iron find improvement in inquiry but sales have not been heavier. One office reports between 10,000 and 12,000 tons of various grades of foundry iron inquired for, including one for 1500 tons and another for 1000 tons. The usual asking prices range from $26 to $27, with $25 reported. The Gould Coupler Co. has filled the malleable and basic on which prices were sought two weeks ago. There is considerable testing going on; a number of producers get inquiries that involve tonnages for third quarter use but the actual purchase that develops from the quotation is only sufficient for present needs. The second largest producer has very little iron for third quarter offering. The number of carload to 100-ton sales have been up to the average. Unless unlooked for demand in malleable iron develops, the Donner Steel Co. will not produce any of this grade in the third quarter.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$27.00 to $28.00
No. 2X foundry, 2.25 to 2.75	26.50 to 27.50
No. 2 plain, 1.75 to 2.25 sil.	26.00 to 27.00
Basic	26.00 to 26.50
Malleable	26.00 to 26.50
Lake Superior charcoal	36.78

Finished Iron and Steel.—Prices on black sheets for shipment into Canada have been shaded by one mill and 3.75c. has been quoted to several buyers in that territory. Generally, inquiry has been lively but not to the point that would indicate a buying movement. Bars are firm at 2.40c. and shapes and plates at 2.50c. Demand is about evenly spread for bars, shapes and plates. Consumers' stocks are low. Demand for tin plate is not as brisk as in June, but has not fallen off to a discouraging point. Better deliveries on wire and nails are being made as manufacturers make inroads on current orders.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Prices are softer and the market is stagnant. Railroad lists closed last week brought $20 to $21 for heavy melting steel Valley district. Stock piles are at their lowest ebb and while some buying is expected it will be for such tonnages as cover immediate needs rather than ahead.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	24.00 to 25.00
No. 1 railroad wrought	17.00 to 18.00
Car wheels	17.50 to 18.50
Machine shop turnings	13.00 to 14.00
Cast iron borings	15.00 to 16.00
No. 1 busheling	17.50 to 18.50
Stove plate	17.50 to 18.00
Grate bars	17.00 to 17.50
Bundled sheet stampings	12.00 to 13.00
No. 1 machinery cast	20.00 to 21.00
Hydraulic compressed	17.00 to 18.00
Railroad malleable	21.00 to 22.00

New York

Pig Iron Dull and Weak—Buying of Finished Materials Not Expected This Month

NEW YORK, July 10.—The pig iron market is extremely dull and so demoralized as to prices that it is impossible to quote the market accurately. Irregularities apply particularly to the Buffalo market, where it seems to be fairly well established that $25 can be done on No. 2 plain and that it is necessary to pay very little, if any, more for silicon running as high as 3.25. In fact, the selling of high silicon irons at the same price as No. 2 plain is a feature of the present situation. In eastern Pennsylvania the base price is not more than $27, and reports of $26.50 are heard. In Virginia $27 is the nominal quotation, with no transactions reported. Very little of the inquiry which recently has been pending has been placed. The Gould Coupler Co. has contracted for 1000 tons of basic and 500 tons of malleable for last quarter. An air brake company has bought only a part of the tonnage for which it was inquiring. The Ingersoll-Rand Co. withdrew its inquiry for foundry which has been pending for several weeks and purchased 500 tons of malleable. A New Jersey melter is in the market for 1200 tons of off-malleable, 700 tons of which is for the last four months of this year and 500 tons for the first quarter of next year. Another New Jersey melter is in the market for 200 tons of No. 1X foundry for delivery in the last quarter of this year. A foundry at Elizabethport, N. J., has bought 200 tons for prompt delivery, silicon analyzing 1 to 1.50. The Gilbert & Barker Mfg. Co., Springfield, Mass., is inquiring for 650 tons analyzing 2.25 to 2.75 silicon and 400 tons analyzing 2.75 to 3.25.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$29.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	29.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	29.27
Buffalo, sil. 1.75 to 2.25	$29.91 to 30.91
No. 2X Virginia, sil. 2.25 to 2.75	32.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—Effective today, British producers of ferromanganese reduced their price from $125, seaboard, to $117.50, the duty being included in this quotation. This price nets the British producer around $84. No sales have been made at this level. The market is exceedingly inactive with almost no contract business reported and such sales as have been made confined to carload lots of alloy by dealers at $120. Steel makers are apparently well covered and are taking the alloy on contract in full measure. The spiegeleisen market is also exceedingly inactive. Quotations are unchanged at $45, furnace, for the 20 per cent alloy and $44 for the lower grade. One carload of imported British spiegeleisen has sold during the week at $51, seaboard. It is difficult to ascertain the minimum price at which 50 per cent ferrosilicon can be bought, as low as $84, delivered, being rumored. Demand, however, is confined to small and carload lots, most consumers being governed by contracts at higher prices.

Cast Iron Pipe.—Owing to labor shortage some shops which could easily run at 100 per cent are operating at only 80 per cent capacity. Deliveries for the most part cannot be made before November. We quote per net ton, f.o.b. New York in carload lots, as follows: 6-in. and larger, $62.30; 4-in. and 5-in., $67.30; 3-in. $77.30, with $5 additional for Class A and gas pipe. We quote soil pipe discounts of both Southern and Northern makers, f.o.b. New York in carload lots, as follows: 6-in. standard, 18 and 20¾ per cent off list; heavy, 28 to 30¾ per cent off list.

Finished Iron and Steel.—Sales representatives of steel companies seem to discern a slightly better feeling among consumers. This is frequently expressed in terms of greater confidence in the stability of steel prices, which some believed a month or so ago would not hold at present levels. Although mills are now pressing their customers harder for tonnage than at any time this year, there is little, if any, disposition to shade prices. While occasional cuts have been made, as, for example, by one mill on structural shapes and by a few mills on black sheets, the steel price structure remains fairly sound. Consumers, however, are not greatly interested in new commitments, as most of them have sufficient steel coming to them on contracts entered into during the first half of the year to carry them well into the third quarter. Sellers do not expect any marked increase in demand before August. In structural steel there is very little of size up for bids except a new manufacturing building for the Western Electric Co. at Kearny, N. J., which will require 2000 tons. Two large projects on which bids have been taken, a bridge for the Central Railroad of New Jersey, taking 22,000 tons, and the New York approach to the New York-New Jersey vehicular tunnel, 4500 tons, have not yet been acted upon so far as steel lettings are concerned. Railroad equipment buying has reached the low point of the year thus far.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c. to 2.84c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Warehouse Business.—Although the seasonal slackening is still in evidence, business is fair. Considerable pricecutting still persists in sheets, tending to produce softness. This situation, however, is regarded as temporary. Mill prices hold firm. Deliveries appear to be catching up in most products. The new classification on net extras on bars and shapes adopted by the mills last week has been adopted by the warehouses. Most of the extras by this classification have been increased, rounds and squares approximately doubled, and flats, angles, etc., approximately 50 per cent. Although as low as 4.45c. has been done on No. 18 soft black sheets, it is generally agreed that at the present mill prices warehouse sales should be considerably higher to leave a fair margin of profit. Inquiries for spring steel have been fairly numerous but they are small. High speed steel maintains the same moderate activity. Deliveries in wrought iron and steel pipe show scant improvement and one large dealer predicts that no change in prices of these will be made this year. A drop of 3c. is noted in No. 1 solder and 3½c. in refined. Straits pig tin also receded 1c. and bar tin 2c. Price quotations appear on page 128.

Coke.—The coke market is somewhat firmer, but the reason for this is not clear. Connellsville furnace coke is quoted at $5 for prompt shipment and foundry at $5.75 to $7. Quotations on standard furnace grades range from $5 to $5.50. By-product is quoted $11.34 to $11.41, Newark and Jersey City points.

Old Material.—With very few consumers in the market dealers are making few offers for old material. Prices are weak and are off at least 50c. a ton on most grades as compared with a week ago. There seems to be plenty of scrap for all demands.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.00 to $13.50
Steel rails, short lengths, or equivalent	13.50 to 14.00
Rails for rolling	16.00 to 18.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	20.00 to 21.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	16.50 to 17.00
Wrought iron track	15.50 to 16.00
Forge fire	12.50 to 13.00
No. 1 yard wrought, long	15.00 to 15.50
Cast borings (clean)	12.50 to 13.00
Machine-shop turnings	11.00 to 11.50
Mixed borings and turnings	10.50 to 11.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	12.75 to 13.25
Locomotive grate bars	13.00 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.50 to $21.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	19.50 to 20.00
No. 1 heavy cast, not cupola size	17.50 to 18.00
No. 2 cast (radiators, cast boilers,	15.50 to 16.00

Boston

Pig Iron Buyers Sit Tight While Furnaces Bid for Business

BOSTON, July 10.—Pig iron buyers the past week continued to sit tight while furnaces shaded prices. Actual business closed was negligible. Most Virginia furnaces reduced the base price from $28 to $27. Other interests cut the price from $27.50 to $27. Virginia iron, however, is still out of line with eastern Pennsylvania and Buffalo, competition between the last two for business in this territory being acute. One buyer maintains two eastern Pennsylvania furnaces offer malleable and No. 2X foundry at $26.50 furnace or $30.15 delivered. The statement cannot be substantiated. It is evident, however, silicon 1.75 to 2.25 can be obtained at $27 furnace, and No. 2X at $27.50, or $30.65 and $31.15 delivered, respectively. Eastern Pennsylvania furnaces, as prices drop, are endeavoring to maintain differentials. This policy does not apply to Buffalo No. 2 plain and No. 2X, the general tendency being to accept firm offers of $27. The Alabama iron market is purely nominal, furnaces not competing for business in this territory. Inquiries, without tonnages specified, are increasing as prices decline. Buyers have in mind that pig iron is practically on last February's basis, when a buying movement started. Advices received from eastern Pennsylvania are that furnaces will go out of blast if prices recede further.

We quote delivered prices on the basis of the latest reported sales as follows, having added $2.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$31.15 to $32.15
East. Penn., sil. 1.75 to 2.25	30.65 to 31.65
Buffalo, sil. 2.25 to 2.75	31.91 to 32.91
Buffalo, sil. 1.75 to 2.25	31.91 to 32.41
Virginia, sil. 2.25 to 2.75	33.42
Virginia, sil. 1.75 to 2.25	32.92
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Finished Material.—Further improvement in tonnages booked is reported by steel mill representatives. Specifications are general and call for shipment this month and in third quarter. Prices on bars, plates, sheets and structural steel hold steady. A noticeable increase is noted in the number of small construction jobs. Fabricating prices are fairly consistent. Large fabricators are well booked up and at least one is assured a sizable carryover into 1924. The New England construction outlook for late 1923 and for early 1924 is steadily growing more hopeful.

Coke.—A further increase in specifications against contract foundry coke, together with a freer movement of domestic coke, brought about by public uneasiness over the anthracite coal supply outlook this fall, has materially improved the position of New England by-product fuel makers. Doubts as to their ability to maintain present coking operations throughout the summer months are dispelled. In fact, they are reasonably assured good business the remainder of 1923, at least. Both the New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., quote foundry coke at $13.50 delivered within the $3.10 freight rate zone. Almost no interest is shown in Connellsville foundry coke. A slight increase is noted in business booked by foundries, which undoubtedly has some bearing on the increased movement of fuel.

Old Material.—Influenced by the completion of orders in brokers' hands, a lack of fresh mill buying, and the weakness in pig iron values, old material prices have slid off further, the average drop on all kinds of scrap being $1.12 a ton the past week. Wrought pipe is flat, easily $2 less, and evidently the weakest spot in the market. Other kinds of wrought material are practically as lifeless, yet not as soft as pipe. Prices on heavy melting steel take an unusually wide range. For extra selected stock, $13.50 on cars is a nominal price. Car lots of desirable sized material sold the past day or two at $12.50 shipping point. The best price large operators offer today is $12. Holders of machine shop turnings, who would not accept $11.50 on cars a week ago, since then have sold at $10.50. Borings and mixed borings and turnings are pressed for sale with few takers. Machinery cast is lower with other materials, although the amount available suitable for textile machinery foundries is comparatively small. A textile machinery maker the past week bought 300 tons No. 1 at $23.50 delivered, off $1. No market for stove plate exists in New England. For shipment to eastern Pennsylvania points, $12 or $12.50 on cars shipping point might be done.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$23.00 to $25.00
No. 1 machinery cast	21.00 to 21.50
Stove plate	11.00 to 12.00
Railroad malleable	24.00 to 24.50
Street car axles	22.00 to 22.50

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $13.50
No. 1 rail wrought	13.00 to 14.50
No. 1 yard wrought	12.00 to 12.50
Wrought pipe (1-in. in diam., over 2 ft. long)	5.00 to 8.00
Machine shop turnings	10.00 to 10.50
Cast iron borings, rolling mill	11.00 to 11.50
Cast iron borings, chemical	13.50 to 14.00
Blast furnace borings and turnings	10.00 to 10.50
Forged scrap and bundled skeleton	10.50 to 11.00
Shafting	19.00 to 19.50
Street car axles	19.00 to 19.50
Rails for rerolling	14.50 to 15.00

St. Louis

Pig Iron Market Extremely Dull and Prices Are Weak

ST. LOUIS, July 10.—With the exception of an inquiry for several hundred tons of Northern iron for prompt shipment, there is no business before the seller of pig iron in this district. Melters simply will not buy. It is believed that they have enough iron on hand to take care of the business they have on their books, and are waiting for more orders before they buy more material. The stove foundries are beginning to let up preparatory to taking inventory. The price of Northern iron is nominally $29, Chicago, but it is believed that an offer to take on a considerable tonnage would result in the cutting of this price to $28, at which sales were made in this territory a week ago. The Southern market ranges from $25 to $27, Birmingham, most concerns quoting the higher price, at which, of course, but few sales are being made. The St. Louis Coke & Iron Co. is quoting $29 to $30, Granite City.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$30.16 to $31.16
Northern malleable, sil. 1.75 to 2.25	30.16 to 31.16
Basic	30.16 to 31.16
Southern fdy., sil. 1.75 to 2.25	30.17

Finished Iron and Steel.—While fabricators are not placing any new orders for steel, they are more insistent in demanding shipments against contracts than they have been for some time. Jobbers are not placing any orders, but a few more inquiries are being received from them. Railroad inquiries are slowing down, the only new one being from the Missouri Pacific for last-half requirements (quantity not given) of nails, fence and wire. There is some interest here in the Masonic Temple, Muncie, Ind., which will require 300 tons of reinforcing bars.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.30c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, $\frac{7}{8}$ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50, and tapped, $2.50 off list.

Coke.—A little better demand is reported for coke, although the market still is easy. Connellsville furnace coke has been sold at $4.50 to $5 and foundry grades at $6.25 for spot shipments and $7.50 on contracts.

Old Material.—The price list of old material was virtually unchanged this week, after weeks of steady

declines. And yet there is no buying by consumers, except where they can get a bargain. Dealers are buying only where it is necessary to supply material on contracts before they expire. Three new railroad lists are before the market: Mobile & Ohio, 2000 tons; Union Pacific, 1000 tons, and Kansas City Southern, 1000 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$18.00 to	$18.50
Rails for rolling	17.50 to	18.00
Steel rails, less than 3 ft.	18.00 to	18.50
Relaying rails, 60 lb. and under	26.00 to	27.00
Relaying rails, 70 lb. and over	33.50 to	34.50
Cast iron car wheels	19.00 to	19.50
Heavy melting steel	16.50 to	17.00
Heavy shoveling steel	16.50 to	17.00
Progs, switches and guards cut apart	17.00 to	17.50
	Per Net Ton	
Heavy axles and tire turnings	12.75 to	13.25
Steel angle bars	15.25 to	15.75
Iron car axles	25.00 to	25.50
Steel car axles	19.00 to	19.50
Wrought iron bars and transoms	19.50 to	20.00
No. 1 railroad wrought	14.50 to	15.00
No. 2 railroad wrought	15.00 to	15.50
Railroad springs	19.00 to	19.50
Cast iron borings	12.50 to	13.00
No. 1 busheling	14.50 to	15.00
No. 1 railroad cast	17.00 to	17.25
No. 1 machinery cast	17.25 to	17.50
Railroad malleable	17.00 to	17.50
Machine shop turnings	11.50 to	12.00
Champion bundled sheets	9.50 to	10.00

Birmingham

Buyers Apathetic and Not Eager to Place Orders for Pig Iron at $25

BIRMINGHAM, ALA., July 10.—The Birmingham pig iron market of several weeks' standing remains untested. The one company quoting $25 had a little iron for third quarter left at the close of the week and was not in the fourth quarter market. A feature of the $25 iron is that the trade was not in over-hurry to absorb it, showing the general listlessness of the buyer as well as attitude of hoping for lower prices. No big buyer had appeared on the scene and the market has not been put to the test. Selling in the East with prices as they are is not thought of. It is a game of watchful waiting with all makers well covered for third quarter, no cancellations and very small stocks. The Tennessee company blew out Oxmoor stack Monday. It was on foundry. The company now has only two stacks on foundry. No cause was assigned for blowing out. It was reported in Birmingham, Saturday, that a Tennessee maker was offering 1.75 to 2.25 and 2.25 to 2.75 silicon at the same flat price of $24.50. Alabama has made and, yard stocks added, marketed 1,500,000 tons of iron in the first half of the year, an unprecedented record. Labor is not plentiful, but so far has caused no serious handicap in production by furnace banking or otherwise.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00
Basic	26.00
Charcoal, warm blast	34.00

Cast Iron Pipe.—The American Cast Iron Pipe Co. has taken 321 tons for Knox City, Tex.; 1043 tons for Longview, Wash., and 1509 tons for Bismarck, S. D. The base is $49. Hickory, N. C., is expected in the market for 20 miles of 16-in. pipe. Sanitary pipe is slow at $65.

Finishing Mills.—New steel business is seasonally slow, but wire drawing mills have bookings to capacity for two to three months, and are on full turn. The Tennessee company is on double turn at all finishing mills. Work was begun last week building the elevated short line ore railroad from Red Mountain to the blast furnaces at Bessemer and Ensley. It will prove a great economy in assemblage of raw material. The Conners Steel Co. awaits some machinery before resuming operations in its No. 2 mill, which was put temporarily out of commission by a fire.

Coal and Coke.—Coke is rallying since parties to old contracts have begun renewals, which are at base of $8. Spot coke is quoted at $8.50. The DeBardeleben Coal Corporation, merger of the Empire, Corona and De Bardeleben Coal companies, is operative with H. T. DeBardeleben president.

Old Material.—The scrap market suffers from the same lassitude as the iron market. There are no suspensions and no cancellations, but very little new business.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$18.00 to $20.00
No. 1 steel	16.00 to 18.00
No. 1 cast	23.00 to 24.00
Car wheels	23.00 to 24.00
Tramcar wheels	22.00 to 23.00
Stove plate	17.00 to 18.00
Cast iron borings	12.00 to 13.00
Machine shop turnings	12.00 to 13.00

Cincinnati

Pig Iron Prices Weak—Sale of Malleable to a Michigan Melter

CINCINNATI, July 10.—With the exception of one sale of 3000 tons of malleable to a Michigan melter, the market has been almost devoid of interest. Two large inquiries are current, one for 3000 tons of malleable for third quarter, and one of 2000 tons for last quarter. It is likely that both of these blocks will be bought within the next 10 days. Prices of Northern irons are weak, and on the sale mentioned above, it is said $26.75, Ironton basis was done, though the iron will not be shipped from southern Ohio. This price has been made by southern Ohio furnaces, however, and on the two inquiries pending it is expected that slightly lower prices will develop. There is little activity in Southern irons. The L. & N. Railroad bought 1000 tons, and did not pay more than $25, base, for the greater part of the tonnage. Some of this iron, of special analysis, went on a $25.50 basis. With the continued dullness of the market, furnaces are piling the greater part of the make, and it is said that at least three furnaces in the southern Ohio district will bank or blow out within the next week or two, while a fourth is expected to go out at any time for relining.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$29.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	29.55
Ohio silvery, 8 per cent	40.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.02
Basic Northern	29.02
Malleable	29.02

Finished Materials.—Orders generally are showing much improvement, but the larger buyers are noticeably out of the market, and the presumption is that they have sufficient material on hand to run them for some time. Some interest, however, is being shown in fourth quarter contracts, and the opinion of the trade generally is that present prices of finished products will be maintained throughout the last half, and even into the first quarter of next year. The only test of prices came last week on the inquiry of the Big Four Railroad for its third quarter requirements of steel. On approximately 1700 tons of plates and shapes, all quotations were on a 2.50c., Pittsburgh, basis, and on bars, 2.40c., Pittsburgh. On other items current prices also were quoted. There is little activity in sheets other than occasional orders for fill-in purposes, and mills generally are pretty well filled for third quarter. Some black sheets are available, from some of the smaller mills, and even some of the larger independents have small tonnages to offer for fairly early delivery. This probably accounts for the shading of prices on black. While there is little current demand for wire products, jobbers having contracts are urging the mills to make delivery, particularly of nails. Track accessories are rather quiet. In the building construction field the only project of consequence is the Cotton Exchange Building, Memphis, for which 800 tons of bars will be required. The William Powell Co., Cincinnati, will build an addition which will require about 150 tons of bars. In the structural field the largest new inquiry is from the

Peoria & Eastern Illinois Railroad, which is asking bids on 1285 ft. of viaduct work, estimated to require 1000 tons. An inquiry for 400 tons of plates is current for the Wilson Dam near Muscle Shoals, Alabama. The general contract for the Shriners' Temple, Nashville, has been awarded to Hugger Bros. Construction Co., Montgomery, Ala., and 700 tons of steel will probably be awarded this week to a Nashville fabricator. The Nashville Bridge Co. has been awarded 900 tons of steel for the municipal auditorium at Birmingham, Ala. Pending projects include an extension to the Havlin Hotel at Cincinnati, and bridge work for the Dix River Power Co., near Danville, Ky.

Warehouse Business.—Local jobbers report a slowing down in orders, but business is still considered good. Reinforcing bars are still in good demand, as well as small angles. Wire nails are moving well. There has been no change in prices.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—There is little activity in the coke market, most of the orders being carload lots for prompt shipment, though occasionally second half contracts are negotiated. Prices rule about the same as last week, Connellsville furnace being quoted at $5 and foundry $5.50 to $6.50. New River foundry is $11 to $13, Wise County furnace $6 and foundry $7. By-product quotations are unchanged at $9 to 9.50, Connellsville.

Old Material.—Only scattered carload sales of scrap are reported, and these are confined almost entirely to foundry grades. Steel mills are entirely out of the market. Dealers are buying for yard stocks, and there is a feeling that the bottom of the market has about been reached. Some grades have declined 50c., while prices of others remain at about the same level as last week.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$12.50 to	$13.00
Iron rails	15.50 to	16.00
Relaying rails, 50 lb. and up	28.00 to	28.50
Rails for rolling	16.50 to	17.00
Heavy melting steel	15.50 to	16.00
Steel rails for melting	15.00 to	15.50
Car wheels	16.00 to	16.50
	Per Net Ton	
No. 1 railroad wrought	12.50 to	13.00
Cast borings	11.00 to	11.50
Steel turnings	9.50 to	10.00
Railroad cast	17.00 to	17.50
No. 1 machinery cast	20.50 to	21.00
Burnt scrap	12.50 to	13.00
Iron axles	23.00 to	23.50
Locomotive tires (smooth inside)	13.50 to	14.00
Pipes and flues	10.50 to	11.00

Detroit Scrap Market

DETROIT, July 7.—Melters in this district in many cases have about completed contracts for pig iron, but are delaying further purchases as long as possible. The melt in automotive lines will in all probability be increased over the present basis the latter part of the month, most factories having completed patterns for change of models. Stove manufacturers have been closed down for the week, due to the midweek holiday, and have taken advantage of this period for necessary repairs to cupolas. Little interest is being shown in old material, with the market having all the tendencies of a buyers' market with turnings very low.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$15.00 to $17.00
Shoveling steel	15.00 to 17.00
No. 1 machinery cast	18.00 to 20.00
Cast borings	12.50 to 13.00
Automobile cast scrap	22.00 to 24.00
Stove plate	15.00 to 17.00
Hydraulic compressed	14.00 to 15.00
Turnings	7.50 to 8.00
Flashings	10.00 to 11.00

Cleveland

Pig Iron Market Weaker—Improved Demand, but Lower Prices for Bolts and Nuts

CLEVELAND, July 10.—Sales of four small lots of Lake Superior ore aggregating about 30,000 tons were made during the week. While some consumers have not purchased all the ore that they are expected to need for the year, the present condition of the pig iron market does not encourage early buying and sellers look for little business before September.

Pig Iron.—The market generally is weaker, but there is not sufficient activity to test prices and there is considerable uncertainty as to what quotations round lot inquiries would bring out. The Valley price on foundry iron has further sagged to $26 and some consumers seem convinced that they will be able shortly to buy at $25. Locally the market is unchanged at around $27 to $27.50 at furnace, the $27 price being low enough to shut out Valley iron at $26. Sales during the week were very light, purchases in this territory being confined to small lots as needed. This hand to mouth policy is being followed by large as well as small consumers. One Cleveland interest reports sales during the week mostly from a western New York furnace for Eastern shipment aggregating 5000 tons of foundry and malleable iron, at $27.25 at furnace. However, the Buffalo market is no longer above $27 and that price could probably be shaded. A lake furnace reports sales of several lots aggregating 1000 tons. The Link Belt Co. is inquiring for 3000 tons of malleable iron for its Indianapolis plant for August and September shipment, this being the only inquiry of any size pending. Most foundries are taking their iron in good volume on contracts. Generally foundries do not appear to be operating so fully as they were a few weeks ago, although there has been no slowing down in the demand for iron from automobile foundries. Low phosphorus iron has declined $1 a ton. Iron in various grades is being offered by steel makers, which is having some effect on the price situation. A number of merchant furnaces are piling iron and several are expected to go out of blast this month.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.25 to $25.50
Northern No. 2 fdy., sil. 1.75 to 2.25	27.50 to 28.00
Southern fdy., sil. 1.75 to 2.25	31.00 to 31.50
Malleable	27.50 to 28.00
Ohio silvery, 8 per cent	27.50 to 28.00
Standard low phos., Valley furnace	34.00

Iron Ore Stocks.—The heavy ore movement during June resulted in an increase in stocks at the Lake Erie docks to 4,511,791 gross tons on July 1 as compared with 4,347,271 tons on June 1. The dock balance on July 1 last year was 6,753,991 tons. Receipts at Lake Erie ports during June were 7,173,028 tons and for the season 11,437,482 tons. Shipments from these docks for the same periods were 5,590,611 tons and 11,485,299 tons respectively.

Semi-Finished Steel.—Most sheet mills are under contract for sheet bars for the third quarter and a number of these have released July specifications. Inquiry is exceedingly light. Sheet bars, billets and slabs are freely offered at $42.50 for early shipment.

Finished Steel.—Mills are getting a fair volume of specifications on contracts and consumers as a rule are taking all the steel due them on old orders, but new business is light and limited to small orders. Prices are firm at 2.40c. for steel bars and 2.50c. for plates and structural material and mills able to make quick shipments are still able to book small lots of plates and shapes at from $1 to $2 above the regular price and, in the case of Eastern mills, the higher price is quoted at mill. The only weakness in the market appears to be in hot-rolled strip steel, which has sold down to 2.75c. for wide sections. For the narrow width 3.15c. is the common price. The demand for hot-rolled strip

has fallen off materially as a result of a decline in the demand from the automobile industry and some of the larger producers are getting well caught up on deliveries. Michigan automobile companies with the exception of some of the smaller car builders are keeping close to their June production schedules, but some, apparently in anticipation of its slowing down, are reducing their inventories and consequently are not ordering steel as freely as last month. For this reason some of the manufacturers of alloy steels have curtailed production. Lake shipyards have received new inquiries for boats. At present lake vessels are pending involving 20,000 to 25,000 tons of plates and structural material. In the building field, little new work is coming out, but fabricators look for a good volume of business in the fall.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers report an improvement in the demand, which has been rather slow for a few weeks. Consumers, however, are rather cautious in placing contracts. Prices are not firm and concessions of 10 per cent are being made by some manufacturers on good-sized orders. Weakness has developed in the rivet market in the East where regular prices are being shaded from $1 to $4 a ton for car lots. In the Central West regular prices appear to be well maintained except on small rivets which are generally weak with quotations ranging from 65 to 65 and 10 per cent off list. Rivet specifications are fairly heavy.

Sheets.—New business is light and some of the mills will need additional tonnage shortly. Prices are fairly firm, although some of the smaller mills are shading black sheets $1 to 3.75c., and other producers are making concessions on sheets in stock. The demand for automobile sheets has fallen off, as motor car manufacturers are reducing their inventories. One mill is offering a surplus stock of body sheets at 5c. or $7 a ton under the regular price.

Reinforcing Bars.—New construction work requiring reinforcing bars has fallen off materially. The only new inquiry of any size is for approximately 100 tons for the Lake County Hospital, Painesville, Ohio.

Coke.—The coke market is quiet and prices are unchanged at $6.50 to $7 for the better grades of Connellsville foundry coke for prompt shipment and around $7 for contracts.

Old Material.—The downward price movement has continued and there is no indication that the bottom has been reached. Heavy melting steel scrap remains at the same price as quoted a week ago, but most other grades have been marked down $1 or more a ton. About the only scrap that is moving is in car lots. Some producers are storing scrap either because they cannot find a market for it or because they think they may be able to get better prices later. Locally little scrap is moving to the mills, as two of the leading consumers have held up on shipments and a third is taking on a limited quantity for which it is issuing permits. Trimmings on the track in Detroit have been offered to a Cleveland consumer at $7.50, but the mill did not take them at that price because of the scarcity of labor for unloading.

We quote dealers' buying prices Cleveland per gross ton:

Heavy melting steel	$16.00 to $16.50
Rails for rolling	19.00 to 19.50
Rails under 3-ft.	18.50 to 18.75
Low phosphorus melting	19.00 to 19.25
Cast borings	13.25 to 13.75
Machine shop turnings	12.00 to 12.25
Mixed borings and short turnings	12.50 to 12.75
Compressed sheet steel	14.50 to 15.00
Railroad wrought	14.00 to 14.25
Railroad malleable	22.00 to 23.00
Light bundled sheet stampings	11.00 to 11.50
Steel axle turnings	16.50 to 17.00
No. 1 cast	20.00 to 21.00
No. 1 busheling	12.00 to 12.25
Drop forge flashings	11.50 to 12.00
Railroad grate bars	13.00 to 13.50
Stove plate	13.50 to 14.00
Pipes and flues	10.00 to 10.50

Philadelphia

Pig Iron Declines Further—Steel Demand Is Light—Scrap Is Weaker

PHILADELPHIA, July 10.—The situation in the steel and pig iron trade is one of expectation, without any tangible evidence as to when a turn for the better will come. It is generally recognized that not much improvement can be looked for before August or early September. Meanwhile blast furnaces, faced with the prospect of piling iron, have become impatient and are striving to obtain business by concessions in prices Foundry iron is off fully $1.50 a ton compared with a week ago. This is a total decline of $4.50 from the peak price of $31, furnace, reached early in second quarter.

Pig Iron.—The bottom has dropped completely out of the eastern Pennsylvania pig iron market in the past week and producers are trying to find a level that will bring out buyers of much-needed tonnage. The difficulty is that they have very little to work on, inquiries being few in number and mostly for small lots, the largest single sale reported for the week being 500 tons. On the limited business that has been done, prices have dropped $1.50 a ton below last week's quotations. The lowest prices which can be verified are $26.50, furnace, for No. 2 plain, $27.50 for No. 2X and $28.50 for No. 1X, but there are indications that some furnaces would go lower on attractive business. The sharp drop in prices is due principally to unwillingness on the part of furnace operators to pile iron if it can possibly be avoided. Already there are substantial piles at some stacks. It is the general opinion that the price decline will be checked only by the blowing out of a number of furnaces, the quantity of iron being produced now being recognized as considerably in excess of actual consumption. The first furnace to go out is one of the Wharton stacks of the Replogle Steel Co. The weakness is not confined to foundry grades. Basic is in the same position. Some furnaces would sell at $27, delivered eastern Pennsylvania, while gray forge has been offered at $26, furnace. Negotiations are on for a few thousand tons of basic and this business may be closed before the end of the week. Malleable was sold last week at $28.50, furnace, but the price today would be more in line with the price on No. 2X. An Eastern furnace is offering copper bearing low phosphorus at $32, a reduction of $1. The Virginia situation is very weak and some furnaces may go out, though another furnace, the Reusens stack, is soon to go in. Stocks of foreign pig iron here are now very low, but prices have been reduced to conform with current quotations on domestic iron.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$27.26 to	$28.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	28.26 to	29.13
East. Pa. No. 1X	29.26 to	30.13
Virginia No. 2 plain, 1.75 to 2.25 sil	32.17 to	32.67
Virginia No. 2X, 2.25 to 2.75 sil.	32.67 to	33.17
Basic delivered eastern Pa.	27.00 to	27.50
Gray forge	27.00 to	27.50
Malleable	30.14 to	30.64
Standard low phos. (f.o.b. furnace)	30.00 to	35.00
Copper bearing low phos. (f.o.b. furnace)		32.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$27.50
Continental foundry, 2.50 to 3.25 sil.	28.50
Low phos. copper free, guar. not over 0.035 per cent phos.	$34.00 to 35.00
Continental, phos. 1.50; sil. 2 to 3	27.00

Ferroalloys.—British producers of ferromanganese have authorized their selling agents to take business for delivery over the remainder of the year at $117.50, Atlantic seaboard, a drop of $7.50 a ton. Domestic producers will undoubtedly meet this price. Very little business is offered. About 300 tons of resale fer-

romanganese has gone begging, consumers saying that they are covered for the rest of the year.

Semi-Finished Steel.—With no activity worthy of note, the billet market may be quoted at $42.50, Pittsburgh, for rerolling quality and $47.50 to $50, Pittsburgh, for forging quality.

Plates.—Inquiries for plates are mostly for small lots for early shipment. A fair amount of business is being done, though less in total volume that the mills are shipping. Prices continue firm at 2.50c., Pittsburgh.

Structural Steel.—The volume of business is small, but mills are still shipping freely on contracts and specifications continue at a good rate. With the exception of the one Eastern mill which has quoted 2.40c., Pittsburgh, in some instances, the price remains firm at 2.50c.

Bars.—Production of bars is cut down somewhat by the warm weather. Specifications come in at a rate that is in fair keeping with production, but new business is light. The market continues firm at 2.40c., Pittsburgh. Bar iron is 2.35c. to 2.40c., Pittsburgh.

Bolts, Nuts and Rivets.—The past week has brought an improvement in the demand for bolts, nuts and rivets and also in the price situation. Some of the extremely low prices have disappeared, but large machine bolts are still obtainable from most makers at 50 and 10 and 10 per cent off list.

Warehouse Business.—Prices on steel out of stock are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅞ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.35c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅞-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅞-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Ore.—Last week receipts of foreign ore at Philadelphia totaled 30,343 tons, as follows: Tunis, 8050 tons; Spain, 8820 tons; Sweden, 13,473 tons.

Old Material.—Prices have dropped within a week 50c. to $2 a ton on nearly all grades. In the absence of demand from consumers business is confined largely to purchases by brokers on old orders. The only exception to the general price decline is pipe, one consumer having bought 1000 tons at $16, delivered, which is higher than the market has been quoted for some weeks. It is reported that one large Eastern consumer will now pay only $16 for No. 1 heavy melting steel and $13.50 for blast furnace borings and turnings, but as these prices went into effect only today it has not been demonstrated whether purchases can be made at these levels.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.00 to $18.00
Scrap rails	17.00 to 18.00
Steel rails for rolling	19.00 to 20.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast iron car wheels	20.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge fire	16.00 to 16.50
Bundled sheets (for steel works)	15.00 to 15.50
No. 1 busheling	17.00 to 18.00
Mixed borings and turnings (for blast furnace use)	14.00 to 15.00
Machine shop turnings (for steel works use)	15.00 to 15.50
Machine shop turnings (for rolling mill use)	15.50 to 16.00
Heavy axle turnings (or equivalent)	17.00 to 18.00
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	18.00 to 19.00
No. 1 cast	20.50 to 21.50
Heavy breakable cast (for steel plants)	18.00 to 18.50
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	15.50 to 16.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

UNION BEGINS DRIVE

Attempt to Be Made by American Federation of Labor to Organize Steel Industry

WASHINGTON, July 10.—Stung by its defeat of 1919, when a radical group led by W. Z. Foster and John Fitzpatrick grasped the reins from it and took control of the steel strike, the American Federation of Labor again has begun a drive to organize the iron and steel industry without so-called radical leaders. Admission of this fact was made today at the office of President Samuel Gompers of the Federation, in vouching for the accuracy of a statement concerning the proposed steel strike carried in the *Baltimore Sun*.

Agents of organized labor, it was stated, already had been sent into the iron and steel areas and the resumed attempt to organize labor in the iron and steel industry will be started by the use of a fund of $70,000 left over from the strike of 1919. In addition to the agents of the American Federation of Labor that now are at work to organize the industry, there are also 16 organizations affiliated with the industry which are supporting the Federation. Mr. Gompers, referring to the abortive strike led by Foster, said there would be no outside agents used in the present drive. Mr. Gompers would neither confirm nor deny reports that Bethlehem, Pa., and Cleveland and Chicago have been selected as the centers of the new drive. It was also claimed that the agents are busy in the Pittsburgh district.

"This is the psychological time for the organization of the steel industry," said Mr. Gompers, "and no man has contributed more to it than Mr. Gary.

"Seventy thousand dollars has been held in trust since the 1920 strike, and if that is not enough to carry on the present fight, it will not lag for the want of funds. Labor will support the movement and see that it goes forward."

Mr. Gompers said he felt that too much attention had been given by the newspapers to Mr. Foster, adding that "publicity is grist for his mill."

Mr. Gompers then added: "A committee composed of the heads of the 16 affiliated organizations has been appointed to carry on the work of organizing the steel industry and it is now going forward. I prefer not to say what the preliminary reports have been since the drive started."

In declining to comment on the reports about certain points being selected as the centers of the drive, Mr. Gompers said: "The reasons for that are obvious. The great money power behind the steel industry will stop at nothing in such a case. With its admitted relations with detective agencies, its readiness to use all means to prevent organizing, even subornation of perjury, and the firing men at the first intimation of any interest in organized labor, any information of our plans would help them rather than us."

It was stated that Michael F. Tighe, president of the Amalgamated Association of Iron, Steel and Tin Workers, has been selected chairman of the executive committee to promote the organization of the steel workers, and William Hannon, a member of the executive committee of the International Association of Machinists, has been chosen secretary.

"The recent decision of the employers," said Mr. Tighe, "that abandonment of the 12-hr. day in the steel industry was not desired by the steel workers, has been challenged by these employees as well as humanitarian advocates in all classes of society. The sixteen national and international organizations which have jurisdiction over the several classes of steel workers have responded to earnest appeals made by these employees to again take up the work of organization, so they can again demand through collective bargaining some measure of redress and protection."

FABRICATED STEEL BUSINESS

Falling Off in Awards, but Round Tonnage of New Private Projects

The week's awards for 19 fabricated steel structures amounted to barely 4500 tons, or less than 240 tons apiece on the average. Thanks to a Ford Motor Co. project at St. Paul, an Elks' building at Milwaukee and a Western Electric enterprise at Kearny, N. J., fresh inquiries call for upward of 18,000 tons. The chief items are:

Awards

Western Union Telegraph Building, New Orleans, 500 tons, to Virginia Bridge & Iron Works.

Kansas, Oklahoma & Gulf Railroad, six deck plate girder spans, 372 tons, to Wisconsin Bridge & Iron Co.

Pennsylvania System, South Bend Division, three single deck plate girder spans, Rosedale, Ind., 148 tons, to Bethlehem Steel Bridge Co.

Central of Vermont Railway, St. Albans, engine-house and machine shop, 157 tons, to American Bridge Co.

Kewaunee, Green Bay & Western, 230-ft. draw span over Fox River, between Green Bay and Fort Howard, Wis., 342 tons, to Wisconsin Bridge & Iron Co.

Federal Reserve Bank, St. Louis, miscellaneous structural steel, 100 tons, to unnamed fabricator.

Ely, Minn., roof trusses for high school, 157 tons, to National Iron Co.

Mahaska County, Iowa, two 140 ft. x 20 ft. skew-truss highway spans, 125 tons, to unnamed fabricator.

Missouri Pacific Railway, one 90 ft., one 26 ft. and three 75 ft. spans and cast steel shoes, 256 tons, to American Bridge Co.

Missouri Pacific, three 50-ft. spans and two 71-ft. spans, 144 tons, divided between Virginia Bridge & Iron Co. and Mt. Vernon Bridge Co.

Manitowoc Portland Cement Co., Manitowoc, Wis., 350 tons of plates for kilns, to Manitowoc Ship Building Corporation.

Mispah Temple, Chicago, 100 tons to Wendnagle & Co.

Nash Motors Co., Kenosha, Wis., addition to forge shop, 120 tons, to Milwaukee Bridge Co.

Witherbee, Sherman & Co., Port Henry, N. Y., headframe, 100 tons, to Wisconsin Bridge & Iron Co.

Municipal auditorium, Birmingham, Ala., 900 tons, to Nashville Bridge Co.

Gas holder, Tacoma, Wash., 250 tons, to Stacey Mfg. Co.

Power plant, Winchester, Mass., 160 tons, to New England Structural Co.

Consolidated Coal Co. Portsmouth, N. H., coal conveyor, 125 tons, to New England Structural Co.

Wood Worsted Mills, Lawrence, Mass., boiler house addition, 132 tons, to New England Structural Co.

Hall of Justice, Los Angeles, 7000 tons, to McClintic-Marshall Co.

National Metal Molding, Economy, Pa., extension to press shop, 100 tons, to Jones & Laughlin Steel Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Ice storage building in the Bronx, New York, 500 tons.

Seaboard Air Line, bridge in South Carolina, 250 tons.

Western Electric Co., manufacturing plant at Kearny, N. J., 2000 tons.

Public School No. 72, New York, 800 tons.

Ford Motor Co., plant at St. Paul, Minn., 7500 tons, bids on general contract to be taken July 12.

Central of Vermont Railway, paint shop, St. Albans, Vt., 145 tons, bids being taken by Arnold Co., Chicago.

Bridge over Cape Fear River, Elizabethtown, N. C., State project No. 302, 315 tons, bids rejected and will be readvertised in the fall.

Docks, Vicksburg, Miss., 1000 tons of sheet piling.

Illinois Central, viaduct at Forty-First Street, Chicago, 1100 instead of 350 tons as announced last week.

Peoria & Eastern Illinois Railroad, viaduct, 1000 tons, bids being taken.

Wilson dam, near Muscle Shoals, Ala., 400 tons, bids being taken.

Masonic building, Nashua, N. H., 350 tons.

State Street double leaf trunnion bascule bridge, Milwaukee, 500 tons. Bids close July 20. R. E. Stoelting, commissioner of public works.

Elks' clubhouse, Milwaukee, 2500 tons; revised bids close July 14. W. F. Eichfeld, executive secretary.

Lake County Hospital, Painesville, Ohio, 100 tons.

RAILROAD EQUIPMENT BUYING

Demand for New Rolling Stock Has Dropped to Lowest Point of the Year

There is so little demand by the railroads for new rolling stock that some of the car builders are wondering what the outlook for them will be in the latter months of the year. Few of them have more than three or four months' business on their books. Locomotive builders, however, are well filled up for the year. July is the low point of the year so far in equipment purchasing.

Fewer freight cars are now in need of repair than at any time since January, 1921, according to reports just filed July 2 by the carriers with the car service division of the American Railway Association. The railroads on June 15 had on order and awaiting delivery, 104,068 new freight cars, while they also had on order on the same date 1993 new locomotives.

The Atchison, Topeka & Santa Fe is inquiring for 300 drop-end mill gondolas.

The Chicago Great Western has ordered 300 box cars from the Pullman Co., this being an increase of an order recently placed.

The Standard Oil of New Jersey has ordered 12 tank cars from the American Car & Foundry Co.

The General Sugar Co., New York, has ordered 100 cane cars of 30-ton capacity from the Gregg Co., Ltd.

The Erie Railroad has let contracts for the repair of 200 produce cars to the Illinois Car Co. and 200 gondola cars to the Greenville Steel Car Co.

The Mississippi River and Bonne Terre is inquiring for 57 40-ton box car bodies.

The Live Poultry Transportation Co. has let 200 poultry cars to the New City Car Co.

The New York Central has placed 500 stock car bodies each with the American Car & Foundry Co. and the Pennsylvania Tank Car Co. and 500 flat car bodies with the Standard Steel Car Co.

The Shell Oil Co. has ordered 60 tank cars from the Pennsylvania Tank Car Co.

The Southern Pacific has placed 11 buffet and baggage cars with the American Car & Foundry Co.

The Virginian Railway has placed 25 gondola cars with the Pressed Steel Car Co.

The Santa Fe ordered 4 business cars from the Pullman Co.

The New York Central is inquiring for 100 to 550 5-ton hopper car bodies.

The Central of New Jersey placed repairs on 300 hopper cars with the Standard Steel Car Co.

The Pacific Electric awarded 50 street cars to the St. Louis Car Co. and 50 motor coaches to the Standard Steel Car Co.

The American Short Line Railroad Association, Chicago, is inquiring for 30 ballast, 50 box, 56 flat, 10 air dump, 150 gondola, 30 stock cars, 3 passenger coaches and 2 baggage and mail cars.

American Puddled Iron Co. Is Incorporated

Incorporation papers have been granted in Ohio to the American Puddled Iron Co., Youngstown, with a capitalization of $3,500,000. The company was formed to take over the properties of the Youngstown Steel Co., which is building a mechanical puddling plant at Warren, Ohio, where operations are expected to start next fall. Incorporators are E. L. Ford, John Tod, John Stambaugh, Fred Tod, John W. Ford, R. C. Steese and Thomas M. Phillips, all well known steel men of the Mahoning Valley.

Mr. Ford, a director of the Youngstown Sheet & Tube Co., is the principal figure in the new company. He is the inventor of the mechanical puddling device which will be employed by the company, and which is now being installed.

The plant, which will cost about $2,100,000, is fast nearing completion, and about $1,300,000 has already been spent on it. A special meeting of stockholders of the Youngstown Steel Co. will be held July 27 to give formal approval to the transfer.

Financing which has been provided for will give about $700,000 of working capital.

The Replogle Steel Co. reports a loss in the first quarter of $109,865, after expenses, taxes and reserve for depreciation. The consolidated balance sheet as of March 31 shows cash of $185,816, and accounts and notes receivable of $568,366. Total assets and liabilities were $15,641,158.

NEW TRADE PUBLICATIONS

Hammer Crushers.—Pennsylvania Crusher Co., Girard Building, Philadelphia. 16-page catalog of crushers for cement slag and limestone, illustrated, and showing a variety of types together with details and character of work. Particular features are said to include an unbreakable steel frame, a non-magnetic separator, quick acting adjustment, oversize bearings and renewable parts. Low cost per ton of crushed product is claimed.

Recording Gas Calorimeter.—Gas Producer & Engineering Corporation, 115 Broad Street, New York. 4-page folder describing the Johnson instrument, designed to insure against low quality gas and waste of coal. It reads in B.t.u. per cu. ft. and is said to be of particularly rugged construction, with practically no moving parts. It may be used for hot or raw gas as well as for clean producer gas, blast furnace gas, oil gas, water gas, coke oven gas and natural gas.

Electric Induction Furnaces.—Ajax Electrothermic Corporation, Trenton, N. J. Bulletin No. 3 describes the new Ajax-Northrup 35-kva. converter and the various standard high frequency furnaces which may be operated from it. Bulletin No. 2, issued previously, describes the 15-kva. converter and smaller furnaces. Both bulletins are pointed to as describing furnaces unique in the history of furnace development. The 35-kva. converter is said to make it possible to reach a uniform and controllable temperature of over 2500 deg. C. (4532 deg. Fahr.) in 15 min. in a furnace 2 in. in inside diameter and 7½ in. deep. The same converter applied to a larger furnace enables one to melt 45 lb. of nickel in 2½ hr. from a cold start.

Precision Bench Lathes and Millers.—Stark Tool Co., Waltham, Mass., illustrated catalog of tools, giving specifications in detail and also featuring Stark lathe attachments.

Threading Machinery.—Landis Machine Co., Inc., Waynesboro, Pa. Catalog No. 26, 6 x 9 in., 78 pages. Devoted to an illustrated description of the company's chasers, chaser holder and rotary die head, an attaching chart and diagrams of clearances for the latter being included. Various single, double and triple head machines for threading bolts and tapping nuts are shown as well as single and double head long bed machines with lead screw attachments for threading standard and stay bolts The company's automatic die head, pipe and nipple threading machines, and chaser grinders are also described and specifications given.

Grating and Stair Treads.—Mitchell-Tappen Co., 15 John Street, New York. Catalog G-6. The design, manufacture and use of "Mitco" interlocked steel grating is illustrated and described, a section being devoted also to interlocked treads and window guards.

Pulverized Coal Burning by the "Multi-Mix" Method.—Ground Coal Engineering Corporation, Worcester, Mass. In an 8-page folder, the principles involved in effective mixing of powdered coal and air for combustion as embodied in the design of this particular type of feeding and burning equipment are brought out with the aid of photographs and drawings. In this method complete mixing is sought before the air and pulverized coal enter the furnace. This is accomplished by a specially designed mixer acting somewhat on the injector principle. The advantages claimed for the system include complete combustion, normal furnace volume only, minimum slag formation and low maintenance of brickwork.

Sand Blast Barrels.—American Foundry Equipment Co., 366 Madison Ave., New York. A 12-page folder, 7½ x 10¾ in. devoted to means of removing sand, scale, rust, oil etc., from castings, forgings, stampings, and a great variety of metalware. It is pointed out that machine tools wear longer when castings have been sand blasted. Illustrations include both diagrams and photographs of installations.

Automatic Rotary Sand Blast Tables.—American Foundry Equipment Co., 366 Madison Avenue, New York. An 8-page pamphlet devoted to the sand blasting of articles requiring unusual care to prevent breakage, bending, scratching or blunting. The description is of a rotary table on ball or roller bearings, with a rubber curtain in sections separating the blast compartment from the outside. Tables of the gravity type are made in two sizes, 4 ft. and 7 ft. in diameter, driven by 2½ and 5 hp. motors.

Hot Water Service Heaters.—Patterson-Kelley Co., 101 Park Avenue, New York. A 32-page catalog of heaters and converters, including those running up to 25,000 gals. per hr. These are shown in a great variety of type, each type having a large number of sizes. The tabular matter gives not only dimensions but capacities, sizes of connections and other particulars needed by those specifying equipment of this type.

Industrial Heating Problems.— The Westinghouse Electric & Mfg. Co. has issued the first number of a miniature publication entitled "Electric Heat," which will be devoted to industrial electric heating problems. In the first issue there are articles concerning the use of electric heat in the manufacture of storage batteries, electric motors and many other subjects. Outstanding are articles by Prof. W. Trinks, Carnegie Institute of Technology, on "Advantages and Limitations of Electric Heat," and "Reduced Labor—A By-Product," by M. R. Armstrong. The method of calculating power requirements of electric ovens is given, together with a number of ways in which electric heating may be applied to difficult jobs.

Electric Hardening Furnaces.—Automatic & Electric Furnaces, Ltd., 173 Farrington Road, London, England, Pamphlet giving testimonials and views illustrative of the use of the Wild-Barfield automatic electric furnaces.

Thermalene Gas.—Thermalene Gas Corporation, Kankakee, Ill. Booklet of 24 pages, 6 x 8 in., describing use and advantages of thermalene gas in welding and cutting. This gas is a combination of oil gas and acetylene gas from which the sulphurated and phosphorated hydrogen and ammonia have been removed. Thermalene gas producers are described and their operation outlined. A page is devoted to description of the Wolf seam tube welding machine, which uses Thermalene gas.

Twist Drills and Reamers.—Latrobe Tool Co., Latrobe, Pa., Catalog 1923, 111 pages, 5⅜ x 7¾ in. Gives sizes, dimensions and list prices of high-speed steel taper-shank twist drills, of standard, collar, short body car and other types. Straight shank taper length drills of various types, millimeter sizes in taper and straight shank drills, oil hole and a variety of special drills are included. Reamer drills, track bits, bridge and boiler reamers, and a variety of other types are included. Pages are devoted to drill grinding and to speeds and feeds.

Electrical Supplies.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Catalog of electrical supplies for 1923-24. In appearance the new catalog does not differ greatly from previous ones. It is indexed according to subjects and to sections, and also has a style number and a thumb index. A new feature—a classified index—has been added to the introductory section under the title "How This Catalog Serves." Here is listed apparatus of particular interest to central stations, electric railways, industrial plants, mines, contractor-dealers, and architects. A complete list of all Westinghouse sales offices, agent jobbers, warehouses, service repair shops is also given, together with several illustrations of new combination sales, service and warehouse buildings, either recently built, or now in course of construction.

Type K Stoker.—Combustion Engineering Corporation, Broad Street, New York. A 4-page folder describing a stoker for operating boilers up to 300 hp. This is a horizontal grate stoker with a deep feed trough running the entire length, through which the coal is forced up over the grate bars. Sliding auxiliary dampers permit admission of air to the side grates or dump plates to complete combustion before the ashes are shaken down.

Locomotive Chart.—Jones-Pratt Co., Hartford, Conn. A chart measuring 30 x 19 in., showing a passenger locomotive of the mountain type, giving the names of 355 principal parts of the locomotive and indicating the Interstate Commerce Commission defect schedule as connected with those parts. The company lists 14 different items of packing and gaskets used on the locomotive. The scale of the drawing is about 3 ft. per inch.

The Rail Steel Products Association, an organization of manufacturers making light rails and reinforcing bars from old rails, has issued an 84-page book which explains both by word and illustration the manufacture of reinforcing steel. Specifications for rails for rolling, the American Society for Testing Materials specifications and manufacturers' standard specifications for rail steel and billet steel concrete reinforcement bars and those for reinforcement bars rolled from billets are included in the book. It is an educational effort and will be useful to those seeking knowledge of this industry.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling.....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....3.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....3.00c. to 3.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. 3.15c. to 3.30c.
Hoops, light gage, under 1 in. wide.....3.30c. to 3.50c.
Bands, base, per lb.....3.15c. to 3.30c.
Strips, base, per lb.....3.00c. to 3.30c.
Cotton ties, per bundle of 45 lb.....$1.61

Cold-Finished Steels

Bars and shafting, base, per lb.....3.25c.
Strips, base, per lb.....5.00c. to 5.25c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per 100 lb.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....63 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 10 per cent off list
Machine bolts, small, cut threads..50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.....3.45
Smaller and shorter, rolled threads
50, 10 and 10 per cent off list
Cut threads.....50 and 10 per cent off list
Larger and longer.....50 and 10 per cent off list
Lag bolts.....60 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ x 4 in.
45 and 10 per cent off list
Larger and longer sizes.....45 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....3.75c. off list
Hot pressed nuts, tapped.....3.75c. off list
C.p.c. and t.square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, blank.....3.75c. off list
Semi-finished hex. nuts:
⅛ in. and smaller, U. S. S.....80 per cent off list
⅜ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts.....50, 10 and 10 per cent off list
Bolt ends with hop pressed nuts..50, 10 and 10 per cent off list
Turnbuckles, with ends, ½ in. and smaller
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller
70 and 10 to 65 and 5 per cent off list
Washers.....5c. to 5 25c. off list

Cap and Set Screws

Milled square and hex. head cap screws,
65 and 10 per cent off list
Milled set screws.....65 and 10 per cent off list
Upset cap screws.....75 per cent off list
Upset set screws.....75 per cent off list
Milled studs.....50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.25
Large boiler rivets, base, per 100 lb.....3.35
Small rivets.....60 and 10 to 60 and 5 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$3.15
Spikes, ½ in., ⅝ in. and ⅝ in., per 100 lb.....$3.50 to 3.75
Spikes, ⅜ in.....3.50 to 3.75
Spikes, boat and barge, base, per 100 lb.....3.50 to 3.75
Track bolts, ⅝ in. and larger, base, per 100 lb..4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..5.00 to 5.50
Tie plates, per 100 lb.....2.55 to 2.60
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld		Butt Weld	
Steel		*Iron*	
Inches	Black Galv.	Inches	Black Galv.
⅛	45 19½	¼ to ⅜....	+11 +39
¼ to ⅜.....	51 25½	½	20 2
½	56 42½	⅝	28 11
¾	60 48½	1 to 1½....	30 13
1 to 3.....	62 50½		
		Lap Weld	
2	55 43½	2	23 7
2½ to 6.....	59 47½	2½	26 11
7 and 8.....	56 43½	3 to 6.....	28 13
9 and 10.....	54 41½	7 to 12.....	26 11
11 and 12.....	53 40½		
		Butt Weld, extra strong, plain ends	
⅛	41 24½	2 to 3	61 50½
¼ to ⅜.....	47 30½	¼ to ⅜.....	+19 +54
½	53 42½	½	21 7
¾	58 47½	¾	28 12
1 to 1½.....	60 49½	1 to 1½.....	30 14
		Lap Weld, extra strong, plain ends	
2	53 42½	2	23 9
2½ to 4.....	57 46½	2½ to 4.....	29 15
4½ to 6.....	56 45½	4½ to 6.....	28 14
7 to 8.....	52 39½	7 to 8.....	21 7
9 and 10.....	45 32½	9 to 12.....	16 2
11 and 12.....	44 31½		

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1¼ in.....	+18
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....	+ 8
3 in.....	40	2 to 2¼ in.....	— 2
3½ to 3⅝ in.....	42½	2½ to 3 in.....	— 7
4 to 13 in.....	46	3½ to 4½ in.....	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes *Cold Drawn*			
1 in.....	55	3 and 3½ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.....	31	4 in.....	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		
		Hot Rolled	
3 and 3¼ in.....	38	4 in.....	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes			
	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage.....	15	2¼-in. O.D. 10 gage...	20
2-in. O.D. 11 gage.....	16	3-in. O.D. 7 gage.....	35
2-in. O.D. 10 gage.....	17	1½-in. O.D. 9 gage....	15
2¼-in. O.D. 12 gage....	17	5⅝-in. O.D. 9 gage....	55
2¼-in. O.D. 11 gage....	18	5½-in. O.D. 9 gage....	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base.....	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.34	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.34
Pac. Coast, ship plates	1.20
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while for Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 30c. to 40c.; sheets and tin plates, 30c. to 40c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 49c.; pipes not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	48c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	45c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$120.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	48.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	51.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	55.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	59.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	64.10
Silvery iron, 6 per cent, per ton, furnace	37.00
Silvery iron, 7 per cent, per ton, furnace	38.00
Silvery iron, 8 per cent, per ton, furnace	39.50
Silvery iron, 9 per cent, per ton, furnace	41.50
Silvery iron, 10 per cent, per ton, furnace	43.50
Silvery iron, 11 per cent, per ton, furnace	46.80
Silvery iron, 12 per cent, per ton, furnace	50.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.00 to $51.00	$43.00 to $46.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	48.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to	9.50
Silica Brick:		
Pennsylvania	42.00 to	45.00
Chicago		52.00
Birmingham		48.00
Ground silica clay, per net ton		10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	$47.50 to 50.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.40 to 2.45
Skelp, sheared, per lb.	2.40 to 2.45
Skelp, universal, per lb.	2.40 to 2.45

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled, base, per lb.	2.15c. to 2.20c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅞-in. and ⅝-in., base per 100 lb.	$3.25 to 3.75
Spikes, ⅜-in., base, per 100 lb.	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c.
Bars, common iron, Philadelphia mill	2.35c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.40

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (1.25% Nickel, 10 to 20 per cent Carbon)	$3.50 to $3.75
2300 (3½% Nickel)	5.50 to 5.75
2500 (5% Nickel)	8.00 to 8.25
3100 (Nickel Chromium)	4.50 to 4.75
3200 (Nickel Chromium)	6.25 to 6.50
3300 (Nickel Chromium)	8.25 to 8.50
3400 (Nickel Chromium)	7.25 to 7.50
5100 (Chromium Steel)	4.00 to 4.25
5200 (Chromium Steel)	8.25 to 8.50
6100 (Chromium Vanadium bars)	5.25 to 5.50
6100 (Chromium Vanadium spring steel)	5.00 to 5.25
9250 (Silico Manganese spring steel)	4.00 to 4.25
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.50 to 5.75
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.75 to 5.00
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.50 to 4.75
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq. the net ton bar price applies.

To Blow in Reusens Blast Furnace

E. J. Lavino & Co., Bullitt Building, Philadelphia, owners of the Ruesens blast furnace in Virginia, have decided to put that furnace in blast and have appointed Park & Williams, Inc., Real Estate Trust Building, Philadelphia, selling agent in the East, including New England. All grades of foundry iron will be made. Lavino & Co., who have made foundry pig iron only occasionally, intend to become regular factors in the pig iron trade.

American Sheet & Tin Plate Co. Advances Wages of Hot Mill Men

The American Sheet & Tin Plate Co. has announced an increase of 10 per cent to hot mill workmen, retroactive to July 1. This increase applies to the old scale and compares with an increase of 6 per cent on the base or 4½ per cent on the old scale granted hot mill men employed in sheet mills working under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers.

Industrial News Items

William S. Sayres, Jr., special master in chancery, sold the entire equipment of the Michigan United Railway at public auction on the steps of the passenger station of the railway at Jackson, Mich., Saturday, June 30. The property was bid in for $5,000,000 by the Irving Bank-Columbia Trust Co. of New York, as trustee for the committee charged with the reorganization of the company. The order was signed by Judge Arthur J. Tuttle, of Detroit, after the auction, and the way is cleared for a reorganization. The original bond issue was for $10,000,000, so that the bondholders will receive only 50c. on the dollar, by bonds representing one-half their present holdings, while the actual cash will be used to pay the unsecured creditors and improve the equipment. The Michigan United Railway covers the heart of the lower peninsula of Michigan. It owns the street railways of Jackson, Lansing, Battle Creek, Kalamazoo, Owosso and Corunna, and all the connecting lines. Its tracks connect up with the Detroit United lines and those of the companies in the western section of the state.

The Automotive Utilities Corporation, Detroit, that had made arrangements to take over a manufacturing plant at Mt. Clemens, Mich., has cancelled this contract and has purchased a plant at Ann Arbor, Mich., formerly known as the Ann Arbor Machine Co. This plant consists of a building with 24,000 sq. ft. of floor space, seven and one-half acres of land with 1000 ft. of railroad frontage. The new company is now moving in its machinery, valued at $30,000, and will be in production about Aug. 1. T. T. Hollinger, former president of the company, has resigned, and Wesley Kendall, formerly vice-president and general manager of the International Metal Stamp Co., has been elected president. A. R. Thomas, former secretary of the corporation, has resigned and has been replaced by George S. Anderson, who was at one time general secretary to Henry Ford.

The Youngstown Foundry & Machine Co., Youngstown, recently acquired by purchase the Poland Avenue foundry in Youngstown of the Mahoning Foundry Co. The purchase was made necessary by the increasing volume of foundry work coming to the Youngstown Foundry & Machine Co. Its monthly capacity will be about 1000 tons of castings, with the new unit, making it one of the largest producers of iron castings in the Middle West. The Youngstown Foundry & Machine Co. also announces that it plans to abandon its roll foundry on East Boardman Street in Youngstown and erect a model roll foundry on a 12-acre site at Girard, in Trumbull county.

The Truscon Steel Co., Youngstown, forecasts a gross business in 1923 of $20,000,000. It is an important manufacturer of the Kahn steel building materials, standardized buildings, pressed steel products and the like. Gustave Kahn of Youngstown, general sales manager, and John Dyer of Detroit, were recently elected to the board of directors.

Trade Changes

Manning, Maxwell & Moore, Inc., have moved to Pershing Square Building, 100 East Forty-second Street, New York.

The U. & O. Press Co., dies, presses and special machinery, Glendale, Brooklyn, N. Y., has moved into its new plant at Hudson, N. Y.

The Anker Engineering Co., Widener Building, Philadelphia, power transmission appliances and special machinery, has taken the agency of the Valley Iron Works, Williamsport, Pa., for the Philadelphia district.

Donnelly & Co., formerly at 531-5 North Fourth Street, Philadelphia, has taken temporary quarters at 468-72 York Avenue. Alterations are being made on a building recently acquired and the company will move to the new location about Aug. 1.

The Falcon Steel Co. and the Falcon Tin Plate Co., Niles, Ohio, manufacturer of blue annealed sheets, black sheets, and coke tin plate, have established Pacific coast sales offices in the Sharon Building, 55 New Montgomery Street, San Francisco. William Best, Jr., is in charge as district sales manager and will handle sales in California, Oregon and Washington.

Henry M. Cooledge, Chase & Cooledge, 12 Main Street, Holyoke, Mass., mill supplies, has sold his interest in the business to the following employees, who now hold positions designated: Walter E. Lindell, president; Roy McCorkindale, vice-president; Edward E. Bogart, treasurer; William Turner, secretary. Mr. Cooledge has not been active in the management of the business for several years.

The Watson Engineering Co., Cleveland, has changed its name to the Watson Co., architect and engineer, this change being made in order that the name of the organization may describe more accurately the scope of its activities. The organization includes a staff of architects and structural, mechanical, electrical and heating engineers. A special department is devoted to remodeling existing plants in order to obtain greater efficiency. Wilbur J. Watson is president.

The Thatcher Furnace Co., manufacturer of heaters and ranges, has moved its general executive offices from New York to the new Thatcher administration building, at St. Francis and George Streets, Newark, N. J. The New York sales offices will remain at 133-135 West Thirty-fifth Street. The original plant was established in Newark in 1850.

The Cyclops Steel Co., formerly of 120 Broadway, New York, has moved its offices to 100 East Forty-second Street.

C. J. Walker, until June, 1922, assistant manager of the Gary, Ind., plant of the American Bridge Co., has moved to Philadelphia, where he will engage in the manufacture of an electric riveter of which he is the inventor. The riveter is designed to do much of the work now done by hydraulic and pneumatic power.

J. C. Bloomfield, who for a number of years was with C. H. Hart & Co., Chicago, contractors, has taken charge of the industrial works Chicago office at 1051 McCormick Building, handling the sale of industrial equipment in that territory.

The American Nickel Corporation has discontinued its Pittsburgh sales office and moved the entire sales organization to the main office and plant at Clearfield, Pa.

Plans of New Companies

The General Accessories Co. has been organized in Pontiac, Mich., by Frank Briscoe and associates in the Briscoe Devices Corporation. The capital stock of the new company is $600,000, of which $100,000 has been paid in. The company will manufacture automotive parts and other mechanical appliances and will take over the die casting business of the Briscoe Devices Corporation, while the latter company will devote its entire resources to its carbureter development. The accessories company has taken over the Briscoe plant on Osmun Street, Pontiac, and has acquired some adjoining property along the Grand Trunk Railroad. Officers of the new company are: Frank Briscoe, president; Howard G. Harris, Detroit, vice-president; Emil D. Moessner, secretary-treasurer.

The S. K. G. Appliance Corporation, Twelfth and Chestnut Streets, Philadelphia, has been incorporated with capital stock of $1,000,000 to manufacture refrigerating machinery and equipment. Its activities for the present will be confined to acting as distributor for MacLaren frozen air refrigerating machines. W. C. Golt is president.

The Shelton Vapor Stove Co., Aetna Building, Indianapolis, has been incorporated with capital stock of $100,000 to manufacture stoves and kindred products. The company has been organized for about a year as a copartnership and does its own manufacturing. Most of the machinery needed has been purchased. The plant is located at Michigan City, Ind. M. C. Shelton is president.

The Frictionless Metal Co., 1458-60 Collins Street, St. Louis, has been incorporated as a consolidation of three plants, located at Chattanooga, Tenn., Richmond, Va., and St. Louis, engaged in manufacturing bearing metals and solder. All plants are now running and operation will continue as formerly. C. W. Bourne is president.

The Halligan Pipe & Supply Co., Chicago, recently incorporated and now engaged in the jobbing of pipe, valves, fittings, etc., and the fabricating of industrial and power house piping, has purchased the entire property and assets of the Federal Pipe & Supply Co., Chicago, and has been reorganized with the following personnel: George J. Halligan, president and treasurer; George Mason, vice-president; Thomas A. Callaghan, secretary; Harry E. Shoff, sales manager. Mr. Halligan was the founder of both the merged companies and his experience covers many years in the jobbing field, originating in the founding of the Western Pipe & Supply Co., from the active management of which he withdrew several years ago. Mr. Shoff, formerly vice-president George B. Limbert & Co., in charge of sales, has been identified with the pipe business for 23 years.

Sand's Level & Tool Co. has been incorporated as a reorganization of J. Sand & Sons and will be located in its new factory at 8629-37 Gratiot Avenue, Detroit. Frank F. Sand is president; Julius A. Sand, vice-president; Edward A. Sand, treasurer; George A. Sand, secretary.

The Tobrin Tool Co., Plantsville, Conn., has been organized to manufacture pipe wrenches, screwdrivers and other tools. The officers of the company are: William S. Thompson, president; Joseph C. Brannin, vice-president and secretary; Robert W. Pain, treasurer, all of whom were formerly associated with the H. D. Smith & Co., Plantsville.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, Lake	Copper, Electrolytic*	Straits Tin, New York	Lead, New York	Lead, St. Louis	Zinc, New York	Zinc, St. Louis
July 3†	15.00	14.12½	37.75	6.50	6.20	6.10	5.75
5	15.00	14.12½	37.50	6.35	6.05	6.20	5.85
6	15.00	14.12½	37.80	6.25	5.95	6.22½	5.87½
7	14.87½	14.25		6.25	5.95	6.25	5.90
9	14.87½	14.25	38.50	6.10	5.80	6.30	5.95
10	14.87½	14.25	38.25	6.00	5.70	6.40	6.05

*Refinery quotation; delivered price ¼c. higher.
†In last week's table July 1 should have been July 2 and the Straits tin quotation should have been 37.62½.

New York

NEW YORK, July 10.

The copper market developed further weakness but is now slightly firmer. In a fairly active tin market prices have receded and then recovered. Reductions in lead prices have been unprecedented. The zinc market has been the only one to consistently advance.

Copper.—The weakness in the electrolytic copper market, which has prevailed for some weeks, increased last week until sales were made around July 3 as low as 14.37½c., delivered. A moderate amount of business was recorded at this level. Since then the market has gradually become firmer until today the minimum price is generally acknowledged to be 14.50c., delivered, or 14.25c., refinery. This price has been established by fair sales and it is stated that sizable inquiries are before the market which can easily be converted into orders at this level. Consumers are more interested than in some time and it is hoped that the market has taken a turn for the better. Some good export business is also reported at 14.50c. to 14.60c., f.a.s. Lake copper is quoted at 14.87½c. to 15c., delivered.

Tin.—From July 2 to today, July 10, the market has been fairly active, particularly on certain days. On July 2 about 400 tons of Straits tin changed hands at a range of 37.37½c. to 37.62½c., the bulk being sold at the lower levels. Dealers were the principal buyers, but consumers were also active. Friday, July 6, was another day during which about 600 tons was sold. The selling in this case was general and shared in by the principal sellers. There was also some covering by shorts. The heaviest buying was done by independent tin plate makers and the range in prices was from 37.62½c. to 37.75c., according to position. Yesterday there was some short covering for July delivery, with about 200 tons sold. Consumers also took part of this. Today the market has been very quiet with spot Straits quoted at 38.25c., New York. The London market is today about £4 per ton higher than on July 2, with spot standard quoted at £180 7s. 6d., future standard at £181 12s. 6d. and spot Straits at £183 7s. 6d. Arrivals thus far this month have been 1150 tons, with the quantity afloat 7992 tons.

Lead.—Unprecedented have been the reductions in the price of lead from July 2 to today, inclusive. Not in many years, if ever, has the leading interest made reductions in its official price on every market day except Saturday for seven days in succession. On July 2, late in the day, the price was reduced from 6.85c. to 6.65c., New York, with the last reduction today bringing the price to 6c., New York. This is a decline of 85 points, or $17 a ton in a little over a week. This action of the American Smelting & Refining Co. means two things: Former high prices have resulted in large production. This has been followed by inadequate sales. Aside from these interesting developments there have been no other features and the market has been very quiet. The St. Louis price has also declined to 5.70c.

Zinc.—In contrast to the other markets zinc has advanced almost daily until prime Western for prompt and July delivery is quoted and has sold at 6.05c., St. Louis, or 6.40c., New York. This is an advance of 30 points over the price of July 2. The stronger market has been due largely to activity on the part of speculators and dealers and the disinclination of producers to sell freely. Buying by galvanizers has been only moderate.

Nickel.—Shot and ingot metal are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c. per lb.

Antimony.—The market is stagnant and weak with Chinese metal in wholesale lots quoted at 6.75c. to 6.85c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted in wholesale lots by importers who can obtain the metal at 26.50c. to 27c., New York, duty paid. The leading domestic producer does not make public any quotation.

Old Metals.—Demand is very light and values are practically unchanged with the exception of lead which is lower. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.50
Copper, heavy and wire	13.50
Copper, light and bottoms	11.50
Heavy machine composition	11.25
Brass, heavy	8.75
Brass, light	7.00
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.50

Chicago

CHICAGO.—Copper and tin have declined sharply in a weak market. Zinc, however, has recovered slightly after recessions which were proportionately heavier than those of the other metals. A large number of the old metal grades have also declined. We quote in carload lots, Lake copper, 15.25c.; tin, 40c.; lead, 6.10c.; spelter, 6c.; antimony, 8.50c. in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.75c.; copper bottoms, 10c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 4.50c.; zinc, 3.50c.; pewter, No. 1, 22.50c.; tin foil, 25c.; block tin, 30c., all buying prices for less than carload lots.

Canadian Scrap Market

TORONTO, Ont., July 10.—The demand for iron and steel scrap in the Canadian market has been dull for the past few weeks with the result that Toronto dealers have made a general downward revision in their buying prices. With but one or two exceptions various materials have been reduced from $1 to $3 per ton, and even at the new level dealers are not inclined to pick up greater tonnages than the prospective market calls for. While local dealers are closing a few small tonnage orders for spot delivery, they point out that no demand exists for third quarter, and that buying for the future has been at a standstill for some time and that up to the present no consumers have made known their third quarter requirements.

In the Montreal market a slump is also reported. Slight reductions are also reported on some commodities in the Montreal market, but up to the present price cutting is not general. Canadian dealers are offering the following prices:

	Gross Tons Toronto	Gross Tons Montreal
Steel turnings	$10.00	$9.00
Machine shop turnings	10.00	9.00
Wrought pipe	8.00	10.00
Rails	15.00	15.00
No. 1 wrought scrap	15.00	15.00
Heavy melting steel	15.00	13.00
Steel axles	18.00	18.00
Axles, wrought iron	21.00	24.00
	Net Tons	
Standard car wheels	16.00	17.00
Malleable scrap	16.00	17.00
Stove plate	16.00	18.00
No. 1 machinery cast	20.00	21.00

PERSONAL

William C. Frye, for seven years president of the Chain Belt Co., Milwaukee, has retired from active participation in its affairs and has been succeeded by C. R. Messinger, vice-president and general manager since 1917. Mr. Frye is retiring after active association with the company for 28 years. During this time he has occupied practically all the important executive positions and just previous to his election as president in 1916 he was treasurer. Mr. Messinger became associated with the Chain Belt Co. in 1917, after eight years as general manager of the Sivyer Steel Casting Co. He is also president of the Sivyer Steel Casting Co., vice-president of the Federal Malleable Co., all of Milwaukee, and a director in the Nugent Steel Castings Co., Chicago. Mr. Messinger was president of the American Foundrymen's Association in 1922-23.



C. R. MESSINGER

W. H. A. Austin has been appointed district sales agent of the Eastern Steel Co., in the territory covered by the New York office, effective July 1. He is also secretary of the company, having been connected with it in various capacities since 1907.

Ernest W. Duston, formerly of Cleveland, is now chief engineer of the American Bolt Corporation, New York. Until about a year ago Mr. Duston was connected with the Duston-Clark Engineering Co., Cleveland.

C. K. Everitt, works manager and director of Edgar Allen & Co., Ltd., Sheffield, England, is now visiting in the United States.

H. J. Perkins, formerly with the Sunnyside Bronze Foundry, the Delta Foundry Machine Co., and F. Bangerter, has been appointed works manager of the Niagara Falls Smelting & Refining Corporation, Buffalo.

Charles F. Michael, vice-president and general manager of the Ohio Locomotive Crane Co., Bucyrus, Ohio, was elected president at the recent annual meeting of the North Central Ohio Manufacturers Association, composed of manufacturers located in a number of Ohio counties, held in Marion, Ohio. F. B. McMillen, vice-president and general manager of the Hydraulic Press Co., Mt. Gilead, was elected first vice-president; Z. E. Taylor, secretary C. & G. Cooper Co., Mt. Vernon, second vice-president, and E. A. Songer, Bucyrus, secretary and treasurer. Among the new directors in addition to the officers are C. F. Burt, manager North Electric Co., Galion; F. E. Myers, president F. E. Myers & Bro. Co., Ashland; E. B. Phillips, general manager Champion Engineering Co., Kenton; C. B. King, vice-president and general manager of the Marion Steam Shovel Co., Marion; J. A. Root, president Fate-Root-Heath Co., Plymouth; Geo. F. Tolison, manager Sterling Grinding Wheel Co., Tiffin; J. E. Miller, manager Bellefontaine Bridge & Structural Co., Bellefontaine; R. W. Main, manager National Steam Pump Co., Upper Sandusky.

Clinton R. French has been elected president of the Machinery Forging Co., Cleveland, and of the Steel Forging Co., Cincinnati, succeeding his father, H. S. French, who died recently. Clinton R. French has been manager of the Cincinnati company.

Louis W. Blauman has returned to the Light Mfg. & Foundry Co., Pottstown, Pa., as sales representative.

J. B. Hill has taken charge of the Detroit district for Williams, White & Co., Moline, Ill., succeeding C. G. d'Uggias, who died recently. Mr. Hill is located at 623 Majestic Building, Detroit.

William R. Hill, New York, manager of the Yale & Towne Mfg. Co., Stamford, Conn., for 20 years, has been appointed president of the Sargent & Greenleaf Co., makers of locks, Rochester, N. Y., succeeding Nathan G. Williams, who died in August, 1921.

W. J. Leighner has been appointed works manager of the George Cutter Co., South Bend, Ind., a subsidiary of the Westinghouse Electric & Mfg. Co.

E. D. Stewart has been appointed branch manager of the El Paso, Texas, office of Westinghouse Electric & Mfg. Co.

George H. Grundy has been appointed manager of steel sales for Peter A. Frasse & Co., Inc., 417 Canal Street, New York, in the New York and Philadelphia territory.

Howard B. Charles, formerly purchasing agent for the McClintic-Marshall Co., Pittsburgh, has resigned to accept the position of secretary-treasurer of the Industrial Paint Co., Oliver Building, Pittsburgh. He also will be actively identified with the sales department of the company.

C. S. Siebert, formerly in the sales department of the Superior Sheet Steel Co. at Canton, Ohio, has resigned to become associated with Waldo, Egbert & McClain, Marine Trust Building, Buffalo, N. Y. Mr. Siebert is a son of W. P. Siebert, assistant general manager of sales of the Carnegie Steel Co.

Lawrence H. Gillespie has severed his connection with the Nicetown Plate Washer Co. to assume charge of bar and plain structural sales of the Montgomery Iron & Steel Co., Ninth and Berks Streets, Philadelphia, effective July 10.

William J. Wooldridge was appointed manager of the electrical sheet department of the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, on July 1. He was connected for about four years in the same capacity with the Whitaker-Glessner Co. at Portsmouth, Ohio, resigning that position last May. For more than 25 years Mr. Wooldridge was an electrical engineer with the General Electric Co. and during many of those years he specialized on electrical sheet steel problems. He is a member of the American Iron and Steel Institute, the American Institute of Electrical Engineers, the American Electro-Chemical Society, the American Institute of Mining and Metallurgical Engineers and the Iron and Steel Institute.



W. J. WOOLDRIDGE

Dr. A. S. McAllister, engineer physicist, who during the past two years has been liaison officer of the United States Bureau of Standards and the Federal Specifications Board, assigned to the headquarters of the American Engineering Standards Committee at New York, has been recalled to Washington for special work by Secretary of Commerce Hoover. Dr. D. R. Harper 3rd, physicist of the Bureau of Standards, has been assigned to the American Engineering Standards Committee succeeding Dr. McAllister. Dr. Harper is a graduate and former instructor of the University of Pennsylvania and has been associated with the Bureau of Standards since 1909. He has specialized in thermom-

etry and heat measurements, particularly in heat transmission and in internal combustion engine physics. He will be concerned with those standardization projects in which the Bureau of Standards and the Federal Specifications Board are cooperating with the American Engineering Standards Committee.

H. A. Deiters, formerly master mechanic of the Ferro Machine & Foundry Co., Cleveland, has become manager of the Price Electric Co., Cleveland, and L. W. Schen, formerly with the Hickok Electric Co., that city, has become affiliated with the same company and has charge of the laboratory.

William B. Mayo, chief engineer Ford Motor Co., has accepted the appointment as general manager of the Department of Street Railways, Detroit. The appointment was tendered Mr. Mayo by Mayor Doremus to fill the vacancy caused by the death of Joseph S. Goodwin. While Mr. Mayo will not give up his connection with the Ford interests, he will devote the major portion of his time to the department, it has been announced.

W. W. Blunt, general manager Holmes Foundry Co., Port Huron, Mich., sailed on the "Doric" the latter part of June on a two months' trip to Europe. He will spend most of his time in England, as prior to his present connection he represented the Westinghouse interests in England for 10 years.

R. E. Bebb has retired from active management of the Canton Stamping & Enameling Co., Canton, Ohio, of which he has been president and general manager for more than 15 years and has become chairman of the board of directors. He is also president of the Central Steel Co., Massillon, Ohio. He has been succeeded by H. T. Bebb.

Harry M. Denyes, who for the past 10 years has been connected with the Jacox steering gear plant of the Saginaw Products Co., a division of the General Motors Corporation, has resigned as chief engineer and joined the engineering staff of the Buick Motor Car Co., Flint, Mich. Mr. Denyes was with the Buick Company previous to his service with the Saginaw company.

Bruno V. Nordberg, president Nordberg Mfg. Co., Milwaukee, has been awarded the honorary degree of doctor of engineering by the University of Michigan.

Oscar E. Schwemer, Milwaukee, has been elected trustee of the defunct Ozone Appliance Co. of Milwaukee, manufacturer of electrical appliances.

A. J. Peoples, secretary-treasurer Detroit Copper & Brass Rolling Mills, was chosen second vice-president of the National Association of Credit Men at the recent annual convention held at Atlanta, Ga. Mr. Peoples has served four years as a director of the association.

James A. Irwin, after 38 years of active service in the steel industry, has retired to take up his residence in Southern California. In 1885 Mr. Irwin entered the employ of Miller, Metcalf & Parkin, Pittsburgh, afterward the Crescent Steel Co., later a subsidiary of the Crucible Steel Co. of America. He served in various sales capacities for these companies and for the past 12 years has been part owner and Eastern representative for the Pittsburgh Tool Steel Wire Co.

H. C. Jones, vice-president Inland Steel Co., Chicago, in charge of the Chicago Heights plant and of advertising, has resigned to engage in private business. W. C. Carroll, vice-president, will take charge of advertising, in addition to his other duties.

P. A. Orton, secretary and treasurer of the Orton & Steinbrenner Co., manufacturer of locomotive cranes, Chicago, has been elected president, succeeding H. G. Steinbrenner, resigned. H. Mertz, assistant secretary, has been promoted to secretary and sales manager, and H. Shaffer, purchasing agent, to treasurer and purchasing agent.

Arthur F. Braid, sales manager, Metal & Thermit Corporation, 120 Broadway, New York, will sail Aug. 4 on the Adriatic for an extended trip in Europe. After visiting his home in Glasgow, Scotland, he will go to London, Berlin and Paris, where he will attend the International Foundrymen's convention in September. After a brief stay in Southern France and Monte Carlo and a tour through the various cities of Italy, he will sail from Naples early in October on the return trip. Mr. Braid will be accompanied by his wife.

H. G. Dalton, Pickands, Mather & Co., Cleveland, sailed last week for Europe, where he will spend two or three months visiting various countries.

George T. Ladd, president Geo. T. Ladd Co., manufacturer of water tube boilers, Pittsburgh, has been appointed a member of a subcommittee of the American Society of Mechanical Engineers on the storage of coal. This committee is part of a large committee recently appointed by the Federated American Engineering Societies to determine the engineering, mechanical and economic factors involved in the storage of coal and the influence of these factors on storage at the mine by the various classes of consumers.

F. H. Rood has been appointed engineer of tests for the Pittsburgh Testing Laboratory, with headquarters at Pittsburgh. He is a civil engineer, graduated from Syracuse University, and for many years was engineer of tests of the New York State Highway Commission. For three years he was assistant engineer of tests at the Pittsburgh Testing Laboratory and for two years research engineer with the United States Bureau of Public Roads.

JUNE STEEL OUTPUT

Daily Rate 11,200 Tons Less Than in May—Year's Rate About 44,850,000 Tons

Due partly to the effects of the heat, steel ingot production for June fell to next to the lowest monthly total for this year. The daily rate of 144,100 tons is a decline of 11,300 tons per day from May.

The basis of the monthly reports of the American Iron and Steel Institute has been changed so that the report now represents companies which made over 95 per cent of the 1922 production. The reports for previous months this year have been revised on the new basis, as indicated in the tables. Although the actual reported output in 1922 is on the old basis of 84.15 per cent of the total production, the calculated monthly output of all companies and the approximate daily production of all companies are comparable with the similar figures presented for the first six months of this year, based on the actual returns of companies which in 1922 made 95.35 per cent of the total. The tables follow:

Monthly Production of Steel Ingots, January, 1922, to December, 1922, reported by companies which made 84.15 per cent of the Steel Ingot Production in 1922

Months 1922	Open-Hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies
Jan. ..	1,260,809	331,851	822	1,891,857	72,764
Feb. ..	1,395,835	348,571	616	2,071,772	86,324
March	1,918,570	451,386	795	2,814,667	104,247
April..	1,997,465	445,939	1,109	2,902,240	116,090
May ..	2,214,774	494,893	1,474	3,218,794	119,215
June ..	2,142,708	487,851	2,918	3,127,775	120,299
July ..	2,020,552	464,047	2,485	2,952,806	118,112
Aug. ..	1,807,310	404,379	2,893	2,629,256	97,380
Sept. ..	1,911,147	460,127	2,505	2,815,261	108,395
Oct. ..	2,352,207	518,010	2,198	3,410,265	131,164
Nov. ..	2,360,903	525,945	2,449	3,430,309	131,935
Dec. ..	2,241,104	536,214	2,572	3,300,416	132,017
Total.	23,624,404	5,469,213	22,836	34,568,418	111,511

Monthly Production of Steel Ingots, January, 1923, to June, 1923, reported for 1923 *by companies which made* 95.35 *per cent. of the Steel Ingot Production in* 1922

Months 1923	Open-Hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies
Jan. ..	2,906,892	728,270	9,467	3,822,369	141,569
Feb. ..	2,613,564	669,903	10,797	3,454,918	143,955
March.	3,046,309	799,525	12,841	4,046,854	149,883
April..	2,974,579	772,485	13,933	3,944,412	157,776
May ..	3,136,558	847,418	16,719	4,195,890	155,400
June ..	2,821,239	737,845	15,483	3,748,890	144,188
Six mo.	17,499,141	4,555,446	79,240	23,213,243	148,803

OBITUARY

Walter Monteith Aikman

WALTER MONTEITH AIKMAN, a pioneer and, for three-quarters of a century, an outstanding figure in the stamping, enameling and galvanizing industries, died July 6, 1923, at his home in Greenwich, Conn., in his ninety-sixth year. At the time of his death, he was chairman of the board of directors of the Central Stamping Co. of New York and Newark, N. J., with which he had been connected for nearly 77 years. Mr. Aikman was thus identified with the enameling industry during practically its entire history in this country and until the last few years was a prominent and active member of associations in the industry.



W. M. AIKMAN

Mr. Aikman was born in New York April 6, 1828. In 1858 he moved to Brooklyn, where he continued to reside until about five years ago, when he moved to Greenwich for all year round residence.

In May, 1847, at the age of 19, Mr. Aikman began his career in the sheet metalware industry by becoming associated with N. E. James & Co., which was established in 1834. At that time, the concern had an office and salesroom at 25 Cliff Street, New York, and a small three-story frame factory building on Railroad Avenue, Newark, N. J. At the end of the second year, Mr. Aikman became a partner of the firm. On the death of N. E. James, the concern became James, Aikman & Co., the senior member being David N. James, a nephew of the founder.

The company later consolidated with E. Ketcham & Co., and in 1886, when the name Central Stamping Co. was assumed, Mr. Aikman became president. The old James factory, which had been rebuilt and considerably expanded at various times, was entirely destroyed by fire in August, 1895, and shortly thereafter a new plant was built on a new location, on the Jersey Meadows, near what is now the Lincoln Highway. At this time the two factories in Brooklyn and another in Millis, Mass., were given up. The buildings of the present factory cover about ten acres.

Mr. Aikman held the office of president from 1886 until 1922, when he became chairman of the board of directors, E. M. Blake becoming president.

Besides his manufacturing interests, Mr. Aikman was also a trustee and vice-president of the South Brooklyn Savings Institution and was for many years prominently identified with the Presbyterian Board of Missions. Mr. Aikman is survived by two daughters, Mrs. Ella M. A. Stevens and Mrs. Mary A. Wood, of Greenwich, and a son, Walter M. Aikman, Jr., of Glen Ridge, N. J.

SAMUEL VAN CAMP, vice-president Van Camp Hardware & Iron Co., Indianapolis, died on July 5 at the New York Hospital, to which he was removed from the Aquitania, having become ill on his homeward trip from Europe. He was born 45 years ago.

CHARLES G. HAWKINSON, secretary and treasurer of the El Paso Foundry & Machine Co., El Paso, Tex., was found dead July 4 in the tonneau of his automobile in the desert near Blythe, Cal. Apparently he had been overcome with heat on the desert while en route to El Paso from the Pacific Coast, where he had been spending his summer vacation. He had been associated with the El Paso foundry company ever since its organization over 20 years ago. He is survived by his wife and two sons.

JAMES F. BOURQUIN, vice-president and general manager of the Continental Motors Corporation, Detroit, died July 1, following an operation for appendicitis. After graduation from the engineering department of the University of Michigan in 1904, Mr. Bourquin came to Detroit and engaged in the automobile industry, first as an organizer of the Liberty Motor Car Co. and then with the Paige Motor Car Co.

H. S. FRENCH, president Machinery Forging Co., Cleveland, and the Steel Forging Co., Cincinnati, died recently after five weeks' illness, aged 57 years. He organized the Cleveland company in 1902 and had been at its head since that time. He organized the Cincinnati company in 1917.

HARRY F. KRAMER, general sales manager Somers, Fitler & Todd Co., Pittsburgh, mill and mine supplies, for the past 20 years, died at his home in Pittsburgh July 4. He was born in that city 52 years ago and had lived there all his life. He was a member of the Masonic fraternity, the Pittsburgh Chamber of Commerce, the Pittsburgh Field Club, the Pittsburgh Athletic Association and the Kiwanis Club. Mrs. Kramer, two sons and two daughters survive.

W. R. JOHNSON, chief engineer Colt's Firearms Mfg. Co., Meriden, Conn., while returning with others from a fishing trip, was almost instantly killed on July 1, in an automobile accident at East Windsor, Conn.

FRANCIS CONEY HERSEY, president Hersey Mfg. Co., South Boston, Mass., sugar making machinery, died last week at his summer home in Kennebunk Beach, Me. Mr. Hersey was born in Jamaica Plain, Boston, in 1843.

Southern Stocks Increased

BIRMINGHAM, July 10.—Owing largely to unsatisfactory furnace practice caused by humidity resulting in production of low-grade irons not previously booked, Alabama furnaces increased yard holdings in June. Stocks on hand June 1 and July 1 were as follows: Foundry, 22,000 and 28,000 tons; warrants, 700 and 800 tons; machine cast, 1700 and 5600 tons; basic, 10,000 and 13,000 tons; totals, 34,400 and 47,400 tons.

In Market for Machinery

The American Short Line Railroad Association, Chicago, is in the market for the following machinery: One crank pin truing machine, one double or single head bolt cutting machine, one pipe cutting machine, one punch and shears, one pneumatic hammer, one 20-in. x 12-ft. engine lathe, one steam hammer, one traveling head shaper, a wheel lathe and five wheel presses of 200 to 300 tons capacity.

Collecting Data on Pig Iron Tariff

Paul M. Tyler of the metal section of the United States Tariff Commission is visiting blast furnaces in the East, collecting cost data in relation to the request of Atlantic seaboard furnace operators for an increase in the duty on pig iron from 75c. to $1.50 a ton under the powers given to the President by Congress in the existing tariff law.

Foley Steel Co. in Difficulties

The Foley Steel Co., Harrison Building, Philadelphia, which a year ago bought the works of the Slatington Iron & Steel Co. at Slatington, Pa., has filed a petition in bankruptcy. The company was headed by P. R. Foley, for many years general manager of sales of Eastern Steel Co., Pottsville, Pa.

Machinery Markets and News of the Works

MARKETS ARE QUIETER

July Business in Machine Tools Is in Relatively Small Volume

Denver, Rio Grande & Western Railroad Closes at Chicago for About $275,000 Worth of Shop Equipment

Outside of railroad buying and inquiry, the machine-tool markets throughout the country are very quiet. Business is apparently not above, and perhaps is a little under the June rate, which was the lowest, generally speaking, of any month this year.

The purchase by the Denver, Rio Grande & Western Railroad of about $275,000 worth of machine tools at Chicago was the outstanding transaction of the past week. The inquiry of this railroad had been pending for some weeks. The Elgin, Joliet & Eastern, whose inquiry has also been pending for some time, is definitely expected to place its orders within a week. Not so, however, with another pending list, that of the Chicago, Burlington & Quincy, which may not be acted upon for at least a month.

A few small railroad inquiries have come out in the East. The Pennsylvania, Seaboard Air Line and Virginian roads are each in the market for a few tools, about four to six each. The New York Central has ordered two engine lathes. The Norfolk & Western is expected to begin buying against its recent list this week.

The Toledo, Ohio, Board of Education has bought about 16 tools for a new manual training school.

Among the important orders of the week was one for a round lot of machines from a company in the automotive field. Cleveland reports inquiries from two Detroit automobile makers. Apparently these inquiries are for the purpose of making estimates of expenditures for proposed extensions.

The slump in demand for machine tools, which is reported from all sections of the country, is most noticeable as regards industrial companies. A frequent explanation is that the shortage of skilled labor is so serious that many companies would not be able to find operatives for machines if they were to buy them.

New York

NEW YORK, July 10.

THERE is very little demand for machine tools by industrial companies, but inquiry from railroad sources continues in fair volume. June was the poorest month of the year with many local sales offices, with the exception that companies which specialize in railroad shop equipment did a very fair business. Among railroad inquiries of the past week is one from the Pennsylvania for four tools, one from the Seaboard Air Line for about the same number and one from the Virginian Railway for six or seven. The New York Central has bought a 42-in. and a 26-in. engine lathe. The Union Pacific has bought a 1500-lb. steam hammer from an Eastern company. The Glen Alden Coal Co. has purchased three 600-lb. steam hammers and one of the Standard Oil companies has taken a 30-in. x 20-ft. engine lathe. In some quarters the lull in demand for machine tools by industrial companies is held to be due to lack of skilled mechanics to operate the machines.

The Public Service Corporation of New Jersey has selected a site for the erection of a $40,000,000 power plant to be built and operated by the Public Service Electric Power Co., a new subsidiary. The station will be built on the Hackensack River and will consist of two units of 200,000 hp. each. Work on the first unit of the new plant will be started shortly, according to an announcement by Thomas N. McCarter, president Public Service Corporation.

A manual training department will be installed in the new three-story high school to be erected on the Greenbrook Road, North Plainfield, N. J., estimated to cost $300,000. Bids will be asked on the general contract on July 16, but bids will not be asked on the machine tools for several months. John T. Simpson, 31 Clinton Street, Newark, is architect.

The American Can Co., 120 Broadway, New York, has plans for a one-story addition, 55 x 128 ft., to its works at 1588 East Fortieth Street, Cleveland, estimated to cost $45,000. C. G. Preis, company address, is architect.

The Embossing Co., Albany, N. Y., manufacturer of mechanical toys, has awarded contract to the Austin Co., Philadelphia, for a one-story addition to its plant at Colonie, N. Y., 62 x 64 ft.

Schloss & Orlando, 105 West Fortieth Street, New York, architects, are preparing plans for the construction of a two-story ice-manufacturing plant at Third Avenue and 181st Street, to cost in excess of $200,000, for a company whose name is temporarily withheld.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until July 24, for one motor-generator set for the Brooklyn navy yard, schedule 1070, and for 1410 side-cutting pliers, schedule 1056.

The Columbia Button Works, 49 West Twenty-seventh Street, New York, has inquiries out for an automatic drop hammer. A plating dynamo will also be purchased.

The State Hospital Commission, Capitol Building, Albany, N. Y., will take bids until July 25 for refrigerating equipment for installation at the State Hospital, Central Islip, N. Y. Sullivan W. Jones, Capitol Building, is state architect.

Power equipment, conveying, and other machinery will be installed in the addition to be erected at the two-story plant of the Larson Baking Co., 732 Henry Street, Brooklyn, at 67-75 Mill Street, estimated to cost $95,000. The McCormick Co., 41 Park Row, New York, is architect and engineer.

The Shibaura Engineering Works, Yokohama, Japan, is planning the installation of considerable American machinery in a new machine shop, foundry and forge shop, for which plans have been drawn. The construction will involve more than $100,000, and it is said that inquiries will be made for equipment at an early date.

The Board of Education, 500 Park Avenue, New York, has plans for a four-story automobile service and machine repair building, 64 x 125 ft., to cost $350,000. William H. Gompert, Flatbush Avenue and Concord Street, Brooklyn, is architect and engineer.

The United States Navy Purchasing Office, Whitehall Building, New York, will purchase 100 steam gages, requisition 296.

The Republic Radiator Corporation, Utica, N. Y., recently organized with a capital of $150,000, is perfecting plans for the establishment of a factory to manufacture water and steam radiators.

The Todd Shipyards Corporation, 25 Broadway, New York, has developed a new electric welding machine, to be known as the Todd twin-pole electric welder, soon to be placed on the market, and will perfect arrangements

for the manufacture in quantity, giving over a portion of its local plant, or one of its other plants, for this purpose.

The State Department, Buenos Aires, Argentine Republic, will take bids until Aug. 5 for two new oil refineries at La Plata and Plaza Huincul, to be operated under Government control. The first noted is designed for a capacity of 14,000 bbl. per day, and the other, 700 bbl. Each refinery will have an adjoining mechanical plant, equipped for the manufacture of containers and other oil equipment.

The Ford Motor Co., Highland Park, Mich., is arranging for the establishment of a department to manufacture steel springs at its new plant at Green Island, N. Y. Additional equipment will also be installed for the production of gears, radiators and kindred equipment in connection with the proposed expansion of the plant.

The Fleischmanns Light, Heat & Power Corporation, Fleischmanns, N. Y., recently organized, plans the installation and operation of a power plant and system. S. V. Ryan and G. S. Ortman, Fleischmanns, are heads. The company's corporate representative is Frost, Watson & Sharp, Albany, N. Y.

The Board of Commissioners, Millville, N. J., will receive bids until July 20 for pumping machinery and auxiliary equipment for installation at the new sewerage pumping station at West Millville, and water pumping station at South Millville. Newton B. Wade is city engineer.

Benjamin Gorlin, 143 Van Nostrand Avenue, Jersey City, N. J., will build a one-story machine and repair shop in connection with a group of 50 garages at the Old Bergen Road and Ocean Avenue, to cost in excess of $50,000. C. H. Ziegler, 75 Montgomery Street, is architect.

The Unique Art Mfg. Co., Newark, manufacturer of mechanical and other toys, has purchased the building at the southeast corner of Pershine and Waverly Avenues for $150,000, for the establishment of a new plant. The structure is four stories, and will be occupied entirely by the new owner.

A machine and mechanical department will be installed in the new five-story building to be erected on Plain Street by L. Bamberger & Co., 147 Market Street, Newark, department store, for general operating and warehouse service, estimated to cost $1,000,000. Abbott, Merkt & Co., 175 Fifth Avenue, New York, are engineers and architects.

The Newark-Flint Corporation, recently organized as a subsidiary of the Durant Motors, Inc., 1819 Broadway, New York, will operate at Newark, representing the Flint, Princeton and Eagle automobiles of the parent company. A building will soon be selected for a service works, to be provided with a complete machine shop and parts department.

New England

BOSTON, July 10.

REPRESENTATIVES of machine tool builders and used machinery dealers have experienced another colorless week. The amount of business booked was infinitesimal if contrast is made with that in other sections of the country. Individual sales were mostly in single lots, the majority presses and grinding equipment and coming under the classification of used tools. The trade reports difficulty in arousing interest among users who have asked for quotations on various types of machines. Prospects that looked good ten days or a fortnight ago are now in the doubtful list.

A maker of gear shapers in this territory has just received an order for 12 high priced machines, one of the largest orders received by a machine tool builder this month. Another New England tool maker finds it necessary to continue night shifts to keep up with bookings. Working schedules in general are beginning to be disrupted, partly because of a seasonal letup in incoming business and partly otherwise. Railroad shop builders appear to have somewhat of an edge on makers of other kinds of shop equipment. A Vermont manufacturer is reported to have closed its foundry and placed its machine shop on a four day per week schedule. A Worcester tool maker indicates a reduction in weekly hour schedules in the near future unless a turn for the better comes soon. Other producers report a slight reduction in working forces or decreasing activities either because of a lack of new business or because of vacations.

Sales of small tools and machine tool parts continues brisk for this time of the year and manufacturers are behind on deliveries. Makers of abrasives are busy, but are not receiving as large orders as during the spring. Labor costs have increased in all branches of the small tool building industry, but workers are more efficient, consequently the labor position of the average producer is fairly comfortable.

The Crane Market

Demand for cranes is rather light. Sales offices are working on inquiries which have been pending for some weeks, but not much new business has come out in the past week. Indications are that many companies are marking time through the summer months, and there is a general feeling that conditions will improve with the approach of autumn.

The McDonald Engineering Co., Chicago, has bought a 20-ton Brown hoist, 50-ft. boom.

The Fisk Rubber Co., Chicopee Falls, Mass., has bought a 30-ton Browning locomotive crane.

The Cleveland Electric Illuminating Co., Cleveland, a 75-ton, 47 ft. span, and a 35-ton, 26 ft. span electric traveling crane from the Cleveland Crane & Engineering Co.

The Standard Boiler & Iron Plate Co., Niles, Ohio, 15-ton trolley from the Cleveland Crane & Engineering Co.

Pittsburgh Steel Products Co., Pittsburgh, one 5-ton, 3-motor, 115-ft. span, and one 10-ton, 4-motor, 85-ft. span, both mill type cranes to the Cleveland Crane & Engineering Co.

Reliance Steel Castings Co., Pittsburgh, one 5-ton, 30-ft. crane to Alfred Box & Co.

The M. J. Whiteall Association, Brussels Street, Worcester, Mass., plans the erection of a two-story, 22 x 24 ft., machine shop addition.

The three-story, 32 x 96 ft. machine shop addition contemplated by the Shawmut Engineering Co., 195 Freeport Street, Dorchester, Boston, is indefinitely postponed.

The Essex Brass Foundry Co., Sixth and Harvard Streets, Cambridge, Mass., has purchased property on Main and Sixth Streets, on which a foundry will be erected. Plans are in the preliminary stage, however.

A permit has been granted the Thomas Co., Thomas Street, Fitchburg, Mass., steel horse collars, to build a one-story, 75 x 87 ft. manufacturing unit.

The Andrew B. Hendryx Co., New Haven, Conn., metal goods, has taken out a permit to build a four-story plant adjoining its present factory on Audubon Street, to cost $70,000.

The Brown Hoist Co., Cleveland, has been awarded contract for coal handling equipment for the new Weymouth, Mass., plant of the Edison Electric Illuminating Co., Boston.

The W. L. Gilbert Co., Winsted, Conn., clocks, is installing additional metal working and other equipment. The company is producing about 4000 clocks per day.

The plant of the R. H. Long Co., Millbrook Street, Worcester, Mass., heretofore devoted in part to the manufacture of footwear, has been sold to the R. H. Long Motor Co., manufacturer of Bay State automobiles, and hereafter will be used exclusively for the production of cars. Both companies are controlled by Richard H. Long, Framingham, Mass.

The Boston Gear Works, Norfolk Downs, Boston, has awarded contract to the Canter Construction Co., 6 Beacon Street, for an addition to cost about $50,000.

Fire, July 2, destroyed a portion of the plant of the Sherwood Paper Co., Somerville, Mass., with loss estimated at $85,000, including equipment. It is planned to rebuild.

The Chase Metal Works, Waterbury, Conn., will commence the erection of a one-story addition, 30 x 72 ft.

The National India Rubber Co., Bristol, R. I., a subsidiary of the United States Rubber Co., New York, has plans for a one-story addition, 60 x 180 ft., and improvements in the present works. Lockwood, Greene & Co., 24 Federal Street, Boston, are engineers.

The American Tube Works, Inc., Somerville, Mass., has awarded contract to Whidden & Beekman, 100 Boylston Street, Boston, for a one-story addition, 21 x 65 ft.

The Rochester Foundry & Machine Co., Rochester, N. H., plans to rebuild the portion of its plant destroyed by fire in June. An official estimate of loss has not been announced.

R. R. MacRae, Castleton, Vt., has commissioned G. F. Lamb, Gryphon Building, Rutland, Vt., architect, to prepare plans for a new two-story and basement ice and cold storage plant, 50 x 110 ft., at Castleton.

The Connecticut Blower Corporation, Hartford, Conn., recently formed under Delaware laws with capital of $250,000, is perfecting plans for the establishment of a plant to manufacture exhaust fans, blower systems, etc., and expects to have the works ready for service in the fall. In the meantime, production will be carried out at the plant of the International Blower Co., which has been succeeded by the

new company M. E. Keeney is president [illegible] C. H. Keeney, treasurer.

Bids have been rejected for the proposed [illegible] of the Ward Baking Co., New York, at Monroe and Mead Streets, New Haven, Conn., to cost $400,000, and revised plans will be prepared. The installation will include power equipment, ovens, conveying equipment and automatic machinery. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

A steam-operated power plant to cost [illegible] will be constructed at the Eastern Maine General Hospital, Bangor, Me. Haven & Hoyt, 220 Devonshire Street, Boston, are architects.

A one-story power house, 33 x 40 ft., will be erected at the plant of the New England Laundry Co., 215 Hawthorne Street, Hartford, Conn.

Philadelphia

PHILADELPHIA, July 9.

THE Pennsylvania Equipment Co., Norwood Station, Pa., is in the market for four to six second-hand Consolidation-type locomotives in serviceable condition, weighing about 130,000 lb. on drivers.

The Republic Lamp & Fixture Works, Inc., 732 Daly Street, Philadelphia, manufacturer of lighting fixtures, etc., has leased two floors in the building at 610 Arch Street, for extensions in its plant.

In connection with its new branch plant at Greenville, S. C., the Steel Heddle Mfg. Co., Twenty-first Street and Allegheny Avenue, Philadelphia, manufacturer of textile machine equipment, has acquired the works of the F. & B. Suter Co., High Point, N. C., manufacturer of similar equipment, and will remove the machinery to the new location. The plant will be two stories 60 x 125 ft., estimated to cost $50,000. A portion of the factory will be equipped for assembling. J. E. Sirrine & Co., Greenville, are engineers. Robert J. Freitag is treasurer.

The Bureau of Yards and Docks, Navy Department, Washington, has plans for extensions in the Government aircraft manufacturing plant at Philadelphia, Building No. 133, and will take bids at an early date under specification 4854.

The Philadelphia Commercial Museum, Thirty-fourth Street, Philadelphia, is in receipt of an inquiry from a company in the Jharia district, India, for machinery for all departments of a match-manufacturing plant, including boxes, for a capacity of 100 gross boxes per day.

The Newport Contracting & Engineering Co., Newport News, Va., has submitted a low bid at $82,145, and will receive award for the construction of a new engine-testing laboratory at the Philadelphia navy yard, for the Bureau of Yards and Docks, Washington.

A number of electric power companies are being organized by F. W. Woodcock, C. A. McClure and associates, to install and operate plants and systems in East and West Brandywine Townships, and vicinity, the companies taking the names of the respective township. Application for State charters will be made Aug. 6. James Collins Jones, Bullitt Building, Philadelphia, is representative.

Motors, conveying and elevating machinery, and other equipment will be installed in the eight-story and basement plant to be erected by the Terminal Warehouse & Transfer Co., Delaware Avenue and Green Street, Philadelphia, estimated to cost $500,000.

The Trenton Malleable Iron Co., New York Avenue, Trenton, N. J., manufacturer of castings, has awarded contract to S. W. Mather & Sons, Greenwood Street, for a one-story addition on a two-story structure, estimated to cost $16,000, exclusive of equipment. William A. Klemann, First National Bank Building, is architect.

The Board of Education, Atlantic City, N. J., has commissioned H. A. Stout, Guarantee Trust Building, architect, to prepare plans for a five-story vocational school, on Surf Place, to cost $175,000.

The Hamburg Boiler Works, Inc., Hamburg, Pa., is planning for the installation of a plate bending roll and other equipment.

Fire, July 2, destroyed a portion of the motor truck body manufacturing plant of the Palm Body Co., Inc., Reading, Pa., with loss estimated at $25,000. It is planned to rebuild.

The Consumers' Ice Co., New Castle, Pa., is perfecting plans for the construction of a large ice-manufacturing and refrigerating plant. A list of machinery will soon be available.

Plans are under way for a reorganization of the Monitor Bi-Loop Radiator Co., Lancaster, Pa., under the direction of William C. Bidlack, Lancaster, who recently acquired the company's plant and business for $92,315. It is proposed to make extensions in the existing work and resume the production of radiators, boilers and kindred equipment, as heretofore manufactured.

The Wincroft Stove Works, Middletown, Pa., has called a special meeting of stockholders on Aug. 29 to arrange for an increase in capital from $50,000 to $300,000, about $100,000 of which will be used for the construction of a new plant at Florin, Pa. James G. Balfour is secretary.

The Lehighton Water Co., Lehighton, Pa., is considering the installation of pumping machinery at its plant, in connection with proposed extensions and improvements, to cost about $40,000.

The Chantrell Hardware & Tool Co., Millmont, Reading, Pa., will commence the erection of a one-story addition to cost about $17,000, exclusive of equipment.

L. K. Bingaman, Allentown, Pa., and associates, have organized the Greene Power & Light Co., Paupack Power & Light Co., Palmyra Township Power & Light Co., Salem Power & Light Co., and Lackawaxen Power & Light Co., to install and operate plants and systems in the sections indicated by company name. Mr. Bingaman will act as treasurer.

Loch & Battista, Inc., Berwick, Pa., is being organized with a capital of $50,000 to take over and expand the plant of the company of the same name, manufacturer of tanks and kindred products.

The Pennsylvania Power & Light Co., Allentown, Pa., is completing arrangements for the purchase of the municipal light and power plants at Pennsburg, Red Hill and Green Lane, for $160,000. Extensions will be made, including the construction of additional steel tower transmission lines.

The Stanley Steel Welded Wheel Corporation, Wilkes-Barre, Pa., manufacturer of automobile wheels, is planning the establishment of a factory in the vicinity of Wyoming, Pa. Negotiations have been opened for the purchase of the former plant of the Matheson Motor Co.

Pittsburgh

PITTSBURGH, July 9.

BUSINESS in machine tools lately has not been as good as earlier in the year, but is much better than at this time last year. Many purchases are pending, but outside of the Westinghouse inquiry for tools for its Sharon plant, few orders are being closed. The market in heavy equipment and cranes also is quiet.

Permission has been granted to the H. C. Frick Coke Co., Carnegie Building, Pittsburgh, to construct a coal tipple with belt conveyor system at its Colonial coal mines, near Roscoe, Pa. Also, for the installation of barge-loading machinery and the construction of ice breakers at this location.

The Northwestern Motor Sales Co., State and Twenty-first Streets, Erie, Pa., is planning for the installation of equipment in its machine and repair shop, including a lathe, grinder, drill press and hand tools.

J. D. Westcott & Son, Union City, Pa., manufacturers of handles, etc., have tentative plans for rebuilding the portion of their plant at Richwood, W. Va., recently destroyed by fire, with loss estimated at $40,000 including machinery.

The Pittsburgh Malleable Iron Co., Thirty-fourth and Smallman Streets, Pittsburgh, has purchased the property of the Pittsburgh Brewing Co., 95 x 335 ft., adjoining its works, for $75,000. New buildings will be constructed and present structures remodeled by the new owner for extensions.

The J. Hoxworth Co., Canonsburg, Pa., is planning the installation of a lathe, drill press, air compressor and other equipment at its machine shop.

A manual training department will be installed in the new central high school to be erected on Somerset Street, Johnstown, Pa., estimated to cost $900,000, for which bids will be called on a general contract in the fall. J. E. Adams, Nemo Building, is architect.

The Penn Bridge Co., Beaver Falls, Pa., has been granted permission to build a boat-building and repair plant, with shipways 800 ft. long on the Beaver River, Bridgewater, Pa. Plans will be prepared at once.

M. C. McClure, Youngsville, Pa., operating a machine and repair shop, is planning the installation of a lathe, drill press and other equipment.

Fire, June 30, destroyed a one-story building, 100 x 200 ft., at the plant of the Universal Steel Co., Curwin Station, near Bridgeville, Pa. An official estimate of loss has not been announced. It is planned to rebuild.

The Common Council, Sharon, Pa., is planning the installation of electrically-operating pumping machinery at the new sewerage disposal works, estimated to cost $200,000.

Jesse E. Moore, Clay, W. Va., and associates, have acquired the plant of the Armorcord Rubber Co., Morgantown, W. Va., at a public sale for $67,000. The new owner, with Noah E. Moore and Joseph H. McDermott, both of Morgantown, are planning to organize a company to take over and improve the works and manufacture a similar line of products.

The Brady Warner Coal Corporation, Brady, W. Va., will make extensions in its property at Oakmont, Pa., including the installation of a conveyor system, picking table, rotary pump, electric substation, and other structures. Betterments are also under way at the coal properties at Brady.

The Robinson Motor Car Co., 212-18 Main Street, Johnstown, Pa., has plans for a three-story service and repair building, 65 x 140 ft., to cost approximately $85,000. Machine tools, bench tools and other equipment will be installed. H. M. Rogers, Trust Building, is architect.

Baltimore

BALTIMORE, July 9.

INQUIRIES are being made by the Carey Machinery & Supply Co., 119 East Lombard Street, Baltimore, machinery dealer, for a quadruple punch and shear, 15 in. throat, with 30 in. throat on shearing end.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until July 17 for 1795 pounds of magnet wire for the Hampton Roads Navy Yard, schedule 1083, and for ammeters and voltmeters for the Portsmouth, N. H., Navy Yard, schedule 1085.

The Radiator Repair Shop, 712 West Broad Street, Richmond, Va., is planning the installation of a lathe, air compressor and other tools.

W. S. Austin, Maryland Trust Building, Baltimore, consulting engineers, is in the market for two 40-hp. motors, with rails, pulleys and controllers; two 20-hp. motors, with similar auxiliary equipment; one 7½-hp. motor with pulleys and compensator, and two 5-hp. motors.

The Ford Motor Co., Highland Park, Mich, has taken title to 40 acres on the eastern branch of the Elizabeth River, Norfolk, Va., for $132,000, as a site for its branch assembling plant. Plans will be drawn for one-story steel and reinforced concrete buildings, to cost approximately $100,000.

The Atlantic Coast Line Railroad Co., Wilmington, N. C., has awarded contract to the T. A. Amason Co., Thomasville, Ga., for a new engine house and addition to its machine shop, 62 x 105 ft., at Lakeland, Fla. The installation will include a large wheel lathe, 200-ton locomotive hoist and other heavy machinery. J. E. Willoughby is chief engineer.

The Common Council, Frankford, Del., is considering the installation of electrically-operated pumping machinery in connection with a proposed waterworks plant to cost about $30,000.

A one-story steam-operated power house will be erected by the Wilmington Gas Co., Wilmington, Del., at its works.

The Susquehanna Power Co., Elkton, Md., has been granted permission to build a hydroelectric power plant on the Susquehanna River, near Conowingo, Md., with ultimate capacity of 360,000 hp., to cost in excess of $15,000,000.

H. M. Shaw, Oxford, N. C., is in the market for a quantity of special pressed steel parts, and will contract with a going plant for the production.

The Carr Auto Spring Co., 290 West Broad Street, Richmond, Va., is planning the installation of a power shear, drill press and other equipment.

Charles B. McVay, Jr., chief of the Bureau of Ordnance, Navy Department, Washington, is taking bids until July 25 for nineteen 8 in./55 guns without breech mechanisms, and nineteen sets 8 in./55 gun forgings, as per proposal form and information on file.

The Eastern Power Co., Elkton, Md., recently organized, has acquired the electric light and power utilities at Elkton, Havre de Grace, Aberdeen, North East, Perryville, Rising Sun and Port Deposit, Md., and Oxford, Pa. Plans are being considered for extensions, including a hydroelectric power development and steel tower transmission system.

The Common Council, Hagerstown, Md., has made application for permission to issue bonds for $300,000 for extensions in the municipal electric power plant and the installation of additional machinery. A. B. Grubmyer is manager of the station.

The F. D. Schluter Auto Welding Co., West Broad Street, Richmond, Va., is planning the installation of a lathe and drill press in its machine shop.

The Virginia Iron & Metal Co., Richmond, Va., has acquired the ordnance reserve depot of the Government at Seven Pines, near Richmond, comprising 1260 acres of land with a number of buildings. Some of the structures will be remodeled and occupied by the new owner for an iron, steel and metal-working plant. L. Bernstein is president.

The Wade Mfg. Co., Wadesboro, N. C., is planning the construction of a hydroelectric power plant at its new textile mill, estimated to cost $1,000,000. A one-story steam power house, 40 x 132 ft., will also be built. Robert & Co., Inc., Atlanta, Ga., is engineer.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, has inquiries out for a 10-ton gantry crane, steam or electric operation; one steam shovel, on wheels or crawler, with bucket 2½ yds. in capacity; four 18-ton saddle tank locomotives, 36-in. gage; and 40 4-yd. dump cars, 2-way, 36-in. gage.

The Amalgamated Mining & Developing Corporation, Marion, Va., recently organized with a capital of $1,000,000, has tentative plans for the installation of electric and other equipment on local mineral properties. A. T. Short is president.

The Broad Street Bicycle Works, 506 West Broad Street, Richmond, Va., is planning the installation of a lathe and air compressor.

The W. T. Harvey Lumber Co., Fifteenth Street and Ninth Avenue, Columbus, Ga., has tentative plans for rebuilding the portion of its main mill, recently destroyed by fire with loss approximating $75,000, including equipment. John Slaughter is general manager.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until July 17 for electric transformers and copper cable for the Canal Zone, circular 1542.

A power plant will be constructed by the Stark Mills of Massachusetts, a subsidiary of the International Cotton Mills, Inc., 60 Federal Street, Boston, at its new textile mill at Hogansville, Ga., estimated to cost $1,500,000.

Fire, June 28, destroyed the mill and power house of the Union Lumber Co., Marshville, N. C., with loss in excess of $200,000 including equipment. It is planned to rebuild.

Evans & Kramer, West Broad Street, Richmond, Va., operating a machine shop, are planning the installation of a lathe, power saw and other equipment.

R. P. Johnson, Wytheville, Ga., machinery dealer, has inquiries out for a heavy planer for hard wood service, with end matcher attachment.

The Nitrate Agencies Co., 104 Pearl Street, New York, has acquired a building at Wilmington, N. C., and plans for the installation of machinery for fertilizer manufacture, including mixing, drying, loading and unloading equipment. A. C. Diehl is local manager.

The Kester Machine Co., Winston-Salem, N. C., will remodel a building on Main Street, two and one-half stories, 25 x 100 ft., for a local works.

Fuqua & Stone, Ashland, Va., operating a machine shop, are planning the installation of a drill press, lathe, electric drill and other equipment.

The Standard Sand & Gravel Co., Lillington, N. C., has inquiries out for a saddle tank locomotive, 20 to 40 tons, 36-in. gage, second-hand.

Buffalo

BUFFALO, July 9.

CONTRACT has been let by the Jamestown Metal Desk Co., Blackstone Avenue, Jamestown, N. Y., to Mullen, Gulanane & Ludwig, 303 North Main Street, for a one-story addition, estimated to cost $50,000.

The Elmira, Corning & Waverly Railroad Co., Corning, N. Y., has authorized plans for rebuilding its repair shops and car barns at South Corning, recently destroyed by fire with loss in excess of $75,000.

The Achilles Rubber Corporation, Binghamton, N. Y., has been organized with an active capital of $150,000 to take over and expand the plant and business of the Achilles Rubber & Tire Co., North Floral Avenue. The new company is headed by W. M. Broderick, R. J. Brown and D. F. Rice.

The Jamestown Malleable Products Co., Tiffany Avenue, Jamestown, N. Y., is perfecting plans for an addition to its foundry and forge shop. New equipment will be installed.

The Buffalo Nipple & Machine Co., 335 Glenwood Avenue, Buffalo, has entered into contract with the Surfo Heating Co., 350 Franklin Street, for the manufacture of Surfo oil burners and oil-burning equipment, and is arranging to devote an entire floor of its plant to this line, with additional space later.

The Manufacturers' Tool & Die Corporation, South Water Street, Rochester, N. Y., is planning for the installation of die and tool-making equipment, to replace the portion of its works recently destroyed by fire. A. W. Formani is president.

Alfred C. Esss, 59 Gold Street, Buffalo, has leased and will operate the wagon works and forge shop at 14 to 16 Williams Street, previously operated by Jacob Rittzel, and will remodel the plant for a machine shop and repair works for automobile service and install equipment.

The Plattsburgh Gas & Electric Co., Plattsburgh, N. Y., is planning extensions in its plant and system in the vicinity of Chazy, N. Y.

The Mann Brothers Co., 340 Ohio Street, Buffalo, operating a linseed oil refinery, will commence the erection of a four-story and basement addition, 50 x 70 ft.

The Standard Oil Co. of New York, 26 Broadway, New York, is said to be arranging a list of equipment for installation at its proposed machine shop at Elmira, N. Y., estimated to cost $50,000, including drill press, lathe, bench tools, etc.

The American Mfg. Concern, Everett and Work Streets, Falconer, N. Y., manufacturer of metal and wood toys and novelties, is perfecting plans for a three-story addition to cost $55,000, including equipment.

The Van Dyke Taxi & Transfer Co., Buffalo, has leased three two-story and one three-story buildings at 119-25 Erie Street, for the establishment of a new service and machine repair works, with parts department. A new one-story shop will also be erected, 114 x 200 ft., for general mechanical service.

The Jamestown Regulator Co., Wellman Building, Jamestown, N. Y., is planning the installation of machine shop equipment and tools. F. H. Garfield is one of the heads of the company.

Detroit

DETROIT, July 9.

REORGANIZATION plans are being arranged by C. H. Wills & Co., Marysville, Mich., manufacturer of automobiles. The property of the company has been purchased for a nominal amount of $750,000 by Kidder, Peabody & Co., 115 Devonshire Street, Boston, bankers, who will arrange financing for the new organization, to be known as the Wills-St. Claire Co., capitalized at $15,000,000. Plans will be perfected for plant extensions and increased output. C. H. Wills will be head of the new company. The present organization has been operating under a receivership since last November.

The Studebaker Corporation, Detroit, will commence the erection of an addition to its local manufacturing plant at Brush and Piquette Streets to cost about $65,000.

The Fruehauf Trailer Co., 1904 Harper Avenue, Detroit, is planning the construction of an addition, to be equipped primarily as a machine shop.

The Calumet & Hecla Mining Co., Calumet, Mich, is planning the installation of an electric hoist and other operating machinery at its local copper properties.

The Consumers Power Co., Jackson, Mich., has acquired the plant and system of the Citizens Electric Co., Battle Creek, Mich. The property will be merged and extensions and improvements made.

The Capitol Steel Corporation, Lansing, Mich., recently organized, has plans for a fabricating plant for the production of steel bars for reinforcing service and other steel specialties. Shearing, bending and other machinery will be installed. David S. Stockbridge is president, and Donald W. Sessions, vice-president.

The Blakely Mfg. Co., Fullerton Avenue and Monnier Road, Detroit, manufacturer of wire products, heretofore located at 5675 Wabash Street, has acquired the plant and equipment of the Liberty Stamping & Mfg. Co., Coon Street. The machinery will be removed to the new works of the purchasing company for expansion in the line of metal stampings and kindred specialties.

The J. W. Murray Mfg. Co., 1975 Clay Street, Detroit, manufacturer of automobile equipment and parts, is concluding negotiations for the purchase of seven acres on Jones Avenue, near the line of the Western Pacific Railroad Co., Oakland, Cal., for a new branch plant to serve the Durant and Chevrolet automobile works in this section. It is estimated to cost $250,000 with machinery.

The Detroit Air Cooled Car Co., Wayne, Mich., manufacturer of air-cooled automobiles, is disposing of a preferred stock issue of $1,200,000, the larger part of the proceeds to be used for expansion and the purchase of additional machinery. W. J. Doughty is managing head of the company.

The Arcadian Consolidated Mining Co., Calumet, Mich., is planning the construction of a new power house to replace the structure recently destroyed by fire. Plans are also under consideration for the installation of new hoisting machinery and other surface operating equipment at the copper mines.

The Board of Education, 1354 Broadway, Detroit, has inquiries out for eight change lathes, Worcester type, for installation in the manual training departments at the local schools, to include face plates, jaw chucks and other appurtenances. C. A. Todd is business manager.

Cleveland

CLEVELAND, July 9.

THE Toledo, Ohio, Board of Education has placed orders against its recent list of 16 machine tools for a new manual training school, dividing the business among a number of manufacturers and limiting the purchases of one type of machines to two of one make to provide a good assortment of tools.

A company in the automotive field purchased a round lot of machines the past week and new inquiries for considerable equipment have come from two Detroit car builders, apparently with a view to taking estimates on expenditures for proposed extensions. The demand as a whole is quieter than last month. Dealers report a decline in volume of single machine orders and in inquiries.

The equipment of the Grant Motor Car Corporation, Cleveland, was sold at public auction by the receiver July 6. It included about 20 machines.

The Lees-Bradner Co., Cleveland, manufacturer of gear cutting machinery, has had plans prepared for its proposed extension. It will be a one-story building, approximately 100 x 160 ft., one bay of which will be used for machine shop purposes and the remaining three bays for an erecting shop.

The American Can Co., Cleveland, has had plans prepared for a one-story addition, estimated to cost $40,000.

The plant of the Marion Metallic Vault Co., Marion, Ohio, has been sold by the receiver to E. H. Fishmer and Thomas H. Clark, of Galion, Ohio, both connected with the National Vault Co. They will use the plant for the manufacture of metal boxes and other sheet metal products.

The Vutex Rubber Co., Barberton, Ohio, will erect a two-story factory, 50 x 60 ft.

The Dillon Electric Co., Canton, Ohio, has completed a two-story and basement addition, 70 x 105 ft., which will double the capacity.

The Bluffton Mfg. Co., Bluffton, Ohio, will erect a one-story addition, 40 x 98 ft.

The Krude-Wierk Mfg. Co., Defiance, Ohio, recently incorporated with a capital stock of $50,000, has commenced the erection of a plant for the manufacture of metal containers.

The Pennsylvania Railroad has commenced the erection of a new machine shop for locomotive repair work at Mt. Vernon, Ohio, to replace a portion of its shops recently burned. It will be a two-story steel structure.

The Akron Lamp Co., Akron, Ohio, manufacturer of gasoline lamps, will build an addition, doubling its present capacity. J. Steese is president and A. C. Dick secretary and treasurer.

Milwaukee

MILWAUKEE, July 9.

NEW business is developing slowly in the local machine-tool market. Scattering orders for one or a few items were booked the past week, but volume was light, especially in view of the interruption of the holiday. Some inquiry is being made by automotive shops, although in the main these cover needs for replacement rather than extension of production facilities. The condition of this industry, however, affords confidence that considerable tool business will develop next fall. Railroad requirements have been appearing slowly.

The Nash Motors Co., Kenosha, Wis., is starting work on the reconstruction and enlargement of the forge shop of its main plant in Kenosha, which will require miscellaneous equipment now being placed. A "hospital" building being erected at the four-cylinder car works in Milwaukee for final adjustments and inspection, needs only a small number of items, most of which have been purchased.

Considerable electrical machinery will be required for the new State Street bridge at Milwaukee, bids on the complete construction of which will be taken until July 20 by Roland E. Stoelting, commissioner of public works. It will be a double-leaf trunnion bascule structure, 267 ft. long overall

and 67 ft. wide, and replace a swing bridge which will be scrapped.

The Lipman Refrigerator Car & Mfg. Co., Beloit, Wis., will erect a new machine shop and assembling floor, 80 x 260 ft., at the main works in South Beloit, and has let the general contract to A. C. Woods & Co., Rockford, Ill. It will cost about $100,000. The equipment of the present isolated machine shop will be transferred and supplemented by a considerable list of new tools. J. R. Morash is general manager.

The Acme Brass & Metal Works, Inc., Waupaca, Wis., which a year ago took over the plant and business of the defunct Jorgenson Mfg. Co., has given an option to an unnamed Chicago manufacturer for the purchase of the property. A decision will be made July 10. The plant has been in only partial operation for months. The prospective new owner intends to resume the manufacture of gas engine primers, piston rings and other automotive parts and specialties, which was the principal business of the Jorgenson company.

The Board of Education, Weyauwega, Wis., is taking bids until Aug. 1 for the construction of a three-story high and vocational training school, 98 x 154 ft., designed by Auler & Jenson, architects, Oshkosh, Wis. It will cost $175,000.

The Perfect Pump & Mfg. Co., Marshfield, Wis., has changed its name to the Northern Equipment & Pump Co. The plant was moved to Ashland, Wis., some time ago and several new lines of production have been entered which are requiring frequent additions to the equipment.

The Stout Institute at Menomonie, Wis., a State-owned school for training vocational instructors, has been granted an immediate appropriation of $75,000 for the construction of a new steam generating plant and the purchase of boilers, engines and other equipment. Bids probably will be taken about July 30. Burton E. Nelson is president and director.

Indiana

INDIANAPOLIS, July 9.

A ONE-STORY motor truck machine and repair shop, 60 x 130 ft., will be erected by the Board of Public Works, Indianapolis, for the city fire department. It will cost in excess of $50,000 with equipment. Edward Doepers, City Hall, is architect and engineer. George Kutsell is secretary.

James W. Smith, Inc., Indianapolis, recently organized with a capital of $100,000, has leased property at 924-26 Fort Wayne Avenue for a new plant to manufacture refrigerating machines up to about 5 tons in capacity. The plant will be devoted entirely to assembling, with parts manufacture handled under contract by several local plants. Later the new company purposes to erect new works for all features of production. James W. Smith is president. Charles G. Roberts and E. R. Wilbrink are also officials of the new company.

The Cambridge Light & Power Co., Cambridge, Ind., has been organized with a capital of $75,000, to equip and operate an electric power plant and system for local commercial service. Frank M. Taylor and Robert S. Ashe, both of Cambridge, head the company.

The Columbus Wood Turning Co., Columbus, Ind., has abandoned plans for rebuilding its local plant, recently destroyed by fire, and will establish a new factory in the former plant of the White Wood Products Co., Crothersville, Ind. Machinery will be installed at once.

The Kendall Motor Products Co., Fort Wayne, Ind., has acquired the plant and business of the Kendall Engineering Corporation, defunct, manufacturer of piston rings and other automotive products. The works will be extended to provide an output of about 85,000 piston rings per month. A branch factory will be maintained at Detroit.

The Merchants Heat & Light Co., Indianapolis, has arranged for an increase in capital stock from $2,500,000 to $3,000,000, a portion of the proceeds to be used for extensions in electric generating plants and system.

The B. K. Settergren Co., Bluffton, Ind., recently organized, has taken over the local plant of the W. B. Brown Co., manufacturer of furniture, recently dissolved, for the establishment of a factory to manufacture pianos and piano mechanisms. Improvements will be made, including the installation of additional equipment for the new line of production.

The Northern Indiana Gas & Electric Co., Fort Wayne, Ind., is arranging an appropriation of $250,000 for extensions and improvements in its generating plants and system during the present year.

Clarence C. Shipp, head of Shipp & Co., Indianapolis, manufacturer of heating and ventilating equipment, has acquired a water power site and power house at Flatrock Mill, near Shelbyville, Ind., and will remodel and improve the present station for a hydroelectric generating plant. It will cost about $125,000.

Chicago

CHICAGO, July 9.

THE Denver & Rio Grande Western has closed for its entire list of tools, involving a total expenditure of approximately $275,000. Action on the Elgin, Joliet & Eastern inquiry is now placed at a week hence. The Chicago, Burlington & Quincy will probably not close against its list for another month. The propositions on the additional tools inquired for by the Chicago & North Western have not yet been passed upon by the mechanical department of that road, so that purchases are not expected for some time. Outside of railroad buying, the market is exceedingly quiet, orders and inquiries from industrial sources being few.

The H. G. Saal Mfg. Co., 1800 Montrose Avenue, Chicago, has purchased a tract, 406 x 627 ft., on Lincoln Street between Argyle and Ainslie Streets, as the site for a plant to manufacture phonograph motors, radio equipment, automobile accessories, etc. It will cost $600,000.

The Goss Printing Press Co., 1535 South Paulina Street, Chicago, has purchased property, 92 x 455 ft., at the southeast corner of Fifteenth Place and Wood Street, for the expansion of its facilities.

Hruby Brothers, 112 North La Salle Street, Chicago, have a contract for a one and two-story plant, 100 x 160 ft., at Fifty-second Avenue and Thirty-third Street, Cicero, Ill., for Maximum Power Motors, Inc. The structure will cost $200,000, and next fall it is planned to start a second unit, 80 x 160 ft., to cost $150,000. The company is a successor to the Universal Gas Electric Co., Lawrence, Kan., and will manufacture a gas-electric six-wheel truck and motor bus, having a four-wheel drive. Garvin Denby is president and W. R. Hostetter, secretary.

James Burns, 64 West Randolph Street, Chicago, is taking bids on a two-story garage addition, Morse Avenue, near Sheridan Road, Chicago, for P. C. Winn., to cost $150,000.

Otto and Walter Schmidt, owners of the Rienzi Garage, 554 Diversey Parkway, Chicago, have let contract for a two-story garage, 150 x 250 ft., at Lehmann Court, to cost $250,000.

The American Steel Foundries, Chicago, is completing an extension, 85 x 200 ft., to the cleaning room of its plant at Indiana Harbor, Ind.

The C. G. Spring Co. of Illinois, a subsidiary of the C. G. Spring Bumper Co., Detroit, has purchased a building at 1445 West Thirty-eighth Street, Chicago, and will use it as a branch warehouse and factory for the manufacture of automobile bumpers. It has a floor space of 60,000 sq. ft.

The Tri-City Malleable Casting Co., which recently purchased a foundry from the Moline Plow Co., East Moline, Ill., is installing five annealing ovens.

The American Products & Package Co., recently organized for the manufacture of children's toys, Anderson, Ind., has purchased the Lavelle foundry building on Chase Street.

The Ford Motor Co., Detroit, which is constructing an assembling and body plant at Hegewisch, Ill., expects to start operation with 5000 employees within six weeks. The present assembling plant in Chicago will be sold and the 800 employees will be transferred to Hegewisch.

B. L. Salzman, Chicago, dealer in salvaged machinery, purchased the plant of the Western Boiler Pipe Co., Monmouth, Ill., at auction. Approval of the sale by the court has not yet been obtained.

The Anchor Concrete Machinery Co., Adrian, Mich., will build a one-story addition, 59 x 65 ft.

The Orton & Steinbrenner Co., Chicago, manufacturer of locomotive cranes, will erect a one-story machine shop addition at Huntington, Ind.

The Mineral Rubber Products Co., 1919 Second Avenue, Moline, Ill., is building a plant to cost $20,000.

The Frank Foundries Corporation, Moline, Ill., is erecting additions to cost $20,000. The improvements include 2000 sq. ft. additional core room space, a retaining wall for storage of raw material, a new carpenter shop, a fire-proof pattern vault and additional space in the molding room and sand and castings storage house.

The State Board of Control, State House, St. Paul, Minn., will take bids for a new power plant at the institutional buildings to be erected at Winona, Minn., estimated to cost $575,000. Plans are also nearing completion for a one-story and basement power house addition to the State mechanical

laundry, St. Paul, to cost $45,000. C. H. Johnston, 615 Capitol Bank Building, is architect for both projects.

The Viking Pump Co., 209 East Fourth Street, Cedar Rapids, Iowa, has plans for a one and two-story addition, 80 x 152 ft. George Wyth is general manager.

The Elgin, Joliet & Eastern Railroad Co., 208 South La Salle Street, Chicago, will take bids for a new one-story car shop at East Joliet, Ill., 300 x 500 ft., to cost about $350,000.

The Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, will proceed with the construction of the second unit of its new locomotive shops at Denver, Colo., to cost $1,000,000 with machinery. Work on the first unit is nearing completion.

The Climax Engineering Co., foot of Fourth Street, Clinton, Iowa, is considering plans for a new one-story foundry. C. B. Stebbins is head.

The Chicago Association of Commerce, 10 South La Salle Street, Chicago, is in receipt of an inquiry (2239) from a company at Pittsburgh, desiring to locate a local bronze foundry for the production of special grill work and kindred specialties. Also, from a company at Monterey, Mex. (2216), which is in the market for machinery for the manufacture of wire hair pins and small wire goods.

The Jacob E. Decker & Sons Packing Co., Mason City, Iowa, is planning for the erection of a new two-story machine shop, 75 x 95 ft.

Gumbinsky Brothers, Inc., 2261 South Union Avenue, Chicago, manufacturer of paper products, has plans under way for a new mill and power plant at Thirty-first Street and California Avenue, to cost in excess of $2,500,000 with machinery. A. Epstein, 2001 West Pershing Road, is architect and engineer. Oscar Gumbinsky heads the company.

The United States Engineer Office, Milwaukee, will receive bids until July 16 for two 1 cu. yd. capacity, clamshell buckets, circular 444, and two horizontal, duplex piston steam pumps, circular 445.

The Iowa Malleable Iron Co., Fairfield, Iowa, is taking bids for a new two-story and basement building, 27 x 64 ft., estimated to cost $50,000.

Cincinnati

CINCINNATI, July 9.

THE machine tool market continues dull, buying generally being confined to single tools. Inquiries however, continue in fair volume and are mostly for one or two machines, but buyers are hesitant about closing deals. There was no railroad buying of consequence the past week, but some activity on the part of manufacturers was noted in connection with a small list of tools wanted for the Pennsylvania Railroad shops at Columbus. The Norfolk & Western Railroad is expected to begin purchasing against its recent list this week.

For the first time in nearly a year machine shop and foundry help is available, a slackening in building operations being given as the reason, though the fact that union foundries recently increased wages one dollar a day is given as the reason for the sudden oversupply of foundry help. Foundries operating open shops have not all granted the full wage increase, though it is possible that some may do so.

The William Powell Co., Cincinnati, valve manufacturer, will let contracts probably this week for an addition to its plant on Spring Grove Avenue. It will be built of reinforced concrete, three stories, and will cost approximately $80,000. It is expected to be ready for occupancy about Jan. 1, 1924. Considerable machine tool equipment will be installed, though officials of the company have not yet prepared a complete list of the tools required.

The plant of the Dayton Steel Foundry Co., Dayton, Ohio, was damaged to the extent of about $30,000 by a fire which started in the core room July 1. Operations were suspended for only a few days and the plant is again running on full time.

The Duro Pump & Mfg. Co., Dayton, manufacturer of pumps and water systems, is having plans prepared for a five-story reinforced concrete addition, with 50,000 sq. ft. of floor space. Bids will probably be called within a few weeks. C. F. Brunette is president.

The Schuyler Mfg. Co., Springfield, Ohio, has established a plant in the Shuey Building, and will manufacture automobile accelerators and fire alarm systems. W. L. Schuyler is president.

The Hamilton Caster & Mfg. Co., Hamilton, Ohio, has installed new equipment in its shop for the production of steel casters. It reports the largest volume of business in its history.

The Dayton Firedoor Co., Dayton, formerly the Cleveland Firedoor Co., has established a plant at 413 West Fifth Street for the manufacture of automatically operated fire doors. Walter Geis is manager of the company.

The Amerag Corporation, Allentown, Pa., has purchased the plant, equipment and rights to manufacture tractors formerly owned by the London Motor Plow Co., London, Ohio.

The Gulf States

BIRMINGHAM, July 9.

A SITE has been selected by the United North & South Oil Co., Luling, Tex., for a new refinery to cost $100,000, for which plans will be prepared at once.

The Dunigan Tool & Supply Co., Inc., Breckenridge, Tex., is planning the construction of a branch machine shop and mechanical works for oil-well machinery at Amarillo, Tex., where a site is now being selected.

The Trans-Continental Oil Co., Fort Worth, Tex., is planning to proceed with the construction of a new refinery, on which work was suspended several months ago. Arrangements will be made for the machinery installation. The refinery will be used for lubricating oil production and is estimated to cost $850,000.

The G. R. Mueller Co., Brown-Marx Building, Birmingham, machinery dealer, is inquiring for one 100-hp. and a 30 to 35-hp. motor, each provided with rails, pulley and starter, controller, etc.

The Bender Steel, Iron & Supply Co., Shreveport, La., has acquired a site and will have plans prepared for a one-story machine shop and foundry.

C. N. Humason, city manager, Lufkin, Tex., will receive bids until July 16 for pumping machinery for a local waterworks station, 26 x 85 ft., and traveling crane. H. N. Roberts, 4227 Irving Avenue, Dallas, Tex., is consulting engineer.

The Common Council, Georgiana, Tex., has tentative plans for a municipal electric light and power plant.

The Elgin Ice & Cold Storage Co., Elgin, Tex., recently organized, has taken over the plant and property of the Elgin Light & Power Co. Plans are under way for extensions in the cold storage and refrigerating plant and the installation of additional equipment. W. L. Ayers is head.

Fire, June 30, destroyed a portion of the plant of the Texas Wheel & Body Co., Commerce and Dove Streets, Dallas, Tex., manufacturer of automobile wheels and bodies, with loss estimated at $75,000. It is planned to rebuild.

The Childress Light & Ice Co., Childress, Tex., is perfecting plans for an addition to its power plant, and the installation of generating equipment and auxiliary machinery. Frank Houston is general manager.

The O'Neals Lime Works, Inc., Birmingham, has arranged an appropriation of $500,000 for its new plant at Calera, Ala. The installation will include 10 kilns, each with capacity of 40 tons per day, power house, machine shop, crushing and quarry plant. All machinery will be electrically operated, direct-connected. The Schaffer Engineering & Equipment Co., 2818 Smallman Street, Pittsburgh, is engineer. John H. Adams is president, and Albert Strafford, secretary-treasurer.

Fire, June 29, destroyed a portion of the No. 1 plant of the Conners Steel Co., Birmingham, with loss estimated at $200,000, including equipment. It is planned to rebuild.

The Dallas Railway Co., Dallas, Tex., has arranged an appropriation of $1,000,000 for extensions in its power house and system, including the installation of additional machinery, to be used over a period of about 18 months.

The Brevard County Power Co., 1422 Munsey Building, Baltimore, recently organized under Maryland laws with capital of $200,000, has tentative plans for a power house and system in Brevard County, Fla., to cost $75,000. The new company is headed by Herman A. Lang and Joseph A. Slattery.

The Car Parts Depot Co., El Paso, Tex., has awarded contract to the Anderson Construction Co., El Paso, for a new one-story works on Texas Street. B. Edwin Ryan is president.

A one-story power house will be erected by the Louisiana Glass Mfg. Co., Monroe, La., recently organized with a capital of $400,000, at its proposed plant, to cost close to $200,000 with machinery. James S. Stock, Lancaster, Ohio, heads the company.

The H. L. Brown Paper Co., Inc., Monroe, La., recently organized, has awarded a general contract to the Morton C. Tuttle Co., Boston, for the first unit of its proposed plant near Monroe. It will cost close to $1,000,000 with machinery,

and will include a power house. George F. Hardy, 309 Broadway, New York, is engineer. H. L. Brown, Orange, Tex., is president.

The Florida Steel & Wire Co., Jacksonville, Fla., recently organized, has plans for a local factory to manufacture wire nails, fencing and kindred products, to cost in excess of $500,000.

Fire, June 28, destroyed the phosphoric acid plant of the American Cyanamid Co., 511 Fifth Avenue, New York, at Brewster, Fla., with loss estimated at $400,000, including machinery and power equipment. The plant was operated in conjunction with the Virginia-Carolina Chemical Co., Richmond, Va.

The Common Council, Bryan, Tex., will extend the municipal electric power plant and install additional equipment to double the present capacity. E. E. McAdams is city manager in charge.

The Bastrop Glass Co., Bastrop, La., recently organized, will take over the plant of the Ouachita Valley Glass Co., constructed at a cost of $250,000. It is purposed to install additional equipment.

The Simpson County Lumber Co., Strengthford, near Waynesboro, Miss., is planning to rebuild the portion of its mill and power house, recently destroyed by fire with loss of $65,000, including equipment. John O'Keefe is general manager.

The Caddo-DeSoto Cotton Oil Co., Shreveport, La., has plans for a new works, 60 x 325 ft., with extension, 80 x 200 ft., to replace its plant recently destroyed by fire. It will cost about $60,000 with machinery. M. O. Stockbridge is vice-president.

The Corona Coal Co., Townley, Ala., will install new electrical and mechanical equipment at its local properties.

The Blue Ribbon Refineries, Inc., Brownwood, Tex., has been organized to take over and expand the Blue Ribbon Refinery, idle for some months. The plant will be developed for handling 2000 bbl. of crude oil every 24 hrs. J. A. Goodman, Memphis, Tenn., is one of the heads of the company.

The Central South

ST. LOUIS, July 9.

PLANS have been authorized by the Louisville Petroleum Refining Co., Inter-Southern Building, Louisville, for the erection of a new refinery, estimated to cost $250,000 with machinery. W. M. Mitchell is one of the heads of the company, in charge.

The Grayson & Dressel Mfg. Co., Ashland, Ky., manufacturer of gas stoves and parts, has leased the Leffingwell Building, Front Street, totaling about 10,000 sq. ft., for a new plant. Improvements will be made and machinery installed at once. It is expected to develop a capacity of 200 stoves per day, or more than triple the present output.

The Farber Fire Brick Co., Farber, Mo., has plans for the erection of an addition, estimated to cost $100,000, including machinery. R. H. Miller is head.

The Common Council, Drexel, Mo., is planning the installation of electrically-operated pumping machinery at its new municipal waterworks. J. P. Davis, 305 Central Trust Building, Jefferson City, Mo., is engineer.

The Board of Trustees, Vanderbilt University, Nashville, Tenn., is taking bids until July 16 for a new power house and other buildings at the institution, to cost in excess of $1,200,000. A mechanical laundry plant will also be built. Coolidge & Shattuck, 122 Ames Building, Boston, are architects.

The Clinchfield Portland Cement Co., Kingsport, Tenn., has acquired property near Macon, Ga., and will have plans prepared for a new plant with initial capacity of about 2000 bbl. per day. A power house and machine shop will be built. The entire works with machinery will cost about $1,000,000. John A. Miller is president, and W. M. Bennett, second vice-president and treasurer.

The Leggett & Platt Spring Bed & Mfg. Co., Carthage, Mo., is considering the erection of a one or two-story addition, estimated to cost $55,000 including equipment.

L. A. Nickell and R. V. Bartow, Troy, Mo., have acquired the local municipal electric light and power plant, and will operate as a private enterprise. Plans are under consideration for extensions and the installation of additional equipment. The purchasers formerly operated the Edina Light Co.

The State Board of Affairs, Capitol Building, Oklahoma City, Okla., will commence the erection of a two-story power house at the local University Hospital, estimated to cost $60,000. New machinery will be installed. Layton, Smith & Forsyth, 701 Southwest National Bank Building, are architects.

The Okemah Gas & Electric Co., Okemah, Okla., recently organized with a capital of $50,000, is planning the installation and operation of a power plant and system. S. T. Palmer and T. E. Standley, Okemah, head the company.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for a generator to be installed in a power house for sawmill service, including auxiliary electrical equipment.

The Daenzer Motor Co., Sterling, Kan., is planning the installation of equipment in its machine shop, including a power lathe, drill press, emery wheel and stand, cylinder grinder, small tools and transmission apparatus. C. H. Daenzer is head.

The Inman Furniture Co., Kentucky and Thirteenth Streets, Louisville, is considering plans for a new four-story plant, estimated to cost $500,000 with machinery. Charles W. Inman is president.

Fire, June 28, destroyed the plant of the Quickel Automobile & Supply Co., Albuquerque, N. M., with loss estimated at $75,000 including equipment. It is planned to rebuild.

The National Radio Mfg. Co., 225 West Second Street, Oklahoma City, Okla., is planning the installation of equipment for a local plant, including lathe, circular saw, polishing machine, grinder, etc., all electrically-operated. Dudley Shaw is president.

The Camp Branch Coal Corporation, Ivel, Ky., is planning the installation of electrical and mechanical equipment, including shaking screens, cutting equipment, transmission apparatus, etc.

The Springfield Packing Co., 741 South Weller Street, Springfield, Mo., plans the installation of a refrigerating plant at its proposed local packing works, estimated to cost $300,000. T. F. Wallace is head.

The Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, has awarded general contract to Joseph E. Nelson & Sons, 3240 South Michigan Avenue, for its new car and locomotive repair shops at Central City, Ky., estimated to cost $370,000 including equipment. F. L. Thompson is chief engineer.

The Common Council, Van Buren, Ark., is considering the installation of electrically-operated pumping machinery in connection with waterworks construction and improvements, estimated to cost $200,000, in which amount bonds have been sold.

The Dixie Cotton Oil Co., Batesville, Ark., recently formed with a capital of $1,600,000, is said to be considering plans for the construction of a cotton oil mill, estimated to cost $250,000 with machinery. D. D. Adams, Little Rock, Ark., and W. O. Scroggins, Batesville, are heads.

A lathe, drill press, cylinder grinder and other equipment will be installed in the machine shop in the two-story automobile service building, 50 x 110 ft., to be erected at Camden, Ark., by O. B. Burns, Camden, to cost approximately $40,000.

The Common Council, Sayre, Okla., has tentative plans for a municipal electric power plant. A fund of $115,000 will be provided for this and other municipal improvements. V. V. Long & Co., 1300 Colcord Building, Oklahoma City, Okla., are engineers.

Philip R. Dunton, Ponca City, Okla., will build a one-story addition to his local power plant, 52 x 80 ft. A list of equipment will be arranged.

The Motch Motor Co., Middlesboro, Ky., will equip a machine shop in its new two-story building, 50 x 180 ft., for which plans are being prepared by Manley & Young, Knoxville, Tenn., architects. A lathe, air compressor, cylinder grinder and drill press will be installed.

A one-story power plant, 56 x 80 ft., will be erected at Forrest City, Ark., for the Forrest City Special Improvement District. Plans have been completed by F. J. Herring, Forrest City, engineer.

The Pacific Coast

SAN FRANCISCO, July 3.

PLANS are being prepared by the Southern Pacific Railroad Co., 65 Market Street, San Francisco, for a new power house at San Luis Obispo, Cal., to cost $50,000.

The Williams Brothers Aircraft Co., San Francisco, will commence the erection of a new one-story plant for parts manufacture and assembling on South Twenty-fifth Street, to cost $30,000, by day labor.

The Fruit Growers' Association, Beaumont, Cal., is considering plans for a local ice-manufacturing and cold storage plant. A. E. Isham is in charge.

Ralph Bennett, Central Building, Los Angeles, and associates, have made application to build a hydroelectric power plant on Big Rock Creek, Los Angeles County, to develop a capacity of 6100 hp., estimated to cost $600,000.

The Washington Iron Works, 1100 Seattle Boulevard,

Seattle, has plans for a one-story addition 126 x 125 ft., to cost $75,000.

The West Coast Laundry Machinery Co., 1248 Seventeenth Street, San Francisco, has filed plans for a two-story plant at Seventeenth and Capp Streets.

The Board of Education, Merced Union High School District, Merced, Cal., is having plans drawn for a one-story machine and mechanical shop, 40 x 120 ft., for the vocational department. Allison & Allison, Hibernian Building, Los Angeles, are architects.

The Atchison, Topeka & Santa Fe Railway Co., Kerckhoff Building, Los Angeles, plans to rebuild the portion of its lumber mill at San Bernardino, Cal., destroyed by fire June 30, with loss estimated at $400,000 including equipment and stock.

The Eureka Smelting Co., Eureka, Nev., recently organized to take over the Eureka-Nevada Railroad, and local mining properties, has disposed of a bond issue of $2,500,000, the larger portion of the proceeds to be used for the erection of a new smelting plant and power house. George T. Wilson is president, and Charles N. Sigison, secretary and treasurer.

The Nevada-California Power Co., Riverside, Cal., has tentative plans for a hydroelectric generating plant on the North Fork of Rush Creek, Mono County, estimated to cost $160,000.

The Eureka Lumber & Planing Mill, East Fourteenth Street and Thirty-sixth Avenue, Oakland, Cal., has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss approximating $60,000, including equipment. A new site is being selected. C. W. Gilbert is one of the heads of the company.

The Great Western Power Co., 14 Sansom Street, San Francisco, has authorized plans for additions to its two hydroelectric power plants at Caribou and Las Plumas, Cal., estimated to cost $1,000,000 each.

The Hayes-Hunt Corporation, Grand Rapids, Mich., manufacturer of automobile bodies for the Durant Motors, Inc., with which it is affiliated, will soon break ground for a new plant at Oakland, Cal., to cost $100,000.

Canada

TORONTO, July 9.

DEMAND for machine tools fell off slightly the past week and orders closed were somewhat below those of previous weeks. This decline, however, is looked upon as only temporary, caused chiefly by the present holiday season, and it is the general opinion that the active demand which has been a feature of the market almost since the beginning of the year will be resumed without any considerable delay. The erection of new plants and additions to old ones continues active throughout the greater part of the Dominion and equipment for many of these has not been purchased. On the whole, the outlook is bright and many manufacturers are showing interest in the more up-to-date equipment which is steadily replacing obsolete tools and machines. Small tools and supplies are in good demand with a steady flow of orders from users in practically all lines of manufacture.

The sawmill at Warsaw, Ont., owned by William Selkirk was totally destroyed by fire when struck by lightning on July 4, causing a loss estimated at $20,000.

The Town Council, Haileybury, Ont., contemplates the erection of a pumping station and the purchase of equipment. Debentures amounting to $20,000 will be sold to provide funds.

A. W. Allen & Son, Middleton, N. S., proposes to build a wood-working factory, 45 x 90 ft., concrete block construction, also a sawmill, 45 x 85 ft. of similar construction. As yet no equipment has been purchased.

It is reported that Brooks Steam Motors, Ltd., 1304 C. P. R. Building, Toronto, contemplates the erection of a factory at Weston, Ont., construction to be started in the fall.

Kendal Brothers, 165 Iberville Street, Montreal, have started excavation work for a $2,000,000 grain elevator for the Montreal Harbor Commission. The steel contract has been awarded to the Canadian Vickers, Ltd. Montreal.

William Kennedy & Sons, Ltd. 252 St. James Street, Montreal, will prepare plans for a power plant and dam at Cat Calumet Island Falls, on the Ottawa River near Bryson, Que., for the Ottawa & Hull Power Co., Ltd.

The Guelph Stove Co., Guelph, Ont., is contemplating improvements and additions to its plant during the summer. It is proposed to install equipment and double the present capacity.

A. Faustin, Ltd., 622 Beaudry Street, Montreal, is in the market for a small lathe and other equipment for use in architectural iron work.

The Detroit Steam Motor Corporation of Canada, 13 King Street West, Toronto, has taken over the building formerly occupied by the Davidson Motor Co., Whitby, Ont., and will assemble cars there until its own plant in Whitby is completed.

The Chicoutimi Pulp Co., Montreal, is contemplating the erection of a new pulp mill.

The General Motors Corporation of Canada, Oshawa, Ont., has awarded contracts for two buildings, one, 100 x 600 ft., to be used as an assembling plant, and the other, 130 x 200 ft., as a maintenance station. Work will start immediately.

It is reported that the Canadian Westinghouse Co., Hamilton, Ont., has awarded the general contract for the erection of a $200,000 addition to its plant to the W. H. Yates Co. This will be a part of the West Hamilton plant and will be the first of a series of buildings to be erected at a total cost of $1,500,000.

The Continental Wood Products Co., Ltd., Montreal, is planning to spend $1,500,000 on the erection of a kraft mill in northern Ontario, where the company has secured a large tract of timber land.

Preparations are under way at Campbellford, Ont., for the construction of a power plant estimated to cost $500,000.

Plans of New Companies

C. M. Olson, Inc., 233 Broadway, New York, has been incorporated with capital stock of $25,000, to act as a manufacturers' agent and to rent machine tools and contractors' equipment.

The Bonmor Bronze Corporation, New York, has been incorporated with capital stock of $10,000 to manufacture brass and bronze lighting fixtures. The corporation is now functioning, with a plant at 117 East 129th Street, and show rooms at 139 Fifth Avenue. L. H. Fischer, 33 Union Square West, is president.

The Remington Automotive Corporation, recently incorporated with capital of $100,000, will manufacture automotive equipment. It will establish a plant in five or six months and soon will be in the market for stamping and screw machines. In the meantime the National Acme Co., New York, and the Fossberg Mfg. Co., Bridgeport, are doing assembling work for the corporation. C. A. Mandolini, 17 West Sixtieth Street, New York, is president.

The Midwest Air Filters, Inc., New York, recently incorporated for $200,000, to sell filtering equipment, engines, etc., will not be active for several months.

The Watson Geach Co., New York, has been incorporated with a capital stock of $30,000 to sell iron ores and metals. It is a successor H. A. Watson & Co.

The Brightman Brothers Co., Columbus, Ohio, has been incorporated with capital stock of $250,000 and has purchased 11½ acres of land located between Markison and Woodrow Avenues, South Columbus. It has let contracts for the erection of buildings and for equipment, and expects to be in operation within 90 days. The company will manufacture hexagon steel bar nuts, shafting machinery, and straightening machinery. Later on additional buildings and equipment will be added in order to manufacture turned and drawn shafting, screw stock and cold drawn products. The officers of the new company were formerly connected with the Brightman Mfg. Co., Columbus, and are as follows: C. W. Brightman, president; G. F. Brightman, vice-president and treasurer; H. M. Brightman, vice-president; H. L. Brightman, secretary, and T. L. Brightman, assistant secretary.

The Waynesboro Nut Lock Co., Inc., Waynesboro, Pa., has been organized to acquire the business of the Bull Dog Lock Washer Co., Baltimore, and is now installing machinery to manufacture the lock washer. The officers of the company are: W. S. Bostwick, president; Mark Landis, vice-president; C. A. Luons, treasurer; and O. M. Peters, secretary and general manager.

The Brooklyn Pulley Co., Brooklyn, recently incorporated with capital stock of $25,000, is still in a formative stage, but the incorporators hope to establish a plant in Brooklyn in the near future. The company will manufacture pulleys and transmission equipment. A. Lubatt, 85 Fifth Avenue, Brooklyn, is president.

The National Gas Burner Co., Brooklyn, has been incorporated for $20,000 to manufacture gas burners. Frank H. Wheelock, 537 Forty-fifth Street, Brooklyn, president of the company and holder of the patents, has announced that stock will be on sale in a few days, and that the company will probably have a plant established in Brooklyn by Sept. 1.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.95c.	.....
Nos. 22 and 24	4.50c. to 5.00c.	5.25c.
No. 26	4.55c. to 5.05c.	5.30c.
No. 28	4.65c. to 5.15c.	5.40c.
No. 30	4.85c. to 5.35c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.75c. to 5.25c.
No. 16	4.90c. to 5.40c.
Nos. 18 and 20	5.05c. to 5.55c.
Nos. 22 and 24	5.20c. to 5.60c.
No. 26	5.35c. to 5.85c.
No. 27	5.50c. to 6.00c.
No. 28	5.65c. to 6.15c.
No. 30	6.10c. to 6.65c.

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—41	—24	⅛ in. Butt...	— 4	+19
¼ in. Butt...	—46	—32	¼ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap....	— 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap.	—34	— 6	7-12 in. Lap..	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¾c. to 20¾c.
High brass wire	20¼c. to 21¼c.
Brass rods	18 c. to 19 c.
Brass tube, brazed	27¾c. to 28¾c.
Brass tube, seamless	25½c. to 26½c.
Copper tube, seamless	27 c. to 28 c.

Copper Sheets

Sheet copper, hot rolled, 23½c. to 24½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin			Coke—14 x 20	
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Prime	Seconds
			80 lb.	$6.80 $6.55
			90 lb.	6.90 6.65
			100 lb.	7.00 6.75
IC	$11.00	$9.75	IC	7.15 6.90
IX	12.25	11.00	IX	8.15 7.90
IXX	13.50	12.25	IXX	9.15 8.90
IXXX	14.75	13.50	IXXX	10.15 9.90
IXXXX	16.50	14.75	IXXXX	11.15 10.90

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	42c.
Bar	48c. to 53c.

Copper

Lake ingot	17½c.
Electrolytic	17 c.
Casting	16¾c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	12c. to 13c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27c.
Refined solder	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	8c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....32c. to 33c.

Old Metals

Business is quiet and the market is practically unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	12.50
Copper, heavy wire	13.50
Copper, light bottoms	11.50
Brass, heavy	8.50
Brass, light	5.50
Heavy machine composition	11.25
No. 1 yellow brass turnings	7.50
No. 1 red brass or composition turnings	9.00
Lead, heavy	5.50
Lead, tea	4.50
Zinc	4.25

THE IRON AGE

New York, July 19, 1923

ESTABLISHED 1855

VOL. 112, No. 3

An Installation for Heavy Fuel Oil

Heating Furnace Equipment Designed to Avoid the High Cost of Light Fuel Oils and the Limitation in the Supply—Details of the Design and Operation

BY W. C. BUELL*

MOST fuel oil installations serving heating furnaces, especially the smaller installations, reflect little credit on the designer, who often is the plant master mechanic and installs the oil equipment without design or a coordinated plan. The following description of a recent oil fuel installation indicates what may be done, even under rather severe limitations.

This installation was made at the plant of Hubbard & Co., Pittsburgh, manufacturers of electrical pole line equipment, railroad tools, shovels, etc. In the various departments of this plant, which is of considerable extent, natural gas, oil and pulverized coal are used for fuel. A short time ago Hubbard & Co. decided to segregate the bulldozer operations of the electrical materials department, and for this purpose erected a brick, steel and glass monitor type building 60 ft. by 160 ft.

When the engineers took over the design of the projected oil system, furnaces and machine layout, it was found impossible to locate the oil, steam and air piping in trenches under the floor, as is most desirable, owing to the fact that the concrete floor was in place. Accordingly, all the piping was placed overhead, supported on the roof trusses.

*Consulting engineer, Pittsburgh

It was arranged that 12 bulldozers, each with its furnace, should be installed, six sets on each side of the building. The general layout of that side of the plant which includes the fuel system is shown Fig. 1. This picture was taken with only two of the six machines on their foundations. The hood at the top of each furnace was later connected to a common stack for the removal of heat from the fires, and the oil system at the left was inclosed with expanded metal.

Furnaces

The furnaces were very simply constructed of steel shapes and fire brick, as shown in Fig. 2. Their inexpensive rugged construction and the absence of cast iron are notable. The "bung clamps" *A* are cast steel and the rods *B* of bolt stock. Every reasonable effort was made to design the furnaces so as to give the operators the maximum protection from the heat; notice the hood and the double shields at both sides.

All furnaces were of the same fire box length—5 ft. 3 in.—but were supplied having two maximum widths of slot *C* 13½ and 18 in. The width of slot is easily adjustable by means of the two bungs *D*, which are placed on the top of the furnace with the long axis in the horizontal plane. By this means of adjustment, sharply defined heats are given and the minimum fuel is required, as the furnace can be adjusted easily to



Fig. 1. Bulldozer Furnaces and Their Fuel Connections, *A* and *B* Being Insulated Pipes Dropped from the Header to Each Furnace; *A* Is the Oil Supply and *B* the Return. The main service supply pipe is at *C* and the oil return to the tank at *D*

fit the work being heated. As will be readily seen, the furnaces may be used without change for either center or end heats.

Oil Burners

Oil burners supplied by George J. Hagan Co., Pittsburgh, and of an advanced type (Fig. 3) were used, two being applied to each furnace. The choice of burners was based on: (a) the method of circulating fuel through the oil head of the burner (patented), (b) the method of adjusting air and fuel at the burner tip instead of at a point remote from the point of mixing and (c) the secondary air adjustment shutter which permits the character of the flame to be controlled through wide limits.

System for Heavy Oil

The writer is firmly convinced that the present common use of light fluid fuel oils will be greatly curtailed in the near future, both by the decreasing availability of oil of this character at a relatively low price, and the action of public opinion against the misuse of the lubricating and chemical reserves of the country, and that only the heavy, viscous, petroleum residuums and tars from coal distillation processes will be considered permissible liquid fuels.

With this thought in mind, the oil system was predicated on the use of heavy liquids, with a viscosity range above 300 Saybolt seconds at 100 deg. Fahr. The successful use of such fuels requires that the fluid be kept constantly in motion in all pipe lines. Accordingly, a circulating or two-pipe system was designed, one pipe taking the oil from the service system to the burner heads, the other returning the unused balance from the burner head to the storage tank.

It will be noted in Fig. 1 that two insulated pipes, *a-b* drop from the header above to each furnace. These are respectively the oil supply and return. The main service supply pipe *c* is seen in this photograph in a vertical position in the center of the second window from the left, rising from the heater to the header on the truss, and the oil return to tank, *d*, also in a vertical position, may be seen at the extreme right of the same window.

The service pumping equipment was based on moving double the maximum quantity of fuel required for burning, or approximately 300 gal. per hr. In Fig. 4 is shown an enlarged view of the oil unloading, oil service and air systems.

It is conceded that generally an air pressure of 1 to 2 lb. per sq. in. brings about the most economical and satisfactory combustion condition with liquid fuels properly conditioned. The blower *e* is a 25-hp. 3-stage turbine type machine, designed to deliver 2250 cu. ft. per min. at 1½ lb., and with an oil burning capacity of 135 gal. per hr. The air piping *f*, including the drops for each furnace, is spiral riveted pipe. This is more costly than the usual soldered galvanized sheet steel pipe, but once installed it withstands usage that would cause the soldered pipe to leak, and a leak in an air line means expense for power, as energy required is on a basis of air moved.

Oil Storage

Ample oil storage for a 15-day supply is provided adjacent to the building. The termination of the oil suction line, *a*, in the tank, Fig. 5, is surrounded at its lower end by a small pipe coil *b* through which steam thermostatically controlled is passed for warming the oil entering the pump suction line, and thus to permit easy flow. A sheet metal hood *c* centering on the suction pipe surrounds the suction end and coil and retards warmed oil from working to the surface of the oil body and dissipating the effects of the steam heating. The return line *d* from the oil service system discharges under this hood and all heated oil is thus retained in a relatively small volume.

Thermostatic control on the steam, which is adjustable within a considerable range, permits the temperature of the oil flowing in the suction line to the pump to be maintained constantly at a selected temperature and, as oils available for fuel seldom require heating to temperatures over 100 deg. Fahr., for good pumping conditions, this is the usual suction oil temperature.

Service System

The service pump *g*, Fig. 4, is motor driven, of the triplex type with 2 in. diameter by 2½ in. stroke of pistons, and geared to operate at one-half the rated pumping speed for water, or in this particular case

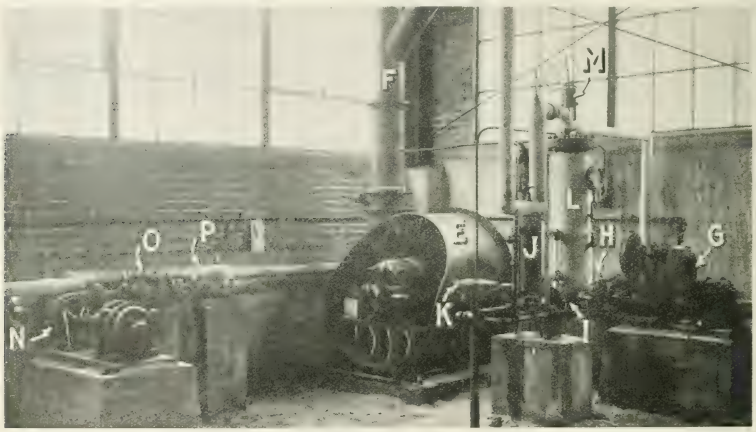


Fig. 4 Oil Unloading, Oil Service and Air System. The 25-hp. blower is at *E*; air piping, *F*; service pump, *G*; emergency relief valve, *H*; twin strainer, *I*; oil cylinder, *J*; emergency valve, *K*; steam booster heater, *L*; thermostatic control, *M*; centrifugal pump, *N*, for unloading incoming fuel from tank cars; twin strainer, *O*; meter, *P*.

45 r.p.m. The pump is capable of delivering at pressures up to 125 lb. gage, but with properly conditioned oils 30 to 60 lb. appears to be the desirable pressure range.

After leaving the service pump the fluid then passes an emergency relief valve *h*, which is set to operate at a pressure 10 lb. greater than the selected

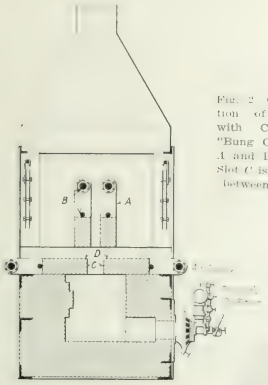


Fig. 2. Cross Section of Furnace with Cast Steel "Bung Clamps" at *A* and Bolts at *B*. Slot *C* is adjustable between lugs *D*

tion of the air volume. This is renewed by means of a small pipe connection from the shop air compressor lines, the pressure of which is always greater than the oil service pressure, and consequently the incoming air forces the oil to its proper level in the gage glass.

Next in the oil service line is the emergency valve, *k*. The diaphragm of this is depressed and the oil valve held open by static pressure from the air blower system. If through interruption of the electric current or for other causes the blower ceases to function, this emergency valve closes, shutting off the oil flow and the valve will not function again until manually set with the air pressure at its normal point. This valve thus prevents oil flooding through failure of the air supply and its later functioning.

Passing then through a steam booster heater, *l*, the oil is heated to the proper final temperature for correct atomizing action at the burners. This final temperature depends upon the physical characteristics of the particular oil being used, but usually ranges between 160 deg. and 240 deg. Fahr. and the heater is fitted with a thermostatic control, *m*, adjustable within this range.

Installed as described above, the system will work continuously with slight attention. Starting and stopping, which means throwing two electric switches, requires the attention of an operator, but aside from that and occasionally cleaning the strainers and giving the moving parts of the equipment the proper inspection and oiling, no other attention is required. All

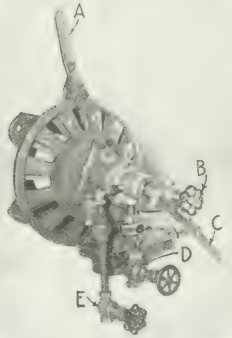


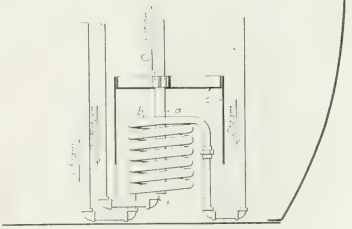
Fig. 3. Oil Burner with Fuel Connection Through the Head, *A* Being the Induced Air Adjustment, *B* the Oil Throttle, C the Air Throttle, *D* the Oil Supply and *E* the Oil Return

Fig. 5. Termination of Oil-Pumping System in Storage Tank, in which the Steam Pipe *b* Surrounds and Heats the Oil Suction Pipe *a*. Returned oil is delivered at *d*, underneath the sheet metal hood *c*

service line pressure. There is a second relief valve in the return system (not shown), through which the unused oil returning to the storage tank passes, and which functions at the selected line pressure. This second relief valve is presumed to pass all surplus oil but if, for any reason, flow through this second valve is interrupted, an increase in service line pressure of 10 lb. will cause the first-mentioned valve to function, thus safeguarding the service lines and apparatus against sudden and excessive pressures.

Then the oil passes through a twin strainer, *i*, the baskets having a 1/32-in. screen, which is smaller than any apertures in the oil burners, and accordingly any foreign substance likely to interfere with burner operation is removed. By means of a system of sliding valves either basket may be cut out of the line for cleaning and without interference in any way with operation.

The oil next passes into a vertical cylinder of considerable height, *j*, which is fitted with a gage glass in its lower section. From three-quarters to four-fifths of the volume of this cylinder is air filled; this gives a pneumatic cushion for the removal of the pulsations inherent in small pump operation. As fuel oil has a considerable affinity for air, there is a continual depleFig. 4. Oil Heater



waste steam lines are trapped and all steam and oil lines are insulated, which in conjunction with the thermostatic controls allows proper heating from the minimum steam.

As there is always hot fluid oil at the burners, the furnaces, even after a shutdown of several days in cold weather, may be started easily and quickly, and the absence of smoke from the fires during the starting

period is most noticeable, especially to one who has operated furnaces with the one-pipe, cold oil system.

Oil Unloading System

The oil set for unloading incoming fuel from tank cars and delivering it into the storage tanks is shown at the extreme left of Fig. 4. This consists of a motor-driven centrifugal pump, *n*, rated at 100 gal. per min., a twin strainer, *o*, of ample capacity and a meter, *p*, the latter to check the oil volume of the invoice.

The unloading pump suction is placed in a pit adjacent to the railroad siding, a couple of hundred feet away; when a tank car is being unloaded the discharge valve on the car is connected to the suction by means of a 3-in. flexible metallic hose. A steam line is wrapped to the suction throughout its entire length, terminating at the pit aforementioned, and this is, when necessary, connected to the heating coils of the tank car to warm the oil for pumping.

The Operation

To try out the system the owners purchased a car of Kentucky fuel oil of about 20 deg. Beaumé gravity but highly viscous at low temperature. The car was delivered on the last and coldest day of the coldest spell of the winter and the oil temperature was not far from zero.

As it was desired to operate the plant at once, an immediate effort was made to unload. The suction and steam lines were attached to the car and it was then found that the car heating coils were inoperative (quite a usual occurrence). For four hours the pump, rated at 100 gal. per min., was able to deliver less than that quantity per hour, but later through the introduction of steam directly into the oil, the pump operated at its maximum and all oil was easily transferred to the storage system. As ample provision had been made for draining the storage tanks, the added water was later easily removed after time had been allowed for settling. The service system was then put in operation and within 30 min. after starting, perfect operation was secured in all the furnaces.

Eliminating repairs necessitated by cracked and faulty fittings (which were noted at once and corrected as soon as possible), no trouble of any kind has been encountered, nor is any anticipated, so long as the system is conscientiously given the small amount of supervision required.

Advantages of Heavy Oil

Heavy oils offer the user:

(a) A considerable differential of price per gallon, often 20 per cent or more.

(b) A considerable increase in calorific value: note the figures following, and further that the difference between 10 deg. Beaumé and 30 deg. Beaumé in this particular respect is 9 per cent.

10 deg. Beaumé, 156,686 B.t.u. per gallon
15 deg. Beaumé, 153,198 B.t.u. per gallon
20 deg. Beaumé, 149,783 B.t.u. per gallon
25 deg. Beaumé, 146,760 B.t.u. per gallon
30 deg. Beaumé, 143,550 B.t.u. per gallon

(c) A much greater floating supply.

Heavy, relatively low priced oils are with us today and will be with us when light oils as fuel are forgotten. Light oils can be burned satisfactorily under almost any conditions, except as to operating costs and continuity of supply.

As the treasurer and the purchasing agent are the only persons aware of these two factors, the operating man has excellent grounds for objecting to the use of heavy oils in his plant, he knowing that his light oil, one-pipe system will not give satisfactory operation when heavy oils are used. Often his objections to the introduction of a system for heavy oils comes from the fact that a considerable amount of theoretical and practical engineering knowledge is required in the design and installation. The heavy oil, two-pipe system has only a slightly higher first cost than the one-pipe system, while the only added operating cost is the small amount of steam required for heating. Under most adverse conditions the cost of steam will not add more than 0.2c. per gal., and this will be many times overbalanced by the favorable price and calorific differentials of the heavy oils.

STORING COAL

Railroads Carrying Out Agreed Program—Facts as to Rolling Stock

WASHINGTON, July 17.—Substantial progress is being made by the railroads in carrying out provisions of the program unanimously agreed upon by them in New York last April, in accordance with which they are to complete by Sept. 1 the storage of coal designed for railroad use, so that after that date the equipment and other transportation facilities may be used to the greatest extent for the transportation of commercial coal necessities.

Forty-four railroads representing 75 per cent of the total mileage of the Class One railroads have reported that during the month of June, they stored 1,821,412 tons of coal. This would mean that each of the 44 roads during the month of June stored an average of more than 41,000 tons.

Including the 1,821,412 tons which was stored during June, the 44 railroads on July 1 had a total of 6,638,812 tons of coal in storage, compared with 4,817,400 tons on June 1.

This would indicate that the railroads are cooperating with the Secretary of Commerce in his efforts to get the industries of this country to lay in their winter coal during the light consuming season—that is, from now until Sept. 1.

The railroads of the United States on July 1 had 190,411, or 8.4 per cent of the freight cars on line, in need of repair. This is the smallest number in need of repair since December, 1920.

The railroads of the United States had on July 1, the latest date available, the largest number of serviceable locomotives, but the smallest number in need of repair for any time since the compilation by the Car Service Division of such reports began in August, 1920.

Serviceable locomotives on July 1 totaled 52,456. This was an increase of 1237 over the number of serviceable locomotives on June 15. At the same time the railroads had 11,450 locomotives in need of repair or 18 per cent of the total number on line.

The railroads of this country also had stored on July 1, 2181 serviceable locomotives in good repair which are being held in readiness for increased traffic demands. From June 15 to July 1, a total of 20,602 locomotives were repaired and turned out of the shops, which was an increase of 1665 over the number repaired during the first 15 days in June.

Despite the fact that loading of revenue freight for the week which ended on June 30 totaled 1,021,770 cars, the greatest number for any one week in the history, the railroads of the United States had on June 30 a total of 63,636 surplus freight cars in good repair.

The net railway operating income of the Class One railroads of the United States in May amounted to $89,999,600, which represented a return on an annual basis of 6.33 per cent on their tentative valuation. The net operating income for the carriers in the Eastern district was at the annual rate of return of 7.72 per cent; the Southern district, 6.72 per cent, and the Western district, 4.43 per cent. The same carriers in May last year had a net operating income of $62,069,000, or 4.46 per cent. In April this year, it was $83,197,800 or 6½ per cent.

The J. L. Mott Iron Works, sanitary supplies, is building a large warehouse with railroad siding on Berley Street, Boston.

Important Work of Trade Associations

Activities Reviewed by Department of Commerce—Secretary Hoover Makes Suggestions in Regard to Extending the Field of Usefulness—Causes of Criticism Considered

BY L. W. MOFFETT

WASHINGTON, July 17.—Completely setting forth the many important phases of work of trade associations and their vital bearing on the efficiency in modern day business, the Department of Commerce yesterday made public a book dealing exhaustively with this important subject. The book entitled, "Trade Association Activities," is a work of thorough-going research, such as never has been attempted before, and unquestionably will be used by business interests throughout the country, as a reference and guide in all the fundamental problems in their lines. Consisting of 368 pages in 16 chapters, together with appendixes, the work deals with the question of trade associations from every possible point of view and involves a full sweep discussion of a multiplicity of subjects and reveals in a striking manner the broad and comprehensive grounds covered by well organized trade associations.

Contributions have been made to the book by a multitude of trade associations in line with the inquiry made by the Department of Commerce to ascertain and illuminate those activities of trade associations which contribute to public welfare. As pointed out in the foreword to the book, the department instituted the work in cooperation with the industries for the elimination of waste, for the extension of trade, and for the improvement in processes of production and distribution. Not alone does the book draw its material from the trade associations, but, reaching out further, it carries material from officials of the Government departments and bureaus, showing the relation of the work of these departments to that of trade associations. It includes contributions from all of the departments of the Government, and recites in a fascinating and informative manner the relationship between the Government and trade associations. The iron and steel, foundry and allied industries, together with the engineering societies, share space in the book, each affording constructive efforts.

Used to Restrain Trade

Necessarily, the book points out that during recent years many of the associations have been subjected to criticism "because certain individuals have used the reputable cloak of trade associations for conspiracy in violation of restraint-of-trade acts." One of the purposes of the book is to show the constructive functions of trade associations in serving public welfare, commerce and industry. Tribute is paid to trade association bureaus of scientific research for improvement of technical processes, the utilization of wider varieties of raw materials, the establishment of standards in quality and grades, simplification of the dimensions of articles, better methods of distribution and the development of higher business ethics. Through activities in insurance, in transportation, in credit information and in promotion of foreign commerce, it is pointed out in the foreword, trade associations have greatly benefited their members and increased national efficiency. Through activities in gathering statistics of production, consumption, stocks and prices, where these have been made equally available to the public, they have contributed to the stability of business and the diminution of speculation and, in fact, it is pointed out many of the national barometers of business and credit which are vital to all business men in formulating judgment "are the work of the trade associations."

The Department of Commerce since its reorganization has been particularly active in cooperating with trade associations to develop progress and efficiency in business along the lines inaugurated. The investigation was undertaken jointly by the Bureau of Census, Bureau of Foreign and Domestic Commerce, and Bureau of Standards, and was supervised by a committee of which F. M. Feiker was chairman.

Secretary Hoover's Introduction

In an introduction by Secretary of Commerce Herbert Hoover, it is declared that the American public is little acquainted with the work of trade associations, which varies widely in the different fields. It is evidently one of the purposes of the book to show all trade associations where they can improve their work. Some of them, it has been pointed out, could well coordinate their work, reduce the number of their associations into a more compact organization and compile more comprehensive and vital statistics than they do at present.

Mr. Hoover, after explaining certain types of associations with limited functions which are frequently mistaken for trade associations, explains the purpose and aim of a trade association. He says it is to deal with all questions of general application in the branch of industry or commerce it serves and so to develop its field that the enterprises in it may be conducted with the greatest efficiency and economy.

"The constructive purposes of trade associations have unfortunately been confused with the minority of activities which have been used as a cloak for action against public interest," says Mr. Hoover, "It is also true that a vast amount of action in public interest has been lost and even great national calamities brought upon us by lack of cooperative action. All who know the situation in such matters realize that the problems of cooperative action are mainly the concern of smaller businesses. The material in this book has been brought together not from the point of view of educating big business, but with the idea that the legitimate trade associations and other forms of business cooperation are the real basis for promotion of smaller businesses.

"If we are to have a comprehensive economic system, it seems to me that the time has come when we should take cognizance of the necessities. The growing complexity of our industrial life, its shift of objective and service, requires the determination of an economic system based upon a proper sense of rightful cooperation, maintenance of long-view competition, individual initiative, business stability, and public interest."

All Activities not Good

Mr. Hoover points out that all trade association activities are not good just as all individual habits are not good until so proved by their reaction on the individual and the community. He suggests that the best way to guide activities into the most constructive and profitable channels is through thorough-going analysis and examination of these activities which seem on the surface to be constructive in their application and results.

Most trade associations, he declares, have evidenced active interest at some time or other in the collection, compilation, preparation and dissemination of statistical material relative to their industries and trades, considered with particular emphasis to production, stocks, shipments or cancellations. Sometimes the greatest desire, it is asserted, has been for data regarding prices and orders. Statistical activity by trade associations has legal limitations, it is explained.

However, he continues, there is no question that the curves in the business cycle from activity to depression have been less disastrous in those industries or trades where accurate lawful statistical data have been available to all. He shows the necessity of statistics "if industry is to march with reasonable profits instead of undergoing fits of famine and feast, if employment is to be held constant and not subjected to vast waves of hardship." Whether these services are to be maintained by the Government or by trade associations, Mr. Hoover says, they must be maintained "if we are to have an orderly economic life."

Demand from Legislatures

Dealing with the question of legislative activities, Mr. Hoover says that the open preparation and presentation of views of different trades upon all sorts of questions of public interest is constantly in demand by legislatures, and that this method of presenting the facts is far more consonant with proper development of public life than the private lobbying of the few or powerful. With regard to simplification and standardization, Mr. Hoover says that the elimination of waste can be accomplished only by collective action in a trade. Hundreds of millions of dollars are declared to have been saved through the adoption of programs of simplification and standardization, not only to the business groups concerned, but to the ultimate consumer. Trade association work is given credit for proving itself the most potent organized influence in the study of cost in industry and trade. The trade association is declared to be a trusted and reliable clearing house for vital credit and collection information. While it is true, Mr. Hoover states, that credit information has been used for restraint of trade, this is not its primary or usual purpose and obviously should be prohibited. The stamping out of unfair competition and misrepresentation and the adoption of fair practice principles are held to have been real accomplishments of scores of trade associations in the direction of better business. If the present-day indications of trade associations have real meaning, Mr. Hoover says, the question of the human factor and its mass relation in business will not be approached blindly and without preparation and knowledge.

Elimination of Waste

Taking up the question of insurance, the Secretary says that, strange to say, there has been little uniformity in State legislation affecting insurance and here in particular the trade association has been instrumental in the reasoned elimination of waste and unnecessary expense. Declaring that public relations—publicity and advertising—has become an exact science, Mr. Hoover says that each trade has its peculiar problems attendant upon merchandising itself or its wares and just so each trade association is proving itself the dominating factor in the development of the public relations of its own business group. It may be cooperative advertising or it may be something more complex. "Whatever it is," it is stated, "it always needs the scientifically trained and guided hand of the trade association specialist backed by unanimous support of the group in telling its story to the public, who must know the truth, the whole truth, at all times."

The trade association in its bearing upon traffic and transportation as an aid for goods to find their way to market readily, is pointed out. There are rate matters, classification, car supply, auditing of transportation bills, the study of competitive transportation agencies, and the real force of such competition. The problem of the cost of distribution and its relation to commercial research is said to be recognized by trade associations with a view to eliminating waste and serving the requirements of consumers. Mr. Hoover states that goods do not find the market with readiness and ease and must be adjusted to demand, an exacting, much sought-after and not too well-defined market. Especially does this apply to export markets and Mr. Hoover says that commercial research by trade associations is proving a real force in this great problem. With relation to industrial research, Mr. Hoover declares this will bring gigantic financial return to industry as a whole in its more general application through trade-association activity.

Government Relations

Dealing with Government relations, Mr. Hoover says:

"Whether the attitude of business be to keep Government out of business or to the contrary, it nevertheless is true that the Government in its manifold activities directly impinges upon commerce and industry at many points. The control of public utilities, the restraint-of-trade acts, the large volume of Government expenditures, all materially affect business, not to mention the legislative problems thrust upon the Government as the result of after-war re-organization. Official trade information, official industrial statistics, official standards, procedure, and practice are being sought by the trades, and the Government is constructively active in cooperation with business to develop these fundamental services."

All of these topics discussed by Mr. Hoover are amplified in great detail in the book.

Commissioner Nelson B. Gaskill of the Federal Trade Commission, in an article expressing his individual views on legal aspects of statistics in his conclusion says in part:

The purpose of this discussion is to show that the service of statistical information as to production costs, volume of production, stocks, sales, and selling prices is a useful and proper activity for a trade association. It is clear that each of these elements of trade information, or all of them combined, can be collected and distributed in a lawful manner and for a lawful purpose. Each and all of them are equally capable of misuse for unlawful purposes. Experience shows that both methods of treatment have been employed. The character of the service, its intent, and the use to which it is put depends upon the spirit of the members of the association projected through the agency which they create. The level of association action will be what its members determine. An effort has been made here to explain the principles underlying the law and the judicial decisions, the reasons for the opposition of the law and the attitude of the administrative agents of the law to certain tendencies, to movements in this or that direction, for a clearer understanding on the part of association members. The present state of the law and the principles which it expresses may or may not meet universal approval. None the less, what trade associations have now to meet is the law as it is, and the tests of conduct are those which the law now establishes.

Legislative Activities

In a chapter on legislative activities, prepared by Attorney Rush Butler of the National Coal Association, Secretary Frederic W. Donahoe of the Refractories Manufacturers' Association, William J. Matthews, Harry Meixell of the National Motor Vehicle Conference Committee, and William Tyler Page, Clerk of the House of Representatives, the concluding paragraph reads as follows:

It must be further remembered that the success of an association in impressing its views upon legislation is in direct ratio to the time in advance of the consideration of pending legislation that such association has used in gaining and interpreting the facts and the views of its membership. If an association and its members have come to agreement and judgment after full consideration, its position is immensely strengthened.

In discussion of the relation of Government departments to trade associations, the State Department says that one of the chief ways in which it can be and is of service to American trade associations is in giving such assistance as it properly can render with a view to promoting and protecting the interests of their members in foreign countries. The War Department says that the Army in time of war will make demands on almost every line of industry and the cooperation of trade associations will be vital to insure success.

Purchasing by the Navy

The Navy Department's statement says at one point:

The Navy's demand for supplies and its methods of purchasing have perhaps helped trade associations in their dealings with the commercial world more in the line of standardization of materials and containers than in any other direction. It is practically impossible even to estimate the Navy's worth to the trade in this particular. It has been such a gradual development and the trade has fallen in line

in such a manner that the standards set by the Navy were adopted as a matter of course and without hesitation.

The statement adds that requests from manufacturers to reprint Navy specifications for their manufacturing department are not infrequent, and only recently one of the largest steel rolling mills requested a list of specifications involving over 600 different items for use in their manufacturing department.

The Department of Labor says that it does not accept data through industrial trade association sources but that information as to wages and prices must be taken from the books of individual establishments. Hence, it is pointed out, the only way in which associations can be of service to the Bureau of Labor Statistics is by opening the way for sympathetic consideration of the subjects by their individual members. The statement says, however, that the bureau has accepted statistics in the cases of wage scales made between large employers' associations or group of such associations with district trade-unions or in some cases even National unions; as, for instance, the National Stove Manufacturers' Association concluded a wage scale for all of its members with the National Iron Molders' Union, covering all the members of that organization working in the stove trade.

Iron and Steel Division

The Iron and Steel Division of the Bureau of Foreign and Domestic Commerce contributes the following statement:

The Iron and Steel Division has established its primary trade association contacts with producers of nonferrous metals and manufacturers thereof. It also operates through the National Association of Manufacturers by the establishment of a contact with this organization's foreign bureau, and more lately with a special committee from the steel industry. This division has endeavored to acquaint [illegible] parts as possible the foreign field services of the Government with the technical aspect of the iron and steel and nonferrous metals industries in order that foreign markets for the products might be more scientifically analyzed. The division has also been instrumental in the obtaining of foreign contracts for American iron and steel manufacturers. Statistical data relating to iron and steel production and foreign trade of the more important industrial nations are translated and currently compiled from foreign Government publications and made available to the trade. Upon request from the Refractories Manufacturers, Association, the minerals and metals section of this division, in cooperation with the association, has undertaken an extensive investigation of foreign markets for fire brick.

Industrial Machinery Division

The Industrial Machinery Division of the Bureau makes the following statement:

The Industrial Machinery Division endeavors to give thoroughly practical assistance on almost any question that may develop in connection with marketing machinery abroad. In cooperation with trade associations the division has frequently arranged to have adjusted through the field service of the bureau such matters as collection of accounts, trade discriminations, boycotts, labor troubles, and similar matters.

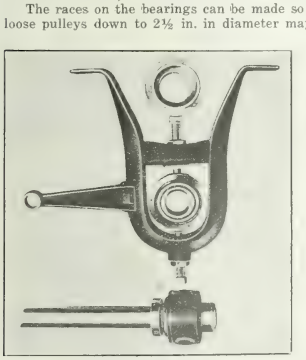
This division's cooperation with trade associations has been effective mainly through specially appointed committees. These committees, acting through the bureau, have been able to arrange for the obtaining of as nearly complete information as possible regarding the distribution methods in foreign countries by which machinery is marketed. Studies attendant upon the economical shipping of machinery abroad and a complete survey of machinery dealers in foreign countries have been other accomplishments of the division. The kinds of machinery with which the Industrial Machinery Division is primarily concerned are those used in industrial enterprises of all kinds, including factories, mines, and the construction of engineering works.

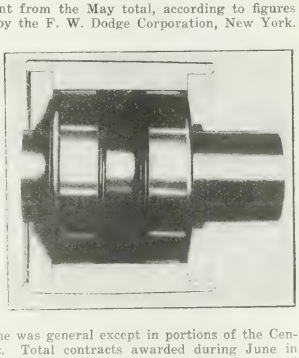
Loose Pulleys and Countershaft Boxes with Taper Roller Bearings

Loose pulleys in sizes from 2½ to 22 in. in diameter, equipped with adjustable taper roller bearings for taking end thrust, are being marketed by the St. Louis Machine Tool Co., St. Louis.

The races on the bearings can be made so thin that loose pulleys down to 2½ in. in diameter may be used by mounting the bearings directly on the shaft. Mounting them on a sleeve is preferred, however, and where this construction can be used it is said that old and worn arbors and shafts may frequently be saved.

The same bearings are also being provided on the company's countershaft boxes, which are made up of a box with proper sockets for adjustment between the screws, and will fit in standard hangers. At both the front and back a felt groove and retainer is provided. The boxes are fitted with suitable adjustable taper roller bearings for the service required, the necessary set and retaining collars being also provided. The boxes may be conveniently put in hangers, already in place. Pressed steel hangers with the boxes are also available.





Loose Pulleys Equipped with Taper Roller Bearings, As Shown at Right, Are Available in Sizes From 2½ to 22 In. in Diameter. A pressed steel hanger with roller bearing countershaft box is at the left. The box may be had either with or without hangers

June Building Construction Declines

Construction work contracted for in June fell off 14 per cent from the May total, according to figures compiled by the F. W. Dodge Corporation, New York.

The decline was general except in portions of the Central West. Total contracts awarded during June in 36 States (including about seven-eighths of the total volume of the country) amounted to $371,034,000. In spite of the decline, the figure indicates that a large volume of work was started. The Dodge Corporation states that any month which exceeds $350,000,000 in these 36 States is a heavy month.

The Colonial Steel Co., Pittsburgh, has purchased vacant property, 50 x 135 ft., at 1440-42 Bryan Place, Chicago, as a site for a warehouse and office building to house the Chicago branch of the company.

CONTROL URGED AS MARK FALLS

Gold Basis Urged for Budget, Taxes and Wages—Business Unchanged—More Companies Under Foreign Control

BERLIN, GERMANY, June 26.—No material change has taken place in the iron and steel markets in June. In unoccupied territory the slight increase in activity, which resulted from the collapse of the mark-stabilization attempt of February, March and April, has continued. In occupied territory production continues for stock. The French embargo on transport to unoccupied territory continues, while the attempt to create a *modus vivendi* with France making export possible has failed. Reserves of ore are still being consumed. Smelting activity has declined and coke ovens are idle except on production for local consumption. The fuel supply in unoccupied territory continues sufficient. In April coke imports, which averaged 1,000,000 metric tons monthly in 1922, increased to 4,500,000 tons; but the new mark collapse made English coal about three times dearer than German, and imports in May (although there are no available statistics) seem to have fallen considerably. On June 25, the French announced that all coal supplies in occupied territory were expropriated "in so far as the Franco-Belgian Control Commission needs them;" but it is not likely that the occupying armies mean to entirely prevent the heavy iron corporations from using their own coal. Labor Union reports show a decline in unemployment in the metal industries but the improvement is less marked than is usual following declines in exchange.

In spite of official pessimism there is no sign of a general collapse of industry which would make the Cuno cabinet abandon its policy of passive resistance. The one possibility of breakdown lies in the decline of exports, which might make it impossible to import foodstuffs, fuel and other necessaries. Hitherto imports have been paid for not with marks, but with high-exchange bills received in exchange for exports. Ninety-day bills drawn for exports delivered prior to the French embargo have until lately been falling due. A complete cessation of exports from the Ruhr means a decrease in the supply of foreign currency; and in the present exchange situation this decrease might cause serious difficulty. The last export figures in values show for April, however, an increase; the total value sent abroad being 435,800,000 gold marks against 360,600,000 gold marks in March, and a monthly average of 330,800,000 gold marks in 1922. Considering the curtailment of Ruhr exports, the April figure is favorable and if unoccupied Germany's foreign business continues to compensate, the stoppage in the Ruhr will probably be offset. Iron and steel imports in the first quarter of 1923 show a large increase over those of the same quarter of 1922, while exports as a whole have slightly declined.

The machinery and engineering works show increased activity in the past few weeks, the exception being locomotive building, in which business has been slack since last year. The chief improvement has been in agricultural machinery and machine-tool manufacture. The latest report shows that 750,000 persons are engaged in this work. In 1922 machinery imports were 10,700 metric tons, or 2 per cent of the exports of 491,000 tons. The export duty on machines was early this year reduced to 1 per cent; and during the brief mark stabilization period in the spring a general reduction, in part complete abolition, of export duties was initiated but the new exchange fall has reduced German prices so much below foreign that a temporary increase in the duties is contemplated.

The iron, steel and machinery industries are much concerned over Government plans to regulate wages by legislation. The demand for this legislation is chiefly from Socialist and Labor Union quarters, but the Federal Minister of Labor favors the measure in principle. The plan is connected with the latest collapse of the mark. The depreciation has brought out numerous projects for establishing state and private business, wholly or partly, upon a "firm mark" basis, which means that business would continue to be done in paper marks, but that the amount of marks changing hands would be increased automatically as the currency declined in buying power. Under present conditions the state finances suffer from the fact that all direct taxes are paid in much worse marks than they are assessed in, the taxpayer escaping the greater part of his intended burden. A good instance is the fact that although the income tax rates rise as high as 60 per cent the total value of income tax receipts in 1922 was only $123,000,000. The workmen complain that they cannot obtain increases in their nominal wages proportionate to the mark's depreciation. This complaint is true, although only at times of particularly rapid depreciation. The suggestion is made that the budget, taxes, wages and perhaps business transactions of all kinds be calculated in fictitious "gold" or "price index" marks. This system is partly in force now. The Prussian and Bavarian savings banks enter paper-mark deposits at their current gold value on the day of deposit and repay the depositors sufficient paper marks to buy the same quantity of gold on the date of withdrawal. Also, paper-mark public loans expressed in values of rye, wheat, coal and potash are now practically the only kind of loans being raised. A "fixed value" wage automatically changing in accord with prices was long in force in Austria, and is still in force for state salaries, but it is condemned by the new Austrian Minister of Finance. German iron and steel employers oppose a "firm mark" wage on the ground that if the mark-exchange recovered, the cost of living would not immediately decline, so that the gold wage paid might become so high that international competition would be impossible.

The mark collapse has brought another great price rise. On June 1, commodity prices were 14,639 fold higher than in 1914, against 8237 fold on May 1, and 2054 fold on Jan. 1, and the increase in June will probably prove to be the greatest yet recorded. In the past three weeks coal prices have been raised twice, and pig iron and Steel Syndicate prices several times. The Railroads council increased freight rates 250 per cent on July 1. From June 25 the price of standard Ruhr (Foerderkohle) coal has been 528,000 m. per metric ton, compared with 221,200 m. on June 1 and about 12.50 m. prior to the war. The corresponding figures for foundry coke are 805,200 m., 338,700 m. and 20 m. per metric ton. Latest pig iron prices from June 24 (in marks per metric ton) are:

Hematite	2,712,000
Foundry iron, No. 1	2,682,000
Foundry iron No. 3	2,629,000
Siegerland steel iron	2,337,000
Spiegeleisen	2,688,000

An extra of 1,039,000 marks per ton is added for hematite smelted from foreign ore and with foreign fuel, with proportionate supplements for other qualities. Latest Steel Syndicate prices from June 25 (in marks per metric ton) are:

Ingots	2,845,000
Blooms	3,214,000
Billets	3,425,000
Slabs	3,542,000
Structural Forms	4,035,000
Bars	4,038,000
Wire Rods	4,295,000
Sheets:	
5 mm. and heavier	4,551,000
3 to 5 mm	5,099,000
1 to 3 mm	5,964,000
Less than 1 mm	6,562,000

The Phoenix A. G. is to increase its capital from 375,000,000 to 675,000,000 marks. This transaction has caused much comment, because the new shares are to be taken over entirely by a Dutch syndicate, which will grant a credit, at nominal value, although Phoenix quotes at over 1,000,000 on the Berlin bourse. In some quarters this deal has resulted in a demand for measures against so-called "uberfremdung" (buying up of native undertakings by foreigners). It is also alleged that the aim is to transfer the main interest in the corporation abroad in order to evade taxation. Lately many German corporations have complicated their real ownership by association with holding companies abroad (mostly in Switzerland). Some of these holding companies are entirely German; and by cheaply selling them interests in native German concerns capital, while remaining in German individuals' hands, is transferred to foreign countries.

New Steel Foundry at Fairfield Car Works

A Basic Open-Hearth Plant in the South Where Castings Can Be Produced on Large Production Basis—Modern Facilities for Handling Materials, Sanitation and Comfort of Employees Are Features

THE steel foundry of the Tennessee Coal, Iron & Railroad Co., at its Fairfield Car Works, Birmingham, Ala., recently completed, was designed for the purpose of manufacturing miscellaneous car castings on a production basis for use at company's car works and elsewhere. Also the manufacture of large and miscellaneous general steel castings required for the various works of the company in the Birmingham district. This foundry was put in operation during April, 1923, the first heat being poured April 14. A brief description of the plant follows:

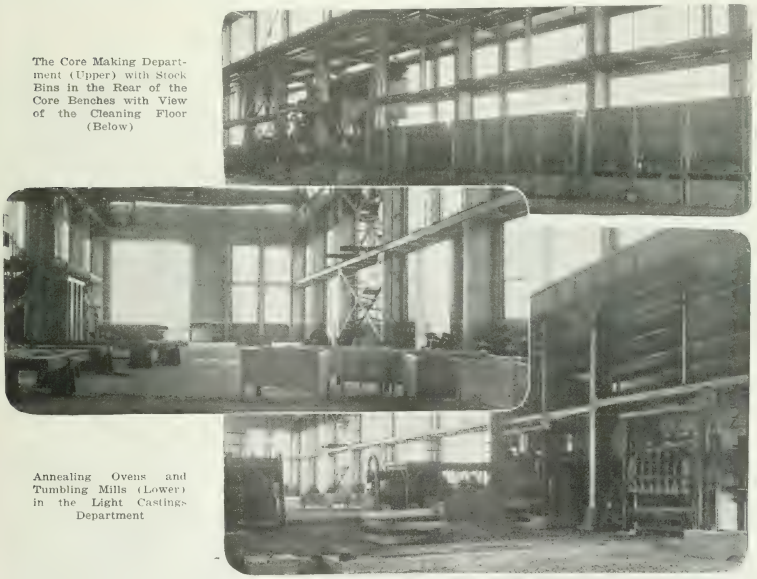
As one approaches the building he is immediately impressed with its massive appearance. The exterior consists of a red shale brick wall with concrete coping, extending 5 ft. above yard level. Above the wall large areas of glass prevail. The building consists of three bays: The main bay is 80 ft. wide and 400 ft. long; on each side of this main bay is a lean-to, the east lean-to being 50 ft. wide and 400 ft. long and the west lean-to being 50 ft. wide and 450 ft. long. The combined floor area of the three bays is 74,500 sq. ft.

Liberal allowances have been made in the design of the building for heights. In the main bay the crane runway is 45 ft., the bottom chord of roof trusses being 65 ft. above floor level, while in each one of the lean-to bays the crane runway is 31 ft. and the bottom chord of roof trusses 41 ft. 8 in.

The roof of the main bay is of corrugated asbestos protected metal. Eight 6-ft. diameter Swartwout ventilators have been provided. The roofs over the two lean-tos consist of a cast-in-place gypsum slab, covered with composition roofing.

In the north end of the main bay, the crane runway is extended 100 ft. outside of building. The area under this runway is used as a flask storage, the flasks being transferred in and out of the foundry as needed by means of overhead cranes. This is a splendid feature and saves a great deal of floor space as only the flasks in actual service will be found inside of the building. Adjacent to the flask storage runway on the east side is located a stock yard, 83 ft. wide and 200 ft. long, having a crane runway with an elevation of crane rail 45 ft. above ground level. This stock yard is for the storage of pig iron, scrap, etc., used for charging in open-hearth furnaces. Material is received in standard gage gondola cars, magnets being used for handling.

A material track having an inclined approach enters the building from the south and passes over concrete storage bins at an elevation of approximately 12 ft. above floor level. The storage bins are inclosed and form a part of the building used for the storage of all sand, clay, limestone, etc. These materials are shipped in drop bottom hopper cars and dumped directly into



The Core Making Department (Upper) with Stock Bins in the Rear of the Core Benches with View of the Cleaning Floor (Below)

Annealing Ovens and Tumbling Mills (Lower) in the Light Castings Department

bins. An overhead monorail telpher system is provided to deliver these materials to sand mills and charging floor.

Excellent crane service is provided throughout the foundry. The main bay has three cranes, one of 75-ton capacity and two of 25-ton capacity each. The large crane is used almost exclusively for handling hot metal. All of these cranes have auxiliary hoist. In the west lean-to there are also three cranes, two of 20-ton capacity and one of 10-ton capacity, the two 20-ton cranes being used to handle hot metal ladles and moving of molds in multiples and the 10-ton crane used exclusively in the cleaning and shipping department. In the east lean-to there is provided one 10-ton capacity crane for general service.

On the west side and close to the foundry building is located a brick building of which one portion is used as a chemical laboratory, completely equipped. The balance is for offices for the foundry superintendents and clerks.

Tar and Gas Fired Open-Hearth Furnaces.

In the north portion of the east lean-to are located two 25-ton basic open-hearth furnaces of the stationary type, elevated sufficiently to accommodate the charging floor which is 12 ft. above the main floor level. The pouring sides of the furnaces extend slightly into the main bay of the foundry, permitting pouring of metal into ladles suspended by cranes in the main bay. The furnaces are designed for the use of tar and by-product gas as fuel and are therefore provided with air regenerating chambers only. The simple arrangement of the stack dampers and air valves and also the direct course of the flues to the stack are important features in the design of these furnaces. The air valves, dampers, and furnace doors are all electrically operated from a central station on charging floor, directly opposite each of the furnaces.

The furnace charges are made up in the stock yard, then placed on cars on a charging floor extension extending under crane runway. Each car will accommodate three charging boxes. Magnets are used for handling materials in the stock yard. A 3-ton high type Wellman-Seaver-Morgan charging machine has been provided to manipulate the cars and charge the furnaces.

The west bay of this foundry is intended exclusively for the manufacture of miscellaneous car castings and other small castings on a production basis. Only machine molding is done in this bay. Five Herman jar and roll-over stripper type machines have been provided for this purpose. Four of these machines have been placed in one group for production work. The fifth machine is separated from the others, intended for special molding. Directly over this group of machines are elevated sand bins from which sand is delivered directly into the flasks placed on jarring machines. These bins are of steel construction.

The sand is delivered into them from an 8-ft. No. 3 Simpson intensive foundry mixer, where sand is prepared and discharged into an elevator, delivering on a belt conveyor which discharges sand into any one of the bins. An individual scraper at each bin, operated from the mixing platform, is used to deflect the sand into the bins. For molding the flasks are placed on the molding machines by means of jib cranes with electric hoists. The completed molds are transferred from the molding machines by the same jib cranes and placed alongside of the machines on skids, each skid accomodating four complete molds. These skids are then transferred by means of an overhead traveling crane and placed in pouring position on the floor. The hot metal required for this section of the foundry is supplied by transferring the ladles on a transfer car from the main bay into this lean-to.

Gas-Fired Annealing Furnaces

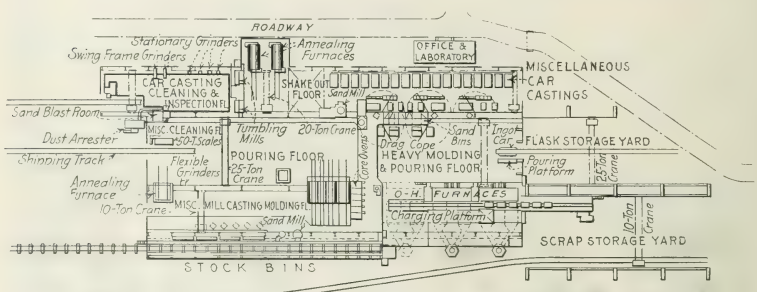
After being poured the molds are transferred on the same skids to the shake-out floor. A Herman plain jarring machine, elevated on a high foundation, is used for shaking out the flasks. The castings, after being flogged, are placed on grids and then charged into the annealing furnaces, there being two of these furnaces of the car type, each 7 ft. 4 in. wide and 28 ft. 6 in. long. High pressure by-product gas is used as fuel. After being annealed the castings are cleaned by means of two 48-in. diameter exhaust tumbling mills and after tumbling, castings are further cleaned by means of flexible and stationary grinders.

The shipping room is located at the extreme south end of the lean-to. Wood block floor construction is used in cleaning and shipping departments.

The main bay is used for the molding, pouring and cleaning of large and miscellaneous castings for the Tennessee Coal, Iron & Railroad Co.'s own requirements. The equipment provided in this bay consists of four gas fired mold drying ovens, one Cay type 16 ft. x 17 ft. annealing furnace and one 12 ft. x 16 ft. sand blast room. Also two large Herman jar, roll-over and stripper machines have been provided. The sand bins for these machines are combined in the same unit with the sand bins used for the west lean-to and fed by the same equipment as before described.

Shipping tracks and west lean-to extend approximately 50 ft. into the building. Large scales are provided adjacent to each track for the weighing of all castings before shipment is made.

All of the east lean-to, with the exception of that portion occupied by the open-hearth furnaces and charging floor, is used for sand mixing and core making. Two sand mills are provided, one small 6-ft.



General Lay-Out of the New Steel Foundry



Looking North in Main Bay, Showing Molding Floor with the Pouring Side of the Open-Hearth Furnaces in the Right Background

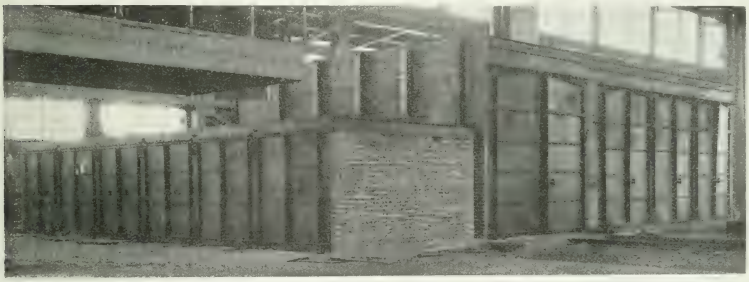
No. 2 Simpson mill used for mixing core sand and one large 9-ft. Frost mill for foundry sand.

A Modern Core Department

For the making of cores, a long continuous bench is provided with overhead sand bins of wood construction. The sand is transferred from the core mixing mill to these bins by means of dumping buckets carried by a 2-ton monorail trolley. For the drying of cores, six 6-ft. x 12-ft. gas fired core ovens are installed. The cores placed on portable racks are transferred from the core making department to the core ovens by means of automatic storage battery lift trucks. The cores are also transferred for use in the various parts of the foundry in like manner. Concrete runways or floors have been provided for these trucks to travel on.

The mixed foundry sand from the large Frost mill is also conveyed in boxes to various points in the foundry by means of these same automatic lift trucks and overhead traveling cranes.

The extensive employment of heat-measuring instruments constitute one of the features of this foundry and, as a result, guesswork is eliminated and definite results are obtained in annealing and drying operations.



The Core Ovens and the Mold Drying Ovens, All Gas-Fired



The Light Casting Department Showing Jolt Roll-Over Machines and Sand Bins

The annealing furnaces are equipped with Leeds-Northrup recording potentiometers with a range from 200 to 1800 deg. Fahr. Recording instruments are located in the laboratory where the foundry superintendent is furnished with complete and continuous record. The mold drying and core ovens are equipped with recording thermometers of the Bristol type.

Another feature is the fuel for annealing and drying of cores and molds, that is, the use of Service Combustion Engineering Co.'s system of burning by-product coke oven gas under high pressure. The gas, delivered to the plant at a pressure of from 10 to 20 oz., is then compressed and delivered to the furnaces at from 10 to 15 lb. pressure. This system has been found economical and satisfactory.

The estimated capacity of this foundry is approximately 1400 tons of steel castings per month, ample allowances having been made for losses.

Will Deepen Canal to Jones & Laughlin Land at Hammond, Ind.

In view of speculation as to when the Jones & Laughlin Steel Corporation, Pittsburgh, will develop the property which it recently acquired at Hammond, Ind., a statement issued by C. A. Westberg, vice-president of the East Chicago Co. is of interest. Mr. Westberg stated that in accordance with the agreement made between the East Chicago company and the Jones & Laughlin company at the time of the purchase of the property, he will award a contract to a dredging company for the deepening of the Indiana Harbor canal from the Standard Oil Co.'s docks to White Oak Avenue. This work will probably take about a year to complete and will make the waterway navigable from Lake Michigan to the proposed slip of the Jones & Laughlin company west of White Oak Avenue and north of the present canal. Col. Walter J. Riley, banker at East Chicago, Ind., had the following to say regarding the project:

"It is possible and probable that in the near future sketches will be made for a possible erection at some future time of a steel plant on the Jones & Laughlin property. Whether or not the plant will ever be erected is entirely problematical, as up to the present time no decision has been arrived at or even considered by the officials of the Jones & Laughlin Steel Corporation. However, the preparation of the land itself for a steel plant has been considered and it may be that a turning station will be dredged on the property and that the portion of the property which would be eventually occupied by the first unit of a steel plant will be filled in and prepared for the construction of a plant, should one be decided on in the future. It is safe to say that it would require between one and two years work with dredges and sand-suckers to construct the slip and turning basin and to bring that portion of the property to a level on which a plant could be constructed."

Steel & Tube Company Injunction Case Submitted to Chancellor

At the conclusion of argument by counsel for the Steel & Tube Co. of America and the Allied Chemical & Dye Corporation before Chancellor Wolcott at Wilmington, Del., last week on the preliminary injunction restraining the Steel & Tube company from distributing its assets to stockholders the chancellor reserved decision in the case. A decision is expected some time prior to Aug. 7, the date of the scheduled meeting of Steel & Tube stockholders to take action on retirement and reduction of stock.

In his argument before Chancellor Wolcott as to whether the Steel & Tube company should not be permitted to distribute to its stockholders the proceeds of the sale of its properties and assets to the Youngstown Sheet & Tube Co., William S. Hilles, counsel for the Allied Chemical & Dye Corporation minority stockholder in the Steel & Tube company, contended that such distribution would render it impossible for Steel & Tube, in case the sale is later set aside to make restitution to the Youngstown company for the properties.

In his argument for the Steel & Tube company, Joseph P. Cotton of New York took the position that as the sale of the company's properties and the price received have been approved by the chancellor, there appears no reason for restraining the distribution to stockholders of the proceeds of that sale. By his former action, he said, the chancellor had in effect approved the sale of the properties and distribution of proceeds.

Western States Organize to Fight Pittsburgh "Plus"

Authorized representatives of the legislatures of Illinois, Wisconsin, Minnesota and Iowa met at Chicago, July 13, to decide upon a plan of action in a campaign against the Pittsburgh basing point practice in the steel industry. Senator John Denvir acted as temporary chairman of the committee representing the Illinois legislature, whereas the other three States had the following spokesmen: Clifford L. Hilton, attorney general of Minnesota; Ben. J. Gibson, attorney general of Iowa; John Fletcher, assistant attorney general of Iowa; Herman Ekern, attorney general of Wisconsin. The States plan to collaborate with the attorneys of the Federal Trade Commission when they make their rebuttal in the Pittsburgh base case this fall. The four States have appropriated a total of approximately $55,000 for the campaign and it was announced that private individuals will subscribe $45,000 more to make an even $100,000.

Elimination of Many Styles of Woven Wire Fence Recommended

WASHINGTON, July 17.—Wire fence manufacturers representing at least 85 per cent of the capacity of the United States at a conference here last Wednesday and Thursday with W. A. Durgin, chief of the Division of Simplified Practice, Department of Commerce, recommended the elimination of 87.5 per cent of the styles of woven wire field and poultry fences and 93.4 per cent of fence containers. It was recommended that no rolls of poultry fence be manufactured except 10 and 20 rod rolls and that no rolls of field fence be manufactured except 10, 20 and 40 rod rolls. A. G. Moore of the Fence Institute, and chairman of the committee representing the fence manufacturers, declared that "if the above styles are adopted by the entire fence industry, as recommended, the styles now made by 27 manufacturers will be reduced from 552 styles to 69, and considering all of the different sized packages as previously made, there was a total of 2072, while in the simplified program there are only 138 packages."

Mr. Moore added: "In case the unnecessary styles are cut out and we manufacture nothing but the different styles suggested by the manufacturers in the simplified program, it means only a reduction of 6.3 per cent of the total amount of fence made. This does not necessarily mean that this 6.3 per cent means a reduction in the consumption of fence, because other styles as suggested will be used in place of these special styles we are trying to eliminate."

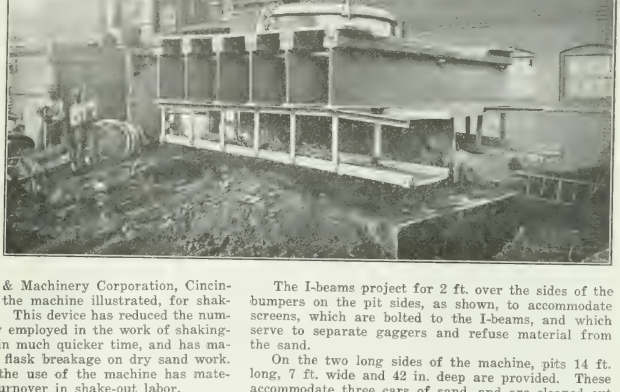
The New London Ship & Engine Co., New London, Conn., has the distinction of being the only New England shipyard, as far as is reported, operating day and night shifts. The company has a sizable Government contract. In addition, the recent completion of new ways has enabled the company to take on much additional work. Approximately 800 hands are employed.

SHAKING-OUT MADE EASIER

Less Breakage of Heavy Flasks—Labor and Labor Turnover Reduced

One of the most arduous and fatiguing jobs about a foundry is the shaking-out of heavy flasks by the old-fashioned method of sledge hammers, crowbars and the use of brute strength on the part of laborers. There is usually considerable breakage of flasks, together with heavy turnover of labor in this department of the foundry.

To ameliorate this condition, the Laidlaw Works, Worthington Pump & Machinery Corporation, Cincinnati, has developed the machine illustrated, for shaking-out heavy flasks. This device has reduced the number of men formerly employed in the work of shaking-out, does the work in much quicker time, and has materially reduced the flask breakage on dry sand work. At the same time, the use of the machine has materially reduced the turnover in shake-out labor.



Device For Shaking-Out Heavy Flasks. Reduced labor force, reduced labor turnover and lessened breakage of flasks are said to result from use of this machine. A Herman bumper with a table 6 x 10 ft. forms the basis of the machine, I beams being riveted to the table. Screens at each side separate the gaggers from the sand. Pits holding three carloads of sand are provided on the long sides; these are cleaned out by crane each shift

A Herman bumper is used as a basis for the shake-out machine. The bumper has a table 6 x 10 ft., and is set on a concrete base above the floor level, with the top of the I-beams about 12 ft. above floor level. The I-beams are riveted to the table, and are spaced on 2-ft. centers. Twenty-four-inch beams are used, this size having been found to be the one best adapted for the work, in that this elevation above the table top is necessary in order to get the proper angle of repose for the free flow of material as it is shaken out of the flask, and it also prevents the sand, when shaking out, from piling up above the top level of beams. Wooden shoes are bolted to the tops of the I-beams to prevent wear and tear from contact with the flasks, and as a further safeguard, a second wooden plank is spiked on top of the shoes to facilitate renewal. These planks are generally renewed every ten days.

The I-beams project for 2 ft. over the sides of the bumpers on the pit sides, as shown, to accommodate screens, which are bolted to the I-beams, and which serve to separate gaggers and refuse material from the sand.

On the two long sides of the machine, pits 14 ft. long, 7 ft. wide and 42 in. deep are provided. These accommodate three cars of sand, and are cleaned out once each shift by means of a grab bucket attached to an electric crane which serves the shaking-out machine.

Slight Decrease in Employment in Iron and Steel Plants

WASHINGTON, July 17.—Employment in the manufacture of iron and steel and their products showed a decrease of 0.16 per cent in June when compared with May, according to the United States Employment Service of the Department of Labor while a decline of 0.67 per cent was shown in the metal and metal products. The paper and printing industry showed the greatest decline in employment, or 4.4 per cent; vehicles for land transportation decreased by 2.5 per cent; stone, clay and glass products by 1.6; textiles and their products by 1.2. The increases noted in employment were: 4.9 per cent in leather and its finished products; 4.8 in beverages; 2.8 in food and kindred products; 0.94 in miscellaneous industries; 0.86 in railroad repair shops; 0.68 in tobacco manufacturing; and 0.24 in chemicals and allied products.

Steel Institute Letter to the President

Owing to the omission of a period in the punctuation of the letter of directors of the American Iron and Steel Institute to President Harding, as published in THE IRON AGE of July 12, the meaning of two sentences was not made entirely clear. Referring to the total abolition of the 12-hr. day at the earliest time practicable, the two sentences should have been punctuated as follows:

"This means the employment of large numbers of workmen on an eight hour basis and all others on a basis of ten hours or less. Without an unjustifiable interruption to operations, the change cannot be effected overnight."

Sheet Sales, Shipments and Production Decreased in June

Substantial decreases are shown in the June report of the National Association of Sheet and Tin Plate Manufacturers in shipments, sales and production of sheets as compared with the previous month. June sales were down 70,000 tons as compared with those of May; production decreased approximately 42,000 tons, while shipments were 45,000 tons less than in the previous month. Unfilled orders decreased about 48,000 tons. A decrease of about 3000 tons in the stock on hand awaiting shipment at the end of June as compared with the month before, is more than offset by an increase of almost 6500 tons in unsold stocks. Net obligations, arrived at by deducting the unshipped and unsold stocks, at the end of June were 357,599 tons, equal to about 1.6 months' production at the June rate of output.

Figures in net tons for June compare with those for the two preceding months as follows:

	June	May	April
Capacity	392,000	420,000	385,000
Capacity reporting	69.8%	70.0%	72.8%
Sales	172,637	242,624	183,904
Production	218,432	260,006	254,808
Shipments	233,128	278,059	253,563
Unfilled tonnage	503,175	551,139	577,969
Unshipped stocks	115,649	118,384	115,577
Unsold stocks	29,827	23,397	24,470

New Merchant Mill of Tennessee Co.

Eleven-inch Unit of Fairfield Plant Near Birmingham —Continuous and Looping Trains, Cooling Beds, Continuous Furnace and Roll Racks Features

ANOTABLY modern merchant mill has recently been put into operation at the Fairfield steel works of the Tennessee Coal, Iron & Railroad Co., Birmingham. By this addition, the company can meet the demand for certain merchant mill products in the South, especially concrete reinforcing bars.

The mill was built by the Tennessee company, and consists of a 16-in. 6-stand continuous roughing train, a 12-in. 4-stand, continuous train, an intermediate looping mill of three 12-in. stands, and a finishing stand provided with 11-in. pinions, making it possible to use either 10-in. or 12-in. rolls for finishing. It is estimated that the capacity of the mill will be 10,000 tons per month. The principal products will be ⅜ to 1⅝-in. plain and deformed rounds and squares, and small flats up to 3-in. in width and 1 in. in thickness.

The main mill building is of standard steel mill building design, 80 ft. wide by 840 ft. long, with full ventilating monitor sash extending the entire length of the building. The crane span is 75 ft. 6 in. The elevation of the crane rail is 27 ft. 6 in. above the floor line. The mill end is provided with a 5-ton electric overhead traveling crane and the shipping end is provided with a 15-ton e.o.t. crane with a double drum hoist and equipped with spreader beam for handling long bars up to 80 ft. in length. Adjacent to the mill building is the motor house which is 43 x 280 ft., also of steel mill building design, with a brick wall partition between motor house and mill. The crane span is 39 ft. The building is served by one 25-ton traveling crane with a 10-ton auxiliary.

Billets of 4 x 4-in. section ranging from 13 to 22 ft. in length are delivered to a billet yard runway where they are handled by a 25-ton e.o.t. crane to a storage bed located in the runway adjacent to the entering end of the merchant mill building.

The billets as needed are placed by the billet yard crane on inclined skids where they are pushed by hand to the approach table of the reheating furnace. A small motor driven charger mounted on a track over and parallel to the approach table pushes a billet endwise into the reheating furnace. A mechanical pusher then pushes the billets sidewise through the furnace, and they are discharged from the furnace by pinch rolls into a 4 x 4-in. hot billet shear, to be sheared to the required lengths before entering the 16-in. 6-stand continuous mill.

The heating furnace is of the continuous type, 23 ft. wide inside the brickwork by 45 ft. 9 in. from center line of charging door to center line of discharge door. The furnace was designed to heat an average of 30 tons of steel per hour. The stack is 4 ft. 3 in. in inside diameter of brickwork, 120 ft. high, with damper controlled by a Carrick furnace regulator. Coke oven gas is used for fuel and is brought to 12 burners placed in the discharge end of furnace.

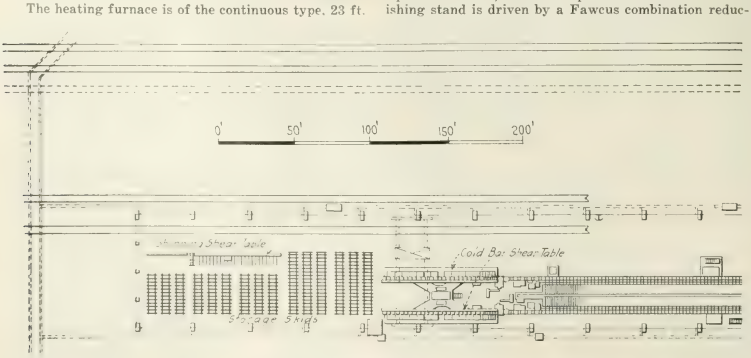
The burners were designed and built by the Surface Combustion Co., New York, and are of the low pressure type with water-cooled nozzles. They are equipped with diaphragms which operate governor valves leading to the gas line and maintain the gas at atmospheric pressure. At this pressure the gas is mixed and carried into the furnace with blown air supplied by a fan of 12,000 cu. ft. per min. capacity at 15 in. water column pressure. The air to the fan is taken from a wind-box placed over the roof of the furnace where its temperature is raised to approximately 225 deg. Fahr. Short water-cooled skids are placed at the charging end of the furnace where the flue gases escape, but the remainder of the hearth is equipped with plain 2½ x 6½-in. steel skids placed in the brickwork.

The 16-in. 6-stand continuous mill is driven by an Allis-Chalmers 1500-hp. induction motor, of 593 r.p.m. full load speed. This motor is connected by a flexible coupling to a Fawcus primary reduction drive which in turn drives the Fawcus main mill drive consisting of cut herringbone spur gears mounted in cast iron housings. This drive as well as the 16-in. mill is shown in one of the accompanying illustrations. From the 16-in. mill the bar passes over a roller table in which is placed a 2 x 2-in. hot billet shear which is used both for cropping and cutting the bars to desired lengths before entering the 12-in. continuous mill.

This 12-in. mill is driven by a 1500-hp., Allis-Chalmers Kraemer set, of 712 r.p.m., base speed; 890 r.p.m. maximum, and 540 r.p.m. minimum. A Fawcus primary and main mill drive is also used on this mill similar to that used on the 16-in. mill.

The 3-stand 12-in. intermediate looping mill is driven by a 1250-hp. Allis-Chalmers Kraemer set, of 570 r.p.m. base speed; 710 r.p.m. maximum, and 430 r.p.m. minimum, through a Fawcus gear set.

The finishing stand is driven by a 500-hp. Allis-Chalmers Kraemer set, of 712 r.p.m. base speed; 888 r.p.m. maximum, and 540 r.p.m. minimum. This finishing stand is driven by a Fawcus combination reduc-



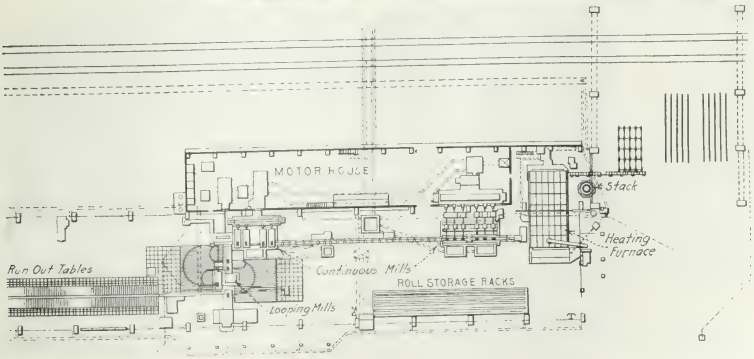
General Layout Show-



The Six Stands of the Continuous Roughing Rolls with the Continuous Heating Furnace. The coke oven gas burners at the discharging end of the furnace are conspicuous and above the furnace end may be seen the air supply pipe leading hot air from the furnace area to the fan at the extreme right, provided for the gas burning installation



In This General View of the 11-In. Mill of the Fairfield Steel Works, are the Roll Racks in the Foreground and the 16-In. Continuous Roughing Rolls at the Right



ing Relation of Units



Cooling Beds and Convenient Way in Which Railroad Cars Are Available for Loading

tion and pinion set. All bars are passed through the looping and finishing stands by repeaters. Cutler-Hammer control is used for all of the mill motors.

The finished product is delivered from the finishing stand to the hot runout tables of a double Griffith type mechanical hot bed, 250 ft. in length by 24 ft. ½ in. center to center of the cold runout tables.

The hot bed is separated from the finishing stand by about 50 ft. and the material is delivered to either side by means of hot runout troughs and an air-operated switch which is pivoted at the finishing stand. The hot runout tables, located in the center of the double hot bed, are driven by an endless cable, the head sheave being driven by an adjustable speed motor. This motor drive is also belted to a set of hot runout pinch rolls, which are used only to aid in delivering light and short bars from the finishing stand to the hot bed.

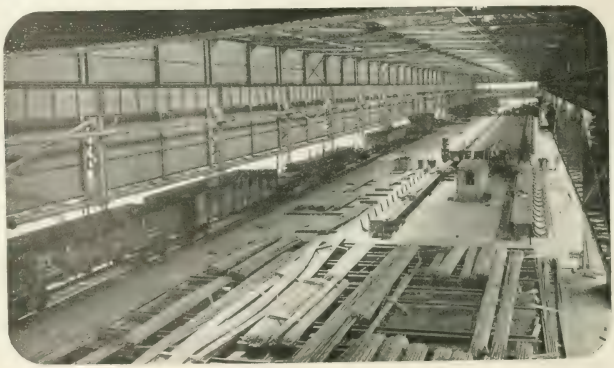
The bars are delivered alternately to each side of the hot bed at a speed slightly faster than the delivery speed of the finishing mill to prevent buckling of the bars. As the bars reach the desired position they are lifted from the hot runout table and deposited on stationary grate bars by scalloped lifting bars extending across the hot bed. The lifting bars are mounted on a structural frame with the side toward the hot runout table, supported on a continuous-motor-driven eccentric shaft extending through the entire length of the hot bed. The opposite side of the frame is suspended by hangers under the cold runout table. Each rotary movement of the lifting bars operating between the stationary bars advances the cooling material 4¾ in. toward the cold runout table.

The cooled bars pass from the end of the lifting bars upon shuffle bars extending over the cold runout table. The ends of the shuffle bars toward the lifting bars are also supported on a continuous motor-driven eccentric shaft extending through the entire length of the hot bed, the opposite ends are supported by small rollers on levers mounted on a continuous rocker shaft. The rocker shaft is operated by an air cylinder located underneath and at the center of the hot bed. The movement of the rocker shaft drops one end of the shuffle bars and deposits the cooled rods on the motor-driven cold runout tables which deliver to the cold bar shears. The hot bed has a capacity of 38 rows of bars, 19 on each side.

The motors for driving the shuffle bars and cold runout tables are located at floor level between the hot bed and the cold bar shears and connected to their respective shafts by spur gear sets, while the motors for driving the lifting bars are located underneath and at the middle of the hot bed and drive through spur gear reduction sets.

An air-operated test piece shear is located on a trolley over the hot bed at the mill end and can be operated on material from either side of the hot bed.

The cold finishing equipment consists of two units leading off from each side of the hot bed. Each unit consists of one vertical stop shear and back shear



Loading Tracks, Assembling Beds, Cradles and Shears, with the Cooling Beds in the Background and Looking Toward the Rolling Mills

table with hand-operated gages and platform scales.

The sheared bars are pulled off the shear table by hand into cradles mounted on platform scales for weighing. The scales are of the suspension platform mill type, consisting of four platforms, each platform being 4 ft. wide and 36 ft. long. A pair of platforms is placed on the side of each back shear table and each pair of scales is equipped with devices for connecting the two scale beams so that they can be used as one weighing unit when handling long bars.

The bars are removed from the cradles by the 15-ton shipping crane and placed either in storage racks or in cars for shipment. An auxiliary shear with skid bed and roller table is located in rear end of the building for the purpose of shearing special short lengths of bars.

NOVEL BONUS PLAN

Pittsburgh Company Will Try an Experiment in Group Effort

The United Engineering & Foundry Co., Pittsburgh, has adopted a new bonus system for shopmen on piece work and hourly rates. This bonus plan is divided into three parts—attendance bonus, service bonus and vacation bonus. An amount equal to 5 per cent of the wages earned each month by each employee is set aside for payment to the employee at the end of the bonus period, provided he has fulfilled the required conditions of regularity and punctuality. The vacation bonus includes a number of days vacation each year. The service bonus provides for the setting aside each month of a percentage of the wages earned by each employee for payment at the end of the bonus period.

F. C. Biggert, Jr., president of the company, explains the new system as follows:

For a number of years this company has paid to selected employees a 10 per cent bonus for faithful and continuous service. The principal condition necessary to obtain this bonus has been that the employee sign a contract agreeing not to leave the employ of the company during the bonus period, or, rather, agreeing that the company was not liable for the bonus in case he did leave. This bonus has not been entirely satisfactory for several reasons.

From the employee's standpoint, the signing of a contract has sometimes been objectionable. The company feels that the contract did not sufficiently stress the need of the employee doing something to earn the bonus. A new bonus system has, therefore, been worked out. This bonus will be paid to all employees in the shops who work on a piece-work or hourly basis.

The new bonus is based upon the assumption that the increased efficiency of operation it will procure will more than offset the cost and, therefore, will decrease the cost of the company's product. If this assumption does not prove out the bonus will be of no value to the company. If it should so far fail as to increase the cost of our product it will prevent our getting work, and will, therefore, be valueless to both employee and company.

The consumer will decide upon our efficiency as a company, but to measure the efficiency of each individual is a very difficult matter in our kind of business. To overcome this difficulty we have decided to base the new bonus upon two conditions which, we believe, are fairly accurate measures of personal efficiency.

First—Regularity and punctuality of attendance.

Second—Length of service.

A man who is always on time and always on the job may certainly be credited with an interest in his work. So the first condition will indicate the willingness and earnestness of an employee.

It is reasonable to suppose that a man who has been long in the employ of the same company has proven his ability, else he would not have been kept. So the second condition will indicate the ability of the employee.

The two conditions will, therefore, give a pretty good measure of an employee's efficiency, for if he is willing and earnest and has ability he must be efficient.

The new bonus will, therefore, be divided into two main parts, one for attendance and one for length of service.

But no person can be continually on the job year after year and keep up his efficiency. He must occasionally have a rest and some time to get away from the routine of work. To meet this requirement the second part of the bonus—that applying to length of service—will be divided into two parts: First, a percentage of wages earned, and second, a certain number of days' vacation on pay, both increasing with length of service, according to established schedules.

The bonus periods will be six months each, beginning with the first day of the month on which each employee begins work.

The attendance bonus will only be set aside for employees when they are on hand and on time every day during the month, except that six days will be allowed in each year to cover absence or lateness. Provision will be made to prevent loss of attendance bonus when an employee is injured in the course of his work. When it is necessary to lay off for lack of work the past length of service will be credited to employees for service and vacation bonus when they return.

Vacation bonus money will not be paid unless and until the vacation is actually taken. The idea back of this rule is that the attendance and service bonuses will tend to prevent a man taking an occasional day off, and as a result he will need to take his vacation when due.

The officers of our company and the department managers have studied and worked over this bonus system for the past two months in an effort to make it as fair and liberal as possible, but it is probable that with all this care there may still be differences of opinion in applying it to individual cases. This will be provided for by forming in each plant a committee of two bonus men and a representative of the company to settle disputes in connection with the administration of the bonus.

In the preceding you have a summary of the new bonus system. It is an experiment. In some respects it is entirely new. Bonuses have been paid for steady attendance and punctuality. In some few cases they have been paid for length of service. So far as we know no paid vacation bonus has ever been tried, and it is quite certain that the three bonuses in combination have not been tried.

This bonus system is an experiment in economics—to see whether it is possible, by paying higher wages, to get enough product to justify these wages. It must be very well understood that there is no charity in the scheme. It is a business proposition. Neither this company nor any other can afford to pay more than the going wage unless the increase in efficiency is such as to reduce the price of the company's product.

Again, this bonus system is an experiment in group effort as against individual effort. If the desired result is to be had it must be by each employee doing his best and insisting that his fellow worker do likewise. This is not meddling in another man's affairs, but looking out for your own, for unless the shirker is culled out or converted to a worker the whole system must fail. And further, it is looking out for the other fellow more than for yourself, for the shirker does himself more harm than he does you.

The foundation of the whole bonus may be stated as efficiency, obtained by group effort. Our business does not lend itself to piece-work and minute division of operations as in the case, for instance, of automobile production. We can only use these methods of measuring personal efficiency in a very limited way. We must, therefore, depend largely upon the spirit of cooperation to get results. And when we get results it is the policy of this company to pay for them.

The Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill., has placed the contract for its Orient No. 2 mine for what is claimed will be the largest coal mining hoist in the world with the Westinghouse Electric & Mfg. Co. and the Nordberg Mfg. Co., the former to furnish the electrical equipment. The hoist is further said to be twice as large as any coal mining hoist in North America, the largest coal mine hoist in North America at present being equipped with a hoist motor of 1400 hp. The motors for the new hoist will be rated at 4400 hp. divided between two motors of 2220 hp. each, one mounted at each end of the drum shaft.

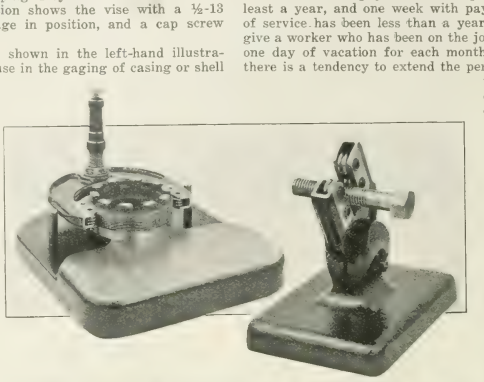
A report to the Department of Commerce says the average Austrian metal wage index for June, July and August, is 13,825, as compared with 11,817 for December, 1922 (based on July 1, 1914).

Devices to Facilitate Thread Gaging

A gage vise and gaging fixture for use in conjunction with its adjustable thread snap gages have been placed on the market by the John-Sons Gage Works, Hartford, Conn.

The gage vise is primarily for use in the inspection room, and may be used with any style or size of the company's adjustable thread snap gages. It is rigidly constructed and clamping is by means of a collar head screw. The illustration shows the vise with a ½-13 U. S. S. style A gage in position, and a cap screw engaged.

The gage fixture, shown in the left-hand illustration, is intended for use in the gaging of casing or shell threads, such as lock nuts, adjusting nuts, sleeves, bearing retainers and similar parts. It may be used in conjunction with any style of the company's adjustable thread snap gages for work larger than 2 in. in diameter.



The Gage Fixture at the Left Is for Gaging of Casing or Shell Threads. The gage vise, at the right, is for use in the inspection room. Both are used in conjunction with adjustable thread snap gages

The finished portion of the base on which work the slides is a hardened steel plate, ground after being fastened in position on the casting. By means of springs in the stem, the gage is free to float in a perpendicular plane. The position of the gage is regulated by the adjusting bolt which projects through a hole in the handle. The stem projects through the threaded bushing and handle, and guides the gage so that at all times it is parallel to the working surface of the base. This arrangement, it is said, eliminates the tendency of cross threading which develops in the use of ring gage, caliper gage, and thread micrometer. Its freedom to float in a perpendicular plane permits the necessary alinement between the gaging rolls and the threads on the piece being gaged.

By gaging the work again after it has been given a quarter turn, an out-of-round thread is readily detected. By grasping the handle and elevating and depressing the gage, a tapered thread can also be detected. After the handle is released the gage will return to its original position.

It is claimed that under actual working tests this gage fixture has proved its practicability in all respects, and has advantages in speed and durability in the gaging of the type of work for which it was designed.

Commission Asked to Reopen Assigned Car Case

WASHINGTON, July 17.—The Interstate Commerce Commission has been petitioned by all of the class one railroads of the country to reopen the assigned car case. In that decision the commission refused the railroads the right to furnish special coal car service at bituminous mines. Estimate was made in the petition that the decision, if made effective on Sept. 1 as proposed, would cost the railroads $100,000,000 in the increased price of coal. Request was made if the commission does not reopen the case as an alternative it should modify the order.

The members of the Electric Hoist Manufacturers' Association report an increase of 3.208 per cent as compared with the previous month in the number of hoists ordered during June, and a decrease of 2.146 per cent in the value of hoists ordered. Shipments of hoists decreased 6.46 per cent as compared with last month.

Vacations with Pay Recommended

Vacations for office workers, with pay, are becoming recognized as investments in future productiveness, according to a survey of the vacation policies of many of the country's leading industries, recently completed by the American Management Association, 20 Vesey Street, New York.

The report shows a general policy to grant two weeks with full pay to office employees employed at least a year, and one week with pay where the period of service has been less than a year. Some industries give a worker who has been on the job less than a year, one day of vacation for each month of service. That there is a tendency to extend the period in which vacations may be taken over a greater part of the year than has been the case, is also brought out.

"Experience proves that pay with vacations is necessary," says the report, "if the employee is to receive the full benefit from his holiday. The employee is thus enabled to take a profitable vacation and returns with increased stamina and renewed vigor, and more than repays the small cost incurred by the employer." In recognition of the importance of giving office workers time for rest and recreation, some industries have established vacation bureaus which give a veritable travel service to employees. Supporting the work of these bureaus company savings plans are operated to assist employees to secure the funds for the trips they contemplate.

Summed up the survey indicates that vacations with pay improve production, increase employee morale, make possible the training of employees for jobs higher up, disabuse an employee of any idea he may have as to his indispensability to the business and permit checking up on the personnel of an organization to determine its character and ability.

Tests of Parts of the New Delaware River Bridge

As mentioned some time ago, the Bureau of Standards is conducting a cooperative investigation with the Joint Commission of Pennsylvania and New Jersey on the strength of certain members of the new bridge across the Delaware River between Philadelphia and Camden. The general problem in hand is the compressive strength of web plates; and it has been found, as might be expected, that the strengths are a function of the properties of the material. A special study is now under way on the relation between the properties and certain metallurgical phenomena which have been developed during the investigation.

Magnetic Testing of Wire Rope

In Bulletin No. 74 brief mention was made of the work which the Bureau of Standards has undertaken on the development of a non-destructive method for testing wire rope. In connection with the investigation, a conference was held on June 16 at which the various interests concerned were represented. It was the sense of the conference that magnetic methods of testing appeared to be most promising and that a large part of the investigation should be directed along that line, although various other methods which may show possibilities should not be overlooked.

Accounting for Foundry Overhead Expense

Allocation of General Expenses, Both of Those as a Factory and of Those of the Foundry Proper

BY F. C. EVERITT AND JOHNSON HEYWOOD*

THE expense of the tool and maintenance department of the foundry is made up the same as for the others, but includes also the share of the distributed expense from "Steam" and "Power and Light." The total chargeable labor is shown separately although it is considered as expense, or non-productive labor, when making up the factory payroll. It includes the mechanics, electricians, blacksmiths, etc.

This department takes care of the general maintenance and repairs, new construction and making of new equipment for the entire plant. It is obvious that it will have maintenance and repair work to do for itself as well as for other departments, the labor and material for which must be considered as a part of the department's expense. This labor is shown as non-chargeable labor. The miscellaneous labor item includes any idle time of the mechanics, when they are not doing chargeable work, together with any general help which the department may require. The repair materials are shown as maintenance materials.

When maintenance labor is required for repairs to the equipment in the steam department, and to power and light, it is transferred direct to these departments and not included with the labor totals of the tool and maintenance departments.

The actual labor accounting will therefore be as follows:

(a) Charged to department No. 1	$4
(b) Charged to department No. 2	21
(c) Non-chargeable labor (including foreman)	15
(d) Chargeable labor	300
Total department labor	$536

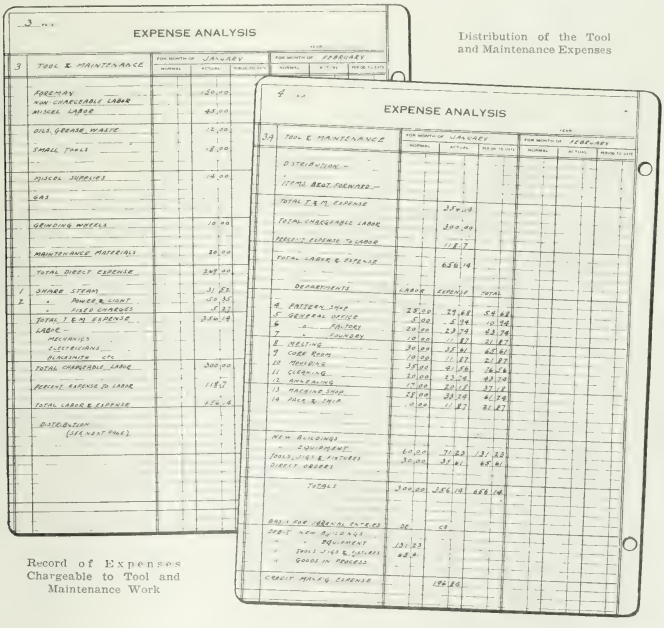
Item (c) is considered a part of the department expense while item (d), the chargeable labor, becomes the direct labor which is used as a basis for distributing the departmental expense.

The total expense as shown in the analysis is $356.14; chargeable labor $300; and expense to labor 118.7 per cent.

Forwarding these items, form 37-3a, we find another item, "total labor and expense," amounting to $656.14.

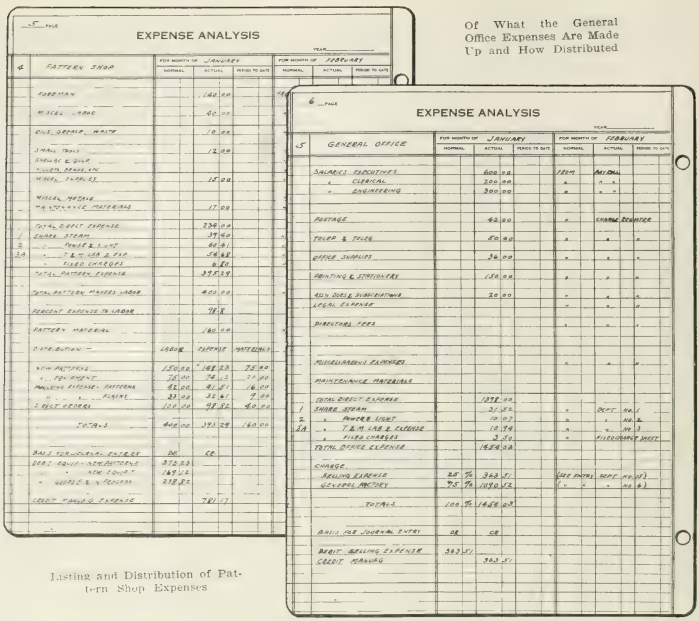
The amount of the labor chargeable to the other departments is determined from an analysis of the time cards as shown on form 37-3a. Just below the

Distribution of the Tool and Maintenance Expenses



Record of Expenses Chargeable to Tool and Maintenance Work

*Of Miller, Franklin, Basset & Co., Inc., New York. In the issue of April 26 was given the procedure for material cost accounting, on June 14 that for labor cost accounting, and on July 12 the first part of the discussion of overhead accounting.



Listing and Distribution of Pattern Shop Expenses

Of What the General Office Expenses Are Made Up and How Distributed

list of departments on this sheet are charges to new equipment which covers the labor used on work chargeable to the asset accounts. Such charges do not belong in the expense of doing business because this labor and material has increased the value of equipment needed for production and becomes a part of the investment. Obvious as this is, many concerns make the serious mistake of charging these items to expense.

With the items of chargeable labor posted against the department, the proportion of tool and maintenance expense is determined and checked with the total chargeable labor and expense of the department, $656.14. These totals are then distributed by posting to the expense analysis of the succeeding departments opposite the item tool and maintenance labor and expense. The amounts to be charged to asset accounts, "New Equipment" and "Tools, Jigs and Fixtures," are then journalized as credits to manufacturing expense and debits to the asset accounts.

The material which has been used in the various departments for maintenance has been charged direct from the expense requisitions, and is shown opposite the item "maintenance materials."

The expense of the pattern shop is distributed in much the same way as that of the tool and maintenance department, but here the material used has been listed instead of charged direct to the general ledger accounts. Either method will serve reasonably well for both departments. It is advisable, however, to adopt but one method for the sake of uniformity.

To distribute the labor, it must be analyzed from the time cards, as follows:

New patterns	$150
New laidlaw	75
Molding expense:	
Patterns	42
Flasks	33
Direct orders	100
	$400

To these items are added—as shown on the distribution part of the expense analysis—the proportion of the department's expense and the material. Molding expense covers the cost of repairs and upkeep of working patterns, core boxes and flasks, and so is chargeable to the molding department.

The expense of the general office department is gathered as shown on form 37-5. Since the general office serves both selling and manufacturing, some way must be found to allocate the expense equitably between the two activities. Whenever possible, office expenses should be charged direct to whichever side of the business is benefitted by them, but in small foundries, where a single person divides his time, it is necessary to prorate the expense based upon a study of just how the time and effort is put in. In this case let us assume that 75 per cent of the activities of the general office are for the benefit of manufacturing and 25 per cent for selling. As a result, the $363.51 is credited to manufacturing expense, and debited to selling expense. This amount is then posted to the expense analysis of the selling department and the balance, $1,090.52, is posted to the expense analysis of the general factory department, form 37-6.

The expense of the general factory department includes those items which only apply to the factory as a whole, and which cannot be charged directly to any other department. General supervision, with its assistance, as well as general store-room help, watchmen and janitors, yard labor and miscellaneous help is obviously an expense which benefits all other departments.

Allocation of Trucking Expense

Since the trucking expense serves both shipping and manufacturing, there is a difference of opinion as to how the charge should be handled. The trucking expense involves the cost of trucking from the packing department to the freight terminals, from receiving

plants to the general stores for raw materials, supplies, equipment and returned goods, and the general trucking for miscellaneous plant service. To attempt to divide this expense on the basis of the actual activity would require excessive clerical detail, and, since its accuracy depends upon the accuracy of the reports turned in by more or less illiterate truckmen, it is doubtful if the extra effort is worth while. Therefore greater simplicity and at least equal accuracy is obtained by charging the expense to general factory and making the distribution proportionately to production. Where the organization is large and the trucking can be definitely analyzed, to divide the expense becomes a simple matter. Here again the conditions in the individual foundry must govern.

In this particular instance, the entire trucking expense has been included in the general factory department.

In addition to the usual list of miscellaneous supplies, there are the new items of water, rent, demurrage, miscellaneous freight and express, freight on returned goods, etc. If there is a separate meter for boiler use, the charge for its water is made direct to the steam department. Otherwise, the entire expense for water had best be charged to general factory department.

Freight and express charges should go into the cost of materials and supplies, but in every factory there are a number of these charges which are difficult to charge direct and can best be handled by charging them to the general factory department.

Accounting for Returned Castings

Since goods returned must be debited to sales and credited to the cost of goods sold, so as to get them back into the goods in process inventory at cost, the freight or express charges involved become items of expense of the general factory department. If, however, the goods are returned because defective and they must be scrapped, there is an element of expense involved which must be carried into the cost.

If the original sales price was ... $ entered the cost of every [illegible] ... [illegible] cost composed of:

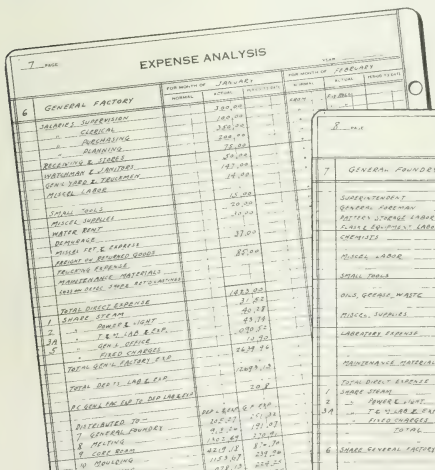
Metal	$200	
Labor	150	
Expense	100	
		$400
and the return value		75

The accounting would be as follows:

	Dr.	Cr.
Sales	$400	
Accounts receivable		$500
Goods finished and in process	400	
Cost of goods sold		400
Pig and scrap account	75	
Manufacturing expense:		
Loss on defective returns:		
Labor	150	
Metal	$75	
Expense	100	
	325	
Goods finished and in process		400
	$1,300	$1,300

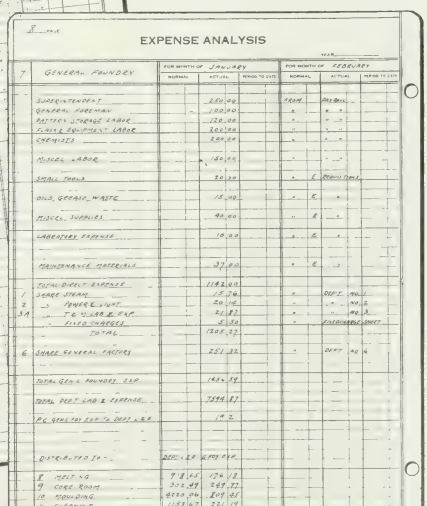
The entire loss involved in the transaction is a business expense and must be included in the cost of manufacturing. The loss in this instance amounts to $325.

For shop scrap returned to the foundry a similar accounting is necessary. The $500 worth of castings, at cost, may be broken and returned for remelting. This amount accordingly becomes a credit to the goods finished and in process account, assuming of course that $500 is the value of the castings, at cost, at the point in the process of manufacturing where the breakage occurred. Scrap value becomes the only salvage, and the difference, which becomes a loss, must be included in the cost, charging it to manufacturing ex-



Expenses of a General Nature Chargeable In Part of Plant as Factory

Expenses of the Foundry as a Whole Distributed in Part to Foundry Departments



pense. Hence the item in the analysis, "Loss on defective shop and returned castings."

Distributing General Expense to Productive Departments

There are four possible ways in which to distribute the general factory expense to the productive departments. They are: First, on the productive labor dollar; second, on the total department payroll; third, on the total department labor and expense; and fourth, on the productive labor hour.

The productive labor dollar is probably most generally in use because of its simplicity, and is based on the principle that the general factory expenses are incurred for the benefit of and hence in proportion to the amount of direct labor used in each department.

Under this method the total of the direct labor in each department is listed for the month. The amount of this expense is divided by the total direct labor to give the percentage of the general factory expense to the total direct labor. This percentage is then applied to the direct labor of each department to obtain the amount of the general factory expense chargeable to each department.

If there is a wide variation in the character of the work, or a marked difference in the rates of pay of different departments, this method may result in charging too much of the expense to one department and not enough to another. Again, if a department increases the rate of pay without increasing the number of employees or its production, while the payrolls of the other departments remain fairly constant, this department will improperly absorb a greater amount of the general factory expense, thus raising the unit cost in the department. In applying this method, attention should be given to the balance of conditions with reference to production, equipment and methods of pay, if accurate results are to be secured.

The total department payroll basis is more representative of the total number of employees and their combined earnings, but it contains to a considerable extent the same element of error as the first. The same caution should be exercised in applying it. The results will be somewhat different from the result of the first method. It does not take into consideration other operating conditions over which the general factory department has supervision, yet is an improvement over the first method when conditions of work and rates of pay vary. The method of calculation is the same as with the first method except that the total payroll of the department is used instead of the direct labor only.

The total labor and expense basis recognizes that the general factory expense is entailed by the general supervision which this department exerts over all operating expense and labor. It is therefore reasonable to consider that the expense of supervision is closely proportioned to the total labor and expense of the departments. A great degree of accuracy in distribution is possible with this method.

The calculations are the same as for the first two, except that the total labor and expense is collected instead of the direct labor or the total payroll. The element of error which was mentioned in applying the preceding methods still exists in the application of this method, but with the total operating expenses included, a much better balance of conditions is secured and the effect of this error is greatly reduced.

This method is used to distribute the general factory expense in the analysis, form 37-6.

The fourth method has advantages in certain foundries. The principle of the productive labor hour method is the same as of the direct labor dollar method except that the labor is measured in time instead of dollars. This means that the general factory expense is considered to be in proportion to the number of hours put in, in each department, by the direct labor operators rather than to their earnings. The additional work of collecting the hours per producer is not an excessive clerical job and may be well worth the additional effort.

To substitute this method for the one illustrated, the only change needed is to add an item in each productive department, showing the "productive man hours." It would mean no additional work in the expense analysis.

No one of the four methods of distributing the general factory expense can be recommended as best for all foundries. There is one best method for any foundry which it is the duty of the cost engineer to decide. Bear in mind in making such distribution that absolute accuracy in manufacturing costs is not a possibility; but practical accuracy is attainable. The effort must be to get the highest degree of refinement which conditions permit.

Expenses of General Foundry

The last of the contributory departments is the general foundry department, the expense analysis of which is form 37-7.

In the foundry proper there are the melting, core room, molding and cleaning departments, each of which may have its foreman, miscellaneous labor, etc., which are direct charges to their respective departments. There are also the general superintendent, general foreman, pattern storage help, flask and equipment help, chemist and general labor for the whole foundry and a few expense items as well as the shares of steam, power and light, tool and maintenance, labor and expense, and fixed charges, all of which go to make up the general foundry expense. This means that none of these items are chargeable direct to any one of the productive departments but must be collected and distributed in exactly the same way and on the same basis as the general factory department expense.

The method of handling the expense of the chemists and the laboratory will depend upon the individual foundry. If the chemist is employed and the laboratory maintained strictly for foundry use, the charge should be made to the general foundry department as shown, but if the laboratory serves other departments of the plant, the expense should be placed where it will be given a more general distribution, preferably in the general factory department. If an outside laboratory is employed the amount will invariably be charged to the general foundry, except when an analysis may be needed for some other department, in which case it would be charged to that department.

The expense analysis of the general foundry department provides control over the foundry supervision, with its associated expenses, by way of comparison and its ratio to the operating expenses of the productive departments. The ratio shown is 19.2 per cent. An increase in this percentage suggests an investigation for the purpose of bringing about the needed economies.

If increased efficiency in the management of the department is striven for, a decrease in this percentage will tell to what extent the effort has been effective as measured in dollars and cents.

It is the use of costs in this manner which makes manufacturing costs of most value. The analysis must be studied constantly, for therein lies the means of controlling the conditions of your foundry and consequently a basis for more satisfactory returns.

(*To be continued*)

The Form of Oxygen in Steel Determined by Vacuum Fusion Analysis

Previous tests have indicated that oxygen existing in iron or steel as iron oxide or silica is completely determined by the vacuum fusion method of analysis for gases in metals. Additional tests have been made with oxides of manganese and aluminum, the results showing a recovery of over 90 per cent of the oxygen in either of these oxides, the oxides used in such tests being in comparatively coarse particles.

It has been shown, both in these tests and by previous investigators, that the reduction of such oxides by carbon is more complete the finer the oxide. It is, therefore, believed that such oxides contained in steels as very fine inclusions are completely reduced in the vacuum fusion method of anlysis.

Captain Robert W. Hunt's Sixty-five Years in Engineering

Robert Woolston Hunt, president Robert W. Hunt Co., Chicago, an outstanding figure in the development of the technique of the steel industry, died in Chicago, July 11 at the age of 84. He was born Dec. 9, 1838, in Fallsington, Bucks County, Pa. He spent several years learning the practical side of iron making in the rolling mills of John Burnish & Co., Pottsville, Pa., and later took a course in analytical chemistry in the laboratory of Booth, Garrett & Blair, upon the completion of which he entered the employ of the Cambria Iron Co., Johnstown, Pa. On Aug. 1, 1860, he established at the Cambria works the first laboratory in the United States as a direct part of an iron or steel organization.



ROBERT W. HUNT
Dec. 9, 1838—*July* 11, 1923

In the fall of 1861 he entered the United States military service and was in command of Camp Curtin at Harrisburg, Pa., with the rank of captain. Upon being mustered out of service after the Civil War he returned to the employ of the Cambria Iron Co. and was sent to the works at Wyandotte, Mich., where experiments with the new Bessemer process of making steel were being conducted. He was placed in charge of the experimental works in July, 1865, and so continued until May, 1866, when the Cambria company called him back to Johnstown to take charge of its steel business. It was at this mill later, and largely under Captain Hunt's direction, that the first commercial order for steel rails ever made in America was rolled.

Later he assisted in designing and building the Bessemer works at the Cambria plant, and in 1873 moved to Troy, N. Y., becoming superintendent of the Bessemer works of John A. Griswold & Co., and in 1875 he became general superintendent of the Albany & Rensselaer Iron & Steel Co. During those years of active connection with steel rail manufacture, he almost completely rebuilt the various works of this company, and also patented many details of iron and steel metallurgical processes and machinery, including, in conjunction with others, the first automatic rail mill table at Troy, in conjunction with the company's chemist, Dr. August Wendel, Captain Hunt pioneered in making by the Bessemer process a number of forms of steel then classed as special, including wagon axles, drop forgings of various kinds, scythes, rifles and musket barrels, springs, and even rock drills, the steels ranging in carbon content from less than 0.10 to 1 per cent.

Upon leaving Troy in 1888, he removed to Chicago and established the Bureau of Inspection, Tests and Consultation, now known as the Robert W. Hunt Co. For many years the Hunt bureau's activities have had a wide range in connection with steel for construction, particularly in railroad work. Captain Hunt had an important part in latter-day changes in steel rail specifications and was a constant advocate of methods in mill practice which were calculated to give a longer life to the rail under the more severe requirements of railroad service. He made many contributions to the society discussions of the subject.

Captain Hunt was twice president of the American Institute of Mining and Metallurgical Engineers; past president of the American Society of Mechanical Engineers; past president of the American Society for Testing Materials, and past president of the Western Society of Engineers. In 1919 he was made an honorary member of the testing society. He was a member of various other technical societies both in this country and Europe.

In 1912 he was awarded the John Fritz Medal (for his contributions to the early development of the Bessemer process) and in June of this year he was given the Washington award of the Western Society of Engineers on the recommendation of a commission representing that society and the four national engineering societies. This award was conferred "for his pioneer work in the development of the steel industry in the United States and for a life devoted to the advancement of the engineering profession." He was for many years a trustee of the Rensselaer Polytechnic Institute and in 1916 received from it the honorary degree of doctor of engineering. The day before his death he was made an honorary member of the American Society of Civil Engineers.

Captain Hunt was a man of many friends, and if the reason be sought one need say no more than that he showed himself friendly. Speaking at Chicago on June 18, when he received the Washington Award, he said, referring to his participation in the various industrial developments of the past 65 years:

> As you can undoubtedly appreciate, such a life has had many phases, some of them of a perplexing and ofttimes strenuous character, and indeed there have been times when the burden seemed too great to be successfully carried, and the perplexities beyond hope of solution; but if ever a man has lived who has been blest with the friendship of his fellowmen, it has been myself, and there has never been a time when I have not had some one with whom to consult, and to an extent share my perplexities, with the result that there has always been an assisting hand held out to me, and never in my long life have I experienced a moment when, for any reason, I could say I was without friends. Based upon such an experience, I can assure my younger friends that no man who tries to do his duty conscientiously need ever fear that he will not receive support, even though it may not come from the direction where one thinks he has a right to look for it.

It will be of interest to reproduce here Captain Hunt's own references to early efforts in the improvement of American steel works and rolling mill practice. Speaking in New York at the Engineering Societies Building on Dec. 5, 1912, in accepting the John Fitz Medal for that year, he said in part:

"The Cambria works had the fortune to roll the first steel rails made in America on a commercial order, from ingots cast in the Pennsylvania Steel Co.'s plant at Steelton, Pa., the rail mill at Steelton not being completed and the Pennsylvania Railroad Co. being anxious to try some American-made Bessemer rails. I had charge of the rolling under the direction of George Fritz, the chief engineer and general superintendent of the Cambria works, and the event was made more notable by Mr. Fritz's experimentally demonstrating that the reduction of steel ingots into blooms by rolling was preferable to performing that work by hammering, as was then the universal practice. Hence the American blooming mill.

"At Cambria we first perfected the practice of

tapping slag from the cupolas in which the iron for conversion was melted, and thereby made possible a much larger output of steel. Previously it had only been possible to keep a cupola in operation not exceeding 24 hours; the cinder tapping increased the run to three or four times as long a period. . . .

"Following a change in a large part of the ownership of the Troy works, among other alterations and additions we remodeled the rail mill, and I embraced the opportunity to put in automatic machinery for handling the steel while being rolled into rails. It had required 14 men; we reduced this number to four and lessened their physical labors. Max M. Suppes was the master mechanic of the works, and gave me valuable assistance, and we united in some of the patents protecting it. Following the successful working of the plant, Capt. William R. Jones, general superintendent of the Edgar Thomson works, attached automatic tables to that rail mill, under license from us, and as he added some new features which he protected by patents, he pooled his interests with Mr. Suppes' and mine, and together we subsequently granted licenses to a number of the principal rail mills. Naturally, the able gentlemen in charge of the different mills made improvements upon our plans as they adapted them to their several requirements. Other engineers have devised labor-saving automatic rail rolling machinery, but such is the history of the Hunt, Jones, Suppes tables.

"While overcoming the many difficulties which we encountered in perfecting the Bessemer process and making it and its products successful both technically and financially, we demonstrated the value of numerous details, the importance of some of which seems later to have been lost sight of until now, in some instances, they are being rediscovered and hailed as heretofore unknown truths. However, if their importance shall thus again become recognized and beneficial results are obtained, good will have been accomplished; but perhaps seeking information from history might be a less costly way of finding facts."

CRUSHING STEEL TURNINGS

Machine Reduces "Stringy" Turnings to Short Shoveling Size—Economies Claimed

The economical preparation of steel turnings by crushing to the size designated as "shoveling turnings," thereby increasing their value, is claimed for the machine illustrated, which is being offered by the American Pulverizer Co., St. Louis.

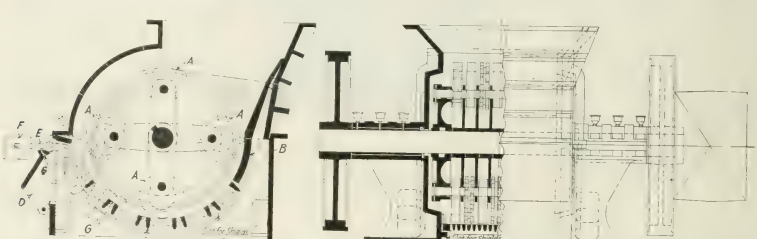
The net increased value of the scrap has been put at about $3 to $4 per ton, and the operating cost from 15c. to 40c. per ton, which includes cost of power, labor and upkeep. Increased loading capacity of cars for the crushed turnings is emphasized as an advantage. The machine may be adjusted within limits to produce shoveling turnings of various sizes.

The rolling ring system employed in the company's coal, cement and other pulverizing machines is also a feature of the steel turning crusher. The crushing elements consist of four loosely suspended rolling rings, shown at *A*, *A*, *A*, *A*, in the line drawing herewith, these being attached to a spider, which is in turn keyed to the main shaft. Several of these spiders with their rings are mounted on the shaft, and revolve with it.

The advantage claimed for the ring crushing construction is that the rings being held in the operating or crushing position by centrifugal force only, they are free to move back 4 in. and thus clear obstructions. The obstruction may consist of material that one of the rings cannot crush, in which case the other rings continue the crushing action, finally breaking the obstruction if possible, or passing it out of the machine by the apron arrangement provided. When a ring has been thrown back out of its normal crushing position it is free to return into action in a direct axial line. The action of the ring is said to be that of striking, crushing and rolling.

Turnings fed into the hopper are drawn in by the rings and crushed against the grinding plate *B* and the grate bars *C*. The crushed turnings fall by gravity through the grate bars, *C*, at the bottom of the machine, as shown. In some installations they drop onto a belt or slat conveyor and are carried out to a chip wringer for removing the oil.

An important feature is the automatic apron and finger system, seen at *D* and *E* for removing large pieces of iron or other material which may be mixed with the turnings fed into the machine. This feature serves to relieve the machine of pieces which cannot be crushed small enough to pass through the grate bars. The fingers are attached and counterweighted as shown. A large piece coming between one of the rings and the fingers presses the finger outward, permitting the piece to drop through between the fingers and the end of the grate bars, the finger returning instantly to normal position by means of the counterweight *F*.



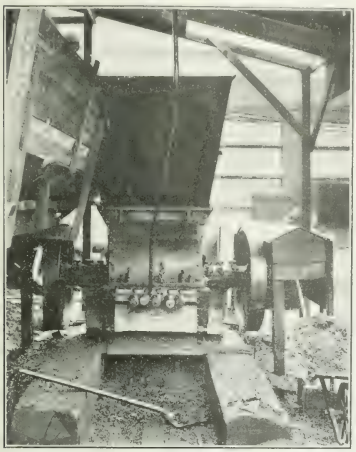
View of Steel Turning Crusher Showing Arrangement of Rolling Rings, Grinding Plate, Grate Bars, Finger and Apron Systems and Other Details. Close balancing of the fingers and apron is a salient feature

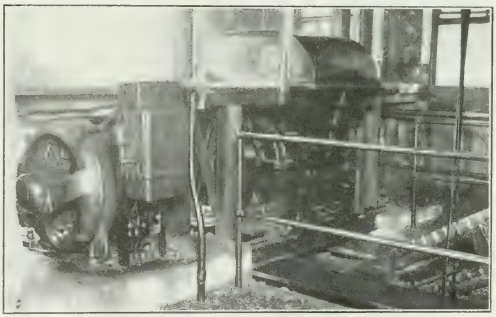
The whole back of the machine, on which the finger system is mounted, forms the apron which is pivoted and counterweighted so that when a larger piece of material than can be handled by the fingers alone has entered the machine, the apron is free to move outward. This provides a still larger opening beyond the grate bars through which such material may be discharged. The counterbalancing of the finger and the apron systems is a special feature and may be conveniently regulated by shifting the counterweights on their respective supports, similar to sliding the weight on a scale beam. In this way a close balancing of the fingers and apron is obtained, which is a salient point in the successful operation of the machine. The apron counterweight may be seen at *G*.

Inside parts of the machine employed in the actual crushing are of manganese steel; outside parts exposed to heavy stress are of cast steel. Two sizes, rated to crush 5 and 10 tons per hour, respectively, are available. They may be arranged for either belt

or direct motor drive, a 40 or 75 hp. motor, depending on the size of the machines, being recommended for the motor-driven unit.

The approximate dimensions of the larger machine are: height, 5 ft. 6 in. to top of hopper; width overall, 6 ft. 6 in.; length, without motor, 7 ft. 8 in.





Steel Turning Crusher Installation With Conveyor and Direct Motor Drive Is Shown at the Right. The upper view is of a different installation and shows the arrangement of the special feed hopper and a front view of the automatic apron and the counterweights. The details of the automatic apron may be noted from the lower right-hand view, the counterweight for the apron, counterweights for the fingers, and the opening for ejecting solid iron pieces being shown. The machine may be adjusted within limits to produce shoveling turnings of various sizes

The machine has been installed experimentally in a number of manufacturing plants within the past few months, particularly in automobile plants, where a large part of the turnings is of such a light, fluffy character that it has been difficult to find a market for them except in conditions of general scrap scarcity. Moreover, it is difficult to load more than 16 or 18 tons of the light, fluffy turnings in a freight car, while in the crushed form about twice that tonnage can be loaded in the same size car. This effects an economy in shipping which adds to the value of the crushed turnings.

It is announced that the main office force of the Steel & Tube Co. of America will be removed to Youngstown this month, arrangements to that effect now being under way. All of the affected employees will be given an opportunity by the Youngstown Sheet & Tube Co., which has purchased the Steel & Tube Co., to go to Youngstown if they so desire. Steel & Tube workers not choosing to go to Youngstown, or unable to leave Chicago, will be given a month's salary.

The Effect of Accelerators on Reinforcing Steel

A number of 1:2:4 concrete and 1:3 mortar specimens in which steel rods have been embedded were broken during the past month, and an examination made of the rods at the Bureau of Standards. Calcium chloride solutions had been used for some of the specimens as the gaging liquid. An examination was also made of expanded metal which had been embedded in small slabs prepared from mortar gaged with a proprietary compound of the accelerator type.

Some of the foregoing specimens were five and others six years old and all had been stored out of doors and exposed to the weather. From this examination, it is concluded that, while calcium chloride tends to corrode the reinforcement, the corrosion does not seem serious or of a progressive nature with age, in cases where the reinforcement is completely embedded in the concrete. However, when using accelerators, care should be taken to completely coat and embed the reinforcement and avoid pockets near it. The strength of the specimens which had been exposed to the weather was considerably higher when calcium chloride had been used than when it had not been employed. Sufficient specimens remain to allow another examination at a later date, and a comparison of the rod condition and strength will be made at different ages.

The Truscon Steel Co., Youngstown, is completing two new factory units at its main plant on Albert Street, which will be ready for occupancy Aug. 1. The company is transferring equipment purchased from the Central Steel Co., Massillon, comprising its steel joist department, to Youngstown.

MAKING DOOR HARDWARE

Economies Effected in the Works of the Yale & Towne Mfg. Co.

The general demand for improvements in manufacturing methods has led to development of a special press for the making of escutcheon plates at the plant of Yale & Towne Mfg. Co., Stamford, Conn., maker of builders' hardware, locks, and other products.

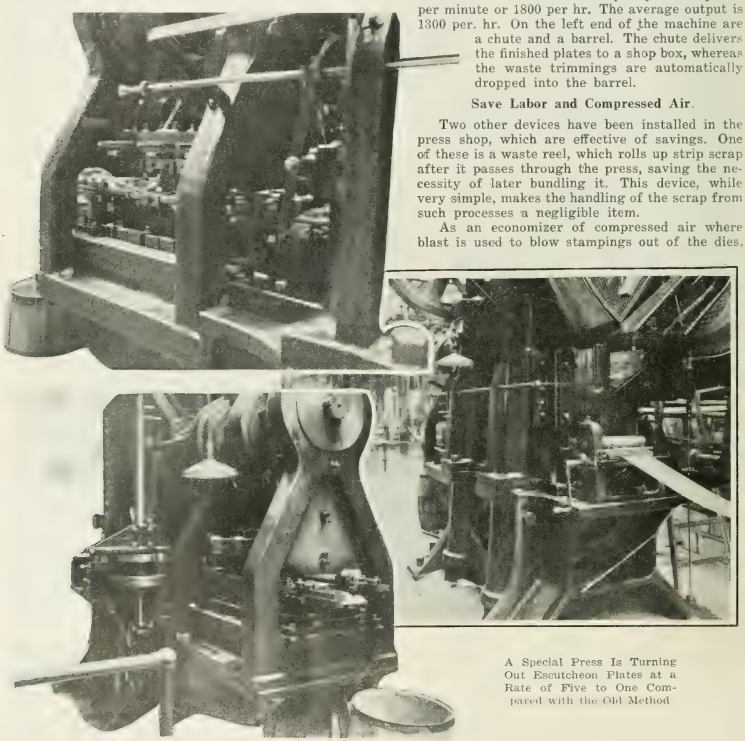
Plates are made from strip metal in brass or plated steel. There were six operations in the former process, consisting of cutting off, dropping or coining, trimming, punching, countersinking and stamping. These required one girl on the stamping operation and five men for the other five operations, together with a considerable amount of floor space to accommodate the presses and working room around them.

In order to save floor space and utilize the labor on other work, the company installed a special press for doing all these operations in one pass through the machine.

Material is fed from a reel at the right end of the machine. It passes through a set of feed rolls, so controlled that they are actuated closely in synchronism with the stroke of the press. The six operations have been so combined that they are accomplished with only five dies. When the press is started, a completed escutcheon plate is dropped out on every stroke of the machine, starting with the fifth.

In appearance the machine would seem to be two double presses combined; a double straight side stamping press, and a double arch type toggle or knuckle press. As the strip passes through, the different operations are performed by the successive dies. An interlocking mechanism is incorporated in the design to prevent any mishap in the event of improper functioning of any of the dies or the roll feed mechanism. Should one of the dies become dulled or broken, so that it did not completely perform its duty, the interlocking mechanism would operate to stop the press. It is figured that the machine has saved on labor cost in a ratio of 5 to 1 on this operation, having released help for other work. It requires only one good man to operate it, as against six operators under the old method.

The calculated dead center pressure exerted is 600 tons. The machine has a capacity of 30 plates per minute or 1800 per hr. The average output is 1300 per. hr. On the left end of the machine are a chute and a barrel. The chute delivers the finished plates to a shop box, whereas the waste trimmings are automatically dropped into the barrel.



A Special Press Is Turning Out Escutcheon Plates at a Rate of Five to One Compared with the Old Method

Save Labor and Compressed Air.

Two other devices have been installed in the press shop, which are effective of savings. One of these is a waste reel, which rolls up strip scrap after it passes through the press, saving the necessity of later bundling it. This device, while very simple, makes the handling of the scrap from such processes a negligible item.

As an economizer of compressed air where blast is used to blow stampings out of the dies, a cam-operated air valve is used. This valve in the air line is mounted on ths side of the press below the crankshaft. It has a hardened button on its stem. A cam is placed on the end of the crankshaft, keyed in such a position that it strikes the button and opens the air valve on the return stroke of the press. The valve is closed by a spring when cam pressure is relieved from the button as the shaft revolves further.

Probably many persons have wondered how the key slot is machined in the cylinders of the Yale night latch or dead latch, as it is commonly called. This is accomplished in a vertical broaching press, rack operated. The cutter has a section that is zigzagged, corresponding to the section contour of the particular key

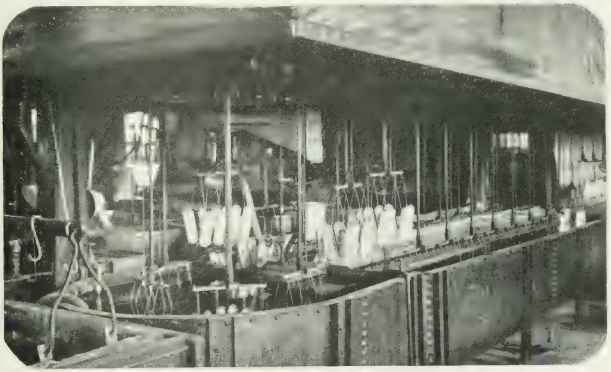
blank to be used. The cutting edge of the broach might be described in appearance as a combination of the common broach and a tapered saw. As the broach is pulled through the cylinder, the successive cutting edges on the taper advance into the work; the cutting edges of course being machined to follow the contour of the broach, thereby following the desired course in the cylinder and producing the correct slot profile.

Continuous Process Plating Machine

Leaving the machine shops and following the course of the escutcheon plates to the plating and polishing department, another interesting process is encountered.

Those plates which are made of steel strip are generally coated with brass or other non-corroding cover. The former process was to dip them for a more or less indefinite period in the common type of pickling, plating and washing vats. This method was not only slow, the pace made being entirely dependent upon the activity of the men handling the work, but was not satisfactory because of the variations in immersion time, which produced varying thicknesses of deposit.

To overcome these objections a special moving cathode machine has been developed which is not only a pace setter for the operator, but gives uniform immersion, hence uniform deposit. Further, with the moving cathode the plating solution is kept in agitation, and the salts uniformly distributed through the solution. The machine saves on labor, floor space, and power.



A Plating Machine Automatically Operated Sets the Pace for the Operator, and Assures Uniform Deposit

The essential features of the machine consist of a series of vats, a conveyor and a loading platform. At the loading platform while the work is moving, the operator loads the work on tee-shaped hangers by means of wires. Each hanger carries eight plates. Arranged in an oval are pickling and washing vats, the long plating vat and after plating washing vats. From the loading platform, the work travels around the track and returns to the loading platform to be removed and hangers reloaded. The hangers are suspended on rollers from the track. At the junction of one tank with another, the hangers ride up on an elevation in the track which lifts the work over the side of the tank and then lowers it into the next vat.

Negotiations are in progress between a committee of the bondholders of the Barney & Smith Car Co., Dayton, Ohio, for the sale of the property, and it is expected that a deal will be completed within a short time, as the majority of the bondholders are favorable to the proposition made for the purchase of the plant. While no definite information has been given as to the purchaser's identity, it is reported that one of the large railroad companies serving the territory is interested.

Conditions in Europe as Seen by Brudenell P. Boyle

Brudenell P. Boyle, assistant to the European manager, Westinghouse Electric International Co., who is on a short business trip to this country, expects a general but slow improvement in European business conditions. Mr. Boyle says the general tone in England seems to be toward stability. People there are becoming tired of the unsettled conditions and are making up their minds to take things as they are and make the most of them. Except for some of the poorer classes who are living on the unemployment doles of the Government and are content to remain idle, the average Englishman is anxious to get back to work and start production. Many of the war made fortunes have also been spent by this time and it is necessary for those who made them to settle down to production again.

Speaking of the Franco-German situation, Mr. Boyle says that there can be no real stability in Europe until the Ruhr matter is settled, and that he could see no prospect of a speedy settlement. He did not see how the French could withdraw from Germany now, nor did he think that they would do so unless there were a violent upheaval in France itself caused by industrial unrest. Since France is mainly an agricultural country, however, the majority of the population is fairly comfortable and is behind the Government. The most likely cause of a change in the situation, Mr. Boyle thinks, will come from Germany, where he expects a change of Government and a more frank attempt to pay off the indemnity. Mr. Boyle said that in spite of the fact that the French policy in the Rhur was bad for English business, the average Englishman is in sympathy with the French and considers that they are quite justified in their aggressive policy.

Investigation of Corrugated Zinc Roofing

In connection with an investigation of the properties of zinc roofing, cold tests were made during the past month on zinc nails and rivets. These were driven at room temperature, cooled to a low temperature by liquid air, and warmed up again to room temperature without producing any appreciable change. Driving the nails at temperatures from 0 to — 40 deg. C. developed a brittleness in most of the nails, the heads flying off of those without fillets. In the case of nails with fillets, the heads did not break off. At — 35 to — 40 deg. C., some of the zinc sheet became brittle and cracked when pounded.

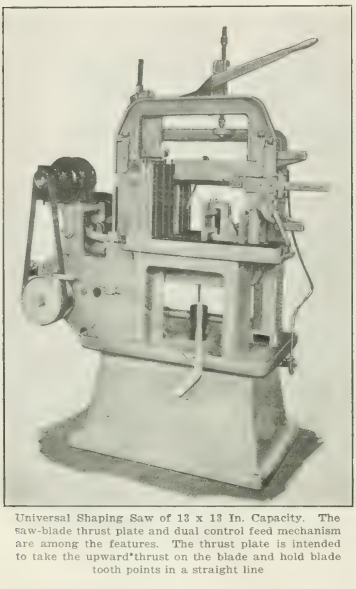
The bureau has requested those interested to submit a greater variety of samples to determine what types, if any, will endure such a test.

NEW UNIVERSAL SHAPING SAW

13 x 13 In. Capacity Machine with Improved Control—Blade Thrust Plate a Feature

A universal shaping saw of larger capacity and with added features, but otherwise similar to its previous machine, described in THE IRON AGE of March 9, 1922, has been placed on the market by the Peerless Machine Co., Racine, Wis. The new features include a saw blade thrust plate and dual control feed mechanism. The capacity is 13 x 13 in.

The frame will accommodate blades from 14 to 21 in. in length and the blade clamping apparatus is



Universal Shaping Saw of 13 x 13 In. Capacity. The saw-blade thrust plate and dual control feed mechanism are among the features. The thrust plate is intended to take the upward thrust on the blade and hold blade tooth points in a straight line

designed to permit of putting up to 10,000 lb. tension on the blade. The so-called thrust plate, which may be seen above the blade in the machine illustrated, is intended to take the upward thrust on the blade, and hold the blade tooth points in a straight line. The thrust on blades from 14 to 21 in. long often causes the blade to bow upward, the teeth nearest the ends of the blade doing the heavier cutting. The thrust plate arrangement is claimed to increase the life and efficiency of the blade by permitting all the teeth to do an equal amount of work. Tests made by the company are said to indicate that blades of 1 in. and even ¾ in. in width may be used safely. The thrust plate, which is 4 in. wide, 30 in. long and 0.048 in. thick, is of saw blade steel and receives tension through the use of two clamping straps. In addition, two set screws permit fine vertical adjustment so as to bring the thrust plate down to the blade for careful alinement.

The dual control feed mechanism feature is intended to reduce handling time. The operator may throw the feed on either side of the machine with one hand while the other hand is used to bring down the saw blade and frame to approximately cutting position, just prior to engaging the feed. The belt shifting gear is connected to the starting lever as shown, so that one straight-line forward motion shifts the belt onto the tight pulley, putting the saw frame in motion and engaging the feed. The dual control is said also to save time when the operator wants to stop the machine just after it has marked the cut, to see how near the line the cut is going to be.

A stop rod for automatically stopping the saw when the cut is completed, or at a predetermined point is also part of the saw frame mechanism. The rod is made telescopic in action by the use of a tubular member. In addition depth and height gages are provided on the screw above the saw frame. The height gage limits the height to which the large coiled spring lifts the saw frame.

The vise is said to have received careful attention. In this machine the distance from the floor to the bottom of the vise is 42 in. The vise table is the upper part of the bed that is bolted to the base of the machine. The front jaw is made up of an angle plate bolted in place. The rear jaw is brought forward by means of a screw and shoe arrangement. The screw accommodates fine adjustment with a total travel of 2 in. Provision is made for approximate or coarse adjustment.

The height of the front jaw is 15 in. An auxiliary front jaw or angle plate 10 in. wide is located at the other side of the saw blade to aline the work. Thus a piece of work 20 in. long is balanced on the vise table. The overall width of the vise table from the loading side to the outboard, bearing side is 18 in. Two T-slots are provided in the outboard bearing for clamping the work when required.

For angular cutting the auxiliary angle plate is removed and the front jaw swung around to any angle up to 45 deg. The capacity on a 45-deg. angle is 9 in. Attention is called to a square key, shown in the illustration, which is intended to assure square alinement of the vise. The front face of the rear jaw is rotated on a hinge pin. This jaw has a heel that alines it with the front jaw when straight cutting is done, but it may be swung around when angular or taper work is held in the vise. This construction is said to have eliminated the necessity of a sub-base, combining the use of angle plate, vise proper and swivel vise in one. A water trough is provided around the vise and pipes guide the water into the tank in the base.

Stroke speeds of 125,80 and 45 a minute, for mild, alloy and tool steels respectively have been provided. The motor bracket is standard and is designed for motors of 1 to 1½ hp. For belt drive the belting is from the lineshaft to tight and loose pulleys. The feed adjusting hand wheel is at the front of the machine. Pressures up to 200 lb. can be applied vertically to the blade. The blade travels back and forth in a horizontal plane.

The machine is 6 ft. 3 in. long, 2 ft. 7 in. wide and 7 ft. high. The weight is 2200 lb. net.

Curtailment of Coke Production

UNIONTOWN, PA., July 14.—A process of curtailment in the production of coke in the Connellsville region is apparent as buyers have withheld their contract requirements for the third quarter and last half. It is estimated that less than one-half of the regional production is under contract for the third quarter, with the result that the coke interests are curtailing their output to meet the demands. Purchases on the spot market are unusually heavy this third quarter as compared with other years due, no doubt, to efforts at beating down prices of coke. General opinion in the regoin is that the price level will not be lower. In fact, a stiffer trend is noted in the coke inquiries during the last two days of the week.

A little stronger trend is noted in coal, although this has not been reflected in increased production.

The Andrews Steel Co., Newport, Ky., will close down for a few days about Aug. 1, during which time new machinery will be installed in the rolling mills, including manipulators and tables. The mills will be put into operation as soon as the installations are completed. The mills of the Newport Rolling Mill Co., which were closed for a week for repairs, have resumed operations, and a steady run is contemplated.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 140 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Coming of the Short Day

As told in THE IRON AGE last week, some of the largest steel companies have been holding conferences of plant managers and department heads to make arrangements for the introduction of eight-hour working shifts. Some of these conferences have been almost simultaneous with the publication of further statements by hostile propagandists, to the effect that the steel manufacturers have been making promises of the eight-hour day with no accompanying effort to bring it about. However, the public will not be left long in doubt as to the facts. Evidently the labor union leaders who have aimed for years to get control of the steel industry and of the thousands of its workers who will not, if they can help it, submit to such control, are satisfied that the end of the twelve-hour day is in sight. One week ago they announced the starting of a new campaign to unionize the steel workers so as to secure the eight-hour day. Today they are assuring newspaper readers that they will not cease their efforts to organize the steel industry, "even when the eight-hour day is established there," and "when the funeral of the twelve-hour day finally comes we will rightly take credit for it."

In all the reports outside engineers have made on two-shift operations at iron and steel works it has been said repeatedly that progress toward the shorter day must be gradual. Such engineers have pointed out also that the cooperation of the men must be secured. That has been taken for granted in the theoretical views of the subject that have filled the daily press; but the fact is that not only workers themselves, but wives and mothers of workers—not ignorant and foreign born, but in many cases of American bringing up—have been heard time and again in protest against short working time, and this not more on the score of a lessened week's wage than of the untoward consequences of the long periods of idle time. The men know, if some uninformed writers do not know, that the hours actually worked in the twelve-hour shift in blast furnace operation have averaged in the case of one of the largest companies exactly 5.7, or less than 50 per cent of the nominal working time. There is good reason, therefore, for saying that one of the factors in bringing about the change will be the time required to secure the cooperation of the men. No little difficulty will be met with, in the case of the tonnage men, who, in compensation for the loss of tonnage will naturally seek a higher tonnage rate.

One thing that is likely to result as twelve-hour jobs are abolished is the employment of considerable percentages of the men ten hours a day. There was quite a little experimenting with ten-hour rolling mill turns in 1921. With the provision of added soaking pit facilities, it has been found possible to operate blooming mills on ten-hour turns without interfering with the flow of ingots from the open-hearth.

In open-hearth operations the problems presented, owing to the varying demand for the different forms of service, at intervals in the 24-hour period, are extremely intricate. Some of the proposals now brought forward involve for some classes of workers off-and-on periods, with considerable variations from straight eight-hour turns. Thus the wrenching of working times to which men have grown accustomed in many years of service will be so severe in many cases as to make the greatest problem of all that of inducing the worker to stay with the industry.

But with all its difficulties and consequences, for good and for ill, the coming in of the shorter day in iron and steel making is close at hand. Public sentiment, partly informed and largely uninformed, has called for it, regardless of economic consequences, but convinced apparently that the change will bring great social benefits. Steel workers and the tens of thousands of men and women who own the steel plants of the country may find the mandate of the public hard to bear, but the leaders of the industry have set their hands to the task and there will be no turning back.

In May British exports of iron and steel, for the first time since the beginning of the war, exceeded the pre-war record. At 424,500 gross tons they were 2 per cent above the monthly average in 1913 of 414,100 tons, scrap not being included.

The increase over 1913 was in seven major items: Tin plates and sheets; black plates and sheets; steel bars, angles and rods; hoops and strips; steel plates and sheets over ⅛ in. thick; wire and sleepers and fish plates. In galvanized sheets May was close to the 1913 rate, while steel rails were about 60 per cent. Pig iron and ferroalloys for May were 92,900 tons, compared with 93,700 tons per month in 1913. The British performance is all the more significant when compared with that of other exporting nations. American steel exports have dragged along until in May at 203,000 tons they were about 84 per cent of the 1913 monthly rate. German exports fell decidedly in the first quarter. For France the April figures show a decline to 70 per cent of the 1922 rate. Belgian exports have held up somewhat better. So far as Continental Europe is concerned, the export losses are directly traced to the Ruhr occupation. England's success, on the other hand, may be largely credited to the same cause, as well as to the absence of keen American competition. The British record is particularly noteworthy for being achieved in the face of rising fuel and labor costs.

Morale After the War

Everyone has been disillusioned as to the very active and profitable trade that was expected to come after the war. What many need still to recognize is that morale has been greatly impaired and that it will take a long time to restore it. The failure of commerce, to use the broader term, to follow the expected pace is due to conditions of mind more than it is due to physical conditions.

The change in mental attitudes has been the wider from the fact that during the war there was unusually great cooperation. Much, perhaps, could be said on the thesis that the change represents a purely mental reaction; that as men did a particularly great amount of team work during the war there was a natural reaction afterwards in the direction of every man wanting to look out for himself.

In the purely manufacturing industries the effects of lowered morale have been seen in various ways. There has been a recklessness in advancing and reducing prices that has produced very undesirable results, demand being impaired at one time and losses caused at another. Workmen have done poorer work and less of it.

The physical damage wrought on the battlefields, being visible or easily pictured, has received more attention than the mental damage throughout the world in lowered morale. If a nation has a certain physical equipment, in mines, factories and transportation facilities and a certain working capacity of the men that compose it, there is the same impairment of productive ability if the working capacity is reduced 10 per cent as if 10 per cent of the physical equipment is destroyed.

The practical question is how the world's morale is to be restored. It has become plain that we need not worry about physical construction, the building of ships, houses and factories. The important restoration is of desire to work and to work well, of faith one man in another and one nation in another and of willingness of every one to be a proper and useful part of the world's economic machine. Nature will reach the requisite end in time, but nature's ways are sometimes painful. Education in morals, or in the Golden Rule, to put it plainly, and in economics will help to smooth the way, but meanwhile it is well for every one to recognize that the whole world is suffering keenly from a greatly lowered morale, produced by the war, and that this decline in morale has had larger economic consequences than are commonly reckoned.

New British View on Machine Tools

A writer in *Engineering*, London, sets forth in a recent number the new British viewpoint in respect to machine tools. It reflects the influence of the intensive production of war times and is very close indeed to the American idea as it has evolved more slowly from a beginning antedating the war by years. Special emphasis is laid on two points. One is the economic necessity of modernizing machine shops. The other represents the acceptance of practice now well established among machine tool builders in the United States, under which the highly special single-purpose machine is preferred only in those relatively rare cases which call regularly for large scale outputs. According to this latter view the truly economical, money-making machine for ordinary quantity output is the high production semi-special standard tool with limited scope of usefulness when compared with general utility models, yet sufficiently adaptable to permit of adjustment to new dimensions and new uses. Regarding replacements, which in Great Britain as well as in this country now constitute the bulk of new business, the writer in *Engineering* says:

> Obsolescence should be the determining factor in the replacement of any high class machine tool, and where new machines or methods can be proved to make a profit on the expenditure they involve by reason of increased production and lower costs, then their installation is surely warranted. But here we are faced with the all-important question, "When is such a machine obsolete?" The conditions in the large manufacturing plant are totally different from those obtaining in the small shop. If a machine tool can show a profit on production and is capable of good work up to the required standard, the fact of its age does not necessarily make it obsolete. When it is questionable whether there would be a market for any increased output which could be obtained from a more up-to-date tool, the small manufacturer wonders whether the large capital expenditure for such a tool would be justified.
>
> If there is no prospect of increased business, then this attitude may be correct, but if there is reason to believe that good orders may be expected when trade revives, the purchase of a new machine is fully warranted by reason of the reduced costs immediately obtained and the possibility of increased production for the same overhead expenses and labor charges when manufacturing is again on a normal basis. Further, such improved tools, even when introduced in the small shops, serve to place our engineering methods and practice generally on a new and up-todate footing.

Even in the largest of British engineering establishments, we are told, "too often does the

initial capital outlay immediately loom up as the 'bogey' when new machines are spoken of, and this fact is apt to rule out of consideration the advantages to be derived from such machines. It is pleasing to note, however, that this shortsighted policy is gradually but surely giving way to a wider vision. The purchase of a machine tool is an investment and the return on such investment determines its value. The present state of trade has served acutely to remind manufacturers of the fact that haphazard methods or lack of definite methods cannot be tolerated, and every endeavor is necessary to place production on as near a 100 per cent efficiency basis as is practical."

The article urges a careful study of conditions before determining the machine which shall be purchased to replace that which is to be discarded. It is pointed out that the tendency to select a machine of the same type should be combated; all facts in the case should be kept in mind, including the essential one that machine tool makers are usually able to guarantee a production on their machines, and this enables an estimate in this direction to be readily made. As to the general type of machine, as between the one-purpose and the semi-special standard tool, these considerations are urged:

The class of labor to be provided for the new machine should also be borne in mind, for if careful setting, accurate reading, or any complex manipulations are necessary, then the most highly skilled operators will be needed, and unless these are found it is likely that many pieces will be spoiled, at the outset at any rate. To obviate this many engineers have favored single-purpose machines, but in these cases it is necessary to have a continuous production of standard components to keep such single-purpose machines successfully employed. Recognizing the value of some attention to this point, machine tool makers have endeavored to keep their designs as simple as possible and to strike a happy medium by producing standard types suitable for a number of uses. The result has been to enable purchasers to find in the range of standard tools those suitable for their own needs, without being involved in the purchase of special machines.

Varied opinions are held as to the relative advantages and disadvantages of these latter. Certain it is that the special machine does hold out advantages of its own, but in view of the fact that plant becomes obsolete when new designs afford increased profit on production, coupled with the wide range of standard machines available for varying requirements, this resolves itself into a question of whether the increased price for special machines is thoroughly justified. These latter are necessarily higher in price, since pattern costs have to be borne by the purchaser, and the advantages of repetition machining are not obtained in their production, repair parts also costing more than those for a standard machine.

The marked change taking place in the character of the materials used by British steel makers is pointed out by the National Federation of Iron and Steel Producers. Comparing the consumption, per ton of steel, of pig iron, scrap and other materials, it is shown that whereas 12.42 hundredweight of pig iron and 9.35 hundredweight of scrap were used per ton of ingots in 1920, there was a decrease by March, 1923, to 10.34 hundredweight of pig iron and an increase to 10.79 hundredweight of scrap per ton of ingots. The data are based on returns from companies responsible for between 70 and 80 per cent of the steel output of the country. In other words, the amount of scrap used has increased in a little over two years from 40 to 46.5 per cent of the total charge, with pig iron now 44.5 per cent instead of 53.2 per cent in 1920. The tendency toward a larger use of scrap is being accented with each year. Germany leads in the movement, as indicated by scrap importations of over 50,000 tons per month in 1922. Receipts of foreign scrap into the United States this year have surpassed all records of recent years at over 19,000 tons per month. It has been found possible to operate open-hearth furnaces, particularly basic, so that high-grade steel can be made more cheaply, with less pig iron. Undoubtedly this practice will increase, until less and less pig iron will be necessary. Should electric steel be more largely produced, more scrap and still less pig iron will be the rule.

Zinc Coating for Steel

At a recent meeting in Pittsburgh of representatives of the National Association of Sheet and Tin Plate Manufacturers and of the American Zinc Institute, it was stated that last year substitutes for zinc-coated iron and steel replaced 1,000,000 tons of sheets which would have required more than 100,000 tons of slab zinc for protective purposes. The statement was also made that nearly 60 per cent of the slab zinc used in this country goes into coating iron or steel. The meeting had been called for the discussion of zinc-coated materials and some who attended go so far as to say it is likely to be "epochal for both industries represented."

There has been dissatisfaction with some zinc-coated materials, variously ascribed to too little zinc and to improper methods of manufacture. The viewpoints of both consumers and manufacturers have been presented in public discussions of the subject (some of which have appeared in these columns), but there have been divided counsels among manufacturers as to the advisability of such discussion as a means of meeting the complaints of users of various galvanized products. In the circumstances the development of the plans set on foot at Pittsburgh will be awaited with no little interest. If an educational campaign is contemplated, in which producers of sheets and producers of zinc are to recognize their common interest, it is to be expected that the cooperation of users of coated sheets will be sought to the fullest extent. Naturally what the consumer wants and is willing to pay for will be the decisive factor in all questions of the market or of manufacturing practice.

The steel barges for use of the Tennessee Co. on the Warrior River between Birmingham and Mobile have begun coming from yards of the Alabama Dry Docks & Shipbuilding Co. at New Orleans. Eight are 25 by 140 ft. and one 50 by 280 ft. Warrior River locks are 52 by 285 ft. The new barges have covered hatches and are strongly built. Neatly fitting the locks, they will call for minimum of lockages at the 17 locks. They will be used principally in taking steel to the Pacific Coast and bringing up Brazilian ores for the Tennessee and American Steel & Wire companies as well as sulphur for district chemical plants.

ABOLISHING TWELVE-HOUR DAY

President Campbell Estimates Increased Cost—Plans of Other Companies

President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, announces that the 12-hr. day will be abolished in all mill departments before the close of the current year. The 8-hr. day has already been pushed so far that less than 1000 additional men will be needed to establish it fully throughout the plants.

"It appears that introductions of the 8-hr. day made or to be made this year will increase the cost of steel about $3 per ton," says Mr. Campbell. "The public, however, seems to want the shorter day, and I suppose will not object to the higher steel costs. It will be necessary for some workmen to accept wage readjustments when the reduction in the number of working hours is effected."

This action by the Sheet & Tube company is especially significant in view of the fact that it occupies an outstanding position in the industry, employing in its three properties upward of 25,000 workmen. It also means that final abolishment of the 12-hr. day is under way in all Mahoning Valley plants.

The Republic Iron & Steel Co., which earlier in the year introduced the 8-hr. turn in its open-hearth department, has been gradually eliminating the 12-hr. day for the past four or five years. The Trumbull Steel Co., operating a plant at Warren, Ohio, has relatively few 12-hr. men left.

President Severn P. Ker announces that the Sharon Steel Hoop Co., Sharon, Pa., is preparing to abolish the long working day in all departments where practicable.

The 8-hr. day has been in effect in the sheet mills of the Mahoning Valley for many years.

Chicago Independent Steel Companies Will Follow Steel Corporation

CHICAGO, July 17.—Chicago independent steel companies will follow the lead of the United States Steel Corporation in the gradual adopting of the 8-hr. work day, but will form no policy of their own until the plan of the corporation has been put into effect. While labor supply is becoming slightly more plentiful, it is not yet apparent that there will be enough labor by Sept. 1 to man the mills to maintain the present rate of output on an 8-hr. basis. Of course there will be a return of workers to the mills after the season's crops have been harvested, but even so, some of the steel people in this district expect that the production may be curtailed somewhat by lack of sufficient labor under the 8-hr. plan. As somewhat decreased steel production will probably be needed to meet fall requirements, it is expected that the new arrangement of working hours will reduce output to a point more in keeping with probable demand, and this will of course tend to stiffen the price situation.

Steel Companies Will Make Change in Hours as Soon as Possible

NEW YORK, July 17.—Erroneous reports have been published in regard to the plans of the steel companies relating to the abolition of the 12-hr. day. A New York afternoon newspaper published an article on the subject, stating that the 12-hr. day would be abandoned in six weeks. A director of the American Iron and Steel Institute, when asked about this statement, said: "If that expression is used it is used in the sense of a man who intended to go around the world, making the start next Wednesday and he should say he was going around the world next Wednesday. Evidently he couldn't go around the world next Wednesday. He could make a start on that day, however.

"The 12-hr. day cannot be abolished unless and until there is sufficient labor—sufficient in numbers—to permit it. The industry might start it within six weeks, but how long it will take to finish it no one can tell at this time, because no one can say what the surplus of labor will be."

Although it is impossible to make so important a change quickly, the steel companies are moving as rapidly as possible. Some conferences have been held and others will be called at an early date. One of the meetings will be of operating officials at the office of President Farrell.

A manufacturer who has had long experience in the operating departments of the different steel companies said Tuesday: "One trouble will be to get the men to work only 8 or 10 hours. Most of the men, especially those in small towns where there are very few means of amusement, are anxious to work long hours. Sometimes the men who are on a 6-day schedule will work a seventh day by going to the plant of another company. If the hours of all employees are changed to 8 or even to 10 hours, many adjustments will be necessary as to working conditions and wages, and the task will not be an easy one."

Pittsburgh Sees Some Serious Problems to Be Solved

PITTSBURGH, July 17.—Steel manufacturers in this district are approaching the matter of the establishment of the 8-hr. day rather slowly. The ramifications are many, and it is not going to be a simple matter to convince workmen now engaged for the longer periods to accept the proposition of reduced wages in keeping with the reduced working period. Plate and bar mill men are paid on a tonnage basis and prefer the longer day, since it means greater earnings. If forced to accept the 8-hr. day, they naturally would seek a higher tonnage rate than now is being paid. This also is the case with common laborers, who probably would not accept the short work day if it means the loss of two hours' pay. The point is also made that if the 8-hr. day is established, there will be many cases where men will attempt to work two turns and the end sought of providing the workmen with more time for their families and recreation would be at least partially defeated.

How long it will take to establish the shorter day in the industry is purely a matter of conjecture. Some seem to believe that it can be accomplished in six months, while others place the time at a year. Investigations have not yet reached a stage where it is possible to provide a real idea as to how costs will be affected by the change.

Management Association Plans Meeting

It is planned to hold the 1923 convention of the American Management Association at the Hotel Astor, New York, Oct. 29 to Nov. 1.

Convention program committees are being formed. Part of the one day conference of the plant executive division will be devoted to the report of the sub-committee on apprentice systems, of which L. L. Park, supervisor of welfare, American Locomotive Co. is chairman. Other topics selected for discussion include following up a foreman training program, and the relation between the employment department and the foreman.

No Organizing in Southern Ohio

CINCINNATI, July 16.—To date there has been no activity apparent on the part of the organizers of the American Federation of Labor to unionize the steel plants in the southern Ohio and northern Kentucky districts. Practically all of the employees of these plants are now, and have been for some time past, working an 8-hr. shift, and as a result one of the greatest arguments for unionization has been eliminated. Steel mill officials do not expect any difficulties from labor troubles developing in this district.

BRITISH IRON AND STEEL MARKET

Pig Iron and Steel Markets Dull—Japan a Heavy Buyer on the Continent—French Book British Rail Order

LONDON, ENGLAND, July 17.

The pig iron market is dull with prices easier, but Germany has bought fair quantities of foundry and hematite iron.

The finished iron and steel market is dull on account of the Scottish holidays. Producers maintain a firm attitude as to prices and are not inclined to reduce them. Foreign buyers at the same time are reluctant to pay the prices asked. China has bought plates, angles and shapes and Japan has purchased locomotive boiler material.

The foreign ore market is quiet and there are sellers of Rubio at 23s. to 23s. 6d ($5.29 to $5.40), ex-ship Tees.

June exports of iron and steel were 365,148 gross tons, of which pig iron exports were 35,639 tons.

Continental prices are advancing with Japan the chief purchaser of all kinds of material. Belgian plants are reported booked full through October and German plants fully sold three months ahead on domestic business. Wire rods are scarce with Belgian producers asking £10 5s. to £10 10s. ($47.05 to $48.20) f.o.b.

In Germany activity among the Ruhr steel works is diminishing; 21 blast furnaces are now blowing against 32 on June 1 and 85 in January. The coke output is less than 5000 tons per day. The French have seized stocks of raw and finished material at the Thyssen works at Mulheim on the Ruhr. The Eisen und Stahlwerks Hoesch at Dortmund have been occupied. The capital of the Rheinische Stahlwerke has been exhausted by wages and maintenance costs and the capital stock is being increased heavily to make good the damage to the Duisburg works. The French are loading up finished material seized at Gutehoffnungshuette. French fuel seizures are still well below the rate ruling before the advance into the Ruhr.

In France De Wendel & Co. are reported to have booked a 25,000-ton rail order for the United Kingdom. Tin plates are steady at minimum prices, but business is generally quiet with the hot weather affecting the output and some mills closed. Galvanized sheets are steady. Japanese buying of black sheets is fair on a basis of £19 (3.89c. per lb.) f.o.b. for thin specifications.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.59 per £1, as follows:

Durham coke, delivered	£2	1½s.				$9.53	
Bilbao Rubio ore	1	4				5.48	
Cleveland No. 1 foundry	6	0				27.59	
Cleveland No. 3 foundry	5	7½				25.16	
Cleveland No. 4 foundry	5	0	to	5½		23.00 to	$23.55
Cleveland No. 4 forge	4	17½				18.78	
Cleveland basic	5	10				25.20	
East Coast mixed	5	2½				25.55	
Ferromanganese	18	0				92.00	
Ferromanganese*	20	0				91.20	
Rails, 60 lb. and up	9	10	to	£10	0s.	43.70 to	46.00
Billets	7	10	to	8	10	34.50 to	39.10
Sheet and tin plate bars, Welsh	9	2½				41.61	
Tin plates, base box	1	3	to	1	3⅛	5.26 to	5.28
						C. per Lb.	
Ship plates	9	15	to	10	5	2.00 to	2.11
Boiler plates	12	10	to	13	0	2.56 to	2.66
Tees	10	5	to	10	15	2.11 to	2.20
Channels	9	10	to	10	0	1.95 to	2.05
Beams	9	5	to	9	15	1.90 to	2.00
Round bars, ¾ to 3 in.	11	0	to	11	10	2.26 to	2.36
Galvanized sheets, 24 g.	17	15	to	18	0	3.64 to	3.69
Black sheets, 24 gage	13	10	to	13	15	2.77 to	2.82
Black sheets, Japanese specifications	15	5				3.13	
Steel hoops	12	0	&	12	10*	2.46 &	2.56*
Cold rolled steel strip, 20 g.	£17	5s.				3.54	
Cotton ties, Indian specifications	15	0				3.03	

*Export price. †Ex-Ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Foundry pig iron:							
Belgium, July	£5	5s.	to	£5	7½s.	$24.15 to	$24.71
France, July	5	5	to	5	7½	24.15 to	24.71
Luxemburg, July	5	5	to	5	7½	24.15 to	24.71
Billets:							
Belgium, July	6	10	to	6	12½	29.90 to	30.45
France	6	10				29.90	
Merchant bars:						C. per Lb.	
Belgium, July	7	15	to	8	0	1.59 to	1.64
Luxemburg, July	7	15				1.59	
France	7	10				1.54	
Joists (beams):							
Belgium, July	7	7½	to	7	10	1.51 to	1.54
Luxemburg	7	15				1.59	
France	7	10	to	7	12½	1.54 to	1.57
⅛-in. plates:							
Belgium, July	8	5	to	8	10	1.69 to	1.74
¼-in. plates:							
Luxemburg	7	15				1.59	
Belgium	7	10				1.54	

Steel Furniture Shipments

WASHINGTON, July 17.—The Department of Commerce announces June shipments of steel furniture stock goods based on reports received by the Bureau of the Census, in cooperation with the National Association of Steel Furniture Manufacturers. Shipments by 22 manufacturers amounted to $1,401,950 in June as against $1,506,072 in May and $1,015,463 in June, 1922. The accompanying table gives comparative figures for the first six months of 1923 and 1922.

	1923	1922
January	$1,362,470	$983,834
February	1,307,173	967,125
March	1,709,206	1,087,228
April	1,520,286	1,058,382
May	1,506,072	1,056,735
June	1,401,950	1,015,463

June Bookings of Steel Castings

WASHINGTON, July 17.—Department of Commerce figures based on reports received by the Bureau of the Census in cooperation with the Steel Founders' Society show for June a slight decline from the May tonnage of commercial steel castings. The bookings in June by companies representing more than two-thirds of the commercial castings capacity of the United States amounted to 84,878 net tons compared with 89,463 net tons in May. The accompanying table shows the bookings of commercial steel castings for the past six months by 65 companies with a monthly capacity of 96,900 tons, of which 38,300 tons would usually represent railroad specialties and 58,600 tons miscellaneous castings.

Bookings of Commercial Steel Castings

	Total		Railroad Specialties		Miscellaneous Castings	
Month 1923	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January	100,605	103.8	47,879	125.0	52,726	90.0
February	90,152	93.0	39,845	104.0	50,307	85.8
March	143,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,788	101.3	50,705	86.5
June	84,878	87.6	42,773	111.8	42,105	71.9

Basing Point Hearing Resumed

WASHINGTON, July 17.—Presentation of evidence by the United States Steel Corporation in the Pittsburgh plus case was resumed before Examiner John W. Bennett of the Federal Trade Commission in Washington today. A. C. Winter, of the Illinois Steel Co., was the witness. He summarized exhibits previously offered and also presented additional contracts made during the years 1909 and 1913.

LUXEMBURG CONDITIONS IMPROVE

Acute Coke Shortage Although German Coke Shipments Increase—American Coke Unsatisfactory—Mills Booked with Cheap Orders

LUXEMBURG, July 6.—The situation in Luxemburg improved perceptibly in June, and particularly toward the end of the month. The works have known a long period of insufficient and unprofitable production, and will, as a matter of fact enjoy no advantage from the present firmness of the market (if this is maintained), until old orders, which were accepted at a loss have been liquidated. Costs will undoubtedly be governed for some time by the prices of coal and coke, and, indirectly, by the fact that the American coke, which is still arriving, is of such poor quality that same has to be mixed at a proportion of 25 per cent at the most with continental coke. The cost of American coke has also increased as a result of the expenses occasioned by the Belgian railroad strike, the consequent detainment of vessels in Antwerp and difficulties experienced in trans-shipping coke to Luxemburg. On the other hand, more regularity in the arrival of German coke is noted.

As the Belgian market is rising, it is evident that the Luxemburg market must follow, although the output is slow; and Luxemburg, as well as Lorraine works, demand higher prices than those quoted by Belgian makers. Numerous orders have been received, in Belgium, from South America, North Africa, Spain and the Near East. Foundry iron No. 3 is firmer, and the latest quotations are 460 fr., Belgian currency. In agreement with Belgian sellers, Lorraine and Luxemburg works have increased the price of semi-finished products and sales have been made at 550 to 560 fr. (Belgian currency) for blooms and 570 to 575 fr. for billets. Following is a list of the furnaces in blast in Luxemburg on July 1:

Luxemburg Blast Furnace Operation on July 1

	No. in Blast	Total
Arbed:		
Esch	5	6
Dudelange	3	6
Differdange	3	3
Terres Rouge:		
Rodval	1	3
Esch	0	
Hadir:		
Differdange	1	1
Dimmeringe	0	
Rodange	2	2
Steinfort:	2	3

In Antwerp, Luxemburg steel is scarce, as a result of the output being severely curtailed to about 50 per cent of capacity because of the persistent coke shortage. However, a few small orders for bars have been taken at about 650 fr. (Belgian currency) f.o.b. Antwerp.

JAPANESE BUY RAILS

Orders for 10,000 Tons Placed—Additional Inquiry for Tin Plate

NEW YORK, July 13.—Orders for 10,000 tons of rails, small bookings of angles and splice bars and further inquiries for tin plate are all that break the spell of quietness in export business. Supplies in many sections are considered low, but the desire to replenish stocks is wanting, obviously due to the lack of confidence in the situation. Continental makers are still the favorite bidders on most products and seem likely to be for some time, their quotations on thin sheets, angles and bars being about 10 per cent below this market.

Independent Japanese buyers placed 7000 tons of 75-lb. rails and 3000 tons of 60-lb. rails with Suzuki & Co. It is estimated that Japan uses between 80,000 and 100,000 tons of rails yearly. Only a portion of this amount has been placed this year, hence one large importer feels reasonably justified in expecting sizable inquiries before long. Angles and splice bars, about 450 tons in all, were placed at about $73 c.i.f. Japan. So strong is continental competition in these products that business placed here is small.

Tin plate is still the liveliest product. Iwai & Co., Ltd., has taken an order for 9500 boxes, and the Nippon Oil Co. will take bids, this time for 18,000 boxes, on July 16. Nothing has developed from the other inquiries mentioned last week. Extensive building plans have been completed in several of Japan's larger cities, it is learned, but execution of these plans in most cases awaits stabilization in market conditions.

Although actual business with China continues to be generally dull, several inquiries have been made for quotations on scrap. There is one inquiry for 3000 tons of structural material and further small inquiries for copper and structural steel. An exporter with good connections in China says there will be large orders for copper to be placed later, buyers apparently waiting only for lower price levels. Moderate purchases of copper and brass have been made. Demand for copper from the mints in China has suffered a severe setback, but this will be offset later, it is hoped, by demand from makers of electric wire. The unfavorable rate of exchange is a barrier to free purchasing of copper.

The Brazilian Government has contracted for improving the harbor and for the construction of modern port works at Ilheos, in the State of Bahia. The total expenditure called for is 4,600,200 milreis (approximately $500,000 at current exchange), and will include dredging, quays, warehouses, cranes, rolling stock, and other port apparatus, paving, and facilities providing for water, light, and sewage disposal. The South Manchuria Railway Co. is contemplating the electrification of railway lines on the Dairen wharves. When the company reaches a decision in regard to the matter, even if no foreign aid is required for the work of installation, electric locomotives and material will have to be purchased from abroad. Firms interested should address the Director of the Machinery Division, South Manchuria Railway Co., Dairen, Manchuria.

There is softening in demand as well as in price of imported ores, and, while other forces may be at work, the deciding factor is the uncertainty of pig iron. One large importer made quotations on three orders, but no business followed. It appears that the prices now quoted are 1c. to 2c. per unit too high to attract orders. Limited tonnages of French iron, equivalent to foundry No. 1, are being offered at $29, c.i.f. Atlantic port, and iron of 2.50 to 3 per cent silicon at 50c. less. Late September delivery is offered on both grades. An importer of Scotch foundry iron is quoting about $32 per ton, c.i.f. Atlantic port, for No. 3, but looks for few orders. With two wage increases recently granted to English miners and more trouble imminent, there is scant hope for lower quotations, unless for unusually large tonnages.

More Employed in Detroit

DETROIT, July 17.—Despite the seasonal reduction in the output of automobiles and the accompanying "change of models" period, the figures of the Detroit Employers' Association show that there was a gain of 903 in the past week, with a total of 222,948 employed by the 79 firms reporting to the association. This is approximately 6000 below the peak, which was reached during the last week in May.

Decline of Union Strength in the South

BIRMINGHAM, ALA., July 17.—The International Mine Workers' Union has suspended the Alabama district organization's autonomy because the membership had grown so small that it was not self supporting. The State organization, which is more than 30 years old, was dissolved and the International union has placed International representatives in charge of the small remnant of union locals that is left.

Iron and Steel Markets

TO REDUCE OUTPUT

Sharp Curtailment in Pig Iron Planned

Finished Steel Prices Generally Maintained—Eight-Hour Day Not a Market Factor

A sharp reduction in pig-iron output is promised in the next 30 days, with a relatively smaller decline in steel production. Thus far definite evidence of a falling off in actual consumption of steel has been lacking, but the reduction of order book totals goes on, while buying at today's higher prices is carefully limited.

A canvass made by Cleveland ore producers indicates that about 30 blast furnaces are likely to go out before the middle of August. Some of them have already piled large amounts of iron.

The Steel Corporation, which apparently took on less new business than the independents in June, being unable then to promise deliveries, has averaged 6000 tons a day more in orders this month than in the first half of June. Some other producers have not done so well and are nearer to the time when fresh tonnages will be needed.

The fact that consumers are taking deliveries so fully under their contracts, some cases being still reported, particularly at Chicago, in which the mills are being pressed for steel, has helped producers to hold prices. Efforts are being made to buy bars at less than 2.40c. and plates and shapes under 2.50c., but on these key products new business is still done at the prices named.

An expectation of lower prices is plainly governing the policy of many buyers, but meanwhile there are indications that stocks in consumers' hands are on a smaller scale than in April, when the peak in steel production was reached.

Preparations for the change from the 12-hour to the 10-hour and 8-hour day in steel works are under way in several organizations, and substantial progress is expected by the year-end. Increased cost is conceded, but does not figure as yet as a market factor. Buyers recognize that when the steel works labor supply shows a material increase steel will also be more plentiful than it is today.

Railroad consumption of steel holds up and the roads expect to buy more cars, but look for lower prices later in the year. The falling off in new building contracts is still a factor, but July is rather more than meeting expectations. In the automobile industry the plans of the makers show much more confidence for the remainder of the year than the prophecies from the outside.

The week's structural awards amounted to about 16,000 tons, the largest being for 4500 tons for a generating station at St. Paul. Inquiries represent about 15,000 tons and include 10,500 tons for tank work and 2800 tons for a New York pier.

Returns from 152 fabricating firms show 112,000 tons booked in June or about 50 per cent of capacity. At the same rate for non-reporting firms, the June total was 127,500 tons, against 145,000 tons in May and 202,000 tons in April.

Some increase in the available supply of semi-finished steel is noted and a sale of slabs has been made at $40 by an Ohio mill.

A slight increase of interest has been shown in the pig iron market, but there have been further price recessions in several centers, particularly in eastern Pennsylvania, where the decline is from 50c. to $1. Quotations on foreign iron are also down in harmony with the domestic market.

In the export trade railroad inquiry is more active. South America and India want about 11,000 freight cars. Colombia has placed 3000 tons of rails with the Alabama mill.

Japan has added 10,000 tons to the considerable list of its rail purchases in the United States this year. More orders are yet to come for Japan's extensive track-standardizing program.

European mills have made the lowest bids on Japanese rails lately, but their deliveries are uncertain. However, Japan is buying freely of other forms of steel from Continental mills at advancing prices.

In the Ruhr only 21 blast furnaces are now active against 32 on June 1 and 85 in January. The French have seized further steel works. In France De Wendel & Co. are reported to have taken a 25,000-ton rail order for the United Kingdom.

THE IRON AGE pig-iron composite price for this week is $25.86 per gross ton. This is $5 below the high point reached in March and 18c. below the figure for last week.

As for the past 10 weeks, THE IRON AGE composite price for the seven leading forms of finished steel stands at 2.789c. per lb., as against 2.446c. on Jan. 1 and 2.169c. in mid-July last year.

Pittsburgh

Steel Buying Diminishing—Pig Iron Weak, with Few Sales Recorded

PITTSBURGH, July 17.—Business in steel again is on a dwindling scale because buyers are getting ample supplies on old orders and manufacturers still having a fair amount of business upon their books are not making very active efforts to secure more. Buyers lately have become satisfied that higher prices in the immediate future are unlikely; indeed, in view of the decline in primary material, they have swung around to expectation of lower prices and any selling activity on the part of the mills just now would only serve to confirm that idea. This condition explains the absence of important price changes in the past week. Estab-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	July 17, 1923	July 10, 1923	June 19, 1923	July 18, 1922
No. 2X, Philadelphia	$27.86	$25.86	$25.36	$22.64
No. 2, Valley furnace†	*25.00*	26.00	27.00	24.00
No. 2, Southern, Cin'ti†	29.05	29.05	29.05	21.53
No. 2, Birmingham, Ala.†	25.00	25.00	25.00	18.00
No. 2 foundry, Chicago*‡	28.00	28.00	31.00	24.00
Basic, del'd, eastern Pa.	*26.50*	27.00	28.14	25.75
Basic, Valley furnace	25.00	25.00	27.50	24.00
Valley Bessemer, del P'gh	28.26	28.26	30.27	26.77
Malleable, Chicago*	28.00	28.00	31.00	24.00
Malleable, Valley	*25.50*	26.00	28.00	24.50
Gray forge, Pittsburgh	*26.86*	27.26	28.27	25.27
L. S. charcoal, Chicago	36.65	36.65	36.65	31.65
Ferromanganese, furnace	*117.50*	120.00	125.00	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	35.00
Forging billets, bars, P'gh	47.50	47.50	47.50	40.00
O.-h. billets, Phila	47.67	47.67	50.17	40.17
Wire rods, Pittsburgh	51.00	51.00	51.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.45	1.70
Light rails at mill	2.25	2.25	2.25	1.75

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.72	1.925
Iron bars, Chicago	2.50	2.50	2.50	1.90
Steel bars, Pittsburgh	2.40	2.40	2.40	1.70
Steel bars, Chicago	2.60	2.60	2.60	1.75
Steel bars, New York	2.74	2.74	2.74	2.04
Tank plates, Pittsburgh	2.50	2.50	2.50	1.70
Tank plates, Chicago	2.80	2.80	2.80	1.75
Tank plates, New York	2.84	2.84	2.84	2.04
Beams, Pittsburgh	2.50	2.50	2.50	1.70
Beams, Chicago	2.70	2.70	2.70	1.75
Beams, New York	2.84	2.84	2.84	2.04
Steel hoops, Pittsburgh	3.15	3.15	3.20	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	July 17, 1923	July 10, 1923	June 19, 1923	July 18, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.85	3.85	3.85	3.15
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.15
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.40
Wire nails, Pittsburgh	3.00	3.00	3.00	2.40
Plain wire, Pittsburgh	2.75	2.75	2.75	2.25
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.05
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$20.50*	$21.00	$21.50	$19.50
Carwheels, Philadelphia	20.00	20.00	23.00	17.50
Heavy steel scrap, P'gh	*18.00*	18.50	21.00	17.25
Heavy steel scrap, Phila	*16.50*	17.00	18.00	15.00
Heavy steel scrap, Ch'go.	*17.00*	17.25	17.50	15.50
No. 1 cast, Pittsburgh	*21.00*	21.50	23.50	19.00
No. 1 cast, Philadelphia	21.50	21.50	22.00	17.50
No. 1 cast, Ch'go. (net ton)	*19.00*	20.50	21.50	17.00
No. 1 RR. wrot. Phila	*18.00*	19.00	23.00	17.00
No. 1 RR. wrot. Ch'go. (net)	14.50	15.00	15.50	13.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$4.50*	$4.75	$4.75	$11.00
Foundry coke, prompt	*5.25*	5.50	5.50	11.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**15.00**	14.87½	15.37½	14.00
Electrolytic copper, refinery	**14.50**	14.25	14.87½	13.75
Zinc, St. Louis	**6.12½**	6.05	6.00	5.75
Zinc, New York	**6.47½**	6.40	6.35	6.10
Lead, St. Louis	**5.90**	5.70	6.95	5.50
Lead, New York	6.00	6.00	7.25	5.75
Tin (Straits), New York	*38.00*	38.25	40.25	31.50
Antimony (Asiatic), N. Y.	**6.85**	6.75	6.75	5.00

Composite Price July 17, 1923, Finished Steel, 2.789c. Per lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	These products constitute 88 per cent of the United States output of finished steel	July 10, 1923,	2.789c.
		June 19, 1923,	2.789c.
		July 18, 1922,	2.169c.
		10-year pre-war average,	1.689c.

Composite Price July 17, 1923, Pig Iron, $25.86 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham		July 10, 1923,	$26.04
		June 19, 1923,	28.21
		July 18, 1922,	23.61
		10-year pre-war average,	15.72

lishment of the 8-hr. day in the steel industry will bring about increased manufacturing costs, but the extent of the increase still is uncertain, as is also the time when the change can be effected, and so far there is little concern among buyers as to the possibility of higher prices.

Finishing mill operations no longer are running in excess of steel works activities; indeed, there having been only a slight decline in ingot production against a fairly substantial one in finishing mill operations, there now is some surplus of unfinished steel and the market in that direction shows unmistakable signs of an easier tendency. A northern Ohio mill recently took about 1500 tons of slabs at $40, mill, and buyers claim ability to secure billets, sheet bars and slabs at the same figure f.o.b. Pittsburgh or Youngstown. There is really not enough going on in semi-finished steel to clearly define prices.

Efforts to check the downward tendency of pig iron prices have not met with much success, because the only demand that is developing is from buyers who believe that the market is at bottom and there are not many buyers who believe that at present, while producers who have iron for sale are a little anxious to sell it.

Scrap prices continue to recede and since curtailment of coke production has been accompanied by a smaller consumption due to the falling away in blast furnace activities, that market does not show much strength. The coal market shows a stronger tendency, not because of any material increased demand, but rather because there has been a drastic curtailment of production.

Pig Iron.—Buyers evidently are not yet convinced that bottom has been reached, and business over the past week in this market has been even lighter than it was the week before. Pressure to sell the steel-making grades possibly is not so heavy as it was recently, but considerable competition has developed on a few inquiries which have come out lately for foundry iron, which has forced a decline of as much as $1 a ton in the price of that grade. The market also is soft on malleable iron. This grade is offered at $25.50, Valley furnace, and while some producers still are asking $26, sales are lacking at either figure. The Link Belt Co. has closed for 3000 tons for its Indianapolis plant and

it is understood that this tonnage was placed at a delivered price of slightly under $27 and that the iron will come from a Cleveland furnace. We note sales of Bessemer iron aggregating about 400 tons at $26.50, Valley furnace, or Valley furnace basis. Pittsburgh melters were the buyers. No important sales of basic iron are reported. All producers are publicly quoting $25, furnace, on this grade, but iron held by middlemen is offered for less, there being one lot of 7000 tons which is offered at $24.50, and the entire lot probably could be bought at $24. Business in foundry iron has been almost entirely in small lots, and at prices ranging anywhere from $25 to $26. The lower figure is not being quoted by any of the furnaces, but is being developed by definite offers from buyers. Westinghouse Electric & Mfg. Co. wants 600 tons of foundry iron. The Valley maker of low phosphorus iron has reduced his price to $34, furnace, for copper free iron, while the Bethlehem Steel Co. is quoting $33, Lebanon, and as low as $29, furnace, is named by another Eastern interest having a large stock of this iron for sale. Fannie furnace of the M. A. Hanna Co., West Middlesex, Pa., has been blown out.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.50 to 25.50
No. 2 foundry	25.00 to 26.00
No. 3 foundry	24.50 to 25.50
Malleable	25.50 to 26.00
Low phosphorus, copper free (nominal)	34.00

Ferroalloys.—Recent reduction of $7.50 a ton by British makers of ferromanganese has been met by domestic producers, and the common quotation now is $117.50. There is no more demand at the lower figure than at the former quotation because consumers in this district are well covered against their requirements for the remainder of the year, and shipments on contracts are free and full. Some doubt exists that even the reduced quotation can be maintained because considerable quantities of both domestic and imported material are in the hands of middlemen and can be bought at less than quotations. Interest in the other ferroalloys also is very limited. There is no quotable change in prices, but there is so little being done that they are altogether untested. Prices are given on page 177.

Semi-Finished Steel.—Makers still are holding to recent prices on billets, sheet bars and slabs, but there is almost no demand and quotations find practically no basis in sales. Finishing mill operations have decreased to a relatively greater extent than ingot production, and there is not a mill in the district that does not have some accumulation of semi-finished material. Non-integrated manufacturers are well stocked and are sparing both in specifications and in their purchases. They note that pig iron has gone off $6 a ton or more in price from the high point of the early part of the year and that there has been a drop of $9 a ton in scrap, while current prices of semi-finished steel are practically the same as those which ruled on the bulk of the shipments during the second quarter. Users of forging billets seem to have settled upon $47.50 base as their maximum price idea, and efforts to obtain more are meeting with little success. There are also some accumulations of wire rods at local mills, due to the fact that makers are not operating their finishing departments as heavily as formerly, while those who are producers who buy their rods also are in a quieter time. The common quotation still is $51 base, but this price is largely nominal. The skelp market is weak at 2.40c., with almost no demand. Plate mills are not fully taxed by demands from plate users, and to keep them going more or less, skelp is being produced. A sale of 1500 tons of slabs for shipment West is noted at $40 for a northern Ohio mill. It is believed that a firm bid of $40, Pittsburgh or Youngstown, would uncover slabs, sheet bars and billets at mills in those districts. Prices are given on page 177.

Wire Products.—Demand still is quiet as regards both orders and specifications. A good many consumers as well as distributors are engaged in taking semi-annual inventories and consequently are not adding to their commitments. The trade expects business to revive considerably in the next 30 days. Mills are catching up pretty steadily with their old orders, but this has caused no softening of prices, although there is more eagerness for specified orders and a few contracts with large jobbers are being entered. Prices are given on page 176.

Steel Rails.—Makers of light rails, rolling them from new billets or new standard rail crops, still are holding to 2.25c. base, and claim they are obtaining that price on such business as they are doing. Their orders, however, are pretty limited, due to the fact that operations of commercial coal mines are not much in excess of 50 per cent of capacity, while they also have considerable competition from rerolled rails, which are quoted at 2.15c. base, and even as low as 2.10c. base. The local rail unit of the Steel Corporation is committed against production over practically all the remainder of this year, and on such standard rail inquiries as have been received, late fourth quarter shipment is the earliest promise. Much tonnage taken for delivery over the first six months of this year still is to be shipped.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2.10c. to 2.15c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Tubular Goods.—Strictly new business in both steel and wrought iron pipe and tubes is very limited, but the uniform report of producers is that buyers are taking all the material due them on old orders and that pressure for deliveries against merchant pipe orders is really heavy. Some makers of steel pipe claim to be sold solidly for the next three or four months, but there are others who can make deliveries as quickly as four and six weeks, and in half that period on plain end line pipe. Discounts given on page 176.

Sheets.—Independent manufacturers who announced two base prices on blue annealed sheets when they opened their books for third quarter business, quoting 3.25c. base for No. 13 gage and lighter and 3c. for No. 12 gage and heavier have quite generally abandoned the differential for light gage material, and have written down such 3.25c. business as they had taken to 3c. base. The general situation shows no particular change. Buyers are well covered by orders or contracts for the present quarter, and as they are getting ample shipments against them, their current purchases are very small. In the main, the regular market prices are fairly well observed. Competition from plate mills is believed to be responsible for the revision and adjustment of prices of blue annealed sheets. Mill operations have come back somewhat from the holiday suspensions but still are below the June rate, which for the industry as a whole, was slightly under 80 per cent. Prices are given on page 176.

Tin Plate.—Hot weather is having the usual effect upon the efficiency of workmen, and production is not nearly so large as it should be with the demand unusually heavy, particularly from the makers of perishable food containers. Most mills are giving shipping preference to this class of material, but at that are not satisfying their customers, and there is a strong possibility of a pinch in the supply before the packing season is over. Stock tin plate is scarce. The market may be regarded as firm at $5.50 per base box Pittsburgh.

Bolts, Nuts and Rivets.—Buyers are exerting considerable pressure for shipments against old orders in bolts and nuts, but new buying is very limited. This statement is equally true about rivets, and while prices show no change, concessions are being offered against desirable business. Prices and discounts are given on page 176.

Cold-Finished Steel Bars and Shafting.—While buyers are specifying fairly well against contracts and orders already in with the makers, new business is very light. Makers continue to quote 3.25c. base, Pittsburgh, for carload lots, and are pretty firm at that figure, but this condition is due more to the higher costs of hot-rolled bars, embodied in the new card of extras recently adopted, than to the size of the current demand for cold-finished bars. Ground shafting is unchanged at 3.65c. base, f.o.b. mill.

Hot-Rolled Flats.—Explanation for a quotation as low as 3c. base for hot-rolled strips is partly found in competition from plate mills. Demand for plates from tank, car and shipbuilders is not sufficient to fully engage the capacity and, as a fill-in tonnage, material which could be classed as plates, skelp or heavy gage strips is being taken. This is a common occurrence in dull markets and manufacturers need the tonnage to keep their plate mills going. Most of the independent companies still regard 3.30c. base as the regular market price not only on hot-rolled strips but on hoops and bands. Not much business is on mill books at that figure, however, and current orders and specifications are only fair. The Carnegie Steel Co. is quoting 3.15c. base on these several products. Specifications against cotton tie orders are reported to be good, although shipments since July 14 carry the higher rates in effect to most Southern points. Prices are given on page 176.

Cold-Rolled Strips.—Trading is rather slow in this product. New demands are moderate, and buyers are specifying against contracts sparingly. Independent makers still are quoting 5.25c. base, while the Steel Corporation price is 5c. base.

Track Fastenings.—Manufacturers are well supplied with business in all products under this heading except small spikes, and while new business is of moderate proportions, there is not much tendency to stimulate it by cutting prices. Low rate of commercial coal mine operations explains the dullness in small spikes. Prices are given on page 176.

Iron and Steel Bars.—Current demands for steel bars are few and small because buyers are getting ample supplies on contract shipments. There are no intimations of price cutting in merchant bars, but it is reported that as low as 2.25c. recently was done on a large lot of reinforcing bars. Independent bar makers generally have adopted the card of extras recently issued by the Carnegie Steel Co. There is no change in iron bars, but demand is very light.

> We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—There is no change in prices, but mills generally are advancing their promises of deliveries against new business. Prices are given on page 176.

Plates.—Inquiries are fairly numerous, but generally run to small tonnages. Evidently there is not enough business to fully engage plate capacity, as strip makers ascribe low prices on their product to plate mill competition and recent passing of the differential on light gage blue annealed sheets probably is due in part to the need of fill-in tonnage for the plate mills. Since the price of 2.50c. base, Pittsburgh, carries very prompt delivery, there is an impression that on a large tonnage on which shipment could be made at convenience of the mill, a lower price would come out. Prices are given on page 176.

Cut Nails.—Leading manufacturers have announced a cut of $3 per ton to the base of $3.25 f.o.b. mill in carload lots.

Coke and Coal.—Coke prices are still soft despite the fact that there has been a considerable let-down in production. The weakness of the pig iron market makes uncertain continuous operation of a number of furnaces now in blast, and those producers who do not contract for third quarter tonnages continue to meet their requirements by spot purchases. Some coke has been thrown back upon the market as the result of blast furnace suspensions which have recently occurred, and disposal of this coke is possible at low prices. Sales have been made of such coke as low as $4.25 per net ton at mines, while on fresh production the spot market is quotable from $4.50 to $5. The contract market on furnace grade based on the last business of this sort is $4.75. Spot foundry coke is quotable from $5.25 to $5.75, a drop of 25c. a ton from last week's prices, while last half contracts are being placed at $6.50 generally. With commercial coal mines in this district not operating on an average more than three days a week, and a large number of mines entirely idle, there is less competition for passing business and this has resulted in slightly firmer prices. We make no change in steam coal, which still ranges from $1.75 to $2 for mine run grade, but on coking coal the market is not below $2.25, while on gas coal $2.50 has become the prevailing price. Steam slack generally is held at $1.25 and gas slack at $1.50.

Old Material.—Still further recessions in scrap prices have occurred since a week ago due to the fact that there has been no increase in the consumptive demand, while dealers obliged to take tonnages on purchases or contracts, which must be sold or thrown down on their yards, find they must go pretty low to make sales. In the past week, there was one sale of heavy melting steel at $19.50 at Butler, Pa., while we also note sales of this grade for Monessen, Pa., delivery at prices ranging from $18 to $18.50. A dealer who participated in a large sale to a local mill several weeks ago claims to have bought this grade of material against that sale as low as $17.50. This evidently was a small "distress" tonnage, because dealers, as a rule, are not willing to sell below $18. Other open-hearth grades show a decline corresponding to that of heavy melting steel, but the new prices are merely appraisals and not based on sales. The most recent business in short shoveling turnings was at $16. It is commented upon that a very much better average quality of material is being offered at today's prices than was being shipped when the market was on a much higher level. This is probably explained by the fact that the dealers are absorbing the railroad offerings, and do not consider prices low enough to put all of their purchases through the yards. There are some mills in this district which regard the kind of heavy melting steel now to be had at $18 to $18.50 as a good investment regardless of immediate changes in prices. The spread between heavy melting steel and basic pig iron also is wide enough to make the latter look pretty cheap by comparison.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$18.00 to $18.50
No. 1 cast, cupola size	21.00 to 21.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 19.50
Compressed sheet steel	16.50 to 17.00
Bundled sheet sides and ends	15.00 to 15.50
Railroad knuckles and couplers	21.00 to 21.50
Railroad coil and leaf springs	21.00 to 21.50
Low phosphorus standard bloom and billet ends	23.00 to 23.50
Low phosphorus plates and other grades	22.00 to 22.50
Railroad malleable	18.50 to 19.00
Steel car axles	21.50 to 22.00
Cast iron wheels	20.00 to 20.50
Rolled steel wheels	21.00 to 21.50
Machine shop turnings	12.00 to 13.00
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.50 to 16.00
Cast iron borings	15.50 to 16.00
Heavy breakable cast	17.50 to 18.00
Stove plate	15.00 to 15.50
Sheet bar crop ends	21.00 to 22.00
No. 1 railroad wrought	15.00 to 15.50

Western Fluorspar Deposits

Results of an examination of the various Western fluorspar deposits made by R. B. Ladoo, mineral technologist of the Department of the Interior, are set forth as follows in Serial 2480, just issued by the Bureau of Mines. The production of acid fluorspar west of the Mississippi River from ore bodies now known probably will not exceed 100 tons annually. It is believed that not over 3000 tons of ground fluorspar can be annually produced, of which one-third will be low grade. It was estimated that the properties visited in the Western States can produce for a few years a maximum of 13,000 tons annually of a grade of gravel analyzing on an average 5 per cent or higher in barite, and a maximum of 4000 tons of fluxing lump. The farther Western steel mills, on account of the difficulty of obtaining fluorspar in gravel form, have been accustomed to use in their open-hearth furnaces both lump and gravel. Western mills likely will go on using Western fluorspar on account of high freight rates.

Chicago

Specifications Are Still Heavy, But Buying Is Not Brisk

CHICAGO, July 17.—Despite the usual midsummer lull in the placing of new tonnage, Chicago district mills are receiving liberal specifications on contracts. Present definite orders on the books indicate a pretty full operation throughout the next three or four months, and it is expected that enough new tonnage will drift in during the next month or two to assure continuity of the present rate of operation throughout the year. Without any marked change for the better, there have been several indications during the past week that the lethargy of buyers as regards new business is gradually disappearing. Most of the new tonnage is in structural steel lines, and the volume of work which has been placed in the past week is unusual for this season of year.

Including 7000 tons for the new plant of the Ford Motor Co. at St. Paul, Minn., which will be placed probably within a day or two, the total volume of fabricated steel work reported to Chicago offices during the week exceeds 18,000 tons.

New demand for the steel products used mostly by manufacturing consumers, such as plates, bars, sheets, etc., is not brisk, but the Chicago mills are being pressed for deliveries on contracts. Surprisingly little letup in demand from automobile companies and railroads has developed, and in fact the leading interest reports that the pressure for deliveries of steel from these sources is as acute as at any time this year. Companies engaged in drop forging work, especially those catering to automobile companies, are especially insistent on hurrying shipments.

Steel plant operations continue at about the same rate reported a week ago. The Illinois Steel Co. has blown out its No. 1 furnace at Joliet, Ill.

Pig Iron.—The first signs of an awakening interest among buyers of pig iron have come within the past week, but there are still no indications of a buying movement. A few inquiries have been received, one for 2500 tons of foundry iron for delivery over the remainder of the year, another for 1000 tons and a few others for smaller amounts, probably, a total of not to exceed 5000 or 6000 tons. However, this is more inquiry than the local trade has had to figure on at any one time in several weeks. Quoted prices remain unchanged at $28 for No. 2 foundry, Chicago furnace, and while sellers believe that the bottom has been reached, it remains true that the prevailing prices have as yet had no real test. Southern iron has shown a little more weakness, sales having been made for delivery at points outside of Chicago at $24.50, Birmingham, while speculative iron has been offered as low as $24. Local pig iron offices are expecting an announcement of lower prices on Lake Superior charcoal iron, but just when the expected reduction will be made or how much it will be, are not known. Copper free low phosphorus iron is now available at about $35.50 to $36, delivered Chicago.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.65
Northern coke, No. 1, sil. 2.25 to 2.75	28.50 to 29.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	28.00 to 28.50
Malleable, not over 2.25 sil.	28.00 to 28.50
Basic	28.00
High phosphorus	28.00 to 28.50
Southern No. 2	30.51 to 31.01
Low phos., sil. 1 to 2 per cent, copper free	35.50 to 36.00
Silvery, sil. 8 per cent (nominal)	43.29

Plates.—The Chicago Bridge & Iron Works has taken another contract from the Sinclair Crude Oil Purchasing Co. for 10 80,000-bbl. oil tanks to be erected at Mexia, Texas, for which 3000 tons of steel, mostly plates, will be required. Railroad car buying is light, but railroads are specifying freely on contracts to provide material for car repairs. Pittsburgh and Youngstown plate mills, although anxious for business, are taking very little in this territory, as Chicago mills, though pretty well filled up, are generally able to find rollings that are acceptable to customers. The mills east of here are also out of it on account of price as they are quoting 2.84c. per lb., delivered Chicago or nearby, which compares with 2.60c. f.o.b. Chicago mill.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Ferroalloys.—Foreign ferromanganese is being offered by British selling agents at $117.50, New Orleans, with a freight rate to Chicago of $7.56, but resale ferromanganese has been offered at $115, New Orleans, and 50 per cent ferrosilicon is available at $90, delivered, though some producers still hold their price at $92.

We quote 80 per cent ferromanganese, $125.06 to $125.88 for all deliveries; 50 per cent ferrosilicon, $92.50, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Rails and Track Supplies.—The Pere Marquette Railroad has placed 10,000 tons of 90 lb. rail, of which 5000 tons will be rolled by the Illinois Steel Co., 4000 by the Bethlehem Steel Co., and 1000 by the Inland Steel Co. Formal contracts have been entered into by the New York Central Lines for the 150,000 tons of rails for which reservations were made a few weeks ago. The Illinois Central has also placed contracts for a part of the 60,000 tons it reserved. The inquiry of the Chicago, Burlington & Quincy for 40,000 tons is still pending, but will probably be closed soon. Two inquiries from industrial railroads in Texas, one for 2000 tons and the other for 1000 tons, are being quoted on by local mills. Inquiry for track supplies is fairly heavy for this time of year. The Chesapeake & Ohio and the Pennsylvania railroads are each in the market for about 1000 tons of tie plates. The Southern Pacific requires 5000 kegs of spikes and the Chicago, Milwaukee & St. Paul, 1000 kegs, while the Chicago, Burlington & Quincy will shortly be in the market for a fairly large lot of spikes and track bolts. An export inquiry for 500 tons of tie plates is active but the business probably will not come to a Chicago mill because of freight disadvantage in shipping to seaboard.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills. Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—A substantial volume of structural steel tonnage has been placed in the past week, considering the reported let up in building construction and the fact that this is between seasons of normal activity. Including the 8000 tons for the Ford Motor Co.'s new plant at St. Paul, which probably will have been let before this issue goes to press, a total of more than 28,000 tons for the week strikes a high average for July business. Close to 2000 tons for the sub-structure of the new Chicago Tribune Building was taken by the American Bridge Co. Two electric power plants at St. Paul just awarded require a total of more than 6000 tons.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—There is very little new bar tonnage coming to the mills but specifications on contracts are fairly good and the mills have a place to ship every ton that is being rolled. Prices remain steady.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.50c. to 2.60c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Sheets.—Specifications on contracts have come in to one or two mills this week at a rate higher than expected. There is little, if any, weakness in prices and on galvanized sheets in particular the market appears to be particularly firm due to the disinclination of some mills to take on more business at 5c. per lb, Pittsburgh, because of the high cost of galvanizing. An advance in spelter within the past week has added some strength also to the galvanized sheet price.

Mill quotations are 3.85c. for No. 28, black 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 51c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Wire Products.—Although demand for wire nails from the cities where building construction work is active continues good, the country districts are not supplying much business. New business is light in volume, but production, which has fallen off slightly, is not keeping pace with requests for shipments on contracts, and some mills are considerably behind.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.95 per 100 lb.; cement coated nails, $3.25 per keg.

Bolts and Nuts.—Although discounts are generally on the basis of 50, 10 and 10 per cent off list on large machine bolts, occasional desirable orders are being taken by one or two sellers at slightly higher discounts. Specifications are not coming in as freely as desired, but the first month of a quarter usually finds this condition, as the carry over from the previous quarter is taking care of current requirements in most instances.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to ⅝ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅝ x 6 in., 40 and 5 off; larger sizes 10 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Warehouse Prices.—Local steel jobbing houses have put into effect the same extras as the mills have recently adopted on steel bars and bar size shapes.

Cast Iron Pipe.—The city of Chicago took bids on July 16 on 500 tons of 8-in. class B pipe and Dayton, Ohio, closed bids July 17 on 400 tons of 10-in., 100 tons of 6-in. and 40 tons of 3-, 4- and 8-in. Jerseyville, Ill., has placed 600 tons, mostly 10-in. pipe, with the United States Cast Iron Pipe & Foundry Co. Most of the cast iron pipe foundries are operating at a full rate. Prices are firm.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $58.20 to $59.20; class A and gas pipe, $5 extra.

Reinforcing Bars.—Buying is slowly receding, and while a few important concrete bar dealers are not active in the market because of their heavy backlogs, competition is, nevertheless, growing keener and it is doubtful whether any current orders are being placed at more than 3c., Chicago warehouse. Bar sellers are experiencing little difficulty in obtaining deliveries from the mills.

Lettings include:

Liberty Memorial Building, Kansas City, Mo., 800 tons to Kansas City Bolt & Nut Co.

Drainage project, Riverdale, Ark., 250 tons to Pigeon-Thomas Co., Memphis, Tenn.

Headhouse and concourse, Chicago Union Station Co., Chicago, 190 tons to Inland Steel Co.

Pending business includes:

City of Chicago, bridges over the Chicago River at California Avenue and Adams Street, 360 tons.

Fourteenth Street viaduct, St. Louis, 1100 tons, contract about to be placed.

Old Material.—Railroad offerings of nearly 13,000 tons of scrap are now before local consumers and scrap dealers, and this with the scrap that is being offered from other sources, coupled with the fact that there is very little demand, has further weakened the scrap market. Prices on nearly all grades are off 50c. or more a ton. The Rock Island Lines offer 3400 tons of scrap, bids closing July 19, the Wabash list has about 3200 tons, bids closing July 18, the Illinois Central offers 1000 tons of rails, bids closing July 18, the Chesapeake & Ohio will close bids July 19 on 4000 tons, the Soo Lines have 250 tons to move and George W. Jennings, Inc., has 1000 tons of railroad steel on which bids close July 19. There is no sign of strength in the market and consumers and dealers are equally at a loss to determine when a recovery in demand and prices may be expected.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$22.00 to	$22.50
Cast iron car wheels	20.50 to	21.00
Relaying rails 56 and 60 lb.	28.50 to	29.50
Relaying rails, 65 lb. and heavier	32.00 to	35.00
Rolled or forged steel car wheels	20.50 to	21.00
Rails for rolling	18.00 to	18.50
Steel rails, less than 3 ft.	19.50 to	20.00
Heavy melting steel	17.00 to	17.50
Frogs, switches and guards cut apart	17.00 to	17.50
Shoveling steel	16.50 to	17.00
Drop forge flashings	11.50 to	12.00
Hydraulic compressed sheets	14.25 to	14.75
Axle turnings	14.50 to	15.00
	Per Net Ton	
Iron angle and splice bars	22.00 to	22.50
Steel angle bars	15.50 to	16.00
Iron arch bars and transoms	22.00 to	22.50
Iron car axles	26.00 to	26.50
Steel car axles	18.00 to	19.00
No. 1 busheling	13.25 to	13.75
No. 2 busheling	10.50 to	11.00
Cut forge	15.50 to	15.50
Pipes and flues	11.00 to	11.50
No. 1 railroad wrought	14.50 to	15.00
No. 2 railroad wrought	15.00 to	15.50
Steel knuckles and couplers	18.75 to	19.25
Coil springs	20.00 to	20.50
No. 1 machinery cast	19.00 to	20.00
No. 1 railroad cast	18.50 to	19.00
No. 1 agricultural cast	18.50 to	19.00
Low phos. punchings	16.50 to	17.00
Locomotive tires, smooth	15.50 to	16.00
Machine shop turnings	9.50 to	10.00
Cast borings	12.00 to	12.50
Short shoveling turnings	12.00 to	12.50
Stove plate	14.50 to	15.00
Grate bars	13.00 to	13.50
Brake shoes	14.00 to	14.50
Railroad malleable	20.00 to	20.50
Agricultural malleable	19.00 to	19.50

Decreasing Blast Furnace Operations in the Valleys

YOUNGSTOWN, July 17.—An accumulation of pig iron and the decreasing cost of scrap is tending to check blast furnace operations in the Mahoning and Shenango Valleys. Among the stacks particularly affected are merchant furnaces dependent on the market for coke supplies, and the least efficient units among steel makers' furnaces.

Two of the detached stacks of the Carnegie Steel Co. in this district are inactive, one at Niles and the other at Sharon. The Hannah furnace at Youngstown of the Republic Iron & Steel Co. is also idle. Both the Republic company and the Youngstown Sheet & Tube Co. are preparing furnaces for suspension during relining.

A number of merchant stacks have been banked in this district, leaving 39 furnaces active out of 46.

A factor in this situation is the decline in the price of old material. Heavy melting scrap, for instance, has dropped from a high of $28.50 to about $18.50, and consequently is being used in the open-hearth in larger tonnages than heretofore, replacing pig iron.

Sheet mill operations are accelerated this week, with the plants of the Newton Steel Co. and the Mahoning Valley Steel Co. again active, following idleness in the past two weeks for repairs and inventory.

Sheet mills in this district were scheduled for operation at the beginning of the week as follows: Youngstown Sheet & Tube Co., 42; Newton Steel Co., 17; Trumbull Steel Co., 15; Sharon Steel Hoop Co., 9; Republic Iron & Steel Co., 8; Mahoning Valley Steel Co., 7, and Falcon Steel Co., 6, or a total of 104.

Of 51 independent open-hearth furnaces in the Mahoning Valley, 45 were scheduled this week.

New York

Some Increase in Inquiry for Pig Iron, But Sales Are Few and Prices Low

NEW YORK, July 17.—The pig iron market has shown greater activity during the past week than for a month or more. The Burnham Boiler Co. is in the market for 5700 tons of No. 2X and No. 2 plain for delivery, as follows: At Irvington, N. Y., 3000 tons; Elizabeth, N. J., 2300 tons; Lancaster, Pa., 400 tons, all for the last half of this year. The Connecticut Foundry Co. is in the market for 1000 tons of No. 1X for last quarter. The former inquiry of W. M. Crane has been withdrawn and he is now in the market for 300 tons of No. 1X for prompt delivery. Another inquiry has come from the Gould Coupler Co., Depew, N. Y., for 2000 tons of malleable and 2000 tons of foundry, although an inquiry for the same tonnage was recently reported as closed. Sales have, however, been few and prices are low. At Buffalo $25 is the ruling quotation on No. 2 plain, with quotations in eastern Pennsylvania ranging from $26 to $26.50, while in Virginia $27 is still quoted. Despite the increased inquiry, the market has not gained strength.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 2X fdy., sil. 2.75 to 3.25	$29.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	28.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	28.27
Buffalo, sil. 1.75 to 2.25	27.91
No. 2X Virginia, sil. 2.25 to 2.75	32.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Cast-Iron Pipe.—The situation is unchanged as far as makers of pressure pipe are concerned. Foundries are well booked for the next couple of months and prices are firm. The difficulties encountered in obtaining labor are the only obstacles to full operation. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.30; 4-in. and 5-in., $67.30; 3-in., $77.30, with $5 additional for Class A and gas pipe. In sharp contrast to the market on pressure pipe, foundries producing soil pipe report extreme dullness and marked irregularity in prices. Quotations today are only nominal, with some Southern makers seeking tonnages at unusual increases in discounts. But little business is reported, however, buyers evidently preferring to await any further decline that may occur. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in. standard, 28 to 30¾ per cent off list; heavy, 38 to 40¾ per cent off list.

Warehouse Business.—The market is extremely quiet in all lines and prices, with the exception of sheets, substantially unchanged. The black and galvanized sheet market continues weak, with black sheets ranging in price from 4.65c. to 5c. per lb. base, and galvanized from 5.65c. to 6c. per lb. Still lower prices are reported to have been made occasionally. The range of prices that has recently prevailed on cold-rolled shafting has been eliminated by an increase put into effect by several sellers from stock who had continued on the old basis when one large factor in this market raised prices to 4.65c. per lb. for rounds and 5.15c. per lb. for squares, flats and hexagons. The prices out of stock for tin plate have been revised in accordance with changes made by the mills. Discounts on wrought iron and steel pipe are the same, but there are continued reports of shading by some sellers from stock. Brass and copper products are unchanged. We quote prices on page 192.

Finished Iron and Steel.—Extreme dullness pervades the entire market, with practically no new business or inquiry of consequence in any of the leading products. Several sellers characterize conditions as seasonal and likely to continue for several weeks. Sales representatives of most of the steel companies do not detect any easing in prices and do not expect any. With the exception of a slight drop in quotations for black sheets, noted a week ago, the price situation remains fairly firm. Consumers of galvanized sheets are reported as looking for lower prices, and their policy seems to be to purchase their limited needs from warehouses at 5.50c. rather than to contract with the mills on a basis of 5.34c. In steel plates almost no business is reported, and the basis price of 2.50c. has not been as yet shaded, partly because there has been no test of the market. There have been occasional sales of steel bars in small lots to consumers needing them for filling-in purposes, but on other leading products there has been practically no activity. New business in concrete bars is reported to continue at a standstill. The only activity of any consequence has been in inquiries for projects involving structural material. In this district new projects have been brought to the attention of fabricators involving over 14,000 tons, but actual business awarded has scarcely exceeded 4000 tons. The feature of the inquiries is over 10,000 tons for tanks for two large oil companies. Details are noted on other pages. The railroads are still entirely out of the market so far as new cars are concerned.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c. to 2.84c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Ferroalloys.—There is practically no demand for ferromanganese and the market is more inactive than in many weeks. Prices are unchanged at the new quotation of $117.50, seaboard, for the British alloy, and it is presumed that domestic makers would meet this price on any business offered. It is understood, however, that the new price has not yet been established by sales. There seems to be an entire lack of business or inquiry. In the spiegeleisen market the same condition prevails as in the ferromanganese. Prices, however, remain the same as for several weeks, or $45 for the 20 per cent alloy and $44, furnace, for the 19 per cent. Sales of 50 per cent ferrosilicon are also exceedingly light, although deliveries on contract are fairly heavy. New business is so small that it is difficult to ascertain the actual price level. Business is stated to have been done as low as $84, delivered. New business in the ferrochromium market is at unchanged prices.

Coke.—The coke market is slightly firmer. Standard foundry coke in prompt carloads is quotable at from $5.75 to $6.25 per ton and higher, with Keystone and similar high-grade brands at $7 on contracts in open cars and $7.25 delivered in box cars. Standard furnace coke is also firmer at $4.75 to $5.25 per ton. By-product coke is unchanged at $11.34 to $11.41 Newark and Jersey City points.

Old Material.—Weakness continues in most grades, and as a result of the difference in freight rates railroad quality being shipped to Bethlehem on a $2.65 rate compared with $3.78 to other eastern Pennsylvania consumers, the price, f.o.b. New York, is from $13 to $13.50 per ton for both No. 1 heavy melting steel and railroad or equivalent. A fair estimate of the market on forge fire is from $9.50 to $10 per ton, New York, one broker offering $13.25 per ton, delivered Phoenixville, Pa. Machine shop turnings and borings and turnings are active, but buying prices are low, turnings being quotable at $10.50 to $11 per ton, and borings and turnings at $9.50 to $10.50 per ton.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$13.00 to $13.50
Steel rails, short lengths, or equivalent	13.00 to 13.50
Rails for rolling	16.00 to 18.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	20.00 to 21.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	16.50 to 17.00
Wrought iron track	15.50 to 16.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	15.00 to 15.50
Cast borings (clean)	11.50 to 12.00
Machine-shop turnings	10.50 to 11.00
Mixed borings and turnings	9.50 to 10.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.75 to 11.25
Stove plate	12.75 to 13.75
Locomotive grate bars	13.00 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.50 to $21.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	19.50 to 20.00
No. 1 heavy cast, not cupola size	17.50 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	15.50 to 16.00

Cincinnati

Pig Iron Prices Still Declining on Sales of Small Tonnages

CINCINNATI, July 17.—On small lot business, pig iron prices continue to decline, particularly on Northern irons. The market in southern Ohio has reached $26, Ironton, this price having been quoted on an inquiry for 3000 tons of malleable sent out by an Indiana melter. Whether this price can be shaded is problematical, but there are some in the trade who believe the market will reach $25 before there is an upturn. There is more strength comparatively to the Southern market, but $25, Birmingham, can still be done, and it is said that the higher silicons have been sold at this price. However, as yet no seller has gone below $25 for the base grade. The market was dull last week. A nearby melter bought 600 tons of Northern at $26.50, Ironton, and several hundred tons of high silicon Southern at $25.50, Birmingham, which figured back would mean approximately $24.50, base. Two sales to Michigan melters, 1000 and 700 tons respectively, of Northern iron were also made, at prices around $27, furnace. There is little new inquiry, and interest is centered on the two Indiana inquiries reported last week, and which will likely be closed this week. Two silvery furnaces in Jackson County have been banked, and one large foundry producer is reported to be preparing to bank within the next few days.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$29.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	29.55
Ohio silvery, 8 per cent	40.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	28.27
Basic Northern	27.27
Malleable	28.27

Finished Material.—There seems to be an improved demand for specialties, such as bolts and nuts, track fastenings, frogs and switches, and such items, but in the heavier rolled products orders, while a little improved, are still comparatively light. The railroads have been good buyers in this district during the past week. A better demand for sheets is reported, and though mills are well sold up for full third quarter, they manage to take on a little extra tonnage from time to time as regular customers demand it. Inquiry is heavier for sheet steel, and mills are being pushed a little harder for deliveries, particularly those mills which show evidences of falling behind on shipments. There is little evidence of price cutting, and orders being placed are at the current schedules. On shapes and plates 2.50c., Pittsburgh, is the regular quotation, and on bars nothing under 2.40c. has been quoted, with small lots being booked at 2.45c. Sheet prices are firm, at 3.00c., 3.85c. and 5c. respectively for blue annealed, black and galvanized, and while reports are heard of shading of prices on automobile body sheets in the northern part of the State, mills in this section are holding firmly to the 5.35c. price. No hold-ups or cancellations for auto body stock are reported. Automobile lamp manufacturers have ordered more steel for July shipment than for any month to date this year. There is little activity in the building line that involves any considerable tonnages of structural shapes or reinforcing bars. Bids will close this week on several projects involving considerable tonnages, however, including railroad work, sheet steel piling, river boat work and office buildings. Most of these inquiries are from Southern States.

Warehouse Business.—There is still a fair demand for steel bars and small angles, and sheet demands are also fair. Nails are moving well, but wire products show evidences of slowing up. Prices are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—There is practically no activity in the coke market and sales are confined to carload lots for spot shipment. Some sellers profess to see a strengthening of prices, as some producers of medium sulphur coke have advanced 50c. over last week's quotations on standard fuel.

Old Material.—The scrap market is very quiet, and on offerings prices are off anywhere from 50c. to $1 per ton. Sales to consumers are negligible, one large dealer reporting that on Monday not a carload was sold in this territory by him. The Southern Railroad and the Norfolk & Western are offering fair-sized lists.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton
Railroad sheets	$12.50 to $13.00
Iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up	28.00 to 28.50
Rails for rolling	16.50 to 17.00
Heavy melting steel	15.00 to 15.50
Steel rails for melting	14.50 to 15.00
Car wheels	15.50 to 16.00
	Per Net Ton
No. 1 railroad wrought	12.50 to 13.00
Cast borings	10.50 to 11.00
Steel turnings	9.00 to 9.50
Railroad cast	16.50 to 17.00
No. 1 machinery cast	20.00 to 20.50
Burnt scrap	12.00 to 12.50
Iron axles	22.50 to 23.00
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	10.00 to 10.50

Birmingham

Furnaces Still Slow to Sell Pig Iron at $25—Merchant Stocks Low

BIRMINGHAM, ALA., July 17.—One Birmingham iron maker sold 40 tons last week. It was for local delivery and brought $27. Inquiry was almost nil. Alabama furnaces charging $27 have not attempted business in competitive fields. With freight added, the Birmingham price for Chicago delivered to compete with Northern iron would have to be $28, which would make the furnace price at Birmingham $22. Listlessness of the market is shown by the reported failure of entire booking of the 18,000 tons offered at $25 the past three weeks. The Alabama furnace position briefly is this: The makers have booked capacity for the third quarter and merchant iron stocks, although larger than on June 1, are less than 30,000 tons. The leading interest is practically out of the merchant iron business. The Alabama furnaces feel able to mark time a while longer waiting to see how the situation in competitive territory develops, meanwhile doing no new business and having no incentive to mark down through proffer of large tonnage. They do not try to read the future, contenting themselves with the immediate safety of the situation and waiting on developments. Labor is easier, the peak of emigration to the North having passed. There are no cancellations and little decrease in consumption, the soil pipe shops being the only field where real reduction has occurred. Outside of the Tennessee company's blowing out of the Oxmoor furnace, which was on foundry iron, there has been no decrease in iron production and none is on schedule. The future is undecipherable.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00
Basic	26.00
Charcoal, warm blast	34.00

Cast Iron Pipe.—The American Cast Iron Pipe Co., has booked 207 tons for Columbus, Ga., 951 tons for Houston, Tex., 385 tons for Clawson, Mich., and 223 tons for Gates, Tex. The National Cast Iron Pipe Co. will be producing De Lavaud pipe with four machines in August and the United States Cast Iron Pipe & Foundry Co. will have five additional machines, nine in all, installed next month. The pressure pipe base remains at $49. Soil pipe is slow at $65.

Finishing Mills.—The Tennessee company remains on double turn in all finishing mills. Fabricating plants are busy. The Virginia Bridge & Iron Co. has booked underframes for 1,000 Southern railway cars and steel bridges in Walker and Marengo counties, Ala. The Nashville Bridge Co. has booked bridges for Redwater and Normanna, Tex., and Robertdale, La. Birmingham fabricators are now enjoying a $2.20 lower freight

charge from Pittsburgh on such steel as cannot be supplied locally. Steel bars are 2.65c. Birmingham. Wire mill orders come in slowly. Production is better owing to easier labor conditions. The Tennessee company is shipping 1500 tons of plates to Port Arthur via Mobile and ocean barges.

Coal and Coke.—Alabama's half year coal production ran to 9,400,000 tons, the largest in five years, and present production is slightly over normal for the season. Brokers report a good fall prospect. Coke ranges from $8 to $9.

Old Material.—The scrap market has marked lower prices. The outgo on old contracts is good, but new business is scarce.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$16.00 to $18.00
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

St. Louis

Only One Pig Iron Inquiry of Size—Low Price Is Reported

ST. LOUIS, July 17.—Interest in the pig iron market centered the last week in the inquiry for 3000 tons of malleable of Northern make for the Link-Belt Co., Indianapolis, which had not been closed at the end of the week. It is learned that a price lower than $27, Chicago, had been quoted. There was a sale of 1000 tons of malleable of Northern make for third quarter delivery to a melter in the St. Louis territory. The St. Louis Coke & Iron Co. sold 200 tons of malleable to a Pacific Coast melter. An Evansville melter wants 200 tons of foundry iron for third quarter delivery, a Michigan melter wants 200 to 300 tons of 2.75 to 3.75 silicon Northern iron, and there are other inquiries for a carload or more. As a whole, melters are showing more interest in the market. The market is still weak, however, and further declines are expected. Southern iron is still at $25, Birmingham.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$30.16
Northern malleable, sil. 1.75 to 2.25	30.16
Basic	30.16
Southern fdy., sil. 1.75 to 2.25	30.17

Finished Iron and Steel.—The contract for 1000 tons of reinforcing bars for the Cahokia plant of the Union Electric Co. will be closed shortly. There is also an inquiry for 300 tons of billet reinforcing bars for the Santa Fe Building at Dallas, Tex. The St. Louis Terminal Railway Association bought 1000 tons of 100-lb. rails. Fabricators of structural material are still well supplied with orders, but no new inquiries of consequence are being received.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—Foundry coke is in better demand for both spot shipments and on contracts. The price for Connellsville coke ranges from $6 to $7 at the furnace, according to the brand. A little interest is being shown in domestic coke for the coming season by dealers.

Old Material.—Buying of old material is still confined to dealers, who are making a few purchases of yard stock and to cover contracts in which there should be a short interest. Consumers are not buying, and may not do so until after Aug. 15. Railroad lists continue heavy, including Norfolk & Western 10,000 tons; Wabash, 3400 tons; Illinois Central, 1000 tons of rails; Rock Island, 3000 tons; Southern Railway subsidiary, 500 tons and Clover Leaf, 250 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$19.00 to	$19.50
Rails for rolling	17.50 to	18.00
Steel rails less than 3 ft.	18.00 to	18.50
Relaying rails, 60 lb. and under	26.00 to	27.00
Relaying rails, 70 lb. and over	33.50 to	34.50
Cast iron car wheels	18.00 to	18.50
Heavy melting steel	16.50 to	17.00
Heavy shoveling steel	16.50 to	17.00
Frogs, switches and guards cut apart	16.50 to	17.00
	Per Net Ton	
Heavy axles and tire turnings	12.75 to	13.25
Steel angle bars	15.25 to	15.75
Iron car axles	25.00 to	25.50
Steel car axles	19.00 to	19.50
Wrought iron bars and transoms	19.50 to	20.00
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	15.50 to	16.00
Railroad springs	19.00 to	19.50
Cast iron borings	12.50 to	13.00
No. 1 busheling	14.75 to	15.25
No. 1 railroad cast	17.50 to	18.00
No. 1 machinery cast	18.00 to	18.50
Railroad malleable	17.00 to	17.50
Machine shop turnings	11.50 to	12.00
Champion bundled sheets	9.00 to	9.50

Boston

Pennsylvania and Buffalo Furnaces Meeting Stiff Pig Iron Competition

BOSTON, July 17.—Sales of pig iron in this territory the past week did not exceed 4000 tons, 2000 of which is reported to have been bought by a heater manufacturer from five different furnaces. Tentative inquiries are increasing, however, including two 1000-tons lots, one from a Connecticut, and the other from a Springfield, Mass., foundry. Furnaces the past week made further price concessions, which had a tendency to hold buyers back. Eastern Pennsylvania and Buffalo furnaces are now having stiff competition from Northern iron due to decidedly advantageous freight rates on the latter. Eastern Pennsylvania No. 2X has sold at $30.15 delivered, and No. 2 plain at about 50c. a ton less, while $29.91 delivered has been accepted for both grades of Buffalo iron. No. 2 plain Northern iron has been offered at $29.15 delivered, the furnace price in this instance being $26. Firm offers of $24.50 on No. 2 plain Buffalo have been turned down, an indication that furnaces will endeavor to hold the market at $25. Western Pennsylvania iron, having the same freight rate as Buffalo presumably can be bought at $26, furnace base. Virginia iron is pegged at $27, furnace base, and nothing new has developed in Alabama prices. Furnaces are more discriminating in accepting fourth quarter business and furnace storage piles are beginning to increase.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East Penn., sil. 2.25 to 2.75	$30.15 to	$31.15
East Penn., sil. 1.75 to 2.25	30.15 to	30.65
Buffalo, sil. 2.25 to 2.75	29.91 to	31.41
Buffalo, sil. 1.75 to 2.25	29.91 to	30.91
Virginia, sil. 2.25 to 2.75		32.42
Virginia, sil. 1.75 to 2.25		31.92
Alabama, sil. 2.25 to 2.75	35.10 to	37.10
Alabama, sil. 1.75 to 2.25	34.60 to	36.60

Coke.—New England foundries continue to store coke in increasing tonnages. In addition, oven interests in this territory are selling domestic coke freely, there being considerable congestion of orders on their books. Connellsville foundry fuel prices appear firmer, but foundries other than Connecticut show little interest. The position of New England foundry coke makers therefore was further strengthened the past week. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote foundry coke on a basis of $13.50 delivered within New England.

Old Material.—The market is in the doldrums. Buying is largely confined to scattered lots of material by dealers for storage purposes, there not being enough activity to keep prices from constantly seeking new low levels. Practically all purchases of heavy melting

steel the past week were at $12.50 on cars, shipping point. Turning and boring values are decidedly soft, there being no market for such materials. Shafting and axle prices also are notably soft. Machinery cast is about 50c. a ton lower due to the weakness of pig iron prices rather than to any increased desire on the part of holders to sell.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	17.00 to 17.50
Railroad malleable	24.00 to 24.50
Street car axles	21.00 to 21.50

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $13.00
No. 1 rail wrought	13.00 to 13.50
No. 1 yard wrought	12.00 to 12.50
Wrought pipe (1-in. in diam., over 2 ft. long)	8.50 to 9.00
Machine shop turnings	9.00 to 9.50
Cast iron borings, rolling mill	11.00 to 11.50
Cast iron borings, chemical	12.50 to 13.00
Blast furnace borings and turnings	9.00 to 9.50
Forged scrap and bundled skeleton	10.00 to 10.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.00 to 13.50

Buffalo

Slight Improvement in Buying of Pig Iron at Low Prices

BUFFALO, July 17.—Buying of pig iron has improved slightly this week with a better line of inquiry. Furnaces have been making some adjustments on higher-priced contracts and considerable bargaining has taken place. Some selling has taken place on a $26 base with as low as $25 having been done. Total inquiry was about 12,000 tons with sales estimated almost as high. Malleable and foundry figured mainly in the selling with two or three sales of lots over 1000 tons.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$26.00 to $27.00
No. 2X foundry, 2.25 to 2.75	25.50 to 26.50
No. 2 plain, 1.75 to 2.25 sil.	25.00 to 26.00
Basic	26.00 to 26.50
Malleable	26.00 to 26.50
Lake Superior charcoal	36.78

Finished Iron and Steel.—Some better inquiry is noted in bars, shapes and plates, with tonnage a little higher, but it has not yet developed into a real buying movement. Usual summer dullness, mills believe, will hold down the buying in heavy quantities for the next month to six weeks at least. Demand for wire products continues good with plentiful nail inquiry. A new hotel is to be constructed at Niagara Falls. It will require 1000 tons of structural steel. A new building for the General Electric Co. to be constructed near Buffalo will require a large tonnage, details of which are not yet available.

We quote warehouse prices, Buffalo, as follows:

Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—The market continues to be very dull with no evidence yet of the expected buying movement. Mills whose operating schedules indicate heavy consumption of scrap material have been showing some interest in the market, but have not reached the point of actual buying. With the adjustment of the pig iron base to a new low level, prospects are that the price of heavy melting steel will be sent down, and there will be more of an inducement for mills to replenish stocks. The prices quoted are nominal.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	24.00 to 25.00
No. 1 railroad wrought	17.00 to 18.00
Car wheels	17.50 to 18.50
Machine shop turnings	13.00 to 14.00
Cast iron borings	15.00 to 16.00
No. 1 busheling	17.50 to 18.50
Stove plate	17.50 to 18.00
Grate bars	17.00 to 17.50
Bundled sheet stampings	12.00 to 13.00
No. 1 machinery cast	20.00 to 21.00
Hydraulic compressed	17.00 to 18.00
Railroad malleable	21.00 to 22.00

Philadelphia

Production and Consumption About Equal—Pig Iron Prices Decline

PHILADELPHIA, July 17.—The fact that production and consumption continue well balanced on the whole in the iron and steel trade in this district is an encouraging sign to manufacturers. In some lines, however, there has developed an increase of shipments in excess of bookings, and this has given cause for greater caution in controlling output. The weakest spots in the market relate to pig iron and scrap. Drops in prices have occurred in both, while semi-finished and finished lines are maintaining previously established levels. The condition prevailing is attributed partially at least to seasonal dullness, though it is conceded that consumers are buying much less freely. Specifications against contracts are especially good in such products as structural material. It is hoped that the pause in buying will be only temporary, some producers predicting that it will give way within a month or so to a purchasing movement, as it is said that buyers have no stocks on hand. Fair-sized lots of foundry and basic iron have been sold, but the business was confined to only a few furnaces. Pig iron prices have declined from 50c. to $1 per ton. The scrap markets in most of the important grades have fallen from 50c. to $1.50 per ton.

Pig Iron.—Spotty conditions prevail in the market for pig iron in this district. No. 2 plain has declined $1 a ton and is now quoted at $26.76 to $27.56, delivered, while No. 1X has taken a similar downward movement and is quoted at $28.26 to $29.01, delivered, with a slightly less decline in No. 2X, now quoted at $27.56, delivered. The market has not become clearly defined. This is shown by the fact that some furnaces have taken only small lots at prices that vary somewhat, but at the same time good sized tonnages of foundry and basic iron have moved at the prices named. It is conceded that the quotations given might be shaded, however, on further attractive tonnages. Basic, declining 50c., is quoted at $26.50 to $27, delivered. Transactions in basic during the past week in this district aggregated from 2500 to 3000 tons, of which 500 tons went to the Penn Seaboard Steel Corporation, while sales of all grades of foundry iron have involved about a similar tonnage. No blast furnaces are reported to have been banked, though there is talk that this may be resorted to in the near future unless increased business comes out. Foreign iron is coming into this district in only limited quantities, and included 750 tons from Germany the past week. Prices of foreign iron also have declined from 50c. to $1 per ton.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East Pa. No. 2 plain, 1.75 to 2.25 sil.	$26.76 to $27.56
East Pa. No. 2X, 2.25 to 2.75 sil.	27.56 to 28.26
East Pa. No. 1X	28.26 to 29.01
Virginia No. 2 plain, 1.75 to 2.25 sil.	32.17 to 32.67
Virginia No. 2X, 2.25 to 2.75 sil.	32.67 to 33.17
Basic delivered eastern Pa.	26.50 to 27.00
Gray forge	27.00 to 27.50
Malleable	30.14 to 30.64
Standard low phos. (f.o.b. furnace)	30.00 to 35.00
Copper bearing low phos. (f.o.b. furnace)	32.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$26.50
Continental foundry, 2.50 to 3.25 sil.	27.50
Low phos. copper free, guar. not over 0.035 per cent phos.	34.00
Continental, phos. 1.50; sil. 2 to 3	26.50

Ferroalloys.—Sales of ferromanganese are extremely limited and involve only small lots, offerings being in excess of demand. The market is unchanged at $117.50, Atlantic seaboard, for both domestic and foreign material. Imports of ferromanganese the past week to this district totaled 750 tons, all of which came from England.

Semi-Finished Steel.—The market for billets is un-

changed from last week at $42.50, Pittsburgh, for re-rolling quality, and $47.50 to $50 for forging billets.

Plates.—Inquiry for plates has improved somewhat the past week. The Philadelphia & Reading Railroad will open bids tomorrow for 800 tons of car plates. One prominent producer is making shipments in four to six weeks, but others give shorter delivery. Inability to make earlier delivery is reported to have caused the loss of business to some requiring the longer period. Mills are operating at 85 to 90 per cent of capacity and some of them report a shortage of labor, precluding heavier production. This rate of output is due largely to specifications from locomotive and car shops against business closed several months ago rather than to new business. Plates are firm at 2.50c., base, Pittsburgh, while the maximum quotation of 2.60c. has not disappeared.

Structural Steel.—Increased demand has developed in the market for structural material, but involves small quantities. The price is firm at 2.50c., base, Pittsburgh. For the most part, mills are fairly well booked, though some are anxious to take on new tonnage.

Bolts, Nuts and Rivets.—Conditions in the market for bolts, nuts and rivets continue to be quiet, with prices unchanged.

Warehouse Business.—No change has been made the past week in prices for steel out of stock.

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.65c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Ore.—Receipts of iron ore the past week aggregated 47,175 tons, as follows: Sweden, 26,375 tons; Cuba, 12,400 tons; St. Johns, Newfoundland, 8400 tons. Manganese ore receipts included 4550 tons from Turkey, 1100 tons from Calcutta, India, and chrome ore receipts were 2000 tons, coming from Portuguese Africa.

Old Material.—Weakening further under lack of demand, scrap prices have declined from 50c. to $1.50 per ton, involving practically all of the leading grades. Heavy melting steel has declined 50c. to a range of $16.50 to $17.50. Low phosphorus scrap has dropped $1.50 and is quoted at $21.50 to $22.50, a fair sized lot having been sold at the former figure. A large tonnage of mixed borings for blast furnace use was sold at $13, and it is reported that this grade of old material might be bought for 50c. less. Machine shop turnings were sold at $14. No immediate signs of improvement in the scrap market are apparent. Luria Bros. have purchased approximately 3000 tons of wrought iron structural material recovered from the destroyed Broad Street shed of the Pennsylvania Railroad.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.50
Scrap rails	16.50 to 17.50
Steel rails for rolling	19.00 to 20.00
No. 1 low phos., heavy 0.04 and under	21.50 to 22.50
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge flashings	15.50 to 16.00
Bundled sheets (for steel works)	14.00 to 14.50
No. 1 busheling	16.50 to 17.50
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.00 to 14.50
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	16.00 to 16.50
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	18.00 to 19.00
No. 1 cast	20.50 to 21.50
Heavy breakable cast (for steel plants)	18.00 to 18.50
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	15.50 to 16.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Cleveland

Pig Iron Prices Lower—Heavy Ore Shipments—Scrap Marked Down

CLEVELAND, July 17.—With a good car supply at lower lake ports, ore is moving in heavy volume and July shipments are expected to exceed 10,000,000 tons. No sales are reported.

Pig Iron.—Prices have further declined in a market that is so dull that it is impossible to definitely establish quotations. However, the situation continues very weak in all Central Western districts. In the Mahoning Valley district, foundry grades are now quoted at $25 to $26 and there are unconfirmed reports of quotations lower than $25. Steel makers appear to be leading in price reductions. In Southern Ohio the market is nominally at $26, but admittedly weak. Buffalo foundry iron is being offered at $25 and there are unconfirmed reports from New England indicating that this grade is being offered at $24 probably by Buffalo furnaces. Locally the general asking price is $27 and some small lot sales for local delivery are reported at this price. However, Cleveland furnaces will have to reduce their quotations to keep out competition of Valley furnaces, naming prices below $25.75. A local producer quoted a price equivalent to $25.67 on the inquiry for 3000 tons of malleable for Indianapolis, from the Link Belt Co. which evidently has not yet bought its iron. In spite of the general weakness, two lake furnaces that are well filled with orders are still holding close to their recent prices and report a few small lot sales at $28.50 and $29. Inquiry continues light and is mostly for small lots for early shipment. The Westinghouse Electric & Mfg. Co. is inquiring for 800 tons of foundry iron for its Trafford City, Pa., plant and the General Electric Co. has an inquiry out for 100 tons of low phosphorus malleable iron for its Erie works. We note the sale of two car lots of high silicon Bessemer iron by a Valley furnace at $28, this usually commanding $2 a ton above standard Bessemer iron. Low phosphorus iron is weak at about $1 lower. Alabama foundry iron is being freely offered at $25. Fannie furnace of the M. A. Hanna Co., West Middlesex, Pa., which has been kept in blast until its entire ore supply could be used up, will go out this week.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$27.00 to 27.50
Southern fdy., sil. 1.75 to 2.25	31.00
Malleable	27.00 to 27.50
Ohio silvery, 8 per cent	41.52
Standard low phos., Valley furnace	33.00 to 34.00

Coke.—The coke market is dull and prices, while not firm, show little change. Standard Connellsville foundry coke is quoted at $5.50 to $6.50 and some makers of the better grades are getting $6.50 to $7 for prompt shipment or contracts.

Reinforcing Bars.—The market on rail steel bars continues irregularly with 2.35c. the common quotation, but with some mills going to 2.30c. or lower. The Moses Cleaveland School, Cleveland, requiring 200 tons, has been placed with Republic Structural Iron Works, and 300 tons for the Cleveland Library has been taken by the Concrete Reinforcing Engineering Co. T. E. McShaffrey has been awarded the general contract for the State Street viaduct, Akron, requiring 300 tons. The Hunkin Conkey Construction Co. has been awarded the general contract for the Jamestown Hotel, Jamestown, N. Y., requiring 700 tons.

Finished Iron and Steel.—Mills are getting a fair volume of specifications on contracts, but new business is light and confined to small lots. While there have been some suspensions of deliveries, these do not involve large tonnages. Most of the suspensions have been on hot-rolled strip steel contracts by makers of cold-rolled strip steel whose business has fallen off

somewhat owing to easing in the automobile field. On the other hand, some consumers are crowding mills for shipments. Some buyers are trying to bring out lower prices than regular quotations and while there are rumors of shading, these appear to be without foundation in respect to steel bars, plates and structural material, on which the market is firm. The only weakness seems to be in hot-rolled strip steel, quotations of 2.75c. to 2.90c. being reported on bands. It is understood that one of the pending inquiries for lake boats is from the Ford Motor Co. for two large freighters, each requiring 5000 tons of steel for carrying ore to its River Rouge plant. The Pere Marquette Railroad, which recently asked for prices on two car ferries requiring 5200 tons of plates, has rejected all quotations and will take new bids this week. An Ohio fabricator is figuring on Great Northern Railroad bridge work requiring 2400 tons of structural material. Local plate mills report a fair volume of small orders. While 2.50c. is the common price for tank plates, mills are still getting 2.60c. for boiler plates. Several independent mills placed the new bar card of extras in effect July 16.

Sheets.—A number of mills are looking for orders for black sheets and some are still quoting 3.75c. on this grade. Other grades are holding firm at regular prices. One Valley district mill that has been holding to 3.25c. for light-gage blue annealed sheets is now quoting 3c. for all gages. New business is light and some consumers are not specifying full quotas on their contracts.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Semi-Finished Steel.—The market is inactive on all grades and there has been no recent test of prices. Mills continue to hold to $42.50 for sheet bars, billets and slabs.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are now generally quoting an additional discount of 10 per cent, making 50, 10 and 10 per cent off list as the prevailing price for large machine bolts. However, the market lacks firmness and there are reports of quotations below that named above. Specifications are fairly heavy, but new business is light. Recent shading of rivet prices has been sufficient to establish prices at a spread with the minimum quotations $2 lower, making ruling prices 2.15c. to 2.25c. for structural and 2.25c. to 3.25c. for boiler rivets.

Old Material.—Prices on most grades except heavy melting steel have declined 50c. to $1 or more a ton. Machine shop turnings are particularly weak, owing to a large production and absence of demand coupled with the fact that some consumers are holding up shipments. Heavy melting steel is unchanged but the recent decline on this material was greater than on most other grades. Busheling has declined $2 a ton and cast scrap has been marked down another $1 a ton. The market continues inactive on all grades. Sales to consumers are confined to small lots that dealers are compelled to move and on which they name attractive prices. A local consumer has been sounding the market on heavy melting steel and would probably pay $16 to $16.50 delivered for this grade.

We quote dealers prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.00 to $16.50
Rails for rolling	18.50 to 19.00
Rails under 3-ft	18.00 to 18.50
Low phosphorus melting	18.50 to 19.00
Cast borings	12.50 to 12.75
Machine shop turnings	11.00 to 11.25
Mixed borings and short turnings	11.50 to 12.00
Compressed sheet steel	14.00 to 14.50
Railroad wrought	12.25 to 12.75
Railroad malleable	22.00 to 23.00
Light bundle sheet stampings	10.00 to 10.50
Steel axle turnings	15.00 to 15.50
No. 1 cast	19.00 to 20.00
No. 1 busheling	10.00 to 11.00
Drop forge flashings	10.50 to 11.00
Railroad grate bars	12.50 to 13.00
Stove plate	13.00 to 13.50
Pipes and flues	9.00 to 9.50

San Francisco

Very Little Activity in Iron and Steel, with Prices Softening

SAN FRANCISCO, July 10.—Business is quiet and there is an undercurrent of feeling that this condition will prevail for some weeks and possibly longer, but whether it is merely due to the usual relaxation of the summer period or to some basic causes not clearly defined, is a question not easily answered at this time. As far as the iron and steel business is concerned, there is very little activity with prices a shade easier, for this section of the State and about steady for Los Angeles and adjacent counties. This is regarded here as a temporary condition that will be equalized before the close of the year.

Pig Iron.—Trading is of a routine character and mostly confined to small lots, the larger consumers being fairly well supplied and the smaller establishments taking just enough to satisfy immediate needs and apparently giving no attention to the future. They say they are justified in this position by market conditions in the Eastern States and also in England where prices have been reduced with every prospect for further declines on round lots for early shipment. Local importers say there is a slight increase in the inquiries for English, Scotch and Chinese iron, but as far as learned the resulting volume of business has been small and unimportant. Prices at present range from $35.50 to $37 per ton, duty paid, on foreign iron. It is stated by those in close touch with the market that some change in prices is imminent, but while there are some strengthening tendencies, there is doubt as to whether prices will be advanced. There has been considerable talk about getting iron in quantity from China, but if this traffic is to assume large proportions, some radical changes in freight costs will be necessary. Pig iron can now be brought from England more cheaply than from China. This is possible because of the fact that carriers can bring iron here from England and the continent with a certainty of an immediate return cargo whereas that would be very uncertain as to China.

Coke.—There is practically no activity in this line and there are no quotable figures. All sales here are being made f.o.b. shipping point, so all interested parties can easily determine the cost laid down here by keeping posted on prices at Eastern and English shipping ports. Among the largest consumers here are the railroad companies whose requirements average about 1500 tons per month, but that business is all covered by contract and what they buy in the local markets is not important in volume. The other consumers are well supplied for the present and are not in the market.

Old Material.—Neither sellers nor consumers show much interest in the market for scrap. The falling off in business in finished products has had a softening effect on old material, but prices are fairly well sustained, the present range being about $15 to $15.50 per gross ton. Dealers say there is considerable hesitancy on the part of consumers and what might be called steady figures apply only to the best grades, that is, cut to lengths. A few sales of borings and turnings have been effected but the quantity has been small. Unprepared scrap, or a general mixture, is very slow to sell and it is reported that in some small trading, the asking figures were shaded fractionally. It seems to be a period of expectancy on the part of consumers, the hope being that prices will weaken in the near future. While present available quantities are sufficient to go around, there is no oversupply. Some tonnage is due by sea but the quantity is not believed to be very considerable.

Net earnings of the Trumbull Steel Co., Warren, for the second quarter, applicable to surplus, are placed at $1,272,000 and $2,000,000 for the first six months. Net for the first half is therefore equivalent to $3.50 per share of common stock outstanding. Net the first quarter was reported at $750,000. The company's favorable earning position is attributed in part to advanced price of tin plate the second quarter.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. 3.15c. to 3.30c.
Hoops, light gage, under 1 in. wide.....3.30c. to 3.50c.
Bands, base, per lb.....3.15c. to 3.30c.
Strips, base, per lb.....3.00c. to 3.30c.
Cotton ties, per bundle of 45 lb.....$1.61

Cold-Finished Steels

Bars and shafting base, per lb.....3.25c.
Strips, base, per lb.....5.00c. to 5.25c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....3.45
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 10 per cent off list
Machine bolts, small, cut threads..50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.....50, 10 and 10 per cent off list
Cut threads.....50 and 10 per cent off list
Larger and longer.....50 and 10 per cent off list
Lag bolts.....60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads..50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.
45 and 10 per cent off list
Larger and longer sizes.....45 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....3.75c. off list
Hot pressed nuts, tapped, each size.....3.75c. off list
C.p.c. and t. square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, tapped.....3.75c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 per cent off list
⅞ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts.....60, 10 and 10 per cent off list
Bolt ends with hot pressed nuts..50, 10 and 10 per cent off list
Turnbuckles, with ends, ½ in. and smaller
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws,
65 and 10 per cent off list
Milled set screws .....65 and 10 per cent off list
Upset cap screws .....75 per cent off list
Upset set screws .....75 per cent off list
Milled studs .....50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $3.15 to $3.25
Large boiler rivets, base, per 100 lb.....3.25 to 3.35
Small rivets .....65 and 5 to 60 and 10 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb.....$3.15
Spikes, ½ in., ⅝ in. and ⅝ in., per 100 lb.....$3.50 to 3.75
Spikes, ⅞ in.....3.50 to 3.75
Spikes, boat and barge, base, per 100 lb.....3.50 to 3.75
Track bolts, ¾ in. and larger, per 100 lb.....4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..5.00 to 5.50
Tie plates, per 100 lb.....2.55 to 2.60
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Steel Butt Weld			Iron Butt Weld		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			
		Lap Weld			
2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			
Butt Weld, extra strong, plain ends					
⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14
Lap Weld, extra strong, plain ends					
2	53	42½	2	23	9
2½ to 3	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1¼ in.	+18
2½ to 2¾ in.	34	1⅜ to 1¾ in.	+8
3 in.	40	2 to 2¼ in.	— 2
3½ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3½ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3⅝ in.	37
1⅝ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2⅝ in.	32		
Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3⅝ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1 ½-in. O.D. 9 gage	16
2¼-in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5 ½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown	0.23	Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.23	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.265	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.34		
Pac. Coast, ship plates	1.20		
Birmingham	0.58		
Memphis	0.56		
Jacksonville, all rail	0.70		
Jacksonville, rail and water	0.415		
New Orleans	0.67		

The minimum carload to meet the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 72,000 lb and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 30c. to 40c.; sheets and tin plates, 30c. to 40c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 49c.; pipes not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	48c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	45c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$117.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	48.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	51.50
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	55.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	59.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	64.10
Silvery iron, 6 per cent, per ton, furnace	37.00
Silvery iron, 7 per cent, per ton, furnace	38.00
Silvery iron, 8 per cent, per ton, furnace	39.50
Silvery iron, 9 per cent, per ton, furnace	41.50
Silvery iron, 10 per cent, per ton, furnace	43.50
Silvery iron, 11 per cent, per ton, furnace	46.50
Silvery iron, 12 per cent, per ton, furnace	50.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.00 to $51.00	$43.00 to $46.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	45.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 9.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	48.00	
Ground silica clay, per net ton	10.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	$47.50 to 50.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb	2.40
Skelp, sheared, per lb	2.40
Skelp, universal, per lb	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb	2.25c.
Rails, light, rerolled, base, per lb	2.10c. to 2.15c.
Spikes, ⅝-in. and larger, base, per 100 lb	$3.15
Spikes, ½-in., ⅝-in. and ⅝-in., base per 100 lb.	$3.25 to 3.75
Spikes, ⅜-in., base, per 100 lb	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb	2.55 to 2.60
Angle bars, per 100 lb	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c.
Bars, common iron, Philadelphia mill	2.35c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb	2.15c. to 2.25c.
Ground shafting, base, per lb	3.65c.
Cut nails, base, per keg	$3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
11/16-in.	28.50	28.50
¾-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (1½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.50
2500 (5% Nickel)	8.00
3100 (Nickel Chromium)	4.50
3200 (Nickel Chromium)	6.25
3300 (Nickel Chromium)	8.25
3400 (Nickel Chromium)	7.25
5100 (Chromium Steel)	4.00
5200 (Chromium Steel)	8.25
6100 (Chromium Vanadium bars)	5.25
6100 (Chromium Vanadium spring steel)	5.00
9250 (Silico Manganese spring steel)	4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

FABRICATED STEEL BUSINESS

Oil Companies the Largest Prospective Buyers—Awards Show an Increase

Awards for the week amounted to around 16,000 tons, compared with 4500 tons in the week previous. Inquiries total about 15,000 tons and include 10,500 tons for tank work and 2800 tons for a pier for the city of New York. The chief items are:

Apartment, Eighty-fourth Street, New York, 750 tons, to Patterson Bridge Co.

Public School No. 47, New York, 1000 tons, to Easton Structural Steel Co.

Smith College, Northampton, Mass., two buildings, 400 tons, to an unnamed fabricator.

Judd Paper Co., Holyoke, Mass., 300 tons, to Palmer Steel Co.

Chicago Tribune Building, sub-structure, 1925 tons, to American Bridge Co.

St. Paul Gas Light Co., St. Paul, Minn., Island Park Power Station, 1500 tons, to St. Paul Foundry Co.

Illinois Central Viaduct at Forty-First Street, Chicago, 1100 tons, to American Bridge Co.

St. Louis-San Francisco Railroad shops at Lindenwood, Mo., 325 tons, to Spuck Iron & Foundry Co., St. Louis.

Federal Reserve Bank, St. Louis, vault framing, 100 tons, to Mississippi Valley Structural Steel Co.

Central Vermont Railroad, bridge work, 145 tons, to American Bridge Co.

Northern States Power Co., high bridge generation station at St. Paul, Minn., 4500 tons or more, to Minneapolis Steel & Machinery Co., and St. Paul Foundry Co.

City of Chicago, bridge at California Avenue, 100 tons, to American Bridge Co.

Missouri Pacific Railroad, riveted span at Watson, Ark., 375 tons, to Virginia Bridge & Iron Co.

Calumet Steel Co., Chicago Heights, Ill., crane building, 275 tons, to unnamed fabricator.

South Side Elevated Railroad Co., Chicago, alterations, 441 tons, to Hansell-Elcock Co.

Scottish Rite Temple, Nashville, Tenn., 800 tons, to International Steel & Iron Co.

Cement plant, Nashville, Tenn., 1000 tons, to Nashville Bridge Co.

Wilson Dam, near Muscle Shoals, Ala., 400 tons to Riter-Conley Co.

Kresge Building, Wilmington, Del., 140 tons, to R. B. Lederle.

Pennsylvania Railroad, Baltimore Division, bridge, 100 tons, to Bethlehem Steel Co.

Fisher Body Corporation, Cleveland, factory extension, 300 tons.

Hotel Jamestown, Jamestown, N. Y., 300 tons; general contract placed with the Hunkin Conkey Construction Co.

Salvation Army buildings, Cleveland, 100 tons; bids taken.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Pan-American Petroleum Co., tank work, 4500 tons.

Sinclair Crude Oil Purchasing Co., tanks, 6000 tons.

Pier on North River at Forty-Fourth Street, for New York City, 2800 tons.

Consolidated Electric Light Co., Baltimore, 300 tons.

Public Service Commission, Newark, 500 tons.

Seaboard Air Line, bridge, 250 tons.

School building, city of Chicago, 500 tons.

Federal Reserve Bank Building, Minneapolis, material for vault for which 500 tons of steel was specified, will be provided for by patented reinforcing instead of structural steel.

New Jersey State Highway Commission, bridge at Burlington, N. J., 160 tons.

Little Business in Railroad Equipment

Both orders and inquiries for cars are light, the only award coming from the Kansas City Southern for 500 box cars.

The Missouri Pacific is in the market for 60 passenger cars.

The Atchison, Topeka & Sante Fe is in the market for 200 flat cars. The Erie Railroad is inquiring for repairs to 498 coke cars, which are to be changed to box cars.

The Kansas City Southern has let contract for 500 box cars to the Pennsylvania Tank Car Co.

STEEL AND INDUSTRIAL STOCKS

Seasonal Dullness More Pronounced Owing to Continued Uncertainty

Over the market in steel and industrial stocks lies the restraint imposed by the season and by the uncertainty in the general situation, particularly as regards the Continental disturbance. The opening was marked with firmness in most issues, Crucible selling at 65, nearly 4 points above its last week's low. There was no period of real activity, however, at any time. A slight reaction occurred in Steel common on the Steel Corporation's announcement of a decline in unfilled orders reaching nearly 600,000 tons. The market leader sold off ¾ of a point from the previous high of 91⅛ during the day. Fluctuations in American Car & Foundry attracted special attention. Its abrupt break of nearly 6 points, which came on Thursday, was puzzling, since the company's business is in excellent condition. The reaction was probably due to speculative trading. There was considerable strengthening at the close, leading steel issues and several industrials making fractional gains.

The ranges on active iron and industrial stocks from Monday of last week to Monday of this week were as follows:

	Low	High		Low	High
Allis-Chalmers..	39⅛	40⅞	Lima Loco.....	59¾	62¼
Allis-Chal. pf....	90	90⅛	Midvale Steel....	23	23⅝
Am. B. S. & Fdy.	70⅛	70⅞	Nat.-Acme.....	10⅝	10⅞
Am. Can.....	86	90⅜	Nat. En. & Stm..	55⅞	57⅛
Am. Can pf.....	108¼	109⅛	N. Y. Air Brake.	30	31½
Am. Car & Fdry.	148¾	156⅞	Nova Scotia Steel	19	19
Am. C. & F. pf..	121¼	121½	Otis Steel.....	7⅝	8¼
Am. Loco.....	134	135¼	Otis Steel, pf....	51	51
Am. Loco., new..	65¼	67⅛	Pressed Stl. Car..	53	55
Am. Loco. pf....	116⅜	118	Pressed Stl. pf...	88¾	90
Am. Radiator...	81	82	Ry. Steel Spring.	101¾	102
Am. Steel Fdries.	32⅝	33⅜	Repogle Steel....	13½	15⅜
Bald. Loco.....	115⅝	120½	Republic.....	41⅝	45⅛
Beth. Steel.....	43¾	46⅜	Republic pf.....	88	89½
Beth. Stl. 7% pf..	87½	89	Reynolds Spring.	19½	22
Br. Em. Stl. 2 pf.	18⅛	19	Sloss	39¼	43
Chic. Pneu. Tool.	78	79½	Sloss pf.....	78	78
Colo. Fuel.....	26¾	28	Steel & Tube pf..	104¼	105¼
Crucible Steel....	62⅝	65⅞	Un. Alloy Steel..	30	30⅝
Crucible Steel, pf.	86⅛	86½	U. S. Pipe.....	23½	24⅛
Gen. Electric...	171½	176	U. S. Pipe pf....	68⅞	68⅞
Gt. No. Ore Cert.	26¼	28½	U. S. Steel.....	89½	92
Gulf States Steel	69¼	73½	U. S. Steel pf....	118	118½
Int. Har.....	76½	78¾	Vanadium Steel..	27	33⅜
Int. Har. pf.....	110	110	Whouse Air Br.	78	80

Industrial Finance

The M. A. Hanna Co., Cleveland, reports net income for the five months ending May 31, of $807,265, after deducting all charges including interest and depreciation. This is at the annual rate before Federal taxes of $1,937,436 and, after allowances for taxes, is equivalent to more than twice the dividend requirements on the 7 per cent, first preferred stock. Earnings during 1922 before Federal taxes were $1,037,055. The Hanna Furnace Co., a subsidiary, for the five months ending May 31, reports a gross income of $742,045. In the corresponding period of 1922 there was a deficit of $471,993. Net profit for the five months amounted to $140,004, against a loss of $1,054,476 during the corresponding period of 1922.

The Rising Sheet Metal Works, Inc., New York, has been incorporated with capital stock of $10,000 to manufacture sheet metal products. I. Eijssner and S. Eijssner, the incorporators, 61 East Sixteenth Street, have carried on a sheet metal business for several years.

The Cesare Electric & Radio Corporation, New York, has been incorporated with $50,000 capital to manufacture electrical and wireless equipment. B. D. I. Cesare, president, informs THE IRON AGE that the corporation is still in a formative stage, but that when a German associate arrives in this country the electrical equipment will be assembled at 243 West Fifty-fourth Street, New York.

Edwin C. Seward, Ocean Grove, N. J., has been appointed receiver in equity for the Turner Machine Co., 28 Eagle Street, Newark, N. J. The application for the appointment states that the assets are $340,531 and the liabilities $192,837. Henry H. Turner is president.

The Frank J. Smith Foundry Co., St. Louis, has increased its capital stock from $8,000 to $24,000. The additional capital will be used to provide for expansion of the business, according to L. W. O'Neil, president. He said that definite plans have not as yet been decided upon, but changes probably will be made by the first of the year. Other officers of the company are: vice-president, Otto Karbe; treasurer, Frank J. Smith, and secretary, J. J. Waddock.

Stockholders of the Collins Co., Collinsville, Conn., edged tools, have authorized an increase in capitalization from $1,000,000 to $3,000,000.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound For Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
July	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
11	15.00	14.37½	38.62½	6.00	5.70	6.50	6.15
12	15.00	14.50	38.62½	6.00	5.70	6.55	6.20
13	15.00	14.50	38.07½	6.00	5.70	6.52½	6.17½
14	15.00	14.50	....	6.00	5.70	6.50	6.15
16	15.00	14.50	38.00	6.00	5.85	6.50	6.15
17	15.00	14.50	38.00	6.00	5.90	6.47½	6.12½

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, July 17.

The markets are all exceedingly quiet, some of them bordering on stagnation. Buying of copper has nearly stopped, and there has been no activity in the tin market. Lead prices seem to have become stabilized. The advance in zinc has continued only to be followed by a slight recession.

Copper.—The moderate amount of business in electrolytic copper, which was in evidence during part of last week, has given place to a lack of new business and almost no inquiry. Consumers of copper are apparently buying only such raw materials as are needed for new orders for finished products which at present are on the decline rather than otherwise. The price of electrolytic copper advanced during the last week until 14.75c. delivered was reached. This quotation is apparently the prevailing one today, but it is largely nominal, and there are indications that a fair test of the market would find business capable of being done at a shade under this level or possibly as low as 14.62½c. delivered. A fair business for export is, however, still in evidence. Lake copper is quoted at 15c., delivered.

Tin.—The past week has been one of the most inactive in a long time. There has hardly been enough business to establish price levels. With the exception of July 10 and 13, when there were a few sales of Straits tin, there has been scarcely any business to speak of and the sales that have been made were largely forced ones. The market on the whole is as near stagnation as is possible, and there are no features of interest. Quotations in London today are about £3 per ton less than a week ago, with spot standard quoted at £177 15s., future standard at £178 15s. and spot Straits at £181 15s. The quotation for spot Straits tin on this side was 38c., New York. Arrivals thus far this month have been 2270 tons with 6972 tons reported afloat.

Lead.—The market is firmer in tone, with higher prices, both here and in St. Louis. Quotations at New York are unchanged for the leading interest, but some independents have sold as high as 6.20c. At St. Louis prices have advanced about 20 to 25 points during the week to 5.90c. to 5.95c. One reason for the firm tone of the market as a whole, particularly in the West, is said to be due to the fires in Idaho which have interfered with the operation of the Heckla and some other large lead-silver mines.

Zinc.—The advance in this market which was in evidence a week ago continued until the middle of last week, when the maximum of 6.20, St. Louis, or 6.55, New York, was reached. Since then prices have receded until today prime Western for spot, July or August delivery, is quoted at 6.10c. to 6.15c., St. Louis, or 6.45c. to 6.50c., New York, which, however, is still 5 to 10 points higher than the prices prevailing a week ago. The publication of the statistics of the American Zinc Institute for June, made public this week, showed that production of slab zinc during the month was 42,840 tons with the shipments 38,686 tons, so that stocks in smelters' hands were increased during June 4154 tons, being 17,173 tons on June 30. This has been something of a bearish influence. The high prices asked for ore have also been a drag on the market, it being claimed that at present prices the metal could not be refined at a profit in a 6.10c. to 6.15c. market. There is still a premium for September and October delivery of about 5 points per month.

Nickel.—Quotations for shot and ingot metal are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c. per lb.

Antimony.—The market is quiet and a little higher, with wholesale lots of Chinese metal for prompt or future delivery quoted at 6.85c. to 6.90c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted in wholesale lots by importers who can obtain the metal at 26.50c. to 27c., New York, duty paid. Quotations from the leading domestic producer are not made public.

Old Metals.—Business is slow but there appears to be more optimism among some dealers whose tendency is to hold stock rather than sell at the present low basis. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.25
Copper, heavy and wire	13.25
Copper, light and bottoms	11.25
Heavy machine composition	11.00
Brass, heavy	8.50
Brass, light	7.00
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.50
Lead, tea	4.25
Zinc	4.50

Chicago

CHICAGO, July 16.—Copper is slightly firmer but unchanged in price. Spelter has advanced. Old metal prices are practically unchanged. We quote in carload lots, Lake copper, 15.25c.; tin, 38c. to 39c.; lead, 5.90c.; spelter, 6.15c. to 6.20c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 10c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 22.50c.; tin-foil, 25c.; block tin, 30c., all buying prices for less than carload lots.

Detroit Scrap Market

DETROIT, July 17.—Production schedules for the remainder of the quarter are being set in automotive lines and the past 10 days has brought out considerable inquiry for casting quotations. Melters are buying to cover orders on their books with the result that purchases of pig iron and waste material are very light.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to $16.50
Shoveling steel	14.50 to 16.50
No. 1 machinery cast	18.00 to 20.00
Cast borings	12.50 to 13.00
Automobile cast scrap	22.00 to 24.00
Stove plate	15.00 to 17.00
Hydraulic compressed	14.00 to 15.00
Turnings	7.50 to 8.00

Suit Against American Chain Co.

Suit has been filed against the American Chain Co. by United States District Attorney Hayward under the Sherman anti-trust act, seeking to restrain the company from alleged monopoly and restraint of trade in the manufacture and sale of automobile bumpers. Sixty per cent of the bumper industry is controlled by the company, it is asserted, and nearly complete control will result if it wins patent litigation now in process. The Government alleges that about 10 companies in the Middle West have assisted in the monopoly.

PERSONAL

Charles S. Boardman, at a recent meeting of the board of directors of the Strong Steel Foundry Co., Buffalo, was elected vice-president and manager of sales. Mr. Boardman became designing and construction engineer with the Lackawanna Steel Co. in 1901, when that company had started construction of its plant at Buffalo. Upon completion of this plant, he joined the firm later known as Conkling & Boardman, consulting engineers, Buffalo, and was engineer for several steel companies in and near Buffalo. During this time Mr. Boardman invented and patented Lackawanna steel sheet piling. In October, 1913, he returned to the Lackawanna Steel Co. as engineer of the steel sheet piling department. Upon the purchase of the Lackawanna Steel Co. by the Bethlehem Steel Co., he continued in the same capacity with Bethlehem company, which he left to join the Strong Steel Foundry Co.

Matthew Mann, Cortland, N. Y., has been made manager of the Vitrified Wheel Co., Westfield, Mass.

Percy R. Drenning, formerly with the T. H. Symington Co., has become associated with the Boyden Steel Corporation as vice-president, with headquarters at Baltimore.

Thomas H. Endicott has been appointed vice-president and general manager of the Green Equipment Corporation, Chicago. He was formerly sales engineer for the Crocker-Wheeler Co., Ampere, N. J., and later was sales manager for the metal cutting department of the E. C. Atkins Co., Indianapolis. Recently he organized a company to serve as engineering consultant to industrials, with headquarters in Indianapolis.

H. B. Speasmaker, for 12 years purchasing agent of the Diamond Alkali Co., Pittsburgh, has resigned to become assistant to H. R. Blickle, president Fort Pitt Bridge Works, Oliver Building, Pittsburgh.

Ben Wyckliff Twyman, general manager Nash Motor Co. four-cylinder car division, Milwaukee, since its establishment four years ago, and George C. Bechtel, general superintendent, have resigned. Mr. Twyman was president and general manager of the Inter-State Automobile Co., Muncie, Ind., prior to joining the Nash organization in 1919.

W. A. Thompson, comptroller Allis-Chalmers Mfg. Co., Milwaukee, has been appointed secretary, and Raymond Dill, assistant secretary-treasurer, becomes treasurer, filling the vacancy caused by the death of Henry Woodland, secretary-treasurer. J. A. Keogh has been appointed assistant secretary, and D. A. Stuart, auditor, is promoted to assistant treasurer.

Charles P. Woods has severed his connection with the Triumph Electric Co., Cincinnati, and will represent the Arctic Ice Machine Co., Canton, Ohio, in southern Ohio, Kentucky, southern Indiana, southern West Virginia and western Virginia. His headquarters will be located at 605 Mercantile Library Building, Cincinnati.

Roy M. Welch has been appointed secretary to the president of the Youngstown Sheet & Tube Co., Youngstown, Ohio, succeeding Walter Meub, who was also secretary of the company. Mr. Meub is now devoting his entire time to secretarial work. Mr. Welch has been assistant to the president in charge of industrial relations.

Donald D. Herr, vice-president Arthur G. McKee & Co., Cleveland, left this week for the Orient, where he will visit various steel and iron plants, including the Indian Iron & Steel Co., Asansol, India, whose blast furnace plant was designed and equipped by the McKee firm.

Ernest J. Poole, general superintendent Carpenter Steel Works, Reading, Pa., was reelected president of the Berks County Manufacturers' Association at Reading last week.

Harold C. Jones, vice-president and advertising manager of the Inland Steel Co., Chicago, whose resignation was announced last week, has become president of the Mid-West Forging Co., Chicago Heights, Ill. He was connected with the Inland Steel Co. for 20 years and is a son of G. H. Jones, one of the founders of the company. The Mid-West Forging Co. was organized four years ago by Mr. Jones and others, and the expansion of its business caused him to decide to give it his entire time.

R. H. Hubbell, formerly connected with the Norton Co. and the Heald Machine Co., both of Worcester, Mass., has been placed in charge of machine tool sales of the Greenfield Tap & Die Corporation, Greenfield, Mass.

C. J. Brown, formerly associated with Frank M. Erb, sales engineer, Fulton Building, Pittsburgh, has joined the Mine Safety Appliance Co., Pittsburgh, with headquarters in Fairmont, W. Va., to handle sales in northern West Virginia. W. L. Graham, with the Hepenstall Forge & Knife Co., Pittsburgh, for a number of years, will handle sales in eastern Ohio and western Pennsylvania for Frank M. Erb, which territory was formerly handled by Mr. Brown.

J. C. Gore, for many years connected with the Domhoff & Joyce Co., pig iron merchants, has resigned to become general sales agent for the St. Louis Coke & Iron Co., with offices in the Continental and Commercial Bank Building, Chicago. The change takes effect Aug. 1. Mr. Gore was for nine years representative of the Domhoff & Joyce Co., in Cincinnati and Chicago. No announcement has been made regarding his successor.

Charles C. Gibson, who has been vice-president and secretary of the Mullins Body Corporation, Salem, Ohio, has been elected president of the corporation, to succeed W. H. Mullins, who will continue as chairman of the board of directors. Frederick P. Mullins has succeeded Mr. Gibson as vice-president and secretary.

James G. Heaslet has been elected president of the new Rollin Motors Co., Cleveland, recently organized by Rollin H. White. R. T. Hodgkins is vice-president and general sales manager, and C. D. Fleming, secretary-treasurer. Mr. White is chairman of the board.

George D. Martin has been elected secretary-treasurer of William Cramp & Sons Ship & Engine Building Co., Philadelphia.

First Iron Ore Delivered Direct to River Rouge Plant

The first iron ore cargo to be delivered direct to the River Rouge plant of the Ford Motor Co. reached that plant July 18. Last year the Ford company delivered a portion of its ore to the docks of the Hanna Furnace Co. in Detroit, from which it was transshipped on barges and some was placed on lighters and transferred to barges. Recently the river has been dredged sufficiently so that the ore boats can now reach the ore handling plant at the Ford docks. The Ford company carried over considerable ore last season and the cargo received during the week was the first ore that it had taken this year.

Texas Steel Co. Will Roll Bars

The Texas Steel Co., Fort Worth, Texas, has been incorporated with a capital of $2,500,000, and the plant, which was formerly that of George W. Armstrong & Co., is being converted to make billet steel bars. Ingots will be cast from electric furnaces, reheated in oil-burning furnaces and reduced into merchant bars on 8-, 10- and 16-in. mills. The company will also make cotton ties, reinforcing steel, small shapes, and steel castings. Equipment has been purchased and is on the ground. The officers are: President, John H. Kirby; vice-presidents, D. R. Knapp, J. F. Foster; secretary, G. W. Link; treasurer, Marcus Bright.

OBITUARY

Stanton Sholes Freeman

Stanton Sholes Freeman, treasurer and general manager of the Port Henry Iron Ore Co., with offices in New York and mines at Mineville, N. Y., died at Forest Hills, L. I., July 14, after a long illness. Mr. Freeman was born at Columbus, Ohio, Dec. 21, 1874. He graduated from Ohio State University in 1898, with the degree of mining engineer. After being employed for about a year as a chemist in Pittsburgh, he became connected with the Carbon Furnace Co., Parryville, Pa., with which he remained until 1916. He was superintendent of the blast furnace for a number of years and later became general manager, his duties including superintending of the furnace and selling of the pig iron. In 1916 he entered the service of the Port Henry Iron Ore Co., and was also for a time receiver of the Temple Furnace, Temple, Pa. He was a past president of the Ohio State University Alumni Association of New York, a member of the Ohio Society, the Engineers' Club and the American Iron and Steel Institute. He was a man of marked ability as an operator of plants and as a salesman, and was noted for his enthusiastic service to the organizations with which he was connected. He is survived by Mrs. Freeman and a daughter, Miss Orra.



STANTON S. FREEMAN

C. L. WAGANDT, a director of the National Enameling & Stamping Co., and manager of Baltimore factory, died at his home in Baltimore, on July 7, aged 65 years. Starting in the industry 50 years ago as an apprentice in the plant of Keehn & Hagerty, Mr. Wagandt soon became manager of a department and eventually assumed full charge of the factory. In 1902, when the Keehn & Hagerty factory was consolidated with the National Enameling company, he remained as manager of the Baltimore plant and later became a director of the company.

JOSEPH F. MITCHELTREE, who for 24 years was associated with the coal department of the M. A. Hanna Co., Cleveland, died July 15, age 53 years. Mr. Mitcheltree was manager of the branch office of the Hanna company in Toledo for a number of years, or until the Toledo office was discontinued.

FRED L. AVERY, president for 10 years past of the Avery & Saul Corporation, South Boston, sheet metal, died suddenly on July 14, at his home in Winchester, Mass. Mr. Avery was past president of the New England Iron and Hardware Association and was prominently identified with the New England sheet metal business. He was born in Roxbury, Boston, 59 years ago and had devoted practically his entire business career to this industry.

Nearly all the work of the Bureau of Standard's foundry has been limited to the preparation of non-ferrous alloys. Recently the bureau purchased a small cupola to be used for investigational purposes in connection with the ferrous alloys and also to provide metal for castings used by the bureau and other branches of the Government. During the past month, the construction of a charging platform and foundations for the cupola were completed. The installation and lining of the cupola are now in progress and the equipment will soon be ready for service.

STRUCTURAL STEEL BOOKED

June Contracting 51 Per Cent of Capacity, a Decline of 7 Per Cent from the May Tonnage

WASHINGTON, July 17.—June sales of fabricated structural steel, based on figures received by the Bureau of the Census in cooperation with the Structural Steel Society, showed a decline from the May figures, which in turn were much less than the previous month's sales. Total sales of 112,786 tons were reported for June by firms with a capacity of 223,595 tons per month.

Tonnage booked each month by 175 identical firms, with a capacity of 229,575 tons per month, is shown below, together with the percentage of shop capacity represented by these bookings. For comparative purposes the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month.

1922	Actual Tonnage Booked	Per Cent of Capacity	Estimated Total Bookings
April	200,588	87	217,500
May	184,638	81	202,500
June	168,498	73	182,500
July	157,631	69	172,500
August	156,011	68	170,000
September	146,146	64	160,000
October	132,450	58	145,000
November	111,784	49	122,500
December	138,024	60	150,000
1923			
January	172,415	75	187,500
February	183,938	80	200,000
March	218,997	95	237,500
April	184,884*	81	202,500
May	120,925**	58	145,000
June	112,786†	51	127,500

*Reported by 166 firms with a capacity of 228,455 tons.
**Reported by 157 firms with a capacity of 228,790 tons.
†Reported by 152 firms with a capacity of 223,595 tons.

British Pig Iron and Steel in June

LONDON, ENGLAND, July 17 (*By Cable*)—The pig iron and steel production in June recorded a decline from the heavy output in May, when new records for the year were made. In June 692,900 gross tons of pig iron was made which compares with 714,200 tons in May. The June production was the second largest this year. The steel ingot and castings output in June was 767,700 tons as compared with 821,000 tons in May. The June figure was the third largest this year.

Comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	639,000
1920, per month	669,500	755,600
1921, per month	217,600	302,100
1922, per month	408,300	486,000
January, 1923	567,900	634,300
February	543,400	707,100
March	633,600	802,500
April	652,200	749,400
May	714,200	821,000
June	692,900	767,700

The June pig iron output, while less than the 1913 rate, is larger than the 1920 monthly average. In steel the June production exceeds both the 1913 and the 1920 rate of output.

To Reorganize Ashtabula Steel Co.

CLEVELAND, July 17.—Plans for the reorganization of the Ashtabula Steel Co., Ashtabula, Ohio, will be considered by the directors at a meeting July 18. It is understood that should a pending deal be consummated, the control of the plant will pass to other interests now identified with the sheet steel industry in Ohio.

The Hydraulic Steel Co. reports net profits of $74,993, after expenses, taxes and interest charges for the quarter ended June 30, 1923.

Machinery Markets and News of the Works

FEW ORDERS REPORTED

Activity in Some Centers Fair, but for Most Part Light

New Railroad Inquiries Include Pennsylvania, New York Central and Illinois Central

In the majority of centers, sales during the week were light. A fair number of orders from both manufacturing interests and railroads is reported from Cincinnati, where demand from the automotive industries for upright drills also has been noted. Improvement over June in the inquiries and orders of a maker of multiple-spindle automatic screw machines is reported from Cleveland. A few small lot inquiries from Detroit automobile companies have been noted.

Demand from Wisconsin for machine tools and other equipment is expected to follow the collapse of the new taxation program recently before the legislature. Companies that suspended plans for plant extensions pending the outcome of the taxation bill proposed will, it is thought, now proceed with those extensions.

Railroad inquiries include a tentative list sent out by the New York Central Railroad for eight machines on which it has asked for approximate prices. The Pennsylvania Railroad is inquiring for a 5- and 6-ft. radial drill for its Pennsylvania shops, a vertical turret lathe and a 21-in. drill for its St. Louis shops, and some tools for its Columbus, Ohio, shops.

The Illinois Central has put out a few new inquiries, including a 500-lb. power hammer, a 32-in. shaper, a 20-in. and a 42-in. drill press. From New England it is reported that one of the carriers previously inquiring on three machines has added four more tools to the list.

The Elgin, Joliet & Eastern Railroad, which was expected to close against its list this week, has asked for revised quotations.

The American Steel & Wire Co. is in the market for a 72-in. boring and turning mill for its Anderson, Ind., plant. The Westinghouse Electric & Mfg. Co. closed for a planer for its East Pittsburgh works, and is understood to be slowly specifying against its Sharon, Pa., works list.

Purchases by the railroads during the week include those of the Norfolk & Western, the Denver & Rio Grande Western, and the St. Louis & San Francisco.

New York

NEW YORK, July 17.

THE Norfolk & Western Railroad has placed orders for at least a part of its recent large list, one Eastern manufacturer having received orders for a 72-in. and a 42-in. boring mill, an axle lathe and a 600-lb. steam hammer. Other business has been placed with machine-tool builders in Cincinnati and elsewhere. The St. Louis-San Francisco Railroad has purchased a 600-ton locomotive wheel press. The Union Tank Car Co., New York, has purchased a number of large machines, including a car-wheel borer and a 400-ton wheel press. A South American railroad shop has purchased several large machines from a New York company. Other than in railroad business the market is quiet.

Work will commence on rebuilding the portion of the plant of the Tottenville Copper Works, Tottenville, S. I., comprising 14 buildings, destroyed by fire last April, with loss of $500,000. The main structure will be 75 x 300 ft. Lockwood, Greene & Co., 101 Park Avenue, New York, are engineers. Benjamin Lowenstein is president, and Adolph Weiss, general manager.

The Stinzing Machine Co., 250 Fourth Avenue, Long Island City, has inquiries out for a power press, Bliss type.

John Hrabush, 40 Crescent Street, Long Island City, manufacturer of automobile trimmings and parts, has plans for a one-story machine and repair shop addition, 45 x 55 ft. Richard L. Lukowsky, 119 Newton Avenue, Astoria, L. I., is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until July 31, for 15,000 sq. ft. of wire cloth for the South Brooklyn Navy Yard, schedule 1094; until July 24, for 75,000 ft. of bell wire, schedule 1093.

The Adirondack Power & Light Corporation, State Street, Schenectady, N. Y., has plans for a new power house at North Albany, to cost $45,000. The company has purchased the plant and system of the Canastota Power & Light Co., Canastota, N. Y., and will make extensions and improvements. The property will be merged with the Adirondack company system.

Frederick Streicher, 105 John Street, New York, operating a die-cutting works, is planning the installation of a vertical milling machine.

The Jamaica Water Supply Co., Shelton Avenue, Jamaica, Brooklyn, is planning the erection of a new electrically operated pumping plant at 118-50 128th Street, Richmond Hill, L. I.

The Unity Gold Mines Co., 120 Broadway, New York, has made application for permission to construct a hydroelectric power plant on the Elk River, Idaho National Forest, Valley and Idaho counties, Idaho.

The New York Central Railroad Co., Grand Central Terminal, New York, has preliminary plans for a new engine house with repair shop at Oswego, N. Y., estimated to cost $150,000. G. W. Kittredge is company engineer.

The Utica Gas & Electric Co., Utica, N. Y., has plans for the installation of a hydroelectric generating station at the new dam at Stewarts Landing, N. Y., near Canada Lake, with initial capacity of about 7500 hp.

Following the recent consolidation of the Hodgman Rubber Co., 8 West Fortieth Street, New York, with plant at Tuckahoe, N. Y., and the Paramount Rubber Consolidated, Inc., Philadelphia, a subsidiary company has been organized under the name of the Paramount Rubber Co., Ltd., to operate in Canada. The new company has purchased the plant of the Regal Rubber Co., Sherbrooke, Que., and plans are under way for extensions.

The Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen, etc., will commence the erection of the first unit of its proposed plant on property recently acquired at Tulsa, Okla., estimated to cost $225,000, including machinery.

G. H. Stetson, 8 West Fortieth Street, New York, representing electric power interests, has applied for permission to build and operate a hydroelectric power plant on the Colorado River, near Bulls Head Rock, vicinity of Needles, Ariz., with initial capacity of 160,000 hp.; also for a similar plant on the same river at Boulder Canyon, Ariz.

The State Canal Board, Albany, N. Y., has approved plans prepared by Dwight B. Ladu, State engineer, for a grain elevator on the barge canal terminus at Oswego, N. Y., estimated to cost $1,200,000. A fund will be provided to carry out the construction during the year. The structure will be 69 x 213 ft., with all machinery electrically operated; the conveyor system will have a capacity of 20,000 bu. per hr., and will be supplemented with a low pressure conveyor system for dust cleaning. Movable steel marine towers will be installed on the side of the elevator, 158 ft. high, 24 ft. wide and 30 ft. long, mounted on car trucks, for loading and unloading service.

The Walter Motor Truck Co., 232 West Sixty-first Street, New York, has leased a portion of the factory now being completed at the Queens Boulevard and Hunter Street, Long Island City, for a branch works. The other part of the structure has been leased by the Boyce-Veeder Corporation, 68 Hunters Point Avenue, Long Island City, manufacturer of fine automobiles.

The Elk Machine Tool Corporation, recently organized to take over and expand the business of the Elk Mfg. Co., 1926 Broadway, New York, is arranging for the early occupancy of a new plant at 243 West Seventeenth Street, New York, to be given over to the production of precision tools, patented by J. C. Elkin, mechanical engineer, who will be president of the new company, in charge of manufacture.

Contract has been let by the Great Atlantic & Pacific Tea Co., 150 Bay Street, Jersey City, N. J., through its subsidiary, the Atlantic Storage Warehouse Co., to the Turner Construction Co., New York, for a new baking plant, four stories, 95 x 200 ft., at 141st Street and the Southern Boulevard, to be provided with ovens, power apparatus, conveying machinery and other equipment, estimated to cost $150,000.

The General Electric Co., 120 Broadway, New York, has disposed of its seven-story plant at 527-31 West Thirty-fourth Street, and will discontinue operations at this location.

Bids will be asked about Aug. 20 by the Common Council, Glen Rock, Ridgewood, N. J., for a pumping plant to be used in connection with extensions in the sewerage system, estimated to cost $55,000. H. J. Harder, 129 Market Street, Paterson, N. J., is engineer.

The New Jersey Power & Light Co., Dover, N. J., will build an addition to its local power station, to be used as an auxiliary in connection with a new generating plant on the Delaware River, near Holland, N. J., for which foundations are being laid. It will be steam-operated, with initial capacity of 200,000 kw. Eugene L. White is vice-president.

A manual training department will be installed on the third floor of the new high school building now in course of erection on Devon Street, Kearny, N. J., estimated to cost $1,000,000. Guilbert & Betelle, Chamber of Commerce Building, Newark, are architects.

The Wheeler Engineering & Condenser Co., Carteret, N. J., has purchased land adjoining its plant at East Carteret, and is said to be planning an addition, to include a one-story foundry.

The Pleasantville Gas Co., Pleasantville, N. J., will make extensions in its steam power plant, gas generating works and system, to cost about $200,000. Permission has been granted to issue stock in this amount.

The Board of Education, Montclair, N. J., has approved plans for an addition to the Glenfield school, to include two new shop buildings, one of which will be equipped for manual training; the other will be used for domestic science work.

The Public Service Electric Co., Newark, has applied for permission to issue stock for $12,750,000, for extensions in power plants and system, entirely separate from its new power project on the Hackensack River, Kearny, N. J., recently noted. The work will include an extension to the Essex power station, Point-No-Point, to cost $1,000,000; addition to the Marion power plant, Jersey City, $750,000, and extensions to the power plants at Perth Amboy, Newark, Hoboken, Camden, Burlington and Trenton to cost $750,000, collectively. New electrical substations and transmission lines will also be built in the last noted districts. N. A. Carle is chief engineer.

F. H. Crawford & Co., 299 Broadway, New York, are in the market for a vertical hydraulic press with single ram, capacity 750 to 1500 tons, stroke not less than 12 in. It must be arranged for motor drive and complete with pump.

Philadelphia

PHILADELPHIA, July 16.

A ONE-STORY power house addition, to cost $90,000, will be erected at the plant of the W. J. McCahan Sugar Refining Co., Tasker Street wharf, Philadelphia.

J. Matlack, 518 North Thirty-second Street, Philadelphia, operating a machine shop, plans for the installation of a power bench lathe.

The Baldwin Locomotive Works, Philadelphia, is considering plans for a one and two-story tank shop. Carl C. Bailey is in charge.

A one-story machine repair and service building, 70 x 145 ft., for company motor trucks, will be built by the Gulf Refining Co., Widener Building, Philadelphia, at Fifty-eighth Street and the Schuylkill River, for which plans have been completed.

A one-story power house, 48 x 71 ft., will be erected at the plant of the Philadelphia Tapestry Mills, Inc., Hutchinson Street, Philadelphia.

William L. Charr, 149 South Fourth Street, Philadelphia, architect, has plans for a one-story machine and repair shop at Seventh and Master Streets, for which the name of the owner is temporarily withheld.

The Largman-Grey Co., 3360 Frankford Avenue, Philadelphia, will build a one-story power plant at its new textile mill at Torresdale Avenue and M Street, to cost about $400,000, of which $100,000 will be used for the power house. LeRoy B. Rothschild, 1225 Sansom Street, is architect.

The Philadelphia Commercial Museum, Thirty-fourth Street, is in receipt of an inquiry from a company at Athens, Greece, for light power machinery.

The Yellow Cab Co., 1208 North Thirty-first Street, Philadelphia, will build a one-story machine repair and service works for company automobiles, 100 x 260 ft., on Schuylkill Avenue.

A one-story power house will be erected at the hat manufacturing plant of Frank Schoble & Co., Tenth and Oxford Streets, Philadelphia, to cost $40,000.

In connection with plans for a high-speed transit subway system at Philadelphia, to be built by the city in cooperation with the Philadelphia Rapid Transit Co., it is proposed to make an appropriation of $6,000,000 for the construction of car repair shops, including machinery, and terminal yards. Other equipment to be purchased, exclusive of rails and rolling stock, is estimated to cost $5,890,000. The Transit Commission of the City Council, City Hall, is in charge.

Bids will be received by the City Council, Woodbury, N. J., until July 24 for one switchboard, with switches, fixtures, and other electrical equipment, for installation at the municipal pumping plant at Sewell, N. J. F. F. Kauffmann, Room 301, 13 North Thirteenth Street, Philadelphia, is consulting engineer.

The Magnetic Pigment Co., Cass and Wolverton Streets, Trenton, N. J., has awarded contract to the N. A. K. Bugbee Co., 206 East Hanover Street, for an addition to cost $30,000.

A one-story power house will be erected at the Villa Maria Convent, West Chester, Pa., to cost approximately $40,000. Emile G. Perrot, Boyerstown Building, Philadelphia, is architect.

The Henry, Millard & Henry Co., 1059 West Market Street, York, Pa., manufacturer of machinery, is inquiring for a second-hand multiple four-spindle universal adjustable drill head, to take ½ to 1-in drills.

The Florin Foundry & Mfg. Co., Florin, Pa., affiliated with the Wincroft Stove Works, Middletown, Pa., P. A. H. Wharter in charge, has preliminary plans for the erection of a new one-story foundry.

The Orangeville Brick & Sheet Products Co., Orangeville, Pa., has tentative plans for a new works, estimated to cost $100,000 including equipment. A power house will be built.

The Pennsylvania Power & Light Co., Allentown, Pa., has acquired the plant and property of the Pennsylvania, New York & New Jersey Power Co., vicinity of Wilsonville, Wayne County, Pa., for $1,250,000. Plans will be prepared for a hydroelectric power house, estimated to cost $5,000,000 with transmission system. The purchasing company has also acquired the Schuylkill Electric Co., operating at Girardville and Ashland, Pa.; extensions and improvements will be made, and the system merged with that of the Pennsylvania company. The latter organization is operated by the Electric Bond & Share Co., 71 Broadway, New York.

Manual training equipment will be installed in the high school to be erected at Red Lion, Pa., estimated to cost $200,000, for which detailed plans will soon be authorized by the local school board, C. E. Smith in charge.

H. G. Smith & Brothers, Scranton, Pa., manufacturers of automobile bodies, springs, etc., are arranging for the removal of their plant to a new building where additional equipment will be provided for increase in production.

Fire, July 6, destroyed a portion of the power house of the John O. Ream Mining Co., Berlin, Pa., with loss estimated at $25,000 including equipment. It is planned to rebuild.

A manual training department will be installed in the new high school to be erected at Plymouth, Pa., estimated to cost $250,000, for which foundations will be laid at once.

The Metropolitan Edison Co., Reading, Pa., is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and improvements. Application for a charter has been made for the Metropolitan Power Co., to be operated as a subsidiary. The new company will build a steam-operated electric power plant in the vicinity of Middletown, Pa. It will arrange a bond issue of $3,250,000, a portion to be used for the new plant and system.

The Town Council, Quakertown, Pa., has authorized an immediate call for bids for the installation of a new power unit at the municipal electric lighting plant.

The Crane Market

The crane market is quiet, but a little more business has been placed in the past week than in the week previous. Inquiries, however, are few. Among recent orders are the following:

The Great Northern Paper Co., Madison, Maine, through H. S. Ferguson, engineer, 200 Fifth Avenue, New York, has bought one 20-ton, 3-motor electric crane and one 50-ton, single-motor, double hoist crane from the Cleveland Crane & Engineering Co. and a 20-ton hand-power crane from the Reading Chain & Block Corporation.

The Hershey Chocolate Co., Hershey, Pa., has bought an 18-ton locomotive crane from the McMyler-Interstate Co.

The Baltimore & Ohio Railroad has ordered six 30-ton locomotive cranes from the American Hoist & Derrick Co.

The Southern Pacific Railroad has ordered from an Eastern manufacturer a 200-ton locomotive lift crane and two 15-ton electric cranes.

The Kensington Davis Co., Buffalo, has ordered a 5-ton, 2-motor crane of 28-ft. span from Alfred Box & Co.

The Reliance Steel Casting Co., Pittsburgh, has bought a 5-ton, 3-motor crane of 28-ft. span from Alfred Box & Co.

The Phoenix Utility Co., New York, has ordered a 1½-ton crane of 23-ft. span from Alfred Box & Co.

Commonwealth Edison Co., Chicago, two 125-ton, 122-ft. span electric traveling cranes for the Crawford Avenue plant, from the Whiting Corporation.

Portland Railway, Portland, Ore., a 75-ton, overhead traveling crane, from the Whiting Corporation.

Banner Iron Works, St. Louis, Mo., a 5-ton electric traveling crane, from the Whiting Corporation.

Union Public Service Co., Minneapolis, Minn., a 10-ton hand power crane, from the Whiting Corporation.

Perins Machine Co., Seattle, Wash., a 25-ton hand power crane, from the Whiting Corporation.

Texas & Pacific Railway, Dallas, Tex., a 5-ton hand power crane, from the Whiting Corporation.

Miehle Printing Press & Mfg. Co., Chicago, a 5-ton, 3-motor, cage-operated, overhead traveling crane and a 3-ton, 2-motor overhead crane, from H. D. Conkey & Co.

T. A. Cummings Foundry Co., Chicago, a 2-ton hand-power crane and a 2-ton hand power hoist, from H. D. Conkey & Co.

Johns-Manville, Inc., Waukegan, Ill., a 1-ton underhung traveling crane, from H. D. Conkey & Co.

Standard Seamless Tube Co., Granite Building, Pittsburgh, is asking prices for estimating purposes on a 10-ton crane.

Marietta Mfg. Co., Point Pleasant, W. Va., has indefinitely postponed the purchase of a 10-ton crane.

Pittsburgh Reinforced Brazing & Machine Co., 2525 Liberty Avenue, Pittsburgh, has deferred action for the present on a 5-ton crane.

The Orrtanna Electric Light & Power Co., Orrtanna, Pa., is planning to rebuild the portion of its power plant destroyed by fire July 7 with loss estimated at $30,000 including equipment.

The Hobson Flatware Co., Lansdale, Pa., recently organized, has leased the building formerly occupied by the Rogers & Davis Co., and will establish a plant for the production of nickel and other metal products. The company is headed by W. H. Hobson and S. F. Aleva.

The Conewago-Dauphin Electric Co. and the Londonderry-Dauphin Electric Co., recently organized, have been granted operating charters and will install power plants and systems at Conewago and Londonderry. The new companies are headed by L. D. West and W. H. Schubert, and are represented by Olmstead, Snyder & Miller, Harrisburg, Pa.

The William Cramp & Sons Ship & Engine Building Co., Philadelphia, announces that it has recently closed large contracts for hydroelectric power machinery and that the I. P. Morris department of the Cramp company is running at capacity as are the other units of the organization. The largest contract is for two 58,000 hp. turbines for the Hydro-Electric Power Commision of Ont., Canada, to be built by the Dominion Engineering Works, Inc., Canadian licensees of Cramp's.

Baltimore

BALTIMORE, July 16.

PROPERTY on Taylor Avenue, Baltimore, totaling about 2½ acres, has been purchased by the Flynn & Emrich Co., 305 North Holiday Street, operating a general machine and iron works, and will be used for the erection of a new plant, consisting of machine shop, foundry, power house and other buildings. It will cost $75,000.

A manual training department will be installed in the new high school to be erected at Newark, Del., estimated to cost $280,000, for which bids will be called at once on a general contract. The Board of Education is in charge.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Aug. 7 for a quantity of screw clamps and wrenches for the Mare Island Navy Yard, schedule 1102.

The Cornice Repair Shop, 313 North Smith Street, Richmond, Va., is planning the installation of a small lathe and other equipment.

The Hackley-Morrison Co., 1798 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a surface condenser, 1000 sq. ft., with steam-driven centrifugal circulating pump.

The Virginia-Western Power Co., Clifton Forge, Va., is disposing of a bond issue of $3,500,000, a portion of the proceeds to be used for extensions, including the completion of a new steam-operated generating plant with capacity of about 500 kw. A. C. Ford is president.

J. P. McConnell and Harold C. Tyler, Radford, Va., are perfecting plans for the organization of a new company to build and operate a stone crushing plant. It will include a power house, quarrying machinery and other equipment.

Bids will be received by the general purchasing officer, Panama Canal, Washington, until July 31 for an electric drill and grinder, centrifugal pumps, deck and power cable, brass and copper tubing, steel and bronze rope, gasoline engine and other equipment as specified in circular 1543.

The Seaboard Motors Co., 1631 West Broad Street, Richmond, Va., is planning the installation of an arbor press, electric drill and other equipment in its machine shop.

Manual training equipment will be installed in the new three-story and basement high school to be erected on West North Avenue, Baltimore, estimated to cost $1,000,000. Competitive sketches and bids will soon be received.

The Atlantic Coast Line Railway Co., Wilmington, N. C., has arranged an appropriation of $1,800,000 for extensions in car and locomotive shops and the installation of additional machine tools and other equipment. J. E. Willoughby is chief engineer.

The Board of Commissioners, District of Columbia, Washington, Room 320 District Building, will receive bids until Aug. 2 for one gasoline-propelled portable crane, with boom and clamshell bucket, as per specifications on file; until Aug. 3 for one engine lathe, 12 in. x 5 ft.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for the following equipment: One mechanical blower, 10 to 12 ft. diameter, connected to side-crank steam engine; one 100 hp. slide valve engine; one 750-gal. per min. centrifugal pump, about 300 r.p.m., suitable for connection to waterwheel; one single stage, belt-driven air compressor, with capacity of 1000 cu. ft. per min., and one belt-driven air compressor, 300 cu. ft. per min. capacity; one or more high-speed planers and band resaws; a quantity of 12 to 14-in. truck wheels and axles, suitable for use on 36-in. gage industrial cars; two electric motors, 100 to 150 hp., three-phase, standard voltage; three transformers, 100 kva. each, 2300 volts high tension and 575 volts low tension; three 15-kva. transformers, 200 volts high tension and 550 volts low tension, and three 500-kva. outdoor type transformers, 13,200 volts high tension and 2200 volts low tension.

The Supreme Motor Repair Co., 1631 West Broad Street, Richmond, Va., has inquiries out for a drill press and cylinder grinder.

Bids will be received by the quartermaster, United States Marine Corps, Navy Department, Washington, until July 25 for one single-spindle shaper, one grinder and miscellaneous equipment, schedule 38-1924.

The Currituck County Board of Education, Currituck, N. C., will build a one-story vocational shop at the Poplar Branch School. Leslie N. Boney, Wilmington, N. C., is architect.

The Poole Engineering & Machine Co., Woodbury, Baltimore, is arranging for expansion in the department now devoted to the manufacture of locomotive boosters, designed to provide increased power for train-starting, produced under



A TESTING track 1270 yd. round, built on the roof of the Fiat automobile plant at Lingotto, near Turin, Italy, is used to test the new motor car chassis and finished cars. The illustration shows King Victor Emanuel III inspecting the track. It is over 100 ft. above the ground and 75 ft. wide, surrounding four courts, which are placed in the center of the rectangular factory. The curves are banked 20 ft. high, and great speeds are possible. Gasoline and oil are pumped to the track from underground tanks.

contract with the Franklin Mfg. & Supply Co. Richard W. Alexander has been elected president, effective Aug. 1.

W. M. Whaley & Co., 51 Commercial Place, Norfolk, Va., machinery dealer, is in the market for a 200 to 250-hp. boiler, Scotch marine type, with appurtenances.

The Farrar Lumber Co., Bainbridge, Ga., is in the market for a mechanical fan, second-hand, 45 to 50 in. diameter, double type.

Walter B. Bauguess, Jefferson, N. C., and associates, are planning the construction of a new hydroelectric power plant on the New River, near Jefferson, with initial capacity of about 1000 hp.

The Hickory Chair Mfg. Co., Hickory, N. C., has plans for a new factory, 100 x 225 ft., to replace its works recently destroyed by fire with loss of $100,000, including machinery.

The Bunn-Cadillac Co., Waycross, Ga., is planning to purchase an air compressor.

The W. M. Layton Brick Co., Smithfield, N. C., is planning the installation of a steam shovel at its clay properties, new or second-hand.

The Shelby Foundry Co., Shelby, N. C., has awarded contract to O. C. Connor, Shelby, for the erection of a new one-story building, 40 x 100 ft., to be equipped for the most part for the production of gear blanks, etc. The company is operating a plant on North Lafayette Street and will remove to the new location. Thomas J. Babington is head.

The City Council, Hagerstown, Md., will install an electrically operated pumping plant in connection with a new municipal waterworks and system, estimated to cost $1,000,000.

The Battey Machinery Co., Rome, Ga., has inquiries out for two electric motors, 10 and 40 hp., respectively, complete with base, pulley and starter.

The Sandy Ridge Coal Co., Big Stone Gap, Va., recently formed with a capital of $350,000, is planning for the installation of electrical and mechanical equipment at its local properties. James W. Gerow is president, and R. T. Irvine, secretary.

V. I. Spurgeon, Gaffney, S. C., has been awarded contract covering about $150,000 for the erection of a three-story high school at Gaffney. Equipment will be installed in the manual training department.

New England

BOSTON, July 16.

MACHINE tool dealers in this section made a poor showing the first half of this month, but prices have held remarkably well in the face of adverse business conditions. The past week saw improvement in prospects, although spotty. It is not anticipated that much business will be booked this month, but the trade looks for a betterment in August and further gains thereafter.

Something like $11,000,000 has been appropriated by the city of Boston for schools and equipment. The Massachusetts Legislature has authorized the expenditure of about half this sum within the next two years and the school authorities will shortly map out an expansion and equipment program.

Although not general, New England machine tool builders report improved business from other sections of the country since July 1. A Worcester builder has booked approximately $100,000 in orders. Stress is placed on the fact that under existing immigration laws the cost of labor must remain high and the supply small. High wages stimulate a demand for labor-saving machinery, and machine tools play an important part in their manufacture. The automotive and allied industries are believed to be tooled up for the remainder of 1923 production, but more intensive and economic machining operations will be necessary in 1924, which should begin to make itself felt in machine tool circles within a short time.

New England's textile machinery industry, which slowed up recently, gives promise of the greatest year on record in 1924. Her package machinery builders are well occupied, more so than a year ago, and constantly growing more active. The development of electric power plants, because of her position with regard to coal mines, necessarily must expand tremendously, which means continued activity in the electrical equipment field. Railroad equipment buying is not expected to expand very much, due to the financial condition of New England's carriers, yet railroad shop equipment makers are optimistic regarding the outlook in other sections of the country. Mine equipment makers are busy and practically assured continued prosperity well into 1924. Foundry equipment builders should steadily benefit from the growing scarcity of molders. In fact, machine tool builders are looking forward to good business from all producers of labor-saving machinery.

The Wachusett Nail Corporation, Hubbardston, Mass., wire nails, has incorporated. A new and larger works has been purchased and the company has tentative plans for additional equipment. Roscoe W. Wilbur is manager.

A permit has been granted the Bird Machine Co., South Walpole, Mass., to erect a one-story, 80 x 140-ft. machine shop.

The Charles T. Tenney Co., Boston, manager of electric power companies, has tentative plans for a power house at Salem, Mass., similar to the one being constructed by the Edison Electric Illuminating Co. at Weymouth, on a 10-acre water front recently purchased. Cranes and machine shop equipment will be required.

The William A. Hardy & Sons Co., Water Street, Fitchburg, Mass., has awarded the contract for a one-story, 50 x 50-ft. brass foundry.

Steps have been taken by the Boston Gear Works, 256 Franklin Street, Boston, for the erection on Holmes Street, Quincy, Mass., of a two-story, 75 x 100-ft. addition.

The Wood Worsted Mills, Lawrence, Mass., a subsidiary of the American Woolen Co., Boston, is erecting an addition to its boiler plant.

Beggs & Cobb, Winchester, Mass., leather manufacturers, have let a contract for the erection of a new power plant. Edward C. Brown, 220 Devonshire Street, Boston, is the engineer.

Coal handling equipment is required by the Consolidated Coal Co., New York, for improvements being made at its Portsmouth, N. H., property.

The International Silver Co., Meriden, Conn., is making extensive changes in the Colt Patent Fire Arms Mfg. Co. plant, recently acquired. The building is one-story, 80 x 200 ft., in which will be installed rolling mill equipment. A new unit for the production of castings will be erected.

The Oakville Co., Waterbury, Conn., manufacturer of pins, metal clips, etc., is having plans drawn for an addition. Lockwood, Greene & Co., 24 Federal Street, Boston, are architects and engineers.

The United Electric Co., State Street, Springfield, Mass., will commence the erection of a one-story and basement power house, 40 x 70 ft., at East Springfield, to cost $45,000. McClintock & Craig, 33 Lyman Street, are architects and engineers.

The H. B. Church Truck Service Co., 26 Reading Street, Roxbury, Boston, is planning for the installation of a power winch and quantity of small tools, including reamers, drills, taps, etc.

The Hall Pipe Organ Co., West Haven, Conn., has acquired a building at Kenyonville, Conn., which will be remodeled for a branch plant for the manufacture of parts. Henry Hall heads the company.

The United Illuminating Co., New Haven, Conn., will make extensions and install additional equipment at its power plant on Grand Avenue, to cost approximately $40,000.

The Walker-Stewart Foundry Co., Summer Street, Southington, Conn., is planning the erection of a new two-story plant to cost $50,000, including equipment.

The Great Northern Paper Co., Madison, Me., will make extensions in its plant and install grinding and other machinery. Improvements will also be made in the present mill.

The Dedham & Hyde Park Gas & Electric Light Co., Dedham, Mass., has made application to issue stock for $50,000, the proceeds to be used for extensions and improvements.

The New York, New Haven & Hartford Railroad Co., New Haven, Conn., has awarded a general contract to the H. Wales Lines Co., Meriden, Conn., for a new engine house, 100 x 105 ft., with repair facilities, at East Hartford, Conn.

Fire, June 29, destroyed a portion of the plant of the Central Maine Power Co., Bath, Me., with loss estimated at $20,000. It will be rebuilt.

The Merrimac Clay Products Co., 53 State Street, Boston, has awarded a general contract to the L. H. Shattuck Co., Manchester, N. H., for its new plant at Plaistow, N. H., to cost $250,000. A machine shop and power house will be built. H. and J. R. Raeder, address noted, are architects.

A manual training department will be installed in the new Morgan Gardner Bulkeley high school to be erected on Maple Avenue, Hartford, Conn., estimated to cost $1,500,000, for which bids are being received on a general contract until Aug. 21. Edward T. Wiley, 983 Main Street, is architect.

Buffalo

BUFFALO, July 16.

TENTATIVE plans are under consideration by the Dahlstrom Metallic Door Co., East Second Street and Buffalo Avenue, Jamestown, N. Y., for a three-story addition to cost $60,000.

The Buffalo-Newton Rifle Corporation, Buffalo, recently organized with a capital of $25,000, will take over and expand the business of the Newton Arms Co., 7 Brewster Street, with plants on Niagara Street and East Jewett Avenue. The new company is headed by C. Newton, D. A. Evans and A. H. Dayton.

William Roehlen, 39 Water Street, Rochester, N. Y., has plans for a one-story machine shop, 45 x 100 ft., at St. Paul and Marietta Streets, estimated to cost $22,000. Leon Stern, 1017 Commerce Building, is architect.

Whistler & Schanland, 1283 Niagara Street, Buffalo, manufacturer of tools, dies, etc., are planning for the installation of a power press.

John Klein, Buffalo, will build a two-story machine and repair shop at 575-89 Tonawanda Street, and will have plans prepared at once.

Fire, July 9, destroyed a portion of the shops of the New York Central Railroad Co., Depew, N. Y., with loss estimated at $50,000, largely confined to motors and other electric power equipment. It is planned to rebuild.

The Watson Truck Corporation, Canastota, N. Y., is planning for the installation of additional machinery for spoke turning and other service.

Bids will be called in the fall for the erection of a new high school at Hamburg, N. Y., with manual training department, estimated to cost $340,000, for which the Board of Education has authorized revised plans.

The Sherman Paper Co., Trust Building, Watertown, N. Y., has plans for a one-story addition, 80 x 100 ft., to its mill at Carthage, N. Y.

The Niagara, Lockport & Ontario Power Co., Lockport, N. Y., will commence surveys for a new hydroelectric generating plant on the Salmon River, near Altnar, Oswego County, to cost $1,000,000, including transmission system. The company recently sold a security issue of $3,000,000, to be used in part for expansion.

Plans have been filed by the Rome Wire Co., Rome, N. Y., for a one-story addition to its branch plant at 180 Clyde Street, Buffalo, 100 x 225 ft., to cost approximately $75,000.

Manual training equipment will be installed in the proposed high school to be erected at Sodus, N. Y., estimated to cost $200,000, for which plans are being prepared by M. Umbrecht, architect, Fayette Park Building, Syracuse, N. Y.

The Penn Yan Boat Co., Penn Yan, N. Y., has plans for two buildings, 80 x 120 ft. and 60 x 100 ft., respectively, estimated to cost $50,000, to replace its works recently destroyed by fire.

The Fuller Co., P. O. Box 125, Adams, N. Y., manufacturer of furniture, is planning for the installation of an electrically operated sanding machine and other equipment.

The C. A. Buffington Mfg. Co., Owego, N. Y., manufacturer of metal-bound folding chairs, etc., has awarded contract to the Austin Co., Cleveland, for a new one-story plant, 60 x 200 ft., estimated to cost $55,000.

B. A. Evans, Ogdensburg, N. Y., is planning for the installation of a lathe, drill press, bench tools and other equipment in a new machine and repair shop to be established at Gouverneur, N. Y.

Pittsburgh

PITTSBURGH, July 16.

THE local machine tool business is dull. Midsummer ordinarily is quiet and buyers are disposed to go slowly until the outlook for the future is clearer. The Pennsylvania Railroad, Southwestern region, recently put out a list of six tools for its Columbus, Ohio, shops. This business will probably be closed at St. Louis, but some local dealers are quoting. The Franklin, Pa., school board recently placed an order for three Sebastian lathes. The Westinghouse Electric & Mfg. Co. has closed for a 10 x 30-ft. Betts planer for its East Pittsburgh works and is understood to be slowly specifying against its Sharon list.

Crane business is slow, both in sales and inquiries, and mill equipment orders are few. It is said that practically none of the business in the latter line which had been figured upon, amounting to about $12,000,000, will be placed in the near future. Requests for appropriations for improvement at local plants of the Carnegie Steel Co. are said to have been turned down in New York.

A new one-story foundry, 80 x 150 ft., will be erected by the Acheson Mfg. Co., Rankin, Pa., manufacturer of steam fittings, etc., to replace the portion of its plant recently destroyed by fire. The company also has tentative plans for two other buildings, 100 x 150 ft. and 100 x 200 ft. respectively. The three structures are estimated to cost $150,000 with equipment. F. C. Robertshaw is in charge.

A manual training department will be installed in the new high school to be erected at Ferndale, near Johnstown, Pa., estimated to cost $150,000, for which revised plans are being prepared by J. E. Adams, architect. The board of Education, H. B. Schrock, 557 Ferndale Avenue, is in charge.

The West Penn Co., West Penn Building, Pittsburgh, operating electric power properties, a subsidiary of the American Water Works & Electric Co., New York, has arranged for an increase in capital from $31,000,000 to $50,000,000 and 500,000 shares of common stock, no par value, a portion of the proceeds to be used for extensions and improvements in electric plants and systems.

The Bravo Contracting Co., Diamond Bank Building, Pittsburgh, will build a new one-story structural shop, 75 x 275 ft., at its shipbuilding plant at Neville Island, estimated to cost $75,000 with equipment.

The Ohio River Edison Co., recently organized under Delaware laws as an interest of the Pennsylvania-Ohio Power & Light Co., Sharon, Pa., is perfecting plans for a new steam-operated electric power house on the Ohio River, near Toronto, Ohio, with capacity of 100,000 hp. With steel tower transmission system it is estimated to cost $10,000,000. Later it is purposed to increase the output to 400,000 hp. Another subsidiary has been organized by the Pennsylvania-Ohio company to be known as the North-East Coal Co., which will purchase about 8000 acres in Jefferson County, Ohio, for coal supply for the new generating plant. It is proposed to install a complete mining plant with electrically-operated machinery.

The Penn-American Refining Co., Rouseville, near Oil City, Pa., has commenced rebuilding the portion of its oil refinery recently destroyed by fire with loss of about $150,000.

The West Virginia Water & Electric Co., Charleston, W. Va., is planning the installation of centrifugal pumping equipment at its plant in the South Hills section. C. S. Dawson is general manager.

The Board of Education, Pittsburgh, is said to be arranging for the early purchase of machine tools and other equipment for the manual training department at the Westinghouse High School.

Manual training equipment will be installed in the three-story high school to be erected by the Union High School District, Dunbar, W. Va., estimated to cost $90,000. Walter F. Martens, Charleston, W. Va., is architect.

The American Sheet Glass Co., Clarksburg, W. Va., recently organized with a capital of $250,000, has acquired a site for a new plant, estimated to cost $150,000 with machinery, and will have plans drawn at once. It will include a power house. P. M. Robinson heads the company.

The Cataract Smokeless Coal Co., Bachman, W. Va., recently organized with a capital of $250,000, is planning the installation of electrical and mechanical equipment at coal properties in this section. Herbert R. Smith and Medford J. Brown are heads.

A manual training department will be installed in the new two-story and basement high school to be erected at Bradford, Pa., estimated to cost $200,000, for which the Board of Education will soon select an architect.

The North, West and South Shenango Township Light & Power companies, Shenango, Pa., have been chartered under State laws to install and operate electric power plants and systems in the respective districts. A. A. Culbertson, Erie, Pa., is treasurer of the companies.

The Red Jacket Coal Co., Charleston, W. Va., has plans for a new four-track coal tipple at its properties on Mate Creek, Thacker coal field. W. M. Ritter, chairman of the board of the W. M. Ritter Lumber Co., Charleston, heads the company.

The Beaver Falls Art Tile Co., Beaver Falls, Pa., has awarded contract to the Farris Engineering Co., Empire Building, Pittsburgh, for a four-story addition, 175 x 300 ft., to cost $85,000 with machinery.

The Dun Glen Coal Co., Glen Jean, W. Va., recently organized with a capital of $500,000, is planning for the installation of electrical and mechanical equipment on properties acquired in this section. C. P. Galloway and Charles Ash, both of Glen Jean, are heads.

Detroit

DETROIT, July 16.

JOHNSON BROTHERS, Ferrysburg, Mich., are planning the erection of a one-story addition to their boiler and plate works, to provide about 7500 sq. ft. of additional floor area.

The Gem Foundry Co., 271 West Western Avenue, Muskegon, Mich., is having plans drawn for a new one-story branch foundry, 60 x 100 ft., at Hart, Mich. E. N. Vanderwest, Montgomery Block, Muskegon, is architect. Henry J. Pangburn is general manager.

The Special Furniture Co., Grand Rapids, Mich., has tentative plans for rebuilding the portion of its plant destroyed by fire July 4, with loss estimated at $100,000 including machinery.

The Monroe Board & Lining Co., Monroe, Mich., manufacturer of paper products, has acquired the local plant of the Republic Glass Co., and will remodel the structure for new works. It is proposed to remove the present factory at Barberton, Ohio, and concentrate production. The company has acquired the plant and business of the Lignistra Fibre Co., Barberton, and will operate as a subsidiary. It will be extended and additional equipment installed. William Gutmann is president.

The J. Heddon's Sons Co., Dowagiac, Mich., operating a general machine shop, is planning for the installation of an automatic milling machine, Brown & Sharpe type.

The Timken-Detroit Axle Co., Waterloo Avenue and the Belt Line Railway, Detroit, has acquired the plant and property of the Standard Equipment Co., Lorain Avenue and West 106th Street, Cleveland, manufacturer of automobile parts, for a new branch plant.

The Spaulding Electric Co., 1344 Michigan Avenue, Detroit, manufacturer of electrical equipment, will commence the erection of a one-story addition, estimated to cost $15,000 exclusive of equipment.

The Anchor Concrete Machinery Co., Adrian, Mich., has plans for the construction of a one-story addition, 60 x 65 ft. Eugene P. Olson is general manager.

The Westcott Engineering Co., 111 West Washington Street, Chicago, structural engineer, has plans for a new two-story mechanical works, 150 x 230 ft., at Ludington, Mich., to cost $75,000, for a company whose name is temporarily withheld.

The Lincoln Mfg. Co., 2630 Erskine Street, Detroit, operating a metal stamping and spinning plant, is planning the installation of a toggle drawing press, Bliss type, second-hand.

The Tamarack Mining Co., Calumet, Mich., is planning the installation of three electrically operated pumping units each with capacity of 350 gal. per min., with motors and auxiliary equipment.

The Detroit Insulated Wire Co., 4561 Wesson Street, Detroit, will commence the erection of a new one-story plant at 6000 Vigo Street, estimated to cost $45,000, including equipment.

The Truck Parts & Foundry Co., Alma, Mich., has arranged for the removal of its plant to a building formerly occupied by the Alma Creamery Co., which will be extended for increased production.

Chicago

CHICAGO, July 16.

THE machine tool market is quiet in all departments. There have been a few more inquiries from industrial companies the past week, but no orders to speak of. No further railroad buying has developed, but considerable business is pending and the Illinois Central has put out a few new inquiries, including a 500-lb. power hammer, a 32-in. shaper, and a 20-in. and a 42-in. drill press. The Elgin, Joliet & Eastern, which was expected to close against its list this week, has asked for revised quotations. The American Steel & Wire Co. is in the market for a 72-in. boring and turning mill for its Anderson, Ind., plant.

Prices are unchanged, but machine tool builders are showing greater flexibility in quoting on new business.

The Chicago Steel & Wire Co., Chicago, has acquired a tract, 193 x 300 ft., on the east side of Torrence Avenue, 610 ft. north of 103rd Street, immediately adjoining its present plant, and will start work immediately on a three-year building program. One one-story factory to cover the entire lot, involving an expenditure, together with equipment, of $500,000, will be erected in three units.

Dubin & Eisenberg, 14 West Washington Street, Chicago, have taken bids on a one-story addition, 50 x 106 ft., to a factory at 5841-43 South Loomis Street, for the People's Metal & Iron Co. The cost is $15,000.

The American Linseed Co., 2225 South Lincoln Street, Chicago, has let contract for a plant, 70 x 112 ft., and alterations, at 2225 Lumber Street, to cost $95,500.

Mojonnier Brothers, manufacturers of dairy machinery, Milwaukee, and 739 West Jackson Boulevard, Chicago, have let contract for a one-story factory, 124 x 202 ft., at 4607-23 West Ohio Street, to cost $45,000.

The Niehoff Corporation, recently organized, has leased a plant at 224 West Illinois Street, 40 x 100 ft., and will manufacture growlers, magnetizers, coil springs, bridges, platinum and tungsten contacts. The equipment used will include three engine lathes of one type and eight lathes of another type, five punch presses, three spinners, one screw machine and milling machines, shapers and bench lathes. Officers are P. G. Niehoff, president; Wilson Compton, vice-president, and E. A. Harrington, secretary and treasurer.

The Jones, MacNeal & Camp Mfg. Co., Otis Building, Chicago, recently incorporated, has a plant at Warsaw, Ind.,

and will manufacture electric steel drills and portable drill stands. Officers are Kenneth MacNeal, president, and G. W. Wilson, vice-president.

The Universal Tamping Machinery Co., Inc., Peoria, Ill., recently formed with $50,000 capital stock, is a reorganization of the partnership known as the Universal Concrete Machinery Co. The company will continue to build concrete block and brick-making machinery, steel block and brick cars and jigging machines. It has just purchased some additional machinery and does not expect to be in the market again for some time. Officers are C. S. Emert, president and treasurer; B. G. Lange, vice-president, and W. H. Janssen, secretary.

The sheet metal plant of G. O. Morton, located in the Woodward Governor Co. building, Rockford, Ill., has been sold to V. B. and V. L. Parker, who will operate it under the name of the Parker Brothers Co.

The Studebaker Corporation has started work on a foundry, 683 x 722 ft., a car storage building and crane shed, 59 x 76 x 364 ft., and an addition to the power plant, 68 x 89 x 90 ft., at South Bend, Ind.

The Federal Mfg. Co., brass finisher, Columbus, Ohio, has purchased 17 acres near Holland, Mich., and will erect a one-story plant, 130 x 300 ft.

A power house to cost $100,000 will be erected at the State Industrial School for Boys, Lansing, Mich.

Within a month the capacity of the cold rivet department of the Champion Rivet Co., at East Chicago, Ind., will be doubled. More than $60,000 has been expended to enlarge the plant.

The S. Ward Hamilton Co., manufacturer of metal specialties, Harvey, Ill., has had plans prepared for a one-story addition, 90 x 170 ft., to cost $60,000.

The Davison Machine Shop, Shelbyville, Ind., has purchased a building at 39 East Jackson Street, which will be remodeled for occupancy within 30 days.

The Charter Gas Engine Co., Sterling, Ill., is considering plans for a one-story and basement addition. W. A. Robinson is president.

Manual training equipment will be installed in the proposed high school to be erected at Brainerd, Minn., estimated to cost $250,000, for which an architect will soon be selected to prepare plans.

The Federal Ice Refrigerating Co., 112 West Adams Street, Chicago, is considering plans for the erection of new works at Mason City, Ill. H. V. Norwelle is president.

The Southern Illinois Light & Power Co., St. Louis, has acquired the municipal light and power plant at Ava, Ill., and will furnish service in this section. Extensions are planned, including transmission line construction.

The Crystal Ice Co., Havana, Ill., has tentative plans for a one-story plant, estimated to cost $40,000. G. H. Radcliffe is one of the heads of the company.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Boone, Iowa, estimated to cost $155,000, for which bids are being asked on a general contract until July 20. Dougher, Rich & Woodburn, Valley National Bank Building, Des Moines, Iowa, are architects.

The Lincoln Stove Repair Co., 205 South Tenth Street, Lincoln, Neb., O. J. Allison, head, has plans for a one-story and basement works, 100 x 140 ft., estimated to cost $65,000.

The Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, will have plans prepared for extensions and improvements in its locomotive repair shops and yards at Council Bluffs, Iowa, to cost $500,000 including machinery. New coal chutes will be constructed and automatic conveyors installed. Later a new 18-stall engine house, with repair department and 100-ft. turntable, will be erected.

The Russell, Burdsall & Ward Bolt & Nut Co., Rock Falls, Ill., has tentative plans for a two-story building, 100 x 170 ft., the greater part to be used as a machine shop. Headquarters of the company are at Port Chester, N. Y.

F. K. North, 1801 Diversey Parkway, Chicago, is inquiring for a Warner & Swasey gate valve seating machine.

The Illinois Malleable Iron Co., 1801 Diversey Parkway, Chicago, is inquiring for one 15-ton, 8-wheel steam locomotive crane with at least a 50-ft. boom.

Indiana

INDIANAPOLIS, July 16.

PLANS are being prepared by the Whiting Foundry Equipment Co., Whiting, Ind., for a one-story addition, to cost in excess of $35,000. L. G. Hallberg, 116 South Michigan Avenue, Chicago, is architect and engineer.

The Citizens Gas Co., Indianapolis, will have plans drawn for rebuilding its benzol by-products plant, destroyed by fire July 8 with loss reported at $200,000, including machinery. The new structure will cost approximately a like amount. John R. Welch is president.

F. J. Gardner, 622 Wagner Street, Fort Wayne, Ind., has inquiries out for sectional steel buildings and is desirous of reaching manufacturers of structures of this character.

Electric, steam power and other equipment will be installed in the new three-story and basement addition to be erected by the Progress Laundry Co., 420 East Market Street, Indianapolis, estimated to cost $115,000. Russel E. Edwards, 45 Union Trust Building, is architect.

The Bastian-Morley Co., La Porte, Ind., manufacturer of boilers, heaters, etc., is planning the erection of a two-story addition, estimated to cost $45,000 including equipment.

The Indiana General Service Co., Marion, Ind., has plans for extensions in its local generating plant and the installatio of a new 10,000 kw. turbo-generator and auxiliary machinery. A new electric substation will be built at West Marion and extensions made in transmission system. The project will involve close to $1,000,000, including machinery.

The La Salle Paper Co., South Bend, Ind., has plans for the erection of a new unit, estimated to cost $300,000 with machinery.

The Hoosier Universal Machinery Co., Goshen, Ind., has been organized to take over and expand the plant and business of the Hoosier Drilling Machine Co. The production of drilling machines and vises will be continued, with the addition of departments for the manufacture of universal joints, and industrial trucks and parts, the latter to be known as the Hoosier Factory Truck.

The National Handle Co., Fort Wayne, Ind., will commence the erection of the first unit of its proposed plant on Erie Street, to include a power house estimated to cost $100,000 with quipment. Other buildings will be erected later.

The Interstate Public Service Co., Columbus, Ind., will make extensions in its plant and system and install additional equipment.

Frank F. Robinson, Indianapolis, has perfected plans for the establishment of a new welding and general metal repair works at 3713 Massachusetts Avenue.

Milwaukee

MILWAUKEE, July 16.

ONE feature of the machine-tool business, which is expected to help keep trade active the remainder of the year, is the reinstatement of several important undertakings and the projection of new ones in Milwaukee and throughout Wisconsin, which have been in abeyance for about six months to await the outcome of a program of radical taxation in the Wisconsin Legislature, now at an end. In many cases inquiries have been before dealers and manufacturers for some time past, but prospects are for early closing of purchases. So far as demand for tools from other sections of the country is concerned, business placed in this market is of small proportions, although generally in excess of the same time last year.

The Belle City Malleable Iron Co., Racine, Wis., which is executing a plant replacement and enlargement project involving $800,000 in all, has decided to proceed with the construction of the new foundry, as originally planned. It has now been decided to erect one-half of the building this year, adding the other half next year. It will be 115 x 360 ft., duplicating the present melting capacity. Investigation is being made to determine if it will be possible to complete work before Dec. 1 on a contemplated structure, 150 ft. long, to connect a new annealng shop, erected during the past year, with the shipping room. Nelson & Co., general contractors, Racine, are in charge of construction of the entire project. C. S. Anderson is general manager of the Belle City company.

The city of Milwaukee expects to ask bids before Aug. 1 for coal and ash handling equipment for the steam generating unit of the new Riverside Pumping Station. While no official estimates have been issued, it is expected that this equipment will cost in the neighborhood of $75,000. R. E. Stoelting is commissioner of public works.

The Simmons Co., New York, which now has under construction at the main factory in Kenosha, Wis., a seven-story building for the manufacture of a new line of steel chamber, hotel and office furniture, finished in exact duplication of the wood product, to supplement its line of steel beds, is contemplating the establishment of its own glass works for the production of mirrors, castors, etc. No intimation has

been given with respect to the location of the new unit. Milton H. Pettit is vice-president in charge of the operation of the Kenosha works.

The Riverview Foundry Co., Silver Lake, near Kenosha, Wis., suffered the total destruction of its stove and range foundry and machine shop by fire caused by lightning on July 10. The loss of $55,000 is offset by $19,000 of insurance. The industry will be rehabilitated, but it has not been decided if the present site will be utilized.

The Curtis Automobile Co., 143 Eighth Street, Milwaukee, has engaged the Federal Engineering Co., 444 Milwaukee Street, local, to design and construct a new garage and maintenance building, three stories and basement, 100 x 130 ft., at Broadway and Martin Streets. It will cost about $125,000 and require much new shop equipment, fixtures, etc. Work will begin about Aug. 1. Frank Olson is vice-president and treasurer.

The city of North Milwaukee, Wis., at a special election, voted to issue bonds in the sum of $125,000 for the erection and equipment of a new high school with vocational training facilities. Van Ryn & DeGelleke, architects, 114 Grand Avenue, Milwaukee, are preparing plans. E. T. Neumann, 439 Thirty-sixth Street, North Milwaukee, is secretary of the board of education.

The Stevens Point Brick Mfg. Co., Stevens Point, Wis., intends to start work immediately on the reconstruction and equipment of its brick, tile and general clay products plant, destroyed by fire July 9 with an estimated loss of $35,000. Nearly all the machinery will require replacement. Joseph Kuchnowski is president and manager.

J. U. Schmidt, Prairie du Sac., Wis., is buying a few new and used tools for a garage and machine shop now under construction on the site of his machine shop and smithy.

The Board of Education, Ladysmith, Wis., has let contracts for the erection of an addition to the high school, to be used for vocational training departments. It will cost about $80,000 including equipment. L. E. Streator is secretary of the board.

The Northern Boiler & Structural Iron Works, Appleton, Wis., has started work on a new fabricating shop, 60 x 100 ft., over the present frame building, to be dismantled later. Inquiry is being made for one 10-ton electric and one 5-ton hand-operated crane. Additions to the air compressor room and power plant were completed last fall and all equipment has been installed. William H. Timme is president.

The Board of Public Works, South Milwaukee, Wis., is taking bids for the construction and equipment of a sewage disposal plant, estimated to cost $35,000, and designed by Alvord, Burdick & Hawson, consulting engineers, 8 South Dearborn Street, Chicago.

The American Skein & Foundry Co., Racine, Wis., is erecting an addition to its gray iron shop and will install an additional cupola. With other equipment the improvement will cost about $50,000.

The United States Engineer Office, Federal Building, Milwaukee, is taking bids for furnishing two 1-yd. clamshell buckets and two horizontal duplex piston steam pumps.

The Chisholm-Scott Viner Co., Columbus, Wis., organized some time ago to manufacture special machinery for removing peas from vines for canning factories, plans to start work shortly on the erection and equipment of a machine and assembling shop, estimated to cost $50,000.

Cleveland

CLEVELAND, July 16.

SOME new inquiry for machine tools has come from the railroads. The Pennsylvania has an inquiry out for a 5 and 6-ft. radial drill for its Philadelphia shops and a 7-ft. radial drill, a 42-in. vertical turret lathe, and a 21-in. drilling machine for its St. Louis shops. The New York Central has sent out a tentative list of eight machines on which it has asked for approximate prices. A few new small lot inquiries have come from Detroit automobile companies. Machine tool builders do not expect much business from this source during the summer, but look for considerable demand in the fall, should conditions continue good in the automobile industry.

Sales during the week were light. The Elwell-Parker Electric Co., Cleveland, purchased a straight side Toledo press of 50 tons capacity and a Cincinnati milling machine. The Bowdil Co., Bowdil, Ohio, maker of mining tools, purchased six used machines. A local manufacturer of multiple spindle automatic screw machinery reports an improvement in orders and inquiries over June.

The City Car Co., Kenton, Ohio, a subsidiary of the Chicago Poultry Transit Co., has completed and placed in operation a plant for car repair work.

The Superior Motor Coach Co., Lima, Ohio, recently organized, is placing a new plant in operation for the manufacture of bodies for motor cars.

A company is being organized in Sabina, Ohio, for the manufacture of electric washing machines, and expects to begin operation shortly. R. M. Allen is president and George L. Wilson, secretary.

The Massillon Clay Products Co., Massillon, Ohio, has been organized with a capital stock of $125,000 by Walter T. Smith, Edward M. Ertle and others, and will erect a plant for the manufacture of brick.

The Ohio Gear & Machine Co., Kenmore, Ohio, an Akron suburb, has established a plant for the manufacture of gears and mechanical molds.

Cincinnati

CINCINNATI, July 16.

THE larger manufacturers are placing orders in fair numbers, more particularly the General Electric Co. and the Westinghouse Electric & Mfg. Co., both of which were purchasers in this market last week. Railroad orders are also coming to this city in fair numbers, the Denver & Rio Grande Western Railroad having placed a large number here within the past 10 days. Scattered buying from other railroads is also reported, including the Norfolk & Western. Drilling machine manufacturers report a surprising demand for upright drills from the automotive industry the past two weeks, but radial drills are moving slowly.

Inquiry is still generally confined to one and two machines to replace wornout equipment, or to round out present production machinery, and while inquiries continue in fairly large numbers, more difficulty is being experienced in closing deals. Some shops have now about caught up with orders, and a small number of men have been laid off by some manufacturers the past week.

The Hamilton Car Co., Newark, Ohio, will build a new forge shop to replace the one recently destroyed by fire. It also has plans for extensions to increase its output from two to five cars per day. At present the company is engaged in repairing cars. William Hamilton is president.

The foundry and machine shop building of the Bevis & Shartle Machine Co., Middletown, Ohio, has been completed. The company does a general machine shop business, and is headed by Gay Bevis.

The Clark Grave Vault Co., Columbus, Ohio, has awarded contract for an addition, 100 x 160 ft. Considerable metal-working machinery will be installed. A. F. Beck is president.

The Cincinnati Enameling Co., Cincinnati, has been incorporated with a capitalization of $50,000. It will do general vitreous enameling jobbing work, and will also engage in the production of sheet metal specialties. The plant will be located at Elmore and Miller Streets. Robert Heuck, formerly of the Cincinnati sales office of the Republic Iron & Steel Co., is president of the company, and H. E. Johnson, formerly with the Cleveland Metal Products Co. and the Mansfield Vitreous Enamel Co., is general manager.

The Gulf States

BIRMINGHAM, July 16.

A NEW oil refinery will be built by the Humble Pipe Line Co., an interest of the Humble Oil & Refining Co., Houston, Tex., near Hearne, Tex., to be equipped for an initial output of 35 cars a day. It will cost in excess of $200,000.

The Eastern Texas Electric Co., Fort Arthur, Tex., has plans for a three-story addition to its power house at Riverside Drive and Houston Avenue, estimated to cost $135,000 with equipment. The company will also build a steel tower transmission line to Beaumont, Tex., to cost $250,000. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

The Magnolia Petroleum Co., Dallas, Tex., has acquired the plant and property of the Kansas-Gulf Oil Co., in the Northwest and Burkburnett fields, near Wichita Falls, Tex., for $1,250,000. The purchase includes a gasoline refining plant with daily output of 5500 gal. Plans are under way for extensions and the installation of additional equipment.

The United States Gypsum Co., 205 West Monroe Street, [illegible]

Chicago, will commence the erection of a new plant in the vicinity of Sweetwater, Tex., on site lately acquired for the production of gypsum products. It will include a power house and machine shop. The estimated cost is placed at $1,000,000, including machinery. G. W. Rathgens, assistant engineer of the company, will be in charge of construction.

The Equitable Equipment Co., Whitney Building, New Orleans, machinery dealer, has inquiries out for an engine-generator set, 150 to 200 kw. capacity.

Electric power, conveying machinery and other equipment will be installed in the new elevator to be erected by the Smith Brothers Grain Co., Sixth and Pecan Streets, Fort Worth, Tex., to have a daily capacity of 125,000 bu., estimated to cost $110,000. Bids will soon be called.

The Western Public Service Co., Colorado Springs, Colo., has purchased the plant and system of the Calvert Water, Ice & Electric Co., Calvert, Tex., with main power plant at Hearne, Tex. The new owner will make extensions, including the installation of additional equipment and transmission lines. Paul Freeman is division superintendent in charge.

The Standard Equipment Co., Birmingham, machinery dealer, has inquiries out for the following equipment: One electric locomotive crane, 20 tons capacity; three electrically operated air compressors; about 5 miles of portable track, 16 to 25-lb. rails; three double-drum hoisting engines; five steel guy derricks, each 15 to 25 tons capacity; two electrically operated shovels, each about 1½ yd. capacity; one revolving gasoline-engine shovel on crawlers; two portable gas compressors; 50 all-steel, two-way dump cars, and 30 double dump contractors' cars; five electric hoists, three large gyratory crushers, and three large jaw crushers, with elevators and screens; all used equipment.

The Leaksville Veneer & Lumber Co., Leaksville, Miss., recently organized with capital of $750,000, has plans for a new mill, with power house, estimated to cost $90,000 with equipment. Max Bryant, Leaksville, will head the new company; Jefferson Griffith, Beaumont, Miss., is also interested.

The Florida Machine Works, 40 Riverside Avenue, Jacksonville, Fla., has plans for a new one-story electric steel foundry at Church Street and the Seaboard Air Line Railroad, estimated to cost $50,000. F. G. Russell is president and general manager.

The Crystal Salt Co., Pierce Junction, near Houston, Tex., has commenced the erection of the first unit of a new refinery. Another plant unit will be built later. Electric power and mechanical equipment will be installed.

The West Texas Utilities Co., Abilene, Tex., is planning for the electrification of the railroad line from Roby, Tex., to North Roby and vicinity, recently acquired, and will make equipment purchases at an early date.

The Electrolock Mfg. Co., Inc., Grove and Washington Streets, Vicksburg, Miss., recently organized, will operate an assembling plant for the manufacture of special locking devices. It has contracted with Gustave Lidseen, 832 South Central Avenue, Chicago, general machinist, for the production of dies and steel parts, and with the Cutler-Hammer Mfg. Co., Milwaukee, for the manufacture of electrical parts. Later, it is proposed to establish a plant for parts production. W. Hemingway, Jr., heads the company.

The Southwestern Traction Co., Temple, Tex., has plans for a new one-story car repair and machine shop, 75 x 150 ft., with car barn adjoining. W. G. Haag is engineer.

The Board of School Trustees, Goshen, Ala., is arranging for the installation of a manual training department in a proposed school, for which plans will be prepared at an early date.

F. W. Grogan, Spur, Tex., and associates, have acquired the electric light and power plant at Pampa, Tex. Plans are being arranged for extensions and the installation of additional equipment.

The New Orleans Corrugated Box Co., New Orleans, has been organized to take over the Union Paper Products Co., Inc., and the New Orleans Corrugated Fibre Box Co., with capital of $500,000. The local plants will be continued in operation and extensions made for increase in production. Samuel Ohnstein is president and general manager.

J. W. Tuberville and George W. Covington, Hazelhurst, Miss., have acquired the plant and property of the Mississippi Cotton Oil Co., Jackson, Miss. The new owners propose to reorganize the company, extend the plant and install additional equipment.

Manual training equipment will be installed in the high school to be erected at Vernon, Tex., for which a bond issue of $[illegible] has been arranged. The Board of Education is in charge.

The Texas & Pacific Railroad Co., Texas & Pacific Building, Dallas, Tex., is planning the construction of new locomotive and car shops in connection with a new yard at Fort Worth, Tex., estimated to cost $500,000 with machinery. E. F. Mitchell, address noted, is chief engineer.

The Lone Star Gas Co., Eastland, Tex., will commence the construction of its gasoline refinery on property recently acquired near Gordon, Tex., to cost close to $500,000 with machinery. It will also build new pumping plants in the Ranger, Eastland and Desdemona oil fields, estimated to cost $250,000, including equipment.

The Coggins Marble Co., Canton, Ga., wants to purchase a steel tower and tank, the tower to be 50, 60, 75 or 80 ft. in height; the tank to be of 8000 to 20,000 gal. capacity.

The Alamo Iron Works, San Antonio, Tex., is in the market for a plate washer punching press, preferably of the horizontal type, to make wrought washers for ½, ⅝ and ¾-in. bolts.

The Williams Patent Crusher & Pulverizer Co., St. Louis, is inquiring for a second-hand No. 5 Mitts & Merrill hub keyseater, with or without motor attached.

The Central South

ST. LOUIS, July 16.

FIRE, July 9, destroyed a portion of the oil refinery of the Interstate Refineries, Inc., Kansas City, Mo., with loss estimated at $200,000, including machinery. It is planned to rebuild.

The Paducah Electric Co., Paducah, Ky., will break ground early in August for a new unit to provide for an ultimate capacity of 10,000 kw. The plant will be steam operated and additional mechanical coal-handling machinery will be installed. The estimated cost is placed at $375,000.

Manual training equipment will be installed in the new two-story and basement junior high school to be erected at Winchester, Ky., estimated to cost $100,000. R. M. Bates, Jr., Cammack-Watts Building, Huntington, W. Va., is architect.

The Common Council, Pine Bluff, Ark., is planning for the installation of electrically operated pumping machinery in connection with extensions and improvements in the municipal water works. A 60,000-gal. tank on 25-ft. tower will also be installed. Fred Bennett, Citizens' Bank Building, is engineer.

The State Highway Commission, St. Louis, is considering plans for a State-owned cement manufacturing works, estimated to cost $250,000 with machinery. It is proposed to ask for prices on buildings and equipment at an early date.

The Stekel-Lanteman Motor Co., Ellinwood, Kan., is planning for the installation of a lathe, drill press and other equipment.

The St. Louis & San Francisco Railroad Co., 900 Olive Street, St. Louis, has awarded general contract to T. S. Leake & Co., 608 South Dearborn Street, Chicago, for its new car and locomotive shops on Fyler Avenue, to cost approximately $500,000 including machinery. J. G. Jonah is chief engineer.

The Missouri Utilities Co., Mexico, Mo., has tentative plans for extensions in its electric generating plant to consist of a new turbo-generator and auxiliary machinery, with additions in transmission system, estimated to cost $100,000. Negotiations are under way for the purchase of the power plant at Warrenton, Mo., and the station will be extended and additional transmission lines built.

The Kentucky Utilities Co., M. E. Taylor Building, Louisville, has preliminary plans for a new ice manufacturing plant at Lancaster, Ky., estimated to cost $60,000. G. Bogard is company engineer.

The Board of Trustees, Trenton School District, Trenton, Mo., will install a manual training department in its new local high school, estimated to cost $130,000, for which foundations will be laid at once. R. H. Sanneman, Kansas City, Mo., is architect.

The Chickasha Gas & Electric Co., Chickasha, Okla., has acquired the municipal power plant at Minco, Okla., and plans for extensions and the construction of a new trans mission line. F. D. Shaffer is general manager.

The Oklahoma Power Co., Oklahoma City, Okla., has purchased a power site in the Kiamichi Mountains, near Antlers, Okla., and will use it later for a large hydroelectric generating plant. Work is in progress on extensions and improvements in the power plant at Antlers, recently acquired.

Manual training equipment will be installed in the three-story and basement high school to be erected at Perry, Okla., estimated to cost $130,000, for which work will be placed under way at once. Monett & Reid, Empire Building, Oklahoma City, Okla., are architects.

The Scranton Machine Shop, Great Bend, Kan., is planning the installation of a power lathe and other equipment.

An electrically operated pumping plant will be installed at Salina, Kan., by the Common Council, in connection with the installation of a new sewerage disposal works. C. A. Haskins, 517 Finance Building, Kansas City, Mo., is engineer.

The Common Council, Mangum, Okla., is planning for a bond issue, the proceeds to be used for extensions in the municipal electric power plant and the installation of additional equipment.

The Bartlesville Zinc Co., Bartlesville, Okla., has tentative plans for a new unit at its concentration plant, estimated to cost $40,000 including equipment.

The Dix River Power Co., Danville, Ky., has preliminary plans for a new hydroelectric power house on the Dix River, with initial capacity of 30,000 kw., estimated to cost $2,000,000, including a steel tower transmission line. The company is a subsidiary of the Middle West Utilities Co., 72 West Adams Street, Chicago.

The Louisville Gas & Electric Co., 311 West Chestnut Street, Louisville, has plans for a new electric power house at Third and Magazine Streets.

A two-story automobile machine shop and service building, 150 x 170 ft., for company trucks and cars, will be erected on Chouteau Avenue, St. Louis, by the Pevely Dairy Co., 1001 South Grand Boulevard, estimated to cost $100,000.

An electrically operated centrifugal pump, with 50-hp. motor and auxiliary equipment, will be installed by the Board of Water Works Improvement, Dequeen, Ark., in connection with extensions and improvements. W. L. Winters, Fort Smith, Ark., is engineer.

The Pacific Coast

SAN FRANCISCO, July 10.

PLANS are being prepared in the engineering department, Southern Pacific Railroad Co., Southern Pacific Building, San Francisco, for a new locomotive erecting shop at Los Angeles, 25 x 498 ft., estimated to cost $600,000, with machinery. The installation will include three traveling cranes, one of 25 tons capacity, and two of 15 tons each.

The Paramount Motors, Inc., Pomona, Cal., has tentative plans for a new works on the Nichols property, Ganesha Park section, for the manufacture of automobile equipment and parts.

The Fidelity Machine Co., Oakland, Cal., has construction under way on a new plant of the Foothill Boulevard and Stanley Road for the production of metal cores, molds, etc., for the manufacture of tires and mechanical rubber goods. The company was organized recently as a partnership by E. M. McCurry and M. H. Gregg.

The California-Hot Springs Co., Visalia, Cal., has preliminary plans for the construction of a hydroelectric power house to cost close to $100,000, with machinery. Joseph Mitchell is general manager.

The Domestic Trade Bureau, San Francisco Chamber of Commerce, Merchants Exchange Building, is in receipt of an inquiry (D-640) from a manufacturer of agricultural implements in the vicinity of Chicago, for the purchase of a local machine shop and foundry for the establishment of a Pacific Coast plant.

The Vaughn Electric Co., 4220 University Way, Seattle, is planning the installation of a plant in a building at 4240 University Way, for the manufacture of electric fixtures and equipment. The company recently acquired the property and business of the M. & M. Electric Co., Seattle, and is concluding negotiations for the purchase of the plant and equipment of the Sterling Electric Co., Tacoma, Wash. It is purposed to remove some of the latter machinery to the new Seattle works.

The Smoot-Holman Co., care of the Chamber of Commerce, Inglewood, Cal., is negotiating for a site for the erection of a new plant to manufacture automobile equipment and accessories. John Spangler is head.

The Merced Union High School District, Merced, Cal., has taken bids for new machine shops and manual training building at the local high school and will commence foundations at an early date. Allison & Allison, 1405 Hibernian Building, Los Angeles, are architects.

The McCorkle Mfg. Co., Oakland, Cal., manufacturer of gas furnaces, has arranged for the removal to its new plant at Adeline and Twentieth Streets, 100 x 165 ft., where additional equipment will be provided for increased output. D. H. McCorkle is president and S. W. Terry, secretary.

The Beaver Seal Jar Cap Co., Compton, Cal., is arranging for a stock issue of $100,000, the proceeds to be used for the construction of a new plant to manufacture glass jars, metal seals, caps, etc.

Fire, July 10, destroyed a portion of the refinery of the Gilmore Refining Co., Long Beach, Cal., with loss estimated at $175,000, including equipment. It is planned to rebuild.

At a special election, July 2, at Sacramento, Cal., approval was given for the construction and operation of a municipal electric light and power plant, and the creation of a municipal utility district. The proposed station will be of hydroelectric type, and with transmission system will cost $5,000,000.

The board of trustees, Union High School District, Huntington, Cal., is taking bids on a general contract for a one and two-story manual arts and training building at the local high school, 196 x 198 ft., estimated to cost $100,000 with equipment. Rea & Garstang, 905 Trust & Savings Building, Los Angeles, are architects.

Canada

TORONTO, July 16.

DEMAND for machine tools showed considerable improvement the past week, chiefly on account of orders placed by the Toronto Transportation Commission for 136 items for its new car shops under construction in Toronto. Some good business on smaller lists was also closed the past few days and buying in units of two or three is holding steady. The demand is not confined to any single industry, but is spread over practically all lines of manufacture. The automobile industry is a steady customer and is entering the market for tools for replacement purposes, and some fair sized lists also have been making their appearance on new works account.

Prospects of a record grain crop throughout the Canadian West is having a stimulating effect on the machinery and equipment market and is resulting in extensive expenditures on elevator account, a large number of which are under construction throughout the West and for which large sums will be spent on equipment.

The General Motors, Ltd., Oshawa, Ont., has taken out a permit for an addition to cost $155,000.

T. L. McLellan, manager of the town of Kenora, Ont., is in the market for electric light and power plant machinery and boilers.

The Toronto Cement Corporation has started work on the erection of a cement plant at Beachville, Ont., to have a daily capacity of 4500 bbl.

The Sinclair Construction Co., Campbellford, Ont., has the general contract for a power house at Campbellford for the Hydro Commission to cost $250,000. Equipment, which is not included in the contract, will cost aproximately $500,000.

The Lyons Fuel & Supply Co., Ltd., Sault Ste. Marie, Ont., is building an addition to its brick plant for the manufacture of rug face brick. Machinery to manufacture tile will also be installed.

Plans are being prepared by Gore, Nasmith & Storrie, engineers, Confederation Life Building, Toronto, for additions to the Belleville, Ont., waterworks system. The work will include a steel intake pipe, gasoline driven motors, purification plant, etc. J. W. Holmes is clerk.

Bids for the construction of a sludge sewage disposal plant for Cochrane, Ont., are being received by R. C. Morston, town clerk.

Port Moody, B. C., is having plans prepared for an addition to the waterworks plants to cost $25,000. Perry D. Roe is mayor.

The woollen mill owned by J. Walshaw & Son, Ltd., Bolton, Ont., was destroyed by fire with loss to building and equipment of $150,000. It will be rebuilt.

John Wilson, Huron Street, Collingwood, Ont., is preparing plans for a factory for the Canadian Postal Lock-Nut & Bolt Co., for which bids will soon be called. F. A. Bassett, Collingwood, is president.

The general contract for a machine shop at Montreal, for the Montreal Harbor Commission, 57 Common Street, has been awarded to Quinlan, Robertson & Janin, 50 Notre Dame Street. W. P. Fennell, Jr., is manager of the Harbor Commission.

The Edwards Lumber & Pulp, Ltd., Pembroke, Ont., has purchased the mills and limits of the Colonial Lumber Co., Pembroke, and proposes to increase the capacity. It is also the intention to build a planing mill, and the erection of a pulp and paper mill will come up for consideration later. Officers of the Edward company include Gordon C. Edwards, Ottawa, president; J. W. Smith, Pembroke, vice-president and general manager; E. R. Bremner, Ottawa, treasurer; W. R. Beatty, Pembroke, secretary.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:
- Refined iron bars, base price....3.54c.
- Swedish bars, base price....7.50c.
- Soft steel bars, base price....3.54c.

Hoops, base price....5.19c.
Bands, base price....4.39c.
Beams and channels, angles and tees
- 3 in. x ¼ in. and larger, base....3.64c.

Channels, angles and tees under 3 in.
- x ¼ in., base....3.54c.

Merchant Steel

Per Lb.

Tire, 1½ x ½ in. and larger....3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)..4.10c.
Toe-calk, ½ x ⅜ in. and larger....4.60c.
Cold-rolled strip, soft and quarter hard..7.50c. to 8.50c.
Open-hearth, spring-steel....5.00c. to 7.50c.
Shafting and Screw Stock:
- Rounds....4.65c.
- Squares, flats and hex....5.15c.

Standard tool steel, base price....15.00c.
Extra tool steel....18.00c.
Special tool steel....23.00c.
High speed steel, 18 per cent tungsten....75c. to 80c.

Tank Plates—Steel

¼ in. and heavier....3.64c.

Sheets

Blue Annealed — Per Lb.

No. 10....4.59c.
No. 12....4.64c.
No. 14....4.69c.
No. 16....4.79c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.80c.	.....
Nos. 22 and 24	4.50c. to 4.85c.	5.10c.
No. 26	4.55c. to 4.90c.	5.15c.
No. 28	4.65c. to 5.00c.	5.25c.
No. 30	4.85c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized — Per Lb.

No. 14....4.75c. to 5.10c.
No. 16....4.90c. to 5.25c.
Nos. 18 and 20....5.05c. to 5.40c.
Nos. 22 and 24....5.20c. to 5.45c.
No. 26....5.35c. to 5.70c.
No. 27....5.50c. to 5.85c.
No. 28....5.65c. to 6.00c.
No. 30....6.10c. to 6.50c.

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in Butt..	—41	—24	⅛ in. Butt..	— 4	+19
¼ in. Butt..	—46	—32	¼ in. Butt..	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap....	— 5	+14
7-8 in. Lap....	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap..	—34	— 6	7-12 in. Lap..	— 3	+16

Steel Wire

BASE PRICE, FINE AND COARSE — Per Lb.

Bright basic....5.00c.
Annealed soft....5.00c.
Galvanized annealed....5.65c.
Coppered basic....5.65c.
Tinned soft Bessemer....6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet....19¾c. to 20¾c.
High brass wire....20¼c. to 21¼c.
Brass rods....18 c. to 19 c.
Brass tube, brazed....27¾c. to 28¾c.
Brass tube, seamless....25½c. to 26½c.
Copper tube, seamless....27 c. to 28 c.

Copper Sheets

Sheet copper, hot rolled, 23¾c. to 24½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Prime	Seconds
			80 lb..	$6.55 $6.30
			90 lb..	6.65 6.40
			100 lb..	6.75 6.50
IC..	$11.75	$10.50	IC..	7.00 6.75
IX..	13.00	11.75	IX..	8.25 8.00
IXX..	14.75	13.00	IXX..	9.50 9.25
IXXX..	16.50	14.75	IXXX..	10.75 10.50
IXXXX..	18.50	16.50	IXXXX..	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb....$7.00 to $8.00
IC....7.25 to 8.25
IX....8.25 to 8.75
Fire door stock....9.00 to 10.00

Tin

Straits pig....41c.
Bar....48c. to 53c.

Copper

Lake ingot....17½c.
Electrolytic....17 c.
Casting....16¾c.

Spelter and Sheet Zinc

Western spelter....7½c.
Sheet zinc, No. 9 base, casks....10¼c. open 10¾c.

Lead and Solder*

American pig lead....8c. to 8¼c.
Bar lead....11c. to 12c.
Solder, ½ and ½ guaranteed....29c.
No. 1 solder....27c.
Refined solder....23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb....75c. to 90c.
Commercial grade, per lb....35c. to 50c.
Grade D, per lb....25c. to 35c.

Antimony

Asiatic....8c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....32c. to 33c.

Old Metals

Business is quiet and the market is practically unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	12.50
Copper, heavy wire	11.75
Copper, light bottoms	10.00
Brass, heavy	6.50
Brass, light	5.50
Heavy machine composition	9.25
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.00
Lead, tea	3.75
Zinc	4.00

THE IRON AGE

New York, July 26, 1923

ESTABLISHED 1855 VOL. 112, No. 4

Strength of Steels at High Temperatures *

Carbon and Alloy Steels Compared—Effects of Carbon Content and Heat Treatment on Plain Steels—Nickel and Chromium Steels

BY H. J. FRENCH AND W. A. TUCKER

TESTS described in this report were made primarily to determine the general effects of varying composition, particularly with respect to alloying elements, upon the tensile properties of steel at temperatures up to about 600 deg. C. When work was started it was found impracticable to secure alloys in sufficient quantities and made under comparable conditions in which the proportions of a single element were varied while all other factors were kept constant, so that the investigation was largely restricted to commercial steels. Only short-time tests were made which do not give information so much desired, i.e., comparisons under sustained loads in those temperature ranges in which the time factor is of prime importance, but sufficient work was carried out to warrant some conclusions of general interest.

While long-time tests are required to determine limiting temperatures below which definite loads can be applied without considerable flow and subsequent failure they do not, however, supply complete information unless carried out under actual operating conditions, for in most cases in which steels are required for high temperature service other factors such as resistance to specific types of corrosion, etc., are of equal importance. Emphasis is therefore laid upon the fact that the scope of the described tests is restricted to one phase of the general subject of the properties of steels at elevated temperatures.

The work supplements that described in an earlier publication [9]† in which attention was called to the increasing interest in the behavior of steels subjected to high temperature service and the inadequacy of available data. Since that time considerable additional information has been presented by Edert [10], Dickenson [11] and others but no detailed review of their work will here be given. Instead there is appended a bibliography containing a summary of steels tested by various investigators, and in addition such comparisons as appear necessary or desirable will be included in the various figures or tables which follow.

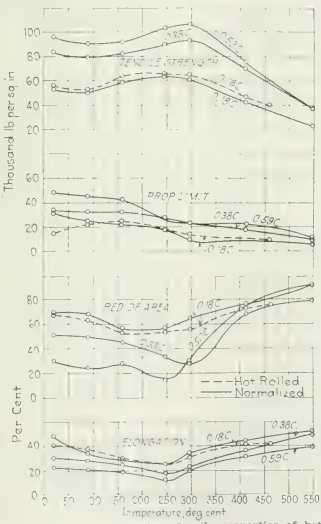


Fig. 1—High temperature tensile properties of hot rolled or normalized carbon steel. Compositions:

C, 0.18	Mn, 0.43	P, 0.017	S, 0.035	Si, —
0.38	0.56	0.014	0.013	0.14
0.59	0.40	0.017	0.027	0.05

Steels normalized by heating respectively to 900, 850 and 850 deg. C. and after 30 min. cooling in air

Materials and Methods Used

Twenty-two steels, first normalized or quenched and tempered, were tested at various temperatures between 20 and 600 deg. C. These include carbon steels of varying carbon content, steels containing single alloying elements such as nickel, chromium, tungsten and uranium and commercial quarternary steels such as nickel-chromium, chromium-vanadium, chromium-molybdenum and nickel-uranium. Except as otherwise indicated, flat test specimens were used with a 2-in. gage length and reduced section of 7/16 in. x ¾ in. and in all cases the equipment and procedure employed was exactly the same as that used in previous tests and already described in detail.‡

The terms proportional limit, tensile strength, etc., used in this report are largely "apparent values," i.e., values observed under a definite set of test conditions and do not have the same significance as in tests at atmospheric temperatures, inasmuch as the properties of steel are so largely dependent upon the rate of loading throughout a large part of the temperature range considered. They serve solely as a basis for comparison of various steels or treatments and were obtained in tests in which care was taken to load all specimens slowly at the same speed. Duplicate, and frequently triplicate, determinations were made at the majority of temperatures chosen and in such cases averages only have been used in the data which follow.

No extended description of inflections in physical properties-temperature curves will be attempted as

*Published by permission of the director of the Bureau of Standards of the U. S. Department of Commerce. The authors are physicist and laboratory aid respectively at the Bureau of Standards, Washington.

†The references in brackets refer to those given in the bibliography at the conclusion of this report.

‡Bureau of Standards, Tech. Paper 219

these are clearly shown for the different steels in the illustrations accompanying this report. The investigation consists primarily of the compilation of a relatively large amount of test data, not well adapted to detailed comparisons of this nature, so that more attention will be paid to the general effects of heat treatment and different alloying elements and to features of special interest in connection with individual alloys.

Carbon Steels

Stress vs. limit of proportionality.—Considerable discussion has centered upon the changes in proportional

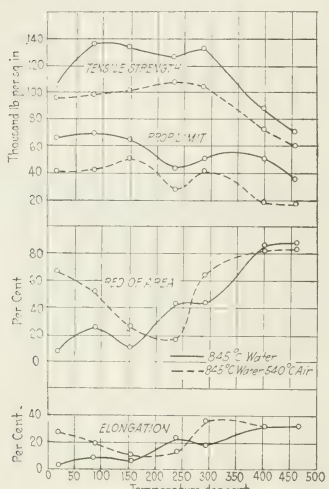


Fig. 2—High temperature tensile properties of water quenched and quenched and tempered medium carbon steel. *C*, 0.33 *Mn*, 0.53 *P*, 0.016 *S*, 0.036 *Si*, 0.07. Quenched samples heated 30 min. at 845 deg. C. and immersed in water. Quenched and tempered samples treated as above and then tempered 30 min. at 540 deg. C.

limit with first rise in temperature in medium or low carbon steels. Some investigators report direct decrease in values while others find negligible variations or a marked increase for alloys of similar composition in which all other factors such as tensile strength and elongation show close agreement. Results shown in Figs. 1 and 2 together with those already reported* for low-carbon steels rolled cold or at blue heat (300 deg. C.) indicate that the proportional limit of steel which has been largely relieved of stress by suitable treatment decreases with rise in temperature. In highly stressed metal resulting from cold or blue-work or quenching and that having residual stress such as often exists in thin sections of hot finished steel, the proportional limit either remains at approximately its room temperature value over a well defined temperature interval or shows an increase with first rise in temperature.

Effects of varying proportions of carbon.—As shown in Fig. 1 the general form of the tensile strength-temperature curves is the same for rolled and normalized metal and for carbon steels of varying carbon content. However, the lower the carbon the lower is the temperature of maximum strength but above about 350 deg. C. the strength of the highest carbon steel drops more rapidly than that of the others, results which agree with the early work of Howard†.

All three steels have good ductility at temperatures of about 350 deg. C. and above, but brittleness in the blue heat range (250 to 300 deg. C.), as shown by values of reduction of area, increases rapidly with carbon content. Likewise the increase in strength at various temperatures produced by raising carbon from 0.38 to 0.59 per cent is not nearly as great as that resulting from a similar increase from 0.18 to 0.38 per cent. It therefore appears desirable to keep carbon low especially when considering temperatures around 300 deg. C.

Effect of heat treatment.—Curves showing the effect of temperature upon tensile properties of 0.33 per cent carbon steel, first water quenched or quenched and tempered, are given in Fig. 2. Comparison with normalized steel shows that the improved properties obtained at ordinary temperatures from quenching and tempering are not maintained at 465 deg. C., but benefits are derived at temperatures up to about 350 deg. C. This is shown by a similar increase in strength at blue heat for both normalized and quenched and tempered samples as well as by the fact that the limit of proportionality does not drop as rapidly with increase in temperature. At the same time values of elongation and reduction of area in the quenched and tempered steel are very nearly equal to and in some cases greater than those in the normalized metal at corresponding temperatures.

Values shown in Fig. 2 for the untempered steel represent combined effects of temperature and variation in properties due to structural changes encountered upon tempering and have been included mainly to show the form of the proportional limit-temperature curve.

Alloy Steels

Steel containing 1.25 *per cent manganese.*—Increase in manganese in normalized low-carbon steel from the usual proportions to 1.25 per cent does not materially alter the changes in tensile properties with rise in tem-

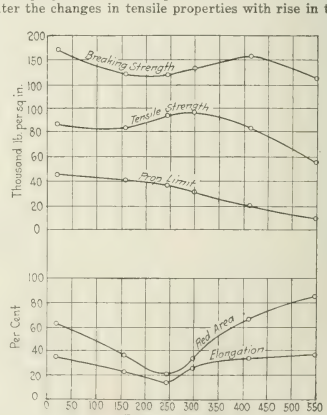


Fig. 3—High temperature tensile properties of normalized carbon-manganese steel. *C*, 0.38 *Mn*, 1.26 *P*, 0.070 *S*, 0.047 *Si*, 0.12. Heated 30 min. at 850 deg. C. and air cooled. Breaking strength is unit load at moment of fracture

perature, as is shown in Fig. 3, but produces a somewhat stronger metal without appreciable loss in ductility. The benefits derived from such an increase are, however, greater at temperatures below about 400 deg. C. than above and became generally less as the temperature is increased.

Nickel steels.—Addition of 3.50 per cent of nickel

*Bureau of Standards, Tech. Paper 219

†J. E. Howard, "Physical Properties of Iron and Steel at Higher Temperatures," THE IRON AGE, April 10, 1890, p. 585.

to normalized medium-low carbon steel raises the proportional limit and tensile strength at room temperatures with only a minor decrease in ductility but these advantages largely disappear at temperatures of about 500 to 550 deg. C. In fact, comparative tests made and already reported [9] show the nickel steel to be somewhat "softer" and more ductile at 550 deg. C. than plain carbon steel of similar carbon content produced under comparable manufacturing conditions. There would therefore seem to be little or no advantage derived from this nickel addition except at slightly elevated temperatures at which quenched and tempered carbon steel also shows superiority over normalized metal.

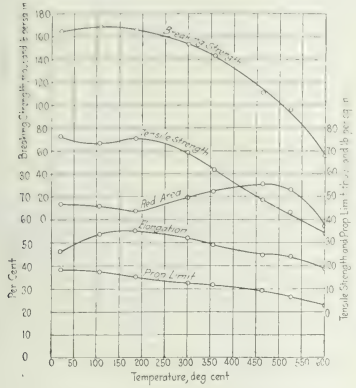


Fig. 4—High temperature tensile properties of 28 per cent nickel steel. *C*, 0.20 *Mn*, 0.80 *Si*, 0.15 *Ni*, 28.6. Test bars 0.4 in. diameter with 2-in. gage length; first heated to 800 deg. C. for 30 min. and air cooled. Breaking strength is unit load at moment of fracture

Curves for 28 per cent nickel steel are given in Fig. 4 and show that the characteristic low limit of proportionality at ordinary temperatures is gradually lowered to a few thousand pounds at 550 to 600 deg. C. While the strength is slightly higher in this temperature range, the ductility as represented by elongation and reduction of area is only about half that of carbon steel of similar carbon content. Likewise no appreciable gain in strength commensurate with the large proportion of added nickel is found at 300 deg. C., but special characteristics such as resistance to certain types of high temperature corrosion and low coefficient of expansion in certain low temperature ranges make this steel of special value.

An interesting feature is the drop in both strength and ductility with temperature rise from 500 to 600 deg. C. A similar effect was observed beginning at lower temperatures in steel of slightly higher nickel content by Bregowsky and Spring [1].

Chromium steels.—As noted in a previous report [9] normalized steel containing 1 per cent chromium shows greater resistance to "weakening" by increase in temperature to about 550 deg. C. than either plain carbon or 3.50 per cent nickel steels. To obtain comparisons between alloys of higher chromium content tests were made at 20, 300, and 550 deg. C. on three steels containing respectively 2.9, 5.4 and 10 per cent chromium and 0.08 to 0.15 per cent carbon, as shown in Fig. 5.

These steels, which were prepared at the Bureau of Standards, were melted in magnesia-zircon crucibles in a high frequency induction furnace and ingots about 1¼ in. square weighing 1000 to 1200 gms. were chill cast. They were subsequently forged at about 1100 deg. C. to ½ in. flats about 1½ in. in width and then subjected to a high temperature quench from 930 deg. C. to assist in breaking up possible traces of ingotism remaining after the limited hot reduction. The bars were next heated to 875 deg. C. and cooled in air and round tensile test specimens 0.4 in. in diameter in reduced section prepared.

Unfortunately the silicon content varies between the low and two higher chromium steels, so that the results shown in Fig. 5 represent the combined effects of varying proportions of both elements. However, the general effect of chromium is to retard or minimize "softening" around 550 deg. C., a feature which will be referred to again in a subsequent section of this report. The 5.4 and 10 per cent chromium steels are air hardening and show high strength values which can be modified by change in initial temperature of cooling and which would be materially reduced upon long exposure at elevated temperatures.

Quenching of stainless steel vs. high temperature tensile properties.—Tests were also made to show the effect of varying heat treatment upon one of the most important industrial air hardening alloys in the iron-carbon-chromium series for high temperature service, namely, 13 per cent chromium or so-called stainless steel. Results will not, however, be reproduced, as these data have already been published in THE IRON AGE.* This alloy has high strength and limit of proportionality in the range about 550 deg. C. where most carbon and structural alloy steels show a decided "weakening" and at the same time it retains good ductility. However, its advantages at lower temperatures, between 20 and 300 deg. C. over quenched and tempered carbon steel of similar carbon content are not so marked.

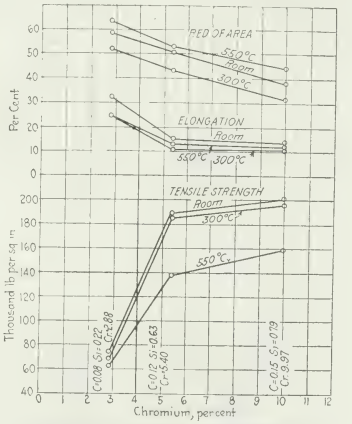


Fig. 5—Tensile properties of various chromium and chromium-silicon steel at 20, 300 and 550 deg. C Compositions:

C	*Mn*	*P*	*S*	*Si*	*Cr*
0.08	0.57	0.014	0.042	0.22	2.88
0.12	0.64	0.010	0.030	0.63	5.40
0.15	0.59	0.005	0.054	0.79	9.97

Refer to text for complete preliminary heat treatments

(*To be concluded in* THE IRON AGE, *Aug.* 2)

*"Stainless Steel at High Temperatures." THE IRON AGE, 110, No. 7, p. 404 (Aug. 17, 1922).

With the starting up of one blast furnace and several open-hearth furnaces at the plant of the British Empire Steel Corporation, Sydney, N. S., on July 16, and the determination of the company to operate coal mines at Glace Bay, the strike situation there is taking on a new and more active phase. That there will be resistance to the operation of trains is assured and preparations are being made to provide a strong military escort. A general tightening up is reported. The police and military forces have a drag net over the whole area. Around reserve colleries a searchlight is playing all night, picking out small groups where pickets have gathered or miners congregate to talk matters over.

BUSY AT INDIANAPOLIS

Continued Activity of Metal Working Industries—Building Breaks Records

INDIANAPOLIS, July 23.—With the exception of the automotive interests, the metal working industries of Indianapolis are still running at about the same rate that has been maintained for the past three or four months. The demand for automobiles has fallen off to some extent, and production programs have been curtailed, but the manufacturers state that this is nothing unusual at this time of year, and they are making preparations for fall programs which call for practically the same rate of operations as was maintained during the spring months. Many of the manufacturers contemplate increasing the percentage of closed models this fall, and some fears are being entertained that body manufacturers, who are reported to be heavily booked for the closed models, will be unable to take care of the demand.

With the exception of those foundries catering largely to the automobile trade, there has been little decrease in the melt of pig iron. Chain manufacturers are very busy, with some of them reporting orders booked for many months ahead. There has also been no appreciable decline in the demand for drop forgings, although the hot weather is having the effect of diminishing the output. Saw manufacturers are also enjoying very heavy business, and on hand saw orders are from three to four months behind. Recent standardization programs are working out well in the saw manufacturing industry. Machine tool manufacturers report a letup in orders during the past four weeks, and curtailment of production is expected unless demand improves.

There is no acute shortage of either skilled or unskilled workers. Workmen released from automobile plants have found employment in other lines, and the labor supply about balances.

Building operations to date this year have broken all previous records, but a decrease is expected in the second half. Plans now maturing call for a heavy program of building to commence shortly after the new year opens.

Increased Activities of Pennsylvania Iron and Steel Industries

HARRISBURG, PA., July 23.—Activities in the iron and steel industries are on the increase in Pennsylvania, according to the semi-monthly labor report to Dr. Royal Meeker, secretary of Labor and Industry, for the period ending July 15. An improvement is noted in the common labor situation, although machinists and machine operators are in great demand.

Erie reports most of its iron and steel companies are strengthening their organizations by weeding out inefficient workers. There is no urgent demand for skilled mechanics, although they can be placed without difficulty. A slight surplus of semi-skilled workers is reported.

Harrisburg reports that the supply of qualified workers does not cover the number lost through dismissals, separations and otherwise. Several larger concerns in the district recently agreed to reduce the number of working days from seven to six for men employed in the gas-producing and open-hearth departments and such others as formerly required seven-day service. This is expected to reduce the turnover of labor.

Johnstown reports an improvement in the labor situation over the first of the month. All plants are operating at capacity where efficient employees can be obtained. McKeesport says its plants are operating at as near capacity as is possible, in view of the shortage of skilled and semi-skilled workmen.

The demand for workmen in the Pittsburgh district is relatively good, and there are no indications of any marked change in the immediate future. Car companies and railroads are said to be increasing their forces. The supply of workmen in the iron and steel trades generally is somewhat short of the demand.

Walsh & McGee's Bar Mill at Newark, N. J., Nearly Completed

The Walsh & McGee Steel Co., which was organized some time ago to manufacture rolled products, is completing the construction of a mill at 646 Doremus Avenue, Newark, N. J. Since the organization of the company, Phillip C. Walsh, 3d, made an extensive survey of rolling mills in the East, with a view to installing such equipment and methods of operation as will permit running a mill with the minimum labor requirement. Heating furnaces, it is stated, will be charged directly from a conveyor. In the charging and discharging of the furnace it is expected that one man will suffice where two were formerly required. The depth of the furnace is sufficient for charging and drawing operations to be done simultaneously. It is estimated that a billet will be drawn every 10 or 12 seconds.

Small bars in various sizes will be rolled and the initial capacity of the mill will be approximately 600 tons per month. A branch line has been laid to the plant affording excellent shipment by rail in addition to docking facilities on an 800-ft. water frontage on the Passaic River. If present plans carry, the plant will be on a production basis within a few weeks.

Harry L. McGee, who, with John Havemeyer, was founder of the Concrete Steel Co., New York, is associated in the enterprise with Mr. Walsh, who is also connected with the National Steel Roller Co., New York, and Walsh Sons & Co., Newark, N. J. Mr. Walsh's brother, William Walsh, also is associated with him. The offices of the Walsh & McGee company are located at 2 Rector Street, New York.

June Shipments of Clay Fire and Silica Brick Show a Loss

Statistics compiled by the Refractories Manufacturers' Association, Frederic W. Donahoe, secretary, Oliver Building, Pittsburgh, for June show a loss of about 8 per cent in that month's business in clay fire brick as compared with the previous month, and about 7 per cent in silica brick by comparison with May. With the same capacity reporting for both months, the figures show that clay fire brick shipments for June were equal to 76 per cent of monthly economical producing capacity, as compared with 84 per cent in May, while silica brick shipments which in May were 66 per cent of monthly economical producing capacity were down to 59 per cent for June. Shipments rather than new orders tell the real story of business, since, as is indicated in the table, orders are subject to cancellation. There was a slight loss of production in June in both classes of brick as compared with May, that in clay fire brick being 4 per cent and that in silica brick 5 per cent. Stocks of clay fire brick at the end of June were 4 per cent greater than at the end of May, but stocks of silica brick were less by 3 per cent than that of one month before. Net new business in clay fire brick decreased 9 per cent, but that in silica brick gained by 4 per cent.

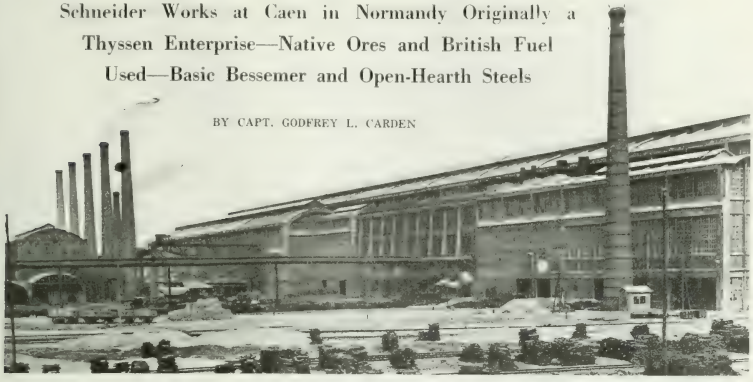
The figures in detail, in 9-in. equivalents, figures in parentheses being the percentages to monthly economical producing capacity, follow:

	June	May
Clay Fire Brick		
Capacity reporting ...	75,341,977	75,341,977
Stock, first of month..	152,193,088 (201)	151,313,259 (200)
Production	61,165,622 (81)	64,288,108 (85)
Shipments	57,785,328 (76)	63,511,279 (84)
Stock, end of month...	155,575,382 (205)	152,193,088 (201)
New orders	44,875,776 (58)	50,894,943 (67)
Cancellations	594,192 (1)	165,219 (0)
Net new business.....	44,281,584 (58)	50,829,724 (67)
Unfilled orders	89,365,766 (118)	102,869,510 (136)
Silica Brick		
Capacity reporting ...	22,565,500	22,565,500
Stock, first of month..	34,960,553 (155)	36,055,506 (160)
Production	12,608,422 (56)	13,783,679 (61)
Shipments	13,258,749 (59)	14,878,632 (66)
Stock, end of month...	34,310,226 (152)	34,960,553 (155)
New orders	10,293,682 (46)	9,955,865 (44)
Cancellations	1,000 (0)	406,243 (2)
Net new business.....	10,292,682 (46)	9,549,622 (42)
Unfilled orders	34,927,877 (155)	37,892,944 (168)

A French Steel Plant Built Since the War

Schneider Works at Caen in Normandy Originally a Thyssen Enterprise—Native Ores and British Fuel Used—Basic Bessemer and Open-Hearth Steels

BY CAPT. GODFREY L. CARDEN



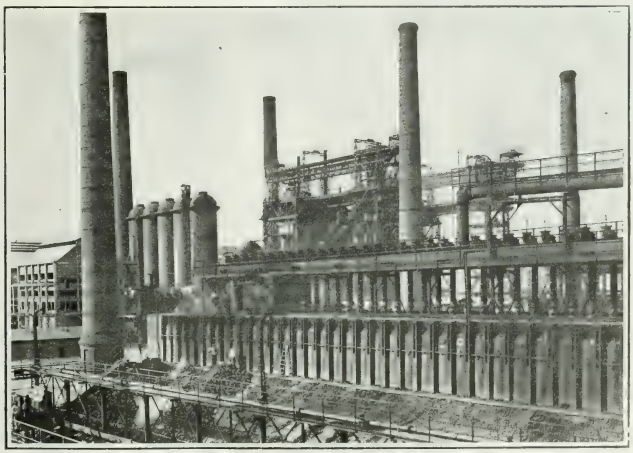
BORINGS made about fifteen years ago disclosed the existence of much iron ore in northwestern France. The principal field was located near the old town of Caen, in Normandy. Today an iron and steel plant employing 4500 men is in full operation at Mondeville, distant about six kilometers from Caen.

The owner of the new works is Société Normande de Metallurgie. The major portion of the capital is in the hands of Messrs. Schneider of Le Creusôt. These interests succeeded the Société des Hauts-Forneaux et Acieries de Caen, under which name the present works were started. The moving spirit in the latter firm was Thyssen, of Mulheim-on-the-Ruhr.

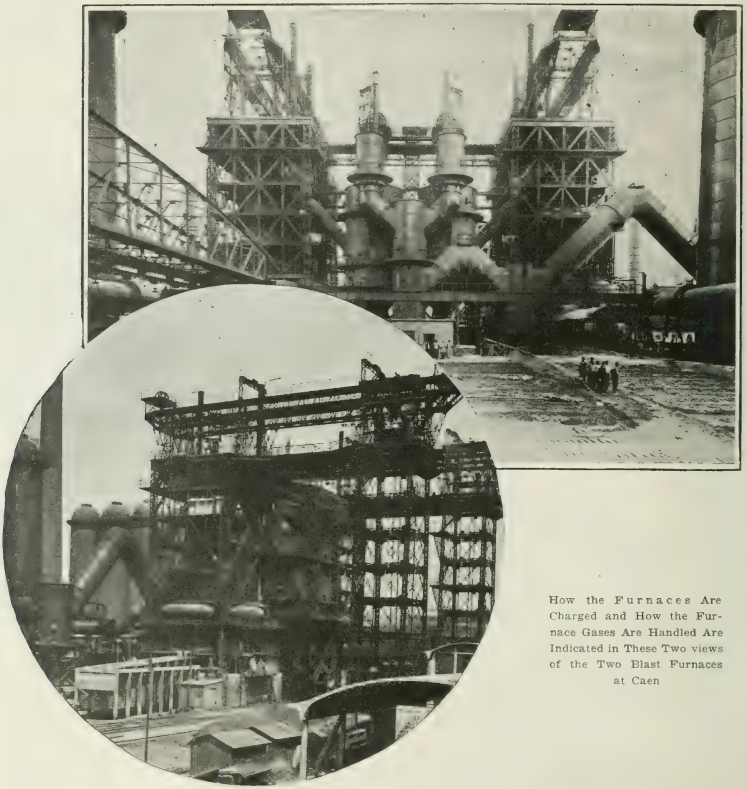
It was Thyssen who first saw the possibilities for a steel works in Normandy. Combining German with French capital he acquired holdings in the Caen region and began the erection of furnaces and mill buildings. No considerable progress had been made when the World War put an end to his activities.

The major portion of the present plant was constructed during the war. Here is one French operation in which expansion and development have continued after the close of hostilities. I visited the Mondeville works some weeks ago and was afforded every facility by M. Morette, the director-general; M. Homery, assistant; M. Legelin, in charge of blast furnaces; M. Tripier, head of the technical staff; M. Bullet, in charge of fuel utilization, and M. Paquet, in charge of rolling mills.

To circle the Mondeville mills inclosure is to traverse



Beyond the Coke Ovens May Be Seen the Network of Structural Shapes Conspicuous in This Blast Furnace Installation and One of the Groups of Five Hot Stoves



How the Furnaces Are Charged and How the Furnace Gases Are Handled Are Indicated in These Two views of the Two Blast Furnaces at Caen

a distance of approximately seven kilometers, and within the inclosure there are 50 kilometers of railroad tracks. The site of the works is a commanding plateau overlooking the valley of the Orne. Approximately 160 hectares (1 hectare equals 2.47 acres) comprise the works area on this plateau. From this eminence a wonderful view is obtained of the surrounding country. Caen is seen in the distance, while the white metal roads of the region are traceable by the eye for miles away in many directions. The Orne touches the base of the plateau, and running parallel with that stream and close to it is seen the Canal Maritime. Between the Orne and the canal the company owns a further area of 200 hectares on which runs its railroad connections with the state railroads and the harbor. From the steel works to the craft in the company's own port the distance is about a mile.

It requires 50,000 tons of coal per month to keep the Mondeville plant running at full capacity, and practically all coal used is brought in from England. The canal from the sea is about 10 miles long and at present admits steamers of 2500 tons carrying capacity. The maximum draft is 17 ft. Canal improvements now in progress aim to admit 5000-ton steamers to the port of Caen. The Orne reaches the sea at Quistreham. Normandy ore is the principal return freight for steamers bringing in coal. In addition, the Mondeville works are shipping abroad about 50 per cent of their output, mainly to England. Apart from steel rails, these shipments are mostly billets and blooms.

The transportation cost between Caen port and the mills ranges from 2 to 3 francs. This is cheap when compared with transportation charges imposed on steel works in eastern France. Between Antwerp, for example, and many of the works in eastern France, the rail charges are approximately 30 francs per ton.

Coal and Coke

There is no coal at Caen, and therefore it is found advantageous to import coal from England, since steamers can come directly to the port of Caen, thus rendering transportation cheap. Coal destined for coke is discharged at Caen into 50-ton cars, and is unloaded automatically at the works into pits of 25,000 tons capacity. The coke produced is used for the works furnaces and a surplus is sold. The present output is approximately 10,000 tons per 10 days. This production is obtained from 14,000 tons of coal, wet, as received from the cars.

There are six batteries, each comprising 42 ovens of 10 tons capacity. Five batteries were at work at

the time of my visit, and the above production is being secured with these five groups. About 200 ovens have been working on an average every day. The time of coking is about 30 hours, since 160 chambers are loaded daily $\left(\frac{24 \text{ hr.} \times 200}{160} = 30 \text{ hr.}\right)$ The maximum output of six batteries is rated at 1500 tons of coke per day. The Société Franco-Belge de Tours type of coke oven is used.

The coke oven gas available is used for the open-hearth and soaking pit furnaces, being mixed with a convenient proportion of blast furnace gas.

The Ruhr occupation having shut off the flow of German coke to both France and Belgium, Mondeville is being called upon to furnish more coke for the French market. The demand has increased appreciably in recent months. The price of English coal at the time of my visit was about 50 shillings per ton.

The stopping of coal from the Ruhr has been felt by the entire steel industries of eastern France. French mines as destroyed by the Germans are not yet in condition to serve French wants, and to restore these mines as sources of supply will take several years yet. The Lens mines were damaged most and these mines were regarded as important adjuncts of the steel industry.

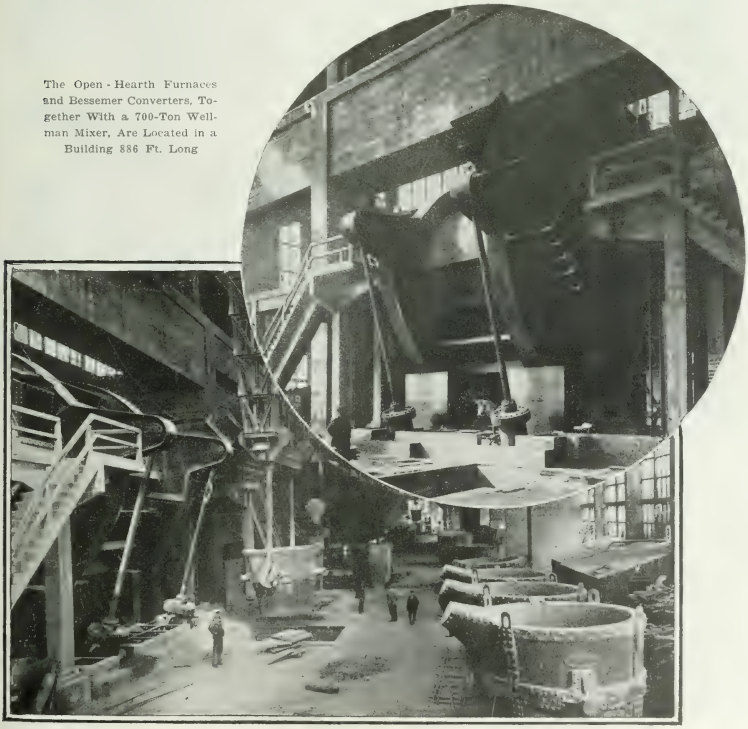
Blast Furnaces

There are two blast furnaces at Mondeville with a rated capacity of 400 tons per day each. In actual practice, the total daily production is around 700 tons. The principal dimensions of the furnaces are: Total height, 89 ft. 6 in.; hearth diameter, 15 ft. 5 in.; top diameter, 15 ft. 1 in.; total volume, 606 cu. m., or 21,250 cu. ft. The entire operation in connection with discharge of ore and charging is automatically effected under electric control. Each furnace is equipped with five Cowper stoves. The blast pressure may vary from 45 to 60 m. of mercury (8½ to 10¼ lb. per sq. in.). The metal for steel making is conveyed in liquid state by 30-ton ladle cars. Blast furnace slag is utilized in the making of cement and brick, or is used for ballast. The gas from the furnaces, after cleaning, is employed in boiler heating, also in the steel furnaces, and as power for the gas engines in the central power station.

The Normandy ore varies according to the mines from which it is taken, but generally it runs about 44 per cent iron. Ores from the May and Saint-Andre mines run about 15 per cent silica. The Saumont mine controlled by the Société Normande de Metallurgie furnishes an oolitic carbonate which after calcination has about the following composition:

Fe	45 to 47 per cent
SiO_2	19 to 17 per cent
Al_2O_3	5 to 4 per cent
P	0.8 to 0.7 per cent

I was assured that there was ample lime available in the vicinity of Caen. I state this because I heard some doubts expressed in this respect.



The Open-Hearth Furnaces and Bessemer Converters, Together With a 700-Ton Wellman Mixer, Are Located in a Building 886 Ft. Long

It is found that the Normandy ores are well adapted to the manufacture of Thomas and foundry pig irons. A common mixture consists of 60 per cent crude and 40 per cent Saumont calcined ore. From these ores the Mondeville furnaces have been able to meet pig iron specifications calling for 0.5 to 0.9 per cent silicon, 1 to 1.5 per cent manganese and 1.8 per cent phosphorus, this latter being secured by the use of a higher phosphorus limestone from the department of La Somme. By an addition of calcined pyrite, foundry pig iron of the Cleveland type containing 1 to 1.3 per cent phosphorus is secured, which satisfies the British market. The Mondeville works import about 700 tons of manganese ore per month.

Bessemer and Open-Hearth Furnaces

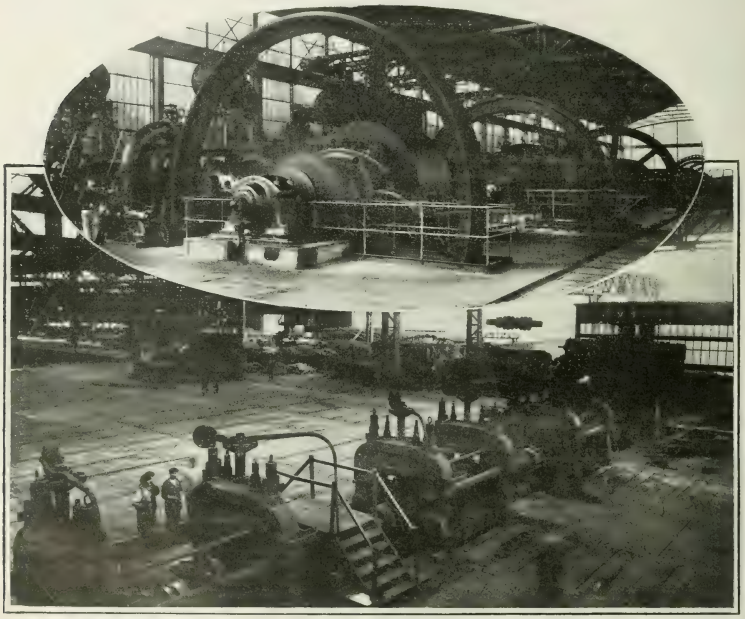
The Siemens-Martin and the Thomas furnaces are housed in a building 270 m. (886 ft.) long. Side by side are five Martin furnaces of 30 tons capacity each, operating with gas from the blast furnaces and the coke ovens or from 10 Hilger gas producers. The basic Bessemer plant has been laid out for five 30-ton converters, three of which are in actual service. There is also in the same building a Wellman mixer of 700 tons capacity. By using this mixer as a reservoir, metal is accumulated in the stoppage of basic Bessemer operations on Sunday. The steel furnace building is the largest single structure in the works. It is commanded by a 60-ton traveling crane. Slag from the Thomas furnaces is sold in the market for agricultural purposes.

Scrap was costing the Mondeville works last spring about 250 francs per ton, and at times it goes considerably higher, though early in the year the market was as low as 200 francs. Scrap has always been in demand in France because the French territory lacks in pig iron. In addition, the Germans in the latter part of last year came into the market and absorbed much scrap. Now that France is short both in coal and coke, she must resort more than ever to the basic open-hearth process and to the use of higher percentages of scrap.

Central Power Station

The central power station is located in a building 200 m. long. The motors in service are the product of the Société Alsacienne de Constructions Mecaniques, Belfort. Two gas engines of 4000 and 5800 hp. were at work on 4000-kw. alternators. The gas engines were made by the same Belfort shops. These engines work double-tandem, two engines to one motor, and are reported as giving excellent results. Blast furnace gas is used. I noticed quite a little play on the engine beds. This is purposely allowed, being deemed good practice, since it affords a certain amount of elasticity to the shock.

In addition to the gas engines there are three turbines, one of 5000 kw. and two of 3000 kw. each. The turbines furnish current for lighting and, when necessary, are utilized to help out the gas motors. There are also two turbines of 3000 kw. each used in connection with the blowers for furnaces, and one turbine rated at 400 to 500 kw. to furnish the starter blast for the furnaces. Finally, there are installed three motors of about 2800 kw. operated by gas engines which serve to blow the blast furnaces and steel con-



Above the Rolling Mills for the Lighter Products is a View of the Three Blast Furnace Gas Engines, Two Built by the Schneider Works at Le Creusot and One by Thyssen at Mulheim on the Ruhr

verters. Two of these last mentioned engines are of the single type and one double. Thyssen built two of the three and Schneider the third one.

Rolling Mills

Two mills are now in operation at the Mondeville works: One reversible duo, 850 x 900 mm. (33½ in. x 35½ in.), and one semi-continuous mill of 300 x 400 mm. (11¾ x 15¾ in.). Room has been provided between them for intermediate size mills and between the furnace building and the main mill for an independent blooming mill to be erected. The main mill consists of four stands; the first, which may be run independently by one of the motors, is used for blooming; the second for shaping, and the third for finishing, enabling the rolling of bars up to 110 m. (360 ft.) long. A fourth stand is used for rolling billets for the market.

The main rolling mills are producing at present between 18,000 and 20,000 tons of finished product monthly. Only one type of ingot is used, whether of Martin or Thomas steel, the size being 3½ tons. A full range of standard and tramway rails is rolled, and in addition the output includes channels, joists, billets from 2 to 10 in., and sheet bars. The list will be increased later by the addition of plates and angles.

Sheet bars are being rolled of 6, 8 and 10 in. width, and of varying thicknesses under 2 in. At the time of my visit considerable work was being done on sheet bars and 2-in. billets for England.

Rolling Mill Power Station

For driving the mills the current, 3-phase, coming from the central station at 5000 volts (3200 hp., 50 cycles, 336 to 420 revolutions, Belfort motor) is transformed in a sub-station into a continuous current by two Ilgner groups having a flywheel of 75 tons weight. This current serves both the reversible train and the semi-continuous train. When necessary, a third Ilgner group having a flywheel of 40 tons is used for driving the small mill.

There are two motors in the rolling mill, one for blooming and one for finishing. The total continuous current is made available here. The power building for the rolling mill is served by a 100-ton traveling crane. This building was erected since the war.

At this writing there are passed as a maximum about 300 ingots per day, working over a period of three shifts of 8 hours each. The small or semi-continuous mill produces about 4000 tons of output per month. Because of this heavy demand when the mills are all working a third heavy gas engine will be installed to meet this and future requirements.

Many of the workmen now employed at Mondeville are Russians. These men are remnants from the Russian forces brought to the Western front during the war by way of Vladivostok and the Suez Canal, while others are said to be more recent acquisitions following the disbanding of Denikin forces.

Apart from the proximity of the rich ore fields, the Mondeville plant is in a favored position for export trade by reason of its water connections. Pending the deepening of the canal, as referred to above, the present practice is to barge the steel products to Havre and load there in deep-draft vessels for long voyages.

Mondeville is profiting at this period of railroad tieups in drawing on England for coal, and the fact that 50 per cent of the output of the plant is for English orders indicates a certain amount of independence of Continental conditions. Mondeville, in a way, is profiting from the situation in the Ruhr much after the manner of English mills. So long as English coal is available, Mondeville can carry on and expand. Indeed, what may be seen there now is only a first step on the way to future developments, for which ample space has been provided.

PURCHASE EXPLAINED

Youngstown Sheet & Tube Co. Tells Employees of Merger of Steel & Tube Co. of America

In a communication to employees, the Youngstown Sheet & Tube Co., Youngstown, comments on the purchase of the Steel & Tube Co., Chicago, stating:

The transaction by which the Youngstown Sheet & Tube Co. became the owner of all the assets of the Steel & Tube Co. of America was completed at the New York offices of this company when the property was formally transferred by officials of Steel & Tube to President Campbell and Treasurer Morris, representing this company. In payment a certified check for $33,000,000 was handed to the sellers, and bond obligations amounting to approximately $22,000,000 more were assumed by this company.

Formal possession of the properties was taken by W. G. Reilly, acting for the company at Chicago at the same time, and the Steel & Tube plants and properties of all kinds are now being operated by this company. The deal was made as of Nov. 1, 1922, and the Steel & Tube Co. of America has been operated since that time for the account of the Youngstown Sheet & Tube Co.

This is one of the important transactions in the steel industry in recent years. The properties and plants secured by this company are located in eight States, consisting of very extensive and valuable holdings of iron ore, including the celebrated Newport and Anvil mines on the Gogebic Range, extensive zinc ore properties, coal properties in West Virigina, Kentucky and Ohio, blast furnaces and ore mines at Maysville, Wis., five blast furnaces at the Iroquois plant, South Chicago; the Mark Works at Indiana Harbor, consisting of by-product coke ovens, blast furnace, Bessemer and open-hearth steel plants, skelp and pipe mills; a tube mill plant at Zanesville, Ohio; an electric steel plant and rolling mills at Kalamazoo, Mich.; tube mills at Evanston, Ill., and other miscellaneous properties. The most important of these plants are located on excellent lake-front harbors, with an abundance of land available for extensions.

This purchase gives the Youngstown Sheet & Tube Co. advantages in the diversification of its products and the geographical location of its plants for the economical distribution of these products which will place it in a more favorable position to serve the market. It also makes this company, in point of raw materials owned and productive capacity, the third largest steel producing concern in the United States and one of the largest in the world.

It is expected that the consolidation of the newly acquired properties under the management of the Youngstown Sheet & Tube Co. will proceed in much the same manner as that of the Brier Hill properties, although it is a larger and more complicated proposition and will naturally require more time.

Automobile Production in June

WASHINGTON, July 24.—The Department of Commerce announces June production of automobiles, based on figures received by the Bureau of the Census in cooperation with the National Automobile Chamber of Commerce and covering approximately 90 passenger-car and 80 truck manufacturers each month, as follows:

Automobile Production
(Number of Machines)

	Passenger Cars		Trucks	
	1923	1922	1923	1922
January	223,706	81,693	19,398	9,416
February	254,650	109,171	21,817	13,195
March	319,638	152,959	34,681	19,761
April	344,474	197,216	37,527	22,342
May	350,180	232,431	*43,012	23,788
June	336,317	263,027	40,565	25,984

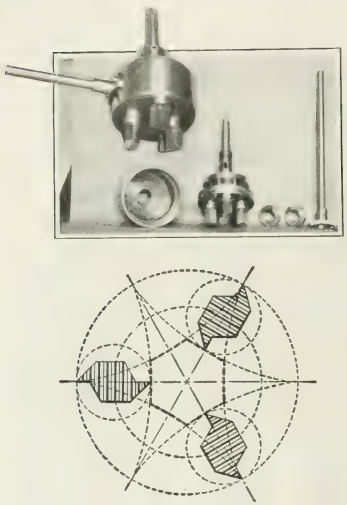
*Revised.

The Norwegian Industries Fair, to be held in Christiania, Norway, from Sept. 2 to 9, is expected to feature prominently in four classifications Norwegian products in metals. Officials announce that reservations for exhibits are booked to an extent 20 per cent greater than the bookings of 1922. Those interested should address the nearest Norwegian consulate.

Tool for Milling Hexagons on Valves

The Geometric Milling Tool Co., 110 North Jefferson Street, Chicago, has put on the market the milling tool illustrated, which is primarily intended for use in valve manufacture but may also be applied to the production of locomotive nuts, oil cups and gages.

The purpose of the tool is to drill, face and mill the six sides of a hexagon in one operation. This is accomplished by a simple planetary motion of three cutters, each having two cutting edges. These cutters revolve and also rotate on a fixed circle, thus generating a cycloid curve, as shown in the illustration, which also indicates there is a slight curvature to the sides of the hexagon. This, however, is said to be so slight that it is not objectionable. The tool can be operated in an ordinary drill press, in conjunction with a simple fixture to hold the work and to guide the casing or body of the tool. The casing is held stationary by means of an arm, gib or pilot pin, permitting it to move up and down, but not to rotate.



Hexagon Milling Tool for Use In Manufacturing Valves. The six sides of the hexagon are produced by the planetary motion of these cutters, each of which has two cutting edges. The parts of the tool are shown in the upper view and the layout of cutters immediately above

In setting up the tool, it is indexed to conform with the outline, or center line, of the hexagon to be milled and remains permanently fixed thereafter. The tool is equipped with demountable and interchangeable cutters, which are easily sharpened and replaced, and is sturdily built of materials selected for their respective purposes. It is bronze-bushed throughout. The tool is made in standard pipe sizes of sizes ⅜, ½, ¾, 1 and 1½ in., and can be equipped with special cutters if desired.

The tool is said to have drilled, faced and milled a standard valve body in about 15 sec., running at 180 r.p.m., and without leaving burrs. Slow wear on the cutter is a feature emphasized. A saving of from one-half to several minutes per unit, depending upon the manufacturer's facilities, is accomplished by the use of this tool, it is asserted, and production costs can be cut from 20 to 30 per cent. The tool has been in use for some time, both in its experimental stage and actual production.

Nick-Bend Tests of Wrought Iron

Previous work on this subject by the Bureau of Standards has shown that the character of the crystalline areas which are often obtained when wrought iron bars are fractured by the nick-bend test is determined largely by the relative size and distribution of the slag threads. In general the smaller the slag threads and the more uniformly they are distributed, the greater is the tendency for crystalline areas to occur.

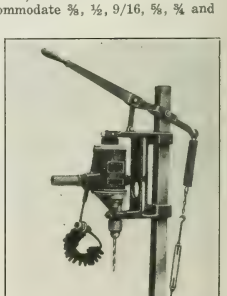
In order to confirm this tentative conclusion, considerable attention has been given to the nick-bend test of open-hearth iron. It was noticed that the full-sized bars, broken in the regular manner of the nick-bend test, invariably gave crystalline fractures. The observations previously made on the difference in the nature of the crystalline break on the tension and compression sides of the bar were also confirmed. On the other hand, a large number of the small impact specimens cut from such bars and tested by the Izod and Charpy methods gave silky fractures. Evidently, the nick-bend test should not be considered merely as an impact test of the Izod and Charpy types on a large scale.

By annealing impact specimens of the open-hearth iron at high temperatures up to and including 1150 deg. C., which renders the grain size larger and more uniform, the fractures obtained in the impact test were very similar to those in the simple nick-bend test of the untreated iron. However, some of the bars annealed at high temperatures still showed a silky fracture after the Charpy impact test. It appears probable, therefore, that the resistance of the iron to shock is not determined simply and wholly by the grain size; but that other features, such as the form of the grain, particularly the character of the junction between neighboring grains, may affect the results. Microscopic examinations of fractured specimens are being made to throw light upon this.

Bench Stand for Portable Drill

The bench stand illustrated, for use in connection with portable drills, permitting them to be used as bench machines, has been added to the line of the Standard Electric Tool Co., Cincinnati.

The device will accommodate ⅜, ½, 9/16, ⅝, ¾ and ⅞-in. capacity machines. Drills may be conveniently detached from the stand by means of the brackets shown, and the brackets may be raised or lowered by means of the bolt holding the lever. Quick return tension may be adjusted to any point desired, and the vertical lever is made long enough to give high pressure, permitting of quick operation. The vertical column is of solid steel, 1¾ in. square. The base is provided with T-slots, as shown, for fastening of the work.



Portable Electric Drill Mounted In Bench Stand. The vertical column is of solid steel, 1¾ in. square

The vertical adjustment of the drill is 9 in., and the distance from the column to center of the spindle is 6 in. The vertical travel of the drill when operated by the lever is 4½ in. The horizontal adjustment is 360 deg. The height of the stand from the bottom of the base to top of column is 36 in. The weight is 85 lb. net. The drill furnished for this stand includes regular equipment of spade handle and lamp socket cord.

NEW METAL SAWING MACHINE

Cold Saw with Capacity for 12-In. Square Bars — Hardened Gears Used—Convenient Control

The Cochrane-Bly Co., Rochester, N. Y., has placed on the market a cold sawing machine having a capacity for 13-in. round stock, 12-in. square bars, 10 x 15-in. rectangular sections and 18-in. I-beams.

The features of the machine include setting of the bed into a deep pan, as shown, the pan catching the oil and chips, and draining the oil into a large reservoir from which it is recirculated. The bed of the machine is scraped to precision surface plates to produce true surfaces for the saw carriage. The saw arbor is 6 in. in diameter, is hardened and ground and fitted into a solid bearing. Bolted joints in the carriage bearing have been eliminated.

Eleven feeds from ½ to 2½ in. per min. have been provided. The feed screw is directly in line with the center of the saw arbor and is placed as close as possible to the saw blade to bring the feed pressure as nearly as possible in line with the resistance of the saw. The nut on the feed screw is split and is adjustable endwise to eliminate lost motion. Lost motion between the screw and gear box is taken up by adjustable hardened steel nuts. The feed screw is driven by worm and worm gear and compound spur gears. The tumbler *A* gives six changes, which are doubled by sliding gears *B* into mesh with gears on the worm shaft. The feed is started, stopped and reversed from the front or back of the machine by levers *C C*. A double pawl holds the clutch block in neutral position or in engagement with the feed gear, or permits it to engage with the reverse gear. The pawls are lifted by means of a rack and pinion arrangement operated by lever *C*, movement of which to the left raises the feed pawl, tripping the machine into neutral. Further movement of the lever raises the neutral pawl, tripping the machine into reverse, which automatically returns the saw carriage at high speed to a point determined by an adjustable stop collar on the trip rod *D*. Another adjustable stop collar serves to lift both pawls at the same time, automatically tripping the machine from feed to reverse. The lever *C* is moved to the right to release the reverse clutch and engage the feed clutch. The carriage may be adjusted to and from the work by means of cranks *E* at either end of the machine.

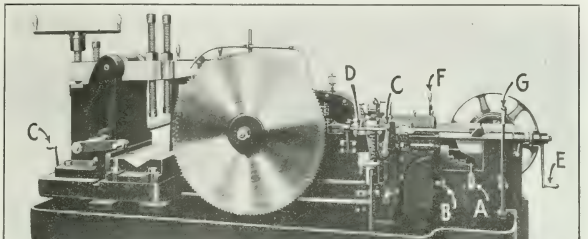
The machine has three cutting speeds, 30, 40 and 50 ft. per min. Speed changes are made by sliding a cone of gears on the driving shaft by means of lever *F*. The saw blade is 37 in. in diameter and 9/32 in. thick. The machine is driven by a 24-in. friction clutch pulley. The clutch is controlled by levers *G* at the front and rear of the machine. The drive shaft has ring-oiled bearings.

The vise is equipped with double clamping screws, as shown, to hold the stock at two points. A vise having air operated clamps is available. A stock feeding device is regularly provided. The stock support carriage is moved by means of a chain and sprocket and a crank which is back geared to the sprocket shaft. One operator may easily adjust a 12 x 12 in. billet in the vise. The top of the yoke on the carriage is hinged to facilitate placing stock in the machine.

All gears, except worm gears, are of steel and run in oil. The miter gears on the drive shaft, the arbor gear and intermediate gear in the worm gear box on the carriage, are of nickel steel, case-hardened. The pinions for these gears are of chrome-nickel steel, hardened. The driving worm, which is of hardened steel, is provided with a heavy ball thrust bearing.

Tests made by the company to determine the power required at various speeds and feeds, cutting an 8-in. billet of 40 carbon steel, are said to show that 4.80 hp. was required at a speed of 30 ft. per min. with ½ in. per min. feed. At the same cutting speed with a 2½ in. feed an average of 14.48 hp. was required. At 40 ft. per min. speed, ½ in. and 2½ in. feed, the power was 5.13 and 14.71 hp. respectively. With a cutting speed of 50 ft. per min. and feeds of ½ and 2½ in. per min., the average horsepower required was 5.37 and 15.51 respectively.

The area of the work table is 27½ x 30 in., and the height 24 in. A 20 hp., 860 to 900 r.p.m. motor is recommended. The floor space required for the belt-driven machine is 71 x 129 in. and for the motor-driven machine, 89 x 129 in. The weight is 12,600 lb., net. The machine is designated as the No. 7.



Cold Saw for Cutting 12-In. Square and 13-In. Round Stock. The bed is set into a deep pan, as shown, which catches oil and chips. The bed is scraped to precision surface plates, and the saw arbor is hardened and ground and fitted into a solid bearing. Three changes of speed and 11 changes of feed are available. The power required at 50 ft. per min., ½ in. and 2½ in. feed is 5.37 and 15.51 hp. respectively

To Build 40 Wilputte Ovens at Rosita, Mexico

The Wilputte Coke Oven Corporation, 469 Fifth Avenue, New York, will install 40 Wilputte regenerative coke ovens, with a by-product and benzol plant at Rosita, in the State of Coahuila, Mexico. William Hutton Blauvelt, 120 Broadway, New York, is the consulting engineer, representing the American Smelting & Refining Co. Coal will be obtained from the company's mines at Rosita. The plans include the installation of a power house, a new shaft and hoist and a coal washer, which has been designed under the direction of G. P. Bartholomew, general manager of the coal mining department of the company.

The coke produced in the oven plant will be used in the smelters of the company and in the general trade. The motor benzol will be sold locally, and the tar and ammonia will go into the general market. The gas will be used in a zinc smelter, which the company will erect at Rosita.

The Franklin-Moore Co., Winsted, Conn., has increased its operating schedule to 10 hours per day.

Rolling Steel and Non-ferrous Rings

How a Weldless Product, Such As Ring Gear Blanks, Is Made on a Commercial Scale at Cleveland

ROLLED rings for gear blanks and for bearing and spinning blanks are being made by the Weldless Rolled Ring Co., Cleveland, with the use of a special rolling machine that was designed by C. C. Venable of that company, who also developed the rolling process. The process was first adopted by the Washington Steel & Ordnance Co., Washington, in 1919-1920, being a development of that company's process for the manufacture of copper rotating bands for armor piercing projectiles. Several months ago the Weldless Rolled Ring Co. was organized by former executives of the Washington company and established a plant in Cleveland with Samuel V. Hunnings and Mr. Venable, formerly metallurgical superintendent and mechanical engineer of the Washington company, as president and chief engineer, respectively. Charles R. Marsh is secretary-treasurer. The company owns the patents for both the special rolling machine and the rolling process.

The process of making rolled rings includes two main steps. The first is forging a hollow blank smaller than the desired ring from round or square bar stock by the usual upsetting process on a 5-in. National forging machine. However, the blanks for rings weighing from 20 to 75 lb. are forged under a drop hammer or power press. After the blank is formed it is placed on the rolling machine and rolled out, the wall thickness being decreased and the diameter increased until a ring is formed of the desired size and shape.

The main housing of the rolling machine carries a spindle to which is attached a 60-in flywheel at one end and a detachable mandrel at the other end. A clutch for starting and stopping is connected to the main shaft. Hinged to the main housing is a top housing which carries the top or main roll shaft, which is driven by a train of two pitch 6-in. face, heavy duty gears. The top roll housing is elevated and lowered by a vertical hydraulic cylinder. Main rolls of various sizes are used ranging from 14 to 20 in. in diameter and from ½ in. to 4 in. wide. At the lower end of the machine is a horizontal hydraulic cylinder to which is attached a reciprocating slide which not only acts as an outer bearing but prevents the spreading of the metal during rolling. In this reciprocating slide is inserted a sleeve which telescopes in to the mandrel and is driven by its contact with the blank that is being rolled, this being necessary because of the change in the peripheral speed of the piece as its diameter is being changed by rolling from the small forged blank into the finished ring. The bed of the machine is designed somewhat similar to a gap lathe to permit ample swing for rings of large diameter.

The forming roll receives its pressure through the

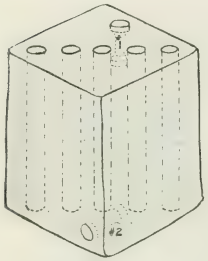
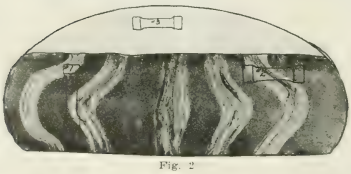
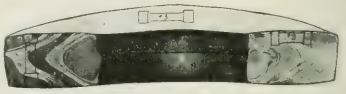


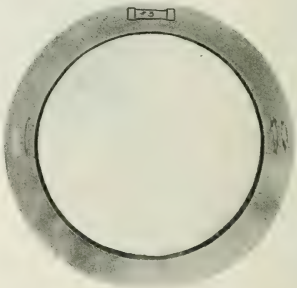
Fig. 1

Physical Tests to Show Value of the Rolling Forging Process

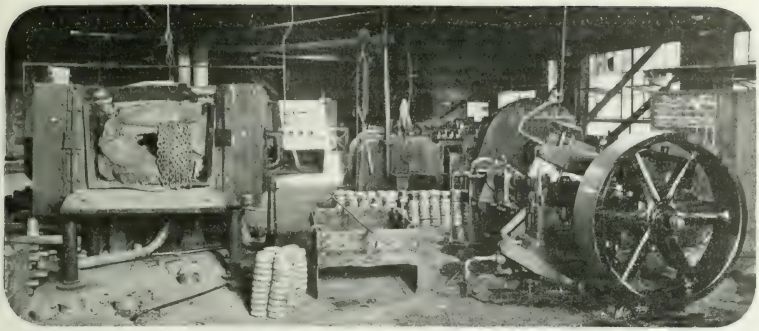

Fig. 2

	No.	Elas. Limit	Ten. Strength	Elong.	Red. Area
Fig. 1	1	42,500	88,500	29	47
	2	37,500	86,600	21	32.2
Fig. 2	1	55,000	93,100	15	22.5
	2	55,275	94,269	17.5	32
	3	55,000	94,000	17.5	28.3


Fig. 3


Fig. 4

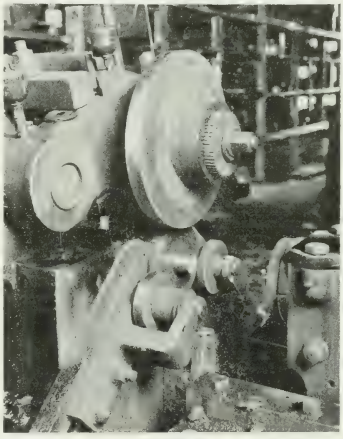
	No.	Elas. Limit	Ten. Strength	Elong.	Red. Area
Fig. 3	1	57,500	100,020	16	34.3
	2	60,000	102,600	20	42.4
	3	60,000	104,000	20.5	41
Fig. 4	3	65,000	111,200	21.5	45.7



One of the Rolling Machines and the Forging Machine, with the Heating Furnaces at the Left

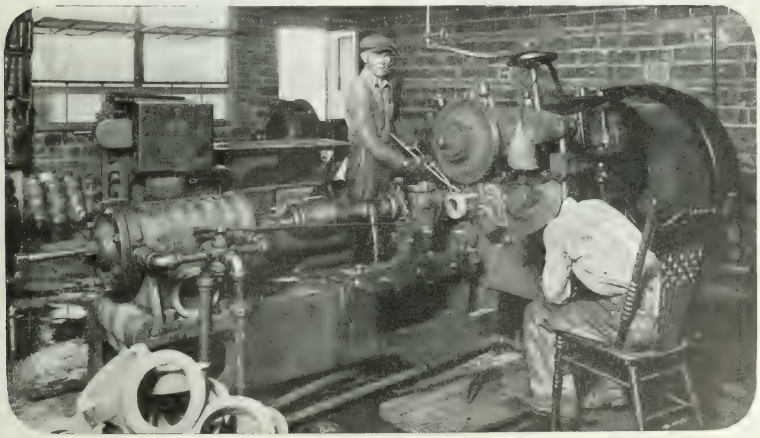
hydraulic cylinder from a centrifugal pump having a capacity of 100-gal. per minute. The pump delivers into an accumulating system and from there through a high pressure line to the cylinder that exerts the pressure on the roll. This pressure can be regulated so as to give a pressure of 5 to 25 tons, the amount of the pressure depending upon the size of the ring that is being rolled. The water exhaust from the cylinder is carried through the drain back to the main reservoir and is again used.

The usual practice is to use a blank with a hole 3 in. in diameter, this size being maintained in the heavier, as well as in the smaller blank. The minimum increase in the inside diameter of the blank under the rolling process is 100 per cent, a 3-in. inside diameter blank being rolled into a ring having an inside diameter



Below: Rolling Machine Showing Operator Placing the Forged Blank on the Mandrel. After the ring is in place the hydraulically operated reciprocating slide is brought forward until its sleeve telescopes the mandrel, then the roll is lowered and the blank is rolled until its diameter is increased to the desired dimensions

At the Right: Mandrel and the Three Guide Rollers with Which the Ring Comes in Contact When it has Reached the Required Size



of at least 6 in., but there is a range of up to 500 per cent in the increase in the outside diameter from the blank to the finished ring. A ring with external flanges or recesses in any design is made from a rectangular or square blank. Internal flanges are necessary on the forged blank in order to maintain the degree of accuracy of rolling required for the desired section.

The mandrel which fits into the main spindle is held in position by a drawbar and has a square dog drive. The main roll has an apron which holds three brackets in which are inserted guide rollers. These brackets are adjustable to roll rings from 3 to 30 in. in diameter. Before the machine is started, the guide rollers are adjusted for the size of the rings to be produced. When the ring is rolled to the desired diameter the guide rollers start to rotate from contact with the circumference of the ring and this indicates to the operator that the required diameter has been obtained. The roll is driven at approximately the same peripheral speed as the 2½ in. in diameter of the mandrel, the peripheral speed being approximately 300 ft. per min. Pressure on the two hydraulic cylinders is controlled by a 1½-in. 4-way valve.

In rolling a blank the first step is to open the air valve and raise the top housing carrying the roll and lift the latter a maximum distance of 5 in., so that the hollow blank can be slipped on the mandrel. After the blank is in place the reciprocating slide is brought forward telescoping the mandrel until the slide comes in contact with the blank. Then the roll is brought down exerting pressure on the blank, which is rolled between the roll and mandrel until its diameter is increased sufficiently to bring the outer circumference in contact with the guide rollers, which act, as stated, as a gage for the operator.

Variation in width of internal or external contour of the rolled ring is controlled by changing the roll and mandrel and adjusting the reciprocating slide. The roll is belt-driven from the 60-in. flywheel by a 30-hp. motor. If specifications call for close limits the ring after being rolled is forced through a sizing die on a 50-ton Ferracute punch press and brought within limits of 0.005 in. It is stated that 90 per cent of the rings as they leave the rolls are concentric within 0.015 in.

The smaller blanks as previously noted are made on a forging machine. Blanks for rings weighing 6 to 20 lb. are formed in three operations, gathering, upsetting and punching off the bar. For blanks under 6 lb. only the upsetting and punching operations are required. Four oil-burning furnaces are provided, two for use in connection with the blank forming operations and two for heating the blanks for rolling. The blanks are heated to a forging temperature before rolling. The stock used is either hot or cold-rolled carbon steel and alloy steels of various analyses, mostly in round bars from 2 to 3 in. in diameter and in lengths of 6 to 10 ft.

The range of sizes that can be rolled by the process is so largely dependent on the weight and section that it is impossible to make definite limitations, although it is stated that, generally speaking, rings weighing from 1 to 75 lb. can be rolled. However, the company tries to avoid the two extremes in weight. It is pointed out that the greatest advantages of the process from the standpoint of manufacturing costs is the ability to use a blank having a small inside diameter and rolling it to one having a large inside diameter.

The relatively smaller blank used as compared with the drop forged process permits the use of smaller forging dies and there is less wastage of steel in the punch-out and flash, and consequently less scrap loss. This saving in making rolled rings as compared with the drop forging process is said to increase in proportion to the increase in the inside diameter of the rings that are being rolled.

Among the mechanical advantages claimed for the rolled rings are that they can be rolled close to size and that the absence of draft reduces machining and permits easy and accurate chucking. Another important feature claimed for the rolling process is that sections can be rolled that cannot be drop forged. Under the rolling process the periphery and inside diameters can be made in such forms as full channel sections or with grooves, which it is stated cannot be made by drop forging.

As a means of showing the direction of the grain as well as the physical properties resulting from the process longitudinal and transverse tests were taken from the bar stock used in the manufacture of the rings for comparison with similar tests taken at successive steps in the production.

The tensile tests of the bar stock showed the greatest ductility, as indicated by the reduction of area in the test piece cut parallel to the axis of the bar (Fig. 1), i. e., corresponding to the direction of rolling, the reduction of area being 47 and 32.2 per cent, respectively, for the longitudinal and transverse specimens.

The effect of the second operation (Fig. 2), was to make the direction of the grain at right angles to the axis of the piece as is shown by the fact that the reduction in area is much higher, in tests Nos. 2 and 3, corresponding to the transverse direction of the bar stock, than in test No. 1, corresponding to the axis of the bar stock, the reductions being 32 and 28.3 per cent in the former tests as compared with 22.5 per cent in the latter.

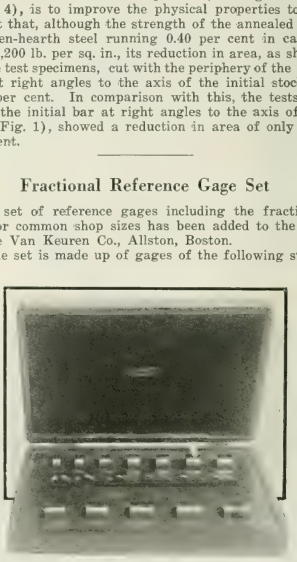
The effect of the third operation (Fig. 3), is a general improvement in the physical properties but, as the greatest flow of the metal is at right angles to the axis of the blank, tests Nos. 2 and 3 cut in that direction show the greatest ductility.

The effect of the final operation, rolling the ring (Fig. 4), is to improve the physical properties to the extent that, although the strength of the annealed ring in open-hearth steel running 0.40 per cent in carbon is 111,200 lb. per sq. in., its reduction in area, as shown by the test specimens, cut with the periphery of the ring but at right angles to the axis of the initial stock, is 45.7 per cent. In comparison with this, the tests cut from the initial bar at right angles to the axis of the bar (Fig. 1), showed a reduction in area of only 32.2 per cent.

Fractional Reference Gage Set

A set of reference gages including the fractional inch or common shop sizes has been added to the line of the Van Keuren Co., Allston, Boston.

The set is made up of gages of the following sizes:

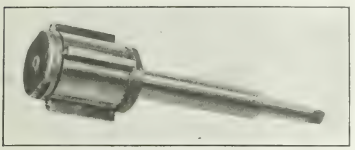


0.0625, 0.125, 0.1875, 0.250, 0.3125, 0.375, 0.4375, 0.500, 0.5625, 0.625, 0.6875, 0.750, 0.8125, 0.875, 0.9375 and 1.000. In addition to the foregoing sixteenth sizes, two gages, 3-32 (0.09375) in., and 5-64 (0.078125) in., are included to give combinations in thirty-seconds and sixty-fourths of an inch.

This equipment is particularly suitable as a reference standard for measuring steel balls and other products the standard dimensions of which are in fractional inches. A Bureau of Standards certificate of accuracy is given with the gages.

New Expansion Reamer

The expansion reamer illustrated has been placed on the market by the Lambert Tool Co., East Fifty-fifth Street and Euclid Avenue, Cleveland. One inch expansion, or from three inches to four inches, is accomplished by two scrolls in which the threaded ends of the blades turn. The inner scroll is fixed, being attached to the shank collar by two pins. The outer scroll is keyed at the end of the spindle. The blades are set in position in the barrel, each being numbered and placed in the slot bearing a corresponding number,



One Inch Expansion Is Accomplished by Two Scrolls in Which the Threaded Ends of the Reamer Blades Turn. The proper cutting diameter is obtained by revolving the barrel

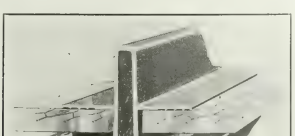
so that the threads on the ends of the blades will properly fit in the threads in the scrolls.

After the tool is assembled, the proper cutting diameter is secured by revolving the barrel, the blades turning in the threads and expanding ¼-in. with a complete revolution of the barrel. The desired adjustment of the blades is made by means of a micrometer. At the end of the outer scroll is a nut which is screwed tight against the scroll after the blades are adjusted. When a change is to be made in the adjustment, the nut is loosened slightly so that the barrel and blades will turn easily. The blades are 5/16 in. wide by 1 in. long, but an extra set of blades of greater width may be provided, and with these the tool will have a capacity of from 4 to 5 in.

The tool is available in sizes from 1 to 3 in. or larger. The 1-in. reamer expands to 1¼ in. and the 3-in. reamer to 4 in. By turning the blade cylinder, tools can be increased by thousandths to any desired size within the limits of the tool. Set in a drilling machine the tool is regarded as particularly adaptable for reaming out automobile cylinders in repair shops where cylinders of various bores are reamed.

Lead-Coated Steel Skylight

The American 3-Way-Luxfer Prism Co., Cicero, Ill., has put on the market a lead-coated skylight known as "Steelead," designed to combine the steel with a lasting quality of lead, a metal which is unaffected by weather, fumes, gases, smoke or dampness. Lead-



Skylight with Load Carrying Members of Steel and Exposed Surfaces of Lead. The lead surfaces are unaffected by weather, absorb vibration and permit of tight joints

covered skylights have been used for some years in Europe, but have only recently been introduced in this country. The type of skylight construction introduced by the American 3-Way-Luxfer Prism Co., consists of a standard steel tee-bar over which is molded a seamless lead sheath of special design. The sheath is so shaped that on the heel of the bar a lead cushion or seat is provided for the glass. This is drawn to a knife edge under the glass to fit into any qualities of the unpolished glass surface.

At the side of this lead cushion is molded a strip of lead which is opened before the glass is set. This forms a gutter to catch any condensation drip from the glass. On the web of the tee-bar is molded, integral with the sheath of lead, a lead wing. After the glass is in place this wing is pressed down on top of the glass to hold it securely and form a weather-tight joint. The underside of this wing is ribbed, so that it fits the unevenness of the glass and forms a series of air seals to keep out wind and water. When pressed into place, the wing is found to hold firmly and no underdraft dislodges it or loosens the glass.

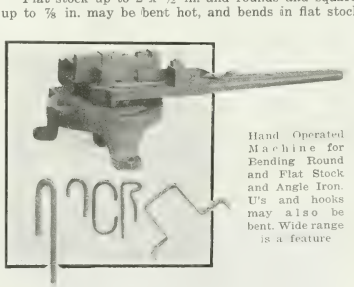
All the load-carrying members are steel and all exposed surfaces are lead. The strength of the steel permits of a maximum of glass area. The lead surfaces absorb vibrations and allow for liberal expansion and contraction without affecting the tightness of the joint. No painting is regarded as necessary and no bolts, screws or nuts are exposed to the weather.

Bender for Light and Medium Stock

The hand-bending tool illustrated, designated as the No. 1 angle and U bender, for light and medium sizes of stock, is being offered by D. A. Hinman & Co., Sandwich, Ill.

With standard equipment the machine will bend round or flat stock to angles of any degree, and angle iron may be bent after cutting a V in the wing of the stock at the bending point. Flat stock may be bent edgewise, and by means of U-blocks, which are available at extra cost, U and hook forms of various sizes may be produced.

Flat stock up to 2 x ½ in. and rounds and squares up to ⅞ in. may be bent hot, and bends in flat stock,



Hand Operated Machine for Bending Round and Flat Stock and Angle Iron. U's and hooks may also be bent. Wide range is a feature

cold, up to 1½ x ¼ in. and rounds and squares up to ½ in. may be made. Flat stock, hot, 1¼ x ⅜ in. and under is readily bent edgewise and angle iron up to 2 x 2¼ in. may be bent by cutting a V in the wing at the bending point.

Forms for U and hook bends up to 2, 4 and 6 in. inside, across, are available. With special equipment U's and hooks up to 12 in. inside, across, can be formed.

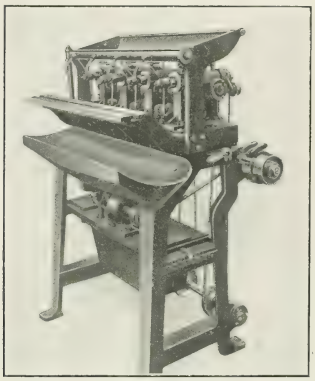
The net weight of the machine is approximately 60 lb.

Follansbee Bros. Co., Pittsburgh, has come to an agreement with the Amalgamated Association of Iron, Steel and Tin Workers of North America and the men are back at work at both plants of the company, following a brief suspension. The company has signed the general scale for its Follansbee, W. Va., plant and a special scale for its Toronto, Ohio, works, which produces charcoal tin plate and automobile sheets. The latter is what is classed as a loose rolling plant and carries a special scale of wages.

Horizontal Gang Type Machine for Small Single Hole Drilling

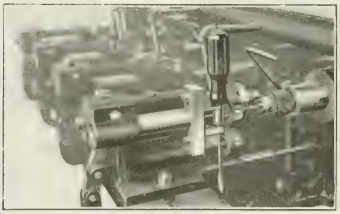
The No. 8 automatic sensitive drill head of the Kingsbury Mfg. Co., Keene, N. H., described in THE IRON AGE of Oct. 19, 1922, has been incorporated in the machine illustrated, which is offered as a multiple spindle horizontal gang type unit for small single hole drilling.

The feed is automatic and the spindles act independently of each other. The adaptability of mechanically



Gang Type Machine for Small Single Hole Drilling. Horizontal spindle arrangement permits chips to drop directly into pan. Fixtures for clamping, ejecting and burring may be used

operated fixtures for clamping, ejecting and burring, and the horizontal position of the spindles which permit chips to drop directly into the pan are among the features of the machine. Machines with either two, three or four spindles equipped with the No. 8 or No. 8½ drill heads having a capacity up to ¼ in. and ⅜ in. (or ½ in. in brass), respectively, are available and either single or three-speed ball bearing countershaft drives may be provided. The machine illustrated is 45 in. long and weighs approximately 800 lb. The



Mechanically Operated No. 60 Fixture with Adjustable Jaw for Screw Drivers

height to the spindles is 42 in. Drill heads are spaced 8 in. on centers.

The company's No. 60 fixture, which is a general purpose mechanically operated device for use with machines incorporating the No. 8 automatic drill head, is shown in the separate illustration. It is regularly equipped with V-block for cross drilling pins, but can be adapted to centering and other work. The front vise jaw is mounted on a stud which is adjustable longitudinally. The work has a rigid backing during the drilling. The rear jaw is on a plunger operated by a stiff spring. This jaw contains the drill guide bushing. Alinement is maintained by a hardened bushing sliding on a hardened and ground pin. This clamping jaw is opened automatically and held open by the drill head at the completion of the cycle. The only motion for the operator is placing the work against the gages and at the same time tripping the spindle. The average time for a complete cycle on brass work is said to be 2 sec., and the average time for a cycle drilling a ⅛-in. hole through ⅜-in. cold-rolled steel is said to be about 6 sec.

The capacity of the No. 60 fixture with standard V-block is for work up to ¾-in. diameter. For centering, the fixture will take work up to 4 in. long, 1½ in. in diameter. A No. 58 fixture, similar to the No. 60 is also available. This has in addition an opposed spindle for removing the burr and is adapted principally for cross drilling pins. The work is automatically clamped, drilled, burred, and finally ejected.

American Malleable Castings Association Meets in Providence

The members of the American Malleable Castings Association held a midsummer meeting at Providence, R. I., July 17 and 18, where they were entertained by the Rhode Island Malleable Iron Works and visited its plant. About 65 members were present, mostly representing Eastern counties. A short business session was held, presided over by President R. R. Fauntleroy. During this meeting the general business situation was discussed. The consensus of opinion was that there is a lull at present in the malleable iron industry, but the members felt that the slowing down is only temporary. Reports indicated that the foundries now have enough work on their books to keep running from two to two and a half months. Reports also indicated that the labor situation has become easier.

The entertainment included a clam bake at Hummocks, a trip by boat to Newport and a banquet at the Providence Biltmore Hotel. Charles Brown, president of the Rhode Island Malleable Iron Works Co., was host at the banquet which was in charge of Harry L. Steeves, vice-president of that company and also vice-president of the association. Speakers at the banquet included President Brown, Governor Flynn of Rhode Island and United States Senator Green of Vermont.

Excessive Labor Turnover in Milwaukee

The fractional percentage of reduction in the number employed in metal trades shops in Milwaukee during May was accentuated to a slight extent in June, although a net increase of 1.2 per cent for all industries is reported. Comment is general relative to excessive labor turnover, particularly in iron and steel and machinery lines. According to W. J. Fairbairn, secretary Milwaukee Metal Trades and Founders' Bureau, the turnover for the first six months of 1923 was of an average which, if continued, will make the yearly total probably in excess of 200 per cent, which is nearly as high as in 1920, when 210 per cent was reported. In 1921 turnover amounted to 98 per cent, and in 1922 it was 147 per cent. These figures are based on averages reported by 25 Milwaukee foundries and machine shops with payrolls numbering from 18,000 to 20,000 in the aggregate. For June the reported turnover was 17 per cent.

June production of automobiles, based on figures received by the Bureau of the Census in cooperation with the National Automobile Chamber of Commerce and covering approximately 90 passenger-car and 80 truck manufacturers each month, is 336,317 passenger cars and 40,565 trucks. In May, the output of passenger cars was 350,180 and of trucks 43,012, the latter a revised figure.

Corporation Closes in Basing Point Case

Examiner Rules Against Evidence Intended to Compare Contract Prices with Quotations in The Iron Age— Believes It Practicable to Tell the Whole Story

WASHINGTON, July 24.—Exhibits introduced by the United States Steel Corporation in the Pittsburgh base case intending to compare contract prices with quotations in THE IRON AGE were held by Examiner J. W. Bennett to confuse the question of uniform prices with stability of price from week to week. He declared that it was "merely confusing evidence as to a competent issue by coupling it up with evidence that is not competent to any issue." The decision is favorable as to the accuracy of quotations of THE IRON AGE in so far as any issue has been made of them.

Mr. Bennett made this ruling last Wednesday at the close of the defense of the Steel Corporation. This and other rulings grew out of objections by Attorneys K. E. Steinhauer and E. W. Burr of the commission.

The ruling referred to a series of exhibits whereby the Steel Corporation through its final witness, A. V. Winter of the price bureau of the Illinois Steel Co., attempted to show lack of uniformity of price with THE IRON AGE quotations. The material dealt particularly with the plan of the exhibits of comparing all contract prices with the four IRON AGE issues immediately preceding the date of contract. The examiner declared:

"It is obvious where the prices change from week to week that (the method followed) would multiply by four the variations so far as the price changes were involved."

A Matter of History

Objection made by Mr. Burr to the failure of the exhibits to compare with the succeeding IRON AGE quotation in view of the probability of a change of price between the issues of THE IRON AGE was referred to by the examiner as a fundamental one.

"THE IRON AGE quotations are a matter of history," said the examiner. "They give prices which have been assumed, and for that reason THE IRON AGE quotations of the dates prior to any sale or any contract could not possibly affect the price of that sale or contract. Where THE IRON AGE quotation coincided with the date of contract, that difficulty might be obviated to the extent of a single date."

Because of this the examiner said that he saw no reason why the date following should not be accepted as the standard date of comparison instead of taking any other date except the next preceding date, "which would apply to some of the sales, namely, the sales made on the date of the quotation."

"The trouble with the four weeks' standard, it seems to the examiner," Mr. Bennett said, "is this: It confuses the question of uniform prices, which is the fact to which this series of exhibits goes, or any one uniform price, stability of price from week to week."

It was pointed out by the attorneys for the commission that Birmingham district contracts were included in the exhibits and compared with THE IRON AGE price at Pittsburgh plus freight to destination in spite of the fact that, it was stated, the Steel Corporation's answer admits that the Birmingham district has not been for many years on the Pittsburgh plus basis, but rather that of the Birmingham differential. With regard to this objection the examiner said that the point was well taken.

Confusing the Issues

Objection also was made that future delivery contract prices were merged with contract prices for immediate delivery, whereas those for future delivery are not comparable with the price prevailing at the date of contract.

"As the examiner pointed out in commenting on similar exhibits some time previous, variations due to differences in deliveries, or differences in prices or due to selling in the Birmingham district, or Chicago district, or Chicago district at times when there was a Chicago base," said the examiner, "might have bearing upon some issue in this case; but, in his judgment, taken with other variations, on a quite different basis, they tend to confuse the issues rather than to clarify them, and are not of value as evidence."

In ruling upon the objection that the exhibits included the full extra in each case where an extra would be expected to be taken in spite of the record showing that at times half extras had been charged and that other times the extras had been waived, the examiner said:

"In the opinion of the examiner, in order to make comparable in a document of this kind, any commodity upon which an extra is charged over the list price, it is necessary to establish as to that commodity that the sales have been uniformly at a certain fixed figure above or below that price, and to the extent that the record indicates a want of fixed relationship between the price of the basic and the price of the item bearing the extra, the examiner considers this specification well taken."

Dealing with certain of the exhibits as the objections related to the question of the extras, Attorney W. W. Corlett of the Steel Corporation declared that these particular exhibits were introduced simply to "show that by the use of those extras we would have been better off in making our comparison had we ignored those figures entirely, because it (the method) brought it off the Pittsburgh base even more than it brought it on the Pittsburgh base. So if anybody is harmed it is ourselves and not the commission."

Attorney Steinhauer combated the position of Mr. Corlett and referred to the other objections upon which Mr. Corlett had offered no defense, it was said.

Analysis of Shipments

Charles K. Winslow of the accounting department of the Steel Corporation presented exhibits purporting to be a general and detailed analysis of shipments from "grand steel producing districts" of the United States into all of the territory west of the line commencing west of Michigan and Indiana and thence down the Ohio and Mississippi rivers and including parts of Indiana near Chicago. The purpose was to show the steel consumption of the socalled Chicago territory as considered by the Steel Corporation.

Mr. Steinhauer objected that the tonnage included a vast amount of steel sold on the fabrication-in-transit privilege basis, which, he said, would not have been purchased from the Eastern mills except in order to secure the privilege. Also, he said, that shipments from the East did not mean a shortage in Chicago, but rather that the Pittsburgh plus practice permitted the Eastern mills to secure business in the Chicago district. He maintained that it gave the Eastern mills a parity in the Chicago district with the local producers. Objection likewise was made that 1920, upon which solely the figures were based, was not a representative year nor a competent test to justify a practice of many years' standing. It was also objected that the statement did not show the tonnage shipped into the Pittsburgh district by mills outside of that district and that among mills East of the Chicago district shown in the exhibit as shipping into the Chicago district were many located at points in Ohio and other producing centers, which, Mr. Steinhauer contended, would not be competent to justify the charging of the unearned freight from Pittsburgh. Objection also was made that shipments into Chicago territory during a single year of heavy business when mills everywhere are crowded

mean nothing except that the shortage in the East is further increased by any shipments westbound. He also urged that the actual production and consumption figures of each company were the best evidence.

An Important Point

In passing upon these objections, the examiner said in part that this series of exhibits "Goes close to the heart of the defense of the respondent. And for that reason it is important that the matter be scrutinized carefully and be considered fully. The first thing that occurs to the examiner is, assuming that there may be a shortage of production in the Chicago district, to what extent is that due to the practice that is being tried out, and to what extent does it reflect the condition of price competition? If, as a matter of fact, there might be a shortage of production in the Chicago district as compared with demand in that district, what does that mean as to the particular point of basing for those various items?"

"It seems to me," he continued, "that unless the whole story is told, and told in as much detail as practicable, and the examiner thinks it would be practicable, to tell it in detail confined to State boundaries—an exhibit of this kind cannot mean much in finally determining the issues in this case." He then went on to say that "to make a comparison which would be at all conclusive as to the effect of a shortage or a greater abundance of steel in the particular district, those items, in the opinion of the examiner, would have to be classified into items which were commercially competitive. In other words, in the examiner's judgment, if you were comparing foodstuffs you would not compare corn prices with wheat prices, although both might be foodstuffs; and so, if you will take an item of bars that took a base price in competition, and include in that item a number of items which might refer in a general way to that base price, but when they came into competition, would have their prices fixed in competition by the immediate competition of the special item, it would seem to me that unless you have the classifications in sufficient detail to permit of comparing a competitive item with a competitive item in each case, you could not reach any very definite conclusion."

Ohio as Center of Production

"It would appear," the examiner further said, "that as to some of the items or sub-classifications in this document, the center of production is in Ohio rather than in Pennsylvania or Pittsburgh. A compilation of this kind, in view of that fact, could not determine with any definiteness, whatever other facts it might show, whether the fact that the items came from outside of Chicago would justify a Pittsburgh base price rather than the base price in the territory where the surplus production took place. There are difficulties of that kind which the examiner would regard as inherent in the document as submitted."

The examiner also said that he thought the export tonnage should be considered in a compilation of the kind mentioned. Mr. Bennett referred also to what he called the weaknesses of the evidence purporting to be compiled by the exhibits offered. He renewed his ruling made when the underlying documents were introduced, holding the evidence incompetent "because founded on hearsay testimony, because the witness is not properly qualified, because no proper foundation has been made for the offer and because it is not the best evidence." Among other things the examiner said was that "the compilation includes a considerable quantity of steel not manufactured in the Chicago district and purchased in the East because it could not be supplied from any other territory."

Mr. Corlett took an exception to the rulings with the right to extend his reason for his exception. The defense closed with the reservation of the right to call one witness to prove the existence of a basing practice in spelter and possibly in some other metals in the foreign markets.

Rebuttal evidence will begin here Dec. 10.

COSTS OF PRODUCTION

Tariff Commission Receives Help from Blast Furnace Operators in Philadelphia District

WASHINGTON, July 24.—At the first public hearing on Tuesday of last week of the Tariff Commission in its investigation under flexible provisions of the Fordney-McCumber act, it was announced that the commission has not as yet decided whether it will make available to interested persons information gathered by its investigators as to costs of production. While the hearing related to an application for a reduction in duty on paint brush handles and, therefore, was of but little general importance so far as the individual case itself was concerned, a great deal of interest was attached to it because it was hoped to get a clear idea of the procedure to be followed by the commission.

It, of course, is well known that in getting information from industries, the Tariff Commission will not disclose statistics of individual manufacturers. Manifestly, to do otherwise would make it extremely difficult, if not impossible, for the commission to gather material. In this connection it is stated that blast furnace operators in the Philadelphia district have cooperated freely with representatives of the commission who are making a study of pig iron production costs under an application seeking to have the tariff duty of 75c. per ton increased the maximum amount of 50 per cent allowable under the flexible provisions of the tariff act.

The investigation is under the direction of Paul M. Tyler, head of the Iron and Steel Section of the Tariff Commission and who himself has been personally gathering information in the Philadelphia district. The work will be extended to all merchant pig iron producing sections of the country as well as to producing centers in Europe. The commission apparently believes that it will be successful in obtaining information as to costs from foreign makers. While foreign manufacturers in certain lines already have indicated that they would not give information to agents of the commission, the opinion seems to be that this attitude will not be adopted generally. It is pointed out that foreign manufacurers themselves, by disclosing legitimate information, can best serve their own interests by bringing out full details at hearings and that at the same time there will be made available to them information as to competitive conditions in the United States, but not in the way of naming or giving figures of individual producers.

An Interesting Point

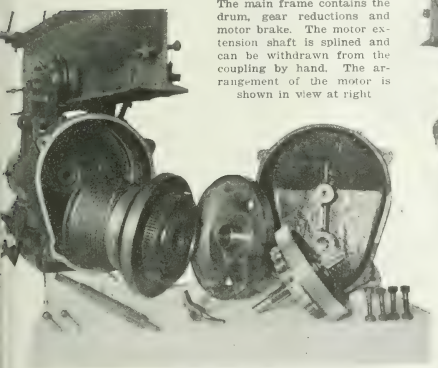
An interesting point discussed at the first hearing under the flexible provisions was brought up by Commissioner Glassie. It was clear from his questions as well as those of other members of the commission that it was earnestly seeking the opinion of lawyers as to the powers of the commission under the flexible provisions, which, represent a distinct departure in tariff making in the United States. Commissioner Glassie asked former Judge Marion DeVries, appearing as counsel for the applicant in the paint brush handle case, whether he thought the commission had the power to raise or lower rates on any commodity regardless of whether there were any imports of such commodities coming to the United States. Mr. Glassie, apparently putting his question in a hypothetical form only, made the inquiry on the basis of the supposition that there were no imports of pig iron. By some, it was gathered from the fact that this product was mentioned specifically, the question of Mr. Glassie indicated the attitude of the commission in conducting an investigation as to pig iron costs. It is evident, however, that such a view is entirely erroneous. It has been pointed out that Mr. Glassie obviously is aware that during the past year there has been a hitherto unprecedented import movement of pig iron and, therefore, that his mention of this product had no significance.

Few Parts Feature of New Hoist

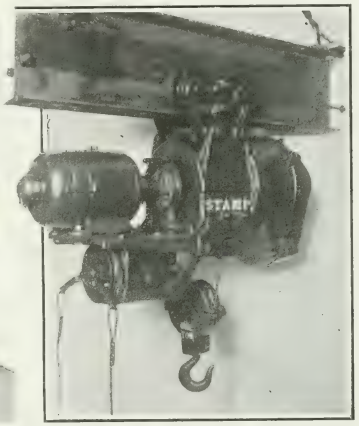
Small number and accessibility of parts, and the use of only two reductions in gearing, are features of a new electric hoist, recently brought out by the Stamp Electric Hoist Co., Cleveland.

The machine, photographic reproductions of which are shown herewith, is offered in capacities from 500 to 5000 lb. The main frame contains the drum, gear reductions and a Weston type motor brake. The gears and shafting are of alloy steel, the former heat-treated. Gear teeth are machine cut. The bearings are of Hyatt heavy-duty type. The hoisting mechanism, including all bearings, except the motor bearings, run in oil. The drum is large in diameter and is grooved and set in the frame so that the cable cannot get outside the drum flanges.

The motor is entirely inclosed and is connected to the hoist by a flexible disk coupling. The motor extension shaft is splined and can be withdrawn from the coupling by hand. Around this coupling is a shoe-type motor brake operated by a cam on the controller shaft. This opens with the motor running and closes with the motor shut off. A heavy limit lever connected by chain to the controller stops the motor at the upper limit of the hook travel.



Small Number and Accessibility of Parts Are Features. The main frame contains the drum, gear reductions and motor brake. The motor extension shaft is splined and can be withdrawn from the coupling by hand. The arrangement of the motor is shown in view at right



The trolley sides are of cast steel. Track wheels are of large diameter and are fitted with flexible roller bearings on alloy steel pins. The trolley is adjustable for several sizes of beams. The current collectors are also adjustable.

The hoist may be equipped with crane type alternating or direct current motors of any standard make, and with single or variable speed control. The full load hoisting speed is from 15 to 50 ft. per min., and the lifting range is from 11 to 45 ft.

Partial Rebuilding of Republic Stack

The Republic Iron & Steel Co. has awarded a contract for the partial rebuilding of No. 3 blast furnace in its Haselton group, Youngstown, to the William B. Pollock Co., of that city. The new work will include an entirely new top, a skip and dust catchers. Plates to be used in the fabrication will be furnished by the Republic company.

The stack will continue in operation until fabrication of the parts is completed, when it will be blown out and relined.

The furnace has been producing iron on the same lining since September, 1918.

Manufacturers Urged to Buy Coal as Soon as Possible

WASHINGTON, July 23.—The importance of safeguarding the continuance of operations by the prompt purchase and shipment during the next two months of coal for fall and winter consumption was strongly urged upon industrial users by the Department of Commerce in a statement made public last Friday by acting Secretary J. Walter Drake. The statement, which has been sent to industrial interests, points out that a statement has just been issued by the Federal Fuel Distributor calling attention to that fact that the industries generally have thus far very largely failed to secure their coal requirement for next winter's use and that they will therefore be demanding the shipment of coal at a time when experience shows the greatest burden of the year is placed upon the railroad. A shortage of fuel, it is pointed out, during the fall and winter would result in a failure of production and a loss far exceeding any slight extra burden that might possibly be occasioned through the purchasing and storing of coal in advance of the time of peak load upon the railroads.

The statement calls attention to the fact that on April 11, 1923, a communication was addressed by Secretary Hoover to the trade associations of the country urging them, among other things, to take immediate steps to bring about cooperation among their members to secure advanced storing of coal during the light consuming season and before the heavy traffic demands of the fall were imposed upon the railroads. It was pointed out that such action on the part of the industries would operate in a great measure to safeguard against the disastrous consequences that have followed the postponement of coal purchasing and shipment to a late period in the season when the railroads are not able to handle the increased traffic.

Neely Bolt & Nut Co., 2101 Wharton Street, Pittsburgh, South Side, which recently enlarged its plant, now is producing large machine and carriage bolts and plans to make the smaller sizes. The company also is making rivets. Formerly its principal product was hot-pressed and cold-punched nuts.

Statistics of the Leather Belting Exchange representing about 60 per cent of the total product show total sales in June of 442,912 lb. valued at $834,447, against 512,573 lb. in the preceding month and 441,812 lb. valued at $721,037 in June, 1922.

Laboratory Control in Automobile Castings

Sand and Iron Subjected to Searching Analyses—Moisture and Porosity Tests—Use of Diagrams for Presenting Data

BY HENRY M. LANE*

ALL core and mold setting jigs used in the Wilson Foundry & Machine Co. plant at Pontiac, Mich., are under constant inspection of the tool room or pattern shop, and also a certain number of castings

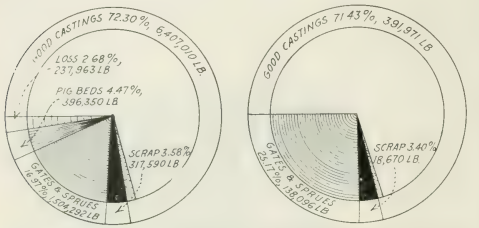


Fig. 1 Diagram Showing Percentage of Good Castings Produced in September, 1922. The dotted portion of each circle represents foundry scrap in the machine shop—at left (gray iron) it was 139,446 lb. or 1.57 per cent of total melt; at right (aluminum) 4589 lb. or 0.84 per cent of total melt

are cut up from time to time to make sure that core boxes, patterns and jigs are functioning properly. In addition to this, a certain number of castings from each day's run are put through the shop every day in advance of the general run, so as to check up on all operations, including coring, molding and the metallurgical work.

Castings selected from each day's heat for tests are marked with paint, the color of which is changed each day. Monday's castings have a blue spot on them, Tuesday's yellow, Wednesday's pink, Thursday's white, Friday's green and Saturday's red.

Necessarily only the castings machined in this plant can be tested in this way. But since the Willys-Knight motors are machined and assembled complete in this plant, and a number of the Overland models completely machined, this makes it possible to send the necessary number of castings through each day to keep an accurate check on the foundry. This accurate check is held in no small way responsible for the remarkably small casting loss in this foundry.

It may be of interest to say something of the metallurgical end. The laboratory has always had control of much more than the metal and, by close collaboration between the foundry superintendent, the head of the laboratory, the head man in charge of the rigging, and one or two others, who act as a general committee, they have been able to correlate all of the work, which results in more economical production, and much more harmonious operation of the plant. In fact this plant is noted for its team work. They have always recognized the fact that good iron alone could not produce good castings, and hence the laboratory has charge of sand, iron, and all other raw materials.

Some of the reports kept in the laboratory will undoubtedly be of interest. Fig. 1 shows a graphical report that is prepared each month for the benefit of different members of the staff. The segments of each circle show the percentages taken up by the various products coming from the melt. The loss includes the difference between pounds of metal purchased and pounds of castings sold. The various classes of scrap from the pig beds, gate sprues, and foundry scrap are naturally returned to the cupola for remelt. The dotted area indicates the machine shop scrap return for the corresponding month and naturally this also passes to the cupola for remelt.

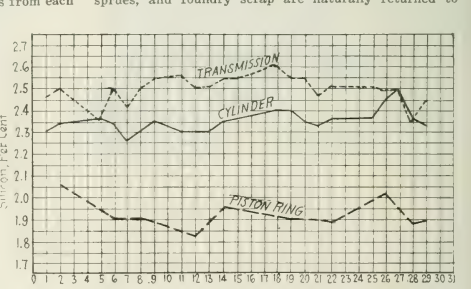


Fig. 2—Silicon Chart for September, 1922

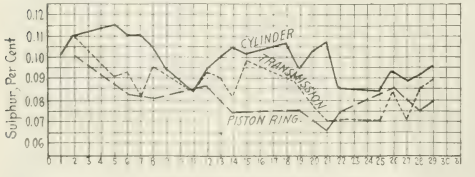


Fig. 3—Sulphur Chart for September, 1922

The remarkably low scrap loss maintained in this plant is due to the eternal vigilance not only of the laboratory, but of those in charge of equipment throughout the entire plant.

Each month there are also made up charts showing the variations of various ingredients as shown by the daily analysis but, in this case, particular attention must be called to the fact that, in order to take advantage of the raw material available, it is frequently necessary to juggle certain elements to maintain the desired combined carbon, Brinell test, or some other physical requirement. Whenever a given element is juggled it is generally necessary to juggle certain other elements in the opposite direction to obtain the required result, and this gives us curves that

*Industrial engineer, Detroit. This is the concluding installment of abstracts of a paper read by Mr. Lane before the National Founders Association. The other portions appeared at page 745, March 15; page 1037, April 12; page 1173, April 26 and page 1562, May 31.

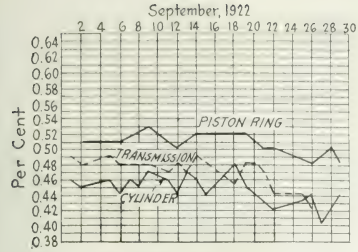


Fig. 5—Combined Carbon Chart for September, 1922

are not so smooth as they would be were it possible to obtain absolutely uniform grades of iron.

Fig. 2 shows the silicon curve for the three principal classes of castings for the month of September, 1922; Fig. 3 the sulphur curve; Fig. 4 the manganese curve; Fig. 5 the combined carbon curve. Particular attention is called to the closeness to which this curve is controlled. Fig. 6 shows the Brinell test curve.

Some other curves that may be of interest include Fig. 7, giving the total amount of coke and iron used for the first ten months of 1922. The right hand portion of this diagram shows the ratio between coke and metal melted. Fig. 8 shows the total amount of molding sand and core sand used, and the ratio between the number of pounds of iron produced and the amount of sand used.

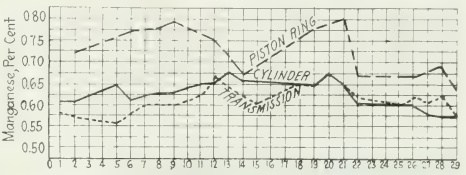


Fig. 4—Manganese Chart for September, 1922

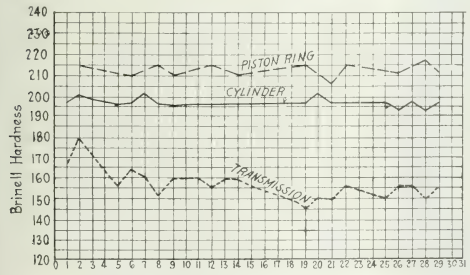


Fig. 6—Brinell Hardness Test Chart for September, 1922

All analyses are made from samples obtained by drilling the test bars. On all standard mixes a test bar is cast every hour, and on special mixes every 20 min.

In the melting practice an amount of limestone is used equal to 3 per cent of the weight of the metal, and fluorspar equal in weight to 5 per cent of the metal, and the cupola practice is aimed to give 5.5 lb. of iron per pound of coke. The diagram shown in Fig. 7 gives the ratio for the entire plant, which is affected more or less by the number of cupolas in blast, and the amount of bed coke which has to be distributed over the entire melt.

For the piston iron a cupola is used which has been lined down to 36 in. in diameter, so as to enable the use of 1000-lb. charges. The well of the cupola will hold about 3000 lb. of metal, so that when a tap of 1000 lb. is made, there should be three fully melted charges in the well, which insures a thorough mix. Transmission iron is melted in the larger of the two cupolas of the old battery, and in this case 2500-lb. charges are used.

The high record mark for melting in this plant was made in January, 1920, when the daily melt averaged 360 tons.

It has already been mentioned that the molding and core sand are under the control of the laboratory, and the laboratory determines the proper time for mixing each batch. All sand heaps are inspected each day, and a moisture and porosity test made. The moisture determination is made by treating a weighed quantity of sand for evaporation of moisture between the temperatures of 100 and 101 deg. Cent. (212 and 214 deg. Fahr.).

Porosity tests are made by an instrument known as "Castrite" which is shown in Fig. 9. The principle on which this works consists in splitting a flow of compressed air between two orifices. Any resistance that is felt at one of these orifices will naturally increase the amount flowing through the other orifice, and raise the pressure shown on the gage used in connection with the instrument. An example of the test made for one day, and the results obtained therefrom will be of interest.

	Percentage Openness	Percentage Moisture
Beardsley-Piper machine No. 1	24.0	5.94
Beardsley-Piper machine No. 2	23.5	5.75
Beardsley-Piper machine No. 3	23.5	6.80
Floor No. 5	25.6	5.45
Floor No. 7	22.3	7.25
Floor No. 12	21.7	8.17
M-4 flywheel facing	15.4	7.93

With the reading shown in this table there were no castings showing blows reported for the day. At one time, however, when they were developing their practice in connection with this instrument, one of the molding floors showed an openness reading of between 17 and 18, and a



Fig. 7—Coke Ratio for 1922

moisture content of between 9 and 10 per cent, and this resulted in 10.15 per cent of the castings showing blows. This shows the importance of moisture and openness tests.

In this connection it may be of interest to state that the openness is to a large extent dependent upon the moisture, as an increase of moisture always gives a lower reading which indicates greater density. The core binder used in this plant is the best grade of raw linseed oil, and is very carefully tested.

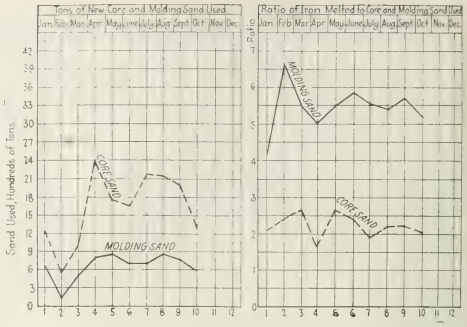


Fig. 8—Diagram Showing Consumption of Molding and Core Sand, and Ratio of Core and Molding Sand to Iron

Production of Coke Declines Slightly in June

WASHINGTON July 24.—The production of by-product coke declined slightly during June, but continued at a rate well in excess of the average monthly rate for any year on record according to the Geological Survey. The total output was 3,166,000 net tons, a decrease from the figure for May of 4.9 per cent. Comparison with June, 1922, when there was an extraordinary demand for by-product coke to fill in the gap in beehive coke production caused by the strike in the Connellsville region, discloses an increase of 586,000 tons, or 28 per cent. The average daily output in June was 105,524 tons, a decrease of 1.7 per cent from the month preceding. Of the 69 by-product plants, 63 were active and six were idle. The output of the plants that were active in June was 87.6 per cent of the estimated capacity of all by-product plants to produce coke. The production of beehive coke also declined during June and the estimated total output was 1,755,000 tons, against 1,829,000 tons in May. Thus it is seen that the present rate of output of beehive coke is about four times that in 1921 and nearly three times that in 1922, and is about the same as that in the years 1919 and 1920.

It is estimated that 7,317,000 net tons of coal were consumed in making this coke. Of the total, 4,549,000 tons were consumed in by-product ovens and 2,768,000 tons were used in beehive ovens. At present the coke industry is consuming coke at the rate of nearly 88 million tons per year, against approximately 85 million tons in 1920, the year of record production.



Fig. 9—"Castrite" Instrument Used for Determining Porosity

New Heavy-Duty Steam Shovel

A revolving steam shovel of the 1¼-yd. class, designed for heavy work without sacrifice of speed, simplicity or ease of operation, has been added to the line of the Osgood Co., Marion, Ohio. In general design the machine is modeled after the company's ¾-yd. steam shovel.

Horizontal hoisting engines, submerged tube type vertical boiler, centering gudgeon for connecting the main body casting to the path gear, simplified continuous tread mounting, power steering on both continuous tread and traction mounting, double-geared shipper shaft and automatic trip rope tension are among the features of construction.

Standard or special gage railroad trucks may be provided. The machine can be equipped with a high-lift boom or trenching dipper, and is said to be especially adapted for use with clamshell or dragline bucket or as a crane. The drums provided for clamshell or dragline equipment are of sufficient power to operate the bucket with single lines, greatly speeding up the operation, it is said, as well as reducing wear on the lines and eliminating a set of sheaves at the bucket connection.

Plans of Maryland Steel Rolling Co.

The Maryland Steel Rolling Co., Fidelity Building, Baltimore, has purchased a plant and will operate a reclaiming mill having a theoretical capacity of about 60,000 tons of steel bars per annum. The present plan of the company is to manufacture bars in the various shapes from ⅜ in. to 2 in. diameter, both iron and steel. It expects to manufacture concrete reinforcement, merchant bar iron and certain grades of tool steel. It is at present operating cold-rolled strip mills at Trenton, N. J., in the manufacture of certain types of cold-rolled steel and commercial sizes of strapping and is drawing plans for extensive improvements to these mills in the near future.

June sales of mechanical stokers, as announced by the Department of Commerce, amounted to a total of 59,719 hp. in rating. May was the largest month this year, totaling 100,513 hp., while June was the smallest. The average for the six months of 1923 was 77,400 hp. per month. The returns were made by 15 establishments throughout this period.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

PRINTED IN U. S. A.

F. J. Frank, *President* George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, Vice Pres. A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building Pittsburgh: Park Building Boston: 419 Unity Building Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

What Is Steel Common Worth?

We read in a financial journal that the United States Steel Corporation has spent over $1,100,000,000 for new construction since its organization and has added about $400,000,000 to its working capital. The new construction has added immensely to the producing capacity of the corporation. The financial paper deduced that steel common has a book value of $260 a share, but proceeds to say "on a basis of earning power, a market price for steel common around $260 a share would not be justified, although the property and liquid assets correspond with that figure."

Without verifying the data, they are probably nearly enough correct to furnish a text for a memorandum on the valuation of industrial property. It is sound economic doctrine that the value of capital goods is a capitalization, at the current rate of interest, of the fixed income which accrues therefrom to the owner. The accepted engineering formula that the value of industrial property is a capitalization of expected earnings is even more precise. The stock market, barring minor and ephemeral fluctuations arising from technical conditions, is generally trying, in the long run, to give expression to this principle. The acceptance of the principle by no means precludes major changes in valuation even within a relatively short time. A property might be valued by a commission of engineers at a certain figure today; yet the same commission might give it a widely different value a year hence, owing to unforeseen changes altering the prospective earning capacity.

The cost value or the book value of property has to do with the matter in only one way, as to which it is unnecessary to digress at present. Additions to property may be made in a sincere way and be carried on the books at the real cost, and yet they may suffer great impairment of value by virtue of becoming useless or meeting altered conditions which reduce their earning capacity. For example, a shipping company that purchased a fleet at upward of $200 per ton in 1918 would not think of carrying it at such a valuation now when ships sell in the market for very much less, their market price reflecting prospective earning capacity. The difference, which in this instance is very large, represents an extinguishment of capital, a loss.

Without having any thought of entering upon an analysis of the present economic position of the United States Steel Corporation, it is misleading to talk about the "intrinsic value" (a foolish term, anyway) of the shares of it or any other corporation. Of course, nobody is going to sell in the market for $90 to $100 per share what is really worth $260, except under duress. In fact, the market is trying to express the present expectation of the net return that is likely to accrue from a possession of steel common shares. That common shareholders are still getting only $5 per share in dividends, while the workers employed by the company are getting greatly increased wages is a correlated affair. It reflects, among other things, the alteration in the division of the produce of industry, as between property and management on the one hand and labor on the other hand, that has come during the last ten years. Such, however, is an exhibition of the economic changes that have to be taken into account in estimating prospective earnings as a basis for the capitalization of property.

Production of Automobiles

Production of passenger automobiles in June was 336,317, against 350,180 in May. The decrease, 4 per cent, should not be taken either as a seasonal decrease or as an evidence that automobile activity in general is falling off. So many factors enter that close comparisons are not justified. The industry is relatively new, and thus has had little opportunity to show what its normal seasonal fluctuations are. Production has grown so rapidly, moreover, that seasonal tendencies would be largely covered up. There are other factors that should deter one from inferring too much from the figures. There is, for instance, the strong trend toward the closed car, which the average individual is not likely to buy at the same time in the year as an open car.

While this year the production decreased 4 per cent from May to June, last year there was an increase in the same period of 13 per cent. That

indicated no general trend, however, since the bare fact is that in 1922 both June and August showed heavier production than either May or July. Production was simply heavy month about.

The monthly production figures have been as follows for passenger cars only:

	1922	1923
January	81,633	223,706
February	109,171	254,650
March	152,959	319,628
April	197,216	344,474
May	232,431	350,180
June	263,927	336,317

While the monthly figures are not much of a criterion as to trends, the half-yearly figures may be taken as really indicative. They are as follows for the past two years, according to the Department of Commerce monthly reports:

Second half 1921	789,111
First half 1922	1,036,497
Second half 1922	1,298,293
First half 1923	1,828,965

If these four numbers were taken, without any other or collateral information, they would show one thing only, that production has been increasing rapidly. The successive increases are 30 per cent, 25 per cent and 40 per cent. Without specific information of the industry we know, however, that continuous geometric increases even much smaller than thus shown are impossible, because eventually any one industry attempting this would have to absorb everything else, all the workmen, all the raw materials and all the public's money. With additional information that prior to the second half of 1921 there had been much heavier production, the case is different.

Another way in which one may go wrong in following figures too implicitly is to assume that there is really a rule as to what proportion of the steel output the automobile industry uses. Statements of the proportion must be taken as suggestive or typical rather than as absolute. Steel is distributed differently in different years. Production of automobiles was 2.3 times as great in the first half of this year as in the second half of 1921. One might take it that the proportion of steel used by the automobile industry increased. As a matter of fact, it decreased. Production of steel ingots in the second half of 1921 was about 9,250,000 tons, and in the first half of this year about 23,250,000 tons. The number of automobiles made, per thousand tons of ingots produced, decreased from 85 in the earlier period to 79 in the later period.

Promoting Industrial Cooperation

A meeting of unusual importance was held in New York last week, at which editors, labor leaders, and representatives of some of the largest fabricating and erecting companies in the country considered subjects of national importance relating to the present labor situation. Some of the facts developed were encouraging as showing that representatives of capital and labor are cooperating to a greater extent in the metropolitan district than is generally known, and that there is reason for believing that even greater cooperation will be possible this year, not only in New York, but in other large cities and manufacturing districts.

One of the surprising statements made was that employers carrying on important building projects are not accepting as many apprentices as the unions are willing to grant them. Various excuses are given but none seem to be conclusive. Numerous employers have declined to take apprentices offered to them. Certainly, as long as this attitude is maintained, the employers have no right to complain of union restriction of apprentices.

Another subject which had very serious consideration, being discussed freely by employers and labor leaders, was the failure of many workmen to render the service which is due their employers. Representatives of union labor admitted frankly that in the past few years there has been a marked decrease in efficiency, but denied that soldiering has been encouraged by the unions. The cause generally assigned by the speakers was the baneful influence of the war, and the only remedy suggested was education by which workers could be aroused to keener appreciation of their obligations. It was pointed out that the inefficiency complained of is true not only in countries where there are more jobs than men, but also in countries in which there is much unemployment.

While meetings of the kind referred to have their chief value in enlightening the public as to what is actually being accomplished in improving the relations of capital and labor, they have a distinct influence in bringing about a more cordial feeling between employers and employees, who, after meeting at a time when there is no strike or other industrial disturbances, are on a footing more likely to lead to results when serious controversies arise. It is the old story of men who understand each other and who are willing to reason together getting along better than those who for lack of acquaintance base their judgments largely on prejudice and distrust.

The Ruhr and Coke Supplies

The Ruhr occupation, as is well known, has upset completely the European production and distribution of coke and made Continental steelmaking countries more dependent than ever on imported fuel. One index is the export movement of American and British coke. Exports of American coke to June 1 this year have been the heaviest in any peace-time period in many years and nearly equal to the war demand in 1918. Shipments took a sharp upward turn in April and May, the average for these two months being over 180,000 tons, while the year's monthly average to June 1 was 122,260 tons. In 1922, exports were only 38,000 tons per month. A statement difficult to explain is that in France "the American coke that has been tried, while satisfactory at first, has since proved to be of poor quality and in many furnaces American coke could only be used up to 15 per cent of the charge and at best up to 40 per cent."

Demand for British coke has also been very heavy at 165,140 tons per month for the first five months of this year. Of the May exports of

160,620 tons, Germany took 83,355 tons, France 25,390 tons and Belgium 22,960 tons. In 1920 British coke exports were only 63,470 tons per month and none was shipped to Germany. Even as late as December, 1922, Germany took only 13,500 tons out of the 120,000 tons exported from Great Britain, while Sweden absorbed one-third of the total. While no appreciable effect on the American coke market can be expected from the present exports, the situation is different in England. There prices have advanced, resulting in increased costs of pig iron and a slowing down in blast furnace output.

The Ruhr occupation has been the opening of Pandora's box, so far as the Continental steel market is concerned. Great Britain has appeared to profit, in view of her larger iron and steel exports, but there are accompanying drawbacks, and when steel again flows out of Germany, after the adjustment that must come with time, there is reason to believe that Great Britain, as well as the United States, will find cheap German steel a real factor in international competition.

March of the Steam Power Plant

Vigorous exploration by power engineers is opening a new era of practice in steam-station production of electrical power. During the past year important proposals for the improvement of power-plant efficiencies have been tried and have proved practicable.

Some of the recent achievements and the problems arising with advancing steam practice were discussed last month in New York at the convention of the National Electric Light Association. The report of the association's prime-movers committee was especially noteworthy. It dealt with high steam pressures, heat balances, stacks, piping, coal and ash-handling equipment, pulverized coal and the removal of oxygen from the boiler feedwater. The report, which has been made available to non-members, is of interest to power engineers in industrial plants.

Two and three stages of feedwater heating, with or without economizers, to give feedwater temperatures between 250 and 300 deg. Fahr., is now conservative practice. Steam pressures around 500 lb. per square inch, with a total steam temperature of 700 deg. Fahr., will be used by some of the more venturesome of the public utility companies now building plants. Experimental installations of turbines and boilers are in progress for 1200 lb. per square inch pressure in this country.

Advances are being made in the use of pulverized coal. In this connection, thought is being given to the use of the radiant type steam superheaters which may be placed in the combustion chamber to protect the walls from excessive heat. The suggestion has been made, also, that steam generating surface be used in a similar manner. Protection of the walls of the combustion chamber when using pulverized coal would permit pre-heating the air used for combustion, thus improving the furnace efficiency.

Re-heating the steam at some point on its path through the turbine, to eliminate moisture from the low-pressure stages, is proposed in connection with the use of high steam pressures. The steam would be withdrawn from the turbine and conducted to super-heaters located in the main boilers. It would be returned to the low pressure stages, super-heated to about its initial temperature. The thermodynamic efficiency of the turbine would be improved and erosion of the blading, due to moisture, would be lessened by this re-heating. When stage heaters are used and steam for heating the feed water is bled from the main turbine, moisture probably may be adequately eliminated without re-heating. In some quarters it is held that moisture separated from the steam centrifugally could be drawn off through the stage heaters.

The progress now being made in central station practice is well ordered. The intention evidently is not to push too rapidly into new ways. The successes and failures of experiment, however, properly fall to the lot of the large central stations whose principal business is the manufacture of energy. Industrial power plants, on the other hand, are in competition with central stations and cannot afford to ignore pronounced improvements in the practice of the latter. Inquiry might be directed profitably to determining what lag should exist between advances by central stations and corresponding advances in, say, steel mill power plants. The matter involves replacement of equipment and thus the charges for obsolescent machinery.

The possible gain in economy by increasing the steam pressure from 350 lb. to 1200 lb. appears not to warrant the replacement of otherwise satisfactory power generating equipment operating on 350 lb. pressure. It would be preferable to maintain the total steam temperature close to 600 deg. Fahr., though a temperature of 700 deg. appears to offer no difficulties. Stage heating of the feedwater may be adopted immediately, but preheating the air for the furnaces and the recovery of generator losses by using feedwater as a cooling medium in a closed system of generator ventilation are speculative.

New York Central Railroad Breaks Ore Handling Record

Records for handling ore by the New York Central Railroad at Ashtabula were broken July 7 when 10 vessels with 83,086 tons were unloaded and the ore was sent forward to the furnaces in 1386 cars. In addition to the ore, 575 cars of coal was dumped into the boats, making a total of 1961 cars handled in one day. The previous high mark set at Ashtabula was made July 10, 1916, when the New York Central Railroad handled 80,179 tons of ore in 1608 cars. The ore handled on July 7 exceeded by 2907 tons the amount handled on the earlier date, but was shipped in 222 fewer cars, showing the increase in the average car load owing to the use of cars of greater capacity. The average car load on July 7 was 59.94 tons as compared with an average of 49.86 tons on July 10, 1916.

The New York Central Railroad also established a new record for handling ore at Ashtabula during the week ending July 7, handling during that week 293,670 tons in 4872 cars as compared with a previous record during the week ending Sept. 18, 1920, when 281,648 tons were handled and shipped in 5571 cars.

German Prices Much Reduced by Mark Depreciation

Pig Iron Advanced 50 Per Cent in Four Weeks, But Now $10 a Ton—Steel Bars Up 150 Per Cent, But 1.05c Per Pound

BERLIN, GERMANY, July 23.—Foundry iron No. 1, which was advanced by the Pig Iron Association to 4,787,000 m. per metric ton ($10.21 per gross ton at 0.21c. per 1000 m.) a week ago remains at the same figure today. (So great has been the fall of exchange in the week that the price equivalent a week ago was $20.)

Steel ingots, which were 3,382,000 m. ($19.75) per gross ton four weeks ago and 6,019,000 m. ($25.22) last week, are now 7,630,000 m. ($16.28).

Steel bars, which were 4,800,000 m. (1.25c. per lb.) four weeks ago and 8,600,000 m. (1.61c. per lb.) last week, are 10,995,000 m. (1.05c. per lb.).

Thin steel sheets are now quoted at 18,149,000 m. (1.73c. per lb.) against 14,093,000 m. (2.64c. per lb.) last week and 7,800,000 m. (2.03c.) four weeks ago.

Sliding Scale Wage Discussed as Relief—More Mergers Reported—Stinnes Interests Extend Control to Banking

BERLIN, GERMANY, July 3.—As a result of the depreciation in exchange, prices are rising rapidly, and the entire economic structure of the country is affected by the prevailing unrest. A proper calculation of prices is almost impossible, as all factors are continually changing. The discussions between employers and employees are entering a phase of greater animosity as the purchasing power of the mark is rapidly declining. The workers in Berlin iron, steel and engineering plants recently decided to call a strike on the wage question, and considerable trouble is reported in other industrial centers. The metal workers have, however, thus far postponed their strike pending the result of negotiations between the Ministry of Labor and representatives of the employers and the trade unions for the introduction of "wertbeständige Löhne," wages not depreciated by the decline in the mark.

Raw Materials Obtained Despite Allied Restrictions

Communication between the occupied area and other parts of Germany has been entirely stopped by the Interallied Commission for the Rheinland, except for the transportation of foodstuffs, for a fortnight. The separation of the important iron and coal-producing Rhenish districts was originally a severe blow to German industry, but it has since been able to secure sufficient coal and raw material from abroad, so that few firms are now experiencing any trouble from shortage of fuel or raw material. The new measure can, therefore, have but little effect on most German works.

The Upper Silesian iron industry (German) has booked numerous orders lately, especially on foreign account. Sheets are not active, as they are meeting with strong foreign competition, largely British. Pig iron, structural shapes, tubes and wires are in good demand despite the great advances in prices. Firms manufacturing specialties are well booked in advance. Following upon the 57 per cent increase in miners' wages and in the cost of material, coal prices are 50 per cent higher. This has affected pig iron, which is now quoted at 3,228,000 m. per metric ton for hematite and steel-making iron low in copper; 3,198,000 m. for foundry iron No. 1; 3,195,000 for foundry iron No. 3, and 3,185,000 for foundry iron, Luxemburg quality. Iron blown in with imported fuel has been fixed at 3,892,000 marks for hematite and steel-making iron poor in copper; 3,862,000 for foundry iron No. 1; 3,859,000 for foundry iron No. 3, and 3,849,000 for foundry iron, Luxemburg quality. Prices for rolled material have again been advanced by about 19 per cent. The present prices per metric ton are given in the following table:

Guiding Prices.

	Basic Bessemer Marks	Open Hearth Marks
Ingots	3,382,000	3,706,000
Blooms	3,820,000	4,184,000
Billets	4,041,000	4,426,000
Sheet bars	4,210,000	4,610,000
Structural shapes	4,773,000	5,166,000
Bar iron	4,800,000	5,200,000
Hoop iron	5,894,000	6,330,000
Wire rods	5,105,000	5,533,000
Sheets:		
5 mm. and heavier	5,710,000	5,874,000
3 to 5 mm.	6,661,000	6,837,000
1 to 3 mm.	7,989,000	7,585,000
Less than 1 mm.	7,509,000	8,252,000

Warehouse stocks in some grades are depleted, so that sellers have had to resort to rationing of customers. The demand from engineering companies has increased, especially from those working for export. Bar and hoop iron are in particularly heavy demand, but structural shapes can be fully supplied.

Scrap prices are also advancing heavily. Consumers are reluctant to pay the high prices demanded, but find it increasingly difficult to obtain material either from the producers or dealers. As new material is continually rising, producers of scrap are forced to reckon more closely with the prices received for their material and are loath to accept anything but the highest price obtainable. Lack of capital is in many cases a hindrance to operation on the old scale, as any delay in payment for raw materials results in heavy losses to the buyer as the result of the depreciation of the mark in the meantime. In the Rhenish districts business has practically come to a standstill.

Numerous Mergers Reported

Renewed efforts toward forming "interessengemeinschaften" and fusions in industry are reported, and closer contact has been established with the Austrian industry and the southeastern markets. The Rhenish firm of Peter Westen has, together with the Mannesmann company, erected large steel works at Mediasch, Hungary, operated with the natural gas available in the district. The Schiepke Agricultural Machine Co. at Hermannstadt, Hungary, has also been absorbed into the new company. It is intended to extend these works and enlarge the sales organization in Southern Russia and the Balkans. The Epple-Buxbaum Upper Austrian Agricultural Machine Co. and the Landsberg and Munich Agricultural Machine companies at Munich have concluded a working agreement.

The Rhein-Elbe works and the Gesellschaft für Lindes Eismaschinen have agreed upon the formation of a new joint company for the exploitation of their patents and systems for the production of welding gas and other chemical products. The Otto Wolff concern has acquired the majority of the Rosenau Co., Düsseldorf, which is producing machine and engineering tools. The Hoesch steel works has concluded an agreement with the Federstahl Industry Gesellschaft Hirsch & Co. By the contract the Hoesch works acquires part of the shares of Hirsch & Co. in return for the supply of iron and steel material at present prices.

Hugo Stinnes Enters Banking Field

The Hugo Stinnes interests have taken up large holdings in the Barmer Bankverein, a transaction which is arousing much comment. Stinnes is in this way adding considerably to his influence, as this bank is financing a large part of the Rhenish-Westphalian industry. It may be recalled that the concern some time ago acquired a large part of the shares of the Berliner Handelsgesellschaft, one of the greatest German banks, which is financing the A. E. G. It appears that the policy of the Stinnes concern is now enlarged to include banking, a field from which the other large industrials have generally held aloof.

SEES MEXICO AS A CUSTOMER

C. V. Allen, Westinghouse Manager, Optimistic About Future of That Country

PITTSBURGH, July 23.—Mexico will soon be our best foreign customer if conditions there continue to improve as rapidly as they have recently, according to C. V. Allen, manager for Mexico, Westinghouse Electric International Co., who is back in the United States on a short business trip.

Mr. Allen is enthusiastic about the future of Mexico. The present Government is doing its best to get the country straightened out politically and Mexico is now in better condition than it has been since the revolution. The railroads, most of which are operated by the Government, are in good condition, and cover the country very thoroughly. The Government telegraph and postal services are dependable. Already the number of industries has increased considerably and all that is needed to make Mexico one of the most productive countries in the world is foreign capital. The most logical place for this capital to be obtained is the United States, and as soon as an agreement has been reached about property rights of foreigners, taxes and other matters of importance to foreign investors that are now being discussed by the American and Mexican Governments, Mexico will be a safe place for American investment.

With reference to these property rights, Mr. Allen said that Americans should not misjudge the Mexican Government, which is only trying to protect its natural wealth from foreign exploitation. Mr. Allen expects an agreement to be reached between the two Governments shortly.

One of the main hindrances to progress in Mexico in the past, said Mr. Allen, was the ignorance of most of the poor Indian class, which numbers 12,000,000 out of the total population of 14,000,000 in the country. The present Government is doing its best to overcome this evil and is spending a great deal of money on popular education. Already the good effects of this policy can be seen, for the younger generation is fast learning to read and write. The change is particularly noticeable to one who returns to Mexico after an absence of a number of years, for servants will now be able to read and write and may, in fact, be able to speak English. As soon as the younger generation takes the place of its elders, Mexico should make rapid forward strides.

On the other hand, the fact that the large majority of Mexicans are still very poor and being dependent for their subsistence on agriculture alone, they cannot buy anything but the most simple products and not many of them. Their chief articles of consumption are clothes and the simplest kinds of food; and most of these are domestic products. Machinery will probably be the largest future import from the foreign countries, for there are practically no machinery manufacturers in Mexico, and, with the development of industries, much machinery will be needed. Already there are a number of large textile mills, some owned by foreigners and some by natives, and shoes now are being manufactured in large quantities. Moreover, with the development of the mines and oil fields, further imports of machinery will be needed.

To the United States rather than to Europe, Mexico will naturally turn for its imports because nearness to this country makes quick deliveries possible and reduces the expense of transportation. For the machinery trade, this proximity is of particular importance, as the necessity of securing repair parts with the least possible delay gives American machinery manufacturers a very great advantage over European competitors.

BELGIAN MARKET STRONG

Mills Well Booked and Inclined to Await Higher Prices—Raw Materials Still High

ANTWERP, BELGIUM, July 7.—As expected a fortnight ago, the iron and steel market is firmer and prices are rising. The recovery seems to be more than a temporary revival and plenty of business is reported in all lines. Prices in all grades of iron and steel are rising, so that consumers no longer hesitate to place business and there is a general effort to boom orders at the now ruling prices in anticipation of still further increases. The market today is higher by 25 to 50 fr. per metric ton on all materials and even at these higher prices demand exceeds the available supply, so that, as a rule, quotations are accepted by buyers without discussion.

Numerous works are fully booked for the summer and others have retired from the market, evidently with the expectation that by waiting still better prices will be obtainable. Notwithstanding the increases, finished and semi-finished materials are regarded as cheap, considering the proportionately higher prices of raw materials, especially coal and coke. As a guide to the current market, the following prices per metric ton, f.o.b. mill, for steel and iron for domestic consumption, are a fair estimate.

	Fr.	Equivalent
Commercial iron No. 2	650	$32.50
Commercial iron No. 3	675	33.75
Commercial iron No. 4	775	38.75
Heavy sheets	700	35.00
Light sheets	1,000	50.00
Bars	650	32.50
Rails	625	31.25
Basic blooms	625	31.25
Open-hearth steel	650	32.50
Bessemer ingots	500	25.00
Blooms	550	27.50
Billets	575	28.75

Statistics Favorable to Export Business

If the situation were such as to permit the purchase of large tonnages for export at these prices, the American importer could secure many low-priced items, as the Belgian franc has been declining rapidly in foreign exchange and in contrast to other such periods, there is no evidence of an immediate recovery. The rate today is 20 fr. to the dollar, against 17.50 fr. at the end of May. The tendency of foreign currencies is mostly upward and still higher rates are expected. Such a situation, although favorable to export business, is making importation impossible and is causing severe disturbances in several markets.

There is a good demand from foreign buyers, especially for pig iron and semi-finished materials. On the other hand, the largest and most important orders placed by Belgian consumers are for beams, angle iron and concrete iron. The largest foreign inquiries are from South America, Spain and eastern markets. British buyers have reappeared but important business in this direction has not yet been reported, although orders will undoubtedly be placed in the next few days as a result of the exchange advantage enjoyed by the pound sterling. Scrap is particularly scarce. Billets also are scarce, although sheet bars are offered more generally.

Export business on bars has been negotiated at 650 fr. per metric ton ($32.50), f.o.b., Antwerp, but it is doubted that works will enter any further orders at this price. Bessemer sheets are quoted at 700 fr. per metric ton ($35), f.o.b. Antwerp; round bars at 800 fr. per metric ton ($40) and billets, because of the small tonnages available have been quoted for export at as high as 140s or 644 fr. per metric ton, f.o.b. Antwerp. This quotation was made with the pound sterling at 92 fr.

Pig Iron Production Increasing

Lorraine works are quoting prices about on a par with the Belgian mill prices, billets, for instance, being held at 600 fr. per metric ton ($30), f.o.b. Antwerp. Luxemburg mills have only small quantities for sale and are still suffering from an insufficient supply of coke. Since last month three more blast furnaces have been blown in in Belgium. On July 1, 38 furnaces were in blast, against 35 previously. Of the 38, three produce foundry iron for merchant purposes. More furnaces will be blown in shortly, among them a number producing steel-making iron.

Prices of Belgian phosphorus foundry iron are 470 to 480 fr. per metric ton ($23.50 to $24). Prices, f.o.b. Antwerp, are about the same. The demand being

heavier, only small quantities for prompt shipment are available and makers are not disposed to consider long contracts at present prices. Consequently the market is firm and prices maintain their upward tendency. Basic Bessemer is quoted at about 430 fr. per metric ton ($21.50), f.o.b. Antwerp, but available quantities are small.

Fairly large tonnages of Luxemburg and Lorraine foundry iron have been sold in Belgium. Prices obtained were 460 to 470 fr. per metric ton ($23 to $23.50). These are also the ruling prices for export business, although some foreign orders have been booked recently at somewhat lower prices. French hematite pig iron has also been sold in Belgium. French works quoted 400 fr. per metric ton, French currency (480 fr., Belgian, or $24). This is 105s. per ton, so it is evident that despite the latest reductions in prices of English hematite iron, there is no market for the British product at present, the current price being 117s. 6d. to 120s., c.i.f. Antwerp.

The coal market is firm. Orders are plentiful and producers are in arrears with deliveries. Prices have not been increased thus far, but it is quite impossible to book orders for prompt shipment and no business is being closed for future deliveries. Ordinary coke is now quoted at 144 fr. per metric ton ($7.20). German origin furnace coke is 152.50 fr. per metric ton ($7.65) and coke produced partially from Belgian, English, German or Dutch coking coals is about 200 fr. per metric ton ($10).

Because of the unfavorable exchange on the Belgian franc with the pound sterling, importation of British coal will probably be restrained as far as possible, but this can only be a partial curtailment, as since the war Britain has been the largest provider of coal to Belgium among all the foreign sellers. Any such curtailment of purchases of coal abroad will depend upon receipts of German coal from the Ruhr. In June the total tonnage received was about 170,000 tons (25,500 tons of coke and 15,000 tons of briquettes).

France as a Consumer and Producer of Machinery

As a machinery producer for foreign markets France has not been of outstanding importance. According to figures compiled by the industrial machinery division of the Department of Commerce, French exports of industrial machinery before the war varied from $19,165,000 to $41,495,000 in value and from 4.5 to 6.6 per cent of the total international machinery trade of the world.

Since the war the French exports have risen to as high as 8.9 per cent of the world's total machinery trade (1919) and in 1920 and 1921 averaged 5½ per cent of the world's total.

As a consumer of machinery, in peace times as well as in war, the position of France is far higher than as a machinery producer and exporter. Before the war the American participation was not very great. During the war it became very important, but subsequently has again decreased. This decline has in part been due to the participation of Germany in this trade.

American manufacturers have an advantage that owing to the extensive use of American equipment in France during the war there is a much better recognition of the merits of American designs than was the case formerly. It is true that the French tariff is a serious obstacle to importation.

In pre-war days the French machine tool industry was not highly developed, but in common with other things the war demand for munitions and other supplies created a very heavy demand for machine tools of all kinds and also for an improvement in the character of equipment produced. Following the armistice, in common with the rest of the world, there was a post-armistice boom with the result that we now find the French machine tool industry producing a better grade of equipment and on a greatly expanded basis when compared with what was known in pre-war days, and as a consequence there is a tendency for French manufacturers to increase their participation in the machine tool trade of the world.

Reports received in the Bureau indicate that very important changes are taking place in the industrial life of France which should have their effect on the market for the better types of machinery in that territory. There is a tendency to re-equip and modernize the factories and the methods of manufacture employed; the 8-hr. law has been repealed, and there is a tendency to place a larger share of production on the piece-work system. The advantages of standardized production are well recognized and where practical, employed. For these and other reasons it would appear at once that the position of France, not only as a producer but as a consumer of machinery as well, is of more than usual interest at the present time.

Slight Increase in Operations of Ohio Foundries

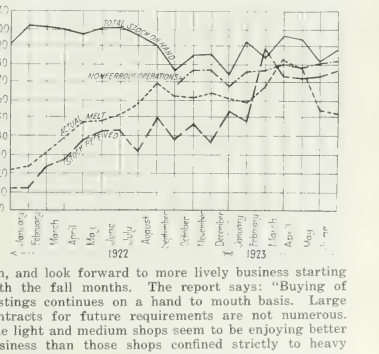
The Ohio State Foundrymen's Association, Cleveland, reports that operations of Ohio foundries for June show a slight increase over May. During May, operations were 81.12 per cent of normal or capacity. For June this increased to 81.27 per cent. June one year ago showed 51 per cent.

The normal melt figure is always equivalent to the capacity of foundries reporting. The capacity of all of the foundries reporting in June is 29,713 tons. Every foundry did not operate at capacity, however, and the actual melt was 24,144 tons, which gives a percentage of normal or capacity of 81.27 per cent.

Total stocks on hand is the total of all of the pig iron and all of the scrap iron on hand. During May, this figure stood at 82 per cent. June has increased to 87 per cent. June, 1922, stood at 101 per cent.

Stocks received, representing a total of all of the grades of pig iron and all of the grades of scrap iron, show a further decline. Last month this figure stood at 56.34 per cent. June figures tapered off to about 52 per cent. This compares with a figure of 42 per cent for June, 1922.

For June, non-ferrous operations were on the basis of 77.25 per cent of capacity or normal. May stood at 72.13 per cent. Some non-ferrous operators expect a slight tapering off during the remainder of the hot season, and look forward to more lively business starting with the fall months. The report says: "Buying of castings continues on a hand to mouth basis. Large contracts for future requirements are not numerous. The light and medium shops seem to be enjoying better business than those shops confined strictly to heavy castings.



For the first month in the past several, June shows a tapering off in total pig iron production. Foundry operators generally are not contracting for future pig iron; buying largely on hand to mouth basis."

TO FIGHT PITTSBURGH BASE

Representatives of Mid-Western States Meet—Mayor of Chicago Issues Statement

CHICAGO, July 23.—A joint interstate commission appointed by four Mid-Western States to fight the Pittsburgh basing plan of selling steel products held a meeting at the Union League Club, Chicago, on Saturday, July 21, with the idea of forming a permanent organization, but owing to the absence of B. F. Peek of Moline, Ill., another meeting will be called for this purpose. The commission was appointed by the governors of Illinois, Wisconsin, Iowa and Minnesota. Attorney-General Herman Ekern of Wisconsin, Attorney-General Clifford L. Hilton of Minneapolis and Senator John T. Denver of Illinois headed the delegation from their respective States. B. F. Baker, Kewanee, Ill., represented the Western Association of Rolled Steel Consumers and S. S. Thompson, Quincy, Ill., represented the Illinois Agricultural Association.

Mr. Peek, who is prominent in the agitation against the Pittsburgh base, was a member of the War Industries Board during the war. A feature of the meeting was a report on economic phases of the Pittsburgh basing plan prepared by a committee of economists, among whom were Prof. John R. Commons of the University of Wisconsin, F. B. Garver, professor of economics at the University of Minnesota, Ivan Wright, assistant professor of economics at the University of Illinois and William G. Raymond, dean of the College of Applied Science at the State University of Iowa. The commission will eventually go to Washington where it will appear before the Federal Trade Commission.

Mayor Dever of Chicago has instructed the corporation counsel of Chicago to make an investigation of the Pittsburgh plus plan to determine what steps, if any, should be taken by the city to cooperate in the fight against the practice. The letter of the mayor to the city council reads in part as follows:

"In various trade journals, and in the public prints it has been stated that this trade practice in the steel industry places an illogical burden on Chicago industry of between $5,000,000 and $8,000,000 annually. This directly increases the cost of all construction and building operations in which steel is used. It is further said in these publications to which I have referred that numerous industries are awaiting only the abolition of Pittsburgh plus to locate in the Chicago district and in one of these publications, the official publication of the Chicago Real Estate Board, that the abolition of this trade practice would result in the immediate location of more than $200,000,000 of new industries and the employment of 50,000 additional workmen in Chicago and vicinity. I am advised that numerous municipalities, trade and civic organizations have addressed memorials to the Federal Trade Commission voicing their protests against the continuance of the artificial price fixing which so directly affects vital municipal activities."

Four States Hold Up Pittsburgh Basing Case Until December

WASHINGTON, July 24.—Rebuttal proceedings in the Pittsburgh basing case were postponed by the Federal Trade Commission yesterday until Dec. 10 on request of attorneys-general of four States in the Middle West. The commission announced that the legislatures in Illinois, Iowa, Minnesota and Wisconsin had appropriated special funds for the use of attorneys-general in their respective States in conducting intensive studies into the problem of steel distribution and prices. The attorneys-general filed petitions with the Federal Trade Commission yesterday in order to comply with the legislation which authorized them to conduct an independent investigation of the proceedings brought by the commission against the United States Steel Corporation and others in the "Pittsburgh plus" case. Proceedings were originally scheduled for Aug 6, but the State officials requested six months for their special inquiries.

ASK FOR REHEARING

Steel Companies File Petition in Assigned Coal Car Case

WASHINGTON, July 24.—Following the action of subsidiaries of the United States Steel Corporation in petitioning the Interstate Commerce Commission to reopen the so-called assigned coal car case, similar requests were made in petitions filed with the commission yesterday by the Bethlehem Steel Corporation and its subsidiaries, including the Bethlehem Steel Corporation, Bethlehem Mines Corporation, and Pennsylvania-Mary Coal Co., and the Seaboard By-Product Coke Co., the Chicago By-Product Coke Co., the Donner-Union Coke Corporation, and the Rainey-Wood Coke Co.

In its petition the Bethlehem Steel Corporation declares that the effect of the commission's order would be disastrous upon it, its labor, its business and upon consumers of steel. It says that the order would require the petitioner's cars to lie idle and unused when the number of such cars available for use at the 30 coal mines of the petitioner exceeds the percentage distribution of cars to other mines in the same district notwithstanding the fact that the Bethlehem Steel Corporation subsidiaries may be able and willing to cause all of its 4000 private coal cars to be loaded and shipped and notwithstanding the fact that the railroads may have the necessary trackage and equipment for such a movement. The Bethlehem Steel Corporation petition says that its subsidiaries consume 13,000,000 tons of coal annually.

The petition further declares that the corporation did not base its request for a reopening of the case solely upon technical rights regarding its property and interests affected but relied largely upon the public character and responsibility of the commission's functions and vast public importance of the commission's order and the total inadequacy of the record to support it.

Complaint of Coke Producers

The petition of the producers of by-product coke, owning 1900 standard steel hopper bottom coal cars and operating 530 by-product ovens consuming 10,250 tons of coal daily, declared that the order was subversive of their entire plan of operation of their business and destructive of the means adopted by them to assure their ability to meet public obligations. These oven interests among other operations sell gas to companies that supply municipalities. They declared that they could not store coal without making the cost of gas prohibitive for sale to the public and even if they could find customers for their gas and coke the effect of the order would be to increase the cost of public service gas and the use of such coke. It also was said that the order would mean the immediate destruction in large part of the values represented by their investment in coal cars and the denial absolutely to their use and enjoyment of their coal cars to the extent the placement of the cars at the mines serving them would exceed the pro rata share of available cars to which other mines in the district should be concurrently entitled. After calling attention to the general idea that the coking of coal so as to conserve the gas and the other by-products is a conservation of natural resources, the by-product coke makers said "the public interest arising from such conservation seems to petitioners to be fully as important as the possible public interest in the equalization of operation among the efficient and inefficient bituminous coal mines."

The Timken steel from which Timken bearings are made has a carbon content of from 0.15 to 0.20 per cent instead of a carbon content of 0.29 as was stated in a recently published Timken roller bearing advertisement.

NO CHANGE IN EXPORT

Far Eastern Business Moderate Chinese Market More Active Foreign Pig Iron Too High to Import

NEW YORK, July 24.—Export trade shows no particular improvement with the exception of Chinese merchant buying, which is beginning to exhibit slightly more animation than for several months. Japanese merchant buying in the United States is at a standstill, most of the current business being from the government and large interests. In South America the Chilean State Railways with a branch office in the United States at 141 Broadway, New York, is receiving bids on a quantity of manganese steel switches and crossings and will probably be in the market in a month or two for the annual rail requirements of the state railroads. Some activity in purchases of rails and railroad material is expected from the Argentine State Railways before long. The state railroads represent about 15 per cent of the total mileage of the country.

Railroad business from Japan at present is confined to a tender on five miles of 60-lb. rails from a privately owned railroad in Korea, which is a feeder line to the Korean State Railways, owned and controlled by the Imperial Government Railways. The 18,000 boxes of tin plate on which bids were opened by the Nippon Oil Co., July 16, were awarded to the New York branch of a Japanese export house. The tender of the Imperial Government Railways, pending for some time, calling for about 150 tons of steel sheet piling was awarded to Suzuki & Co., New York, and placed with a large independent.

Chinese buyers are showing a slight renewal of activity and inquiries are current for second-hand plates, wire shorts, steel pipe, cold-rolled shafting of large size for use in connection with textile mills, sheet bar crop ends and some small lots of casting copper. Following a several weeks' period of refusal by Chinese merchants to pay the prices asked by sellers in the United States for wire shorts, business has been renewed in a few instances, the Chinese evidently being willing to transact business in this commodity at about $50 per ton, f.a.s. American port.

In contrast to reports that low-priced foreign iron is available, importers continue to point out that Continental iron about equivalent to No. 2X foundry is quotable at not less than $27.50 to $28 per ton, c.i.f. Atlantic port, and importers of Scotch foundry are unable to offer No. 3 at better than about $30 per ton, c.i.f. port. One importer of British iron is able to offer a Middlesbrough foundry iron, low in phosphorus at $28 per ton, c.i.f. Atlantic port.

The Brazilian Minister of Public Works has authorized the Federal inspector of railroads to call for bids for the steel work on a railroad bridge over the Mossoro River, in the state of Rio Grande do Norte, the cost not to exceed $1,000,000, says a report to the Bureau of Foreign and Domestic Commerce.

Recent British statistics on pig iron exports show in May 4281 tons of pig exported from the Middlesbrough district to the United States, the largest tonnage to any one country. Germany was second with 3862 tons and Australia third with 3745 tons.

FRENCH BUSINESS IMPROVES

Domestic Trade Good and Export Improves Slightly—Mills Delay Booking for Fourth Quarter

PARIS, FRANCE, July 13.—Business is flourishing with domestic consumers, and export shows considerable improvement. Prices have finally become stable with a distinct tendency to advance, exceptional price reductions no longer existing, as most works have been able to fill their books with highly satisfactory business. It is reported that many works are reluctant to accept orders at current prices for delivery in August or later, expecting further increases before the end of the year. As a result of the good export trade enjoyed by Belgium, offers from this source to French consumers are less numerous and of small importance. The United States and the United Kingdom are reported to be making fairly extensive purchases in France and Luxemburg, doubtless taking advantage of the present favorable rates of exchange. It is believed that British buyers are at present active in accumulating stocks in view of the possibility of a reduced French output because of the anticipated curtailment in deliveries of Ruhr coke and the prospect of miners' strikes in both France and England.

The French production of iron and steel in May totaled 393,400 metric tons of pig iron against 350,500 metric tons in April, and 399,200 tons of steel against 365,800 tons in April.

Pig Iron.—Demand has increased considerably and works are no longer inclined to quote for future deliveries, confining offers at present prices to delivery well within the third quarter. Prices vary with different furnaces and localities. Prices are generally based upon the facilities available to the furnace for obtaining coke supplies. The average quotation on medium phosphorus foundry iron, No. 3 P. L. is 380 to 390 fr. per metric ton, at furnace. A good export demand from Italy, Belgium and the United States is reported. Lorraine furnaces are quoting for export, f.o.b. Antwerp, 420 to 425 fr. per metric ton (Belgian currency) for Bessemer basic and 460 fr. (Belgian) for ordinary, chill-cast, pig iron, No. 3. Hematite is now quoted at 410 to 420 fr. per metric ton in the East and 430 fr. per metric ton at furnaces in the Southwest. British hematite, mixed numbers, is quoted at 525 fr. per ton in the Paris area, which is too high to compete with the domestic product.

Ferroalloys.—The Comptoir Electro-Metallurgique announced new prices on July 1. Ferrosilicon, 20 per cent, has been reduced 50 fr. per ton to 700 fr.; 40 and 90 per cent are unchanged at 950 fr. and 2100 fr. per ton, respectively, and 75 per cent has been reduced 50 fr. per metric ton to 1650 fr. Ferrochrome, 2 to 4 per cent Cr. has been increased 30 fr. per metric ton to 2460 fr.; 4 to 6 per cent Cr. reduced 115 fr. per metric ton to 1785 fr.; 6 to 8 per cent Cr. reduced by 85 fr. per metric ton to 1735 fr.; and 8 to 10 per cent Cr. reduced 115 fr. per metric ton to 1695 fr. Spiegeleisen, 10 to 12 per cent Mn., is quoted at 520 fr. per metric ton in the East, 18 to 20 per cent Mn., at 620 to 635 fr. per metric ton.

Semi-finished Material.—Export trade is better, particularly sales to the United Kingdom, as, it is reported, British prices are 20 per cent higher than Belgian or French export quotations. As a result of increased demand works are booked to capacity for about 6 weeks. One firm in western France is stated to have booked business in semi-finished material for export to the United Kingdom at £6 15s. per metric ton, f.o.b. Antwerp. At present Bessemer basic blooms are being quoted at 900 to 940 fr., f.o.b. works, for domestic consumption and 560 to 565 fr. (Belgian currency), f.o.b. Antwerp, for export; billets 940 to 1000 fr., f.o.b. works, domestic consumption and 590 to 600 fr. (Belgian currency), f.o.b. Antwerp, for export. The building trades are active, but the season is rather well advanced. Beams and angles are quoted at 1100 to 1170 fr. per metric ton for domestic consumption and 640 to 670 fr. (Belgian currency), f.o.b. Antwerp, for export. Bars are quoted at 1120 to 1160 fr. per metric ton, base, for domestic consumption and 700 fr. (Belgian currency), f.o.b. Antwerp, for export.

Sheets.—Prices have somewhat stabilized and the following average prices are quoted for domestic consumption, f.o.b. works: heavy sheets, 1260 to 1360 fr. per metric ton; medium, 1500 to 1720 fr. and light, 1840 to 2000 fr.

Coke.—About 161,000 tons of Ruhr coke was imported in June. From imports of British and Dutch coals about 100,000 tons of coke is produced monthly, exclusive of collieries and steel works. British and American contracts have in most cases expired, and there is no inclination to renew.

Iron and Steel Markets

A MORE ACTIVE WEEK

Extent of Current Demand Regarded Favorably

Pig Iron and Steel Output Less—Low Prices for German Steel

The week has brought more activity in some forms of finished steel, particularly plates and structural material, but not to the extent of affecting prices. There is a general expectation, also, that several more weeks will pass without a decisive change in the present positions of buyers and sellers.

It is evident that some of the smaller steel companies whose rollings have fallen considerably from the recent peak, must soon have larger orders to maintain profitable operations, but there are few signs today of either forward buying on the one hand or of price cutting to help order books on the other.

That early delivery business develops each week in the volume that has marked July is favorably construed in view of the continued smallness of cancellations and the moderate size of consumers' stocks.

Some further decline has come in blast furnace and steel works activities in the Pittsburgh and nearby districts. The Carnegie Steel Co. is running at 92 per cent of ingot capacity, while Pittsburgh and Valley independent companies are averaging above 80 per cent.

There has been some accumulation of steel ingots, and in semi-finished steel concessions have been made, as low as $40 having been quoted on sheet bars and slabs outside the Pittsburgh and Valley districts, as against a $42.50 contract price.

As for several weeks, what yielding has appeared in finished steel prices has been chiefly in sheets, which larger buyers have obtained at 3.75c. for black, and on hot-rolled flats. There is some laxity also on extras in the case of bars for cold finishing, and on bolts, nuts and rivets the market is easier.

The automotive industries, with all their favorable outlook, are no longer free buyers of steel, and the largest maker has been most frequently named in connection with suspensions of steel deliveries. A number of parts manufacturers are now on a 75 per cent operating basis.

The effect of the eight-hour day on steel costs will develop slowly. It may be a factor in the firm attitude of most sellers, but it is recognized that the turning point in the present market situation will come before much progress can be made toward the short day.

A number of fabricating shops that a few months ago held for full prices are now aggressive in seeking business. Including 2500 tons for Japan, and over 11,000 tons for private undertakings, the week's awards for steel work exceed 23,000 tons. The projected Palmer House in Chicago puts the total of fresh inquiries to fully 18,500 tons.

At Chicago the call for steel for oil tanks has kept up, and for 30,000 tons of such work now under inquiry there much of the steel would be drawn from mills farther east, Chicago plate mills not being able to promise the deliveries wanted. A Kansas fabricator has been obliged lately to go to a Pittsburgh mill for 5000 tons of steel for an oil tank contract.

Lower warehouse prices have appeared in several markets. Chicago reports a 15-cent concession on wire nails. At Cleveland there has been some shading by jobbers in galvanized sheets, and at certain points in Ohio prices on bars, plates and shapes have shown keener competition between Cleveland and Pittsburgh warehouses.

Active inquiries for railroad cars are less than 2000 in number. Little railroad equipment has been ordered but increased interest is noted in repair work.

A moderate increase in buying of pig iron is responsible for a more cheerful feeling in that market, but prices have gone lower. At Chicago and in the East, foundry and basic grades are down from 50c. to $1 per ton, and while $25 still prevails in the South, sales have been made as low as $24. Charcoal iron has been reduced $4.50 and silveries and Bessemer ferrosilicon, $5. The largest transaction of the week was the purchase of 20,000 to 25,000 tons of foundry grades by a cast-iron pipe company.

German steel prices, though advanced over two and one-fourth times in four weeks, cannot keep pace with the fall of mark exchange. Though thin sheets are now over 18 million marks per ton, the equivalent American price is 1.73c. per pound. The equivalent of the steel bar price is 1.05c. Foundry iron is barely $10.25 per ton and steel ingots $16.25.

There are more predictions of severe competition from German steel, even in the United States, when the Ruhr settlement comes. Recently German bars were quoted for delivery at a Gulf port at $8 per ton below the price of Pittsburgh bars.

Germany has bought shipbuilding material in Great Britain. India has bought 15,000 tons of rails from British mills, and Japan, Australia and South Africa are also in the rail market.

Pittsburgh

Moderate Improvement in Demand, But Buyers Are Conservative

PITTSBURGH, July 24.—In a number of directions the steel market reflects a slight increase in interest on the part of consumers and distributors, and the trade consequently is beginning to take hope that a revival in business is not far off. There has been no change in the character of demand, which still is for small individual lots, and in practically all cases, for very prompt shipment. Collectively, rather than individually, is the inquiry better than it has been recently, since there is no forward buying. The demand, however, is helpful in sustaining finished steel prices, since the orders generally are going to the mills with

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	July 24, 1923	July 17, 1923	June 26, 1923	July 2, 1922
No. 2X, Philadelphia†	$28.56	$27.56	$30.76	$28.76
No. 2, Valley furnace†	25.00	25.00	26.50	25.00
No. 2, Southern, Cincin.	29.05	29.05	29.05	22.55
No. 2, Birmingham, Ala.	25.00	25.00	25.00	18.73
No. 2 foundry, Chicago*	27.50	28.00	30.00	25.00
Basic, del'd. eastern Pa.	25.50	26.50	28.14	23.74
Basic, Valley furnace	25.00	25.00	27.00	24.00
Valley Bessemer, del. Pgh	28.26	28.26	29.26	26.76
Malleable, Chicago*	27.50	28.00	30.00	25.00
Malleable, Valley	24.50	25.50	26.50	27.00
Gray forge, Pittsburgh	26.26	26.26	27.76	26.26
L. S. charcoal, Chicago	32.15	36.65	36.65	31.65
Ferromanganese, furnace	117.50	117.50	125.00	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. Sheet bars, P'gh	42.50	42.50	42.50	35.00
Forging billets, base, P'gh.	47.50	47.50	47.50	40.00
O.-h. billets, Phila.	47.67	47.67	47.67	40.17
Wire rods, Pittsburgh	51.00	51.00	51.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.45	1.70
Light rails at mill	2.25	2.25	2.25	1.75

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.72	1.925
Iron bars, Chicago	2.50	2.50	2.50	2.00
Steel bars, Pittsburgh	2.40	2.40	2.40	1.70
Steel bars, Chicago	2.60	2.60	2.60	1.75
Steel bars, New York	2.74	2.74	2.74	2.04
Tank plates, Pittsburgh	2.50	2.50	2.50	1.70
Tank plates, Chicago	2.80	2.80	2.80	1.75
Tank plates, New York	2.84	2.84	2.84	2.04
Beams, Pittsburgh	2.50	2.50	2.50	1.70
Beams, Chicago	2.70	2.70	2.70	1.75
Beams, New York	2.84	2.84	2.84	2.04
Steel hoops, Pittsburgh	3.15	3.15	3.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	July 24, 1923	July 17, 1923	June 26, 1923	July 2, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	4.35	3.85	3.85	3.15
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.15
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.40
Wire nails, Pittsburgh	3.00	3.00	3.00	2.40
Plain wire, Pittsburgh	2.75	2.75	2.75	2.25
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.05
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material Per Gross Ton:				
Carwheels, Chicago	$20.50	$20.50	$21.50	$19.50
Carwheels, Philadelphia	20.00	20.00	22.00	17.50
Heavy steel scrap, P'gh	17.00	18.00	20.50	17.25
Heavy steel scrap, Phila.	16.00	16.50	17.50	15.00
Heavy steel scrap, Ch'go.	17.00	17.00	17.50	15.50
No. 1 cast, Pittsburgh	20.50	21.00	23.50	19.00
No. 1 cast, Philadelphia	20.00	21.50	22.00	17.50
No. 1 cast, Ch'go. (net ton)	18.50	19.00	21.50	17.00
No. 1 RR. wrot. Phila.	18.00	18.00	21.00	17.50
No. 1 RR wrot. Ch'go. (net)	14.50	14.50	15.00	14.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.50	$4.50	$4.75	$14.00
Foundry coke, prompt	5.25	5.25	5.50	14.00

Metals				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	15.00	15.00	15.12½	14.00
Electrolytic copper, refinery	14.50	14.50	14.75	13.75
Zinc, St. Louis	6.10	6.12½	5.70	5.95
Zinc, New York	6.35	6.47½	6.05	6.30
Lead, St. Louis	6.10	5.90	6.70	5.40
Lead, New York	6.25	6.00	7.00	5.75
Tin (Straits), New York	39.62½	38.00	40.37½	32.12½
Antimony (Asiatic), N. Y.	7.00	6.85	6.75	5.25

Composite Price July 24, 1923, Finished Steel, 2.775c. Per lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 85 per cent of the United States output of finished steel

July 17, 1923,	2.780c.
June 26, 1923,	2.780c.
July 25, 1922,	2.169c.
10-year pre-war average,	1.689c.

Composite Price July 24, 1923, Pig Iron, $25.68 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

July 17, 1923,	$25.93
June 26, 1923,	27.79
July 25, 1922,	24.05
10-year pre-war average,	15.72

the lightest order books, which might otherwise be sufficiently in need of business to cut prices. The mills which are best off in the matter of orders generally are shipping more tonnage than they are putting on their books and, with the exception of the Steel Corporation subsidiaries, the condition of producers is such that they must soon have larger orders to maintain profitable operation.

Not much trouble now is experienced by large lot buyers of black sheets to get them at 3.75c. base. Hot-rolled flats are easy, but these are the only real points of weakness that yet have cropped out, although there are reports that some of the makers of hot-rolled bars are not adhering rigidly to the extra of $3 per ton recently established for bars of cold finishing quality. The automotive industry, notwithstanding the favorable reports as to production, is not a free buyer of steel at present. Manufacturers who have new models coming out for the 1924 season are rather slow to release specifications to the body and part makers and the latter cannot place orders for material until they know just what is required. The Ford Motor Co., despite the fact that in the first six months of the year it had an output at the rate of 1,800,000 cars annually, is most frequently mentioned as a company which is cancelling or suspending tonnages.

A slight increase in activity in pig iron has been attended by further price recessions, but not by Valley furnaces. The latter, including the steel works' furnaces making merchant iron, are holding more firmly to the recent prices and letting the low-priced business go elsewhere. Decline in blast furnace activities in this and nearby districts has begun. The Republic Iron & Steel Co. has put off its No. 3 Hazelton furnace for relining and the Carnegie Steel Co. has blown out a furnace at Niles, Ohio, one at Sharon, Pa., and the Edith Furnace in Pittsburgh. The latter company now has 50 of its 59 furnaces making iron. The Jones & Laughlin Steel Corporation recently blew out one of its Aliquippa stacks, but still has 11 of its 12 furnaces in. Altogether, 119 furnaces out of a total of 138 in this and nearby districts now are making iron, while one furnace is banked. This is a loss of six furnaces from the recent peak point. Steel works operations show no material decline. Carnegie Steel Co. is running about 92 per cent ingot capacity and independent companies are averaging above 80 per cent. There is some accumulation of ingots on the yards of most companies

and while quoted prices show no variation, the market on semi-finished material is soft and concessions are being made to move tonnages promptly. As low as $40 mill has been quoted by producers outside of the Pittsburgh and Youngstown districts on sheet bars and slabs.

The decline in scrap prices still is unchecked, heavy melting grade now being quoted at $17 to $18, delivered this district, as against the high point of the early part of the year of $27 to $27.50. Curtailment of coke production has been sufficient to check the decline in that product, but prices are not materially higher than they were a week ago.

Pig Iron.—Interest in the market on the part of melters has expanded slightly in the past week, but it has been confined largely to the foundries. The market on the steel-making grades has been quite as dull as it has been at any time recently. Westinghouse Electric & Mfg. Co., which recently inquired for 400 tons each of No. 2 and No. 3 foundry iron for Trafford and 700 tons of No. 1, and 350 tons of No. 2X for Cleveland, closed for these tonnages late last week. The iron for Trafford went to a western Pennsylvania furnace at $25 for No. 2 and $24.50 for No. 3, the freight to destination being $1.13 per ton. This figures back to $24.37 at Valley furnace, but no Valley producers yet have gone that low for No. 2 iron, although we note one recent sale of 100 tons of No. 2X iron at $25 Valley furnace, which, deducting the silicon differential, would mean $24.50 for No. 2 plain. The National Radiator Co., Johnstown, Pa., is in the market for 1000 to 1500 tons of No. 2 or No. 2X iron for each of its three plants at Trenton, N. J., Johnstown and New Castle, Pa. Union Radiator Co., Johnstown, Pa., is inquiring for 500 tons of No. 2 foundry. Malleable iron is a good deal of a drug on the market here as in other markets. We note one sale of 500 tons of this grade to a glass works foundry at $24.50, Valley furnace. Carload lots of Bessemer iron have been sold at $26.50, and the Midvale Co. at Nicetown, Pa., has put out an inquiry for 500 tons.

The freight is too high for this business to be placed locally. American Steel Foundries is seeking 1000 tons of basic for its Chicago works. This business hardly will come to nearby furnaces on account of the high freight. Low phosphorous iron now is available from the East at as low as $33.50 delivered this district, but the Bethlehem Steel Co. still is quoting $33, Lebanon, and the Valley producer of this grade is holding at $34 furnace and reports the sale of about 100 tons at that figure.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.50 to 25.50
No. 2 foundry	25.00 to 26.00
No. 3 foundry	24.50 to 25.50
Malleable	24.50 to 25.50
Low phosphorus, copper free (nominal)	34.00

Ferroalloys.—There has been no increase in the demand for ferroalloys since a week ago, and prices are entirely nominal in the absence of important transactions. Few consumers believe that the recent reduction of $7.50 a ton in ferromanganese is the last one to be made; indeed, the expectation is common that another cut this time to $110 is near at hand. As high as $85, delivered, is quoted on 50 per cent ferrosilicon, but the most recent sale was at $82.50, and it is believed that this price could be done again. Demand for this material is very limited. The long expected revision of prices of Bessemer ferrosilicon and silvery iron has materialized in a cut of $5 a ton. Jackson, Ohio, producers now will take business in Bessemer ferrosilicon at $43.50, furnace, for 10 per cent and in silveries at $38 for 10 per cent. Prices are given on page 239.

Semi-Finished Steel.—Makers in this district still are holding at $42.50 for billets, sheet bars and slabs, and while admitting that there is some accumulation of ingots, disclaim taking any business even for the purpose of reducing stocks at less money. Mills not in the Pittsburgh or Valley district, however, are not holding so firmly, having recently made quotations of $40, mill, on both sheet bars and slabs. As an appraisal, $40 is nearer the real market today than is $42.50, buyers being inclined to seek lower prices because of the decline in pig iron and scrap over the past two months, which has seen no material decline in semi-finished steel prices. Consumers also are holding back their specifications and orders for wire rods; this condition is accounted for partly by expectations of lower prices, although it is due in no small measure to the lighter demand for the products of rods. Skelp is very readily obtained at 2.40c. Prices are given on page 239.

Wire Products.—Some makers detect a slightly better undertone to the situation, reporting that buyers are showing more interest in the market than before in several weeks, and that the increased inquiry has been attended by some gain in actual orders. This improvement is seen more in nails and plain wire than in barbed wire or fence, the outlook for prosperity among the farmers being rather too dim at the moment to encourage distributors to load up on the latter products. The leading interest has about 11 weeks' business on its books, but unless there is a decided increase in orders in the very near future, most independent companies will have completed their obligations in the next 30 or 45 days. No intimations of lower prices are heard. Prices are given on page 238.

Bolts, Nuts and Rivets.—Makers are more eager for orders than buyers are to place them, and prices are not over and above firm. Specifications against old orders are fairly free. Discounts and prices are given on page 238.

Steel Rails.—The market for light rails still is extremely dull, largely because of the fact that so many coal mines are idle and the rate of operation of commercial mines that are running is so low. These sections rolled from billets or from standard rail crops still are held at 2.25c. base, but mills rolling them from old rails generally are quoting 2.15c. base, and have gone as low as 2.10c. base to get business.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2.10c. to 2.15c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Track Fastenings.—New business in large spikes is about equal to shipments on old orders, but makers are in no such comfortable position with regard to small spikes, which are extremely slow of sale. Most makers also are well supplied with business in tie plates. Prices are given on page 238.

Iron and Steel Bars.—There is a fairly steady demand for small tonnages of merchant bars for early delivery, but big inquiries for future shipment still are lacking. Buyers have no trouble obtaining comparatively small amounts for prompt delivery at 2.40c. base Pittsburgh. Extras recently established for size, cutting, etc., are becoming effective, but the report is pretty frequent that all mills are not exacting the extra for bars or cold finishing.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Hot-Rolled Flats.—New business in the products under this heading is considerably smaller than the shipments against old orders and conditions are more favorable to buyers than sellers. This is particularly the case in the wider materials in which makers generally have light order books and also are having considerable competition from blue annealed sheet and skelp makers. The regular market on hoops, bands and hot-rolled strips is 3.15c. to 3.30c. base, but prices as low as 3c. have been made on strips by mills not rated as regular producers of that line. Prices are given on page 238.

Structural Materials.—There is no apparent weakening in prices, although some mills have reduced their obligations to a point where they are making better delivery promises. Considerable irregularity is noted in fabricated steel prices. Some shops filled up very heavily before prices reached their high point, while others held back to take advantage of the best prices obtainable. The former are not in a position to accept business except at full quotations, but the latter, lacking work, are going very low to get orders. An

erected price of around $90 recently was quoted on a railroad viaduct in the Middle West by one of the latter group. The Rosenbaum Co., Pittsburgh, is planning to construct a large warehouse in this city taking about 3000 tons of steel; original plans recently were revised and fresh bids asked for. Plain material prices are given on page 238.

Plates.—Mills here are quoting on a large number of inquiries emanating from tank and car builders and from the railroads for repair work. These inquiries generally are for small lots, but the aggregate is fairly large. Prompt deliveries are required in all cases. The Steel Corporation is not quoting, as it cannot make deliveries within a specified time. The regular price of 2.50c. base, Pittsburgh, is still well observed, and there is one recent case where 2.60c. was done on a tonnage where delivery was very urgent. Prices are given on page 238.

Tubular Goods.—It is the experience of one local maker of steel pipe that orders for the first three weeks of this month show a substantial gain over those for the same period in June. But as a general proposition, while specifications against old tonnage, particularly in buttwelded goods, are heavy, new orders continue to decrease. This is reflected in the tendency on the part of most makers to advance their delivery promises against lapwelded goods. Plain end pipe in the larger dimensions now can be had very promptly, but where threads and couplings are provided, delivery promise is not so good because of the scarcity of labor. Shipments by most mills this month will fall behind those of June because of a lighter production. Some fair-sized inquiries for line pipe are coming out and a local mill recently took 20 miles of 6-in., or about 1000 tons. The supply situation in wrought iron pipe is much easier than it was over the first half of the year. Smaller sizes of boiler tubes still are hard to secure promptly, but the larger sizes now can be placed for shipment as early as five and six weeks. There is no change in prices nor any suggestions of an immediate change. Discounts are given on page 238.

Sheets.—Buyers still are moving with considerable caution. They are taking most of the tonnage due them on old orders, but are not much concerned about future requirements. Deliveries against new business are so prompt that the tendency is to let the mills carry the stocks. Auto body makers are doing little at present because the manufacturers are rather slow to release specifications of their new models. The price situation shows no particular change; most mills are holding to the regular market quotation, but there are some makers with light order books who are taking business in black sheets at 3.75c. base, or $2 a ton below the regular market. Sheet mill operations are heavier than they were over the first two weeks of the month, but are not yet back to the late June rate. Prices are given on page 238.

Tin Plate.—This market is very firm as all makers are heavily obligated against the production for the current quarter, and because of the inefficiency of labor, due to the heat, most of them have fallen behind in their shipments. Perishable food container requirements are unusually heavy this year, and in trying to meet this demand it has been necessary for some producers to curtail allotments for other purposes.

Cold-Finished Steel Bars and Shafting.—Business is dull with most makers of this district, this being due in no small measure to the fact that the automotive industry is between seasons and is doing very little buying. There is no shading of prices, chiefly because increased costs of hot-rolled bars involved in the recent revision of extras are becoming effective and considerably reduce profits; indeed, there is a possibility of a new card of extras on cold-finished steel bars, which would restore the former price alinement in the two kinds of bars. Ground shafting still is quoted at 3.65c. base.

Cold-Rolled Strips.—Most producers have fair-sized order books, but as new business is pretty light and there are some suspensions from the automotive industry, they are steadily reducing their backlogs. The quotable market still is 5c. to 5.25c., base, Pittsburgh, and thus far there has not been much trouble in maintaining these prices. The test is ahead, however, unless there is a decided betterment in demand in the near future.

Coke and Coal.—Coke quotations are holding at about the levels of a week ago, but the tendency is somewhat stronger due to the fact that there has been a steep cut in production. While there are still occasional sales of "distress" tonnages of furnace coke as low as $4.25 per net ton ovens, the more common minimum is $4.50, while $5 is the going price on fair sized lots of high grade coke. There is practically no contract market because furnaces now active, which are not covered for the present quarter, are meeting their requirements on spot offerings. Spot foundry coke is quotable from $5.25 to $5.75, while the contract market ranges from $6 to $6.50 with most producers. Light production is sustaining the coal market rather than the size of the demand. Slack coal finds a fair demand and is firm at $1.25 to $1.30 per net ton at mines, while gas slack is priced at $1.40 to $1.50. Mine run steam coal holds at $1.75 to $2, mine run coking coal at $2.25 to $2.35, and gas coal from $2.35 to $2.50.

Old Material.—The market still is seeking a trading level and still lower prices have been reached since a week ago. Consumptive demand is almost entirely lacking and dealers are confining purchases for the most part against short sales, and deliveries against these sales are not so urgent that they are at all anxious to buy. It has been demonstrated that none of the steel plants in this district will pay more than $18 for heavy melting steel and dealers' prices range anywhere from $17 to $18; that becomes the quotable range on this grade, although dealers would hardly take an order of any size from mills at less than $17.50, and $18 is the minimum selling price of several dealers. A Brackenridge, Pa., consumer late last week bought 500 tons of machine shop turnings at $11.75, and since then has bought at $11.50 and even as low as $11. The market is quotable on this grade at from $11 to $12, as the latter price has been paid within the week on overshipments. Turnings are freely offered in Detroit at $7 and that would mean $11.28, since the freight is $4.28. Railroads are pressing much scrap on the market. The Norfolk & Western Railway had a supplement list of 3700 gross tons on its July list and the Pennsylvania Railroad is trying to move much tonnage outside of its formal monthly lists. It is a buyers' market.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$17.00 to $18.00
No. 1 cast, cupola size	20.50 to 21.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 19.50
Compressed sheet steel	16.50 to 17.00
Bundled sheet sides and ends	15.00 to 15.50
Railroad knuckles and couplers	20.00 to 21.00
Railroad coil and leaf springs	20.00 to 21.00
Low phosphorus standard bloom and billet ends	22.00 to 23.00
Low phosphorus plates and other grades	21.00 to 22.00
Railroad malleable	18.50 to 19.00
Steel car axles	21.00 to 21.50
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	20.00 to 21.00
Machine shop turnings	11.00 to 12.00
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	17.50 to 18.00
Stove plate	15.00 to 15.50
Sheet bar crop ends	21.00 to 22.00
No. 1 railroad wrought	15.00 to 15.50
Cast iron borings	15.00 to 15.50

Steel & Tube Co. of America Offices Are Moved to Youngstown

YOUNGSTOWN, July 24.—The auditing, sales and traffic departments of the Steel & Tube Co. of America, Chicago, recently purchased by the Youngstown Sheet & Tube Co., have been moved to Youngstown, affecting more than 100 employees. The business of the company will be maintained independent of that of the Sheet & Tube until litigation relative to the sale is disposed of. The Steel & Tube organization will then be merged with that of the Sheet & Tube Co., if the merger is not prevented.

Chicago

Strong Pressure for Deliveries of Finished Material—Pig Iron Lower

CHICAGO, July 24.—Reports of industrial curtailment do not check with pressure upon the Chicago steel mills for deliveries on contracts, according to a statement of the leading Chicago steel interests. It is further stated that the tonnage on mill books is sufficient to carry through the third quarter at the present rate of production. There is no evidence of any recessions in prices except on wire nails, which are so much easier that local warehouses have reduced their prices 15c. per 100 lb.

New business is mostly in small lots for early shipment, and these orders the Chicago mills are usually able to take care of, but large tonnages for specific work, on which early delivery is necessary, are often being passed up by the local mills. A Kansas fabricator was obliged to go to a Pittsburgh mill for 5000 tons of steel for oil tanks recently contracted for. Pending inquiry for oil tanks, if developed into orders, will call for a total of 30,000 tons of steel, mostly plates, and Chicago mills have been unable to give protection on all of this tonnage with the required promises of delivery. The Pere Marquette Railroad is in the market for two car ferries, which will take 5000 tons of steel, and some or all of this business, if placed, may go to mills in other districts. There is a fair demand for structural steel, and deformed steel bars for structural projects. Outside mills are participating in a larger share of this business. A new structural project shortly to be in the market is the new Palmer House, which will require 10,000 to 12,000 tons of steel. There is a slight pick-up in car work, largely repairs.

Further recessions in pig iron prices have occurred. Northern foundry and basic iron are down 50c. a ton, the leading local producer now quoting $27.50. Producers of Lake Superior charcoal iron have announced a new price of $29, furnace, and Jackson County, Ohio, makers of silvery iron have reduced quotations $5 a ton, the present basis being $34.50, furnace, for 8 per cent.

Production by Chicago steel companies continues at the high rate of the past several weeks. Hot weather has cut in slightly on output of finishing mills, but ingot production is practically undiminished. The change to the 8-hr. day figures largely in present calculations of Chicago steel companies, but the leading independent has announced no plans for putting the new workday into effect other than to follow whatever course the Steel Corporation mills adopt.

Pig Iron.—So little pig iron business is in sight that the leading local producer made a further bid for tonnage this week by reducing its open quotations 50c. a ton, making foundry iron $27.50, furnace, for fair sized lots and $28 for carloads. The usual 50c. differentials obtained on iron of higher silicon content. Malleable and basic iron are also quoted at $27.50. Producers of Lake Superior charcoal have announced a reduction of $29, furnace, making the delivered prices $32.04 or $32.15, Chicago, depending upon the freight rate. The former price was $33.50, furnace. Jackson County, Ohio, makers of silvery iron have announced reductions of $5 a ton. Thus, 8 per cent., which has nominally been quoted at $39.50, furnace, is now quoted at $34.50. Adding the freight rate to Chicago of $4.79 makes the delivered price here $39.29. The only important foundry iron business of the week was the purchase by the Holland Furnace Co., Holland, Mich., of 1000 to 1500 tons of iron, analyzing 2.75 to 3.25 per cent silicon, for delivery at its Holland and Cedar Rapids, Iowa, plants. The Michigan business is reported to have been taken by Detroit or Toledo furnaces at about $30, delivered, Holland. Deducting a freight rate of approximately $3 a ton, the furnace price was $27 for this grade of iron or $26, base. This is apparently about $1 a ton lower than Detroit and Toledo furnacer have been quoting. The Cedar Rapids tonnage will be shipped from Chicago furnaces, which, it is stated, did not compete for the Michigan business, as to meet Michigan prices it would have been necessary to quote not over $26, base, f.o.b. Chicago furnace. The low prices named by some outside furnaces are making it impossible for Chicago iron to reach into competitive districts without considerable concessions. The sale, for example, of 3000 tons of malleable iron to an Indianapolis company at $26.77, delivered, puts Chicago iron several dollars a ton out of the running. Southern iron is weak at $25, Birmingham, with $24 being named by some merchants. The American Steel Foundries is in the market for 1000 tons of basic. A Wisconsin melter is inquiring for 800 tons of malleable.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	28.00 to 28.50
Northern coke, foundry No. 2 sil. 1.75 to 2.25	27.50 to 28.00
Malleable, not over 2.25 sil.	27.50 to 28.00
Basic	27.50 to 28.00
High phosphorus	27.50 to 28.00
Southern No. 2	30.01 to 31.01
Low phos., sil. 1 to 2 per cent, copper, free	35.50 to 36.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—There is very little demand for ferroalloys, most consumers being pretty well covered for the year. Prices are unchanged except on 50 per cent ferrosilicon, which is now available at $88 to $90, delivered, with indications that even the lower price could be shaded on attractive business.

We quote 80 per cent ferromanganese, $125.06 to $125.88 for all deliveries; 50 per cent ferrosilicon, $88 to $90, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Structural Material.—The Citizens' Committee to Enforce the Landis Award issues a statement commenting on the falling off in building permits, which in June, the statement says, were only about 25 per cent of the value of the April permits and nearly $10,000,000 less than in June of last year. Building permits for June in Chicago were lower than for any month since October, 1922. Notwithstanding this situation, steel fabricators are figuring on a very fair amount of work for midsummer, and in any instances where delivery is a primary consideration the steel will be obtained from mills east of here. Contrary to expectations, the Ford Motor Co. plant at St. Paul, requiring 8000 tons, has not been awarded, but it is expected that the fabrication will be divided between two fabricators in the twin cities. Bids will be executed for shortly on 10,000 or 12,000 tons for the New Palmer House, Chicago.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Plates.—New inquiries for oil tanks are in the market, the total of steel that will be required if all of this business is placed being about 30,000 tons. Chicago mills probably will not be able to make the desired deliveries on this material and a good portion of it will undoubtedly go East. A Kansas fabricator, recently awarded tanks requiring approximately 5000 tons of steel, has placed this in the Pittsburgh district, being unable to get satisfactory deliveries from the Chicago district mills. The Mid-West Engine Co., Indianapolis, has placed 1500 tons of plates and shapes for car building. The Pere Marquette Railroad is asking bids on two car ferries requiring 5000 tons of steel, mostly plates. Plate prices are very firm and there is still pressure for deliveries from railroads and tank builders.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Reinforcing Steel.—There is a fair degree of activity in reinforcing steel, but most of the inquiries and orders are for small lots, not exceeding 50 to 60 tons. The largest job of the week is 1100 tons of rail and billet steel bars for the Fourteenth Street Viaduct, St. Louis, which went to the Laclede Steel Co. The Scullin Steel

Co. was awarded 500 tons for the Cahokia power plant at East St. Louis. Other jobs let are as follows:

Tilden and Franklin Schools, St. Paul, Minn., 100 tons, to Corrugated Bar Co.

Main and Ferry Building, Peoria, Ill., 125 tons, to Corrugated Bar Co.

Holy Family Hospital, Manitowoc, Wis., 125 tons, to Corrugated Bar Co.

Bars.—There is a good demand for bars for building construction with considerable new business in sight, but in merchant bars consumers are largely satisfied with shipments on their contracts and new orders are for small amounts for early shipment.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.50c. to 2.60c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—Local jobbers have reduced prices on wire nails 15c. per 100 lb., this representing approximately the concession some mills have made to get business. Nails seem to be weaker than other wire products.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Bolts and Nuts.—There is no improvement in the volume of specifications coming in on third quarter contracts, many consumers being well taken care of by material coming to them on second quarter contracts. Better specifications are expected next month. Prices are still weak and concessions are frequently offered on desirable business.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Sheets.—Although there were reports a few weeks ago of slight concessions on sheets by one or two mills, particularly on black sheets, the market is now firm and there is little, if any, inclination to make concessions. The continued high productive rate of the automobile industry is undoubtedly a factor in this strength.

Mill quotations are 3.85c. for No. 28, black 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Rails and Tracks Supplies.—Several roads are tentatively inquiring about their 1924 rail requirements. Local producers believe that a fairly large rail tonnage for next year will be placed in addition to that recently put on mill books, most of which will be rolled this fall and winter for early spring delivery. Orders for track supplies and specifications on contracts continue to come in at a very good rate.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Cast Iron Pipe.—The American Cast Iron Pipe Co. has been awarded 570 tons of 8-in. pipe by the city of Chicago and the United States Cast Iron Pipe & Foundry Co. has received the Dayton, Ohio, work amounting to 680 tons. The city of Milwaukee will defer the purchase of about 2000 tons of 54-in. low pressure service main until after Jan. 1, both because new Riverside pumping station cannot be completed until after July 1, 1924, and in anticipation of the possibility of a decline in price by the time the material is actually needed. While demand has fallen off as compared with earlier months of the year, a fairly good volume in small orders is being received from industrial buyers. Two or three pending inquiries from industrial companies total several thousand tons. Defiance, Ohio, will close bids July 30 on 40 tons, class B.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $58.20 to $59.20; class A and gas pipe, $3 extra.

Old Material.—Further railroad offerings this week amount to 12,000 tons, of which the Burlington offers 6000 tons, bids closing July 26, the Santa Fe, 4000 tons, bids closing July 24, and the Chicago, Milwaukee & St. Paul has 2000 tons on which bids close July 30. There is ample supply of scrap, in which offerings from the railroads predominate. Prices on several items are off slightly from last week's quotations. Some brokers believe that prices are due for a further decline of $2 or $3 a ton on the average, while others advance the opinion that prices are now scraping bottom. A factor receiving attention is to what extent the crop movement will prevent the free shipment of scrap a month or two hence. There is a disposition on the part of some industrial producers to hold their scrap for higher prices if they have the necessary storage space, but yard dealers as a rule are not inclined to stock up at present prices, which they believe to be high for speculative purposes.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$22.00 to $22.50
Cast iron car wheels	20.50 to 21.00
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.00 to 20.50
Rails for rolling	18.00 to 18.50
Steel rails, less than 3 ft.	19.25 to 19.75
Heavy melting steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.00 to 17.50
Shoveling steel	16.50 to 17.00
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheets	13.25 to 13.75
Axle turnings	14.25 to 14.75
Per Net Ton	
Iron angle and splice bars	22.00 to 22.50
Steel angle bars	15.50 to 16.00
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	26.00 to 26.50
Steel car axles	18.00 to 18.50
No. 1 busheling	18.00 to 18.50
No. 2 busheling	10.50 to 11.00
Cut forge	15.00 to 15.50
Pipes and flues	10.50 to 11.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	18.50 to 19.00
Coil springs	19.50 to 20.00
No. 1 machinery cast	18.50 to 19.50
No. 1 railroad cast	18.00 to 18.50
No. 1 agricultural cast	18.00 to 18.50
Low phos. punchings	16.50 to 17.00
Locomotive tires, smooth	15.50 to 16.00
Machine shop turnings	9.50 to 10.00
Cast borings	12.00 to 12.50
Short shoveling turnings	12.00 to 12.50
Stove plate	14.50 to 15.00
Grate bars	12.75 to 13.00
Brake shoes	14.00 to 14.50
Railroad malleable	20.00 to 20.50
Agricultural malleable	17.50 to 18.00

Canadian Scrap Market

TORONTO, ONT., July 23.—Business in the Canadian iron and steel scrap market is still at a very low level. Consumers are showing no interest in their requirements for the future, but both steel plants and foundries are placing small tonnage orders for scrap for spot delivery. In the Montreal market practically the same conditions exist as those ruling in Toronto. Consumers are picking up odd lots of scrap, but show no interest in future needs. While no change is reported in Toronto dealers' buying prices, Montreal dealers have made slight downward revisions on some commodities during the past week. Dealers are now offering the following prices for iron and steel scrap:

Dealers' Buying Prices

	Toronto	Montreal
Gross Tons		
Steel turnings	$10.00	$9.00
Machine shop turnings	10.00	9.00
Wrought pipe	8.00	8.00
Rails	15.00	14.50
No. 1 wrought	15.00	15.00
Heavy melting steel	15.00	13.00
Steel axles	18.00	18.00
Axles, wrought iron	21.00	24.00
Net Tons		
Standard car wheels	16.00	17.00
Malleable	16.00	16.00
Stove plate	16.00	16.00
No. 1 machinery cast	20.00	21.00

New York

Much More Activity in Pig Iron, but Lower Prices Are Named

NEW YORK, July 24.—Sales of pig iron during the past week have been larger than for any week in a number of months, but new low prices have been named. The Warren Foundry & Pipe Co. purchased from 20,000 to 25,000 tons of foundry grades, on a large part of which the price was $25, furnace, for No. 2 plain. There is no evidence that any of the tonnage was placed on a lower basis, although some of the lower grades may have been purchased at the usual differentials. The Burnham Boiler Co., which has been inquiring for 5700 tons of No. 2X and No. 2 plain for the last half of this year, has purchased about half that tonnage. The Gould Coupler Co. has bought about 500 tons of malleable and is in the market for 200 tons of basic. The New York Air Brake Co. has bought 2400 tons of foundry grades for delivery in August, September and October. A sale of 5000 tons of foundry iron has been made to a melter not in the immediate New York district. Fair inquiry is pending, but a report that a radiator company was in the market for 5000 to 10,000 tons for the remainder of the year has proved incorrect. A pump company is inquiring for 800 tons and there are several inquiries for 1000 to 1500 tons of various grades. A Connecticut foundry company has closed for 1000 tons of foundry iron. The ruling quotation in eastern Pennsylvania and Buffalo is now $25 and reports of lower than that figure at Buffalo are not confirmed.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East Pa. No. 2X fdy., sil. 2.75 to 3.25	$28.27
East Pa. No. 2X fdy., sil. 2.25 to 2.75	27.77
East Pa. No. 2 fdy., sil. 1.75 to 2.25	27.27
Buffalo, sil. 1.75 to 2.25	29.91
No. 2X Virginia, sil. 2.25 to 2.75	32.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Coke.—Recent quotations on coke are being maintained. Standard foundry coke for prompt shipment ranges from $5.75 to $6.75 per ton, depending upon the brand, with contracts at $7 and $7.25 per ton. Standard furnace for prompt shipment is from $4.75 to $5.50 per ton, with some producers quoting $6 per ton on contracts, but exhibiting no inclination to press for business at this price. By-product coke is unchanged at $11.34 to $11.41, Newark and Jersey City points.

Ferroalloys.—The ferromanganese and spiegeleisen markets are duller than in many weeks. There seems to be an entire absence of demand for ferromanganese and only a few inquiries for small lots of spiegeleisen. Practically no sales are recorded, even in small or carload lots. New business in 50 per cent ferrosilicon is reported as confined to small and carload lots for which $84 to $85, delivered, is the established price. Specifications on contract are stated to be good, but not as insistent as earlier this year. There is no change in the ferrochromium market, demand for which is lighter partly because of less demand from automobile makers for alloy steel.

Cast-Iron Pipe.—No evidence of a decline in activity among makers of pressure pipe is reported. Prices are holding firm and deliveries are still extended well up to October, labor scarcity being the only deterrent to full operation. Bids were opened July 24 on about 1400 lengths of 36-in. pressure pipe by the Department of Water Supply, Gas and Electricity, City of New York, the pipe to be furnished through a contractor. The award of 20,500 tons of cast-iron water pipe made by Porto Rico, P. I., a number of months ago, has been under litigation in the courts and either a new call for bids may be issued or a change in the award may be made. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.30; 4-in. and 5-in., $67.30; 3-in., $77.30, with $5 additional for Class A and gas pipe. Makers of soil pipe report a slight increase in activity, although prices are still somewhat weak. Despite the curtailment in operations said to have been made by Southern founders on soil pipe, Northern makers are reported still running full. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in. standard, 28 to 30¾ per cent off list; heavy, 38 to 40¾ per cent off list.

Finished Iron and Steel.—Buying, if anything, has improved. Seldom are the lots large enough to test prices but a number of instances in steel bars and in sheets have appeared in which the lots were attractive but the buyer was unable to break the general price levels. It remains that the weakness in the pig iron market has had a deterrent effect on forward buying in steel, but order books are generally still well enough filled to give the situation considerable strength. Fabricated steel buying goes on apace but not much is promised in the railroad equipment field. There are hardly more than 2500 freight cars now pending and not a great amount of underframes or other steel car parts. The only irregularity noted in plates appears to cover some bidding on a Buffalo basis. A need for tonnage is shown by some sheet mills and some low prices were made on locomotive driving axles.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c. to 2.84c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Warehouse Business.—The past ten days most warehouses report as better from the standpoint of volume of orders than the previous part of the current month. Although orders were numerous, they were generally for small quantities of material. In some lines there is activity between jobbers in small purchases of certain sizes to keep stocks complete. The market on black and galvanized sheets continues weak in spots and is quotable at from 4.65c. to 5c. per lb. base for black sheets and 5.65c. to 6c. per lb. for galvanized. The wrought iron and steel pipe market is unchanged, a small amount of shading still being reported. Swedish charcoal and Lancashire iron bars are still on a basis of 7.50c. per lb. Importers here consider that despite the expected settlement of the labor situation in Sweden the price will probably be slightly higher because of the heavy demand for Swedish iron from European and other foreign consumers. Brass and copper warehouses report no change in prices. We quote prices on page 254.

Old Material.—The downward movement in practically all grades of scrap continues uninterruptedly. Heavy melting steel is on a still lower basis this week at $12 to $12.50 per ton, buying price New York, with railroad quality $12.50 to $13 per ton. No. 1 yard steel is today about $16 per ton, eastern Pennsylvania delivery, with shipments to western Pennsylvania consumers at $17.50 to $18 per ton. Borings and turnings are quotable at $9.50 to $10 per ton and the buying price on machine-shop turnings is not to exceed $10 to $10.50 per ton. Some turnings are going forward to Phoenixville, Pa., and shipments of borings and turnings to Bethlehem, Pa., continue. As high as $14.75 per ton, delivered to Lebanon, Pa., is being offered on specification pipe. For stove plate dealers are offering $16 to $16.50 delivered to New Jersey foundries and $16.75 per ton delivered to Harrisburg, Pa. A fair estimate of the market on stove plate is $12.50 to $13 per ton, buying price New York.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$12.00 to $12.50
Steel rails, short lengths, or equivalent	12.50 to 13.00
Rails for rolling	16.00 to 18.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	20.00 to 21.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track	15.00 to 15.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	15.00 to 15.50
Cast borings (clean)	10.50 to 11.00
Machine-shop turnings	10.00 to 10.50
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.00 to 11.00
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.50 to $21.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	19.50 to 20.00
No. 1 heavy cast, not cupola size	17.50 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 17.00

Boston

Pig Iron Buying Improves and Market Is on a Steadier Foundation

BOSTON, July 24.—Improvement in pig iron buying in this territory is noted, but the market can hardly be called active. Individual new inquiries are for not more than 600 tons, usually 100 tons and occasionally 500 tons. The bulk of business booked the past week was solicited by brokers. A Connecticut foundry is reported to have bought 500 to 1000 tons, and a Springfield, Mass., melter approximately 1100 tons No. 2X and No. 1X, through other than local agencies. Based on actual sales, eastern Pennsylvania appears to be on a $26 furnace base, with 50c. differentials, although some furnace interests hold to $27.50 base. Buffalo No. 2X early in the week was offered at $25, and No. 1X at $25.50, but recent sales have been at 50c. a ton more. Firm offers of $24.75 and $24.50 for No. 2 plain and No. 2X have again been rejected by furnaces. Virginia furnaces are more anxious for nearby business and have shaded $27 furnace base 50c. in some instances. The Alabama iron situation remains as heretofore. The outstanding price feature is a drop in Lake charcoal iron from $33.50 to $29 furnace base. Little iron sold the past week for fourth quarter, most furnaces not being anxious for extended datings. Some of it will run over from third to fourth quarter, however. The Springfield foundry was offered northern No. 2X at $29.50 delivered and No. 1X at $30, which is better than eastern Pennsylvania and Buffalo furnaces can do. The pig iron market generally appears to be on a steadier foundation than early in the week.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$30.15 to $31.65
East. Penn., sil. 1.75 to 2.25	29.65 to 31.15
Buffalo, sil. 2.25 to 2.75	29.91 to 31.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.91
Virginia, sil. 2.25 to 2.75	32.95 to 33.42
Virginia, sil. 1.75 to 2.25	32.45 to 32.92
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama sil. 1.75 to 2.25	34.60 to 36.60

Cast Iron Pipe.—The Warren Foundry & Pipe Co. has been awarded about 500 tons of 16-in. pipe for the new Turners Falls, Mass., supply line. This is the only important business closed in the New England territory in several weeks. Various municipalities and gas companies are putting out feelers for pipe to be delivered in 1924. Pipe makers are still three to four months behind on deliveries. Cast iron pipe, in carlots, f.o.b. common Boston rate points, is as follows: 4-in., $72.10 a ton; 6-in. to 14-in., inclusive, $67.10; 16-in. and larger, $65.10. The differential on class A and gas pipe is $5 a ton.

Warehouse Business.—The movement of iron and steel out of local warehouses is increasing. Stocks of rounds, especially ½-in., and some sizes of flats are broken. Most warehouses have put into effect larger extras. Lower prices on certain bolts are indicated within the near future. Galvanized staples have advanced 20c. a keg, and sheet lead has declined ¾c. to 13½c. per lb. base. Boston warehouse prices on iron and steel follow:

Soft steel bars, $3.61½ a 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steel, $3.71½; tire steel, $4.50 to $5.15; open-hearth spring steel, $8 to $10; crucible spring steel, $12; regular steel bands, $4.80; bands over 6 in. wide, $5.05 to $5.20; hoop steel, $5.80 to $6.30; cold rolled steel, $4.75 to $5.25; refined iron, $3.61½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.60 to $7.10.

Coke.—Specifications against foundry coke contracts continue fairly liberal, which indicates an increasing New England melt of iron inasmuch as most foundries have limited storage facilities. A few melters have cut down August specifications, due to needed repairs and vacations. The New England Coal & Coke Co. and the Providence Gas Co. are still quoting $13.50, delivered New England, on by-product foundry fuel. Both companies are well sold ahead on domestic fuel, on which a small operating profit is shown. They are just about breaking even on foundry coke, which makes the question of still lower prices next month problematical. Connellsville by-product foundry coke is $11.55 to $12.55 delivered New England, but melters show little interest in such fuel.

Old Material.—New England foundries are showing slightly more interest in No. 1 machinery cast, for which $22.50 to $23 delivered is paid. Some stove plate was sold the past week, delivery by truck. Blast furnaces are in the market for moderate tonnages of borings and turnings, but little material is coming out at prices offered by dealers. The market for chemical borings is flat, the largest consumer not only being out of the market, but holding up shipments from New England. So far as can be ascertained, there are no orders in this market for pipe, but dealers are buying most other materials in limited tonnages, usually for stocking purposes. Freer offerings of forged scrap and bundled skeleton have forced the market off about $1 a ton. Heavy melting steel and wrought prices are weak.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	11.00 to 12.00
Railroad malleable	24.00 to 24.50
Street car axles	21.00 to 21.50

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 rail wrought	12.00 to 13.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long)	8.50 to 9.00
Machine shop turnings	9.00 to 9.50
Cast iron borings, rolling mill	11.00 to 11.50
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	9.00 to 9.50
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.00 to 13.50

Birmingham

Buying of Pig Iron by Cast Pipe Makers Expected to Test the Market

BIRMINGHAM, ALA., July 24.—One of the Birmingham makers holding for $27 sold a car a week for three successive weeks. That indicates the business done at that base. Last Saturday a carload was booked at $25, with the maker holding at that base. Early revamping of the base is now expected, makers finally sensing the inevitable. The new base is expected to arrive through fourth quarter business placed with large pipe makers at such price as the Birmingham makers may be able to secure. The Alabama iron make is not curtailed. The Tennessee company operates two furnaces on foundry and eight on basic, the Sloss-Sheffield Steel & Iron Co. continuing its seven-stack merchant iron production and the other merchant producers maintaining June production. Humidity causes accumulation of unbooked iron of low silicon content. Charcoal iron is well cared for at $34, with less than 1000 tons on hand. There have been a few hold-up orders. Birmingham makers are informed of resale iron at $24.50 in Western markets. General melt in the South is close to the high point, although falling off in respect to soil pipe. Few melters of any kind are in market for new iron. Yard holdings are probably increasing on account of the make of low grade and unbooked metal.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00
Basic	24.00
Charcoal, warm blast	34.00

Cast-Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has booked 1000 tons of 24-in. for Memphis and the American Cast Iron Pipe Co. has booked 2446 tons for Los Angeles and 490 for Sidney, Ohio. The pressure pipe base remains at $49. Soil pipe is slow at $65. A cargo of over 5000 tons of pipe and steel products left Mobile last week for Pacific Coast points. Total pipe business with the Pacific Coast for first half of the year is estimated at 100,000 tons.

Finishing Mills.—Tennessee company mills continue double turn with aim at capacity production, the rail mill being at the rate of 35,000 tons a month and car plants turning out 25 finished steel cars per diem. The new merchant bar mill is gradually working toward its monthly capacity of 10,000 tons. Structural steel works have all they can handle and one large concern has turned down business. All are on full turn. The Conners Steel Co. has resumed in one mill following repairs caused by fire. Demand for cotton ties is greater than last year.

Coal and Coke.—Demerara has taken 1000 tons of Alabama coal via Mobile and other cargoes for Windward Islands destinations have been booked. Barcelona and Valencia, Spain, each took 1200 tons of sulphate of ammonia from the Tennessee company's by-product plant via Mobile last week. With suspension of the autonomy of the Alabama district by the International Miners' Union, Alabama may be considered approximately 100 per cent open shop in its coal mines.

Old Material.—The scrap market is without feature and the new and lower prices are maintained. Buying during the past week was better, but little was done ouside of No. 1 cast.

We quote per gross ton f.o.b. Birmingham dis-trict yards, nominal prices, as follows:

Old steel rails	$18.00 to $18.50
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

Buffalo

Low Pig Iron Prices Fail to Develop a Buying Movement

BUFFALO, July 24—Lower prices have not served to bring out any worth while buying in any grade of pig iron. Rumors of lower than $25 base are in active circulation, but all sellers insist $25 is the lowest that has been done. Under date of July 21, one producer advanced to $26, base, and so announced to its trade. Buying during the week covered actual needs only and there is nothing to indicate any kind of a buying movement. No stacks have been blown out, but there is no question that there will be curtailment about Aug. 1. The 2400 tons of high silicon iron for a railroad equipment maker, shipment to Watertown, N. Y., has been closed, but not by Buffalo seller. One producer quoted $26.50 ($25 base) but the quotation was not accepted. The Rochester furnace has an advantage of 89c in freight rate on shipment to this point and in general a better freight rate on all business east of Buffalo. Lake Superior charcoal iron has been reduced $4.50 a ton.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$26.00
No. 2X foundry, 2.25 to 2.75 sil.	25.50
No. 2 plain, 1.75 to 2.25 sil.	25.00
Basic	26.00
Malleable	26.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—Inquiry and demand does not show any falling off and prices remain at the same level. Bars are quoted at 2.40c. and plates and shapes at 2.50c. Galvanized sheets are firm at 5c. and the price of 3.85c. on black sheets is general. The shading of black sheet prices on Canadian business still goes on and 3.75c. and even lower is known to have been made on several tonnages. Structural enterprises are pretty well concluded for this year except on small jobs.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.65c.; hoops, 4.65c.; bands, 4.50c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled annealed sheets, 4.75c.

Old Material.—Mills are buying heavy melting steel but only in such measure as they consider unusual bargains. Both dealers' and consumers' stocks are near the exhaustion point, and some buying must develop this month. While prices are nominal, there is a further weakening and all commodities have been readjusted.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	11.00 to 12.00
Cast iron borings	15.00 to 16.00
No. 1 busheling	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

St. Louis

Sales and Inquiries for Pig Iron Are Few and for Small Tonnages

ST. LOUIS, July 24.—Sales of pig iron during the last week were from a carload up to 100 tons, and only a few of these were made. Inquiries ranged from a carload up to 200 tons, and these, too, were few in number. Melters still are buying only for immediate needs. Two of the largest stove foundries in St. Louis have closed for the summer repair work, and the third is running only part time. Some of the Quincy (Ill.) plants are closed, although the Belleville stove industries are operating. Foundries operating on railroad orders are extremely busy, but in other lines there is a slowing down of orders. Melters are cautious about their future requirements of pig iron. On the other hand, the makers are willing to mark time. A sale is reported of Northern iron at $27.50, Chicago, 100 tons being involved. Southern iron is quoted at $25. It is difficult to say just what the market is on either make, as there is dickering for each individual order as the inquiry develops. The St. Louis Coke & Iron Co. is quoting $28 to $29 at its Granite City furnace.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 31 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$30.16
Northern malleable, sil. 1.75 to 2.25	30.16
Basic	30.16
Southern fdy., sil. 1.75 to 2.25	30.17

Finished Iron and Steel.—Conditions generally are quiet. The only railroad inquiries were for quantities less than carloads. Jobbers are not buying anything, seemingly waiting for price reductions, which the mills intimate may never come. Fabricators of structural steel are buying nothing, although they are insisting on shipments against contracts. Orders for reinforcing bars for the Coronado Hotel, St. Louis, 350 tons, and the Washington Hotel, Shreveport, La., 300 tons, went to the Laclede Steel Co. The Kansas City Bolt & Nut Co. got the order for 750 tons of reinforcing bars for the Memorial building in Kansas City.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets cold rolled, one pass, 5.20.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, $\frac{7}{8}$ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—A fair demand is reported for domestic coke for shipment beginning next month to dealers, more of whom are said to be turning to coke in view of the uncertainties of the anthracite situation. Foundry coke is in fairly good demand. Sales of Connellsville coke are reported at prices ranging from $5.75 to $7 at the ovens.

Old Material.—The only buying of old material at present is by dealers. Some of this is to cover contracts, while there has been some buying of material to lay up in anticipation of the demand dealers feel will assert itself about Aug. 15. In the meantime consumers are out of the market, with the exception of buying

a few specialities. On these specialties there has been a stiffening of prices, other items remaining about the same. Railroad lists include: St. Louis & San Francisco, 1500 tons; Belt Railroad of Chicago, 500 tons; Atchison, Topeka & Santa Fe, 4000 tons; Missouri-Kansas-Texas, 2000 tons; Wabash, 337 tons; Canadian National Railway (Battle Creek, Mich.), 2000 tons.

We quote dealers' prices f.o.b. consumers' works St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$19.00 to $19.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.00 to 18.50
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00
Per Net Ton	
Heavy axles and tire turnings	12.75 to 13.25
Steel angle bars	15.25 to 15.75
Iron car axles	26.00 to 27.00
Steel car axles	20.00 to 21.00
Wrought iron bars and transoms	21.00 to 22.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	15.50 to 16.00
Railroad springs	19.00 to 19.50
Cast iron borings	12.50 to 13.00
No. 1 busheling	14.75 to 15.25
No. 1 railroad cast	17.50 to 18.00
No. 1 machinery cast	18.00 to 18.50
Railroad malleable	17.00 to 17.50
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	9.00 to 9.50

Cincinnati

Sale of Malleable at $2 Below Recent Price Silvery Prices Reduced

CINCINNATI, July 24.—Two sales of outstanding importance were reported last week. The Link-Belt Co. bought 3000 tons of malleable iron for third quarter shipment at $26.77, delivered Indianapolis, but the name of the furnace from which the iron will be shipped was not disclosed. This price represented a cut of approximately $2 per ton under the previous low price of the market, and it is said could not be duplicated today, as the order was an exceedingly attractive one. The S. Wayne-Robinson Co., Richmond, Ind., bought 1500 tons of foundry iron for fourth quarter, the silicons ranging from 1.75 to 3.25, and it is reported that this iron was divided equally between the southern Ohio furnaces and a lake furnace, at prices ranging from $25.75 to $26.25, furnace. Several other sales of 100 to 400 tons of Northern iron were reported at $26, Ironton basis. The only sale of Southern iron of importance was of 500 tons to a nearby melter at $25, Birmingham, for silicons 2.25 to 2.75, or $24.50 base. Silicons are being given away by some Southern furnaces, which have not, however, gone below $25 for any grade. Jackson county silvery furnaces have cut the schedule $5 per ton, 8 per cent now being quoted at $34.50, furnace. Some business was done on the decline, the most notable sale being for 500 tons. A decline in pig iron production in the southern Ohio district will be brought about by the blowing out of Hamilton furnace next Sunday. Star silvery furnace went out on Monday. One of the two Marting furnaces in blast will blow out within the next 10 days, and about Aug. 1 Hanging Rock and Belfont furnaces will either bank or blow out. This will leave only one active producer of foundry in the Ironton district. The Wellston furnace will go on low phosphorus this week, and Globe and Jisco furnaces, it is expected, will continue to operate on silveries and spiegeleisen for some time. Two inquiries of 1000 tons each are current for malleable iron.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$29.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	29.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	28.27
Basic Northern	27.27
Malleable	28.27

Finished Materials.—While orders are not heavy, there is a much better demand for finished products for fill-in purposes, and some of the larger consumers, particularly of sheets, are showing some interest in fourth quarter tonnages, though not actually inquiring. Most of the orders are being placed for one to two carloads, and purchasers usually try to exact delivery promises of from two to three weeks, but mills generally speaking are unable to make better deliveries than from six to eight weeks. On the heavier products, such as shapes and plates, eight weeks is the usual run. Steel bars are in little demand, most of the orders being for reinforcing bars in small tonnages. Forging billets, car wheels, axles, and bolts and nuts are in fair demand, particularly bolts and nuts, some goodsized orders for which were placed. There is also a slightly better demand for wire products, but the attention of the consumer is more generally given to urging the mills to make shipment on contracts. There is little new activity in the structural field. A school building at Indianapolis will shortly be up for bids, the steel work requiring about 300 tons. An office building for the Continental National Bank, Indianapolis, general contract for which has been awarded, will also be up for bids shortly, it not having been decided whether the building will be of steel or reinforced concrete. The Shrine Temple at Louisville, scheduled for bids July 16, has been postponed till a later date. The Neil House at Columbus, the steel work for which was reported awarded last February, will be redesigned for reinforced concrete construction and new bids taken in the near future. This was a 5000-ton project. The principal letting last week was of 1300 tons of steel for a viaduct for the Peoria & Eastern Illinois Railroad, on which the Fort Pitt Bridge Co. was low bidder. The Big Four Railroad has awarded 150 tons of bridge work to the Mount Vernon Bridge Co.

Warehouse Business.—Local jobbers are enjoying a fair business, particularly in reinforcing bars and small angles. Nails, too, are moving well. Prices remain as last quoted, with no changes anticipated.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Cast Iron Pipe.—The City of Huntington, Ind., will receive bids until July 30 for the construction of a sewage disposal plant, including about 16,000 ft. of 12- to 42-in. pipe, at an estimated cost of $250,000.

Old Material.—While there is little current demand, the opinion is becoming more pronounced that the bottom of the scrap market has about been reached, and dealers are commencing to purchase scrap to lay on yards. More bidders appeared at the Southern Railroad opening at Washington, and prices offered were slightly higher than last month. The same is true of the Norfolk & Western list. Prices generally show little change, but cast scrap is weaker and larger offerings have knocked the price off $1. One steel mill in the district is taking small tonnages of heavy melting at its own prices, figuring about $18, delivered.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$12.50 to $13.00
Iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up	28.00 to 28.50
Rails for rolling	16.50 to 17.00
Heavy melting steel	15.00 to 15.50
Steel rails for melting	14.50 to 15.00
Car wheels	15.50 to 16.00
Per Net Ton	
No. 1 railroad wrought	12.50 to 13.00
Cast borings	10.50 to 11.00
Steel turnings	8.00 to 9.50
Railroad cast	16.50 to 17.00
No. 1 machinery cast	19.00 to 19.50
Burnt scrap	12.00 to 12.50
Iron axles	22.50 to 23.00
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	9.50 to 10.00

Coke.—The movement of coke is rather slow, although there is some evidence of a better feeling on the part of both producers and melters. The demand still runs mostly to carloads, with an occasional contract covering the remainder of the year being negotiated. Prices generally show no change, although some of the operators who had been holding up their prices have been forced to meet the competition of

the lower priced sellers. Plans are now being made to curtail production, particularly of 48-hr. fuels, in all districts, as a result of the number of merchant furnaces going out or contemplating going out of blast.

Cleveland

Pig Iron Market Still Weak—Consumption of Ore Decreases

CLEVELAND, July 24.—Consumption of Lake Superior ore, which reached the peak of 6,118,540 gross tons during May, fell off 302,401 tons to 5,816,139 tons during June, according to the monthly report of the Lake Superior Iron Ore Association. However, a large part of this decrease can be accounted for by the shorter month. Both central districts and lake front furnaces consumed less ore in June than in May, but the consumption of Lake Superior ore by Eastern furnaces increased 26,318 tons during the month. The amount consumed in June, 1922, was 3,440,583 tons. On July 1 there were 22,800,253 tons of ore on hand at furnaces and Lake Erie docks, as compared with 18,864,791 tons on June 1, and with 25,447,079 tons on July 1, last year. Stocks at furnaces July 1 were 18,288,462 tons, as compared with 14,786,481 tons on June 1.

Pig Iron.—The market has become somewhat more active, but buying during the week was largely confined to foundry and malleable iron for early requirements. However, some inquiry is now coming out for iron for the remainder of the year, although not much of a buying movement is looked for at present, in view of the fact that many consumers seem to doubt whether prices have reached bottom. The market is still weak, although there seems to be a disposition on the part of a number of producers not to go below $26 on foundry and malleable iron. However, in the Valley district much of the business taken during the week was on the basis of $25 and there is evidence that that price is being shaded in Buffalo. Locally the market has declined 25c. to meet the competition of $25 Valley iron and several small lot local sales were made by one Cleveland producer at $26.75, delivered. Another local producer is still holding to $27. The Westinghouse Electric & Mfg. Co. has purchased 1050 tons of two grades of foundry iron running to 2.25 to 3.35 in silicon for its Cleveland plant for August shipment. Of this, 600 tons was purchased from a Cleveland furnace and the remainder from a Valley producer. The recent purchase of 3000 tons of malleable iron by the Link-Belt Co. for its Indianapolis plant is understood to have been made at $26.77 delivered. Among new inquiries is one for 3000 tons of malleable for the fourth quarter and two 500-ton lots for earlier delivery. The American Steel Foundries is inquiring for 1000 tons of basic for August shipment and a Canton consumer is in the market for 250 tons of malleable iron for early shipment. Low phosphorus iron is still weak and no longer quotable above $33. We note the sale of a 300-ton lot of high silicon low phosphorus by a Valley furnace to a northern Ohio consumer at $34, this iron carrying a $1 a ton differential. A reduction to $34.50 for 8 per cent has been made on Ohio silvery iron schedule. However, the new price is only about $2 a ton lower than some of the recent quotations.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$26.75 to 27.25
Southern fdy., sil. 1.75 to 2.25	31.00
Malleable	26.75 to 27.25
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	33.00

Bolts, Nuts and Rivets.—Bolt and nut specifications are fair for this time of the year, manufacturers reporting a good number of small orders. The new bar card extras has resulted in a price increase for some of the raw material, particularly for stock for small nuts. Consequently makers soon will be inclined to shade regular prices. Rivet prices have further declined about $3 a ton and are weak. The market now is established at 3c. to 3.10c. for structural and 3.10c. to 3.20c. for boiler rivets, and some makers have revised contracts to these prices. Further concessions of $2 a ton to 2.90c. for structural and 3c. for boiler rivets for prompt shipment are reported. Small rivets are also lower, now being quoted at 65 and 10 per cent off list.

Coke.—The demand for foundry coke is light and prices show little change. The supply is plentiful. We quote standard Connellsville coke at $5 to $6.50 for prompt shipment and $6.50 to $7 for contracts.

Sheets.—Demand for sheets continues light. Most mills, however, are comfortably filled with orders and those making automobile body sheets have their third quarter production under contract. Prices are holding fairly firm. While black sheets are still being shaded $2 a ton to 3.75c. per lb., this concession is not general. A price of 4.75c. has appeared on galvanized sheets, but this seems to have been on surplus mill stocks.

Reinforcing Bars.—The Bourne-Fuller Co. has taken 575 tons for the Jamestown Hotel, Jamestown, N. Y. The only new inquiry of any size is for 200 tons for a hotel at Harrisburg, Pa., the general contract for which has been placed with the Hunkin-Conkey Construction Co., Cleveland. Rail steel reinforcing bars are unchanged at 2.30c. to 2.35c.

Warehouse Business.—Jobbers are doing a good volume of business in sheets and their sales in other lines are fair. Some shading is reported on galvanized sheets. There are reports of $3 a ton concession in warehouse prices on steel bars, plates and structural, but it is claimed that this shading is only on material for out-of-town shipment to points that come in competition with the lower regular prices of Pittsburgh warehouses.

Semi-Finished Steel.—Some new inquiry has come out for billets and slabs, but no sales are reported. Mills are holding firmly to $42.50 for sheet bars, billets and slabs. A carlot sale of forging billets is reported at $50, Eastern mill.

Finished Material.—Mills are getting a fair volume of specifications, but new business is light and there is little inquiry for round lots of steel for specific work. The market is firm and efforts of buyers to develop lower than the regular quotations on steel bars, plates and structural material have proved unsuccessful. The probability of the establishment of the 8-hr. day in the steel industry in the near future is evidently having some effect in stabilizing the market at present levels, as it is pointed out that should mills make concessions now, it would be necessary for them to advance their prices again when operating costs are increased by the adoption of a shorter work day. Another feature of the market in practically all finished lines is that cancellations and suspensions are not more than normal for this season of the year. Encouraging reports continue to come from the automobile industry in Detroit, where the plants of the leading car builders continue in good operation. Automobile companies look for a good demand for cars during the remainder of the year, but are following a cautious policy in buying steel. Cleveland automobile plants are now operating at 50 per cent of capacity. Manufacturers of automobile parts are operating at 75 per cent or more of full capacity. The recent inquiries for several lake boats have not resulted in any orders. The Pere Marquette Railroad is considering the building of 500 refrigerator cars in its own shops. Little inquiry is coming out in the structural field. The demand for nails and wire is holding up well and deliveries show little improvement. The leading interest has reduced railroad and boat spikes $5 a ton to 3.50c. per lb., which for some time has been the price quoted by independent mills.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.35c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Old Material.—Prices have further declined 50c. to $1 a ton and the market continues weak and inactive. Borings and turnings are about the weakest items on the list. A local mill purchased a small tonnage of heavy melting steel at $16.50 delivered, and small lot purchases have been made by dealers at $16, producers yard. Local mills are still holding up shipments. Dealers are buying scrap from producers, which they are compelled to lay down because they can find no market for it. Dealers are offering $10.75 for turnings delivered at Breckenridge.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel, nominal	$16.00
Rails for rolling	$18.00 to 18.50
Rails under 3 ft.	17.75 to 18.00
Low phosphorus melting	18.50 to 19.00
Cast borings	11.50 to 11.75
Machine shop turnings	10.50 to 10.75
Mixed borings and turnings	11.00 to 11.50
Compressed sheet steel	13.00 to 13.50
Railroad wrought	12.25 to 12.75
Railroad malleable	22.00 to 22.50
Light bundle sheet stampings	10.00 to 10.50
Steel axle turnings	14.50 to 15.00
No. 1 cast	18.50 to 19.50
No. 1 busheling	10.00 to 10.50
Drop forge flashings	10.00 to 10.50
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Pipes and flues	9.00 to 9.50

Philadelphia

Increased Buying and Inquiry Causes More Cheerful Sentiment

PHILADELPHIA, July 24.—Greater buying, together with increased inquiry and specifications against contracts in a number of finished lines, has given a more cheerful tone to the iron and steel market in this district. The weak spots continue to be manifest in scrap and pig iron, however. Both have softened in price, some of the leading grades of old material have declined 50c. per ton the past week, while eastern Pennsylvania and Virginia grades of foundry iron have fallen $1 per ton, and basic iron 50c. per ton. Even in pig iron there are some furnace representatives who claim that a great deal more activity is in prospect. They express the opinion that buyers, being without stocks, feel that the bottom has been practically reached, and will soon come into the market and close for their requirements.

The finished lines which show the most activity are plates, shapes, steel bars, wire, pipe, spikes, bolts and nuts. While the improved purchases and specifications in these lines have not been on a widespread or heavy scale, they are accepted as promising a better turn in the market and to insure continued operations at the present good rate. Plate, spike and bolt business has been especially good with some producers, and while the railroads are the leading buyers, the purchasers represent miscellaneous consumers.

The fact that some good-sized sales of foundry iron have been made the past week also is looked to as an encouraging sign, even if they have been limited as to the number of furnaces involved, and have been negotiated at reduced prices.

Pig Iron.—Considerably greater business was done in pig iron in this district the past week than the preceding week and, while it was obtained at reduced prices, producers say buyers are showing somewhat more interest generally. Furnace people profess the belief that the price slump has been checked and that this will encourage renewed purchases. One producer has made sales of more than 10,000 tons of eastern Pennsylvania foundry grades which are quoted $1 per ton under prices one week ago. No. 2 plain now is quoted at $25.76 to $27.56, delivered, or a minimum furnace level of $25. While reports have been heard that small lots have been sold under this quotation, it is not thought that much business, if any, is being offered at the lower price. Virginia grades also have been sold at $1 per ton less than prices of one week ago in consuming districts near the furnaces, but because of the high freight rate these grades are not reaching this district. Basic iron has declined 50c. per ton to a minimum of $25.50, delivered, eastern Pennsylvania. An unverified report was in circulation of a sale of 4,000 tons of copper-free low phosphorus iron to a Philadelphia district consumer at slightly less than $33, delivered. The Warren Foundry & Pipe Co. bought from 20,000 to 25,000 tons of No. 2 plain and No. 3. Foreign pig iron also has taken a downward turn, declining $1 per ton on all grades. It is stated that almost no foreign iron now is being sold in this district, but shipments against contracts continue to arrive. Imports to this district the past week totaled 5328 tons, of which 3524 tons came from Belgium and 1804 tons from France. While there was talk recently of blowing out furnaces, none has gone out of blast in this district the past week. The Lavino Furnace Co. has blown in its furnace at Reusens, Va.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.76 to $27.56
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.56 to 27.26
East. Pa. No. IX	27.26 to 28.01
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.17 to 31.67
Virginia No. 2X, 2.25 to 2.75 sil.	31.67 to 32.67
Basic delivered eastern Pa.	26.00 to 26.50
Gray forge	27.00 to 27.50
Malleable	30.14 to 30.64
Standard low phos. (f.o.b. furnace)	30.00 to 35.00
Copper bearing low phos. (f.o.b. furnace)	32.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.50 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.50
Low phos. copper free, guar. not over 0.035 per cent phos.	33.00
Continental, phos. 1.50, sil. 2 to 3	25.50

Ferroalloys.—The market for ferroalloys continues to be dull. Except for sales of carlots no new tonnage is moving and inquiries are lacking. Prices are unchanged, ferromanganese being quoted at $117.50, Atlantic seaboard.

Semi-Finished Steel.—No change has developed in the market for semi-finished steel. Rerolling billets are quoted at $42.50, Pittsburgh, and forging steel at $47.50 to $50, Pittsburgh.

Plates.—Makers of plates in this district report considerably increased activity in the market. Both new buying and specifications against contracts have developed in large proportions and sales of from 500 to 1000 tons have been closed at 2.50c., base, Pittsburgh, some producers asking 2.60c. for small lots. The railroads are the most prominent factors and have been specifying rather freely against contracts and are being booked for new requirements. Oil tank business also has improved. One producer reports having booked more plate tonnage in July than in any other month of the present year, and has had to extend delivery for a period ranging from 60 to 90 days, while previously delivery was being made in 30 days. This mill reports that specifications and new business are about equal.

Structural Steel.—Moderate activity exists in the market for structural material, especially small shapes, and the price continues to be quoted at 2.50c. base, Pittsburgh. Deliveries are being made in 30 to 45 days, and most mills are booked comfortably, and in addition to receiving specifications against contracts in fair-sized volume, report improved buying. The American Bridge Co. was the lowest bidder for 1900 tons for the Delaware River bridge, Philadelphia to Camden, N. J., being built by the Delaware River Bridge Joint Commission. The award is expected to be made in about one week.

Bolts, Nuts and Rivets.—Unusually large purchases and specifications against contracts have been made in this district during the past week for spikes, bolts, nuts and rivets. Specifications for heat-treated track bolts were made against a contract with one large maker involving about 2000 kegs, while several hundred tons of machine bolts, nuts and rivets were also included. The Philadelphia & Reading Railroad purchased 1000 kegs of standard spikes, and is asking for quotations on 200,000 to 300,000 low carbon track bolts and 200,000 to 400,000 heat-treated bolts. The Public

Service Railway Co. of New Jersey closed for 5000 tie rods. Prices remain unchanged for bolts, nuts and rivets. Reports of a weakened market for castellated nuts are declared to be unfounded. Most of the railroad purchases are for third quarter delivery.

Warehouse Business.—Demand for steel from warehouse stocks is fair for this time of the year, buying being of a miscellaneous character. Prices are unchanged.

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅞ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅞-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; square and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅞-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Ore.—Iron ore receipts in this district the past week amounted to 44,114 tons, of which 22,920 tons came from French Africa and 21,194 tons from Sweden.

Iron and Steel Bars.—Specifications for steel bars have increased and a slightly better buying movement has developed. Steel bars continue to be quoted at 2.40c. base, Pittsburgh. Demand for common iron bars is quiet and the price is unchanged.

Sheets.—Mills are comfortably booked on blue annealed and galvanized sheets, and are making deliveries in each grade in six to eight weeks. While producers are not rolling so heavily on black sheets, they also report fair booking in this grade, and are making deliveries in four to six weeks. Railroads and coal companies are the most conspicuous buyers of blue annealed sheets, and also are increasing specifications and inquiries for this class of tonnage. Prices are unchanged, No. 10 blue annealed being quoted at 3c., Pittsburgh; galvanized No. 28 at 5c., Pittsburgh, and black sheets No. 28 at 3.85c., Pittsburgh.

Old Material.—Further recession has developed in the market for scrap, heavy melting steel and other leading grades declining 50c. per ton. Sales are even more restricted than they were one week ago, and inquiries are light. The fact that consumers do not have any sizeable stocks on hand leads some dealers to the belief that improvement will develop in the market within a reasonable time. Imports of scrap to this district the past week totaled 3185 tons, of which 3110 tons came from the Dominican Republic and 75 tons from England.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $17.00
Scrap rails	16.00 to 17.00
Steel rails for rolling	19.00 to 20.00
No. 1 low phos., heavy 0.04 and under	21.50 to 22.50
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge fire	15.00 to 15.50
Bundled sheets (for steel works)	14.00 to 14.50
No. 1 busheling	16.00 to 17.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.00 to 14.50
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (for copper bent)	16.00 to 16.50
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	19.00 to 19.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	18.00 to 18.50
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 15.50
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

The week of Oct. 22 has been set aside as management week. The management division of the American Society of Mechanical Engineers, the Taylor Society, the Society of Industrial Engineers and the National Association of Cost Accountants will cooperate in meetings to be held all over the country during that week.

PREPARING TO ORGANIZE

Union Circulars Say Strike of 1919 Was Unwise—Another Not Favored

CHICAGO, July 23.—William Hannon, a general organizer for the American Federation of Labor, has arrived in Chicago to take charge of efforts to unionize the steel workers of this district. Commenting on the recent announcement by Judge Gary of the United States Steel Corporation regarding the establishment of the 8-hr. day in the steel industry, Mr. Hannon said: "It is significant that E. H. Gary made this announcement only after our organization plans were announced. We believe he is holding out hope of the shorter day in order, if possible, to shove legislation through Congress repealing the present restriction immigration laws and also he may deceive the men into believing they need not unionize."

The fact is that the letter of the directors of the American Iron and Steel Institute was written June 27, made public by President Harding July 5 and the plans of the federation were announced July 10.

Mr. Hannon stated that efforts to unionize the Wisconsin plants will be directed from the Chicago headquarters. Organizers are also to be sent into Colorado and Alabama. The first weeks, it is stated, will be devoted to a program of education to prepare for mass meetings which will be held in the fall. The federation's plan of educating the workers to the union idea is to consist largely of the distribution of circulars in several languages. Some of the circulars already printed declare that the union leaders do not favor a strike. The 1919 strike is characterized as a mistake and statements are made that the Federation of Labor intends to win without calling the men out.

Mr. Hannon will be assisted at Chicago headquarters by Charles Glover of the blacksmiths organization, E. J. Holley of the iron, steel and tin workers and John Tunney of the mine, mill and smelter workers.

To Find New Uses of Sheet Steel and Improve Galvanizing Methods

Plans have been perfected for a survey of the country, sponsored by the National Association of Sheet and Tin Plate Manufacturers, having for its object the uncovering of new uses for sheet steel. Incidental, but by no means an unimportant part of the survey, will be an effort to develop better galvanized sheets, in which the American Zinc Institute is cooperating. The investigation, which is preliminary to a country-wide advertising campaign, has been placed in the hands of a Chicago firm which specializes in such work.

Ultimate plans in connection with galvanized sheets call for the elimination as far as practicable of light coated sheets. This is to be accomplished by ascertaining from buyers the purpose to which the material is to be put, and to give to the producer the final word as to the weight of the coating. If, for example, a demand is made for galvanized sheets with ½-lb. coating, and the material is to be used for roofing or some other purpose entailing exposure to the elements, the buyer is to be informed that such a coating will not last long and will be advised to purchase sheets of heavier coating, which not only will give service but prevent unfavorable comment on the material. Eventually, it is planned to devise standard coatings for all uses and thus eliminate guesswork in specifications and unfavorable criticism of quality, which in the last analysis is the result of insufficient information as to performances under given conditions.

The properties of the Kilbourne & Jacobs Mfg. Co., Columbus, Ohio, will be sold at auction Sept. 12, unless a mortgage of $900,000 held by the New York Trust Co. is satisfied before that time. The company will continue in operation until that date under the direction of Paul Norton, special master, appointed by the Federal court to manage the properties.

BRITISH IRON AND STEEL MARKET

Pig Iron Market Weak—French Seizures of Fuel Closing Ruhr Plants—India Orders 15,000 Tons Rails from England

(By Cable)

LONDON, ENGLAND, July 24.

The pig iron market is weak and demand is almost stagnant. Furnacemen are considering the question of banking some of their furnaces. No. 3 foundry iron is quoted at 106s. 6d. ($24.44), f.o.b. Six Scotch furnaces have already been blown out and it is doubtful if they will be relighted after the holidays. The hematite pig iron market is dull and there are easier supplies, with mixed numbers easily obtainable at 103s. 6d. ($23.75), f.o.b.

The market for foreign ore is quiet, with sellers of Rubio at 22s. 9d. to 23s. ($5.23 to $5.29), ex-ship Tees. Mediterranean hematite ore is quoted at 20s., c.i.f.

A slight improvement in demand for finished iron and steel is noted. Germany has bought shipbuilding material and India has placed orders for 15,000 tons of rails. Japan, Australia and South Africa are also in the market.

The continental position is unchanged. Japan has bought moderately small parcels of various products, otherwise the market is generally dull. Semi-finished steel is scarce, with wire rods quoted at £10 10s. ($48.18) and billets at £7 5s. ($33.27), both f.o.b.

In France the Nord et d'Est Cie is about to blow in a third furnace. Owing to the intensified confiscation campaign in the Ruhr a fuel crisis is not expected to develop until December.

In Belgium, owing to a shortage of semi-finished steel, ironmasters are requesting permission to purchase part of the Ruhr stocks.

In Germany seizures of works fuel stocks is strangling the industry of the Ruhr. The Bochumer Verein at Bochum, Westphalia, has 20,000 men idle. A large part of the Krupp plant is closed, as well as the Deutscher Maschinenfabrik at Wetter and the Wittener Gussstahlwerk at Witten. The Thyssen works at Hamborn are impeded by military occupation. Locomotives and cars have been confiscated at the Rheinische Metallwaren at Düsseldorf. The French claim that they are allowing plants sufficient coke to keep blast furnaces running, although dampened down. The Hoerderichshuette at Hattingen is blowing in furnaces again. The tin plate market is quiet at minimum prices for August-September delivery, with inquiries reported from Portugal. There is a fair demand for wasters with 28 x 20s. sold at 43s. 9d., f.o.t. Galvanized sheets are firm with improved demand including fair sales to India and other colonies. Black sheets are easier for thick gages, with Japanese specifications sold at £13, f.o.b. (3.9c. per lb.).

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.59 per £1, as follows:

Durham coke, delivered	£2	1½s.				$9.53
Bilbao Rubio ore†	1	4				5.48
Cleveland No. 1 foundry	5	15				26.34
Cleveland No. 3 foundry	5	5				24.10
Cleveland No. 4 foundry	5	0				23.00
Cleveland No. 4 forge	4	17½				18.78
Cleveland basic	5	1½				24.05
East Coast mixed	5	3½				23.65
Ferromanganese	18	0				92.00
Ferromanganese*	20	0				91.20
Rails, 60 lb. and up	9	10	to £10	0s.		43.70 to $46.00
Billets	7	5	to 8	0		33.35 to 36.80
Sheet and tin plate bars, Welsh	9	2½				41.61
Tin plates, base box	1	3	to 1	3½		5.26 to 5.28
						C. per Lb.
Ship plates	9	10	to 10	0		1.95 to 2.05
Boiler plates	12	10	to 13	0		2.56 to 2.66
Tees	10	5	to 10	15		2.11 to 2.20
Channels	9	10	to 10	0		1.95 to 2.05
Beams	9	5	to 9	15		1.90 to 2.00
Round bars, ¾ to 3 in.	11	0	to 11	10		2.26 to 2.36
Galvanized sheets, 24 g.	17	15	to 18	0		3.64 to 3.69
Black sheets, 24 gage	13	10				2.77
Black sheets, Japanese specifications	15	5				3.13
Steel hoops	12	0	& 12	10*		2.46 & 2.50*
Cold rolled steel strip, 20 g.	17	5				3.54
Cotton ties, Indian specifications	15	0				3.08

*Export price. †Ex-Ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Foundry pig iron:						
Belgium, July	£5	5s.	to £5	7½s.	$24.15 to	$24.71
France, July	5	5	to 5	7½	24.15 to	24.71
Luxemburg, July	5	5	to 5	7½	24.15 to	24.71
Billets:						
Belgium, July	6	10	to 6	12½	29.90 to	30.45
France	6	10			29.90	
Merchant bars:					C. per Lb.	
Belgium, July	7	15	to 8	0	1.59 to	1.64
Luxemburg, July	7	15			1.59	
France	7	10			1.54	
Joists (beams):						
Belgium, July	7	7½	to 7	10	1.51 to	1.54
Luxemburg	7	15			1.59	
France	7	10	to 7	12½	1.54 to	1.57
¾-in. plates:						
Belgium, July	8	5	to 8	10	1.69 to	1.74
¾-in. plates:						
Luxemburg	7	15			1.59	
Belgium	7	10			1.54	

Buyers' Strike in Steel—Fuel Prices Still High—Order for Large New British Plate Mill

LONDON, ENGLAND, July 12.—The iron and steel markets are in by no means a healthy state. There seems to be a strike of buyers, except for urgent requirements and, as a result, makers generally are pressing for new orders. In pig iron, prices have a decidedly weak tone and No. 3 Cleveland G. M. B. is now worth no more than 110s. At this figure, however, consumers are not keen and there is no doubt that values will have to fall considerably lower before there is any general revival.

Of course, the most important factor bearing upon prices is the question of fuel, and while the present high levels for such are maintained, it is difficult to see how iron and steel producers can make any substantial reductions. Should the Ruhr deadlock come to an end, however, it is more than probable that fuel prices would come down with a run, as it is really only the strong export demand which has kept prices up so high. An early settlement, however, now seems more remote, especially as the continent is again buying British coal and coke in large quantities, and Germany is endeavoring to secure supplies of steel, not only for her home use but also for export. The German works, indeed, are said to be very busy on home orders, and most of them are full up for two to four months ahead. During last week Germany has made purchases of hematite up to about 10,000 tons, but this is about the only important move in this market. On the West Coast furnaces have already been put out of action.

There is nothing fresh in manufactured iron and steel, consumers taking little or no interest, and for heavy material in general makers are wanting fresh orders.

Continental works are apparently after orders but makers, evidently apprehensive of a shortage of fuel, are at present raising their prices. These are now being quoted in sterling, instead of in francs, so that the fluctuations of the exchange rates have no effect upon the export levels. They do not, however, appear to be getting much business.

Armstrong, Whitworth & Co. have recently secured an order for 25 heavy main line locomotives for the Buenos Aires Great Southern Railway, which are for freight traffic, and will consume oil fuel.

An interesting announcement is that the Consett Iron Co. has recently placed an order with Davy Brothers, Sheffield, for a new plate mill plant. This order is said to be the largest of its kind placed in this country. It includes a 40-in. electrically driven slabbing mill, with universal manipulator, 44-in. x 12-in. steel hydraulic slab shears, 32-in. x 6-ft. 6-in. electrically driven 3-high light plate mill, with deflecting tables and 42-in. x 9-ft. 6-in. electrically driven 2-stand reversing heavy plate mill, and the whole of the handling equipment for the plate-finishing department.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. 3.15c. to 3.30c.
Hoops, light gage, under 1 in. wide.....3.30c. to 3.50c.
Bands, base, per lb.....3.15c. to 3.30c.
Strips, base, per lb.....3.00c. to 3.30c.
Cotton ties, per bundle of 45 lb.....$1.61

Cold-Finished Steels

Bars and shafting base, per lb.....3.25c.
Strips, base, per lb.....5.00c. to 5.25c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per keg.....2.75
Woven fence, carloads (to jobbers)....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 10 per cent off list
Machine bolts, small, cut threads..50, 10 and 10 per cent off list
Machine bolts, larger and longer..60, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads
50, 10 and 10 per cent off list
Cut threads .....50 and 10 per cent off list
Larger and longer .....50 and 10 per cent off list
Lag bolts .....60 and 10 per cent off list
Flove bolts, Nos. 1, 2 and 3 heads.....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.
45 and 10 per cent off list
Larger and longer sizes .....45 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....3.75c. off list
Hot pressed nuts, tapped.....3.75c. off list
C.p.c. and t. square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, tapped.....3.75c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 per cent off list
⅞ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list
Bolt ends with hot pressed nuts.....50, 10 and 10 per cent off list
Turnbuckles, with ends, ½ in. and smaller
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws,
65 and 10 per cent off list
Milled set screws .....65 and 10 per cent off list
Upset cap screws .....75 per cent off list
Upset set screws .....75 per cent off list
Milled studs .....50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $3.00 to $3.10
Large boiler rivets, base, per 100 lb..... 3.10 to 3.20
Small rivets .....65 and 10 off list

Track Equipment

Spikes, ½ in. and larger, base, per 100 lb.....	$3.15		
Spikes, ⅜ in., ⅞ in. and ⅝ in., per 100 lb.....	$3.50 to	3.75	
Spikes, ⅜ in.....	3.50 to	3.75	
Spikes, boat and barge, base, per 100 lb.....	3.50 to	3.75	
Track bolts, ⅝ in. and larger, base, per 100 lb..	4.00 to	4.25	
Track bolts, ½ in. and ⅝ in., base, per 100 lb..	5.00 to	5.50	
Tie plates, per 100 lb.....	2.55 to	2.60	
Angle bars, base, per 100 lb.....	2.75		

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	28½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6.....	28	13
9 and 10....	54	41½	7 to 12.....	26	11
11 and 12...	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3.....	61	50½
¼ to ⅜.....	47	30½	¼ to ⅜ ...	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½.....	60	49½	1 to 1½.....	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4....	57	46½	2½ to 4....	29	15
4½ to 6....	56	45½	4½ to 6....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10....	45	32½	9 to 12.....	16	2
11 and 12...	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1½ in.	+18
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....	+ 8
3 in.....	40	2 to 2¼ in.....	— 2
3¼ to 3¾ in.....	42½	2½ to 3 in.....	— 7
4 to 13 in.....	46	3¼ to 4½ in.....	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in....	47	3½ and 3¾ in....	37
1¾ in.	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		

Hot Rolled

3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	3½-in. O.D. 9 gage..	15
2¼-in. O.D. 12 gage..	17	5⅝-in. O.D. 9 gage..	55
2¼-in. O.D. 11 gage..	18	5½-in. O.D. 9 gage..	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.80	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Manufacturers have numerous pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export....	0.225	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.31	Cleveland, Youngstown		Kansas City (pipe)..	0.705
Baltimore, export.....	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic....	0.34	Detroit	0.29	Omaha	0.735
New York, export.....	0.265	Cincinnati	0.39	Omaha (pipe)	0.705
Boston, domestic.....	0.365	Indianapolis	0.31	Denver	1.27
Boston, export.....	0.255	Chicago	0.34	Denver (pipe).....	1.215

Pacific Coast	$1.34		
Pac. Coast, ship plates	1.20		
Birmingham	0.58		
Memphis	0.56		
Jacksonville, all rail..	0.70		
Jacksonville, rail and water	0.415		
New Orleans	0.67		

The minimum carload for most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 30c. to 40c.; sheets and tin plates, 30c. to 40c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 49c.; pipes not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	6.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	48c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	45c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$117.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton	77.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.00 to $51.00	$43.00 to $46.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	48.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to	9.50
Silica Brick:		
Pennsylvania	42.00 to	45.00
Chicago		52.00
Birmingham		48.00
Ground silica clay, per net ton		10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb	2.40
Skelp, sheared, per lb	2.40
Skelp, universal, per lb	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb	2.25c.
Rails, light, rerolled, base, per lb	2.10c. to 2.15c.
Spikes, ⅝-in. and larger, base, per 100 lb	$3.15
Spikes, ½-in., ⅞-in. and ⅝-in., base per 100 lb.	$3.25 to 3.75
Spikes, ⅜-in., base, per 100 lb	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb	2.55 to 2.60
Angle bars, per 100 lb	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c.
Bars, common iron, Philadelphia mill	2.35c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb	2.15c. to 2.25c.
Ground shafting, base, per lb	3.65c.
Cut nails, base, per keg	$3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (1½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.50
2500 (5% Nickel)	8.00
3100 (Nickel Chromium)	4.50
3200 (Nickel Chromium)	6.25
3300 (Nickel Chromium)	8.25
3400 (Nickel Chromium)	7.25
5100 (Chromium Steel)	4.00
5200 (Chromium Steel)	8.25
6100 (Chromium Vanadium bars)	5.25
6100 (Chromium Vanadium spring steel)	5.00
9250 (Silico Manganese spring steel)	4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.75
Chromium Molybdenum, bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

RAILROAD EQUIPMENT BUYING

Better Inquiry, Particularly for Repair Parts, But Not Much Actually Pending

A little better inquiry for railroad equipment, particularly repair parts for freight cars, is in evidence. The Mid-West Engine Co., Indianapolis, has engaged in car repair work.

After eliminating various inquiries which have appeared in the recent past as now not likely to develop into business, the total number of cars now before car builders is probably less than 2500 and there is not a great amount of pending business in center constructions or other steel parts. The subjoined list covers the main items. It is understood that 400 grain cars for South Africa have been placed in the United States.

Erie Railroad, 498 coke cars to be converted into box cars.

Canadian National Railway, 1000 automobile cars to be placed in the United States.

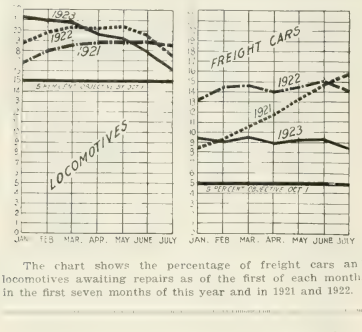
Santa Fe, 300 gondolas and 200 frame cars.

Missouri Pacific, 60 passenger equipment cars.

Delaware, Lackawanna & Western, 200 refrigerator cars with steel underframes.

Chesapeake & Ohio, 3 refrigerator cars.

Southern Railway, 1000 sets of center sills.



The chart shows the percentage of freight cars and locomotives awaiting repairs as of the first of each month, in the first seven months of this year and in 1921 and 1922.

Nickel Plate, 300 box car underframes and 10 caboose underframes.

Pere Marquette, 500 refrigerator car underframes.

The Philadelphia & Reading is reported having placed 400 steel hopper cars to the Middletown plant of the Standard Steel Car Co.

The Union Railroad has ordered 10 locomotives from the Lima Locomotive Co.

The Mexican Petroleum Co. has ordered 25 oil tank cars from the American Tank Car Co., though order is unconfirmed.

The Central Railroad of New Jersey is asking bids on the repair of 300 box cars.

The New York, Chicago & St. Louis is inquiring for 300 steel underframes for box cars.

The Pennsylvania Equipment Co., Norwood Station, Pa., is in the market for a 10 to 12-ton dinkey locomotive for a 29-in. gage track.

Jones & Laughlin Steel Corporation May Build Bar Mill

PITTSBURGH, July 24.—The Jones & Laughlin Steel Corporation has petitioned the Pittsburgh City Council for the vacating of South Thirty-fourth Street between the Monongahela River and the right of way of the Pittsburgh & Lake Erie Railroad. If the petition is granted, it is the intention of the corporation to use the land for the installation of a new bar mill and the enlargement of the steel works at that point.

FABRICATED STEEL BUSINESS

Week's Awards Large and Chiefly for Private Enterprises—Considerable New Work

Including 2500 tons for export and over 11,000 tons for private undertakings, the week's awards for fabricated steel work at 23,000 to 24,000 tons in sizable projects were notable. A new building proposal in Chicago, the Palmer Hotel, put the total of fresh inquiries to fully 18,500 tons. The chief items are as follows:

Elks' building, Queens, L. I., 450 tons, to an unnamed fabricator.

Miners' Bank, Wilkes-Barre, Pa., 400 tons, to an unnamed fabricator.

New York Central, for bridge at Painesville, Ohio, and one at Englewood, Chicago, 600 tons, to the Fort Pitt Bridge Co.

Pan-American Petroleum Co., tanks in Louisiana, 2400 tons, to the American Bridge Co.

Vehicular tunnel, New York approach, 4500 tons, to the American Bridge Co.

New York Central, three bridges, 250 tons, to the Bethlehem Steel Bridge Co.

Tanks in California, 2100 tons, to the Lancaster Boiler Works.

Western Electric Co., Kearney, N. J., 1900 tons, to unnamed fabricator.

Loft building, 230 West Thirty-eighth Street, New York, 1300 tons, to Levering & Garrigues Co.

Apartment house, Henry and Pierpont Streets, Brooklyn, 500 tons, to Levering & Garrigues Co.

Public School No. 72, New York, 1000 tons, to A. E. Norton, Inc.

Theater, Staten Island, New York, 300 tons, to the Hinkle Iron Co.

University of Washington, Seattle, Wash., library building, 500 tons, to Poole & McGonigle.

Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., blacksmith shop, 500 tons, to McClintic-Marshall Co.

Fisher Body Corporation, Cleveland, store room, 160 tons, to Van Dorn Iron Works Co., and factory addition, 250 tons, to the Austin Co.

Columbia Chemical Co., division Pittsburgh Plate Glass Co., Barberton, Ohio, 150 tons, to Rogers Iron Co.

Shibaura Engineering Co., Japan, steel plant buildings, 2500 tons, to United States Steel Products Co., to be fabricated by American Bridge Co.

Peoria & Eastern Illinois Railroad, viaduct, 1300 tons, Fort Pitt Bridge Co., low bidder.

Big Four Railroad, bridge, 150 tons, to Mt. Vernon Bridge Co.

Milwaukee, State-Martin Street bridge, 1500 tons, to Milwaukee Bridge Co.

Belle City Malleable Iron Co., Racine, Wis., foundry addition, 300 tons, to Kenwood Bridge Co.

Saco-Lowell Shops, Lowell, Mass., foundry, 120 tons, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Southern Railway, highway bridge, 1500 tons, and bridge repair material, 300 tons.

Masonic temple, Springfield, Mass., 500 tons.

Chicago, Rock Island & Pacific Railroad, girder spans, 1400 tons.

Great Northern Railway, bridge work, 1250 tons.

First National Bank building, Davenport, Iowa, 1000 tons.

Elks' Club, Milwaukee, 1000 tons; inquiry issued before, but now revised.

State legislative building, Olympia, Wash., 400 tons.

Palmer House, Chicago, 10,000 to 12,000 tons; bids to be asked soon; Holabird & Roche, architects.

U. S. Engineers' Office, Huntington, W. Va., steel derrick boat, 100 tons, bids close Aug. 16.

Neil House, Columbus, Ohio, is being redesigned, and will be of reinforced concrete construction.

Office building, Worcester, Mass., 1000 tons.

Gas holder, Beverly, Mass., 600 tons.

North Vincent building, Cleveland, 200 tons, bids taken.

Richard Dudgeon, Inc., Broome and Columbia Streets, New York, has been incorporated with capital stock of $100,000, assuming control of the organization conducted by Mr. Dudgeon for some time in the manufacture of hydraulic machinery. Business will be continued as formerly and proposed enlargement will be taken up as soon as an adjustment is effected in the affairs of railroads, with which most of its business is done. The incorporators are: R. L. Dudgeon, J. W. Nelson and J. Moore.

NON-FERROUS METALS

The Week's Prices

	Copper, New York		Straits Tin	Lead		Zinc	
	Electro		New	New	St.	New	St.
July	Lake	Ingot*	York	York	Louis	York	Louis
18	14.00	14.37½	38.12½	6.10	5.95	6.45	6.10
19	14.87½	14.37½	38.12½	6.15	5.95	6.42½	6.07½
20	14.87½	14.37½	39.37½	6.20	6.00	6.45	6.10
21	14.87½	14.50		6.20	6.00	6.45	6.10
23	15.00	14.50	39.62½	6.25	6.10	6.45	6.10
24	15.00	14.50	39.62½	6.25	6.10	6.45	6.10

*Delivery quotation, delivered price ¼c. higher.

New York

NEW YORK, July 24.

There is very little activity in any of the markets and price changes are not extreme. There is a little more buying of copper than recently at fairly firm prices. The tin market has been moderately active. The lead market has advanced from the low point. Demand for zinc is light and prices are practically stationary.

Copper.—A better tone is reflected in the electrolytic copper market and sellers report fairly good business. Inquiries are better than in some time and some of them have resulted in orders, most of which have been placed at 14.75c., delivered, with the majority of the deliveries scheduled for August and September. This is believed to indicate that copper consumers have fairly good prospects for an active early fall business. Export demand, while not heavy, is reported fairly good. Lake copper is quoted from 14.87½c. to 15c., delivered.

Tin.—About the middle of last week a more active market in Straits tin developed, which resulted in fairly good buying. On July 17 from 350 to 400 tons changed hands, most of it taken by dealers, some of whom were evidently covering short accounts. On July 19 sales of 400 to 500 tons were made, with consumers the principal buyers, and on the next day, Friday, fair sales were recorded, with consumers doing the buying even at the higher price levels. On Saturday, July 21, there was a good demand but few sellers. Yesterday and today the activity of the days referred to has almost completely disappeared and the market is again stagnant. Spot Straits tin is quoted today in New York at 39.62½c., with prices in London about £10 per ton higher than a week ago at £187 for spot standard, £187 15s. for future standard and £190 for spot Straits. Arrivals thus far this month have been 4925 tons, with 4722 tons reported afloat.

Lead.—The early part of last week there was a fairly active market, with consumers loading up at the bottom prices which then prevailed. Following this there was an advance in prices in the outside market caused partly by demand from dealers, but the activity referred to started to vanish toward the close of the week. Yesterday, somewhat to the surprise of the trade, the leading interest advanced its price from 6c. to 6.25c., New York. Sales are reported to have been made in the outside market this week as high as 6.30c., New York. The St. Louis market is correspondingly higher at 6.10c. to 6.15c., New York.

Zinc.—There is almost no activity and the market is largely a waiting one. Changes in prices have been slight. There is very little demand from consumers and sellers are not pressing the market. One cause for the attitude of the latter is the price of ore, which continues high, rendering its refining unprofitable at the present price of the metal.

Nickel.—Shot and ingot metal are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c. per lb.

Antimony.—The market is stronger, partly because of the firmness in the Chinese market. Wholesale lots of Chinese metal for prompt or future delivery are quoted 7c. to 7.20c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted in wholesale lots by importers at 26.50c. to 27c., New York, duty paid in cases where they can obtain it from their principals. The leading domestic producer does not make public its quotations.

Old Metals.—There has been a little inquiry in the market during the week, but business generally has been quiet with values practically unchanged. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.25
Copper, heavy and wire	13.25
Copper, light and bottoms	11.25
Heavy machine composition	11.00
Brass, heavy	8.25
Brass, light	7.00
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.25
Lead, tea	4.00
Zinc	4.50

Chicago

CHICAGO, July 24.—The non-ferrous metal markets are quiet. Tin is higher and lead is stronger. We quote in carload lots, Lake copper, 15.25c.; tin, 41.50c.; lead, 6.15c.; spelter, 6.15c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 10c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter No. 1, 20c.; tin foil, 22.50c.; block tin, 27.50c.; all buying prices for less than carload lots.

Blast Furnace Operations Curtailed in Mahoning Valley

YOUNGSTOWN, July 24.—Blast furnace operations are still slackening in the Mahoning Valley. The Youngstown Sheet & Tube Co. has blown out No. 4 stack in its East Youngstown group for relining. No. 3 furnace in Hazelton group of the Republic Iron and Steel Co. will suspend for overhauling and modernization. In the Youngstown district, comprising Mahoning and Shenango Valleys, 36 furnaces are now pouring, of 46, as compared with 43 active stacks six weeks ago.

Of 117 independent sheet mills in the Mahoning Valley, 100 are rolling. Six of seven open-hearth furnaces of the Trumbull Steel Co. have resumed, following suspension due to a break in the blooming mill.

Will Receive Bids on Suspension Bridge Over Delaware River

PHILADELPHIA, July 24.—The Delaware River Bridge Joint Commission will receive bids for the main cables of the new suspension bridge over the Delaware River at Philadelphia on Aug. 15. These cables are to be the largest yet used in any suspension bridge, the diameter being 30 in. They will require approximately 6800 tons of No. 6 galvanized bridge wire. The contract also includes 105,000 lineal feet of 2¼ in. wire rope and 500 tons of electric furnace steel castings. There are in addition 50 tons of high tensile bolts. Names of general contractors who are figuring on this work can be secured from the Joint Commission at 816 Widener Building, Philadelphia.

Dallas E. Winslow, who recently purchased the Paterson Motor Car Co., Flint, Mich., has purchased the Cincinnati division of the Standard Parts Co., Cleveland, for a consideration of $400,000. The entire Cincinnati equipment will be moved to Flint immediately, according to Mr. Winslow.

WILL PROCEED CAREFULLY

Plans for Abolishing the 12-Hour Day Are Being Worked Out

PITTSBURGH, July 24.—It is apparent now that the elimination of the 12-hr. day in the steel industry is going to be a gradual, orderly process with as little disturbance to operating, business and price conditions as possible. Nobody who is well informed as to steel plant conditions either as to equipment or labor supplies expects the change can be fully effective in six months and the more general opinion is that a longer period will be required if the change is to be made smoothly. Although nothing was said in the correspondence between the President and Judge Gary as to the setting up of the 8-hr. day or the three shift working system, this has been injected into consideration of the matter, since a 10-hr. day does not harmonize well with the idea of continuous operations, and it is in those departments of steel plants where operation is constant that the problem of reducing working hours is the greatest.

Plans have not yet been worked out as to just how the shorter day will be applied. Few, however, subscribe to the idea that it will be possible to get the men now working the longer day to accept the shorter turn at the present hourly or tonnage rates. It is the opinion of those who have done some investigating and who have in mind the smooth working of the change that some sort of a compromise will be necessary whereby the men and the companies divide the cost. Thus, if the men now working 12 hours go on an 8-hr. turn, they will be paid for 10 hours at the present rate. Common labor around a blast furnace now getting $4.80 for 12 hours would get $4 for 8 hours under such a suggestion. This would mean that the men sacrifice 80c. a day in wages for the shorter day and the company a like amount. Corresponding adjustments in the scales of other classes of labor, it is contended, would serve to close the gate against the activities of organized labor.

The Question of Costs

It is a matter of serious doubt among those who have looked into the matter whether the change will add enough to costs to warrant any material increase in selling prices. It is known that the increased costs with a Youngstown district plant where only 5 per cent of the men now work longer than 8 hours was slight. The increase in costs with most mills in this district will come through the scrapping of obsolete equipment and the substitution of labor-saving machinery, which will reduce the number of men required for a given kind of work. It will take time to bring about such a change and that is why the well informed do not look for the total elimination of the long day in six months. Hope for the success of the movement rests in the reduction of the number of jobs which take long periods of time rather than in the possibility that the increased number of men required will be readily available.

Cold-Rolled Strip Cutting Extras Have Been Revised and Increased

A new card of extras recently was issued by leading manufacturers of cold-rolled strip steel, the principal change in which as compared with the old card is in the charges for cutting to lengths of 24 in. and longer. The old card set up extras on widths 1 in. and wider and under 1 in. to ½ in., inclusive. The new card has three sets of extras based on widths, 3 in. and wider, under 3 in. to 1 in., inclusive, and under 1 in. to ½ in. Substantial increases over the old card are shown. The new extra sizes in inches are shown in the table.

Thickness	1.00 and Thicker	.099 to .050	.049 to .036	.035	.034 to .031	.030 to .026	.025	.024 to .020	.019 to .017	.016 to .015	.014 to .013	.012	.011	.010
Extras for thickness	Base	.20	.45	.45	.60	.80	.80	1.10	2.10	2.65	3.30	3.95	4.20	4.65
Extras for soft or intermediate tempers	.45	.45	.55	.55	.70	.70	.70	.70	...	No Extra		...	...	
Extras for narrow widths—														
Under 1½ in. to 1 in. inclusive	.25	.25	.25	.25	.40	.40	.40	.40	.50	.50	.50	.50	.50	.50
Under 1 in. to ½ in. inclusive	.45	.45	.45	.45	.60	.60	.60	.60	.70	.70	.70	.70	.70	.70
Extras for wide widths—														
Over 6 in. to 9 in. inclusive	...	...	...	...	.15	.15	.25	.25	.50	.50	...	...	...	...
Over 9 in. to 12 in. inclusive	...	...	...	.40	.40	.40	.60	.60	.75	...	...	...	...	...
Over 12 in. to 16 in. inclusive	...	...	.25	.50	.60	.75	...	...	...	...	...	...	...	...
Extras for cuttings to lengths of 24 in. and longer—														
2 in. and wider	.25	.45	.45	.45	.70	.95	.95	1.20	2.55	2.55	3.50	5.00	...	...
Under 3 in. to 1 in. inclusive	.35	.55	.55	.55	.90	1.25	1.25	1.60	3.30	3.30	4.50	6.00	...	...
Under 1 in. to ½ in. inclusive	.50	1.00	1.00	1.00	1.50	2.00	2.00	2.50	4.00	4.00	5.25	...	...	...

Extras for cutting to lengths shorter than 24 in. upon application. Boxing or wrapping 25c. per 100 lb. extra. Minimum charge 50c.

Westinghouse Scholarship Awards

The winners of the four Westinghouse War Memorial Scholarships for 1923, are George Earl Doty, Pittsburgh, who will study electrical engineering at Carnegie Institute of Technology; Lawrence B. Biebel of Oakmont, Pa., who will take a course in electrical engineering at the University of Pittsburgh; Paul M. Williams of Wilkinsburg, Pa., who will study electrical engineering at Carnegie Institute of Technology; and Lee P. Doyle of San Francisco, who will go to Ohio State University for a course in electrical engineering.

These scholarships were established in 1919 as a means of perpetuating the memory of employees of the Westinghouse Electric & Mfg. Co. and its subsidiary companies who took part in the world war. Each scholarship carries with it the annual payment of $500 for a period not to exceed four years, the payment to be applied toward an engineering education in any technical school or college selected by the successful candidates and approved by the scholarship committee. The scholarships are granted for one year only, but they will be continued for the full course provided the scholar maintains the academic and other standards required.

Two classes of scholarships are provided, (A) for sons of employees of the company or its subsidiaries who have been employed for five years or longer; (B), for employees who have been continuously employed for at least two years and who shall not on the Sept. 1, prior to the opening of the school year have exceeded the age of 23.

The annual meeting of the Sheet Metal Contractors' Association of Ohio was held in Cincinnati July 18, 19 and 20. George Dietz, Cincinnati, was reelected president, G. S. Mooney, Columbus, secretary. The convention went on record as favoring a standard code for furnaces in the State of Ohio, and efforts will be made to have this code adopted during the coming year.

PERSONAL

C. A. Meissner, Pittsburgh, who supervised the construction of the new by-product coke plant for the Koppers Construction Co., which was installed at the plant of the Weirton Steel Co., Weirton, W. Va., has been made superintendent. Casey Evans, Steubenville, Ohio, has been appointed his assistant.

Samuel Lewis president Atlantic Smelting & Refining Works, Inc., 57 Richards Street, Brooklyn, sailed July 10 for Europe.

Joseph J. Komara, formerly works manager of the Wyckoff Drawn Steel Co., Pittsburgh, and previously with the Columbia Steel & Shafting Co., Pittsburgh, now is vice-president and general manager of the Eastern Steel Products Corporation, with a plant at Spring City, Pa., and general offices in the Widener Building, Philadelphia.

G. A. Trube, who returned from France a short time ago on completion of a special industrial mission for an American banking institution, sailed again for France on July 25 to take charge of an engineering construction enterprise in that country. Mail addressed to him in care of the Equitable Trust Co., 23 rue de la Paix, Paris, will be forwarded to him.

William J. Merten, metallurgical engineer, Westinghouse Electric & Mfg. Co., and chairman Pittsburgh chapter, American Society for Steel Treating, has been appointed a member of the committee on heat treatment of carbon steel, National Research Council.

Alexander I. McKay has been made superintendent of the Morgan Mfg. Co., Keene, N. H., screw machine products. He formerly was associated with the New Home Sewing Machine Co., Orange, Mass.

R. C. Jackson, New York, who recently joined the Durant organization, has been made president of the Locomobile Co., Bridgeport, Conn.

A. C. Quere has resigned as assistant sales manager of the Ashtabula Steel Co., Ashtabula, Ohio, and has become affiliated with the sales department of the Cleveland Steel Co., Cleveland. He was formerly connected with the Niles Steel Products Co., Niles, Ohio.

J. B. Haskell of the Mosler Safe Co., Hamilton, Ohio, has accepted the position of chief engineer of the West Virginia Rail Co., Huntington, W. Va., and will take up his new duties Aug. 1.

Charles M. Anderson has resigned as managing director of the Safety Division, Milwaukee Association of Commerce, to accept a similar position at Memphis, Tenn, effective Aug. 15.

Newlin T. Booth has resigned his position as superintendent of the Bethlehem Steel Co., at Steelton, Pa., to operate the Deemer Steel Casting Co., New Castle, Del., of which he has become owner.

George A. Reuff has been appointed general manager, Christy Park Works, National Tube Co., succeeding the late E. C. Jaycox. Mr. Reuff has been connected with the Ellwood Works, Ellwood City, Pa., during the past 10 years as master mechanic and superintendent of the bar mill.

W. C. Reitz, secretary and treasurer Pittsburgh Steel Products Co., recently was elected a director of the Duquesne National Bank, Pittsburgh.

Andrew Telfer, now manager of the city works, National Tube Co., Pittsburgh, which embraces the Continental and Republic works, has assumed the management of the Pennsylvania works in Pittsburgh, of which the late J. W. Latshaw was manager.

F. A. Duttenhofer has been appointed purchasing agent for the Fox Motor Car Co., Philadelphia, succeeding C. H. Landsittel.

M. E. Davis, who has had charge of the New York office of the Vulcan Iron Works, Wilkes-Barre, Pa., for several years, has taken up other work. He is succeeded by Thomas MacLachlan of the home office, who will take charge immediately.

Otto Da Costa Schmidt has been appointed chief engineer of the Thomas Spacing Machine Co., Glenshaw, Pa.

Personnel Changes at Bethlehem Plants

Changes in the operating personnel of the Coatesville, Maryland and Steelton plants of the Bethlehem Steel Co. include the following promotions following a number of resignations:

Coatesville Plant

F. E. Howells appointed assistant general manager succeeding E. A. Hagerman, resigned. Mr. Howells was formerly mechanical engineer at the Steelton plant.

P. F. Dolan appointed superintendent blast furnace department succeeding V. W. Aubel, resigned. Mr. Dolan was formerly assistant superintendent of blast furnaces at the Maryland plant.

Howard Fairweather appointed superintendent flanging department succeeding V. B. Ash, resigned.

Maryland Plant

Owen R. Rice appointed assistant superintendent blast furnaces succeeding P. F. Dolan, transferred to Coatesville. Mr. Rice was formerly metallurgical assistant blast furnace department at the Bethlehem plant.

Steelton Plant

W. W. Cooper appointed superintendent steel foundry department succeeding Newlin T. Booth, resigned. Mr. Cooper was formerly assistant superintendent of the steel foundry department.

E. R. Howells appointed assistant superintendent steel foundry, formerly metallurgist of the steel foundry department.

George S. Comstock appointed mechanical engineer succeeding F. E. Howells. Mr. Comstock formerly was assistant mechanical engineer.

OBITUARY

HERBERT F. TOPP of Herbert F. Topp & Co., iron and steel brokers, Cincinnati, died suddenly, following a stroke of apoplexy, just before reaching his residence from his office July 24. Mr. Topp had been in his usual health during the morning, but during the early afternoon complained of pains in his arms and chest. He was driven to his home by one of his employees, but died just as he reached his house. Mr. Topp was 41 years of age and had been connected with the steel and iron business all his life. He was in his younger days an employee of the United States Steel Corporation, later being a salesman with the Dayton Coal & Iron Co., and after severing his connection there, became Cincinnati manager for Crocker Bros. He was admitted to partnership in that firm in 1920, but retired in 1921 to go into business for himself.

IRA S. FOUSE, vice-president and general manager, as well as director of the Allegheny Foundry & Machine Co., Glassmere, Pa., and his brother, John M. Fouse, treasurer Pittsburgh Welding Corporation, Pittsburgh, were drowned while bathing at Bethany Beach, near Baltimore, July 20. One of the brothers got beyond his depth and called for help; the other swam to his rescue and both were carried down. Ira S. Fouse was born in Pittsburgh 39 years ago, and prior to his affiliation with the Allegheny Foundry & Machine Co. was purchasing agent of the Standard Steel Car Co., Butler, Pa. John M. Fouse was 37 years old, a native of Pittsburgh and, besides his connection with the Pittsburgh Welding Corporation, was representative of the Dominion Bridge Co., Montreal. He was a graduate of Lehigh University, class of 1905.

THOMAS E. TUCKER, president Gem City Boiler Co., Dayton, Ohio, died July 19, following an operation for appendicitis.

Machinery Markets and News of the Works

MID-SUMMER LULL PREVAILS

Little Interest by Industrial Companies—Railroads Buying in Small Lots

Pennsylvania, Baltimore & Ohio and Norfolk & Western Issue Lists

There has been little activity during the week, the usual mid-summer lull prevailing for the most part in all districts. Inquiries from scattered points continue to be received and some of them are evidently for the purpose of determining costs of contemplated extensions or new shop projects. In Cincinnati, railroad buying in small lots has been fairly good and in New England the buying of small tools is notable. Increased activity in sheet metal working machinery is reported. It is estimated that the machine tool industry as a whole is now operating in the neighborhood of 33 per cent of capacity.

The Pennsylvania Railroad, central region, has issued a list involving 30 tools, for its Pitcairn, Sharpsburg, Youngwood and Jerry shops.

A list of 20 machines including three shapers, two drilling machines, seven engine lathes, a vertical boring mill, a centering machine, two twist drill grinders, two No. 1 grinding and polishing machines, a motor-driven hacksaw and a 1-ton electric hoist, has been issued by the Baltimore & Ohio Railroad for its Glenwood shops.

The Norfolk & Western Railroad in addition to purchasing against its recent list, has asked for quotations on a number of other tools. The Southern Railway is taking bids on about six miscellaneous machines and the Virginian Railway is also in the market. The Union Pacific Railroad is inquiring for a driving-wheel lathe and a drill press.

An inquiry for new or used machinery which includes a 16 to 20-in. engine lathe, a 20-in. drill, a 24-in. shaper, a milling machine and a 12-in. emery grinder, has been put out by the Aeroshade Co., Waukesha, Wis. Scattered inquiry for seven lathes, four shapers, two radial drills and two large pipe machines is reported from Cleveland. A safe company in Hamilton, Ohio, is expected to purchase some shearing machinery this week.

Railroads that bought during the week include the Atchison, Topeka & Santa Fe, which closed for several large tools, said to be hang-overs from its recent large purchase. The Chicago North Western placed orders for two large automatic machines and the Pennsylvania placed an order for a similar machine.

The Paige Automobile Co. purchased a round lot of automatic machines, and the Maxwell Motor Co. took a few tools for its Dayton body plant. A Massachusetts textile machinery maker closed for three lathes, a vertical milling machine and a spline miller. A large Eastern manufacturer is understood to have completed purchases of internal grinders with a final order for 20 machines, bringing the total to 80.

It is understood that all of the 75 tools for the Sharon, Pa., plant of the Westinghouse Electric & Mfg. Co. have been placed.

New York

NEW YORK, July 24.

BUT little activity is evident, the few inquiries now current being for single tools and purchasers evincing no inclination to hurry orders. Dealers in used machinery report a fair degree of activity in some lines, particularly a certain amount of interest in small radial drills and plate shop equipment. One seller of used tools is reported to have booked a fair sized order the past week. Railroad business continues about the most active section of the market, but there is very little noted in this district. The Denver & Rio Grande has purchased a 9-in. wheel lathe from an Eastern manufacturer. The Brooklyn Union Gas Co., Brooklyn, N. Y., has bought an engine lathe and a 53-in. boring mill. A large Eastern manufacturer has completed purchases of internal grinders from the Heald Machine Co., with a final order for 20 machines, bringing the total to 80.

Although sellers who deal largely with the automotive industry report practically no business at present, it is stated that automobile manufacturers are not asking suspension of delivery on tools now under order and further small purchasing is expected in the fall.

C. Brandes, Inc., 237 Lafayette Street, New York, manufacturer of radio headsets and other wireless equipment, has purchased the plant of the Universal Tobacco Machine Co., Newark, N. J., consisting of a two-story building, 100 x 126 ft., and adjoining site, 225 x 240 ft. The new owner will equip the first floor for parts manufacture and assembling. The New York works will be maintained until the second floor is available when all operations will be concentrated at the new location.

A manual training department will be installed in the new three-story and basement high school to be erected at Amsterdam, N. Y., estimated to cost $450,000, for which bids are being taken on a general contract until Aug. 15. G. L. Lockhart, Inc., 1353 University Avenue, St. Paul, Minn., is architect; Niles & Daly, Amsterdam, are associated architects.

The State Engineering Department, 158 State Street, Albany, N. Y., Dwight B. Ladu, State engineer, will install lathes, drill press, planer, bench tools and other equipment in a new machine shop for the department.

The General Motors Corporation, 224 West Fifty-seventh Street, New York, has formed a subsidiary, the Moraine Products Co., to operate at a portion of its plant at Dayton, Ohio. The new company will manufacture equipment for automobiles of the parent company. In connection with the construction of an addition at its Canadian works at Oshawa, Ont., operated by the General Motors, Ltd., for which plans have been completed, the structure will be one-story, 100 x 600 ft., and will be equipped as an assembling works. It will cost $150,000 with machinery.

Manual training equipment will be installed in the new two-story high school, 60 x 158 ft., to be erected at Schuylerville, N. Y., estimated to cost $100,000. Nichols & Gardinier, 46 North Pearl Street, Albany, N. Y., are architects.

The United Refrigeration & Terminals Co., New York, recently organized, has purchased the former brewing plant of the Bernheimer & Schwartz Co., Amsterdam Avenue, between 128th and Lawrence Streets. Immediate possession will be taken and a portion of the structure remodeled for an ice-manufacturing and refrigerating plant, estimated to cost $150,000. Calvin Tichenor, C. H. Attwater and R. P. Dorland head the new company.

Richard Dudgeon, New York, manufacturer of hydraulic jacks and kindred equipment, has organized the Richard Dudgeon, Inc., capitalized at $100,000, to take over and expand the present plant at Columbia and Broome Streets. It is headed by C. L. Dudgeon, J. W. Nelson and others.

The Wright Aeronautical Corporation, Paterson, N. J., has leased the building of the Paterson Industrial Develop-

ment Co., totaling 90,000 sq. ft. of floor space for extensions. It will also occupy a new building now being constructed by the Paterson Industrial Company, comprising 17,000 sq. ft. of floor area.

Bids will be received by the Borough Council, Stone Harbor, N. J., until Aug. 6 for pumping equipment and auxiliary machinery for installation in a new plant for the municipal waterworks. Joseph L. Sweigard, 1120 Lincoln Building, Philadelphia, is engineer. Harry M. Simpson is borough clerk.

Fire, July 19, destroyed a portion of the plant and machinery of the Diamond Match Co., near Rahway, N. J., with loss estimated at $65,000. Headquarters are at 111 Broadway, New York.

Bids will be received by the Borough Council, Pennington, N. J., until Aug. 26 for electrically-operated pumping machinery for installation in a new station for the municipal water department. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers. Henry L. Laning is borough clerk.

Manual training equipment will be installed in the new three-story junior high school to be erected at Wildwood, N. J., estimated to cost $110,000, for which bids are being taken on a general contract. A. R. Stackhouse, 1120 Locust Street, Philadelphia, is architect.

The Bart Reflector Co., 124 Belmont Avenue, Bloomfield, N. J., is in the market for a 150 hp. steam engine and boiler, second-hand; oil tank, 10,000 to 20,000 gal. capacity; pressure blower and rotary oil pump, Sturtevant type.

The Borough Council, National Park, N. J., will take bids until Aug. 13 for pumping machinery and auxiliary equipment for a new pumping plant for the municipal waterworks. A bond issue of $45,000 has been approved. Edward R. Allen is mayor.

The Public Service Electric Co., Public Service Terminal, Newark, will commence the erection of a new one-story power house at 304-12 Norfolk Street, estimated to cost $80,000.

Philadelphia

PHILADELPHIA, July 23.

PURCHASE has been made by the R. Scheinert Co., 123 North Third Street, Philadelphia, manufacturer of automobile equipment, of the two-story plant of the Lowry Top & Body Co., Gaul and Hagert Streets, for $80,000. The new owner will use the structure for a new plant.

Electric power equipment, conveying and other machinery will be installed in the new printing plant to be erected by the Philadelphia *Inquirer*, 1109 Market Street, Philadelphia, estimated to cost $600,000 with machinery.

The W. L. C. Plumbing Supply Co., Philadelphia, manufacturer of pipe, has acquired the five- and two-story buildings of the Mechling Brothers Mfg. Co., 951-53 North Ninth Street, for a new plant.

Max Levy & Co., Wayne Avenue and Berkley Street, Philadelphia, manufacturer of photo-engraving equipment and supplies, will take bids before the end of the month for a four-story addition, 60 x 100 ft., to cost approximately $80,000. Louis Levi, 1343 Real Estate Trust Building, is architect.

The American Motor Body Corporation, Philadelphia, operating the Hale & Kilburn Co., Eighteenth and Lehigh Streets, manufacturer of automobile bodies, car seats, etc., is arranging for a bond issue of $5,000,000, to be used for an expansion program at the local plant and the branch works at Detroit. Charles M. Schwab, head of the Bethlehem Steel Co., has recently purchased a substantial interest in the company.

A one-story machine repair shop will be erected at Hunting Park Avenue and Twenty-eighth Street, by the Tasty Baking Co., 2335 Sedgley Street, Philadelphia, for which a general contract has been awarded to the John N. Gill Construction Co., 112 South Sixteenth Street.

The General Electric Co., Witherspoon Building, Philadelphia, has awarded contract to the White Construction Co., 95 Madison Avenue, New York, for the first unit of its new plant at Fifty-sixth Street and Elmwood Avenue to cost $250,000.

The Bureau of Water, City Hall, Philadelphia, has been authorized to install electrically-operated pumping machinery for booster service for the Chestnut Hill district, in a station to be built at Germantown and Southampton Avenues. Fred C. Dunlap is chief of the bureau.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Amsterdam, Holland, for American-made steel tools, scales and scientific instruments; from a company at Barcelona, Spain, for glass-making machinery; from a concern at La Paz, Bolivia, for agricultural tractors, caterpillar type; and from a company at Melbourne, Australia, for iron clamps, etc.

The Associated Engineers Co., 1001 Diamond Street, Philadelphia, is said to be in the market for a punch press.

The Trenton Auto Radiator Works, Perry Street, Trenton, N. J., is having plans drawn for a two-story addition. Harry G. Aitken, American Mechanic Building, is architect. Nathan Kramer is head.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, is considering the erection of three one-story shops at its repair works, Reading, Pa., estimated to cost $150,000 with machinery. Otto Jerold is company architect. Work will be commenced on a new storage battery plant and signal tower at the new terminal at Camden, N. J.

The Reading Rubber Co., Kutztown, Pa., manufacturer of automobile tire tubes and kindred products, has leased a building at Fleetwood, and will remodel it for a new plant. The cost is estimated at $90,000, including equipment. Samuel H. Bell, Reading, is president.

M. S. Kemmerer & Co., Sandy Run, Pa., operating coal properties, are having plans prepared for a new coal breaker to cost approximately $150,000, including machinery.

The Barry & Zechner Co., Inc., 33 East Fulton Street, Lancaster, Pa., manufacturer of pumping machinery, etc., is having plans drawn for a two-story machine shop, 60 x 100 ft., to cost $30,000. W. P. Ericman, 422 Woolworth Building, Lancaster, is architect.

The Pennsylvania Coal Co., Dunmore, Pa., is planning to rebuild the machine repair shop at No. 7 Junction, Sebastopol, Pa., destroyed by fire July 19.

Schmid Brothers, Pearl and Lake Streets, Lancaster, Pa., manufacturer of hardware products, etc., and operating a machine shop, are planning the installation of a straight side punch press, arched punch press and other equipment.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Llewellyn, Pa., estimated to cost $110,000, for which plans are being prepared by Frank Reilly, 112 South Centre Street, Pottsville, Pa., architect.

The Glen Iron Power & Tool Co., Glen Iron, Pa., recently organized with capital of $500,000, is planning the establishment of a factory to manufacture pipe wrenches, etc. It is also proposed to build a local electric generating plant to furnish service in this section.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, will commence the construction of a new icing plant at Altoona, Pa., estimated to cost $100,000, including equipment.

The building to be erected by the Philadelphia Tapestry Mills, Inc., Philadelphia, is for general construction and not a power house. Contract has been awarded.

New England

BOSTON, July 23.

BOOKINGS by machine tool dealers show little, if any, expansion. Three 14-in. lathes, a vertical milling machine and a key seater, a 4-in. spline milling machine, four small presses, a 20-in. back geared drill, and a used sensitive drill are representative sales the past week. Dealers report considerable prospective activity, but difficulty in closing sales. Prices apparently are as firm as heretofore. A Massachusetts maker of shapers has advanced some numbers about 10 per cent.

Increased activity is noted in the sheet metal-working machinery market. A Wakefield furniture manufacturer and a Taunton stove maker have been fairly active buyers. Small tools and machinery parts are in exceptionally good demand for this time of the year. The city of Boston has accepted bids for furnishing and installing equipment in the Austin School, Paris Street, East Boston.

In the crane market interest centers largely in an inquiry for a fairly large crane from a Massachusetts forging concern and a Worcester steel mill's requirements. The Hunt-Spiller Mfg. Corporation, South Boston, gun metal castings, is reported to have purchased five small Whiting cranes having long spans.

The Marlboro Wire Goods Co., Marlboro, Mass., is taking bids for a one-story, 80 x 150 ft., manufacturing plant. Rector Moineau is manager.

The Central Oil & Gas Stove Co., Gardner, Mass., has awarded contract for a one-story, 60 x 116 ft., enameling plant.

The Crane Market

ACTIVITY in purchases and new inquiries for both overhead and locomotive cranes is less than for several months. Much of the present quietness is attributed by builders of cranes to the usual dullness felt at this season. No new inquiries of any size are reported. Still pending are the two 15-ton overhead traveling cranes for the Railway Steel Spring Co., 30 Church Street, New York; the 10-ton overhead crane for the Third Avenue Railway Co., New York, with two drums for lifting cars; and the four 20-ton locomotive cranes for the New York Central & Hudson River Railroad, New York. The 25-ton overhead traveling crane for the Brooklyn Edison Co., Brooklyn, N. Y., is reported to have been placed this week. Several inquiries for locomotive cranes are still pending.

Among recent purchases are:

Sullivan Machine Co., Claremont, N. H., two 5-ton, 37-ft. 7-in. span, overhead traveling cranes from the Pawling & Harnischfeger Co.

Dwight P. Robinson & Co., New York, a 75-ton trolley for the Cheswick Power Co., Springdale, Pa., from an unnamed builder.

General Electric Co., Schenectady, N. Y., a 20-ton, 42-ft. span, hand power crane for the National Railways of Mexico, from the Whiting Corporation.

Rividavia Oil Co., Buenos Aires, Argentina, an oil burning locomotive crane for use in the Argentine oil fields, from the Orten & Steinbrenner Co.

U. G. I. Contracting Co., Philadelphia, a 20-ton, used Browning locomotive crane from R. A. Parkinson, dealer, Philadelphia.

Abbott, Merkt & Co., New York, engineers, two small hand power cranes for the Megarge Paper Mill, Tulleytown, Pa., from Alfred Box & Co.

Central Aguirre Co., sugar, 129 Front Street, New York, a small 3-motor electric traveling crane from an unnamed builder.

Phoenix Utility Co., 71 Broadway, New York, a 15-ton, 21-ft. span electric traveling crane from the Northern Engineering Works.

Dodge Brothers Motor Co., Detroit, Mich., a 15-ton, 10-ft. span, 4-motor electric traveling crane from the Northern Engineering Works.

Hart Brothers Machine Co., Clarksburg, W. Va., a 5-ton, 26-ft. span, 3-motor electric traveling crane from the Northern Engineering Works.

Southwark Foundry & Machine Co., Philadelphia, a 5-ton, 3-motor, floor-controlled overhead crane from Maris Brothers.

Boston & Maine Railroad Co., for shops at Billerica, Mass., a 7½-ton, cage-controlled electric hoist from Maris Brothers.

The Norma Co. of America, ball bearings, has purchased 18 acres in Glenbrook, Conn., on which it is proposed to erect a branch plant. The first unit will be 120 x 400 ft., work on which will commence about the middle of August.

The Walsh Steam Boiler Works, Holyoke, Mass., has purchased land now occupied in Appleton and Mechanic Streets and several parcels adjoining, on which it is proposed to make improvements.

The Moore Drop Forge Co., Springfield, Mass., will erect a one-story, 56 x 81 ft., press unit, and another of approximately the same proportions for a blacksmith department.

Work will commence on a new machine shop and engine house at the locomotive repair shops of the Central Vermont Railway Co., St. Albans, Vt., to cost $80,000.

The Progressive Mfg. Co., Torrington, Conn., manufacturer of bolts, studs, etc., has awarded general contract to the Torrington Building Co. for an addition, estimated to cost $50,000 with equipment. W. E. Hunt, Torrington, is architect.

The Common Council, Fitchburg, Mass., is having plans prepared for a two-story machine shop and automobile service building, for municipal cars, estimated to cost $100,000. Herbert Foster, 72 Fox Street, is architect.

Fire, July 14, destroyed a portion of the plant of the Thinsheet Metals Co., Waterbury, Conn., with loss estimated at $25,000. It is planned to rebuild.

The American Steel & Wire Co., Grove Street, Worcester, Mass., has plans under way for a one-story addition, 55 x 100 ft., with extension, 20 x 30 ft., estimated to cost about $145,000. It will be equipped for annealing.

Manual training equipment will be installed in the new high school to be erected at Newburyport, Mass., estimated to cost $250,000. Edwin S. Dodge, 15 Exchange Street, and McLaughlin & Burr, 88 Tremont Street, both of Boston, are associated architects.

The Tileston & Hollingsworth Co., 49 Federal Street, Boston, manufacturer of paper products, has plans for two new buildings at 898 River Street, to be equipped as a machine department and finishing department, respectively, estimated to cost $75,000.

The Montaup Electric Co., Fall River, Mass., has applied for permission to issue capital stock for $600,000, the proceeds to be used for the acquisition of light and power properties and for extensions in plants.

The C. Locash Machine Shop, Stark Avenue, Wakefield, Mass., is planning the installation of a machine table saw, motor-driven.

The Yale & Towne Mfg. Co., Stamford, Conn., locks, lifting equipment, etc., has purchased the 75 x 250-ft. property adjoining, formerly occupied by the Krueger Piano Co.

The Town Council, Vernon, Conn., is planning to build a two-story high school in the western district, estimated to cost $300,000. It will contain hand tool equipment for light tinware and plumbing work.

Baltimore

BALTIMORE, July 23.

WORK has been commenced by the Baltimore & Ohio Railroad Co., Baltimore, on rebuilding its locomotive shops on Pratt Street, destroyed by fire last year. The structures will consist of a three-story shop and office to cost $105,000; and a one-story works, 66 x 200 ft., estimated to cost $100,000, for machine shop and other service. The general contract has been let to Frainie Brothers & Haigley, 18 Clay Street.

The S. B. Sexton Stove & Mfg. Co., Baltimore, has been organized with a capital of $150,000 and 2000 shares of stock, no par value, to take over and expand the business of the company of the same name at 501 West Conway Street. The new organization will continue the manufacture of stoves, furnaces and ranges. It is headed by William D. Macmillan, Harold Tschudi and Matthew Gault.

Bids will be received by the Bureau of Yards and Docks, Navy Department, Washington, until Aug. 15, for one electric traveling bridge crane, for the Puget Sound Navy Yard, specification 4861, until Sept. 12, for bins for the coaling plant at the United States Navy Yard, Pearl Harbor, H. T., specification 4772.

The Caswell Training School, Kinston, N. C., is taking bids until July 31 for electrical and other equipment for installation in its power department, including engines, boilers, electric generator and auxiliary machinery, and switchboard, with instruments. H. A. Underwood, 916 Commercial Bank Building, Raleigh, N. C., is architect.

The Dowling Mfg. Co., 54 Bay Street, East, Savannah, Ga., is in the market for electric motors, 1 and ½ hp.

The Colliers Motor Corporation, Dublin, Va., is planning the establishment of new works to manufacture automobile equipment, including a department for the manufacture of drop forgings. Two hammers and auxiliary equipment will be installed, to develop an output of about 2 tons per day. S. B. Collier is president.

The Winchester Automotive Machine Works, Winchester, Va., is planning the installation of a drill press, milling machine and other equipment.

The Kenedy Memorial Home, R. F. D. No. 3, Kinston, N. C., is planning the installation of electrically operated pumping machinery for a new waterworks system, to include a 60-ft. steel tower, with 15,000 to 20,000-gal. steel tank. Theodore B. Davis is superintendent in charge.

Fire, July 10, destroyed a portion of the automobile machine works of the Thompson-Sexton Mfg. Co., Burlington, N. C., with loss estimated at $45,000 including equipment. It is planned to rebuild. W. N. Thompson, Burlington, is head.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Aug. 7 for miscellaneous wire rope for Eastern and Western yards, schedule 1118.

Electric power equipment, conveyors and other machinery will be installed in the new six-story printing plant, 60 x 150 ft., to be erected by the Baltimore *News and American*, Baltimore, estimated to cost $650,000. G. R. Callis, Jr., American Building, is architect.

The Norfolk Sugar Refining Co., Norfolk, Va., will break ground within 60 to 90 days for its proposed refinery, held in abeyance for a number of months. The plant will include a power house and machine shop and is estimated to cost $3,000,000.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, has inquiries out for a 25-ton standard gage, saddle tank locomotive, Vulcan type, second-hand.

The Asheville Supply & Foundry Co., Asheville, N. C., is planning for extensions and improvements in its plant to cost $20,000.

A manual training department will be installed in the high school to be erected at Ingleside, Ga., estimated to cost $100,000. R. E. Carroll, superintendent of DeKalb County Schools, Decatur, Ga., is in charge.

The Oakland Motor Car Co., Pontiac, Mich., has plans for a factory branch at Atlanta, Ga., to occupy an entire block, estimated to cost $200,000. A machine shop and parts department will be installed.

Newlin T. Booth, Steelton, Pa., and associates, are concluding negotiations for the purchase of the plant of the Deemer Steel Casting Co., Newcastle, Del., for about $750,000. A company will be organized to operate the property and will make extensions.

Manual training equipment will be installed in the high school to be erected at Hickory, N. C., for which a special election to vote bonds for $225,000 has been called on July 31. C. Gadsden Sayre, Raleigh, N. C., is architect.

The Columbia Railway & Navigation Co., Columbia, S. C., has been granted a preliminary permit for the construction of a hydroelectric power plant on the Santee River, near Ferguson, S. C., about 40 miles from Charleston. The initial station will develop 125,000 hp. and will cost $1,500,000.

The Hercules Powder Co., du Pont Building, Wilmington, Del., is in the market for a number of digestors, 8 ft. in diameter and 30 ft. high, sufficient for 100-lb. working pressure, new or second-hand.

An ice-manufacturing plant with daily capacity of 80 tons and cold storage plant will be installed in the new eight-story food products warehouse to be erected at Wilmington, Del., by the Holstein-Harvey Terminal, Inc., capitalized at $2,000,000. A site has been selected at French and Water Streets. The structure will be 80 x 120 ft., and will cost in excess of $500,000, with equipment. Morton Harvey is president and Perlee C. Sisler, first vice-president.

The Board of City Commissioners, Raleigh, N. C., will receive bids until Aug. 1 for electrically operated pumping machinery and other equipment to increase the capacity of the water plant to 5,000,000 gal. The cost is estimated at $350,000. C. C. Page, Raleigh, is company engineer.

The Orangeburg Foundry Co., Orangeburg, S. C., is perfecting plans for rebuilding the portion of its foundry and shops recently destroyed by fire.

The Consolidated Gas, Electric Light & Power Co., Baltimore, will build a one-story brick and concrete addition to its plant at 700-24 West Pratt Street, at a cost of $14,500. It will also build an addition to its battery station at 10-12 McClellan Street, to cost $31,000.

The United States Heading Co., Durham, N. C., recently organized with a capital of $200,000, has taken over the local crate-manufacturing plant of the Lunsford-Losson Co. Plans are under way for additions and the installation of considerable new machinery and power equipment. Nathan Lunsford is president, and T. B. Christian, secretary.

Electric and steam power equipment will be installed in the new laundry, 147 x 250 ft., to be erected at St. Mary's and Eutaw Streets, Baltimore, by Archer's Laundry, Howard and Mulberry Streets, estimated to cost $200,000 with machinery.

The Everett Brothers Motor Co., Athens, Ga., is arranging for the establishment of a machine shop and foundry. A pattern shop will also be equipped. A list of machinery will soon be arranged and inquiries asked.

The Domestic Stoker Co., New York, has been incorporated under Delaware laws with capital stock of $50,000 to manufacture stokers and kindred equipment. The company states that plans are unformed, but that it is practically certain that a plant will not be built and that a manufacturing contract will be closed. Negotiations are in progress along that line. The company may be addressed through F. J. Nash, 7 Dey Street, New York.

Pittsburgh

PITTSBURGH, July 23.

THE most interesting development of the week in machine tools has been the issuance of a list by the Pennsylvania Railroad, Central Region, involving about 30 tools for the Pitcairn, Sharpsburg, Youngwood, and Jerry shops.

Generally, business is seasonably dull with a tendency to defer purchases until the latter part of the year. It is believed that if buying tapers off purchases can be made to better advantage in the fall than at present.

Business over the first half of the year was satisfactory, but it is pointed out that most of it was in the replacement of worn-out equipment, and that there was little new buying outside of that for the Gary plant of the National Tube Co., and the transformer plant of the Westinghouse Electric & Mfg. Co., Sharon, Pa. It is understood that all of the 75 tools for the latter plant now have been placed.

The crane market has not shown much life the past week, and builders of rolling mill equipment have continued to find business very moderate. The tendency to postpone purchases of power equipment also is marked, although the Pittsburgh & West Virginia Railway Co. recently bought from the General Electric Co. three 750-kw. bicedr type, three-phase, 60-cycle, 2300 volt, turbo-generators with exciters for its Pittsburgh shop, while the Carnegie Steel Co. has placed an order with the Allis-Chalmers Mfg. Co., for one 600-kw. motor generator set with control panels for the Schoen Steel Wheel Works, McKees Rocks, Pa.

The Dravo Construction Co., Pittsburgh, is making plans for a new structural shop, 75 x 275 ft.; the Acheson Mfg. Co., Rankin, Pa., is planning on a shop, 100 x 200 ft. and Lee C. Moore & Co., Pittsburgh, contemplate a structural shop on Neville Island, Pittsburgh.

Bids will be received by the United States Engineer Office, Pittsburgh, until July 30, for one belt conveyor for sand and gravel service, capacity 220 tons per hr., equipped with head and tail pulleys, tighteners, troughing rolls, carriers, etc.; also, for one continuous bucket elevator, circular 559.

Charles R. Geisler, Ferguson Building, Pittsburgh, architect, is preparing plans for a new one-story and basement factory on Craig Street, to be equipped for metal-working, radiator repairs, etc. The owner's name is temporarily withheld.

Fire, July 13, destroyed the conveyor system and other equipment at the plant of the Marshall Coal Co., Mount Clare, W. Va., with loss estimated at $40,000. It will be rebuilt.

The Vulcan Refining Co., Coraopolis, Pa., is perfecting plans for the rebuilding of its one-story oil refinery at Third Avenue and Kendall Street, 130 x 190 ft., recently destroyed by fire. J. N. McAllister is in charge.

Frank H. Robinson, Behan Street, Pittsburgh, manufacturer of clay-working machinery, is forming a new company under the name of Frank H. Robinson, Inc., to take over and expand the present plant and business. A State charter has been granted. The new company will manufacture industrial railroad equipment, mechanical devices and appliances, etc., and clay-working apparatus. A. S. Fairley and W. L. Schaich are interested.

The Fretz-Moon Tube Co., Twenty-third and Sedgley Streets, Philadelphia, operating a plant at East Butler, Pa., has closed negotiations with the Corona Cord Tire Co., Butler, for the purchase of its plant and adjoining property of 4½ acres, at East Butler, for $75,000. The new owner will remodel the plant, installing machinery for the manufacture of small pipe.

The Eureka Pipe Line Co., Fairmont, W. Va., is planning to rebuild the portion of its oil works at Downs, recently destroyed by fire, with loss estimated at $70,000 including equipment.

The Pittsburgh Railways Co., 435 Sixth Avenue, Pittsburgh, will purchase new electric motors, a grading shovel and other equipment.

Manual training equipment will be installed in the new two-story and basement junior high school to be erected at Bradford, Pa., estimated to cost $280,000. Lowry, Green & Co., 22 Market Street, Harrisburg, Pa., are architects.

The West Penn Railways Co., West Penn Building, Pittsburgh, affiliated with the West Penn Co., power utilities, has plans for a new power house in the Kingston section, Latrobe, Pa., to cost in excess of $500,000 including equipment.

Manual training equipment will be installed in the new high school to be erected at Buckhannon, W. Va., estimated to cost $250,000, for which an architect will soon be selected. The School Board, W. C. Hinkle, is in charge.

The United States Cast Iron Pipe & Foundry Co., Burlington, N. J., with office at 71 Broadway, New York, has awarded contract to the Austin Co., Cleveland, for a one-story foundry at Scottdale, Pa., 105 x 260 ft., estimated to cost $60,000.

The Clarksburg Automobile Co., Clarksburg, W. Va., has tentative plans for a three-story and basement service and repair building, 75 x 100 ft., estimated to cost $75,000. Machine tools, bench tools and other equipment will be installed. F. D. McEnteer, Clarksburg, is architect.

Manual training equipment will be installed in the new three-story and basement high school to be erected at Welch, W. Va., to replace a structure destroyed by fire. It will cost about $150,000. Alexander B. Mahood, L. & G. Building, Bluefield, W. Va., is architect.

The Maxton Coal Co., Morrisdale, Pa., recently organized, is planning the installation of electrical and other equipment on properties lately acquired between Hawk Run and Morrisdale, totaling 12 acres. C. B. Maxwell, Morrisdale Coal Co., heads the new organization.

The Hutton-Beale Coal Co., Fairmont, W. Va., recently formed with a capital of $500,000, has plans for the installation of electric power and other equipment on local properties. Ernest Hutton and W. N. Beale, Fairmont, head the company.

Cleveland

CLEVELAND, July 23.

THE local machinery market is experiencing a mid-summer lull, both orders and inquiries having fallen off during the week. Some business continues to come from Detroit automobile manufacturers, largely for special or automatic machines. The Paige Automobile Co. has purchased a round lot of automatic machinery for its new Jewett plant. The Chicago & North Western Railroad placed orders for two large automatic machines and the Pennsylvania placed an order for a similar machine for production work on locomotive parts. A northern Ohio industrial company placed an order for six machines with a Cleveland dealer. One local dealer reports scattered pending inquiries for seven lathes, four shapers, two radial drills and two large pipe machines.

The Marion Steel Body Co., Marion, Ohio, has been incorporated with a capital stock of $50,000 to manufacture steel bodies for trucks, steel grave vaults and other pressed steel products. It recently purchased the plant of the Marion Metallic Vault Co. E. H. Fishmer is president and Thomas H. Clark, secretary and treasurer.

The A. C. Williams Co., Ravenna, Ohio, will shortly commence the erection of extensions to its plant.

The Aetna Rubber Co., 815 East Seventy-ninth Street, Cleveland, will build a $30,000 addition.

A. L. Post & Son will build a new factory at Earlville near Kent, Ohio.

The Buckeye Traction Ditch Co., Findlay, Ohio, has acquired a $25,000 interest in the Visible Pump Co., Findlay, and the offices of the latter company will be moved to the plant of the Ditcher company, which has been making pumps for the Visible Pump Co. The present personnel of the two organizations will be maintained. Plans are under way for increasing production.

The Northern-Ohio Traction & Light Co., Akron, Ohio, has placed contracts for the erection of a new power house.

The Favorite Stove & Range Co., Piqua, Ohio, will build an addition, 100 x 200 ft.

Buffalo

BUFFALO, July 23.

PLANS are nearing completion for the erection of a one-story addition to the plant of the Buffalo Bolt Co., North Tonawanda, N. Y., estimated to cost $25,000.

The Palmeter Tool Co., 308 Falconer Street, Jamestown, N. Y., is perfecting plans for the erection of a new one-story branch factory at Celeron, N. Y.

The Automatic Transportation Co., Inc., Buffalo, recently organized with a capital of $2,000,000, will succeed to the plant and business of the company of the same name at 2935 Main Street, and will expand the business for the manufacture of industrial storage battery trucks, tractors and parts. The new organization is headed by W. C. Carr, W. L. Kleindinst and J. H. Prescott.

The Jamestown Malleable Products Co., Tiffany Avenue, Jamestown, N. Y., has awarded a general contract to the C. Haas Co., Tenth and Monroe Streets, for a one-story foundry, 50 x 200 ft., to cost approximately $50,000.

Manual training equipment will be installed in the new high school to be erected at Kenmore, N. Y., estimated to cost $100,000, for which revised plans have been prepared.

The Orwell Garage & Machine Co., Orwell, N. Y., is planning the installation of a bench milling machine, portable electric drill and other equipment.

The Harrison Radiator Corporation, Lockport, N. Y., has secured permission to close a block on Elm Street, the site to be used for the erection of an addition, for which plans will be prepared at once.

The Mica Co. of Canada, Ltd., Hull, Que., has acquired the property of the Diamond Creamery Co., Massena, N. Y., and will remodel the structure for branch plant. The work will cost about $50,000, with equipment.

The Canandaigua Cold Storage Co., Inc., Canandaigua, N. Y., recently organized with a capital of $200,000, plans the installation and operation of a cold storage plant, to cost $85,000 with equipment. J. H. Hutchison, Pittsford, N. Y., heads the company.

The Moreau Mfg. Co., Glens Falls, N. Y., will commence the construction of a new hydroelectric generating plant on Sherman Island, to cost close to $1,000,000 with machinery and transmission system.

A refrigerating plant will be installed by the Department of Parks and Public Buildings, Buffalo, in the new municipal market building to be erected on Elk Street. John H. Meahl is commissioner in charge.

The St. Lawrence Transmission Co., Potsdam, N. Y., will commence the construction of a hydroelectric power plant on the Oswegatchie River, near Heuvelton, N. Y.

The Power Corporation of New York, Light and Power Building, Watertown, N. Y., has acquired property on the Beaver River, and has authorized plans for a new hydroelectric generating station, estimated to cost $250,000, including power transmission system. W. P. McCreager, Northern New York Trust Building, Watertown, is chief engineer.

The Rochester Industries, Inc., St. Paul Street, Rochester, N. Y., is planning for the establishment of a factory to manufacture portable typewriters and parts.

Cincinnati

CINCINNATI, July 23.

THE machine tool industry as a whole is reported to be operating at approximately 33 per cent of capacity. Orders the past week were in fair volume and inquiries continue from widely scattered points. Railroad buying in small lots has been fairly good, and some of the larger manufacturers of electrical equipment have also been fair buyers. The automobile industry continues to place orders in moderate volume.

While no heavy lists have come out, railroad companies are coming into the market for tools. The Pennsylvania has issued a list for various shops and the Norfolk & Western, in addition to purchasing against its recent list, has asked for quotations on a number of additional tools. The Southern Railway is taking bids on about six miscellaneous machines, and the Virginian Railway is also in the market. The Mosler Safe Co., Hamilton, is expected to purchase some shearing machinery this week, and the Herring-Hall-Marvin Safe Co. is buying right along. The Maxwell Motor Co. has purchased a few tools for its Dayton body plant. The General Electric Co. has purchased a number of sheet metal working machines.

The Baltimore & Ohio Railroad has issued the following list for its Glenwood shops:

One 32-in. shaper.
One 36-in. upright drilling machine.
One 44-in. vertical boring mill.
Three 24 in. x 12 ft. engine lathes.
One 12-in. centering machine.
Two 3-in. twist drill grinders.
One electric 1-ton hoist.
One motor-driven hack saw.
One 20-in. drill press.

Two 36 in. x 18 ft. motor driven engine lathes.
One 24-in. shaper.
One 28-in. shaper.
Two 20 in. x 10 ft. engine lathes.
Two No. 1 grinding and polishing machines.

The J. & F. Schroth Packing Co., Cincinnati, will erect a 5-story manufacturing plant at Township and Massachusetts Avenues in which some mechanical equipment will be installed. Tietig & Lee, Fourth National Bank Building, Cincinnati, are architects.

The Shartle Brothers Machine Co., Middletown, Ohio, paper mill machinery manufacturer, has purchased the plant of the Willard Middletown Machine Co., for expansion.

The Studebaker-Wulff Rubber Co., Marion, Ohio, has purchased at receiver's sale the plant of the Liberty Tire Co., Carey, Ohio. The new owners will continue the manufacture of automobile tires.

The Auld Mfg. Co., Columbus, Ohio, has been organized with a capitalization of $225,000 to take over the emblem and jewelry division of the D. L. Auld Co. The plant will be at 225 North Fourth Street. The D. L. Auld Co., is installing machinery in its plant on Fifth Avenue for the manufacture of inside hardware for automobiles, including door handles, dash accessories, etc.

The Leidecker Tool Co., Marietta, Ohio, manufacturer of oil well tools, has been incorporated with a capitalization of $1,000,000. It was formerly a West Virginia corporation and the change was made to bring the company under Ohio laws. It operates a plant at Westview.

The Patterson Tool & Supply Co., Dayton, Ohio, is inquiring for a No. 2 Barber-Coleman hobber.

Detroit

DETROIT, July 23.

THE Gagnier Stereotype Foundry, 525 Howard Street, Detroit, will commence the erection of a new one-story foundry on McKinstry Street, to cost $20,000.

The Detroit Lubricator Co., 5938 Trumbull Avenue, Detroit, has awarded contract to the A. A. Albrecht Co., 1130 Penobscot Building, for a four-story addition, 120 x 140 ft., to cost $75,000 with equipment.

J. G. Kastler & Co., 524 Detroit Savings Bank Building, Detroit, architect, has plans for a new two-story and basement ice and refrigerating plant, 75 x 90 ft., the owner's name to be announced later.

The Great Western Smelting & Refining Co., 5202 Lorraine Avenue, Detroit, has plans for a new two-story foundry, 100 x 200 ft., to cost $50,000 with equipment. Albert Kahn, 1000 Marquette Building, is architect.

The Marine Rubber Corporation, Sparta, Mich., manufacturer of automobile tires, has tentative plans for new works at Holland, Mich., and will remove to the new location.

The Wolverine Power Co., care of Holland, Ackerman & Holland, Ann Arbor, Mich., engineers, is perfecting plans for four new hydroelectric power plants on the Tittabawassee and Tobacco Rivers, Midland and Gladwin Counties. The initial installation will aggregate about 15,000 hp., which will be utilized by the Consumers Power Co., Jackson, Mich., under contract. The Consumers company will build a power substation near the Midland-Gladwin County line. The engineers noted will prepare plans for the project and will call for bids in the near future. It is estimated to cost $750,000. Frank I. Nixon, Edenville, Mich., is president, and William C. Manchester, Detroit, vice-president.

The Michigan Body Corporation, Alma, Mich., is being organized with a capital of $200,000 to take over the property of the Chanticleer Coach Co., occupying the building of the Maxwell Mfg. Co., Alma. The new company has purchased the plant of the Bollstrom Motor Co., St. Louis, Mich., and will establish works for the manufacture of automobile bodies and special motor bus bodies, removing the business of the Chanticleer company and installing additional equipment.

Chicago

CHICAGO, July 23.

ASIDE from a small amount of railroad buying, there is very little activity in the local machine tool market. The Union Pacific Railroad has issued an inquiry for a driving wheel lathe and a wheel press. The Atchison, Topeka & Santa Fe has closed within the past few days for several large tools, which are hang-overs from its recent large purchases. Industrial companies are showing very little interest in machine tools and the market as a whole is as dull as that of last month.

The Aeroshade Co., Waukesha, Wis., has issued an inquiry for the following new or second hand tools: One 16 to 20-in. engine lathe, 8 to 10-ft. bed; one 20-in. drill; one 24-in. universal shaper; one milling machine; one 12-in. emery grinder.

The Bull Dog Motor Truck Co. has purchased a two-story brick plant, 60 x 140 ft., at Galena, Ill., for the manufacture of four-wheel chain drive motor trucks. It expects to be in the market shortly for a drilling machine, lathe, tool grinder and a milling machine, and possibly some smaller machines. Officers are J. H. Pifer, president; B. J. Patrick, vice-president; and A. P. Lord, secretary-treasurer.

The Sterling Devices Mfg. Co., recently incorporated with $2,500 capital stock to manufacture talking machine tone arms and radio head-phones, has leased space at 412 Orleans Street, Chicago, and has a factory at 345 West Austin Avenue. Officers of the company are Frederick Keller, president and treasurer; Elizabeth Fitzgerald, secretary; and H. Soffran, vice-president.

The Scott & Harsted Mfg. Co., was recently incorporated to manufacture polishing machines, special machinery, drapery hardware. Its plant is at 1610 West Augusta Street, Chicago. Walter H. Scott, John Shimel and M. Boe are officers of the company.

The Aurora, Elgin & Chicago Railroad has completed extensions to its shops at Wheaton, Ill., at a cost of $75,000. The additions increase the capacity of the old car shops 50 per cent and embody new carpenter, blacksmith and paint shops. The new building is 59 x 220 ft. of brick and steel. Tracks running into the buildings allow repairs to be made on the cars direct.

The Almira Iron Works, Inc., structural and ornamental iron, has removed its shop to 4020 Schubert Avenue, Chicago, where it has enlarged facilities.

The Nelson-Ersland Mfg. Co., 3122 West North Avenue, Chicago, has engaged in the manufacture of a new children's velocipede. A building at 1610 North Troy Street has been leased, but larger quarters will be sought soon. The company has purchased most of its equipment, but will soon be in the market for a power punch press and possibly additional machine shop equipment later. The officers are J. H. Nelson, president; Louis Ersland, vice-president, and Neil Chesebro, secretary-treasurer.

N. A. Strand & Co., manufacturers of flexible shafts and equipment, are occupying a new plant at Lincoln and Argyle Streets, Chicago. The new building is 90 x 100 ft., two floors and basement, and increases the company's floor space from 6000 to 18,000 sq. ft. The plant is fully equipped.

The Twin Branch Power Co., a subsidiary of the American Gas & Electric Co., New York, has let contract for a large electric power plant at South Bend, Ind.

The Champion Rivet Co., Hammond, Ind., has in process extensions which will double the capacity of its cold rivet department.

The Chicago Steel & Wire Co., Chicago, has purchased land, 193 x 300 ft., on Torrence Avenue, near 103rd Street, as a site for an addition to cost approximately $500,000. Plans are being prepared by L. G. Hallberg & Co., architects.

The American Car & Foundry Co. has bought a plot 240 x 250 ft., on Paulina Street, near Blue Island Avenue, for future expansion.

The Michelman Steel Construction Co., Quincy, Ill., has increased its capital stock from $50,000 to $150,000 to provide additional capital for increasing the capacity of its plant. The company expects to specialize in steel building fabrication, but will also do some boiler and tank work.

The Hays Brass & Aluminum Foundry Co., Michigan City, Ind., will soon complete a brass and aluminum foundry in that city. E. G. Orcutt of Laporte, Ind., is president and general manager, and Joseph W. Hays, Michigan City, is secretary.

The Consolidated Purchasing Agency, Railway Exchange Building, Chicago, is in the market for three or four used General Electric gas-electric motor cars.

Durant Motors, Inc., Lansing, Mich., has let contracts for a new warehouse, 80 x 560 ft., a two-story addition, 100 x 200 ft., to its No. 4 manufacturing building, and the company will also buy sufficient new equipment to double the capacity of its power plant. The present schedule of the Durant plant at Lansing calls for the production of 100 Durant cars and 300 Star cars per day. The additions to be built are part of a plan to bring the production up to 550 cars per day by Jan. 1.

Lightning, followed by fire, destroyed the Riverview Foundry, Silver Lake, Wis.

The Chicago & Alton Railroad Co., 179 West Jackson Boulevard, Chicago, has plans for a new engine house

and repair shops at Ridgeley, Ill., to cost $700,000 with machinery. H. T. Douglass is company architect.

The manual training department will be installed in the three-story and basement high school to be erected at Marion, Iowa, estimated to cost $150,000. W. J. Brown, 201 American Trust Building, Cedar Rapids, Iowa, is architect.

The S. W. Hamilton Mfg. Co., 152nd Street, Harvey, Ill., manufacturer of hardware products, is taking bids on a general contract for a one-story addition, 70 x 90 ft., estimated to cost $65,000. Henry Raeder, 20 West Jackson Boulevard, Chicago, is architect.

The Chicago Signal Co., 312-18 South Green Street, Chicago, is planning the installation of a Universal milling machine.

The Stewart-Warner Speedometer Corporation, 1828 Diversey Parkway, Chicago, has commenced excavations for its six-story and basement addition, 150 x 200 ft., estimated to cost $600,000 including equipment. L. G. Hallberg, 116 South Michigan Avenue, is architect.

The Producers' & Refiners' Corporation, California Building, Denver, Colo., is perfecting plans for a new gasoline refinery in the Salt Creek field, near Casper, Wyo., estimated to cost $2,000,000. A machine shop will also be erected.

The Common Council, Pender, Neb., will soon commence the erection of a new municipal ice-manufacturing plant.

The Hampton Brick & Tile Co., Hampton, Iowa, is considering plans for the erection of a new one-story and basement works to manufacture tile products, estimated to cost $80,000 with machinery. C. F. Osborn is president.

The Illinois Power & Light Corporation, Venice, Ill., is perfecting plans for a new power house to cost $1,000,000, with machinery and transmission system.

The State Sanitarium, Oakdale, Iowa, will commence extensions and improvements in its power house to cost about $20,000. H. F. Liebbe, State House, Des Moines, Iowa, is State architect.

Manual training equipment will be installed in the two-story and basement central high school to be erected at Grand Island, Neb., estimated to cost $350,000. Kirschke & Crocker, Ryan Building, are architects.

Indiana

INDIANAPOLIS, July 23.

SMALL, ARNOLD & CO., INC., Indianapolis, recently organized with a capital of $100,000, is perfecting plans for the operation of works at Delaware and McCarty Streets, to manufacture shock absorbers. William Small, formerly president William Small Co., manufacturer of the Monroe automobile, heads the new company.

The Cumberland Hydro-Electric Power Co., Indianapolis, has applied for permission to construct three hydroelectric generating plants in the vicinity of Burnside, Ky., two on the main Cumberland River, and the other on the south fork of the same stream. The stations will cost in excess of $800,000, with machinery and transmission systems.

The Chesapeake & Ohio Railroad Co., Richmond, Va., has tentative plans for a new engine house and repair shop at Peru, Ind. C. W. Johns is chief engineer.

The Indiana Board & Fiber Co., Vincennes, Ind., has preliminary plans for a new pulp mill at Memphis, Tenn., estimated to cost $500,000 with machinery.

The Interstate Public Service Co., Columbus, Ind., has secured permission to issue stock for $950,000, a portion of the proceeds to be used for extensions.

The Universal Portland Cement Co., Buffington, Ind., will install a mechanical dust precipitation system at its local mills to cost about $500,000. Headquarters of the company are at 210 South La Salle Street, Chicago.

A one-story power house will be built at the Concordia College, Fort Wayne, Ind. J. M. Riedel, 305 Noll Building, is architect.

Manual training equipment will be installed in the new three-story high school to be erected at Kingsbury, Ind., estimated to cost $80,000. A. Steigley, 2546 East Seventy-third Street, is architect.

The Merchants Heat & Light Co., Indianapolis, will issue bonds for $95,000 and stock for $148,000, a portion of the proceeds to be used for extensions and improvements.

The Perry Appliance Co., Inc., Perry, Okla., has been organized to manufacture mechanical appliances. Contract has been let for immediate manufacturing, but a little later the company will start investigation into the practicability of doing its own manufacturing. If it decides to do its own work, it will be in the market for equipment at that time. Ralph Foster heads the company.

Milwaukee

MILWAUKEE, July 23.

QUIET pervades the machine-tool trade, although manufacturers are occupying as much capacity as before in filling old orders. Dealers booked only scattering orders the past week, but the condition is similar to that usually prevailing at this period. Inquiries are of moderate volume and portend increased activity. Considerable inquiry is put out for purposes of determining costs of contemplated extensions or new shop projects. It is known that the expectancy of lower costs is holding much work in abeyance, while there is now developing more confidence in the immediate future, lack of which probably was a factor in holding up numerous projects within the past 90 days. The city of Milwaukee has decided to defer purchase of several thousand tons of 54-in. cast iron pipe for at least a year, as the actual need can be deferred, and it is believed likely later purchase can be made at a lower price than at present.

The Seamless Tube Co. of Wisconsin has been organized at Appleton, Wis., by local capital which within the year acquired the plant, equipment and other property of the defunct Reliance Motor Truck Co. at Appleton, and have since operated the plant in a small way as a jobbing machine shop. Articles of incorporation were filed July 17. The capital stock is $400,000. The principals are A. G. Brusewitz, Mathew Rossmeissl and William Greenen, all of Appleton.

Frank Holton & Co., Elkhorn, Wis., manufacturers of band instruments, are entering the market for a sizable list of tool room and production equipment for two two-story additions, 60 x 267 and 40 x 120 ft. Work will be started about Aug. 15 so that the new facilities may be ready about Nov. 1. Frank Holton is president and general manager.

The Board of Industrial Education, LaCrosse, Wis., let the general contract to Grahn & Bathurst, 638 Plymouth Court, Minneapolis, Minn., for the construction of the new $175,000 vocational training school, designed by Otto A. Merman, local architect. Equipment will be purchased some time in August or early September. Joseph B. Funke is president of the board.

The Allis Mfg. Co., 198-202 Milwaukee Street, Milwaukee, manufacturer of brass and aluminum castings, has increased its capital stock from $50,000 to $75,000 and will supplement its equipment to some extent. Details have not been issued, however. Orin L. Hower is secretary and manager.

R. E. Stoelting, commissioner of public works, Milwaukee, is asking bids until July 31 for the complete work of replacing the copper roofing of the main tower of the City Hall. A bond of $4,200 or check for $2,100 is required with each tender.

The Everready Auto Jack Co., Milwaukee, has been incorporated with $35,000 capital stock to manufacture portable lifting devices, automobile jacks, etc. Plans for production have not been completed. The incorporators include William Putzke, Ervin Ruben and Walter Pozorski, 878 Oakland Avenue, Milwaukee.

The Central South

ST. LOUIS, July 23.

PLANS are being perfected by the Independent Lubricating Co., Topeka, Kan., recently organized with a capital of $100,000, for a new refinery estimated to cost $60,000. J. E. Longshore, Topeka, is one of the heads of the company.

The State Highway Commission, St. Louis, has decided to call for bids for the erection of two new State-owned cement mills, instead of one, and will receive quotations within the next 60 days. If both mills are constructed, the investment is expected to exceed $1,500,000, with equipment. The engineering department of the commission, Jefferson City, Mo., is in charge.

The Coleman-Nelson Co., Tulsa, Okla., has acquired the plant of the Southern Refining Co., Haskell, Okla., inactive for a number of months. Plans are under way for remodeling for the refining of gasoline.

The United States Foil Co., 2934 Grand Avenue, Louisville, is having plans drawn for a new one-story foundry estimated to cost $17,000, exclusive of equipment. O. P. Ward, 1501 Lincoln Trust Building, is architect. R. S. Reynolds is president.

The Wabash Screen Door Co., 111 West Washington Street, Chicago, Ill., is planning the erection of an addition to its branch plant at Memphis, Tenn., estimated to cost $50,000 including machinery.

The White Eagle Oil & Refining Co., Wichita, Kan., will take bids in August for the erection of its proposed refinery on property recently acquired near Casper, Wyo., to cost approximately $600,000 with machinery. J. W. Calkins is in charge.

The W. M. Dean Co., Columbia, Tenn., has inquiries out for a traveling crane, hand-operated.

A manual training department will be installed in new school to be erected at Tiptonville, Tenn., estimated to cost $75,000. Mahan & Broadwell, Memphis, Tenn., are architects.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, and Orear-Leslie Building, Kansas City, Mo., will take bids early in August for a new factory branch on Milwaukee Avenue, to be three stories, totaling 30,000 sq. ft. of floor area. P. H. Anthony, 1109 Waldheim Building, is architect.

The Dosch Chemical Co., Seventh Street and Bernheim Lane, Louisville, has tentative plans for the rebuilding of the portion of its works destroyed by fire July 11, with loss estimated at $200,000 including machinery and power equipment.

The Derby Oil & Refining Co., Wichita, Kan., has acquired property at Pueblo, Colo., and plans the erection of a new oil storage and distributing plant to cost in excess of $50,000.

The No-Oyle Bearing Co., Tulsa, Okla., recently organized, has leased a building and will install equipment for the manufacture of ball and other bearings. The installation will include a traveling crane, blowers, gang saws and kindred equipment. R. B. Laing is president, and John A. Bowman, secretary.

The Board of Fire & Water Commissioners, Kansas City, Mo., has preliminary plans for the installation of an electrically-operated pumping plant and other improvements in the municipal waterworks, estimated to cost $1,000,000. Fuller & Maitland, Kansas City, are supervising and consulting engineers.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for a gyratory crusher, Gates No. 5 or No. 6 type, or similar, second-hand.

Fire, July 17, destroyed a portion of the works of the Atlantic Oil Co., West Irvine, Ky., with loss estimated at $150,000, including equipment and stock.

The Paint Pigment Co. of America, Knoxville, Tenn., will install machinery in a local building for the manufacture of pigments from iron ore at a cost of $35,000. Max Grant is president.

The City Water Commission, City Hall, Tulsa, Okla., is taking bids until July 30 for pumping machinery for the Mohawk municipal pumping station, comprising two alternate proposals, as follows: (A) For two 12,000-gal. steam turbine driven centrifugal pumping engines, with two 300-hp. water-tube boilers; and (B) for two 12,000-gal. motor-driven centrifugal pumping engines. J. D. Trammell and W. R. Holway, 508 Wright Building, are engineers. D. H. Maury, 1445 Monadnock Block, Chicago, is consulting engineer. A. J. Rudd is chairman of the commission.

The White Oak Corporation, Knoxville, Tenn., H. T. Spencer, president, is in the market for a 200-ton wheel press, second-hand.

The American Electrical Co., 708 North Broadway, Oklahoma City, Okla., is arranging for the installation of a power lathe, about 16 in. swing, 6 ft. bed, and other equipment.

The United States Engineer, Custom House, Louisville, is taking bids until July 30 for one centrifugal pump, 6 in. vertical type.

Wells Brothers, Great Bend, Kan., operating a forge and machine shop, are planning the installation of two power lathes, cylinder grinder, drill press, transmission equipment and other apparatus.

The Beech Creek Coal Co., Nicholson, Tenn., has tentative plans for rebuilding its tipple and coal washery recently destroyed by fire with loss reported at $65,000, including machinery. J. P. Kivett, Tazewell, Tenn., operates the property.

The Gulf States

BIRMINGHAM, July 23.

ARRANGEMENTS are being perfected by the Orchard Fire Pot Foundry Co., San Juan, Tex., for a new one-story foundry with capacity of about 250 fire pots per day. B. L. Miller is general manager.

The City Council, Dallas, Tex., has tentative plans for a one-story automobile machine shop and service building for municipal cars, estimated to cost $75,000. John C. Harris, commissioner of finance, will be in charge.

Manual training equipment will be installed in the new high school to be erected at Denton, Tex., estimated to cost $150,000, for which bids will be asked at once on a general contract. W. G. Clarkson, First National Bank Building, Fort Worth, Tex., is architect, and engineer.

Fire, July 10, destroyed a portion of the oil plant of the Gulf Production Co., El Vista, Tex., with loss estimated at $250,000 including equipment. It is planned to rebuild.

The Houston Lighting & Power Co., Houston, Tex., has plans for a new two-story power house estimated to cost $140,000, including machinery.

The Gulf Crushing Co., Inc., 816 Howard Avenue, New Orleans, is planning the construction of a new power house, with Diesel engine, in connection with a new crushing mill, estimated to cost $50,000. A conveyor and mechanical dryers will be installed in the works to be located at Morgan City, La. John Scott, Morgan City, is consulting engineer.

The Marion County Lime Co., Ocala, Fla., recently organized with a capital of $250,000, has tentative plans for a local plant estimated to cost $100,000, including machinery. E. F. Fitch is president.

The Wilson Cypress Co., Palatka, Fla., has inquiries out for two overhead, chain-operated cranes, 22 to 34 ft. span, 10 to 15-ton capacity.

Manual training equipment will be installed in the new high school to be erected at Leeds, Ala., estimated to cost $75,000. The Board of Education is in charge.

The Porter Coal Co., Porter, Ala., is planning for the installation of electrical and mechanical equipment at its local properties, including power equipment, hoisting and conveying machinery, etc.

The Texas & Pacific Railroad Co., Dallas, Tex., is planning the construction of a new engine house and repair shops on site near the Fair Grounds. It will be equipped for heavy locomotive repairs and the present works, designed for light repairs, at Liberty and Gaston Avenues, will be removed to the new location. The new plant will cost about $600,000, including equipment.

The Standard Equipment Co., Birmingham, machinery dealer, has inquiries out for four 3 to 8-ton capacity gasoline locomotives; four 16 to 35-ton saddle tank locomotives, and one 60 to 90-ton geared locomotive.

The Magnolia Petroleum Co., Dallas, Tex., operated by the Standard Oil Co. of New York, is planning the construction of a new storage and distributing plant at Powell, Tex., with capacity of 1,000,000 gal., estimated to cost about $450,000 with equipment.

Fire, July 11, destroyed a portion of the car repair shops of the Kansas City Southern Railroad Co. at Shreveport, La., with loss estimated at $125,000, including equipment. It is planned to rebuild.

The Transcontinental Oil Co., Dodge, Tex., has commenced an extension program to cost about $1,000,000. A by-products plant will be built for the production of gasoline and additional machinery installed in the lubricating oil works. Power equipment and other machinery will be required.

The Trinity Portland Cement Co., Dallas, Tex., has acquired 600 acres near Fort Worth, Tex., as a site for new works. Plans for the initial unit will be prepared at once, to have a capacity of 2500 bbl. per 24 hours. It is estimated to cost $750,000, including power house and other departments. Offices will be established at Fort Worth to handle the project and it is purposed to have the mill ready for operation within 12 months. H. L. McCourtie is president, and C. D. E. Ulrickson, vice-president and general manager.

Manual training equipment will be installed in the three-story high school addition to be erected at Tampa, Fla., by the Hillsborough County Board of Public Instruction, estimated to cost $150,000. M. Leo Elliott, Tampa, is architect.

The Benwick Gasoline Co., P. O. Box 962, Eastland, Tex., is planning the construction of a new gasoline refinery, estimated to cost $90,000. Additional steel tanks will be installed in the storage department. Louis Bender is president.

The Thermatomic Carbon Co., Sterlington, La., is planning the construction of a power house and machine shop at its new helium manufacturing plant near Breckenridge, Tex., estimated to cost $250,000 with machinery.

Manual training equipment will be installed in the three-story high school to be erected in the Oak Cliff section, Dallas, Tex., estimated to cost $500,000, for which bids will be called on a general contract about Aug. 15. DeWitt & Lemmon, Dallas, are architects.

Plans are under consideration by H. Banks Jones, city manager, Amarillo, Tex., for the installation of electrically-

operated pumping machinery in connection with extensions in the municipal waterworks, estimated to cost $1,700,000.

The Bucy-Ingram Lumber Co., W. T. Waggoner Building, Fort Worth, Tex., is planning for the construction of a power house at its new lumber mill on Park Place, 110 x 265 ft., estimated to cost $60,000.

The Eastern Texas Electric Co., Port Arthur, Tex., will make extensions in its power plant and system and install additional equipment estimated to cost $135,000. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

The French Kaolin Co., St. Petersburg, Fla., has inquiries out for a steam shovel, standard type, with ¾-yd. bucket, for installation at La Grange, Ga.

Canada

TORONTO, July 23.

IMPROVED inquiry is reported for machine tools the past few days. Municipal governing bodies are furnishing a good demand for equipment for waterworks, sewage and electrical plants, and during the week bids have been asked on equipment for several plants. Locomotive and car building shops are also buyers of equipment, chiefly for replacement purposes. While awards have been made in connection with new machine shops at Montreal for the Harbor Commission, it is understood that contracts for equipment and tools are still to be let. Orders for wood-working plants, sawmills, etc., show a good volume of business on this account.

R. Morrissette, De la Madeleine, Que., is asking for prices on a small pumping outfit, 40-ft. head, 1½-in. diameter, also for a gasoline motor for La Cie Opieduc, Batiscan, Que.

C. A. Maguire, chairman Board of Control, Toronto, will receive bids until Aug. 21 for the supply and installation of two 2,880,000 Imperial gal. centrifugal pumps and motors at the Strachan Avenue sewage disposal station. Specifications, etc., are at Room 12, City Hall.

The Brigden Brick & Tile plant, Brigden, Ont., has been taken over by the Ontario Farmers Drainage Co., Ltd., of which Andrew Hicks is president. Additions are under way and new equipment will be installed.

The S. E. Dinsmore Co. has the general contract for a power plant at Ford, Ont., for the Ford Motor Co. of Canada, to cost $400,000. It will be 112 x 148 ft., of steel, reinforced concrete and brick. Equipment will cost approximately $1,500,000.

J. G. Pendrith, 970 Queen Street, West, Toronto, has awarded contract to L. E. Dowling, 167 Yonge Street, for a brick machine shop, 56 x 142 ft., to cost $30,000.

The Southern Canada Power Co., 20 St. Nicholas Street, Montreal, is having plans prepared for power development at Hennings Falls, Que., and will call for bids in September.

The Hydro Electric Commission, North Bay, Ont., is in the market for three steam generators for a substation at Gormonville, Man.

The Dominion Tar & Chemical Co., Ltd., St. Boniface, Man., is in the market for complete equipment for a boiler house and distillery, also for three storage tanks.

The Dominion Refineries, Ltd., Lethbridge, Alta., has started work on a refinery to cost $100,000 and to have a daily capacity of 500 bbl.

The Hollinger Consolidated Gold Mines, head office, Toronto, has awarded the contract for a new dam and power plant on the Abitibi River to Sir William Arrol, Ltd., St. Catharines, Ont., and London, England. Plans call for the installation of equipment for the production of 25,000 hp.

Bradshaw's, Ltd., have started work on the erection of a plant on Symington Avenue, Toronto, for the manufacture of waxed paper, etc. It will be 65 x 216 ft., of reinforced concrete.

The Macdonald Wire Goods Co., Ltd., Drummondville, Que., has completed a new brick factory, 75 x 260 ft., and proposes to bring out new lines of wire and stamped kitchenware early in the fall. J. S. Macdonald is general manager.

The Canadian Mead-Morrison Co., Ltd., Montreal, has recently purchased considerable new equipment and machinery for its plate shop, including rolls and gate shears and electric welding machines. The company can now handle sheet metal up to 8 ft. wide.

STEEL AND INDUSTRIAL STOCKS

Some Covering of Shorts—Tone Is More Cheerful but Dullness Still Prevails

Recent movements in steel and industrial stocks show effects of buying by investors who have been attracted by the low prices. Further proof is at hand that Steel common is no longer a speculative favorite. The leader is still dull and moves more slowly than the rest of the list. No significant change has occurred yet, but the general tone is more cheerful. In the latter half of the week considerable short covering was apparent in Steel common and Crucible, occasioning an advance in Crucible of 2 points on small turnover. Bethlehem was the strongest of the steels on several occasions. Equipment issues continued strong, reflecting the continued activity of the railroads. Steel & Tube of America has been listed on the Stock Exchange.

The range of active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers...	40	42⅝	Inland Steel ...	32½	32¾
Allis-Chal. pf....	89⅞	90	Int. Har.	75	78½
Am. B. S. & Fdy.	71	71⅝	Lima Loco.	60¾	64⅝
Am. Can	87⅝	93¼	Midvale Steel....	23⅝	25⅝
Am. Can. pf	108⅝	109⅜	Nat.-Acme	10⅝	11⅝
Am. Car & Fdy..	151¼	160	Nat. En. & Stm..	57	61⅞
Am. Car & F. pf.	122¾	124¼	Nat. Enam. & St.	95	96
Am. Loco.	66	69⅝	N. Y. Air Brake..	30½	34
Am. Loco. pf....	119	119	Otis Steel	8¼	8⅞
Am. Radiator ..	80	81	Pressed Steel ..	52	56¼
Am. Roll. Mill pf.	97	97	Pressed Steel pf.	90	90½
Am. Stl. Fdries..	33⅜	35¼	Ry. Steel Spring.	101⅞	104⅜
Am. Stl. Fd. pf..	100¼	101	Replogle Steel...	14⅝	15½
Bald. Loco.	112⅞	122¼	Republic	43	47
Bald. Loco. pf..	112½	112½	Republic pf.	89	93½
Beth. Steel	41⅞	43⅝	Sloss	42	45
Beth. cum. pf...	89⅞	89½	Steel & Tube pf.	102¾	105¼
Beth. Stl. 8% pf.	102	102½	Steel of Canada..	68½	68½
Br. Em. Steel...	6	8	Timken Roller ..	36⅝	38½
Br. Em. Stl. 1 pf.	17⅛	18	Transue-Williams	31	31
Chas. Pfaudler	79⅝	80⅛	Un. Tank Car...	87	87
Colo. Fuel	27⅝	29⅞	U. S. Pipe	24½	28
Crucible Steel...	62⅜	67¼	U. S. Pipe pf....	68⅝	71
Crucible Steel pf.	89	89	U. S. Steel.....	89⅝	92⅝
Davis pf	62	64	U. S. Steel pf...	117⅞	118
Gen. Electric ...	174	176⅞	Vanadium Steel..	30⅜	32⅝
Gt. No. Ore Cert.	23¼	23⅝	Va. I. C. & Coke	56	57
Gulf States Steel	69¾	75½	Whouse Air Br.	81½	84

Republic Iron & Steel Co. Declares Special Dividend

Directors of the Republic Iron & Steel Co. have declared a special payment of 2 per cent of dividends in arrears on preferred stock in addition to the regular quarterly distribution of 1¾ per cent. This action was made possible through a substantial increase in earnings for the quarter ended June 30. Net profit applicable to dividends of $2,206,845, after taxes and charges were reported, equal after preferred dividend requirements to $4.23 a share earned on the $30,000,000 common stock outstanding, against $3.65 a share earned in the preceding quarter and 34c. a share earned on $25,000,000 preferred stock in the second quarter of 1922.

Unfilled orders on hand at the end of June, however, showed a sharp decline from the preceding quarter, amounting to 187,392 tons, against 332,795 tons on March 31 and 196,886 tons on June 30, 1922. The extra dividend on the preferred stock reduces the arrearage on that issue to 3 per cent. Both the extra and the regular dividends are payable Oct. 1 to shareholders of record Sept. 15. The report for the June quarter compared with the corresponding period of 1922 is as follows:

	1923	1922
Operating profit	$2,947,247	$563,053
Depreciation and renewals	349,202	249,575
Bond interest	293,021	204,774
Exhaustion of minerals..	98,179	22,322
Net profit	2,206,845	86,382
Preferred dividends	937,500	.....
Surplus	1,269,345	86,382

Based on the two quarterly reports for 1923, net profits, after taxes and charges for the six months ended June 30, were $3,740,688, or the equivalent of $7.88 a share, on the common stock, after allowing for preferred dividend requirements. For the first six months of 1922 a deficit of $625,700 was reported.

The West Penn Appliance Co., Knoxville, Pa., has been organized as a subsidiary of the West Penn Power Co., 14 Wood Street, Pittsburgh. The new company will do no manufacturing itself but will act as distributor for the parent company. G. M. Gadsby is vice-president.

Industrial Finances

Total net revenue of the Virginia Iron, Coal & Coke Co. for the six months ended June 30 was $212,831 and after interest, taxes, etc., net income reached $358,543. Of this $243,559 was earned in the first quarter.

Gross sales of the Hayes Wheel Co. for the first six months of 1923 totaled $9,672,812, against $6,155,431 in that period of the year previous, a gain of 57 per cent. Net profit was $900,026 against $510,331. After all charges, net applicable to common stock was $787,526, or $3.92 per share. Balance sheet as of June 30 favors assets in the ratio 3 to 1.

The Colorado Fuel & Iron Co. reports gross receipts for the quarter ended June 30 of $12,103,516 against $8,650,240 in that period of 1922. Operating expenses, interest, taxes and reserves having been provided for, there was reported a surplus for the period of $498,058, equivalent, after allowing for preferred dividends, to $1.34 per share on the $34,235,500 common stock outstanding. In the same period last year there appeared a deficit of $19,430. Surplus for the first six months of 1923 was $880,771, or $2.34 per share on common.

New York Air Brake Co. in the first six months of 1923 reported net earnings available for dividends of $1,487,206, or approximately $5 per share on the 300,000 shares of stock. This compares with net profit in the full year 1922 of only $958,741. Orders on hand are between $2,000,000 and $3,000,000, the highest in the company's history.

The Donner Steel Co. reports net earnings for the six months ended June 30, from operations, after maintenance, taxes, etc., of $1,348,964. Net income was $803,516.

Net operating income of the Gulf States Steel Co. for the quarter ended June 30 was $597,670. After providing for taxes, depreciation, etc., net income was $439,928, which added to net for first quarter makes $973,906, for the six months.

Two Federal receivers have been appointed to reorganize the Marlin Arms Corporation, New Haven, according to John F. Moran, president. Business will be continued without interruption, he stated. Controlling interest of the corporation is held by the Metropolitan Finance Corporation of New York, controlled by Harvey Fisk & Sons, Inc.

The Eaton Axle & Spring Co. reports sales amounting to $2,206,803 and profits, after all charges, of $192,083 for the quarter ended June 30.

The Penn Seaboard Steel Corporation, in a report covering the five months ended May 31, shows net profit after expenses of $180,654. After deductions for interest, idle plant expenses, etc., and $9,402, which was applicable to minority holding, there was a balance of $58,736.

Improvement in the machine tool industry this year is reflected to some extent in the earnings of the National Acme Co., automatic screw machines, etc. Sales for the six months ending with June, last, were $5,215,593, or nearly equal to the total for 1922. After allowing for bond interest charges, the company earned $2.51 on its 500,000 shares of stock of $50 par value.

Industrial News Items

The Marion Steel Body Co., Marion, Ohio, has been incorporated with capital stock of $50,000 to manufacture automobile bodies. Its building is completed, but the details of the company's plans for the future are unknown. Gwendoyln Burke heads the company.

H. O. Swoboda, Inc., Empire Building, Pittsburgh, has been retained as consulting electrical engineer by the Klein-Logan Co., that city, tool manufacturer, and has changed the entire electrical equipment of the latter from direct to alternating current. The Swoboda company also has prepared plans for the electrical equipment of the new buildings under construction by the Neely Nut & Bolt Co., South Side, Pittsburgh.

The Standard Turbine Corporation, Wellsville, N. Y., for some time engaged in the manufacture of steam turbines in capacities up to 750 hp., has purchased the plant of the Charles Youngs Machine Co., Wellsville. A contract has been awarded to the Austin Co., Cleveland, for the construction of a new steel building to be located at Scio, N. Y. It will be completed in August and will be the permanent location of the company. J. Y. Dahlstrand, formerly chief engineer of the Kerr Turbine Co., Wellsville, is manager.

The Brown Paper Co., Inc., Monroe, La., recently organized by pulp and paper manufacturers of Orange, Tex., has awarded a contract for the construction of a $2,000,000 mill to the Morton C. Tuttle Co., Boston.

The Frigair Co., Pasadena, Cal., has been organized with capital stock of $250,000 to manufacture refrigerators and refrigerating equipment. General headquarters are made in rented buildings equipped for work. Several branch factories will be established in the East and Middle West for manufacturing. W. F. Warner is president.

C. F. Fay, formerly district sales agent in the New York territory for the Eastern Steel Co., has purchased the business of Abeel Brothers, iron merchants, 190 South Street, New York, and incorporated under the name Abeels Brothers, Inc. The acquired business antedates the war of the Revolution, having been formed in 1765 as a general merchandizing company. In the building now occupied are many relics of ancient business methods and instruments. Though primitive in construction, the building is yet sturdy and capable of housing a modern warehouse business. The officers of the new organization are: C. F. Fay, president and treasurer; F. A. Thomas and C. H. Arnold, vice-president, and Maybelle K. Fay, secretary.

The Empore Engineering Co., Inc., 316 West Redwood Street, Baltimore, has been organized to manufacture and distribute one-ton refrigerating plants of special design. Compressors and other parts will be manufactured under contract. E. A. Fowler is president; G. V. K. Greene, vice-president; A. Anderson, secretary, and E. F. Dean, treasurer and general manager.

The American Plywood Wheel Co., 5675 Wabash Avenue, Detroit, was recently organized to manufacture a ply-disc wheel, which will be distributed to dealers throughout the country. The company is in the market for automobile hubs, brake drums, flanges, felloe bands, rim, rim bolts and hub bolts. Its present plant will be occupied for about a year, when the company expects to build a plant of its own. W. H. Ebry is president.

Elmer S. Hubbard, as principal, has purchased the plant, business and good-will of the Cutaway Harrow Co., Higganum, Conn. The business will resume with Mr. Hubbard as president.

The General Electric Co. in the six months ended June 30 booked orders totalling $164,263,755 against $114,219,248 for the corresponding period in 1922. In these six months the company took on new business at the monthly rate of $27,377,000, or about $6,317,000 per week.

The Carroll Foundry & Machine Co., Bucyrus, Ohio, at a special meeting of the stockholders July 13 approved a change in name of the company to the Bucyrus Road Machinery Co. and an increase in the authorized common stock from 10,000 to 25,000 shares, of no par stock, and from 5000 to 7000 shares of $100 par value preferred stock. H. D. Jones, formerly with the Buffalo-Springfield Roller Co., and later with the Galion Iron Works & Mfg. Co., has become affiliated with the Bucyrus company as vice-president. Other officers include E. L. Frantz, chairman of the Apex Electrical Co., Cleveland, chairman of the board, W. E. Mathew, president, George H. Lavan, secretary, and R. B. Washburn, treasurer.

The Cincinnati Railroads Terminal Development Co., Cincinnati, has been incorporated with a capitalization of $250,000 by a number of prominent citizens of the city. The organization is preliminary to a larger organization to be capitalized at $20,000,000, to build terminals in the lower section of the city, estimated to cost, when completed, approximately $80,000,000, and which will be leased to the various railroads entering the city. Geo. D. Crabbs, president of the Philip Carey Mfg. Co., is president of the Terminal Development Co.

The Timken-Detroit Axle Co., Detroit, has acquired the plant of the Standard Equipment Co., West 106th Street and Lorain Avenue, Cleveland, by the purchase of the preferred and common stock. The Cleveland company was organized in 1917 and has a modern plant that is engaged in the manufacture of automobile axles, beveled gears, differentials and drop forgings. The Standard Equipment Co. will retain its identity and will operate under its present management with O. J. Ashman as vice-president and D. F. Domizi in charge of engineering and production. It is stated that Mr. Ashman will be elected a director of the Timken company.

Rochester Industries, Inc., Rochester, N. Y., has been organized to manufacture a new development in portable typewriters. Temporary quarters have been secured in the Davis Machine Tool Co.'s building at St. Paul Street, where manufacturing processes are being developed. It is hoped to start quantity production next year. Working capital will be provided by issuing $500,000 in preferred stock. For future use $750,000 in stock is retained. Fifty thousand shares of common also were issued. It is planned to build a plant and to manufacture other office appliances. Morton H. Anderson, formerly superintendent of production of the Bethlehem Steel Co., and general manager of the Symington-Anderson Co., who has been working for three years on the project, is president; Samuel E. Durand, manufacturer, vice-president and treasurer; George E. Wynkoop, secretary. Among the directors are Charles F. Wray, treasurer Wray & Sons and the National Brass Co., and Arthur Ingle, president Brighton Corporation and vice-president of the Consolidated Tool Co.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.80c.	.....
Nos. 22 and 24	4.50c. to 4.85c.	5.10c.
No. 26	4.55c. to 4.90c.	5.15c.
No. 28	4.65c. to 5.00c.	5.25c.
No. 30	4.85c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized	Per Lb.
No. 14	4.75c. to 5.10c.
No. 16	4.90c. to 5.25c.
Nos. 18 and 20	5.05c. to 5.40c.
Nos. 22 and 24	5.20c. to 5.45c.
No. 26	5.35c. to 5.70c.
No. 27	5.50c. to 5.85c.
No. 28	5.65c. to 6.00c.
No. 30	6.10c. to 6.50c.

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage Ans. Coarser	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¾c. to 20¾c.
High brass wire	20¼c. to 21¼c.
Brass rods	18 c. to 19 c.
Brass tube, brazed	27¾c. to 28¾c.
Brass tube, seamless	25½c. to 26½c.
Copper tube, seamless	27 c. to 28 c.

Copper Sheets

Sheet copper, hot rolled, 23¾c. to 24½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55 $6.30
		90 lb.	6.65 6.40
		100 lb.	6.75 6.50
IC	$11.75 $10.50	IC	7.00 6.75
IX	13.00 11.75	IX	8.25 8.00
IXX	14.75 13.00	IXX	9.50 9.25
IXXX	16.50 14.75	IXXX	10.75 10.50
IXXXX	18.50 16.50	IXXXX	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	41c.
Bar	48c. to 53c.

Copper

Lake ingot	17½c.
Electrolytic	17 c.
Casting	16¾c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¼c.
Bar lead	11c. to 12c.
Solder, ⅛ and ½ guaranteed	29c.
No. 1 solder	27c.
Refined solder	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	8c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 32c. to 33c.

Old Metals

There has been practically no change in values during the week and business has been moderate. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	12.50
Copper, heavy wire	11.75
Copper, light bottoms	10.00
Brass, heavy	6.50
Brass, light	5.25
Heavy machine composition	9.25
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.75
Lead, tea	3.50
Zinc	4.00

THE IRON AGE
New York, August 2, 1923
ESTABLISHED 1855 VOL. 112, No. 5

Merchant Pig Iron Operations Analyzed

How Charting of Production, Stocks and Shipments May Be Helpful in Adopting Selling and Manufacturing Policies

BY W. HERMAN GREUL*

PLANS for the shutting down of merchant pig iron furnaces have suggested an analysis of the operations in this industry during the past eighteen months. Statistics covering plants producing approximately 60 per cent of the merchant pig iron of the country given out by the Department of Commerce† afford the material and comparable charts give a method for visualizing some of the salient features of the situation.

A brief description of the charts which the author has found effective in the analysis of business operations, and used herein, will facilitate their interpretation.

1. The horizontal or time scale is uniform throughout the series.

2. The bottom or base line always has a zero value.

3. The vertical scale for each subject charted is so selected that the eye quickly grasps *relative* changes from the relative slopes of the curves.

4. Only one subject (for example, Production) is shown on each chart, but it is presented in two phases, the thin line showing the current monthly fluctuations above and below the average for 1922 (represented by the first horizontal ruling above zero), and the thick trend line showing the annual or long pull tendency in relation to the corresponding value for the calendar year 1922 (represented by the second horizontal ruling above zero).

5. A modification of the above is adopted in the shaded chart of Fig. 1, in which all three subjects are combined in one picture in order to bring out the relative size of the three subjects at any one time rather than their trends through periods of time.

Consider first the chart of Fig. 1, showing the relative size, in tons, of "Shipments," "Production" and "Availables" (stocks at the first of the month plus production of the month). The first horizontal ruling of the chart above zero is made to equal the monthly average of "Shipments" for the calendar year 1922. The value of each point in all three curves can thus be seen quickly in terms of this average value. The shaded portion indicates by its varying thickness the tonnage of stocks *in excess* of shipping demands.

Note that when the dotted "Production" line falls below the line for "Shipments" that this excess decreases (the shaded strip becomes narrower) and vice versa. Note that at the end of January, 1922, this excess represented over two months' average shipping requirements, that this decreased by the end of September to a little over a half month's supply, but that it gradually in-

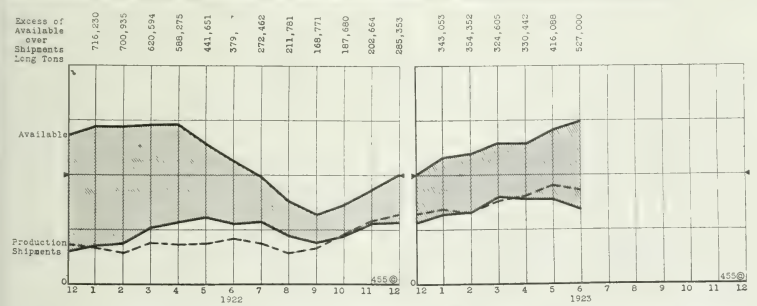


Fig. 1—The Shaded Area Shows That at End of January, 1922, There Was an Excess of Two Months' Average Shipping Requirements, But By Late September the Excess Was Only a Little Over a Half Month's Supply

*Consultant in analysis of business operations, New York.
†Supplied to Department by American Pig Iron Association.

creased to sufficient for a month and a half at the end of June, 1923, in spite of large increases in shipments during those nine months. This means increasing amounts of money tied up in inventory, more than three times as much at the end of June, 1923, as at the end of September, 1922.

Compare now the two charts in Figs. 2 and 3, showing respectively the movements of "Shipments" and "Production" and follow the two trend lines. Note the ever increasing upward movement of production in spite of the flattening out of the trend of shipments, particularly during the six months of the current year. This relationship is specially significant when it is remembered that these trend lines show the "long-pull" tendency rather than the current month movements. A little reflection will make it clear that there is a definite cautionary message here for those who determine production schedules. It may be of interest to point out that the tendencies mentioned were reflected month by month from as early as August of last year, ever since which time the steepness of the upward slope of the production trend has been greater than that of shipments.

It will be of interest also to compare these

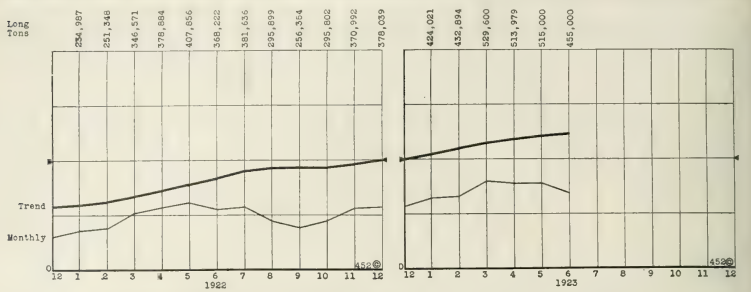


Fig. 2—The Upper Line Shows the Almost Continuous Upward Trend of Shipments

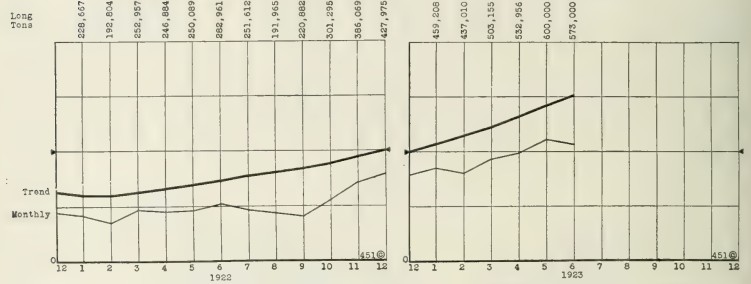


Fig. 3—Compared With Fig. 2, the Trend of Production Shows An Upward Movement Greater Since Early August Than the Trend of Shipments

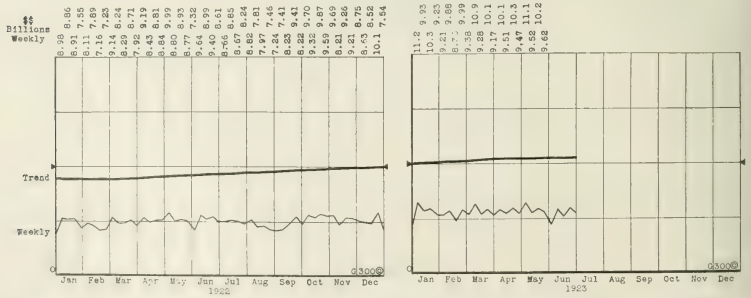


Fig. 4—The Trend of the Buying Activity of the Ultimate Consumer Shows Tendencies With Which Figs. 2 and 3 Should Be Compared

same two trends with that in Fig. 4 of "Debits" as reported by the Federal Reserve Board. These figures of debits to individual accounts represent money over the counters of the banks of the country for individual, industrial and commercial purposes. They reflect quite directly the buying activity of the ultimate consumer and the tendencies shown may well be taken into account by the industrialist when he considers his own production schedules and prices. In the last analysis the man in the street pays for the pig iron produced, and while pig production can be pushed up at any pace the furnace owners desire or can afford, it is well for them to keep a weather eye on what the general public is doing about purchases.

Note the difference in the slopes of production trend and debits trend, particularly during the current year. Note also that the shipments trend is more nearly parallel to debits and shows the same tendency to flatten out in the second quarter of this year.

Every thoughtful industrialist recognizes the economy of steady, uniform production schedules. In the abstract, the stabilizing of industrial activities is conceded to be desirable in the interests of the investor as well as for the benefit of the worker. Despite these facts, however, note the "feast-or-famine" production rates over the relatively short period of eighteen months pictured by the accompanying charts. To be sure, these picture the consolidated results of many independently motivated producers, and corrective action of the group is not so simple as though all were under direction of a single authority. But with the existing development of statistical data and analytical methods much may be accomplished, and with decided savings when the individual establishments apply the methods here illustrated to the current study of their own operations and compare them with the broader tendencies of their group and of the public. A large measure of stabilization of the pig iron industry is possible if the responsible executives desire it.

"How are sales running?" is a frequent inquiry of the executive, and the answer usually comes in terms of this month's or last month's tonnages or dollars of sales. It is more pertinent to ask how the *trend* of sales compares with that of production and with that of shipments. Fig. 5, in comparison with Figs. 2 and 3, not only answers these inquiries but also gives a fair indication of where these factors are heading. The practice of booking orders for future delivery is clearly shown by the sharp peaks of April and December, 1922, and March, 1923, in the monthly curve (thin line) of Fig. 5, and in turn its effect is shown in the irregularity of the trend line. Even with these irregularities to confuse the picture it is clear that there is no warrant in the progress of

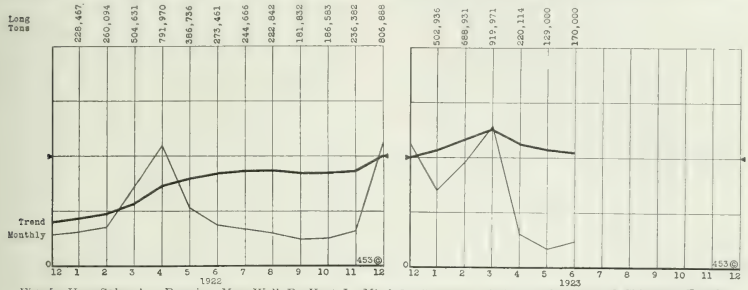


Fig. 5—How Sales Are Running May Well Be Kept In Mind In Connection With Production and Shipment Trends. Figs. 3 and 2.

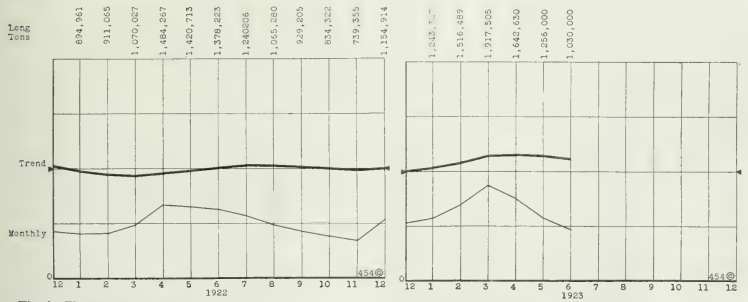


Fig. 6—The Trend of Unfilled Orders May Be Compared With the Trend of General Business Activity Reflected In Fig. 4

"Sales" for the continued boosting of production.

The balance of "Unfilled Orders" is perhaps a better guide than "Sales" in this connection, but if viewed simply from the month-to-month values (thin line of Fig. 6), it is likely to lead one into a too frequent alteration of production plans. The long-pull trend, as shown by the heavy line of Fig. 6, is a safer guide. While this swings slowly up and down during the period covered by the charts, it is less affected by the temporary fluctuations of sales, production and shipments. Comparing its general direction from end to end of the eighteen months it will be seen that it approximates that of the trend of general business activity as reflected in the chart of "Debits" (Fig. 4).

The whole series of pictures here presented suggest not a drastic curtailment of production but rather a steady checking of the increase of production until consumption has more nearly caught up.

The individual operator will, of course, obtain a better guide for his policies by setting up his own statistics of his various company operating factors for comparison with each other and with those of the industry as a whole.

Obviously there are important factors to be considered in the problem other than those that have been mentioned, such as prices, quantities of various grades of product, costs, transportation, ore and fuel resources, the activity of consuming industries, etc., and no analysis is complete which ignores them. The facts above presented, however, do suggest the possibility of securing a greater degree of stability of operation of the industry and offer a means of currently studying its characteristics with a view to making correction where needed.

GERMANY'S MACHINERY TRADE

Continued Shrinkage in Business and in Output Per Worker

(Special Correspondence)

BERLIN, GERMANY, July 5.—The manufacturers of machinery form one of the most important groups in German industry. The number of persons engaged in such manufacture is now estimated at about 700,000. The difficulties with which the producers of machinery have had to struggle since the war from the general political and economic situation have grown daily. The results of work have been diminished in the first place by the sudden introduction of the eight-hour labor day and the resulting disharmony among the various groups in the metal-working industries. The supply of foundry pig iron for castings as well as that of rolled and forged material of every kind has diminished steadily and there have been many disagreeable discussions between the producers and consumers. The uncertainty from the fluctuations in the value of the mark and its rapid depreciation have greatly aggravated the situation. In many cases it was impossible for the manufacturers to fill orders placed at fixed prices. The numerous disputes with the laborers' unions, the increasing wages and the want of skilled workmen and of dwelling houses, the onerous taxes, the decrease of home capital power, the tendency in all parts of the world to increase custom duties—all these circumstances were so many handicaps to the machinery industry in Germany.

The sudden reduction of the capacity of the German iron and steel works after the war brought on the "Eisenwirthschaftsbund," by which under the authority of the Government the production, distribution and prices of all iron and steel products were regulated. This movement paved the way for the voluntary organization of the manufacturers of machinery under the guidance of the Verein Deutches Maschinenbau Anstalten, which was founded some thirty years ago. Under the able secretaryship of Mr. Froelich the membership increased rapidly and comprises now about 1200 firms employing a total of 535,000 persons. The verein is composed of 12 principal groups and 120 secondary groups, comprising all the different branches of the machinery industries. Their common purpose is the representation of all machinery manufacturers and dealers in domestic as well as export trade matters. In a remarkable report presented to the verein at its recent annual meeting these two facts were emphasized:

1. A continuing reduction in incoming orders.
2. A diminution of output per worker.

About 700 establishments have given data showing clearly that the reduction of business which began in 1921 went further in 1922, both in the domestic and foreign trade. Of course, the position of most of the works has weakened considerably.

But still more dangerous for the prospects of the German machinery industry is the fact, to which statistics give ample testimony, that the production per head has decreased in a most remarkable manner. From carefully compiled data it appears that the per capita machinery production in pre-war years was as follows:

1910	6.0 tons	1912	7.4 tons
1911	6.8 tons	1913	7.7 tons

In the time after the war the decline has been to the figures shown below:

First half of 1921	2.2	4.0 tons
Second half of 1921	1.8	
First half of 1922	1.8	3.9 tons
Second half of 1922	2.1	

The causes for this reduction are to be found in the many handicaps mentioned above. There have been complaints also that the lessened production has been due in considerable degree to a lack of good will on the part of the workers.

Pipe Foundries and Pig Iron

In its last issue, *Pipe Progress*, the publication of the American Cast Iron Pipe Co., has this comment on the pig iron situation as related to the cast iron pipe industry: "The big melters, such as the cast iron pipe foundries, are believed to have contracts for iron sufficient for three or four months' operations. The pipe foundries were forced into this position by their customers, as we have stated recently, when self-protection demanded that iron orders be placed as fast as pipe orders were booked. This has turned out to be a fortunate situation, as the most of this iron was contracted for at lower prices than the peak market and pipe prices therefore have not gone as high as the current iron market of the past several months would have seemed to warrant."

The Interstate Commerce Commission in a decision announced last Saturday ordered cancellation of suspended tariffs proposing to increase rates on coke from points in Pennsylvania and West Virginia to Rock Island and Moline, Ill., and Davenport, Iowa, and Omaha. It was proposed to increase the rate from the Connellsville region to the first three named cities from $6.17 to $6.55 per ton. The movement of coke involved is extremely slight.

NEW PROFIT SHARING PLAN

United Alloy Steel Corporation Adopts Amendments Suggested by Experience

A new profit sharing and employee insurance plan was recently adopted by the United Alloy Steel Corporation, Canton, Ohio, under which employees are permitted to share in the profits by the purchase of stock in the corporation, on which they are paid profit-sharing dividends, in addition to the regular dividends, and all employees, whether subscribers for the stock or not, are protected by group insurance. However, those who participate in the profit-sharing plan are given larger insurance protection than the non-subscribers. This makes the plan a combined profit-sharing and insurance plan.

Before adopting the plan the company made a thorough investigation of profit-sharing plans in use by many other industrial companies, and in the preparation of the details of its plan it adopted no particular innovations in profit sharing but selected features of other plans already in use that it regarded as most satisfactory. It is of interest to note in this connection that in the adoption of the new plan the corporation abandoned as unsatisfactory a former profit-sharing plan which rewarded employees who had been in its service for five years, and formulated the new plan with the idea of sharing profits with those who show a special interest in the company, holding that there can be no justification of profit sharing unless it is a means of cultivating and holding a real interest in the company's success and welfare by those participating in the plan.

Mr. Charls Gives His Views

George H. Charls, vice-president and general manager of the corporation, expressed his views regarding profit sharing in the following statement:

"No profit-sharing plan is practical which rewards the employee who shows a lack of interest in the company's welfare in the same degree as one who possesses and manifests great interest and works hard for the company's success. This is the fundamental principle, and any plan which ignores it is surely doomed to failure. Our former profit-sharing plan did this very thing, and those participating were rewarded on the basis of years' service, regardless of special individual interest in work done. Further, those with the corporation less than five years had no opportunity to share, regardless of the amount of interest displayed in its behalf. This plan excluded the majority of the employees in the organization and was discontinued for these reasons."

Under the new plan, a person employed by the company at least three months can subscribe through the company's treasurer for the purchase of shares of the corporation's stock up to an amount equal to one-third of his annual earnings, but not exceeding twenty-five shares. This subscription is entered at the ruling market price. Interest is charged at 5 per cent annually on the balance due on the stock after the employee has been credited with his monthly cash payments and the regular dividends. In case regular dividends are discontinued, the profit-sharing dividend will also be discontinued, but at the same time the 5 per cent interest charged will automatically cease until the dividends are resumed. The stock will be held in trust for the employee until fully paid for. Payments on the stock are to be made at the rate of 50c. per share per month, deductions for these payments being made from the employees' wages.

Stock Held by Trustees

The stock will be held by two or more trustees appointed by the board of directors. The trustees will accumulate for contingent credit upon the purchase price all dividends declared, until the stock is fully paid for and the stock certificate delivered to the purchasing employee. However, the stock certificate will not be delivered to the purchaser before the expiration of four years of continuous employment. The profit-sharing dividend is credited on the number of shares purchased at the rate of $3 per share annually during continuous employment, the par value of the stock being $50, and the payment of this is contingent on the payment of the regular quarterly dividends. Should the employee be in arrears on his regular stock payments of 50c. per share per month, he is not credited with the profit-sharing dividends. Should he be discharged, or leave the company's employ or make application for withdrawal from the plan, he will not be credited with either the profit-sharing or regular dividend.

In case employment with the company ceases for any reason before the stock is fully paid for, all cash payments will be returned, together with 5 per cent interest, the employee losing all claim on the accumulated dividends. All credits under the plan are based on full years of continuous service.

When Employees Are Laid Off

Employees temporarily laid off owing to curtailment or suspension of operations and who return as soon as advised of the resumption of operations are considered as being continuously in the corporation's employ. Employees absent more than six consecutive days are considered as having discontinued their employment. A subscription for stock does not deprive the company of the right to discharge an employee. In case an employee dies before he has paid for his stock and he has continued his employment up to the time of his death or last illness, the corporation will deliver to his beneficiary the number of shares of stock which his cash payments and accrued dividends will pay for. In case of total disability due to accidental injury sustained while engaged in work at the plant, a similar settlement will be made with the employee. The corporation reserves the right to amend the plan or to terminate it altogether at the end of any year. In that event settlement will be made with each employee under the terms governing withdrawal.

Under the plan if an employee subscribes for stock at $40 per share and makes regular payments and is credited with $2 per share regular dividend and $3 per share profit-sharing dividend per year, and is charged 5 per cent on the balance due on stock subscription, the total cost of the stock will be $21.90 per share.

Under the insurance plan, the company insures the life of its employees for $500, but in case the employee is a subscriber to the stock, the insurance is increased to $1,000. This amount is further increased to $1,500 should the employee stockholder have been in the corporation's continuous employment for more than five years.

The profit-sharing plan was placed in effect April 1, and during the first three months under its operation over 2700 employees, or approximately 30 per cent of the total employees, subscribed for stock, their subscriptions aggregating over 45,000 shares.

Invitations have been issued by the New England Coal & Coke Co., Boston, to members of the New England Foundrymen's Association, for a cruise about Boston Harbor and an inspection of the company's foundry coke plant at Everett, Mass. The invitation is extended in cooperation with the association's regular August meeting on Wednesday, Aug. 8. W. J. Lavelle, manager coke sales, is in charge of arrangements. Entertainment includes a buffet luncheon during the harbor trip and a shore dinner at the City Club, Boston, following the inspection of the Everett plant.

The Otis Steel Co. expects to place its new hot strip steel mill in operation in August and its cold-rolled strip mill in September. Its new open hearth plant will not be ready for operation until the first of the year.

The Canadian Pacific Railway Co. has placed an order with the Algoma Steel Corporation, Sault Ste. Marie, Ont., for 35,000 tons of rails. The order, it is understood, will be sufficient to keep the rail mill busy until the end of September.

EMPLOYMENT AND WAGES

Some Increase in Car Building and in Iron and Steel—Wage Drop in Automobiles

The U. S. Department of Labor through the Bureau of Labor Statistics has presented reports concerning the volume of employment in June, 1923, from 6441 representative establishments in 50 manufacturing industries, covering 2,251,565 employees whose total earnings during one week in June amounted to $60,066,469. Identical establishments in May reported 2,251,037 employees and total payrolls of $60,409,157. Therefore in June, as shown from these unweighted figures for 50 industries combined, there was an increase over May of less than one-tenth of one per cent in the number of employees, a decrease of 0.6 per cent in total amount paid in wages, resulting in a like decrease in the average weekly earnings.

In metal working lines, an increased employment of 2½ per cent is indicated in iron and steel and of 2.9 per cent in car building, comparing the returns for June and May. An increase of 1 per cent is shown in foundries and machine shops and a decrease of ½ per cent in automobiles. Practically stationary wages are shown except in the automobile industry, where the amount of payrolls was lower in proportion than the number of employees. The information tabulated is as follows:

Periods	Number of Establishments	Number of Men	Week's Payroll	Average Weekly Pay
Iron and Steel:				
May, 1923...	166	211,024	$6,390,933	$30.28
June, 1923...	166	216,264	6,487,863	30.00
June, 1922*..	111	120,871	2,605,603	21.56
Automobiles:				
May, 1923...	180	263,216	8,925,870	33.91
June, 1923...	180	261,968	8,474,064	32.35
June, 1922*..	37	109,090	3,560,005	32.64
Car Building and Repairing:				
May, 1923...	187	147,739	4,419,380	29.90
June, 1923...	187	152,026	4,571,820	30.07
June, 1922...	57	45,216	1,259,580	27.85
Foundry and Machine Shops:				
May, 1923...	451	126,658	4,054,644	29.67
June, 1923...	451	137,960	4,123,064	29.88

*As present reports cover many more plants, the June, 1922, figures are of interest only as indicating changes in wage rates.

OLD AND PROGRESSIVE

Ninety-Fifth Anniversary of Morris, Wheeler & Co. Is Celebrated

The house of Morris, Wheeler & Co., Philadelphia, has just observed its ninety-fifth anniversary. Founded in 1828, the business was carried on for 90 years at 1608 Market Street, then removing to its present location at Thirtieth and Locust Streets, where the plant covers five acres, over four of which are under roof. An extensive description of the company's warehouse and equipment appeared in THE IRON AGE of Feb. 24, 1921.

The business was founded by Israel Morris, the grandfather of William P., Frederick W., Jr., George L., C. Christopher and Reginald H. Morris, given in order of seniority, who with Andrew Wheeler now compose the active members of the company. Mr. Wheeler's father, Andrew Wheeler, entered the business in 1847, remaining until his death in 1904. In 1884, his son, the present Wheeler representative, entered the business, and became a partner in 1892. The treasurership of the American Iron and Steel Association was in the Wheeler family for more than 40 years. Andrew Wheeler, Sr., succeeded his brother in the office and was in turn succeeded by his son.

In dealing with its employees, the personal element has figured strongly with Morris, Wheeler & Co. With the flight of time and as the business grew to larger proportions there have been changes, of course, but many "old timers" are on the payroll and others are on the pension list of the company. Two now in the service have been active for 45 years, and several have been in the same employ over 40 years. In addition to carrying those who have served long and well on its pension list, the company also carries for its people group insurance covering the entire establishment. This is in addition to State insurance. The group insurance referred to grows in value each year, reaching its maximum at the end of ten years.

Members of the company are diffident in speaking of its long and successful history, but they nevertheless treasure the legacies of the past, as evidenced by some framed documents in the fine offices of the company. One testifies how the company in 1851, at the "Exhibit of the Works of Industry of All Nations" in London, England, was given an award for excellence in iron boiler plate, then made by the company. (It still owns the plant at which the boiler plate was made.) The certificate of award was signed by Prince Albert, Consort of Queen Victoria. Another interesting document is a letter signed by Millard Fillmore, then President of the United States, notifying the company that it had been honored by the British exhibit.

Other examples are early bills of lading, one of which had been sent to the company by a customer of 50 years' standing. This bill of lading looks like a small handbill, and has a picture of a locomotive on it. Needless to say the Pennsylvania Railroad does not bother with such details today. Another, dated Aug. 7, 1832, records the shipment of 16 tons of "cast" and "blister" steel on the good ship Monongahela, from England, the total valuation being £52 0s. 6d.

A very considerable part of the company's business is in structural steel, while it carries large stocks and does a notable business in soft, refined and Swedish iron, C. R. steel, bands, hoops, plates, shapes, sheets, tubes, rails, welding rods and all else that a large steel warehouse may be expected to have on hand.

Wheeling Steel Corporation Did Well in First Half of Year

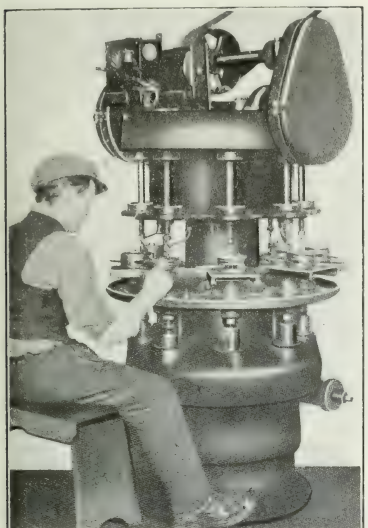
Wheeling Steel Corporation, in the six months ended June 30 last, earned net profits of $2,792,326 and, after providing for the dividends for the period on the preferred A and B stocks, carried to the surplus, $2,055,073. The balance over the preferred dividend requirements was equal to 4 per cent on the common stock. The report is the best the corporation has made since organization three years ago, notwithstanding that the earnings did not reflect in full the benefit of production from several of its new mills included in the large construction program and which have not yet been completed. Among the latter are included the rod and wire mill at Portsmouth, Ohio, which was started on April 23 and which it is announced will have enough trained men to operate it in full within three or four months. The company did not have the benefits from the large expenditures for additions and improvements that have been made at the Steubenville Works, which were undertaken so that the works would supply the Yorkville, Beach Bottom, Whitaker and Martins Ferry mills with sheet and tin bars.

The statement also indicates the management has continued its policy of creating very substantial reserves for depreciation and other purposes. Announcement also is made that in future a statement will be mailed stockholders showing the result of each quarter's operations. The present statement follows:

Total income after deducting provisions for repairs and maintenance of plants, etc.		$4,829,019
Provision for general depreciation	$1,411,671	
Provision for exhaustion of minerals	145,085	
Interest on bonds and borrowed money	479,937	2,036,693
Net profit for the six months		$2,792,326
Surplus Jan. 1, 1923		$6,010,902
Net profits for six months		2,792,326
		$8,803,228
Deduct: Dividends		
On pref. A stock, 2½ per cent	$32,745	
On pref. B stock, 3½ per cent	704,509	$737,253
Net surplus at June 30, 1923		$8,065,975

Continuous Drilling Machine

An eight-spindle continuous drilling machine here illustrated is being marketed by J. W. Brown, Jr., 101 South Thirteenth Street, Philadelphia. The carrier containing the spindles and work tables rotates continuously around the column. There is a table for each spindle and they move with their centers always in line.



The Spindles and Work Rotate Continuously Around the Column. During each revolution of the carrier, each table drops clear of the drill and the work is removed

During each revolution of the carrier each table drops clear of the drill and is again raised and fed to the drill. The operator is stationed at the side of the machine at which the tables drop, and as the tables drop he removes the finished piece and replaces it with one to be machined. In many cases the automatic jig, which is a standard extra for the machine, is employed to clamp the work. Tools for successive operations are mounted in sequence in the spindles, and the operator advances the piece one spindle as it comes to him until the piece is finished.

The spindle drive is from a pair of spur gears on the right-end of the pulley shaft to a bevel pinion and a combined bevel and spur gear. Spindle speeds are changed by varying the ratio of the spur gears. The carrier is driven from the left-end of the pulley shaft through the change gears, planetary gearing, a second bevel pinion and bevel gear. The speed of the carrier is changed by means of change gears. The smallest member of the planetary gearing is 5 in. in diameter. For the feed a roller is provided at the bottom of each table plunger, the roller riding on a fixed cam. The cam shape determines the feed. Individual adjustment of the table is made by the right-and-left stem, which extends through both parts of the table plunger. Simultaneous adjustment of all tables is made by rotating the large nut on the table by means of the crank shown.

The depth of hole drilled with standard cam is 1 1/16 in. The capacity in cast iron is ¾ in. diameter and ⅝ in. in 0.40 corbon steel. The maximum diameter in facing 1/16 in. cast iron is 1½ in. and in steel 1¼ in.

The spindles are 1 5/16 in. in diameter and take a No. 3 Morse Taper. The distance from the spindle to the top of table when table is at highest point of the cam is 16 in. maximum and 6½ in. minimum. The distance from center of spindle to column is 6½ in. and from center to center of spindles in circle is 9 in. The maximum height of the table from the floor is 39 in. The pulley is 12 x 4 in. and runs at 1200 r.p.m. The total cam movement is 2 in. All gears are cut from the solid. Shafts are of 0.40 carbon steel and spindles are of 0.80 carbon steel and mounted in ball bearings. Lubrication is amply provided for and all gears and moving parts safeguarded. A tapping attachment and cluster drill heads are available as extras.

The floor space required is 3 x 4 ft., and the weight is 3000 lb. The power required ranges from 5 to 15 hp. according to character of the work.

Ocean Freights to Pacific Coast Points to Be Advanced

The Atlantic Inter-Coastal Steamship Conference has agreed on a general advance in ocean freight rates from Atlantic to Pacific ports, via the Panama Canal, effective Aug. 1. The advance on iron and steel in most cases is 5c. to 10c. per 100 lb. and in a few instances 15c. and 20c. The present rail rate from Pittsburgh to New York per 100 lb. is 34c., to Baltimore 31c. and to Philadelphia 32c. The present ocean rate from New York, Baltimore and Philadelphia to any of the Pacific Coast ports is in most cases 30c. per 100 lb. The new rates effective Aug. 1 will be as follows per 100 lb.:

	Rate
Steel bars, bands, hoops, rods (eliminate shafting)	0.40
Reinforcing metal, concrete, lathing, flooring, woven wire fencing	0.60
Billetts, blooms, ingots, muck bars (eliminate steel scrap)	0.40
Bolts, nuts, rivets screws, washers	0.40
Castings, forgings, molds; wheels, sprocket	0.50
Boiler ends and heads, plates (eliminate plates and sheets, Nos. 12 to 16 gage)	0.40
Plates and sheets, No. 12 or lighter gage	0.50
Manganese; silicon (ferro) (eliminate pig iron)	0.40
Pig iron	0.35
Pipe (other than coils), iron or steel (not over 12 in. in diameter but over 20 ft. long, but not exceeding 40 ft.)	0.55
Over 12 in. in diameter 2½c. per 100 lb. additional for each additional inch.	
Nails, spikes, wire, staples	0.40
Nails, horseshoe	0.40
Plates, shapes and bars, bent or not bent, punched or not punched, angles, channels, plates	0.40
Structural iron or steel, fabricated (eliminate unfabricated)	0.55
Rails, steel ties—Will not apply on rails exceeding 36 ft.; rails over 36 ft. and not exceeding 60 ft., 10c. per 100 lb. additional	0.40
Bars, bolts, fastenings, base plates, track spikes, tie rods	0.40
Tin plate—In boxes strapped (eliminate in crates)	0.40

All rates apply on pieces or packages not exceeding 30 ft. long, except as otherwise provided. Pieces or packages over 30 ft., but not exceeding 60 ft., subject to additional charge of 10c. per 100 lb. Over 60 ft. special arrangements must be made. Minimum C. L. weight as per official classification.

Standard Sanitary Mfg. Co.'s New Plant at Baltimore

The Standard Sanitary Mfg. Co., Pittsburgh, manufacturer of bathtubs and similar articles, plans to begin work on the foundation for the first unit of its plant to be erected on Fifth Avenue, near Camp Holabird, Baltimore, about Sept. 1. The first unit, which will be the enamelware plant, with equipment, etc., will cost about $3,000,000. No definite plans have been made for the two additional units. H. Diescher & Sons, Pittsburgh, are the engineers in charge of the work.

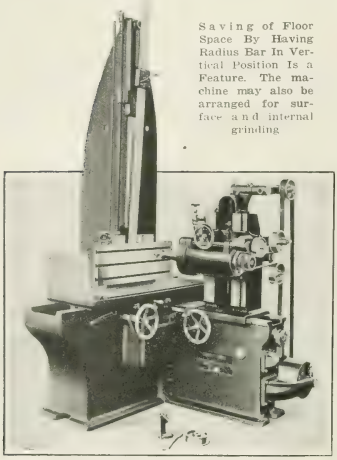
The plant is to be one-story, 2100 ft. long with some of the buildings 200 ft. and others 175 ft. wide. It is hoped that the plant will be ready for operation in the spring of next year.

Theodore Ahrens is president of the company and W. C. McKinney is vice-president in charge of manufacture.

Radius, Internal and Surface Grinder for Railroad Shop Work

Wide adaptability in railroad shop work is claimed for the heavy duty radius, internal and surface grinder illustrated, which recently has been placed on the market by the Rockford Milling Machine Co., Rockford, Ill. The saving in floor space by having the radius bar in a vertical position, as shown, is an outstanding feature.

The machine has a capacity for grinding radii from 18 to 100 in. The pendulum motion is independent of the rest of the machine, and may be detached or the radius bar swung out of the way, if desired. This arrangement permits using the machine as a horizontal surface grinder. A standard spindle is provided for radius link grinding and light surface grinding. Provision is made for internal grinding, planetary motion to the spindle being through gearing which is adjustable in the spindle head while in motion. For heavy surface grinding the standard spindle may be replaced by another designed for that purpose.



Saving of Floor Space By Having Radius Bar In Vertical Position Is a Feature. The machine may also be arranged for surface and internal grinding

The base is made up of two heavy castings provided with wide bearing surfaces for the horizontal table and spindle column. The vertical column for the radius bar is bolted to the back of the base; this column serves also as a motor bracket for the motor driven machine. The column is 130 in. high and the radius bar, 1 x 3 in. wide, is graduated in ¼ in. and is conveniently adjustable from the operating position by means of a handwheel.

For radius grinding the work is held in the vertical table which is secured to the radius bar. This table measures 12 x 36 in. and is controlled in its reciprocal motion by the horizontal table to which it is clamped. The horizontal table is 16 x 48 in. and has a longitudinal feed of 50 in., either hand or power feed in either direction. The reciprocating motion is automatically controlled. The tables are guarded from dust and grit.

The mounting of the spindle column and spindle head may be noted from the illustration. The column has a horizontal movement of 14 in., obtained by hand, but power feed may be provided. The spindle head has vertical adjustment of 20 in. on the spindle column. The spindle runs in ball bearings and means are provided to take up wear. Sleeves of different sizes may be applied. The driving sleeve is also connected in the housing by an eccentric spindle, providing a planetary motion for internal grinding, which can be increased up to 1¾ in. larger than the diameter of the wheel.

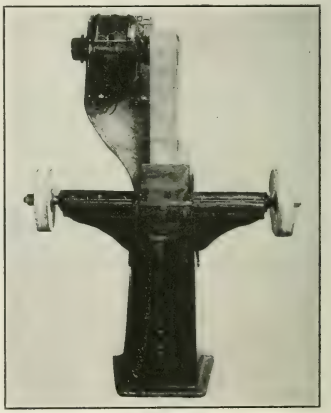
Motor drive is recommended, a 7½-hp., 1200-r.p.m., motor being used. A jack shaft may be furnished or the machine may be driven from the line shaft. Regular equipment includes oil pump, spindle with planetary motion for hole grinding, splash guards for the table, and a diamond holder. Heavy surface grinding spindle, power horizontal movement to the spindle column, and motor drive arrangement are extras.

The height of the machine is 12 ft. 2 in. and the floor space occupied 81 x 114 in. The weight is 6800 lb. net.

Polisher with Overhead Motor Drive

Grinding and polishing machines of the St. Louis Machine Tool Co., St. Louis, are being equipped with motor drive arranged as shown in the accompanying illustration of the company's No. 7 polisher. Ball and roller bearings are also now available for the spindles.

The motor is carried on a bracket which is bolted to the rear of the pedestal. Having the motor out of the way of the operator and the saving of floor space are among the advantages claimed for this arrangement. It is also said to prevent damage from dirt and dust that usually accumulates around a motor that is placed upon the floor, and to protect the motor from abrasive dust that frequently finds its way into a motor mounted on the spindle of the machine. There are four sets of bearings, two close to the pulley and two close to the wheels. Parts are said to be easily disassembled when it is desired to inspect the bearings.



Overhead Mounting of Motor Is a Feature

It will be noted that the base of the machine illustrated is wider at the front than at the back. The difference in width is 4 in. The flare toward the back gives extra footing on the floor and the belt pull being toward the rear, the arrangement tends to make the machine stand more solidly. The width of the front does not interfere with the operator's feet.

The machine may be equipped with belt guards of the type shown, or the top of the column may be closed if it is desired to drive the spindle by belt from a shaft below the floor. Tight and loose pulleys may be mounted on the spindle when the drive is directly from the line shaft. The tight and loose pulley machines are provided with rack and pinion belt shifter.

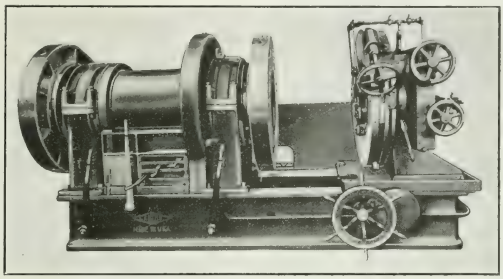
A McKee revolving distributer is to be installed on the No. 3 Hazelton blast furnace of the Republic Iron & Steel Co., Youngstown, by Arthur G. McKee & Co., Cleveland.

Pipe Threading and Cutting Machine

The Landis Machine Co., Waynesboro, Pa., has added to its line an 18-in. pipe threading and cutting machine, the range of which is 8 to 18 in., and covered by one die head and one set of chasers.

The machine has a single pulley drive and is provided with eight speeds, which are obtained by means of a speed box located beneath the main spindle. A friction clutch is mounted on the main drive shaft with the pulley, or if driven by electric motor a chain sprocket may be substituted for the pulley. The operating cone of the clutch is moved by two levers located at the ends of the head stock within easy reach of the operator. The forward lever is used for starting and stopping when making up flanges. The lever in the middle is for reversing.

Gears are inclosed and, with the exception of the main driving gear and its pinion, they run in oil. The main bearings of the hollow spindle are lubricated with flat link chains which run in oil in reservoirs provided in the base. The driving pinion shaft and the reverse shafts are lubricated by sight feed oilers.



Machine for Threading and Cutting 8 to 18-In. Pipe. The entire range of the machine is covered by one diehead and one set of chasers

At each end of the hollow spindle there is a three-jawed independent chuck for holding the pipe during operation. The rear chuck is equipped with flange grips for fitting flanges.

The carriage which supports the die-head, the cutting off and the reaming tool is moved either by power or by hand. Power traverse is both forward and backward and is controlled by a lever located on the operating side of the carriage. In advancing the carriage toward the chuck, the lever is pulled and held until the threading position for the die is reached. In reversing the movement of the carriage, the lever is pushed forward and held. Releasing the lever stops the carriage at any point within its travel. Automatic stops prevent the die-head from coming in contact with the chuck in the forward movement and the carriage from running off the guides in the backward movement. The reaming tool may be quickly set to position and locked with a lever.

The length of the machine is 12 ft. 2 in., the height is 6 ft. The extreme width of the belt driven machine over the pulley is 5 ft. 10 in. and the width of the motor driven unit over the motor plate is 6 ft. 8 in. The weight is 22,000 lb. In the motor driven machine the motor is mounted on a base over the gear box.

The Youngstown Boiler & Tank Co., Youngstown, has booked a total of 75 55,000-bbl. oil tanks for the Corsicana field in Texas, all for comparatively early delivery. The tanks are going forward at the rate of three or four a week. This construction calls for about 11,000 tons of steel plates, which are being rolled by Mahoning Valley mills. Heavy production of oil calls for additional storage capacity and tank makers generally are having a heavy run of business at this time.

The Union Mfg. Co., New Britain, Conn., has been awarded first prize, a gold medal, by Brazil, for an exhibit of chucks at the South American Exposition.

Accidents at Coke Oven Plants

Statistics compiled by the Department of the Interior, through the Bureau of Mines, show that accidents at coke ovens throughout the United States during the calendar year 1922 resulted in the death of 29 men and the injury of 1710 employees. Of the fatalities reported, eight occurred at bee-hive coke ovens and 21 at by-product ovens. Injuries, involving a minimum of one day's disability, at beehive ovens amounted to 474, while the number reported from by-product ovens is 1236.

The injury rate at both bee-hive and by-product ovens was lower in 1922 than in 1921. The fatality rate for bee-hive ovens was also reduced, but the rate for by-product ovens increased slightly.

At bee-hive ovens 98 men out of every 1000 employed sustained injuries, as compared with 119 the year before. The fatality rate at bee-hive ovens was 1.66, a reduction from the 1921 figure of 1.76. For by-product ovens the injury rate was reduced from 138 in 1921 to 92 in 1922, while the fatality rate rose from 1.09 to 1.57. These rates are based upon a unit of 300,000 shifts, which is equivalent to 1000 men working 300 days.

Reports to the Bureau of Mines from both bee-hive and by-product ovens showed a total of 19,278 men employed, each man averaging 284 days of work, the volume of work by all employees being 5,470,939 man-days. Comparing these figures with 1921, they indicate an increase of 19 per cent in the number of employees, an increase of 10 per cent in average work days per man, and 31 per cent in total number of shifts worked in the entire industry.

Most of the accidents occurring at bee-hive ovens were due to falls of persons, cars and motors, burns, falling objects, coke-drawing machines, hand tools and nails and splinters.

At by-product ovens 21 employees were killed and 1236 injured, the principal causes of accidents being falls of persons, burns, falling objects, hand tools, cars and motors, nails and splinters and coke-drawing machines, in the order stated.

Machine Tool Exhibit in New Haven Again This Year

The New Haven branch of the American Society of Mechanical Engineers has decided to hold another machine tool exhibit at the Mason Laboratory, Yale University, Sept. 18, 19, 20 and 21. The 1922 exhibition had 135 exhibits and was attended by over twelve thousand people.

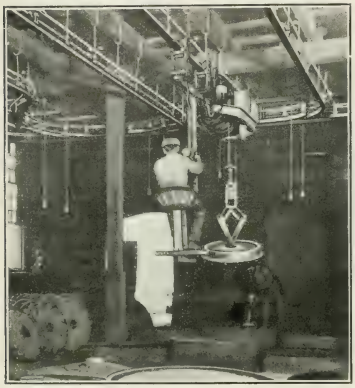
The exhibition will be held again under the joint auspices of the New Haven branch of the A. S. M. E. and the Engineering School of Yale University. The exhibition is intended as a cooperative effort to show the best equipment and methods for the benefits of manufacturers, engineers and the engineering school.

A program is promised to include papers by leading authorities and motion pictures of methods and processes. Information regarding the exhibition may be obtained from the New Haven branch of the American Society of Mechanical Engineers, Mason Laboratory, 400 Temple Street, New Haven, Conn.

Tramrail System in Car Wheel Foundry

Efficient handling of material and reduced labor costs are expected from the tramrail system recently installed in the foundry of the Standard Car Wheel Co., Cleveland. It does the handling from the time metal leaves the cupola until the car wheels are delivered to the sand blast for the final operation in the plant. The conveying system is partly hand and partly electrically operated.

The cupola at the side of the molding room is tapped into a 5-ton bull ladle from which 1-ton pouring ladles are filled. The latter are carried over the molding floor by a hand-propelled trolley to which an air hoist is attached. Over the foundry floors are six 1-ton hand-operated trolleys equipped with air hoists. These operate on six straight-line tracks that extend down



Electric Hoist and Traveling Conveyor Delivers Castings to the Soaking Pits. It also takes the wheels from the pits to the storage floors at the left

to a transverse aisle near the lower end of the foundry, adjoining the soaking pits. Car wheels are lifted from the molds by means of tongs suspended from the air hoist and are carried by a hand trolley down to the transverse aisle. While still suspended from the hoist the riser is knocked off. The wheel is then transferred to another trolley by means of a rod and chain attached to the air hoist of this trolley. The track of this transverse trolley extends the length of the aisle and curves around beneath an electric conveyor that serves the soaking pits. The wheel is dropped on the floor beneath the latter conveyor and the core is knocked out.

There are four rows of soaking pits and above each row a tramrail on which runs a 1-ton electric hoist and electric carrier operated from a platform attached to the conveyor. Two of these carriers are provided for handling wheels to and from the soaking pits. After the core is knocked out the electric hoist lifts the wheel with scissor-type tongs that are inserted in the bore and carries it to a soaking pit. From the soaking pits the electric hoists convey the wheels around to a storage floor in the adjoining bay, and from storage to a sand blast machine at the end of the bay, from where they go to the storage yard.

Three electric carrier tracks are provided in the storage bay. The various conveyor tracks are connected with switches and crossovers as needed to make the system complete.

With the conveyor system the whole soaking pit unit is handled by three men. One man transfers the wheel from the air hoist, that brings it from the foundry floor, to the hand-power hoist operating in the aisle and pushes it to a soaking pit floor where the second man knocks out the core and hooks the wheel on to the electric carrier. The third man operates the electric conveyor and places the wheel in the soaking pit. The conveyor system handles a production of 250 car wheels per day.

The tramrail installation was furnished by the Cleveland Crane & Engineering Co., Wickliffe, Ohio. The air hoists were supplied by the Curtis Pneumatic Machinery Co., St. Louis.

Spiral Fluted Tap

A tap known as the Threadwell is being marketed by the Wells Corporation, Greenfield, Mass. It has right-hand spiral flutes, the cutting action of which, like a twist drill, is said to be designed on the same "shearing" principle as a properly ground lathe tool. Each tooth has a positive rake that "cuts" the metal. Each cutting edge has three points of clearance; rake angle of spiral, rake angle of hook in flute and clearance due to relief. These are said to be similar in effect to the three points of clearance in a lathe turning tool known as the back rake, side rake and undercut clearance.

The right-hand spiral, as in a twist drill, is said to curl the chip and propel it upward through the flute and "out" of the hole with a propelling action similar to that of a spiral conveyor, and without jamming or wedging of the chips. This feature is emphasized as an advantage in machine tapping, as the spiral flute tap does not need to be backed out to loosen the chips, but taps out the hole in one continuous forward motion. This chip conveying action is also emphasized as an advantage in tapping out "blind" holes. The spiral flute design is claimed to eliminate the necessity for a set of taper, plug, and bottoming taps. Unless otherwise specified the tool is made with a short "plug" chamfer, and will tap all except "blind" holes where a full thread is necessary clear to the bottom. In this case a very short chamfer is ground on the tap, and this together with the advantages described is said to make the tool of unusual value as a "bottoming" tap.

The chamfering of the tap is a feature. In addition to eccentric relief, an extra chamfer is given at the point where the taper and straight parts usually meet. Easy starting is a feature. The edges of the starting or chamfered threads are rounded over and sharp corners taken off. This narrows the tooth and is intended to permit the thread to catch quickly without reaming. The tap has a factor of safety of eight, which is pointed to as due not only to the shearing design of the teeth, which eliminates much of the cutting strain, but also



Spiral Fluted Tap The chip conveying action is a feature

to the rigidity of the tool which has a less number of flutes and stronger lands than commonly found. Rigidity of the lands is said to prevent thread binding under torsional strain, also to make the tap less liable to spring in working and permit it to hold its size and lead in any material.

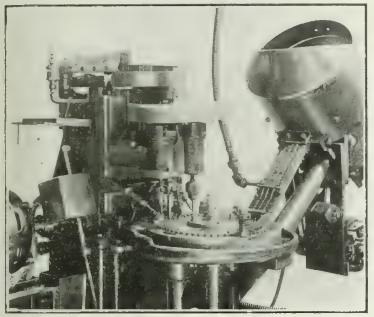
Unusually complete information about steel joist construction is furnished in a 32-page booklet entitled "Truscon Steel Joist Data Book," issued by the Truscon Steel Co., Youngstown. A series of photographs of buildings in which steel joists made by the company are installed composes the first part of the booklet. There follow tables of properties of various kinds of joists and channels, tables of safe loads on several types of joist construction, weights of joists and building materials, coefficients for deflection, and tables of safe stresses. The last part of the booklet is devoted to specifications for the company's joists and detailed information about all kinds of steel joist construction, with numerous drawings, photographs and tables.

Dial Fed Tapper Equipped with Hopper

The dial-fed multiple-spindle tapping machine of the Anderson Die Machine Co., Bridgeport, described in THE IRON AGE of Jan. 26, 1922, is now available equipped with automatic hopper feed as illustrated, for tapping knurled battery nuts.

The hopper is driven by an independent motor, the purpose of which is to fill the three chutes or runways leading from the hopper to the dial, previous to starting the machine for the tapping operation. The mouths or exits from the hopper are arranged so that the nuts may leave the hopper only in one way, turned upside down for the tapping operation. A series of hooks or ejectors, arranged on the inside of the rotary plate that forms the bottom of the hopper, serve to dislodge nuts that have the opposite end turned up and which tend to obstruct the feeding of nuts that are properly turned.

When the indexing dial is stationary, the lower



Multiple Spindle Tapper with Automatic Hopper Feed for Taping Battery Nuts

end of the chutes aline with the openings in the dial, and the nuts are fed by gravity into the proper openings in the dial. As the dial indexes a gate provided closes the lower end of the chutes, which prevents nuts from projecting beyond the proper point and obstructing the free rotation of the dial. This gate is timed and is actuated by the movement of the dial itself.

The ratchet, spacing the dial, has 18 teeth, and for each of these there are three openings, or 54 stations, around the dial. For each stroke of the machine three nuts are tapped. The nuts are clamped in the tapping position by means of the cam mounted on the vertical camshaft of the machine. A roll and plunger with bracket forms standard equipment. From the plunger there is a series of three clamping jaws, the two side jaws being operated by means of a toggle.

The operating member of the toggle gear is secured in a floating position on the plunger operated by the cam. In this way variation in the diameter of the nut is compensated for. The central or third position is clamped by a jaw which is mounted directly on the plunger that provides the movement for the clamping jaws. The timing of the cam for accomplishing this is, of course, adjusted to suit the various other movements and functions of the machine.

The ejector is made up of three fingers mounted on a bracket which moves up and down with the taps. They are arranged to swing outwardly and if necessary force the nut out of the dial.

The machines are timed to run 40 strokes a minute, producing theoretically 120 pieces a minute or 7200 an hour. It is claimed that in actual use three of the machines, running on a 20-hr. per day schedule, have tapped from 375,000 to 421,000 pieces.

Need of Technically Trained Men in Steel Industry

President Eugene G. Grace of the Bethlehem Steel Co., in the August issue of what is known as Lehigh Leaflets, published by Lehigh University, Bethlehem, Pa., will contribute an article on steel and research. From an advance copy of the article the following extracts have been taken:

Today we are witnessing production of iron and steel at an ascending rate which, if continued for the span of but one generation, will yield more tons, it seems fair to say, than have been made since man appeared on the earth. This prospect invites, as never before, improvements, however small, in processes and materials.

One of the needs of the industry, always present, is men technically trained along practical lines. The highly theoretical engineer can accomplish but little in a manufacturing organization and it is generally necessary that the college graduate gain five or ten years' practical experience before he is found of real value. This is due, many times, to his having been trained along theoretical lines only.

Our increasing knowledge of iron and its alloys has not brought us to the end of the path. Rather it has widened an ever receding horizon beyond which lie unsolved problems in chemistry, electricity, metallurgy, microscopy, mechanics and many other fields, all inviting continuing and expanding research.

New Copper Rod and Wire Mill in Chicago

The Brenner-Moxley-Mervis Co., whose temporary address is in care of the American Insulated Wire & Cable Co., 954 West Twenty-first Street, Chicago, has awarded contract for the first unit of a plant for the manufacture of copper rods and drawn copper wire. The company has bought an eight-acre tract of ground at Kedzie Avenue and the Chicago Drainage Canal. The first unit, to cost approximately $500,000, will have a frontage on Kedzie Avenue of 116 ft. and a depth of 338 ft., and will be in operation in September. Other units will be built as the business of the company expands, the ultimate expenditure for plant and equipment to be about $6,000,000. Present plans call for the consumption of 10,000,000 lb. of copper annually.

The new company is headed by Nathan T. Brenner, president of the American Insulated Wire & Cable Co. The vice-presidents are William J. and George T. Moxley, who are officers of William J. Moxley, Inc., manufacturer of margarine. N. T. Brenner, Jr., and Meyer B. Mervis, both with the American Insulated Wire & Cable Co., are treasurer and secretary, respectively, of the new company.

Copper rods and wire are not now extensively manufactured in the Central West, most of the existing plants being located on the Atlantic Seaboard or in Montana.

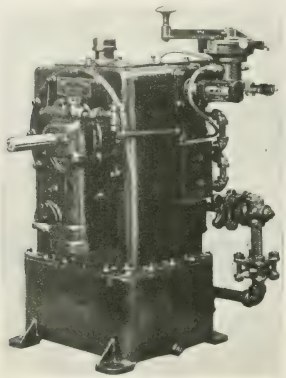
Final details of the sale of the Damascus Brake Beam Co., Cleveland, to the American Steel Foundries has been concluded, and the Cleveland plant has passed to the control of the latter company, but will continue to be operated under its old name as a separate unit. Three members of the old board have been elected to the new directorate, which will be headed by R. P. Lamont, president of the American Steel Foundries. The directors to remain are S. Livingstone Mather, John J. Stanley and H. C. Robinson. Mr. Lamont will be chairman of the board, and other officers and directors of the Damascus company will be R. H. Ripley, president; F. E. Patterson, vice-president, and A. E. Adamson, formerly secretary and treasurer of the Damascus company. Mr. Ripley is vice-president of the American Steel Foundries and Mr. Patterson is secretary and treasurer of that company. The American Steel Foundries acquired control of the Damascus company through an exchange of stock, the Chicago company giving 1½ shares of preferred stock for each share of Damascus common stock.

New Pump for Hydraulic Presses

A variable-delivery pump designed primarily for use with hydraulic presses but adaptable also to other service has been placed on the market by the Oilgear Co., Milwaukee. The new unit, which is designated as type W, has a maximum capacity of 3060 cu. in. per min. and maximum working pressure 1000 lb. per sq. in.

Steady flow of oil free from pulsation is a feature claimed. The amount of oil delivered to the press cylinder is controlled by means of a single lever attached to the stroke-changing mechanism through a hydraulically-operated control cylinder. The instantaneous response to the control handle is emphasized.

The essential parts of the new unit are similar to those of the company's type QC control pump previously described. These parts include the revolving driver carrying the cross heads and plungers, the cylinder barrel and plungers, the ground ported pintle upon which the cylinder barrel rotates, and the swinging arm by means of which the revolving barrel may be shifted relative to the driver, in order to regulate the length of the pump stroke. The assembly of the



plungers and cross heads differs from that in the type QC in that the plungers are closely coupled to the cross heads. This is intended to provide a suction action that makes it unnecessary to depend on a large auxiliary gear pump. The type W is equipped with a small gear pump to keep the running parts well lubricated and to operate the control cylinder.

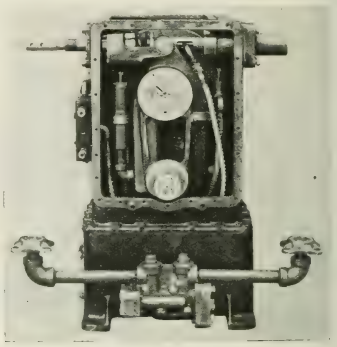
Hydraulic control for regulating the stroke of the main pump consists of a double-acting hydraulic cylinder and a piston which is attached to the stroke-changing arm by a cross yoke and two links. These are arranged so that a heavy spring holds the pins at all times against one side of their bearings in the links, cross yoke and arm, thereby preventing play in the joints. Oil pressure to the control cylinder is regulated by a small balance piston valve that admits oil to one end of the cylinder and at the same time permits it to flow from the opposite end. This construction is said to provide a hydraulic dashpot which holds the arm rigid in any position.

Oil is delivered from the ports through the passages in the main pintle down through one of the two passages provided in the casting which forms the arm on which the pump unit rotates. When oil is flowing down through one passage it is being drawn up through the other. The direction of flow in these passages depends on the direction of flow of oil from the pump. The oil passages in the arm communicate with suitable passages in the lower pintle and these in turn with the delivery and intake pipes. An automatic two-way valve is provided to assure proper direction of flow of oil to and from the sump.

Another South African Steel Merger

Proposed amalgamation of the South African Iron & Steel Corp., Ltd., and the Newcastle Iron & Steel Co., Ltd., is reported to the Department of Commerce by Consul C. J. Pisar, Capetown. Announcement of the proposed merger followed shortly upon the amalgamation of the Union Steel Corporation, Ltd., with the South African Iron & Steel Corporation, Ltd. The consolidation of the three plants will bring the combined output appreciably nearer the Government's bounty of 15 shillings per ton offered in respect of plants with a minimum capacity for iron and steel production from native ores of 50,000 tons per annum. It is reported that the new concern has the support of large and important financial houses and steel producers in England.

According to the Minister of Mines and Industries,



Variable-Delivery Pump for Hydraulic Presses. The machine with two sides of the casing removed to show hydraulic control, swinging arm and overload relief valves is above. Arrangement of control handle and piping is shown in full view at the left

the Union Steel Corporation, Ltd., Vereeniging, Transvaal, produced 14,434 tons of steel in 1921, valued at £361,468. The South African Iron & Steel Corporation, Ltd., Pretoria, Transvaal, operated only four months in 1921, and produced 1148 tons of pig iron with an experimental furnace.

The Newcastle Iron and Steel Works, Ltd., Newcastle, Natal, the latest entrant into the combine, has completed the erection of a blast furnace with a capacity of 150 tons per day. This plant is favorably situated as regards raw materials, coke, clay, etc., but has not been in active operation during the past year on account of lack of capital. For the purposes of the amalgamation, the assets of this company are valued at £175,000.

Powdered Coal for Malleable Plant

The Albion Malleable Iron Co., Albion, Mich., has decided to provide a pulverized coal installation for firing eight 20-ton malleable melting furnaces, five batteries of core ovens and an annealing oven, and it is expected that the ladle drying ovens will also be fired with pulverized coal. The installation is to be made by the Grindle Fuel Equipment Co., Harvey, Ill. It will include coal-handling equipment, a Grindle 10-ton per hr. multiple-tube dryer, two 6-roller high-side air-separation pulverizers, pneumatic conveying system equipped with automatic control device, and storage hoppers with feeding and burning equipment at each furnace.

ACCIDENTS LESS FREQUENT

Gratifying Decline in Rates in Nearly All Kinds of Iron and Steel Plants

WASHINGTON, July 31.—Definite decline in accident rates was shown in the iron and steel industry as a whole as between the two five-year periods of 1910-1914 and 1915-1919, while the two years following, 1919-1920, had lower rates than those for the average of the preceding five years and there was a slight decline from 1920-1921. Lucian W. Chaney of the Bureau of Labor Statistics, Department of Labor, is author of a pamphlet on "Statistics of Industrial Accidents in the United States" just issued, which reveals the trend of accident frequency in the iron and steel and other industries of the United States.

Accident rates for blast furnaces are among the highest found in the industry, it is pointed out, but as an offset some of the most definite reductions which can anywhere be found are reported for this department. While the figures for total accident frequency in the Bessemer department make a satisfactory series the severity rates for the second five-year period are higher than those for the first five years and 1921 is higher than 1920.

Open hearths are shown to have a marked decline in accident frequency, while the severity rates, though in less degree have still definitely declined. The accident rates for foundries are somewhat disappointing as regards the progress of accident prevention. As compared with the basic metallurgical processes the foundries have a lower accident severity with a higher accident frequency.

Heavy rolling mills show a steady and marked decline in accident frequency, but in severity the second five-year period was slightly higher than the first. In 1920 and 1921, however, there was quite a drop. From the first five-year period to 1921 severity declined 67 per cent. Plate mills exhibit one of the most uniform declines in both frequency and severity of accidents which is on record. Frequency had a decline of 54 per cent and severity of 50 per cent during the period covered.

The accident rates for sheet mills were strikingly low at the beginning of the period and from that low point decline irregularly but definitely. Tube mills share with sheet mills the lowest accident rates, both frequency and severity, found in any of the departments of the iron and steel industry. A notable feature of their experience is the very striking decline in accident frequency which the table shows. This is related closely with the large use, in mills of this type, of a foreman's bonus for accident reduction.

The production of the structural elements of bridges and steel frame buildings is shown by the accident rates for fabricating shops to be a matter of considerable hazard. These accident rates have declined in considerable measure and rather regularly. In wire drawing a very notable decline is to be observed in accident frequency.

The report includes a table which provides a precise idea of the trend of events in specified departments, the accident rates being computed for five-year intervals from that ending in 1911 to that ending in 1921.

The decline in accident frequency from the first period to the last in the several departments was as follows: The industry, 43 per cent; blast furnaces, 52 per cent; Bessemer, 64 per cent; open hearths, 47 per cent; heavy rolling mills, 51 per cent; plate mills, 46 per cent; and sheet mills, 24 per cent. In accident severity the decline was as follows: The industry, 32 per cent; blast furnaces, 46 per cent; Bessemer, 29 per cent; open hearths, 23 per cent; heavy rolling mills, 25 per cent; plate mills, 50 per cent; and sheet mills, 45 per cent.

Foundries is the only department to show an increase for both accident frequency (5 per cent) and severity (20 per cent). Two departments, plate mills and sheet mills, show a greater decline in accident severity than in frequency; the others have a greater decline in frequency.

WELDING IRON ELECTRICALLY

Use of Gray Iron Electrodes on Iron Castings by a French Investigator—How Carbon Was Added

A brief and very interesting note on the welding of cast iron with the electric arc appeared in the April issue of the *Revue de Metallurgie*, by M. Lebrun. He says this solution of a difficult problem was reached in France toward the end of 1920. Previous efforts had not given a proper weld. In the case of steel electrodes, which were generally used, a thin layer of white iron between the added metal and the piece to be welded was found which was brittle and without solidity. When gray cast iron electrodes were used the combustion of considerable of the carbon and silicon of the iron gave white iron as a result.

Success was reached by using gray iron electrodes sufficiently high in silicon, and by incorporating carbon in the added metal so as to compensate for that burned away during fusion of the electrode in the arc. This taking up of carbon is possible because the cast iron remains liquid long enough and also during this period of fusion it is subjected to a kind of intense stirring which comes probably from gas evolution. The carbon added in the form of graphite or charcoal easily dissolves in the deposited metal because of this stirring action and the metal is again changed to gray iron.

Different methods may be worked out for insuring a regular addition of carbon to the deposited molten metal. The most simple in practice is to surround the cast iron electrode with a covering containing a large percentage of graphite or charcoal, and of convenient thickness. The rods may be provided with a groove containing the needed carbon; they may be hollow, or a mechanical method of adding the carbon may be arranged. The principle is to replace the carbon burned out by the arc.

In the original article three photomicrographs are given of metal deposited according to this process. They show cast iron with plenty of graphite and very little free cementite, which would indicate that the metal would machine easily. This is borne out in practice. The metal has a much finer grain than that of ordinary cast iron while still preserving the same ease of working and strength. Analysis gives the following results:

	Ordinary Cast Iron, Per Cent	Metal Deposited by the Arc, Per Cent
Combined carbon	0.38	0.20
Graphitic carbon	2.80	2.00
Total carbon	3.18	2.20
Manganese	0.66	0.85
Phosphorus	1.27	1.76
Sulphur	0.05	0.058
Silicon	2.21	4.04

Neither blowholes nor hard spots are found in the weld. Before welding, the pieces to be welded should be heated or else the first part of the deposited metal solidifies too rapidly to have time to take up carbon, and the junction zone shows white iron and undissolved carbon, which gives a poor weld. The temperature of preheating should be at least 1300 deg. Fahr. G. B. W.

The Peebles Mfg. Co., Newton Falls, Ohio, has awarded a contract for two additional factory buildings, one 100 x 100 ft. and the other 40 x 480 ft. The outer walls are to be of corrugated iron and the interior wall of wood. It is necessary to build structures of this kind, instead of brick, in order that they may be completed in time to house additional machinery which has been ordered. The company manufactures railroad cranes.

A gold medal for its chucks was awarded to the Union Mfg. Co., New Britain, Conn., by the Brazilian Centennial Exposition at Rio de Janeiro.

Iron and Steel Exports Decline Sharply

Imports for June Also Are Less—Movement of Pig Iron to United States for Fiscal Year Amounted to 655,286 Tons—Efforts to Increase Exports Expected

WASHINGTON, July 31.—Iron and steel exports in June, 1923, totaled 171,183 tons, valued at $21,242,193, reflecting a sharp decrease of 32,206 tons under May, while imports of iron and steel in June amounted to $443,645 in value as compared with 7697 valued at $478,456 in May.

One of the striking comparisons of the import and export figures for the fiscal year ending with June, 1923, is the approach in volume of the former to the latter. The total imports of 1,111,929 tons, valued at $39,101,367, is only 704,397 tons under the total exports for the same period, which amounted to 1,816,329 tons, valued at $199,848,561. This unusual situation of a comparatively small difference from a point of tonnage between imports and exports is, of course, especially due to the unprecedented movement of incoming shipments of pig iron, and in a lesser degree to the heavy imports of scrap. Pig iron imports alone amounted to 655,286 tons during the fiscal year, or considerably more then one-half of the total imports, while imports of scrap amounted to 226,502 tons. The large imports for the fiscal year 1923 are also emphasized when compared with those for the corresponding period of 1922 with a total of only 186,186 tons, valued at $17,875,143.

Exports of Iron and Steel
(Gross Tons)

	June		Twelve Months Ended June	
	1922	1923	1922	1923
Pig iron	1,996	2,960	28,330	31,891
Ferromanganese	55	200	1,021	3,638
Ferrosilicon	58	45	467	931
Scrap	3,739	4,372	40,875	40,074
Ingots, blooms, billets, sheet bar, skelp	13,178	9,652	63,127	113,377
Iron and steel bars	19,084	15,669	102,190	166,862
Alloy steel bars*	229	280	4,673	2,694
Wire rods	3,565	2,626	41,123	24,380
Plates, iron and steel	9,844	11,177	119,851	109,124
Sheets, galvanized	10,628	10,664	82,172	112,744
Sheets, black steel	23,823	9,995	299,328	101,306
Sheets, black iron	2,214	2,214	6,678	12,654
Hoops, bands, strip steel	3,032	2,787	25,033	38,312
Tin plate, terne plate, etc.	8,160	6,966	78,551	83,434
Structural shapes, plain material	6,023	12,141	113,224	112,114
Structural material, fabricated	2,380	5,807	23,281	86,724
Steel rails	43,672	18,937	240,162	240,477
Rail fastenings, switches, frogs, etc.	5,378	2,964	23,962	37,991
Boiler tubes, welded pipe and fittings	18,718	17,940	161,857	170,845
Cast iron pipe and fittings	1,686	1,781	26,377	44,695
Plain wire	11,283	11,182	83,840	94,684
Barbed wire and woven wire fencing	8,825	8,854	42,363	83,290
Wire cloth and screening*	170	125	622	1,579
Wire rope and cable*	333	778	2,312	6,086
Wire nails	4,675	4,525	51,286	34,829
All other nails and tacks	913	705	7,126	8,458
Horseshoes	50	168	703	1,109
Bolts, nuts, rivets and washers, except track	1,868	2,094	14,620	18,858
Car wheels and axles†	1,986	1,833	8,178	17,274
Iron castings†	729	934	5,233	9,984
Steel castings†	97	590	1,249	3,353
Forgings†	387	217	1,262	2,588
Machine screws	10	...	85	...
Total	212,295	171,183	1,721,418	1,816,329

*Not reported separately prior to January, 1922.
†Previous to January, 1922, reported by value only.

Imports of Iron and Steel into the United States
(In Gross Tons)

	June		Twelve Months Ended June	
	1922	1923	1922	1923
Pig iron	5,850	30,033	40,472	655,286
Ferromanganese	13,535	11,786	30,799	114,187
Ferrosilicon	1,518	1,008	11,011	17,937
Scrap	10,000	15,717	50,969	226,502
Steel ingots, blooms, billets, slabs and steel bars	1,089	736	17,478	25,511
Rails and splice bars	6,586	4,244	29,105	24,791
Structural shapes	154	720	1,525	10,686
Boiler and other plates*	.....	119	.....	1,623
Sheet and saw plates	229	104	334	1,087
Bar iron	268	1,365	2,919	10,991
Tubular products*	.....	285	.....	3,284
Castings and forgings*	.....	385	.....	1,814
Nails and screws*	.....	198	.....	924
Tinplate	64	124	356	9,076
Bolts, nuts, rivets and washers*	.....	-	.....	171
Wire rods	62	302	1,218	2,983
Round iron and steel wire*	.....	554	.....	2,885
Flat wire and strip steel*	.....	83	.....	812
Wire rope and insulated wire, all kinds*	.....	49	.....	469
Total	39,155	68,019	186,186	1,111,929
Manganese ore	44,329	86,138	257,208	306,610
Iron ore	133,817	277,380	264,318	2,255,951
Magnesite	7,662	11,490	76,712	125,774

*Not reported separately previous to Sept. 22, 1922.

68,019 tons, valued at $2,597,159, a decrease of 7866 tons from the preceding month. Exports of machinery in June were valued at $23,631,349, an increase of $205,907 over May. Imports of machinery were valued at $911,901, as against $1,378,275 in May. Exports of machine tools in June totaled 7567 in number and

Machine Tool Exports

	—May, 1923—		—June, 1923—	
	Quantity	Value	Quantity	Value
Lathes	67	$57,158	64	$86,385
Boring and drilling machines	125	42,106	307	44,710
Planers, shapers and slotters	8	17,256	17	26,855
Bending and power presses	24	27,038	21	10,703
Gear cutters	9	17,787	89	9,871
Milling machines	22	24,914	29	34,330
Thread-cutting and screw machines	84	71,476	54	36,384
Punching and shearing machines	76	14,167	366	14,896
Pedal machines	18	3,150	9	7,758
Rolling machines	3	3,000	2	485
Sharpening and grinding machines	3,767	112,779	1,824	72,034
Chucks, centering, lathe drill and other metal-working tools	149	27,886	3,815	34,614
Pneumatic portable tools	1,095	55,565	1,033	64,896
Totals	5,697	$477,450	7,567	$443,645

Imports of Machinery
Value

	June, 1922	June, 1923	—12 Months Ended— June, 1922	June, 1923
Metal-working machine tools and parts	$21,255	$16,814	$194,546	$357,307
Agricultural machinery and implements	230,255	295,426	1,738,394	2,868,711
Electrical machinery and apparatus*	.....	20,584	.....	400,958
Other power generating machinery*	.....	45,755	.....	1,901,514
Other machinery	200,016	199,731	3,181,653	2,526,368
Vehicles, except agricultural	92,619	333,591	1,628,832	2,307,147
Total	$544,145	$911,901	$6,743,425	$10,302,008

*Not reported previous to Sept. 22, 1922.

Iron and Steel Exports by Countries

(Gross Tons)

	June, 1923	12 Months Ended June, 1923
Plates:		
Canada	10,082	87,921
S. America	202	1,212
Japan	65	1,721
Australia (Less than ½ ton)	3,209	2,858
China		
Galvanized Sheets:		
Canada	4,632	35,068
Cuba	1,271	9,679
Philippine Islands	730	10,163
Australia	708	2,678
Argentina	432	5,706
Mexico	356	5,867
Japan	279	3,994
Central America	254	3,961
Colombia	196	4,329
China	194	2,012
Dutch East Indies	136	1,142
Black Steel Sheets:		
Canada	4,917	55,494
Japan	3,368	33,148
Argentina	38	3,892
Tin Plate:		
Canada	2,942	25,105
Japan	1,862	24,653
China	642	5,671
Argentina	343	4,232
Cuba	314	3,258
Italy	11	2,779
Steel Rails:		
Cuba	6,906	42,245
Kwantung	5,742	9,183
Canada	2,275	28,870
Japan	484	87,579
Honduras	2	9,495
Chosen		11,679
Galvanized Wire:		
Argentina	3,305	19,422
Brazil	1,693	8,452
Japan	1,617	14,372
Canada	1,406	16,720
Chile	480	6,189
Australia	367	9,867
Barbed Wire:		
West Indies	1,779	10,719
Argentina	1,479	12,958
Brazil	1,099	18,810
Canada	451	6,227
Australia	324	8,549
Colombia	258	5,480

Exports for the fiscal year 1922 were 1,721,418 tons, valued at $181,377,620, a decrease of 94,911 tons under exports for the fiscal year 1923. The latter, however, showed a decrease of 69,968 tons under exports for the calendar year 1922.

Declines were shown in exports in June under May in most of the important items and were particularly marked in the case of steel rails, the largest item of export in June, with a total of only 18,937 tons, as against 30,847 tons in May. The falling off in exports of this item as well as in some of the other prominent products such as black steel sheets is attributed partly to the decreased purchases by Japan. Japan was by far the largest foreign buyer of steel rails for the fiscal year, taking 87,579 tons, while Cuba ranked second, taking 42,245 tons. Canada, which again is the principal market of exports of American iron and steel, led as the principal buyer for the fiscal year of plates, galvanized sheets, black steel sheets, and tin plate. In the last named product, however, Japan was a close second.

The belief prevails here that American iron and steel manufacturers will make an earnest attempt to increase exports during the last six months of 1923, and will find it possible to intensify their effort because it is understood that they are in a better position both to meet prices of European competitors and to take on added bookings for foreign delivery. It is recognized that some foreign makers are quoting prices which it is difficult, if not impossible, for American manufacturers to meet. At the same time, the instability of foreign currencies and the depreciation which they suffer cause the foreign maker to meet a hard problem in importing raw materials, such as the American manufacturer does not face.

Hope is also entertained that the Ruhr and other European disturbances will give way to more settled conditions in the near future, and consequently provide better markets abroad.

Decreases made in imports in June of the present year related most particularly to pig iron, with a total of 30,033 tons and scrap with a total of 15,717 tons. The most important increases were in ferromanganese with a total of 11,786 tons, and rails, with a total of 4244 tons. There was a close balance between imports and exports of iron bars in June, the

Pig Iron and Scrap Imports by Countries

(Gross Tons)

	June, 1923	Twelve Months Ended June, 1923
Pig Iron:		
England	16,050	297,967
Canada	6,500	50,216
British India	4,678	8,703
Scotland	2,100	112,014
China	550	1,952
Germany	150	22,734
Belgium		58,707
France		95,894
Sweden		863
Netherlands		2,537
Austria		299
Cuba		4,100
Scrap:		
Canada	8,725	161,131
Cuba	5,270	36,963
England	645	13,295
Scotland	640	2,767
Mexico	195	500
Panama	132	15,361
Sweden	47	263
Dutch Guiana	24	24

Imports of Iron Ore by Countries

(Gross Tons)

	June, 1922	June, 1923	12 Months Ended— June, 1922	June, 1923
Sweden	49,722	77,641	90,129	648,820
Cuba	45,047	66,000	103,394	638,300
Spain		21,984	21,680	158,842
Canada	347	11,100	4,182	15,424
Other countries	38,701	100,655	45,033	794,565

Machinery Exports

By Value

	June, 1922	June, 1923	Twelve Months Ended June, 1922	June, 1923
Locomotives	$783,170	$258,963	$18,132,922	$5,307,075
Other Steam Engines	298,700	40,064	1,361,900	1,726,764
Boilers	150,394	75,807	1,503,109	1,217,845
Accessories and Parts	53,982	107,868	536,018	1,070,436
Automobile Engines	831,401	433,432	3,955,569	5,356,866
Other Internal Combustion Engines	638,994	877,228	4,170,844	3,742,445
Accessories and Parts for	225,582	337,963	1,342,353	3,013,225
Electric Locomotives	79,339	149,065	*1,506,742	2,968,348
Other Electric Machinery and Apparatus	753,643	613,208	15,569,853	6,941,472
Excavating Machinery	103,802	85,798	*710,334	1,441,267
Concrete Mixers	32,243	46,628	398,179	578,412
Road Making Machinery	20,364	85,458	414,539	625,941
Elevators and Elevator Machinery	297,170	345,713	*1,950,928	4,555,775
Mining and Quarrying Machinery	568,726	979,837	5,358,265	7,999,716
Oil Well Machinery	580,887	451,946	*2,273,191	4,844,141
Pumps	490,373	744,293	5,562,792	6,834,209
Lathes	84,198	96,385	*1,045,177	738,867
Boring and Drilling Machines	68,580	44,710	*336,666	592,577
Planers, Shapers and Slotters	52,220	26,855	*147,920	245,993
Bending and Power Presses	31,531	10,703	*239,390	170,882
Gear Cutters	15,937	9,971	*96,087	152,783
Milling Machines	51,622	34,830	*158,045	442,159
Thread Cutting and Screw Machines	17,290	36,384	*86,835	365,773
Punching and Shearing Machines	20,685	14,890	*96,549	138,590
Power Hammers	3,162	7,158	*55,706	137,304
Rolling Machines	585	485	*24,504	148,590
Sharpening and Grinding Machines	69,297	72,034	832,708	916,949
Other Metal Working Machinery and Parts of	823,953	370,627	6,997,929	5,420,874
Textile Machinery	1,385,904	820,648	17,460,311	9,648,832
Sewing Machines	691,151	828,927	5,727,923	8,431,877
Shoe Machinery	81,981	215,944	997,475	1,317,748
Flour-Mill and Gristmill Machinery	80,650	81,617	1,036,997	1,056,590
Sugar-Mill Machinery	404,532	267,535	4,302,369	3,711,807
Paper and Pulp Mill Machinery	109,022	147,194	2,466,299	1,990,852
Sawmill Machinery	23,418	23,406	570,287	556,383
Other Woodworking Machinery	109,570	88,493	1,092,783	1,422,044
Refrigerating and Ice Making Machinery	166,123	173,849	1,866,823	2,047,170
Air Compressors	245,855	187,665	1,995,381	2,456,324
Typewriters	1,012,665	1,275,471	10,396,381	12,873,512
Power Laundry Machinery	41,899	81,661	552,708	957,267
Typesetting Machines	369,527	223,726	3,410,701	3,527,947
Printing Presses	227,293	373,961	4,694,510	4,232,797
Agricultural Machinery and Implements	1,962,831	4,292,292	*9,406,213	37,378,458
All Other Machinery and Parts	9,467,885	8,149,314	94,231,993	97,020,067
Total	$23,556,199	$23,631,349	$246,114,675	$256,315,553

*January 1 to June 30, 1922

Imports of Manganese Ore by Countries of Origin

(In Gross Tons)

	June, 1923		June, 1923
Brazil	23,945	Turkey in Europe	2,154
Russia	4,005	Germany	33
British West Africa	3,498	Java	6
British India	2,500		

former being 1365 tons and the latter being 1191 tons.

Of the total imports of pig iron for the fiscal year ending with June, 1923, England was the leading country of origin, providing 297,967 tons, while Scotland

Imports of Iron and Steel in Gross Tons

(Monthly Averages)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl.	26,505	†14,132		
1914 to 1918, incl.	23,351	4,645	3,281	‡47,155
1919 to 1921, incl.	23,901	5,708	3,710	37,115
1922	59,545	31,954	9,117	31,204
January, 1923	120,078	83,935	5,120	829
February	67,704	25,792	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	36,371	7,221	14,071
May	75,585	39,764	10,482	12,734
June	68,019	30,033	12,794	36,138
Six months' average	85,964	49,706	8,980	13,535

*Not included in "total imports."
†Includes ferroalloys.
‡Average for three years, 1916 to 1918, only.

came second with 112,014 tons, and France was third with 95,894 tons. Canada was the chief country of origin of scrap imports, having provided 161,131 tons during the fiscal year.

Sweden led as the source of origin of iron ore imports, the incoming shipments of that product for

Exports, January, 1922, to June, 1923, Inclusive

(Gross Tons)

	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,217,732	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
Fiscal year 1921	4,168,619	129,541	82,549
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	205,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	145,640	1,791	9,353
September	129,475	5,203	6,810
October	132,924	1,553	8,364
November	127,782	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922	1,986,297	30,922	107,201
January, 1923	123,190	2,482	10,563
February	133,902	2,786	7,733
March	163,920	2,881	11,416
April	177,471	1,844	11,247
May	203,389	1,548	12,824
June	171,183	2,960	9,652
Fiscal year 1923	1,816,329	31,891	112,377

*Calendar years.

the fiscal year being 648,820 tons and Cuba ranked a close second, providing 638,300 tons. Of the imports of ferromanganese in June, 11,745 tons came from England, 39 tons from France and two tons from Germany.

The American Society of Mechanical Engineers will hold a regional meeting at Chattanooga, Tenn., on Oct. 23 and 24. The program is expected to include three sessions, one on hydroelectric power, one on management and one on welding. E. C. Patterson, general manager, Chattanooga Boiler & Tank Co., Chattanooga, has been appointed to have charge of the details of the meeting.

The Open Shop Association of San Antonio, Tex., is conducting a trade school for bricklayers and plasterers. The first class of plasterers is now out on jobs, rendering good service, and the second class will be out in four weeks. The first class of bricklayers will complete its course within the next eight weeks.

BETHLEHEM EARNINGS

First Quarterly Statement Issued—President Grace Gives Views on Business Conditions

President Eugene G. Grace of the Bethlehem Steel Corporation made public last Thursday the first quarterly earnings statement issued by the company and announced that the policy will be continued. The usual quarterly dividend of 1¾ per cent was declared on common stock. Earnings for the period ended June 30 and inclusive of Midvale properties totaled in net $11,601,682. The necessary deductions reduced this figure to $5,426,471 net income. After the dividend on preferred, there remained $2.40 per share available on the $180,000,000 of common stock outstanding, and surplus for the period, after these disbursements, was $2,102,262. There are now 51,000 Bethlehem stockholders. The detailed statement follows:

Total net earnings	$11,601,682
Less interest charges, including proportion of discount on and expense of bond and note issues	3,245,082
Balance	$8,356,600
Less provision for depreciation, obsolescence and depletion	$2,930,129
Net income	$5,426,471
Less dividends	
Preferred	$1,079,851
Common (1¼%)	2,244,358
	$3,324,209
Surplus for the quarter	$2,102,262

Demand for steel products holds well considering the time of the year, Mr. Grace said, and there are unmistakable signs of increased activity. No important cancellations or delayed deliveries have been requested and prices are holding firm. Comparisons of earnings with the preceding quarter and the corresponding quarter of 1922 are impossible, because all the details of the mergers had not been arranged in time to be included in the earlier statements.

By the nature of the company's business, which is in large measure contractual, it is difficult to estimate the amount of business ahead on a tonnage basis. Represented in dollars, the orders on hand amount to $80,066,000, comparing with $67,510,007 at the close of 1922 and $50,164,618 at the close of 1921. Mr. Grace said that the value of orders on the books at the close of each quarter also will be given in the future in connection with the earnings statement. Operating schedules are at approximately 80 per cent of capacity and will remain at this level through August, as indicated by orders pending.

Mr. Grace said that nearly all of Bethlehem 7 per cent non-cumulative preferred stock has been exchanged for the new 7 per cent cumulative preferred and between $11,000,000 and $12,000,000 of the $30,000,000 8 per cent preferred also has been converted. Between 85 and 90 per cent of the total stock of the Midvale Steel & Ordnance Co. has been exchanged for Bethlehem common. About 2400 shares of Cambria Steel stock out of a total of 900,000 shares remain unconverted.

The head of the Bethlehem company intimated that minority holders of Cambria stock, who have not accepted Bethlehem's offer of $181 a share for their holdings, probably will have to take the original price agreed upon with the Midvale management.

The Navy Department last week disposed of practically all surplus material and equipment located at the Charlestown Navy Yard, Boston, and the Squantum, Quincy, Mass., plant, erected during the war for the Bethlehem Shipbuilding Corporation, Ltd., Fore River Works. Large lots of brass, copper, steel, chain, valves, fittings, tools, steam launch engines, optical, marine and radio supplies and various other materials were disposed of at fairly representative market values. The Government plans to abandon the Squantum plant.

Machine Shop Reorganized while Operating

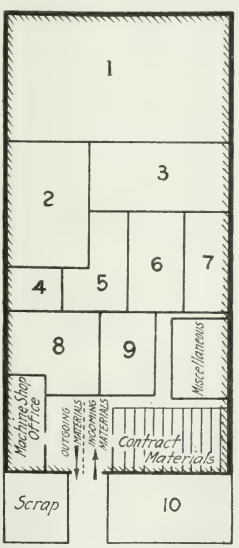
Congestion Relieved Without Interfering with Production—Shop Procedure Systematized and Production Control Introduced—Methods Outlined

BY CARLOS DE ZAFRA*

INTERESTING problems were presented in the reorganization, under the direction of the writer, of a large machine shop running at full capacity, and without interfering with production during the transformation.

The shop had become greatly congested and contracts on hand were subject to considerable delays at times because of the inability of the machine shop to function properly in advance of requirements. This situation was the inevitable outcome of certain post-war conditions which had not yet been remedied. Executive incompetency and procrastination advanced the inevitable day to such time that, through sheer necessity, it became imperative that something drastic be done to clear the plant of the congestion and place the machine shop on a footing to cope with the work in a systematic and orderly procedure and in accordance with the importance or priority of the work to be done under the several contracts active at the time.

The machine-shop group, consisting of machine shop, blacksmith shop and pipe shop, were all virtually under one roof, the building being about 500 ft. long and 250 ft. wide. About 350 mechanics were employed and the equipment ranged from small automatic machines to large lathes and boring mills, steam hammers, etc. The machine shop, to which we will confine our attention, had become so congested that it was difficult to move about between machine tools without walking upon the mass of unfinished and finished materials on the floor around the tools and in the passageways. Getting things done in a hurry was the order of the day, with the result that regulations, conceived with all good intent, were made the exception until eventually all jobs became rush orders. Like the cry of "wolf! wolf!" rush orders became so commonplace that ultimately delays accumulated to the breaking point in shop management. Finally the writer was asked to straighten out the mess and, if possible, without interfering with production.



For Taking Inventory and Cleaning Up, the Shop Was Chalked Off As Shown

Method of Attack Decided Upon

It was suggested that an inventory, taken over night, might afford an accounting of materials in the shop, but upon examination of the plant it was quite evident that nothing short of a thorough house-cleaning would accomplish the desired result. It was either that or let bad-enough alone. It was then Thursday noon and the inventory was desired by the next morning, so that the executives could decide what further steps to take and start the new method at the beginning of the following week. While that was not an impossibility, it was evident that such a course would mean a waste of time and money, because such an inventory would not eliminate the cause of the congestion, would be worthless within an hour or two after completion, and the situation would be no better, but possibly even worse, afterward. It was therefore suggested that, in lieu of a mere inventory, the writer be given full responsibility and *carte blanche* to clean out the machine-shop group, systematize the procedure, introduce a system of production control, as well as to inventory all materials in the group. It was proposed to begin taking inventory and cleaning up the shop Saturday noon after the men had quit work for the week-end, and complete the job before the men returned Monday morning, so there would be no loss of working time and no confusion. This intermission between Thursday and Saturday noon was used in preliminary work, such as formulating the method of attack, organizing the clerical and labor force necessary, so that the job could be done quickly and with the least confusion and least effort.

On the face of it, the task appeared to be Herculean, but after all it became merely a case of dividing the work into as many groups as could complete their elementary assignments within the alloted time. Accordingly the machine shop and outside storage yard were chalked off into ten sections, as shown at left, the sections being as nearly equal as possible as regards the work to be done within them. In addition, two large sections of floor space were cleared of everything. One of these, marked "miscellaneous" on the figure, was reserved for unidentified materials, and the other section was subdivided and marked with the numbers of the contracts then active in the shop. It will be noted that this division of the shop was not equal as to area, large machine tools and materials requiring a larger area than the small automatics for the same clerical effort on inventory and assortment.

Around each machine tool were several piles of castings or partly finished materials yet to be worked on by the adjacent tool. While job tags identified most of these piles, others were totally lacking in identification due to the natural tendency of the machinist to handle the tagged piece first, remove the tag and place it "somewhere" around the machine and then forget to replace it until the last piece in the lot was finished. By this time, several hours or days later, the tag had been lost. The work-benches also, and other catch-all places were filled to overflowing with spoiled, defective or excess materials. In addition to these conditions there existed a laxity of management that permitted mechanics from the other departments to enter the machine shop and remove whatever they found that was required on their job, even though not specifically

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assigned to their particular job. The effect of all this upon any attempt to maintain dependable shop records can only be lightly imagined.

Ten Squads of Two Men Each Take Inventory

In the work of reorganization ten squads of two picked men each were employed, one of each squad being a technical man who could readily identify the anatomical relation of the materials and work in progress to the machines produced in the shop. The other member was a clerk, whose duty it was to chalk off each piece as called by the first member and enter it on a special inventory blank. These squads were first given thorough and specific directions regarding their work, as was another group of four remaining in the office to compile the inventory sheets as rapidly as filled and dispatched by runner to them. A gang of six laborers was also detailed to remove or shift materials as occasion required.

The squads took possession of their alloted spaces at one o'clock Saturday afternoon. The procedure was as follows: Each piece of material was marked after the section number, contract number or shop number, for example, 3-361-270M, meaning it came from section 3, was intended for contract No. 361 and its shop or part number was 270M. It was, after proper entry on the inventory sheet, removed to section 361 reserved for all materials intended for that contract. Parts lacking identification were marked merely with the section number from which they were removed and were placed in the "miscellaneous" section for future reference.

A section outside of the shop door was set aside for scrap, which consisted of items obviously of no further use as far as the machine shop was concerned. These were subsequently to be delivered to the reclamation department. As fast as the inventory sheets came in the clerks in the office were trying to complete the identification of each item by comparison with the master sheets, making such notation on each as would facilitate subsequent identification.

Only One Job Left at Each Machine

The various groups completed their respective assignments between 2 and 4 p. m. Sunday, having worked throughout the night, stopping only for meals. All materials had been removed from the machine-tools and benches to their alloted sections with the exception of one job at each machine for the men to work on upon their return Monday morning. Three tons of miscellaneous scrap materials, mostly small castings and fittings averaging about 3 lb. each, had been removed to the scrap heap for reclamation, while a considerable excess stock of usable materials, such as bar stock, valves, fittings, etc., were returned to "stores" for credit and reissue to subsequent jobs. The floor of the machine shop was now plainly visible and clean.

Method of Handling Shop Orders Changed

Orders were at once issued excluding from the machine shop all mechanics from other departments. Any requirements were to be filled only by application to the production division clerk placed in the shop as later explained. It had been the custom to issue shop orders in multiple, one copy for each shop or department effected or interested. Each shop was characterized by a distinctive color. Under the filing system used in the so-called production division each color was filed separately and in numerical order. Thus, an order involving seven departments was issued under seven colors, which required seven filing operations, one for each color. If it was desired to ascertain the history of any order it necessitated searching through as many files as there were departments or colors involved. The idea in the adoption of this system was that it grouped together all the orders of any one department, but in actual practice the history of the department was inconsequential to that of the progress of orders. Therefore the files were changed so that each order was filed according to its number only, which brought together under one clip all the departments or colors. Thus the filing labor was reduced to a minimum and likewise the chances of error. Time for finding the complete history of an order was also greatly reduced. Orders awaiting execution, orders being worked on and completed orders were segregated under the new procedure so that the errors incidental to filing and time required for locating were correspondingly reduced and inactive or "dead" orders kept out of the "active" files.

Equipment vs. Personnel

As to equipment, the plant in question was one of the most modern of its kind. Here, however, as in many similar cases, modern equipment was put into the hands of personnel incompetent to exact from these advantages an accounting worthy of their hire. The large outlay for fine shop buildings, the best tools, and the best planning and production methods went for naught because the personnel responsible for its efficient maintenance was but of mediocre or antiquated quality. High quality personnel will produce far better results with less equipment and get results with less confusion in an old-fashioned shop than incompetent and inefficient personnel will in the most modernly designed and equipped plant. Why executives do not select their subordinates with the same care and demand the same effective return per dollar spent for personal service that they do for machine service is puzzling, yet it is frequently done.

To have resystematized the machine shop procedure would have been time and money wasted had not the personnel responsible for its subsequent maintenance been also reorganized. From previous observation as head of the statistical department the writer knew the relative merits of the clerks in the production division, who were in charge of this particular phase of the work. Therefore little experimenting with the personnel was necessary. The clerks were shifted in their respective jobs according to their previously demonstrated abilities and then set to work according to standard practice instructions, which were put into typewritten form and covered the whole procedure in detail. Each clerk learned that he had a particular job, that there was a distinct point in the cycle of events at which his work started and ended and that also there was a definite time for the completion of the alloted tasks. Overlapping of efforts and consequent opportunity for passing up responsibility were eliminated.

Shop Orders Delivered With the Material

Under the old system shop orders were dispatched to the shops as soon as issued, irrespective of whether required materials were ordered or on hand or not. Under the new system the production division controlled all orders until the materials were delivered to the shop in question. Then the order, with the materials checked thereon, was turned over to the shop foreman in exchange for his signature, as receipt for same, in the production record book.

All materials into and out of the machine shop passed through the main entrance only, and were checked both ways by the production checker stationed at the door, who required a receipt for all materials delivered to the shop and who gave a receipt for all materials leaving the shop. As soon as all materials required to work on an order were on hand the shop order was delivered with the materials to the shop foreman when next he required a job for a given machine. Proper regard was paid to the priority of orders.

Numerous other details had to be worked out. The success of the reorganization was due to a carefully prepared schedule, a proper balance of task with ability and a logically prepared procedure, the whole so worked out "in black-and-white" that each clerk knew definitely what was expected of him and of his associates. Incidentally the clerical force was reduced in numbers. The shop foreman, his assistants and the workmen, although dubious at first, gave their cooperation toward a fair trial of the new procedure and also their indorsement when they realized that the new system afforded them better shop conditions, placed responsibility where it belonged, and contributed toward greater output.

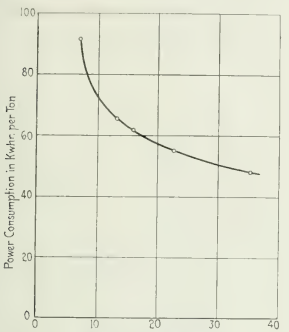
POWER FOR ROLLING MILLS*

Economic Principles Governing the Use of Electrical Power in Iron and Steel Works

BY C. A. ABLETT

IN considering whether it will prove economical to drive rolling mills electrically or not, careful consideration must be given to the effect of the demand for power required by the different methods of driving. As the mill drive is part of the works power equipment, whatever method of drive is selected cannot be treated separately from the power station plant or power company's tariff, as the case may be, both of which are affected in greater or less degree by each of the alternative systems of driving that would come under consideration. It will be readily recognized that if they are dissociated the result will almost certainly be increased capital expenditure.

It is known that electrically driven rolling mills rolling the same type of section, under generally similar conditions of output, temperature and size of billet,



Reduction in Unit Power Consumption as Output of the Mill Increases. Rolling 21-lb. I-beams from 7¼ x 7¼-in. billets

show great variations in the quantity of power consumed, expressed in kwhr. per ton rolled. Consequently there exist marked differences in the working costs of such mills, where one might expect that the working costs would be approximately the same. The existence of such differences has been too readily accepted by engineers, and insufficient attempts have been made to ascertain the cause, with a view to the reduction of the working costs to the lowest obtainable. Examples of these differences are shown by the following figures:

	Kwhr. per Ton Rolling I-Beams	
	Weighing 18 lb. per Foot Run	Weighing 12 lb. per Foot Run
Mill A	38.7	47.2
Mill B	58.0	69.5
Mill C	53.5	72.9

Cases of high power costs may be attributable to:

Improper drafting of rolls;

Improper selection of drive;

Improper selection of motor;

Billets not properly heated;

Improper selection of system of power supply to suit local conditions;

Gradual introduction of mixed power plants, due to not adhering to the original program; and

Lack of proper records.

Electrical driving gives ample facilities for detecting and remedying cases of high power costs arising from high power consumption due to roll drafting, which is unsuitable from the point of view of power costs. But little has been done in this direction, and no information is generally available regarding the principles to be observed in drafting to obtain low costs.

In the selection of drive and motor to obtain the cheapest power consumption, the principle to be acted on is that of keeping all losses, electrical or mechanical, to an absolute minimum. To attain this, however, embraces a great deal of detail engineering work. It is usually found, however, that the plant arrangement to attain minimum losses entails increased capital costs, and therefore to obtain the best all-around result, i.e., the lowest combined capital and power costs, complete balance sheets must be prepared to represent the different conditions under which the mill has to work, after consideration of the proposed rolling program and the manner in which this rolling program may develop in the future. It then becomes a matter of judgment to select the type of plant to give the best all-around economy under these varying conditions.

Generally speaking, greater differences in power consumption are to be found in mills where the product rolled is of such a character as to require a greater fluctuating power than in those where the power taken remains more constant. Consequently the former types of mills are those in which the possible economy is frequently not attained.

Where a mill is rolling less than the full output, the power consumption in kilowatts per ton is greater than if it were rolling its full output, as is illustrated by the following figures:

Rolling I-Beams Weighing 21 Lb. per Foot from Billets 7¼ x 7¼ In.

Output, Tons per Hour	Power Consumption, Kwhr. per Ton
7.2	91.5
13.2	65.0
16.0	62.0
22.7	55.0
35.5	48.0

The figures in both tables are quoted solely for comparative purposes, and are not intended as examples of ideal power consumption.

*Abstract taken from a paper presented before the British Iron and Steel Institute at the 1923 annual meeting.

American Copper Industry in 1922

Final figures for the output of the copper industry of the United States for 1922 have just been issued by the Department of the Interior as compiled by H. A. J. Jenison of the Geological Survey. Preliminary figures were published in THE IRON AGE of Jan. 18.

The total production in 1922 of new refined copper from both domestic and foreign sources was 1,358,659,101 lb. as compared with 1,020,027,096 lb. Of the 1922 output 1,215,729,655 lb. was electrolytic copper, with 122,545,126 lb. Lake copper, and the remainder classed as casting copper. The total output of secondary copper was 146,010,542 lb., which was in addition to the foregoing figures.

Returns from all producing companies show that their stocks of electrolytic, lake, casting and pig copper on hand and in process of refining at the beginning of this year was 216,000,000 lb. of refined copper and 361,000,000 lb. of blister copper and material in process of refining. The corresponding figures for 1922 were 459,000,000 lb., and 283,000,000 lb. respectively.

The amount of copper withdrawn for domestic consumption in 1922 was 896,633,833 lb. as compared with 610,988,744 lb.

Exports of refined copper in ingots, bars, rods or other forms is returned as 652,666,939 lb. in 1922 as against 596,117,247 lb. in 1921. Total exports of copper in all forms, including refined copper, were 743,039,888 lb. in 1922 as compared with 628,804,750 lb. in 1921.

The Endicott-Johnson Shoe Corporation, Binghamton, N. Y., during the first week in July spent $615,000 for vacations for its 14,000 employees. It was first planned to scatter the vacations throughout the year, but this, it was found, would keep the various departments short handed. Orders were then issued to close all the plants on July 1 for one week. Each man was handed a week's pay in advance and told to have a good time.

ASSIGNED COAL CAR CASE

Date of Making Order Effective Is Deferred—Vigorous Statements Presented

WASHINGTON, July 31.—Petitions of the United States Steel Corporation and the independent steel interests to have the Interstate Commerce Commission reopen the assigned coal car case have been unsuccessful in accomplishing their purpose for the present at least. The commission last Thursday entered an order deferring from Sept. 1 to Oct. 1, the effective date of the order, but in all other respects it remains in full force. This means that the railroads on Oct. 1 will be compelled to cease giving special car service to coal mines providing railroad fuel or to industrial corporations such as the steel companies, despite the fact that the latter provide their own cars. It remains to be seen whether the private owners of cars will be given a hearing at a future date.

The railroads and the iron and steel and other industrial interests were particularly vigorous in urging a reopening of the case, while many prominent coal producers expressed strong opposition to its reopening. Among the latter was the Pennsylvania Coal Producers' Association. In an answer filed with the commission, this association asserted that the general public would be greatly benefited by application of the decision. It denied that discard of the assigned car rules will bring an increase to the public amounting to $100,000,000 annually. It was contended that the result of the decision will be a healthy competitive situation in place of a feverish effort on the part of consumers to obtain coal regardless of cost.

Steel Corporation Argument

Among other reasons assigned by Steel Corporation subsidiaries for further hearing was that not one pound of the coal mined by the applicant mining companies was either marketed, sold, or shipped in competition with coal mined in the same or an adjacent district and that therefore the essential element of competition was lacking, and a finding of undue prejudice or preference was not maintainable. They asserted there was no charge of undue preference or prejudice by any steel maker who used the cars of the carriers in favor of the steel maker who used private cars. Moreover, they said there was no evidence in the record to that effect, nor had it been urged that any carrier had discriminated between competitive steel companies in the transportation of private cars containing coal for use in the making of steel.

Nor, it was pointed out, was there any evidence to support a finding of unreasonableness in respect of the use of private cars for carrying coal for steel-making.

"It is generally conceded that the allowance by the railroads to the private car owners is inadequate or non-compensatory," said the petition. "Such being the case, what is there unreasonable about the practice, except that the car owner pays too high a rate. On the other hand we submit that any rule the application of which would decrease the available supply of cars for the transportation of freight, increase the cost of operating the railroads and add to the expense of manufacture would be unjust and unreasonable and would impose an unwarranted burden upon interstate commerce."

Needs of the Steel Industry

The applicants went into considerable detail to show why the steel industry must have its own cars to assure itself of the supply of fuel, and to show the commission that the private cars were bought at the solicitation of the railroads because they could not find the money to buy them.

At another point, the Steel Corporation petition said:

"Manufacturing conditions peculiar to the steel industry make necessary a steady and continuous supply of raw materials, the most important of which is coal. Several tons of this commodity are required to produce a ton of finished steel. Experience has demonstrated that the carriers have been unable to furnish the equipment necessary to transport such large tonnages of this raw material—this for the reasons (1) of the peak demands for transportation when the traffic is abnormal and (2) during normal times the situation in particular districts is such that the local carriers have not the equipment available. At the solicitation of the carriers themselves, the steel companies have invested large sums of money in private cars. Unless such cars are available, it will become necessary at times to close down part of the mills, to curtail manufacture and to throw out of employment many thousands of men, not only those employed in the mills and at the coal mines, but also men employed at limestone quarries and iron ore mines, as well as employees of the steamship companies and the railroad companies which transport these commodities."

Compelled to Furnish Cars

The petition pointed out the fact that because of the special grades of coal needed for the making of coke, used in the manufacture of steel, it is necessary to procure coal from mines located in districts many miles from the ovens. The fluctuating demands on carriers' equipment and the uncertainty of the carriers' car supply have compelled the steel companies and their affiliated coal companies to furnish private cars at their own expense.

Because of the nature of the manufacturing process, it was pointed out that there must be continuous operation of the steel plants because of the great distances between the plants and their adjacent coke ovens, on the one hand and the mines on the other. There is no other method of which applicants know by which the coal can be transported from the mines to the plants in order to meet the requirements of the steel companies and at the same time effect an economical operation of the railroads themselves.

"The furnishing of the coal cars by the steel industries is an outgrowth of the peculiar transportation conditions, in respect of the movement of special grades of coal in large quantities from mines either owned or affiliated with the industries to their blast furnaces, which, when the blast furnases are in full operation, involves a peak movement," the petition says. "Under normal conditions, applicants' steel plants require approximately 500,000 tons weekly for movement via rail. When the blast furnaces are out, there is no demand on the railroad companies for such heavy transportation. Therefore, in view of this situation, the railroads have invited the mills to furnish their own cars for the transportation of this heavy traffic.

"There is nothing we submit irregular, abnormal or unreasonable in the practice—so long recognized by this commission, by the courts, and by Congress, as proper and lawful."

Pay of Ohio Foundry Employees

The wage report of the Ohio State Foundrymen's Association, Cleveland, for the second quarter of 1923 shows an increase in the rate of pay in practically every class of foundry help.

Below is a comparison of average dollar rates per hour paid the principal classes of labor:

Month	Iron Molders	Core Makers	Brass Molders	Pattern Makers	Common Labor
July, 1922.....	0.719	0.595	0.612	0.648	0.364
October, 1922....	0.655	0.567	0.695	0.653	0.373
December, 1922..	0.673	0.607	0.709	0.71	0.398
April, 1923.....	0.704	0.616	0.714	0.665	0.399
July, 1923.....	0.776	0.701	0.786	0.674	0.437

The Electrical Alloy Co., Morristown, N. J., has commenced operations at its new rolling mill, 60 x 125 ft., recently completed, comprising motor-driven rolls and electric furnace. The mill will be used for rolling special alloys in ribbon and bar shapes for wire production at the other local plant of the company on Ridgedale Avenue.

Strength of Steel at High Temperatures—II*

Behavior of Cobalt, Tungsten and Uranium Alloy Steels —Steels Containing Chromium—General Discussion and Conclusions

BY H. J. FRENCH AND W. A. TUCKER

Steel containing 5 per cent cobalt.—The characteristic changes in tensile properties of normalized 0.6 per cent carbon steel with rise in temperature are not materially altered by addition of 5 per cent cobalt except that a sharper decrease in ductility is observed in the neighborhood of 200 to 250 deg. C. (Fig. 6). The cobalt steel has somewhat higher

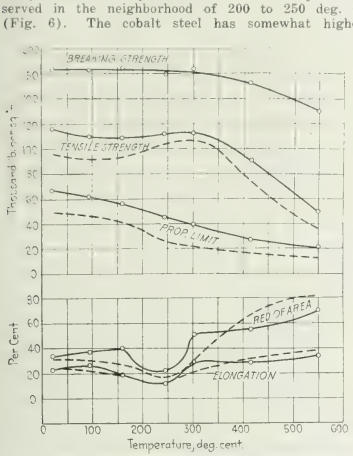


Fig. 6—High Temperature Tensile Properties of Steel Containing 0.6 Per Cent Carbon and 5 Per Cent Cobalt First Heated to 650 Deg. C. and Air Cooled. Composition:

C, 0.62; Mn, 0.34; Si, 0.43; Co, 4.96 per cent.

Dotted lines show properties of normalized 0.6 per cent carbon steel for comparison.

Breaking strength is unit load at moment of fracture

strength and proportional limit at all temperatures between 20 and 550 deg. C. and in addition equal or better ductility than the carbon steel to about 350 deg. C.; above this temperature, the latter steel has higher values of elongation and reduction of area. Cobalt additions should therefore be of value where increased resistance to weakening at temperatures up to about 550 deg. C. is desired.

Tungsten tool steels.—Test results for two air-cooled tungsten "finishing-tool" steel are shown in Fig. 7. The extreme brittleness maintained to relatively high temperatures, as illustrated by low values of elongation and reduction of area, is without doubt largely due to the high carbon content as is the rather sharp drop in strength in the 1 per cent tungsten steel from about 130,000 to 55,000 lb. per sq. in. in the interval 300 to 550 deg. C., though the first mentioned effect is probably intensified by the tungsten additions. It is unfortunate that no low-carbon tungsten steels were tested as this element would be expected, from our general knowledge of tungsten steels and high temperature tests already reported, to be of value in delaying the softening of steels in the range around 500 to 600 deg. C., particularly when present in large proportions.

Uranium steels.—It appears from comparison of data in Fig. 8 with the properties of carbon steels that the addition of about 0.20 to 0.35 per cent uranium delays the lowering of the limit of proportionality so that at 550 deg. C. uranium steels show generally higher values than similar steels without additions of this element. Likewise the increase in strength which may be produced at ordinary temperatures is maintained to 550 deg. C. without, in most cases, appreciable loss in ductility.

In quenched steels subsequently tempered at high temperatures (Figs. 9 and 10) the principal advan-

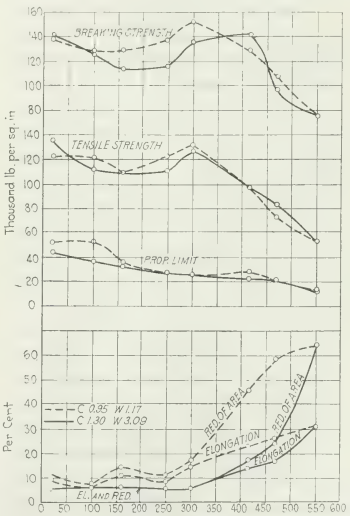


Fig. 7—High Temperature Tensile Properties of Tungsten "Finishing Tool" Steels First Heated to 800 to 815 Deg. C. and Air Cooled. Composition and treatment:

C, 0.95; Mn, 0.22; Si, 0.26; W, 1.17. Heated 30 min at 815 deg. C. and air cooled.

C, 1.30; Mn, 0.29; Si, 0.19; W, 3.09. Heated 30 min. at 800 deg. C. and air cooled.

Breaking strength is unit load at moment of fracture

tages of uranium additions are noted at temperatures below about 400 deg. C., though there is, of course, observed a slight increase in strength and limit of proportionality at 550 deg. C. But this would probably disappear with further rise in temperature.

Chrome-vanadium, chrome-molybdenum and *chrome-nickel steels.*—Comparisons of normalized chrome-vanadium (1.00 per cent Cr; 0.20 per cent V) and

*Published by permission of the director of the Bureau of Standards of the U. S. Department of Commerce. The authors are physicist and laboratory aid respectively at the Bureau of Standards, Washington. The first section was published in THE IRON AGE, July 26.

The references in brackets are to the bibliography at the conclusion of this report.

chrome-nickel (1.00 per cent Cr: 3.00 per cent Ni) steels containing about 0.38 per cent carbon were reported in a previous publication [9] and showed that the former was to be preferred from the standpoint of high strength and limit of proportionality at 550 deg. C. in a short-time test. While this steel showed greater resistance to "weakening," the strength of

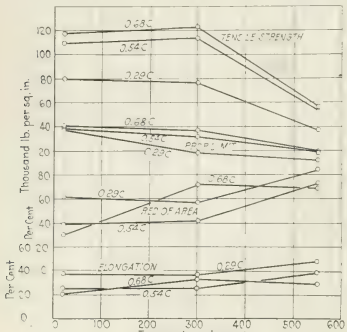


Fig. 8.—Tensile Properties of Normalized Carbon-Uranium Steels at 20, 300 and 550 Deg. C. Composition:

C.	Mn.	P.	S.	Si.	Ur.
0.29	0.66	0.015	0.016	0.30	0.19
0.54	0.60	0.031	0.015	0.25	0.21
0.68	0.39	0.016	0.016	0.24	0.29

Steels normalized by heating respectively to 900, 850 and 825 deg. C. and after 30 min. cooling in air.

the chrome-nickel steel was higher at all temperatures below about 475 deg. C.

The tensile properties-temperature curves for a typical chrome-molybdenum steel are given in Fig. 11. The principal feature worthy of mention is the fact that the limit of proportionality of the chrome-molybdenum steel has decreased less at 550 deg. C. than that of the chrome-vanadium, though it has somewhat lower strength and higher ductility, under the conditions of test, probably due in large part to the difference in carbon content.

A very high limit of proportionality in comparison with normalized steels is also shown in the quenched and tempered samples (Fig. 11) but at lower temperatures between 20 and 300 deg. C. no special advantages are observed.

General Discussion and Conclusions

In the foregoing brief discussion comparisons were made between individual steels to throw light upon the effects of different alloying elements or treatments but no attempt was made to consider the entire series of steels as a whole.

Little difficulty is encountered in securing metals of sufficient strength for service at temperatures not exceeding about 300 deg. C. but selection for operating temperatures of 550 to 600 deg. C. or above is a more difficult matter. Short-time tensile tests, such as were carried out by the authors, do not give much of the information desired on account of the extreme importance of the time factor but it would be reasonably expected that steels having the highest limit of proportionality in this temperature range in a short-time test would in general be able to withstand higher sustained loads without considerable flow than those with low proportional limits, though not in direct proportion to the observed values. Steels in a highly unstable condition, such as quenched metal not subsequently tempered are, of course, excluded. Therefore comparison of the entire series of steels was made on the basis of proportional limit and the six alloys having highest values at room temperature, 300 and 550 deg. C. are listed in order in Table 1.

The most striking feature observed is the predominance of steels containing chromium and the absence of those containing nickel except in combination with other elements such as uranium or chromium. For example, at 550 deg. C. five of the six steels showing highest limit of proportionality contain chromium; two also contain molybdenum and additions of vanadium or uranium are each found in one case.

Table 1 shows likewise that a comparison of the proportional limit at ordinary temperatures is no indication of the relation at elevated temperatures either around 300 or at 550 deg. C. However, the order of strength superiority at 20 deg. C. is an approximate indication of the relation at all temperatures up to about 400 deg. C., but does not hold good at much higher temperatures, as is shown in Table 2. In other words the higher the strength produced at ordinary temperatures by suitably chosen compositions and treatments the higher, in general, will be the strength at a given temperature within the range 20 to 400 deg. C., but wide variations in elastic ratios may be expected on account of the sensitivity of proportional limit at room and slightly elevated tempera-

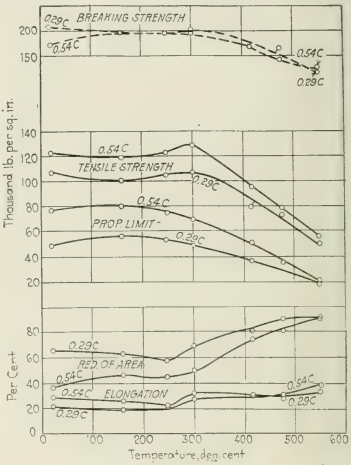


Fig. 9.—High Temperature Tensile Properties of Quenched and Tempered Carbon-Uranium Steels. Composition:

C.	Mn.	P.	S.	Si.	Ur.
0.29	0.66	0.015	0.016	0.30	0.19
0.54	0.60	0.031	0.015	0.25	0.21

First steel quenched in water from 900 deg. C. and tempered 30 min. at 600 deg. C. Second steel quenched in water from 850 deg. C. and tempered 30 min. at 600 deg. C.

Breaking strength is unit load at moment of fracture.

tures to stress conditions in the metal, a feature previously emphasized in discussion of carbon steels.

Conclusions

Probably the most important conclusions to be drawn from the described tests may be summarized as follows:

1. The effect of temperature rise to about 600 deg. C. is to reduce tensile strength and proportional limit and greatly increase ductility. Certain combinations of composition and treatment, notably normalized chrome-vanadium, quenched and tempered stainless, and air cooled 28 per cent nickel steels are strongest at ordinary temperatures, but carbon and the majority of alloy steels tested show maximum strength

and minimum ductility at temperatures within the range of 200 to 350 deg. C.

2. The proportional limit of medium or low-carbon steel, which has been largely relieved of stress by suitable treatment, decreases with rise

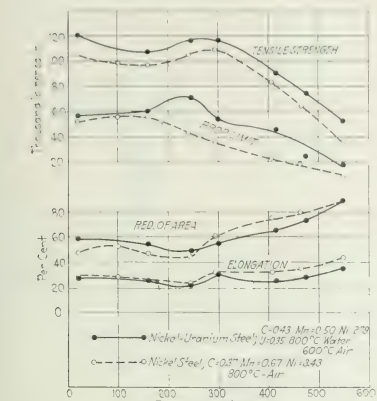


Fig. 10—High Temperature Tensile Properties of Quenched and Tempered Nickel-Uranium and Normalized 3.50 Per Cent Nickel Steels. Composition:

Ni-Ur steel: C, 0.43; Mn, 0.50; Si, 0.50; Ni, 2.79; Ur, 0.35; 3.50 per cent Ni steel: C, 0.37; Mn, 0.67; Si, 0.20; Ni, 3.43 per cent.

in temperature. In highly stressed metal, resulting from cold or blue-work or quenching and that having residual stress such as often exists in thin sections of hot finished steel, the proportional limit either remains at approximately its room temperature value over a well defined interval or shows an increase with first rise in temperature.

3. From the standpoint of high strength and limit of proportionality of steels at elevated temperatures the temperature scale may be divided roughly into 3 parts; (1) the range 20 to about 450 deg. C.; (2) the range 450 to 600 deg. C.; (3) above 600 deg. C.

4. In the lowest range high strength and proportional limit are functions of composition and heat treatment and in general combinations giving highest strength at ordinary temperatures show similar superiority throughout the entire range. It is, however, advisable to keep carbon low since brittleness, illustrated by low values of elongation and reduction of area, increases rapidly with increase in carbon content, particularly in the blue heat range.

5. The upper limit in the second or transition range requires nearly full tempering following hardening so that in most cases the benefits to be derived from heat treatment are limited except in the lower portion of the range and high strength and limit of proportionality are largely functions of composition. While short-time tests, such as were carried out by the authors, do not give direct comparisons of steels subjected to sustained loads on account of the importance of the time factor, it would be reasonably expected that steels having highest limits of proportionality would be able to sustain higher loads than those with low proportional limits though not in direct proportion to observed values. On this basis of comparison it appears possible to improve the properties of steel by adding such elements as chromium, cobalt, uranium, molybdenum and vanadium. On the other hand nickel even in large proportions appears to "soften"

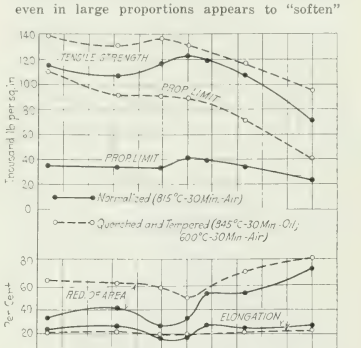


Fig. 11—High Temperature Tensile Properties of Chromium-Molybdenum Steel First Normalized or Quenched and Tempered. Composition:

C, 0.27; Mn, 0.62; P, 0.018; S, 0.008; Si, 0.26; Cr, 0.99; Mo, 0.41 per cent.

rather than strengthen steel in this range, particularly at about 550 deg. C. and above.

6. It is known that the drop in strength and proportional limit at temperatures around 550 deg. C. is permanent and that additional rise in temperature is accompanied by a further decrease in values so that the described tests also throw light upon what may be expected at higher temperatures. It would therefore appear improbable that commercial steels can be pro-

*Table 1—The Six Steels Showing Highest Proportional Limits at Various Temperatures Together With Heat Treatments Used and Tensile Properties**

Proportional Limit. Lb. per sq. in.	Steel	Heat Treatment	Tensile Strength lb. per sq. in.	Elongation in 2 in. Per Cent	Reduction of Area, Per Cent
	At 550 deg. C				
40,500	0.27% C; 0.99% Cr; 0.41% Mo	845°C—oil; 600°C—air	95,700	23.5	80.6
33,000	0.38% C; 1.98% Cr; 0.18% V	900°C—air	80,900	22.5	74.8
	0.31% C; 12.75% Cr	1150°C—oil; 675°C—air	69,800	12.0	16.7
25,750	0.31% C; 12.75% Cr	955°C—oil; 675° C—air	60,500	26.3	76.3
23,750	0.27% C; 0.99% Cr; 0.41% Mo	815°C—air	70,600	27.0	72.4
21,250	0.43% C; 2.79% Ni; 0.35% Ur	800°C—air	48,440	36.0	84.8
	At 300 deg. C				
88,250	0.27% C; 0.99% Cr; 0.41% Mo	845°C—oil; 600°C—air	131,200	19.5	49.5
77,500	0.39% C; 0.93% Cr; 3.05% Ni	850°C—air	172,500	23.5	63.1
74,500	0.37% C; 1.04% Cr; 0.18% V	850°C—air	142,250	18.0	45.8
70,000	0.54% C; 0.21% Ur	850°C—water; 600°C—air	128,570	26.5	49.5
63,750	0.43% C; 2.79% Ni; 0.35% Ur	800°C—water; 600°C—air	117,550	30.0	54.4
58,000	0.31% C; 12.75% Cr	1150°C—oil; 675°—air	97,380	7.5	13.2
	At 20 deg. C				
110,650	0.27% C; 0.99% Cr; 0.41% Mo	845°C—oil; 600°C—air	139,250	21.0	63.1
88,000	0.37% C; 1.04% Cr; 0.18% V	850°C—air	144,300	19.5	42.5
77,000	0.54% C; 0.21% Ur	850°C—water; 600°C—air	122,400	21.0	36.4
66,750	0.62% C; 4.96% Co	850°C—air	116,050	22.3	33.9
64,000	0.43% C; 2.79% Ni; 0.35% Ur	800°C—air	112,100	27.5	50.5
63,500	0.31% C; 12.75% Cr	955°C—oil; 675°C—air	111,500	24.5	60.8

*Experimental melts prepared in induction furnace, K, L, and M, have not been considered.

duced, to withstand continuously fairly large loads at temperatures above about 650 deg. C. except when large proportions of one or more alloying elements are added to reduce the iron content to such low values that the resulting product cannot correctly be called steel, or in special cases where extremely large proportions of special compounds are present.

Table 2—The Six Steels and Treatments Producing Highest Strength at Various Temperatures Selected from the 27 Lots Tested as Shown in Table 1

(Experimental heats K, L and M not considered)

Steel	Treatment*	Code Letter in Table 1	Position in list based on highest tensile strength At 20 deg. C	At 300 deg. C	At 550 deg. C
Chrome-nickel	N	O	1	1	4
Chrome-vanadium	N	Q	2	3	3
Chrome-vanadium	Q&T	P	3	2	2
Chrome-molybdenum	Q&T	S	4	4	1
Tungsten	N	U	5	5	—
Carbon-uranium (4.4% C)	Q&T	BB	6	6	—
Chrome-molybdenum	N	R	—	—	5
Stainless	Q&T	N	—	—	6

*N=air cooled from above the transformations; Q&T=quenched and tempered. Complete chemical composition and heat treatments shown in figures.

Some of the steels tested were donated specially for the described tests or taken from steel similarly supplied for general investigative work. Acknowledgments are therefore due to the following organizations: Nitrate division, ordnance dept., U. S. Army for the 0.38 per cent carbon, 3.50 per cent nickel, low chrome-vanadium and nickel-chromium steels; Lukens Steel Co., Coatesville, Pa., for the 0.18 per cent carbon steel; Carnegie Steel Co., Pittsburgh, and Ludlum Steel Co., Watervliet, N. Y., for the remaining carbon steels; Doehler Die Casting Corporation, Brooklyn, for the high chrome-vanadium steel and the Standard Alloys Co., Pittsburgh, for all heats containing uranium. Acknowledgement is also made to R. P. Neville,

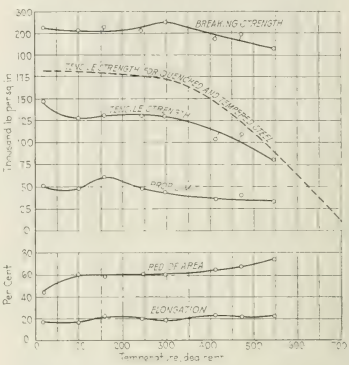


Fig. 12—High Temperature Tensile Properties of Chromium-Vanadium "Die Steel" Air Cooled from 900 Deg. C. Composition:

C, 0.38; Mn, 0.56; P, 0.011; S, 0.014; Si, 0.16; Cr, 1.98; V, 0.18 per cent.

Breaking strength is unit load at moment of fracture

associate chemist, for preparing the high chromium steel ingots, series K, L and M, and to A. T. Derry, associate physicist, for forging these metals.

Selected Bibliography on Mechanical Tests of Alloy Steels at High Temperatures

(For bibliography on Carbon steels refer to Bureau of Standards Tech. Paper 219).

1. I. M. Bregowsky and L. W. Spring, "The Effect of High Temperature on the Physical Properties of Some Alloys, *Proc.* Int. Assoc. for Testing Materials, VI Congress, VII, 1, 1912.

Tension tests from 20 to 595 deg. C. of rolled 30 per cent nickel steel.

Torsion tests from 20 to 595 deg. C. of 25 and 30 per cent nickel steels; oil tempered 3.50 nickel-vanadium steel; annealed carbon-vanadium tool steel.

2. Schulz, "Neuer Versuche und Erfahrungen mit Turbinenschaufel-material für höhe Temperaturen," *Die Turbine*, 9, pp. 225, 243, 266 (1913).

Discussion of the high temperature properties is given for pure iron, 5 and 25 per cent nickel and nickel-chromium steels as well as pure metals and non-ferrous alloys.

3. J. E. Hurst and H. Moore, "Materials for the Exhaust Valves of Internal Combustion Engines," London *Engineering* (Nov. 19, 1919), p. 673.

Discusses the requirements of steels for valves in internal combustion engines and the specifications and properties including those at high temperatures of a variety of steels used for such purposes.

4. L. Aitchison, "Valve Failures and Valve Steels in Internal Combustion Engines," Paper read before the Institution of Automobile Engineers, Nov. 5, 1919. London *Engineering* (Dec. 12, 1919), p. 739.

Discusses requirements of motor valves and gives tensile test data up to about 1000 deg. C. for a variety of steels used for such parts. Compares high tungsten, high chromium, 3 per cent nickel and nickel chromium steels on the basis of the various requirements.

5. G. Gabriel, "Comparative Values of Motor Valve Steels," THE IRON AGE, 106, p. 1465, 1920.

Tensile tests at various temperatures between 650 and 1000 deg. C. on chromium steels containing from 2.8 to 13.1 per cent chromium and 0.35 to 1.4 per cent carbon subjected to various preliminary treatments; quenched and tempered chromium-tungsten and chromium-tungsten-vanadium (high-speed) steels; structural nickel-chromium and chromium-vanadium steels subjected to various heat treatments or in the hot worked condition.

6. A. H. d'Arcambal, "Physical Tests on High-Speed Steels," *Trans.* Amer. Soc. for Steel Treating, II, No. 7, p. 556, 1921.

Gives values of tensile strength between 20 and 650 deg. C. for low tungsten-high vanadium and high tungsten-low vanadium high-speed tool steels after heat treatment such as is ordinarily used for tools.

7. R. S. MacPherran, "Comparative Tests of Steels at High Temperatures," *Proc.* Amer. Soc. for Testing Materials, 21, p. 852; 1921.

Tensile tests between 20 and about 650 deg. C. of annealed 3.25 and 34 per cent nickel steels; quenched and tempered structural nickel-chromium and chromium-vanadium steels; quenched and tempered 3.4 per cent chromium and rolled high-nickel-chromium steels.

8. A. P. Spooner, Discussion of paper by MacPherran referred to above, *Proc.* Amer. Soc. for Testing Materials, 21, p. 863; 1921.

Tensile tests between 20 and about 870 deg. C. of annealed or normalized steels of the following types; 3.50 per cent nickel; nickel-chromium (2:1); chromium-vanadium; chromium-molybdenum; stainless (14 per cent Cr); high-speed steel; 31 per cent chromium steel.

9. H. J. French, "Tensile Properties of Some Structural Alloy Steels at High Temperatures," Bureau of Standards Tech. Paper 205, Dec. 1921.

Tensile tests from 20 to 550 deg. C. of normalized steels containing about 0.38 per cent carbon as follows: (1) carbon steel (2) 3.50 per cent nickel steel (3) steel containing 3 per cent nickel and 1 per cent chromium (4) steel containing 1 per cent chromium and 0.2 per cent vanadium.

10. H. Edert, "Warmversuche mit Sondernstählen," *Stahl und Eisen*, 42, p. 961, 1922.

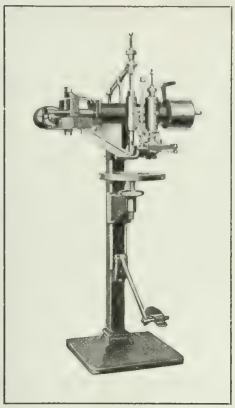
Brinell hardness, impact, bending and tensile tests up to 800 deg. C. of quenched or quenched and tempered nickel-chromium steels containing 1.9 to 5.8 per cent nickel, 1.7 to 20.6 per cent chromium and 0.12 to 0.31 per cent carbon and chromium-vanadium steel containing 2.4 per cent chromium and about 0.6 per cent vanadium.

11. T. H. S. Dickenson, "Flow of Steel at Red Heat." Paper before the British Iron & Steel Institute, September, 1922. London *Engineering* (Sept. 15, 1922), p. 265.

Discusses short-time vs. long-time tests at high temperatures and gives for both types limiting temperatures below which 0.3 per cent carbon, nickel-chromium, stainless and high speed steels can stand 8.5 tons per sq. in. without suffering sensible deformation.

Automatic Screw-Driving Machine

The machine illustrated, which is for driving short screws and screws with short bodies and large heads, is a recent addition to line of the Reynolds Machine Co. Massillon, Ohio. It may be adapted also to drive electrical binding screws, washer-head screws, switch box and other types of screws that cannot be driven by the company's standard machines.



Among the features it may be mentioned that no handling of the screws is required beyond keeping the hopper supplied. The machine will magazine and drive screws from No. 4 to 10 inclusive and up to ½ in. long. It will drive screws to the center of a 14 in. circle and set screws tight or loose, as required.

The spindle runs at 800 r.p.m. and the pulley at 400 r.p.m. Two types of tables are available, 12 in. in diameter or 14 x 24 in.; and the table may be adjusted 2 in. without moving the bracket on the column. The size of the base is 18 x 20 in. and the height of the machine 5 ft. 6 in.

Production of Iron and Steel in Canada Declined in June

The production of pig iron in Canada during June declined slightly from the record output of the previous month. The output for June was 99,239 long tons as compared with 101,533 tons in May. Analyzing the production of pig iron for May and June, it will be noted that the output of foundry iron produced for sale increased from 23,242 tons in May to 28,144 tons in June; while basic iron produced for the further use of the companies reporting declined from 61,714 tons in May to 55,565 tons in June. The chief reason for the falling off in the production of pig iron during June was the closing down of three blast furnaces at the Sydney, N. S., plant of the British Empire Steel Corporation, on account of labor troubles. At the end of June only seven furnaces were in blast, as follows: Two at Hamilton, Ont., operated by the Steel Co. of Canada; four at Sault Ste. Marie, Ont., by the Algoma Steel Corporation, and one at Port Colborne, Ont., operated by the Canadian Furnace Co. The production of ferroalloys declined slightly from 2287 tons in May to 2185 in June. The entire quantity in both months was ferrosilicon produced in electric furnaces for sale.

The production of steel declined from the record output of 104,079 tons in May to 96,167 tons in June. This decline in the production of steel is also directly attributed to the labor troubles at Sydney, N. S., where open-hearth furnaces, in fact, the entire plant, was forced to cease operations for a time. Just as conditions were approaching normal, bombs planted at vital points wrecked water lines and caused another shutdown. There is little hope that operations will be resumed to any considerable extent until repairs have been made.

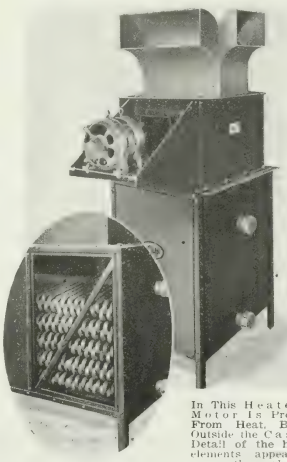
Unit Air Heater for Industrial Use

The York Heating & Ventilating Corporation, Bridgeport, Pa., has recently placed on the market a unit heater which it recommends for industrial heating and ventilating purposes. The makers claim for it several advantages that have not been embodied in previous units of this type. In the first place, the heating coil is made of the best grade of pipe, with all joints at both headers welded, and the whole is tested to a pressure of over 200 lb. per sq. in. This permits the unit to be used with either high or low-pressure steam, as desired. Another distinctive feature is claimed in the air-circulating fan, which has been provided with ball bearings of the self-alining type, to insure quiet and vibration-free operation. The bearings are outside of fan housing and out of contact with hot air.

These units require the minimum of floor space for the amount of heat supplied. In the accompanying photograph is shown this unit provided with a bracket on one side upon which the motor is mounted and direct connected to the circulating fan.

This heater is provided with a discharge outlet at the top, which will direct the air in one, two, three or four directions, as desired. The air inlet at the bottom takes the air from all four sides, thus having a low velocity of entrance and insuring the removal of the cold air from the floor, where it naturally settles. Due to the height of this unit, a considerable amount of heat will be generated with a reduced quantity of air, even when fan is not in operation.

These units are supplied from a capacity of 346,000 B.t.u. per hour and a circulation of 3870 cu. ft. of air per minute, up to a maximum capacity of 1,850,000 B.t.u. per hour, and 19,640 cu. ft. of air per minute.



In This Heater the Motor Is Protected From Heat, Being Outside the Casing. Detail of the heating elements appears at the oval

A competitive examination for selecting a junior metallurgist for the Bureau of Mines at Tuscaloosa, Ala., has been announced by the United States Civil Service Commission, Washington, to which application should be made for further information.

The Mahoning Foundry Co., Youngstown, recently settled all labor difficulties with its molders and is now operating as a closed shop, employing union labor throughout. The company manufactures furnaces and light and heavy castings.

BOOK REVIEWS

Metallography: Metals and Common Alloys. Part II. By S. L. Hoyt. Pages 462 + ix. 6⅜ x 9¼ in., 142 illustrations and 126 tables. Published by McGraw-Hill Book Co., New York.

This is Doctor Hoyt's second volume in his series of three on the subject of Metallography and the book covers in a general way the following subjects: Pure metals, white metal alloys, light metals, brasses and bronzes, steel and cast iron, special steels.

In the chapter on pure metals, their general properties are discussed in a manner which covers broadly the chief characteristics, as hardness, electrical conductivity, mechanical strength and structural features. The treatment of iron and copper is much more complete than are the other metals.

While not bearing the stamp of rare distinction of original research characterizing Rosenhain's book, this book contains considerably wider references to the subject matter. As a reference work for engineer or laboratory it will be found quite useful. The volume is profusely illustrated with equilibrium diagrams, graphs and photomicrographs, the latter uniformly excellent.

The chapter on the brasses is ample enough to satisfy its place in a book of this scope. Here, as elsewhere in the work, the references are recent and have been selected with discrimination.

In the chapter on iron and steel, the matter of the equilibrium diagrams is discussed rather fully. New researches, published since this book was written, particularly Westgren's X-ray analysis on the existence of cementite or carbon in the dissolved state, that of Honda on the revised iron-carbon diagrams, shed further light on the subject. The matter is still partly in a state of flux and a study of the present volume will readily prepare one for following up the more specialized investigations. For obtaining this background, Doctor Hoyt's present work is admirably suited. What at first glance may appear to be a pedantic presentation of the subject later passes for a sincere effort to present all of the sides of what is still in some aspects a debatable question, namely the equilibrium conditions of the iron-carbon system. The chapter on the special steels is good and is ample in scope.

Steel Thermal Treatment. By John W. Urquhart. Pages 336 +xv, 6 x 9¼ in., 136 illustrations. Published by D. Van Nostrand & Co., New York. Price, $8, net.

This book has been written by a practical man of many years' experience and differs from many books that have come from practical men in that its subject matter has been carefully edited from the viewpoint of modern metallurgical science, thus interpreting the practical in the light of the theory of heat treatment.

The book has good type, is attractively bound and particularly is the flow of diction to be commended because it makes for easy reading. One regrets, however, that the references could not have been a little more carfully included. The author has been very free from the criticism of not giving credit to authorities quoted but, on the other hand, the absence of particular references will somewhat curtail the use of the book as a reference book for class work. It is otherwise admirably suited to that purpose.

The chapter on equipment is of course treated from the English point of view and is too meager in places since some of the most useful pyrometric equipment is not mentioned.

As a reference for the practical heat treater the book mentions many "kinks," familiarity with which can only come after years of experience. This book is well worth the price to any heat-treating shop and can be profitably read because it presents a good outline of the present state of art.

The important place given to stainless steel indicates the prominence of this alloy in English practice. The specialist reading the book will constantly regret that more detail has not been given on numerous items, especially in the treatment of high-speed steels. This, however, is a limitation which could hardly have been overcome within the scope of 336 pages.

Advertising to Retailers. By R. L. Burdick, Pages 308, 5½ x 8½ in.; illustrated. Published by the Ronald Press Co., 20 Vesey Street, New York. Price, $3.50.

Getting adequate distribution of products in an economic manner is a problem of such importance that the manufacturer, advertising manager, sales executive, and business man generally, will welcome the fresh help which Mr. Burdick's book will afford. While it contains little that is radically new, it has the outstanding merit of segregating and analyzing the best procedures for developing trade distribution. It comprises, in effect, an outline of tried methods which have "worked" and will "work."

It is difficult to mention all of the particularly good points in the uniformly excellent treatment which characterizes the book. If any parts merit special commendation they are the chapters on "What Is a Retailer?", "What Can Be Advertised to Retailers?", "Training the Appeal to Retailers" and "Means and Mediums for Advertising to Retailers." The emphasis he places on responsibly audited circulations and the importance of distinguishing between papers which are bought on paid subscription and publications which are distributed free—the latter really belonging in the category of circulars, printed matter, etc.—is especially vital and appropriate today.

The book has had the advantage of careful reading while in manuscript by publishers of retail publications, advertising men and teachers in universities. It is appropriately illustrated by 50 full page reproductions of advertisements, charts, etc.

Locomotive Catechism, 1923 Edition. By Robert Grimshaw. Pages xi + 958 + 39; about 500 illustrations. Published by Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price, $4.

This, the thirtieth edition of a work first published in 1893, has been revised and enlarged to bring it fully abreast of the latest practice in locomotive engineering. It is divided into 89 chapters and an index, each chapter taking care of some specific topic likely to come up in examinations of firemen, engineers, trainmen, switchmen, shop hands and roundhouse men.

Among the most recent pieces of information covered will be found data on compound, electric and unaflow locomotives, on the Walschaert valve gear, super heaters, air brakes, etc. The author, who has been connected with the American Railway Master Mechanics' Association and Master Car Builders' Association, etc., has prepared the work from first hand data. It deals not only in the underlying principles, but also in the practical handling and operation, of all kinds of locomotives.

Income Tax Procedure—1923. By Robert H. Montgomery, C. P. A. Pages xxix + 1750, 5½ x 8½ in. Published by the Ronald Press Co., 20 Vesey Street, New York. Price, $10.

The Ronald Press Co., New York, has just issued another volume of 1750 pages treating on all phases of the Federal income tax. There is hardly a question a corporation may ask that is not answered. The book is divided into four sections: Application Administration; Income; Deductions and Special Classes of Tax Payers. Considerable space is devoted to undistributed profits of corporations. One feature is the number of rulings on technical points. The index of these cases covers 16½ pages. Many of these are in answer to the question, "What is a stock dividend?"

New Books Received

A Manual of Artificial Respiration. By Capt. G. R. G. Fisher. Pages 80, 4½ x 6 in.; illustrations 22. Published by Stratford Co., Publishers, 234 Boylston Street, Boston. Price, 75 cents.

The Electric Furnace for Iron and Steel. By Alfred Stansfield. Pages 453, 6 x 9 in.; illustrations 139. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $5.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

P. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice Pres.* A. C. Pearson, *Treas.* P. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building Pittsburgh: Park Building Boston: Ajlo Teatz Building Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 883 Ellicott Square. Washington: 26 Jackson Place. N. W. San Francisco: 321 Market St. London, Eng.: 11 Haymarket, S. W. 1.

Subscription Price: United States and Possessions, Mexico, Cuba $6.00; Canada, $8.50. Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879

The Farmers and Organized Labor

The Western farmers have recently been having some political conventions and economic conferences. Into some of these the labor unions and communist organizations injected themselves. In one instance the communists captured the meeting, but the farmers whose eyes had been opened retired in disgust. The American farmer is, in fact, individualistic and capitalistic, although he might not so identify himself. In his ignorance he has sometimes permitted socialistic experiments to be tried upon him. But when socialism, syndicalism and communism are presented to him in recognizable forms he has no appetite for them.

At the wheat conference in Chicago in June there were present Mr. Gompers and Mr. Stone, who pledged the support of their labor organizations to whatever follies the farmers might be contemplating in order to raise the price for wheat. The labor leaders can and do freely promise their aid in efforts whereof they know the futility. All that they ask is a free hand in carrying out their own purposes of higher wages for organized labor. So long as the farmers collaborate with them they give something for nothing. Nay, worse than that, they ally themselves against their own interests.

The main cause for agricultural distress at the present time is not that prices are too low, but rather that costs are too high, this being a consequence of the exactions that town labor has found itself able to make and maintain. These exactions are imposed not only upon the farmers of the country but also upon the white collar classes. Statistically something more than 50 per cent of the people are victimized by something less than 50 per cent. The advantages that are gained by certain groups of labor would be quickly lost if the remuneration of all workers, including the farmers, were advanced correspondingly. No group of workers can gain anything except at the expense of other groups. This ought to be so obvious as to require no further argument or explanation.

We think that we can discern signs of growing sanity among the Western farmers. The selfish politicians may preach to them about Government loans to carry the wheat and about the Government buying the wheat, etc., as panaceas for their troubles, but many of the farmers are ceasing to be misled by such claptrap. They are beginning to perceive that the low prices for their products and the high costs for raising and carrying them are both associated with the continued disorganization of industry in Europe. They see, therefore, that their own welfare is not so independent of European welfare as some of the doctors have been teaching, and that the United States in some way must help Europe so that Europe can buy from us, which means, of course, that we must buy from Europe. American copper producers, cotton producers, petroleum producers and all the producers of raw materials whereof there is a surplus above the needs of domestic consumption see the thing in the same way.

If there be a shortage of labor in the United States, or, what is more probable, a disinclination of labor to work as hard as is needful, with the results of shortage of goods and consequently high prices, the natural economic solution is to let the people of foreign countries work for us. We need not fear competition of Europe in work that we can do better. Even in competitive manufacturing there is no use in struggling along if labor is going to exact all the profit. It may be anticipated that the next year or two will see a great change of mind about the tariff.

The Practical and the Spiritual

Two remarkable articles published in the *Atlantic Monthly* for August—one by Woodrow Wilson, ex-President and man of letters, and the other by Philip Cabot, a man of varied experience in banking and other business—emphasize impressively the necessity of spiritual development. The ex-President speaks of the solution of the problems of the nation and the preservation of civilization, while the Boston banker tells how he has found more vitality and power and a keener zest for life, but both argue that in the cultivation of the spiritual rather than in the pursuit of the material real life is found.

Newspaper comments have suggested that the

country is confronted by problems of immediate and concrete difficulties which can be dealt with only by practical and definite methods and that "sweet reasonableness and pious ejaculations" will not suffice. Of course, there must be definite applications of broad principles, but every man must do that largely according to his own ability and conscience.

Getting down to something very concrete and practical, we have before us the solution of the problems of the long day in the steel industry. This solution cannot be found in a way to insure permanent success by considering only costs and other material elements. A large consideration in the minds of the manufacturers who are now engaged in the great task of working out the change to the shorter day must be the welfare of the men, even when some of them are disposed to stand in their own light. If men have been on duty for such long hours that for a while they will not know how to spend their spare time wisely, that is not an argument against the shorter day. Rather it shows the importance of not only granting shorter working time but of helping the men to find ways to the best use of the spare time that will be theirs. In working out the plans there will arise questions which will require not only clear thinking but such a disposition to recognize the human side of the problem as shall make this great change a means to better working relations throughout the industry.

Payment by Results

In the first two years after the war, when labor unrest was particularly great, there was much talk about "piece work" or, to bring out the basic principle, payment by results. Of late the subject has received less attention, and this is unfortunate, for if even a small part of what was being said only three years ago is true, this is a problem that will recurrently force itself upon attention. Periodic neglect of such matters is natural. The same thing is to be observed in the matter of "the business cycle," which receives much attention when times are especially good or especially bad—notably the latter.

It would be quite unfair to assert that discussion of payment by results has ignored the human element, but it is probably true that the psychological aspect has been missed in many cases. Thus employers have been more inclined to propose piece work when there was much labor unrest than when there was little. The proposal then presents the appearance of being a compromise or surrender. When men are critical and filled with an exaggerated sense of their importance they are least disposed to work hard. From the business viewpoint that may be the time for a piece work plan, but from the psychological viewpoint it is not.

Many men are complaining of the ups and downs of commodity prices, giving at one time a sellers' market and at another time a buyers' market. The question is whether we really wish to mitigate this same tendency in the case of employment, so that employer and employee shall continuously have more balanced relations.

The vital fact must be kept in the forefront that the purely business and the purely psychological requirements in a system of payment by results cannot be met at the same time. They are divergent. To illustrate simply, assume that a fair earning is $5 a day and a fair output is fifty pieces, making 10 cents apiece a fair remuneration, and that the cost to the employer of furnishing the facilities is $5 a day, making total cost $10 or 20 cents apiece on a 50-piece output. If simply the principle of the employer paying the employee for what the employer obtains were adopted, the payment would be $4.80 for forty-nine pieces, $5 for fifty pieces and $5.20 for fifty-one pieces. There would be double penalty and double reward. The average employee would object to the one and might be suspicious of the other.

It is for such cases as these that the management needs to supply the arithmetic of simple shop cost calculations. It is possible that shops which have been preeminently successful in piecework operations have found it desirable to place on instruction cards, at least those for oft-repeated jobs, some explanation beyond merely stating what is the bonus for a performance better than the reasonable task, or the reduction, if any, for failure to meet it. A bit of mathematics outlining the reason for the bonus or penalty ought to dispel suspicion.

In the example suggested, the instruction card might say that the company can afford to pay $10 a day for fifty pieces, $5 to the workman and $5 for the interest charges and upkeep of machine and factory space, including light, power and general overhead expenses. This actually means 20 cents outlay per piece. Then if the operator makes fifty-three pieces the factory can afford to pay $10.60; reserving $5 for itself, it can give the operator $5.60. If only forty-seven pieces are made, the factory, though taking $5, might still lose in that it is not getting full output and there would be left for the workman only $4.40. Any measures calculated to help the worker to see the manufacturing problem of meeting competition are worth while, whether a piece rate system or any other basis of wage payment is involved.

Liberalizing Compensation

Workmen's compensation is again coming to the fore as a matter for consideration and amendment. Industrial legislation comes in waves, and it is compensation's turn. The tendency is to increase the benefits which accrue to injured workers under its operation, and a chief reason urged is that they should keep pace with the cost of living. While, of course, higher wage schedules automatically result in larger benefits, which are based upon the earnings of beneficiaries, immediately antedating the accident, it is now argued that this in itself is not a sufficient increase where disability is serious and protracted. Large employers of labor are inclined to see justice in this proposition.

Owners' interest in new legislation does not lie so much in keeping down total cost of this item of overhead as in the effort to have the

greater part of the increase go where they believe it will do the most good. They feel that those whose injuries cause absence for only short periods should not be considered so worthy of assistance as those whose injuries compel protracted idleness.

A recent amendment of the Massachusetts compensation act reduces the waiting period following an accident, before compensation begins, from ten to seven days. Other States have the same shorter period, so that the increased cost does not put Massachusetts manufacturers at a disadvantage in competition. It can be appreciated, however, that the new law increases considerably the direct cost of compensation as well as the overhead cost involved in keeping records for a much greater number of beneficiaries, all without any very material gain to them.

Based on the figures of accidents in Massachusetts industries in 1922, when the waiting period was ten days, 32,459 cases would be affected by the amendment, at an average cost of $6.86, representing three days' compensation, making a total new cost of $223,286. Moreover, it is estimated that the cost of administering the system is increased about an equal amount, not to speak of the tendency of idleness to increase. It is believed by those who have studied the workings of compensation that the shorter period stimulates malingering on the part of many who otherwise return to their work within ten days, but who would be tempted to take a few extra days if they were to receive compensation for the time.

Employers hold that if $400,000 is to be added to the cost for compensation in Massachusetts it would be better to maintain a longer waiting period and spend the money for increased benefits for those who most need it, the victims of accidents which compel longer idleness, or, because of maiming, a change to minor employment, or for dependents in cases where death results. The number of serious cases is very small when compared with the total number of accidents. The $400,000 of Massachusetts money would give substantial aid if distributed among the serious cases instead of being frittered away on the large number of short term cases.

Compensation agitation is not confined to the United States. The British Parliament is now considering a bill which would impose heavier burdens on industry in spite of the fact that the benefits, based on wartime conditions, are slightly reduced. Particularly objectionable is a provision that employers cannot plead that the accident was caused by the man acting in contravention to statutory or other regulations, or to specific orders given him by his employer, or that he took upon himself that which he had no business to do, providing it "was for the purpose of or in connection with his employer's trade or business." This, it is maintained, embraces practically every accident which might occur. The effect would be to nullify statutory regulations, the neglect of which now means accident without compensation.

The British bill looks to be a compromise. It was deemed imperative to reduce the maximum amounts established under the exigencies of war time. However, the increased scope of liability is practically a return to the original British compensation act, under which even drunkenness was no bar to liability. There was the case of a sailor who went ashore from his ship. Returning to the dock very drunk, he boarded the vessel by a dangerous and forbidden passage, fell through a hatch into the hold and was badly injured. Compensation was allowed him. Plainly, if such cases are to be made subjects of legislative aid, the burden ought to be on the public and not on the individual or corporation that happens to be the employer.

Further testimony to the importance of chromium in industry is found in the work of the Bureau of Standards on the strength of steels at high temperatures. The second and concluding instalment of an article giving the results of an investigation of this subject appears on other pages of this issue. In a comparison made on the score of proportional limit, the authors find that the most striking feature observed is the predominance of steels containing chromium. "At 550 deg. C. five of the six steels showing the highest limit of proportionality contain chromium; two also contain molybdenum and additions of vanadium or uranium are each found in one case." As industrial processes, chemical and others, increase in scope and complexity, a demand is created for stronger metals at high temperatures. Chromium thus far has been the main reliance in meeting these conditions.

American Locomotive Co. Earnings

The American Locomotive Co. and subsidiaries report net profits for the first half of 1923 of $7,917,125, after interest on bonds, etc., against $2,267,259 for the six months ended Dec. 31 last. With taxes and preferred dividends deducted there remained $6,097,125, equal to $12.19 per share on the 500,000 shares of no par common. Surplus for the period, after reserving $1,500,000 for additions and betterments, amounted to $3,597,125. President Andrew Fletcher, in his statement to stockholders, said in part:

"The total unfilled orders on June 30, 1923, amounted to $54,688,031, as compared with $49,349,140 on Dec. 31, 1922. Domestic business at both periods represented about 99 per cent of the unfilled orders. The amount of unfilled business on hand June 30 is sufficient to keep the plants operating at full capacity for the remainder of the year."

Storage of Coal Being Studied

Steel mills are classed among the "preferential" industries in the storage of coal studies undertaken by the Federated American Engineering Societies in cooperation with the U. S. Coal Commission and the Department of Commerce. Electric railway, light and power, steam railways; smelters; railway equipment; electrical equipment; autos and accessories are industries also classed as preferential.

Foundries and machine shops and ship building are among the industries embraced in the study as "desirable."

More than 100 committees comprising 500 engineers are pursuing the inquiry, the aim of which is to aid in solving the nation's fuel problem. It is hoped to complete the coal storage study by fall.

Working on Abolition of the Long Day

Conferences of Iron and Steel Manufacturers Held in New York and Cleveland—Many Difficulties Presented, but Executives Determined and Will Proceed as Rapidly as Possible

THE past week has been one of conferences in New York and other cities in regard to the abolishing of the 12-hr. day in the steel industry. A meeting of the presidents of subsidiary companies was held Thursday at the office of Judge Gary, chairman United States Steel Corporation, and on the following day the directors of the American Iron and Steel Institute met. At both meetings methods of bringing about the change were considered, but no announcement was made except one of progress. It is expected that meetings will continue this week.

President Grace's Statement

"The shorter day is no longer an issue. The question now is how and when it shall be effected," Eugene G. Grace said last week during an interview in which he laid stress upon a point much neglected in newspaper discourses, namely, that the crux in making the change lies in the continuous operation departments.

As to how the change will be made, Mr. Grace said, "You can't take a man from the 12-hr. to the 8-hr. day and cut his pay in proportion to the hours. There must be a compromise to give him a chance, either on the tonnage basis or some other, to make something near his present earnings." It is well known that many steel workers prefer $4.80 for the long day to $3.20 for the short day. The Bethlehem organizations are now formulating plans to eliminate the long turn and, according to the president, expect "within a very short time to begin the actual rearrangement of forces. This will be accomplished with the employees a party to it through Bethlehem's employee representation system."

How soon the change will come is dependent solely upon the available labor. "If there were enough men to make three shifts, the change would be made tomorrow," Mr. Grace said. There will be some negro workers from the South and Mexicans from the border to help make the quota, but these will not come in large numbers. The hope of getting the full 60,000 required hangs on immigration legislation. Mr. Grace favors a "highly selective" immigration law which will admit a larger percentage of those who will make good citizens. In Bethlehem plants alone 2500 Mexicans have been employed during the last few months and they have proved satisfactory.

Mr. Grace added: "We said that we would change to the shorter day, and we will."

Employee Representation

President Grace made a statement sketching in brief the results of the employee representation system as described fully in THE IRON AGE of June 14 by John Calder, consulting engineer, Lexington, Mass.

Conference Held in Cleveland

CLEVELAND, July 30.—Some of the operating heads of Cleveland steel plants held a conference during the week with steel plant officials in Youngstown in regard to the adoption of the 8-hr. day. As yet no definite steps have been taken in this territory and it is generally felt by independent producers that steel companies must all work together in bringing about the shorter day.

The Upson Nut plant of the Bourne-Fuller Co. was placed on an 8-hr. day several years ago. Outside of the American Steel & Wire Co.'s plants only two local steel companies will be affected by the adoption of the shorter working hours, these being the McKinney Steel Co. and the Otis Steel Co. At the McKinney plant the 12-hr. day is in force only in departments where the operations are continuous, which includes the open-hearth, blast furnace and coke oven departments. The Otis Steel Co. is operating on a 12-hr. basis in its blast furnace and coke departments, but is operating all its mills, as well as its open-hearth furnaces at its Lakeside plant, on an 8-hr. schedule. This company will start up the new open-hearth plant at its Riverside works in a few months and probably developments in the meantime in the shorter hour movement will lead to a decision as to whether it will place this plant on an 8-hr. or 12-hr. day.

Making Progress at Youngstown

YOUNGSTOWN, July 31.—Institution of the 8-hr. day in the steel plants of the country will not be a simple matter. In fact, it presents difficulties which are easily overlooked by the layman. Its further introduction is more likely to be a gradual process, rather than a somewhat sudden change. Two of the principal factors entering into the situation at present are the lack of adequate labor supply and the disinclination of many workers, particularly the foreign-born, to have their wages reduced, even as a partial offset to the cut in their hours of work.

In the Mahoning Valley the shorter workday is more generally in effect at the plants of the Trumbull Steel Co. at Warren than at any other property. There is no particular significance to this situation, however, as the Trumbull company employs many sheet and tin plate workers, who are generally on an 8-hr. basis. The company, however, was among the first to adopt the 8-hr. day in its open-hearth department, where it has been in effect for several years.

The majority of employees of the Trumbull company are on the short-turn basis. The abolition of the 12-hr. day by this company came by degrees and was accompanied by no unusual circumstances. There were no wholesale or revolutionary changes.

Youngstown Sheet & Tube Co. Plans

"In considering the 8-hr. day it is necessary for us to do the right thing first by our men," observes President James A. Campbell of the Youngstown Sheet & Tube Co.; "secondly, by our stockholders, and, third, by the public. Many people believe it is comparatively easy and simple to establish the shorter day. But the problem is really a difficult one. The three principles I have laid down must be observed and everybody must be satisfied. The change is really a revolution in the steel industry and must be considered in all of its angles before it is actually accomplished."

It was the plan of the Sheet & Tube company to begin the introduction of the shorter day about Aug. 1, but it is apparent that little progress will be made in reducing working hours at this time. In fact, independent interests as a general rule are awaiting the action of the United States Steel Corporation on this subject. In the matter of introducing the shorter day, as in the matter of wages, the action of the leading interest may be expected to prove a dominating influence. As competitors in the steel markets, they cannot pay higher wage rates than the Steel Corporation, and as competitors for labor supply, it is unlikely they can be less generous than the principal employer.

"We hoped to make a start toward the expansion of the shorter day on Aug. 1," states Mr. Campbell, "but the difficulties are so many and so hard to solve that it will take longer to decide on a definite plan. The steel industry is one of the most keenly competitive in the country and no one concern can afford to make the change much in advance of its competitors."

The larger independents are conducting surveys of

their properties, determining how different departments will be manned under the new arrangements.

Eight-Hour Turns with Eight Hours Pay

During the summer there has been considerable shifting in the plants of the Sheet & Tube and the Republic Iron & Steel companies, affecting chiefly the higher-priced men. For instance, some of the 12-hr. men at the blooming mill of the Republic company were recently put on an 8-hr. basis. Those affected were blooming mill heaters, pit crane and stripping crane operators. In no case was the wage rate per hour or the rate per ton affected. In other words, men previously working 12 hr. and reduced to 8 hr. were paid for 8 hr. on the same hourly basis, or at the same tonnage rates, which they had previously received for 12 hr.

Most of the men affected were American workers. The changes were originally made by the Sheet & Tube company, and when employees doing similar work at the Republic plant learned of this, they made request for the same reduction in their working hours, even though it involved a substantial reduction in compensation. "The change was not made voluntarily on our part," says an official of the Republic company, "but at the request of the men."

In some cases the reduction in compensation, where the men were paid the tonnage rates, amounted to as much as $80 and $90 per month. The great majority of the American workmen prefer the shorter day, and at the same time are seeking steady employment.

Ten-Hour Rolling Mill Turns

In some rolling mills of independent plants in the Youngstown district men now work 10½ hr. on the day shift and 13½ hr. on the night shift. It is proposed to change this arrangement to two 10-hr. shifts, and close down the departments for four hours, during which repairs may be made, or rolls changed, etc.

It is generally conceded that the 12-hr. day is doomed, but this does not necessarily mean a universal 8-hr. day. It means rather establishment of 8-hr. shifts where continuous operations are necessary, and 10-hr. shifts in most other departments. The highest number of hours which any men will work when the changes become effective will be 60 hr. per week, and the smallest, 44, with most of the men averaging 55 hr.

Wage adjustments, it is felt, will be inevitable, and it is regarded as certain that the men will be obliged to accept a reduction in the amount of pay they receive for the shorter day. Cost of production will be advanced.

Labor Supply in the Coming Winter

In some quarters the problem of labor supply is not regarded so seriously as in others. For instance, it is pointed out that, in a five or ten-year period, plants in the Youngstown district do not average more than 70 per cent. Operations the past four months have been above average, as a result of which there has been a considerable influx of workmen into the district, though the number has been insufficient to meet the requirements.

Industrial leaders do not anticipate that operations during the winter will average above 75 per cent. With the decrease in operating schedules the additional workers brought into the district will be available for establishing the shorter workday. It will also mean adjustments and changes in the supervising forces. More foremen will be needed, and there will be advancement for many of the older employees, who will become key men on the shift that is to be added.

Steel men are almost unanimous in saying that production costs will increase, the estimates varying from $3 per ton of steel, made by Mr. Campbell, to $4 and $4.50 per ton, suggested by others. As operations are now largely mechanical, production will not be increased by having three shifts instead of two.

In rolling mill departments, where men are paid on a tonnage basis, no great loss in production is expected, as it has been the experience that men paid on a piece or tonnage basis will try and earn as much in 10 hr. as in 12 hr. This was demonstrated when the Sheet & Tube company changed from 12-hr. night shifts to 10-hr. night shifts in its tube mills.

Judge Gary Indorses Prohibition and Opposes Modification of the Law

Prohibition has been of incalculable benefit to the workers in American industry, particularly those in the steel industry, and their families, Judge Elbert H. Gary, chairman of the board of the United States Steel Corporation, Monday declared in an interview for *The New York Times*.

According to Judge Gary, the effects of prohibition, despite the admitted violations of law in the large cities, have included a decrease in the consumption of intoxicating liquor, a decrease in crime and poverty, an increase in the health of the workers and their families and their savings deposits.

These advantages to the workers have been coupled with an improvement in the working ability and disposition of the employees, according to Judge Gary. Even without the material and moral advantages to its employees, Judge Gary said the Steel Corporation would be for prohibition, because it pays.

Judge Gary declared himself against any modification of the prohibition laws. He added:

"While there have been violations of these laws, particularly in the larger cities; while there has been illicit manufacture of 'hootch,' so-called, and while there has been more or less bootlegging, yet as a total result of the prohibitory laws there has been a large decrease in the use of liquor, at least in the vicinity of our various plants throughout the country.

"There has been a decrease in the number of inmates of jails, asylums and hospitals. There has been an increase, and a large increase, in the bank balances of savings deposits. The health of the people has improved. The families of workmen are better clothed and better treated. The attendance of the workmen and their families at church, of the children in schools and of all of them at clean, legitimate, healthful resorts and places of amusement, has materially increased."

Steel Production Well Maintained

YOUNGSTOWN, July 31.—In contrast with the decline in furnace output, steel production continues with little diminution. The independents are maintaining an average of 45 open-hearth furnaces, of 51, on the active list.

Sheet output shows considerable decline this week, due to slackening requirements. Of the 117 independent sheet mills in the Mahoning Valley, 89 were scheduled to resume early in the week, the lowest number in many months, excepting the suspensions for repairs around July 1.

Individual schedules call for operation of sheet mills as follows: Youngstown Sheet & Tube Co., 30 of 42 mills; 17 of the 17 mills of the Newton Steel Co. (three additional mills are now being completed); 15 of the complement of 15 in the group of the Trumbull Steel Co.; eight of the 18 mills at Niles of the Republic company; seven of the nine mills of the Sharon Steel Hoop Co.; five of the eight units of the Falcon Steel Co. and seven of the eight Mahoning Valley Steel Co. mills.

The Falcon Tin Plate Co. is operating seven of its nine mills at the Canton property. The Trumbull Steel Co. has 23 tin mills scheduled this week.

The conduit department of the Sheet & Tube company at its Struthers plant has been suspended.

Plate, skelp and bar mills continue with little change in schedules.

BLAST FURNACES STOPPING

Twenty-three Now Idle in the Pittsburgh and Adjoining Districts

PITTSBURGH, July 31.—In a special summary detailing the furnaces in and out of blast, THE IRON AGE under date of May 21 last noted as active a total of 126 out of 138 furnaces in the triangle bounded by Johnstown, Pa., on the east, Wheeling, W. Va., on the south, and Warren, Ohio on the north. It was then stated that the above total probably marked the high peak of blast furnace activities for this year since four or five of the furnaces were in blast chiefly because the then existing prices permitted profitable liquidation of ore stocks. Since July 1 most of these furnaces have quit and there have been several other suspensions because of the decline in the prices of pig iron on the one hand and because a lighter demand for finished steel has rendered unnecessary the production of pig iron on the scale of the early part of the year. As of today, 115 furnaces are active, 22 are cold and one furnace is banked. This is at variance with recent daily newspaper statements that 30 furnaces have gone out. As will be seen, 12 furnaces have not been in operation at any time on the present movement, so that only 10 have blown out since the peak in May. We present herewith a table giving the present standing of the furnaces in the territory indicated:

	Total	July 31 In	July 31 Out	May 21 In	May 21 Out
PITTSBURGH DISTRICT					
Steel Works Blast Furnaces					
American Steel & Wire Co.	4	4	0	4	0
Carnegie Steel Co.	54	50	4	53	1
Pittsburgh Crucible Steel Co.	2	2	0	2	0
Jones & Laughlin Steel Corporation	12	11	1	12	0
National Tube Co.	4	4	0	4	0
Pittsburgh Steel Co.	2	2	0	2	0
Merchant Furnaces					
Clinton Iron & Steel Co.	1	1	0	1	0
Total	59	54	5	58	1
MAHONING AND SHENANGO VALLEYS					
Steel Works Furnaces					
Carnegie Steel Co.	15	12	3	15	0
Republic Iron & Steel Co.	7	5	2	6	1
Sharon Steel Hoop Co.	1	1	0	1	0
Trumbull Cliffs Furnace Co.	1	1	0	1	0
Youngstown Sheet & Tube Co.	9	8	1	9	0
Merchant Furnaces					
A. M. Byers Co.	1	1	0	1	0
Hanna Furnace Co.	3	2	1	3	0
Reliance Coke & Furnace Co.	2	1	1	2	0
McKeefrey Iron Co.	1	1	0	0	1
Sharpsville Furnace Co.	1	1	0	0	1
Shenango Furnace Co.	3	*2	1	2	1
Struthers Furnace Co.	1	1	0	1	0
Stewart Furnace Co.	1	1	0	1	0
Valley Mold & Iron Corporation	1	0	1	0	1
Total	47	37	10	42	5
WESTERN PENNSYLVANIA					
Steel Works Furnaces					
Cambria Steel Co.	11	9	2	9	2
Merchant Furnaces					
American Manganese Mfg. Co.	2	1	1	1	1
Kittanning Iron & Steel Mfg. Co.	1	0	1	1	0
McKinney Steel Co.	3	3	0	3	0
Total	17	13	4	14	3
WHEELING DISTRICT					
Steel Works Furnaces					
Carnegie Steel Co.	7	5	2	5	2
National Tube Co.	2	2	0	2	0
Wheeling Steel Corporation	5	4	1	4	1
Weirton Steel Co.	1	1	0	1	0
Total	15	12	3	12	3
Grand Total	138	116	22	126	12

*One furnace banked.

YOUNGSTOWN, July 31.—With the exception of receding iron output, due to slack in demand for pig iron, production schedules of steel companies are holding up well. No. 3 blast furnace in the Hazelton group of the Republic Iron & Steel Co. is scheduled for suspension at an early date for relining, contract for the work having already been awarded. In the Mahoning Valley, the idle furnaces include D stack at East Youngstown, of the Youngstown Sheet & Tube Co., suspended for relining; the detached Hannah furnace of the Republic company, and the detached Thomas stack at Niles, Trumbull County, of the Carnegie Steel Co. Otherwise all blast furnaces, both steel company and merchant stacks, are in action.

In the Shenango Valley, 13 of 20 furnaces are operating. The Atlantic stack at New Castle of the Republic company is idle, as well as the Sharon, Pa., furnace of the Carnegie Steel Co. Otherwise the inactive blast furnaces in the Shenango Valley are merchant stacks.

Plans for Vocational Shops in Baltimore Schools

Plans are being made by the Board of Education, Baltimore, for the installation of elaborate vocational shops in four of the large high schools now under construction or which are to be started soon. Considerable equipment, such as small machine tools, woodworking machinery, electric shop equipment, etc., will be installed. Charles W. Sylvester, director of vocational training, Administration Building, Madison and Lafayette Avenues, Baltimore, wants catalogs and data on the equipment which will be needed.

There also are six elementary schools under construction or about to be started. These are to contain woodworking shops only.

The Forest Park Junior-Senior High School, which is under construction, is to have the largest shops. There will be four mechanical drafting rooms, machine, electric, sheet metal, automobile, two woodworking and printing shops. The shop building will be separate from the main school building. The Clifton Park Junior High School, also under construction, will have woodworking, machine, electric and sheet metal shops and two drafting rooms.

Work has not been started as yet on the Southwestern Junior High School. This building will contain a combination machine and automobile shop, sheet metal, electric and woodworking shops. The Colored Junior-Senior High School, upon which work has been started, will have a separate building for the shops. An old building will be remodeled at a cost of about $100,000 for this purpose. It will include machine, automobile, woodworking, electric, sheet metal and printing shops.

The machinery which will be installed is to be of a variety of makes, according to Mr. Sylvester, in order to give the students training on more than one kind.

In addition to the many schools where pre-vocational training is given and those planned the school officials of Baltimore also operate the Carroll Vocational School. This contains machine, automobile, pattern, electric and printing shops. This school is operated on a 6-hr. day basis, the students spending half of the time in shop work and the other half in related subjects and general education.

Southern Traffic League Favors General Rate Investigation

WASHINGTON, July 31.—Informal application was made last week to the Interstate Commerce Commission by the Southern Traffic League for a general investigation into the commodity rate situation in Southern territory. Particular concern was shown with respect to commodity rates that were permitted to become operative July 1, despite numerous protests from organizations of shippers who showed concern over the action of the commission in permitting application of the rates because of what they considered would be its effect on the existing class rate investigation. The commission, however, after refusing to suspend the rates, gave out a statement which was designed to assure shippers that the apprehension shown was not justified.

Iron and steel producers in western Pennsylvania and in Ohio made particularly strong protest against increased rates on their manufactures. Some shippers are inclined to make formal complaint about the rate situation developed as the result of the failure of the commission to suspend the rates.

EXPORT MARKET QUIET

Japan Buys British Tin Plate and Inquires for More—British Cotton Ties Imported

NEW YORK, July 31.—The quietness in export trade continues as far as iron and steel are concerned, but there has been a fair degree of activity in inquiries for electric cranes from Japan and China. Cuban buyers have been inquiring for iron and steel and South American markets continue active on small lots of wire, galvanized sheets, nails, etc. Chinese merchants are actively buying wire shorts at about $49 per ton, f.a.s., American port, and continue willing to consider quotations on second-hand plates but are not inclined to go above $28 to $30 per ton, c.i.f. China, on this latter material. Galvanized sheets, wire and tin plate are extremely quiet in the Chinese market. The total world buying is not large and Great Britain is getting most of the orders at prices sometimes $8 and $10 below American quotations.

Japanese merchant buyers are inquiring for black sheets of light gage, inquiries generally being for 50 or 100 tons, and a few for 300 tons, but activity seems to be entirely confined to obtaining prices. There has been some purchasing of wire rods and a few sales of light gage wire are reported. In tin plate, the Nippon Oil Co. is again in the market, this time for 19,000 boxes, bids opening Aug. 1. The previous contract for 18,000 boxes was placed by a Japanese export and import house with Richard Thomas & Co., Ltd., Abercarn, Monmouthshire, England. This is believed to be the first tin plate tonnage of the Nippon Oil Co. placed with a British seller this year.

British sellers of cotton ties are evidently disposing of a fairly large tonnage in the United States, to a certain extent supplanting the German competition which usually occurs, but which has been eliminated this year as a result of political conditions in Europe. One importer of cotton ties mentions the arrival of 100,000 bundles of British ties and a Texas company is reported to have purchased a total of 80,000 bundles at between $1.60 and $1.65 per bundle, although the price generally quoted for British cotton ties is about $1.80 per bundle, c.i.f. Atlantic port, duty paid and loaded on cars.

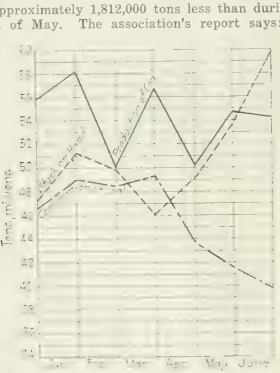
While reports of Belgian competition in foreign markets continue, the low-priced business actually transacted is believed by some importers and exporters to be somewhat exaggerated. Although a price of $36 per ton, f.o.b. Antwerp, was recently quoted as the Belgian export price for rails, an importer in New York who forwarded an inquiry for 1000 tons of 65-lb. rails to three of the largest Belgian rail mills received a quotation from only one and this was $46 per ton, c.i.f. American port.

Scotch foundry iron is said by importers to be completely out of reach for importation into the United States at present. Continental iron is also above the present domestic market. One importer reports a recent quotation of $28.50 per ton, c.i.f. New York, Philadelphia or Boston, on French foundry iron, less than 1 per cent phosphorus and either 2.25 to 2.75 per cent silicon or 2.75 to 3.25 per cent.

LESS COAL BURNED

Consumption of Both Hard and Soft Grades Declined in June

The most recent data on coal collected by the National Association of Purchasing Agents show that during the month of June the industrial consumption of hard and soft coal in the United States and Canada was approximately 1,812,000 tons less than during the month of May. The association's report says: "As



Coal Production, Consumption and Stocks in First Six Months of 1923

these figures are based entirely on the industrial consumption of coal, they reflect a further decrease in business of 4.3 per cent during the month of June. For the month of May we recorded a decrease in business of 5 per cent and for the month of April a decrease of 10 per cent. During the first quarter we recorded an increase in business of 9.63 per cent and for the second quarter a decrease of approximately 15¼ per cent.

"Inasmuch as our chart reflects a further decrease in business, it should be stated that the coal consumption of some branches and lines of business for June indicated no further dropping off in the volume of business, also that the coal consumption of a considerable number showed an increase, but the larger percentage showed further declines and on the whole or in general there was a decrease of 4.3 per cent. This would indicate that the downward trend is about at an end and that no further decrease in business will be registered for July and that there is a possibility that the upward swing will begin with the month of August.

"The stocks of hard and soft coal in commercial consumers' bins on July 1 were 6,053,200 tons greater than on June 1. Expressed in number of days, the supply on July 1, based on the June consumption, was sufficient to meet the industrial requirements of the United States and Canada for a period of 45 days, based on the March, April and May consumption, we had in storage on July 1 sufficient for approximately 41 days.

"The estimated total production of hard and soft coal in the United States during the month of June was about 426,000 tons less than during the month of May."

	Net Tons
Stocks on Hand	
May 1, 1923	49,622,000
June 1, 1923	52,669,800
July 1, 1923	58,723,000
Consumption	
Month of April	43,658,000
Month of May	41,532,000
Month of June	39,272,000
Production	
Month of April	50,209,000
Month of May	54,735,000
Month of June	51,509,000

(Of the June production 45,644,000 tons was soft coal and 8,665,000 tons was hard coal.)

Figures of the Bureau of the Census, Washington, show that 196,267 establishments engaged in manufacturing in 1921 made goods to the value of $43,653,283,000, compared with $62,041,795,000 from 214,383 establishments in 1919. Wage earners in 1921 were 6,946,564, and wages amounted to $8,200,324,000, or $1,180 per person. These figures compare with 9,000,059 and $10,461,797,000 and $1,162 in 1919. The 6,896,190 wage earners in 1914 received only $4,067,719,000, or $590 per person, exactly one-half of the 1921 average wage.

PIG IRON OUTPUT DOWN

July Total 3,679,810 Tons—Loss of 25 Furnaces

Curtailment Movement Well Under Way, Including 9 Merchant Stacks

Through the excellent cooperation of the operating companies, acknowledgment of which is hereby made, THE IRON AGE is able to present in this issue a close approximation to the pig iron output of July. There is so much interest throughout the iron trade in the present relation of supply and demand that the effort was made to compile the July statistics and go to press with them on the evening of July 31. This involved the telegraphing of returns from all the furnaces in blast, and the producers were asked to estimate the production of the final day. The response has been most gratifying and it is safe to say that the figures compiled will show no material divergence from the final tabulation which will be presented next week. For only seven furnaces out of the total number producing pig iron in July was it necessary to make estimates in this office because of the non-receipt of telegraphic advices up to the hour of going to press.

The estimated production for the 31 days of July is 3,679,810 gross tons, or 118,703 tons a day, as against 3,668,413 tons in the 30 days of June, or 122,280 tons a day.

That the curtailment movement referred to in these columns two weeks ago is well under way appears from the blowing out or banking of 27 furnaces in the past month. Two furnaces were blown in in July, making the net loss 25. Thus there are in blast at the beginning of August 297 furnaces, against 322 furnaces one month previous. Of the furnaces blown out or banked in July 18 were steel works furnaces and 9 were merchant furnaces. Such a reduction in the pig iron output of the steel companies points also to a considerable cutting down of steel ingot production in the month just ended.

The estimated production of ferromanganese in July was 26,231 tons, or the largest for any month this year, the average for the first six months having been about 20,000 tons per month. The spiegeleisen output in July was about 12,850 tons, which compares with an average of 10,000 tons per month for the first six months.

Furnaces In and Out

Among the furnaces blown in during July was the Oriskany furnace of the Lavino Furnace Co. at Reusens, Va., and the Standard furnace in Tennessee, which had been banked late in June.

Among the furnaces blown out or banked in July were the following: One Wharton furnace of the Replogle Steel Co. in New Jersey; C furnace of the Bethlehem Steel Co. in the Lehigh Valley; one Lucy, one Isabella and the Edith furnace of the Carnegie Steel Co. and No. 1 Alliquippa furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; No. 4 New Castle furnace and the Sharon furnace of the Carnegie Steel Co., one Shenango furnace of the Shenango Furnace Co. and the Fannie furnace in the Shenango Valley; one furnace of the Virginia Iron, Coal & Coke Co. in Virginia; one Youngstown and one Brier Hill furnace of the Youngstown Sheet & Tube Co. and the Niles furnace of the Carnegie Steel Co. in the Mahoning Valley; one River furnace in northern Ohio; the Milton furnace and one furnace of the Marting Iron & Steel Co. in the Hanging Rock district, as well as the Hamilton furnace in southern Ohio; one Joliet and one South Chicago of the Illinois Steel Co. in Illinois; one Mayville furnace in Wisconsin; two furnaces of the Colorado Fuel & Iron Co. in Colorado; the Philadelphia furnace of the Sloss-Sheffield Steel & Iron Co. and the second Oxmoor furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama as well as the Rockdale and the second Allen's Creek furnace in Tennessee.

Official Report of the Tenth National Foreign Trade Convention

Less in bulk than most of its predecessors, the report of the Tenth National Foreign Trade Convention, held in New Orleans, May 2-5, 1923, represents the seasoning process that has made these annual conventions more and more practical year by year. Then, too, the discussions of four and a half years since the armistice had left less to say on the problems of Europe and their relation to our export trade. What was traversed at the meeting of 1919-22 in a series of addresses from bankers, publicists, shipping men and large exporters was represented at New Orleans in the "Report on European Conditions," submitted on the first day by a special committee of the National Foreign Trade Council. Taking for its text the summary of the report laid before the International Chamber of Commerce at Rome—largely the work of the American delegation—the special committee analyzed in an admirable way the European situation, and its deliverance is one of the outstanding features of the volume before us. Following it is a ten-page paper by Prof. Jeremiah W. Jenks on "European Progress During the Last Year"—an optimistic view based on the observations of a trip of several weeks through central Europe.

A thorough-going study of "The Shipping Situation of the World," by President James A. Farrell of the Steel Corporation, was a feature of the meeting and is one of the most valuable addresses in the volume. Mr. Farrell takes a broader view of the shipping question than is commonly presented in the sharp drawing of lines between subsidy and anti-subsidy partisans. He would have our Government develop friendly relations with the maritime nations of the world with respect to shipping. In a word, his program is cooperation at home and friendly relations with international shipping.

A good deal was said at the convention about the financing of foreign trade, and in connection with the discussion of foreign credits a novel convention episode was the putting on of a playlet illustrating the right way and the wrong way of running the credit office in connection with export trade. A second playlet had for its motif the helpful function of a banking house in making up for the inexperience of merchants who at times rush into the export business as opportunists. The South American market comes in for considerable attention in this connection.

The volume emphasizes again the capable direction the work of the National Foreign Trade Council has had under the administration of Secretary Davis.

The Maryland Public Utilities Association, which was formed several months ago, held a meeting on July 26 at the State House, Annapolis, at which addresses were made by Governor Albert C. Ritchie, William Milnes Maloy, chairman of the Public Service Commission, and several members of the association. Representatives of more than 50 public utilities companies of the State were present. The executive committee decided upon a sliding scale for the dues, from $10 for the companies whose gross earnings were under $10,000, to $700 for those whose earnings were more than $5,000,000. It also was decided to have permanent quarters at the Engineers' Club, Baltimore.

Iron and Steel Markets

FURNACES BLOWING OUT

Net Loss of Twenty-five in July

Further Curtailment Coming—Oil Industry a Large Buyer of Finished Steel

That pig-iron production is being sharply curtailed appears from the July statistics which THE IRON AGE has gathered by wire on the last day of the month. Still other furnaces are scheduled for blowing out in August.

Along with this movement, which will tend to check the three months' decline in pig-iron prices, though it has not yet done so, there is a fair increase in activity in finished steel, but with little change from the policy of buying in small lots which has been followed for some weeks.

On direct returns from all but seven out of 322 blast furnaces, the estimated pig-iron output for the 31 days of July is 3,679,810 tons, or 118,703 tons a day, against 3,668,413 tons for the 30 days of June, or 122,280 tons a day.

Of the 27 furnaces shut down in July, 18 were steel company and 9 merchant furnaces. Many went out late in the month, so that the July figures reflect only in part the loss of this capacity. Only two furnaces blew in last month.

The 297 furnaces in blast Aug. 1 had an estimated capacity of 114,500 tons a day, against 125,000 tons a day for the 322 furnaces active on July 1—the loss being over 8 per cent.

Prices for finished steel continue to mark the diverse influences affecting pig-iron and rolled products. Deliveries can be made in shorter times, but replenishment orders are more numerous and the marked infrequency of suspensions and cancellations testifies to the large volume of consumption, in spite of the moderate slowing down in production. It is still true that the test of prices is yet to come.

The Steel Corporation's second quarter earnings confirm the production records showing May as the peak month, as higher priced bookings were reached. The slight falling off in June was somewhat accentuated in July.

Pittsburgh mills have found plates, strips and tin plate the lines in which order books have held up best of late. The Pacific Coast and Hawaii will require food containers beyond early estimates.

Specifications for cotton ties indicate an increase over the early season estimates of requirements.

The oil industry has contributed largely to the week's business. Sixty tanks bought for the Sinclair company will take 18,000 tons of steel and those for three other companies 3350 tons. A Pittsburgh independent pipe maker will supply 25 miles of 6-in. pipe in Louisiana for the Atlantic Refining Co.

About 7500 tons of fabricated steel building work was purchased for public, public service and private uses. Of 21,000 tons of fresh inquiries, 16,000 tons was for private enterprises.

Buying of pig iron in the East has been active, especially in the Philadelphia district, where it is estimated sales of foundry iron for July amounted to 125,000 tons. The Pittsburgh market also shows greater activity and for the most part price recessions seem to have been checked, but quotations are down 50c. at Chicago and in the South $24 has become the ruling price. A round tonnage of basic has been sold by a middleman on a $24 basis, Youngstown, but furnaces are still holding this grade at $25.

In a generally dull export market the lively race in Germany between the falling of mark exchange and the boosting of prices appears to have only academic interest, even though the net result is that pig iron is only one-half its equivalent here and bars and sheets only one-third.

England lately has been making the sales. Japan and Cuba have obtained sheets at levels fully $8 below the American quotations and India has taken some 20,000 tons. Now sheets have been advanced in the British market, though other changes are downward. The Nippon Oil Co. ordered 18,000 boxes of tin plate of a British maker and now is in the market for 19,000 boxes. Great Britain has supplanted Germany in getting American cotton tie business.

British shipbuilding during July was the lowest (except for April, 1922) in 40 years. Continuance of the boilermakers' strike has caused two more shipyards at Stockton to close.

THE IRON AGE pig iron composite price is now $25.38, compared with $25.68 last week. Eleven weeks of the past twelve have shown a decline, the figure now being $5.41 below that of early May.

Finished steel, according to THE IRON AGE composite price, remains at 2.775c. per lb. The present price is less than 2 per cent below the highest of the past 29 months.

Pittsburgh

Basic Pig Iron Sold by a Middle Interest—Steel Prices Hold

PITTSBURGH, July 31.—Steel market characteristics are very much the same as they have been the past few weeks. Inquiries are fairly numerous, but they run individually to small tonnages and in all cases are for fairly prompt delivery. There is still a substantial gap between the shipments on old orders and strictly new business, although there are estimates that in some products new business taken during the month of July reached 80 per cent of shipments. This was the case with one local maker of strips, and there has been such a persistent demand for plates that it is probable that new business and completed orders lately have been fairly close in that product. Tin

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	July 31, 1923	July 24, 1923	July 2, 1923	Aug. 1, 1922
No. 2X, Philadelphia‡	$26.26	$26.56	$29.76	$29.76
No. 2, Valley furnace	25.00	25.00	26.50	28.00
No. 2, Southern, Cin'ti‡	28.05	29.05	29.05	22.55
No. 2, Birmingham, Ala‡	24.00	25.00	25.00	18.50
No. 2 foundry, Chicago*	27.00	27.50	29.00	26.00
Basic, del'd, eastern Pa.	25.50	25.50	28.00	27.25
Basic, Valley furnace	25.00	25.00	25.50	25.00
Valley Bessemer, del. P'gh.	28.26	28.26	29.26	26.76
Malleable, Chicago*	27.00	27.50	29.00	26.00
Malleable, Valley	24.50	24.50	26.50	27.00
Gray forge, Pittsburgh	26.26	26.26	27.76	27.76
L. S. charcoal, Chicago	32.15	33.15	36.65	33.15
Ferromanganese, furnace	117.15	117.15	125.00	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	35.00
Forging billets, base, P'gh.	47.50	47.50	47.50	40.00
O.-h. billets, Phila	47.67	47.67	47.67	40.17
Wire rods, Pittsburgh	51.00	51.00	51.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh. lb.	2.40	2.40	2.45	1.70
Light rails at mill	2.25	2.25	2.25	1.75

Finished Iron and Steel,				
Per Lb. to Large Buyers.	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.72	2.025
Iron bars, Chicago	2.50	2.50	2.50	2.00
Steel bars, Pittsburgh	2.40	2.40	2.40	1.70
Steel bars, Chicago	2.60	2.60	2.60	1.75
Steel bars, New York	2.74	2.74	2.74	2.04
Tank plates, Pittsburgh	2.50	2.50	2.50	1.70
Tank plates, Chicago	2.80	2.80	2.80	1.75
Tank plates, New York	2.84	2.84	2.84	2.04
Beams, Pittsburgh	2.50	2.50	2.50	1.70
Beams, Chicago	2.70	2.70	2.70	1.75
Beams, New York	2.84	2.84	2.84	2.04
Steel hoops, Pittsburgh	3.15	3.15	3.30	2.50

Sheets, Nails and Wire,	July 31, 1923	July 24, 1923	July 2, 1923	Aug. 1, 1922
Per Lb. to Large Buyers.	Cents	Cents	Cents	Cents
Sheet, black, No. 28, P'gh.	3.75	3.75	3.85	3.1
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.00	4.1
Sheets, blue anTd. 9 & 10	3.00	3.00	3.00	3.0
Wire nails, Pittsburgh	3.00	3.00	3.00	3.0
Plain wire, Pittsburgh	2.75	2.75	2.75	2.6
Barbed wire, galv., P'gh	3.50	3.50	3.50	3.6
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.00	$20.50	$24.00	$14.00
Carwheels, Philadelphia	20.00	20.00	22.00	17.50
Heavy steel scrap, P'gh	17.00	17.00	20.00	17.00
Heavy steel scrap, Phila.	16.00	16.00	17.50	15.00
Heavy steel scrap, Ch'go	16.50	17.00	17.25	15.00
No. 1 cast, Pittsburgh	20.00	20.50	22.50	19.00
No. 1 cast, Philadelphia	20.00	20.00	21.00	18.00
No. 1 cast, Ch'go. (net ton)	18.50	18.50	21.50	17.00
No. 1 RR. wrot. Phila	18.00	18.00	21.00	17.50
No. 1 RR. wrot. Ch'go. (net)	14.00	14.50	15.00	13.5

Coke, Connellsville, Per Net Ton at Oven				
Furnace coke, prompt	$4.75	$4.50	$4.75	$14.00
Foundry coke, prompt	5.25	5.25	5.50	13.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.87½	13.00	13.00	14.12½
Electrolytic copper, refinery	13.37½	14.50	14.50	13.75
Zinc, St. Louis	6.30	6.10	5.75	6.25
Zinc, New York	6.65	6.45	6.10	6.60
Lead, St. Louis	6.65	6.50	6.55	5.47½
Lead, New York	6.75	6.25	6.85	5.80
Tin (Straits), New York	38.75	39.62½	38.50	32.75
Antimony (Asiatic), N. Y.	7.70	7.00	6.95	5.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business

Composite Price July 31, 1923, Finished Steel, 2.775c. Per lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

July 24, 1923.	2.775c.
July 2, 1923.	2.789c.
Aug. 1, 1922.	2.160c.
10-year pre-war average.	1.689c.

Composite Price July 31, 1923, Pig Iron, $25.38 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

July 24, 1923.	$25.48
July 2, 1923.	26.79
Aug. 1, 1922.	24.38
10-year pre-war average.	15.72

plate makers are specified fully against production for the next 60 days, but in all other finished products, judging by the promptness with which deliveries are being made on new orders, the preponderance of shipments over new business must be fairly great.

Another week has gone by with no discernible change in finished steel prices, but the absence of forward buying probably reflects buyers' expectation as to future price tendencies. Elimination of the 12-hr. day probably will add to costs, but to what extent can hardly be measured before plans for this movement have been generally formulated. Current prices generally are so well above invoice prices that buyers argue that increased costs resulting from the shorter workday need not necessarily mean higher prices than now are quoted, and they point also to the possible effect of the break in pig iron and scrap prices upon prices of finished steel products.

In spite of the very hot weather, steel works operations in this and nearby districts are holding up very well. The Carnegie Steel Co. holds about 92 per cent of ingot capacity, and the leading independent here is averaging about 85 per cent of ingot capacity. Reports in the daily press as to blast furnace suspensions have been much exaggerated. Since the first of July nine furnaces in this and nearby districts have been blown out, and one furnace, a merchant stack, has been banked. The Carnegie Steel Co. has blown out six furnaces and will put down another one late this week. Youngstown Sheet & Tube Co., Republic Iron & Steel Co. and Jones & Laughlin Steel Corporation each have put down one furnace, and the Republic Iron & Steel Co. is getting ready to put off another stack. Most of the furnaces which have gone on the idle list are small ones with high costs, and the attendant loss of production will be small. There has been some activity in foundry iron, but so much crossing into the territories not ordinarily served by the sellers that the market on Valley iron is not very clearly defined. Still lower prices have been reached on old material, but a slightly stronger tendency is observed in coke prices, which is partly traceable to demands occasioned by the possibility that much high sulphur coke will be wanted to replace anthracite coal in case there is a strike of the hard coal miners.

Pig Iron.—The most interesting development of the week has been the sale of a substantial part of a tonnage of basic pig iron owned by a middle interest in the Youngstown district, and which constituted something of a menace to the maintenance of prices. It is

understood that 3500 tons, or about one-half of the total lot, has been disposed of recently at prices ranging from $24 to $24.50, Youngstown. A Sharon melter purchased 1000 or 1500 tons of this iron at these prices. Producers, both steel works and merchant, still are holding this grade at $25, but have not succeeded in doing business at that price. It is claimed that $25 is about cost, and there is no disposition to meet prices made on resale tonnages. Until all the resale iron is out of the way, it probably will be hard for sellers to get the higher figure. Such business as has been done in Bessemer iron has been at $26.50 Valley furnace, although it is claimed by a local melter who has an inquiry out for 600 tons for last quarter shipment that a lower price has been quoted. Sale of foundry iron reached a relatively large total. The National Radiator Co. has closed for 1250 tons of No. 2 iron for its Newcastle, Pa., works, and for about 2500 tons for its Johnstown, Pa., works. The Johnstown iron was placed at a delivered price of about $26.50 and the tonnage for Newcastle at around the same delivered price. None of this iron is from Valley furnaces, most of which are asking $26 furnace. The Union Radiator Co., Johnstown, Pa., which has increased its inquiry to 750 tons, has a delivered price of $26.34, or about 18c. a ton below the delivered price of a Johnstown producer. Eastern interests are reported to have taken a small tonnage of low phosphorus iron at $32.50 delivered Pittsburgh, or about $27 at furnace, a drop of $1 from the price of a week ago on this iron. The Valley maker of this grade now is quoting $33 furnace.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.50 to 25.50
No. 2 foundry	25.00 to 26.00
No. 3 foundry	24.50 to 25.50
Malleable	24.50 to 25.50
Low phosphorus, spot, fur. nominal	33.00

Ferroalloys.—The market here is dull almost to the point of stagnation. Consumers generally are well protected by contracts, and with consumption on a somewhat lighter scale than during the first half of the year, there is no occasion for purchases beyond contract shipments. Quotations on all ferroalloys are unchanged from those of a week ago, but they are merely nominal in the absence of important sales. Some resale ferromanganese is available at $115 at the Atlantic seaboard, but this price is no more interesting to consumers than is the quotation of domestic producers and of importers of $117.50. The great bulk of the tonnage now moving on contracts carries a price several dollars a ton below current quotations. Prices are given on page 305.

Semi-Finished Steel.—Open market activities still are extremely limited because nonintegrated manufacturers are so well supplied by shipments on requirement contracts. The general quotation on billets, slabs and sheet bars still is $42.50, Pittsburgh or Youngstown, and mills in those centers have not yet shaded that price, although northern and central Ohio mills are reported to have gone to $40 mill, or even lower on slabs and sheet bars. It is quite apparent, however, that the maintenance of the quotation of $42.50 is for the purpose of protecting contracts rather than because there is an outlet for all of current production. There is little forward buying of finished steel, and finishing mills are not specifying very far ahead on semi-finished material. The situation, also, is weakened by the fact that pig iron and scrap prices are down so much from their second quarter levels. On forging billets, makers in this territory have found sales above $47.50 impossible. Makers of wire rods admit that there is room for considerable improvement both in specifications and orders. Outside of an inquiry from the National Tube Co. for 4500 tons of narrow skelp, the market for this product is extremely dull. Prices are given on page 305.

Wire Products.—While there is slightly more interest in the market on the part of the distributing and manufacturing trade, actual business still is of very moderate proportion, and mill bookings rapidly are dwindling with new orders much smaller than those that are being completed. There is greater anxiety for business on the part of the mills; but the need of orders is not yet so great that there is any disposition to get them at the expense of prices. Quotations are given on page 304.

Steel Rails.—Makers of light rails rolling them from new billets or from new standard rail crops still claim sales at 2.25c. base for 25-lb. to 45-lb. rails, despite the competition from rerolled rails, which are reported to be available at $2 to $3 a ton less. This concession probably is partly accounted for by the fact that the base sizes of rerolled rails are from 12 lb. to 45 lb., while on new steel rails the base price applies on 25-lb. to 45-lb. sections, and there is an extra charge for rails weighing less than 25 lb. per yd. Demand is somewhat better than it has been, but there is still room for improvement.

We quote light rails rolled from new steel at 2.25c. base, (25 lb. to 45-lb.); those rolled from old rails, 2.10c. to 2.25c. base, (12 lb. to 45-lb.) f.o.b. mill; standard rails, $43.00 per gross ton mill, for Bessemer and open-hearth sections.

Cold-Finished Steel Bars and Shafting.—Shipments against old orders still are in much greater volume than strictly new business, but prices hold firm because there is not much selling pressure, owing to the higher average price of hot-rolled bars involved in the recently adopted extras for quality, cutting, etc. The automotive industry is rather sparing in specifications and is not yet showing much interest in requirements for the latter part of the year. Automobile manufacturers just now are engaged in perfecting plans for the 1924 series of cars, and this affects the activities of the parts makers. Demands from the machine tool industry are light, and agricultural implement manufacturers are doing very little buying. Prices are given on page 304.

Bolts, Nuts and Rivets.—Makers of rivets in this district claim to be holding to a base of $3.25 per 100 lb. for large structural rivets, and while they are making occasional cuts of as much as $2 a ton on attractive business, they are not meeting the prices recently reached in the Cleveland district. It is claimed that with bars at 2.40c. base, Pittsburgh, the margin of profit is small enough even at $3.25 base for large structural rivets. Even a base of 50, 10 and 10 per cent off list for large machine bolts does not seem to be interesting to buyers, who, although specifying fairly well against old orders, are very sparing in the matter of new purchases. Prices and discounts are given on page 304.

Track Fastenings.—Recent reduction to a base of $3.50 for 100 lb. for small railroad spikes by the American Steel & Wire Co. has not yet been followed by local independents, who continue to quote $3.75, although sales at that price are almost impossible and the bulk of current production is being stocked. Makers here are well supplied with orders for large railroad and for boat and barge spikes, and new business is practically even with shipments on old orders. Prices are given on page 304.

Iron and Steel Bars.—As is true of most all finished steel products, inquiries for merchant bars are more numerous, but they run to small tonnages and call for prompt delivery. Recently adopted extras add considerably to costs and buyers are cautious about forward buying until satisfied that there is to be no easing in base prices. Demand for iron bars is slowing down, but makers do not yet need orders badly enough to shade prices.

We quote soft steel bars, rolled from billets, at 2.10c. base; bars for cold-finishing or screw stock analyses, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Tubular Goods.—The general situation is much as it has been for several weeks past. Oil producers are buying storage tanks on account of overproduction of crude oil, and are cutting down on their pipe purchases. There is a good deal of pressure on the mills for deliveries of merchant pipe and a fair amount of new business. Discounts are given on page 304.

Sheets.—Real activity is lacking, although in common with other products the inquiry shows some im-

provement. Deliveries on old orders are providing the requirements of consumers fully, and fresh buying is entirely for small lots. Full finished sheets are rather slow because of the between season period in the automotive industry. Plain black sheets are not selling very freely, and while it is claimed here that 3.85c. base is not being shaded, the report persists that some mills are badly enough in need of orders to go to 3.75c. base to secure them. Prices are given on page 304.

Tin Plate.—While there has been a slight gain in production, the position of makers with regard to keeping their customers fully supplied is not materially better than it was a week ago. A considerable demand for food container material lately has developed from the Pacific Coast and Hawaii, where crops are exceeding early estimates. It promises to be a serious problem for manufacturers to get out all the tin plate that will be wanted for food containers as early as is required. There is no change in prices.

Hot-Rolled Flats.—New business is better than it has been, but falls far short of making good completed orders. Much of the business for the present quarter was booked at 3.30c. base Pittsburgh, but on recent bookings 3.15c. base has been the prevailing price, while on the wide sizes, where competition is greatest on account of the ability of skelp and blue annealed sheet makers to enter the market, prices as low as 3c. base have been made. Specifications on cotton ties indicate that the crop is more promising than it was earlier and that tie requirements will exceed early expectations. The August price on ties is $1.62 per bundle of 45 lb., there being a carrying charge of 1c. per bundle per month. Prices are given on page 304.

Cold-Rolled Strips.—Although this product is not very active, there seems to be enough business to go around to sustain recent prices of from 5c. to 5.25c. base Pittsburgh.

Structural Material.—There has been no change in prices, but shipments against old orders considerably exceed new business and the mills are advancing their delivery promises. Structural lettings in this district are few and small, prospective business includes a warehouse for the Rosenbaum Co., a combination church and office building for the Smithfield Methodist Episcopal Church, a church for the German Evangelical Lutheran Church, and a four-story building for a local floral concern. It is claimed that the erected price on a viaduct for a Middle Western railroad will be somewhat above $100 a ton instead of $90 a ton as recently reported. Plain material prices are given on page 304.

Plates.—There continues to be a lively demand for tonnages for early delivery in connection with tank and car repair work. The Greenville Steel Car Co. is reported to be seeking 1500 tons and the Dravo Contracting Co. is low bidder on six steel scows for the U. S. Engineers, Louisville, Ky., for which about 725 tons of steel will be required. Leading companies pass by new inquiries because they cannot make the required delivery. Prices are given on page 304.

Coke and Coal.—The spot coke market still is somewhat depressed by tonnages thrown back upon it as the result of blast furnace suspensions. Sales have been made of such lots of furnace coke lately as low as $4 per net ton at oven, but on new production $4.25 now is minimum, and some producers are unwilling to go below $4.50. A local steel company seeking a large tonnage for August delivery failed to uncover a lower price than $5. There seems to be three distinct markets on furnace coke at present, that for "distress" tonnages, that for new production on weekly contracts and that for longer shipping periods. The spot market on foundry coke is still quotable from $5.25 to $5.75 and the contract market from $6 to $7, generally $6 to $6.50. The possibility of a strike of the anthracite miners has strengthened the market on off grade coke, but thus far does not seem to have helped the coal market, which is dull and weak. We quote spot tonnages of mine run steam coal from $1.65 to $2 per net ton at mines and mine run gas and coking coal at $2.25 to $2.35. Slack coal commands about $1.30 for steam and $1.50 for gas grade.

Old Material.—The tendency of price still is downward because offerings exceed the demand. There is only one steel plant in this district that is taking scrap at present, others being closed to shipments either by suspensions or railroad embargoes. This works to the advantage of the one open spot, since dealers have much material rolling for which they are anxious to find a place. We note one good-sized sale of heavy melting steel at $17, but as part of the contract, the seller is to be permitted to ship an equal tonnage against an older and higher-priced order. This is merely a case of "marrying" orders. It is doubtful whether a consumer who could not provide shipping instructions against an old and high-priced contract could buy this grade at less than $17.50, and there are few dealers who will go that low, except on tonnages that can be shipped immediately. There is practically no market for the lighter sorts of old material, and prices are nominal and entirely subject to negotiation. The market is well sustained on the better grades of railroad material by fair-sized purchases by the steel foundries.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$17.00 to $17.50
No. 1 cast, cupola size	20.00 to 20.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md., Huntington, W. Va., and Franklin, Pa.	18.50 to 19.00
Compressed sheet steel	15.50 to 16.00
Bundled sheet sides and ends	14.50 to 15.00
Railroad knuckles and couplers	20.00 to 21.00
Railroad coil and leaf springs	20.00 to 21.00
Low phosphorus standard bloom and billet ends	22.00 to 23.00
Low phosphorus plates and other grades	21.00 to 22.00
Railroad malleable	18.50 to 19.00
Steel car axles	19.00 to 19.50
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	20.00 to 20.50
Machine shop turnings	11.00 to 11.50
Heavy steel axle turnings	14.50 to 15.00
Short shoveling turnings	14.00 to 14.50
Heavy breakable cast	17.00 to 17.50
Stove plate	14.50 to 15.00
Sheet bar crop ends	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
Cast iron borings	14.00 to 14.50

In celebration of the thirtieth anniversary of its founding, the General Electric Co., Schenectady, N. Y., has issued to its stockholders, in behalf of the chairman and president, a "Thirty-Year Review of the General Electric Company." It is a fascinating 34-page booklet showing briefly what the company has contributed to the various fields of the science, and industry and human life in general. It opens with a short summary of the financial growth of the company since it succeeded the Edison General Electric Co. and the Thomson-Houston Electric Co. in 1892. The following titles of sections give a good idea of the contents of the booklet: "Large Scale Power Generation," "Power of the Sea," "In the Field of Transportation," "Revolutionizing Manufacture Through Electric Drive," "At the Panama Canal," "Contribution to Long Distance Wireless Communication," "Cleaner and Better Fuel," "Lightening Home Burdens," "Progress in Illumination," "One Million Volts," "How G. E. Money Is Spent" and "Opportunities for the Future." Lists of the company's manufacturing plants and sales offices and excellent photographs supplement the text.

D. G. McMillan has disposed of his interests and retired as president of the National Gauge & Equipment Co., LaCrosse, Wis., manufacturer of dash gages and metering devices for automobiles. He served as trustee of the bankrupt Hans Motor Equipment Co. in 1914 and with P. M. Gelatt organized the present company in 1915, developing it into one of the largest industries in the Northwest. Mr. Gelatt, formerly vice-president and secretary, has been elected president; J. M. LaVaque, vice-president and treasurer; P. E. Stroup, Detroit, vice-president and sales manager; J. E. Richmond, secretary.

Chicago

Consumers Considering Future Needs—Pig Iron Still Declining

CHICAGO, July 31.—The steadiness of finished steel prices has been a source of surprise to many consumers in view of the continued lull in the market. It is becoming apparent that the backlogs of local mills are larger than was generally supposed. Railroad car builders who bought large tonnages early in the year find that there is little or no improvement in deliveries, although they are pressing the mills hard for shipments in an effort to expedite the completion of equipment urgently desired by the carriers for their fall traffic. While few observers are willing to hazard a guess as to the future course of the market, an increasing number of consumers are giving serious attention to the placing of their future supplies. Users' stocks are generally low, and the possibility that more liberal buying will develop within the next month or two is entering into the calculations of the mills. Steel warehouses have noted an improvement in demand during the past ten days, and this may be a forerunner of more general buying at the mills. It is true that industrial activity has been checked in some directions, notably in the agricultural implement field, but local mills are still pressed for deliveries against past commitments, and the specifications received by the leading producer during the past week were the heaviest in six weeks and exceeded the weekly average for the last three months.

The steel market as well as all other markets has been overcast with gloom by the sharp decline in wheat, but it is believed in some quarters that the importance of that commodity as an economic factor has been overestimated. O. P. Austin, statistician, the National City Bank, New York, is authority for the statement that the value of the wheat harvested in 1922 was only 10 per cent of the total crops of American farmers and barely 6 per cent of the total wheat produced by them in that year.

Oil storage tank awards continue to feature the steel buying. The Sinclair Crude Oil Purchasing Co. has evenly divided an order for 60 tanks requiring 18,000 tons of plates between the Chicago Bridge & Iron Works and the American Bridge Co. Other tank awards for the week account for nearly 3400 tons additional. Two car ferries placed by the Pere Marquette involve 5000 tons. Sustained activity in the building field is indicated by an inquiry by the Sanitary District, Chicago, for 6250 tons of reinforcing bars.

Local mill operations remain substantially unchanged, although another blast furnace has been put out. The Inland Steel Co. continues to operate at 70 to 80 per cent of ingot capacity, while the Illinois Steel Co. remains on a 93 per cent basis. The latter company, however, has blown out a blast furnace at South Works for relining. One of its Joliet stacks was put out for the same reason a week ago. It now has 25 out of 27 steel works stacks operating, besides one merchant furnace active at Milwaukee. Local independents have formulated no program for the introduction of the 8-hr. day, but will follow the plan which will be announced following the conclusion of the conferences between the executives and the subsidiary presidents of the United States Steel Corporation.

Pig Iron.—The market remains quiet and weak, and local iron is now quotable at from $27 to $27.50, base furnace. At least one Southern furnace is now quoting $24, base Birmingham, but even at that figure cannot compete with Northern producers for business in this territory. A southern Wisconsin melter is inquiring for 1000 tons of malleable for delivery over the remainder of the year and a Michigan user is in the market for 400 tons of foundry for August and September shipment. A local purchasing office has closed for 1000 tons of basic for delivery to an Ohio plant. Orders and inquiries, however, are notably few, but sellers are of the opinion that buying cannot be postponed much longer. While there has been some decline in the melt of foundries, particularly those serving the farm implement industry, iron consumption in the aggregate is holding up surprisingly well. At the same time, stocks on users' yards have reached a low point, probably averaging not more than 30 days' supply.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50 to 28.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00 to 27.50
Malleable, not over 2.25 sil.	27.00 to 27.50
Basic	27.00 to 27.50
High phosphorus	27.00 to 27.50
Southern No. 2	30.01 to 31.01
Low phos., sil. 1 to 2 per cent, copper, free	34.00 to 35.00
Silvery, sil. 8 per cent	39.28

Ferroalloys.—Demand for the ferroalloys is almost entirely absent, and prices are untested. It is intimated that foreign producers of ferromanganese might entertain offers of $115, seaboard, for fourth quarter delivery, but no sales at that price are reported.

We quote 80 per cent ferromanganese, $125.06 to $125.88 for all deliveries; 50 per cent ferrosilicon, 88 to 89, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Plates.—The Sinclair Crude Oil Purchasing Co. has placed 30 oil storage tanks, calling for 9000 tons, for erection near Casper, Wyo., with the Chicago Bridge & Iron Works. Considerable additional tank work is pending. The Pere Marquette has awarded two car ferries, requiring 500 tons of plates, to the Manitowoc Shipbuilding Co. The steel for both the tanks and the ferries will be rolled by the leading local mill. The Government has let two additional river barges, 300 tons, with the Dubuque Boat & Boiler Works. Orders for plates for early shipment, principally small lots, continue to go to mills east of here in view of the forward commitments of local producers. Chicago mill prices are firm and there continues to be pressure for deliveries, particularly from the car builders. Up to July 1 not even half of the cars and locomotives on order had been delivered to the railroads.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Rails and Track Supplies.—Considerable rail tonnage will be placed as soon as the mills announce their prices for 1924. At present writing it seems probable that the current price will be continued. Railroad orders for track supplies, although of a hand-to-mouth character, are fairly numerous, several lots of from 5000 to 10,000 kegs of spikes and bolts having been placed.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—Fabricating awards for the week constitute an encouraging total for this season and new work continues to develop in fair volume. Action on the new Palmer House, Chicago, involving 10,000 tons, will probably be deferred until this fall, when a number of other projects now in contemplation are also expected to come up for bids. The market, though generally characterized as quiet, is steady and local prices on plain material are firm.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—In a comparatively quiet market the railroads are buying fair quantities of soft steel bars for car repair work and car specialty makers are replenishing their supplies. Agricultural implement makers, on the other hand, are taking less steel as their sales decline. The automobile industry is also slowing down, although in contrast with the farm machinery manufacturers its production is still at high rate. On the

whole, steel consumers are consistently cautious, preferring to limit themselves to deliveries against their contracts and small orders for early shipment, rather than to commit themselves ahead. Some business for early delivery is going to mills east of here because of the obligations of local producers. Demand for bar iron is light and the going price remains unchanged at 2.50c., Chicago. Rail steel bar mills have adopted new extras similar to those recently put into effect by manufacturers of soft steel bars. Current business in hard bars continues slow, but mills still have fair backlogs and look for better demand by mid-August, particularly from fence post manufacturers.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.50c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Sheets.—The situation in sheets, especially in black and galvanized, is admittedly weaker than in the other major rolled products, but new business is too light to test the market. Such small lots as are being bought generally move at the regular prices and concessions are of an isolated character.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Wire Products.—Specifications are slightly better, particularly in nails. Mill prices are unchanged. The reduction of 15c. per 100 lb. on wire nails by local steel warehouses last week brought their prices down to a parity with those of Chicago hardware jobbers. For mill prices see finished iron and steel f.o.b. Pittsburgh, page 304.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Bolts and Nuts.—Third quarter specifications show no improvement and prices are weak. New orders are small and few, too few to bring out anything but sporadic concessions.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to ¾ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ¾ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Cast-Iron Pipe.—Demand in the aggregate is smaller than in the early months of the year, but there is little change in prices. The situation is slightly easier on the larger sizes and as low as $49, Birmingham, can be done on pipe above 12 in. in diameter. The Detroit City Gas Co. has distributed 1200 tons of 6- to 12-in. gas pipe among several makers. The American Cast Iron Pipe Co. will furnish 325 tons of 6-, 8- and 10-in. water pipe for Niles, Ill. Detroit takes bids Aug. 6 on 3264 tons of 6- and 8-in., Class B, and is considering the installation of three and one-half miles of 24-in. and 12 miles of 12-in.. The Sanitary District, Chicago, has taken bids on the general contract for North Side Sewage Treatment Works, Division A, requiring 2830 tons of 6- to 60-in. Los Angeles takes bids Aug. 1 on 1500 to 1800 tons of 6-, 8- and 10-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in, $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Reinforcing Material.—While there is a fair demand for concrete reinforcing steel, most of the orders and inquiries are for lots under 100 tons. Prices are unchanged at 3c. to 3.25c., Chicago, but the higher price is being obtained only on extremely small lots.

Pending business includes:

Sanitary district, Chicago, North Side Sewage Treatment Works, division A, 6250 tons, bids on general concrete taken.

First National Bank, Davenport, Iowa, [illegible] general contract taken July 30.

Ford Motor Co. plant, St. Paul, Minn., reinforcing steel being purchased piecemeal, separate lots [illegible] 250 tons being in the market at present.

Old Material.—There has been practically no consumer buying outside of a purchase of 2000 tons of malleable by a local user. The market is listless and so lacking in transactions that prices are almost nominal. All grades of scrap are still weak and further declines have been registered, but some dealers are of the opinion that bottom has been reached. They are not yet laying in stocks, however. Large railroad offerings continue to insure an ample supply of material. The Pennsylvania, Southwestern Region, advertises 7000 tons, the Northwestern Region, 2600 tons and the Central Region 10,000 tons. The Michigan Central, the Erie and the New York Central has put out blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$22.00 to $22.50
Cast iron car wheels	20.00 to 20.50
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.00 to 20.50
Rails for rolling	18.00 to 18.50
Steel rails, less than 3 ft.	19.25 to 19.75
Heavy melting steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00
Shoveling steel	16.00 to 16.50
Drop forge flashings	11.00 to 11.50
Hydraulic compressed sheets	12.75 to 13.25
Axle turnings	14.00 to 14.50
Steel angle bars	17.25 to 17.75

Per Net Ton

Iron angle and splice bars	22.00 to 22.50
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	25.50 to 26.00
Steel car axles	17.50 to 18.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.50 to 10.00
Cut forge	14.75 to 15.25
Pipes and flues	9.50 to 10.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	14.75 to 15.25
Steel knuckles and couplers	18.50 to 19.00
Coil springs	19.00 to 19.50
No. 1 machinery cast	18.50 to 19.50
No. 1 railroad cast	18.00 to 18.50
No. 1 agricultural cast	17.50 to 18.00
Low phos. punchings	16.00 to 16.50
Locomotive tires, smooth	15.50 to 16.00
Machine shop turnings	8.50 to 9.00
Cast borings	12.00 to 12.50
Short shoveling turnings	12.00 to 12.50
Stove plate	14.50 to 15.00
Grate bars	12.75 to 13.00
Brake shoes	14.00 to 14.50
Railroad malleable	19.50 to 20.00
Agricultural malleable	17.00 to 17.50

The Truscon Steel Co., Youngstown, has declared a quarterly dividend of 3 per cent on common stock, payable Sept. 15 to holders of record Sept. 5, and the regular preferred payment of 1¾ per cent, due Sept. 1, to holders of record Aug. 21. On June 15 last the Truscon company placed its common stock on a 12 per cent annual basis, declaring a 2 per cent dividend for two months. The preferred dividend applies to $2,274,000 of that issue and the common to 422,000 shares of $10 par value of that issue. The company's earnings applicable to common are reported several times dividend requirements.

The Baltimore Safety Council, recently organized in Baltimore, has extended its activities to the industrial plants. It is arranging to hold classes of instruction for superintendents, foremen, master mechanics and other officials, and also is planning monthly meetings at which prominent speakers will discuss safety problems in the industrial field.

The Seattle offices of the Bethlehem Steel Corporation have been removed from the Colman Building to rooms 2019-20, L. C. Smith Building. W. C. Scott, Jr., is district representative.

New York

Pig Iron Fairly Active and Sagging of Prices Checked—Large Order for Pipe

NEW YORK, July 31.—Buying of pig iron has been fairly active during the past week and the sagging tendency of prices seems to be checked. While the buying has not been in as large volume as in the preceding week, the total tonnage represents a considerable number of melters, and the inquiry now pending is of no mean proportion. Some of this inquiry relates to tonnages concerning which no details have been made public, by special request of several companies that have come into the market. The Burnham Boiler Co., which had been inquiring for 5700 tons of No. 2X and No. 2 plain for the last half of the year, is understood to have completed its purchases. A pump company which has been inquiring for 800 tons is now in the market for from 2500 to 3000 tons, mostly for August and September delivery. A New Jersey melter is inquiring for 1500 tons for fourth quarter and a Connecticut company is in the market for 2500 tons. Hardware and electric interests are credited with buying tonnages of fair size in New England. The ruling quotation in eastern Pennsylvania and Buffalo is still $25 for No. 2 plain, with considerable irregularity as to the higher silicon irons.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$27.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	27.27
Buffalo, sil. 1.75 to 2.25	29.91
No. 2X Virginia, sil. 2.25 to 2.75	32.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—There continue to be practically no inquiries or sales of ferromanganese and the market is featureless. The only interesting news is the fact that imports of ferromanganese in June were the largest for any month this year at 11,786 gross tons. There have been sales of a few carloads of spiegeleisen at $47.50, furnace, but there is no inquiry before the market. Nothing is heard of transactions in manganese ore, but it is interesting to note that imports in June of 36,138 tons were not only the largest for any month this year but were only about 400 less than the total imports for the first five months of this year. The 50 per cent ferrosilicon market is unchanged and featureless and the same is true of the ferrochromium market.

Cast-Iron Pipe.—This market continues strong. While the volume of inquiry has declined somewhat, makers attribute this quietness to the realization by buyers that deliveries are so extended that it would be difficult to obtain pipe for laying before winter. Most foundries are booked well up to Nov. 1. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.30; 4-in. and 5-in., $67.30; 3-in., $77.30, with $5 additional for Class A and gas pipe. Only a light demand is reported for soil pipe, orders being usually for small lots of a carload or two. Jobbers' stocks are, as a rule, well filled. Foundries, however, are active on old orders and particularly on pipe fittings, delivery on which has been somewhat more extended than on pipe. Effective July 27, a revision of discounts was made by Northern foundries, prices being reduced about $1.50 per ton, in an effort to eliminate competition of Southern foundries, which was recently particularly keen. The Northern discount on 6-in. standard is now 34½ per cent, compared with 35¾ per cent, the schedule of Southern makers. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in. standard, 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Finished Iron and Steel.—An expansion in the volume of specifications against contracts; some increase in the number of new orders (though many are for no more than 50 tons and few for more than 200 tons); the placing of these orders usually with the mills able to make the best deliveries (this spelling the steady passage of material into consumption), and concern expressed by buyers of the price-stiffening and output-curtailing effect of the 8-hr. day—these factors appear to have resulted in a practical cessation of talk of lower prices. As interest on the part of buyers in fourth quarter needs is expected to become active in late August and as the producers, it is believed, will then have relatively little steel on order at prices below the current market, signs point to a testing of prices within a month. Though some mills report specifications and orders as now equalling shipments, there is a view that before another month elapses deliveries will be that much easier that only salesmanship against pressing and attractive needs of buyers will sustain prices. Today prices are firm, several instances being learned of that showed inability of inquirers to secure concessions even from mills admittedly desirous of orders, particularly in sheets. Requests are appearing for fourth quarter protection but as yet they are regarded only as feelers. Concrete bar business is active and the volume of fabricated steel work continues remarkably large. Consumption shows no cessation and suspensions are much below the normal, with no reports whatever of cancellations. One item of special interest was the placing with the Jones & Laughlin Steel Corporation of 25 miles of 6-in. pipe for the Atlantic Refining Co. for Louisiana delivery.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The coke market shows little change. Probably as low as $4.50 could be done on standard furnace coke for prompt delivery, and from $5.50 to $6.50 on standard foundry coke. There is virtually no contracting. Fear of a strike in the coal fields has caused much uncertainty, especially as to contracts. By-product coke is quoted at $11.34 to $11.41, Newark and Jersey City.

Old Material.—No improvement is evident, prices on all grades continuing weak. What little activity there is seems to be largely confined to heavy melting steel, borings and turnings, stove plate and some specification pipe. No. 1 heavy melting steel is generally unchanged, shipments going forward to eastern Pennsylvania at $15.50 and $16 per ton, delivered. Borings and turnings are in fair demand for Phoenixville at $13, Johnstown at $13.75 and Bethlehem at $12.50 per ton, delivered, with very small tonnages appearing because of the low prices offered. New Jersey foundries are buying some stove plate, $16.75 per ton, delivered, being the average offering price of brokers on this grade. Stove plate is also going forward to Harrisburg and Phoenixville at lower prices as a result of the higher freight rates. Specification pipe is not quotable at better than $9.75 to $10.25 per ton, buying price New York, based on $14 per ton, delivered, Lebanon, Pa.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$12.00 to $12.50
Steel rails, short lengths, or equivalent	12.50 to 13.00
Rails for rolling	16.00 to 18.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	20.00 to 21.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	15.00 to 15.50
Wrought iron track	14.50 to 15.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	14.00 to 14.50
Cast borings (clean)	10.50 to 11.00
Machine-shop turnings	10.00 to 10.50
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 18.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.50 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.50 to 20.00
No. 1 heavy cast, not cupola size	17.50 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 17.00

Warehouse Business.—With most warehouses July has been about as satisfactory a month for business as June, despite the dullness experienced early in the month. While the volume of orders has been large the past month, purchases were almost invariably small. Stocks in warehouse are evidently not large, many warehouses having curtailed their purchases from mills as much as possible. Prices on most grades carried in stock continue firm, although there is some reported

shading on bars. Sheets are slightly firmer than for several weeks, but low prices are still being quoted on good tonnages. A fair estimate of the market on black sheets is still 4.65c. to 5c. per lb. base and galvanized 5.65c. to 6c. per lb base. Warehouses handling pipe report a fair degree of activity and an improvement in receipts from the mills. The schedule of discounts from list on pipe is holding slightly firmer than formerly. We quote prices on page 324.

Cincinnati

Southern Market Declines $1—More Inquiries Are Pending

CINCINNATI, July 31.—There are more inquiries before the trade than for some weeks and while these generally are for small tonnages, they indicate more interest on the part of the melters. Sales reported are also more numerous. A West Virginia melter bought a round tonnage of southern Ohio iron, both foundry and malleable grades, last week, at prices reported to be $25.50, Ironton. An Indiana melter bought 1000 tons of foundry, 500 being placed at $25.50 and 500 at $26, Ironton. An Indianapolis melter is reported to have closed on 1000 tons of malleable on the basis of $27.90, delivered, the order being placed with a lake furnace. A northern Ohio melter bought 1000 tons of basic at $24, Valley furnace. A Muncie melter is reported to have placed 1000 tons with a Valley furnace at $24.50, furnace. There are evidences of a strengthening of Northern iron prices, and it is doubtful whether less than $26 can now be done in the southern Ohio district. Some resale material is being offered at 50c. less, but the tonnage is very small. The Southern market can hardly be quoted today at more than $24, Birmingham, as an Alabama furnace is offering iron at this price. Tennessee furnaces are quoting $25, but will probably meet competition. Little business is being done in Southern iron, the only sale coming to light being 300 tons to an Indiana melter at $25, base Birmingham. Silveries are quiet, but there is some inquiry for foundry, malleable and basic grades. A Detroit melter is inquiring for a round tonnage of foundry and a central Ohio melter has asked prices on 1000 tons of foundry. A Hamilton melter wants 500 tons of foundry and a steel castings company is in the market for 500 tons of basic. Ironton iron and Belfonte furnaces are scheduled to bank this week.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$28.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	28.27
Basic Northern	27.27
Malleable	28.27

Finished Materials.—Buying continues at about the same rate that has been maintained for the past few weeks. Orders are not large, but are becoming more numerous, particularly for shapes and plates. Some mills are reported to be getting close to the limit of their orders, and are making a drive for business, but there is no evidence of lower prices being quoted. In fact, the market seems to have acquired some strength in the past week or two. An Indiana car manufacturer bought 1800 tons of plates last week from an independent mill in the Pittsburgh district, Chicago mills being unable to quote on the business for the delivery wanted. There is little activity in bars, carload orders predominating. A noticeable increase in the demand for sheets is reported by a number of selling agencies, and while prices of black sheets are reported to be weak, shading is confined to one or two of the smaller mills which need tonnages for rolling this month. There is little activity in wire products. Track fastenings also are quiet. Prices of bolts and nuts are being shaded, and it is reported from some quarters that lower prices have been quoted on small spikes. There is little new inquiry in the structural steel market. The Kosair Temple, Louisville, is the only new project of size, the steel tonnage being estimated at 500. Several projects involving tonnages up to 100 tons are up. In reinforcing bars, the principal inquiries come from Nashville, where a State Deaf and Dumb Institute will require about 300 tons, and additions to Vanderbilt University, about 400 tons. Road work in Kentucky will require several hundred tons.

Warehouse Business.—Jobbers report a slackening in business, but orders are still considered fair in view of general conditions. There has been no change in prices in the Cincinnati market, although warehouses in Cleveland and Chicago are reported to have cut on some lines $3 per ton.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; loops, 4.50c.; bands, 3.50c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—There is little activity in coke, and prices rule about the same as last week. Sales generally run to carload lots for immediate shipment, though some contracts are being negotiated for the remainder of the year.

Old Material.—The scrap market is stagnant, little trading being done even between dealers. Borings and turnings are weaker, as the local user is preparing to shut down for repairs, and there is little demand from outside points. Pipes and flues are a drug on the market. Car wheels have been reduced $1.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton
Bundled sheets	$12.50 to $13.00
Iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up	28.50
Rails for rolling	16.50 to 17.00
Heavy melting steel	15.00 to 15.50
Steel rails for melting	14.50 to 15.00
Car wheels	14.50 to 15.00
	Per Net Ton
No. 1 railroad wrought	12.50 to 13.00
Cast borings	10.00 to 10.50
Steel turnings	8.50 to 9.00
Railroad cast	16.50 to 17.00
No. 1 machinery cast	19.00 to 19.50
Burnt scrap	12.00 to 12.50
Iron axles	22.50 to 23.00
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	9.00 to 9.50

Birmingham

Pig Iron Sales Are of Small Lots Only for Prompt Delivery

BIRMINGHAM, ALA., July 31.—While one producer holding for $27 went through a fourth consecutive week of one car per week, two others reported decidedly more brisk inquiry toward the last of the week, lots asked for ranging from 100 to 500 tons. The uniform quotation except by one one-furnace operator was $27. This front is maintained without apparent break by every Birmingham producer, especially the large ones. They meanwhile regard the East with interest as to decreased production, buying movement and prices. Sales have been of small lots for prompt delivery. Melters are as firm on the average in holding back. Decline in soil pipe make is the sole noticeable evidence of decrease in melt. However, hold-up orders have been more numerous and iron is being piled in considerable quantity by some of the large makers. There has been no blowing out or banking of furnaces. The car situation is all that could be desired. Resale iron at as low as $24 is heard of from the Middle West, but quantities are small.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$25.00
Basic	24.00
Charcoal, warm blast	34.00

Finishing Mills.—All finishing mills aim at capacity production, missing it by handicap of hot weather and humidity. The Tennessee company mills are on same turn as during March, when it broke many records. Kobe, Yokohama and Dairen have taken 4500 tons of steel rails and 1200 tons was shipped to Puerto Colom-

bia via Mobile. The Kilby Frog & Switch Co., maker of railroad track material, is on full turn, with orders to capacity for three to four months. Wire mills report low ebb of new business, with orders on books covering next two months and operations on full turn. Labor is much easier. Bars are 2.65c., f.o.b. Birmingham.

Cast Iron Pipe.—The American Cast Iron Pipe Co. has booked 1493 tons for Minneapolis and 188 tons for Oglesby, Ill. Volume of business is falling off on account of difficulty in securing prompt delivery and weakness of the iron market, causing buyers to hold up orders to later date. The base remains at $49. Soil pipe has slumped at least $10 a ton and is not higher than $55 for standard, with as low as $50 sometimes named. Four to five plants have closed owing to cessation of demand.

Old Material.—The scrap market is slow, like the iron market, but cast grades move fairly well at the lower schedule established two weeks ago.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$16.00 to $18.00
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

Buffalo

About 25,000 Tons of Pig Iron Sold—Strong Competition for Pennsylvania Furnaces

BUFFALO, July 31.—About 25,000 tons of various grades of foundry pig iron has been sold and the total of business includes several unusual tonnages. Competition with eastern Pennsylvania furnaces on New England business has been especially keen, and while rumors of less than $25 for silicon 1.75 to 2.25 are current, there are no specific instances known of Buffalo iron being quoted at less. Inquiry has been better and considerable business is still pending. The General Electric Co. is inquiring for 2000 tons for delivery to Schenectady. One furnace quoting $26 encountered general quotations of $25 throughout the territory. Most sales are for spot shipment, but several contracts for August and September delivery have been closed. The district offices of the Bethlehem Steel Co. are not quoting on Lackawanna iron for third quarter delivery, but some sales of off grades have been made from stock piles. Furnace operation throughout the district is unchanged.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$26.00
No. 2X foundry, 2.25 to 2.75 sil.	25.50
No. 2 plain, 1.75 to 2.25 sil.	25.00
Basic	26.00
Malleable	26.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—Greater interest is being shown by buyers in bars, shapes and plates, and sheet activity has been livelier. The market on bars is firm at 2.40c. and a fair average of small orders is recorded each day. Shapes are firm here at 2.50c., but reports of 2.40c. by Eastern mills are current. Plates for domestic shipment are uniform at 2.50c., but on Canadian business American mills have met a price of 2.40c. The galvanized sheet market holds firm at 5c. Black sheets have been sold at 3.75c. Pressure for delivery in sheets is just as strong and mills are better able to make deliveries; most of the order books on sheets are pretty well cleaned up and 30-day delivery is the rule. Jobbers have been more active on semi-finished material, but small consumers are out of the market. Agricultural implement manufacturers have been more active in seeking prices.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Coke.—Demand has been lively and good grades of foundry are quoted at $5.50 for spot shipment and on remainder of year contracts the ruling price is $6 to $6.50. A number of contracts have been closed on this basis.

Old Material.—Two consumers are buying small tonnages of heavy melting steel, but the prices they are offering are not sufficient to interest the dealers. There is still some trading between dealers to fill old orders and from $18 to $19 has been paid on heavy melting steel for stop shipment to fill these contracts.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 busheling	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

St. Louis

One Southern Furnace Quotes $24, Birmingham—Pig Iron Very Dull

ST. LOUIS, July 31.—Purchases of pig iron in this territory continue extremely light. The last week was exceedingly quiet. Melters simply will not show any interest in the market, except for a carload here and there as it is actually needed. There is no buying for future delivery. The melt in the district has fallen off with the hot weather, the closing of stove foundries here and in Belleville, and fewer orders being received by most of the other foundries. Concerns handling railroad business are the busiest. Northern iron is quoted at $27.50, Chicago, with the understanding that an offer of any considerable tonnage would be met with a price of $27. One Southern furnace made a price of $24, Birmingham, subject to the maker's confirmation, and this was regarded merely as a "feeler." The St. Louis Coke & Iron Co. is quoting $28 to $29, Granite City.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.66 to $30.16
Northern malleable, sil. 1.75 to 2.25	29.66 to 30.16
Basic	29.66 to 30.16
Southern fdy., sil. 1.75 to 2.25	30.17

Finished Iron and Steel.—Mills are informing their representatives here that they are well booked up on sheet mill products, but they need business in tubes and wire products. Orders in these lines are scarce. The jobbing business is still dull. Fabricators are busy, but are generally well supplied with structural material, and are buying only to supply immediate needs. Some wheel orders were placed. St. Louis Car Co. bought 520 30½-in. wheels for a Los Angeles street car order. The axles for these cars are still unpurchased. The Missouri Pacific bought 90 36-in. passenger wheels and the Mississippi River & Bonne Terre Railway bought a carload. Foreign mills are said to have gotten the 3000 to 4000 tons of billet reinforcing bars inquired for recently by Austin Bros, Dallas, Tex., at a price of $4, delivered. A Kansas City firm wants 100 tons of basic open hearth wire rods. A Dallas (Tex.) concern bought a carload of rivets. The Pennsylvania Lines west of Pittsburgh want 1000 boiler tubes.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—The coke market is weak, a condition due to production increasing and demand decreasing. Large by-product producers of domestic report that dealers

are buying for early shipment, the uncertainty of the anthracite situation giving them some concern.

Old Material.—Buying of old material is still confined to dealers who absorbed all of the heavy railroad offerings of the week. Dealers are using most of this material to fill existing contracts, and some of it is being laid down in yards. Consumers are still out of the market. There is no market for iron rails, the mills having abandoned their use because of the difficulty of getting any quantity. The market is nominally $16 to $16.50 per gross ton.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton
Iron rails	$16.00 to $16.50
Rails for rolling	17.50 to 18.00
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.00 to 18.50
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00
	Per Net Ton
Heavy axles and tire turnings	12.75 to 13.25
Steel angle bars	15.25 to 15.75
Iron car axles	26.00 to 27.00
Steel car axles	20.00 to 21.00
Wrought iron bars and transoms	21.00 to 22.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	15.50 to 16.00
Railroad springs	19.00 to 19.50
Cast iron borings	12.50 to 13.00
No. 1 busheling	14.75 to 15.25
No. 1 railroad cast	17.50 to 18.00
No. 1 machinery cast	18.00 to 18.50
Railroad malleable	17.00 to 17.50
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	9.00 to 9.50

San Francisco

Decreased Demand for Iron and Steel Products—Some Prices Weak

SAN FRANCISCO, July 25.—While interested parties are disinclined to admit that business is quiet in iron and steel lines, there is no disguising the fact that the bookings of new business is less voluminous than it was 90 days ago. There are no special reasons for this condition, except that it is merely a reflective influence from the Eastern markets, and as is always the case with trade movements in all commodities, the effects are not noticeable on this coast until the changes are well in progress in the Eastern business centers. There has been a gradual falling off in the demand for finished steel and iron products during the last three weeks and this has reacted on the productive end of the industry. Dealers and others interested in the activities connected with iron and steel are hopeful that the fulfillment of existing contracts will be sufficient to keep things going until the business recuperates, without an intervening period of dullness. In speaking of the situation, one prominent importer says: "We have had an active market for some time past and a brief period of reaction will be beneficial in some ways rather than harmful."

Pig Iron.—Very little business is in progress and indications point to quiet trade for some little time. The fact is that consumers are well supplied and they are out of the market. It is also noteworthy that there is almost no booking of orders for fourth quarter requirements. This is not unusual at this particular time, however, because the large orders placed early in the year to avoid anticipated higher prices have been filled during the last few months, and this arriving of tonnage has not only filled all immediate needs but permitted the accumulation of material which will be available for some time. Should there be any marked trade depression, available supplies may be sufficient with very small buying until the end of the year. While some importers quote prices as unchanged but rather easy, others say asking figures on desirable lots are a trifle higher. Sellers give out figures all the way from $35 to $39 per ton, but why there should be this wide range, with market conditions quiet, no one seems willing or able to explain.

Coke.—The market is inactive, in fact, so dull that no quotations are given out. Some cargoes were ordered months ago for future delivery and some of these are still to come to hand but they will have no bearing upon present market conditions. Pending inquiries have so far failed to materialize into actual orders. Supplies are very moderate and several consumers are expected to be in the market within the next few weeks.

Old Material.—There has been a perceptible falling off in business during the last two weeks and in consequence there is a weakening in prices, some say, of 50c. to $1 per ton, while others claim to be able to buy at $1.50 per ton less now than two weeks ago. However this may be, the quotable variation in prices is not as great as in the case of pig iron, but the trade seems to be fully awake to the fact that the immediate future is a period of uncertainty that is well worthy of careful study before making any large business commitments. Advices from Los Angeles show that prices there are from $1 to $1.50 per ton less than in this city, but this is not an important factor because the supply in southern California is commonly larger in proportion to the demand than it is in San Francisco and vicinity.

Finished Iron and Steel.—With a fair demand for bars, rods and plates, business is moving quietly, but there is no complaint of dullness. Orders for structural steel are of good volume and judging from the number of new bond issues authorized by both municipalities and counties in this State, for improvements which will require considerable steel tonnage, the trade movement will be satisfactory for some months to come. While prices are said to be steady, there is a marked hesitancy in giving out quotable figures. The demand for wire products continues good and the same may be said as to nails. A large eight-story warehouse to be erected in Oakland for Montgomery Ward & Co. during the latter part of this year will require a large tonnage of structural steel.

Boston

Buffalo Iron Prices Hold, but Eastern Pennsylvania and Virginia Are Easier

BOSTON, July 31.—Connecticut foundries are reported to have bought iron, notably eastern Pennsylvania, freely the past week for shipments over the remainder of 1923. Sales were made largely through New York agencies, and include 1500 tons No. 2 plain and No. 2X eastern Pennsylvania at less than $29 and $29.50, respectively, delivered Derby. Elsewhere in New England individual sales reported did not exceed 750 tons, ran as low as car lots, averaged perhaps 200 to 250 tons, and in the aggregate were considerably smaller than for the previous week. Eastern Pennsylvania No. 2 plain sold at $28.65 delivered, No. 2X at $28.65 and $29.15, and No. 1X at $29.15 and $29.65. Buffalo No. 2 plain and No. 2X sold at $29.91 and $30.41 delivered and No. 1X at $30.41. These prices represent a shading of $1 to $1.50 on Pennsylvania iron, while those in Buffalo remain practically unchanged. Virginia No. 2X sold at $32.42, off 50c. from the previous week. Car lots of Alabama were taken for mixture purposes at $27 furnace base. A Vermont foundry is reported to have bought northern New York No. 1X at $28.39 delivered, which figures back to $27 furnace. The American Hardware Corporation, New Britain, Conn., is in the market for 1000 tons No. 1X, the Blake & Knowles Pump Works, Holyoke, Mass., for 500 to 1000 tons various grades, and a Providence, R. I., foundry for 1250 tons high silicon and high manganese iron.

We quote delivered prices on the basis of the latest reported sales as follows, having added $2.5. freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $8.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$28.65 to $29.15
East. Penn., sil. 1.75 to 2.25	28.65
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.41
Virginia, sil. 2.25 to 2.75	32.42 to 33.42
Virginia, sil. 1.75 to 2.25	31.92 to 32.92
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Warehouse Business.—The movement of iron and steel out of warehouses continues of good proportions for this time of the year. Stocks of the largest warehouses are in fairly good condition, but those of the smaller ones are broken, rounds being in urgent need. Warehouses are specifying against mill contracts freely, and in some instances are anticipating shipments. Machine bolts have been marked down 10 per cent. Malleables, on the other hand, are 1c. per lb. higher, and horseshoe nails 75c. the package.

Soft steel bars, $3.61½ a 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steel, $3.71½; tire steel, $4.80 to $5.15; open-hearth spring steel, $8 to $10; crucible spring steel, $12; regular steel bands, $4.80; bands over 6 in. wide, $5.05 to $5.30; hoop steel, $5.80 to $6.30; cold rolled steel, $4.75 to $5.25; refined iron, $3.61½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.50 to $7.10.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. are quoting by-product foundry coke for August shipment at $13.50, delivered New England, the same as for July shipment. Both concerns are sold far ahead on domestic fuel and operating at full capacity. Specifications against foundry coke contracts are steadily increasing, but not for stocking purposes, which indicates New England foundries are well occupied. Connellsville foundry cokes are still obtainable for less money than New England product, but melters show little interest, no sales of importance being reported here the past week.

Old Material.—Scattering sales of No. 1 machinery cast to New England foundries at $22 to $22.75 delivered serve to keep interest in the old material market alive. Aggregate sales the past week were in the neighborhood of 1000 tons. Local brokers, within the past day or two, received inquiries from Pennsylvania mills for 100 to 200 ton lots of heavy melting steel at $15.50 delivered, which may be forerunners of more active buying. A maker of brake shoes offers $15.50 delivered New England for stove plate, but is securing little material. Brokers are destitute of orders for most other kinds of scrap. The market for pipe, cast iron borings and shafting appears virtually lifeless.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	15.50 to 16.50
Railroad malleable	24.00 to 24.50
Street car axles	21.00 to 21.50

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 rail wrought	12.50 to 13.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long)	8.50 to 9.00
Machine shop turnings	9.00 to 9.50
Cast iron borings, rolling mill	11.00 to 11.50
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	9.00 to 9.50
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.00 to 13.50
Stove plate*	11.00 to 12.00

*For Pennsylvania shipment.

Detroit Scrap Prices Lower

DETROIT, July 31.—New low levels have been established on old material for the year. Melters are showing interest in pig iron for third quarter. Interest is being shown by dealers in the offering of 3500 tons of miscellaneous scrap by one of the largest producers for August delivery.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to $15.00
Shoveling steel	14.50 to 16.50
No. 1 machinery cast	17.00 to 19.00
Cast borings	7.50 to 8.75
Automobile cast scrap	21.00 to 23.00
Stove plate	14.00 to 16.00
Hydraulic compressed	11.50 to 12.50
Turnings	7.00 to 8.25
Flashings	9.50 to 10.50

Philadelphia

Improvement in Pig Iron More Pronounced—Plates in Active Demand

PHILADELPHIA, July 31.—The improved tone in the general iron and steel market in the Philadelphia district has been given added strength during the past week. It is especially marked in the case of pig iron. This is due to actual increase made in the volume of inquiries and sales. In other lines the better feeling is based, partly at least, on sentimental conditions rather than any greater movement in the way of inquiries and purchases, except in the case of plates. The market for this product has been given a firmer position also because of further buying and specifications against contracts at 2.50c., base Pittsburgh. The market for sheets seems to be well founded on existing prices, blue annealed, perhaps being in the strongest position at 3c., base Pittsburgh. The other lines of rolled steel are largely marking time, but there is a more hopeful feeling that they will be stimulated by a buying movement before mills, now fairly well booked, have taken care of present tonnages.

While minimum prices of foundry grades of pig iron remain unchanged, there has been some equalizing of freight rates, which has brought down the delivered levels of the more distant furnaces. There has been another rather heavy sales movement of these grades in this district the past week, and it is estimated that 125,000 tons of foundry iron has been sold in this district during July. Sales of basic for the month have not exceeded 10,000 tons. Virginia grades are not reaching this district because of high freight rates. Malleable and gray forge are inactive, and prices, brought in line with quotations on the active grades, are nominal. Standard low phosphorus, copper-free, has shown a price recession of $1 with a minimum of $29, furnace, while copper-free, foreign low phosphorus is quoted at $30, f.o.b. cars, Philadelphia, a decline of $3 under last week. Blast furnace interests say that buyers are sounding the market with much more interest, and apparently are manifesting the belief that the bottom has been reached. Some producers now are predicting an upward price turn in the near future.

The scrap market is listless, with further declines of 50c. to $1 a ton in some of the leading grades, and a 50c. increase in heavy breakable scrap and stove plate for steel plants, this rise being due to sales of fair-sized tonnages.

Pig Iron.—Sales of foundry iron by furnaces in this district the past week have involved good-sized tonnages. They have included the several grades. The tonnages are for delivery to this district, New York and New England, the latter taking a heavy proportion. No change has been made in the minimum price, but some of the more distant furnaces have equalized freight rates so as to attract business. There is a much more confident feeling among producers, some of whom believe that the bottom of the market has been reached and that the tendency of prices now is upward. It is evident that some buyers are showing more interest and because of the purchases made and negotiations under way, it is apparently their feeling that the trend no longer is downward, at least, though there are those who say they do not share this opinion of the market. Among sales of the different foundry grades was a fair-sized tonnage for the Burnham Boiler Corporation, for delivery to its plants at Irvington, N. Y.; Lancaster, Pa., and Elizabeth, N. J., over the remainder of the year. The market for other grades remains dull. An inquiry is out for 200 tons of copper bearing low phosphorus iron, generally quoted at $32, furnace, though a quotation of $33 also is being made. The price range on standard copper free low phosphorus has declined $1 and is now quoted $29 to $34, furnace, while copper free foreign low phosphorus iron is down $3 and is quoted $30, f.o.b. cars, Philadelphia. Fear of a strike of anthracite miners has stimulated purchases for bituminous coal and furnace coke, and has had a senti-

mental effect in strengthening the pig iron market. Imports of pig iron to this district the past week amounted to only 215 tons, which came from East India.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.76 to $26.34
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.26 to 26.84
East. Pa. No 1X	26.76 to 27.34
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.17 to 31.67
Virginia No. 2X, 2.25 to 2.75 sil..	31.67 to 32.67
Basic delivered eastern Pa.	25.50 to 26.00
Gray forge	25.50 to 26.50
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	29.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	32.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.50
Low phos., copper free, guar. not over 0.035 per cent phos.	30.00
Continental, phos. 1.50; sil. 2 to 3	25.50

Ferroalloys.—While the market for ferroalloys remains dull, inquiries for small lots of ferromanganese and spiegeleisen have developed in this district the past week. There does not appear to be any prospect of any marked improvement in buying in the early future. Standard ferromanganese continues to be quoted at $117.50, Atlantic seaboard, while 19 to 21 per cent spiegeleisen remains at $44, furnace.

Semi-Finished Steel.—The market for semi-finished steel remains unchanged at $42.50, Pittsburgh, for re-rolling billets and $47.50 to $50, Pittsburgh, for forging steel.

Plates.—Further improvement was reflected in the market for plates the past week. There is greater buying and also increased specifications against contracts. While neither movement represents a heavy volume, the stimulation in the case of both is well defined and comes from miscellaneous sources, but particularly from the railroads. An inquiry is out for 7000 tons of car plates. Mills are comfortably booked and the price of 2.50c., base, Pittsburgh, is more strongly established. One prominent maker in this district is making delivery in four to six weeks, on sheared plates, and two weeks on universal plates. Some other makers require longer periods.

Structural Steel.—Fair sized specifications are reported by some makers of structural material, who are giving delivery in 30 days. Inquiries are said to have fallen off slightly. An improvement in lettings on contracts to fabricators is reported with some mills. While there still persists a report that structural steel, in a limited quantity, may be obtained at 2.40c., base, Pittsburgh, it is said this is due to the necessity of maintaining rolling schedules and is not representative of the market, which continues to be quoted at 2.50c.

Warehouse Business.—Limited buying of steel out of stock is reported by warehouse interests, consumers desiring immediate delivery. Prices remain unchanged.

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅛ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅛-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; square and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Bolts, Nuts and Rivets.—Concessions of from 5 per cent to 10 per cent are reported to have been made by some producers of bolts and nuts on attractive business, but the general market quotations remain unchanged. The Pennsylvania Railroad has not as yet closed on its inquiries for 200,000 to 300,000 carbon-treated track bolts, and 200,000 to 400,000 heat-treated track bolts. The Philadelphia & Reading has released an order for about 700 kegs of heat-treated track bolts, leaving 1300 kegs yet to be placed. This latter lot is for delivery on the Atlantic City division, and it is stated there is no hurry in closing the business.

Iron and Steel Bars.—The market for steel bars continues to be quiet, with a slight increase in specifications reported. The price remains unchanged at 2.40c., base, Pittsburgh. No change has been made in the market for bar iron, which is dull.

Ore.—Imports of iron ore to this district the past week totaled 43,978 tons, divided as follows: Algiers, 19,360 tons; Cuba, 12,400 tons; Sweden, 7418 tons; Newfoundland, 4800 tons. Imports of manganese ore amounted to 823 tons, all from East India.

Old Material.—Further declines have been made in some grades of scrap in this district, while increases have been made in heavy breakable cast and stove plate for steel plants. The advance of these latter two grades is attributed to fair-sized purchases, among them being those made by the Central Iron & Steel Co. for its plant at Harrisburg. Each grade has increased 50c., heavy breakable now being quoted at $18.50 to $19 and stove plate at $17 to $17.50. Heavy axle turnings are down $1.50, at $14 to $15, and No. 1 forge fire is down $1, at $14 to $14.50, while declines of 50c. have been made in bundled sheets and machine shop turnings for steel works. Imports of scrap to this district amounted to 2950 tons, all from Cuba.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $17.00
Scrap rails	16.00 to 17.00
Steel rails for rolling	19.00 to 20.00
No. 1 low phos., heavy 0.04 and under	21.50 to 22.50
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	13.50 to 14.00
No. 1 busheling	16.00 to 17.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	13.50 to 14.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	18.00 to 19.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	18.50 to 19.00
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 15.50
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Cleveland

Finished Steel Market Shows Improvement—Blue Annealed Sheets Active

Pig Iron.—The demand for pig iron further increased during the week and local interests booked a fair volume of business in malleable and foundry grades, sales being larger than during any previous week of the past two or three months. Buying was largely for early requirements, but some fourth quarter contracts were placed. While some producers are holding to $26, the bulk of the business at which the Valley can be used as a basing point is still going at around $25. A Cleveland furnace is quoting $25 for out-of-town shipments and $26 at furnace for local delivery. Hence the local market is no longer quotable above the latter price, or a decline of 25c. a ton, although one Cleveland producer is still asking $27. One lake furnace that has been holding to $29, being well sold up for the third quarter, has reduced its price to $27, has opened its books for the fourth quarter, and during the week sold 10,000 tons of foundry and malleable iron, including one 3000-ton of the latter grade. A Pennsylvania radiator interest has purchased 1050 tons from a Cleveland interest. A Muncie, Ind., interest

which recently inquired for 3000 tons of malleable iron has not yet placed its order.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	26.50
Southern fdy., sil. 1.75 to 2.25	31.00
Malleable	26.50
Ohio silvery, 9 per cent	37.52
Standard low phos., Valley furnace	33.00

Sheets.—Some of the mills have booked considerable business recently in blue annealed sheets, but the demand for other grades is light. The market is firm except on black sheets, which are still being shaded $2 to 3.75c. Mills are in need of black tonnage.

Reinforcing Bars.—New demand has improved. Price concessions of $2 a ton are reported on soft steel reinforcing bars, but it appears that these are being made only by some of the jobbers on stocks purchased at lower than present mill prices. These price concessions are being made to meet the competition of rail steel mills that are quoting 2.30c. to 2.35c. New inquiries include the State Street Viaduct, Akron, 350 tons, and a building for the Schroth Packing Co., Cincinnati, 150 tons.

Semi-Finished Steel.—There has been no recent inquiry to test prices, but makers continue to quote sheet bars, billets and slabs at $42.50.

Finished Iron and Steel.—The situation in the finished steel market shows some improvement. The volume of orders has increased, but buyers are as a rule placing orders for smaller lots than usual and the demand is largely for material for early shipment. Consumers are getting good shipments on old contracts, but appear to be using up material fairly promptly and consumers' stocks are reported to be generally low. While some further efforts have been made to break prices on round lot orders, buyers have not succeeded in bringing out lower than 2.40c. on steel bars and 2.50c. on plates and structural material. Plates are in fairly good demand and evidently mills are still booking orders for shipment in from ten days to three weeks at prices equivalent to 2.65c. to 2.70c., Pittsburgh. One local plate mill which has been quoting regular prices is now asking 2.60c. for small lots for quick shipment. Hot-rolled strip steel is firmer, with quotations ranging from 3.15c. to 3.30c. The Pere Marquette Railroad has placed its two car ferries with the Manitowoc Ship Building Corporation. These will require 5200 tons of plates and structural material which has been placed with the Illinois Steel Co. Inquiry in the building field is very light.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Bolts, Nuts and Rivets.—Bolt and nut specifications continue good, but new business is light. The regular discount is being shaded up to 5 per cent in some cases for round lots. Rivet specifications have improved, owing largely to a heavy demand from tank shops. Prices are well established at the reductions reported last week.

Old Material.—Prices have further declined on several grades and have now reached a point where many believe they will go little, if any, lower. Consequently dealers and some mills are buying material to lay down. Present prices are being cut little, but producers are having trouble in selling what is offered, as the trading level of the market has not been well established.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel, nominal	$15.75 to $16.00
Rails for rolling	17.75 to 18.00
Rails under 3 ft.	17.25 to 17.50
Low phosphorus melting	18.50 to 19.00
Cast borings	11.00 to 11.50
Machine shop turnings	9.75 to 10.00
Mixed borings and turnings	9.75 to 10.00
Compressed sheet steel	13.00 to 13.50
Railroad wrought	12.25 to 12.75
Railroad malleable	20.50 to 21.00
Light bundle sheet stampings	10.00 to 10.50
Steel axle turnings	14.50 to 15.00
No. 1 cast	18.50 to 19.50
No. 1 busheling	9.75 to 10.00
Drop forge flashings	9.75 to 10.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Pipes and flues	9.00 to 9.50

NEW TRADE PUBLICATIONS

Air Preheater.—James Howden & Co. of America, 114 Liberty Street, New York. In a 12-page pamphlet, 8½ x 11 in., is described a patented air preheater designed to utilize some of the waste gases carried into the stack from the operation of steam boilers. This is designed particularly for marine use, being the invention of Frederick Ljungström of Stockholm, Sweden, James Howden & Co., Glasgow, Scotland, having made an arrangement with the Ljungström interests for extending and pushing the use of the device. By its use an increase in overall plant efficiency is claimed, as well as increase in boiler efficiency and capacity, a greater success in burning low grade fuel and reduction of heat losses.

Portable Sherardizing Furnaces and Equipment.—New Haven Sherardizing Co., Hartford, Conn. 24-page catalog showing sherardizing furnaces and other equipment used in plants for sherardizing materials. Prominent in the catalog is a group of instructions covering particularly the loading, operation, rotating and cooling of the drums and going into numerous problems of the sherardizing process. The tabular matter includes dimensions of United States standard bolts and screws.

Riveters.—[illegible] Works, Inc., Loomis Avenue, Chicago. Leaflet illustrating and describing briefly several of the more important types of Hanna riveters, which are made in about 500 styles and sizes.

Water Supply for Swimming Pools.—Graver Corporation, East Chicago, Ind. Bulletin on the design and construction of swimming pools and descriptions, photographs, charts and tables to explain the construction and operation of sanitary filtration, heating and sterilization systems made by the corporation. The method of calculating the size of heater necessary for any given pool is explained.

Washing Metals by Machinery.—The Crescent Washing Machine Co., New Rochelle, N. Y. An 8-page folder, 8½ x 11 in., describing the process of washing metals by machinery and the Crescent machines which have been developed for this purpose. These machines are adapted for cleaning such metal pieces as axle housings, grease gun shells, connecting rods, automobile headlights, steering gear parts, brass electrodes, ball bearing parts, gears, brass and cast iron meter parts, flatware blanks, silversmiths' hardware, screw machine products, etc. The circular gives a list of manufacturers in all of the lines using Crescent machines.

Crucibles.—The Ross-Tacony Crucible Co., Tacony, Philadelphia. A 24-page booklet, with cover, 5½ x 8 in., illustrating and describing the Ross-Tacony crucibles. The various types of crucibles manufactured by this company are shown and the booklet also contains views of the company's plant, both exterior and interior.

Furnaces and Industrial Fuel Equipment.—Heeman & Broughton Co., Detroit. Catalog No. 4. Describes carbonizing and annealing, carbon steel, high-speed steel, lead and cyanide, oil tempering, end heating and various special furnaces. Standard sizes are given and the illustrations include cross-section views as well as photographic reproductions. Oil and gas burners, gas and air mixers, gas and oil pumps, compressors, blowers and other equipment are also shown and described. The catalog is 7¾ x 11¾ and contains 31 pages.

Belt Conveying Apparatus.—Chillingworth Engineering Corporation, New York. Bulletin describing the Mellin belt conveyor idler. It also contains tables on dimensions, spacing of troughing idlers, proper width of belt for size of material and maximum speed of belts; as well as formulas for capacity of belts, belt tensions, and pull of belt.

FABRICATED STEEL BUSINESS

Private Enterprises Feature Both Lettings and Inquiries—More Oil Tanks

Private undertakings continue to feature activity in the fabricated structural steel field. The largest item of the week was the contracting for 60 oil tanks taking 18,000 tons of steel. Little railroad work appeared. Public work promises to supply quite a backlog, in no small part for public schools. Awards include the following:

Delaware River Bridge, anchorage cable bents, 1900 tons, to the American Bridge Co.

Western Electric Co., Kearny, N. J., 1900 tons, to the American Bridge Co.; award mentioned last week, but not definitely located.

Consolidated Gas & Electric Co., Baltimore, turbine supports, 300 tons, to the Chesapeake Iron Works.

Public Service Corporation, Newark, N. J., power station, 500 tons, to Levering & Garrigues Co.

Ice plant, Bronx Borough, New York, 400 tons, to the Hay Foundry & Iron Works.

Public School No. 30, New York, 200 tons, to the Hay Foundry & Iron Works.

New York Edison Co., Forty-first Street and East River, column cores, 900 tons; practically awarded at this writing to Post & McCord for erecting and American Bridge Co. for fabricating.

Sinclair Crude Oil Purchasing Co., 60 storage tanks in the Wyoming district, 18,000 tons, half to Chicago Bridge & Iron Works and half to American Bridge Co.

Gymnasium, Martinsville, Ind., 250 tons, to Central States Bridge Co.

Illinois Central, girder and I-beam spans, 176 tons, to unnamed fabricator.

Inland Steel Co., two 220-ft. trusses and one 100-ft. truss, 480 tons, to Kenwood Bridge Co.

State reformatory buildings, Pendleton, Ind., 400 tons, to Insley Mfg. Co.

Endicott-Johnson Corporation, St. Louis, mercantile building, 236 tons, to Mississippi Valley Structural Steel Co.

Minneapolis, truss reinforcing for concrete arches, Nicollet Avenue bridge, 138 tons, to Minneapolis Steel & Machinery Co.

Ozan-Graysonia Lumber Co., Prescott, Ark., deck plate girder span, 197 tons, to unnamed fabricator.

Memphis Cotton Exchange and office building, Memphis, Tenn., 734 tons, reinforced concrete construction substituted

Gas holders, Niagara, N. Y., Merced, Cal., and Selma, Cal., 500 tons, to Stacey Mfg. Co.

Inland Steel Co., Indiana Harbor, power house extension, 350 tons, to Lakeside Bridge & Steel Co.

Ford Motor Co., Iron Mountain, Mich., transfer and shipping shed, 200 tons, to Worden-Allen Co. (Supplements 4000 tons placed with same interest in May. More supplemental orders to come.)

Shawsheen, Mass., bank building, 104 tons, to the New England Structural Co.

Tidewater Oil Co., eight 80,000-bbl. tanks for the Powell field in Texas, 2000 tons, to an unnamed fabricator.

Delmar Oil Co., three 55,000-bbl. tanks for Oklahoma, 450 tons, to Graver Corporation.

Invincible Oil Co., two 55,000-bbl. tanks and miscellaneous work for Louisiana, 900 tons, to Graver Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Baltimore & Ohio, small bridges, 350 tons.

Pier shed, North River, New York, 2800 tons, W. G. Triest, low bidder.

Girls' High School, Brooklyn, N. Y., 3000 tons.

Public School No. 99, Brooklyn, N. Y., 400 tons.

Apartment house, 760 Park Avenue, New York, 800 tons.

Apartment house, Grand Central area at Forty-seventh Street, New York, 5000 tons, award by Thompson-Starrett Co. imminent.

Office building, Grand Central area, New York, 6000 tons, Todd Robertson & Co., builders.

Department store, Newark, N. J., 500 tons.

Hotel, East Forty-fourth Street, New York, 800 tons.

Apartment house, East Eighty-ninth Street, New York, 800 tons.

Masonic Temple, South Bend, Ind., 600 tons, general contract awarded.

Wilson Foundry & Machine Co., Pontiac, Mich., addition, 400 tons.

Rock Island Lines, Eldon, Iowa, 17 steel [illegible] spans, 650 tons.

Mead-Morrison Mfg. Co., 12-ton ore bridge for erection at Buffalo, 500 tons.

Chicago Sanitary District, North Side sewage treatment works, division A, 750 tons.

Elks' Club, Milwaukee, 1300 tons; bids opened July 25 on revised specifications. Worden-Allen Co., Massillon Bridge Co. and American Bridge Co. tied for low; award Aug. 1 or 2.

Kosair Temple, Louisville, Ky., 500 tons, bids close Aug. 15.

Vanderbilt University, Nashville, Tenn., 100 tons, bids being taken.

Store building, Detroit and Warren Road, Cleveland, 150 tons, general contract placed with the Munkin Conkey Construction Co.

Railroad Equipment Buying

The Chicago, Burlington & Quincy is inquiring for diaphragms and doors for gondola car repairs in its own shops, involving 1300 tons of plates, shapes and bars.

The Union Pacific has placed 100 dump cars with the Greenville Steel Car Co.

The Pan-American Petroleum Co. has ordered 10 tank cars from the American Car & Foundry Co.

The Minnesota Steel Co. has placed 20 flat cars with the Standard Steel Car Co.

The Inland Steel Co. is inquiring for five 75-ton billet cars.

The American Short Line Railroad Association, McCormick Building, Chicago, is inquiring for two second-hand 70-ft. steel underframe combination mail, baggage and passenger cars and two 8-wheel steel underframe cabooses, second-hand.

British Iron and Steel Market

Pig Iron Market Weak—Shipbuilding Lowest in Years—Only 11 Furnaces Blowing in Ruhr—Galvanized Sheets Higher

(*By Cable*)

LONDON, ENGLAND, July 31.

Pig iron still is weak, with demand stagnant, but no further steps have been taken yet to reduce output. No. 3 Scotch foundry iron is offering at £5 5s. ($23.94), f.o.t. Hematite is dull, even the new low figures not attracting buyers.

Foreign ore is quiet, with the Bilbao strike holding up shipments. Rubio is quoted at 23s. ($5.24), c.i.f. Tees. North African hematite ore is being sold at about 22s. to 22½s. ($5.02 to $5.13).

Steel buying continues poor, but there is some revival of inquiry for shipbuilding material for France. Germany is inquiring for large lines of structural steel. The Scotch holidays have affected sales and output.

Shipbuilding during July was five vessels, of 754 tons total gross register, the lowest in 40 years, except for April, 1922. Owing to the continuance of the boilermakers' dispute, Craig, Taylor & Co., Ltd., have closed their shipyard at Stockton, and Richardson, Duck & Co. Ltd., Stockton, are dismissing men.

There is some revival in demand for Continental steel, mainly from India and Japan, for bars, sheets, sections and angles. China has bought wire nails on the basis of £15 to £16 (3.05 to 3.26c. per lb.) f.o.b. Semi-finished steel is scarce, wire rods being quoted at £10 15s. ($49.02), f.o.b.

In the Ruhr only 11 furnaces are blowing now, against 74 in January. In Luxemburg 14 furnaces are blowing against 20 April 1 and 31 Jan. 1, out of 47. The Acieries Reunies de Burbach-Eich-Dudelange has 6 furnaces blowing (out of 23); Terres Rouges, 3 (out of 11); Hadir, 3; d'Ougrée Marihaye, one and Athus-Grivegne, one.

Tin plate is steady, with improved business on the August-September basis, which now holds good for

(*Continued on page 309*)

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. ..... 2.50c.

Structural Material

Beams, channels, etc., base, per lb. ..... 2.50c.
Sheet piling ..... 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 2.40c.
Soft steel bars for cold finishing ..... $3 per ton over base
Reinforcing steel bars, base ..... 2.40c.
Refined iron bars, base, per lb. ..... 3.25c.
Double refined iron bars, base, per lb. ..... 4.85c. to 5.00c.
Stay bolt iron bars, base, per lb. ..... 8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. 3.15c. to 3.30c.
Hoops, light gage, under 1 in. wide ..... 3.30c. to 3.50c.
Bands, base, per lb. ..... 3.15c. to 3.30c.
Strips, base, per lb. ..... 3.00c. to 3.30c.
Cotton ties, per bundle of 45 lb. $1.61

Cold-Finished Steels

Bars and shafting base, per lb. ..... 3.25c.
Strips, base, per lb. ..... 5.00c. to 5.25c.

Wire Products

Nails, base, per keg. $3.00
Galvanized nails, 1 in. and over ..... $2.25 over base
Galvanized nails, less than 1 in. ..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. 2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg. 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg. 3.45
Cement coated nails, base, per count keg. 2.70
Woven fence, carloads (to jobbers) ..... 67½ per cent off list
Woven fence, carloads (to retailers) ..... 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 10 per cent off list
Machine bolts, small, cut threads..50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in. ..... 60 and 10 per cent off list
Smaller and shorter, rolled threads ..... 50, 10 and 10 per cent off list
Cut threads ..... 50, 10 and 10 per cent off list
Larger and longer ..... 50 and 10 per cent off list
Lag bolts ..... 50 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads..... 50 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in. ..... 45 and 10 per cent off list
Larger and longer sizes ..... 45 and 10 per cent off list
Hot pressed square or hex. nuts, blank..... 3.75c. off list
Hot pressed nuts, tapped ..... 3.75c. off list
C.p.c. and t. square or hex. nuts, blank..... 3.75c. off list
C.p.c. and t. square or hex. nuts, tapped..... 3.75c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S. ..... 80 per cent off list
⅞ in. and larger, U. S. S. ..... 75 per cent off list
Small sizes, S. A. E. ..... 80 and 5 per cent off list
S. A. E., ⅜ in. and larger..... 75 and 5 per cent off list
Stove bolts in packages..... 75, 10 and 5 per cent off list
Stove bolts in bulk..... 75, 10, 5 and 2½ per cent off list
Tire bolts ..... 50, 10 and 10 per cent off list
Bolt ends with hot pressed nuts..50, 10 and 10 per cent off list
Turnbuckles, with ends, ½ in. and smaller ..... 55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller ..... 70 and 10 to 65 and 5 per cent off list
Washers ..... 5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws, ... 65 and 10 per cent off list
Milled set screws ..... 65 and 10 per cent off list
Upset cap screws ..... 75 per cent off list
Upset set screws ..... 75 per cent off list
Milled studs ..... 50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $3.00 to $3.10
Large boiler rivets, base, per 100 lb. ..... 3.10 to 3.20
Small rivets ..... 65 and 10 off list

Track Equipment

Spikes, ⅞ in. and larger, base, per 100 lb.	$3.15
Spikes, ½ in., ⅝ in. and ⅝ in., per 100 lb.	$3.50 to 3.75
Spikes, ⅞ in.	3.50 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ¾ in. and larger, base, per 100 lb.	4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.	5.00 to 5.50
Tie plates, per 100 lb.	2.25 to 2.60
Angle bars, base, per 100 lb.	2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2½ in.	— 7
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes *Cold Drawn*			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in. to 4½ in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		
Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base ..... 83 per cent off list
Carbon 0.30 to 0.40, base ..... 81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼-in. O.D. 12 gage	17	1⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box $5.50

Terne Plate

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. ..... 3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. ..... 3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. ..... 5.35c.

Galvanized

No. 28 (base), per lb. ..... 5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb. ..... 5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. ..... 3.85c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic	$0.265	Buffalo	$0.215	Pacific Coast	$1.34
Philadelphia, export	0.235	Cleveland	0.29	Pac. Coast, ship plates	1.20
Baltimore, domestic	0.31	Cleveland, Youngstown		Birmingham	0.58
Baltimore, export	0.225	Comb.	0.19	Memphis	0.56
New York, domestic	0.34	Detroit	0.29	New Orleans	0.70
New York, export	0.255	Cincinnati	0.29	Jacksonville, all rail	0.70
Boston, domestic	0.365	Indianapolis	0.31	Jacksonville, rail and water	0.415
Boston, export	0.255	Chicago	0.34	Denver (pipe)	0.87
				Denver	1.215
				St. Louis	$0.43
				Kansas City	0.735
				Kansas City (pipe)	0.705
				St. Paul	0.60
				Omaha	0.735
				Omaha (pipe)	0.705

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 45c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	6.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.95

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	12c
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$117.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.00 to $51.00	$43.00 to $46.00
Maryland	50.00 to 53.00	45.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	45.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 9.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	48.00	
Ground silica clay, per net ton	10.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled, base, per lb.	2.10c. to 2.15c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ⅜-in., base per 100 lb.	$3.25 to 3.75
Spikes, ⅜-in., base, per 100 lb.	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c.
Bars, common iron, Philadelphia mill	2.35c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.85c.
Cut nails, base, per keg	$3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (1½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.50
2500 (5% Nickel)	8.00
3100 (Nickel Chromium)	4.50
3200 (Nickel Chromium)	6.25
3300 (Nickel Chromium)	8.25
3400 (Nickel Chromium)	7.25
5100 (Chromium Steel)	4.00
5200 (Chromium Steel)	3.25
6100 (Chromium Vanadium bars)	5.25
6100 (Chromium Vanadium spring steel)	5.00
9250 (Silico Manganese spring steel)	4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.75
Chromium Molybdenum, bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

EARNINGS INCREASE

Steel Corporation Shows Larger Surplus for Second Quarter

Chairman Gary Makes Conservative Statement as to Business Conditions—Takes Hopeful View as to President Harding's Illness

The report of the United States Steel Corporation for the second quarter of 1923 shows a surplus for the second time since the first quarter of 1921, when the surplus was $2,816,905. The surplus for the second quarter of 1923 was $7,205,412, as compared with $4,859,351 for the first quarter.

The net earnings for the second quarter of 1923 were $47,858,181, compared with $34,780,069 for the first quarter. The usual quarterly dividends of 1¾ per cent on the preferred stock and 1¼ per cent on the common stock were declared. Earnings for the first and second quarters of 1923 and the three preceding years were as follows:

Quarters	1923	1922	1921	1920
First.....	$34,780,069	$19,339,985	$32,286,722	$42,089,019
Second....	47,858,181	27,286,945	21,892,016	43,155,705
Third.....	.....	27,468,339	18,918,058	48,051,540
Fourth...	.....	27,552,392	19,612,033	43,877,862
Net earnings each year		$101,617,671	$92,708,827	$177,174,126

The statement of the earnings for the second quarter ending June 30 shows that May was the best month of the three, but June was somewhat better than April. The statement is as follows:

Earnings

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
April, 1923 ...	$15,097,037	$697,049	$14,399,988
May, 1923....	18,392,070	693,395	17,698,675
June, 1923....	16,450,923	691,405	15,759,518
	$49,940,030	$2,081,849	
Net earnings.....			$47,858,181
Less charges and allowances for depreciation and sinking funds on bonds.....			13,029,797
Net income.....			$34,828,384
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,706,772	
Premium on bonds redeemed.....		257,500	
			4,964,272
Balance			$29,864,112
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent.....		$6,304,919	
Common, 1¼ per cent		6,353,781	
			12,658,700
			$17,205,412
Less sums appropriated and expended, account of additions, improvements or betterments to plants and properties.....			10,000,000
Surplus for the quarter.....			$7,205,412

Judge Gary's Statement

Judge Gary was asked whether he would care to explain the item of $10,000,000 shown in the quarterly report as indicating sums appropriated and expended or to be expended on account of additions, improvements or betterments to plants and properties. In reply he said:

"That is for the purpose of accurately informing the public of the fact that our surplus does not necessarily mean that we have an amount in cash equal to that. We are expending regularly about $5,000,000 monthly for account of new properties, extensions to our plants, improvements of our own, and while a large portion of that is always properly credited to capital, yet as it has been expended it is not capital or surplus which is available for the payment of dividends. We are proposing to get our accounts into such shape that on their face they will explain this to the stockholders, so that it will not be necessary to inquire at stockholders' meetings if our properly shown surplus is available for dividends and why it is that we do not increase our dividends."

Business Conditions

On being asked as to the steel business, especially as to prospects for the immediate future, Judge Gary said:

"No one can prognosticate definitely and with certainty what the progress of business will be, even for the next few months. If one makes a prediction which subsequent events prove was not justified there is apt to be adverse criticism. Consequently, as some of you at least know, we always try to be very careful with regard to what we say of the future.

"There has been some diminution in new business during the last thirty or forty days. That is seasonable—natural for the summer months, and therefore not at all surprising. At the present time our new orders are not quite as large as our shipments, and, of course, if that should continue for a long period our shipments would necessarily decrease, but if our orders continue to be as large as they are now, with the large tonnages on the books unfilled and unshipped, there should be enough business to keep us going practically full for a long period.

"Of course, I would not make any statement that would have a tendency to hurt business of any kind, and I would not intentionally say anything that would make anyone more hopeful of the future than the facts justify. I think I am justified in saying, however, that from the standpoint of the manufacturer we should feel very well satisfied with the present situation. Now, as always, things may happen to cause a relaxation of business, because capital is timid. People hesitate to act; they postpone purchases until they can see a little more clearly in the future. No man can say certainly that he knows there may not be interruptions to our present progress and prosperity. On the other hand, as I see it, no one is justified in saying that such will occur in the immediate future."

President Harding's Illness

The sickness of the President was mentioned, and Judge Gary said:

"I understand from the latest bulletin that President Harding is much improved, and I do not believe his illness will be prolonged. I hear that all the people in Washington and nearly everyone away from there are praying for his recovery. That means more to the President than hundreds of doctors. Mrs. Harding, brave, wise, patient, is of immense benefit to her husband just at this time. She is a very high type. I expect to see Mr. Harding on the way to recovery in the near future. He has a very good Cabinet, a very able vice-president—one of the ablest we have ever had—and even if Mr. Harding should not be able to do much, if any, work for the next three months, which I think is not possible, the affairs of this country would go on just the same."

A reorganization committee of stockholders of the Winther Motors, Inc., Kenosha, Wis., reports that it has been guaranteed sufficient support to enable it to make an acceptable bid for the entire property intact, with adequate surplus for working capital to resume the operation immediately upon transfer. A new corporation with $500,000 capital stock will be formed. The Winther company, capitalized at $4,200,000, was declared bankrupt Feb. 10 and scheduled liabilities at $655,034 and assets at $1,038,722. Edward C. Kraemer, 1204 Twenty-eighth Street, Milwaukee, is secretary of the reorganization committee.

Creditors of the Mitchell Motors Co., Inc., Racine, Wis., bankrupt, at a meeting held July 23 to receive the report of the appraisers, authorized the trustee, Herbert F. Johnson, to receive private bids for 30 days, and if no satisfactory bid is received then to offer the property at public auction. The appraisal shows a going value of $1,819,851.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
July	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
25	14.87½	14.50	39.25	6.40	6.20	6.45	6.10
26	14.87½	14.50	38.62½	6.50	6.25	6.55	6.20
27	14.87½	14.50	38.87½	6.50	6.25	6.60	6.25
28	14.87½	14.37½		6.60	6.50	6.60	6.25
30	14.87½	14.37½	38.87½	6.75	6.65	6.65	6.30
31	14.87½	14.37½	38.75	6.75	6.65	6.65	6.30

*Refinery quotation, delivered price ½c. higher.

New York

NEW YORK, July 31.

The markets continue quiet and generally uninteresting. Buying of copper is light and prices are easier. The tin market is dull and quotations are lower. Speculative buying in lead has advanced prices. Prices for zinc are higher, due to unusual conditions.

Copper.—The electrolytic copper market has been exceedingly quiet. The chief buying has been for export, but this has not been large. Domestic orders have been few and as a result there have been some concessions in quotations. Electrolytic copper for delivery the rest of this year is quoted at 14.62½c., delivered, or 14.37½c., refinery, with the possibility that on desirable business these levels could be shaded slightly. One seller reports inquiries for about 2000 tons, only a small portion of which has resulted in orders. Lake copper is quoted at 14.87½c., delivered.

Copper Averages.—The average price of Lake copper for the month of July, based on daily quotations in THE IRON AGE, was 14.94c. The average price of electrolytic copper was 14.39c., refinery, or 14.64c., delivered.

Tin.—The market has been exceedingly dull and the better tone, which was manifested a week ago, has given way to very little interest, particularly by consumers. Not more than 300 to 400 tons of Straits tin was sold during the week, according to reliable estimates. Even dealers have shown very little activity. On the New York Metal Exchange a little business was done, possibly 100 tons, mostly futures. The market is devoid of interesting features, the chief interest centering in statistics for July, available tomorrow. Spot Straits tin was quoted today in a very quiet market at 38.75c., New York. The London market yesterday was about £3 lower than on July 24, with spot standard quoted at £184, 17s. 6d., future standard at £185 17s. 6d. and spot Straits at £188 7s. 6d. Arrivals this far this month have been 5205 tons, with 4547 tons reported afloat.

Lead.—The market has developed decided strength, which is attributed to demand from dealers and operators who have been bidding the market up. By some sellers consumers are reported as quite inactive and by others as buying considerably. On Thursday, July 26, the leading interest again advanced its price 25 points, to 6.50c., New York, the outside market having already exceeded this figure. Quotations today in the outside market are 6.75c., New York, and 6.65c., St. Louis. Lead in carload lots for shipment from St. Louis has sold here as high as 6.90c.

Zinc.—Within the week the price of prime Western has advanced about 20 points to 6.30c., St. Louis, or 6.65c., New York, for August shipment. The premium for September and October is about five points each month over the August price. Domestic demand is exceedingly light and consumers are buying only what they need, which is not much. The strength of the market therefore is attributed to an advance in London prices and to the firmness of ore prices here. There is even some prospect of export to England.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c. per lb.

Antimony.—The market for Chinese antimony continues to gather strength at 7.70c. to 7.80c., New York, duty paid, for wholesale lots for prompt and early delivery.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers in wholesale lots at 26.50c. to 27c. per lb., New York, duty paid, in such cases where they can obtain it from their principals. No quotations are made public by the leading domestic producer.

Old Metals.—Business continues quiet with a sluggish market. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.25
Copper, heavy and wire	13.25
Copper, light and bottoms	11.25
Heavy machine composition	11.00
Brass, heavy	8.25
Brass, light	7.00
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.50
Lead, tea	4.50
Zinc	4.50

Chicago

CHICAGO, July 31.—Tendencies in the metals are uneven, tin having declined, while lead and spelter have advanced. The advance in lead does not appear to have much foundation in sales, but there has been a fair amount of buying on the rise in zinc and many consumers are of the belief that this commodity has been too low. Among the old metals lead pipe and zinc have gone up in sympathy with the virgin materials. We quote in carload lots, Lake copper, 15.25c.; tin, 40.50c.; lead, 6.75c.; spelter, 6.30c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 10c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5c.; zinc, 4c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 27.50c.; all buying prices for less than carload lots.

GERMAN IRON AND STEEL UP

Falling Mark Exchange and Boosting of Prices Running a Lively Race

(By Radiogram)

BERLIN, GERMANY, July 30.—Hematite iron is now quoted at 14,213,000 m. per metric ton ($13.72 per gross ton, at 95c. per 1,000,000 m.) Foundry iron No. 1 has been advanced by the Pig Iron Association to 12,960,000 m. ($12.51), from the 4,787,000 m. prevailing during the two previous weeks ($10.21 on July 23 and $20 on July 16).

Steel ingots have been pegged by the Stahlbund at 18,750,000 m. ($18.10), compared with 7,630,000 m. ($16.28 at 21c. exchange) last week.

Steel bars are now at the ingot price of 18,750,000 m. (0.81c. per lb.), compared with 10,995,000 m. (1.05c. per lb.) last week.

Thin steel sheets have been advanced to 31,257,000 m. (1.35c. per lb.), compared with 18,149,000 m. (1.73c. per lb.) last week.

The Allis-Chalmers Mfg. Co. reports sales of $6,082,079 in the quarter ended June 30, against $4,778,863 billed in the same period last year. Net profits, after taxes and expenses, were $628,418, equal to $1.30 per share on common stock, against $799,796 in that period of 1922. Net profits in the first half year of 1923 were $1,097,108, against $578,529 in that period of 1922.

W. H. Barr, president of the National Founders' Association and president of the Lumen Bearing Co., Buffalo, addressed a party of Youngstown business men last week. Invitations for the meeting were sent out by President James A. Campbell of the Youngstown Sheet & Tube Co. Mr. Barr regards the business outlook as favorable.

Youngstown Steel and Tube Change in Personnel

YOUNGSTOWN, July 31.—William C. Reilly and Frank Purnell were named vice-presidents and Walter E. Watson, general manager of sales, of the Youngstown Sheet & Tube Co., Tuesday, at a meeting of directors. Elmer T. McCleary was appointed manager of the new and enlarged Youngstown district of the company; C. M. Lingle, manager of the company's coal properties, and F. H. Gordon, general superintendent of the property at Zanesville, Ohio, acquired by the purchase of the Steel & Tube Co., Chicago. The directors elected F. R. Wahl, Chicago, assistant secretary. Mr. Wahl, who is familiar with Illinois laws, will be in charge of the company's corporate offices in Chicago, established when it took out an Illinois charter. J. C. Argetsinger, a corporation lawyer of Youngstown, becomes assistant to Leroy Manchester, general counsel. The action of the board becomes effective Aug. 1. Other promotions are yet to be made in the operating department.



FRANK PURNELL

Mr. Purnell comes to the Sheet & Tube Company from the Bethlehem Steel Export Corporation, of which he was vice-president. He was previously in the sales organization of the Youngstown Sheet & Tube Co. President Campbell states that Mr. Purnell will practically be his assistant.



WALTER E. WATSON

Vice-President Charles Snelling Robinson will be in charge of all operations, including ore, coal and limestone properties. Mr. Reilly will continue as assistant to Mr. Robinson. He has been with the company since 1900.

Mr. Purnell, the new executive vice-president, grew up with the Sheet & Tube Company. During the war he went to Washington as assistant to J. Leonard Replogle, in charge of the steel section of the War Industries Board. Upon conclusion of that service, he went to New York, Jan. 1, 1919, to be a vice-president of the Consolidated Steel Corporation, the export agency for a group of independent steel companies. On the dissolution of that company he assumed the management of the export subsidiary of the Bethlehem Steel Corporation. He returns to the Sheet & Tube organization at the express request of President Campbell.

For operating purposes the Sheet & Tube properties have been divided into two districts known as the Youngstown and Chicago districts. The Youngstown district will embrace the properties at Youngstown, East Youngstown, Struthers, Hubbard and Zanesville. The Chicago district will embrace the Mark and Iroquois works at Chicago, and the properties at Evanston, Ill., and Kalamazoo, Mich. The manager of the Chicago district has not yet been named.

Mr. McCleary, manager of the Youngstown district, has been since 1912 assistant general superintendent of the Sheet & Tube Company, with which he has been connected since 1906. He started with the company as a chemist, having previously served the Carnegie Steel Co. in a similar capacity in the blast furnace department. In 1909 he was made assistant superintendent of blast furnaces and the steel department of the Sheet & Tube company.

Mr. Watson, the general sales manager and formerly assistant general sales manager, has been with the company 10 years. He came to the Sheet & Tube company from Labelle Iron Works Co., which he served as assistant manager of sales. He had previously been in the sales department of the National Tube Co. He is an official in several subsidiary companies of the Sheet & Tube company.

F. W. Gordon, made general superintendent of the Zanesville plant, was previously superintendent of this property.

The property at Mayville, Wis., including two blast furnaces, ore mines and a farm, will be operated independently, and a manager is yet to be named for these holdings.

James A. Campbell has been president of the company for 19 of the 23 years of its existence. During that period it has expanded from humble beginning to a corporation employing 25,000 men, with property and interests throughout the country and in foreign lands. Its various holdings are conservatively valued at $250,000,000. It can produce over 3,000,000 tons of materials annually, 6 per cent of the aggregate capacity of the country.

PERSONAL

W. H. Stewart, who has been sales agent at Montreal, Canada, for Bethlehem products, has been named to succeed Frank Purnell in position and duties as vice-president of the Bethlehem Steel Export Corporation. Mr. Stewart took up his new work in New York on Aug. 1.

Alexander D. Darragh, formerly manager of the plate, shape and bar division of the Consolidated Steel Corporation, New York, sailed last week for Mexico City, where he will undertake certain special duties with the Consolidated Rolling Mills & Foundries Co., which has a steel plant and foundry at Mexico City. He will remain in Mexico at least six months.

Frank B. Zeller, for 15 years connected with the New York Air Brake Co., New York, has resigned as purchasing agent, effective Aug. 15.

Armand Alexandre has resigned as vice-president of the Harry Benjamin Equipment Co., St. Louis, and has returned to his birthplace, Paris, France, to make his future home with his aged parents. Mr. Alexandre came to America 20 years ago. He was with the Ohio Iron & Metal Co., Chicago, 10 years, and with the Benjamin company 10 years. He became an American citizen five years ago.

A. H. Vollmer, who has been resident manager at Cleveland for the Domhoff & Joyce Co., pig iron and coke, has been transferred to Chicago, where he will be resident manager after Aug. 1. He will be succeeded at Cleveland by G. K. Connelly, formerly of the St. Louis office.

H. B. Kraut, who has been export sales manager in the machine tool division of Jos. T. Ryerson & Son, Inc., has resigned his position.

Charles Williams, formerly superintendent of the Baldt Works, Penn Seaboard Steel Corporation, Philadelphia, has been appointed steel works manager for Henry Disston & Sons, Inc., Tacony, Philadelphia. Formerly he was identified with the American Steel & Wire Co. in the Pittsburgh district.

William E. Bradford, inventor of the Bradford ingot mold, has been made superintendent of open hearth department, Baldt Works, New Castle, Del., of the Penn Seaboard Steel Corporation.

Ralph W. McPhee, who resigned a few weeks ago from Henry Pels & Co., New York, to join the Black-

man-Hill-McKee Machinery Co., St. Louis, has been made vice-president of that company.

Richard W. Alexander has resigned as vice-president of the Equitable Trust Co., Baltimore, to become vice-president and treasurer of the Poole Engineering & Machine Co., also of Baltimore, of which he has been a director for some time. He will remain as a director of the trust company.

James T. Wilson, vice-president and assistant general manager Nash Motors Co., Kenosha, Wis., has been appointed general manager of the Nash four-cylinder car division, Milwaukee, but will continue to direct production of the main works in Kenosha, where six-cylinder passenger cars and Nash motor trucks are built. James E. Auten, purchasing agent LaFayette Motors Corporation, Milwaukee, a Nash interest, has been installed as works manager of the four-cylinder car plant.

Guy Bayley of Sanderson & Porter, consulting engineers, New York, is now in Cleveland at the plant of the Anderson Rolled Gear Co., making an investigation for Sanderson & Porter with regard to arranging for an expansion of the manufacture of rolled gears.

OBITUARY

SIR JOHN STRATHEARN HENDRIE, president Hamilton Bridge Works Co., Hamilton, Ont., died at Johns Hopkins Hospital, Baltimore, following an operation on July 17, aged 65 years. Sir John was connected with numerous manufacturing and financial organizations, was formerly lieutenant governor of Ontario and served in the Ontario legislature.

CHARLES S. HUBBARD, at one time secretary of the H. M. Myers Co., shovel manufacturer, Beaver Falls, Pa., and later resident manager of that plant, when it was absorbed by the Ames Shovel & Tool Co., Boston, was found dead in a room in the Duquesne Club, Pittsburgh, on the evening of July 27. Death was attributed to heart disease. He was born in Minneapolis 67 years ago, but when very young went to Pittsburgh with his parents. He was educated in the public schools of that city and at the Western University of Pennsylvania, now the University of Pittsburgh, from which he was graduated with the class of 1880. He served as director of the Pittsburgh Department of Public Safety for four years, beginning in 1914, and as city treasurer for a like term, beginning in 1918. He served from 1915 to 1919 as president of the Duquesne Club.

CLAUDE R. WILSON, president International Fuel & Iron Corporation, Pittsburgh, and an active figure in the distribution of coal, coke, iron and steel, died in Chicago, July 28. He was born in Huntington, Ind., 40 years ago and came to Pittsburgh in about 1903. He was a member of the New York Club, New York, the Manufacturers Club, Philadelphia, and the Pittsburgh Athletic Association. Mrs. Wilson and a son, Raymond S. Wilson, survive.

JOHN WILLIAM PETERSON, president-treasurer, Richardson-Phenix Co., Milwaukee, division of S. F. Bowser & Co., Fort Wayne, Ind., died July 24 following an operation. He was 47 years of age and prominent as an engineer and production executive in the field of automatic lubricating devices.

WILLIAM VELTE, inventor of the Velte gas reversing valve for open-hearth furnaces, died at his home near Mars, Pa., July 17. He was born in Germany 74 years ago and was actively engaged in the foundry and machine business in the Pittsburgh district since 1872. At the time of his death he was the active head of the Velte Foundry & Machine Co., Mars. Mr. Velte is survived by his widow, two sons and six daughters. One son, Ralph C. Velte, is general sales manager of the Valley Mould & Iron Corporation, Sharpsville, Pa., while the other, Lawrence H. Velte, is associated with the Velte company.

DAVID N. BARKER, who for 41 years was connected with the Jones & Laughlin Steel Corporation, 22 years as manager of the Chicago office and warehouse, died on July 21 at his home at Evanston, Ill., aged 79 years. Mr. Barker retired from active work in 1916. He was born at Homer, N. Y., in 1844 and spent his early life on a farm. He went into business at Waukegan, Ill., later entering the Chicago office of the Jones & Laughlin company, of which he became manager in 1894, retaining that position up to the time of his retirement seven years ago. He was a director of the State Bank of Chicago and a stockholder in the Jones & Laughlin Steel Corporation.

THOMAS B. CONROY, president Conroy Boiler & Tank Works, Chicago, died at his home in Chicago, July 29, at the age of 62.

British Iron and Steel Market

(*Continued from page* 303)

shipments up to and after the end of September. There is a fair export inquiry, including Japan, Scandinavia and the Continent.

Galvanized sheets are strong, with an upward tendency. There have been large sales to India and other markets. The works now are fully sold to the end of September. India is inquiring for October to December shipment and fully 20,000 tons already have been sold.

Black sheets are firmer on the Far Eastern demand, 24 gage being sold at £13 10s. (2.75c. per lb.).

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£2	1½s.			$9.46
Bilbao Rubio ores	1	4			5.47
Cleveland No. 1 foundry	5	15			26.22
Cleveland No. 3 foundry	5	4			23.72
Cleveland No. 4 foundry	5	0			22.80
Cleveland No. 1 forge	4	17½			22.23
Cleveland basic	5	5			23.94
East Coast mixed	5	0			22.80
Ferromanganese	18	0			82.08
Ferromanganese*	20	0			91.20
Rails, 60 lb. and up	9	0	to £9 10s.		41.04 to $43.32
Billets	7	5	to 8	0	33.06 to 36.48
Sheet and tin plate bars, Welsh	9	2½			41.61
Tin plates, base box	1	2	to 1	3⅛	5.14 to 5.17
					C. per Lb.
Ship plates	9	10	to 10	0	1.93 to 2.04
Boiler plates	12	10	to 13	0	2.54 to 2.65
Tees	10	0	to 10	10	2.04 to 2.14
Channels	9	5	to 9	15	1.83 to 1.98
Beams	9	0	to 9	10	1.83 to 1.93
Round bars, ¾ to 3 in.	10	15	to 11	5	2.19 to 2.29
Galvanized sheets, 24 g.	18	10	to 19	0	3.77 to 3.87
Black sheets, 24 gage	13	10			2.75
Black sheets, Japanese specifications	15	5			3.11
Steel hoops	12	0	& 12	10*	2.41 & 2.54*
Cold rolled steel strip, 26 g.	17	5			3.51
Cotton ties, Indian specifications	15	0			3.05

*Export price. †Ex-ship. Tees, nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Foundry pig iron:					
Belgium	5	5s.	to £5	7½s.	$23.94 to $24.51
France	5	5	to 5	7½	23.94 to 24.51
Luxemburg	5	5	to 5	7½	23.94 to 24.51
Billets:					
Belgium	7	5			33.06
France	7	5			33.06
Merchant bars:					C. per Lb.
Belgium	7	17½	to 8	0	1.60 to 1.63
Luxemburg	8	0	to 8	5	1.63 to 1.68
France	7	10			1.53
Joists (beams)					
Belgium	7	7½	to 7	10	1.50 to 1.53
Luxemburg	7	15			1.58
France	7	10	to 7	12½	1.53 to 1.55
¼-in. plates:					
Belgium	8	5	to 8	10	1.68 to 1.73
⅜-in. plates:					
Luxemburg	7	15			1.58
Belgium	7	10			1.53

MARKED IMPROVEMENT

More Active Inquiry and Buying Reported in the Youngstown District

YOUNGSTOWN, July 31.—Valley independents report substantial improvement in inquiry and in buying the past ten days, with prospects of still further betterment. Sales executives state that the aggregate of small orders received since the middle of July is helping to stabilize operating schedules. There has been no unusual demand, but a marked change as compared with buying conditions extending over the previous 30 or 45-day period.

"The past week has been better than other weeks in July," states an executive of the Youngstown Sheet & Tube Co. "Inquiries were more numerous and sales show increases. The general feeling in the industry is that buying will shortly be resumed for the usual run of fall business. Conditions look somewhat brighter than they did earlier in the month."

Buying of sheets and the larger sizes of pipe is slow, but the demand for wire products, the smaller sizes of pipe, plates and bars continues favorable. As a whole, steel makers see little cause for complaint, pointing out that there is usually a recession during the summer months, as compared with the spring and fall.

The Sheet & Tube company is now making shipments of pipe from its Western properties, purchased from the Steel & Tube Co., to the western and southwestern oil fields. The California oil developments have created a substantial demand this year for tubes, especially the larger sizes. The California field requires deep-well drilling in many cases.

Uncertainty as to Sheet Prices

There appears to be much uncertainty with respect to the actual prices applying on black sheet tonnage. Whereas some of the leading independent sheet makers in this territory aver they are adhering to the official 3.85c. quotation on the base gage, it is certain that the smaller makers are cutting below this figure in order to balance their order books. Buyers insist they are obtaining supplies below the market quotations.

The Trumbull Steel Co. has installed equipment for the production of highly finished sheets, used extensively by the automobile industry, and is devoting a portion of its capacity to manufacture of this grade of sheets. This is helping to take up the slack.

Price Trend Downward

It is the general anticipation that steel prices are headed toward lower levels. Pig iron and scrap have already made sizable declines, though steel makers contend that scrap was unduly high. Decline in scrap prices has caused a revival in demand from melters who turned to iron supply when heavy melting advanced to $26 and $27 per ton.

Due to the competition from certain grades of skelp, makers of hot-rolled strip have been obliged to make sharp cuts in quotations to secure business. Reductions as much as $6 per ton on the ordinary gages are mentioned in this connection.

Consumers in general have been cutting their stocks and buying on a hand-to-mouth basis, largely to meet current requirements. It is the belief of some sales executives that demand will continue for some time to be dominated by such needs.

The leading independent tin plate interest in this territory is booked for the quarter on tin plate, and consumers are already beginning to inquire about fourth quarter prices. As yet these have not been named. Indications are that the company will end the quarter with considerable unfilled tonnage, which will lap over into the fourth quarter. As is usually the case in the tin plate market, large consumers are being given preferential treatment, and a price of $5.25 to such interests, in comparison with the nominal $5.50 quotation, is mentioned.

Cold-rolled strip is still in firm demand, and hot strip deliveries are possible in three to four weeks.

Sheet bars have recently sold in this territory at $40 per ton, while at least two interests have sold round lots of standard basic pig iron at $25.

Merchant bars appear to be holding at 2.40c., though reports of concessions are appearing with much more frequency and persistency.

In many respects, the market exhibits unmistakable downward tendencies, with indications that "official quotations" are due for early revision to comply with actual going prices.

BELGIAN MARKET STRONGER

Prices Generally Firm, with Slight Scarcity Developing—Anxiety Over Exchange Decline

BRUSSELS, BELGIUM, July 18.—The market is prosperous and firm, with prices generally on the same level, except in a few instances where slight increases are reported. There are a favorable number of orders for bars, works which have booked ahead for three or four months generally refusing to quote. It is hoped that the future rise of the market will only be to conform to the pressure of exchange depreciation. Until now, quotations have not followed the depreciation of currency, and the exchange decline is expected to become greater unless the international situation is cleared up, and the present unfavorable commercial balance is eliminated.

Coke.—The prices for blast-furnace coke delivered in June was 10 fr. per metric ton higher than in May. Half-washed coke is quoted at 211.85 fr. per ton; washed coke 231.85 fr., and ordinary coke at 190.70 fr. (Belgian currency).

Pig Iron.—The situation is very firm with no change reported in prices. Chill cast foundry pig iron No. 3 is quoted at 465 to 480 fr. per metric ton and ordinary basic pig iron No. 3 is quoted at 420 to 425 fr.

Wire Products.—The market is stronger despite the recent increase of 100 fr. per metric ton.

	Fr.	
Plain wire, base	1,175 to 1,200	$58.75 to $60.00
Galv. wire, base	1,325 to 1,350	66.25 to 67.50
French nails, base	1,225 to 1,250	61.25 to 62.50

Semi-Finished Steel.—A general tendency to increase prices is evident, with a slight scarcity of material, and several steel works are booked to capacity and out of the market. The following prices are currently quoted for basic material per metric ton:

	Fr.	
Ingots	540 to 555	$27.00 to $27.75
Blooms	575 to 590	28.75 to 29.50
Billets	615 to 630	30.75 to 31.50
Tank plates	850 to 870	42.50 to 43.50

Iron Bars.—Demand for iron bars is fairly heavy, with new increases in prices as a result of the decline of exchange and the number of current orders: No. 2 bars are 700 to 725 fr.; No. 3, 750 to 775 fr., and No. 4, 850 to 875 fr. per metric ton.

Finished Material.—The price situation is very firm, with a persistent tendency to increase. Bars are particularly in demand, and transactions in beams are better.

	Fr.		
Bars	715 to	725	$35.75 to $36.25
Beams	690 to	715	34.50 to 35.75
Angles	715 to	725	35.75 to 36.25
Rods	875 to	900	43.75 to 45.00
Hoops	975 to	1,000	48.75 to 50.00
Rails	600 to	700	30.00 to 35.00

Sheets.—The market is steady with important demand in the heavy gages, which are generally dull. The following prices per metric ton are being quoted for various gages:

	Fr.		
5 mm. and heavier	735 to	750	$36.75 to $37.50
2.0 and 3.0 mm.	780 to	850	39.00 to 42.50
1.5 mm.	870 to	900	43.50 to 45.00
1.0 mm.	1,050 to	1,075	52.50 to 53.75
0.5 mm.	1,125 to	1,150	56.25 to 57.50

The Wickwire-Spencer Steel Corporation reports sales of $16,300,571 for the half year ended June 30, against $8,761,216 in the same period of the previous year. Total income, after all expenses, amounted to $2,008,080, against $929,166.

Plans of New Companies

Harmer, Inc., New York, has been incorporated for $100,000 to manufacture arc lamps of the type used in the moving picture industry and other electrical equipment. The company is now manufacturing at a plant in Long Island City, N. Y., but hopes to establish a plant in New York at an early date. Further plans will be announced later. C. S. Ashley, 120 Liberty Street, New York, is representative.

The American Steam Specialty Corporation, New York, recently incorporated with a capital stock of $10,000, will manufacture steam valves. It is now looking for a plant. L. J. Hamel, 206 Broadway, New York, is representative. The officers will be announced later.

The Mekelburg Specialty Corporation, New York, recently incorporated and capitalized for $100,000, will import toys and specialties. The officers are Joseph Levie, president; Samuel Solomon, vice-president; and Joseph Mekelburg, secretary.

The Eureka Tinware Mfg. Co., New York, has been incorporated for $25,000 to manufacture tinware and metal products. The company has a plant at 629 East Sixteenth Street, and is now making garbage cans and mail boxes. The company will be in the market soon for a double seamer and several presses.

The New Eagle Roofing & Sheet Metal Corporation, New York, recently incorporated with a nominal capital of $5000, will operate a roof repair shop. L. B. Mark and W. Ostreicher, the incorporaters, have not yet selected a shop. Herman Cohen, 38 Park Row, New York, is representative.

The Gill Clutch Corporation, New York, has been incorporated for $400,000 under Delaware laws, with authorization to manufacture in New York. It has exclusive rights to manufacture and sell, in the United States and Canada, certain automotive products invented by E. R. Gill, inventor of Gill piston rings. The inventions include new types of clutches, transmission bands and spark plugs. It is claimed that the transmission band, which is for Ford cars, stops chattering and utilizes the full power of the engine because of its metal lining. It is stated that the spark plugs do not accumulate carbon and add to the mileage per gallon of gasoline. The corporation intends to manufacture by contract, and the contracts are being negotiated at the present time. The officers are: President, N. Randall Osborne, Scranton, Pa., also president Union Motor Car Co., that city; vice-president, E. R. Gill; secretary, E. R. Gill, Jr., both of Yonkers, N. Y.; treasurer and counsel, Harrison Osborne, New York. The corporation may be addressed at its laboratories, 10 Alta Avenue, Yonkers, New York.

The Biltrite Motor Equipment Co., New York, has been incorporated with a capital stock of $10,000. It will manufacture all kinds of automobile equipment, and expects to rent a plant by Aug. 1, although much of the pressing and die work will be done by contract. The office of the company is at 822 Tenth Avenue for the present and the incorporators are B. Lehr, H. Lehr and R. F. Lecount.

The Art Craft Auto Lamp Mfg. Co., New York, recently incorporated with a nominal capital of $5,000, is manufacturing automobile lamps at its plant at 141 West Fifty-fourth Street. The company plans some extension at an early date, with the installation of presses and stamping machines. The incorporators are M. Brook, I. Witkoff, and J. Futterman. Mr. Brook was formerly with the U. S. Auto Lamp Mfg. Co.

The Cagan Foundry Co., Brooklyn, maker of iron and other metal castings, incorporated with capital stock of $10,000, has taken over the foundry of the Apollo Foundry Co., 76 Quay Street, Brooklyn.

The Murray Lighting Corporation, Brooklyn, recently incorporated for $20,000, will open a store at 394 Rockaway Avenue, Brooklyn, to sell lighting fixtures and equipment. The corporation may extend later into the manufacturing field. H. R. Berlinicke, one of the incorporators, informs THE IRON AGE. The other incorporators are B. Wertheim and M. H. Rosenbloom.

The B. & S. Metal Products Corporation, Brooklyn, has been incorporated for $10,000 to manufacture sheet metal goods and roofing. The corporation is still in an undeveloped condition, but the hope has been expressed that it will have goods on the market by the first of next year. G. S. Levine, 233 Broadway, New York, is representative.

The Macbeth Daylighting Co., New York, incorporated for $10,000 with permission to increase to $500,000, is a reorganization of the Artificial Daylighting Co., 227 West Seventeenth Street, manufacturer of lighting equipment and fixtures. A change in the officers of the company will be announced later.

The Marvel Gas Co., Crawfordsville, Ind., recently organized to manufacture acetylene gas plants and equipment, will purchase all materials and fixtures under contract. Its equipment is sufficient for present [illegible]. C. E. Lucas of the Crawfordsville Shale Brick Co., Crawfordsville, heads the company.

The Overhead Door Co., 3629 Coliseum Avenue, Indianapolis, has been incorporated with $200,000 capitalization, to manufacture door hangers and similar products. It will do its own manufacturing and is in the market for equipment. A plant is being sought somewhere in Indiana. Manufacturing at present is being done at Cass Avenue, Detroit. A. W. Bulk is vice-president and general manager.

Harlacher Brothers, Greenville and Arcanum, Ohio, recently incorporated to manufacture agricultural implements, will confine present activities to acting as sales representatives in these products.

The Groner Co., Inc., Phillipsburg, N. J., has been organized with capital of 1000 shares of no par stock as a reorganization of J. J. Groner & Co., formerly of Easton, Pa. It has a completely equipped foundry and is now manufacturing gray iron, semi-steel, brass, bronze and aluminum castings, large and small. There is also a pattern shop and a machine shop equipped with light and heavy tools for miscellaneous machine work. J. J. Groner is president and general manager; E. R. Yarnelle, American Horseshoe Works, vice-president; J. L. Evans, Losey & Co., secretary; T. A. Mellon, Kuebler Foundries, Inc., treasurer.

The Orchard Fire-Pot Foundry Co., San Juan, Tex., recently organized to manufacture fire-pots and other castings, has let a contract for the erection of a building and is now in the market for foundry equipment. Address E. L. Miller, general manager.

The Essex Thermostat Co., 50 Washington Terrace, East Orange, N. J., recently organized to manufacture heat-regulating devices, for the time being will only repair and deal in these lines. Thomas E. Crone heads the company.

The Canton Metal Products Co., Canton, Ohio, has been organized to manufacture metal goods and is negotiating for the purchase of a Canton firm. Harry Nusbaum, 618 Renkert Building, is corporate representative.

The Circular Tool Co., Inc., 51 Beaufort Street, Providence, R. I., has been organized to manufacture circular saws, metal slitting saws, screw slotting saws and special cutters. All manufacturing will be done in the company's shop. After August 1, headquarters will be at 71 Willard Avenue. W. B. Hopkins, formerly vice-president and general manager of the Thurston Mfg. Co., is general manager. The superintendent, G. A. Swanson, and sales manager, G. H. Nye, both held respective positions with the Thurston company.

Russell & Co., Inc., St. Joseph, Mo., has been incorporated with capital stock of $50,000 to manufacture farm implements and equipment. This will be a branch office of the Russell company with headquarters at Massillon, Ohio.

The North Judson Steer-Well Corporation, North Judson, Ind., has been organized to manufacture safety devices for automotive use. The company expects to do its own manufacturing and now has part of its equipment installed. Francis E. Vaughn heads the company.

The Wolverine Specialty Co., Inc., Battle Creek, Mich., has been incorporated with capital stock of $25,000 to manufacture automobile equipment and parts. It has equipment and will do its own manufacturing for the time being. Later on this work may be done by contract and the company is interested in hearing from companies equipped to do this kind of work. D. G. Wells is president.

The Elk Machine Tool Corporation, 165 Broadway, New York, has been organized to take over the assets of the Elk Mfg. Co., New York. The new company, capitalized at $112,000, will continue to manufacture and sell precision tools formerly made by the old company under the Elkin patents. The company will be located July 15 in a new plant at 243 West Seventeenth Street. This plant is now being equipped with modern machinery for quantity production of high-grade precision tools. Representative and branch offices will be maintained in several large cities throughout the country. Its chief products will consist of machine tools for shaving, burnishing and squaring bearings used in internal combustion motors, valve-lifters, air-compressors and other precision tools. J. G. Elkin is president of the company.

The combined Motor Truck Repair Co., New York, was recently incorporated with capital stock of $10,000, and will operate a general machine and repair shop. The incorporators are G. Vitelio and J. and C. A. Motto. Address care of Kramer, Bourke & Galgano, 120 West Forty-second Street, New York.

The Brandes Products Corporation, 237 Lafayette Street, New York, has been incorporated with capital stock of $250,000 to manufacture radio products for C. Brandes, Inc., New York. Property has been purchased at 196-204 Mt. Pleasant Avenue, Newark, N. J. The company will occupy

a building with total floor space of 46,000 sq. ft. and eventually will employ about 1000 persons. Frederick Dietrich is president.

The Defiance Lantern & Stamping Co., 33 Hebard Street, Rochester, N. Y., has been incorporated with capital stock of $100,000 to take over a business established since 1901 in the manufacture of tubular lanterns and similar products. The business will continue as formerly with W. H. F. Russell as president and J. D. Henry as manager.

The Freed-Cross Iron Works, Inc., Richmond, S. I., recently was organized to operate a general steel and iron works. Immediate business will be on a small scale. The incorporators are F. and M. Cross and F. Crook. Address care of A. B. Hertz, 51 Chambers Street, New York.

The Russell Cooling System, Inc., Philadelphia, has been organized to manufacture a cooling system and to deal in iron and steel and machinery. Manufacturing for the first few years will be done by contract. Edwin J. Russell is president, Harold W. Fullmore, vice-president and general manager, and Robert A Barr, secretary-treasurer.

The Hugh Co., Inc., 190 Elk Street, Buffalo, has been incorporated with capital stock of $25,000 to manufacture sheet metal and products. The company is in the market for equipment including electric spot welders, punch presses, drill presses, etc. Its products will consist of foundry chaplets, special stampings for bed-steam manufacturers, film carrying cases, metal cabinets, tanks, etc. E. Hugh heads the company.

The Hampton Roads Iron Works, Inc., Newport News, Va., has been incorporated with capital stock of $25,000 to operate a general iron and steel works. Its operation will be conducted on a limited scale. W. B. Colonna, Newport News, is secretary.

Edward F. Goltra and his associates in the Mississippi Valley Iron Co., whose furnace in Carondelet, St. Louis, has been down for several years, have organized the Riverside Coke & Iron Co., with a capital stock of $250,000. Mr. Goltra said that the new company would act as a sales agency for the by-product coke made at this furnace when it is blown in again.

Albert Weber, Inc., New York, has been incorporated for $50,000. Mr. Weber will act as consulting engineer and general contractor. His present address is at the Progress Engineering & Machine Works, 421 East Fifty-third Street, New York, of which he is part owner.

Wills-St. Claire, Inc., Boston, has been incorporated in Massachusetts as a branch of the Marysville, Mich., company, to manufacture automobiles. Authorized capital consists of 50,000 shares 7 per cent cumulative preferred, 50,000 6 per cent first and like amount of second preferred, all of $100 par value, and 400,000 shares no par value. Incorporators are: President, Asa B. Nelson, Cambridge, Mass.; treasurer, Dunbar S. Carpenter, Winchester, and John C. Rice, Dedham.

The Brakman Electric Co., care of W. W. Armstrong, Powers Building, Rochester, N. Y., has been incorporated with capital stock of $50,000 to manufacture electrical equipment. No construction is contemplated at this time. The incorporators are: R. J. Jauss, A. L. and C. Brakman, Rochester.

Trapani & Cagliostro, Inc., New York, has been incorporated to operate a general machine shop. The incorporators have operated a shop for four years. Up until a few months ago they were located on Mulberry Street. The firm now has a much larger plant at 147 Baxter Street. Since the move, much equipment, including lathes and punches, has been added, but no further additions are likely for some time. The firm is very busy at the present time, continuous 12-hr. shifts being the rule. The main products are several types of metallic and semi-metallic fruit presses. A. J. Cagliostro, one of the incorporators, also conducts an electric wiring service.

The General Accessories Co., organized to manufacture automotive accessories, has taken over the plant, die casting equipment and business of the Briscoe Devices Corporation, Pontiac, Mich., and is negotiating to take over two other plants in Michigan, which will be operated in conjunction with the Pontiac plant, manufacturing for the General Accessories Co. and also for the general trade. Frank Briscoe, pioneer radiator manufacturer, is president; Emil D. Moessner, formerly with the Ford Motor Co., is business manager; Howard G. Harris, Howard G. Harris Co., Detroit, is vice-president.

The Retherford Mfg. Co., 109-11 North High Street, Muncie, Ind., has been incorporated with capital stock of $50,000 to acquire the enterprise of R. M. Retherford in the manufacture of lighting fixtures and equipment. The company has a factory sufficiently equipped to supply present needs. R. M. Retherford heads the company.

The Highland Machine & Foundry Co., Alexandria, Va., has been incorporated with capital stock of $200,000 under Delaware laws, to manufacture castings, patterns, stampings and automotive devices in iron, brass, bronze and aluminum. Contract has been let for the construction of a number of small buildings on the plot of 40,000 sq. ft. recently purchased by the company. Only a small part of the machinery has been purchased. It is proposed to devote considerable time to making the necessary dies and in general preparation for quantity production. H. Adams, is president; R. H. Baur, secretary-treasurer, and C. R. Kline, general manager.

The Lebanon Brass Works, Lebanon, Pa., recently incorporated with capital stock of $20,000 has purchased a plant and is already equipped for non-ferrous foundry work and nickel plating. The company is in the market for a pyrometer. Richard Drew heads the company.

Holstein-Harvey Terminal, Inc., organized under Delaware laws, is planning the erection of an eight-story warehouse at Wilmington, Del. The officers of the company will be: Morton Harvey, president; Perlee C. Sisler and Henry T. Bush, vice-presidents; William H. Pollock, secretary.

The Waynesboro Nut Lock Co., Inc., Waynesboro, Pa., has been incorporated with capital stock of $100,000 and has leased a plant at Waynesboro for the manufacture of lock washers, having taken over the patents, trade marks and other assets of the Bull Dog Lock Washer Co. of Baltimore. Equipment formerly owned by the Baltimore company will be used. The officers are: W. S. Bostwick, president; Mark A. Landis, vice-president; Chester A. Lyon, treasurer; O. M. Peters, secretary and general manager.

The Collins Concrete Pipe Co., Portland, Ore., has been organized to manufacture concrete piping, having taken over a small manufacturing plant which has been in operation for some time. It will do its own manufacturing. Address care of Lewis, Lewis & Finnigan, 414 Couch Building, Portland, Oregon.

The Ramsey Chain Co., Inc., Albany, N. Y., has been incorporated with capital stock of $300,000 to manufacture chains for transmission service. J. H. Ramsey and A. D. and E. D. Farrell are incorporators. Address care of N. F. Towner, 126 State Street, Albany.

The Automotive Equipment Co., Portland, Ore., announces that it will confine present activities to conducting a jobbing business. Address care of Frederick H. Drake, Title and Trust Building, Portland.

The Yatman Rubber Corporation, 267-71 Mt. Pleasant Avenue, Newark, N. J., recently incorporated with capital stock of $100,000 to manufacture rubber products is planning to purchase a new plant and additional equipment within the next 12 months, during which time its lease will expire. Orvis L. Gonzalez is president and treasurer.

The Buffalo Newton Rifle Co., 1081-85 Ellicott Square, Buffalo, has been incorporated with capital stock of $125,000, and will manufacture firearms, ammunition and supplies. Small parts, such as are made on automatic screw machines and punch presses, will be let out to contract. All other operations will be done in the company's plant. It is now in the market for equipment and hopes to be on a production basis by fall. Charles Newton is president.

The Fireite Extinguisher Co., with general office and factory at Masontown, Pa., has been incorporated under Delaware laws, capitalized at $500,000, and will manufacture fire extinguishers. It is now in the market for hot rolled pickled steel, 2½ in. wide by 0.035 gage. The company will do its own manufacturing. William L. Graham is president; E. S. Graham, vice-president; E. W. S. Graham, secretary-treasurer.

The Moraine Products Co. has been organized under Ohio laws as a subsidiary of the General Motors Corporation to develop at Dayton, Ohio, some of the products which have passed the experimental stage. It will be the function of the company to determine the merits of a product in terms of large scale production. C. F. Kettering, president General Motors Research Corporation, will be president of the new company also.

Southern Bearing Co., Inc., 3030 South Twentieth Street, Birmingham, Ala., has been organized to manufacture ball bearings but for the present will confine activities to the function of distributor in these lines. G. E. Woodward heads the company.

The Surplus Steel & Iron Service, with offices at 327 South LaSalle Street, Chicago, has been organized to act in the capacity of purchasing and sales agent in the handling of surplus steel and iron. Lists of surplus material will be printed and mailed to steel consumers. The manager of the company is F. X. Devlin, formerly purchasing agent of the National Tube Co., and Spang, Chalfant & Co., Pittsburgh. W. W. Decker, also a member of the firm, was for many years associated with the Cleveland Cooperative Stove Co.

Trade Changes

The Imperial Brass Mfg. Co., Chicago, manufacturer of brass specialties and oxy-acetylene welding and cutting equipment, has opened a branch office in the House Building, Pittsburgh, under the management of John A. Coyle, who for 25 years was actively connected with the high grade steel making industry, with the Crucible Steel Co. of America, the Baldwin Steel Co., the Hess Steel Castings Co., the National Drawn Steel Co. and, recently, with the Universal Steel Co. Associated with Mr. Coyle will be Elmer H. Miche, who will specialize on oxy-acetylene welding and cutting apparatus.

The Thos. H. Dallett Co., Philadelphia, has purchased a new factory, which affords greatly enlarged quarters, at 165-89 West Clearfield Street.

The Swedish Charcoal Steel Producers, Inc., which for the past three years has had an office at 165 Broadway, New York, has changed its name to the Swedish Charcoal Steels, Inc. The company specializes in the sale of Swedish alloy steels for use in the manufacture of cutlery, bearings and other products requiring high-quality steel.

The American Stainless Steel Co. has changed its address from 1541 Oliver Building to 806 Commonwealth Building, Pittsburgh.

N. A. Strand & Co., formerly at 5001-9 North Lincoln Street, Chicago, has moved into its new building at Lincoln and Argyle Streets.

The J. E. Dilworth Co., Inc., 493 South Main Street, Memphis, Tenn., has been appointed representative in the Memphis and Vicksburg territories for the Chicago Belting Co., Chicago.

The E. S. Stacy Supply Co., 41-3 Taylor Street, Springfield, Mass., has been made exclusive distributer in Massachusetts and Connecticut for Blue Oak handles manufactured by the Curtis Handle Co., Fort Madison, Iowa.

The Chicago warehouse of the Latrobe Tool Co., manufacturer of high speed drills and reamers, Latrobe, Pa., has been moved to 1440 West Lake Street, Chicago.

J. N. Moyer, dealer in new and used machine tools, specializing in power presses, has moved from 119 North Third Street, Philadelphia, to 117 North Third Street. The considerable additional space enables Mr. Moyer to have his shop, showroom and offices combined.

W. H. Harris & Co., dealer in coal and coke, Fisher Building, Chicago, has been appointed sales agent for the Chicago By-Product Coke Co., Chicago. The plant of the Chicago By-Product Coke Co. consists of 100 Koppers ovens with a daily capacity for carbonizing 2000 tons of coal. The coke requirements of the Peoples Gas Light & Coke Co., Chicago, are supplied from this plant and some of the coke is used at the plant for the manufacture of gas. The surplus tonnage, after supplying those needs, amounts to approximately 250,000 tons annually and this tonnage will be sold on the general market for industrial and domestic purposes. Both furnace and foundry coke will be offered to the industrial trade. J. A. Galligan, vice-president, W. H. Harris & Co., formerly identified with Pickands, Brown & Co., and the By-Products Coke Corporation at Chicago, will devote particular attention to the sale of foundry coke.

The Cincinnati Machinery & Supply Co., used machinery and supplies, has moved from 1322 Central Avenue to its new five-story building at 216 East Pearl Street, Cincinnati.

Joseph Hyman & Son, Tioga, Livingston and Almond Streets, Philadelphia, have changed their address to Richmond Street and Erie Avenue.

Allen E. Stillman, Inc., 805 Lexington Avenue, Brooklyn, announces that A. P. Stillman has disposed of his interest in the firm and severed his connection with them. Albert A. Allinger is president.

The Griffin Mfg. Co., Erie, Pa., has purchased the Steel Products Mfg. Co., and the Walker Foundry Co. property which adjoins its plant. This affords nearly double the ground room available for future expansion.

The Vanadium Alloys Steel Co. will move the Pittsburgh sales office from First and Ross Streets to the Oliver Building, Pittsburgh, effective Sept. 1.

John D. Cronenweth, president Great Lakes Distributing Co., Detroit, producer and shipper of foundry sands, has recently been elected to the board of directors of the Lancaster Coal & Sand Co., New Lexington, Ohio, which has holdings in New Lexington, Ohio, with capacity of 15 cars of No. 4 milled molding sand per day. The Great Lakes Distributing Co. will have the exclusive handling of the output of this product in the future.

W. S. Rulison, who has been connected with the iron and steel business for more than 30 years, has severed his connection with the W. F. Robertson Steel & Iron Co., Cincinnati, and has opened offices at 605 First National Bank Building, Cincinnati, for the sale of iron and steel products.

Wyckoff Drawn Steel Co., Pittsburgh, announces the opening of a Philadelphia office in charge of E. H. Carmany, district sales manager, at 711 Atlantic Building.

Pilling & Co., Inc., exclusive sales agents for Wrigley's Southern charcoal iron made by the Bon Air Coal & Iron Corporation, Nashville, Tenn., have designated Walter Wallingford & Co., Oliver Building, Pittsburgh as Pittsburgh district sales agents for this brand of semi-cold blast charcoal iron.

Frank J. Jarecki has purchased the Manhattan Machine & Tool Works, dies, special machinery, screw presses and grinders, of which he was president and manager, and is now doing business under the style Jarecki Machine & Tool Co., at the same location, 40-50 Market Avenue, N. W., Grand Rapids, Mich.

The V. & O. Press Co., designer and manufacturer of dies, presses and special machinery, Glendale, Brooklyn, N. Y., has moved into its new plant at Hudson, N. Y.

The Stowe-Fuller Refractories Co. Acquires Other Companies

The Stowe-Fuller Co., the National Fire Brick Co. and the Minor Fire Brick Co., which have for many years been engaged in manufacturing and selling fire brick and refractory materials, have lately been consolidated into a single company under the name the Stowe-Fuller Refractories Co., which began operations as of July 2, 1923, and will conduct the business heretofore carried on by the above-named companies.

The Stowe-Fuller Refractories Co. has also acquired a controlling interest in the Federal Refractories Co., manufacturer of silica, magnesite and chrome brick, and will handle the output of the Open Hearth Fire Brick Co., the Zoar Fire Clay Co., the Lock Haven Fire Brick Co. and the Hite Coal & Clay Co. This makes this company self contained and in a position to mine, manufacture and supply every class of refractory material required by a steel plant and other manufacturers requiring different refractory fire brick materials for their special work.

The management of the company will continue in the hands of the same officers who have heretofore operated the various properties. Charles B. Stowe is the chairman of the board of directors of the new company, Charles E. Kapitzky is the president; Thomas Kemp, the first vice-president and operating manager; Joel H. Fuller, the second vice-president, and Charles J. Steitz is the secretary.

Industrial Items

The Ohio Edison Co., Sharon, Pa., a Delaware corporation, has arranged for a change of name to the Penn-Ohio Edison Co., at the same time increasing its capital to $37,500,000. A note issue of $3,250,000 is being sold, a portion of the proceeds to be used for the acquisition of properties in this section and power plant extensions. The company will operate the Ohio River Edison Co., which is perfecting plans for a hydroelectric power house on the Ohio River, near Toronto, Ohio, to cost approximately $10,000,000. James D. Andrews is president.

The Dells Paper & Pulp Co., Eau Claire, Wis., will invest $400,000 in enlarging its mills, hydroelectric generating plant and pumping capacity, and has engaged L. A. DeGuere, engineer, Wisconsin Rapids, Wis., to undertake the project as designer and contracting engineer. The turbo-generating equipment will be furnished by the Allis-Chalmers Mfg. Co. Inquiry is being made for paper and pulp machinery, motors, scales, grinders, crushers, etc. L. E. Davis is president and general manager.

Receivers have been asked for eight subsidiary companies of the R. L. Dollings Co., including the American Motor Truck Co., Newark, Ohio, Champion Engineering Co., Kenton, Ohio, Matthews Engineering Co., Sandusky, Ohio, and the Recording Devices Co., Dayton, Ohio. C. H. Spencer, Newark, has been appointed receiver for the American Motor Truck Co., but no action has yet been taken in regard to any of the other companies.

The Associated Holding Corporation, New York, has obtained exclusive American rights to manufacture and sell the Voss molding machine, now being manufactured and used in Germany. Unique features are claimed for the machine and the corporation is trying to make arrangements to have it manufactured in this country by some company already making machinery of that type. The secretary of the corporation is J. Oppenheim, Room 705, 729 Seventh Avenue, New York.

STEEL AND INDUSTRIAL STOCKS

Steel, Under Pressure, Breaks to New 1923 Low Following Violent Fluctuations in List

In the violent fluctuations of steel and industrial stocks last week there is represented to some extent the indecision and inaction of the dull season, and to some extent the disappointment over the critical conditions beyond the Atlantic. While there was a pause to catch breath before determining what future course to pursue, aggressive professional selling started rolling the ball of liquidation. Trading was usually done on a small scale owing to the uncertainty. In the last days there came acute weakness and some activity. Pressure was particularly upon steel stocks and Steel common broke to 86¾, a new 1923 low. This figure is only about four points above the 1922 low. It is believed that the precipitous decline was the result of professional attacks and selling by traders.

The range of active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalm.	35½	42⅜	Inland Steel	33½	34
Allis-Chalm. pf.	90⅜	92	Int. Har.	72⅝	77
Am. B. S. & Fdry.	70	73	Int. Nickel	108¼	109
American Can	89¼	92⅞	Lima Loco.	61	64⅜
American Can pf.	109	109	Midvale Steel	24	25⅛
Am. Car & Fdry.	154½	160	Nat.-Acme	10⅞	11
Am. Locomotive	66⅝	70¾	Nat. E. & Stm.	56½	62
Am. Locomot'e pf.	119	119	N. Y. Air Brake	31	33½
Am. Radiator	79	81	Otis Steel	8	8⅞
Am. Steel Fdries.	32¼	35⅜	Otis Steel pf.	48	48
Baldwin Loco.	112⅜	123⅞	Pressed Stl. Car.	52½	56
Baldwin Loco. pf.	113	113	Ry. Steel Spring.	100¼	103¾
Bethlehem Steel	15¾	19⅜	Replogle Steel	10¾	14⅜
Beth. Stl. 7% pf.	87¼	89	Republic	42	46⅞
Beth. Stl. 8% pf.	102	102	Republic pf.	93	93
Br. Em. Steel	7¼	7¾	Sloss	13½	16½
Br. Em. S. 2d pf.	18½	20	Steel of Canada	70	70
Cambria Iron	41	41	Steel & Tube pf.	105	106½
Chic. Pneu. Tool	79¾	81	Superior Steel	24	24¾
Colorado Fuel	25	28¾	Un. Alloy Steel	30	31
Crucible Steel	59	67	U. S. Pipe	24	27½
Crucible Steel pf.	87	87	U. S. Pipe pf.	68	68¼
Deere pf.	62¼	63¼	U. S. Steel	86¾	92⅝
General Electric	173¼	176¼	U. S. Steel pf.	117⅞	118
Gt. No. Ore Cert.	26⅝	28⅝	Vanadium Steel	31½	36
Gulf States Steel	67⅛	74½	Va. I. C. & Coke	55	55

Industrial Finances

Vanadium Corporation of America reflects in its six months' report the depression abroad. Net for 373,334 shares was only $1.03 a share, but this is 28c. better than the latter half of 1922, and $1 better than the corresponding period of 1922. Cash assets on June 30 were nearly double those of Dec. 31, $1,602,221 against $801,842, and compare with $197,965 a year ago.

Replogle Steel Co. in its second-quarter statement (including Wharton & Northern Railroad Co. and Ferro Monte Railroad Co., but excluding Empire Steel) shows a deficit of $18,741 and a deficit for the first half-year of $112,274. This compares with a deficit in the quarter ended March 31 of $93,553.

Plans of New Companies

The American Metal Novelty Co., New York, has been incorporated with a nominal capital of $5,000. The incorporators, M. Glaser and H. Inker, have manufactured brass and copper novelties at 51 Pike Street for four years and the new company will continue the business. The shop has been renovated, but no additions of machinery are contemplated.

The Printape Machine Corporation, New York, recently incorporated with $10,000 capital, has a fully equipped plant in Brooklyn and offices at 80-82 Greene Street, New York. The corporation is manufacturing and putting on the market a device which prints on one side and wets the gummed side of paper adhesive tape used to hold together corrugated paper boxes. The device operates as the tape is used from a roll. The incorporators are A. Honigstock and H. C. Wolfe.

The Mott Haven Fireproof Door Co., New York, recently incorporated for $25,000, will manufacture fireproof doors, window sashes, etc. The company is now looking for a plant, and when one is secured will be in the market for equipment. J. Snyder, N. Rosmer, and B. Moses are incorporators, and the company may be reached through its representative, Emanuel Morganlander, 1540 Broadway.

The Henning Automatic Safety Gas Hose Co., Brooklyn, has been incorporated with capital stock of $10,000. The company is now manufacturing gas valves and hose at its plant at 235 Duffield Street, Brooklyn. It is claimed that the products make gas leakage accidents impossible because they automatically shut off the gas upon any break or separation of the hose from the valves. Considerable extension of the plant, with installation of new equipment, is contemplated. The incorporators are G. and F. G. Henning.

The Hydrolea Heater Corporation of America, 1803 Times Building, New York, has been incorporated with capital stock of $500,000 to manufacture heating devices, including generator-burners. All manufacturing is being done under contract. O. E. Culbert is secretary.

The Anderson Radio Corporation, Newark, N. J., has been incorporated with capital stock of $250,000 to manufacture and deal in wireless equipment. The manufacturing phase of the business has not been definitely determined yet. Address care of William Anderson, 38 Park Place, Newark.

The Supra Spark Plug Co., care of William M. Goldweber, 1 Exchange Place, Jersey City, N. J., has been incorporated with capital stock of $250,000 to manufacture spark plugs and kindred automotive equipment. It has a plant and expects to be ready for initial operations in two weeks. Manufacturing will be done on a moderate scale at first. Frank H. Snook heads the company.

The Leach Steel Corporation, 1335 Main Street, Buffalo, has been organized to manufacture steel structures. Construction will soon be started on a building for the storage of corrugated sheets and steel sash. This work the company will do itself. Next spring it will build a structural fabricating shop. Thomas Leach is president.

The Automatic Transportation Co., care of Thomas E. Boyd, 440 Prudential Building, Buffalo, has been incorporated with capital stock of $2,000,000 to acquire an established business in the manufacture of trucks, tractors, etc. It has a complete plant for this line of work, which will be continued, as formerly. The incorporators are: W. C. Carr, E. L. Kleindinst and J. H. Prescott.

The Haletone Mfg. Co., care of Frederick V. Winters, 1133 Broadway, New York, recently incorporated with capital stock of $100,000 to manufacture vacuum equipment, is holding its plans in abeyance pending a decision on certain matters of policy. A. Schirmann, 547 East Eighty-fourth Street, is secretary.

The McVoy Sheet & Tin Plate Co., 344-50 West Austin Avenue, Chicago, has been formed as a reorganization of the business conducted since 1877 by Eugene J. McVoy in sheets, tank steel, tin and terne plate, sheet copper and zinc. Capital employed will be approximately $1,000,000. Plans are not fully completed. Warehouses are maintained at Chicago and Pittsburgh, and its New York office is at 2042 Grand Central Terminal Building. Mr. McVoy is president of the corporation.

The Schrell-Schultz Co., with office at 7 East Forty-third Street and factory at 225 East Thirty-sixth Street, New York, has been incorporated with capital stock of $100,000 to manufacture and deal in drawing instruments and materials. The business formerly conducted by H. J. Schultz in the manufacture of engineers' and draftsmen's instruments has been taken over by the new company, and F. V. Schrell, formerly of Schrell & Brock, manufacturer in a similar line, has been taken into the firm. The incorporators are: H. J. Schultz, F. V. Schrell and C. D. Donohue.

The Quinplex Radio Corporation, 233 West Forty-second Street, New York, has been incorporated with capital stock of $500,000 and will manufacture wireless equipment. Present developments are yet in the formative stage. The incorporators are: M. L. Lewis, A. Wellman and M. Christeleit. Conrad Milliken, 36 West Forty-fourth Street, New York, is corporate representative.

The Johnson Equalizer Corporation, care of Morrell, Bates & Topping, 27 Cedar Street, New York, has been incorporated with capital stock of $200,000 to manufacture springs, shock absorbers and kindred products. Contracts are now being placed for manufacturing, all of which for the present will be done in this way. The company may consider manufacturing for itself later on. The incorporators are: G. M. Hessler, J. H. Bay and A. Palmer.

The Carlson-Sharp Co., Inc., Dover, N. J., has been incorporated with capital stock of $125,000 and will manufacture roofing materials. Definite plans as to method of manufacture are lacking. Address care of Lyman M. Smith, Dover.

The Sands Mfg. Co., Sweeney Avenue and Erie Railroad, Cleveland, recently incorporated to manufacture gas tank water heaters and automatic instantaneous water heaters, has completed an addition to its factory and has placed all contracts to cover its present needs. L. Sands is president; J. M. Sands, vice-president; and Garry Sands, secretary-treasurer.

The Motor & Machinery Castings Co., 7742 West Division Avenue, Detroit, has been incorporated, capitalization $35,000, to manufacture castings. At present it is working on gray iron and semi-steel castings. Orders on hand will keep the plant at capacity for some time. T. H. Barron is president.

Machinery Markets and News of the Works

JULY A LEAN MONTH

Sales Generally Not Up to Average of Preceding Months

Foreign Inquiry for Several Tools—Big Four Railroad Issues List

July has been a lean month and in comparison with previous months of the year may be said to be below the average. The past week has been very quiet for the most part, although in the Cincinnati district fair activity is noted. Automotive parts manufacturers have made purchases in Cincinnati and a good order for lathes was received from the Detroit district.

Among inquiries during the week is a request for prices on more than 25 tools, including 12 engine lathes, which has been received from the Instituto de San Bernardo, Bogota, Colombia.

The Big Four Railroad has issued a list of 10 tools for the Urbana shops and the Pennsylvania Railroad took bids July 25 on 14 lathes for its St. Louis shops. A short list is expected from the Lehigh Valley Railroad and orders for a few tools are looked for from the Illinois Central this week.

The Cleveland Board of Education has issued a list of 16 machines and considerable small miscellaneous equipment for the woodworking, sheet metal and electrical departments of the West Technical High School, for which bids will be received Aug. 3.

The Pollak Steel Co., Cincinnati, has taken bids on metal-working machinery, including punches and shears and some presses. Awards for equipment for the new Baltimore plant of the Standard Sanitary Mfg. Co. are expected. Samuel Diescher & Sons, Pittsburgh, are the engineers on this work.

Purchasers include the Pennsylvania Railroad, which continues to take miscellaneous tools for various shops. The Chicago & North Western has also bought. The Santa Fe and the Union Pacific have placed a few more orders, and now have bought most of the machines for which they recently inquired.

The equipment for the new plant of the Pebbles Engineering Co., Newton Falls, Ohio, is reported to have been awarded, the bulk of the business being placed with a Cleveland dealer.

In the automotive field the Hudson Motor Car Co. has commenced to place orders for equipment for the enlargement of its Essex plant. No general list has been issued. The company is now buying large special machines and later is expected to place orders for smaller machines of standard types.

The Shipping Board took five engine lathes and the American Can Co. five shapers. The list of the Montreal Harbor Commission has all been practically purchased. The Railway Steel Spring Co., which is erecting a large shop at Latrobe, Pa., plans to transfer its equipment and does not expect to have to purchase many new tools.

New York

New York, July 31.

WITH the exception of slight activity on the part of the railroads, the machine-tool market in this district is extremely quiet. Among the railroads, the Lehigh Valley is reported as on the point of issuing a short list of tools. The list of the Baltimore & Ohio includes about 10 tools. A request for prices on lathes, milling machines, planers and grinders and other equipment for a machine shop has been received from the Institute de San Bernardo, Bogota, Colombia. The list includes 12 engine lathes, one precision lathe, one turret lathe, one automotive parts grinding machine, two sensitive drills, two portable electric drills, one tool grinder, one planer, two milling machines, one threading machine, one hydraulic shaft-straightening machine, one universal cutter grinder and three oil furnaces.

Contract has been let by the American Can Co., 120 Broadway, New York, to the Lindgren Co., Monadnock Building, San Francisco, for a two-story addition to its plant at Third Avenue and Twenty-first Street, San Francisco, to cost $300,000 including machinery.

Montemayor & Co., 24 State Street, New York, are desirous of getting in touch with manufacturers of soft or mild steel tubes, black, for columns, 1½ to 3 in. outside diameter, 13 to 20 ft. long, without solder, weldless, cold or hot drawn; also with manufacturers of welded steel tubes, 1 in. outside diameter and smaller, about 13 ft. long, black, soft, mild steel, suitable for making hames.

The Memco Engineering & Mfg. Co., 24 Vanderbilt Avenue, Brooklyn, manufacturer of electrical devices and equipment, has leased the factory at Hamilton and Freeman Avenues, Long Island City, for a new plant.

Johns-Manville, Inc., Madison Avenue and Forty-first Street, New York, manufacturer of roofing, asbestos products, etc., has authorized plans for the erection of a new one-story plant, 150 x 1000 ft., at Asbestos, Que., to cost $300,000 with machinery.

Ovens, power equipment, conveying machinery, etc., will be installed in the new baking plant to be built by Wiegan Brothers, Inc., 150 East Twenty-second Street, at 334-42 East Twenty-seventh Street, 120 x 130 ft., to cost $100,000.

The Fort Miller Pulp & Paper Corporation, Fort Miller, N. Y., has plans for the erection of a one-story addition, 45 x 125 ft., estimated to cost $200,000 with machinery.

The Staten Island Edison Corporation, St. George Terminal, Tompkinsville, S. I., is being organized to acquire and expand the electric light and power interests of the Richmond Light & Railroad Co., now in receivership. The new company will be headed by J. H. Pardee, president of the existing company, and will operate the electric railroad system as a separate subsidiary. Extensions will be made in power plant and system.

The Victoria Falls & Transvaal Power Co., Ltd., Johannesburg, S. A., has plans for a new electric generating station in the Witbank coalfield district, estimated to cost $5,000,000 with steel tower transmission system. A considerable portion of the machinery will be purchased in America, and engineers for the company will come to this country for such purpose. Plans have been filed with the Electrical Equipment Division of the Bureau of Foreign and Domestic Commerce, Washington, and are available for inspection.

John D. Parsons, Inc., 93 North Pine Avenue, Albany, N. Y., manufacturer of store fixtures, etc., is planning to rebuild the portion of his plant on Hamilton Street recently destroyed by fire with loss of about $175,000 including equipment.

A manual training department will be installed in the new three-story high school to be erected at Scotia, N. Y., estimated to cost $250,000, for which bids are being taken on a general contract. J. M. Ryder, Parker Building, Schenectady, N. Y., is architect.

The Municipal Gas Co., 126 State Street, Albany, N. Y.,

The Crane Market

The market on overhead cranes has been quiet this week but there has been some activity in purchases of locomotive cranes. An inquiry for a locomotive crane for export to Japan is reported from several Japanese export houses, among which are Takata & Co., 50 Church Street, New York, and Mitsui & Co., 65 Broadway, New York. One of the large locomotive crane purchases recently made was that of the New York Central & Hudson River Railroad, which closed on four 20-ton locomotive cranes with the Industrial Works. This brings the total purchases of this railroad in the past fortnight or more to nine cranes, a previous list of five 20-ton cranes, three with magnets and two with grab buckets, having been awarded to the Brown Hoisting Machinery Co. In overhead traveling cranes, the Pennsylvania Railroad, Eastern Region, Philadelphia, is reported to be receiving bids on a 15-ton gantry crane and a 5-ton overhead traveling crane. It is stated that the buildings being constructed for the General Electric Co. at Philadelphia by the White Construction Co., New York, will involve 10 or more overhead cranes, inquiry for which has not yet been issued. Export demand for overhead cranes seems to be particularly active. Among current inquiries is a request for bids on a 25-ton and a 40-ton, about 33-ft. span, overhead traveling crane for Japan, from Okura & Co., 30 Church Street, New York. Another export inquiry, issued by both the Wonham Bates & Goode Trading Corporation, 251 Fourth Avenue, New York, and Hill & Buechner, 315 Fourth Avenue, New York, calls for bids on a 7½-ton jib crane with 30-ft. jib and alternate quotation on a 5-ton jib crane. The China-Japan Trading Co., 115 Broad Street, New York, is receiving quotations on a 5-ton, 3-ton and 2-ton, electric traveling crane, all 28-ft. span, and an inquiry for a 10-ton, 50-ft. span, and 5-ton, 50-ft. span, overhead traveling crane is reported to have been issued by Mitsui & Co., 65 Broadway, New York, and Andrews & George Co., 50 Church Street, New York.

Among recent purchases are:

L. H. Shattuck, Manchester, N. H., a 5-ton, 20-ft. span, double I-beam crane from the Whiting Corporation.

General Electric Co., Schenectady, N. Y., a 20-ton, 42-ft. span, rope drum overhead traveling crane from the Whiting Corporation.

The Texas Co., 17 Battery Place, New York, a 20-ton, 1-motor, overhead traveling crane from the Niles-Bement-Pond Co.

American Brass Co., Waterbury, Conn., several small cranes for Waterbury and Western plants, from the Pawling & Harnischfeger Co.

Hickman-Williams & Co., Chicago, Ill., a 25-ton locomotive crane from the Industrial Works.

New York Central & Hudson River Railroad, New York, four 20-ton locomotive cranes from the Industrial Works.

Phoenix Utility Co., 71 Broadway, New York, a 30-ton locomotive crane from the Brown Hoisting Machinery Co., order placed in New Orleans.

Arthur McMullen Co., 50 Church Street, New York, a 20-ton locomotive crane for use on contract in New York State, from the Brown Hoisting Machinery Co.

Rockland Light & Power Co., Nyack, N. Y., through Charles H. Tenney, engineer, Boston, a 25-ton used Browning locomotive crane from the Grey Steel Products Co., New York.

Standard Gauge Steel Co., Beaver Falls, Pa., one 5-ton special type, 3-motor, overhead crane with span of 21 ft. 5 in., to the Alliance Machine Co., Alliance, Ohio.

Durant Motors Co., Elizabeth, N. J., in the market for two 15-ton locomotive cranes, one for Flint, the other for Lansing, Mich., has purchased the crane for Flint from the Industrial Works.

I. M. Ludington Sons, Rochester, N. Y., a 25-ton locomotive crane from the Brown Hoisting Machinery Co.

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will commence the construction of a three-story electric power house, 25 x 60 ft., to cost approximately $125,000 with equipment.

A machine shop and parts department will be installed in the new ten-story building, 60 x 140 ft., to be erected at Albany, N. Y., by the E. V. Scratton Motors, Inc., Washington Avenue, estimated to cost $200,000. Bids will be asked early in the fall. Strickland, Blodgett & Law, 7 Washington Avenue, are architects.

The United States Army, Quartermaster Department, Camp Alfred Vail, N. J., will take bids until Aug. 15 for two drilling machines, one lathe and one variety saw bench, proposal 1.

The New Jersey Power & Light Co., Dover, N. J., will build a one-story power house at Bloomsbury, N. J.

Bids will be received by the Board of Commissioners, Haddonfield, N. J., until Aug. 16 for one electrically operated pump and auxiliary equipment for a new sewerage pumping station. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers. Allen Clymer is borough clerk.

The Board of Education, City Hall, Newark, Alfred H. Krick, assistant secretary, will receive bids until Aug. 8 for power transmission machinery, woodworking vises, work benches, condensation pumps and miscellaneous equipment, as per specifications on file.

The Western Electric Co., 195 Broadway, New York, has leased the three-story factory at 708-20 Frelinghuysen Avenue, Newark, totaling 10,000 sq. ft., for the establishment of a new plant. It will be occupied early in the fall, giving employment to about 500. The plant will be operated separately from the new works to be erected on the Kearny meadows, near Newark, for which excavations are under way.

The Bertolette Machine Tool Co., 357 West Side Avenue, Jersey City, N. J., is in the market for 16-ft. plate bending rolls, punches and shear presses and pipe machines.

New England

BOSTON, July 30.

JULY unquestionably was the leanest month experienced this year by some machine tool dealers and representatives in this territory. This is generally ascribed to the vacation period, during which buyers are inclined to postpone purchases, and also to the leanness of new business booked by users of machine tools, which has developed acutely in the past fortnight. The rank and file of machine shops and manufacturers apparently are existing on week to week business and conserving cash resources rather than spend money for needed equipment under negotiation. There are, however, industries assured of good business well into 1924 if they do not secure another order, and it is largely to these that the machine tool trade looks for business next month and later.

Aside from the purchase by the Walworth Mfg. Co., South Boston, of a 5-ton electric crane for its Chicago pipe shop, and a grinding machine costing well up into four figures by the Putnam Machine Works, Fitchburg, Mass., individual sales the past week were small. A Worcester steel mill has indefinitely postponed its crane requirements.

A permit has been granted the Simonds File Co., Fitchburg, Mass., to build a one-story, 28 x 60-ft. addition to its plant on Falulah Road.

The Boston Elevated Railway Co., Massachusetts Avenue, Boston, is considering bids submitted last week for a coal handling system to be installed at its new machine shops, Everett, Mass.

The Cooley-Wright Mfg. Co., Waterbury, Vt., stone machinery, has purchased the plant and equipment of the Wiggins Machine & Mfg. Co., Burke, Vt. The business will be moved to Waterbury as soon as an addition to the plant can be completed.

The Romer Motors Corporation, Taunton, Mass. has purchased the plant of the Nelson Machine Co., where it proposes to carry on the manufacture of automobiles. The sale price was $10,500, subject to a mortgage of $50,000, four years' taxes, and receivers' certificates.

The American Pin Co., Waterbury, Conn., has awarded contract to the Immick Co., Meriden, Conn., for a one-story addition to Building No. 1, 40 x 120 ft., and a one-story foundry extension, 25 x 35 ft.

Fire, July 19, destroyed the plant of the Merrill Mill Co., Patten, Me., manufacturer of spool bars, etc., including steam-operated electric light and power plant, adjoining, with loss estimated at $80,000.

A machine shop will be installed in the three-story service building to be erected by Smith & McCarthy, Pittsfield,

Mass., operating the local Ford automobile agency, estimated to cost $15,000. G. F. Haynes, 184 North Street, is architect.

Herbert Swanson, care of James H. MacNamehen, 147 State Street, Boston, architect, has broken ground for a one-story machine shop on Beacon Street, Waban, Mass.

The New England Power Co., 50 Congress Street, Boston, has applied for permission to issue bonds for $2,800,000, and preferred stock for $2,700,000, a portion of the proceeds to be used for additions in generating plants and system, including the power development at Davis Bridge.

A manual training department will be installed in the two-story and basement high school to be erected at Gardner, Mass., estimated to cost $175,000. The Board of Education is in charge.

The Narragansett Electric Light Co., Providence, R. I., has plans for a new four-story power house on Elm Street, to cost approximately $100,000.

The Colburn Gear & Mfg. Co., 98 Holmes Street, Quincy, Mass., will build a new one-story machine shop.

Work is under way on the addition at the plant of the Boston Gear Works, Norfolk Downs, Boston, to be two-stories, 85 x 100 ft., estimated to cost $50,000.

A one-story power house will be erected by the East Braintree Bleacheries, Inc., Adams Street, East Braintree, Mass.

Philadelphia

PHILADELPHIA, July 30.

A TRACT of seventy acres, between Sixty-third and Sixty-ninth Streets and Gibson and Eastwick Avenues, Philadelphia, has been acquired by the Ford Motor Co., Highland Park, Mich., for $426,000. It will be used as a site for a large assembling plant to cost $1,000,000, and for which plans will be drawn at once. A power house will be included. The company is now operating an assembling plant at Broad Street and Lehigh Avenue, and this will be removed to the new location. William Wallace is assistant manager at the Philadelphia works.

Fire, July 22, destroyed a portion of the three-story millwork plant of Frank A. Cruice, Twenty-first and Ridge Streets, Philadelphia, including machinery and other equipment, with loss estimated at $50,000. It is planned to rebuild.

The Apex Machine Co., 2801 West Susquehanna Street, Philadelphia, has awarded contract to the J. S. Rogers Co., Drexel Building, for a one-story machine shop at Stenton and Wyoming Streets, estimated to cost $35,000.

C. M. Roswell, 1162 Marlyn Road, Philadelphia, machinery dealer, has inquiries out for a 5000-kw. turbo-generator, 2300 volts, three phase, 60 cycle, 150 to 175 lb. steam pressure, with surface condenser and auxiliary equipment.

Fire, July 21, destroyed a portion of the plant and machinery of the Savannah Chemical Co., Thirty-seventh and Dickinson Streets, Philadelphia, manufacturer of fertilizer products, etc., with loss approximating $100,000. It is planned to rebuild.

The Budd Wheel Co., Twenty-third and Westmoreland Streets, Philadelphia, manufacturer of steel disk wheels for automobiles, has awarded contract to the Wark Co., Drexel Building, for a one-story addition.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Mayaguez, Porto Rico, for quotations on American pipe drilling and threading machinery; from a concern at Santiago, Cuba, in the market for ice-manufacturing machinery; from a company at Melbourne, Australia, desirous of getting in touch with American manufacturers of clamps and kindred mechanical products; from a concern at Amsterdam, Netherlands, wishing to get in contact with American manufacturers of steel tools, scales and scientific instruments; from a concern at La Paz, Bolivia, in the market for agricultural tractors and machinery; and from a company at Toluca, Mexico, asking for quotations on American floor-planing machinery.

The Board of Education, Atlantic City, N. J., has plans nearing completion for a three-story addition to the industrial school, 42 x 125 ft., at Indiana and Baltic Avenues, and will soon call for bids on a general contract. Bertram Ireland, Guarantee Trust Building, is architect.

The Trenton & Mercer County Traction Co., Trenton, N. J., has tentative plans for the construction of a new car repair shop and material yard on site to be selected. It is also purposed to build an extension to the power plant and install additional machinery. The expansion program will cost more than $500,000. Rankin Johnson is president.

The Pennsylvania Wire Glass Co., Pennsylvania Building, Philadelphia, will soon award a general contract for a new plant at Lewistown, Pa., to cost more than $200,000 with machinery. A power house will also be built. The plant will specialize in the production of plain and corrugated wire glass. The company is now operating works at Dunbar, Pa.

A manual training department will be installed in the new two-story and basement high school to be erected at Midland, Pa., estimated to cost $175,000. W. G. Eckles, Lawrence Savings & Trust Building, New Castle, Pa., is architect.

Electrically-operated pumping machinery will be installed in the new sewerage disposal plant to be constructed by the City Council, Lancaster, Pa., estimated to cost $1,000,000. The municipality has been ordered by the State Board of Health to make the improvement before the close of the year.

The Collins Engineering Co., Conshohocken, Pa., is being reorganized with an active capital of $100,000, and plans for extensions. William S. Campbell, cashier of the People's National Bank, West Conshohocken, is treasurer.

The Consolidated Motors Co., New Castle, Pa., care of the local Board of Trade, has tentative plans for a new one-story plant, primarily for assembling, estimated to cost $60,000 with machinery. W. O. Dayton is vice-president.

Harold M. Fredericks, Lock Haven, Pa., operating an electrical equipment and repair plant, including armature winding, etc., has plans for a new factory for increase in production. Considerable additional equipment will be installed.

The Pennsylvania Power & Light Co., Allentown, Pa., is arranging an expansion program to cost about $8,000,000 during the next 24 months. The work will include the construction of a new hydroelectric generating plant on Wallenpaupack Creek, near Hawley, Pa.; a number of small generating plants and power substations; steel tower transmission lines and the installation of additional equipment at existing plants. The company is operated by the Electric Bond & Share Co., 71 Broadway, New York.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Flourtown, Pa., estimated to cost $200,000, for which bids are being called on a general contract. Ritter & Shay, North American Building, Philadelphia, are architects.

The Superior Metal Co., Bethlehem, Pa., has been chartered under State laws with a capital of $40,000 to operate a plant, now in course of erection, for the production of metal products. The initial works will cost approximately $25,000. Henry M. Kelly, Ottawa, Ill., is treasurer of the company.

C. Schubert and R. Van Horn, Philadelphia, care of James Collins Jones, representative, Bullitt Building, are forming electric power and transmission companies, for which charters will be taken out on Aug. 13. The companies will be known as the West Township, Decatur Township, West St. Clair Township, Frank Township, Uni Township and Lincoln Township Power companies, and will install plants and systems in the respective districts.

The National Roofing Co., Cly, Pa., has been reorganized with John F. Young as president, succeeding C. C. Eastlack. Work will proceed on rebuilding the plant recently partially destroyed by fire, and other extensions and improvements are planned.

Manual training equipment will be installed in the two-story high school to be erected at Mays Landing, N. J., estimated to cost $285,000, for which bids will soon be asked on a general contract. J. H. Vaughn, Guarantee Trust Building, Atlantic City, N. J., is architect.

The Electric Light & Power Co., Hightstown, N. J., is planning for installation of a power house and system in a portion of Washington Township.

Baltimore

BALTIMORE, JULY 30.

CONTRACT for the construction of a $250,000 plant at Eastern Avenue and Twenty-third Street, Baltimore, for the Porcelain Enamel & Mfg. Co., has been awarded to the P. C. Street Engineering Co., 406 St. Paul Street, Baltimore. It will be one and two stories and cover an area of 100 x 510 ft. It will replace the plant at Eighth and O'Donnell Streets, destroyed by fire last October.

The Baltimore & Ohio Railroad Co., Baltimore, has appropriated about $115,000 for the installation of additional equipment at its tie-treating and timber-preserving plant at Green Spring, Md., to include generator, boiler and auxiliary equipment, air compressors, treating cylinders, tanks, etc. It is expected to increase the capacity 50 per cent.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for the following equipment: One 150 hp.

boiler, with auxiliary equipment and stack; 18 x 20 in. cast iron reducers, with 18 in. bell; one 1-ton electric hoist; one 15 to 25 kw. engine-generator set; one 100-hp. slide valve engine; 12 cypress tanks, 10 ft. in diameter and 6 ft. high, and six cypress tanks, 12½ ft. in diameter and 7 ft. high, equipped with agitators; one belt-driven air compressor, 300 cu. ft. per min. capacity; one 750-gal. per min. centrifugal pump, water-wheel operated, and one 1000-gal. per min. centrifugal pump, electrically-operated; three transformers, 500 kva. each; gate valves, pipe and fittings.

W. D. Jones, 207 East Jackson Street, Richmond, Va., operating a machine repair works, is planning the installation of a lathe, electric drill and other equipment.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Aug. 21 for 44 chain hoists for installation at the Norfolk and Mare Island Navy Yards, schedule 1145; until Aug. 14 for three motors, controllers and spare parts for the Portsmouth, Va., Navy Yard, schedule 1137; until Aug. 21, for 2 condensate pumps for the Puget Sound Navy Yard, schedule 1147; and motor-generator sets and transformers for the same yard, schedule 1142.

The North State Power Co., Raleigh, N. C., has tentative plans for a new electric power plant in Wake County. Alan Turner is president.

The Shamrock Propellers Co., Norfolk, Va., C. H. Boyles, general manager, is negotiating for the purchase of a site for a new plant estimated to cost $200,000 with machinery. The main building will be used as a foundry.

The Southland Hardwood Lumber Co., Waynesville, N. C., recently organized with a capital of $500,000, is planning for the construction of a power house in connection with a proposed lumber mill, to cost $100,000 with machinery. A. H. Creelman, Waynesville, is head.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a 100 hp. boiler, Scotch type, with auxiliary equipment.

Seay & Askew, 1829 West Main Street, Richmond, Va., operating a machine repair shop, are planning the installation of a lathe, drill press and other equipment.

The Chatham County Commissioners, Savannah, Ga., will take bids until Sept. 20 for one dredge, with oil-burning equipment, including one 457 hp. internal combustion engine, and one 1 cu. yd. bucket.

The Tractor & Machinery Sales Corporation, Richmond, Va., recently organized with a capital of $1,000,000, has tentative plans for new works for parts manufacture and assembling of farm tractors, with department for the manufacture of other agricultural equipment. It is estimated to cost $150,000. J. H. Tucker is president.

G. A. Guignard and T. C. Williams, Columbia, S. C., are organizing a company to build a hydroelectric power plant on the Salude River, near Columbia. It is also proposed to erect a similar station on the Sante-Cooper Canal, Berkeley County. The plants will have a combined capacity in excess of 200,000 hp., and will cost more than $750,000 with transmission system. The local chamber of commerce is interested.

The Southern Wholesale Lumber Co., Columbia, S. C., plans to rebuild its mill and power house destroyed by fire July 22, with loss approximating $35,000.

James J. McDonald and Arthur P. Hoffa, Frostburg, Md., operating coal properties, plan the installation of electric power and mechanical equipment at their Caledonia mines, near Frostburg and at Phoenix, Md. Work is under way on a new coal tipple.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for one 16- to 12-ton saddle tank locomotive, 26-in. gage, second-hand.

A. H. Davison, Athens, Ga., has inquiries out for a gasoline engine, hydraulic ram, log chains, and other equipment.

The Ninety-Six Lumber Co., Ninety-Six, S. C., is considering plans for rebuilding the portion of its lumber mill and power house destroyed by fire July 23 with loss estimated at $100,000, including equipment. J. H. Walker heads the company.

Manual training equipment will be installed in the new high school to be erected at Walterboro, S. C., estimated to cost about $85,000, for which bids will soon be asked. James B. Urquhart, Columbia, S. C., is architect.

The Carolina Pole Co., Selma, N. C., will build a power house in connection with its proposed pole-treating plant, estimated to cost $100,000. It is also planned to equip a machine shop. I. H. Powell is president.

The J. G. Skelton Co., Inc., Richmond, Va., machinery dealer, has inquiries out for a 20-ton, double drum, locomotive crane, eight wheels, with about 40-ft. boom.

Stevens Brothers & Co., Atlanta, Ga., manufacturers of clay products, are in the market for a 30- to 40-ton locomotive, saddle tank.

The Eastwick Engineering Co., 342 Madison Avenue, New York, has received contract for the erection of the sugar mill at Norfolk, Va., for the Norfolk Sugar Refining Co., Inc., and will handle all details. The first unit will have a capacity of 500 tons per day and will cost $3,600,000, including power house and other buildings. J. B. Morgan and H. B. Calwell, both of Norfolk, head the company.

The Midway Foundry Co., Burlington, N. C., is arranging plans for rebuilding the portion of its plant recently destroyed by fire with loss approximating $60,000, including equipment.

The Consolidated Gas, Electric Light & Power Co., Baltimore, is inquiring for second-hand B & S gas or water pipe, one mile of 4-in. and three miles of 6-in. Address care of the purchasing agent.

The Frederick Iron & Steel Co., Frederick, Md., is in the market for 8000 square nut machine bolts with 1¼-in. thread, ¾ x 2½-in. square head.

Pittsburgh

PITTSBURGH, July 30.

MACHINE tool business in this district still is uniformly dull. The trade has the Pennsylvania Railroad list for its local shops to work on, and the Baltimore & Ohio list for its Glenwood, Pittsburgh, shop also will be quoted against by the local trade. Outside of these lists there is very little business that promises to be closed at an early date. The Railway Steel Spring Co., which is erecting a large shop at Latrobe, Pa., plans to transfer all of the usable equipment from its Pittsburgh plant to the new works, and does not expect to purchase many new tools. Samuel Diescher Sons, Farmers Bank Building, Pittsburgh, are the engineers for the new plant of the Standard Sanitary Mfg. Co. in Baltimore, and probably soon will begin awards for the equipment. The market also has ruled very quiet on cranes and other heavy equipment.

Generally, the machine tool and equipment trade is inclined to take a hopeful view of the future, chiefly on account of the definite development of a movement toward the elimination of the 12-hr. day in the steel industry. This effort means the employment of more men than at present, and since the possibility of fresh recruits through immigration is slight, it is believed that only through a reduction in the number of men required for given work will it be possible to provide enough men to establish the shorter working periods. This, it is argued, will be attainable only through the installation of a great deal of labor-saving machinery.

Bids will be received by the City Water Board, Wellsburg, W. Va., until Aug. 15, for two 2,000,000-gal. motor-driven centrifugal pumps, one to be low-lift type and the other high-lift, with auxiliary machinery, for the municipal waterworks. Hudson & Myron, 808 Wabash Building, Pittsburgh, are engineers. J. F. Thompson is secretary of the board.

The Pittsburgh Steel Products Co., Union Arcade, Pittsburgh, has awarded a contract to the Austin Co. for a one-story addition at its Allenport, Pa., works, 120 x 620 ft.

The Venango Public Service Corporation, Franklin, Pa., will take over and merge 23 electric light and power utilities now operating in different portions of Venango County. Extensions will be made in a number of power plants and additional equipment installed.

A one-story machine shop will be installed in the three-story service building, 90 x 120 ft., to be erected by Decker Brothers, North Spring Street, Bellefonte, Pa., local agents for the Chevrolet automobile, estimated to cost $80,000.

The Dunbar Flint Glass Corporation, Dunbar, W. Va., recently formed with a capital of $125,000, will arrange a list of equipment to be installed in its new plant, including link belt and conveyor system, transmission equipment, etc. Two main buildings will be erected, 50 x 120 ft. and 40 x 120 ft., respectively. J. M. Payne, Jr., is president.

The Borough Council, Ford City, Pa., will receive bids until Aug. 6 for electrical equipment for municipal service, including one motor-generator set, 40 hp., with 25-kw. generator; one 4-cylinder gas engine, direct-connected to a 250-kva. electric generator, engine type and generator resistance,

and one switchboard panel and instruments, with auxiliary equipment. The city clerk is in charge.

Power equipment, conveying and other machinery will be installed in the six-story and basement printing plant to be erected at Seventh Street and the Bigelow Boulevard, Pittsburgh, by the Press Publishing Co., 228 Oliver Avenue, estimated to cost $700,000. Hunting & Davis, Century Building, are engineers.

The Lathwood Foundry Co., Wayne and Thirtieth Streets, Pittsburgh, Pa., will soon take bids for a three-story and basement addition, 103 x 195 ft., estimated to cost about $40,000. C. H. Dunnells, 135 Riverview Avenue, is engineer.

The State Board of Control, Charleston, W. Va., will receive bids until Sept. 28 on a general contract for a three-story industrial school for boys at Pruntytown, near Grafton, W. Va., 70 x 150 ft. R. A. Gillis, Fairmont, W. Va., is architect.

The Citizens' Light & Power Co., Oil City, Pa., is perfecting plans for a new power house on North Seneca Street, estimated to cost $50,000.

Manual training equipment will be installed in the new high school to be erected in the Stealey Heights section, Clarksburg, W. Va., estimated to cost $125,000, for which the Board of Education will authorize plans at an early date.

The Common Council, Salem, W. Va., plans the installation of electrically operated pumping machinery in connection with a new waterworks system to cost $130,000.

Cleveland

CLEVELAND, July 30.

THE Pebbles Engineering Co., Newton Falls, Ohio, is placing a round lot of equipment for its new plant to manufacture small truck cranes and for car repair work. The bulk of this business has been placed with a Cleveland dealer. In the automotive field the Hudson Motor Car Co., Detroit, has commenced to place orders for considerable equipment for the enlargement of its Essex plant. No general list has been issued, but the company is reported to be taking up the purchase of various types of machines separately. It is now buying large special machines and later is expected to place orders for the smaller machines in standard types.

The Cleveland Board of Education has issued a list of 16 machines and considerable small miscellaneous equipment for the woodworking, sheet metal and electrical departments of the West Technical High School, for which bids will be received Aug. 3. With these exceptions the market is dull. Buying is confined almost wholly to single machines to round out present equipment and business is below normal for this season of the year. Compared with June, the aggregate sales for July will show a marked decrease.

The list issued by the West Technical High School, Cleveland, includes the following machines, all motor driven:

One 10-in. sensitive drilling machine
Two 2-wheel grinders
One 13 in. x 5 ft. quick change gear lathe
One combination punch and shear, No. 2 Niagara or equivalent
One 24-in. hand forge
One bench saw
One 12-in. hand jointer
One saw bench
Two 30-in. band saws
One 15-in. disk sander
One oil stone tool grinder
One 12-in. swing woodworking lathe
One 8-in. belt sander
One 5 x 12½-in. trimmer

The Globe Brass Mfg. Co., 5532 Perkins Avenue, Cleveland, will shortly commence the erection of a new plant on East Fifty-fifth Street to manufacture plumbers' brass goods. It will include a machine shop and foundry.

The Louisville Sheet Steel Co., Canton, Ohio, has been purchased by the Hydro-Forge Co., Alliance, Ohio, for $70,000. The latter company, which was recently organized, plans to install new machinery and begin operation early next year. The Louisville plant became involved in financial difficulties about eighteen months ago and was shut down.

The Radiant Electric Co., Massillon, Ohio, has been incorporated with a capital stock of $25,000 to manufacture electric heating appliances, including electric stoves. The officers are C. W. Stewart, president; Frank Held, vice-president; R. G. Harsch, secretary, and T. W. Thomas, treasurer and general manager.

The Massillon Aluminum Co., Massillon, Ohio, manufacturer of aluminum ware, has commenced the erection of an addition, which will add 20,000 sq. ft. to its present floor space and triple the company's output.

The National Lubricant Container Co., Cleveland, has acquired the plant of the Meech Foundry Co. on Meech Avenue.

The Wayman Electric & Mfg. Co., East Palestine, Ohio, expects to erect a new factory building under the direction of a local contractor. It is in the market for punch presses, small sensitive drills and tapping machines.

Chicago

CHICAGO, July 30.

THE Chicago machinery market is extremely quiet. Buying of machine tools by industrial plants amounts to so little in the aggregate that July will be the poorest month of the year so far. In railroad shop equipment a few orders are being placed, but two or three companies are getting most of the orders. The Santa Fe and the Union Pacific have placed a few more orders and now have practically bought all of the machines for which they recently inquired. The Illinois Central is expected to place orders for a few tools this week. There is no important business on the horizon, and the general expectation is that quiet conditions will last through August and possibly into September.

The Mulvey Iron Works, Percy E. Barry, president, 1840 Carroll Avenue, Chicago, contemplates the erection soon of a two-story factory, 103 x 406 ft., of brick and steel construction, on Fulton Street, near California Avenue.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, has awarded contract to the John W. Snyder Co., 116 South Michigan Avenue, for a two-story concrete steel machine shop, 90 x 200 ft., on West Twenty-second Street, at Fisk Street.

The Atlas Drop Forge Co., Lansing, Mich., has announced that it will erect new buildings which, with equipment, most of which has been ordered, will cost about $300,000. J. P. Hopkins is general manager.

The Frank Foundry Co., Davenport, Iowa, has taken out a permit to build an addition to its plant to cost $10,000.

The Werra Aluminum Foundry Co., South Bend, Ind., is contemplating the construction of an addition. It is a branch of the Werra Aluminum Foundry Co., Waukesha, Wis., and manufactures aluminum parts for automobiles, stoves, etc.

The Wilson Foundry & Machine Co., Pontiac, Mich., has started work on additions to its plant to cost $1,500,000. This will about double the capacity of the plant and will give a total output of about 1700 automobile motors daily for the Willys-Overland Co., Toledo, Ohio.

The Peninsular Power Co., Iron River, Mich., will build a new power station, 44 x 60 ft., adjoining its present plant, to cost about $250,000.

The Wayne Tank & Pump Co., Fort Wayne, Ind., contemplates the construction of a new factory and contracts will probably be let within the next few weeks. The new building is to take care of increased demand for the company's water softening equipment.

The Tokheim Pump & Tank Co., Fort Wayne, Ind., has awarded contracts for three new buildings to cost approximately $80,000. One building will be a tank shop, 100 x 200 ft. This company has recently completed an addition to its machine shop, and machinery is now being installed.

The Hansell-Elcock Co., whose steel fabricating plant is at Archer and Normal Avenues, Chicago, has leased for a long period 11½ acres with building at California Avenue and Thirty-first Street. The structure has approximately 30,000 sq. ft. of floor space and was acquired to provide for future expansion.

The Chicago Steel & Wire Co. has awarded contract for a power plant, 45 x 48 ft., at East 103d Street and Torrence Avenue, Chicago. It will cost about $50,000 and an additional $50,000 will be expended for equipment.

The Universal Implement Mfg. Co., recently organized, is seeking a location for the manufacture of a new type of farm tractor which will cultivate as well as perform the other universal tractor duties. The company, whose temporary address is Post Office Box 113, Oak Park, Ill., is in the market to purchase or lease a fully equipped plant which can be adapted for an initial output of 10 tractors a day. J. W. Wilson, president, has been for many years engaged in motor truck and motor car production. He was formerly general superintendent and technical supervisor for the Republic Motor Truck Co., Alma, Mich.; factory manager of the Interstate automobile plant at Muncie, Ind.; general superintendent of the Elmore Mfg. Co., Clyde, Ohio, a former subsidiary of the General Motors Corporation, and also spent

two and a half years in the Ford Motor Co. plant at Detroit in a technical advisory capacity. J. G. Kerst, Springfield, Ill., inventor of the tractor, is vice-president and treasurer of the company.

Manual training equipment will be installed in the new four-story high school addition, 145 x 145 ft., to be erected on Eastman Avenue, Joliet, Ill., estimated to cost $500,000, for which bids are being taken on a general contract. D. H. Burnham & Co., 105 West Monroe Street, Chicago, are architects.

The Common Council, Villisca, Iowa, is considering plans for the installation of a municipal electric light and power plant, estimated to cost $75,000. H. J. Swanson, mayor, is in charge.

A manual training department will be installed in the new high school to be erected at Atkinson, Neb., estimated to cost $150,000, for which bids will be received on a general contract until Aug. 21. Colby & Westerlind, Grain Exchange Building, Sioux City, Iowa, are architects.

The Modern Machine Shop, Danville, Ill., is considering plans for a two-story and basement addition, 75 x 150 ft. C. F. Carter is head.

The Municipal Utilities Commission, Watertown, S. D., will receive bids until Aug. 29 for pumping machinery, filter equipment, etc., for installation at the municipal water works. W. F. Cochrane is city engineer. A. M. Myhre is secretary.

A manual training department will be installed in the two-story high school to be erected at Fairbury, Neb., estimated to cost $200,000, for which bids will be received on a general contract until Aug. 6. Fiske & Meginnis, 553 Bankers' Life Building, Lincoln, Neb., are architects.

Plans have been authorized by the First National Bank, Fifth Street and Marquette Avenue, Minneapolis, Minn., C. T. Jaffrey, president, for extensions in its power plant on Marquette Avenue, to cost $35,000. Additional equipment will be installed. G. M. Orr, 516 Andrus Building, is mechanical engineer.

The California Ice Co., Antioch, Ill., has tentative plans for rebuilding the portion of its plant destroyed by fire July 20 with loss estimated at $70,000.

Manual training equipment will be installed in the new two-story high school to be erected at Waseca, Minn., estimated to cost $350,000, for which bids will be called on a general contract in August. W. B. Ittner, Board of Education Building, St. Louis, is architect.

The American Short Line Railroad Association, 1832 McCormick Building, Chicago, is inquiring for three General Electric gas-electric railroad motor cars and two wheel presses of 200 to 300 tons capacity, all used equipment. J. W. Cain is manager of purchases.

Buffalo

BUFFALO, July 30.

THE Northern Oil & Fuel Corporation, Coffeen Street, Watertown, N. Y., will build a one-story machine shop at its oil storage and distributing plant at Cape Vincent, estimated to cost $30,000. G. W. Lane is president.

Electric power and transmission machinery, conveying apparatus, etc., will be installed in the new plant, 400 x 450 ft., to be erected by the American Lithographic Co., 52 East Nineteenth Street, New York, at Buffalo, to cost $100,000. Frank Hackford is manager of the Buffalo branch of the company.

The Rochester Body Co., Inc., Favor Street, Rochester, N. Y., will take bids early in August for a two-story addition, 60 x 225 ft., estimated to cost $40,000. W. F. Hunt is one of the heads of the company.

Herman J. Otten, Buffalo, has made application for permission to equip a sheet-metal works in the one-story building, 58 x 98 ft., at 825-29 East Ferry Street.

The Greenfield Construction Co., Frewsburg, N. Y., is planning for the purchase of power equipment, including boilers and auxiliary apparatus.

A controlling interest in the New York Concrete Pipe Co., Warsaw, N. Y., has been secured by Chandler, Baker & Mallard, Inc., Earlville, Madison County, N. Y., manufacturer of similar products. The new owners purpose to extend the plant and install additional equipment. C. C. Chandler is president and C. O. Gallett, secretary and treasurer.

The Niagara Falls Power Co., Niagara Falls, N. Y., will install hydroelectric equipment for a total capacity of 210,000 kw. at its new power plant now in course of erection. Negotiations are under way with the Government for additional water supply for operation. Paul A. Schoellkopf is president.

The Quality Sand & Gravel Co., Springville, N. Y., plans the installation of equipment for digging, conveying, loading, etc., on property to be operated on Waverly Street. Stephen Engle is president and James P. Healey, secretary and treasurer. The company was recently organized.

F. Jaeckle, Fredericka Street, North Tonawanda, N. Y., is planning for the installation of transmission equipment, conveying machinery, lathe, planer and other equipment in a local building for a new woodworking plant.

Fire, July 22, destroyed the ice plant, with loading machinery and other apparatus, of Howland & Co., Athens, N. Y., with loss estimated at $75,000. Plans for rebuilding are under consideration. The cooperage shop of the Athens Supply Co. on adjoining property was partially destroyed, the loss approximating $15,000.

F. D. Wells, Savannah, N. Y., is planning to purchase a three-drum hoisting engine with 1½-yd. capacity clam-shell bucket. The installation of a stiff-leg derrick is also being considered.

H. W. Wolcott, 1461 Main Street, Buffalo, operating a battery manufacturing and repair plant, is planning the erection of an addition and will issue a list of equipment.

Milwaukee

MILWAUKEE, July 30.

RECOVERY from the sagging tendency in machine tool business noted in June is indicated by the volume of orders booked by local manufacturers in July. The month, however, is below the monthly average from January to May, yet it is ahead of July last year. General industrial activity appears to be increasing. Public and private utilities are furnishing a steady demand for generating equipment, steam and hydroelectric, pumping machinery, etc. Skilled foundry and machine shop labor remains scarce, but common labor is becoming more plentiful.

The Milwaukee Central Board of Purchases, City Hall, is asking bids until Aug. 3 for furnishing the complete coal and ash handling system for the new Riverside pumping station of the municipal waterworks plant. A bond of $11,400 or check for $5,700 is required with each tender. Joseph W. Nicholson is chief buyer.

The Schroeder Grinding & Machine Co., Fond du Lac, Wis., is moving its shop and plant from Second and Macy Streets to a larger building at 13 West Second Street. It is installing a new Heald cylinder grinder, a Norton crankshaft grinder and other equipment.

The Green Bay Sugar Co., Green Bay, Wis., has plans for a two-story addition, 60 x 150 ft., to be equipped as a beet pulp drying and grinding plant; estimated to cost about $125,000. Charles H. Hine is general manager.

The Bronze Seal Piston Ring Co., Green Bay, Wis., has been incorporated with $20,000 capital and leased the building at 1800 Broadway, which will be equipped as a machine shop for manufacturing patented piston rings. The incorporators are T. W. Pritchard and George E. Prickett of Oshkosh, Wis., and C. W. Wright, 427 South Monroe Avenue, Green Bay.

The city of Milwaukee is asking bids until Aug. 3 for furnishing two 200-gal.-per-min. sump pumps for the new Riverside pumping station.

The Racine Deflector Co. has been organized at Racine, Wis., by Michael Hammes and L. J. Borman to manufacture a patented device for automobile headlights. Additional equipment will be purchased to supplement that of a small experimental shop conducted for the past year.

The city of Oshkosh, Wis., is considering plans by Byron T. Gifford, consulting engineer, for a new electrical pumping station unit for the municipal waterworks system. The equipment will consist of five electrically driven and automatically controlled centrifugal pumps, three of 2500-gal.-per-min. and two of 1250-gal.-per-min. capacity. Bids for the equipment are expected to be taken shortly. A. C. McHenry is manager of the water department.

The Lederman System, Inc., Green Bay, Wis., is installing considerable machinery, including automatic screw machines, pressing and stamping equipment, in a part of the factory of the Oneida Motor Truck Co., and expects to start quantity production Aug. 6 of a sheet metal filing case with automatic selection features. Most of the equipment requirements have been filled.

The Board of Education, Neenah, Wis., has selected a site and engaged John D. Chubb, architect, 109 North Dearborn Street, Chicago, to design a new three-story high school and vocational institute, 224 x 365 ft., estimated to cost $500,000. Bids will be taken late in August by George W. Burnside, secretary, 145 West Wisconsin Avenue, Neenah.

The North East Power Co., subsidiary of Wisconsin Public Service Corporation, 559 Marshall Street, Milwaukee, has placed contract with the Allis-Chalmers Mfg. Co., Milwaukee, for two 4650-hp. vertical turbo-generator units for the new hydroelectric plant at Caldron Falls, Wis., estimated to cost $750,000. J. R. McDonald, Black River Falls, Wis., has the general contract for the construction of reinforced concrete dam and power house. Inquiry is being made for six 14 x 16-ft. steel tainter gates, two steel penstocks, two traveling gate hoists, four transformers, switchboards, etc. Mead & Seastone, Madison, Wis., are consulting engineers in charge.

The Universal Clothes Presser Mfg. Co., Milwaukee, has been incorporated with $25,000 capital stock to manufacture special machinery. The incorporators are W. H. Dick, Jacob H. Weishan, H. A. Krause and James Fiskow. Temporary headquarters have been opened at 1104 American Avenue, pending selection of a factory and office.

Indiana

INDIANAPOLIS, July 30.

PLANS are nearing completion for a two-story and basement branch factory at Fort Wayne, Ind., by the Chalfant Can Co., 1966 South Meridian Avenue, Indianapolis, estimated to cost $55,000. At present it is undecided whether to proceed with the work in the fall or to defer it until the coming year. Pohlmeyer & Pohlmeyer, Central Building, Fort Wayne, are architects. L. A. Corcoran is president.

C. A. Bradford, Indianapolis, will establish a new one-story machine shop at 570 North Belleview Place.

H. J. & W. M. Gelzer, Hillsdale, Mich., manufacturer of screens, screen doors, etc., have acquired the plant of the Auburn Mfg. Co., Auburn, Ind., devoted to a similar line of manufacture. The new owners will take immediate possession and plan the installation of considerable machinery and power equipment.

Electrically-operated pumping machinery and other equipment will be installed by the City Council, Evansville, Ind., in connection with the construction of a new filtration plant and extensions to the municipal waterworks, estimated to cost $250,000.

The Hedderich Brothers Co., Evansville, Ind., is building a one-story addition to its brass foundry, 60 x 60 ft.

The Tucker & Dorsey Mfg. Co., State and Bates Streets, Indianapolis, will build a one-story addition to its power house.

Power equipment, elevating and conveying machinery and other equipment will be installed in the freight terminal to be erected by the Terminal Realty Co., Indianapolis, on Kentucky Avenue, comprising three buildings, estimated to cost $900,000. The company is a subsidiary of the Terre Haute, Indianapolis & Eastern Traction Co., the Interstate Public Service Co., Indianapolis & Cincinnati Traction Co., and the Union Traction Co., and the terminal structures will be used by these roads jointly. Robert I. Todd of the first noted traction company is president.

Detroit

DETROIT, July 30.

BIDS will be received by the Board of Water Commissioners, Detroit, until Aug. 21, for one 37,000,000 gal., vertical, triple expansion, crank and flywheel type pumping engine, for installation at the municipal waterworks. Theodore A. Leisen is consulting engineer; H. S. Starkey is secretary.

The Jackson & Church Co., 321 North Hamilton Avenue, Saginaw, Mich., operating a steel fabricating plant, has tentative plans for an addition. John L. Jackson is head.

The plant and property of the Bowman-Gould Co., Detroit, manufacturer of wireless equipment, automotive specialties, etc., has been acquired by new interests. The company will be reorganized, it is stated, extensions and improvements made, and operations resumed.

The Board of Education, Detroit, has inquiries out for tools and other equipment for installation in manual training departments, including 18 lathes, 9 x 36 in.; one back-geared crank shaper, 14 to 16 in.; six single, back-geared engine lathes, 13 in x 4 ft.; two bench type arbor presses; two 20-in drill presses; one milling machine; one sensitive floor drill, and other tools. C. A. Gadd, 1354 Broadway, is business manager.

The Mason Motor Co., Fenton Road, Flint, Mich., has tentative plans for an addition. M. C. Day is secretary and treasurer.

The Triangle Truck Co., St. Johns, Mich., has been reorganized and has tentative plans for expansion to manufacture a new line of motor trucks and equipment. Henry D. Minich, vice-president Republic Motor Truck Co., Alma, Mich., is president of the new company; B. F. Wright, formerly connected with the Republic company as chief engineer, is vice-president in charge of production.

Manual training equipment will be installed in the new senior and junior high school to be erected at Owosso, Mich., estimated to cost $500,000, for which an architect will soon be selected. E. J. Willman, Board of Education, is in charge.

E. G. Davett, Marquette, Mich., operating a general machine repair works, is planning the installation of a drill press, air compressor, emery grinder and other equipment.

The Copper Coal Co., Saginaw, Mich, recently organized with a capital of $500,000, is considering the installation of electric power and other equipment at its properties. Otto L. Dittmar is president.

The Consumers Power Co., Jackson, Mich. is planning the installation of a branch power house and system at Ithaca, Mich., where a franchise has just been granted.

The Common Council, Lansing, Mich., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal water system estimated to cost $600,000. Otto Eckert, City Hall, is city engineer.

Cincinnati

CINCINNATI, July 30.

A LITTLE more activity in the local market was noted the past week, and better prospects for business are reported by many manufacturers. Some fair-sized deals were closed. The Pennsylvania Railroad continued to purchase miscellaneous tools for various shops, and the Chicago & North Western was also a buyer. The United States Shipping Board placed orders for five engine lathes, and the American Can Co. for five shapers. The Delco Light Co., Dayton, bought two multiple spindle drills. The list of the Montreal Harbor Commissioners has practically all been purchased, most of the orders going to Canadian manufacturers.

Automotive parts manufacturers have been fair buyers and one local manufacturer reports a good order for lathes from the Detroit district. A number of good inquiries have been issued. The Pennsylvania Railroad took bids July 25 on 14 engine lathes for its St. Louis shops, and the Big Four has issued a list of 10 tools for the Urbana shops. The Pollak Steel Co., Cincinnati, has taken bids on metal-working machinery, including punches and shears and presses.

A large manufacturer of grinders, which recently advanced prices, is reported to have booked numerous orders for grinding machines previous to the advance becoming effective.

The Universal Body Co., Columbus, Ohio, manufacturer of truck bodies for Ford cars, has purchased property adjoining its plant for expansion, and contemplates the erection of an addition this fall. H. B. Coen is president.

The Bauer-Stuart Co., Springfield, Ohio, has been incorporated with a capitalization of $25,000. It will manufacture automobile shock absorbers, but has not yet announced the location of its plant. Louis E. Bauer and Harve R. Stuart are the chief incorporators.

The Vaco Washer Co., Sabina, Ohio, has been incorporated with a capitalization of $10,000 to manufacture electric washing machines. The plant will be located in Sabina and production is expected to start some time in August. R. W. Allen is president.

The Elwood Myers Co., Springfield, Ohio, manufacturer of advertising novelties, has been placed in the hands of receivers, L. E. Bauer and Harlan C. West having been appointed. The plant will be continued in operation.

The Daniel Husker & Implement Co., Kenton, Ohio, has been organized to manufacture motor-driven husking machinery. F. J. Laubis is president. The plant, which is now in production, is located at Vine and Grove Streets.

The Standard Wheel Co., Terre Haute, Ind., has discontinued the manufacture of automobile and motor truck wheels, and hereafter the plant will be devoted entirely to the production of malleable iron castings. It is now operating two furnaces and contemplates extensions, although not in the immediate future. E. J. Fischer is president.

The Central South

ST. LOUIS, JULY 30.

TENTATIVE plans are being considered by the Congo Grease Machine Corporation, St. Louis, recently organized with a capital of $50,000, for the establishment of a plant to manufacture grease machines and other motor accessories. H. A. Robert Fisher and A. M. McSpadden, St. Louis, head the company.

The Hilton-Collins Co., Inc., Louisville, operating a boiler and plate shop, is in the market for a 100-lb. hammer, Bradley type, punches, bull-dozers and other equipment.

The Kansas City Power & Light Co., 1330 Grand Avenue, Kansas City, Mo., has plans for a new one and two-story building, 160 x 180 ft., at Twenty-fifth Street and Penn Avenue, a portion of the structure to be used as a machine shop and service works for company cars and trucks. It will cost about $125,000. A. E. Bettes is chief engineer.

The Anderson-Pritchard Oil Corporation, Oklahoma City, Okla., will build an addition to its refinery at Cyril, Okla., for gasoline production. It will cost $100,000 including machinery.

The Arkansas Boys Industrial School, Pine Bluff, Ark., will break ground for a new one-story trade and industrial instruction building. Seig & McDaniel, Memphis, Tenn., are architects. W. B. Sorrells is chairman of the board of trustees.

The Industrial Refining Co., Wichita, Kan., has purchased the refinery of the St. Louis Oil & Refining Co., El Dorado, Kan. The new owner will make extensions and install new machinery.

Manual training equipment will be installed in the new high school to be erected at Warrensburg, Mo., estimated to cost $200,000, for which bids are being received on a general contract until Aug. 8. J. B. Felt & Co., 800 Grand Avenue, Temple Building, Kansas City, Mo., are architects.

The Duncan Machinery Co., Dempster Building, Knoxville, Tenn., machinery dealer, is in the market for one 10 hp., single drum, gasoline hoisting engine, and one 150-hp., Scotch marine boiler and auxiliary equipment.

The Interstate Refineries, Inc., Twenty-second and Manchester Streets, Kansas City, Mo., will rebuild the portion of its refinery, recently destroyed by fire. The work will cost close to $200,000, with machinery. E. J. Rolfs is in charge.

Manual training equipment will be installed in the new junior high school to be erected at Linwood Boulevard and Montgall Avenue, Kansas City, Mo., estimated to cost $900,000. Charles A. Smith, 602 Finance Building, is architect.

The City Council, Danville, Ky., is planning the installation of electrically-operated pumping machinery in connection with a new municipal water plant to cost about $200,000. Peare, Greeley & Hansen, 38 West Adams Street, Chicago, are engineers.

The Union Electric Light & Power Co., St. Louis, has concluded arrangements for the purchase of the electric power properties of the Light & Development Co., operating in neighboring territory, for about $9,000,000. The new owner plans extensions in a number of plants and the installation of additional equipment.

J. H. Cochran, 210 Keller Building, Louisville, is in the market for a second-hand 150-hp. motor, 500-550 volts, with rheostat, starter, etc.

The Michael Ferguson Hardware Co., Paducah, Ky., has plans for a new one-story factory, 115 x 150 ft., with power house, estimated to cost $100,000 including equipment. D. Harry Jameson, Paducah, is architect.

H. J. Nicholas, head of the Nicholas Crusher Co., Thirty-third and Wyoming Streets, Kansas City, Mo., is planning the erection of new works to manufacture clay products, estimated to cost $100,000 with power house and machinery.

The Silver Hill Concrete Products Co., Silver Hill, Mo., recently organized, has tentative plans for the establishment of a factory to manufacture concrete specialties. Leonard J. Mathers and John Campbell, Silver Hill, head the company.

The Bradbyer Dunntile Mfg. Co., 17 South Zunis Street, Tulsa, Okla., is arranging for the erection of a new plant, 100 x 100 ft., to manufacture building and roofing tile products, estimated to cost $35,000. Equipment will include elevating and conveying machinery, power equipment, etc. J. J. Campbell is secretary.

The Central Oil & Gas Co., Liberty, Mo., is planning the construction of a new oil storage and distributing plant on local site. Similar works will also be erected at Henrietta, Mo. The equipment will cost $80,000.

The Dixie Laboratories, Inc., 511 West McDaniel Street, Springfield, Mo., has acquired a site for a new one-story plant for the manufacture of spraying equipment and devices for agricultural service. E. S. Carter is general manager.

The Water, Electric Light and Sewer Improvement District, Piggott, Ark., will receive bids until Aug. 7 for electric equipment for a new lighting plant, including one 125 hp. high compression internal combustion engine, direct-connected to a 100 kva. generator, with exciter; one 75 hp. engine, similar type, direct-connected to a 50 kva. generator, with exciter; one five-panel switchboard, transformers and miscellaneous equipment. Albert C. Moore, Joplin, Mo., is consulting engineer. William F. Linke is secretary.

The Elliott & Stephens Machinery Co., Chemical Building, St. Louis, is exclusive distributor in the southwestern territory for the Lodge & Shipley Machine Tool Co., covering its line of lathes.

The Gulf States

BIRMINGHAM, JULY 30.

PLANS are being perfected by the Gulberson Corporation, Pennsylvania Avenue, South Dallas, Tex., for an addition, comprising a foundry, machine shop and other buildings for the manufacture of its regular line of oil well equipment and tools. It is proposed to double the capacity. The expansion will cost close to $450,000, including machinery.

The Kaufman Metal Co., Clark and First Streets, Jacksonville, Fla., is in the market for a metal furnace with capacity of about 300 lb., for melting brass, etc.

The Lockard Brick Works, Meridian, Miss., are arranging to rebuild the portion of the plant and power house, recently destroyed by fire with loss estimated at $60,000. New brick-molding machinery, mechanical drying equipment, etc., will be installed. M. M. Lockard is head.

The Robert Mugge Co., Tampa, Fla., has inquiries out for an 8000 lb. steam hammer, two 6 in. centrifugal pumps; one 20 to 30 hp. boiler, and auxiliary equipment.

Manual training equipment will be installed in the high school to be erected at Corsicana, Tex., estimated to cost $125,000, for which bids are being received on a general contract until Aug. 7. William B. Ittner, Board of Education Building, St. Louis, is architect.

F. E. Brown and C. C. Holden, Bronte, Tex., have secured a franchise for local light and power service, and plan the erection of a new power plant and system. The initial installation will cost $60,000.

The Union Power Co., Inc., Shreveport, La., recently organized, will build a power house and pumping station in connection with its proposed carbon black manufacturing plant at Monroe, La., estimated to cost $1,000,000 with machinery. F. T. Whited, vice-president Frost-Johnson Lumber Co., Shreveport, is president of the Union Company. Frank J. Silsbee is vice-president and general manager.

The Community Mfg. Enterprise, Inc., is arranging for the installation of a crushing plant in a local building and will purchase equipment, including boilers and auxiliary power apparatus, trucks and trailers. G. P. Greig is secretary and treasurer.

A manual training department will be installed in the new high school to be erected at Vernon, Tex., for which bonds for $110,000, have been approved. Guy A. Carlander, Amarillo, Tex., architect, has been selected to prepare plans.

An ice-manufacturing and precooling plant to cost about $70,000 will be erected by the Florida Vegetable Corporation, Sanford, Fla.

The Elmer Tank & Boiler Works, Inc., New Orleans, has inquiries out for a set of bending rolls and bevel shears for handling ½-in. plates; also for one large and one small horizontal punch. C. C. Elmer is head.

A cold storage and refrigerating plant will be installed in the new meat-packing plant to be erected by the Jacob Decker & Son Sales Co., Mason City, Iowa, at Dallas, Tex. The structure will be 75 x 100 ft. and is estimated to cost $60,000.

Bonds have been voted by citizens of Edgewood, Tex., for $55,000, for the installation of a municipal electric light and power plant, in conjunction with a waterworks system.

The Union Water Co., Hartselle, Ala., is planning the installation of electrically-operated pumping machinery in connection with a new local waterworks. It is a subsidiary of the Alabama Water Co., Birmingham.

Manual training equipment will be installed in the new two-story high school to be erected at Eagle Lake, Tex., estimated to cost $115,000, for which plans are being prepared by Giesecke & Harris, Austin, Tex., architects.

The Southwestern Graphite Co., Burnett, Tex., will establish a main grinding and refining plant at Lyons

Avenue and the Texas & New Orleans Railroad. It will cost approximately $150,000 including machinery.

The Western Public Service Co., Sour Lake, Tex., will make additions to its electric power plant and install new equipment.

The Louisville & Nashville Railroad Co., Louisville, has tentative plans for enlargements in its locomotive shops at Albany, Ala., and the installation of additional equipment.

The Piedmont Lumber Co., Auburn, Ala., recently organized with a capital of $100,000 to take over the plant and property in the Auburn section of the C. Y. Young Lumber Co., plans for extensions and additional machinery installation. Charles H. Haynes, Cliffside, N. C., is president.

The Texas Power & Light Co., Dallas, Tex., will build a number of high power substations for electric service in the new oilfields in the vicinity of Powell, Tex., with the construction of transmission lines and the installation of motors and other electric power machinery at the various properties. John W. Carpenter is vice-president and general manager.

The Industrial Cotton Oil Co., Waco, Tex., has been organized with a capital of $150,000, to take over the local mill of the American Cotton Oil Co. The new owner plans extensions and the installation of additional equipment. W. D. Kyser, Marlin, Tex., is president, and J. M. Ford, Waco, vice-president and general manager.

The Sowden Engineering Co., San Antonio, Tex., recently organized, has acquired the plant of the Stroud Mfg. Co., for the manufacture of farm tractors, agricultural implements, etc. Equipment will be installed at an early date. F. G. Sowden is president.

The W. D. Wood Lumber Co., Birmingham, is in the market for five 10-ton, electrically-operated chain hoists, with three-phase, 60 cycle motors.

The Leahy Machine Shop, Rogers, Tex., has inquiries out for a 100-hp. oil-operated engine, with auxiliary equipment.

The People's Ice Co., Wichita Falls, Tex., is planning the installation of additional equipment to develop a maximum output of 100 tons per day.

The Laredo Electric & Railway Co., Laredo, Tex., has plans for the construction of a new steam-operated power house. John M. Marriott, San Antonio, Tex., is engineer.

The Invincible Oil Corporation, P. O. Box 1117, Shreveport, La., is inquiring for one or two 8 ft. x 30 ft. or 6 ft. x 40 ft. pressure still shells, either riveted or welded and with solid firesheet.

The Pacific Coast

SAN FRANCISCO, July 25.

THE Pacific Wheel & Rim Co., 417 North Broadway, Santa Ana, Cal., is planning the erection of a new factory to manufacture steel disk wheels and rims. A site has been acquired.

The San Diego Oil Products Co., San Diego, Cal., has purchased the by-products cottonseed oil works of the Goodyear Tire & Rubber Co., Phœnix, Ariz., and will extend the property for a new branch plant. C. H. Bencini is president.

The Vitrified Products Co., San Diego, Cal., is planning the erection of a new unit estimated to cost $50,000. George W. Kummer is general manager.

The Campbell Oil Co., Shelby, Mont., is perfecting plans for a new oil refinery, estimated to cost $500,000 with machinery.

The Pacific Steel Corporation, Los Angeles, recently organized, has purchased 200 acres at Long Beach, Cal., as a site for a new plant to manufacture steel products, estimated to cost $2,000,000 with equipment. D. M. Reynolds, First National Bank, is president.

The McGuire Cabinet Co., 1514 Hooper Avenue, Los Angeles, has awarded a contract to W. F. Gow, Bank of Italy Building, for a two-story addition to cost $25,000. H. M. Banfield and Herbert A. Welch, 514 Bryson Building, are associated architects.

The Board of Supervisors, San Jose, Cal., will take bids until Aug. 6 for a new power plant at the County hospital, estimated to cost $90,000. Binder & Curtis, 255½ South First Street, are architects.

The Baker-Hickman Sash & Door Co., 814 American Avenue, Long Beach, Cal., has tentative plans for two one-story buildings, each 80 x 120 ft., estimated to cost $75,000.

The Clay Products Co., Fullerton, Cal., has acquired property on the Bastanchury ranch as a site for a new plant to manufacture tile and other products, estimated to cost $90,000. A power house will be built. The company has established temporary offices in the California Hotel Building, Fullerton. George R. Whitcomb is head.

The Domestic Trade Bureau, San Francisco Chamber of Commerce, Merchants Exchange Building, is in receipt of an inquiry (D-653) from a concern in the Hawaiian Islands desiring to get in contact with manufacturers of sanitary can machinery.

The California Spring Co., Los Angeles, will take bids for a new one-story plant, 107 x 120 ft., estimated to cost $23,000 exclusive of equipment. W. Douglas Lee, Sun Building, is architect.

Canada

TORONTO, July 30.

WHILE no large machine tool lists were issued during the week, small orders were on a parity with those of the past few weeks, which resulted in a good movement of tools. Sales for the first six months of this year show a decided improvement over those for the corresponding period last year, and the outlook is for strong demand for the remainder of the year.

Several inquiries are out for equipment for electrical development projects. The Canadian National Railways have been in the market with small lists, chiefly for replacement purposes. The Canadian Pacific Railway is interested in equipment for shops in western Canada and is purchasing an occasional machine for replacement in other shops.

The Mahaffy Iron Works, 4 Trafalgar Avenue, Toronto, is asking for prices on motors, machinery, tools, etc., for a new plant to be erected on Kendal Avenue, at a cost of $50,000.

The Imperial Oil, Ltd., Sarnia, Ont., is in the market for oil tanks and pumping equipment to replace that destroyed by fire a short time ago. The new equipment will cost approximately $60,000.

The City Council, Walkerton, Ont., plans to build a pump house, stand pipe and install gasoline operated pumps at a cost of about $35,000.

It is reported that the T. Eaton Co., 190 Yonge Street, Toronto, has purchased the assets and plant of the Hercules Rubber Co., Brampton, Ont., and proposes to make additions and install equipment to double the capacity.

The Granby Consolidated Mining & Smelting Co., Vancouver, B. C., has started work on the erection of an ore mill and concentrator building at Granby, B. C., to cost $600,000.

Industrial Items

The Universal Steel Co., alloy and tool steels, Bridgeville, Pa., sustained damage to its main merchant mill through fire on June 30, to the extent of $15,000. The roof over a large area was destroyed and a small portion of the steel work was damaged. Aside from a few small motors and tools, the electrical equipment remains intact. Repairs are under way.

The Kerr Turbine Co., Wellsville, N. Y., has effected a reorganization through the acquisition of practically all its common stock by new interests. Paul B. Hanks, formerly president, having disposed of his holdings, has resigned and has been succeeded by W. T. Hamilton of Pittsburgh. Capital for expansion has been put into the business in sufficient amount to take care of all present and future requirements, enabling the company to take care of any volume of business that may be developed in the future.

The General Railway Signal Co. shows surplus of $245,337, after expenses, interest, taxes, etc., in its report for the half-year ended June 30. George D. Morgan, vice-president, said that unfilled orders aggregate $1,200,000.

Transue & Williams Steel Forging Co. reports net earnings $279,048, for the six months ended June 30. This compares with a deficit of $116,462 in that period of 1922. Balance sheet as of July 1 shows net working capital of $2,427,000, against $2,169,000 on Dec. 31, last. Current assets are now about $2,727,000 and current liabilities around $300,000. Quarterly dividend was recently increased from 50c to 75c. per share. Order books are well filled.

Roger J. Adams & Co., Inc., 320 Van Nuys Building Los Angeles, Cal., has under construction at Alhambra, Cal., a plant for the manufacture of concrete building blocks, which will be in operation about Aug. 1, with initial capacity of 2000 blocks per day. A large tract of land has been obtained and a warehouse 80 x 300 ft. will be built. The company contemplates erecting additional plants in southern California, after the Alhambra plant gets under way. Roger J. Adams is president.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.80c.	.....
Nos. 22 and 24	4.50c. to 4.85c.	5.10c.
No. 26	4.55c. to 4.90c.	5.15c.
No. 28	4.65c. to 5.00c.	5.25c.
No. 30	4.85c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.75c. to 5.10c.
No. 16	4.90c. to 5.25c.
Nos. 18 and 20	5.05c. to 5.40c.
Nos. 22 and 24	5.20c. to 5.45c.
No. 26	5.35c. to 5.70c.
No. 27	5.50c. to 5.85c.
No. 28	5.65c. to 6.00c.
No. 30	6.10c. to 6.50c.

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in Butt	—41	—24	⅛ in. Butt	— 4	+19
¾ in. Butt	—46	—32	¾ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap.	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¾c. to 20¾c.
High brass wire	20¼c. to 21¼c.
Brass rods	18 c. to 19 c.
Brass tube, brazed	27¾c. to 28¾c.
Brass tube, seamless	25½c. to 26½c.
Copper tube, seamless	27 c. to 28 c.

Copper Sheets

Sheet copper, hot rolled, 23¾c. to 24½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14 x 20 Prime	Coke—14 x 20 Seconds
		80 lb.	$6.55 $6.30
		90 lb.	6.65 6.40
		100 lb.	6.75 6.50
IC.	$11.75	$10.50	IC. 7.00 6.75
IX.	13.00	11.75	IX. 8.25 8.00
IXX.	14.75	13.00	IXX. 9.50 9.25
IXXX.	16.50	14.75	IXXX. 10.75 10.50
IXXXX.	18.50	16.50	IXXXX. 12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	41c.
Bar	48c. to 53c.

Copper

Lake ingot	17½c.
Electrolytic	17 c.
Casting	16¾c.

Spelter and Sheet Zinc

Western spelter	7¼c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¼c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27c.
Refined solder	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	8c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	32c. to 33c.

Old Metals

The market is quite dull and discouraged, with prices on copper and brass slightly off, while lead is a little higher.

	Cents Per Lb.
Copper, heavy crucible	12.25
Copper, heavy wire	11.50
Copper, light bottoms	10.00
Brass, heavy	6.50
Brass, light	5.25
Heavy machine composition	9.25
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.00
Lead, tea	3.75
Zinc	4.00

THE IRON AGE

New York, August 9, 1923

ESTABLISHED 1855 VOL. 112, No. 6

Steel Works Experience with the Short Day

Wage Adjustments as Worked Out at Various Plants—The Question of Spare-Time Work Under the New Regime—Six-Day and Seven-Day Week

BY BRADLEY STOUGHTON

IF there is one factor which stands out more clearly than any other in connection with successful changing from the 12-hour day in the iron and steel industry, it is that it must be done with the cheerful cooperation of the 12-hour workers. No other method has resulted in satisfaction, or accomplished a permanent system of 8-hour or 10-hour shift. It is my belief, after studying the results of change at the prominent American works where it has been successful, that the greatest degree of mutual satisfaction is obtained when both sides—employer and employee, payer of wages and recipient—make concessions to accomplish the desired result. Seldom does anyone value highly what he gets for nothing, and more seldom still does he make a good use of it.

Companies with Three-Shift Experience

Now that the 12-hour day is to be abandoned in the steel industry it is essential that both sides make the best use possible of the advantages which can be had from the changed conditions. This is the history and present experience of: Colorado Fuel & Iron Co., American Rolling Mill Co., Commonwealth Steel Co., National Enameling & Stamping Co., Wisconsin Steel Co., Trumbull Steel Co., Duquesne Steel Foundry, and others. It is also the lesson to be learned from some of our American steel plants which abandoned the 12-hour day and then returned to it, and from experiences in Europe. If our un-Americanized foreign workers prefer to work twelve hours out of the twenty-four for the sake of extra wages, they should be forced by their fellow workers—and not by the management—to live more in accordance with the best American standards and to employ their leisure time for the betterment of themselves, their families and the community. It seems to be difficult for the inexperienced to use freedom intelligently, just as is often the case with young persons and "newly-rich" in the use of money.

Use of the Time Gained

The intelligent use of leisure time is important for the success of the shorter day. In the case of steel workers it seems to depend largely on the amount of responsibility to which the worker has been accustomed previously, as for example, in the matter of participation in government. This is strongly brought out in the Report of the International Labor Office in Geneva, Switzerland, on the change abroad. Thus, in England (see especially pages 11 to 16 of the report) the energy and output of the workers have increased with the shorter hours; but in Austria, Poland, Czechoslovakia and Spain there are abuses which make the results

THIS is the first of a series of articles Mr. Stoughton will present to readers of THE IRON AGE. *It deals especially with the experience of a number of steel companies which have already abandoned, in all or in some of their departments, the 12-hour day. The second and third articles, which will be published in our next two issues, will deal with plans now under way in Central Western steel centers for the introduction of the shorter day in pursuance of the action recently taken by the directors of the American Iron and Steel Institute. They will be based on new investigations Mr. Stoughton has just made and on conferences with works managers at important plants.*

These interviews have added much to the data Mr. Stoughton has presented heretofore as the author of Part 3 *of the volume on the "Twelve-Hour Shift in Industry," published by the committee of the Federated American Engineering Societies, which dealt with work periods in continuous industry. What he will present in the second and third articles may be expected to contribute in a definite way to the solution of the problems with which all steel plant managers are now dealing.*

worse. In general, Germany is very disappointing, but this example scarcely supports the argument, because other conditions here outweigh the effect of shorter hours. On page 16, the report summarizes the results:

Timekeeping appears to have improved in Belgium, Great Britain, Italy and Japan, but other replies do not indicate any change. The longer leisure seems to be spent at home or in gardening. Men often take up supplementary work either in their principal or some other occupation. In some cases, indeed, workers are said to obtain less rest under the three-shift system, for the reason that they now overtire themselves by supplementary work. Keener interest is being taken in trade unionism and politics. A number of employers aver that there has been an increase of alcoholism and other bad habits, especially among the younger workers.

Taking Up Spare-Time Work

At the Colorado Fuel & Iron Co., where 53 per cent of the workers are American, the men were changed from 12-hour shifts to 8-hour shifts in November, 1918, at their own request. As the result of negotiation they accepted a reduction of 26 2/3 per cent in the daily wage (*i.e.*, an increase of 10 per cent in hourly rate). Nevertheless, there has been no disposition to engage in outside labor to eke out the income. At three other American plants, where the proportion of foreign labor is greater, the change from the 12-hour to the 8-hour shift was followed by many instances of outside work, such as in garages and repair shops, milk and newspaper deliveries, working in stores, cutting lawns and caring for furnaces for hire, and other part-time work, which used up the spare energy and efficiency of the workers. This is to be distinguished from home work in gardens, which brings recreation and is not fatiguing if indulged in moderately. This type of spare-time work is encouraged in all the three-shift plants.

The method of dealing with the other type of spare-time laboring was different in the three plants mentioned: At one plant, which is dominated by trade union influence, a certain amount of outside work in garages has to be endured, depending upon the attitude of the majority of the men. It is observed here, however, that most of the men put in their free time in gardening at their homes in the country surrounding the plants. No other misuse of time is noted and such work as is done has no great effect on the energy of the millwrights. The second plant in question is governed by a works council, and the disposition to take up outside work was corrected by the workmen themselves, through the council, as soon as the matter was called to its attention. At the third plant the management carried on negotiations with the men which put a stop to the practice. These three plants differ from the Colorado Fuel & Iron Co. in that they are situated in large Middle-Western centers of industry and draw their laborers largely from classes of foreigners. Partly through fear of losing the 8-hour day, and partly out of a spirit of fairness, the men were made to see the desirability of eliminating the abuse of leisure time. Mutual trust and good-will naturally had to precede the good understanding and cooperation which alone could control the situation.

Methods of Making the Change

Instances of actual experience in negotiations by which the 12-hour day was eliminated are undoubtedly interesting and valuable in the present situation. Some may well be cited here: The Commonwealth Steel Co. is a small open-hearth casting plant. It changed the continuous operations from 2 to 3 shifts some 12 years ago. The molding work was not continuous. An attempt was made to operate it on three 8-hour shifts, but it has been found more efficient to work two 8-hour shifts, allowing time between for shaking out molds, cleaning up, etc. This experience is interesting in relation to what occurs with two 10-hour rolling mill shifts, which have in at least two cases disclosed "bottle-necks" in the general scheme of plant operation and resulted in greatly increased production over the same mills operated continuously for 24 hours.

At the Commonwealth plant no demand had been made for abandoning 12-hour shifts, but the suggestion originated with the manager, Major Robert A. Bull. The proposal met with enough favor from the men to enable an agreement to be reached whereby both sides made wage concessions resulting a little better than 50-50 in favor of the employer. That is to say, hours were decreased by 33 per cent and wages were increased from 16 to 22 per cent. Major Bull has since expressed himself to me as convinced that a 50-50 division of wages would result in actual saving to the employer, due to better operation. He bases this opinion on his experience at Commonwealth and at two similar plants subsequently changed over under his direction. Detailed studies and research in the results of the work were published in the Transactions of the American Foundrymen's Association, 1912, and in *Engineering Magazine*, January, 1913. This figure might therefore be used as a starting point of negotiations in similar plants.

Colorado Experience

At the Colorado Fuel & Iron Co. the change to three shifts came in response to a request from the men, instead of the suggestion of a trusted and popular general manager, as at Commonwealth. The Pueblo plant employs more than 6000 men and operates blast furnaces, Bessemer converters, open-hearth furnaces, rolling mills, wire mills, etc. The relations between men and management had been cooperative previously. Wage controversies were avoided by an agreement whereby the same wages were paid as in the East. In 1918, when Eastern plants adopted the basic 8-hour day, which means 14 hours' pay for 12 hours' work, or an increase of 16 2/3 per cent, the men asked that, instead of receiving a "basic 8-hour day" at 16 2/3 per cent increase, they receive an actual 8-hour day at 10 per cent increase. All departments were then working 12 hours per day. On Nov. 1, 1918, all departments changed over to 8 hours per day, and so remain at the present time. The change was made all at once and without occasioning any noteworthy difficulties. Writing 3½ years later—that is, June, 1922—the management avers that there is and has been no dissatisfaction with the plan. As a basis for negotiations at other places it is interesting to note that the increase of labor efficiency after the change was, on the average, at least 10 per cent, so that the labor cost of production per ton was not increased. The decrease varies greatly in different departments, however.

In the same connection it should be noted that the readiness of the Colorado men to accept an 8-hour day with a much lower daily wage is not necessarily a criterion of what would occur in our eastern States, because the 8-hour sentiment is far stronger in Colorado than it is in the East, and because the proportion of American laborers is much greater—perhaps twice as great. If the men had accepted the "basic 8-hour day," with time-and-a-half for every hour over 8 hours, and had continued to work 12 hours per day, their daily wages would have been 59 per cent greater than it was on the actual 8-hour day with a 10 per cent increase. In other words, they accepted a 40 per cent reduction in daily wage to get the 8-hour day, instead of a 16 2/3 increase, with longer hours. It is too much to expect that men in Eastern industrial centers would be equally complaisant.

The Harvester Company's Plan

The Wisconsin Steel Works is a subsidiary of the International Harvester Co., which is operated under the "Harvester Industrial Council," in which employees

and management have equal representation "in the consideration of all questions of policy relating to working conditions, health, safety, hours of labor, wages, recreation, education, and other similar matters of mutual interest." It was extremely simple therefore, to negotiate in a friendly way the question of changing from two to three shifts. The Industrial Council was established on March 10, 1919, and all continuous departments of the works were on 8-hour shifts by May, 1919. The change was rendered easier by the fact that the Bessemer and blooming mill had been on 8-hour shifts for five years.

In the matter of wages, employer and employee split on the 50-50 basis, just as the American Iron and Steel Institute directors now recommend shall be done in the general movement away from the 12-hour day. The men who had been working 12 hours received 10 hours pay for 8 hours work; those who had been working 10-hour shifts received 9 hours pay for 8 hours work. The so-called "8-hour basis" continued, viz: Time worked over 8 hours per day received pay at 1½ the regular rate. The men work 20 turns in 21 days, according to the usual schedule on three-shift work, to be discussed later. For Sunday work, even on regular schedule, and for five of the legal holidays per year, time-and-a-half of the hourly rate is paid.

It happened that the change to the 8-hour day came at the same time as an increase of 10 per cent in the wages at neighboring plants, so that the men accepted a 25 per cent decrease in daily wage, with less hours of work, instead of a 10 per cent increase. Some departments work only two shifts of 8 hours each; for example, the ore unloaders at the blast furnaces. At first, only the men on continuous processes were put on 8-hour shifts, but later, at the desire of the men as expressed by their representatives on the council, all departments went on the 8-hour day.

At Sheet and Tin Plate Plants

It is well known that sheet and tin plate mills are pretty thoroughly unionized in this country, and are on the three-shift system. Two prominent producers of sheets and tin plates have also put other departments on the actual 8-hour day. Each of them is operating without dissatisfaction, and each serves as a different example of the manner of making the change: The National Enameling & Stamping Co. employs only union labor and deals with its men through the unions. By annual negotiation the number of 8-hour men has been pretty steadily increased. In one case the men wanted to go back to 12-hour work in order to make more money, and the union would not let them. Millwrights and rolling mill labor are on 12-hour duty, because they have so much idle time per day. Day labor works two shifts of 10 hours each. Eight years ago the open-hearth department changed from two to three shifts. The daily wage adjustment made with the union involved the men giving up 75 per cent and the company 25 per cent of the difference; in other words, the men worked two-thirds the number of hours at a 12½ per cent increase in wage per hour.

The universal mill and plate mill departments have also been put on 8 hours. Each time a change was made the company started off by adding 50 per cent to the number of men employed, but later was able to reduce them in many cases, such as spell hands on rolling mills, extra crane men, etc. In other cases they did not later decrease the number of men, but increased the production per man per hour. This was especially noticeable in cases where the 12-hour day was reduced to a 10-hour day.

Trumbull Steel Co.

The Trumbull Steel Co. also operates sheet and tin plate mills, and it has all departments of its works except its blast furnace on two shifts. In making the change it negotiated directly with its men and it adopted the technical principle of installing all possible labor-saving devices to carry the peak loads. As pointed out on pages 266 to 278 of "The Twelve Hour Shift in Industry" this mechanical handling of the peak loads is the most effective way of benefiting from the advantage of 8-hour human work versus 12-hour work—or, rather, 8-hour shifts versus 12-hour shifts, because the men usually cannot work for the entire shift, be it 8 or 12 hours long. A second cardinal principle of this company is that the equipment must be put in the best of condition before the change is made, in order to take advantage of the increased efficiency which comes with three shifts instead of two.

American Rolling Mill Co.

A company whose operation of the 8-hour day has attracted much attention is the American Rolling Mill Co. This company attacks the problem of the change in a characteristic way, viz: as a research investigation. The study extended over seven months before the blooming and bar mills were put on three shifts, in February, 1920. The result was an increase in the labor force, not of 50 per cent, but only 11 per cent. The men were paid a slightly higher hourly rate than they had received for 12 hours work, but a bonus was added to increase their daily wage to the same as before, provided they increased their efficiency as much as the plant studies had indicated was possible. In point of fact, the average increase in production per man over a period of months was 15 per cent.

In April, 1920, the open-hearth department was put on three shifts, with a 15 per cent increase in the labor force. In this department the increase in productivity per man has been less than the estimate, and labor costs per ton have increased also. For time over 8 hours the company pays the regular rate; it believes that added rate of compensation for overtime defeats some of the objects and advantages of the 8-hour day. Another principle of the company is to change gradually and only after full study of the conditions. It is to be observed, however, that this company differs from most companies in being trained to practice and to be guided by research. Whether the same practice would be successful with the generality of American companies is another question. In any event, it is obvious that this is a method of attack which demands special research in each plant and for each department. Apparently specially trained engineers would also be required.

In the Youngstown District

As noted in THE IRON AGE of Aug. 2, 1923, some of the higher-priced men in the Youngstown district have this summed been changed at their own request from 12 to 8 hour per day, without advance in hourly rate or tonnage basis. The article mentions especially men at the blooming mill of the Republic plant, and refers not only to rollers, but also cranemen, pitmen, etc. They made the request upon learning that it had become effective in some departments of the Youngstown Sheet & Tube Co. The men are mostly Americans. They made the change knowing that, unless their productivity per hour was increased, they would lose a part of their previous daily earnings.

Modifying Six-Day Week

In connection with the change from the 12-hour day the question is certain to arise in many instances of the abolition of the 7-day week, which has become synonymous in the public mind with the long hours of the steel industry. If the 8-hour day and the 6-day week become effective it will undoubtedly involve an

increase in the cost of steel per ton higher than the estimates of $3 to $4 per ton so far predicted. It will also involve the so-called "floating gang," which takes the place of the men one day per week, but not always on Sunday. It will involve a reduction of hours from 84 per week to 48 per week, which, with the inevitable periods of enforced resting time which must continue as at present for a while at least, means that the men cannot really accomplish a "man's work." This would

Table I—Week-End Change of Shifts on Three-Shift System

	First Week			Second Week			Third Week			First Week		
	12N 8am	8am 4pm	4pm 12N	12N 8am	8am 4pm	4pm 12N	12N 8am	8am 4pm	4pm 12N	12N 8am	8am 4pm	4pm 12N
Mon.	1	2	3									
Tu.	1	2	3									
Wed.	1	2	3									
Th.	1	2	3									
Fri.	1	2	3									
Sat.	1	2	3									
Sun.	3	3	1									
Mon.				1	2	3						
Tu.				1	2	3						
Wed.				1	2	3						
Th.				1	2	3						
Fri.				1	2	3						
Sat.				1	2	3						
Sun.				1	1	2						
Mon.							2	1	3			
Tu.							2	1	3			
Wed.							2	1	3			
Th							2	1	3			
Fri.							2	1	3			
Sat.							2	1	3			
Sun.							2	2	3			
Mon.										1	2	3
Tu.										1	2	3

be a condition undesirable from the standpoint of both sides, as well as the public.

However, it is possible to so arrange the three-shift week-end change of turn to give each man a 56-hour week and from 4 to 12 daylight hours every Sunday, with possibilities of church, family life, etc. Several means of accomplishing this are published in the Report of the International Labor Office, Geneva, Switzerland, September. 1922. A sample method is also indicated in the accompanying Table I. It is sometimes varied so that crew No. 3 (example: first week) works until 1 o'clock, instead of 4 o'clock, thus dividing the Sunday better with crew No. 1. Other variations are simply made and are often suggested by the men themselves.

Steel Treaters' Convention and Exhibition

The fifth annual convention of the American Society for Steel Treating and the International Steel Exposition, held under the auspices of the society, will take place in Motor Square Garden, Pittsburgh, during the week of Oct. 8. Papers have been secured from Japan, England, France and Germany, and these combined with the large number of papers to be presented by some of America's foremost metallurgical engineers, all combine to make this year's technical sessions the strongest that have ever been held by this society. An increase of 25 per cent more space has been taken for the exhibit at Pittsburgh than was used last year at Detroit and the 50,000 sq. ft. of exhibit space will be given over to a display of metals, metalworking machinery, appliances and equipment for the steel treating department. The large majority plan to have their exhibits in operation.

The American Steam Gage & Valve Mfg. Co., Boston, has sold its branch plant at 3 Grand Street Court, Worcester, Mass., to the American Schaeffer & Bundenberg Corporation, New York, for approximately $100.000. The new owner has an interest in the Schaeffer & Bundenberg Mfg. Co. Brooklyn, maker of gages and valves, which has been affiliated with the American company. The plant has been idle for about two years. It originally was built by the Critchley Machine Screw Co. The new owners plan to begin operations at an early date.

Iron and Steel Exposition at Buffalo

Reservations for space in the Broadway Auditorium, Buffalo, Sept. 24 to 28, are reported by the Association of Iron and Steel Electrical Engineers to have been made by more than 100 manufacturers of steel mill apparatus. In the list which follows (F) indicates an exhibit in the Foundry Show; (FI) indicates an exhibit in both shows. There is to be a complete steel foundry in operation, showing process of preparing hot metal and transmuting it into finished stings.

List of Demonstrators for Steel Mill and Foundry Show

Aero Pulverizer Co.
Alliance Machine Co.
Allis Chalmers Mfg. Co.
American Heat Economy Bureau
Andresen Co.
Appleton Electric Co.
Atchison Graphite Co. (F)
Automatic Reclosing Circuit Breaker Co.
American Arch Co.
Bacharach Industrial Instrument Co.
Baker R & L Co.
Bartlett Hayward Co.
R. H. Beaumont Co.
Benjamin Electric Mfg. Co.
Bussmann Mfg. Co.
Boxlll Bruell Carbon Brush Co.
Chapman Valve Mfg. Co.
Chicago Fuse Mfg. Co.
Chicago Pneumatic Tool Co. (FI)
Cleveland Crane & Engineering Co. (F)
Cleveland Pneumatic Tool Co. (F)
Corliss Carbon Co.
Crocker-Wheeler Co.
Crouse Hinds Co.
Cutler Hammer Mfg. Co.
Cutler Electrical & Mfg. Co.
Delta Star Electric Co.
M. H. Detrick Co.
Economy Fuse & Mfg. Co.
Edison Storage Battery Co.
Electric Controller & Mfg. Co.
Electrical Materials Co.
Electric Power Equipment Corporation
Electric Storage Battery Co.
Electro Labs Co.
Electro Metallurgical Corporation (F)
Electro Service Co.
Elwell Parker Electric Co.
General Electric Co.
George J. Hagan Co. (F)
Hagan Corporation
Hayward Co.
Harbison Walker Refractories Co. (F)
Hyatt Roller Bearing Co.
Johns Manville, Inc.
Johns Pratt Co.
Keystone Lubricating Co.
Lakewood Engineering Co.
Lapiak Fire Brick Arch Co.
Lumen Bearing Co.
London Steam Turbine Co.
Mahr Mfg. Co. (F)
Martindale Electric Co.
William G. Merowit
Mercury Mfg. Co.
Mutual Electric & Machine Co.
Mutual Foundry & Machine Co.
National Carbon Co.
National Electric Mfg. Co.
National Engineering Co. (F)
Nichols Lintern Co.
Norma Co. of America
R. D. Nuttall Co.
Northern Equipment Co.
Ohio Electric & Controller Co.
Osborne Mfg. Co. (F)
Packard Electric Co.
Pangborn Corporation (F)
Pittsburgh Electric Furnace Corporation (F)
Pittsburgh Electric & Machine Works
Pittsburgh Transformer Co. (FI)
Precision Grinding Co. (F)
Reed Engineering Co.
Reliance Electric & Engineering Co.
Republic Flow Meter Co.
Robertson Cataract Co. (F)
Rollway Bearing Co.
Rowan Controller Co.
Schweitzer & Conrad, Inc.
Shepard Electric Crane & Hoist Co.
SKF Industries, Inc.
Square D Co.
Standard Underground Cable Co.
Superheater Co.
Thomas Flexible Coupling Co.
Thompson Electric Co.
Tide Water Oil Sales Corporation
Tool Steel Gear & Pinion Co.
Trumbull Electric Mfg. Co.
Truscon Steel Co. (F)
United States Graphite Co.
V. V. Fittings Co.
Van Dorn Electric Tool Co.
Venango Sand Co. (F)
Western Electric Co.
Westinghouse Electric & Mfg. Co. (FI)
Wickes Boiler Co.
Wilson Welder & Metals Co.
Whiting Corporation (F)
Worthington Pump & Machinery Co. (F)

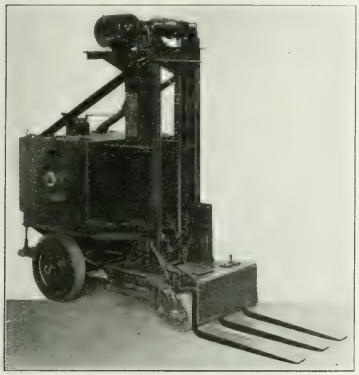
National Safety Congress

Sixty sessions are included on the program of the twelfth annual congress of the National Safety Council to be held at Buffalo, N. Y., Oct. 1 to 5, at the new Statler Hotel. The New York State Department of Labor and the American Association of Industrial Physicians and Surgeons are also planning annual meetings in cooperation with the congress and several joint sessions have been arranged. G. Howard Ferguson, premier of Ontario, Canada, will open the first general session. Other speakers will include Royal B. Meeker, commissioner Pennsylvania Department of Labor and Industry, who will talk on International Aspects of the Safety Problem, Bernard L. Shientag, commissioner Department of Labor, New York, and Lewis A. De Blois, E. I. du Pont de Nemours & Co., Wilmington, Del. A safety playlet—a scene in a foundry—will be staged by eleven steel workers from the Edgar Thompson Works of the Carnegie Steel Co. At least three new sections of the National Safety Council will be formed at the congress. They are the Ice and Refrigeration, Marine, and Employees Benefit Association. Between 500 and 600 benefit associations are now in operation in member companies of the council. A complete program of the congress is not yet available.

New Model Tier-Lift Truck

A lifting, carrying and tiering truck, designed to pick up its load without the use of platform skids, has been placed on the market by Lakewood Engineering Co., Cleveland. A feature claimed for the new truck is that it permits of tiering or stacking material without the waste of 12 to 14 in. space incident to the tiering of loads on platform skids.

The new machine is known as the fork "tier-lift" and is in many details similar to the machine described in THE IRON AGE of Jan. 22, 1920. Its development is said to have resulted from a demand for the economical handling of such commodities as tinplate, taking into consideration the loading of the plate at the mill



Tiering Truck Designed to Obviate Use of Skids

and the unloading and storing at the factory. The use of platform skids for carrying the load into the freight car is said to have necessitated so large a quantity of skids that the investment charges offset the savings otherwise available.

Loads up to 2500 lb. may be handled, the load being placed on 2 x 2 in. strips. Tinplate may be placed on these strips in the car at the mill, and a similar truck may be used to unload it at the plant and stack it in 2000-lb. units, three-high. With a travel of about 125 ft., it is claimed that an operator and helper can unload a 35 to 40 ton car of tin in about 1¼ hr. The unit may be applied to the handling of other commodities, the saving of investment in skids being the feature.

The driving and lifting mechanism of the truck is standard. The forged steel forks or arms are placed on the truck to meet requirements in the handling of dies, flat paper, radiators, barrels and other commodities. The truck is made to lift to various heights.

Storage of Coal

Difficulty with regard to coal supplies has caused the Link Belt Co., Chicago, to look into the subject of storing in summer a large part of the coal to be used the following winter. It has been generally assumed that provision in the industries for storing an average of 10 per cent of the year's coal requirements would form a sufficient balance wheel to relieve the extreme tension of coal delivery during the winter months, when railroad operation is difficult and coal demands great.

Among the reasons given for storing coal, in preference to taking a chance on getting it when everybody else is in the market, include both an assurance of the supply and a better quality of coal. It is believed that this will lower both the retail and the wholesale prices of coal and thus be of financial advantage all around. It will also relieve the nation's transportation system of undue burden at the time of its greatest stress.

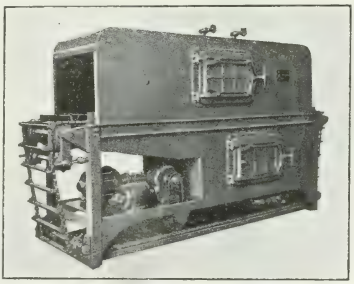
Naturally, the figures compiled by the Link Belt Co. point toward the use of mechanical means for unloading and handling the coal. The figures are based on results at a plant in Pennsylvania using about 4500 tons of coal per year and storing several hundred tons customarily. Coal is here piled in units of 70 tons and the total cost of handling the entire 4500 tons, including fixed charges on the equipment, depreciation, etc., is about $675, or 15c. per ton. This figure was compared with manual handling, which at 40c. per ton aggregated $1,800. The saving of more than $1,100 represents almost the entire cost of the equipment in a single year.

Improves Metal Washing Machines

Improvements have been made in the metal washing machines of the Crescent Washing Machine Co., New Rochelle, N. Y., increased speed and easier operation being features of the new machine.

The "revolving wash" principle is incorporated as in the previous design. The work passes between two sets of wash arms, one set above and the other below. The arms revolve slowly and play the cleaning solution upon the parts to be cleaned. The machines may be used singly for either washing or rinsing metal parts, or, where both these operations must be done, two machines may be connected. Drying, lacquering and slushing are among other uses to which the machine may be put.

The model 1A automatic machine shown in the illustration will wash parts up to 18 in. wide and 14 in. high, placed directly on the conveyor. Smaller pieces are placed upon the conveyor in racks, the size of which are 17½ x 17½ in. The machine is compact and is intended for use in small metal cleaning departments, at the end of a line of automatic screw machines, or where available floor space is limited. The height is 57½ in., the width 27 in. and the working



Compactness, Quick and Convenient Operation Are Features

level is 36 in. The tank is of 75 gal. The mounting of the pump and motors may be noted from the illustration. The pump is driven by a 1½-hp. motor, a ½-hp. motor being used for the conveyor. The speeds are 2, 4, 6 and 8-ft. per min.

A model 2A machine of similar design is also available for parts up to 26 in. wide and 14 in. high. The height of this machine is 61½ in. and the width 35⅛ in., the working level being 36 in. The weight of this unit is 2550 lb. and that of the 1A, 2250 lb.

The Parker Wire Goods Co., Worcester, Mass., is operating in a new plant at Washington and Leamartine Streets. New machinery has been installed, and the metal stamping department enlarged. The plant is of one-story construction and contains about 44,000 sq. ft. of manufacturing space. E. D. Priest is chairman; Howard W. Nestor, vice-president and treasurer; W. H. Lawrence, production manager; W. A. Peterson sales manager.

Two New Material-Handling Trucks

The Yale & Towne Mfg. Co., Stamford, Conn., has placed on the market a high platform general utility truck and an elevating platform truck, designated as the K-20 and the K-22, respectively.

The K-20, shown in the left-hand illustration, is intended for the economical intraplant movement of material, which can be placed on the platform by hand, chain block, electric hoist or crane. A gravity dump body for handling loose material and an electrically operated swinging boom crane are available as auxiliary equipment. Large wheels, full spring suspension, ease of control, few parts, and these accessible and grouped into self-contained major units, are features. Pressed steel frames with integral battery box are used, and also the company's spur-gear unit power axle. Most of the single parts and unit assemblies are standard and are interchangeable with those of all other models in this series.

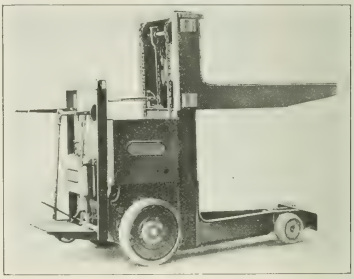
The wheelbase is 58 in. and the wheel tread 33¾ in. The overall length of the truck is 102¼ in., the width 38 in. and the height 53⅝ in. The platform space is 38 x 84 in. and the height 25½ in. The ground clearance is 5 in. The maximum speed, empty, on level concrete is 8½ mi. per hr., and with 4000 lb. load 6¼ mi. per hr. The maximum speed on a 10 per cent grade, 4000 lb. load, is 2¼ mi. per hr. The rated capacity is 4000 lb. The turning radius of outside and inside edge of truck is 91 and 42 in. respectively. The minimum width of intersecting aisles for 90 deg. turn is 49 in.

The motor is series wound, totally inclosed, 36 volts, 15 amp. 1800 r.p.m. continuous rating and the battery may be either Edison or Exide. The controller is of the company's drum type with renewable arcing contact and cut-out switch. There are three speeds forward and reverse. Battery connector, resistor and charging plug are provided. The drive unit is of double reduction spur-gear type, 18.7 to 1, running in oil and mounted on ball bearings. Full floating axle shafts, driving the wheels through inclosed universal ball joints, are provided. The wheels are of pressed steel and are mounted in ball bearings, deep groove type. The brake, which is of the external double shoe type, is mounted on the motor shaft and operated by foot lever connected directly to the cut-out switch.

The elevating platform truck is shown at the right. It is a self-loading transportation unit designed to combine the advantages of high and low lifting and its rated capacity is 4000 lb. The drive unit is interchangeable with the K-20 platform truck and wheels, wheel bearings, brake and other units are of the same type as the K-20 truck. The turning radius of the outside and inside edge of truck is 90 and 39 in., respectively, and minimum width of intersecting aisles is 60 in. The truck speeds are the same as noted above. The hoisting speeds are 4½ in. per sec. empty, and 2 in. per sec. maximum with 4000 lb. load. The lowering speed, all loads, is 4¾ in. per sec. maximum, controlled by regenerative action of hoisting motor.

The hoist motor is entirely inclosed. The hoist controller is of the drum type with automatic throw-out when the platform reaches high and low position. The hoist unit is of the triple reduction spur-gear type, 105 to 1, is inclosed in housing, and drives the chain over hardened sheaves. The brake on the hoisting mechanism is of the external double shoe type and is mounted on the motor shafts and interconnected with the hoist controller. The wheelbase is 55 in., the length is 106 in. and the height 83 in. overall. The platform height is 11 in. in the low position and 61 in. in the high. The ground clearance is 3¼ in. The weight of the truck with Exide battery is 3300 lb.





A Minimum Number of Parts and These Grouped Into Self-Contained Units, the Majority of Which Are Interchangeable With Those of All Other Trucks of the Series, Are Features. A gravity dump body and swinging boom crane may be provided for the industrial truck at the left. The lowering and lifting mechanism of the elevating platform truck, shown at the right, is of the triple, spur-geared reduction type, electrically controlled

Weirton Steel Co. Improvements

New sheet mill of the Weirton Steel Co., Weirton, W. Va., is rapidly nearing completion and the company already is taking business for late September and October delivery. The first unit of four mills will be in operation about the middle of September. The mill consists of eight hot mills, arranged in two trains of four mills each and four cold mills, with annealing and galvanizing departments. J. M. Hill, formerly with the Canton Sheet Steel Co., Canton, Ohio, and the Apollo Steel Co., Apollo, Pa., is manager of the mill, and Daniel Miller, formerly with the Brier Hill Steel Co., Youngstown, is superintendent of the galvanizing department.

The sheet mill is one of several additions made at this plant. The new by-product coke plant, consisting of 37 improved type Koppers ovens, now is in full operation, and making coke in less than 12 hr. coking time. C. R. Meissner, formerly with the Koppers Co., Pittsburgh, as engineer of tests, is superintendent of the plant, and Casey Evans, formerly at the by-product coke plant, Steubenville Works, Wheeling Steel Corporation, is assistant superintendent.

A Dwight-Lloyd sintering plant is another recent installation by this company.

At the directors' meeting of the Kelly Nail & Iron Co., held at Ironton, Ohio, I. Austin Kelly, New York, was elected president, without duties, to succeed the late Oscar Richey. I. P. Blanton was elected vice-president and general manager. Mrs. Nannie H. Wright and Frank L. McCauley, having sold their stock in the company and resigned from the board, their places were filled by T. J. Hayes, secretary of the company, E. K. McKeown, manager blast furnace department, and A. D. Markin. The company is now engaged in relining its blast furnace and connecting an engine installed in 1920. Other improvements are also being made to increase the capacity of the furnace from 125 to 200 tons of pig iron per day.

Why Foreigners Are Needed in Steel Plants

Practical Experiences Which Indicate Their Usefulness and Suggest the Wisdom of Modifying the Immigration Laws

BY GEORGE WALTER*

HOW many American citizens, American-born, who are now crying out against the invasion of the foreigner, have witnessed this foreigner at work around the furnaces of a great steel mill? How many of these same patriots would have been willing to change places with him, had they seen him in action? And, if so, what would have been the wage asked? Then who are the individuals responsible for the cry against the high price of steel and steel products?

I have worked in the great mills at Gary and before the blazing furnaces of Pennsylvania, and my opinions are purely personal ones, formed as a result of experience. I was employed at Gary a few years ago, when labor was plentiful and choice jobs were not to be had. In a great plant of this kind "pull" avails little, and a man must play his part in the great machine efficiently in order to get on.

One day I had a letter from a friend, stating that he was out of work and wanted a job. Could I do anything for him? He was willing to do anything. I had known Bill for a long time. We had been farmer boys together, and I had always known him to be a good hard worker. I went to the superintendent of my department the next morning and asked him to hire Bill. The superintendent told me that he was "full up," but if I guaranteed Bill to be a good man, I could tell him to come ahead and he would make a place for him.

I wired Bill at once including carfare. Two days later he arrived, and I shared my room with him. I stood good for his meals at the restaurant and gave him some money for carfare to his work. The superintendent gave Bill a job at labor; the best he had at the time, but he gave him the preference and a soft job. Instead of being put to work with a gang of "foreigners" shoveling sand, he was given a job thawing out cars of sand with a steam hose. Fifteen minutes were required on this job to set the nozzles for an hour's thawing. This hour was then Bill's own. It gave him plenty of opportunity to go inside and get warmed up if he got cold. The first three nights Bill set his hose lines for the first time, and then went inside and slept the remainder of the night.

It Was a Hunkie's Job

At the end of a week, the superintendent told me that Bill "couldn't stand the cold, but that he didn't mind heat." So he had transferred him to the rail mill. Two days later I found a note pinned to the bed saying that Bill hadn't come to "take a 'hunkie's' job"; he had at least expected a job fit for a white man, and he "had quit cold." After I had finished paying the bill at the restaurant and explaining to the superintendent that Bill had changed some, I decided that Bill was right. "It was a hunkie's job because the hunkie was the only one who could be trusted to do it."

Bill's case is only one of thousands, and it is because of this that the great steel industries have come to depend so much upon the foreigner. The foreigner comes to this country with little or nothing. His head is full of ideas of big money easily obtained. Friends soon place him to rights and, as soon as he realizes that he must work and work hard to get his big money, he goes to work. Long hours and hot furnaces do not deter him; he wants the money and gets it. His work is well done because he knows that his job depends upon it.

He believes that seven or eight years over these furnaces will break his health, unless he is possessed with a super-physique, but he has no intention of doing this. A few years' hard work and frugal living, and he has saved considerable money. It requires considerable money, however, to live in the United States; so he either sets up a little business of his own or goes home.

This business he owns in its entirety. If it fails he alone is the loser. None of his friends has borrowed money sunk in the deal. But his business does not fail. He assured himself of that before he opened up. He works, his wife works and his children work helping to keep shop. Bye and bye he has put enough by to open another shop, and so it goes. Had he had the least doubt of success, he would have returned home, where his few thousands would have lasted him a lifetime. There he would have told "how he done it" and more would have come over to fill his place and prevent a shortage of help.

Spending Money in Europe

Who spends the more money in Europe, the returned foreigner or the American tourist? Then why do we cry because American export business is so far below that of other countries who must depend upon export business for their very existence? We want to sell the foreigner the finished product of our factories, and yet we tell him blandly that he must not come over here and help make these products, even though he has sold his household goods to purchase his passage. The "quota is full" means just what it says, but the foreigner must spend his last few dollars and travel thousands of miles to the gates of Ellis Island to find it out. Then at the expense of the steamship company he is returned to his native land to see others living in his old home and others in his old place at the mills.

I have seen men in steel mills working entire shifts with wet towels bound around their foreheads. Smoke and soot gummed up with sweat ran down the bare blistered shoulders of the men at the soaking pits, spitting blue dust from their mouths as they shoveled it into the pits below. Small wonder that the cry should be, "This is no white man's job." Nevertheless this job is necessary to the production of steel, and the men who do it, though they may not be Americans, are white. Also many of them are embryo Americans. For years the steel interests have been bending their efforts toward Americanizing these toilers, and their efforts to a large degree have been fruitful. The allegation that the steel industries are un-American is false; they are decidedly American and have proved it, but they must get their work done to exist, and the foreigner seems to be the only dependable laborer available for the job.

Agitating for More Money

Many who do not consider the steel industry in their attacks upon the foreigners make the complaint that they are responsible for low wages. But the steel interests will tell you different. Here is the bitter that comes with the sweet. The greater per cent of the foreigners are continually agitating for more money. When it is offered, nothing can stay the dropping of tools but an attractive counter offer.

"Me quit, boss."

"How come quit, John?"

*In charge of maintenance Milholland Machine Co., Indianapolis, Ind.

"Me ketchim more money 'nother place."

"Yeah, and ketchim more work, too."

"No matter more work. Ketchim more money, plenty more money; me quit. Tomorrow me ask new boss give my friends job. Mebbe whole gang quit."

And the whole gang will quit unless the boss is wise and makes a raise. These men stick together and try to get for their friends as good as they have themselves. They are not afraid to recommend their friends, because they *know that they will do a full day's work for a day's pay.* They won't go to sleep on the job, as Bill did, not very often. They want more money, though, and when they get it their American brother gets it, too, but he seldom realizes the part the foreigner played in getting it. When they strike, they strike until the day of settlement. Others may take their places or they may go to work elsewhere, but they won't sneak in through the back gate.

Steel wants and must have the foreigner. Steel is ready and willing to deal with the strike question among the foreigners. Then why not let down the bars a little and let steel have its labor and at the same time hold steel responsible for the good behavior of its imported product?

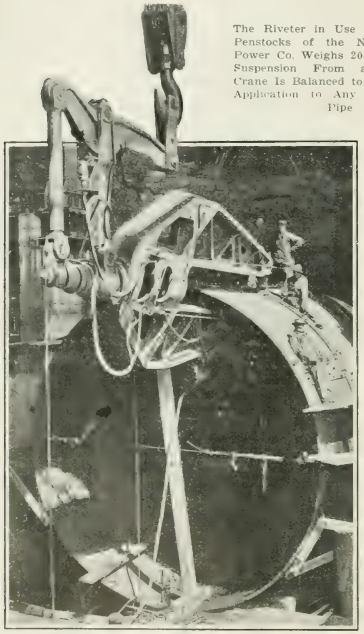
Large Riveter Triples Speed of Hand Riveting

A record of 450 rivets in a working day of 8 hr. has been the average performance of the bull riveter in use on the penstock work at the Niagara Falls Power Co. tunnels at Niagara Falls, N. Y. On a regular run 45 rivets in 35 min. was the schedule. The riveter, the largest portable machine in use, was built by the Hanna Engineering Co., Chicago. It was described in THE IRON AGE of May 3.

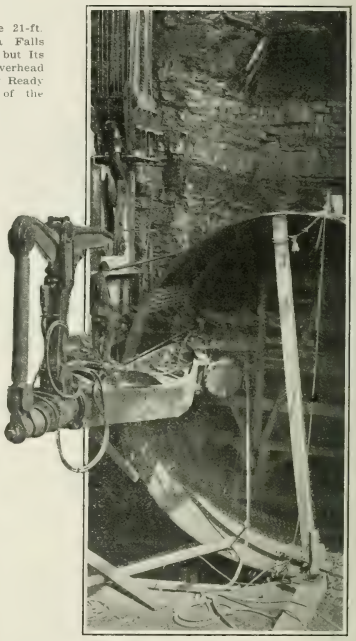
Work on the second penstock has just been completed so far as the services of the riveter are concerned, and the third is not yet ready for riveting. The labor saving accomplished is computed at 66 per cent. The average work of a crew of seven men hand-riveting is 150 rivets in an 8-hr. day. The labor-saving feature is enhanced, it is held, through the fact that with hand-driven rivets a percentage must be allowed for cutting out loosely driven rivets—a condition not found in the machine-driven work.

The rivets used on the penstocks are 1⅜ and 1½ in. in size. The plates are 1⅜ and 19/16 in. in thickness, and were rolled at Homestead. The jaws of the riveter compress the plates under pressure of 150 lb.

Each of the three penstocks is 21 ft. in diameter for the supply of 70,000-hp. turbines. The Hanna machine weighs 20 tons, and is slung from an overhead crane. It is balanced so that the operators can swing it in any position desired with but little effort. Air operated worms raise, lower or turn it.



The Riveter in Use on the 21-ft. Penstocks of the Niagara Falls Power Co. Weighs 20 Tons but Its Suspension From an Overhead Crane Is Balanced to Allow Ready Application to Any Part of the Pipe



The work on the penstocks is done in the open, and as each ring is completed the tube is rolled into place on rails.

The Surplus Steel Exchange, Inc., 7 Dey Street, New York, recently organized, has opened an office in Chicago, 2257 Oakdale Avenue, to handle listings and inquiries from that district which hitherto have been dealt with from New York. This district comprises Illinois, Minnesota, Wisconsin, Iowa, Missouri and Indiana. Duplicate listings of surplus stocks will be kept on file both in Chicago and New York. A. E. Thiffault and Raymond I. Gaspers, both of whom have been affiliated with the steel trade for many years are in charge of the Chicago office. Both men were formerly with the American Sheet & Tin Plate Co. and Mr. Gaspers was at one time with the Illinois Steel Co.

Inland Steel Co. and the Shorter Work Day

Labor Lost to Plants Working the Long Shift — Steel Institute Plans 25 Per Cent Advance in Hourly Rate

CHICAGO, Aug. 6.—"Why did the Inland Steel Co. abandon the three-shift basis of operation in its steel works?" In answer to this question, which was put to him by a representative of THE IRON AGE, P. D. Block, president of that company, said:

"The plan was abandoned after 18 months' trial in 1919 and 1920, because we could not hold our men. We paid the highest wages per hour, but our employees preferred to go to other mills and work a longer shift in order to obtain a higher total wage per day. The reason for our abandonment of the plan may be summed up in one word—competition. With all producers on the same basis, whether it be 8 hours, 10 hours, a combination of the two, or some other plan, no difficulties will be encountered on this score. It is for that reason that we have decided to adopt whatever program is put into effect by the industry."

Ten-Hour Shifts in Finishing Mills

"How much additional labor will be required when the 12-hour day is abandoned?"

"A definite answer to this question," said Mr. Block, "cannot be made until we have completed an investigation which is now under way. We shall first determine exactly how many employees are now working 12-hour shifts. It is possible that they may constitute from 40 to 50 per cent of our total payroll. A second consideration is the number of hours which these men will work under the new plan which is being formulated by leading producers in the industry. It should be noted that while it has been definitely decided to abandon the 12-hour day, this does not necessarily mean the adoption of three shifts of eight hours each. In the continuous process departments, such as the blast furnaces, open-hearth furnaces and coke ovens, the adoption of the 8-hour day will probably prove necessary. In the finishing departments, however, the men may be put on a 10-hour basis."

"Would not the production of the mills be curtailed if they were put on 10-hour shifts?"

"This would depend upon the condition of our order books. If they were such as to permit the completing of a section at the end of a shift, the two hours between shifts could be used for changing rolls. Of course, it frequently happens that rolls must be changed several times during the day."

"Did you find when you were operating on a three-shift basis that the production per man per hour was greater than under the two-shift system?"

"No. On the contrary, we have produced more tonnage in two shifts from the same mills than we did with three shifts. I might say in this connection, however, that the efficiency of labor during the period in which we made our experiment was sub-normal, and better results should be obtained in three shifts than in two."

Questions of Cost and Labor Supply

"How much will the abandonment of the 12-hour day increase the cost of finished steel per ton?"

"At the present moment, I would prefer not to answer that question. When we have completed our investigation of costs and when we are operating on the new basis, we shall be in a position to make an intelligent estimate."

"Will the steel industry be able to obtain the additional labor required?"

"It will encounter less difficulty in this direction than would have been the case three months ago. I favor, however, a modification of our immigration act, which would permit a larger number of workmen to enter this country from those sections of Europe which have heretofore furnished the bulk of labor in our mills. I am strongly in accord with the selective principle, but I believe the country would be benefited by more liberal application of it. Recently the steel plants have been forced to bring large numbers of negroes from the South and Mexicans from over the border, but it would be better for the industry and the country at large if the mills could continue to recruit their forces from the same European sources which have supplied their labor in the past. It is not in the interest of sound economy for one section of the country to take labor urgently required in another section. The negroes should remain in the South."

Institute Statement on Wage Readjustment

The past week has been another period of progress in the abolishing of the 12-hr. day in the steel industry. The principal event was the meeting of the directors of the American Iron and Steel Institute at the Metropolitan Club, New York, Thursday, Aug. 2, at which plans for establishing shorter hours were considered.

At the conclusion of the meeting, Judge Elbert H. Gary, president of the institute, issued the following statement:

"Following the correspondence between President Harding and the Steel Institute, and as a result of the most painstaking investigation, manufacturers of iron and steel, representing substantially the entire industry of this country, will now begin the total elimination of the 12-hr. day and will progress as rapidly as the supply of labor will permit. It is impossible to say when the changes will be completed. It will depend upon labor conditions at respective plants. There will be no unnecessary delay on the part of anyone.

"Where the hours of employees connected with continuous process are reduced from 12 to 8 hours, their wage rates will be so adjusted as to afford earnings equivalent to a 25 per cent increase in hourly and base rates.

"All other workmen will be on 10 hours or less and their present hourly and base rates will be continued; but whenever it is practicable, by promotions or changes in position, the daily earnings wil be accordingly adjusted."

The Wilson Foundry & Machine Co., Pontiac, Mich., has started construction work on extensive additions to its plant. These include the doubling of its assembling plant, where the Willys-Knight motor is produced. The present capacity of its assembling plant is 250 motors per day and this will be increased to approximately 500 per day when this unit is completed, probably around Jan. 1. A new mill room for cleaning castings and a new aluminum foundry are also planned. Yard facilities for handling coke, sand and pig iron are being changed and a crane with a 100-ft. span will be installed to cover the entire iron and scrap yard and also to convey these materials to the five cupolas. In addition to the Willys-Knight motor, which is built complete, this plant makes the castings for the small Overland car, now running between 700 and 800 per day.

Continuity of Policy at Washington

President Coolidge's Attitude Toward Important Questions Affecting Business—To Carry on the Work of Readjustment

BY L. W. MOFFETT

WASHINGTON, Aug. 7.—As a sorrowing nation pauses to pay tribute to Warren G. Harding, one of the best beloved of its Presidents, many here, where Government policies are so large a part of men's lives, are seeking to appraise the significance of the unexpected change in all calculations that has been brought about by his death. It would be presumptuous to forecast what President Coolidge may do in administering the affairs of state in any given case. But analysis of his record and of his temperament gives plain indication that he will be conservative and favorably disposed toward business. It is equally to be expected that he will show like fairness to labor, whether organized or not.

A conspicuous event in the life of President Coolidge, when he was Governor of Massachusetts, no doubt is so deeply graven on the minds of organized labor leaders that they will hotly deny that he is a friend of organized labor. But when Mr. Coolidge summarily broke the police strike in Boston the blow was not directed at organized labor as such, but rather at the attempt of representatives of organized society to desert their tasks and let the forces of disorder take control.

The new President has announced that he will carry out the policies of his late chief. This in itself assures fair treatment to capital and labor and from an international standpoint the maintenance of friendly and helpful relations with foreign governments. The wide difference in the temperaments of Mr. Harding and President Coolidge suggests that variations may be expected in methods of administration. The late President was of benign and gregarious nature, thoroughly enjoyed greeting people, loved peace and in order to maintain it was willing to compromise even to a point which many of his friends thought was extreme. President Coolidge, taciturn as an official, anxious to survey thoroughly and understand a situation before action, is immovable once his mind has been made up.

The Trying Period of Readjustment

Mr. Harding came into office during the trying period of reconstruction. As Mr. Harding sought an "era of understanding," so will Mr. Coolidge, according to those intimately acquainted with him, and it may be expected that he will continue the Harding plan of bringing opposing elements into closer relationship. In his zeal to bring the country back to "normalcy," the lamented President sought to remove any causes of difference with foreign governments, including the late enemy nations. The most important legislation of the past two years was the revision of tax and tariff laws and the act restricting immigration, and the President warmly urged and succeeded in having passed the rural credits laws to aid the farmer. He vetoed the soldier bonus bill, yet it was expected that had he lived he would have approved of the plan of Republican leaders in Congress to grant a bonus to the soldiers at the next session, although it is vigorously opposed by business interests. The attitude of the new President on this matter remains to be seen. One of President Harding's greatest achievements, next to the results of the armament conference, was the cutting down of Government expenditure and the enforcement of economies needed to bring the country to a peace-time footing. His firmness in enforcing this policy was outstanding.

A Business Administration

"Mr. Coolidge will give a business administration," said one who has had an opportunity to give his record a close study. "He has backbone and a stability that is based on common sense and determination to do his duty. He dislikes political blocs, and if it becomes necessary there can be no doubt that he is prepared to come into sharp conflict with them at any time. It is a mistake to say that he is anti-labor."

Greatly as he was respected, there were many who thought that President Harding was too generous in his treatment of the coal and railroad strikes, and it is believed that Mr. Coolidge will adopt a more determined policy in the case of the pending anthracite situation.

Tariff and Taxes

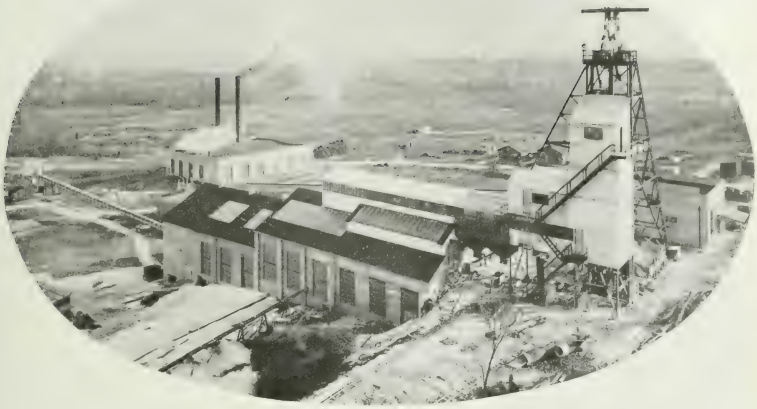
President Coolidge has the view of the New England Republican concerning the tariff. Because of this he is classed as a high protectionist. It is doubted whether he is as sympathetic toward the flexible provisions of the Fordney-McCumber act as was Mr. Harding, at whose behest this departure of tariff rate readjustment was incorporated in the law. The new President has indicated that he favors downward tax revision, though what he may accomplish in this direction at the next Congress is problematical. It is his view that, for the interest of business as well as of labor, the Government should encourage the expansion of the former and in order to do so must not assess excessive taxes against profits, but rather give business an opportunity to reinvest a portion of its earnings. Naturally he is opposed to Government ownership of public utilities, but it is believed he would have no hesitancy in establishing control over the railroads and coal mines if the absence of such action would mean interruption of service to the country.

On the matter of immigration, which some leaders in the iron and steel industry say must be less restricted if they are to be assured of an adequate supply of workers, it is not believed that President Coolidge will be at all inclined to a liberalization of the law. It has been pointed out that he might be willing to see it revised in some respects, but that it is improbable that he will be agreeable, even if he could get the concurrence of Congress, to a letting down of the bars to any noticeable extent. He is an earnest advocate of a strong American merchant marine and favors the ship subsidy bill sponsored by the late President.

A Cabinet Viewpoint

Business interests of the country find assurance in the fact that President Coolidge has an unusually intimate knowledge of the Harding policies. This is due to the plan the late President inaugurated of having the Vice-President attend Cabinet meetings. While in promising to continue the policies of the Administration President Coolidge also asked all Cabinet members to remain, it is quite conceivable that some changes in the Cabinet personnel may take place. It is recognized, also, that it may not be possible for President Coolidge to follow strictly all of the Harding policies, and that his handling of the problems before him will be on his own lines. He is less flexible than Mr. Harding, and temperamentally much more like former President Cleveland. With the determination of a Roosevelt, he is entirely without the latter's crusading spirit. He is confidently expected to be a careful, conservative President who will seek in every way to carry forward without hurt to business the policy of readjustment from war conditions and of relief from war-time burdens.

New and special courses in metallurgy and allied subjects have been announced by the Carnegie Institute of Technology in Pittsburgh.



Mining and Milling of Fluorspar

Preparation of This Mineral, Essential As a Flux in Steel Making, Has Complexities Comparable with Those to Be Found in Manufacturing Plants

FLUORSPAR is fully as necessary a material in certain phases of American steel manufacture as the metal that enters the furnace. Without it, it is doubtful whether basic open-hearth practice would have achieved its dominant position among steel-making methods. Of the entire output of fluorspar, 80 to 85 per cent is used in basic open-hearth and electric furnaces as a flux and detergent and there is no known substitute. Yet until recently it has remained in obscurity and few users have been familiar with the treatment which the mineral must undergo before it is suitable for introduction into the furnaces.

Off hand, it might be assumed that its production would offer no more difficulties than the quarrying and crushing of limestone, another important material used in iron and steel making. As a matter of fact, however, the mining of the ore on a large scale necessitates extensive underground workings and the milling of the mineral after its elevation to the surface has complexities comparable with those to be found in many manufacturing plants. In a broad sense, quantity production of fluorspar for the market is a combination of mining and manufacturing.

Small scale operations which consist merely of quarrying the mineral, have been rapidly disappearing as the available supply of high-grade spar is becoming exhausted. The extraction of the ore and its treatment will become more and more expensive as the necessary investment in equipment increases. Fortunately the fluorspar required in the steel industry, while amounting to a considerable tonnage in the aggregate, is only about 10 lb. per ton of steel produced. Increases in the cost of spar therefore are not likely to become so great as to restrict its use or to materially affect the cost of steel making.

The most recently constructed fluorspar mill in this country is that of the Hillside Fluorspar Mines at Rosiclare, Ill. In its construction and equipment it is as substantial and complete as any steel works unit. Built of reinforced concrete and structural steel, it has a large area of window space in the side walls, as shown above, as well as skylights in the roof. The power house is shown in the left background, the hoist house at the extreme right and mine timbers at the lower right corner. The belt loading conveyor is in the left center. Mechanical equipment, electrically driven, is provided for all milling operations, and the plant is carefully planned so that the material moves in logical sequence, with no unnecessary handling.

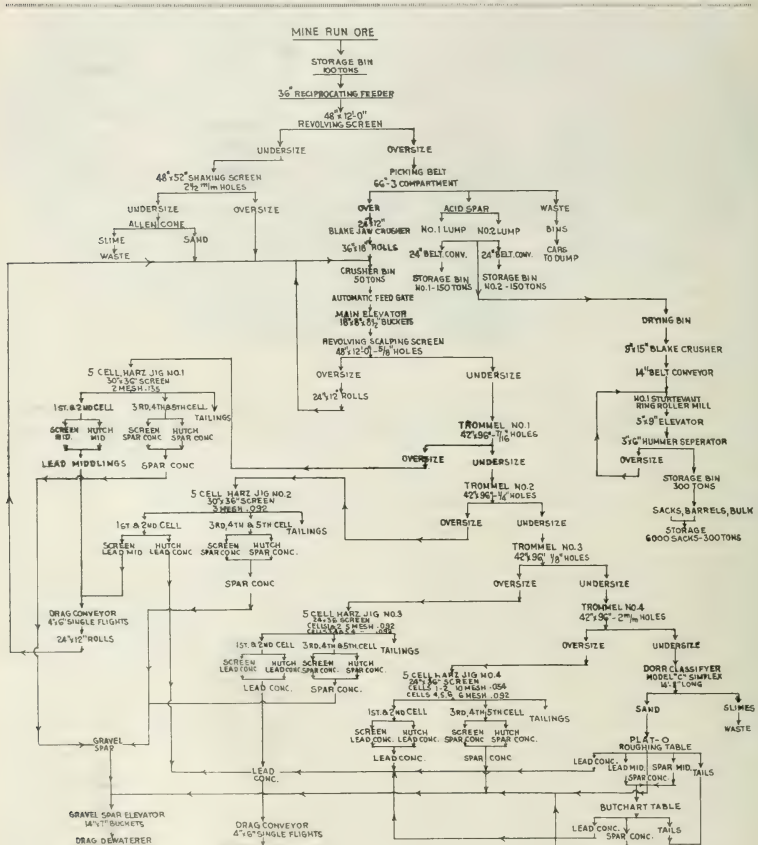
Ore is hoisted from the mine by self-dumping skip to a storage bin which is considerably higher than the remainder of the plant. A reciprocating feeder pushes the mine run ore into a revolving washing screen, from which under-size material is discharged through a launder, or chute, to a shaking screen for further treatment. The over-size material is passed from the screen to a continuous three-compartment traveling steel picking belt. This is located on the top floor of the building where excellent light is afforded by continuous sash and roof lights. Pickers, stationed on each side of the belt, remove the waste rock and throw it into bins in back of them, at the same time placing selected acid or other lump spar in the middle compartment of the belt. The waste hoppers overhang tracks and the waste rock is emptied into small dump cars for removal to the waste dump.

The spar remaining in the two side compartments of the belt is discharged into a Blake jaw crusher, from which it is passed through a pair of crushing rolls into a 50-ton bin. From the bottom of the bin the spar is automatically fed through a feeder to a bucket elevator by which it is carried up and discharged into a scalping screen which takes out the oversize for re-crushing, the undersize passing to the sizing trommels or revolving screens, arranged on an incline, each trommel being a step lower than the preceding one. A

continuous stream of water passes through them, flushing the under-size material from trommel to trommel. The over-size ore is discharged from each trommel through a launder to a jig. The under-size from the final trommel goes through a launder to a Dorr classifier which will be referred to later.

The separation of the fluorspar and lead from the which forces water up through the mass of ore on the screen on the down-stroke of the plunger, and allows the mass to come back to the screen as the plunger moves up.

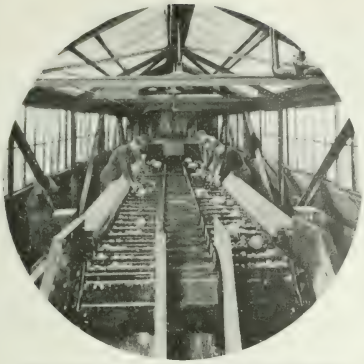
As the grains of mineral on the jig screen are approximately the same size, and as two grains of the same size but different specific gravity will fall at dif-



Flow Sheet Showing the Sequence of Milling Operations

worthless gangue material is accomplished by wet jigging on Harz type jigs. A jig of any type is a device for giving pulsations to a mass of ore which is being treated by it.

In the Harz jig the mass of ore rests on a fixed screen in a box filled with water, and opposite to the screen is a plunger, having an up-and-down motion, ferent rates of speed, the heavier falling the faster, so under the influence of the pulsating plunger the heavy lead and spar grains work their way to the bottom next to the screen and the smallest particles go through into the box below, known as the hutch, from which they can be drawn at intervals. The grains next to the screen form a bed which is drawn off under a

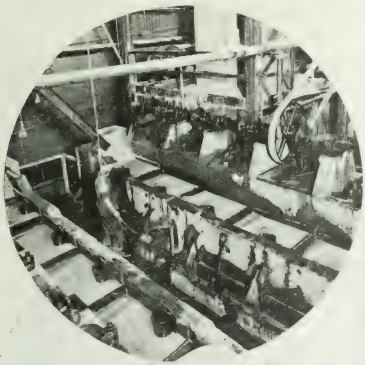


The Picking Belt at the Top of the Building Contains Three Compartments. The waste is picked out of the side compartments and selected acid lump bar is placed in the center compartment

skimmer at intervals, as it accumulates, and the waste material works its way to the top.

On a commercial Harz jig it is usual to have a number of screen and plunger boxes, known as cells, arranged in series, with a slight step or fall below, each cell giving a cascade effect.

The plungers are all driven from a common shaft by a series of eccentrics, and the ore is fed continuously to



Two of Four Jigs Having Five Compartments Each, in which Lead, Fluorspar and Tailings Are Separated

the highest cell, which extracts part of the valuable minerals and passes the remainder over a tail board or partition to feed the next cell, which also separates part of the valuable minerals, and passes the remainder to the next cell and so on until, at the tail of the last cell there are not enough valuable minerals for further jigging and it is discharged as waste, or tailings. In the Hillside mill there are four sets of Harz jigs, each served by its respective trommel, and each jig has five compartments or cells. These jigs are of concrete construction.

The lead, being the heaviest mineral, is removed first, and this is done on Richards pulsator jigs, of which there are four arranged ahead of, and in tandem with, the Harz jigs.

These jigs have no plungers and the pulsating movement of the water in the jig is accomplished by a rotating valve which interrupts the flow of a stream of water, furnished by a tank, thereby giving a series of rising and falling movements to the material on the screen. The Richards jigs receive the entire stream of feed from the trommels and take out the lead concentrates, and pass the rest of the material to the Harz jigs, which remove the spar, discarding the calcite and limestone as tailings.

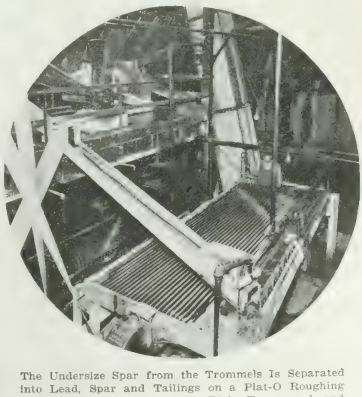
Not all the lead concentrates are clean enough to go to the storage bin, and part of the coarsest contain too much spar and must be recrushed to unlock the values. These middlings, as they are called, are passed to an elevator which discharges into a small trommel. The over-size from this trommel feeds a small pair of rolls, the product from which passes to the elevator and



Row of Four Trommels for Jig Sizing. From these trommels even sizes for each jig are obtained, thereby insuring satisfactory concentrating

back to the trommel. The screen products from the lead trommel are laundered to the Richards jigs taking the finer sizes of feed. The lead concentrates are dropped into boxes and wheeled to bin for storage.

The spar concentrates from the Harz jigs are laundered to an elevator which discharges into a drag de-waterer. After de-watering, the concentrates, known



The Undersize Spar from the Trommels Is Separated into Lead, Spar and Tailings on a Plat-O Roughing Table, which Is Shown in the Right Foreground, and Later on a Butchard Table, which Is Shown Below to the Left



An Electrically-Propelled and Operated Shuttle Conveyor at the Top of Concrete-Covered and Drained Storage Bins Delivers Spar into the Various Bins as Required



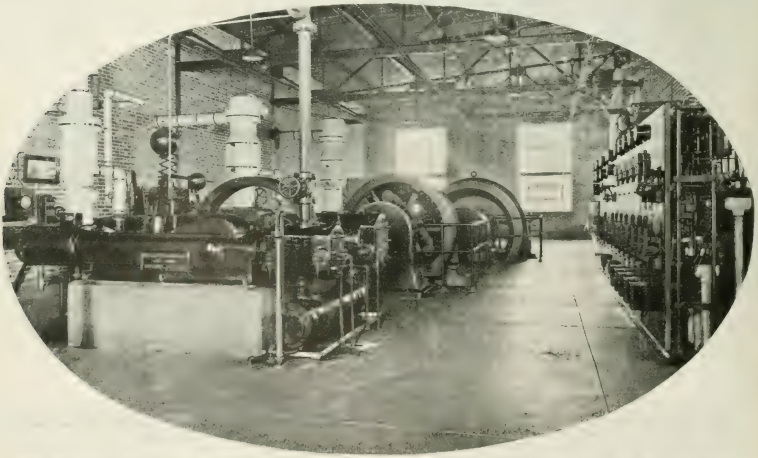
Underneath the Concrete Storage Bins Are Hoppers by Means of which Spar Is Passed Through the Distributor, Shown in the Background, to the Conveyor Belt for Car Loading. The boy is selecting samples

as gravel spar, are dropped on a shuttle conveyor which is arranged to discharge into any one of a series of storage bins. The bins have a capacity of 150 tons each, and are provided with gates at the bottom from which the spar is drawn off on a belt conveyor. The latter carries the material to chutes alongside the railroad tracks by means of which either box or open cars may be loaded. A boy stationed at this belt collects samples of the material going into a car for chemical analysis. Complete laboratory equipment has been provided and analyses are made of mill run spar heads or feed for the jigs, jig tailings, and gravel spar as delivered from the bins.

The under-size spar from the trommels is handled separately from the material just described. Sluiced through launders to a Dorr classifier, it is de-slimed and de-watered; it then passes to a Plat-O roughing table. This table is rectangular and is set level, the long way, with the deck inclined from the feed side, toward the tailing side. The head motion gives the table a reciprocating movement, lengthwise with a slow forward stroke and sharp return. Narrow riffles lengthwise of the table form channels to hold the heavier minerals which work to the bottom, while the lighter gangue minerals are forced to the top and washed over the riffles by the flow of wash water. The motion of the table carries the heavier minerals toward the discharge and the tailings are washed over the side.

The lead, being the heaviest, comes off in the two of three riffles at the high side and the spar, being the lighter, comes next and, by proper adjustment of the table, the tailings are kept to the low side of the table.

This table, in addition to clean spar and lead concentrates, makes a mixed product of lead and spar, or middlings, which are re-treated on a Butchart table, which operates on similar principles to the Plat-O just described and makes clean lead and spar concentrates.



A Well-Equipped Power House Provides Electrical Power for All Milling and Mining Operations. An air compressor is shown in the foreground, and engines and generators in the rear

The lead is wheeled to the lead bin, and the spar joins the stream of gravel from the jigs.

The preparation of the bulk of the spar milled has been outlined, but thus far little has been said concerning the disposition of the under-size material discharged from the initial revolving screen or washer, or of the acid spar sorted on the picking belt. The under-size from the washer screen is discharged to a shaking screen and the material which fails to pass through the mesh is dropped into the 50-ton mill bin. The spar which passes through the screen is fed to an Allen cone which separates sand and slime. The slime is wasted and the sand is de-watered and sluiced to the main mill bin for further treatment.

The acid spar collected on the middle compartment of the picking belt is separated into grades known as No. 1 and No. 2 lump, and is discharged into a storage bin, from which it is drawn for sacking, or shipment in bulk.

A well-equipped power house provides electrical power for all milling and mining operations. The equipment is as follows: Four Erie City 150-hp. horizontal return tubular, 72-in. x 18-ft. 150-lb. suspended setting, flush front, hand-fired boilers, set in two batteries and equipped with balanced draft by the Engineer Co. Two Cameron horizontal plunger boiler feed pumps, 12 x 6 x 18-in. and a feed water heater furnished by the Hoopes Mfg. Co. A Chuse non-releasing 18 x 21-in. Corliss engine, direct-connected with a General Electric 210-kva. 2300-volt, 3-phase, 60-cycle 200 r.p.m. alternator, and a Chuse non-releasing 23 x 28-in. Corliss engine, direct-connected with a General Electric 450-kva. 2300-volt 3-phase 60-cycle 150 r.p.m. alternator, both units having belted exciters. A switchboard of black slate furnished by the Marquette Electric Engineering Co., Chicago. Two steam-driven Ingersoll-Rand Co. air compressors supply 650 cu. ft. per min., one a type X P V 3 and the other a F. R. I. type 173 F. P. M.

Water used in milling is pumped from the storage pond to a 50-000-gal. tank by two 1000-gal. motor-driven centrifugal pumps. After it has passed through the mill it is returned to a settling pond for re-use.

The Hillside mine is opened on the Rosiclare vein, which is a fissure vein of varying width and depth occupying a fault in the rock formation. The vein is nearly vertical so that shafts must be sunk for mining. From the shafts, drifts are driven in the ore at vertical intervals of 75 to 100 ft. The drifts are generally carried the full width of the vein and 12 to 14 ft. high so that necessary head room for timbering is secured. Stopes of broken ore are then beaten out above the timbering and the ore is drawn off through chutes to mine cars. Pockets at the shaft station are provided into which the mine cars discharge the ore through gratings, known as "grizzlies." Large pieces, too large to pass through, are broken to smaller size with sledge hammers. The ore is hoisted in a self-dumping skip which is loaded from gates in the pockets. The skip is operated by a Nordberg double-drum electric hoist, hoisting a 3-ton skip in balance with a cage. This hoist has cylindrical drums 5 ft. in diameter, hydraulically operated post brakes, and Lilly safety controllers, and is geared through herringbone gears to a 150-hp. 2300-volt General Electric Co. induction motor. The shaft is lined with concrete and has three compartments, two for cage and skip and the other a pipe and ladder compartment.

MOBILIZING INDUSTRY

Plans of War Department Include Effort to Eliminate Profiteering

WASHINGTON, Aug. 7—Plans being studied for the mobilization of industry in case of war have just been published in a pamphlet by the office of Assistant Secretary of War Dwight F. Davis. It is the purpose of the pamphlet to inform business men and the public generally about this extremely important feature of the national defense. It is pointed out that every man, woman and child, every resource and every dollar in the entire nation must throw its weight toward victory in time of war. Industry alone cannot win a war, the Assistant Secretary states, but it can lose a war by failing to supply the armies with munitions, vital to their fighting efficiency.

The Assistant Secretary of War declares that one of the objects accomplished by the plans being prepared will be the elimination of profiteering, the pamphlet stating:

"In this connection the War Department is giving most careful attention to the ways and means whereby profiteering may be controlled in time of war. The principle that the men at home shall not profit from the war, while their fellows are staking their lives and their health for their country, is fundamental as a proposition of common justice."

The Assistant Secretary has explained that the plans are being worked out on a strict business basis and claims that in case of another emergency they would save billions of dollars as compared to the amount wasted in the last war.

The definite requirements of the Army will be carefully figured, in order that no unnecessary articles may be purchased. Standard specifications used in industry will be employed wherever possible. A uniform contract will be worked out, in order to eliminate the chances of fraud and confusion. The plan will also take into consideration the prompt settlement of obligations and the return to normal conditions at the conclusion of the emergency.

Cooperation with the Navy in developing procurement plans will be accomplished by the recently created Army and Navy Munitions Board.

It will be necessary, in time of war, to create an agency similar to the War Industries Board to coordinate the civilian demand with those of the Army and Navy.

In order to prevent competition among procuring branches, facilities requested by them have been tentatively allocated for the purpose of procuring the supplies required. The officers in charge of procurement districts are engaged during the present year in making a survey of establishments required to meet the supply program.

The ordnance procurement agencies are located at Boston, Baltimore, Bridgeport, Conn., Chicago, Cincinnati, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, Rochester, N. Y., San Francisco and St. Louis.

Encouraging Manufacturing

The problems facing the Ordnance Department and Air Service are declared to be peculiarly critical. It is pointed out that in the case of the Ordnance Department the maintenance of war reserves is vital. "While at the present moment we are fairly well off in this connection, 10 years or even five years hence we probably will be in much worse shape, especially in the matter of explosives," says Assistant Secretary Davis. "Weapons of war change rapidly, and it is very difficult to forecast 10 years in advance the types that will be required. It is very unlikely that Congress will ever consent to appropriate in time of peace sufficient money to maintain a war reserve which military men would like to have in order to insure a more rapid mobilization. There seems to be, therefore, but one thing to do in connection with the ordnance problem, and that is to secure sufficient appropriations annually to keep the art of manufacture alive. This will involve placing annually 'education' or 'experimental' orders with selected facilities, furnishing them with the necessary jigs, dies, gages, etc., in order to encourage them to experiment in the manufacture of these non-commercial articles." It is stated that the air service problem is even more critical.

As the planning develops, it is pointed out, critical features will become known and deliberate decisions can be made, the advice and judgment of men of great experience in industries being obtained on questions of major importance.

Accounting for Foundry Overhead Expense

How the Expenses, Other Than Those of Labor and Material, of Core Making, Molding, Cleaning and Annealing May Be Classified

BY F. C. EVERITT AND JOHNSON HEYWOOD*

THE first of the productive departments is melting. It was discussed in detail in the earlier article on accounting for material. Therefore we will jump directly to the core room, whose expense analysis is shown as form 37-9.

The materials used in the core room, such as sand, core oils, compounds, flour, molasses, etc., are not the type of direct materials which will be found in the finished casting, and so cannot be treated the same as iron, which is the real direct material in the product. Usually core materials are bought in such quantities that the charge may be made direct to the department, the charges being monthly debits to the manufacturing expense account. This greatly simplifies the accounting and avoids requisitioning small quantities from stock.

Since a three or four months' supply of sand is purchased at one time, the charge is made to the sand inventory account and the amounts used during each month reported, so that the actual consumption can be charged to the manufacturing expense account and credited to the inventory account.

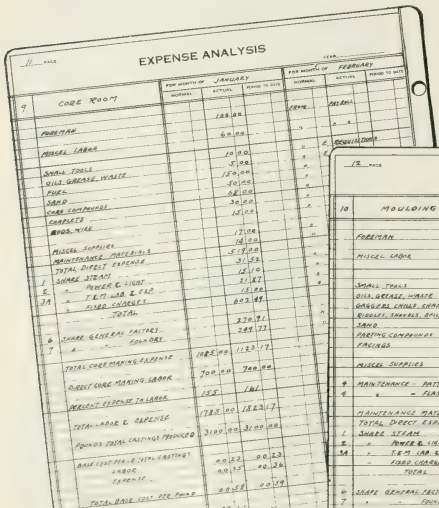
The monthly total for supplies is added to the direct core-making labor. This sum, divided by the total weight of castings produced, gives a base cost per pound, in the same way as was used in determining iron costs. This method is reasonably accurate in foundries making a fairly uniform type of castings or whose castings can be divided into a few classes. It is especially good where one class of castings is made, though instances may arise where an entirely different unit may be necessary. In foundries doing a general jobbing business, care must be used in determining the core cost for the job.

In order to illustrate the workings of the analysis, two ways of arriving at a unit cost are shown:

(a) Percentage of total core making expense to direct labor.

(b) Base core cost per pound of total castings produced.

*Of Miller, Franklin, Basset & Co., New York. Material cost accounting was discussed in the issue of April 26; labor cost accounting in the issue of June 14; and two sections of the discussion on overhead expense accounting were given in the issues of July 12 and July 19.

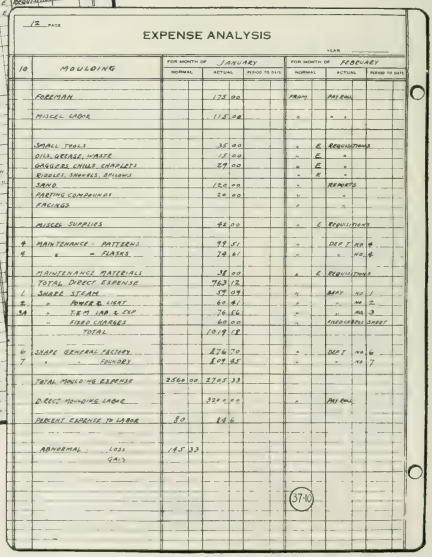

EXPENSE ANALYSIS

9	CORE ROOM	JANUARY NORMAL	JANUARY ACTUAL	JANUARY PERIOD TO DATE	FEBRUARY NORMAL	FEBRUARY ACTUAL	FEBRUARY PERIOD TO DATE
	FOREMAN		120 00				
	MISCEL. LABOR		60 00				
	SMALL TOOLS		10 00				
	OILS, GREASE, WASTE		5 00				
	FUEL		170 00				
	SAND		50 00				
	CORE COMPOUNDS		62 00				
	CHAPLETS		10 00				
	WIRE, NAILS, ETC.		17 00				
	MISCEL. SUPPLIES		16 00				
	MAINTENANCE - MATERIALS		5 18 00				
	TOTAL DIRECT EXPENSE		31 28				
L	SHARE STEAM		5 10				
E	" POWER & LIGHT		21 47				
34	" TEM. AND L. FD.		15 00				
	" FIXED CHARGES		802 45				
	TOTAL		370 81				
6	SHARE GENERAL FACTORY EXPENSE		249 73				
7	" " FOUNDRY						
	TOTAL CORE MAKING EXPENSE	1185 00	1123 17				
	DIRECT CORE MAKING LABOR	700 00	700 00				
	PERCENT EXPENSE TO LABOR	155	161				
	TOTAL-ABOVE & EXPENSE	1785 00	1823 17				
	POUNDS TOTAL CASTINGS PRODUCED	3100 00	3100 00				
	BASE COST PER # TOTAL CASTINGS LABOR	00 23	00 23				
	EXPENSE	00 13	00 26				
	TOTAL BASE COST PER POUND	00 58	00 49				
	ABNORMAL LOSS	38 11					
	GAIN						

(37-9)

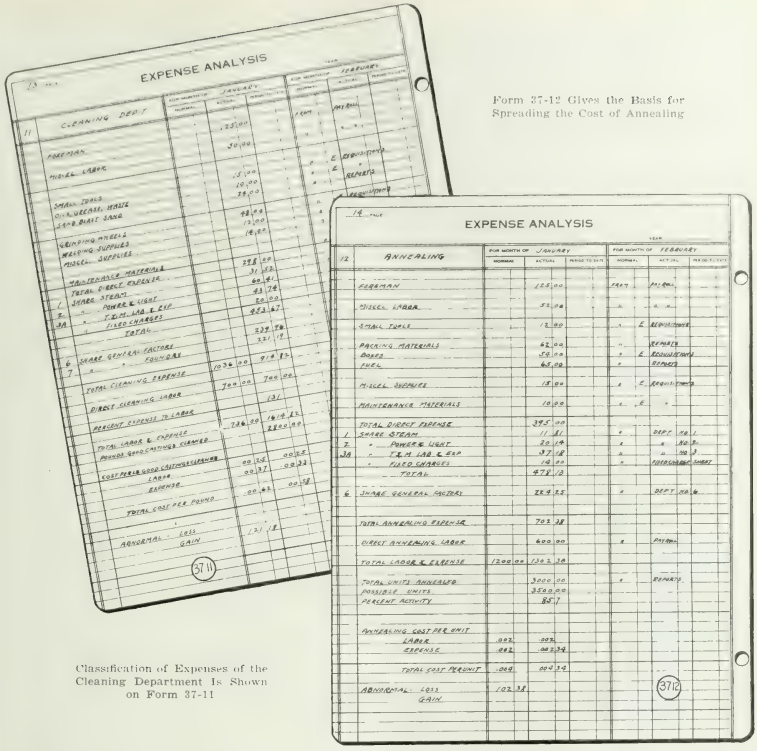
Core Room Expenses May Be Classified as in Form 37-9

Molding Department Expenses Are Analyzed as Shown in Form 37-10


EXPENSE ANALYSIS

10	MOULDING	JANUARY NORMAL	JANUARY ACTUAL	JANUARY PERIOD TO DATE	FEBRUARY NORMAL	FEBRUARY ACTUAL	FEBRUARY PERIOD TO DATE
	FOREMAN		175 00		FROM	PAY ROLL	
	MISCEL. LABOR		112 08		"	" "	
	SMALL TOOLS		35 00		"	E REQUISITIONS	
	OILS, GREASE, WASTE		15 00		"	E "	
	GANGERS, CHAPLETS		27 00		"	E "	
	RUBBLE, SWEEPS, BRUSHES				"	E "	
	SAND		120 00		"	REPORTS	
	PARTING COMPOUNDS		24 00		"	"	
	FACINGS				"	"	
	MISCEL. SUPPLIES		42 00		"	E REQUISITIONS	
4	MAINTENANCE - PATTERNS		99 51		"	DEPT. NO. 4	
4	" - FLASKS		78 61		"	" NO. 4	
	MAINTENANCE MATERIALS		36 00		"	E REQUISITIONS	
	TOTAL DIRECT EXPENSE		763 12				
L	SHARE STEAM		57 09		"	APPT. NO. 1	
E	" POWER & LIGHT		60 41		"	" " 2	
34	" TEM. AND L. FD.		76 26		"	" " 3	
	" FIXED CHARGES		60 00		"	FROM GENERAL SHEET	
	TOTAL		1017 18				
6	SHARE GENERAL FACTORY		276 70		"	DEPT. NO. 6	
7	" " FOUNDRY		209 65		"	" NO. 7	
	TOTAL MOULDING EXPENSE	2500 00	3203 33				
	DIRECT MOULDING LABOR		324 00		"	PAY ROLL	
	PERCENT EXPENSE TO LABOR	80	84 6				
	ABNORMAL LOSS		14 33				
	GAIN						

(37-10)



Form 37-12 Gives the Basis for Spreading the Cost of Annealing

Classification of Expenses of the Cleaning Department Is Shown on Form 37-11

The first method may well be used in a foundry where many kinds of cores are made. It requires reporting the time of the coremaker or the piece price for each core made, in order to determine the direct core making labor.

If the foundry makes, say, radiation only or automobile cylinders only, the core cost may be on the basis of good castings produced. If it makes a variety of castings which can be grouped in classes, the core cost per pound of all castings produced (good and bad) is determined, together with the loss by classification, to arrive at the core cost per pound of good castings.

The molding department expense analysis is shown on form 37-10. Molding sand is one of the most important items listed. It may seem logical to distribute its cost on the basis of the amount of metal poured, since more sand is destroyed through contact with molten metal than from any other cause.

The other items of expense, however, cannot be distributed on this basis, so an extra calculation would be necessary. It is seldom necessary to use more than one basis of expense distribution for a single department. If different methods of expense distribution seem necessary, the department should be carefully divided into two or more smaller departments, so that a more accurate basis may be determined.

Here we prefer to distribute the sand cost with the other items of molding expense. If the direct labor is the basis, it is assumed that the amount of sand used is in approximate proportion to the labor necessary to ram up the flasks. Granted that a small, complicated pattern with backdrafts and undercuts will require more direct labor for a small amount of sand than would a large, simple pattern, requiring a greater amount of sand. But experience shows that the error involved by such variations is too small to worry about, when the big saving in clerical effort is considered.

In a jobbing foundry, the amount of molding labor must be reported for each job and a share of the department expense added to give the labor and expense cost. If the castings can be classified into a few groups the method is greatly simplified, because a pound cost can be determined for each classification. This application is quite correct and can invariably be applied where the molding is on a standard product, but with the general run of jobbing work few foundries will lend themselves readily to classification of castings and the method which will fit the local conditions best must be applied.

In a foundry where the helpers are employed continually with the same molders, their labor is unquestionably direct, but if molders' helpers serve molders, wheel in sand, etc., their labor is non-productive and therefore a part of the expense of the department. This simplifies the collection of labor costs and still keeps within the range of practical accuracy. Charging this labor to expense should not be done offhand, as it may lead to an unbalanced distribution of the expense. It is far better to re-classify the labor into definitely assigned tasks where possible.

If a foundry is so equipped that there are several classes of molding, it may be desirable to divide the

molding department into two, three or four sub-departments. If a large part of the product is made on molding machines which are served constantly by an overhead crane, this portion of the molding floor must be set up as a sub-department with the molding cost spread on the machine hour basis. Bench work, combined possibly with light floor work, should constitute another sub-department, and so on.

In a large plant the equipment of the cleaning department—form 37-11—may be so extensive and varied that it may be necessary to classify it and divide the department into sub-departments. The equipment may consist of a battery of rumblers or tumbling barrels, a battery of sand-blast units, a group of grinders and chippers, etc. The class of castings made will also affect the need for further sub-division of the cleaning department. If the castings are fairly uniform, subdividing the department may be unnecessary; but with a wide variety, several sub-divisions may be required. This is evident when we consider cleaning a 1000-lb. casting with pneumatic chipper and sand-blasting, possibly scratch brushing, requiring an hour's time as compared with a 300-lb. casting of a higher finish, with ornamental details, needing more careful handling, which also requires an hour's time to clean. If the rate per hour be 60c., the 1000-lb. casting would show a labor cost of $0.06 per 100 lb. and the 300-lb. casting would cost $0.20 per 100 lb. The malleable foundry would need separate departments for soft iron cleaning and hard iron cleaning.

The cleaning cost of a uniform product such as radiation or straight stove plate is comparatively simple, merely a total cleaning shop cost per unit per pound. It may be necessary, however, to consider breakage loss with the different classes of castings, and arrive at a cleaning cost by classification.

In the large foundry there is a better opportunity for classifying the labor so that it is grouped into definitely assigned units, but in small and even medium-sized foundries, it is not uncommon to find part of the cleaning shop labor used in the foundry to help pour off. When this is done, care should be taken to record such labor transfers so that the proper credit may be given to the cleaning department payroll and the amount charged to the miscellaneous labor in the molding department. This is not necessary when conditions permit organizing the labor into molding, pouring, shake-out and cleaning groups. It is the use to which labor is put which determines how and where the charge shall be made.

While in the typical gray-iron foundry which we are describing there would not, of course, be an annealing department, we shall describe the procedure in such a department for the benefit of those needing it, as it brings up some new and difficult problems.

To find a basis for spreading the cost of annealing as gathered on form 37-12, however, presents a problem very different from those which have been previously considered. Usually the cost of annealing is incorrectly determined.

Whether the product is uniform or varied, if it be found possible to pack the castings in the annealing pots so that a uniform packing weight of, say, 800 lb. can be regularly maintained, there is little question as to the reliability of the straight "cost per pound to anneal" basis. But if, because of variation in the class of castings annealed, it is impossible to maintain a uniform packing weight and the weight packed varies, say, from 500 to 800 lb. per pot, the cost per pound basis will not give correct annealing costs.

Let us show, first, the fallacy of the cost per pound basis. Assume that ten castings of one kind weighing 30 lb. each can be packed for annealing in each pot. The labor and expense for the month amounts to $1,302.38, which for 300,000 lb. annealed, gives a cost per pound of $0.00434.

Now, assume a second lot of castings weighing 30 lb. each, but of a shape and construction which will permit only five castings to be packed in one pot. That means that the same amount of space in the annealing ovens will accommodate but 150,000 lb. of castings with practically the same labor and expense. These castings may be more difficult to pack and require the same amount of time as the first lot. The cost in this case will be $0.00868 per lb. to anneal.

Let us now assume that we have filled the same annealing space with half of each lot of castings. In this case we can anneal:

First lot of castings	150,000 lb.
Second lot of castings	75,000 lb.
Total	225,000 lb.

The cost will now be $0.0058 per lb. to anneal.

This last cost figure is an average pound cost for the two lots of castings, but is not correct for either lot for it makes one lot of castings carry too large a proportion of the cost and the other too little.

The correct method is to give a unit value to each casting and spread the overhead at so much per unit.

The first lot can be packed 10 castings at 30 lb. each in a pot. We may, therefore, establish a "space pound unit" which makes each one of these castings represent 30 units. In the second instance, only five castings at 30 lb. each occupy the same space. Therefore, the unit for this lot of castings will be double, or 60 units per casting; 300 units of either casting can be packed for annealing in one pot.

The true cost of annealing is figured on the unit basis like this:

First Lot:		
Units per casting	30	
Units per pot	300	
Number pots placed	500	
Total units	150,000	
Second Lot:		
Units per casting	60	
Units per pot	300	
Number pots placed	500	
Total units	150,000	
Total units placed	500,000	
Unit Cost Calculation:		
Total annealing labor and expense		$1,302.38
Total units annealed		300,000
Annealing cost per unit		0.00434
Figuring the annealing cost for castings from the		
First Lot:		
Castings, units each	30	
Cost per unit	0.00434	
Cost to anneal each casting	0.1302	
Weight each casting		30 lb.
Cost per lb. to anneal	0.00434	
Second Lot:		
Castings, units each	60	
Cost per unit	0.00434	
Cost to anneal each casting	0.2604	
Weight each casting		30 lb.
Cost per lb. to anneal	0.00868	

If the standard unit value of each casting is correctly determined the castings may be packed in any way, and the correct cost of each easily figured. The method will cover any foundry or any class of castings, without the necessity of classifying the castings. The cost should be determined on the basis of total units annealed, reporting with every heat the number of units good and the number of units bad, to arrive at a percentage of loss.

Most foundries operate a machine shop. If small, a single expense analysis only would be needed. If large, the machine shop would have to be divided into a number of departments. It would, in fact, require as comprehensive a cost system as does the foundry. Since we are in these articles describing only the method of determining foundry manufacturing costs we shall give no space to the machine shop. For the same reason we shall not discuss selling costs for they have nothing to do with manufacturing.

We have laid the greatest stress on the cost side of accounting. It should be noted, however, that the method described ties in with the general books of account. It is, in fact, merely an analysis of the figures developed by the accounting system in such a way as to throw light on costs.

We have not shown in detail how this system ties in. To do that would require a sizeable book rather than a few short articles. The method of combining the two methods should, however, be evident to any capable accountant. To tie in the costs to the general books is advisable for it gives a constant check upon the reliability of the cost figures.

No Liberalization of Immigration Laws

Outlook Is That Congress May Tighten Present Provisions —Selective Methods Are Being Given Careful Consideration

WASHINGTON, Aug. 7.—Efforts looking to the liberalization of the 3 per cent immigration law apparently will be futile. While for a long time the sentiment of the country seems to have been directed against any further letting down of the bars, large employing interests have been urging that this is necessary if relief is to be obtained from the shortage of labor. Easily the iron and steel industry is one of the outstanding examples that typifies this situation. With plans now actively under way for the elimination of the 12-hr. day, the problem of the industry has become increasingly difficult. The fact may as well be faced, however, that no matter how plausible may be arguments to relax the immigration laws, every indication appears to point toward the improbability of such action by Congress.

Selective Immigration Favored

The truth of the matter is that the tendency is toward tightening the law. There can be no doubt that industrial interests as a class have become thoroughly convinced of the need of selective immigration, though on a more generous basis than now is allowable, but running counter to this view is that of administration officials and many members of Congress, and President Coolidge is expected to continue the Harding policy on this question. Because of this it would be wide of the mark to charge propaganda of organized labor with complete responsibility for restrictive legislation enacted and which perhaps is in prospect. No doubt, it is pointed out, the active campaign that always has been carried on by organized labor for the limiting of immigration has been effective to a substantial degree, but likewise it is held to be true that organized labor found a strong public sentiment back of it in the past for a certain degree of restriction, though this does not imply that approval was given to the insistence of organized labor upon the so-called literacy test. Rather, it is maintained, the country as a whole saw that under previous laws many of the immigrants constituted a hodge-podge that was excessive in quantity but lacking in quality. It was contended that while this did afford a greater source from which to draw laborers, relatively the supply was small for either the factory or the farm, with the result that a large number of undesirables were thrown upon the country, many of them willingly disposed of by their native lands.

Conference Board's Recommendations

The National Industrial Conference Board in a recent report on "The Immigration Problem in the United States" surveyed at great length the present 3 per cent law, in which it urged many far-reaching changes and improvements, but it went on record in favor of consideration of the human side of immigration and declared that a selfish economic attitude alone will not serve. It treated the subject from an extremely broad point of view and took into account national and international social questions as well as economic progress. It also pointed out that injustices and inconsistencies arising from imperfect administration should, if possible, be avoided in the future and went on to say that the State Department and Department of Labor do not work in harmony. It urged more careful selection through the issue of passport visés.

The report on these points appears to accord with recommendations of Secretary of Labor Davis, who now is abroad studying immigration law and with the report just made to the Department of Labor by Mrs. Muriel Lynch Crichton, who was sent to Europe by Secretary Davis to study details there. It is reported here that Secretary Davis since his arrival in Europe has become even more firmly convinced than ever that the process of selection of immigrants to the United States should originate with American authorities abroad through visés of American consuls, rather than permitting foreign governments to permit indiscriminate emigration from their countries.

Keeping Out Undesirables

Mrs. Crichton in her report made recommendations that are known to meet with the approval of Secretary Davis and which he is expected to attempt to have incorporated in law at the next session of Congress. She said that there must be a selective method of admitting immigrants to the United States to keep out a great many undesirables who could enter under the present quota plan of admission. She goes so far as to say that it appears "as if some governments are sending their social inadequates to the United States to avoid their custodial care." The present method of selection is also held to invite immigrants of a lower plane of intelligence than is necessary to American citizenship. She also points out that too often passports are visèd abroad only to have the alien denied admission at Ellis Island. The result is a hardship on all concerned. Mrs. Crichton favors the setting up of a clearing house abroad and suggests that it might be established at London, where all passports could be visèd and the fact definitely established whether or not the applicant would be admitted. It is the opinion of Mrs. Crichton that if there is any change in immigration legislation, it should be in the direction of tightening rather than relaxing requirements.

Labor from the South

This is taken to reveal accurately the tendency toward the immigration problem. For this reason many iron and steel manufacturers and other employers have reached the point where they no longer are depending upon immigration from Europe as a source of any great labor supply. This already has caused them to turn to Canada, to which country the immigration law does not apply and also to the the negroes of the South and to Mexicans. From these sources the iron and steel industry has to depend mostly on negro and Mexican labor, and there now has developed a large influx of these classes in the iron and steel plants. Curiously enough this class of labor, either native to the United States or at its threshold, is not as well understood by the iron and steel manufacturer of the North as is European labor. It is realized that this understanding involves a social study as to the characteristics of the negro and the Mexican and that before such labor can be brought up to the highest point of efficieny this understanding is necessary. Belief is expressed that these sources will prove to be progressively more important as sources of labor supply to it as time goes on and yet there are those who are inclined to think that both the negro and the Mexican will, unless understood and made satisfied in employment in the North, drift back to the South and Southwest. There has been a great deal of talk, but so far it has never gone beyond that stage, of ironing out the cycle of employment in the coal industry so that the number of employees engaged can be reduced and the surplus placed in the iron and steel and other industries. The iron and steel industry, also, of course, is constantly increasing mechanical efficiency and changing methods of compensation. These exertions on the part of the iron and steel industry manifestly have been due in large part at least to an anticipation that immigration laws not only will not be relaxed but will be tightened.



American Equipment Used in Handling Iron Ore at a Baltic Seaport in Sweden. The car dumper at the left dumps the ore into a transfer car which discharges it into bins at side of track. The bridge grab bucket carries it to storage piles under the bridge, or directly to a boat. The span of the ore bridge is 240 ft.; its overall length is 493 ft.

EXPORTING ORE IN SWEDEN

Bridge and Grab Bucket Loads Ore Into Vessels—American Equipment Used—Labor Saved

American equipment has been adopted for handling Swedish iron ore in a new plant that was placed in operation recently at Oxelösund on the Baltic Sea, near Stockholm. This differs from the mechanical ore handling plants on the Lake Erie ports and at Eastern seaboards in that the equipment is used for loading ore into boats instead of unloading from the boats. The Swedish ore, which is of high iron content, is loaded into vessels of 5000 to 9000 tons capacity for shipment to the United States, England, Germany and other consuming countries. It is stated that this is the only plant in the world that uses a bridge and grab bucket for loading iron ore into vessels.

Shortly before this plant was completed the same interest installed a car dumper for handling ore at Narvik, Norway, 140 miles north of the Arctic Circle. This ore freezes in the car during a large part of the year, but it is stated that it does not freeze to the sides of the cars like American ore and it is dumped out in a solid mass when frozen, and is then broken up with hammers. As Narvik is an open port the year around, owing to the effect of the gulf stream, handling of ore at this point is not suspended during the winter months.

The ore handling plant at Oxelösund, Sweden, was built by the Brown Hoisting Machinery Co., Cleveland, for the Trafikaktiebolaget Grangesberg. The Cleveland company also erected the car dumper in Norway. The Swedish ore handling plant includes a car dumper and ore bridge, both generally similar in design to equipment of this type used in this country, although the car dumper is of smaller capacity than those that are now being built for American use.

The ore is shipped in from the mines in 35-ton cars and from these the car dumper dumps it into a special side-dump transfer car of 50 tons capacity. The latter discharges the ore into bins at the side of a track near the dumper. From these bins the bridge and grab bucket take the ore direct to a boat or place it in storage piles under the bridge. The handling plant will be operated the entire year but the port is open only six months of the year so that during the winter months the ore will be placed in storage to await the opening of navigation. There is storage capacity for 300,000 tons of ore.

The ore bridge has a 240-ft. span and its overall length is 493 ft. At the water end there is an apron to raise and lower over the boat. The bridge is equipped with a man-riding trolley that handles a bucket of 10 to 15 tons capacity, which was especially designed for handling this ore, which is very hard and much of it is in large chunks, or from 6 to 24-in. cubes. Departing from the usual construction the bucket was made with forged teeth for grabbing the ore and it also has a special multiplication to provide greater closing power than is found in the standard type of grab bucket. The plant has a capacity of loading 5000 tons of ore in 10 hr. The entire plant is electrically operated and it requires only two men, an operator and an oiler to operate the bridge.

This plant replaces crude handling methods heretofore in use and is said to result in large savings in labor. Formerly the ore was shoveled by hand from cars on trestles, shoveled from the stock piles into tubs on cars, and the tubs were dumped into boats by means of small cranes.



Closer View of Swedish Ore Handling Plant Showing Car Dumper, Transfer Car and Bins Into Which the Ore Is Dumped. The car dumper used smaller capacity than those now being built for American use

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Still Under the Heavy Hand of War

The untimely death of our great-hearted President is to be reckoned as another of the losses the great war has brought to the American people. The years of readjustment have been in an especial way tragic years for the nation's chief magistrates. Much has been written in the past week of the increasing demands upon our Presidents and of strain beyond the breaking point imposed by duties that make the hours of their work-day nearer twenty-four than eight. But to all this there have been added in these past few years more problems and more difficult problems than any President has had to deal with in an equal period of peace time, not excepting the reconstruction days following the Civil War.

Patiently and with the highest devotion President Harding has given all that was in him to the tremendous tasks of readjustment. He was open to counsel from every quarter and never sought to compel others who were alike responsible to the people to bend to his will. But the war seems to have unfitted this people as well as the peoples of Europe for really human cooperation in the solving of its unparelleled problems. Too many men—and the demarcation has not been on party lines—have been more willing to balk the plans of the Executive than to concede anything of their individual pre-judgments and allow a forward step to be taken.

Had there been such cooperation at home as was given by foreign governments in response to the Administration's appeal at the disarmament conference, the country today would be farther along in the solution of the problems that block its progress.

As it stands, the record of President Harding's administration is one that is destined to be more highly appraised as the people come to a better appreciation of the difficulties that were opposed. It will take time to sharpen the contrast between the President, who gave his utmost without thought of consequences to himself, and the organized blocs of various names which put self-interest above the common good.

"Let us reason together." Though he never so phrased it, that may well stand as the message of President Harding to his countrymen, given in the same spirit that at the end of the Civil War prompted a great leader's "Let us have peace."

Pig Iron and Steel Prices

The question has been asked, What effect will the steady decline of the past three months in pig iron prices have upon prices for rolled steel products? Rather too readily it has been taken for granted in some newspaper comments on the iron and steel market that the course of pig iron is shortly to be duplicated in finished steel. The reasoning apparently is that pig iron is the raw material of the steel maker and therefore that what brings down the raw material will affect in time the finished product in like degree.

As steel makers and most steel buyers know, relatively little of the pig iron that is bought in the market enters into steel. Foundries buy most of the blast furnace product that is made to be sold. Thus the state of the foundry industry has much to do with the demand for merchant pig iron and the price such iron brings in the market. Also, the size of the merchant iron output and its relation to the demand naturally have to do with determining the course of pig iron prices. As nearly all steel producers have their own blast furnaces, they have no direct interest in what foundries and a very few non-integrated producers of rolled steel pay for their pig iron.

There have been times when merchant pig iron, owing to the relation between the supply of such iron and the demand for it, has risen or fallen in price for some weeks, without a corresponding change in prices of rolled steel products. Thus the situation in the past three months —a decline in pig iron and a practically unchanged market for rolled steel—is not without precedent.

Usually the decision to blow out a merchant furnace is not quickly made. There is a stock of ore which it is desirable to convert into pig iron, or there is a connected iron mine to keep going, or there is the hope that the market will turn and

that the cost of stopping—and later starting again—as well as the laying idle of regular employees will be avoided. Some of these reasons have operated in recent months and much iron accumulated before the shutdowns that have now begun in earnest. On the other hand, the large steel companies can make fairly prompt adjustments of output to demand. They have done this in the past sixty days, as ingot production has dropped from a rate of 49,500,000 tons a year to one of about 41,000,000 tons a year. The putting in effect of the shorter day and the present state of labor supply will work against an increase above the existing rate of production.

The familiar fact that pig iron is really bought and that contract prices are not subject to revision presents a contrast with finished steel. A decline in pig iron does not affect business on the books except perhaps to postpone delivery. In steel the maker has a stake in holding prices, since a reduction might involve a much larger volume of sales already made.

Naturally the working out of the law of supply and demand will go far toward determining prices for finished steel in the next six months. The various factors in that situation call for more detailed statement in another article, though it may be said in passing that so far as this year is concerned, present indications are for a fairly stabilized market for rolled products. What is here emphasized is that the pig iron market is a product of causes which are not necessarily attended by like effects in steel.

Steel Works Fact and Fiction

Rose C. Feld spent a night in the open-hearth building of the Gary steel works and later visited two Steel Corporation plants and one of an independent company in the Pittsburgh district. She wanted to know at first hand what the twelve-hour shift means to the workers. Judging from what she writes in the New York *Times*, Miss Feld is a capable woman and fair-minded. This latter attribute has been lacking in many who have attempted to solve the twelve-hour problem by denunciation.

One of the first surprises Miss Feld had was the sight of scores of workmen coming to the plant in automobiles driven by their wives. Another was the discovery she made as she went about watching operations that "the days when a man was stripped to the waist loading everything, carrying everything, pushing everything by hand, are gone." Probably a further surprise came in the information given her by the workers that the twelve-hour shift "isn't hard work, but you've got to be on the job." One of the workers, comparing his job with that of the housewife who doesn't stay steadily around the fire when the food is cooking, observed, "You've got to be around for twelve hours just to watch your pot. You can take a nap for a couple of hours; sure, you can. Your buddy will wake you if anything goes wrong. Just as long as you're there, it's O. K."

Miss Feld's four columns in the *Times* show quite aptly the difference between the facts about steel mill work and the imagining of things that go on in a steel mill by critics who never go near.

Speaking of this latter class, we find in the New York *Herald* of Aug. 3 a letter from Philip Cabot, of Boston, who from that safe and serene outlook makes the wonderful discovery that if the steel works managers knew how to make their furnaces and workers really work, instead of loafing, there would be no twelve-hour problem. Thus:

> In the case of a manufacturer whose administrative staff is old, somewhat ossified and largely automatic the increase in the number of hands and the increased rate paid per hour will increase his cost. But it is a matter of common knowledge that on the twelve-hour shift the men don't work twelve hours. They work about eight hours and loaf the rest, often with the full knowledge and approval of the foreman. He at least recognizes that men won't and can't work twelve hours. In the case, therefore, of the manufacturer whose staff is young, alert, imaginative and capable, ways will be found by better organization and planning of work to get as much work done in eight hours as was formerly done in twelve, so that although the wage rate be increased the labor cost will not rise. In some plants it will even go down.

What have the "old," "ossified" and "automatic" iron and steel metallurgists been thinking of all these years, from Sir Lowthian Bell on down, that they have allowed blast furnaces and open-hearth furnaces to loaf on their reactions? Lazy nature has been taking far too much time at blast furnaces for oxidation of coke, reduction of iron ore, decomposition of CO_2 and decomposition of CO. With proper speeding up of these operations by a "young, alert, imaginative and capable" staff, why shouldn't there be three or four casts for every two that are got now; then workmen wouldn't be kept waiting between tappings, "with the full knowledge and approval of the foreman"!

And if the staff isn't sufficiently "imaginative," just call on Boston.

The Farmer Problem Not New

In the comment in these pages last week on the effort of organized labor to get the farmers to make common cause with it, reference was made to the growing evidence that the farmers are not misled as to the real causes of their present unfavorable position. To speak specifically of the railroad phase of the problem, it will be recognized by the farmers that railroad wages are the important factor in high freight rates and that railroad wages have a connection with wage rates in the industries. It was shown in this department of THE IRON AGE of June 7 that in fixing rates railroad valuation counts for only three-eighths as much as the railroad payroll, a difference of 3.7 per cent in the payroll being equal in dollars to a difference of 10 per cent in railroad valuation or in the rate it is decided the railroads should earn on their valuation. This fact cannot always be concealed from the farmers, and that has a bearing on the permanence of the farmer-labor *rapprochement*.

It would appear that one of the things that make the solution of various problems of today difficult is a widespread impression that it is a new thing, growing out of the war, for us to have these particular problems, and that, therefore, perforce we must apply artificial remedies. It

is not a new thing for us to have problems and it is a fact that some of these derangements do settle themselves.

To go back to some of the things we saw and heard before the war: There was the propaganda of James J. Hill, a man of remarkable foresight, who argued that in a few years we were going to run short of wheat, which would go to a price we could not afford to pay. Probably Mr. Hill thought as clearly as one could think, and he certainly was well fortified with statistical facts as well as with close acquaintance with commerce. Yet today's problem is precisely the reverse. Our wheat producers cannot get enough money for their wheat.

Then there was the recurrent "back to the farm" cry. Every year or two we were being ruined by too many farmers becoming factory or other kinds of workmen. We were going to have more town workmen than we could employ or pay decent wages to, and foodstuffs were going to be so high priced that workmen could not buy them.

Nor is it only since the war that we have been exercised unduly over national problems. Three years before the war we were much excited over reciprocity with Canada. The opponents insisted we were giving everything to Canada. Finally reciprocity won in the United States but—Canada rejected the alleged gift.

Some of these recollections should move us now to avoid growing pessimistic over our problems. We must do what we can, diligently and methodically, to improve matters, but none should be filled with fear that we are going to be overwhelmed with a flood of economic retribution. We are going to get through.

Standardizing and Diversifying

For years there have been two trends in rolled steel and other mill products, one in the direction of increasing the number and one in the direction of decreasing it. The latter trend is the newer.

The matter is of more importance than is ordinarily recognized. Few men realize how many different things the group of works comprising what is commonly called "the steel industry" really makes. Frank Baackes, vice-president of the American Steel & Wire Co., testified in the Pittsburgh Plus case that his company makes 30,000 different things. There are more than a score of different kinds of two-inch pipe. In merchant bars there are variations in shape, width and thickness. Though the statement is not precisely accurate, it is roughly indicative to say that in sheets the number of commodities is the continued product of five factors—the number, respectively, of gages, widths, lengths, analyses of steel and surface finishes. All gages are not made in all widths, nor all finishes in all lengths, but the reference is suggestive.

Some products are familiar to some men and entirely strange to others—jail bar, for instance. There is a nail known as a blued nail, which has been sterilized so that lathers may keep a supply in the mouth.

Altogether, it is probably a fair and certainly not a ridiculous guess that "the steel industry" makes 150,000 to 200,000 different things.

On the one hand, steel enters into almost all kinds of work. It is to the advantage of the users and therefore of the public that the use of steel be facilitated, that steel be furnished in such form as will best serve the numerous and diversified needs of the public. At the same time the rendering of such service is beneficial to the steel industry, helping its growth. On the other hand, unnecessary diversification involves an economic loss which some one, the general public in the last analysis, must pay, in higher cost of manufacture and expense of maintaining individual stocks.

There is an old story of a tribe in Africa which had a word for a cow's tail, another for a horse's tail, and so on, but had been unable to generalize and coin a word simply for "tail." In the current number of *World's Work* Donald MacMillan tells of his little Eskimo instructress giving him names for holes in various things but denying that there could be a generic name, for if there was a hole it had to be a hole in something.

Of course we are much more enlightened than the Africans or the Eskimos; but it has been found that a steel rail is not exactly a steel rail. It is this road's rail or that road's rail, and the same with the intricate piece of mechanism that holds the rail to the tie, known to the uninitiated as "a railroad spike" but to the trade as this engineer's notion of a spike or that engineer's idea of what a spike ought to be. In the agricultural implement works there are likely to be beams and beams, one being a harrow beam, another a plow beam, and so on, when in many cases the diversification is due chiefly to each implement being in charge of a different engineer.

Along such lines as these there has been room for simplification or standardizing, and some good results have been accomplished, but there is room for much more. The various societies have done good work but have much before them.

In the other direction, the possible new customer of the steel industry receives a much more patient hearing than used to be accorded him. The old attitude was: "Here are our sections; which do you want?" The new attitude is: "What is your problem?"

COMING MEETINGS

August

American Institute of Mining and Metallurgical Engineers. Aug. 20 to 30. Quebec, Canada. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

Lake Superior Mining Institute. Aug. 29, 30 and 31. Twenty-third annual meeting, Hotel Spalding, Duluth, Minn. A. J. Yungbluth, secretary.

September

Chemical Industries. Sept. 17 to 22. National exposition, Grand Central Palace, New York.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

German Market Chaotic as Mark Falls

Figures Doubled in Effort to Maintain World Prices — Central European Iron and Engineering Works Busy —Exchange Trouble and German Industry— Payment According to Index Extending

(*By Radiogram*)

BERLIN, GERMANY, Aug. 6.—New prices, to offset the fall in the gold value of the mark, have been announced for iron and steel items. The Pig Iron Association has advanced the price of foundry iron No. 1 to 26,220,000m. per metric ton ($11.99 per gross ton, at 45c. per 1,000,000m.) from 12,960,000m. ($12.51 at 95c. exchange) last week and 4,787,000m. for the two previous weeks ($10.21 on July 23 and $20 on July 16).

Steel ingots have been pegged by the Stahlbund at 31,968,000m. ($14.62), compared with 18,750,000m. ($18.10) last week, and with 7,630,000m. ($16.28) two weeks ago.

Steel bars have jumped to 46,250,000m. (0.94c. per lb.), compared with 18,750,000m. (0.81c. per lb.) last week and with 10,995,000m. (1.05c. per lb.) two weeks ago.

Thin steel sheets have been advanced to 77,102,000m. (1.57c. per lb.) from 31,257,000m. (1.35c. per lb.) last week and with 18,149,000m. (1.73c. per lb.) two weeks ago.

BERLIN, July 24.—In the endeavor to retard the advance of foreign currency against the mark, the Reichsbank is rationing the amounts it supplies to the other banks. The orders have, however, grown to such an extent now that the Reichsbank threatens to take strong action. On one day it went so far as to allot generally only ¼ per cent and gave as the reason that the amounts ordered were in excess of the requirements of the industry. Some import lines, especially for foodstuffs, have received preferential treatment in this respect, in order to insure sufficient foreign supplies. There have been negotiations between the Reichsbank and the other banks to adjust the differences. The authorities are also taking action to insure a greater handing over of part of the incoming foreign exchange to the Reichsbank.

The rationing of foreign exchange has a strong influence on the import trade and has in some industries led to more rigorous terms of payment. Bills are not accepted, as some banks refuse to discount them, and the paper mark cheques are reckoned up to their amount in dollars on the day they are credited by the bank. All inland payments have still to be made in marks but, owing to the forced higher Berlin mark exchange, trade and industry are reckoned with the New York parity instead of the Berlin Bourse on all new contracts. On account of the latest exchange policy of the Reichsbank, some traders in raw material are even reckoning up the paper mark payments of their customers only in relation to the percentage of foreign currency they are able to procure. This of course creates chaotic conditions, as it is impossible to foresee when the full amount will be allotted and at what exchange. A calculation of the ultimate cost is thus almost impossible.

Coal is still rising and iron and steel prices are advanced every few days. The railroad is also increasing the freight rates by 150 per cent on Aug. 1. The large changes that are taking place are reflected also by the development of the various price indices. During the third week in July the cost of living index, for instance, was 28,892 (1914 = 1) which is an advance of 34.3 per cent against the previous week or of 278 per cent compared with the June average. This index, which is now published every week, is extensively used, not only in determining the advance in wages and salaries, but also as a factor in adjusting prices, fees, etc. According to an order of the Minister for Economic Affairs (Reichswirtschaftsminister) official fees are now to be determined by multiplying the pre-war fee with the cost of living index.

Inland Payments in Foreign Exchange

The minister has also issued another order which constitutes a change in the policy of the Government in regard to payments in foreign currency for goods sold to a German customer. The situation created by the rationing of foreign exchange having become a danger to German trade and industry, it is now intended to alleviate this by allowing the exchange received by exporters to be utilized for direct payments to the manufacturer, who has to pay for imports in foreign currency. The order is to remain in force until Aug. 15, and refers only to goods made with foreign material and only to the wholesale trade.

The seller is under the obligation to give the exchange received within two weeks either to the Reichsbank or to an importer who has to be named on a special certificate. The customer has to send this certificate immediately to the Foreign Exchange Office (Devisenbeschaffungsstelle), which controls these transactions. The seller is, however, not entitled to demand such payments, nor can the customer buy foreign exchange for that purpose. The order does not affect the obligation of exporters to hand over part of their received exchange to the Reichsbank.

Mergers Reported

It is reported on good authority that the Linke-Lauchhammer concern is increasing its influence in western Germany by taking a large interest in the Düsseldorfer Eisenbahnbedarf Carl Weyert & Co. (railroad supplies). The linking up of Weyert & Co. would serve as an extension of the car factory of P. Herbrand at Köln-Ehrenfeld (Linke concern) where necessary extensions could not be made, for want of space.

The Badische Motorlokomotivwerke and the Karlsruher Maschinenbau Gesellschaft (engineering works) have concluded a contract for the joint manufacture of motor locomotives with the hydraulic Lentsch gearing for the time these patents are running. The motor works will specialize in the manufacture of the gearing and the Karlsruhe works in the locomotives. The Uerdingen car shop and the Rheinische Stahlwerke are contemplating a merger.

Idle Works in Ruhr

Reports from the Ruhr district state that large sections of the Krupp works are forced to idleness owing to the requisitioning of their coal by the French. The tire mill, the foundries 2 and 3, and the open-hearth works 7, the largest of the Krupp steel works, have had to stop operations. The coal supplies of the Bochumer Verein für Bergbau und Gusstahlfabrikation were also stopped and work had to be suspended. The 20,000 workmen here are employed on emergency work.

Two Austro-Russian companies have just been established to redevelop the trade between the two countries. Prior to the war Russia was one of the principal customers of some of the products of the Austrian iron and engineering industry, especially agricultural machines and implements. The Soviet

Government holds 50 per cent of the shares of these companies; 75 per cent of the capital is paid in by the Austrian partners, and the rest is successively paid by the Soviets out of the profits, of which they receive more than 50 per cent. The Austro-Russian Syndicate, which is financing the companies, is also giving a credit of $1,000,000 to the Soviets. Through these companies there is now the possibility of extensive exports of hardware goods, machines, rolling stock and motor cars from Austria to Russia. The Syndicate includes a number of well-known engineering firms.

Business Good in Poland

The Polish iron and engineering industry is at present well booked with orders, and a great number of engineering firms, especially those producing textile machinery, are mainly working for export. The pre-war production has been exceeded and from the Bielitz district, for instance, 75 per cent of the production is exported. The iron works in Poland are to a great part depending on East Upper Silesia for their pig iron. The works in this district have, however, hardly been able to produce enough for their own requirements, and there has at times been considerable scarcity in other parts of the country.

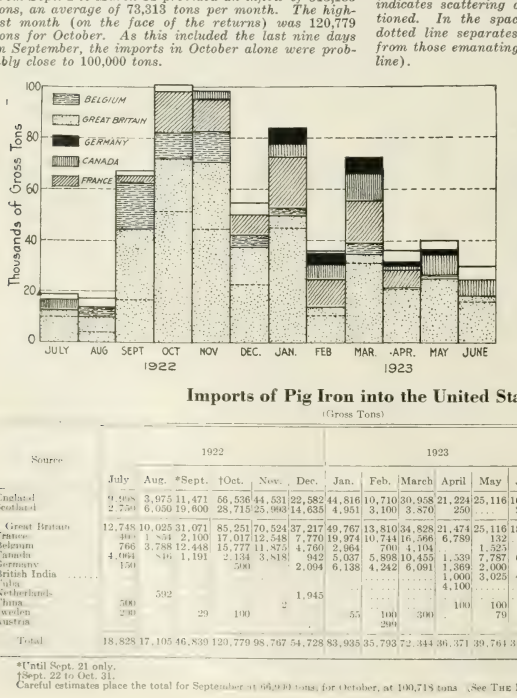
Numerous new companies have been founded in Polish Upper Silesia. Not only German companies having works on both sides of the new German-Polish frontier are establishing new companies on the Polish side, but other foreign capital is also showing considerable activity. Nearly a thousand new joint stock companies have been established during recent years in Poland. The Stinnes concern is also busy in further extending its influence here, but it is reported that legal measures are contemplated to restrict his activities. He seems to use his foreign connections now, which do not fall under the restrictions of the Versailles treaty. He is also endeavoring to gain control of the Oberschlesische Eisenbahnbedarfs Gesellschaft, but it is said that the Polish Government intends to take actions against the numerous non-German firms controlled by Stinnes.

It may be recalled in this respect that this concern acquired the majority of the Upper Silesia Bismarkhütte and the Kattowitzer Bergbau Gesellschaft a few weeks ago, linked them up with the Königs and Laura Hütte and transferred the shares to the Austrian Alpine Montangesellschaft. The latter transaction brought him into closer contact with the Austrian Bosel-Weinmann group, which controls the Skoda munition works, Pilsen. The French concern of Schneider-Creuzot is also interested in the Skoda works, which thus form one of the links between the French and the German concerns.

The Great Pig Iron Inflow of 1922-1923

FINAL figures of the Department of Commerce show imports of pig iron in the fiscal year ended June 30 aggregating 655,286 gross tons. The seven months from Sept. 1 to March 31 provided an inflow of 513,185 tons, an average of 73,313 tons per month. The highest month (on the face of the returns) was 120,779 tons for October. As this included the last nine days in September, the imports in October alone were probably close to 100,000 tons.

In the diagram the monthly imports are shown, together with the countries from which the greatest amounts came. Blank space at top of each month indicates scattering amounts from countries not mentioned. In the space devoted to Great Britain, the dotted line separates imports from England (below) from those emanating from Scotland (above the dotted line).



Although the Import Figures Reported from Washington Show September Tonnage at 46,839 and October at 120,779, These Represent Only Three Weeks of September in the One Case and the Period from September 22 to October 31 in the Other. In the chart, allowance is made for this, September being plotted as 66,900 tons and October as 100,718 tons

Imports of Pig Iron into the United States

(Gross Tons)

Source	1922 July	Aug.	*Sept.	†Oct.	Nov.	Dec.	1923 Jan.	Feb.	March	April	May	June	12 months ended June, 1923	First six months of 1923	Source
England	9,995	3,975	11,471	66,536	44,531	22,582	44,816	10,710	30,958	21,224	25,116	16,050	297,967	148,874	England
Scotland	2,756	6,050	19,600	28,715	25,993	14,635	4,951	3,100	3,870	250	...	2,100	112,014	14,271	Scotland
Great Britain	12,748	10,025	31,071	85,251	70,524	37,217	49,767	13,810	34,828	21,474	25,116	18,150	409,981	163,145	Great Britain
France	406	1,854	2,100	17,017	12,548	7,770	19,974	10,744	16,566	6,789	132	...	95,894	54,205	France
Belgium	766	3,788	12,448	15,777	11,875	4,760	2,964	700	4,104	...	1,525	...	58,707	9,293	Belgium
Canada	4,064	816	1,191	2,134	3,818	942	5,037	5,898	10,455	1,339	7,787	6,505	50,216	37,221	Canada
Germany	150	...	...	500	...	2,004	6,138	4,242	6,091	1,369	2,000	150	22,734	19,990	Germany
British India	...	...	...	...	...	...	...	...	...	1,000	3,025	4,678	8,703	8,703	British India
Cuba	...	...	...	...	...	...	...	...	...	4,100	...	...	4,100	4,100	Cuba
Netherlands	...	592	...	...	...	1,945	...	...	...	...	...	...	2,537	...	Netherlands
China	500	...	...	...	2	...	...	...	...	100	100	550	1,252	750	China
Sweden	280	...	29	100	...	...	55	100	300	...	79	...	863	534	Sweden
Austria	...	...	...	...	...	...	...	299	...	...	...	...	299	299	Austria
Total	18,828	17,105	46,839	120,779	98,767	54,728	83,935	35,793	72,344	36,371	39,761	31,033	655,286	298,240	Total

*Until Sept. 21 only.
†Sept. 22 to Oct. 31.
Careful estimates place the total for September at 66,900 tons, for October, at 100,718 tons (See THE IRON AGE, June 14, page 1717).

MORE FOREIGN INQUIRY

Chinese Inquire for Sheets, Tin Plate and Wire Shorts and Japanese for Black Sheets—British Prices Lower

NEW YORK, Aug. 7.—What is probably a temporary improvement in buying has been evident from Chinese merchants, and Japanese merchant inquiry has also revived slightly in the past week. Chinese buyers continue active in purchases of wire shorts and the surplus of shorts that was being offered for export in the United States a few weeks ago, as a result of the Chinese refusal to pay the prices asked, has apparently been considerably reduced. Besides wire shorts, Chinese buyers are inquiring for some tin plate and for small lots of corrugated, galvanized sheets in crates. One exporter dealing with the Far East reports a recent order for 1000 boxes of 14 x 20 in. tin plate, of 100 and 118 lb. weight. Despite this revival of activity in buying by China, exporters generally consider it only temporary in view of the unsettled political conditions.

Japanese merchant inquiry has also shown a slight improvement in the past week, but few orders have as yet been booked. The present activity is largely for light gage black sheets, and a number of inquiries is reported ranging from 50 tons to 300 tons. One Japanese export house reports an order for about 100 tons. At present the sheet market in Japan shows slight signs of improvement but prospects of transacting any large business at present are considered somewhat remote by Japanese purchasers, as shipments of black sheets from the United States, purchased several months ago at about $95 per ton, c.i.f. Japan, are beginning to arrive, while the present American market price is said to range from $106 to as high as $115 per ton, c.i.f. Japanese port, with British prices far lower.

A part of the present interest in American sheets is attributed to the fact that many of the British mills which have been supplying tonnages for the past few months are unable to promise early enough delivery, although their prices are still several dollars under the American market. British sellers of tin plate are also quoting lower prices, the American quotation generally averaging about $6.40 per box, c.i.f. Japan, compared with the British price of about $6 per box. On the recent order of the Nippon Oil Co. of 18,000 boxes, which was awarded to a British maker, it is stated that the maker promised that the quality of the tin plate furnished would be improved by using one pass cold-rolled sheets for tinning. That this will eliminate all difficulties is apparently doubted in some quarters, as it is claimed that one of the principle objections to Welsh tin plate has been brittleness when used in making cans.

In addition to the merchant inquiries for black sheets that are pending there is the tender of the South Manchuria Railway Co., for furnishing 130 sets of manganese steel frogs and switches and a tender from the City of Osaka for 30 sets of frogs and switches for the municipal tramways. No inquiries of any size for rails are reported.

Foreign pig-iron continues too high to be profitably imported at the present domestic market. A recent quotation on an English foundry iron analyzing about 3 per cent sil., 0.05 sul., 0.5 phos. and 0.5 to 1 per cent mang. was $28.50 per ton, c.i.f. North Atlantic port, duty paid. The uncertainty of political conditions in Europe is somewhat of a deterrent to lower quotations by French and other Continental furnaces, but importers are continuing negotiations for continental iron and claim that there is a possibility that lower prices may be obtained before long.

FRENCH MARKET QUIET

Pig Iron Production Increases, but Coke Situation Still Acute—Prices Firm

PARIS, FRANCE, July 27.—The market continues unchanged, awaiting future developments. Prices are maintained, no increase being noted except for pig-iron and semi-finished material. Domestic demand has increased slightly. The general industrial situation is greatly influenced by the international complications, and, although a greater development of export trade is permitted by the low value of the franc, this is offset by the increased cost of raw materials and machinery, which must be purchased in countries with high exchange.

Prices are strong, partly because demand is heavier and partly because the coke price is to be increased 5 fr. per ton from Aug. 1. Moreover, there is some doubt that coke stocks will be satisfactorily refilled in the fall.

Coke.—From July 1 to 12, 44,000 tons of coke were received from the Ruhr and from July 12 to 20, 12,000 tons. The weakness of arrivals is attributed not to a scarcity of supplies but to the slow operations in getting them out of stock. Should this situation continue, the July total will only be 80,000 tons, or half the June deliveries.

As a result of the slight increase in the cost of German coke and French coke (made from British and Dutch slacks) it has been decided to increase the per-equation price 5 fr. per ton for August. The maintenance for August of the minimum percentage of distribution of July (that is 55 per cent of the entire works consumption) could not be undertaken because of restocking supplies. Nevertheless, it is hoped that an average of 40 to 50 per cent can be reached.

Iron Ore.—Pig-iron production having been increased, consumption of iron ore is larger, but still on a rather small scale. However, exports have been good, especially to Belgium.

In South Wales, tests of recent shipments in Briey iron ore are being continued; it is reported with satisfactory results. Imports by Scotland of Briey iron ore have been reduced to practically nothing as a result of the stoppage of industry. Transactions with Middlesbrough have also ceased.

No business is contemplated with the United States until the time that French requirements in coal have become so urgent that imports from America must be resumed. Prices continue on the same level: Briey ordinary (35 per cent of iron) is quoted at 15 to 16 fr., according to tonnage involved.

Pig-Iron.—The pig-iron output is increasing slowly. Consumers until recently have not been able to place any contracts, August quotations not being known. There is a slight change in the prices for domestic transactions: No. 3 P. L. varies from 390 to 420 fr. per ton at works, according to the area. Offers from Lorraine works are few; 390 fr. (French currency) was quoted in Antwerp for chill cast foundry pig-iron No. 3, and 385 fr. for ordinary basic pig-iron. In hematite pig-iron, 420 to 440 fr. is quoted at furnace. British hematite pig-iron is quoted c.i.f. Antwerp at 110s. and about 500 fr. in the Parisian area, a difference of 50 fr. with the French product. Consequently, transactions in British hematite pig-iron are rare.

Semi-Finished Material.—Business is more active in semi-finished products, some fairly large orders having been booked. The following prices for domestic trade are generally quoted per 100 kg. on basic material:

	Fr.
Ingots	45 to 48
Blooms	48 to 52
Billets	53 to 55
Largets	55 to 57

Lorraine works have quoted blooms, f.o.b. Antwerp (Belgian currency) at 600 fr. and billets at 625 to 635 fr.

Beams.—Demand from the building trades is small. Former prices, 56 to 57 fr. per 100 kg., base, at works, are still maintained. For export, Lorraine beams are quoted at approximately £7 10s. per ton, which is 585 fr. (French currency) f.o.b. Antwerp.

Rails.—Very few transactions are reported. An order for 2000 tons of 55-kg. sections has been awarded to the Société Normande de Métallurgie by the State railroads, at 539 fr. per ton, delivered Batignolles.

Rolled Products.—Prices continue firm, but demand has not improved. Works refuse to accept contracts for delivery after August. Prices range from 57.50 to 61 fr. per 100 kg. at works. For export, f.o.b. Antwerp, Lorraine bars have been offered at 610 fr. (French currency) or 740 fr. (Belgian currency).

Sheets.—Inquiries have been made for sheets, and a few orders are reported, but prices are unchanged. The following prices per metric ton are quoted by Lorraine mills:

	Fr.
Heavy	640 to 700
Medium	800 to 850
Light	900 to 1,000

Indiana to Join Fight on Pittsburgh Plus

Governor W. T. McCray, of Indiana, has authorized U. S. Lesh, attorney general, to confer with the attorneys general of other Middle Western States who are planning to appear before the Federal Trade Commission in the interests of the abolition of the Pittsburgh base method of selling finished steel. The governor stated that he was opposed to the Pittsburgh base practice, but that Indiana's cooperation in an effort to stamp out that method would depend on Mr. Lesh's report on the conference. Both houses of the 1923 Indiana legislature passed concurrent resolutions voicing opposition to the "Pittsburgh plus" plan, but owing to the failure of the resolutions to be sent forward for engrossment, they do not appear in the published acts of the year.

Almost coincident with Governor McCray's action was the organization of an executive committee to represent the States of Illinois, Wisconsin, Iowa and Minnesota in the preparation of evidence to be presented before the Federal Trade Commission. The body, which was formed at a meeting held at Chicago, includes the following: B. S. Baker, treasurer, Kewanee Boiler Co., Kewanee, Ill., chairman; Herman L. Ekern, attorney general of Wisconsin, secretary; Ben. J. Gibson, attorney general of Iowa; Clifford S. Hilton, attorney general of Minnesota; Robert Scholes, Peoria, Ill., attorney and State representative.

The discussion at this meeting largely concerned the effect of Pittsburgh plus upon the farmer. Burton F. Peek, vice-president Deere & Co., Moline, Ill., and a member of the War Industries Board during the war and chairman of the Industrial Board in 1919, presented statistics to show the increased cost of farm machinery attributable to the Pittsburgh base practice. These figures were tabulated when the freight rate between Chicago and Pittsburgh was $7.60 a ton instead of $6.80 as at present, and he asserted that they should accordingly be reduced.

His statistics were as follows: Riding cultivator, $1.23; mower, $1.28; disk harrow, $1.89; corn planter, $1.93; sulky rake, $2.60; grain drill, $3.06; gang plow, $3.61; tractor plow, $6.26; corn binder, $6.88; grain binder, $6.98; tractor, $19.80.

Farmers' Meeting in Salt Lake City Against Pittsburgh Plus

At a meeting held at Salt Lake City, Utah, last week, the Western States Region of the American Farm Bureau Federation indorsed the fight being waged against "Pittsburgh plus" and decided to ask the governors of the respective states included in the region to instruct their attorneys general to join with mid-west attorneys general at a meeting which will be held at Chicago in September for the purpose of formulating a plan of action for intervention in the case now before the Federal Trade Commission. The date for this meeting has not yet been set and no invitations have yet been sent out. Governor Mabey of Utah has already authorized the attorney general of that State to participate in the conference. The Western States Region of the American Farm Bureau Federation comprises all states west of and including Montana, Wyoming, Colorado and New Mexico.

Chairman Topping Regards Steel Trade Prospects as Favorable

The Magazine of Wall Street will have in its issue of this week an interview with Chairman John A. Topping of the Republic Iron & Steel Co. He says that both business sentiment and demand have improved in the past month and further improvement seems probable. Steel operations for July were in excess of expectations, the volume of orders having exceeded the total for June.

"Aside from the encouragement of an improved demand for iron and steel, general business, measured by the usual trade indices, also shows continued activity, as is evidenced by the trade reports of the mail-order houses and retail stores and railroad reports of freight-car loadings, all of which indicate that consumption has not been materially affected."

In spite of the Ruhr situation, Mr. Topping takes a hopeful view of the business outlook here, seeing there is no unemployment, but rather a scarcity of labor; that wages are high and the purchasing power of the people not seriously impaired. He considers business fundamentals no less sound than they have been. "In fact, conditions have improved rather than otherwise, inasmuch as crops were in prospect during the first six months of the year, whereas now crop figures can be more accurately measured by the harvest under way. Money is cheap and abundant, speculation in the commodity markets is absent, stocks are normal and in some cases sub-normal."

As to the steel industry, operations are close to 80 per cent of capacity, and under existing conditions of labor supply, taken in connection with the elimination of the 12-hr. day, no increase in output beyond this level can be reasonably expected. This change in working schedules by the iron and steel works of the country, notwithstanding statements to the contrary, will mean an increase of substantial proportions in cost of production, and ultimately these increases in cost must be reflected in selling prices.

As heretofore, industry generally will continue its efforts to lower costs by the introduction of any device or process suggestive of greater economy or saving in labor, but in view of the strides already made in this direction by the steel industry in particular, it is not likely that sufficient additional labor-saving devices can be brought into use to more than partly offset increased cost, and it will require time and study to accomplish this.

Mr. Topping considers that the present restrictions on immigration produce a serious problem. "Unless relief is soon granted our resources cannot be fully developed, nor can the requirements of the country be met for increased production in all directions."

Increased Stocks of Pig Iron in Alabama

BIRMINGHAM, Aug. 7.—Stocks on Alabama blast furnace yards increased 35,000 tons in July owing principally to hold-up orders. Stocks on yard July 1 and Aug. 1 were: Foundry, 29,000 and 57,000 tons; machine cast, 5600 and 12,000 tons; warrants, 800 and 1500 tons; basic, 13,000 and 13,200 tons; total, 48,000 and 84,000 tons.

The Equitable Equipment Co., Inc., 411 Whitney-Central Building, New Orleans, has completed a purchase from the Santa Fe Railroad of approximately 16,000 tons of relaying rails, varying in size from 52 to 60 lb.

A 10-ton ore handling bridge will be installed at Ougree, Belgium, for the Societe Anonyme d'Ougree-Marihaye, by the Brown Hoisting Machinery Co., Cleveland. It will have a 110-ft. span and an overall length of 214 ft.

The Tropenas Co., 25 Broadway, New York. has been awarded the gold medal for its exhibition of side-blow converters at the Rio de Janeiro Centennial Exposition.

ASSIGNED COAL CAR CASE

Petition to Reopen Made by Youngstown Sheet & Tube Co.

WASHINGTON, Aug. 7.— Reopening of the assigned car case was asked of the Interstate Commerce Commission in a petition of the Youngstown Sheet & Tube Co., Youngstown, made public yesterday. Like other steel interests owning private cars to haul its coal, the Youngstown Sheet & Tube Co. strongly urged reopening of the case and there is a growing belief that the request which has been made with great earnestness will be granted.

The Sheet & Tube petition points out that the company owns approximately 10,500 acres of coal land in Pennsylvania and 4500 acres of coal land in West Virginia and owns 1300 standard steel hopper bottom coal cars. It is maintained that the effect of the order of the commission will be to deny to the company absolutely the use of coal cars to the extent that the placement of cars at its mines will exceed the pro rata share of railroad system cars to which other mines in the same district shall be concurrently entitled.

"In no other instance in the entire history of the regulation of interstate commerce by the Interstate Commerce Commission has so important an order so vitally affecting important interests of shippers or receivers of traffic been made upon a record so devoid of evidence disclosing the circumstances and conditions of the transportation, traffic and business affected," says the petition.

The petition says that the company considered it unnecessary to ask for a hearing when the question was taken up originally because no attacks had been made against the propriety of the use of privately owned cars and that also the investigation was made upon the commission's own motion.

Replies of coal interests combat requests made by railroads and owners of private cars for a reopening of the case. Opportunity was afforded, the Southern Ohio Coal Exchange attorneys said, for everyone to come forward and present evidence that bore upon the matters under investigation, including private cars.

"We submit that under such circumstances the prayers of these great corporations for an opportunity to present merely cumulative evidence on the subject of private coal car ownership is a belated wail, and not worthy of serious consideration by the commission," says the Southern Ohio Coal Exchange answer. "Private car owners, as a whole, were adequately represented at the hearing, on brief and in argument. On the brief filed in behalf of private car owners and considered by the commission, the names of 19 companies owning private cars appear, and in the aggregate they own about 16,000 private coal cars. On argument counsel stated that the total investment by the companies he represented was not less than $30,000,000. In addition to this counsel for private car owners was heard before the whole commission and at that time presented reasons similar to those now urged in a petition for rehearing. There is nothing presented in any of the petitions which supports the conclusion sought to be established that the case was submitted on an incomplete or insufficient record. We submit that the commission was advised by evidence of record why private car owners made their investment in such cars. The expenditures were made to insure the owners of a regular and adequate supply of coal without regard to the condition of the car supply generally.

"With the private cars they became preferred shippers of coal. Because of their ability to make the investment they had and have an undue advantage over a shipper unable to make such investment.

"As we read them, there is not a suggestion in any of the positions that anything new or different will be presented by these petitioners if the case should be reopened than is already in the record, and as above noted, considered by the commission."

GOLD MARK RECKONING EXTENDS

German Export Duties and Some Taxes Assessed on Gold Mark Basis—Prices Advance

BERLIN, GERMANY, July 17.—After six months of Franco-Belgian occupation, the Ruhr question seems no nearer settlement than in January.

Export Duties on Gold Basis

The Federal Ministry for Economic Affairs has, in conjunction with the Minister of Finance, issued a new order for the payment of export duties (Ausfuhrabgabe) in gold marks, in effect on July 18. Pfennig amounts are taxed to a minimum of 10 pf., less than this amount going tax free. This innovation is only safeguarding receipts from depreciation and entails no hardship, as nearly all export contracts are made in foreign currency. The Prussian Diet has also given power to the Government to increase taxes in proportion to the depreciation of the mark, with the stipulation that the gold customs surcharge is to serve as a maximum index.

Strikes in the Berlin metal and engineering industries and in the building trades have been settled, and employers and employees have agreed to have wages based on the improved cost of living index. The question of finding a way to shift to the gold mark basis is also being discussed. According to the latest official statistics, wages of skilled workmen advanced from 35.10 m. per week in 1913-14 to 100,299 m. in May, 1923, and those of laborers from 24.03 m. to 89,989 m. A comparison of the value of these wages with the cost of living shows that their relative purchasing power during May increased to 74.9 per cent and 98.1 per cent respectively.

Employment in the metal and engineering industry shows little alteration. Generally the works are fairly well employed. There have lately been more domestic inquiries and the volume of orders booked has increased. Foreign interest does not seem strong, and only an average number of export orders are being booked.

General advances in prices still continue, which is indicated also by the rise in the wholesale index from 33,838 to 48,644 times the pre-war standard, between July 3 and July 10. During the same period foodstuffs advanced 47 per cent; industrial products, 39 per cent; domestic goods, 49 per cent, and imported goods, 27 per cent.

The Prussian Diet has asked the Government to take action against the advances in prices fixed by some of the syndicates, especially those in the iron and steel industry, and generally to increase its influence in these bodies. The resolution stated that the syndicates had done valuable work in fixing export prices and that the Federal Association of the German Industry had exerted its influence to induce the syndicates to fix domestic prices as low as possible, in the general interest, but it had not in all cases met with response, and the policy of the syndicates in regard to domestic prices required strong supervision. It was also pointed out that the Eisenwirtschafts-Bund, in which representatives of the employees, the consumers and the producers are fixing the prices of iron and steel, has no influence on the prices of ore.

Coal has again gone up 50 to 58 per cent, and iron and steel have been advanced 17 to 45 per cent. The following table compares the prices in marks on July 6 and July 17. [See page 349 for prices on Aug. 6, received by Radiogram.]

	Present Prices	July 6
Ingots	6,019,000	4,437,000
Blooms	6,780,000	5,012,000
Billets	7,365,000	5,341,000
Sheet bars	7,580,000	5,524,000
Structural shapes	8,555,000	6,262,000
Bar iron	8,600,000	6,300,000
Hoop iron	10,612,000	7,733,000
Wire rods	9,154,000	6,698,000
Sheets: No. 6 and heavier	9,732,000	7,098,000
Nos. 6 to 11	10,869,000	7,952,000
Nos. 11 to 20	12,777,000	9,301,000
Nos. 20 and lighter	14,093,000	10,234,000

JULY PIG IRON OUTPUT

Larger Than June, but Lower Daily Rate —Decline from June, 3892 Tons Per Day

Twenty-seven Furnaces Blown Out and Two Blown In—Net Loss of 25

Actual returns from all blast furnaces operating in July show only a small difference from the estimated data published in THE IRON AGE Aug. 2. Telegraphic returns, with the last day's ouput estimated, indicated a production of 3,679,810 gross tons; the actual returns from the same companies show the July output to have been 1476 tons less than this or 3,678,334 tons. Compared with June, also revised, the total was larger but there was a decided falling off in daily rate.

Production of coke and anthracite pig iron for the 31 days of July amounted to 3,678,334 tons or 118,656 tons per day, as compared with 3,676,445 tons or 122,-548 tons per day in June, a 30-day month. The May total, a 31-day month, was 3,867,694 tons or 124,764 tons per day. While the July production exceeded the June by 1889 tons, there was a decline of 3892 tons per day in the output. As compared with April, there was a difference of only 332 tons per day. There were 27 furnaces blown out or banked in July and only 2 blown in, a net loss of 25. This compares with a net gain of 2 in June, 11 in May, and 14 in April.

The total number of furnaces in blast on Aug. 7 was 298 as compared with 323 on July 1 and 321 on June 1. The capacity of the 298 furnaces operating on Aug. 1 is estimated at about 114,200 tons per day as compared with 122,555 tons per day for the 323 furnaces in blast July 1.

The largest output of ferromanganese for any month this year was made in July at 26,493 gross tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from July, 1922, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
July, 1922	52,295	15,297	77,592
August	45,672	12,914	58,586
September	53,856	13,935	67,791
October	66,060	19,032	85,092
November	72,177	22,813	94,990
December	75,179	24,398	99,577
January, 1923	79,991	24,190	104,181
February	80,684	26,251	106,935
March	87,881	25,792	113,673
April	90,145	28,179	118,324
May	96,029	28,735	124,764
June	90,907	31,641	122,548
July	88,798	29,858	118,656

The figures for daily average production, beginning with January, 1917, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921	1922	1923
Jan.	101,643	77,799	106,525	97,264	77,945	53,063	104,181
Feb.	94,473	82,835	105,006	102,720	69,187	58,214	106,935
Mar.	104,882	103,648	99,685	108,500	51,488	65,575	113,673
Apr.	111,165	109,607	83,607	99,766	39,670	118,324	.....
May	110,238	111,175	68,002	96,312	39,394	124,764	.....
June	109,002	110,793	70,495	101,151	35,494	78,701	122,280
July	107,820	110,354	78,340	98,931	27,889	77,592	118,656
Aug.	104,772	109,341	88,496	101,529	30,780	58,586	.....
Sept.	104,465	113,942	82,332	104,310	32,850	67,791	.....
Oct.	106,550	112,482	60,115	106,212	40,215	85,092	.....
Nov.	106,859	111,802	79,745	97,830	47,183	94,990	.....
Dec.	92,997	110,762	84,944	87,222	53,196	99,577	.....
Year	104,619	105,496	83,789	99,492	45,325	73,645	.....

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production		Spiegeleisen and Ferromanganese			
			1922		1923	
	1922	1923	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	1,306,045	2,479,727	6,874	1,230	19,358	12,056
Feb.	1,311,170	2,259,154	3,610	4,930	21,383	3,657
Mar.	1,629,982	2,724,305	11,600	2,095	20,730	13,832
Apr.	1,707,902	2,704,360	14,998	4,211	20,808	7,440
May	1,879,180	2,976,892	15,432	4,902	19,568	9,532
June	1,876,033	2,727,208	18,273	4,817	19,717	18,289
6 mos.	9,710,312	15,871,646	70,787	22,185	121,564	64,807
July	1,931,138	2,752,738	18,873	7,176	26,493	12,876
Aug.	1,415,832	.....	11,402	7,925	.....	.....
Sept.	1,615,696	.....	10,681	4,235	.....	.....
Oct.	2,047,873	.....	9,193	12,283	.....	.....
Nov.	2,165,295	.....	13,232	4,192	.....	.....
Dec.	2,330,545	.....	17,007	10,591	.....	.....
Year	21,216,691	.....	151,175	68,587	.....	.....

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for July and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	July (31 days)	June (30 days)	May (31 days)	April (30 days)
New York	265,406	253,625	266,658	235,553
New Jersey	18,920	26,033	24,605	18,758
Lehigh Valley	90,231	91,078	93,493	87,366
Schuylkill Valley	116,428	117,779	123,061	108,744
Lower Susquehanna and Lebanon Valleys	74,645	64,374	64,609	46,682
Pittsburgh district	759,159	737,839	789,330	769,672
Shenango Valley	142,419	164,969	169,708	146,032
Western Pa.	205,059	201,026	221,369	199,177
Maryland, Virginia and Kentucky	91,443	89,164	107,613	103,245
Wheeling district	155,324	149,067	157,071	146,303
Mahoning Valley	366,681	378,170	383,068	362,843
Central and Northern Ohio	286,021	289,498	309,261	298,797
Southern Ohio	72,130	74,798	77,402	69,344
Illinois and Indiana	645,043	620,281	646,913	556,223
Mich., Minn., Mo., Wis. and Colo.	139,330	159,254	160,456	144,723
Alabama	236,049	239,589	249,810	241,674
Tennessee	16,056	19,901	23,267	23,600
Total	3,678,334	3,676,445	3,867,694	3,549,736

Capacities in Blast Aug. 1

The following table shows the number of furnaces in blast Aug. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast July 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Aug. 1 In Blast	Aug. 1 Capacity per day	July 1 In Blast	July 1 Capacity per day
New York:					
Buffalo	22	20	7,670	20	7,740
Other N. York	5	4	870	4	960
New Jersey	4	2	610	3	860
Pennsylvania:					
Lehigh Valley	16	8	2,340	9	2,950
Spiegel	2	2	210	2	245
Schuylkill Valley	15	12	3,760	12	3,980
Lower Susquehanna	9	6	1,870	6	1,700
Ferromanganese	1	1	65	1	70
Lebanon Valley	6	2	345	2	300
Ferromanganese	2	2	120	2	125
Pittsburgh district	55	52	23,700	54	23,910
Ferro and spiegel	4	2	235	4	675
Shenango Valley	19	10	3,860	14	5,300
Western Pennsylvania	25	18	6,495	19	6,700
Ferromanganese	1	1	120	...	...
Maryland	5	4	1,400	4	1,430
Ferromanganese	1	1	110	1	110
Wheeling district	15	12	5,110	12	4,970
Ohio:					
Mahoning Valley	28	25	11,650	27	12,375
Central and Northern	26	20	8,925	21	9,650
Southern	16	7	1,760	10	3,495
Illinois and Indiana	42	38	20,090	40	20,675
Mich., Wis. and Minn.	12	10	3,410	11	4,110
Colorado and Missouri	6	1	350	3	1,195
The South:					
Virginia	18	6	830	6	835
Kentucky	7	2	505	2	535
Alabama	39	25	7,310	28	8,000
Ferromanganese	1	1	80	1	85
Tenn., Ga. and Texas	16	4	500	5	575
Total	419	298	114,200	323	122,555

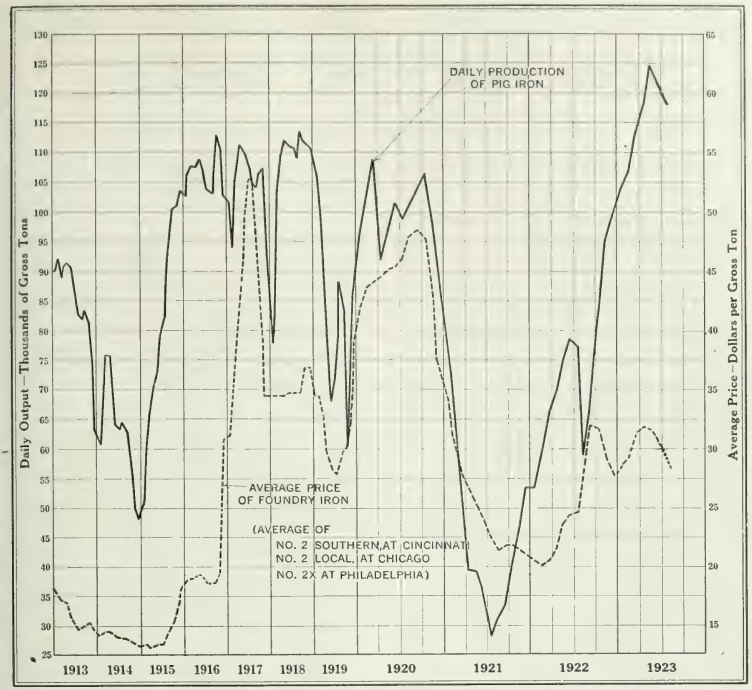


Diagram of Pig Iron Production and Price

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1919—Gross Tons

	1919	1920	1921	1922	1923
Jan.	3,302,260	3,015,181	2,416,292	1,644,951	3,229,604
Feb.	2,940,168	2,978,879	1,927,257	1,629,991	2,934,187
Mar.	3,090,243	3,375,907	1,595,522	2,035,920	3,523,868
Apr.	2,478,218	2,739,797	1,193,041	2,073,114	3,549,736
May	2,108,056	2,985,682	1,221,221	2,306,679	3,867,694
June	2,114,863	3,043,540	1,064,833	2,361,028	3,676,445
½ year.	16,033,808	18,138,986	9,428,166	12,050,683	20,841,534
July	2,428,541	3,067,043	864,555	2,405,365	3,678,334
Aug.	2,743,388	3,147,402	954,193	1,816,170	.....
Sept.	2,487,965	3,129,323	985,529	2,033,720	.....
Oct.	1,863,558	3,292,597	1,246,676	2,637,844	.....
Nov.	2,392,350	2,934,908	1,415,481	2,849,703	.....
Dec.	2,633,268	2,703,855	1,469,086	3,086,898	.....
Year*	30,582,878	36,414,114	16,543,686	26,880,383	.....

*These totals do not include charcoal pig iron. The 1922 production of this iron was 224,731 tons.

Among the furnaces blown in during July was the Oriskany furnace of the Lavino Furnace Co. at Reusens, Va., and the Standard furnace in Tennessee, which had been banked late in June.

Among the furnaces blown out or banked in July were the following: One Wharton furnace of the Replogle Steel Co. in New Jersey; C furnace of the Bethlehem Steel Co. in the Lehigh Valley; one Lucy, one Isabella and the Edith furnace of the Carnegie Steel Co. and No. 1 Alliquippa furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; No. 4 New Castle furnace and the Sharon furnace of the Carnegie Steel Co., one Shenango furnace of the Shenango Furnace Co. and the Fannie furnace in the Shenango Valley; one furnace, Max Meadows of the Virginia Iron, Coal & Coke Co. in Virginia; one Youngstown furnace of the Youngstown Sheet & Tube Co. and the Niles furnace of the Carnegie Steel Co. in the Mahoning Valley; one River furnace in northern Ohio; the Milton furnace and one furnace of the Marting Iron & Steel Co. in the Hanging Rock district, as well as the Hamilton furnace in southern Ohio; one Joliet and one South Chicago furnace of the Illinois Steel Co. in Illinois; one Mayville furnace in Wisconsin; two furnaces of the Colorado Fuel & Iron Co. in Colorado; the Philadelphia furnace of the Sloss-Sheffield Steel & Iron Co. and the second Oxmoor furnace and No. 2 Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama as well as the Rockdale and the second Allen's Creek furnace in Tennessee.

The Henry furnace at the River Rouge plant of the Ford Motor Co. set a new tonnage figure in July. The average daily output was 551 tons on a coke consumption of 1866 lb. per ton. The average silicon was 3.11 per cent. This furnace is now on the fourth year, having produced approximately 568,040 tons of foundry iron with silicons between 3 and 4 per cent.

Iron and Steel Markets

STEEL OUTPUT FALLS

Down 10 Per Cent in July, But Orders Increase

Growing Promptness in Deliveries—Rail Buying Ahead

The fact that July brought more new business to a number of steel companies than they took in June has been favorably interpreted. At the same time the mills have been giving proof of growing ability to make prompt deliveries, indicating that the renewal of forward buying is some distance ahead.

Black sheet shipments within a week of the order, bars in two to three weeks, and plates and shapes in thirty days are now possible with some mills, though the larger companies with diversified products have not reached such flexibility.

The process of adjusting pig iron and steel output to the present scale of shipment, which is 15 to 20 per cent below that of the recent peak, is still under way. It does not appear that consumption has declined to that extent, but that in the past three months consumers have run their stocks down, whereas in the spring months they were accumulating under fear of scarcity.

Steel ingot production figures for July are expected to show about 10 per cent falling off from June; in other words, the July rate was 40,000,000 to 40,500,000 tons a year, against 49,500,000 tons at the high point in April.

Pig iron curtailment has continued in August, stocks in all districts showing large increases last month.

As men are taken from 12-hr. shifts in the reduction of working hours that has begun already in some districts, output will be brought closely in line with demand. The stabilizing effect the movement will have on prices is already receiving attention from buyers.

Generally speaking, the price situation in finished steel has not changed. However, weakness has developed in hot rolled flats and in cold rolled strips. In the former, independent makers have reduced the base price from 3.30c. to 3.15c. Cold rolled strips from all mills can now be had at 5c., as against the recent independent price of 5.25c.

A decided change in the wire trade is seen in the active solicitation of business by mills that lately were disposed to let the situation drift.

The railroads, which have figured so largely in the year's steel demand, are expected to place orders for 1924 rails in the next sixty days. Inquiries for 60,000 tons are now pending at Chicago. The Southern Pacific has placed 10,000 tons of tie plates with the Tennessee mill.

Fabricated steel had another 9000-ton week, two-thirds of this amount being for private buildings. Fresh inquiries exceeded 21,000 tons, of which 10,000 tons is for Standard Oil Co. tanks. Railroads have not contributed in some time to the fabricators' order books.

In the market for steel bars the new and higher extras are operating to prevent the cancellation of orders to which the old extras apply. But at Chicago bar iron has weakened, prices now ranging from 2.40c. to 2.50c.

Another week of active pig iron buying, especially in the East and at Chicago and St. Louis, points to the nearer approach of the turning point in the market, but prices are still weak in all centers. A notable purchase was about 35,000 tons of basic by an eastern Pennsylvania steel maker at $25, delivered. Central Western basic declined $1 to $24 at furnace. Fully 20,000 tons of foundry iron has been bought in the New York district within a week and a St. Louis producer has booked 18,000 tons. Southern pipe iron has been bought on a $23 basis.

The July movement of Lake Superior iron ore, 10,411,248 gross tons, broke all records apart from the 10,659,206 tons of July, 1918, and this is only the fourth time in Lake ore history that shipments have exceeded 10,000,000 tons in a month. The total to Aug. 1 was 26,596,731 tons, nearly 54 per cent gain over the same period in 1922.

With the continued decline of pig iron THE IRON AGE composite price has registered a drop every week, with one exception, since May 8. The present figure, $24.79, against $25.38 last week, is just $6 below that of three months ago and is the lowest in a full year.

Finished steel is stationary at 2.775c. per lb., only one slight change having been made in THE IRON AGE composite price since May 8. It is now 25 per cent above the figure one year ago.

Pittsburgh

Prompt Deliveries Easy on Steel Orders—Striking Dip in Pig Iron

PITTSBURGH, Aug. 7.—It is becoming apparent that despite reports of an improved inquiry for steel, there is not enough business to go round, and while this has not yet been reflected in prices, it is quite apparent in the promptness of deliveries. Prices carry spot delivery on practically all finished products. Black sheets are known to have been shipped in as quickly as a week; lapwelded pipe shipments now are being promised in 30 days, as against 90 days, the average promise of two months or so ago. No difficulty is experienced by buyers in securing bars in two to three weeks, and plates and shapes in a month's time, and there has been a very decided change in the wire products

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 7, 1923	July 31, 1923	July 10, 1923	Aug. 8, 1922
No. 2X, Philadelphia†	$25.76	$26.26	$28.26	$31.14
No. 2, Valley furnace†	*24.00*	25.00	26.00	29.00
No. 2, Southern, Cincinnati	28.05	28.05	29.05	24.05
No. 2, Birmingham, Ala.†	24.00	24.00	25.00	19.50
No. 2 foundry, Chicago*	27.00	27.00	28.00	27.00
Basic, del'd, eastern Pa.	*25.00*	25.50	27.00	27.25
Basic, Valley furnace	*24.50*	25.00	25.00	26.00
Valley Bessemer, del. P'gh	28.26	28.26	28.27	28.76
Malleable, Chicago*	27.00	27.00	28.00	27.00
Malleable, Valley	24.50	24.50	26.00	28.00
Gray forge, Pittsburgh	25.76	26.26	27.27	28.76
L. S. charcoal, Chicago	32.15	32.15	35.65	33.15
Ferromanganese, furnace	117.15	117.15	120.00	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	35.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	35.00
Forging billets, base, P'gh	47.50	47.50	47.50	40.00
O.-h. billets, Philadelphia	47.67	47.67	47.67	42.67
Wire rods, Pittsburgh	51.00	51.00	51.00	40.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	1.80
Light rails at mill	2.25	2.25	2.25	1.75

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.025
Iron bars, Chicago	*2.40*	2.50	2.50	2.00
Steel bars, Pittsburgh	2.40	2.40	2.40	1.80
Steel bars, Chicago	2.60	2.60	2.60	1.90
Steel bars, New York	2.74	2.74	2.74	2.14
Tank plates, Pittsburgh	2.50	2.50	2.50	1.80
Tank plates, Chicago	2.80	2.80	2.80	1.90
Tank plates, New York	2.84	2.84	2.84	2.14
Beams, Pittsburgh	2.50	2.50	2.50	1.80
Beams, Chicago	2.70	2.70	2.70	1.90
Beams, New York	2.84	2.84	2.84	2.14
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.50

Sheets, Nails and Wire,	Aug. 7, 1923	July 31, 1923	July 10, 1923	Aug. 8, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.75	3.75	3.85	3.15
Sheets, galv., No. 28, P'gh	5.00	5.00	5.00	4.15
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.40
Wire nails, Pittsburgh	3.00	3.00	3.00	2.40
Plain wire, Pittsburgh	2.75	2.75	2.75	2.25
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.05
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$19.50*	$20.00	$21.00	$19.50
Carwheels, Philadelphia	20.00	20.00	20.00	17.50
Heavy steel scrap, P'gh	17.00	17.00	18.50	17.50
Heavy steel scrap, Phila	*15.50*	16.00	17.00	15.00
Heavy steel scrap, Ch'go	*16.00*	16.50	17.25	15.50
No. 1 cast, Pittsburgh	20.00	20.00	20.50	19.00
No. 1 cast, Philadelphia	20.00	20.00	21.50	18.00
No. 1 cast, Ch'go (net ton)	18.50	18.50	20.50	18.00
No. 1 RR. wrot., Phila	18.00	18.00	19.00	17.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	15.00	14.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$4.50*	$4.25	$4.75	$14.00
Foundry coke, prompt	5.25	5.25	5.50	15.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*14.75*	14.87½	14.87½	14.12½
Electrolytic copper, refinery	*14.12½*	14.37½	14.25	13.75
Zinc, St. Louis	*6.15*	6.30	6.05	6.30
Zinc, New York	*6.50*	6.65	6.40	6.65
Lead, St. Louis	*6.62½*	6.65	5.70	5.50
Lead, New York		6.75	6.75	6.00	5.85
Tin (Straits), New York	*38.37½*	38.75	38.25	32.62½
Antimony (Asiatic), N. Y.	*7.60*	7.70	6.75	5.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Aug. 7, 1923, Finished Steel, 2.775c. Per lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

July 31, 1923	2.775c.
July 10, 1923	2.789c.
Aug. 8, 1922	2.212c.
10-year pre-war average	1.689c.

Composite Price Aug. 7, 1923, Pig Iron, $24.79 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

July 31, 1923	$25.38
July 10, 1923	26.04
Aug. 8, 1922	25.94
10-year pre-war average	15.72

situation in that producers, recently so indifferent to new business, now are actively soliciting business.

Definite weakness has appeared in hot rolled flats and in cold rolled strips. In the former, independent makers have generally reduced the base price from 3.30c. to 3.15c. and the change carries the narrow light gage material, for some time held at a premium over the easily rolled sizes, to the same level. Independent makers of cold rolled strips have receded from the 5.25c. base to 5c., thus matching the Steel Corporation base. In both cases, the revision includes tonnage on the books of makers entered at higher prices.

In a broad way, the question of prices is paramount with buyers today, as it was bound to be as they neared the end of their orders with the mills and began to sound the market on future supplies. Efforts now are being made to introduce the probable increase in costs as a result of the elimination of the 12-hr. day in the steel industry as a reason why at least present prices must be maintained. It is estimated that this change will add at least $2 per ton and possibly more to the cost of making steel and it is argued this increase cannot be assumed by the steel manufacturers.

The stabilizing effort in pig iron prices here has not been successful as yet. Important producers are not deviating from quotations, but by adhering to what they regard as fair prices, they appear to be merely "holding the umbrella" for those who have iron they want to move. Still lower prices have been reached within the week under review on basic and foundry grades. There is better balance between supply and demand in the coke market and the price is slightly firmer. No further decline is observed in the better grades of scrap, but light material still is very weak and hard to move.

The Carnegie Steel Co. on Aug. 2 put out its second Lucy stack in Pittsburgh and now is making iron in 46 furnaces out of a total of 59. This is a net loss of 7 furnaces from the peak point reached in May and maintained through June. Clinton Iron & Steel Co., Pittsburgh, probably will blow out its furnace next week, and it is reported that the McKinney Steel Co., Cleveland, will soon put out one of its Josephine, Pa., furnaces. Bessemer steel ingot production is low in this and nearby districts, but open hearth furnace activities show no material decline.

Pig Iron.—Sales of basic iron last week at $24, Valley furnace, are reported to have absorbed all the

iron available at that figure. Lately the offers at that grade have been at $24.50, and there was one sale of 2000 tons to a producer having a large contract to fill at $25. This iron cannot run above 1 per cent in silicon, nor below 1 per cent in manganese, and there are a few producers who will not take the business except at the full quotations. Most makers are holding to $25, Valley furnace, for basic, but outside of an inquiry for 2000 tons from the Edgewater Steel Co., Edgewater, Pa., there is no business in sight, as other users supplied their present requirements from the low priced offerings of last week. The regular market price of $26.50, Valley furnace, on Bessemer iron is well observed, although 600 tons for last quarter shipment was secured by a local melter at $26. There was another sale of this grade of 500 tons and other lots aggregating about 200 tons, all at the full price. The business done establishes the quotable market at $26 to $26.50. As low as $24.50 for No. 2 foundry at Valley furnace has been made to consumers in the past week, and brokers have been able to buy as low as $24; on the other hand, there have been sales up to $26 for the base grade, but usually in small lots and then of a brand which the melters must have for their mixes. Warren Tool & Forge Co., Warren, Ohio, is in the market for 1000 tons of malleable iron; quotations of $25.50 and $26 have not proved interesting, since iron of this grade still is to be had as low as $24.50. W. P. Snyder & Co. make the average price of basic iron shipped from Valley furnaces in July $24.75 and of Bessemer $26.70.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$24.00 to $25.00
Bessemer	26.50
Gray forge	24.00 to 25.50
No. 2 foundry	24.50 to 26.00
No. 3 foundry	24.00 to 25.50
Malleable	24.50 to 25.50
Low phosphorus, copper free (nominal)	33.00

Ferroalloys.—Interest in supplies on the part of consumers still is lacking, because they are amply covered by contracts and there are no delays to shipments. Prices show no change, but they are merely nominal. Some resale ferromanganese, which recently was offered at $115, Atlantic seaboard, without finding takers, now is available at $111.50, or $6 a ton below the public quotation of makers, both domestic and British. No. 2 furnace, American Manganese Mfg. Co., Dunbar, Pa., now on foundry iron, will be turned over to the production of spiegeleisen late this week. Prices are given on page 371.

Semi-Finished Steel.—The National Tube Co. was a recent buyer of billets, slabs and skelp, taking in all about 25,000 tons, and so far as can be learned was unable to develop lower prices than recently have been quoted. This business was divided between a Youngstown producer and one located to the east of Pittsburgh. Although the local steel-making subsidiary of the Steel Corporation is running at about 92 per cent of ingot capacity, it apparently is not getting out enough semi-finished steel for its own requirements and those of the associated companies, since the American Sheet & Tin Plate Co., although not a buyer, is short of open hearth sheet bars. Outside of this activity, the semi-finished steel market is as quiet as it has been at any time lately. Finishing mills, which do not produce their own steel, are getting ample supplies on requirement contracts and this obviates the necessity of open market purchases. The market is still quoted at $42.50, Pittsburgh or Youngstown, on billets, sheet bars and slabs, and while reports persist that lower prices can be done, there is nothing in the way of sales to substantiate them. Forging billets are quoted by all makers at $47.50 base, but sales are few and small. Skelp holds at 2.40c. and wire rods at $51 base. Orders and specifications for the latter are light. Prices are given on page 371.

Wire Products.—New business, despite the fact that inquiry is expanding, still lags behind shipments on old orders with most makers in this district. It is claimed by some that current obligations will take 60 days to complete and the leading interest is said to have about 90 days' business in sight. Jobbers, however, for the first time in several months are building up their stocks, indicating a heavier movement on old orders than was the case recently, and it is also observed that some mills which were not anxious for business a short time ago, now are in a receptive mood. All mills here are adhering to $3 base per keg for nails and $2.75 base per 100 lb. for plain wire. Some shading of these prices is reported in the southern Ohio territory by mills local to that district, but it is reported that the Colorado Fuel & Iron Co., which was on a base of $2.90 for nails, advanced is price to $3 as of Aug. 1. The labor situation is slightly easier with local mills and there has been some expansion in production. Prices are given on page 370.

Steel Rails.—The local standard rail unit of the Steel Corporation has about all the business it can handle for the remainder of this year and is virtually out of the market for additional tonnages for shipment in the next four months. There is more interest in light rails than there was recently, but sales remain small and competition for orders is rather stiff, although mills rolling these sections from new billets deny going under 2.25c. base for 25- to 45-lb. rails.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 2.10c. to 2.25c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Iron and Steel Bars.—There is no change in the base price, but it carries with very prompt delivery. Demands are moderate both individually and in the aggregate. Iron bars are holding in price, but are not actively sought.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Tin Plate.—Pressure for shipments still is extremely heavy, particularly for perishable food container sizes. Much tonnage is wanted to supplement contract shipments, but actual business is reduced by the fact that there are no mills in a position to take on more business and keep the promise of delivery required. Fourth quarter prices are not expected to be any lower than those now ruling and if steel advances on account of the elimination of the 12-hr. day, an advance may be made. The market now is $5.50 per base box, Pittsburgh, with all makers at that price.

Cold-Finished Steel Bars and Shafting.—Shipments on old orders still are running well in excess of new bookings, but evidently most makers have enough orders in sight to be freed of the necessity of actively soliciting business, since deviations from the regular market price of 3.25c. base, Pittsburgh, are virtually unknown, except in the case of one mill in the Middle West and one in the East, which are taking business at 3.15c. The recently adopted extras for quality, size, cutting, etc., now effective add roughly about $5 per ton to the cost of hot-rolled bars and are another factor in the maintenance of prices. These changes, however, were anticipated in cold-finished bars, which probably explains the absence of efforts to advance the latter. Ground shafting holds at 3.65c. base, f.o.b. mills for car lots.

Hot-Rolled Flats.—These products are slow of sale and not especially active in the matter of specifications, although expansion of activities among automobile parts manufacturers is helping strips to some extent. There has been a general reduction among independents from 3.30c., base, to 3.15c., and it is understood that contracts written at the higher prices have been revised to the lower figure. This change also carries the light narrow material, which for some time has commanded a premium over the easily rolled gages and widths, to 3.15c. Reports persist of sales of wide strips as low as 3c., base. Prices are given on page 370.

Tubular Goods.—While some steel pipe makers claim that new orders in July balanced shipments, such a claim is an exception rather than the rule. New demands from the oil industry still are tapering and while a good deal of material is being shipped, it is largely on account of old orders. This assertion is substantiated by the fact that some mills now can make

deliveries of lap-welded pipe as promptly as 30 days, while the most distant delivery that is promised of about four to six weeks is about twice as prompt as the mills were promising a short time ago. In the butt-welded sizes the situation is relatively stronger, since the demand has held out more persistently and the mills have not had cancellations to enable them to catch up with their obligations. Wrought iron pipe mills have reduced their order books to a point where they can make very prompt deliveries on new business. Boiler tubes are moving freer on old than new business. Discounts are given on page 370.

Sheets.—A substantial expansion in the specifications for automobile sheets is the outstanding feature of the market this week. Automobile manufacturers have completed the tests of their new 1924 models and have had sufficient response in the way of sales to release orders to the parts makers. There has not been much interruption to shipping instructions in the other finishes and buyers still are taking all the tonnage due them on old orders. New business is light, however, particularly in black sheets, and the report persists that several mills want orders in that grade badly enough to go below the regular market price of 3.85c. base to get them. Some interest in fourth quarter prices is beginning to show. It is probable that the leading interest will not announce prices for that period until after Labor Day. It is stated that the elimination of the 12-hr. day will not mean much if any change in sheet mill costs, since over 90 per cent of the men now are on an 8-hr. basis, but it is estimated that the change in the working time in the steel plants will add at least $2 a ton to the cost of steel and this will be reflected in sheet prices. There is no certainty that the shorter workday will be fully established by the last quarter of the year, but if it is the incident increase in costs will at least probably mean the maintenance of present prices. Mill operations are expanding, but there is no corresponding increase in production, owing to the high humidity, which has reduced the efficiency of the workmen. Prices are given on page 370.

Cold-Rolled Strips.—There has been a general recession on the part of independent makers from 5.25c. base, Pittsburgh, to 5c. The latter price has been that of the American Steel & Wire Co. for several weeks, and lately the independents have been finding it difficult to obtain more. Remaining third quarter tonnages on the books of independent makers will share in this cut of $5 per ton.

Structural Material.—Demands upon local mills are not keeping pace with the deliveries of old orders and the price, though unchanged, is more of a spot than a future delivery quotation than it was recently. Structural shops in the district are finishing their jobs more rapidly than they are getting new ones, and better delivery promises are being offered and some shops need work sufficiently to go pretty low to get awards. Plain material prices are given on page 370.

Plates.—Tank inquiries are productive of a lively inquiry for plates, but builders here are not far enough along with old orders to guarantee the delivery demanded and are getting practically none of the business. Local mills have been helped by the inability of Western mills to take business offered. The price is unchanged at 2.50c., base, Pittsburgh, but this price carries quick delivery. Prices are given on page 370.

Bolts, Nuts and Rivets.—Business in bolts and nuts is slow, both as regards orders and specifications. There is considerable anxiety for orders on the part of makers, as is indicated by quotations of 50, 10, 10 and 5 per cent off list for large machine bolts. Price cutting in a market like the present one only serves to make buyers more cautious. The rivet market also is rather unsettled by the fact that the leading Cleveland maker is going $5 per ton below the price of local makers to get orders. Local makers claim they have not met the Cleveland price and they cannot do so without loss with the cost of steel bars higher as a result of the increased extras for size, etc., recently established. It is apparent, however, that on new business $3.25, base, for heavy structural rivets is both maximum and extreme. Prices and discounts are given on page 370.

Track Fastenings—Fair demand is noted for small lots of large railroad spikes, but actual orders for small spikes still are light though inquiry is said to be better. Prices are given on page 371.

Coke and Coal.—Production of beehive oven furnace coke is more nearly in balance with the demand and, while there are occasional sales of "distress" tonnages as low as $4.25, the real market so far as an assured supply is concerned no longer is below $4.50 per net ton at oven. A local steel company, not making its entire requirements in its own ovens, paid the latter price on a week's supply. Some interest is beginning to show in fourth-quarter contracts and one involving 10,000 tons a month is reported to have been closed at $5 net to the producer. On monthly contracts or for the remainder of the present quarter, most producers now regard $5 as minimum. Plenty of spot foundry coke is available at $5.25 to $5.75, although the demand is heavier than it has been. The coal market is steadier, but not much strengthened by a still low state of production. It is doubtful that production of commercial mines now is 50 per cent of capacity, but there is no shortage. Mine run steam coal still ranges from $1.65 to $2, and mine run gas and coking coal from $2.25 to $2.35, although the latter price lately has been more of an asking than a selling price. Steam slack commands from $1.35 to $1.40 and gas slack about $1.50.

Old Material.—Small purchases of heavy melting steel for delivery at Midland, Pa., seem to have steadied the market on that grade at the prices of a week ago, but the market is as weak as ever on the lighter grades, particularly those for blast furnace use, which are extremely hard to move. The principal users in this district are embargoed and material that has to be sold is hard to place at any price. Steel foundries are in the market for the better grades of railroad steel and for low phosphorus melting stock and their purchases have imparted some strength to those grades. Evidently there are some short sales to be covered, since offerings of the Pennsylvania Railroad, Central Region, brought $18, delivered, for heavy melting steel, $22 for knuckles and couplers and $18.75 for rails.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$17.00 to $17.50
No. 1 cast, cupola size	21.00 to 21.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 18.50
Compressed sheet steel	15.50 to 16.00
Bundles, sheets, sides and ends	14.50 to 15.50
Railroad knuckles and couplers	21.00 to 21.50
Railroad coil and leaf springs	21.00 to 21.50
Low phosphorus bloom and billet ends	23.00 to 23.50
Low phosphorus plate and other material	22.00 to 22.50
Railroad malleable	20.00 to 20.50
Steel car axles	21.00 to 21.50
Cast iron wheels	18.00 to 18.50
Rolled steel wheels	21.00 to 21.50
Machine shop turnings	10.75 to 11.25
Sheet bar crops	20.00 to 21.00
Heavy steel axle turnings	13.50 to 14.00
Short shoveling turnings	13.00 to 13.50
Heavy breakable cast	17.00 to 17.50
Stove plate	14.50 to 15.00
Cast iron borings	13.00 to 13.50
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	17.00 to 17.50

Increased charges for heat treating axles were generally established in May. A new card of extras was issued superseding one dated Jan. 1, 1921. The extra for annealing is now 1c. per lb. against 0.5c. and the extra for quenching and tempering 1.8c. against 1c. obtaining up to May. The base price of axles is 3c., Pittsburgh.

Work is steadily progressing on the construction of four large basic open-hearth furnaces and a 14-in. continuous merchant mill for the Inland Steel Co. at Indiana Harbor, Ind., with prospects for their completion by December. The remainder of the company's expansion program has not yet been definitely decided upon.

Chicago

Turn in Pig Iron Buying—Rail Purchases for 1924 Early Possibility

CHICAGO, Aug. 7.—Pig-iron buying has taken a turn for the better and a fair tonnage for both early shipment and fourth-quarter delivery has been booked by Chicago district furnaces. A St. Louis producer has taken orders for 18,000 tons, of which 14,000 tons was basic and the remainder malleable and foundry.

The finished steel situation shows no material change. Buying is on a somewhat broader scale, the leading mill having had the heaviest orders for any week in three months and the best specifications since March. Jobbers also note a gradual improvement in business, particularly from the metropolitan centers as contrasted with the rural districts. Warehouse business for July showed a gain over June. Current shipments from mills still exceed new commitments, but local producers still have comfortable backlogs, one mill in fact being farther behind on deliveries than at the first of the year. Sellers believe that the inception of a buying movement is at hand and that the stability of present prices is assured, if indeed the abandonment of the 12-hr. day does not necessitate advances. In this connection it is pointed out that the transition to the new basis of operation will involve some confusion, which will tend to limit production for a time.

The railroads, which have been the heaviest consumers of finished steel, are expected to continue in that role. Most of the carriers, according to present indications, will place orders for rails for 1924 delivery between now and Oct. 1. Inquiries for 60,000 tons are now pending. No further oil storage tank awards are reported, but the Standard Oil Co. of New Jersey has entered the market for 29 tanks for erection in the East.

Local mill and blast furnace operations are unchanged.

Pig-Iron.—Demand has picked up notably during the past few days and orders ranging from carloads to a thousand tons have been placed. Prices, which have been very weak, are now showing a firmer tendency and it is doubtful whether Northern iron can be bought at better than $27, base, Chicago furnace. In fact, carload lots are bringing as high as $27.50, base. It is too early to determine whether current activity in the market is a mere flash in the pan or whether it marks the inception of a buying movement, but in view of heavier buying in other centers, sellers feel that the protracted lull has come to an end. Among inquiries before the trade may be mentioned 750 tons of malleable for fourth-quarter delivery wanted by a Wisconsin melter, 200 tons of foundry, 100 tons of malleable and 50 tons of 10 per cent silvery desired by a local buyer for early shipment and 500 tons of foundry for a Chicago user for prompt delivery. A local steel interest is inquiring for 500 tons of 10 per cent Bessemer ferrosilicon. A local melter has closed for 500 tons of charcoal iron. That transportation difficulties may again retard deliveries of iron, if they do not in fact force curtailment of production, is feared in some quarters. Already a shortage of cars is being felt in certain sections of Ohio as well as in Tennessee and the situation may become general when the heavy fall traffic gets under way.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50 to 28.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00 to 27.50
Malleable, not over 2.25 sil.	27.00 to 27.50
Basic	27.00 to 27.50
High phosphorus	27.00 to 27.50
Southern No. 2	30.01 to 31.01
Low phosphorus, 1 to 2 per cent copper free	34.00 to 35.00
Silvery, sil. 8 per cent	38.29

Ferroalloys.—A local melter has purchased 100 tons of resale spiegeleisen at a concession under the prices quoted by furnaces. Otherwise the ferroalloys are quiet.

We quote 80 per cent ferromanganese, $125.06 to $125.88 for all deliveries; 50 per cent ferrosilicon, $88 to $90, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Structural Material.—John Griffiths & Son Co., Chicago, is low bidder on the general contract for a sewage disposal plant to be built by the Sanitary District, Chicago, involving 750 tons. Bridges for this project, on which separate bids will be taken, are said to require more than 2000 tons additional. There have been few structural steel lettings during the week, but fabricators are placing stock orders with the mills more freely than for several weeks. Some business on which prompt shipment is desired is going to mills East of Chicago.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Plates.—The Sinclair Crude Oil Purchasing Co., which last week placed 60 oil storage tanks, is expected to place additional tank orders. In the aggregate, demand for plates is still light, although orders and specifications received by local mills are the best in several weeks.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Preliminary Sec Chicago Iron and Steel Market

Reinforcing Bars.—The John Griffiths & Son Co., Chicago, submitted the low bid on the general contract for the north side sewage disposal plant to be built by the Sanitary District, Chicago. Lettings of bars of more than 100 tons are few and smaller awards are also less numerous than earlier in the year. Approximately 1000 tons of bars for the Illinois road work is pending, and the State is now taking bids on lots of 500 to 1000 tons twice a month instead of taking figures every six weeks as formerly. The taking of bids on the freight house for the Chicago, Burlington & Quincy, Chicago, involving 900 tons, has been postponed until Aug. 18.

Lettings include:

Public school, Winfield, Iowa, 140 tons to Concrete Steel Co.

Illinois State bridge work, 100 tons to Kalman Steel Co.

Pending business includes:

Chicago, Burlington & Quincy freight house, Chicago, 900 tons, taking of bids postponed until Aug. 18.

Illinois road work, 1000 tons.

Clubhouse for Olympia Fields Golf Club near Chicago, 200 tons.

Bars.—Buying of soft steel bars shows slight improvement. There has been increased demand during the week from dealers in deformed bars and inquiry from other sources has been somewhat more active. Reports from Detroit indicate that while a few automobile manufacturers continue to operate at capacity, most of them show a slight decline in production, due, it is said, to changes in design. Bar iron has weakened, although demand shows some betterment. Prices now range from 2.40c. to 2.50c., Chicago mill. New business in rail steel bars is light. The new extras on this commodity are the same as those on soft steel bars for rounds, squares, flats and hexagons. New extras on special sections have not yet been announced. The Chicago Heights mill of the Inland Steel Co. will close for two weeks for repairs at the end of the current week.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.40c. to 2.50c., Chicago; rail steel, 2.20c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—The summer lull still persists and new business is limited, but sellers look forward to a revival of demand toward the close of the current month. Indications are that jobbers' stocks are low and that retailers' shelves are bare. Pressure for deliveries against old orders is still felt and jobbers report a continuation of good business, particularly in industrial centers. Demand from agricultural sections, of course, is normally quiet during the summer. Mills

are able to make excellent shipments on barbed wire, but some of them, notably the leading producers, are still as much as six weeks behind on wire nail deliveries. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 370.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Bolts and Nuts.—Although demand has shown no particular improvement, price shading is less general than heretofore. The new extras on soft steel bars recently put into effect by the mills will add materially to the cost of bolt and nut manufacture.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Sheets.—The market is still quiet and it is a question whether prices would hold if inquiries involving several thousand tons should appear. Deviations from ruling quotations are still of an exceptional character owing to the small amount of business coming up for consideration. Orders for black sheets have been placed at as low as 3.75c. base Pittsburgh, and a few lots of galvanized have been bought at 4.90c. and 4.95c. base Pittsburgh. Local mills being committed through the quarter are not actively soliciting business, although their customers in some instances are pressing them to accept additional tonnage.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c per 100 lb.
Jobbers quote f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Rails and Track Supplies.—The Norfolk & Western inquiry for 50,000 tons of rails for delivery at the rate of 5000 tons a month, starting in September, is still before the trade. This road is also in the market for 5000 tons of angle bars and an equal tonnage of spikes and bolts. A Western road has put out an inquiry for 10,000 tons of rails for 1924 delivery, and most other lines are expected to enter the market for their next year's rail needs between now and the first of October. The Oregon Short Line will build a branch line from Rogerson, Idaho, to Wells, Nev., a distance of 98 miles, at an estimated cost of $5,000,000. The Southern Pacific has placed 10,000 tons of tie plates with the Tennessee mill. The only important order for track supplies taken during the week by local mills was 2000 tons of angle bars. Demand for light rails is very small.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.
Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.
Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts 4.90c. base.

Cast Iron Pipe.—Cleveland will take bids on 1000 tons of water pipe Aug. 9. South Bend, Ind., is in the market for 400 tons of 4 to 10 in. Eloise, Mich., will take bids Aug. 15 on 7200 ft. of 4 to 8 in. Independence, Iowa, will receive bids on 80 tons of 4 and 6 in. Defiance, Ohio, has awarded 65 tons to James B. Clow & Sons. The market is quiet and without important features.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Old Material.—Although consumers are showing more interest in the market to the extent that they are willing to buy at their own prices, the amount of tonnage changing hands is still comparatively small. A steel works has closed for a few thousand tons of heavy melting, and there has been some slight increase in the number of orders received for other grades of scrap, ranging in size from carloads up to 500 and 1000 tons each. A number of dealers are buying more freely to fill old orders and this is regarded as an indication that they feel that prices are scraping bottom. It is interesting to note, however, that additional declines have been registered on numerous grades of scrap listed below. Railroad offerings include the Chicago & Eastern Illinois, 1200 tons, and the Pere Marquette, 3000 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$22.00 to $22.50
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.00 to 20.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	19.50 to 19.50
Heavy melting steel	16.00 to 16.50
Frogs, switches and guards cut apart	16.00 to 16.50
Shoveling steel	15.75 to 16.25
Drop forge flashings	10.00 to 10.50
Hydraulic compressed sheets	12.50 to 13.00
Axle turnings	13.00 to 13.50
Steel angle bars	17.25 to 17.75
	Per Net Ton
Iron angle and splice bars	22.00 to 22.50
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	25.50 to 26.00
Steel car axles	17.50 to 18.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.00 to 9.50
Cut forge	14.25 to 14.75
Pipes and flues	9.50 to 10.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	14.25 to 14.75
Steel knuckles and couplers	18.50 to 19.00
Coil springs	19.00 to 19.50
No. 1 machinery cast	18.50 to 19.50
No. 1 railroad cast	17.50 to 18.00
No. 1 agricultural cast	17.00 to 17.50
Low phos. punchings	16.00 to 16.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	8.00 to 8.50
Cast borings	11.00 to 11.50
Short shoveling turnings	11.00 to 11.50
Stove plate	14.00 to 15.00
Grate bars	12.75 to 13.00
Brake shoes	14.00 to 14.50
Railroad malleable	19.00 to 19.50
Agricultural malleable	16.50 to 17.00

Canadian Scrap Market

TORONTO, ONT., Aug. 7.—With a state of almost stagnation featuring the demand for iron and steel scrap in the Canadian market, prices have again been reduced by dealers. This reduction ranges from $1 to $3 per ton and takes in nearly all commodities handled in the Toronto market. In the Montreal market the reductions were not quite so pronounced and only two or three articles were affected. Despite the fact that dealers have reduced both their buying and selling prices, this has caused no improvement in consumer demand. Steel plants and foundries are buying only in limited tonnages for immediate use and only in an isolated case has a consumer bought for delivery covering the third quarter. Canadian dealers are offering the following prices for scrap.

Dealers' Buying Prices, Per Gross Ton

	Toronto	*Montreal*
	Gross Tons	
Steel turnings	$10.00	$9.00
Machine shop turnings	10.00	9.00
Wrought pipe	8.00	8.00
Rails	14.00	14.50
No. 1 wrought scrap	14.00	15.00
Heavy melting steel	14.00	13.00
Steel axles	16.00	18.00
Axles, wrought iron	18.00	22.00
	Net Tons	
Standard car wheels	15.00	16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	19.00	21.00

Detroit Scrap Prices Remain Unchanged

DETROIT, Aug. 7.—Melters are continuing to buy scrap for current needs only, although production schedules are set for third quarter in automotive lines. Stove and furnace manufacturers are operating on an 80 per cent basis. Radiator plants are about at capacity.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.40 to $15.00
Shoveling steel	14.50 to 16.50
No. 1 machinery cast	17.00 to 19.00
Cast borings	9.75 to 10.75
Automobile cast scrap	21.00 to 23.00
Stove plate	14.00 to 16.00
Hydraulic compressed	11.50 to 12.50
Turnings	7.25 to 8.25
Flashings	9.50 to 10.50

New York

An Active Week in Pig Iron, with Concessions Still in Evidence

NEW YORK, Aug. 7.—Reliable estimates put the total of pig iron bought in the New York district in the past week at close to 20,000 tons. As a result of this activity, fewer inquiries are now before the furnace companies than was the case one week ago. For delivery to a Connecticut foundry, the tonnage closed through New York offices amounts to 2500 all for August delivery. A New Jersey buyer closed for 3000 tons for September and October, and a Jersey City foundry took 900 tons, deliveries running from September to November inclusive. For the various plants of a pump interest, 3000 tons were taken, deliveries to be in August and September. An electric company is reported to have bought 2000 tons. Other transactions of which details are not available indicate that one or two large companies have been buying recently on a considerable scale and that foundry operations are keeping up to the date of the second quarter. While from the standpoint of seller's $25 is regarded as the existing base price, some furnaces are still inclined to waive the customary differentials on silicon and competition is therefore quite active. However, the purchases of the past week are construed as indications of the judgment of a number of large melters that the market is at least nearer the point of stabilization, even if it has not definitely made the turn.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$27.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.27
East. Pa. No. 2, sil. 1.75 to 2.25	27.02 to 27.27
Buffalo, sil. 1.75 to 2.25	28.91 to 29.41
No. 2X Virginia, sil. 2.25 to 2.75	32.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—Both demand and inquiry for ferromanganese is entirely absent and the market is dead. The only interesting feature is the fact that the July output of ferromanganese from American blast furnaces was the largest this year at over 26,400 tons. The highest previous record was in September, 1920. There have been a few sales of carload lots of spiegeleisen at $47.50, furnace, but there is almost no inquiry. No developments are heard of in the manganese ore market. One seller reports inquiries for 100 tons of 50 per cent ferrosilicon, with the market exceedingly dull and prices unchanged at $82.50 to $85, delivered.

Cast-Iron Pipe.—The market continues active and demand has been such that many makers are booked up to the end of the year on some of the smaller sizes of pipe. Even on the larger sections deliveries are reported to be, as a rule, well into November. Few municipal tenders are reported current, but private buying is still good. It is expected by those in close touch with the situation created by the litigation over the award of 20,500 tons of water pipe in the Philippine Islands that a new call for bids will be issued in about a month. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.30; 4-in. and 5-in., $67.30; 3-in., $77.30, with $5 additional for Class A and gas pipe. The soil pipe market continues weak and discounts show another five-point increase this week. At present prices makers claim that they are facing a loss on every ton of pipe sold and are booking practically all business in small lots for shipment at their convenience. At the prevailing schedule makers are generally refusing to consider forward business. We quote discounts on both Northern and Southern makers, f.o.b. New York, in carload lots, for prompt shipment, as follows: 6-in. standard, 39½ to 40¾ per cent off list; heavy, 49½ to 50¾ per cent off list.

Finished Iron and Steel.—No important steel tonnage is in the market except in the structural field, which is the active feature of today's steel market. A fresh crop of inquiries for building construction is up for bids. One large interest estimates that about a dozen jobs, none less than 1000 tons, totaling about 33,000 tons, may be placed within the next week or two, bids having gone in on all of them. In addition there are many small jobs of 50 to a few hundred tons not included in the above total, which swell today's active structural projects in the New York district to 40,000 tons or more. Some estimates run as high as 50,000 tons, which is a substantial amount of work for this time of year. New inquiries include some sizable jobs, including 4000 tons for a highway bridge a Perth Amboy, N. J., 3000 tons for a girls' commercial high school in Brooklyn, 1100 tons for a newspaper building in Philadelphia, and a half dozen or more apartment houses in New York. Several new schoolhouses are soon to come up for bids. In tank work, still an active feature of the market, the Standard Oil Co. leads with an inquiry for 10,000 tons for erection at Bayway, N. J. Demand for steel products by manufacturing consumers is not in large proportion, most of the inquiries, of which there is an increasing number, being for small lots for early shipment. Steel mill representatives report their situation easy so far as deliveries are concerned, but absolutely firm as to prices. Current orders, though small, are filling in gaps in rolling schedules and encourage the mills to believe that orders will increase as deliveries on second quarter contracts are completed.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—As a result of lowered production, due to the unprofitable prices recently made, a slight stiffening in the market is indicated. However, standard foundry coke is still available at $5.50 per ton for prompt carloads. Prompt furnace coke graded as standard ranges from $4.50 to $5.25 per ton. A number of producers in the Connellsville and Latrobe districts have gone out rather than to continue concessions recently made. By-product coke is still quoted at $11.34 to $11.41, Newark and Jersey City.

Old Material.—Prices continue weak, heavy melting steel showing another slight decline this week. No. 1 yard steel is now bringing not to exceed $15.50 per ton, delivered, eastern Pennsylvania. Borings and turnings are active but prices are extremely weak, some dealers offering as low as $13.75 per ton, delivered, eastern Pennsylvania. Little or no tonnage is reported obtainable at such offers and a fair estimate of the buying price, New York, is $9 to $10 per ton on borings and turnings, $9.50 to $10 on machine shop turnings and $9.50 to $10 per ton on cast borings. As high as $13 per ton is being offered on machine shop turnings, delivered, Phoenixville, Pa. Stove plate is fairly active. For Harrisburg, a delivered price of $17 per ton is being paid. Specification pipe is stronger and up 50c. per ton. Dealers are quoting as high as $14.50 per ton, delivered, Lebanon, Pa., on pipe.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$11.50 to $12.00
Steel rails, short lengths, or equivalent	12.50 to 13.00
Rails for rolling	16.00 to 18.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	9.50 to 10.00
Machine-shop turnings	9.50 to 10.00
Mixed borings and turnings	9.00 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25 to 10.75
Stove plate	12.75 to 13.25
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00 to 19.00
No. 1 heavy cast, not cupola size	16.00 to 17.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 17.00

Warehouse Business.—Warehouses continue to report a fairly good business, activity this month being about on a par with the average of July. In general, prices are fairly firm with the exception of quotations on black and galvanized sheets, sales of which are still

reported to have occurred at as low as 4.50c. and 5.50c. per lb., base, respectively. Such quotations are said to be more isolated this week than in the several previous weeks and a fair estimate of the sheet market is probably 4.65c. to 5.00c. per lb. on black and 5.65c. to 6.00c. per lb. on galvanized. Sellers of wrought iron and steel pipe report better mill shipments and slightly less inclination to shade scheduled prices. We quote prices on page 388.

St. Louis

Better Buying in Pig Iron—Notable Steel Inquiries From Railroads

ST. LOUIS, Aug. 7.—Demand has been better than for several months, and orders and inquiries were more numerous for larger tonnages as well as those for a carload up to 100 tons. While the market was off $1 a ton earlier in the week on Northern iron, it is now firmer, with an expectation of a slight recovery in price. One inquiry before the market was for 5000 tons of basic iron for a melter in the St. Louis industrial district. An Indiana melter is in the market for 1000 tons of malleable. A St. Louis melter wants 200 to 400 tons of malleable, while another local consumer wants 200 tons of high silicon iron. There are scattering inquiries for carloads and upward, amounting to 300 tons. The St. Louis Coke & Iron Co. sold 500 tons to a local melter who is negotiating for an additional 500 tons of foundry iron. The same maker sold 2500 tons of off grade basic iron in scattering lots and 400 tons of other grades to melters in the district. Two Southern makers are now quoting $24, Birmingham, and this may be said to be the market, although others are quoting higher prices. A noticeable feature here is that melters are pressing makers for shipments against contracts and there are very few holdups of shipments.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	29.17

Finished Iron and Steel.—Railroad inquiries were the most important feature of the market during the week. These inquiries included:

Missouri Pacific Railway, 400,000 tie plates for 75, 85 and 90-lb. rails, about 2000 tons; miscellaneous structural material, 100 tons; carload of bolts.

Terminal Railway Association, St. Louis, 750 kegs of spikes.

Wabash Railway, carload of fire box plates.

Cotton Belt, carload of plates.

Fabricators are doing a good business, but principally in small orders, one interest here reporting the sale of 700 tons during July in quantities of 30 to 60 tons. The small-order business is continuing in August. Jobbers continue buying only from hand to mouth.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—The market for coke generally is weak because of overproduction. Connellsville coke is selling at $5.75 to $7 at the ovens. A better demand for domestic coke from dealers is reported by by-product concerns here.

Old Material.—A few specialties show advances this week; otherwise the list is unchanged. Generally there is a firmer tone. Rolling mill grades are being sought, with only a few inquiries for melting grades. Dealers have about covered all of their short interests and are showing confidence in the market by buying to lay down. They feel that there will be more activity within the next thirty days. The Baltimore & Ohio is out with a list of 21,000 tons of old material.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$16.00 to	$16.50
Rails for rolling	17.50 to	18.00
Steel rails less than 3 ft.	18.50 to	19.00
Relaying rails, 60 lb. and under	26.00 to	27.00
Relaying rails, 70 lb. and over	33.50 to	34.50
Cast iron car wheels	18.00 to	18.50
Heavy melting steel	16.50 to	17.00
Heavy shoveling steel	16.50 to	17.00
Frogs, switches and guards cut apart	16.50 to	17.00
Per Net Ton		
Heavy axles and tire turnings	12.75 to	13.25
Steel angle bars	15.25 to	15.75
Iron car axles	27.00 to	27.50
Steel car axles	21.00 to	21.50
Wrought iron bars and transoms	21.00 to	22.00
No. 1 railroad wrought	15.00 to	15.50
No. 2 railroad wrought	16.50 to	17.00
Railroad springs	19.00 to	19.50
Cast iron borings	12.50 to	13.00
No. 1 busheling	16.00 to	16.50
No. 1 railroad cast	18.00 to	18.50
No. 1 machinery cast	18.50 to	19.00
Railroad malleable	17.00 to	17.50
Machine shop turnings	11.50 to	12.00
Champion bundled sheets	9.00 to	9.50

Birmingham

Pig Iron Buying Dull, but No Disposition to Curtail Production

BIRMINGHAM, Aug. 7.—The Birmingham pig iron market may be summed up as follows: All Birmingham district makers and all other makers continue holding for $27 and make scattering sales for prompt Southern delivery. They do not mark down at all, because there has been no purchasing movement and any drop, they say, would mean another. The one-stack maker offering remainder of third-quarter make over a month ago at $25 and reducing base two weeks ago to $24, had on the first of the month an unsold quarter make of 1500 tons, showing that it had taken five to six weeks to dispose of 18,000 to 20,000 tons on a $24 and $25 base. A leading maker expressed the attitude to a nicety, saying: "We stand pat and shall so long as we move the iron." Some iron, about 200 tons, was sold in St. Louis at $24.50. It was a resale transaction based on iron bought two months ago from one of the makers now holding at $27. The maker selling at $24 has booked some iron for fourth quarter in conjunction with that taken for third quarter. He will be out of market as soon as all third-quarter capacity is taken. There seems to be no disposition to curtail production. Alabama production in the seven months of the year was 1,680,000 tons, an increase over 1922 of 47 per cent, and is at a rate of 2,880,000 tons a year, compared with the record of 2,950,000 tons in 1917. Soil pipe factory hold-ups are the principal cause of yard accumulations in July. No perceptible decrease in melt in the South is elsewhere noticeable.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$24.00
Basic	$23.00 to 26.00
Charcoal, warm blast	$3.00 to 34.00

Finishing Mills.—Wire drawing mills report slight improvement in new business with indications of increased briskness in the near future. Operations remain on full turn on back-log of orders covering five to six weeks. Tennessee company finishing mills operate at the accustomed capacity with the new merchant bar mill at about 6000 tons a month. The Tennessee company turns out an average of 25 steel cars daily. Cotton ties are brisk. Structural steel shops have all they can handle.

Cast Iron Pipe.—The American Cast Iron Pipe Co. has booked 350 tons for Rio Grand, Porto Rico; 680 tons for Rosedale, Kan., and 1153 tons for Los Angeles. The United States Cast Iron Pipe Co. has booked 700 tons for De Land, Fla.; 800 tons for Van Buren, Ark., and 5000 ft. for a Birmingham utility, all specifying De Lavaud pipe. The base is $49. Soil pipe is dull,

with a half dozen shops down and the price $50 to $55 base.

Old Material.—The scrap market has been very dull and outgo from yards has been at a minimum. Prices are barely maintained.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$16.00 to $18.00
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

Eastern interests are still at work on a project for purchase of the properties of the Pratt Consolidated Coal Co., which they have several times tried to acquire during the past year. It is understood that the deal was twice within an ace of going through when unexpected deaths of interested parties interrupted. The Pratt Consolidated Coal Co. has not given an option but named a price at which it will sell. This is understood to be from $7,000,000 upward. This company was the largest independent producer in Alabama prior to organization of the De Bardeleben Coal Corporation on a merger of the Empire, Corona and De Bardeleben Coal companies.

Cincinnati

Dips Last Week in Both Southern and Northern Pig Iron

CINCINNATI, Aug. 7.—The market is showing a little more activity, and some fair sales of pig iron were made last week. This activity may have been caused by the fact that one furnace in southern Ohio offered a limited tonnage on the basis of $25.50, and melters felt that this price was a good one. On the other hand, evidence is not lacking that stocks in foundry yards are pretty well used up, and melters in order to run have found it necessary to buy iron. The buyers, however, are cautious, and orders placed are generally for only enough iron to keep running for 30 days. There is little inclination on the part of melters to cover for third or last quarter. Prices are inclined to firm up. In southern Ohio it is said that $26 is the minimum today. Last week, however, $25 could be done on an attractive lot, with $25.50 being quoted on lots up to 200 tons. The furnace making this price, however, advanced its price to $26, and this appears to be the lowest price at which iron can be had today from the Ironton district. An Indianapolis melter is reported to have bought 2000 tons of malleable iron from a Lake front steel making interest at $26.77 delivered, or less than $24 Ironton basis, and an eastern Indiana melter is reported to have bought 500 tons at approximately the same figure. A southern Ohio melter bought 500 tons at $25.50 Ironton, and numerous sales of lots ranging from car loads to 200 tons were made at $25.50 and $26. On Southern iron there is little to report, although it is said that small tonnages of high silicon iron were sold at a price that figures back to $23.50 Birmingham. The open quotation is still $24, but on an attractive tonnage it is said that this price can be beaten. With Northern iron selling at $26, there is little chance of Southern iron coming north of the Ohio at today's prices. We note one sale of 700 tons of Tennessee iron at $24 Birmingham. There is no activity in basic or Bessemer. An inquiry for 1000 tons of silvery is expected to come out this week. Silvery producers are looking for a stronger market during the fourth quarter, and at least one of them will not quote present prices for this delivery.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$28.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	28.27
Basic Northern	27.27
Malleable	28.27

Sheets.—An improved demand is reported. Automobile body and lamp manufacturers have placed some fair sized orders this week, and reports indicate that operations this fall will be just as heavy in this line of manufacture as was the case in the first half. While reports are heard of black sheets being offered at 3.75c., this price could only be done on larger tonnages, and from only one mill in the northern part of the State. Blue annealed and galvanized prices are firm, and strength is also shown in the quotations on automobile body sheets.

Cast Iron Pipe.—There seems to be no let-up in buying. Covington, Ky., has placed 210 tons with a nearby producer. Cincinnati will take bids Aug. 13 on 100 tons, and Newport, Ky., will take bids Aug. 16 on 2800 ft. of 16-in., or about 250 tons.

Warehouse Business.—Local jobbers report business fair, though not so brisk as in June or July. August usually is a quiet month, so not much significance is attached to the slump. Prices continue as last quoted, and there is no evidence at hand of reduction being made.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Tool Steel.—A slight improvement is noted in the demand for tool steel. Sales during the month of July fell off sharply from June, but evidences are not lacking of better demand to come. Prices are steady at 75c. to 95c. per lb. for 18 per cent tungsten steel.

Finished Materials.—There is a continued fair demand for finished materials in small tonnages. While two to three weeks delivery on plates is now being freely offered, there is no evidence of lower prices than 2.50c., Pittsburgh, being made. Some plates are being shipped into this district from eastern Pennsylvania mills. On bars there is little current activity, and while most mills are reported to be booked for six to eight weeks ahead, one of the independent mills was quoting bars in this market for two weeks' delivery at a 2.65c. basis. Shapes are in fair demand. There is little activity in wire products, with the exception of nails, but the delivery situation is reported to be showing little improvement. Track accessories are very quiet. The only structural project of importance to come up was for a power plant at Omaha, financed by Louisville capitalists. Tank builders report an unprecedented amount of work on inquiry from power plant projects throughout the country. Reinforcing bars are fairly active, but inquiries run generally to small tonnages. There is some talk of prices being shaded $2 per ton, but nothing authentic has been developed.

Coke.—There is little activity in either furnace or foundry fuels. Prices of New River coke have been reduced 50c. to $1 per ton, foundry coke now being obtainable at $11 per net ton at ovens. No changes are reported in Pocahontas, Wise County or by-product prices.

Old Material.—A steel works interest in this district is in the market for a small tonnage of heavy melting steel for August delivery, but has indicated the price which it is willing to pay as about $15.50 delivered. Prices generally are lower, with offerings somewhat heavier.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$12.50 to	$13.00
Iron rails	15.00 to	15.50
Relaying rails, 50 lb. and up	28.00 to	28.50
Rails for rolling	16.00 to	16.50
Heavy melting steel	14.50 to	15.00
Steel rails for melting	14.50 to	15.00
Car wheels	14.50 to	15.00
	Per Net Ton	
No. 1 railroad wrought	12.50 to	13.00
Cast borings	9.00 to	9.50
Steel turnings	8.50 to	9.00
Railroad cast	16.00 to	16.50
No. 1 machinery cast	18.50 to	19.00
Burnt scrap	11.50 to	12.00
Iron axles	21.50 to	22.00
Locomotive tires (smooth inside)	13.50 to	14.00
Pipes and flues	8.50 to	9.00

Cleveland

Dullness Again in Pig Iron, With Prices Weak—Steel Firm

CLEVELAND, Aug. 7.—With a movement of 10,411,248 gross tons ore shipments from Lake Superior iron mines in July broke all previous records, with one exception—July, 1918, when the movement was 10,659,206 tons. This is the fourth time that shipments in one month have exceeded 10,000,000 tons. July and August, 1917, had movements of 10,241,633 tons and 10,146,786 tons, respectively. July shipments showed a gain of 1,468,912 tons over July, 1922. The movement up to Aug. 1 was 26,596,731 tons, or an increase of 9,303,218 tons, or nearly 54 per cent, over the corresponding period last year.

Pig Iron.—Following the increased demand of the preceding week the market during the past week has relapsed into dullness and basic has developed marked weakness. Although most of the basic disposed of in the Valley has been by reselling and although one Cleveland furnace has within a few days sold 1000 tons at $25, Valley furnaces have figured in some transactions at $24, which may now be regarded as the ruling Valley price on basic, a decline of $1 since last week. One Cleveland producer who recently sold a round tonnage of foundry iron has reduced his price from $27 to $26.50, furnace, and is selling for the fourth quarter. Very low prices are being made at Buffalo, $24 being the price most frequently heard on No. 2 foundry. A Cleveland firm quoted $25 western New York furnace on No. 2 foundry to a New England buyer, who expressed confidence that he could place the order at less than $24. A few sales of Southern iron have been made on a basis of $24.50, Birmingham. Low phosphorus is weak and has declined to $32, Valley furnace, or $1 below the recent nominal quotation.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$24.00
Northern No. 2 fdy., sil. 1.75 to 2.25	26.50
Southern fdy., sil. 1.75 to 2.25	30.50
Malleable	26.50
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	32.00

Bolts, Nuts and Rivets.—Specifications on nuts and bolts are coming in satisfactorily. One company reports that July was next to the best of any month this year, but new business is coming in slowly. Competition is not so keen as it was, and this is attributed to the fact that manufacturers realize that the new bar card of extras will result in a considerable increase in the cost of their materials. In castellated nuts business is rather slow, owing to decreased demand from automobile manufacturers, but prices are being maintained. On rivets, the ruling quotation in this market is now $3.25 on large structural rivets and $3.35 on large boiler rivets, but reports of shading from $1 to $3 in other territories are heard.

Sheets.—Demand shows some improvement and there is not so much talk about price shading. Doubtless black sheets can be had at 3.75c. per lb., but concessions are not freely granted.

Reinforcing Bars.—Salesmen who have returned to Cleveland from territory covering several hundred miles report a gratifying increase in the number of new projects, including school buildings and other public enterprises. Rail steel reinforcing bars are quoted at 2.30c. to 2.35c.

Semi-Finished Steel.—On sheet bars, billets and slabs, $42.50 is still being quoted, but almost no business is being done and the quotation is considered nominal and likely to be reduced on a test.

Finished Material.—The volume of new business is not large but many inquiries for rather small tonnages indicate encouraging increase in business and, on the whole, the prevailing sentiment is more cheerful. On structural material a number of projects which had been pending, including the Penn Harris Hotel, Harrisburg, Pa., 640 tons; the Allerton Hotel, Cleveland, 1500 tons and the plant of the Cleveland Stone Co., Amherst, Ohio, 200 tons, are expected to be closed in a few days. The Niagara Falls Hotel, 1300 tons, seems also to be near the closing point. The Forest City Steel & Iron Co. has taken contracts to fabricate a number of jobs, most of which are for less than 100 tons each. In the bar market the new card of extras is having a tendency to check any cancellation of tonnage which has been contracted for under the lower extras which previously prevailed. As the time for the beginning of the establishment of the shorter day in the steel industry approaches, more thought is being given to the probable effect on costs and the fact that there will be an increase is undoubtedly having some influence in steadying the market. The tonnage for the new Union Railroad Station, which will ultimately amount to about 75,000, is not being seriously considered at the present time, as it is not expected that bids will be called for this year. The tin plate market is active. The demand for hoops and bands is less than for any other finished material.

Warehouse Business.—Demand continues in a fairly satisfactory volume and although there has been some shading reported on galvanized sheets, prices are being well maintained for the most part.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Alloy Steel.—Two of the leading automobile manufacturers of Cleveland have reduced production 30 per cent and effect is being felt in the decreased demand for alloy steels. Prices are, however, being maintained.

Coke.—There is a fair demand for foundry coke and prices show a slight increase in firmness. We quote standard Connellsville foundry coke at $5.50 to $7 for prompt shipment. Virtually nothing is being done on contracts.

Old Material.—The downward trend seems to have been checked, but the market is extremely dull and prices are untested.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel, nominal	$15.75 to $16.00
Rails for rolling	17.25 to 18.00
Rails under 3 ft.	17.25 to 17.50
Low phosphorus melting	18.50 to 19.00
Cast borings	11.00 to 11.50
Machine shop turnings	9.75 to 10.00
Mixed borings and turnings	9.75 to 10.00
Compressed sheet steel	13.00 to 13.50
Railroad wrought	12.25 to 12.75
Railroad malleable	20.50 to 21.00
Light bundle sheet stampings	9.00 to 10.00
Steel axle turnings	14.00 to 14.50
No. 1 cast	18.50 to 19.50
No. 1 busheling	9.75 to 10.00
Drop forge flashings	9.75 to 10.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Pipes and flues	9.00 to 9.50

Blast furnace No. 4, of the Steelton, Pa., plant of the Bethlehem Steel Corporation, was banked on Aug. 4. All furnaces of the plant had been in operation since March, but prior to that time several had been idle since 1920. One hundred men are affected by the banking of the furnace, but these have been transferred to other departments of the Steelton plant.

Buildings of the American Puddled Iron Co., Youngstown, formerly the Youngstown Steel Co., have been completed at the plant site north of Warren, Ohio, and equipment is now being installed. The company expects to begin operations in October.

The Maryland plant of the Bethlehem Steel Corporation, Sparrows Point, Md., has placed four of its five new open-hearth steel furnaces in operation. The fifth is expected to be ready for operation within a few weeks.

Boston

Pennsylvania Furnaces Take Business at $25 a Ton Base and Less

BOSTON, Aug. 7.—Eastern Pennsylvania furnaces took the bulk of the estimated 10,000 tons of pig iron sold in this territory the past week. Such iron sold at $25 furnace or $28.65 delivered for No. 2 plain and silicon 2.25 to 2.75 per cent, and at $28.65 and $29.15 for No. 1 X in a majority of instances. But $24.50 furnace base was done early in the week, and one melter in the market for 6000 to 8000 tons fourth quarter iron claims he can do better than $25 furnace base today. Few furnaces will accept fourth quarter business, however, because of the fuel outlook. Others doing less than $25 heretofore now quote $25 base and $25.50 for No. 2 X. Still others quote $25.50 and $26, respectively. The undertone of the eastern Pennsylvania iron market therefore appears steadier. A Providence, R. I., foundry is reported to have bought 1250 tons, silicon around 4 per cent, Virginia, at $25 furnace through a New York house. The price cannot be substantiated here. Virginia No. 2 X and No. 1 X sold at $26 furnace base. Buffalo No. 2 plain and No. 2 X hold at $25 furnace or $29.91 delivered, and nothing new pricewise has developed in Alabama, consequently these irons have not figured to any extent in recent business.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$28.65 to $29.65
East. Penn., sil. 1.75 to 2.25	28.65 to 29.15
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.41
Virginia, sil. 2.25 to 2.75	32.42 to 32.92
Virginia, sil. 1.75 to 2.25	31.92 to 32.42
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Coke.—The outstanding feature of the fuel market is the pressure on New England by-product companies for domestic coke. Both the New England Coal & Coke Co. and the Providence Gas Co. are booked to capacity on such fuel practically for the remainder of 1923. So far, both companies have filled specifications against foundry coke contracts on schedule, although minor important delays on loadings have cropped up the past few days. The indicated curtailment in coke production in the Connellsville district further strengthens the position of New England foundry coke makers. By-product foundry coke is still quoted at $13.50 a ton delivered within New England.

Old Material.—Hopes entertained last week that business was on the mend have evaporated. Business is almost at a standstill. Holders of material generally anticipate better business in September and consequently are not anxious to sell at going prices. One house the past week sent out offers on mixed borings to seventy firms and received but one acceptance. Offers to buy chemical borings at $11.50, made by another firm, brought out four car lots. Offers to buy heavy melting steel at $12 on cars at shipping point fail to attract sellers. Brokers are buying some No. 1 machinery cast at $19 on cars, for storage purposes.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	15.50 to 16.50
Railroad malleable	24.00 to 24.50
Street car axles	21.00 to 21.50

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 rail wrought	12.50 to 13.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long)	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
Cast iron borings, rolling mill	10.50 to 11.00
Cast iron borings, chemical	11.50 to 12.00
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	12.00 to 12.50
Stove plate*	11.00 to 12.00

*For Pennsylvania shipments.

Buffalo

Pig Iron Lifeless, but Improvement in Steel Broad in Scope

BUFFALO, Aug. 7.—Two furnaces have been blown out—the first in the expected curtailment of operations since the depression started. Rumors of one producer's intending to bank several stacks are not confirmed. Only one seller is able to report any life to the market; another finds demand has fallen off and is even slower than the preceding week. This is especially true in New England where eastern Pennsylvania furnaces are quoting lower prices than Buffalo sellers and at the same time enjoy an advantage of $1.26 in freight rates. Inquiries include 15,000 to 20,000, including one lot of 5000 tons. The remainder is made up of less tonnages mostly in the carload to 100-ton lots. Sales total about 10,000 tons in scattered lots. Not any of the local sellers will admit any shading of the $25 base price, although all encounter rumors of $24.50 for silicon of 1.75 to 2.25 per cent being quoted in the immediate selling area. A small lot of silicon 2.25 to 2.75 brought $25.50.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$26.00
No. 2X foundry, 2.25 to 2.75 sil	25.50
No. 2 plain, 1.75 to 2.25 sil	25.00
Basic	26.00
Malleable	26.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—Quietness generally felt by pig iron sellers does not apply in the finished material field and both specifications and inquiry have been fairly lively. Prices on bars, shapes and plates are firm; the only exception encountered by sellers seems to be made to car builders who have been able to shade bar prices. Sheet and pipe business is brisk. Mill operations are on the same schedule and no immediate curtailment is in sight. Deliveries on bars are better and one mill lost several tonnages through the fact that a competitor offered delivery within two to three weeks—the best performance found in several months. All mills are now quoting the extra list on bars. The fact that the 8-hr. day is soon to become operative is expected to have the effect of holding present prices because of the increased cost of operation.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Except for a few occasional sales of heavy melting steel, business is stagnant. Prices are nominal and demand is at the lowest ebb of the year.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 bushelings	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

Railroad freight rate on limestone from the Hillsville and Walford mining districts in Western Pennsylvania, near the Ohio line, will be reduced from 76c. to 55c. per ton to points in the Mahoning and Shenango Valleys, effective Sept. 15. The cut to the Mary blast furnace at Lowellville, operated by the Sharon Steel Hoop Co., will be from 50c. to 36c. per ton. About 1200 lb. of limestone are used in the manufacture of each ton of pig iron and the saving per ton, therefore, will be from 12c. to 18c. The reduced rate was granted by the Central Freight Association, following a request by H. D. Rhodehouse, manager of the traffic bureau of the Youngstown Chamber of Commerce.

Philadelphia

Large Sales of Basic Pig Iron at $25, Delivered —Steel Situation Still Quiet

PHILADELPHIA, Aug. 7.—With plans already under way in Eastern steel plants for the turnover to the 8-hr. day, attention in steel sales offices is largely centered upon the effect of this move upon the demand and selling prices of steel. While a high labor cost is expected under the new plan, methods are being developed in several organizations by which this cost may be lower than was at first counted upon. Men working in continuous process departments, such as the open-hearth plants, will be put on 8-hr. shifts and will receive an advance in their daily wage rate of 25 per cent, making their pay equivalent to a 10-hr. day rate on the present basis. The number of men employed in certain departments will be cut down, as for example in the open-hearth department, where one man will tend two or three furnace jobs instead of one. Whatever the effect of the 8-hr. day may be upon costs, the opinion is strong in selling offices that its inauguration will forestall any possibility of lower selling prices for the immediate future.

Certain developments of the past week have created a more hopeful feeling, foremost among these being the sale of about 40,000 tons or more of basic pig iron, which some observers hold to mark the turning point in the pig-iron market. Some grades of scrap appear also to be scraping bottom and accumulation is going on among consumers and yard dealers. A recovery in raw materials will, of course, have at least a sentimental effect on finished products.

Steel business is proceeding in a quiet way, there being a limited amount of new business as consumers are quite generally covered for about 60 days. The steel mills have substantial tonnages on their books for a similar period, the only exceptions being some of the Eastern plate and shape mills. In general, the latter have about a month's work ahead.

Pig Iron.—An Eastern plate mill has closed for 35,000 tons or more of basic pig iron for delivery through August, September and October and a Delaware steel company has bought not less than 5000 tons and may possibly take 10,000 tons. This business was divided among four or five furnaces, which made identical prices of $25, delivered, on the large purchase. Added to the substantial sales of foundry iron of the past two or three weeks it has put the eastern Pennsylvania pig-iron situation on a firmer basis. Several furnaces are now quoting a minimum of $25, furnace, on No. 2 plain and $25.50 on No. 2X, but it remains to be seen whether some furnaces which have not taken large backlogs will follow these prices immediately, and in fact they have not been in effect long enough with the furnaces quoting them to become definitely established. Sales of foundry iron have been made within the past few days at $24.50 for No. 2 plain and $25 for No. 2X, and in a few instances 25c. a ton below these prices has ruled. About 100,000 tons of iron was sold by eastern Pennsylvania furnaces in July, and probably 15,000 to 20,000 tons has been closed since the first of the month. There is now very little inquiry and the buying movement is believed to be over for the present, so far as the larger tonnages are concerned. There is still a good deal of iron on furnace yards, stocks in July having increased fully 20,000 tons in this district, as much of the iron recently sold is for delivery over the next three months. Very little has been sold for November-December, and one furnace company feels so certain of at least a slight recovery in the market that it is declining to quote at all for fourth quarter. It might be said that this situation is not one-sided in that some of the most careful buyers in the East have not covered beyond October and do not show any present disposition to do so. Virginia iron at $26, base, furnace, is not reaching this district as its high freight rate shuts it out in competition with low-priced Pennsylvania iron. There is very little activity in grades other than foundry and basic, low phosphorus being particularly stagnant and weak. The Brooke furnace will probably be blown out within 10 days for relining.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.26 to $26.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.76 to 26.14
East. Pa. No. 1X	26.26 to 26.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.17 to 31.67
Virginia No. 2X, 2.25 to 2.75 sil.	31.67 to 32.67
Basic delivered eastern Pa.	27.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	29.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	32.00 to 33.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.50
Low phos., copper free, guar. not over 0.035 per cent phos.	31.50
Continental, phos. 1.50; sil. 2 to 3	25.50

Ore.—Large shipments of ore continue to come from abroad, last week's receipts including 19,822 tons of iron ore from Sweden, 3770 tons from Newfoundland and 7500 tons from Cuba, while 2004 tons of chrome ore came from British India.

Ferroalloys.—A slightly better inquiry has appeared for spiegeleisen, but furnace representatives who quote $45, furnace, are losing orders, the supposition being that resale material is being offered at a few dollars less per ton. Ferromanganese is not in demand and prices remain at $117.50, seaboard or domestic furnace.

Billets.—Ruling quotations by Eastern steel companies are $42.50, Pittsburgh, on open-hearth rerolling billets and $50, Pittsburgh, on forging billets, but the latter price does not always take the business, as lower quotations are being named by Pittsburgh mills.

Plates.—Of outstanding interest in the plate market is an inquiry from the Baltimore & Ohio Railroad for 5000 tons for repairing 1000 freight cars. This inquiry also carries with it about 1000 tons of bars and structurals. The Newport News Shipbuilding & Dry Dock Co. was low bidder on two Clyde Line boats, which will require about 3000 tons each of plates and probably 1000 tons each of other forms of steel. The Baltimore & Ohio is reported to be contemplating the purchase of 50 locomotives, but this has not yet become a definite inquiry. Eastern plate mills have on the average about 30 days' work, and one or two having bookings that run well into September. Nevertheless plates are easy to obtain for shipment in two or three weeks. Prices appear to be firm at 2.50c., Pittsburgh.

Structural Material.—The Belmont Iron Works has taken two jobs requiring about 2500 tons of steel, one the General Electric Co. plant in South Philadelphia and the other an insurance company office building in Philadelphia. Fabricators have two or three months' work ahead, and most of the mills have a fair volume of orders on their books, but new work is coming out slowly in this district. Prices are firm at 2.50c., Pittsburgh, except that one or two Eastern mills are accepting desirable tonnage at 2.40c.

Bars.—Steel bar demand is keeping up at a fair rate considering that most of the trade is getting sufficient steel on contract shipments. Current orders are filling in gaps in rolling schedules. Bar iron makers will issue a new card of extras this week. Steel and iron bars are quoted at 2.40c., Pittsburgh. Quotations of 2.35c. on bar iron are said to be less frequent.

Sheets.—A fairly satisfactory carload business is being done in sheets, which, however, are less active in this district than the heavier steel products. Prices appear to be firm, except in black sheets, quotations of 3.75c. occasionally appearing, though 3.85c., Pittsburgh, is being quoted by a majority of the mills. Blue annealed at 3c. and galvanized at 5c. are both firm in price.

Coke.—Eastern furnaces are not inclined to contract for coke for fourth quarter at $5.50, Connellsville, the ruling quotation, and some of them are depending on the spot market for current requirements, spot coke being freely available at $4.50. Foundry coke is to be had at $5.50 for prompt shipment.

Old Material.—An upward turn of prices on old material may not be immediately at hand, but there are indications that both consumers and dealers believe that present levels are about the bottom. A few Eastern plants are quietly laying by stocks, believing apparently that scrap is a good purchase at present prices, and yard dealers are in many instances declining to sell, preferring to hold what they have for a possible rise. Scrap is in good supply, but a general program of accumulation by both consumers and dealers would not be an unexpected development under present conditions and would of course tend to strengthen the market. Heavy melting steel is off 50c. a ton, now being available at $15.50 to $16. Other grades remain substantially as quoted last week.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap rails	15.50 to 16.00
Steel rails for rolling	17.00 to 18.00
No. 1 low phos., heavy 0.04 and under	21.50 to 22.50
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	13.50 to 14.00
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	13.50 to 14.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	18.00 to 19.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	18.50 to 19.00
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 15.50
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

RAILROAD EQUIPMENT BUYING

Fewer freight cars were in need of repair on July 15 than at any time since December, 1920. The number in need of repair on July 15 was 188,621, or 8.3 per cent of the number on line. The Class One railroads of the United States had in need of repair on July 15, 11,855 locomotives, or 18.6 per cent of the total number on line, an increase of 405 over the total number on July 1.

Some of the items of the week are the following:

The Missouri Pacific has placed 10 baggage, 12 chair cars and 18 passenger coaches with the American Car & Foundry Co. and 9 divided coaches, 3 club and 8 dining cars with the Pullman Co.

The Wabash has ordered 75 box car underframes from the American Car & Foundry Co.

The Mississippi River & Bonne Terre has withdrawn an inquiry for 50 box cars.

The International Harvester Co. is inquiring for 10 billet cars.

The Southern Railway has placed 1000 center sills with the Virginia Bridge & Iron Works.

The Philadelphia & Reading has awarded repairs on 500 steel hopper cars to the Standard Steel Car Co.

The New York Central has let repairs on 500 all-steel hopper cars for the Pittsburgh & Lake Erie to the Standard Tank Car Co.

The Canadian Pacific will build 1300 box cars in its own shops.

George N. Clemson, Middletown, N. Y., for the last 35 years engaged in manufacturing Star hack saw blades, will resume the manufacture of the general saw line which he discontinued about 30 years ago. Approximately $500,000 will be expended on the first buildings. The new company will be called the Clemson Saw Co. Its line will include hand, cross-cut, solid and inserted tooth circular saws and wood band saws. Mr. Clemson is president; Richard D. Clemson, vice-president; W. E. Cross, secretary-treasurer; W. R. Batcheller, general manager. Construction is under way and it is expected operations will be started by Jan. 1.

FABRICATED STEEL BUSINESS

Week's Awards Only Fair Total, but Inquiries Still Quite Promising

Private enterprises continue to supply the bulk of business in fabricated steel. New inquiries exceed 21,000 tons in amount and of these 6100 are for public service work, 4500 tons for private buildings and 10,000 tons for oil tanks. Of 9000 tons of awards, about two-thirds were for private account. Awards included the following:

Loft building at Broadway and Twenty-ninth Street, New York, 350 tons, to George A. Just Co.

Salaam Temple, Newark, N. J., 950 tons, to Bethlehem Fabricators, Inc.

General Electric Co., manufacturing plant at South Philadelphia, 1700 tons, to Belmont Iron Works.

New York Edison Co., Forty-first Street and East River, New York, 750 tons for column cores; mentioned last week and now formally awarded to Post & McCord and American Bridge Co.

Colfax power station, Springdale, Pa., 450 tons, to Pittsburgh-Des Moines Steel Co.

New York & Queens Gas & Electric Co., building at Flushing, Long Island, 200 tons, to American Bridge Co.

Theater, Pittston, Pa., 250 tons, to McClintic-Marshall Co.

Apartment building at 760 Park Avenue, New York, 500 tons, to Post & McCord.

Cameron Public School, Chicago, 386 tons, to Duffin Iron Works.

State of Minnesota, bridge No. 4004, at Scanlon, 236 tons, to American Bridge Co.

Niagara Hotel, Niagara Falls, N. Y., 1000 tons, to Buffalo Structural Steel Co.

Garage in Pittsburgh, 200 tons, to Jones & Laughlin Steel Corporation.

Kentucky Hydro-Electric Co., transmission tower, 1700 tons, to American Bridge Co.

Phoenix Mortage Co. building, Cleveland, 170 tons, to the Forest City Steel & Iron Co.

Cleveland Electric Illuminating Co. building, 108 tons, to the Forest City Steel & Iron Co.

General Accident, Fire & Life Assurance Co., Philadelphia, office building, 750 tons, to Belmont Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Standard Oil Co. of New Jersey, oil tanks to be erected at Bayway, N. J., 10,000 tons, mostly plates.

Highway bridge over Ashley River, South Carolina, 2100 tons.

State Highway Commission of New Jersey, highway bridge over Raritan River at Perth Amboy, 4000 tons.

Standard Oil Co., fourth section of office building at 18 Broadway, 800 tons.

Standard Oil Co., two boiler houses to be erected at Cleveland, 1700 tons.

Bulletin Building and annex, Philadelphia, 1100 tons.

Rock Island Lines, 10 girder spans, DeWitt, Neb., 540 tons.

Power plant, Omaha, Neb., for Louisville interests, 800 tons, bids asked.

The Colorado Fuel & Iron Co. has adopted the "suggestion system" with a view to giving every employee the opportunity to propose the best ideas of which he is capable for the betterment of operating methods and for economy in production. A statement of the system printed in several languages has been posted in conspicuous places on the premises, and assurance is given that every worthy suggestion shall get attention and that every employee shall receive full credit for his ideas. The names of those who make suggestions will be published in the company's bulletin. The plan provides that prompt acknowledgment of suggestions shall be made, stating whether further consideration shall be given and giving reasons when this consideration is not in order. Cash awards will be made for suggestions of merit.

British Iron and Steel Market

Pig Iron Dull—Ferromanganese for Export Lower—Rails Easier—Galvanized Sheets Firmer

(By Cable)

LONDON, ENGLAND, Aug. 7.

Pig iron is dull, with prices weakening further. Steps are being taken to bank three Cleveland furnaces. Iron makers report that such a period of inactivity has not been experienced for several years.

Foreign ore is lifeless. Best Bilbao Rubio nominally is 23s. ($4.24) ex-ship Tees.

English steel prices are unaltered but Scotch ship plates, angles and tees are down 5s. in the home market, to £10 and £9 15s. (2.04c. and 1.98c. per lb.) respectively.

Midland iron workers' wages have been advanced 7½ per cent, under the sliding scale arrangement.

France and the United States have secured contracts for constructional work for the Manchester Corporation. The French tender was £3,000 ($13,680) and the American tender £1,400 ($6,384) below the lowest British figure.

Trade in Continental iron and steel is difficult. Owing to the well-sold condition of the Belgian works, quotations practically are nominal. There are fresh feature offerings of French billets and wire rods by makers, not sellers, [for the first time] since the War.

Tin plate is steady but the revival of business has not been sustained. There is some domestic and export demand, but no substantial parcels are concerned. Welsh plants are remaining closed this week, for the holidays.

Galvanized sheets are strong, with continued demand from India, South America, Australia and South Africa. Makers are fully sold, up to the end of September. Thin gage sheets are in demand, except for Japan.

There is a strong Far Eastern demand for black sheets for November to January shipment. Most works are sold for three months ahead and some to the end of the year. Prices are firm. Japanese specifications are now £19 10s. (3.97c. per lb.).

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£2 1½s.			$9.46
Bilbao Rubio ore†	1 4			5.47
Cleveland No. 1 foundry	5 10			25.08
Cleveland No. 3 foundry	5 3			23.48
Cleveland No. 4 foundry	5 0			22.80
Cleveland No. 4 forge	4 17½			22.23
Cleveland basic	5 5			23.94
East Coast mixed	5 0			22.80
Ferromanganese	18 0			82.08
Ferromanganese*	18 10			84.36
Rails, 60 lb. and up	6 10	to £9 10s.		38.76 to $43.32
Billets	7 5	to 8 0		33.06 to 36.48
Sheet and tin plate bars, Welsh	9 2½			41.61
Tin plates, base box	1 3	to 1 3½		C. per Lb. 5.24 to 5.27
Ship plates	9 10	to 10 0		1.93 to 2.04
Boiler plates	12 10	to 13 0		2.54 to 2.65
Tees	10 0	to 10 10		2.04 to 2.14
Channels	9 5	to 9 15		1.88 to 1.98
Beams	9 5	to 9 10		1.83 to 1.93
Round bars, ¾ to 3 in.	10 15	to 11 5		2.19 to 2.29
Galvanized sheets, 24 g.	18 15	to 19 0		3.72 to 3.87
Black sheets, 24 gage	13 10			2.75
Black sheets, Japanese specifications	15 5			3.10
Steel hoops	12 0	& 12 10*		2.44 & 2.54*
Cold rolled steel strip, 20 g.	17 5			3.51
Cotton ties, Indian specifications	15 0			3.05

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Foundry pig iron:				
Belgium	£5 5s.	to £5	7½	$23.94 to $24.51
France	5 5	to 5	7½	23.94 to 24.51
Luxemburg	5 5	to 5	7½	23.94 to 24.51
Billets:				
Belgium	7 5			$33.06
France	7 5			33.06
Merchant bars:				C. to f. Lb.
Belgium	7 17½	to 8 0		1.60 to 1.63
Luxemburg	8 0	to 8 5		1.63 to 1.68
France	7 10			1.53
Joists (beams):				
Belgium	7 12½	to 7 15		1.55 to 1.58
Luxemburg	7 15			1.58
France	7 10	to 7 12½		1.53 to 1.55
Angles:				
Belgium	8 0	to 8 5		1.63 to 1.68
½-in. plates:				
Belgium	8 5	to 8 10		1.68 to 1.73
⅜-in. plates:				
Luxemburg	7 15			1.58
Belgium	7 10			1.53

Pig Iron Prices Lower—Railroad Equipment Buying Good—Germany Taking Structural Material

LONDON, ENGLAND, July 26.—Conditions in the pig iron markets do not show much improvement. Demand is only meager, in spite of the fact that prices are coming down; stocks at makers' works are reported to be approaching substantial quantities. How long this can continue it is difficult to say, but steps are being made to cut down production if more sales cannot be effected. There has been a spasmodic demand from the continent, more especially from Germany, for hematite, and some fair tonnages were sold, but other continental countries seem unable to entertain business, even though supplies may be wanted. Cleveland prices have fallen appreciably during the last fortnight, and today No. 3 G. M. B. is called by sellers at about 104s., and is quite plentiful while Scotch No. 3 foundry is offered at about 105c. East Coast hematite is quoted at 102s. 6d., and probably less would be taken in the event of an attractive order.

The finished iron and steel situation is a little better. Of course the whole question hangs upon the raw material market, but though pig iron prices have come down, there has been little alteration in the values of steel, makers asserting that present quotations leave little or no selling margin. Germany has been inquiring and has bought fair quantities of structural material, and other export markets have shown a little interest, but contracts for new ship building are few and far between. Apart from the thin sheet trade, the most active departments at the present time are the railroad material manufacturers. Recently the Metropolitan Carriage, Wagon & Finance Co., Ltd., of Birmingham secured good contracts for cars for South Africa. The Birmingham Wagon & Railway Carriage Co., Ltd., have orders for steel cars for the Central Argentine Railway. The Metropolitan Carriage, Wagon & Finance Co. and the Gloucester Carriage & Wagon Co. have been awarded contracts for cars for the Madras & Southern Mahratta Railway. In addition, the Birmingham Railway Carriage & Wagon Co. are busily engaged on the construction of 20 all-steel vestibuled corridor, sleeping and dining cars, for the Compagnie Internationale des Wagons Lits. In connection with the electrification scheme of the Southern Railway, two important contracts for motors and control gear have been awarded to the English Electric Co. and the Metropolitan Vickers Electric Co. The agreement consists of 508 traction motors each of 300 hp. with the appropriate controlling apparatus.

According to Lloyds Register of shipping, 1923-24 just published there was an increase in the steam tonnage owned in the world of 992,421 tons. The countries showing the largest increases were Germany, 702,665 tons, and Italy 167,407 tons. The largest decreases were the United States seagoing tonnage 141,471 tons, and in France 108,548 tons.

Additional plans for expansion are announced by the Peebles Mfg. Co., maker of railroad cranes, whose plant is located at Newton Falls in Trumbull County. Five new buildings will be erected, including a freight car repair structure, foundry, forge shop, machine shop and a building for storage of materials. It is expected to award contracts for the erection of these buildings on Aug. 15.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. ..... 2.50c.

Structural Material

Beams, channels, etc., base, per lb. ..... 2.50c.
Sheet piling ..... 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 2.40c.
Soft steel bars for cold finishing ..... $3 per ton over base
Reinforcing steel bars, base ..... 2.40c.
Refined iron bars, base, per lb. ..... 4.25c.
Double refined iron bars, base, per lb. ..... 4.85c. to 5.00c.
Stay bolt iron bars, base, per lb. ..... 8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. ..... 3.15c.
Hoops, light gage, under 1 in. wide ..... 3.30c. to 3.50c.
Bands, base, per lb. ..... 3.15c.
Strips, base, per lb. ..... 3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb. $1.62

Cold-Finished Steels

Bars and shafting base, per lb. ..... 3.25c.
Strips, base, per lb. ..... 5.00c.

Wire Products

Nails, base, per keg $3.00
Galvanized nails, 1 in. and over ..... $2.25 over base
Galvanized nails, less than 1 in. ..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. 2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per 100 lb. 3.45
Cement coated nails, base, per count keg 2.70
Woven fence, carloads (to jobbers) ..... 67½ per cent off list
Woven fence, carloads to retailers ..... 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 10 per cent off list
Machine bolts, small, cut threads..50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in. ..... 50 and 10 per cent off list
Smaller and shorter, rolled threads
50, 10 and 10 per cent off list
Cut threads ..... 50 and 10 per cent off list
Larger and longer ..... 50 and 10 per cent off list
Lag bolts ..... 60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads..... 50 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.
45 and 10 per cent off list
Larger and longer sizes ..... 45 and 10 per cent off list
Hot pressed square or hex. nuts, blank..... 3.75c. off list
Hot pressed nuts, tapped..... 3.75c. off list
C.p.c. and t. square or hex. nuts, blank..... 3.75c. off list
C.p.c. and t. square or hex. nuts, tapped..... 3.75c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S. ..... 80 per cent off list
⅞ in. and larger, U. S. S. ..... 75 per cent off list
Small sizes, S. A. E. ..... 80 and 5 per cent off list
S. A. E., ⅜ in. and larger..... 75 and 5 per cent off list
Stove bolts in packages..... 75, 10 and 5 per cent off list
Stove bolts in bulk..... 75, 10, 5 and 2½ per cent off list
Tire bolts ..... 50, 10 and 10 per cent off list
Bolt ends with hot pressed nuts..50, 10 and 10 per cent off list
Turnbuckles, with ends, ½ in. and smaller
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller
70 and 10 to 65 and 5 per cent off list
Washers ..... 5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws,
65 and 10 per cent off list
Milled set screws ..... 65 and 10 per cent off list
Upset cap screws ..... 75 per cent off list
Upset set screws ..... 75 per cent off list
Milled studs ..... 50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $3.00 to $3.25
Large boiler rivets, base, per 100 lb. ..... 3.10 to 3.35
Small rivets ..... 70 and 10 to 65 and 5 off list

Track Equipment

Spikes, ⅞ in. and larger, base, per 100 lb.	$3.15
Spikes, ½ in., ⅞ in. and ⅝ in., per 100 lb.	$3.50 to 3.75
Spikes, ⅜ in.	3.50 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ¾ in. and larger, base, per 100 lb..	4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..	5.00 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, base, per 100 lb.	2.75

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	3½	26	11
7 and 8	56	43½	2 to 3	28	13
9 and 10....	54	41½	7 to 12.....	26	11
11 and 12....	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	58	42½	2	23	9
2½ to 4....	57	46½	2½ to 4....	29	15
4½ to 6....	56	45½	4½ to 6....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10....	45	22½	9 to 12.....	16	2
11 and 12...	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3½ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		
Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in. ..	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base ..... 82 per cent off list
Carbon 0.30 to 0.40, base ..... 81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage..	15
2¼-in. O.D. 12 gage..	17	5¾-in. O.D. 9 gage..	55
2¼-in. O.D. 11 gage..	18	5½-in. O.D. 9 gage..	57

Tin Plate

Standard cokes, per base box $5.50

Terne Plate

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. ..... 3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. ..... 3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. ..... 5.35c.

Galvanized

No. 28 (base), per lb. ..... 5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb. ..... 5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. ..... 3.85c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export....	0.33	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.31	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export.....	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic...	0.34	Detroit	0.29	Omaha	0.735
New York, export.....	0.255	Cincinnati	0.28	Omaha (pipe)	0.705
Boston, domestic.....	0.365	Indianapolis	0.31	Denver	1.27
Boston, export.....	0.265	Chicago	0.34	Denver (pipe).....	1.215

Pacific Coast	$1.34		
Pac. Coast, ship plates	1.20		
Birmingham	0.58		
Memphis	0.56		
Jacksonville, all rail..	0.70		
Jacksonville, rail and water	0.415		
New Orleans	0.67		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$117.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid, per ton	117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, received, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.00 to $51.00	$43.00 to $46.00
Maryland	50.00 to 53.00	45.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	48.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 42.00
Ground fire clay, per net ton	6.50 to 9.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	48.00	
Ground silica clay, per net ton	10.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb	2.40
Skelp, sheared, per lb	2.40
Skelp, universal, per lb	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb	2.25c.
Rails, light, rerolled, base, per lb	2.10c. to 2.15c.
Spikes, ⅝-in. and larger, base, per 100 lb	$3.15
Spikes, ½-in., ⅝-in. and ⅝-in., base per 100 lb.	$3.25 to 3.75
Spikes, ⅜-in., base, per 100 lb	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb	2.55 to 2.60
Angle bars, per 100 lb	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c.
Bars, common iron, Philadelphia mill	2.35c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb	2.15c. to 2.25c.
Ground shafting, base, per lb	3.65c.
Cut nails, base, per keg	$3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (1¼% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.50
2500 (5% Nickel)	8.00
3100 (Nickel Chromium)	4.50
3200 (Nickel Chromium)	6.25
3300 (Nickel Chromium)	8.25
3400 (Nickel Chromium)	7.25
5100 (Chromium Steel)	4.00
5200 (Chromium Steel)	8.25
6100 (Chromium Vanadium bars)	5.25
6100 (Chromium Vanadium spring steel)	5.00
9250 (Silico Manganese spring steel)	4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug.	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
1.....	14.87½	14.37½	38.12½	6.75	6.62½	6.60	6.25
2.....	14.75	14.25	38.12½	6.75	6.62½	6.55	6.20
3.....	14.75	14.12½	38.00	6.75	6.62½	6.52½	6.17½
4.....	14.75	14.12½	....	6.75	6.62½	6.52½	6.17½
6.....	14.75	14.12½	38.00	6.75	6.62½	6.50	6.15
7.....	14.75	14.12½	38.37½	6.75	6.62½	6.50	6.15

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Aug. 7.

The markets generally are sluggish and quotations in most of them are lower. Buying of copper is moderate at declining prices. The tin market is inactive and prices are lower. The lead market has turned dull and slightly easier. There is no life to the zinc market and quotations have declined.

Copper.—There has been some moderately good buying of electrolytic copper the past week and there are some substantial inquiries before the market, but, as a whole, conditions may be considered no better than might be expected this time of the year. It is reported that late last week 5,000,000 lb. of electrolytic copper was bought but the actual price realized was not made public. It is generally believed, however, that the metal changed hands at 14.37½c., delivered. Metal has been available at that price for some days and there is no question that further orders could be placed at this level. There is an inquiry before the market for 3,000,000 lb. and another unconfirmed report of one of 4,000,000 lb. It is believed that there is considerable business yet to be placed by consumers for September consumption. The export market is only moderately active. Lake copper is quoted around 14.75c., delivered.

Tin.—The Straits tin market has been inactive on all days except last Thursday, Aug. 3, when about 250 tons changed hands at 37.75c. to 38c., mostly futures. One lot was reported sold at 38.25c. Early in the week dealers seemed eager to make sales, which was interpreted as an effort to sell short, but on Saturday and yesterday there were indications of bidding by dealers to strengthen the market, but very little resulted from either of these movements. On Friday, owing to the death of the President, business was almost completely suspended. Yesterday the markets in London were closed owing to a bank holiday. The quotation of spot Straits tin today was 38.37½c., New York, and London quotations were about 7½s. per ton above those of yesterday at £181 15s. for spot standard, £182 15s. for future standard and £185 5s. for spot Straits. Arrivals thus far this month have been 1425 tons, with 6612 tons reported afloat. Deliveries into consumption in July were 5305 tons, with 2037 tons in stock and landing on July 31.

Lead.—This market has turned quiet and the pronounced strength of a week or so ago has somewhat diminished. Buying by consumers has been very light and there has been very little bidding by dealers. It is believed by some that the recent advance has come to a halt and that a decline may not be unexpected. The price of the leading interest continues unchanged at 6.50c., New York, with the St. Louis price a little lower at 6.60c. to 6.65c.

Zinc.—There is almost no consuming demand for prime Western, and this, together with lower prices in London, has resulted in a softening of the market here. For August or 30-day delivery prime Western is quoted at 6.15c., St. Louis, or 6.50c., New York, which is largely nominal, with the September price 6.20c., New York, and the October, 6.25c.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Quotations for shot and ingot nickel in the outside spot market are 29c. to 32c. per lb.

Antimony.—One seller reports the sale of 600 tons of Chinese antimony for delivery through the rest of the year. The market is fairly active, due partly to the fact that large quantities of antimony are being used by battery makers. Wholesale lots for early delivery are quoted at 7.60c. to 7.70c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers in wholesale lots at 26.50c. to 27c. per lb., New York, duty paid, by such dealers who can obtain it from their principals. The leading domestic producer makes public no quotations.

Old Metals.—The market is weak and business is very quiet. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.00
Copper, heavy and wire	13.00
Copper, light and bottoms	11.00
Heavy machine composition	11.00
Brass, heavy	8.00
Brass, light	6.75
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	6.00
Lead, tea	4.75
Zinc	4.75

Chicago

CHICAGO, Aug. 7.—Tin, lead and zinc have declined while antimony has advanced. There has been no activity in the market outside of hand to mouth buying. Among the old metals lead pipe has declined. We quote in carload lots, Lake copper, 15.25c.; tin, 40c.; lead, 6.65c.; spelter, 6.20c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 10c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 4.75c.; zinc, 4c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 27.50c.; all buying prices for less than carload lots.

June Production of Malleable Castings

WASHINGTON, Aug. 3.—The Department of Commerce announces statistics on the production of malleable castings manufactured for sale during June, 1923, as shown by reports received by the Bureau of Census. The figures for May are revised to include reports received since the preliminary bulletin for that month was issued. The returns include only those castings manufactured for sale as such and do not include those used in the plant or finished and sold as other products.

The returns for June include 96 establishments and show that during the month these plants were operated 67.3 per cent of their total capacity. The revised figures for May include the production of 90 establishments which were operated 71 per cent of their total capacity during the month.

Month	No. of Plants Reporting	Total Production, Tons	Total Shipments, Tons	Orders Booked, Tons	Monthly Capacity of Plants, Tons
June....	96	61,949	61,441	38,536	92,004
May.....	90	64,726	62,806	52,898	91,174

Two foundries and equipment situated on Robeson Street, Reading, Pa., will be offered at public sale on Aug. 18, as the estate of the late Edwin A. Moore. The first unit covers one acre and includes foundry, core building, carpenter and machine building, two sand blast buildings and cupola, engines, boilers, machinery and appliances. The second unit is located at Spring City, Chester County, Pa., and covers three acres. Improvements consist of foundry, machine, power and other buildings, together with cupola and various equipment constituting a well-established foundry business. Both foundries are being operated by the executors and will be sold as going concerns. Information will be given by the Reading Trust Co., executors, Fifth and Court Streets, Reading.

PERSONAL

William C. Reilly, the new vice-president of the Youngstown Sheet & Tube Co., Youngstown, has been general superintendent of the company since 1901. He began his career in the industry as a boy with Brown, Bonnell & Co., at Youngstown, subsequently serving the Mahoning Valley Iron Co. He became identified with the Republic Iron & Steel Co. in 1899, when that company was formed, serving as assistant to James A. Campbell, who was appointed superintendent of the Republic company in the Youngstown district. Mr. Campbell, now the Sheet & Tube company president, and Mr. Reilly were associated together in formation in 1900 of the Youngstown Iron, Sheet & Tube Co., subsequently the Youngstown Sheet & Tube Co.



WILLIAM C. REILLY

Charles A. Tice and George C. Tinsley of Youngstown have formed the Tice-Tinsley Steel Co., organized for the buying, selling and warehousing of iron and steel products, and succeeding the Tice Steel Co. Headquarters are at 402 Terminal Building, Youngstown. Mr. Tice was formerly in the sales department of the Brier Hill Steel Co., Youngstown, and previously with the Berger Mfg. Co., Canton. Mr. Tinsley has been with the David J. Joseph Co. at Youngstown and was formerly connected with the Commercial Shearing & Stamping Co. Plans are being developed for the establishment of a warehouse.

Frank C. Farrell, who has been assistant superintendent of blast furnaces and the steel department of the Youngstown Sheet & Tube Co., Youngstown, has been advanced to works superintendent at Youngstown. Emil F. Vogel, who has been superintendent of the coke works, has been promoted to assistant works superintendent. Both will report directly to E. T. McCleary, recently appointed manager of the company's Youngstown district plants.

Joseph G. Butler, Jr., veteran iron and steel maker of the Mahoning Valley, has been sojourning at Atlantic City. Mr. Butler is accompanied by a number of nurses, owing to his failure to recover from injuries sustained several years ago when he was struck by a motor vehicle.

William Eberline, manager of the Chicago store of the Greenfield Tap & Die Corporation, Greenfield, Mass., has resigned to become assistant sales manager of the Lakeside Forge Co., Erie, Pa.

E. E. Hart, for the past two years on the sales force of the Stocker-Rumely-Wachs Co., machinery dealer, Chicago, has resigned and opened an office in Machinery Hall, Washington Boulevard and Clinton Street, Chicago.

George C. Schade has resigned as purchasing agent of the Fort Pitt Bridge Works, Canonsburg, Pa., effective Aug. 1.

Stanley H. Smith, who represented the Pennsylvania Steel Co. and the Bethlehem Steel Co. in Cleveland and Chicago, and since leaving the latter company has been acting as manufacturers' agent at 422 Frankfort Avenue, Cleveland, where he represents the Wyoming Shovel Works, the National Lock Washer Co., Harrisburg Pipe & Pipe Bending Co. and the Stevens Metal Products Co., has recently been appointed district representative for Ohio for the Titusville Forge Co.

Richard F. Grant of the M. A. Hanna Co., and president of the Cleveland Chamber of Commerce, has been elected director of the sixth district of the United States Chamber of Commerce, comprising Ohio, Michigan, Indiana, Illinois and Wisconsin.

George E. Merryweather, president Motch & Merryweather Machinery Co., has been appointed a member of the board of 12 trustees, which constitutes the executive board of the Cleveland Engineering Society, to take the place of the late H. E. Hackenberg.

Andrew M. Kennedy has been appointed general manager of the Sharpsville Furnace Co., Sharpsville, Pa. He was formerly superintendent of the open hearth department, Trumbull Steel Co., Warren, Ohio, and before that was with the Sharon Steel Hoop Co., Sharon, Pa. He is a graduate of Lehigh University, Class of 1912. R. W. Coats has resigned as superintendent of the blast furnace, effective Sept. 1. His successor is J. W. Halloran, formerly with the blast furnace department of the Republic Iron & Steel Co., Youngstown, Ohio.

W. C. Hamilton has resigned as works manager of the Duquesne Steel Foundry Co., Coraopolis, Pa., to go back with the American Steel Foundries. He becomes chief metallurgist of the latter and will make his headquarters in St. Louis. William Troutman succeeds Mr. Hamilton with the title of general superintendent.

George S. Davies, formerly in the sales department of the Dover Fire Brick Co., Cleveland, has been appointed district sales manager for the Ashland Fire Brick Co., Ashland, Ky., with offices at 1252 East Fifty-fifth Street, Cleveland.

William E. Clark has become connected with the Calorizing Co., Pittsburgh, and will be in charge of Michigan and northern Ohio territory, with offices in Detroit. He was born in Chicago 37 years ago and was graduated from Crane Technical School, Armour Institute of Technology and the United States School for Engineer Officers, Fort Leavenworth, Kan. He served as captain of engineers in the United States Army for two years, being in command of engineer troops in France. During the war he built and had charge of the operation of a heavy forge shop and foundry for the engineers at Nevers, France. Mr. Clark's business experience includes his connection with the engineering department of the American Steel Foundries, Chicago, the sales department of the Babcock & Wilcox Boiler Co., Chicago, as assistant superintendent of the American Foundry & Machinery Co., Chicago, and mechanical engineer for several other companies. He is a member of the American Society of Mechanical Engineers and the American Society for Steel Testing.



WILLIAM E. CLARK

Christian Walter, for two years a director and vice-president of the U. S. Tractor & Machinery Co., Menasha, Wis., which has been reorganized as the Wisconsin Automotive Corporation, has been elected president and will henceforth devote his entire time to the enterprise. G. D. Harris remains vice-president and general manager; Dr. A. B. Jensen, treasurer; Joseph G. Sailer, secretary, and A. F. Reinecke, assistant secretary and treasurer.

Christopher J. Meyer, president Evinrude Motor Co., Milwaukee, expects to sail Sept. 6 from New York to visit the Evinrude factory in Munich, Germany, and for general investigation of export possibilities throughout Europe. His tour embraces visits to France, Spain, Belgium, Denmark and the British Isles.

William Hodges, superintendent of production Standard Steel & Bearing Corporation, Plainsville, Conn., has resigned. He proposes to return to Illinois and engage in business but has not completed plans.

R. W. Chandler, manager industrial truck division Yale & Towne Mfg. Co., Stamford, Conn., is to visit manufacturing centers in England, France, Belgium, Sweden, Denmark, Norway and Holland within the near future.

Walter H. Underwood has been appointed general manager of sales of the St. Louis Coke & Iron Co., St. Louis. He went with the St. Louis company about three years ago to take charge of sales and was made sales manager about two years ago. J. C. Gore, as has been announced previously, was made general sales agent at Chicago.

Jerome Benjamin has been made vice-president of the Harry Benjamin Equipment Co., St. Louis, to succeed Armand Alexandre, resigned. Fred S. Fuld has been elected treasurer to fill the vacancy caused by the promotion of Mr. Benjamin.

W. E. Dunn, Jr., secretary Southern Metal Trades Association with headquarters at Atlanta, Ga., will sail on Aug. 18 on the Leviathan from New York to attend the International Congress of Foundrymen, which convenes in Paris commencing Sept. 2. Mr. Dunn goes as representative of the metal trades industry of the entire South, the trip being given as a compliment in appreciation for his services.

J. H. Crossley of the Metropolitan-Vickers Electrical Co., Manchester, England, who has been in the United States studying industrial electric heating developments, recently sailed on the return journey.

Harry J. Bell, manager safety council, Chicago Association of Commerce, has resigned to accept the position of manager of the safety division of the Milwaukee Association of Commerce, succeeding Charles M. Anderson, who on Aug. 15 will assume charge of the division at Memphis, Tenn.

OBITUARY

WILLIS F. MCCOOK, president, as well as one of the organizers of the Pittsburgh Steel Co., Pittsburgh, and a prominent figure in a legal way for many years in the iron and steel and affiliated industries in Pittsburgh, died at the West Penn Hospital, Pittsburgh, Aug. 5. He was born in Lisbon, Ohio, Jan. 19, 1851. His parents moved to Pittsburgh during his infancy and he had been a resident of that city all his life. He was graduated from Yale University with the class of 1873, and completed the legal course at Columbia University two years later and was admitted to practice in Pennsylvania that year. During his career as a lawyer Mr. McCook was connected with the organization of many of western Pennsylvania's largest industrial enterprises in the capacity of counsel. Early in his career he was the legal representative of Henry C. Frick and T. M. Carnegie. He helped to organize the Frick Coke Co. at the time the Carnegie Steel entered into business relations with Mr. Frick and his associates. Mr. McCook was counsel for Mr. Frick in the latter's celebrated controversy with Andrew Carnegie. He was an active figure in the organization of the Republic Iron & Steel Co., and the American Steel & Wire Co. He was identified with the following corporations: Pittsburgh Steel Products Co., vice-president and director; Mesaba Cliffs Iron Mining Co., vice-president and director; American-Austrian Magnesite Corporation, vice-president and director; Concordia Electric Co., vice-president and director; Workingman's Savings Bank & Trust Co., vice-president and director; Duquesne National Bank, director; Equitable Life Assurance Society of the United States, director; American Iron and Steel Institute, director; Mercy Hospital, Pittsburgh, trustee; Western Pennsylvania School for the Blind, member of the board of managers. He was a member of the Duquesne, Union, University, Oakmont Country, Pittsburgh Golf, Pittsburgh Athletic Association, Yale Club of New York and Catholic Club of New York. He is survived by six daughters and three sons.


WILLIS F. McCOOK

HARVEY H. BROWN, long prominently identified with the iron ore and pig iron and lake vessel industry in Cleveland, died at his home in that city Aug. 2. He was active in business until about a year ago when his health failed. His age was 75 years. He was the senior partner in the iron ore firm of Harvey H. Brown & Co., which he, with his father, Fayette Brown, organized in 1879. Associated with him in that firm was his son, Fayette Brown. He was also president of the Stewart Furnace Co., formerly the Stewart Iron Co., Ltd., which operates a blast furnace at Sharon, Pa., he and his father having purchased the Stewart plant about 1888. He was treasurer of the Stewart company until the death of his father in 1910, when he succeeded the latter to the presidency. Mr. Brown was also long affiliated with the Brown Hoisting Machinery Co., Cleveland, being at one time treasurer, then president, and for the past four years chairman of the board of directors. He was also a prominent figure in financial circles in Cleveland, being a director of the Union Trust Co. and of the Guardian Savings & Trust Co. of that city. He was a member of a family four generations of which have been active in the industrial and financial life of Cleveland. He was a man of strict integrity and of kind disposition and was held in the highest esteem by all of his associates. His father, Fayette Brown, founded the Brown Hoisting Machinery Co., and his brother, Alexander E. Brown, was the president of that company at the time of his death in 1911. The latter's son, Alexander C. Brown, is at present president of the Brown Hoisting Machinery Co. Besides his son, Fayette Brown, Mr. Brown is survived by three daughters and another son, Harvey H. Brown, Jr., who is connected with the Brown Hoisting Machinery Co.


HARVEY H. BROWN

WILLIAM R. MILLER, president W. R. Miller Co., Pittsburgh, furnace and contracting engineer, died at his home in that city on July 26. Mr. Miller was born in Sharpsburg, Pa., in 1850 and had made his home in Pittsburgh practically all of his life. He had a wide acquaintance in the iron and steel industry because of his engineering activities and as the originator of several improvements in furnace installation. He developed the Miller gas producer. For a great many years he was head of the Forter & Miller Engineering Co., from which developed the W. R. Miller Co.

EDWARD M. WOODWARD, president and treasurer of the Woodward & Powell Planer Co., Worcester, Mass., and an ex-president of the National Machine Tool Builders' Association, died at his home, Aug. 2, aged 76 years. He was born in Marlboro, N. H., and learned the machinists' trade in the woodworking shop

of his uncle in that village. His first employment as a journeyman was with Lathe & Morse, Worcester, manufacturers of lathes. In 1870 he became mechanical expert at the southern headquarters of the Weed Sewing Machine Co. at Baltimore, and 10 years later went with E. P. Bullard, founder of the Bullard Machine Tool Co., Bridgeport, Conn., as salesman in the New York office. This connection continued for seven years, in the course of which Mr. Woodward was made a partner. In 1887 he organized the business of the Powell Planer Co., with A. M. Powell, to manufacture the Powell planer, and later, with incorporation, the name was changed to the Woodward & Powell Planer Co. He was a founder and the third president of the National Machine Tool Builders' Association, and had been president of the Worcester Branch, National Metal Trades' Association, president of the Worcester Chamber of Commerce, and president of the Worcester County Mechanics' Association. For many years he took a prominent part in the civic affairs of Worcester, having been president of the common council and of the board of alderman, and chairman of the overseers of the poor. He had been prominent as a mason since young manhood and had received his thirty-second degree. He leaves one son, Edward M. Woodward, Jr., vice-president Woodward & Powell Co.

HORACE VAUGHN WINCHELL, well known as a geologist of the Lake Superior region and iron ore authority, died on July 27 in Los Angeles, Cal., where he had been living for some time. He was born at Galesburg, Mich., in 1865 and graduated from the University of Michigan in 1889. During the two years following he was assistant State geologist of Minnesota. After spending two years in charge of explorations with the Minnesota Iron Co., he engaged in general practice as economic geologist and mining engineer. For several years his services were given to the Anaconda Copper Mining Co. and the Amalgamated Copper Co. In 1906 he was appointed chief geologist for the Great Northern Railroad. Mr. Winchell was an active figure in the promotion of the mining industry and served as president of the American Institute of Mining and Metallurgical Engineers in 1919. He was a member of the Geological Society of America, the National Geological Society, the Lake Superior Mining Institute, the Federal Institute of Mining Engineers, and the Institute of Mining and Metallurgy, an English organization. He was co-author of "The Iron Ores of Minnesota," published in 1891, and was the author of many valuable papers on the geology of ore deposits. He had much to do with the development of the Mesabi iron range and his prophecies of its extent and value, that were received with skepticism by the iron ore trade in the early eighteen-nineties, were more than verified. The funeral was held at Minneapolis, Minn., on Thursday, Aug. 2. The list of honorary pall-bearers included: Ex-President W. W. Folwell and George E. Vincent, Prof. H. F. Nachtrieb, Prof. F. L. Washburne and Dean W. R. Appleby, all of Minnesota University; President Angell of Yale; and C. J. Rockwood, W. F. Webster, N. M. Cross, Thomas S. R. Roberts, Harlow Gale, C. S. Langdon, Warren Upham, John S. Pillsbury, E. C. Gale, C. K. Leith, Herbert Hoover, John D. Ryan, L. W. Hill, Sidney Eastman, J. E. Spurr, F. F. Sharpless, John Blair, Dwight E. Woodbridge, Reno H. Sales and John P. Gray.



H. V. WINCHELL

WALTER P. FEDDER, manager of the order department at New York of the United States Steel Products Co. from the date of its organization, who died on June 22, started in the steel business when he was barely 20 years of age, entering the employ of the Cleveland Rolling Mills in 1895. His birthplace was Pittsburgh.

MAJOR WILLIAM TOZER, director Steel, Peech & Tozer, Ltd., Rotherham, England, and of the United Steel Companies, Ltd., which controls Steel, Peech & Tozer, Workington Iron & Steel Co., Samuel Fox & Co., Rother Vale Collieries, Frodingham Iron & Steel Co. and Appleby Iron Co., died Aug. 2. He had been a member of the Iron and Steel Institute since 1883.

ALOYSIUS J. SWEENEY, assistant to the president McKinney Steel Co., Cleveland, died Aug. 3, after a long illness, aged 46 years. Mr. Sweeney entered the employ of the company 20 years ago as a stenographer and had been in charge of its transportation department for over 10 years.

CHARLES M. MILLER, founder and treasurer Superior Foundry Co., Cleveland, died Aug. 3, after a four months' illness, aged 69 years. He organized the Superior Foundry Co. about 30 years ago. A son, Lester I. Miller, is vice-president of the foundry company.

CHARLES S. HURD, who has been identified for a number of years with the proposal for the building of an iron and steel plant in the New York district, died suddenly in New York, July 31, aged 74 years. Mr. Hurd some years ago conducted the negotiations which resulted in the sale of the Benson iron mine in Northern New York by the Benson heirs to the company which later sold it to the Eastern Steel Co. He was a member of the Bankers' Club and an associate member of the American Iron and Steel Institute.

DELMONT J. KENNEDY, president Bulger Block Coal Co., Pittsburgh, died Aug. 5, in Poland Springs, Me. Mr. Kennedy was a life-long resident of Pittsburgh. He was also president of the D. J. Kennedy Co., the Superior Mining Co., the Darlington Brick & Mining Co., and a director of the City Deposit Bank.

JOSEPH LUTHER WILLIAMS, one of the founders of the Transue & Williams Steel Forging Corporation, Alliance, Ohio, died at his summer home at Petoskey, Mich., July 26. He had recently resided in Cleveland. In 1894, he, with his brother, Silas J. Williams, and Frank and Oliver Transue, formed the Transue & Williams Drop Forge Co., which later was reorganized under its present name. He was secretary and treasurer of that company for a number of years, until poor health compelled him to give up active business, but he retained his interest in the company until death.

Lake Ore Movement in July

Lake Superior iron ore shipments from the upper lake ports in July were 10,411,248 gross tons, or 1,468,912 tons in excess of those for July, 1922, or an increase of 16.43 per cent. The total of this season's shipments to Aug. 1 was 26,596,731 tons, which compares with 17,293,513 tons to Aug. 1, 1922. The shipments by ports and for the season in 1922 and 1923 are as follows:

	July, 1922	July, 1923	To Aug. 1 1922	To Aug. 1 1923
Escanaba	799,536	1,123,048	1,604,130	3,119,695
Marquette	454,221	534,024	848,765	1,335,373
Ashland	1,379,608	1,184,462	2,579,056	3,067,616
Superior	2,010,368	3,013,851	4,364,963	7,648,581
Duluth	2,872,882	3,450,915	5,126,745	8,324,974
Two Harbors	1,425,721	1,104,948	2,769,854	3,099,592
Totals	8,942,336	10,411,248	17,293,513	26,596,731
Increase, 1923		1,468,912		9,303,731

The increase to Aug. 1, this year, in the season shipments was 9,303,218 tons, or 53.80 per cent as compared with last year. Duluth contributed 31.30 per cent of the total against 29.64 per cent a year ago. Escanaba and Ashland made substantial gains this year. Great Northern's percentage this year was 25.54 per cent of the total against 22.43 per cent last year.

NEW TRADE PUBLICATIONS

Feed Water Treatment.—Andrews-Bradshaw Co., Pittsburgh. Bulletin entitled, "Clean Steam From Your Boilers" containing information on the effects of wet and dirty steam from boilers and the limitations of feed water treatment. The publication is intended for the power plant executive.

Gas Burning System.—American Heat Economy Bureau, 826 Wabash Building, Pittsburgh. Small portfolio of drawings showing the application of the Selas one-valve control system for the industrial application of gas for the steel industry. The apparatus is manufactured by the Selas Co., Philadelphia, but the American Heat Economy Bureau has been appointed agent for the United States in connection with the steel industry. K. Huessener is manager of the American bureau. The drawings include an application to sheet mill furnaces.

Pipe Threading Machines.—Curtis & Curtis Co., Bridgeport, Conn. Booklet devoted to new Forbes pipe threading and cutting machines, which are semi-automatic in operation. An automatic die release throws the dies automatically out of the thread when the desired length has been cut. An automatic oiling system delivers cutting-oil at points in advance of each chaser.

Wireless Telephony.—Mangus Electric Co., Inc., Greenwich and Desbrosses Streets, New York. Radio catalog and reference book of 40 pages, containing information concerning radio products.

Belting.—The Chicago Belting Co., 113-25 North Green Street, Chicago. Four-page folder, 6 x 8 in., tells the story of how pre-tested belting is made and sketches in brief the development of the three-ply White Strip brand.

Pumping Machinery.—The Weinman Pump Mfg. Co., 270-80 Spruce Street, Columbus, Ohio. Booklet of 25 pages, 7 x 10 in., comprised of excerpts from bulletins issued since 1919 displaying by word and picture various types of steam and power pumping machinery. Sectional views and repair lists are given. Specifications for the several designs also appear, together with suggestions for architects.

Newport Rotary Oil Burner.—Hydro-Carbon Burner Mfg. Co., Newport, R. I. Catalog of 16 pages and cover, illustrating and briefly describing an oil burner designed for industrial use. It is said to burn efficiently all grades of fuel oil, including Mexican oils as heavy as 11 deg. Baumé. It is used for high and low pressure boilers and hot water heating systems.

Solve the Burning Question with Oil.—Advance Oil Burner Co., 807 East Fifteenth Street, Kansas City, Mo. A catalog of 16 pages and cover devoted to oil burners for industrial and domestic use, including steam atomizing burners, air atomizing burners, oil pumping outfits, etc.

Tool and Cutter Grinding.—Norton Co., Worcester. A tool grinding handbook including a catalog of Norton universal tool and cutter grinding machines. Size 5 x 7 in., 117 pages. Following sections devoted to a description of the company's universal machine, the selection of wheels, and data as to general grinding procedure, there is a section of more than 51 pages devoted to the solution of problems in tool and cutter grinding. The set-up is in most cases illustrated. The catalog of tool grinders is confined to illustrations and specifications of the various units. Wheels furnished with the various machines are shown, as well as the construction and method of adjusting spindles. The book is indexed.

Watchmakers' Tools.—Kendrick & Davis Co., Lebanon, N. H. Describes and illustrates the company's line of tools, including screw drivers of various types, sleeve wrenches, pin vises, bench keys, ring mandrels, hammers, staking blocks, staking tools and other equipment. Size 6 x 9, 83 pages.

Flexible Couplings.—Charles Bond Co., 617 Arch Street, Philadelphia. Booklet F, size 3½ x 6½ in., 12 pages. Devoted to the features and uses of Grundy patent flexible insulated coupling, sizes and dimensions being given. The Mather patent flexible coupling for fractional horsepower loads is also described, and letters regarding the merits of the couplings are included.

Material Handling Equipment.—Herbert Morris, Incorporated, Buffalo. Book 5041, 32 pages, 6 x 9 in. The features of the company's triple-gear chain blocks are described and capacities given. The traveling triple-gear block, blocks with hand-wheel extended, twin lift hoists and the Morris platform hoist are also shown. The worm gear block is illustrated and described and also trolleys of the push and geared types and an electric rope hoist. The illustrations include views of actual installations.

Grinding Wheels.—L. Best Co., 28 West Broadway, New York. Supplementary catalog of more than 80 pages. The manufacture of Sterling grinding wheels is briefly outlined and list prices and rules for calculating list prices of straight, cup, cylinder and tapered vitrified and silicate wheels are given, the same data being given also for shellac and rubber wheels. A large part of the catalog is devoted to list prices of special shapes used on various makes and types of grinding machines. Tables of information are included.

Fuel Oil Equipment.—Combustion Engineering Corporation, 43 Broad Street, New York. An attractive booklet designated as the QC-1, devoted to the construction and use of Quinn fuel oil burning equipment. Data relative to the properties, specifications, advantages and supply of fuel oil are given. The Quinn oil burner is described in detail and the operating and equipment cost of oil vs. coal is taken up. A section on important considerations in installing an oil burning system treats of oil storage, pumping, burning. The design of furnaces is outlined and a section is devoted to an explanation of the combustion of fuel oil. Size 8½ x 11 in., 31 pages.

Grinding Wheels.—Norton Co., Worcester. Booklet of 20 pages, 4½ x 7 in., the title of which, "Factors Affecting Grinding Wheel Selection," indicates the subject matter dealt with. A table of grinding wheel recommendations for various kinds of work and operation is included.

Welding and Cutting Apparatus.—Bastian-Blessing Co., 125 West Austin Avenue, Chicago. Catalog No. 27. Rego welding, cutting, brazing, soldering and lead burning outfits are described and illustrated, one section being devoted to complete outfits, trucks, goggles and hose; another to torches and kerosene burners, and a third to regulators, gages, manifolds, acetylene generators, and fittings. A price list and telegraph code covering the items in the catalog is separate.

Shipbuilding Furnaces.—Charles F. Kenworthy, Inc., Waterbury, Conn. Bulletin No. 82 describes plate and angle furnaces and a flanging or boilermaker's furnace for shipbuilders' use and designed for burning coal, gas or oil fuel. Chamber widths for the plate heating furnaces run from 48 to 144 in., with lengths up to 13 ft. 6 in.; for the angle or bar heating furnaces from 24 to 42 in. and with lengths up to 60 ft.

Sheet Metal Blocking Machines and Wrapping Attachments.—Charles F. Kenworthy, Inc., Waterbury, Conn. Bulletin No. 86 describes a wrapping machine designed for brass mill work and particularly for minimizing labor.

Portable Rivet Furnace.—Charles F. Kenworthy, Inc., Waterbury, Conn. Bulletin No. 81 is a leaflet describing a vertical oil-fired furnace for heating rivets up to 1½ in. diameter. Its capacity is 500 to 600 ⅞-in. rivets per hour. It can be brought up to full heat from cold in 10 min.

Non-Oxidizing Annealing Furnaces.—Charles F. Kenworthy, Inc., Waterbury, Conn. Bulletins Nos. 80-N, 83-N, 87-N, 89-N, 90-N, 91 and 93 are devoted to different types of annealing furnaces designed to avoid all danger of oxidizing products in process of treatment. The different types include vertical and horizontal furnaces of various sizes, from those used by jewelers, with annealing capacity as low as 170 cu. in., to furnaces capable of handling as much as 5000 lb. per hour. These are all illustrated and briefly described in the bulletins, which give certain particulars of specifications.

Over-Fired Annealing Furnaces.—Charles F. Kenworthy, Inc., Waterbury, Conn. Bulletin No. 81 describes and illustrates furnaces for annealing brass, copper, German silver and steel products, varying from small furnaces to those of the car type. The latter are made in sizes from 36 to 84 in. door opening and with chambers from 10 to 20 ft. long.

Billet Heating Furnaces.—Charles F. Kenworthy, Inc., Waterbury, Conn. Bulletin No. 85 illustrates and describes a continuous furnace for use in rod mills, extrusion plants, shrapnel plants and hot tube rolling mills in sizes ranging from 30 to 84 in., with heating chamber length from 12 to 30 ft.

Hot Metal Handling Machinery.—Charles F. Kenworthy, Inc., Waterbury, Conn. Bulletin No. 92 illustrates and describes pan pulling machines and crane tongs, particularly for use in wire and tube mill work and for handling material in bulk.

The Magic Dial.—W. S. Ray Mfg. Co., San Francisco. An 8-page pamphlet describing and illustrating an auto-

matic oil burner for use in connection with domestic heating systems. A folding chart completes the illustrations. The arrangement is fitted for oil fuel, gas for ignition, electricity to control the burner through a thermostat and means for controlling oil and air automatically.

Rotary Fuel Oil Burner.—W. S. Ray Mfg. Co., San Francisco. Catalog A of 12 pages deals with high pressure installations for stationary and marine boilers. It is thoroughly illustrated both by photographs and drawings and covers equipment from 6 to 600 hp. per unit.

Rotary Fuel Oil Burner.—W. S. Ray Mfg. Co., San Francisco. Catalog C is devoted to low pressure boilers, furnaces and special industrial uses. It runs through sizes from 6 to 600 hp. per unit, and is illustrated in the catalog by both drawings and photographs.

Air Compressors and Vacuum Pumps.—Pennsylvania Pump & Compressor Co., Easton, Pa. A 32-page catalog, well illustrated, describing details of the equipment carried in the title. The compressors listed as power-driven run from 44 to 875 cu. ft. of free air per minute. Steam-driven compressors are covered, from 67 to 875 cu. ft. Power-driven vacuum pumps are listed, running from 311 to 2502 cu. in. piston displacement, while steam-driven vacuum pumps of 572 to 2502 cu. in. are covered. Air receivers are described, with diameters from 16 to 48 in.

Suction Gas Producer Plates.—Smith Gas Engineering Co., Dayton, Ohio. In Bulletin No. 19, June, 1923, 36 pages are devoted to descriptions of producer systems of the mechanically operated type, as well as stationary producers designed for use with miscellaneous fuels. Numerous illustrations are given of producers in service as well as details of parts. The producers described range from 25 to 400 hp., with a rating of 10,000 B.t.u. per hour per hp.

The Coxe Stoker.—Combustion Engineering Corporation, Broad Street, New York. An 8-page catalog illustrating and describing a traveling grate stoker designed for industrial use, with particular reference to burning coke, breeze and small size anthracite coal. A table of tests made in five different plants gives much information.

Pyrometers.—Brown Instrument Co., Philadelphia. Booklet with title of "The Automatic Control of Temperature in the Heat Treating of Steel." Two installations of the company's automatic control pyrometer are described and illustrated and the features of the pyrometer are outlined. The instrument is shown installed in an electric furnace, and the company's cold junction compensated pyrometer is briefly taken up. Size 7¾ x 10½ in., 12 pages.

Ground Form Cutters.—Brown & Sharpe Mfg. Co., Providence. Booklet of 12 pages devoted to the advantages of ground form gear, spline shaft and sprocket cutters.

Grinding and Polishing Machines.—L. Best Co., 28 West Broadway, New York. Booklet describing and illustrating the features of the company's ball bearing grinding and polishing machines, two sizes of which are available. Special exhaust type safety hoods are also described.

Lathe and Drill Chucks.—Westcott Chuck Co., Oneida, N. Y. Catalog No. 510 giving dimensions and list prices of the company's scroll combination lathe chucks, cutting-off chucks, spur geared scroll combination lathe chuck, scroll universal lathe chuck, and the IXL independent and two-jawed chucks. Little Giant, double grip. Little Giant auxiliary screw and the Oneida are among the drill chucks shown.

BOOK REVIEWS

An Introduction to the Study of Metallography and Macrography. By Leon Guillet and Albert Portevin, translated by Leonard Taverner. Size 6 in. x 9½ in. Pages xv + 289; 117 plates and numerous illustrations. McGraw-Hill Book Co., Inc. Price, $7.

Although a young science, metallography already possesses an extensive literature in many countries. The present volume is a translation of a book by the eminent French workers, Dr. L. Guillet and A. Portevin, and is an introduction to the whole field of metallography covering both ferrous and non-ferrous metals and alloys. It is based on the course of instruction given by the authors at two of the well-known Paris schools or universities, namely the Ecole Centrale des Arts et Manufactures and the Conservatoire National des Arts et Metiers.

Part I deals with metallography and constitutes the major part of the book, including 256 pages. It is divided into five chapters. The first one of 22 pages is on the preparation of microsections. The authors define metallography in a very narrow way "as the microscopical study of polished and etched metallurgical specimens," but fortunately they treat the subject in a much broader way in their book. This first chapter, while it contains nothing particularly new, is a very clear description of methods of polishing and etching microsections.

The second chapter of 64 pages deals principally with equilibrium diagrams and thermal analysis, and has a good section on the relation between the equilibrium diagram, the microstructure and the physical properties of metals and alloys. Chapter 3 of 61 pages deals with the various mechanical tests, mechanical and heat treatment, and the relation between the diagrams, the treatment and the final properties.

Chapter 4 of 71 pages, the longest in the book, takes up the metallography of iron, steel and ferrous alloys. A short table gives a commercial classification of steels which looks strange to us. For instance, low carbon steel is given as 0.25 to 0.40 per cent, and medium carbon steel as 0.40 to 0.60 per cent. An interesting feature is that the so-called stable equilibrium diagram of the iron-graphite series is described in detail as well as the usual iron-carbide diagram. This chapter contains a detailed description of the constituents and structures of carbon steels, and also a full section dealing with the alloy steels along the lines of Guillet's book: Les Aciers Speciaux. The final chapter of Part I, containing 59 pages, takes up the brasses, bronzes, bearing metals and other industrial non-ferrous alloys.

Part II, while relatively short, is interesting, and gives methods and results of macrographic examination. Attention may be drawn to the numerous plates and illustrations which constitute a valuable feature of the book. On the whole they are excellent, but it should be mentioned that the only evidence of poor translation is in some of the titles. Also the magnifications used for the micrographs are very numerous, such as 18, 27, 44, 45, 57, 80, 85, 170, 180, 280, etc., as well as the standard magnifications in general use here.

In general it may be said the book is of interest and value particularly as showing a French method of teaching the subject.

G. B. WATERHOUSE.

Iron and Brass Valves, Cocks, Pipe Fittings

A new flexible covered catalog of the Pittsburgh Valve & Fittings Co., Barberton, Ohio, has been received, embracing 355 pages of data on the general subject indicated by the title. There is a large amount of tabular matter covering dimensions, capacity and prices for hundreds of different sizes and types of equipment, in addition to useful tables of bolts, pipes, pipe threads, steam table and circular measurement.

The work is well indexed and should find a place in the library of engineers specifying equipment of this type. The company calls attention to a large increase in the variety of goods made, in response to increasing needs and demands of the trade, and stands ready to amplify in any necessary way the information contained in the catalog pages.

New Books Received

American Iron, Steel and Heavy Hardware Association. Report of Fourteenth Annual Convention. Pages 160, 6 x 9 in. Published by American Iron, Steel and Heavy Hardware Association, Marbridge Building, New York.

Walzen und Walzen-Kalibrieren. By Wilhelm Tafel. Pages 303, 6 x 9 in.; illustrations 186; second edition. Published by Fr. Wilh. Ruhfus, Königshof 23, Dortmund, Germany. Price, $1.60.

Plans of New Companies

The McVoy Sheet & Tin Plate Co., 2042 Grand Central Terminal, New York, has been reorganized from the sheet and tin plate company of Eugene J. McVoy, Chicago, organized in 1877. The new corporation will act as distributer of blue annealed and tank steel, tin and terne plate, sheet copper and zinc. Its only item of manufacture is galvanized sheets. Capital employed will be about $1,000,000. Mr. McVoy is president. Main office is at 344-50 West Austin Avenue, Chicago. Plans are not yet completed.

The Star Metal Box Co., 509 West Nineteenth Street, New York, is being reorganized and incorporated with $100,000 capital stock, to manufacture metal boxes and containers for public service and industrial use. The incorporators, S. and I. Halper and J. N. Arnstein, formerly conducted such a business, their buildings having been destroyed by fire. They are now looking for a factory somewhere in Brooklyn, which will double capacity. It is likely that additional equipment will be needed. S. Halper is president.

The Warner Speed Control Corporation of America, New York, has been incorporated with capital stock of $20,000 to manufacture motors, engines and kindred products. The company is still in the formative stage and has not completed plans for operation. W. G. Lovatt and G. and A. Worsnop are the incorporators. Address care of H. S. Hechheimer, 1540 Broadway.

The Fox Hardware Co. New York, has been organized with capital stock of $50,000 to manufacture and deal in harware products. Actual operation will be delayed for a time, pending the disposal of organization matters. B. Chess, 302 Broadway, is corporate representative.

The American Steam Specialty Corporation, New York, has been organized to manufacture steam equipment, principally values. It is now looking for a plant and hopes to proceed with operations as soon as plant and equipment are provided. Manufacturing will be on a limited scale. U. S. Hamel, 206 Broadway, represents the company.

The Grayson & Dressel Mfg. Co., Ashland, Ky., has been incorporated with capital stock of $20,000 to manufacture stoves, gas appliances and hardware specialties. Plans are not yet definitely decided but when the time arrives, the company will conduct its own operations. Charles J. Grayson and John B. Dressel head the company.

The Seamless Tube Co. of Wisconsin has been organized at Appleton, Wis., by William Geenan, A. G. Brusewitz and Matt Rossmeisel, who purchased the property of the Reliance Motor Truck Co. at receiver's sale some time ago. Capital stock is $400,000. For several weeks repairing has been done, and also some general machine work. The company's main product will be seamless tubing.

The Surplus Steel & Iron Service, Chicago, has been organized with offices at 327 South La Salle Street, to handle surplus stocks. W. W. Decker, for 20 years with the Cleveland Co-operative Stove Co., and F. X. Devlin, who was formerly purchasing agent for Spang, Chalfant & Co. and the National Tube Co., head the new organization.

The Universal Pipe Machine Co., 128 Monroe Avenue, Memphis, Tenn., has been organized with $50,000 capital stock to manufacture power-operated pipe threading machines and parts. A few of these machines are now being made by contract but later the company may undertake its own manufacturing. Joseph L. Tanner is secretary.

The Hunter Crucible Steel Co., with works and general offices at 6600 Grant Avenue, Cleveland, has acquired the plant and equipment of the Electric Steel & Forge Co. and has conducted its business in crucible steel for some time. The latter company is no longer in business.

The Western Metal Crafts Co., 2037 West Sixteenth Street, Los Angeles, Cal., recently organized to manufacture metal products, has equipped a plant and is now in operation. Paul Moyer is president.

The Honecker No-Air Tire Corporation, Brookville, Ind., has been organized to manufacture tires for automotive use. Some time will be consumed in completing preliminary preparations before actual operation will be considered. John C. Morin is manager.

The Combined Drill & Screw-Set Co., Brooklyn, recently incorporated with capital stock of $50,000, will manufacture a drill invented by Sydor Solop, who heads the company. The company is in the process of organization, and probably will not take any steps to begin manufacture or to put the appliance on the market for some time.

The Crown Mining & Mfg. Co., Dahlonega, Ga., with executive offices at 402-8 Grant Building, Atlanta, Ga., has been incorporated with capital stock of $1,000,000 to operate mining properties and to manufacture from the mined products. Iron, magnetite, copper and sulphur will be mined. In prospecting and operating the company will require considerable mining, transportation, smelting, power plant and electrical equipment. The management is particularly interested in improved ore crushing and concentration apparatus. Data and catalogs should be mailed to Box 1571, Atlanta. John B. Hutchins is secretary-treasurer.

The Giant Spring Bumper Co., New York, recently incorporated with capital stock of $50,000, is manufacturing double-strip spring bumpers for automobiles. The plant is located at 425 East 102d Street in conjunction with the plant of the International Metallic Casket Co. V. Breuer, P. Salkin and Philip Leschnik, incorporators of the Giant Spring Bumper Co., also control the International Metallic Casket Co. No additions of machinery are likely at the present time.

The Henry Stadlmair Co., Inc., New York, incorporated for $100,000 to manufacture talking machines and parts, will confine itself to a jobbing business for the present.

The Saginaw Handle Co., Saginaw, Mich., recently organized to manufacture various kinds of handles for industrial use, has its factory well unnder construction. It will likely require some equipment after building is finished, but it is not yet in a position to name its needs. J. A. Max is manager.

The Bridgeport Cabinet Works, 112-14 South Avenue, Bridgeport, Conn., has been organized to build and repair automobile bodies, office fronts and fixtures, having acquired a business already established. At present it has buildings and equipment for immediate needs. C. A. Dornack heads the company.

The Riverside Coke & Iron Co., with a capital stock of $250,000, has been incorporated as a subsidiary of the Mississippi Valley Iron Co., St. Louis. The new company will produce coke at the plant of the Mississippi Valley Iron Co. for its own consumption.

Trade Changes

Roehm & Davison, 6450 Mack Avenue, Detroit, have moved to 3131 Beaufait Street.

D. G. McMillan has disposed of his interests and retired as president of the National Gage & Equipment Co., LaCrosse, Wis., manufacturer of dash gages and metering devices for automobiles. He served as trustee of the bankrupt Hans Motor Equipment Co. in 1914 and with P. M. Gelatt organized the present company in 1915, developing it into one of the largest industries in the Northwest. Mr. Gelatt, formerly vice-president and secretary, has been elected president; J. M. LaVaque, vice-president and treasurer; P. E. Stroup, Detroit, vice-president and sales manager; J. E. Richmond, secretary.

The Broad Gage Iron Works, Inc., 80 Portland Street, Boston, ornamental iron workers, has leased for a long term of years manufacturing quarters at 193 Friend Street, that city.

Walter B. Enck, for several years assistant to the president, Donner Steel Co., Buffalo, but who recently has been engaged in the coal and coke business in Philadelphia on his own account, has accepted the position of Philadelphia resident manager of the Pioneer Coal & Coke Co., Oliver Building, Pittsburgh. He will retain his present offices in the Pennsylvania Building, Philadelphia.

The Morgan H. Grace Co., Inc., 301 Produce Exchange, New York, has taken over the import and export business of Bush & Daniels, who are retiring from active business. Mr. Daniels will remain with the company as a director. Business will be continued and expanded along present lines.

General sales offices of the Keokuk Electro-Metals Co. have been moved to Keokuk, Iowa, where furnaces and executive offices are located.

The Heine Boiler Co., St. Louis, has made the following changes in sales organization, effective Aug. 1: George F. Murphy, having completed the reorganization of the New York office, has taken charge of the Philadelphia territory with headquarters in the Pennsylvania Building. Harold P. Childs, formerly special representative of the executive offices of the General Electric Co., New York, has become associated as manager of the New York office with headquarters at 11 Broadway. J. R. Fortune, formerly manager of the Detroit office, has assumed charge of the territories formerly covered by the Pittsburgh, Cleveland and Detroit offices, and will maintain offices in the Dime Bank Building, Detroit, and in the Park Building, Pittsburgh. The Cleveland office has been discontinued.

The Miller Spouting Co., manufacturer of automobile and hardware stampings, West Bend, Wis., has changed its name to the Metal Stamping Corporation.

Machinery Markets and News of the Works

DULL, UNPROFITABLE MARKET

Machine-Tool Business Quiet in Nearly All Districts

Only Business of Importance Is Purchases by Several Railroads, None of Large Volume

Mid-summer quiet continues in all of the leading machine-tool markets, the only business to relieve the dull monotony being purchases by several railroads ranging from a single tool up to 10 or a dozen.

The Chicago & North Western has bought about 10 machines which were listed in THE IRON AGE of June 28. The Chicago, Burlington & Quincy, according to latest advices from Chicago, will close on its list within the next fortnight. The Elgin, Joliet & Eastern is also expected to close very soon on its inquiry of long standing. A few orders are being placed this week by the Illinois Central. The Nickel Plate has ordered nine tool grinders, but has not yet closed on another inquiry for about 15 miscellaneous tools.

An interesting inquiry, which may indicate future business, comes from the Pennsylvania Railroad, Central Region, which is taking bids on 34 tools. This road has not indicated just when orders will be placed.

The Southern Railway has bought a planer, four boring mills, a wheel press and a carwheel borer. The Nashville, Chattanooga & St. Louis has ordered a 3500-lb. steam hammer and the Georgia, Florida & Alabama has bought a 1500-lb. steam hammer.

The machine-tool trade sees some signs of returning confidence, but it is not believed that any marked improvement in the demand for tools may be expected before September.

New York

NEW YORK, Aug. 7.

RAILROAD buying, the chief activity in this district for the past few weeks, has quieted down considerably, although a number of tools are still pending on lists of different roads. Few new inquiries, even for single tools, are reported the past week. The used tool market is also quiet. A recent railroad purchase was that of the Southern Railway and included a 42-in. planer, two 44-in. boring mills, a 400-ton wheel press, a carwheel borer, two side-head boring mills. The Nashville, Chattanooga & St. Louis Railroad has closed on a 3500-lb. steam hammer, and the Georgia, Florida & Alabama Railroad on a 1500-lb. steam hammer. The American Laundry Machine Co., Cincinnati, has bought a 6-ft. boring mill.

Contract has been let by the Independent Metal Box Corporation, 652 Metropolitan Avenue, Brooklyn, to the Wexler & Levine Realty Co., 637 Metropolitan Avenue, for a new one-story plant. Levy & Berger, 375 Fulton Street, are architects.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Aug. 21, for 10,530 lb. of connecting rods for use at the Brooklyn Navy Yard, schedule 1186.

The W. B. McLean Mfg. Co., 319 Freeman Avenue, Long Island City, manufacturer of fixtures, show cases, etc., with headquarters at 3042 Bigelow Street, Pittsburgh, has tentative plans for a new reinforced-concrete plant on site lately acquired at Academy Street and Freeman Avenue.

The Titanium Pigment Co., 94 Fulton Street, New York, a subsidiary of the National Lead Co., 111 Broadway, has taken title to the former plant of the Mineral Refining & Chemical Corporation, St. Louis, on a 17-acre tract. The new owner will remodel the plant and install additional equipment.

The Goodyear Tire & Rubber Co., 120 Broadway, New York, has leased property at Eleventh Avenue and Fifty-eighth Street, 100x250 ft., for the erection of a new six-story building to consolidate its local plant and branches, including that at Long Island City. The financial offices will be retained at the Broadway address noted.

The Norma Co. of America, Inc., Anable Avenue, Long Island City, manufacturer of ball bearings, etc., has engaged Francisco & Jacobus, 511 Fifth Avenue, New York, architects, to prepare plans for the initial unit of its proposed works at Glenbrook, near Stamford, Conn., to be one-story, 160x325 ft.

The truck and car axle division of the Savage Arms Corporation, Utica, N. Y., and Sharon, Pa., consisting of dies, tools, patterns, patents, etc., has been acquired by the Wisconsin Parts Co., Oshkosh, Wis., which will continue manufacture at the latter plant. Extensions are being made and the equipment will be removed to the Oshkosh works.

Power equipment, conveying and other machinery will be installed in the two-story incinerator plant to be erected at Woodhaven, L. I., by the municipal works department, Borough of Queens, 68 Hunterspoint Avenue, Long Island City, estimated to cost $240,000, for which bids will be asked about Aug. 20. Joseph Powers, 8008 Boulevard, Rockaway Beach, L. I., is engineer.

The Nathan Novelty Mfg. Co., 55 Fifth Avenue, New York, manufacturer of automobile equipment and accessories, has purchased a factory on 182d Street, between Clinton and Prospect Avenue, 150x207 ft., for a new works.

The Mesabi Iron Co., 25 Broad Street, New York, has arranged for a stock issue of $1,572,536, the entire proceeds to be used for extensions in its sintering plant to increase the capacity from 250 to 800 tons a day.

The Pathe Phonograph & Radio Corporation, 18 East Forty-second Street, New York, has leased the five-story building at 150 East Fifty-third Street for a new plant and will install equipment at once.

Manual training equipment will be installed in the three-story and basement junior high school to be erected at Hawthorne Avenue and Culver Streets, Yonkers, N. Y., to be known as the Nathaniel Hawthorne school, estimated to cost $300,000, for which bids will be taken at once on a general contract. G. H. Chamberlain, 18 South Broadway, is architect.

In connection with a merger of the Calumet & Hecla Mining Co., 25 Broadway, New York, with the Ahmeek Mining Co., Centennial Copper Co., and affiliated interests, plans are under consideration for the construction or acquisition of plants for the manufacture of brass and copper products, to be operated in conjunction with the mining properties in the Michigan copper districts.

A machine shop will be installed in the one-story automobile building to be erected by the Department of Plant and Structures, Municipal Building, New York, on 181st Street, 80x210 ft., estimated to cost $150,000. Max Hausle, 3307 Third Avenue, is architect.

The Superintendent of Lighthouses, Staten Island, N. Y., will receive bids until Aug. 15 for two industrial electric trucks and six trailer trucks, proposal 25404.

A machine shop and parts department will be installed in the two-story automobile service building, 115x118 ft., to be erected at Boscobel Avenue and 172d Street, New York, by Herbert Mitchell, care of John J. Dunnigan, 394 East 150th Street, architect, estimated to cost $350,000.

The New Jersey Commercial Body Co., 235 Elizabeth Avenue, Newark, has awarded a contract to Enstice Brothers, 111 Academy Street, for a new one-story automobile body manufacturing plant, 100x280 ft., at 353-67 Frelinghuysen Avenue, estimated to cost $65,000. W. Orrin Bartlett, 738 Broad Street, is architect. W. H. Henderson is president.

The Okonite Co., 501 Fifth Avenue, New York, manufacturer of insulated wires and cables, with plant at Passaic, N. J., has arranged for a note issue of $600,000, a portion of the proceeds to be used for extensions. H. Durant Cheever is president.

Fire, July 26, destroyed the plant of the Bound Brook Crushed Stone Co., Bound Brook, N. J., in the Chimney Rock Ravine section, with loss estimated at $200,000, including stone-crushing and other machinery. It is planned to rebuild.

Work will commence on extensions in the power house at the Essex County Sanatorium, Verona, N. J., by the Board of Freeholders, Court House, Newark, estimated to cost $50,000. Runyon & Carey, 845 Broad Street, Newark, are engineers.

Bids will be received by the Chester Township Committee, Maple Shade, N. J., until Aug. 14, for one steel standpipe, 20 ft. in diameter and 120 ft. high. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers.

The Associated Utilities Co., care of William Braun & Co., 30 Church Street, New York, engineers, is arranging for the erection of a new ice-manufacturing and cold storage plant at Newark, estimated to cost $1,000,000 with machinery.

New England

BOSTON, Aug. 6.

THE most important transaction the past week involved a 50-in. geared head lathe and a fairly large squaring shear, purchased by the General Electric Co., Pittsfield, Mass.; additional press equipment and a large punch and shear, by a Massachusetts textile machinery maker; and a five-ton I-beam crane, by the Cape Ann Anchor Works. Some New England builders, confining their activities to machine tools alone, are beginning to feel the business pinch not only in this but in other territories, the volume of unfilled orders on their books having declined rapidly the past month. British buyers are sounding out this market for miscellaneous used equipment. In the absence of new inquiries, local machine tool dealers are confining efforts to revive old inquiries.

Makers of electric trucks report a material improvement in business the past fortnight, good orders having been placed locally as well as in Bridgeport and New Haven, Conn. The Yale & Towne Mfg. Co., Stamford, Conn., reports an improvement in the export demand for electric trucks. Some of the smaller New England makers of tools, dies, etc., are exceptionally active. The small tool business generally, however, is slowing up. Curtailment in operations of New England cotton mills has checked what heretofore was an active transmission market. The American Steel & Wire Co., Worcester, Mass., will spend a large share of $300,000 on transmission in changing over some of its equipment to motor drive.

Bird & Sons, Inc., South Walpole, Mass., has decided to hold in abeyance its proposed one-story and basement machine shop, 80 x 140 ft.

Work has been started by the Tileston & Hollingsworth Co., 892 River Street, Hyde Park, Boston, paper manufacturer, on a two-story, 40 x 100 ft. addition to cost approximately $100,000.

The recent auction sale of the George H. Adams Needle Co., Franklin, N. H., to Frank R. Woodward, Hill, N. H., has been confirmed by the courts. Preliminary plans have been made for improvements, including the development of water-power for the operation of machinery.

The Acme Mfg. Co., Bangor, Me., manufacturer of pipe clamps, etc., will take bids this month for a new one-story plant. G. A. Hershey is treasurer.

The Blackstone Valley Gas & Electric Co., Pawtucket, R. I., will commence the erection of a one-story power house, 100 x 120 ft., on West Park Place, Woonsocket, R. I., estimated to cost $60,000. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

The French Mfg. Co., Robbins Street, Waterbury, Conn., manufacturer of bronze and copper tubing, etc., has awarded a general contract to the Torrington Building Co., Torrington, Conn., for a one-story addition, 72 x 120 ft., estimated to cost $30,000. W. E. Hunt, Torrington, is architect.

The American Schaeffer & Budenberg Corporation, 338 Berry Street, Brooklyn, N. Y., a subsidiary of the American Steam Gage & Valve Mfg. Co., 208 Camden Street, Boston, has taken over the branch plant of the parent organization at 3 Grand Street, Worcester, Mass., for the establishment of new works to manufacture gages, valves, etc.

The American Thermos Bottle Co., 366 Madison Avenue, New York, has tentative plans for the erection of a new factory in the vicinity of Hartford, Conn.

A one-story power house will be erected at the mill of the Rathbun Knitting Co., Woonsocket, R. I., to be 40 x 44 ft. Knight C. Richmond, Providence, R. I., is engineer.

The Hopedale Mfg. Co., Milford, Mass., manufacturer of textile machinery, will build a one-story foundry, 80 x 90 ft.

The Scovill Mfg. Co., Waterbury, Conn., manufacturer of brass goods, etc., has awarded contract to the Berlin Construction Co., Berlin, Conn., for extensions to cost $50,000.

Manning, Bowman & Co., Pratt Street, Meriden, Conn., manufacturer of enameled ware, etc., has tentative plans for additions to cost approximately $100,000, including equipment.

The Ashuelot Gas & Electric Co., Concord, N. H., is planning the construction of a new hydroelectric power plant in the vicinity of Marlboro, N. H., to cost about $100,000.

The Hartford Electric Light Co., Hartford, Conn., is perfecting plans for an addition to its South Meadows power plant to double the present capacity. A new steam-turbo generator and auxiliary machinery will be installed. Extensions will be made in the transmission system.

P. K. Lindsay & Co., 384 Atlantic Avenue, Boston, manufacturer of air compressors, etc., is planning the installation of an engine lathe, bench type, 9-in. swing.

The Bristol Co., Waterbury, Conn., manufacturer of measuring instruments, etc., has awarded a general contract to the Clark Construction Co., 168 Grand Street, for a one-story addition to its plant in the Platts Mills section, 50 x 100 ft., estimated to cost $50,000.

Power equipment, ovens, conveying and other machinery will be installed in the two-story and basement addition, 60 x 100 ft., to be erected at the plant of the Dexter Baking Co., Waterbury, Conn. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects.

Philadelphia

PHILADELPHIA, Aug. 6.

JOSEPH PICKARD'S SONS, Inc., Palethorp and York Streets, Philadelphia, manufacturer of wire products, has taken bids on a general contract for a new plant. Clarence E. Wunder, 1415 Locust Street, is architect.

The Supply Officer, Navy Department, Philadelphia, will take bids at once for 24 motor starters, requisition 651; and for 2800 steel shackles, aero requisition 642.

Contract has been awarded by the Yellow Cab Co., 1208 North Thirty-first Street, Philadelphia, to Ketcham & McQuade, Philadelphia, for a new service building, parts and automobile repair works estimated to cost $120,000.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from Balmuccia, Italy, for American machinery to manufacture iron shoe lasts.

The Edward G. Budd Mfg. Co., Twenty-eighth Street and Hunting Park Avenue, Philadelphia, manufacture of steel automobile bodies, is receiving bids on a general contract for the erection of an addition at Hunting Park Avenue and Wissahickon Street. The Ballinger Co., Twelfth and Chestnut Streets, is architect.

Plans have been completed for an addition to the power house of the University of Pennsylvania, Thirty-fourth and Spruce Streets, Philadelphia, estimated to cost $45,000.

A power plant will be constructed by the Viscose Co., Marcus Hook, Pa., at its proposed artificial silk plant in the Holmesburg-Tacony section, Philadelphia, estimated to cost $3,000,000.

The Acme Rubber Mfg. Co., East State Street, Trenton, N. J., manufacturer of tires and mechanical rubber products, is having plans drawn for a two-story addition estimated to cost $50,000. William A. Klemann, First National Bank Building, is architect.

A. F. Stonch & Co., Lock Haven, Pa., are planning the installation of a motor-driven cut-off saw, motor-driven molder, chain mortiser and other equipment at their woodworking plant. V. R. Garleb, P. O. Box 87, heads the company.

S. S. Fretz, Jr., & Co., Philadelphia, has been chartered under State laws to take over and expand the plant and business of the company of the same name at Twenty-third and Sedgley Streets, manufacturer of steam fittings, pipe, etc. Raymond Groff is treasurer.

The William Ellis Cement Products Co., Norristown, Pa., recently organized, has perfected plans for a new plant in Upper Merion Township for the manufacture of cement blocks and kindred products. William Ellis heads the company.

The Crane Market

QUIETNESS continues in the overhead and locomotive crane markets. Not many orders are noted, but a number of awards are still pending. It is reported that the General Electric Co. will not be in the market for cranes for the plant under construction at Philadelphia for at least a month. Among pending inquiries are the 15-ton gantry and 5-ton overhead traveling cranes for the Pennsylvania Railroad, Philadelphia, a 25-ton and a 30-ton overhead traveling crane to be purchased by Stone & Webster, Boston, Mass., for the Ford plant at Iron Mountain, Mich.; a 20-ton, 23-ft. 6-in. span overhead traveling crane, either new or used for the Fitzgibbons Boiler Co., 47 West Forty-second Street, New York; a 100-ton overhead traveling crane for Fond du Lac, Wis.; a 60-ton overhead crane for Freemansburg, Pa., and a 10-ton gantry crane to handle ¼-cu. yd. bucket, inquired for by the Phoenix Utility Co., 71 Broadway, New York, which has also received prices on material for building a small jib crane; a 25-ton overhead crane for the Brooklyn Edison Co., Brooklyn, N. Y., and two 15-ton special overhead cranes, expected to close this week, for the Railway Steel Spring Co., 30 Church Street, New York. Bernard H. Prack, architect, Keystone Building, Pittsburgh, is receiving bids on a 15-ton, 31-ft. 2-in. span crane for Emeryville, Cal.

A number of inquiries for cranes for export, especially to Japan and China, are pending, but prospects of obtaining such business in the face of foreign competition are considered remote by most crane builders. On a recent tender of the Central Railroad of Brazil, for two 22-ton, 52-ft. span, 5-motor overhead traveling cranes, the range of prices quoted by the American, British, French, Belgian and German bidders was wide. All quotations were, c.i.f. Rio de Janeiro, Brazil. The two American bids were the highest of the fifteen quotations submitted, being $15,585 and $15,625 respectively. The next highest bid was on a Swedish built crane and totaled $12,197.50 based on today's exchange rate. The German bids, which were submitted in pounds sterling, ranged from $6,726 to $8,960. The two British bidders quoted $9,357.15 and $11,012.40 respectively, while the Belgian bid submitted by the Willebroeck, Belgium, was the lowest at $5,046.70 based on the current rate of exchange between the Belgian franc and the dollar of about 4.63c. per franc. The bids were as follows:

Bedford Engineering Co., England	£2,415	$11,012.40
Paul Ryermann, Berlin, Germany	£1,675	7,637.50
Niles-Bement-Pond, United States	.....	15,585.00
Graham Bros. Aktiebolog	Rs.119,000,000	12,197.50
Paul Weyerman G.m.b.h., Germany	£1,541 10s.	7,028.25
Societe des E. G. Houplain, France	111,465 fr.	6,432.65
Carl Flohr A. G., Berlin, Germany	£1,945	8,869.20
Deutsche Maschinenfabrik A. G., Germany	£1,965	8,960.40
Siemens-Schuckert Werke, Germany	Rs.66,170,000	6,782.40
Stothert & Pitt, Bath, England	£2,092	$9,255.14
Willebroeak, Belgium	109,000 fr	5,046.70
Ardeltwerke G.m.b.h., Germany	£1,175	6,426.00
Rhein Metalwerke und Maschinenfabrik	£1,771	8,075.75
Whiting Corporation, United States	.....	15,625.00
Le Titan Anversois, Belgium	153,800 fr	7,120.94

Among recent purchases are:

Phoenix Utility Co., 71 Broadway, New York, a 12-ton, 20-ft. span, hand power crane for export to Guatemala, Central America, from Alfred Box & Co.

Central Maine Power Co., Augusta, Me., two 15-ton hand power cranes from the Whiting Corporation.

Northern New York Utilities, Inc., 30 East Forty-second Street, New York, a 40-ton, 30-ft. span and a 20-ton, 26-ft. span electric traveling crane from the Northern Engineering Works.

Detroit Edison Co., Detroit, Mich., a 25-ton, 3-motor, overhead crane and a small hand power crane from the Northern Engineering Works.

Binghamton Light, Heat & Power Co., Binghamton, N. Y., a 75-ton, 50-ft. span overhead traveling crane with 10-ton auxiliary from the Northern Engineering Works.

Sandusky Gas & Electric Co., Sandusky, Ohio, a 30-ton, 33-ft. span hand power crane from the Northern Engineering Works.

Jerkins Brothers, New York, a 5-ton, 3-motor and a 1-ton, 1-motor, overhead traveling crane from the Northern Engineering Works.

Central Railroad of New Jersey, Jersey City, N. J., three 30-ton, 50-ft. boom locomotive cranes from the Ohio Locomotive Crane Co.

Fruit Growers Express, Washington, D. C., a 20-ton locomotive crane from the Browning Co.

Eagle Iron Works, Des Moines, Iowa, a 6-ton, 40-ft. span electric traveling crane from the Roeper Crane & Hoist Works.

Carpenter Steel Co., Reading, Pa., six 5-ton electric transfer cranes, 29-ft. span and two 5-ton, cage-operated electric hoists from the Roeper Crane & Hoist Works.

Potomac Electric Power Co., Washington, D. C., a 10-ton, 21-ft. span hand power crane from the Roeper Crane & Hoist Works.

Edison Electric Illuminating Co., Boston, Mass., four 1-ton hand power cranes from the Roeper Crane & Hoist Works.

General Electric Co., Erie, Pa., a 30-ton gantry crane from the Alliance Machine Co.

Standard Gage Steel Co., Beaver Falls, Pa., a 5-ton trolley from the Cleveland Crane & Engineering Co.

Kellogg Structural Steel Co., Buffalo, a 5-ton, 70-ft. span, 3-motor overhead traveling crane from the Milwaukee Electric Crane & Mfg. Co.

Manual training equipment will be installed in the new two-story senior and junior high school to be erected at Midland, Pa., estimated to cost $300,000, for which bids will soon be asked on a general contract. W. G. Eckles, Lawrence Savings & Trust Building, New Castle, Pa., is architect.

The Greenwood Light & Power Co., Millville, Pa., is being organized as a subsidiary of the Pennsylvania Power & Light Co., Allentown, Pa., to take over and expand the local system of the Millville Electric Light Co., recently acquired by the parent company.

Willson Goggles, Inc., Washington and Second Streets, Reading, Pa., manufacturer of industrial optical products, eye protectors, etc., is planning the construction of a new unit, estimated to cost $500,000 with precision and other machinery. Dr. Frederick Willson is president.

Manual training equipment will be installed in the two-story high school, 75 x 250 ft., to be erected at Ridgway, Pa., estimated to cost $175,000, for which bids are being asked on a general contract until Aug. 25. Maurice E. Kressler, 13 Fourth Street, Harrisburg, Pa., is architect.

The Ideal Auto Parts Co., 1013 Market Street, Harrisburg, Pa., has tentative plans for the establishment of a branch works between Harrisburg and Middletown, Pa., Charles E. Craft and J. A. Blessing head the company.

The Worthington Pump & Machinery Corporation, 115 Broadway, New York, will retain the ownership of its plant at Hazleton, Pa., valued at $4,000,000, and negotiations for the purchase by a British automobile manufacturing company, to be used for an American works, have been broken off.

The Nilco Lamp Works, Inc., St. Marys, Pa., manufacturer of electric lamps, etc., is enlarging its plant and installing additional equipment heretofore used at its Emporium, Pa., works.

The Moscow & Roaring Brook Electric Co., Moscow, Pa., recently organized, is arranging for the installation of a plant and system in Roaring Brook and Covington Townships.

The Blue Lick Coal Co., Meyersdale, Pa., recently organized, is planning for the installation of electric power and other equipment at its properties. Clarence F. and Clyde J. Rowe, both of Meyersdale, head the company.

Manual training equipment will be installed in the high school addition to be built at Church and Fairfield Streets, Ligonier, Pa., estimated to cost $100,000. G. H. Haberlen, superintendent of the Board of Education, is in charge.

The G. Klein Co., North Glenside, Montgomery County, Pa., operating a machine shop, is planning for the installation of a power lathe and other equipment.

The Davies Mine Switch Lock Co., Mayfield, Pa., recently organized with a capital of $250,000, is perfecting plans for a factory to manufacture special equipment for coal-mining. Walter H. Kohler and Patrick F. McAndrew, Scranton, Pa., head the company.

Electrically-operated pumping equipment will be installed in connection with the new water supply system at the Lackawanna County Tuberculosis Hospital, Scranton, Pa., for which plans are being prepared by F. O. Stone, engineer, Court House, Scranton.

Baltimore

BALTIMORE, Aug. 6.

PROPERTY at Bentalou Street and Pennsylvania Avenue, Baltimore, heretofore held by the Baltimore Car Wheel Co., has been purchased by the Consolidated Gas, Electric Light & Power Co., Lexington Building, as a site for a new plant.

The Chamber of Commerce, Cumberland, Md., Franklin H. Ankeney, secretary, has received an inquiry from a company at Pittsburgh desiring to secure a local site for the construction of a plant to manufacture automobiles and parts.

The Common Council, Mocksville, N. C., will commence the installation of a municipal electric light and power plant.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Aug. 28, for miscellaneous machine tools for the San Diego Navy Yard, schedule 1185; until Aug. 21 for six testing generators for the Mare Island Navy Yard, schedule 1155; until Aug. 28 for 13,800 ft. steel wire rope, schedule 1187, and 12,000 sq. ft. copper wire cloth, schedule 1172, for the same yard, and until Aug. 28 for 70 electric soldering irons for the Norfolk, Va., Navy Yard, schedule 1159.

Warner, Moore & Co., Richmond, Va., are in the market for a jaw crusher to break limestone to a size of 7 in. or smaller, second-hand, with auxiliary operating equipment.

The Bureau of Yards and Docks, Navy Department, Washington, has plans nearing completion for a new generating building at the naval property, Bellevue, D. C. L. E. Gregory is chief.

The Georges Creek Clean Coal Co., Barton, Md., recently organized with a capital of $750,000, is planning the installation of electric power equipment and mining machinery in the Georges Creek section. John Hardegan and Harry Clise head the company.

New interests headed by W. Woods White, Atlanta, Ga., have acquired the local plant of the Oliver Rim Co., manufacturer of automobile rims, for $85,000. The company will be reorganized and operations resumed, to include the production of iron and steel castings, machine equipment, etc. Josiah T. Rose, Atlanta, will be connected with the new company.

The United Iron & Metal Co., Baltimore, has plans for the erection of a new one-story works, 42 x 214 ft., on Millington Avenue.

Bids will be received by the Chief of Air Service, War Department, Washington, until Aug. 14 for 500 compasses and other aeronautical instruments, Proposal QR 24-11.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, has inquiries out for a steam shovel, caterpillar or traction type; two 36-in. gage, saddle tank locomotives, Vulcan type preferred, second-hand, and for 20 dump cars, steel underframe, each 4 yd. capacity, 36 in. gage, 2-way, second-hand.

The Aquia Creek Quarries Co., Alexandria, Va., has acquired the former shipyard of the Marine Railway & Coal Co. and will install stone-crushing machinery transmission equipment, etc., with power house, for a new plant, estimated to cost about $50,000.

D. T. Burch, 2043 West Broad Street, Richmond, Va., operating a machine shop, is planning the installation of a lathe, drill press and other equipment.

The Southern Public Utilities Co., Charlotte, N. C., plans to rebuild the portion of its power plant on the South Boulevard, recently destroyed by fire with loss reported at $50,000.

The Mount Airy Granite Cutting Co., Mount Airy, N. C., is arranging for a new cutting, polishing and finishing plant to replace that recently destroyed by fire. New equipment will be installed, and the purchase of a crane is said to be under consideration.

A power house will be constructed by the Norwood Mfg. Co., Norwood, N. C., in connection with an addition to its textile mill, estimated to cost $150,000.

The High Point Furniture Co., High Point, N. C., is in the market for electric equipment for a power house, including one 225 kva. generator, with exciter, switchboard and other auxiliary equipment; also for one 30-hp., two 20-hp., four 10-hp., ten 5-hp., and one 2-hp. motor, second-hand. M. J. Wrenn heads the company.

Manual training equipment will be installed in the high school to be erected on Camp Hill, Cumberland, Md., estimated to cost $500,000, for which plans will soon be drawn. The Board of Education is in charge.

W. F. Bowe, Jr., 514 Broad Street, Augusta, Ga., general contractor, is in the market for concrete-mixing machinery, steam-driven, with auxiliary equipment.

L. A. MacMullen, 3504 Hermitage Road, Richmond, Va., operating a general machine works, has inquiries out for a milling machine, lathe, drill press, and other equipment.

The Common Council, Elizabeth City, N. C., has preliminary plans for the installation of a municipal electric power plant, in conjunction with waterworks system, estimated to cost $200,000. J. J. Bray is city engineer.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until Aug. 21, for nickel steel pinions, valves, steel rope, pipe dies, centrifugal pump, electric cable, and other equipment, circular 1549; until Aug. 14 for brass tubing, sheet copper, sheet brass, grindstones, etc., schedule 1546.

Stevens Brothers & Co., Atlanta, Ga., have inquiries out for one steel stack, about 30 in. in diameter and 50 ft. high, used.

A power house will be built in connection with the cotton mill to be erected by the Williamson Mills Co., Haw River, N. C., recently organized with a capital of $700,000. J. O. Cobb, Durham, N. C., and W. F. Williamson, Burlington, N. C., head the company.

The Richmond Battery Co., 1839 West Broad Street, Richmond, Va., operating an electrical repair works, plans the installation of a lathe and other equipment.

The Piedmont & Northern Railway Co., Greenville, S. C., plans to rebuild the portion of its locomotive shops recently destroyed by fire with loss approximating $25,000 including equipment.

The South Carolina Gas & Electric Co., Spartanburg, S. C., has plans for an addition to its hydroelectric power house at Gaston Shoals, S. C., estimated to cost $150,000 with machinery.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for one centrifugal pump, direct-connected to gasoline engine, capacity 4,000,000 gal. in 24 hr.

Morton Jones & Co., 310 South Side Avenue, Asheville, N. C., recently organized, are considering plans for the establishment of a works for the manufacture of furnaces for domestic heating, furnace castings, etc., to cost about $30,000. Morton Jones is president.

The Crewe Furniture Co., Crewe, Va., is arranging for the equipment of a local plant to manufacture kitchen cabinets.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for one 70-hp. motor, with pulley, starting base, etc.

The Board of County Commissioners, Savannah, Ga., will take bids until Sept. 20 for one oil-burning land dredge with 1 cu. yd. bucket and 45-hp. oil-burning engine and auxiliary equipment. G. R. Butler is county clerk.

The Atlas All-Steel Truck Body Co., Baltimore, has been organized by Robert J. McNamara to manufacture all-steel automobile truck bodies. It is occupying part of the plant of McNamara Brothers Co., Westport, Baltimore, manufacturer of steel plate, tanks, boilers, etc. Production has started.

Pittsburgh

PITTSBURGH, Aug. 6.

THERE is no improvement in machine tool business in this district. The Pennsylvania Railroad, Central Region, which recently issued a list of 30 tools and subsequently increased the number to 34 is merely tabulating the bids, and there have been no awards. A large volume of business has been quoted against and many new installations are under consideration, but prospective buyers are moving slowly in the matter of purchases. Activity in heavy equipment is chiefly in filling old orders.

Manual training equipment will be installed in the new junior high school to be erected at Clearfield, Pa., estimated to cost $110,000, for which bids will soon be called on a general contract. Howard & Thatcher, Du Bois, Pa., are architects.

The Monongahela-West Penn Public Service Co., Fairmont, W. Va., is planning for extensions in its power plants and system, and the installation of additional equipment. The company recently increased its capital from $20,000,000 to $30,000,000, and is arranging a preferred stock issue of $1,000,000, a portion of the proceeds to be used for expansion.

The Progressive Ceramics Mfg. Co., Warwood, W. Va., recently organized, is planning the establishment of a plant to manufacture tile and kindred products, to include a power house. Harry Kalin and Alec Wishnew, both of Warwood, are heads.

The Electric Equipment Service Co., Pittsburgh, is having plans completed by D. A. Crone, Cameraphone Building, architect, for the erection of a one-story factory on Liberty Avenue.

The Virginia Power Co., Union Trust Building, Charleston, W. Va., has plans for an addition to its electric generating station at Cabin Creek Junction, W. Va., and the installation of additional machinery.

A merger has been arranged between the West Virginia Hardware & Supply Co., Huntington, W. Va.; Logan Hardware & Supply Co., Logan, W. Va.; Welch Hardware & Supply Co., Welch, W. Va.; and the Lexington Mine & Mill Supply Co., Lexington, Ky., under the first noted name. The new company will be capitalized at $250,000. A tract of three acres has been acquired at Huntington and plans will be drawn at once for a new works to consolidate the different interests, estimated to cost $100,000. C. W. Beckner, secretary, will be manager.

The Monongahela Chain & Mfg. Co., Fairmont, W. Va., is considering plans for a new factory in the vicinity of Mannington, W. Va.; Dr. F. W. Vance heads the company.

The Griffin Mfg. Co., Erie, Pa., has been incorporated under State laws with capital of $1,500,000, to take over and expand the plant and business of the same name, specializing in the manufacture of cold rolled and turned shafting, hardware products, etc. W. A. Crawford is treasurer of the new company.

A group of electric power and transmission companies has been organized by G. C. Savering, Johnstown, Pa., to install and operate electric power plants and systems in adjacent townships. Headquarters will be established at Meadville. Mr. Savering will be treasurer of the companies.

A machine shop and parts department will be installed in the two-story automobile service building to be erected by Boag & Boag, on Third Street, Clearfield, Pa., 50 x 70 ft. Bids for the building and tools will be asked in September. Oscar Miller, Glen Richey, Pa., is architect.

Fred W. Brant, Berlin, Pa., is considering the installation of electric power and other equipment at his coal mine near Hopwood, Pa., recently acquired from James W. Feather.

A lathe, drill press, air compressor and other equipment will be installed in the new three-story automobile service building, 50 x 100 ft., to be erected by S. M. Goodloe, Williamson, W. Va., estimated to cost $50,000, for which plans are nearing completion.

Manual training equipment will be installed in the new three-story and basement senior and junior high school, 180 x 280 ft., to be erected at Clairton, Pa., estimated to cost $350,000, for which a general contract will soon be awarded. Charles W. Bates, 77 Twelfth Street, Wheeling, W. Va., is architect.

The Bedford Rustic Furniture Co., Bedford, Pa., is considering the erection of a power house in connection with a proposed two-story plant to cost $75,000. L. F. Hoffman is head.

Buffalo

BUFFALO, Aug. 6.

PLANS have been filed by the Atlas Steel Casting Co., 1965 Elmwood Avenue, Buffalo, for a new one-story foundry.

George L. Waitt, Buffalo, has acquired a one-story building at 492 Kensington Avenue, Buffalo, for a new plant to manufacture metal devices for holding cores or molds in place and other mechanical products.

The Berkay Co., Inc., 24 Institute Street, Jamestown, N. Y., manufacturer of brass and bronze castings, is planning for extensions and the installation of foundry equipment, furnaces, polishing equipment, etc.

The Empire Gypsum Co., Cutler Building, Rochester, N. Y., has tentative plans for rebuilding the portion of its plant at Garbutt, N. Y., destroyed by fire July 21, with loss estimated at $25,000 including equipment. The power house, also, was damaged.

Ovens, power equipment, conveying and other machinery will be installed in the two-story addition to be erected by the Egloff Bakery, Inc., 147 Genesee Street, Buffalo, 96 x 180 ft. Improvements will also be made in the present plant. L. S. Beardsley, 116 West Thirty-ninth Street, New York, is architect.

The J. N. K. Machine Corporation, 108 Harrison Street, Jamestown, N. Y., operating a general machine works, is planning for expansion and the installation of lathes, drill press, milling machine and other equipment. E. R. Swanson is in charge.

The Pennsylvania Railroad Co., Pennsylvania Terminal, New York, is planning for additions to its locomotive shops at Olean, N. Y., to replace the portion of the works destroyed by fire several months ago. The expansion will include a machine shop, erecting shop, power equipment and ash-handling apparatus, estimated to cost $60,000. F. P. Huston is master mechanic at the shops.

Bids will be received by the Board of Trustees, Palmyra, N. Y., until Aug. 20 for pumping machinery and auxiliary equipment for the municipal waterworks. Hopkins & Field, 349 Cutler Building, Rochester, N. Y., are engineers. Sanford M. Young is clerk of the board.

The Rathbun Mfg. Co., Jamestown, N. Y., manufacturer of radio and electrical apparatus, is in the market for a used No. 0 Brown & Sharpe automatic screw machine.

The L. Parker Co., Centerfield, N. Y., will install machine tools, bench tools, etc., to replace equipment in its general repair works recently destroyed by fire.

The Kroehler Mfg. Co., Binghamton, N. Y., manufacturer of furniture, with headquarters at 1319 South Michigan Avenue, Chicago, has tentative plans for a new factory at San Francisco for Pacific Coast trade, estimated to cost $800,000. Work will commence early next year. P. E. Kroehler is president.

Manual training equipment will be installed in the new high school to be erected at Eastwood, N. Y., estimated to cost $150,000, for which bids will be received on a general contract until Aug. 25. LaVaute & Mulrane, 309 Herald Building, Syracuse, N. Y., are architects.

Zube & Kahrs, 908 East Water Street, Syracuse, N. Y., operating a general machine repair shop, are planning the installation of an 18-in. lathe and other equipment.

Electric power equipment, conveying and other machinery will be installed in the new three-story bottling works, 60 x 120 ft., to be constructed by the Bashford Cider & Vinegar Co., 143 Water Street, Lyons, N. Y., estimated to cost $70,000.

The Radiant Floor Waxer-Polisher Co., 215 Victoria Street, Toronto, is contemplating the establishment of a plant in Buffalo to manufacture its product for the American market and desires to hear from American manufacturers who make a specialty of small light stampings.

Detroit

DETROIT, Aug. 6.

PLANS have been filed by the Michigan Copper & Brass Co., 3851 West Jefferson Street, Detroit, for the erection of a new two-story factory, estimated to cost $40,000.

Manual training equipment will be installed in the high school to be erected at Galien, Mich., estimated to cost $95,000. D. H. Allen, president of the Township Board of Education, is in charge.

The Conant & Donaldson Co., Kalamazoo, Mich., recently organized with a capital of $50,000, is arranging for the establishment of a plant to manufacture tools and other equipment. Emmett McCarthy heads the company.

The Precision Speedometer Co., 9 West Woodbridge Street, Detroit, is planning the installation of additional equipment in its machine shop, particularly for precision work.

The Kirsch Mfg. Co., North Prospect Street, Sturgis, Mich., manufacturer of metal curtain poles, has tentative plans for the erection of a three-story addition in the fall. C. W. Kirsch is president and general manager.

The Detroit & Ironton Railway, Detroit, recently acquired by Henry Ford to be operated in conjunction with his Detroit, Toledo & Ironton Railway system, will be electrified from the River Rouge plant to Flat Rock, where connection will be made with the last noted railroad, a distance of 13 miles. Electric generating, power and other equipment will be installed, estimated to cost $5,000,000.

The Besser Mfg. Co., Alpena, Mich., manufacturer of concrete-mixing machinery, parts, etc., has commenced the erection of a one-story addition, 40x200 ft.

The R. B. Collis Sprayer Co., 190 Territorial Avenue, Benton Harbor, Mich., manufacturer of spraying equipment, etc., is planning the erection of a new two-story factory, 50x125 ft., estimated to cost $25,000.

The Hudson Motor Co., Jefferson Avenue, Detroit, is having plans drawn for a one-story addition, 65x275 ft. Albert Kahn, 1000 Marquette Building, is architect.

The Fisher Body Corporation, General Motors Building, Detroit, has plans for a new one-story power house at its plant on Trombley Street, to cost about $50,000.

The Detroit Auto Specialties Co., Detroit, a subsidiary of the Hupp Motor Car Corporation, manufacturer of automobile fenders, hoods and other metal products, has plans for a new factory in the rear of the works of the parent company, Mt. Elliot Avenue and Dunn Road, to be one-story, 120x500 ft., estimated to cost $350,000. It will be ready about the end of the year, at which time the present plant will be removed to this location and additional machinery installed.

The Gray Motor Corporation, Detroit, has preliminary plans for additions, for assembling and other work, estimated

to cost $200,000. It also purposes to build a number of assembling plants in other cities.

The Cooper Coal Co., Saginaw, Mich., recently organized with a capital of $450,000, is planning the installation of electric power and other equipment at its coal mines in Kochville and Tittabawassee townships. Otto L. Dittmar is president and William E. Thompson, treasurer, both of Saginaw.

Cleveland

CLEVELAND, Aug. 6.

THE machinery market is extremely dull. Not only were aggregate sales very light the past week, but little new inquiry came out. The Nickel Plate Railroad has placed orders for nine tool grinders but has not yet acted on its original list of about 15 machines. The purchase by the Pebbles Engineering Co., Newton Falls, Ohio, referred to last week, aggregated seven tools, mostly heavy duty drilling machines. It is expected to buy some additional equipment when its new factory buildings are completed.

The Ohio Trent Coal, Coke & Amalung Co., Toledo, Ohio, recently organized, has acquired a site on which it plans to shortly begin the erection of a plant for the manufacture of fuel.

The Hydro Forge Co., which recently acquired the plant of the Louisville Sheet Steel Co., Louisville, Ohio, advises that it will manufacture medium heavy forgings and will begin operation about Feb. 1, 1924. H. K. Strickler and others are interested. The company's office is in the Eagle Building, Alliance, Ohio.

The Eaton Axle & Spring Co., Cleveland, has purchased the machinery, inventory, patents, etc., of the Cox Brothers Mfg. Co., Inc., manufacturer of automobile bumpers, with plants in Cleveland and Albany, N. Y. Both William G. Cox and Theodore M. Cox will become affiliated with the Eaton Co., the former in Cleveland, in charge of sales, and the latter in Albany, in charge of production.

The Van Dorn Iron Works Co., Cleveland, has been awarded contract for 700 steel cells for the County jail at Los Angeles, Cal., amounting to approximately $600,000.

The Packard Electric Co., Warren, Ohio, is having plans prepared for a three-story addition, 85 x 200-ft.

The Fisher Body Corporation, Cleveland, is planning the erection of a one-story factory, 120 x 240-ft.

The Wayman Electric & Mfg. Co., East Palestine, Ohio, recently incorporated with capital stock of $200,000, is a reorganization of a former company and will erect a factory. It is in the market for punch presses, small sensitive drills and tapping machines.

Chicago

CHICAGO, Aug. 6.

RAILROAD business continues to hold the center of the stage. The Illinois Central is expected to close against a few remaining inquiries this week and is also preparing an extensive new list. The Elgin, Joliet & Eastern will probably finally place orders against its inquiry of long standing this week or next. The Chicago, Burlington & Quincy, according to latest advices, will take action on its list within the next fortnight. The Chicago & North Western has closed against a small inquiry for about 10 items, which was published in THE IRON AGE of June 28. Industrial buying is at a low ebb and the only transaction of any consequence which is reported is the purchase of a 3½-ft. radial drill, a single spindle high speed sensitive drill, a No. 4 plain milling machine and a No. 2 universal milling machine by the Yellow Sleeve Valve Co., Moline, Ill.

Villisca, Iowa, has voted for the erection of a municipal electric light plant to cost $75,000.

The Central Brake Shoe & Foundry Co., a new organization, has about half completed a plant at 5259-62 West Sixty-sixth Street, Chicago, to cost $100,000. The company will manufacture brake shoes and will do a general foundry business. Frank Van Inwagen is president.

The Hansell-Elcock Co., structural steel fabricator, Archer and Normal Avenues, Chicago, has acquired a leasehold to a triangular tract of 12 acres bounded by Thirty-first Street on the north, California Avenue on the west and the Sanitary District Canal on the southeast. It will be improved as the development of the company's business requires.

The Town Council, Barron, Minn., has voted bonds of $15,000 to start the construction of a municipal hydro-electric plant.

J. D. Wallace & Co., manufacturers of wood planing machines, 1401 West Jackson Boulevard, Chicago, have purchased a site, 112 x 266 ft., on California Avenue, extending from the northwest corner of Adams Street to the southwest corner of Wilcox Street, and will improve it with a factory.

Work has started on the construction of a factory, 100 x 200 ft., at Walnut Street and the Pennsylvania Railroad, Greenwood, Ind., to be occupied by the Indianapolis Pump & Tube Co. The company now has a plant in Indianapolis, but all equipment will be removed to the new location. Electric heaters and other electrical devices will be manufactured.

The Bastian-Blessing Co., 125 West Austin Avenue, Chicago, has purchased a four-story and basement building at the northwest corner of Ontario Street and Fairbanks Court from Burke & James, Inc. The Bastian-Blessing Co. manufactures soda fountains.

The Henry T. Adams Mfg. Co., manufacturer of loose-leaf specialties, 6796 South Chicago Avenue, Chicago, has let contract for a one and two-story factory, 8561-69 South Chicago Avenue, to cost $50,000.

S. W. Wurm, 7700 South Paulina Street, Chicago, has let contract for a one-story wagon shop, 25 x 48 ft., at 5845 South Ashland Ave., to cost $12,000.

The Stewart-Warner Speedometer Co., 1828-58 George Street, Chicago, has let contract for a six-story factory addition, 141 x 215 ft., to cost $700,000.

The Elgin, Joliet & Eastern Railroad is taking bids for a one-story car repair shop at East Joliet, Ill.

The Board of Education, Chicago, will install a vocational department in the new Theodore Roosevelt high school, estimated to cost $4,000,000, for which plans are being drawn. It will consist of two machine and automotive shops, one sheet-metal working shop, three woodworking and two electric equipment shops. John C. Christensen, officer of the Board, is architect.

The Lubrite Refining Co., Arcade Building, St. Louis, manufacturer of refined oils, is planning the erection of a one and two-story refinery at at East S. Louis, Ill., estimated to cost $400,000 with machinery.

The Domestic and Foreign Commerce Department, Chicago Association of Commerce, 10 South La Salle Street, is in receipt of an inquiry from an engineering company at Toronto, Ont., desiring to get in touch with a concern at Chicago or vicinity, in position to manufacture a motorless electric refrigerator.

S. M. Seator, 19 South La Salle Street, Chicago, architect, has completed plans for a two-story and basement factory on Blackhawk Street to manufacture paper boxes and containers, estimated to cost $90,000 with machinery. The owner's name will be announced later.

The Clinton Machinery Co., 128 South Clinton Street, Chicago, is planning for the installation of a new punch press and other equipment.

The Northwestern-Davenport Cement Block Co., 1735 Davis Street, Davenport, Iowa, has plans for a new two-story factory, 70 x 75 ft. A. H. Ebeling, 818 Kahl Building, is architect.

The Calumet Steel Co., 208 South La Salle Street, Chicago, will take bids at once for a new one-story crane building, 75 x 450 ft., at its Chicago Heights plant. J. H. Porter is president.

The Adams Co., Dubuque, Iowa, operating a machine shop, is planning for the installation of a slitting shear and other equipment.

Fritz Work, 257 Fifth Street, La Salle, Ill., is organizing a company to build a plant for the manufacture of cement and concrete blocks, for which plans will be prepared at once.

Manual training equipment will be installed in the new high school to be erected at Clatonia, Neb., estimated to cost $90,000, for which excavations will soon commence. E. J. Chittenden, secretary Board of Education, is in charge.

A. E. Hagenboeck, 115 Twenty-first Street, Moline, Ill., has awarded a general contract to Axel Carlson, People's Bank Building, for a new one-story foundry, 40 x 95 ft., at Twenty-ninth Street and Second Avenue.

Manual training equipment will be installed in the three-story and basement senior and junior high school to be erected at Wymore, Neb., estimated to cost $200,000, for which bids will probably be taken in the fall. Fiske & McGinnis, Bankers' Life Building, Lincoln, Neb., are architects.

Milwaukee

MILWAUKEE, Aug. 6.

BUILDERS of machine tools report no perceptible change in market conditions. Inquiry has improved slightly, giving hope of a betterment in demand, but orders placed the past week form an aggregate approximating that of a weekly average in July. Production is fairly well sustained, however. The fact that there has been no intermission of old orders, and no cancellations, is regarded as a favorable sign. Milling machine demand is quiet, with scattering sales to automotive industries and railroads, generally in single tools.

The Great Lakes Boatbuilding Corporation, 333 Becher Street, Milwaukee, has increased its authorized capitalization from $200,000 to $750,000 to finance enlargement of plant and production for quantity output of a standardized 26-ft. motor yacht under an agreement with the Packard Motor Car Co., Detroit, which will supply the standard Packard power units and market the craft. Definite details of the enlargement program are now being completed. William C. Morehead is president and general manager.

The Charles Schott Machine Co., 1281 Twenty-eighth Street, Milwaukee, is in the market for a small list of miscellaneous equipment for a one-story machine shop addition, 42 x 60 ft.

The Milwaukee Coke & Gas Co., Milwaukee, intends to replace at once the benzol plant of its Greenfield Avenue-Mitchell Street works, which was almost totally destroyed by explosion and fire on Aug. 1, with a loss estimated at nearly $250,000. J. W. Schaeffer is president and general manager.

The Common Council, Marshfield, Wis., has contracted with Layne & Bowler, Chicago and Memphis, for the construction and equipment of additions and changes in the municipal waterworks plant. The contract embraces every part of the work, from drilling new wells to supplying the requisite gallonage at proper pressure to mains, under bond equalling the contract price. Work is required to start by Aug. 13.

The Green Bay Newspaper Co., 315 Cherry Street, Green Bay, Wis., publisher of the *Daily Press-Gazette*, has let the general contract to the Wisconsin Engineering & Construction Co., Wausau, Wis., for a new plant, two stories and basement, 58 x 114 ft., estimated to cost $125,000 with equipment. The architects are Foeller, Schober & Stephenson, local.

The Wisconsin Parts Co., Oshkosh, Wis., manufacturer of heavy duty front and rear axles, is enlarging its plant and buying considerable new machinery, having acquired by purchase the entire motor truck axle business of the Savage Arms Corporation, Sharon, Pa., and Utica, N. Y., including the entire inventory, dies, tools, patterns, patents and designs for front and rear axles of the double reduction type for one to five-ton vehicles. W. F. Rockwell is president and general manager of the Oshkosh company.

The Grimm Aluminum Castings Co., Manitowoc, Wis., is taking bids through W. J. Raeuber, local architect, for a brick and steel shop, with steel sidewall and monitor shaft, 60 x 120 ft. The investment will be about $50,000.

Bids are being taken by Harry Boyer, city clerk, Black River Falls, Wis., until Aug. 28, for furnishing and erecting complete a 150,000-gal. steel tank mounted on a 50-ft. steel tower for the municipal waterworks system. The engineer is W. G. Kirchhoffer, Madison, Wis.

The Brainerd Foundry Co., has been organized at Brainerd, Minn., by E. O. Webb, Clyde E. Parker and Fred E. Kinsmiller to manufacture gray iron castings. A site has been purchased and contracts will be let at once for the erection of a shop, 60 x 120 ft., for which equipment is being purchased.

The Common Council of Barron, Wis., has definitely decided to build a hydroelectric generating plant costing about $35,000 for the first unit, at the Taylor dam, owned jointly by the municipality and the estate of C. S. Taylor. Plans are now in process and bids will be taken about Sept. 1.

The Milwaukee Boiled Ham Co., 901 Holton Street, Milwaukee, is in the market for boilers, motors, cookers and other specialized equipment for a two-story addition, 71 x 104 ft., designed by Leiser & Holst, architects, 105 Wells Street, local. John J. Czala is president and general manager. The work will cost about $75,000 complete.

Jim's Repair Shop, Milwaukee, will take bids Aug. 27 for a one-story brick and concrete machine and repair shop, 49 x 103 ft., adjacent to the present shop at 1524 Galena Street. Frank Howend, 67 Wisconsin Street, is architect.

M. E. McCaffrey, secretary Board of Regents, University of Wisconsin, Madison, is taking bids until Aug. 20 for a complete water softener installation and the refrigeration unit for the new Wisconsin General Hospital being erected at a cost of $800,000. Arthur Peabody, Madison, is State architect.

The Milwaukee Electric Railway & Light Co., Public Service Building, is taking bids through Fred H. Luber, designing architect, for a boiler house addition, 50 x 71 ft., to the Oneida Street steam generating plant, and for a two-story brick and concrete substation, 35 x 65 ft., at North Milwaukee, Wis.

Arthur L. Seidenschwartz, architect, 290 Third Street, Milwaukee, is completing plans for a brick and steel addition, 50 x 75 ft., to a local foundry, the identity of which is withheld for the present.

The Board of Education, Burlington, Wis., has engaged Oppenhamer & Obel, architects, Wausau and Green Bay, Wis., to design the new $300,000 vocational training institute, 185 x 245 ft., two stories and basement. Bids will be taken early in September by Nettie E. Karcher, secretary of the board.

Cincinnati

CINCINNATI, Aug. 6.

WHILE orders are not heavy, reports from manufacturers during the week indicate that a slight improvement is evident in the machine tool field. Railroad and automotive buying has been fair, and while most of the automotive buying has been done quietly a substantial volume of orders for miscellaneous machines has been booked. Inquiries are more numerous, and while generally confined to one and two machines, the chances of orders developing from a good percentage are very good.

There was no heavy buying during the week, although the Central Vermont is reported to have purchased a number of tools, including a planer with a Cincinnati manufacturer. The Otis Elevator Co. and the Ironton Engine Co. were also purchasers. A very much improved demand for used machinery is reported by dealers, and orders booked the past 10 days were far in excess of those for the previous three weeks.

The Columbus Steam Pump Works, 83-85 West Broad Street, Columbus, Ohio, has awarded contract to the Austin Co. for a new foundry. Cranes and other equipment will be installed.

The Washington Motor Co., Eaton, Ohio, has commenced the erection of its new plant at Middletown, Ohio, and on its completion the equipment of the present works will be moved to that city. The new plant will be 68 x 200 ft. and will be completed in about three months.

The Gem City Pattern Works, Dayton, Ohio, will shortly commence the erection of a one-story concrete building, 40 x 60 ft., to take care of increasing business. Additional woodworking machinery has been purchased. H. J. Kastner is general manager.

Reports current to the effect that the plant of the American Blower Co. would be moved from Detroit to Cincinnati have not been fully confirmed. The company several years ago purchased the plant of the Lane & Bodley Co. at Bond Hill, and it is expected that it will shortly be placed in operation. Officials state that the extent of the company's operations in Cincinnati in the future are contingent on a number of problems, which have not yet been completely worked out.

Indiana

INDIANAPOLIS, Aug. 6.

Fire, July 26, destroyed the wire-drawing building and adjoining sections at the plant of the Kokomo Steel & Wire Co., Kokomo, Ind., with loss estimated at $75,000, including equipment. It is planned to rebuild.

The American High Speed Chain Co., Illinois and South Streets, Indianapolis, has leased property at 227 East South Street, heretofore occupied by the Prest-O-Lite Co. The structure will be remodeled and the present works removed to this location.

Lockwood, Greene & Co., 38 South Dearborn Street, Chicago, engineers, have prepared plans for a one-story power house in conjunction with new dye works at Fort Wayne, Ind., estimated to cost $60,000, for which the owner's name will be announced in the near future.

Bids will soon be asked by the Whiting Foundry Equipment Co., Whiting, Ind., for a one-story addition, estimated to cost $40,000 with equipment. L. G. Hallberg, 116 South Michigan Avenue, Chicago, is engineer.

The Standard Oil Co. of Indiana, Indianapolis, has arranged an appropriation of $1,000,000 for extensions at its refinery at Whiting, Ind. Initial work is under way on two plant units to cost $350,000, and other units to cost a like amount will be built in the near future. Additions will be made in the paraffin department, to cost $250,000 with equipment, and extensions made in the white oil department to double the present refining capacity.

The Zero Ice & Fuel Co., Indianapolis, is planning the installation of electrically-operated ice-manufacturing equipment at its plant at Cornell Avenue and Twenty-seventh Street.

Manual training equipment will be installed in the high school to be erected at Milton, Ind., estimated to cost $100,000, for which ground will be broken at once. The Board of Education is in charge.

The Interstate Public Service Co., Bloomington, Ind., is disposing of a bond issue of $7,192,000, a portion of the proceeds to be used for extensions and improvements. Harry Reid is president.

The Indianapolis Light & Heat Co., Indianapolis, will expend about $1,500,000 for extensions in plants and system during the present year, inclusive of construction now in progress. A new turbo-generator of 12,000 kva. capacity, with auxiliary machinery, will be installed at the power plant on Kentucky Avenue, to be ready for service by the end of the year. A new power house will be located in the Broad Ripple section. C. C. Perry is president.

A machine shop will be installed in the three-story service building at 125 North East Street, Indianapolis, to be established by the Radio Taxi Co. A lease has been taken on the property, and early occupancy is being arranged.

The Board of Works, Evansville, Ind., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks estimated to cost $270,000, for which bonds are being issued.

The Gulf States

BIRMINGHAM, Aug. 6.

WILLIAM A. BURR, San Antonio, Tex., is organizing a company to construct and operate a plant for the production of lead pipe, sheet lead, etc., estimated to cost $45,000.

The Mississippi Cotton Oil Co., Jackson, Miss., has been chartered under Delaware laws with capital of $100,000 to take over the plant of the company of the same name, recently acquired by J. W. Tuberville and George W. Covington, who will head the new organization. Plans are being perfected for extensions and the installation of additional machinery.

Sutton, Steele & Sutton, Inc., 4215 Gurley Street, Dallas, Tex., manufacturer of ore and concentrating machinery, will commence the erection of a new foundry for the production of fine carbon and alloy steel castings, estimated to cost $250,000 including machinery. Contract for electric furnaces has been let to the Pittsburgh Electric Furnace Corporation, Pittsburgh.

The Saline Coal Co., Texarkana, Ark., recently organized with a capital of $90,000, is planning the installation of electric power and other equipment at Grand Saline, Tex. J. F. O'Neal is president and general manager.

The Cohoon Brothers Co., Orlando, Fla., operating a general machine shop, is planning for the installation of a lathe, bench tools, and other equipment.

The Ferris Brick Co., Ferris, Tex., has been incorporated with a capital of $500,000 to take over and merge the businesses of several pressed brick companies of Ferris. Plans are under consideration for extensions in a number of the plants and the installation of power and other equipment. W. E. Weatherford is president of the consolidated company and J. A. Carpenter, secretary and treasurer.

Work will commence on a new building at 2500-2 Commerce Street, East Dallas, Tex., to cost about $25,000, replacing the portion of the plant of the Texas Wheel & Body Co., destroyed by fire several weeks ago.

The Alabama Power Co., Birmingham, is perfecting plans for a new hydroelectric power station at Cherokee Bluffs, Ala., estimated to cost $10,000,000, including steel tower transmission system. A railroad will be built from Asbury, Ala., to the plant site, seven miles.

J. F. Scofield, Berry, Ala., is planning the establishment of a factory for clock assembling. It is proposed to purchase parts from different manufacturers and inquiries are being made for producers of such precision equipment, including shafts, gears, levers, etc.

Manual training equipment will be installed in the new high school to be erected at Hull, Tex., estimated to cost $100,000, for which bids are being asked on a general contract. Alfred C. Finn, Coggan Building, Houston, Tex., is architect. J. W. Canter, secretary of the school board, Daisetta, Tex., is in charge.

Four chain ovens, power equipment, conveying and other machinery will be installed in the new seven-story plant to be erected by the Brown Cracker & Candy Co., Dallas, Tex., to cost $275,000, for which a general contract has been let to the Hughes-O'Rourke Construction Co., Dallas. J. L. Brown is president.

The Landa Milling Co., New Braunfels, Tex., recently organized with a capital of $1,500,000, has taken over the local electric light and power house and plans extensions and the installation of additional equipment. It will also acquire a local oil mill and stone crushing plant, both of which will be enlarged.

The Rosenthal Packing Co., Galveston, Tex., is planning for extensions for the installation of a cold storage and refrigerating department. The machinery installation will approximate $25,000. Stowe & Stowe, Galveston, are architects.

The Arab Gasoline Corporation, Eastland, Tex., will commence the construction of its new gasoline refinery and will expend about $1,000,000, for the refinery and a carbon black manufacturing works, on adjoining site. A list of machinery has been arranged. Samuel Butler is president and Horace Butler, vice-president and general manager.

The Common Council, Boynton, Fla., is contemplating the installation of electrically-operated pumping machinery in connection with a new waterworks plant, to cost $75,000.

The Common Council, Edgewood, Tex., has arranged a bond issue of $55,000, for the installation of a municipal electric light and power plant, in conjunction with a waterworks station.

The Southern Cartridge Co., Houston, Tex., recently organized to build a plant, has arranged a fund of $200,000 for the initial works. The main building will be one-story, 80 x 365 ft., and with adjoining structures will be equipped for a daily output of 60,000 gun shells, 12 to 20 gage, and 125,000 cartridges, 12 to 38 caliber. W. C. Nunn and R. C. Fulbright head the company.

The Galveston, Houston & Henderson Railroad Co., Galveston, Tex., will install an air-lift pumping plant, with air compressor, etc., at its new water station at League City, Tex., to develop an output of 400,000 gal. per day.

H. W. Dexter, Bisbee Building, Jacksonville, Fla., machinery dealer, has inquiries out for a drill press, crank shaper and other equipment.

Joseph E. Decker & Sons, Dallas, Tex., contemplate erection of an ice and cold storage plant to cost $45,000.

The Deal-Parsons Planing Mill Co. Tuscaloosa, Ala., has acquired the plant of the Modern Lumber Co., Northport, Ala. The new owner will make extensions in the mill and power house and install additional equipment estimated to cost $75,000.

The Marland Refining Co., Ponca City, Okla., has acquired property at Texas City, Tex., for the installation of a new oil storage and distributing plant to cost $100,000 with equipment.

The Florida Vegetable Corporation, Sanford, Fla., has plans for a new refrigerating and precooling plant to cost $65,000. All machinery will be electrically-operated.

W. H. McGrath, Corsicana, Tex., engineer, is organizing a company to build an ice-manufacturing plant to cost $100,000, including equipment.

The Central South

ST. LOUIS, Aug. 6.

PLANS are being considered by the Smith & Davis Mfg. Co., 1933 Locust Street, St. Louis, manufacturer of iron and brass bedsteads, springs, etc., for a new one and two-story factory, estimated to cost $350,000 with machinery.

Powell & Wasson, Inc., Muskogee, Okla., has preliminary plans for a new gasoline refinery to cost approximately $100,000. The company recently increased its capital from $50,000 to $300,000.

Manual training equipment will be installed in the three-story high school to be erected at Dexter, Mo., estimated to cost $100,000, for which bids will be taken at once on a general contract. H. H. Hohenschild, Odd Fellows Building, St. Louis, is architect.

The Holston Quarry Co., Straw Plains, Tenn., has inquiries out for a steam shovel, railroad type, with 2½ yd.

capacity bucket, Marion or Bucyrus type preferred, second-hand.

Plans are being considered by the Lebanon Woolen Mills, Lebanon, Tenn., for a power house, in connection with its proposed addition, to cost $110,000. D. W. Southgate, 150 Fourth Avenue, Nashville, Tenn., is architect.

The Kansas City Southern Railroad Co., Kansas City, Mo., has authorized plans for a new one-story car repair shop at Shreveport, La., to replace the portion of the plant recently destroyed by fire. It will cost about $175,000 with equipment.

The American Car Co., 1518 South Vandeventer Street, St. Louis, a subsidiary of the J. G. Brill Co., Philadelphia, has awarded contract to Amber & Zimmerman, 1228 Pine Street, for a one and two-story addition, 40x80 ft., to cost $45,000.

The Wood & Lane Co., 915 Olive Street, St. Louis, has inquiries out for a rotary converter, 300 to 500 kw. capacity, 600 volts; also for one short wall mining machine, Goodman type, with 6 ft. cutter bar, electrically-operated.

The Moline Implement Co., Lyons, Kan., is planning for the installation of a lathe and other equipment. W. J. Myers is head.

The Stockton Light & Power Co., Stockton, Mo., has rejected all bids received for the construction of a hydro-electric power plant on the Sac River, estimated to cost $75,-000. Russell & Axon, 404 McDaniel Building, Springfield, Mo., engineers, will prepare revised plans.

The M-B Automotive Corporation, Jacksonville, Tenn., recently organized with a capital of $10,000,000, has acquired a portion of the Old Hickory powder works of the Government, near Nashville, for the establishment of a new plant to manufacture motor trucks, buses, etc. The machinery installation is estimated to cost $100,000. Guy Hamilton is vice-president, and Martin Soule, secretary, both of Jacksonville.

The Temple Cotton Oil Co., Little Rock, Ark., has acquired the local plant of the American Cotton Oil Co. Plans are being considered for extensions and the installation of additional equipment.

The N. O. Nelson Mfg. Co., Twentieth and Chestnut Streets, St. Louis, manufacturer of steam fittings, plumbing equipment, etc., has awarded general contract to the Widmer Engineering Co., Laclede Gas Building, for a new one-story plant, 60 x 295 ft., estimated to cost $50,000.

The Chicago & Western Coal Products Corporation, Witteville, Okla., operating the Columbia Coal Mining Co., plans the installation of additional equipment, including electric power apparatus. A preferred stock issue of $260,000 is being sold to provide for the expansion.

The Duncan Machinery Co., Dempster Building, Knoxville, Tenn., machinery dealer, is in the market for equipment for a woodworking plant, including planer, matcher, rip saw and miscellaneous tools.

Manual training equipment will be installed in the new high school to be erected at Burlingame, Kan., estimated to cost $100,000. W. E. Glover, Stormont Building, Topeka, Kan., is architect.

The Friderichsen Floor & Wall Tile Co., Independence, Mo., will make extensions in its plant and install additional machinery at a cost of $30,000.

The Southland Portland Cement Co., Nashville, Tenn., recently incorporated with a capital of $1,000,000, has preliminary plans for a new works in the vicinity of Crab Orchard, Tenn., to cost about $500,000. It will include a power plant. Benjamin L. Ireland, Nashville, and Louis H. Wright, Indianapolis, head the company.

The Oklahoma Pipe Line Co., Oklahoma City, Okla., is planning for the erection of an electrically-operated plant in connection with a pipe line from the Hewitt oil fields.

The Owensboro Clay Products Co., Owensboro, Ky., recently formed with a capital of $100,000, will commence the erection of a new plant at Bon Harbor, for the manufacture of tile, building blocks, etc., to cost about $50,000 with machinery. A power house is planned. Benjamin F. Medley and John A. Bolger are heads.

The Red Star Mill & Elevator Co., Wichita, Kan., will build a new one-story and basement power house at 1901 North Emporia Street, estimated to cost $30,000.

Power equipment, transmission, conveying and other machinery will be installed in the series of warehouses to be built by the Dark Tobocco Growers' Cooperative Association, Owensboro, Ky., in Kentucky and Tennessee, to cost collectively about $1,000,000. Manley & Young, Knoxville, Tenn., are architects and engineers.

The Lion Oil & Refining Co., El Dorado, Ark., has construction in progress on a new refinery to cost $2,500,000 with machinery. F. H. Thwing is president, and V. H. Smith, vice-president and general manager.

Mansfield & Sons, East Central Street, Arkansas City, Kan., operating a general machine works, will install additional equipment, including a lathe, drill press, transmission equipment, etc.

The Tennessee Electric Power Co., Nashville, Tenn., will commence an expansion program to include the installation of a hydroelectric power plant addition at Great Falls, Tenn.; a new steam-operated generating plant at Hales Bar, Tennessee River, and an addition to the steam-operated generating plant at Nashville.

George H. Durant, Union Star, Mo., is planning to rebuild the portion of his local power plant recently destroyed by fire with loss of $25,000.

The Illinois Central Railroad Co., Chicago, will commence the erection of an addition to its locomotive and car repair shops at Jackson, Tenn., to cost $200,000 with equipment.

The Pacific Coast

SAN FRANCISCO, Aug. 1.

PLANS are being prepared by the Atchison, Topeka & Santa Fe Railway Co., Kerckhoff Building, Los Angeles, for the erection of two new shop units at its repair works at San Bernardino, Cal., estimated to cost $1,200,000 with equipment. The company is perfecting plans for rebuilding the portion of its shops at Barstow, Cal., recently destroyed by fire with loss approximating $100,000, including machinery.

The Independent Paper Products Co., Fresno, Cal., is having plans drawn for a one-story factory on Butler Avenue, estimated to cost $50,000 with equipment. Leland Rosener, Insurance Exchange Building, San Francisco, is architect. All machinery will be electrically operated.

The Roch Harbor Lime Co., Bellingham, Wash., is planning to rebuild its plant and power house destroyed by fire July 28, with loss estimated at $900,000 including machinery.

The Puget Sound Light & Power Co., Seattle, has plans for the construction of a new power house at Tenino, Wash.

The Jacobson-Reid Lumber Co., Rainier, Ore., is planning the erection of a new mill and power house to cost $80,000.

C. T. Richardson, 1022 East Gutierrez Street, Santa Barbara, Cal., will build a new one-story machine shop at 423 North Salispuedes Street.

The Sacramento Pipe Works, Seventh and R Streets, Sacramento, Cal., manufacturer of cast and wrought iron pipe, is contemplating the erection of a new one-story plant, 100 x 150 ft., estimated to cost $50,000 with equipment.

The California-Hawaiian Sugar Refining Co., Los Angeles, has selected a site on Terminal Island, Wilmington district, for a new refinery to cost in excess of $300,000 with machinery. The plant will include a power house and machine shop.

The Bratlie Brothers Mill Co., Ridgefield, Wash., is planning to rebuild its planing mill and power plant destroyed by fire July 26, with loss estimated at $100,000 including equipment.

The Southern California Edison Co., Los Angeles, is arranging for an increase in capital from $100,000,000 to $250,000,000. At least $80,000,000 of the proceeds will be used for extensions and improvements, including the construction of additional hydroelectric power plants and steel tower transmission lines.

The Federal Refrigerating Co., Los Angeles, is having plans prepared for a new ice-manufacturing and refrigerating plant at Downey Road and District Avenue, 200 x 400 ft., with power plant, estimated to cost $250,000 including machinery. The company has a tract of 16 acres and purposes to build 10 complete operating units of the size noted, with central electric power plant, to cost $2,000,000. Frank D. Chase, Inc., Los Angeles, is engineer.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is completing plans for a one-story, steam-operated electric power plant on Stevenson Street, estimated to cost $250,000 with equipment. It will also erect a new power house on East Fiftieth Avenue, Oakland, Cal., to cost $50,000.

Manual training equipment will be installed in the new junior high school to be erected in the Boyle Heights section, Los Angeles, estimated to cost $300,000. Edgar H. Cline, 743 North Wilton Place, is architect.

W. H. Woodfield, Jr., 30 Hemway Terrace, San Francisco, has plans for a one-story foundry and machine shop at 275 North Folsom Street, estimated to cost $20,000 exclusive of equipment. James H. Hjul, 1342 Mission Street, is engineer.

The Hitchcock Tractor Co., Richmond, Cal., manufacturer of farm tractors, etc., has acquired property at Oakland, Cal., and will remove its plant to this location. The works will be extended and additional equipment installed.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.80c.	.....
Nos. 22 and 24	4.50c. to 4.85c.	5.10c.
No. 26	4.55c. to 4.90c.	5.15c.
No. 28	4.65c. to 5.00c.	5.25c.
No. 30	4.85c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.75c. to 5.10c.
No. 16	4.90c. to 5.25c.
Nos. 18 and 20	5.05c. to 5.40c.
Nos. 22 and 24	5.20c. to 5.45c.
No. 26	5.35c. to 5.70c.
No. 27	5.50c. to 5.85c.
No. 28	5.65c. to 6.00c.
No. 30	6.10c. to 6.50c.

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in Butt	—41	—24	⅛ in. Butt	— 4	+19
¾ in. Butt	—46	—32	¾ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19¾c. to 20¾c.
High brass wire	20¼c. to 21¼c.
Brass rods	18 c. to 19 c.
Brass tube, brazed	27¾c. to 28¾c.
Brass tube, seamless	25½c. to 26½c.
Copper tube, seamless	27 c. to 28 c.

Copper Sheets

Sheet copper, hot rolled, 23¾c. to 24½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14 x 20 Prime	Seconds
		80 lb.	$6.55 $6.30
		90 lb.	6.65 6.40
		100 lb.	6.75 6.50
IC	$11.75	$10.50	IC 7.00 6.75
IX	13.00	11.75	IX 8.25 8.00
IXX	14.75	13.00	IXX 9.50 9.25
IXXX	16.50	14.75	IXXX 10.75 10.50
IXXXX	18.50	16.50	IXXXX 12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	41c.
Bar	48c. to 53c.

Copper

Lake ingot	17½c.
Electrolytic	17 c.
Casting	16¾c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¼c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27c.
Refined solder	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	8¾c. to 9¼c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	32c. to 33c.

Old Metals

The market is still weak and values are lower. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	12.25
Copper, heavy wire	11.50
Copper, light bottoms	9.75
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	9.25
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.50
Lead, tea	4.00
Zinc	4.00

THE IRON AGE

New York, August 16, 1923

ESTABLISHED 1855 VOL. 112, No. 7

Features in Manufacture of Mack Motors

Bonus System Effective in Boosting Production Without Sacrificing Accuracy—New Fixtures and Diamond Tools Show Desirable Results

BY L. S. LOVE

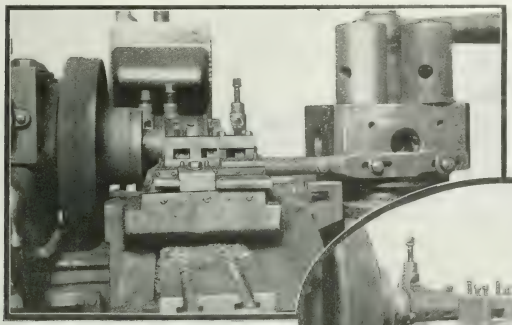
CHECKING accuracy in a commercial product to one-tenth of a thousandth and at the same time maintaining a production schedule is noteworthy even in the automotive industry. This result of combining accurate work with an incentive toward high production has been developed at the Plainfield, N. J., plant of the International Motor Co., manufacturer of Mack trucks. At this plant are built all the motors produced by the company for assembly into completed chassis at another plant. Three sizes are made, and flexibility in equipment is thus required. All motors are of four cylinders, with the cylinders cast in pairs, and they are of 4 in., 4¼ in. and 5 in. diameter, respectively.

The time study system has been worked out and provides a bonus for increased activity on the part of the operator and thus for effort to hasten setting up operations or reduced time between cuts. As a new job comes into the shop, it goes first to the engineering department, where it is analyzed and the operations planned with their sequence progressively routed. The operations are then prescribed on cards, different colors being used, cards of one color show routing, those of another color show also the time allowed for each operation. A route and time card follows each job through the shop.

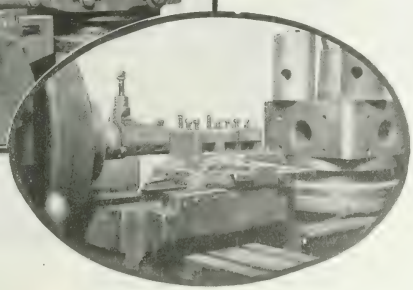
In figuring the time element for a given job, a high grade operator is timed in producing not less than ten pieces at best feed and speed and from this performance the average time is arrived at. All time studies are figured in the decimal system and set in hundredths of an hour. To the actual time is added 30 per cent to arrive at the allowed time for which the operator is to be paid.

Once the time study is made and allowed time is set, there is no change nor cut made in less than a year. Then a change may be made, but only due to a change in design or method of handling. Any saving of time in setting up work or doing better than the allowed time in any other manner gains a bonus for the operator. At the same time, he must maintain the accuracy limits for the job on which he is working or have work rejected and charged against him.

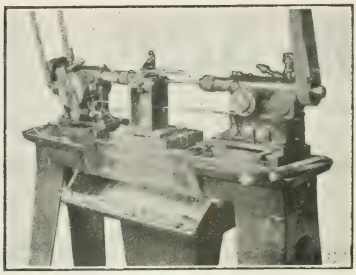
A daily production sheet is tabulated, giving each



The Use of Three Tools at Once Permits Rough Turning of Pistons in a Carriage Travel of Two Inches Preparatory to Heat Treatment. Carriage feed is by push bar on turret and spring return (Left)



One Operation on Pistons Is Eliminated by Use of an Equalizing Arbor Which Chucks on the Inside of the Rough Casting, Thereby Requiring no Preliminary Boring Operation (Right)



Valve Lifter Roller Pin Holes Are Drilled and Reamed in a Semi-Automatic Horizontal Two-Spindle Drill in One Chucking, Taking Only Half the Time Formerly Needed in a Four-Spindle Machine, Which Required Another Chucking

operator's percentage of efficiency. This sheet shows whether he is a consistent bonus earner or whether he persistently falls below the production set in the time study. From this daily sheet a monthly efficiency record is compiled and each operator's percentage is noted on his record sheet in the employment department. Here his value to the company may be carefully checked according to his actual performance.

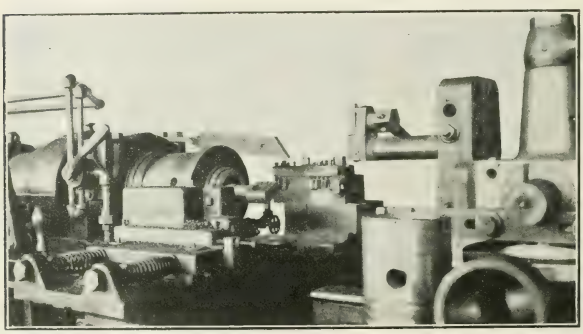
A daily cost sheet is also tabulated. This shows the acutal cost of producing each job, as it includes the operator's wages for the actual time consumed plus his bonus earned on the job. In this way a record is maintained of average costs over a period of months.

In the screw machine department an operator is allowed four machines. He is expected to keep three machines running constantly, thus being allowed one machine idle for set up. The incentive is to hasten set ups and thus keep the fourth machine running as much of the time as possible, thereby earning a bonus. Overtime beyond the regular 9-hr. day is credited at time and a half in addition to the bonus.

Piston castings, in common with various other cast iron parts, such as cylinders, valve guides, etc., are subjected to a heat treatment after the first machining operation. The machining operation removes the scale and the heat treatment, which is a baking at low temperature for 24 hr. followed by slow cooling, releases strains. One chucking has been eliminated in the revised plan of operations on pistons. It had been the custom in the past to bore the piston skirt adapter bearing in a common vertical drill press preparatory to mounting on a draw arbor with a draw pin which registered the bored skirt in a pilot for rough turning. This operation has been eliminated in the preliminary machining before heat treatment, saving one chucking.

Pistons are now mounted on an air operated equalizing arbor, which grips on the inside rough wall, properly centering the casting for turning. The operation is performed in a semi-automatic turret lathe. The cross slide carries three nickel alloy cutting tools, cutting at once, and travels only 2 in. to perform the rough turning operation over the entire surface. Feed to the carriage is effected by a push bar attached to one side of the turret; a spring returns it. When the cut is completed, the machine returns to starting position and stops, waiting for the attendant to remove the work and insert another casting.

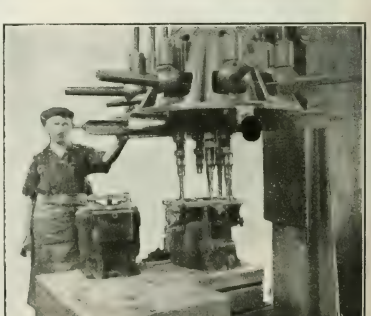
After heat treatment, pistons are bored and reamed in a semi-automatic turret lathe which has a four-sided turret. On the turret are mounted four two-jaw, box-body chucks, one on each side. These chucks are provided with special slip jaws of a form properly to grip the pistons. The combination boring and reaming tool is special and is carried in the spindle of the machine. With the four chucks in use the operation is continuous, the operator unloading a finished piston and loading another while the machine is working, after which the indexing of the turret introduces another casting to the tool. Finish turning is accomplished on a pilot with a draw arbor and pin through the wrist pin holes.



A Cam on the Lathe Spindle Serves to Reciprocate the Auxiliary Slide on the Front Carriage for Turning Piston Pin Relief on Pistons. The rear carriage turns grooves while the casting is held by a draw bolt and spring center

Wrist pin relief and ring grooves are turned in a turret lathe in which the piston is chucked as in finish turning. A spring tension center carried on the turret supports the outer end. On the fixture is a cam which actuates the cross slide against spring pressure, causing it to clear the piston periphery all over except where the pin relief is desired, at which points the cam permits the springs to push the slide into cutting position. Ring grooves are cut by tools in the rear slide at the same time.

The completing operation in the turning of pistons is one of burnishing the ring grooves to assure absolutely uniform size and also to harden them to resist ring wear. This is done in a common lathe with a hardened disk on a



Holes in Both Top and Bottom of Cylinder Castings Are Drilled Under One Cluster Head Drill, Using Two Jigs, the Drill Spindles Being Set in Two Groups. This necessitates lifting the castings from the floor only once



Lapping of Wrist Pins Permits Them to Be Graded in Variations of 0.0001 In. The abrasive medium is washed off in a tank of kerosene

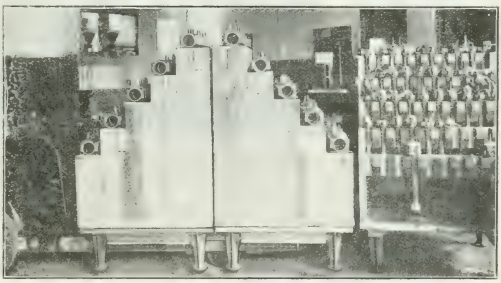
shaft mounted in bearings on the lathe carriage. This disk has a thickness of the proper width for the grooves.

Cylinder castings, after being rough milled top and bottom and rough bored, are heat treated. The next succeeding operation is one of drilling holes in top and bottom of the castings. Those in the bottom are taper reamed and are used for location in finish boring the cylinders and also on an assembly plate when the cylinders, manifolds, carbureter, etc., are assembled before mounting on the crank case. This drilling operation is handled under a cluster head multiple drill using two jigs, one for each side of the casting. The spindles are arranged in two groups and the operator sets up first for one side, then the other, so that the machine is working constantly, with the necessity of raising the castings only once from the floor to secure the holes on both sides.

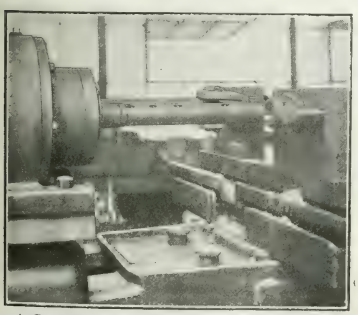
Cylinders are then finish milled four pairs at a time before being bored, reamed and burnished. The latter operation is accomplished under a radial drill with a roller burnishing tool.

A remunerative change was recently made in the drilling and reaming of valve lifter roller pin holes. These were formerly drilled and reamed in a four-spindle, sensitive drill. The present method involves the use of a two spindle semi-automatic horizontal machine with spindles opposed. The lifters are mounted in a fixture on the machine; one spindle advances, drills the hole through both sides of the jaw or roller recess, and retires, upon which the other spindle advances from the other side and reams. The machine stops upon completion of the cycle until another piece has been inserted and the starting lever again is tripped. This change has cut the cost of this operation in half and at the same time assures alinement, as both operations are performed in one chucking.

While the International Motor Co. believes generally in the use of commercial machines for shop production, special machines or adaptations of standard machines in some cases have been found desirable. A case of this kind is in the boring of connecting rods. It has been the practice to broach the bronze wrist pin bushing in a horizontal broaching machine, for which the company makes its own broaches. This bushing was checked to limits of 0.0003 in. The split bushing, which is babbitt lined bronze, was hand reamed. These two operations are now combined in one and handled on a machine developed for the purpose. In this operation the center distance is assured and the required accuracy maintained.



Connecting Rods After Inspection Are Loaded in Special Racks Which Are Carried Two at a Time on Elevating Platform Industrial Trucks



A Converted Internal Grinder with a Special Two-Spindle Head Is Used with Diamond Tools for Boring Both Ends of Connecting Rods in One Setting

The machine used is a converted internal grinder from which the regular work and wheel heads are removed. In place of the work head a two spindle boring head has been mounted. These spindles have fixed centers and are mounted in ball bearings, permitting high speed of operation. The boring bars carried in the heads are provided with diamond tools, which have been found when run at high speed to produce a better finish on babbitt than reamers, and maintain accuracy longer due to negligible wear. On the wheel head carriage of the grinder is mounted a fixture which carries the work to be bored.

Although the use of elevating platform industrial trucks, shop boxes, etc., is general in this plant, it was found that connecting rods were rather cumbersome to transport in quantities. For this reason racks have been provided in which they may be hung as they come off of the inspection bench. The racks when filled are transported two at a time to the assembly department, thereby greatly reducing the number of trips necessary to carry a given number of rods.

A number of improvements in the design and manufacture of wrist pins have recently been instituted. Formerly these pins were designed with a straight

bore, and were machined, ready for carbonizing, in a four-spindle automatic screw machine and a hand turret lathe on the second operation. The present wrist pin has a tapered hole, tapering from the center both ways, giving a thicker wall in the center and consequently less likely to show deflection under strain. The manner of manufacture has been changed to accommodate the taper, but the making of the pin requires no more time than did the straight hole pin. It is rough bored in a four spindle screw machine, centered and champfered in a hand turret lathe and then turned on an arbor to 0.010 in. It next goes to a centerless grinder to be ground before carbonizing, after which it is taper bored in a double end four spindle chucking machine. Next the pin goes to the centerless grinder again, where it is ground to limits of 0.0002 in.

A recent addition to the operations is one of lapping which effects even closer accuracy, namely, 0.0001 in., to which they are graded under a Prestwich fluid gage. This lapping machine is one recently placed on the market by Warren F. Fraser, Westboro, Mass. It consists essentially of a base and column, each supporting a large cast iron surfaced disk. Through the center of the lower disk is an arbor which delivers an eccentric motion to the work holder. The latter is a disk having arms to receive the wrist pins, permitting them to roll under the effect of the lapping motion. These arms are on lines which would form chords to the disk circle rather than being radial. This angle together with the eccentric motion of the arbor and the rotary motion of the pins themselves is effective in constantly changing the relative contacts between the disks and the work. Flour of emery and oil is used as the grinding medium. This is washed off after the operation is complete by immersion in a tank of kerosene which permits the solid matter to settle.

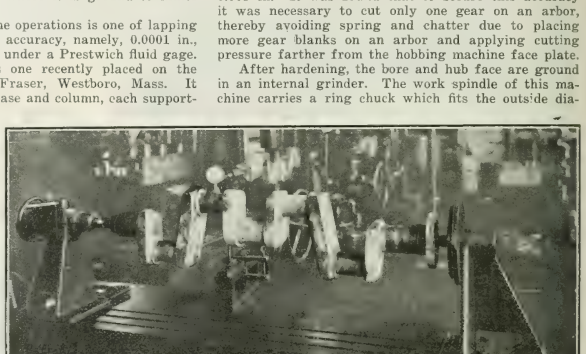
On the inspection bench these pins are graded according to a range covering 0.0007 in. in seven grades. They are then etched with a number in the bore according to size by tenths of thousandths. The grading of the seven sizes permits 0.0002 in. under size and 0.0005 in. over. These pins in turn are matched with pistons and rods which show corresponding variations in size. As an example, a wrist pin measuring 1.6244 in. would be called a No. 3 it would be assembled with a No. 3 piston and rod bushing which measure 1.6247 in. and 1.6249 in. respectively. Wrist pins when assembled are full floating, being held in place endwise by retainer springs in grooves in the piston holes.

The Mack truck is one of the comparatively few motor vehicles which has a case hardened crank shaft. After turning, the shafts are placed two in a box with a commercial compound and are brought up to 1700 or 1750 deg. F. in about 4 hr., where they are held for 24 hr. before plunging. This is found to give a hardened case ⅛ in. deep. Naturally they stretch and warp somewhat under this treatment. Experiments have been made with a clamp attached before plunging, but so far this has not worked out satisfactorily. To overcome the warping, the shafts are swung in centers mounted on a surface plate. On one center are gaging disks to which the dial indicator height gage is set. Straightening is done under hydraulic straightening presses. It has been found that frequently pressure on the central main journal is sufficient to spring the shaft back to line. These shafts must gage on all bearings to within 0.060 in. before going to the crank grinders.

Cam shafts in the past have been ground from the rough. An innovation in this plant is rough turning in a cam shaft turning machine in 5 min. for the 8 cams instead of 15 min. as formerly required for rough grinding, a saving of two-thirds.

In the making of the helical timing gears, all blanks are annealed before cutting and the practice has been to test gears for concentricity of the pitch line before the gears go to heat treatment. They are meshed with master gears in a testing bench and must run within 0.003 in. It was found that to secure this accuracy it was necessary to cut only one gear on an arbor, thereby avoiding spring and chatter due to placing more gear blanks on an arbor and applying cutting pressure farther from the hobbing machine face plate.

After hardening, the bore and hub face are ground in an internal grinder. The work spindle of this machine carries a ring chuck which fits the outside diameter of the gear. Three pins are placed about the gear between teeth at equi-distant points and serve to center the gear on the pitch line and drive it as the chuck revolves. Flat wheels and cup wheels are used on the bore and hub face respectively.



After Case Hardening, Crank Shafts Are Straightened to Within 0.060 In. Under Hydraulic Straighteners Before Going to Crank Grinders

(To be concluded)

Metal Working Machinery to Be Exhibited at Steel Treaters' Convention

The metal working machinery manufacturers have come to recognize the international steel exposition, held jointly with the convention and under the auspices of the American Society for Steel Treating, as an excellent opportunity to exhibit their product to a large group of interested individuals. Consequently, from year to year there has been noted a gradual increase in the number of machinery dealers who have accepted the opportunity offered by the exposition to show their product to the thousands of manufacturing executives in attendance. The exposition to be held at Motor Square Garden will have a larger number of metal working manufacturers than ever before. The following machinery manufacturers will have their exhibits in operation: National Automatic Tool Co., Richmond, Ind.; Baker Bros., Toledo, Ohio; American Tool Works Co., Cincinnati; Gould & Eberhardt, Newark, N. J.; Cincinnati Milling Machine Co., Cincinnati; V. & O. Press Co., Hudson, N. Y.; Warner & Swasey Co., Cleveland; Keller Mechanical Engineering Corporation, Brooklyn; National Machine Co., Tiffin, Ohio; Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; Ohio Machine Tool Co., Kenton, Ohio; Laughlin & Barney Machine Co., Pittsburgh; Avey Drilling Machine Co., Cincinnati; Oliver Instrument Co., Adrian, Mich.; Millholland Machine Co., Indianapolis; Universal Grinding Machine Co., Fitchburg, Mass.; Blanchard Machine Co., Cambridge, Mass., and High Speed Hammer Co., Inc., Rochester, N. Y.

New Testing Methods for Castings—I*

Transverse and Shearing Tests Recommended and Tension and Shock Tests Condemned—Argument for Testing a Part of the Casting Itself

IN response to the invitation of the Institution of British Foundrymen to present a paper at the Congress at Birmingham, the French Foundrymen's Association has chosen as a subject of world-wide interest the new methods established by the researches of two French scientists for inspecting the strength of castings. Both men are well known in England. One of them, Mr. Fremont, was awarded the Bessemer medal at the last gathering of the Iron and Steel Institute, in Paris last September. The other, A. Portevin, has presented to the same institute a large number of reports and has received from it the Carnegie medal.

Great progress in foundry practice can be hoped for by the systematic employment of these methods for testing. They deserve to be taken into consideration

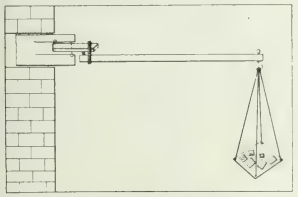


Fig. 1. Sketch of the Ramus Machine, often Called the Monge Machine—One of the Earliest Known Devices for Testing Materials

and carefully tried out. Since the start of the industry the transverse test has been employed. In 1790 we find the Ramus machine, now known as the Monge machine, described in the annals of chemistry. (See Fremont: "New Methods of Mechanical Tests on Castings" [in French], page 11.) The great scientist Monge, who described and employed this machine, was considered its inventor. The researches of Mr. Fremont show that the actual inventor is Michael Ramus, manager of the Creusot foundry. The test bars were square and measured 80 mm. (3⅛ in.) on the side and about 50 cm. (20 in.) in length. They were gripped at one end and loaded at the other end.

Fig. 1, copied from Mr. Fremont's paper, shows the Ramus machine, which has been described and illustrated by Monge in the "Description of the Art of Manufacturing Cannons" (Paris, 1794, page 18). This fact is the cause of the machine having been attributed to Monge, although he refers to it as the "Creusot machine." Although Mr. Fremont and many others consider the transverse test as the ideal one—Monge's test is still described in the majority of French specifications —this test has been practically abandoned and replaced by two worthless tests, the tension and the shock test.

Colonel Prache, in his paper before the Congress of the Belgian and French Foundrymen's Associations held in Liége in 1921, says: "The progress of semi-steel during the war was retarded by the mechanical tests imposed by the artillery department. Whoever has made any semi-steel shells knows that these tests had only a remote connection with the castings which were run."

Practice in Various Countries

In America, transverse tests were taken in the past on square or rectangular test bars of all dimensions and all lengths. Great efforts have recently been made in that country to agree on a standard test bar and prevail on other countries also to accept it. A round test bar of 1¼ in. diameter was chosen, to be broken on knife edges with a spread of 12 in.

However, the American pipe foundries are using a bar of 2 in. by 1 in. placed flat on knife edges spread 24 in. apart. Wheel manufacturers who use a tempered casting process employ the same bar, while other factories retain the old bar, which is 1 in. square and rests on knives with a spread of 12 in. Finally, test bars have been broken on knives with a 3 ft. and even a 5 ft. spread. Keep has experimented on and recommended test bars ½ in. square, resting on knives with 12-in. spread.

In England the standard test bar is 2 in. high, 1 in. wide and 3 ft. 6 in. long, and rests on knives with a 3 ft. spread. In Germany the transverse test is employed on round bars of 30 mm. (1.2 in.) diameter by 650 mm. (25½ in.) length, poured from the top in oven-dried molds, and broken on supports with 600 mm. (23⅝ in.) spread. In France the Monge test has been practically replaced by the tension and shock test.

The shock test is made on a 40 mm. (1.6 in.) square bar, 200 mm. (7⅞ in.) in length, resting on knife edges with 160 mm. (6.3 in.) spread; a weight of 12 kg. (26½ lb.) dropping from an increasing height produces the break. The starting height and the increase between successive drops vary according to the specifications. The tension test is made on test bars of either 16 mm. (⅝ in.) diameter, or of 25 mm. (1 in.).

The Case Against Shock and Tension Tests

To prove the shock test worthless, Mr. Fremont compared the results obtained on bars tested with the drop

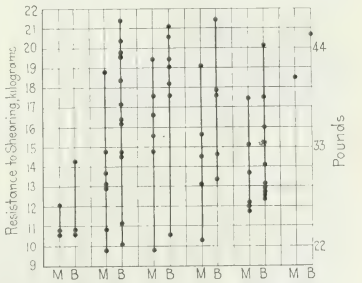


Fig. 2. Comparison of Shearing Tests with Tests Made with the Drop Hammer

hammer with those on shearing tests made on fragments of the same test bars. The results are shown in Fig. 2.

These shearing tests were made on small test bars of 2 x 10 mm. (0.08 x 0.39 in.), some of them selected from the center and the others from the edge of the thick shock bars, with a square section 40 x 40 mm. (1.6 x 1.6 in.). For each bar broken under shock at a given height, shearing tests were made on bars selected at the center and at the edge. The points relate to the shearing tests, *M* signifies center (*middle*) and *B*, edge (*border*) of the test bar. It will be seen that some

*Paper presented by E. Ronceray, to the Institute of British Foundrymen in the name of the Technical Foundrymen's Association. Translated by E. J. Lowry, Hickman, Williams & Co., Pittsburgh.

of the test bars taken from the large bars, having broken at a small height, gave excellent results, while the opposite result is found sometimes on tests from the bars which broke only at a great height. The resistance of the test bars from the center is always less than that of those taken at the edge. This is to be explained by the difference in cooling speed. These results are sufficient to condemn the shock test itself, even if there were no other reasons.

Everybody knows that the tension test has no value for castings, owing to their sensitiveness against lateral strain. In fact, Mr. Portevin has demonstrated by the mirror method that the tension test is without any value when taken under ordinary conditions. The same remark applies to tempered steel, which presents the same characteristics.

In America the tension tests are accepted, but not

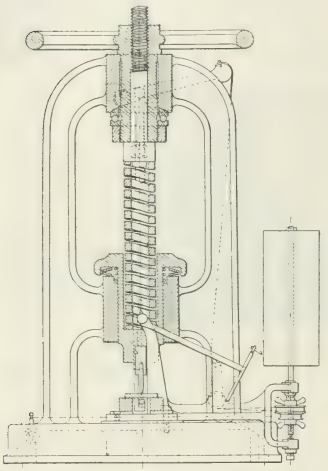


Fig. 3. Machine Designed by Mr. Fremont for Using Test Bars of Small Size

recommended. This test is very little used in England and has been discarded by the specifications in Germany. The best French investigators are of the opinion that these tests should not be employed under ordinary conditions.

The structure of cast iron varies with the speed of cooling, and consequently with the thickness of the sample and the conditions of the run. It seems almost unbelievable, even during the present times of progress and science, that the qualities of cast iron should be examined by the aid of test bars run separately and whose structure is entirely different from that of the castings. It is surely very difficult to obtain from the same ladle any two specimens giving the same results on tests. What can be expected of test bars run separately from the castings whose quality they are to control, and of a thickness entirely different from these castings, and generally cast at a different time?

Colonel Prache was quite right in saying that "the service tests of the artillery department have hindered the foundrymen in making better shells," and so was Mr. Portevin when he said that "from the point of view of the quality of the metal for shells it is difficult to make a worse selection of testing methods." It is easy to understand that, to obtain results which can be compared for shells of different thicknesses, test bars of different thicknesses should have been chosen. But the best way would surely have been to judge the quality of the castings by test bars taken from their own mass, rather than on test bars more or less different from the castings themselves. The objection to this method is the impossibility to sacrifice a casting from a given lot in order to secure a test bar.

The investigations of Mr. Fremont and Mr. Portevin relate to such methods, and in our opinion are capable of giving considerable progress to foundry work. Their methods will permit foundrymen to choose the best

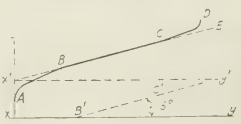


Fig. 4. General Character of Diagram from the Fremont Machine, the Elastic Limit Being Reached at *C*, and the Angle Measuring the Coefficient of Elasticity

compositions of metal and the best foundry methods. Mechanical engineers will then have an opportunity to modify their designs and benefit to the fullest extent from the results given by all the many tests which will be made on different castings. The result will probably be that the confidence in a given casting will grow, because the finished product will be more regular and more reliable.

It would be a great advantage if such methods were submitted to a commission made up of members of the various foundry associations, for the purpose not only of choosing tests to be recommended, but also to agree on the dimensions of the test bars, so that the results of all foundries or all investigators could be compared.

Fremont's Bending Test Machine

To study in the laboratory the qualities of a casting, Mr. Fremont recommends the static bending test. But as this must be made on test bars taken from the castings themselves, he has constructed a machine which will permit the employment of a test bar of reduced dimensions. He also thought it necessary to tell the conditions of the test. He chose the dimension of 10 mm. (0.39 in.) width by 8 mm. (0.31 in.) thickness and 35 mm. (1.4 in.) length, so that the test bar can be cut from the casting at any desired spot, thus enabling the investigation of all the various parts. His machine, which is provided with a recording apparatus, is shown in Fig. 3.

To verify the practical values of the results ob-

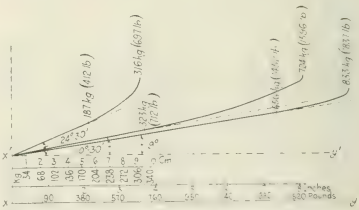


Fig. 5. Three Typical Diagrams Obtained on the Fremont Machine, Illustrating Different Qualities of Castings and Superposed to Permit Comparison

tained by this method, he has made tests on 110 specimens of castings, for most of which he was cognizant of their results through practical tests.

The dimensions of the test bar chosen were determined by the power of the machine, which is from 1000 to 1500 kilos (2205 to 3307 lb.), but the effort must be brought about gradually, without the least attempt at extreme shock in breaking. The method chosen is the one using a hand wheel drive on a screw, with the insertion of a large spring between screw and the punch

holder. This spring acts gradually and, without shock, transmits the strain of the screw.

The weight of the movable part is balanced by a resistance coil spring placed in the slide of the frame. The large spring will bend proportionately to the work applied, which it transmits at the rate of 1 mm. for 43 kgs. of pressure (1 in for 2408 lb.) The breaking of the test bars takes place only when the screw has made from 3 to 8 revolutions, according to the strength of the casting. This permits a simple and easy way of measuring the strain applied. The elastic limit or coefficient of elasticity is obtained by reading a recording diagram.

A suitable device carries the drum along, by means of wire in connection with a large spring, so that 1 mm. on the line of the abscissae corresponds to a strain of 3.4 kg. (190 lb. for 1 in.). As the bending of the test bar is very minute, it is enlarged about 200 times and recorded on the line of ordinates.

Fig. 4 shows the diagram obtained. The left side shows a curve which results from the contact of the test bar with the recording knife. The actual starting point is x', $x'y'$ being considered as the zero point. When this line is no longer straight, at C, the elastic limit is reached, and the angle E, $x'y'$ gives the measure of the coefficient of elasticity.

Breaking of the test bar, owing to the nature of the

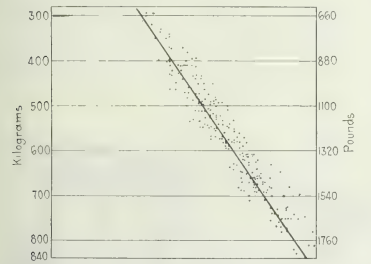


Fig. 6. Showing Proportionality Between the Resistance of a Casting to Bending and Its Resistance to Shearing

casting, is always sharp. To eliminate damage to the recording apparatus, two Belleville washers have been placed under the tool carrier. The run of the punch is thus limited to 2 mm. (0.08 in.) However, a special device is provided to prevent the horizontal levers from being injured when the test bar breaks.

The machine is weighted, in measuring the bend of the large spring under a given load, or else while acting on a scale which is gradually weighted. A like proceeding is used to get the deflection of the test bar, by pushing the levers through the intermediary of a precision caliper.

Fig. 5 shows three typical diagrams, corresponding to the different qualities of castings and arranged to permit comparison.

For the first breaking load, 316 kilos. (697 lb.) angle 24 deg. 30 min.
For the second breaking load 724 kilos. (1596 lb.) angle 10 deg. 30 min.
For the third breaking load 833 kilos. (1837 lb.) angle 9 deg.

This diagram shows that the deflection has varied from the low to treble this figure. The coefficient of elasticity can be determined by the bending diagram. Numerous experiments made by Mr. Fremont show that, the more resistant the casting is, the smaller the bending will be, while the variation for steel is infinitely small. He recommends this method for examining metal and establishing the terms of specifications for the laboratory. For the acceptance of the finished castings he recommends the shearing test.

Shearing Tests have been investigated for daily acceptance of castings. In a preceding article on steel

Mr. Fremont demonstrated that the phenomenon of shearing or punching is an action of tension and not of sliding, as had been supposed. The various layers compressed by the punch or the shear blade will not separate at once from the layer from which they come.

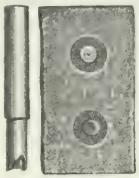


Fig. 7. Hollow Drill of Milling Form and the Holes It Cuts. The core is broken out and forms the test piece

Every fiber of metal will act as a tension test bar, which will elongate under the strain of the tool. (See Paper on Riveting, in French, "Bulletin of the Society for the Encouragement of National Industries," 1906).

He has been able to demonstrate that for steel there is a direct relation between the resistance to shearing and the resistance to tension. To determine this matter as far as the casting is concerned, he made tests on 110 specimens from castings, of which he knew the results of their static bending tests. He has been able to ascertain that the resistance to shearing for the casting is proportionate to the resistance to bending, as is demonstrated in Fig. 6. This has been confirmed by new experiments of Mr. Portevin, in semi-steel.

Other experiments have shown that, for castings, the resistance to tension is equal to the resistance to shearing. Consequently a shearing test is perfectly satisfactory for the acceptance of the castings and, moreover, there is no chance for any errors similar to those of the present tension test. To pass on the quality of a casting, it occurred to Mr. Fremont to test a small square prism of 5 mm. x 5 mm. (0.2 in. x 0.2 in.) taken from the piece, or a small cylinder of 5.64 mm. (0.22 in.) diameter; that is, in each case to use a section of 25 sq. mm. (0.04 sq. in.) from the casting.

This method was presented by him to the International Congress for Testing Methods, held in New

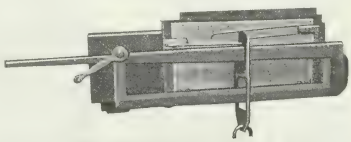


Fig. 8. Head of Machine for Cutting or Shearing Test Pieces and Autographically Recording the Effort Required to Overcome the Resistance

York in 1912. Dr. Moldenke said:* "These small stems are sheared every 3 mm. (⅛ in.) and the average is taken. The proportion is exquisite in its novelty and ingenuity."

It is often possible to take from finished castings small prisms of metal which can be adjusted to the square section of 5 mm. x 5 mm. But when this is impossible, the same results are obtained by drilling holes in the casting in a special way, which leaves a bar of metal in the center to serve for the test piece. The hole made by this operation may be plugged if necessary. These holes are made with a drill in the shape of a round mill, having a diameter of 10.5 mm. (0.4 in.) Fig. 7.

This round mill in cutting leaves in the center of the hole a small cast iron cylinder, 5.64 mm. in diameter (25 sq. mm. section), constituting the test bar. This test bar is detached with a special small tool made up of two eccentric tubes which enter the drilled hole, leaving a small clearance within each other. The inside of the small tube has a diameter of 5.64 mm., while the outside of the larger one has a 10.5 mm. diameter. The two tubes are pushed into the circular

* "Principles of Iron Founding," Moldenke, page 163.

slot hollowed out by the round mill. By turning the outer tube with the aid of the lever, the inner tube is kept immovable and the test bar is thus separated.

This test bar, round or square, is then cut 3 mm. x 3 mm. (⅛ x ⅛ in.) and at the same time the strain is measured. This gives the resistance of the casting at the periphery and at the different depths of the casting chosen. One of these castings, of about 20 mm. (0.79 in.) length and weighing about 4 grams, (1/7 oz.) permits making five shearing tests, i.e., less than 1 gram per test instead of more than 1 kg. (2.2 lb.)

The cutting is effected between two blades with parallel cutting surfaces. The machine employed for this method, as shown in Fig. 8, is to be slightly modified, to make its use more convenient in practice. It consists simply of a lever which has a stationary point, with a device for applying on the blade the strain of a movable weight running along the lever. This weight is shifted by a small handle that is drawn on the weight by a spring, but a device with screw and fly-wheel will be provided on future machines.

The strain is multiplied in proportion to the arms of the levers. When the effort corresponds to the strength of the test bar, the breakage takes place. During the operation a pencil shifts along a slip of paper, producing a diagram similar to the one shown. The table, arranged according to the constants of the machine, gives the strength of the specimen tested.

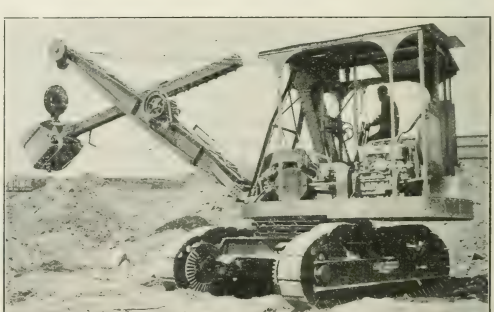
(*To be continued*)

New Gasoline Dipper Shovel

A gasoline driven power shovel operated entirely with gears and shafts is being marketed by the Orton & Steinbrenner Co., 608 South Dearborn Street, Chicago.

In adapting the gasoline motor to a dipper shovel, the principal difficulty has been in the necessity to provide an arrangement to take the place of the independent source of power for the reversible crowding motion of the dipper stick. With the steam-operated type this is accomplished by means of a small steam engine geared directly to the dipper shaft. With the gasoline or electric type this method is said not to be feasible. Of sprocket and chain arrangements and wire rope drives, the company claims that they will not stand up under severe usage, especially where the cables are bent over a number of small diameter sheaves and drums, and reversing curves are employed.

Positive gear drive is an outstanding feature of the machine illustrated. A shaft at the bottom of the boom connection carries double steel bevel gears and bronze friction clutches. This shaft is concentric with the pivot of the boom and consequently, being independent of its position, the boom can be used at any angle to suit the exigencies of the work. A steel shaft carrying two bevel pinions extends along the boom. One pinion meshes at the bottom with the gears on the horizontal shaft, and the other at the top meshes with gears on a countershaft located about half way up the boom. The countershaft carries a brake and "slip friction," and is geared directly to a cast-steel rack on the dipper stick. With this arrangement it is claimed that a minimum number of levers are required and fatigue incident to operating the rope-driven type is eliminated.



Gasoline Driven Dipper Shovel Operated Entirely by Gears and Shafts. Shovel boom may be taken off and crane boom substituted. With double drums, the shovel may be used interchangeably with the crane

The hoisting mechanism is the same as used in the company's locomotive cranes. The machine may be conveniently converted into a clam-shell outfit, drag line or skimmer rig. Power is supplied by a heavy-duty four-cylinder Climax motor, and the drive is by means of steel shafting and bevel gears. The flexible crawling tread is a feature, and steering is accomplished by one man in the cab. On the main horizontal drive shaft are two brake wheels by means of which each tread may be operated independently or both may act together. The mechanical differential arrangement is similiar to that used on automobiles. Alemite fittings are used exclusively in lubrication.

In using as a crane, only the shovel boom need be removed and the crane boom attached. The crowding frictions for operating the dipper being carried by the shovel boom and an integral part of it are removed with it. The shovel when equipped with double drums may be used interchangeably with the crane. With the crane boom attached various types of buckets or scoops may be used and pile driver leads may be swung from the tip of the boom.

To Take Over Plant of Eastern Ohio Mfg. Co.

C. G. Thomas, Warren, Ohio, announces that a new company will shortly be formed to take over the plant of the Eastern Ohio Mfg. Co., Warren, Ohio, which will be equipped for the manufacture of cold-rolled strip steel. The plant will have an initial capacity of 1500 tons per month and will specialize in the manufacture of the highest grade of strip steel, including various high carbon, alloys, nickel plating steels, etc.

The organization will include C. H. Lewis, formerly secretary of the Western Reserve Steel Co. and later with the Niles Trust Co., Niles, Ohio.

E. B. Hite, Lancaster, Pa., will also be associated with the company as general manager in charge of operations. Mr. Hite has had a wide experience in the manufacture of strip steel. He was formerly with the Crucible Steel Co. of America and for the last few years superintendent of the Lancaster Steel Products Co., which is a subsidiary of the General Motors Corporation and produces strip steel for its various plants.

It is expected that the plant will be in operation prior to Jan. 1, 1924.

Jones & Laughlin Steel Corporation, Pittsburgh, has adopted a plan for the sale to its employees, under special terms, of its cumulative preferred 7 per cent stock at $107.50 a share. A maximum of 5000 shares will be sold on this, the initial offering. Details of the plan have not been made public.

The Rôle of Chemistry in Semi-Steel

Chemical Control of Both Raw Materials and Finished Product Necessary—Rôle of Combined Carbon—Effect of the Other Elements

BY J. E. BOCK*

AS gray iron foundrymen we all aim to produce castings which are strong and tough and at the same time are easily machinable. There is no process by which gray iron can be given these desirable properties more readily, at a reasonable cost, than by the addition of steel scrap to the mixtures in the cupola. The product thus obtained is popularly known as semi-steel. Some people, especially in the last year or two, have objected to this name as being misleading, and for other more or less valid reasons. It is not my intention either to defend or to find fault with the name. I merely use it for want of a better one, and because it means to me, as I am sure it means to most of you, a gray iron of exceptionally high quality, made from mixtures containing from 10 to 40 per cent of steel, and having a tensile strength of at least 30,000 lb. per sq. in. and transverse strength of at least 3200 lb. These values are for mixtures containing the minimum steel additions and are correspondingly higher as the percentage used approaches 40 per cent.

Continuous Chemical Control

Such a product is uniformly obtainable only when both raw materials and the finished castings are under continuous chemical control. Any foundry whose work is of such nature as to require particularly close-grained, tough iron will find it a paying proposition to employ the services of a chemist. I mean a chemist who is on the ground, in constant touch with the foundry and its personnel, rather than one or more outside chemists who supply analyses now and again with more or less accuracy and do not take a personal interest in the work at hand. In the foundry of the Vilter Mfg. Co., Milwaukee, we are concerned primarily with ammonia fittings, which are subjected to pressures up to 300 lb. per sq. in. in service, and consequently close-grained iron is absolutely essential to success. In this paper it is my purpose to tell you as briefly as may be the more important aspects of my work.

While one naturally thinks of chemistry as applied to semi-steel as a laboratory process, the foundry chemist who does not spend considerable time in the foundry itself cannot hope to be successful. In our case, it is about a fifty-fifty proposition, and I know that, however important the chemical tests are, the work within the foundry is no less essential. The chemist should personally check over the blue prints of all castings to be made so that he can acquaint himself with their intricacies. This is especially important in a jobbing shop. He can then intelligently calculate mixtures for the different classes to be cast. The weighing off of these mixtures should be done under his personal supervision or that of a competent assistant. The charging of the cupola should be similarly handled. When the iron begins to flow he must again be on the job to check each tap as it is made and to see to it that the metal gets to the mold or molds for which it is intended quickly, and in proper condition for pouring.

Cupola Practice

In this connection one cannot too greatly emphasize the importance of good cupola practice, and consequent hot, fluid metal. If semi-steel is not melted hot, the reaction gases cannot escape and the component parts of the mixture cannot mix properly. The resulting castings will be dirty, spongy and altogether unsatisfactory. A number of good textbooks are available in which good cupola practice is described in detail. There are also illuminating articles appearing from time to time in the technical press, so that one would no longer expect to find poorly operated cupolas. However, we hear of many instances to the contrary and if you are obtaining anything but the best results, a little investigation will repay you beyond the shadow of a doubt. The reactions which take place within the cupola form as important a part of the chemistry of semi-steel as the laboratory work itself, and this paper would be most incomplete without at least a brief summary of the outstanding essentials of good cupola practice.

The ratio of the tuyere area to the area of the cupola is very important. The height of the charging door often is a deciding factor. The proper amount of coke on the bed is of utmost importance, and it is a good idea to light the bed sufficiently early so that it may be thoroughly burned through before charging is begun. As regards the amount of coke between charges a ratio of approximately 10 to 1 will be found correct. A mild blast of sufficient volume is always to be preferred to high blast with its attendant evils. Use as little daubing as possible and avoid excess sand on the cupola bottom.

Analyses Which Are Necessary

Let us now consider the work in the laboratory from the practical viewpoint rather than the theoretical. As already brought out the chemist controls semi-steel (or ordinary gray iron for that matter) by analyzing both raw materials and finished product. The physical state of the raw materials frequently has as much influence upon the results obtained as has the chemical analysis. Pig iron constitutes upward of 50 per cent of the ordinary semi-steel mixture.

The machine cast product is, to my mind, much to be preferred not only because it is cleaner, but because it is of more uniform size. The laboratory analyzes all pig iron received for silicon, sulphur, phosphorus and manganese. Carbon determinations are rarely made in this connection. Graphite and combined carbon in the raw material have no direct relation to the corresponding constituents of the finished castings and are therefore of no value. Total carbon is sometimes determined for use in deciding upon the percentage of steel to be added to a given mixture.

The most important factor, however, in deciding upon the percentage of steel to be used in making the mixture is the thickness of the metal in the finished castings. The lightest sections ordinarily require 10 to 20 per cent of steel and the percentage is increased with increase in section, 40 per cent being the highest percentage feasible under ordinary melting conditions. As regards the kind of steel scrap which is suitable, in general any mild, low carbon steel of suitable size will fill the bill. By suitable size we mean pieces weighing approximately the same as the ordinary pig iron and of roughly the same dimensions. Large pieces will not melt so rapidly as the balance of the charge, and abnormally small pieces will be badly oxidized even before reaching the melting zone. Either condition will result in poor quality metal decidedly off analysis. The laboratory analyzes all steel scrap received for carbon, sulphur, phosphorus and manganese, which are relatively important in the order given.

The remaining raw material, which is usually used to make up the balance of the semi-steel charge, is scrap gray iron. Many foundries use any scrap which may be available and do not hesitate to use as much as

*The author is with the Vilter Mfg. Co., Milwaukee, Wis. The paper was presented before Wisconsin Foundrymen's Association, Madison.

50 per cent. It is our practice, adhering closely to analysis, not only to limit the gray iron scrap used to 25 per cent, but to use only our own semi-steel scrap as produced from day to day. The analysis of this material is checked continuously in checking the finished castings and it is the only safe scrap to use.

Use of Ferroalloys

Occasionally we make use of alloys to supply deficiencies in the pig iron available, but we aim to avoid their use whenever possible. If charged into the cupola we have found invariably that there are large losses and, furthermore, that the product obtained is not uniform in spite of every precaution. If added to the metal in the ladle the alloy is rarely properly fused, and in any case it chills the metal by the amount of heat required to melt the alloy added. Ferrosilicon and ferromanganese are the two alloys commonly used and the laboratory checks these for silicon and manganese content respectively when we cannot avoid using them.

Quality of the Coke

In addition to the raw materials mentioned the laboratory checks numerous other products which are used in semi-steel practice. Among these are fireclay, firebrick, various sands, limestone and coke. Because of its far-reaching effect upon the finished product, both as regards temperature and chemical composition, the coke must be checked most carefully. Equally important, if indeed not more important than chemical composition, is the cell structure of the coke. The best coke for cupola use must be dense and hard. Such a product will not burn too readily in the upper part of the cupola and can be depended upon to carry the heavy burden without crushing.

A given shipment of coke should contain a minimum of so-called "black butts" or ends. The chemical determinations usually called for are moisture, fixed carbon, ash, volatile matter and sulphur. The fixed carbon is the sum of the ash and volatile matter subtracted from 100 per cent, and inasmuch as the volatile matter is fairly uniform and relatively small in amount it is the ash primarily which gives an indication of the thermal capacity of the coke. Good coke carries less than 12 per cent ash, and the less the better. The sulphur in the coke must, however, be watched with equal care because it determines so largely the amount of sulphur in the finished castings. With good cupola practice and coke running 0.85 per cent or less in sulphur the amount of sulphur absorbed by the metal will be about 0.02 per cent; but no matter how good the cupola practice, if the coke runs 1.00 per cent or over in sulphur, 0.06 per cent or often more will be absorbed and high quality semi-steel becomes an impossibility, unless extraordinary measures, such as an all-pig and steel scrap mixture, are resorted to.

Proper Amount of Combined Carbon

In the case of the finished castings the important determinations are silicon, sulphur, phosphorus, manganese and total carbon as in the case of pig iron, but to these is added the estimation of the combined carbon content, and in this case the latter is the most important of all. It is the amount of combined carbon which determines the hardness, and incidentally the machinability of the finished semi-steel. A combined carbon of 0.75 per cent to 0.80 per cent is ideal, for it means a close-grained iron, still readily machinable. As the combined carbon is increased to 1 per cent the castings become very hard, and above 1 per cent the best tool steel cannot make an impression upon them.

The rate of cooling (disregarding chemical composition for a moment) is the deciding factor which determines the amount of combined carbon which will be formed in a given casting. When, however, we vary the chemical composition of the mixture we can obtain as little or as much combined carbon as we desire. It is for this reason that chemical analysis is so indispensable where uniform results are an object. Silicon, sulphur, manganese and phosphorus influence the amount of combined carbon formed, in the order named.

The silicon content is the generally accepted basis upon which all pig irons are classified and sold, for the very reason that its influence upon the condition of the carbon is the greatest of all. High silicon increases the amount of graphite formed and, since the amount of graphite plus the combined carbon equals the total carbon, it necessarily decreases the combined carbon formed. In light castings high silicon is desirable because it tends to counteract the rapid cooling effect which would otherwise cause undesirably high combined carbon. Ordinarily approximately 2 per cent of silicon is used for such work, while as little as 1 per cent is sufficient for the heaviest classes of castings.

High sulphur tends to increase the amount of combined carbon and is best kept low not only for this reason, but because it causes shrinkage and promotes the formation of blow-holes, especially when dull metal is encountered. However, the evils attributed to high sulphur are frequently greatly magnified. For light work sulphur of 0.10 per cent will give satisfactory results if the metal is poured hot and the manganese is kept fairly high. Heavy work may carry 0.12 per cent sulphur without causing trouble; in fact we have frequently analyzed samples running as high as 0.15 per cent and found no difficulty in obtaining sound castings which were readily machinable. It is, of course, advisable to keep the sulphur as low as possible for the sake of cleaner metal, but no one should become hysterical over a few points, other conditions being favorable.

Manganese and Phosphorus

As regards manganese there is a mistaken notion that it hardens gray iron, and semi-steel also, by increasing the combined carbon. It is true that it does ultimately have such an effect, but this property will not exert its influence until the amount of manganese is raised to considerably over 1 per cent. In practice we aim to keep the manganese relatively high, 0.75 to 1 per cent, but have never encountered difficulty up to as high as 1.25 per cent. Less than 0.75 per cent of manganese is not advisable in semi-steel, as its powerful desulphurizing and deoxidizing effects do not come into play to any extent below that point.

Phosphorus has no direct bearing upon the condition of the carbon, but if relatively high it is liable to cause segregation and thus reduce the strength of the mixture. In semi-steel the phosphorus may vary from 0.20 to 0.50 per cent, depending upon the class of work to be made. For close-grained castings subjected to high pressures, as in our case, 0.20 per cent phosphorus or even less gives very good results. The only objection to low phosphorus is loss of fluidity, but if the iron is melted hot and poured promptly no difficulty is experienced in obtaining strong, sound castings.

Total Carbon

Granting now that a given gray iron mixture is prepared which contains the proper quantities of silicon, sulphur, phosphorus and manganese to produce the ideal combined carbon of 0.75 per cent, we can produce a still stronger mixture by lowering the total carbon. This is in reality what we do when we add steel scrap to the gray iron mixture, and this is the outstanding difference between ordinary gray iron and semi-steel. Owing to the fact that an indefinite amount of carbon is always taken up by the metal from the incandescent coke within the cupola, the regulation of the total carbon in the resulting castings is not an easy matter. When, however, all raw materials are carefully analyzed and good cupola practice is adhered to, the total carbon can be kept within fairly narrow limits. We have found 3 to 3.25 per cent total carbon to be ideal.

In conclusion, while all of the factors discussed are essential to good semi-steel practice, all or any of them will be futile if the foundry organization as a whole will not cooperate with the chemist. The latter must be able to inspire respect and to retain it. If he is able to produce continuously good results, this becomes a simple matter, but if difficulties are met with it frequently becomes anything but simple. Fortunately the major portion of the black cloud of prejudice which enveloped all foundry chemists not so very many years ago has been largely dissipated by good work done, and it is to be hoped that, as time goes on, better and better relations may be established and consequently better results obtained.

Eight-Hour Day Summarily Established

Sweeping Changes Made by Carnegie Steel Co.—Advances in Cost May Not Be So Large as First Estimated—Revisions of Plans Expected

(*Staff Correspondence*)

PITTSBURGH, Aug. 14.—Two developments mark the present sweeping movement to carry the iron and steel industry into three eight-hour shifts on continuous operation. One is that the Carnegie Steel Co. is blazing the trail, putting its coke ovens, blast furnace plants and steel mills all on the 8-hr. basis on the termination of the 13-hr. turns at 7 o'clock Thursday morning, Aug. 16. The other is that there will be a rigid adherence to the 8-hr. turns, even if it becomes necessary to shut down any units of the different works, which is to say that production is secondary at the moment to getting the machine working in the new way. Preliminary observations show that the operating officials are entering on the new régime in a wholehearted fashion with a will to overcome obstacles and no thought that such as develop will long remain in the way.

Other subsidiaries of the United States Steel Corporation are not necessarily making the change in the summary manner of the Carnegie company, and many independent companies as yet have hardly delved into the paper part of the problem of realining the forces and ascertaining where new men must be put and how many there will be of them. The industry generally will watch closely what happens at the Carnegie plants, and naturally every experience will be studied for its bearing on plants preparing for the change or now making the transformation gradually, department by department.

How Employees Will Take the Change

There is a great deal of uncertainty as to the attitude of different classes of employees to the readjustments of wages. Alongside one another will be the former long turn men, now on 8-hr. shifts at a 25 per cent advanced hourly wage; and single shift or day men, say, whose hours remain the same or may be reduced an hour or so but whose hourly wage rate continues without change. Plants still operating on the two shifts (more commonly 11 hr. in the daytime and 13 hr. for the night) are expected to have dissatisfied men applying for employment, and on the other hand Carnegie operating men probably look for applications from men who do not wish to work more than 8 hr. Some of these, it is believed, are not now in the steel trade and averaged up will prove to be of a higher caliber than men now employed and of a type sorely needed.

Operating officials freely admit they undoubtedly will modify their personnel schedules repeatedly before they can hope to arrive at the practical ideal under the conditions. The outstanding fact is the will on the part of the management to establish the short turn. The bulk of the operating forces, so far as it has been possible to gage sentiment, is in a receptive mood, the doubtful cases being those unchanged in the wage scales whose minds may dwell on the differences in hourly rate more than on the differences in the character of the work under the new arrangement.

The New Régime at Blast Furnaces

A somewhat close study of a blast furnace plant would indicate that an increase of 15 per cent in the number of employees will suffice, not including a few additional salaried men. The total labor cost, considering wage earners, may not be increased more than 10 or 11 per cent, seeing that the 12-hr. workers (that is, the alternating 11 and 13-hr. workers) take a daily wage reduction of 16 2/3 per cent, while many will continue at present scales and even do their regular tasks in less time than formerly, in other words in the same work periods as the 8 or 10-hr. groups.

Against a theoretical increase of 50 per cent in the numerical strength of the force, in changing from two to three working groups for every 24 hr., even in the blast furnace department proper, to take a particular case, the actual expansion may not reach 35 or 40 per cent. The plan may do with one, two or three less blowers in one of the day shifts, depending on the size of the plant, for there is the general foreman as well as higher plant operating officials available for supervision at such times. Against four helpers at the cast house for the long shift, three will probably suffice.

A blower, getting under the three-shift plan 60c. per hour and presumably under the two-shift plan 75c. per hr., is an item in the labor cost. A labor force 35 or 40 per cent larger than in the two-shift régime at five-sixths of the daily wage of that régime (the men getting 25 per cent more per hour but for 8 against 12 hr. = 1.25 x 8/12 = 0.83) means that the increased labor cost of the blast furnace department proper—not including ore handling, or the yard switching, or handling of the burden, or the electrical, mechanical or other divisions of pig iron manufacture—is 1.35 x 5/6 = 1.125, or 1.40 x 5/6 = 1.166, or a mean of 14½ per cent, which is the estimate of one efficient blast furnace plant of moderate size, for just the furnace workers themselves, as stated.

Increased Labor Cost Around Ten Per Cent

It is when the whole blast furnace plant is considered that a better idea is gained of the cost features of the change. A curious point is that among what may be called the auxiliary occupations of the blast furnace—a group taking perhaps 40 per cent of the whole blast furnace department—increases among the numbers which must be present at every shift are offset by the reduced labor cost of others who will work 10 hr. per day at unchanged rates against former work periods of 11 hr. Added to this 40 per cent is 15 per cent not affected by the continuous process, as those engaged in yard switching, car dumping and the like. With this 55 per cent and 25 per cent engaged at the furnaces there remains 20 per cent in the electrical and mechanical departments, and in the laboratory and in recovering and handling of flue dust. A rough survey indicates that a labor cost increase for the last group of 20 per cent so that the total increased labor cost of making pig iron promises to be as follows:

0.55 (of total labor force)	x 1.00	(cost factor)	= 0.55
0.25	x 1.15		= 0.29
0.20	x 1.20		= 0.24
1.00			1.08

or 8 per cent increased cost.

It seems safe, therefore, to conclude in the light

of this survey that the labor increase in making pig iron in the sizable and efficient plant will not exceed 10 per cent. Thus, if pig iron costs $1 or $1.50 per ton for the labor to make it, the new cost will range between $1.10 and $1.65. This leaves quite a margin for steel making and steel rolling to make the increased cost of steel as much as $4 a ton. In some quarters it is believed the increment may be kept down to $2.

Day's Earnings May Change Little

One reason why there may be trouble on the score of wages is that the average daily wage will not be reduced as much as 6 per cent while the 8-hr. turn men take a 16 2/3 per cent reduction. Thus there is a 10 per cent increase in labor cost for a 15 per cent increase in labor force, or an average wage of $1.10 \div 1.15 = 95.6$ per cent of what it formerly was. For example, the average daily wage for all the men may have worked out under the long turn at $5.10 per day. Now it may average $4.90 or only 20 cents less. Yet the expectation of trouble has been that those getting no hourly wage advance will put in the first claims for reconsideration of their status. But after all there are relatively few of them. A blower at 53½c. per hr. getting $6.42 for 12 hr. will now receive $5.36 at 67c. per hr. for 8 hr. A tuyere foreman who has been receiving $5.89 for 11 hr. will go to 10 hr. a day and probably at the same rate or $5.35 per day. A pig machine man at 43c. per hr. for 12 hr. would receive $5.16 per day; now at 53.5c., say, for 8 hr. he receives $4.28. A stove cleaner foreman at 43½c. for 11 hr. received $4.79 per day and now at 10 hr. will get $4.35. These comparisons are perhaps far of the mark, seeing that men working together are treated alike and any cases of disproportionate wage adjustments are few in number and not likely to affect materially the net result. In fact, surveyed generally it would seem that fears of discontent on the score of partiality have been magnified.

Scheme for Changing Shifts

One plan in respect to the change of shifts is to make the change every two weeks and in the middle of a week. At the time of the coming off at, say Thursday morning, of the 11 p. m.-7 a. m. shift of the day before, the shift which has been resting for eight hours comes on and is then followed again by the former 11-7 shift. Then at 11 p. m. comes on the shift which took the 7 a. m.-3 p. m. shift of Wednesday. In other words, every two weeks, one shift is off for 32 hr. and the other two shifts alternate 8 hr. on and 8 hr. off. Then for two weeks the shifts go unchanged, each working 8 hr. and having 16 hr. off. At the end of the two weeks, a new shift is idle for 32 hr. and the other two alternate as stated, 8 hr. on and 8 hr. off. Thus a given shift has 32 hr. free every six weeks and in the intervening periods works for two weeks from 7 to 3 o'clock in the daytime; then for two weeks 3 p. m. to 11 p. m., and then two weeks from 11 p. m. to 7 a. m. The accompanying table shows the scheme.

As is to be noted, this arrangement is for a seven-day week operation, applicable to such a continuous plant as a blast furnace or coke oven installation. It means that for two Sundays a given man is free from 7 a. m. until 11 p. m. On two other Sundays he is free after 3 p. m. and on two other Sundays has daylight until 3 p. m. In short, even allowing for sleep, every man can have some daylight for himself and family on every Sunday of the year. Shift changing in midweek helps to this end.

One reason for changing the shifts in the middle of the week (every two weeks) is to minimize opportunities for dissipation which might be offered, considering the numbers ordinarily idle over a week end in an industrial community. The provision corresponds to the fixing of pay days at times calculated to protect a man against himself.

SCHEME FOR CHANGING SHIFTS ON THE THREE SHIFT SYSTEM

First Period of Two Weeks

	8 hr. beginning 7 a. m.	8 hr. beginning 3 p. m.	8 hr. beginning 11 p. m.
Thurs., Aug. 16	1	2	3

Rotation of shifts repeated for 13 days, thus:

Wed., Aug. 29	1	2	3

Second Period of Two Weeks

Thurs., Aug. 30	2	3	1

Rotation repeated for 13 days. On Aug. 30 Shift No. 2 will work 8 hr. after 8 hr. rest and Shift No. 3 likewise 8 hr. after 8 hr. rest; then each has 16 hr. rest. Meanwhile Shift No. 1, quitting work at 3 p. m., Aug. 29, will not resume until 11 p. m. Aug. 30, an interval of 32 hr. The relation of shifts on the fourteenth day of the second period is:

Wed., Sept. 12	2	3	1

Third Period of Two Weeks

Thurs., Sept. 13	3	1	2

Rotation repeated for 13 days. Shift No. 3 will again have two work periods of 8 hr. with an intervening rest of 8 hr. but Shift No. 2 will now have the 32 hr. holiday interval and Shift No. 1 will do as Shift No. 3. Then the rotation remains, the relation at the end of the period being.

Wed., Sept. 26	3	1	2

Cycle Repeated

Thurs., Sept. 27	1	2	3

Shift No. 3 now gets the 32 hr. interval, so that each shift gets a respite from work every six weeks and without a break in the continuity of earnings.

This review of what is being done to bring about the 8-hr. day covers only some of the high spots. It is not necessarily a picture of the average procedure and the problems peculiar to coke and steel making are hardly glimpsed, but it certainly ought to be convincing of the steadfastness of purpose of the iron and steel makers to consummate an epoch-making industrial change in a period of time thought impossible a short while ago and of a complexity not thoroughly understood even in high quarters. W. W. M.

Preliminary Steps in Twelve-hour Day Elimination

PITTSBURGH, Aug. 13.—Carnegie Steel Co. will begin the elimination of the 12-hr. day at its plants on Aug. 16, the beginning of the second pay period of the month, and while no official announcement has yet been made by other Steel Corporation subsidiaries here, the common impression is that they also will inaugurate the change in those departments of continuous operation, beginning with the blast furnaces, on the same day. Meanwhile, the independent steel companies, with the exception of those in the Youngstown district, which already have the shorter workday partially in effect, and the operators of merchant furnaces, despite numerous conferences and discussions of the matter, appear to have arrived at no definite plan of action, nor as to when the change will be made. Apparently, it is the intention of these interests to study the matter further and be guided in their course by the results attending the Steel Corporation efforts.

The Steel Corporation plan apparently calls for the setting up of three 8-hr. shifts in the blast furnace, open-hearth furnace and coke oven departments, in the order named, as promptly as possible and to the extent of the available labor supply. If the labor supply is sufficient, there will be three crews of the same num-

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COST OF PRODUCING PIG IRON

Tariff Commission Investigation to Determine Whether Duty Needs Changing

WASHINGTON, Aug. 14.—Investigation by the Tariff Commission as to costs of production of pig iron in the United States has been almost completed. The final work is being done in the Pittsburgh and Youngstown districts and is expected to be finished this week. It is being done under the direction of Paul M. Tyler, head of the iron and steel division of the commission, and is the outgrowth of an application of Eastern merchant blast furnace interests for an increase in the duty of 75c. per ton. Under the flexible provisions of the Fordney-McCumber act the President is authorized, after an investigation to raise or lower duties by a maximum or minimum of 50 per cent. An increase of 50 per cent in the present duty on pig iron would raise it to $1.125 per ton.

The investigation into the producing cost has embraced all of the principal producing sections of the country and has been devoted largely to costs at merchant stacks, although it also has covered to some extent costs at steel works furnaces. Cooperation by producers in giving the commission desired information has made it possible to get a comprehensive survey of the entire situation.

Upon completing the work in this country Mr. Tyler, with his staff, will undertake a similar investigation in competing countries in Europe. It has not been determined when the work in Europe will be begun, but it is likely it will be in the near future. Also, it is not known what the attitude of foreign pig iron makers may be with regard to giving costs and other data to the American tariff agents, but it is believed that, on the whole at least, the latter will be accorded the desired cooperation. In this connection, it is felt that the absence of such assistance from foreign makers might be construed to mean that production costs in Europe are so low as to justify a higher duty for the protection of American makers, who are faced with greater costs.

While the maximum increase under the flexible provisions in the duty on pig iron could be only 37.5c. per ton, it is understood here that a number of blast furnace operators feel that this in itself would be helpful, and particularly so in a sharply competitive market. Manifestly, there can be no present indication as to what the attitude of the Tariff Commission may be on this subject. It can be known only after hearings, which will follow the investigation abroad. It has been pointed out, however, that in the event an increase in duty were held to be justified, and the contention made that a 50 per cent advance over the present duty would be insufficient, it still would be possible to resort to Congress to increase the rate. But when the character of the next Congress is called to mind, it plainly is altogether speculative as to what it might or might not do concerning readjustments of the tariff.

President Coolidge is said to be a stronger protectionist than was the late President Harding, but even though he should be sympathetic toward an increase on pig iron rates, over and above that which could be made through authority given him in the flexible provisions, it is a question as to how far he could go in getting Congress to change rates.

Regardless of what may be the outcome of the pig iron investigation, interest in it has been stimulated by figures showing that imports of pig iron for the fiscal year ended June, 1923, reached the unprecedented total of 655,286 gross tons, while for the first six months of the present year they were 298,240 tons, which also set a record, though since March the imports have declined sharply.

American Files and Razor Blades Well Received in England

WASHINGTON, Aug. 14—IN THE IRON AGE of June 7 was published an abstract from a report of the American consul in Sheffield, England, in which the statement was made that the American file is more popular among users in Great Britain that the British-made article because better steel is used for the American file. The Sheffield *Daily Telegraph* on June 23 makes the following comment on this statement:

"An American consular report claims that the American file is more popular among users in this country than the British-made article, for one reason because better steel is used for the former. We learn that some of the American files are made of Sheffield steel, shipped to England, and sold cheaper than Sheffield files. This is, of course, a partisan view of the subject which our own makers would not agree with.

"All the same, American competition in files seems to be very formidable in the British colonies and foreign markets, while the home trade for files is about as bad as it can be. The position has recovered somewhat from the extreme depression of last August, but not sufficiently so to occupy half the machinery installed for producing the goods. In a condition when available trade will not go around, severe competition, accompanied by cutting prices to the bone, is inevitable, and that is what is now happening. Making files was never profitable in the old days, except in the matter of acting as a feeder to other branches of the steel trade, but we doubt whether a tenth of the firms engaged in the trade are now earning profit."

Consul William J. Grace supplements his previous report regarding files by making a similar statement as to quality of American safety razor blades. His comment follows:

"That which has been reported by this consulate in reference to files may also be said concerning American safety razor blades, except perhaps in respect to price. In the many trade discussions here urging the adoption of mass production and the use of improved machinery in the manufacture of cutlery, including razors, the excellence of the quality, workmanship and keen cutting edge of the American safety razor blade has always been emphasized. Large quantities of razor blade steel, made and rolled in Sheffield, are shipped to the United States, and a certain proportion of this steel comes back here in the form of safety razor blades, under well-known American trade names, which are sold over the counters of the various shops in this city."

Import Duty on Magnesite Attacked

WASHINGTON, Aug. 14.—Acting upon the application of Austrian producers, the Tariff Commission yesterday ordered an investigation into costs of producing magnesite in the United States and abroad. It is said that some American consumers of magnesite also were interested. While the commission did not give out the nature of the application, made under the flexible provisions of the tariff act, it is understood that it seeks to have a reduction made in the duty on grain magnesite, which was fixed at 23/40c. per lb. in the Fordney-McCumber tariff law and which was the subject of prolonged hearings when the tariff was being drafted, and of debate when it was before Congress. Iron and steel interests, together with importers of magnesite, sought to have the duty reduced, while domestic producers of magnesite attempted to have the duty increased above the rates determined upon.

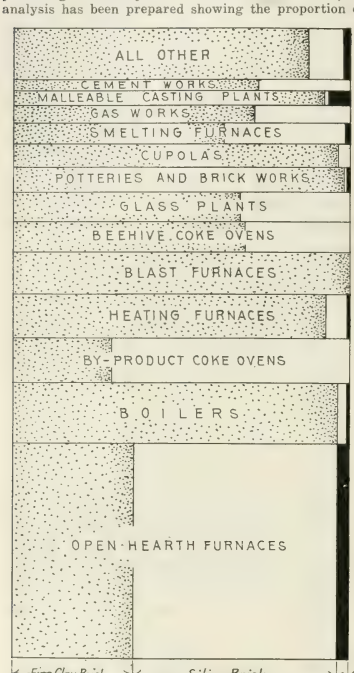
The investigation will cover all magnesite included in the magnesite paragraph, including crude, with a rate of 5/16c. per lb.; caustic calcined, with a rate of 5/8c. per lb. and grain. The application for an investigation was made by the following concerns: Vertischer Magnestwerke Actien Gesellschaft, Austrie-Armenian Magnesite Co., and Ateirusche Magnesite Industria Actien Gesellschaft.

WHERE REFRACTORY BRICKS GO

Open-Hearth Furnaces Take One-third, Boilers Almost One-tenth, Blast Furnaces, Heating Furnaces and By-Product Coke Ovens About One-Fifteenth Each

On the basis of partial returns from the companies producing refractory brick in the United States, an analysis has been prepared showing the proportion of the output of the companies reporting which goes to various industries. Each table covers, separately, fire clay brick, silica brick and a group of miscellaneous brick, including magnesite, chrome and bauxite. Eighteen separate industries are listed, with miscellaneous items following. The figures are all on the basis of 9-in. equivalents. They thus represent production in quantity rather than in sales value or dollars.

As the figures are presented they are on a percentage basis, both with regard to the total production of all three groups of bricks, and with regard to the production of each separate kind.



Distribution of Refractory Brick in the United States. Vertical space shows proportion of total brick absorbed by the agency named; shaded areas show the proportion, within each user, of each kind of brick. The dotted areas are fire clay; white areas, silica; black areas, magnesite, chrome and bauxite brick

Iron and Steel Electrical Engineers' Convention Papers

Papers to be presented at the annual convention of the Association of Iron and Steel Electrical Engineers, Broadway Auditorium, Buffalo, Sept. 24 to 28, follow:

"Special Control for Ore Bridges with Special References to Wind Velocities," by Paul Canney, electrical engineer Minnesota Steel Co., Duluth, Minn.

"Systematizing the Work of the Electrical Engineering Division," by P. T. Vanderwaart, electrical engineer New Jersey Zinc Co., Palmerton, Pa.

"Electric Transportation in Steel Mills," by F. O. Schnure, electrical superintendent Bethlehem Steel Co., Sparrows Point, Md.

"Economical Use of Fuel in the Steel Plant," by H. C. Seibert, fuel engineer Bethlehem Steel Co., Bethlehem, Pa.

"Electrically Operated Centrifugal Pumps," by B. A. Cornwell, electrical engineer Carnegie Steel Co., Youngstown, Ohio.

"Slip Regulators," by D. M. Petty, electrical engineer Bethlehem Steel Co., Bethlehem, Pa.

Committee reports include:

"Electrical Developments," by W. Kennedy, power engineer Worth Steel Co., Claymont, Del.

"Standardization," by F. W. Cramer, engineer of tests Bethlehem Steel Co., Johnstown, Pa.

"Safety," by Walter Greenwood, safety engineer Carnegie Steel Co., Youngstown, Ohio.

"High-Pressure Steam Boilers," by D. S. Jacobus, consulting engineer, Babcock & Wilcox Co., New York.

"Automatic Engine Stops," by Walter Greenwood, safety engineer Carnegie Steel Co., Youngstown, Ohio.

"Electric Furnaces," by E. T. Moore, electrical engineer Halcomb Steel Co., Syracuse, N. Y.

"The Tempering of Coal," by T. A. Marsh, chief engineer Green Engineering Co., Chicago.

"Surface Combustion," by W. N. Hepburn, vice-president Surface Combustion Co., New York.

"Electrification of the Iron and Steel Foundry," by L. W. Egan, consulting engineer, Cleveland.

"Skip Hoists," by A. C. Cummins, electrical engineer Carnegie Steel Co., Duquesne, Pa.

"Boiler Troubles from the Operating Man's Standpoint," by Carl Smith, fuel engineer Inland Steel Co., Indiana Harbor, Ind.

	Total	Fire Clay Brick		Silica Brick		Magnesite, Chrome and Bauxite Brick	
		of Total	Separate	of Total	Separate	of Total	Separate
Iron blast furnaces	6,688	6,688	10,111	.....	.....	.....	.....
Open-hearth furnaces	34,182	12,418	18,888	20,760	63,089	1,004	73,334
Heating furnaces	6,942	6,455	9,820	460	1,397	27	2,000
Crucible furnaces	306	77	118	183	555	46	3,333
Electric furnaces	499	301	459	184	560	14	1,000
Cupolas	3,643	3,537	5,382	106	324	.....	.....
Malleable casting plants	2,279	2,127	3,236	15	46	137	10,000
Beehive coke ovens	4,835	3,344	5,088	1,491	4,532	.....	.....
By-product coke ovens	7,072	2,033	3,094	5,039	15,311	.....	.....
Boilers	9,594	9,351	14,228	216	657	27	2,000
Smelting furnaces	3,221	2,018	3,072	1,157	3,515	46	3,333
Gas plants	2,798	1,976	3,006	822	2,498	.....	.....
Chemical plants	1,422	1,422	2,163	.....	.....	.....	.....
Cement works	1,898	1,405	2,139	493	1,498	.....	.....
Lime plants	1,530	1,091	1,661	439	1,332	.....	.....
Potteries and brick works	3,929	3,921	5,966	1	3	7	500
Glass plants	4,556	3,223	4,905	1,534	4,662	.....	.....
Railroads	887	879	1,339	1	2	7	500
Miscellaneous	3,518	3,457	5,260	6	18	55	4,000
Total	100,000	65,723	100,000	32,907	100,000	1,370	100,000

FOUNDRYMEN OFF FOR EUROPE

Delegation to Paris Convention Sailing Aug. 18 A British Tour Also

With the sailing of the Leviathan from New York on Saturday, Aug. 18, a number of foundrymen and representatives of foundry equipment companies start on a tour having as its main objective the International Foundrymen's Congress and Exhibition, which will be held in Paris, Sept. 12 to 15. As indicated in the tentative itinerary published in THE IRON AGE of July 5, the tour will include a stay of from two to three weeks in Great Britain, during which visits will be made to Sheffield, Manchester, Birmingham and other centers of interest to members of the metal-working trades. Following the congress at Paris, another tour has been arranged to industrial centers of France and Belgium.

Below is given the list of those who are to make the trip. Most of them are going on the Leviathan, but some have booked by other steamers and will join the main party in Paris:

G. W. Knotts, United Engineering & Foundry Co., Youngston, Ohio, and Mrs. Knotts.

Verne E. Minich, president American Foundry Equipment Co., New York, and Mrs. Minich.

John Hill, Hill & Griffith Co., Cincinnati, and Mrs. Hill.

Edward W. Campion, Buckeye Steel Castings Co., Columbus, Ohio.

J. S. McCormick, J. S. McCormick Co., Pittsburgh, and Mrs. McCormick and two children.

Q. S. Snyder, vice-president Pittsburgh Rolls Corporation, Pittsburgh.

G. H. Clamer, Ajax Metal Co., Philadelphia, president American Foundrymen's Association, and Mrs. Clamer and daughter.

Dr. Richard Moldenke, Watchung, N. J., formerly secretary American Foundrymen's Association, and Mrs. Moldenke.

Walter Wood, R. D. Wood & Co., Philadelphia.

C. S. Gilbert, Canada Iron Foundries, Ltd., St. Thomas, Ontario, and Mrs. Gilbert.

Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

C. H. Gale, Cleveland Ohio.

L. L. Anthes, Anthes Foundry, Ltd., Toronto, Canada.

Stanley G. Flagg, Jr., Stanley G. Flagg & Co., Philadelphia.

Henry M. Lane, president Henry M. Lane Co., Detroit.

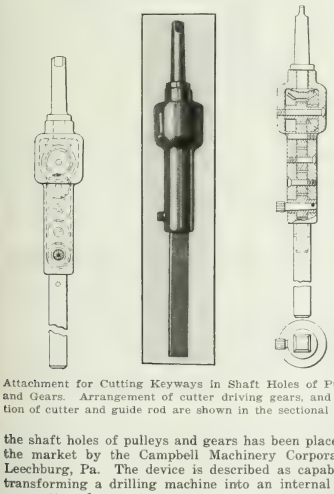
George H. Wadsworth, Wadsworth Core Machine & Equipment Co., Akron, Ohio, and Mrs. Wadsworth.

Arthur F. Braid, Metal & Thermit Corporation, New York.

The Leviathan party will arrive at Southampton on Friday, Aug. 24. Saturday will be spent at Windsor, and Monday will be given up to plant visitation in the London district. Tuesday the party goes to Sheffield and the next two days will be spent there and in nearby districts. On Friday evening at Manchester a dinner of welcome will be given by the National Ironfounding Employers' Federation. The party will remain in Manchester, visiting plants there and in outlying districts until Sept. 4, when it will take train for Birmingham. Various excursions will follow, and on Saturday, Sept. 8, a return will be made to London. The party leaves London for Paris on Tuesday, Sept. 11, in company with members of the Institution of British Foundrymen.

Internal Keyway and Slot Milling Attachment Used with Drilling Machine

A device known as the Campbell internal keyway and slot miller attachment for use with drilling machines in the rapid and accurate cutting of keyways in the shaft holes of pulleys and gears has been placed on the market by the Campbell Machinery Corporation, Leechburg, Pa. The device is described as capable of transforming a drilling machine into an internal keyway cutter of a new type.



Attachment for Cutting Keyways in Shaft Holes of Pulleys and Gears. Arrangement of cutter driving gears, and location of cutter and guide rod are shown in the sectional views

The construction of the attachment may be noted from the illustrations. The body is hollowed out to accommodate a system of gears, arranged as shown, which transmit the revolving motion of the machine spindle to the lower gear containing the end milling cutter. Cutters are provided with taper shanks to facilitate easy insertion and removal, and are available for all sizes of keyways up to the capacity of the attachment.

The device includes a square rod portion, as shown, which moves up and down in a square guide hole cut in the machine table, and serves to support the lower end of the attachment and prevent revolving of the body. A vise has been designed to hold and advance the work into the cutter if more than one "cut" is required in machining the keyway. This vise is provided with a suitable hole for the square rod, and its use obviates the necessity of altering the machine itself.

The work to be machined is placed on the table of the machine or in the vise and the attachment placed with its taper shank in the spindle of the machine and the square rod in its guide. After locating the work so that the keyway or slot will be cut in the desired place, it is then clamped. The drilling machine is started and the cutter lowered into the work by means of the feed mechanism of the machine.

The attachment is said to have been found to remove stock as rapidly as standard vertical milling machines using a cutter of the same size, the keyways cut also being accurate as to size and smooth of finish. Two sizes are available, type A2 for keyways up to ¾ in.; minimum diameter of hole, 1⅝ in., and length of hub 4½ to 9 in. long, as ordered. The type A3 is for keyways up to 1½ in., in holes 2⅝ in. diameter, minimum, and hub lengths of 8 to 12 in., as ordered.

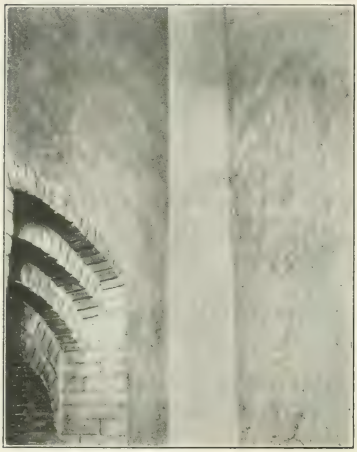
It is understood that a complete machine tool is in the process of development which will also permit of milling the teeth of annular gears, as well as the cutting of keyway and slots.

Members of the National Screw Thread Commission were in session at Greenfield, Mass., the past week, business meeting being held at the Weldon Hotel. There were various discussions on standardization and other matters of interest to the commission, which comprises Dr. G. K. Burgess, director, Bureau of Standards; H. W. Bearce of the bureau; Commanders J. N. Ferguson and M. A. Libbey, United States Navy; R. E. Flanders, Jones & Lamson Machine Co., Springfield, Vt.; George S. Chase, Cleveland; Earle Buckingham, Pratt & Whitney Co., Hartford, Conn., and F. O. Wells, Greenfield.

Monolithic Lining for Hot Blast Stoves

The relining of the hot blast stoves using monolithic construction of refractories has been successfully applied to a two-pass side combustion stove at Hamilton, Ont., in the plant of the Steel Company of Canada. As a one-piece lining of large size, which has been through several months' continuous service, the installation is of unusual interest.

Old blast furnace linings were salvaged by crushing to uniform size and using all material which would pass through a ¼-in. mesh screen. Old bricks are particularly suitable for this work. In their initial service the impurities have been burned out and shrinkage removed. This material was added to diluted Hytempite, a high temperature cement, to form a stiff plastic material about the consistency of molding sand. Old fire bricks were used for building the wall to back up the monolithic lining, leaving header courses projecting. This brick work was first coated with a thin



Hytempite wash after dust and loose particles had been removed.

After diluting Hytempite in a mortar box to the consistency of pancake batter, the crushed old brick including the fines were mixed in until a molding sand consistency was reached. The proportions used were 50 lb. of Hytempite to each 100 lb. of crushed old fire brick. Forms were made of lumber about 1 in. thick and 30 in. of form in height were used at a time.

The mixture, made in suitable sized batches, was then rammed in behind these forms. A bonding coat of Hytempite batter was brushed over each section of the old brick work just prior to ramming the material. This served to tie the rammed material to the standing wall.

The size of the chamber lined is approximately 25 ft. in height by 15 ft. in longest axis. The drawing shows how the header courses support the monolithic lining which is 9 in. thick at the thinnest point and about 13 in. thick at the thickest point. At the gas tunnel entrance an arch of old fire brick was sprung as shown in the half-tone illustration to support the monolithic lining at this point until thoroughly dry.

As each 30 in. section was rammed the forms were removed and raised 30 in. for packing the next section. This procedure was followed until the top of the wall was reached. After the walls were completed they were allowed to air dry for 24 hr. and then the entire surface covered with a wash coat of Hytempite batter to give a smooth hard finish to resist hot gas action.

The blast furnace was blown in on Jan. 2, 1923, and the stoves have been in constant operation since. To secure the photograph reproduced the camera was lowered from the top of the inside wall, the position being indicated in the diagram of the lining.

The lining was installed under the direction of H. G. Hilton, superintendent of the plant with the assistance of W. H. Gaylord, Jr., field service engineer of Quigley Furnace Specialties Co., New York.

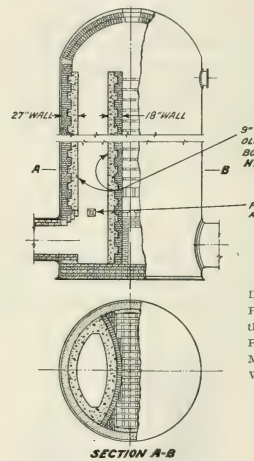


Diagram Shows Point at Which the Accompanying Photograph of the Monolithic Lining Was Taken.

Efforts to Organize Steel Workers to Continue

Efforts to unionize the steel industry will not be checked by the abandonment of the 12-hr. day, according to William Hannon, the general organizer of the American Federation of Labor, now making his headquarters at Chicago. He is quoted as follows: "When the fact that we have started to organize the steel workers is sufficient to cause a promised reduction in the hours of workers from twelve to eight, there can be no question about the necessity for unionization. We have not fully formulated the demands we will make upon the steel manufacturers when we have completed the organization of the workers. The 8-hr. day has been one of the matters we intended to take up with the employers. Plenty of steel workers are attending the meetings which we are holding in steel centers all over the United States."

At a recent mass meeting held under the auspices of the American Federation of Labor at Gary Labor Temple, Gary, Ind., the following men spoke: John Turney, Springfield, Ill., of the Mine, Mill and Smelter Workers of America; E. J. Holley, Cleveland, of the Amalgamated Iron, Steel, Tin and Sheet Metal Workers Association; C. N. Glover, Chicago, of the Brotherhood of Blacksmiths, Drop Forgers and Helpers; Fred Detrick, president of the Gary Trades and Labor Assembly. A similar meeting was held at Waukegan, Ill.

According to a statement of the American Railway Association the railroads of the United States on July 31 had 76,453 surplus freight cars in good repair and immediately available for service if necessary, despite the fact that, during the week which ended on July 28, 1,041,044 cars were loaded with revenue freight, the largest number for any week in the history of the country. When a record loading of 1,018,539 cars was established during the week of Oct. 14, 1920, which record remained until this year, a shortage of 69,517 cars was reported.

BOOK REVIEWS

Construction and Use of Automatic Screw Machines. Pages 353, 6 x 9 in.; illustrated. Published by Brown & Sharpe Mfg. Co., Providence. Price, $1.

This volume gives a simple yet detailed description of the construction, operation and adjustment of Brown & Sharpe automatic screw machines and also of the tools and attachments used with them. It is offered in the belief that a machine tool cannot be operated efficiently unless it is thoroughly understood by those who handle it. It is intended to make clear that the principles of the machines are simple and the method of operation easily understood; that it is not a difficult matter to design and make cams, and to set up the machines, so that the greatest quantity of work can be produced in a given time, with the required finish and within consistently maintained close limits.

A chapter is devoted to a general explanation of how the machines operate, and another to the erection and care of the machine, which includes an arrangement of machines on shop floor, arrangement of overhead works and proper lubrication. Getting a No. 2 automatic ready for a job when the cams, together with the necessary tools and a drawing are furnished to the operator is clearly outlined and illustrated. Several pages are devoted to the construction and adjustment of the machine.

An outstanding chapter is on standard tools, what they are and how to use them, the success of the automatic screw machine being emphasized as depending to a great extent on the selection and setting of the tools used. The different types of tools are illustrated and the construction and use of these tools are given in detail. How to design cams for Brown & Sharpe machines is also an important chapter, and the instructions given, which are intended for foremen and mechanics, are easily followed. Data compiled in tables at the end of the book eliminate most of the figuring. A good understanding of the operation of the machine is essential, however, and experience in handling or study of the preceding chapters of the book should provide the necessary background knowledge. A chapter on how to machine the cams follows, and information on the use and construction of several standard attachments is also given. More than 90 pages of tables and a comprehensive index conclude the book.

This volume is a notable contribution to the literature of the subject. Those responsible for its preparation have succeeded in large measure, and the book undoubtedly will be much appreciated.

The Working of Steel. By Fred H. Colvin and K. A. Juthe. Size 6 in. x 9¼ in. Pages X + 245; 135 plates and illustrations. Second Edition. McGraw-Hill Book Co., Inc. Price $3.

This rather recent book by Colvin and Juthe has been so well received that a second edition has been called for. In order to obtain an idea of its scope the twelve chapters will be taken up briefly in order.

Chapter 1 of 12 pages is on Steel Making. The only good feature is the section on electric furnace practice. The sections on Bessemer, open-hearth and crucible are very brief and not always correct. No idea is given of the relative tonnage and importance of the various kinds of steel, nor the important uses of each kind.

Chapter 2 of 12 pages is on the Composition and Properties of Steels. On page 13 is given a table showing the relation of tensile properties to analysis which is rather misleading. For instance, a soft boiler plate steel of 0.08 to 0.10 per cent carbon would not usually show 60,000 lb. per sq. in. tensile strength. This chapter is also incorrect or misleading in some sections, and both Chapters 1 and 2 should be carefuly gone over by a good metallurgist before issuing a new edition.

The third chapter of 22 pages is on Alloy Steels. Here again some misleading statements are to be found, but the chapter has a very good section on stainless steels and another on the making of connecting rods for Liberty motors. A striking feature of these first three chapters is the virtual absence of references, which would be welcomed by readers because of the necessary brevity of the sections.

Chapter 4 of 18 pages is very interesting, and is on the materials used in the Liberty motor and their application to automotive purposes. Chapter 5 of 11 pages on Forging is very sketchy, but has a good section on a method for making rifle barrels, developed by one of the authors.

Chapter 6 of only four pages takes up Annealing. Chapter 7 of 26 pages and Chapter 8 of 40 pages take up Case Hardening and Heat Treatment. While there is a lot of repetition the first one is a good practical chapter. The next chapter is not carefully written; for instance, the usual conception of normalizing is not that of the authors: "Normalizing is a seating like annealing, followed by a moderately rapid quench." Also on page 108 the table is incorrect because a steel with no carbon would not show an arrest at 1330 deg. Fahr. In this chapter is an excellent section on the making and treatment of case-hardened gears, which should be included more properly in the chapter on Case Hardening.

The next chapter of 20 pages is on the Hardening of Carbon Steel Tools. It is a little disjointed, but very good, and is followed by a chapter on the Hardening and Treatment of High-Speed Steel, which appears to be a good compilation from the handbooks of various steel makers. Next comes a brief chapter on Furnaces, mainly covering furnaces for heating for hardening. An interesting feature is that electric furnaces are mentioned, but no examples are given, which is a serious omission. Finally comes a good chapter on pyrometers, of 29 pages.

It will be seen that there are a great many good features about the book, notwithstanding serious errors and misleading statements. It lays most stress on case hardening and the heat treatment of tools, and can be recommended to those interested in these subjects.

G. B. WATERHOUSE.

Steel Corporation's Orders Decrease

Unfilled business on the books of the United States Steel Corporation as of July 31 amounted to 5,910,763 tons, or 475,498 tons less than reported for June 30. During June business fell off 595,090 tons, in May 307,158 tons and in April 114,823 tons, while increases of 119,343 tons, 373,213 tons and 165,073 tons were shown respectively in March, February and January. A year ago the unfilled tonnage was 5,776,161 tons, or 134,602 tons less than on July 31, last. Following is the unfilled tonnage as reported by months since January, 1920:

	1923	1922	1921	1920
Jan. 31	6,910,776	4,241,678	7,573,164	9,285,441
Feb. 28	7,283,989	4,141,069	6,933,867	9,502,081
March 31	7,405,332	4,494,143	6,284,765	9,892,075
April 30	7,288,509	5,096,913	5,845,224	10,359,747
May 31	6,981,351	5,254,228	5,482,487	10,940,465
June 30	6,386,261	5,635,531	5,117,868	10,978,817
July 31	5,910,763	5,776,161	4,830,324	11,118,468
Aug. 31	.....	5,950,105	4,531,926	10,805,038
Sept. 30	.....	6,691,607	4,560,870	10,374,804
Oct. 31	.....	6,902,287	4,286,829	9,836,852
Nov. 30	.....	6,840,242	4,250,542	9,021,481
Dec. 31	.....	6,745,703	4,268,414	8,148,122

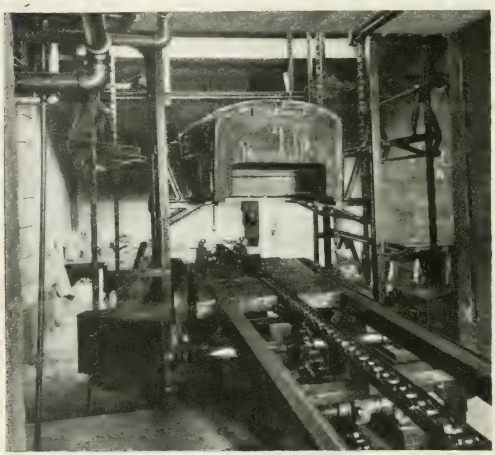
The largest total of unfilled orders was on April 30, 1917, at 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Stockholders of the Wheeling Steel Corporation postponed until Aug. 28 the special meeting called for Aug. 9, to take action on the closed bond issue of $75,000,000, secured by all the corporation's properties. The meeting scheduled for Aug. 9 had been postponed from a previous date because of lack of time for attorneys to prepare necessary forms for submitting the issue to the stockholders. The same reason caused the second postponement. The stockholders will be asked to execute a deed of trust to secure the issue and to authorize the issuance of $8,000,000 of convertible notes of the company, and to provide for the disposition of the bonds when authorized.

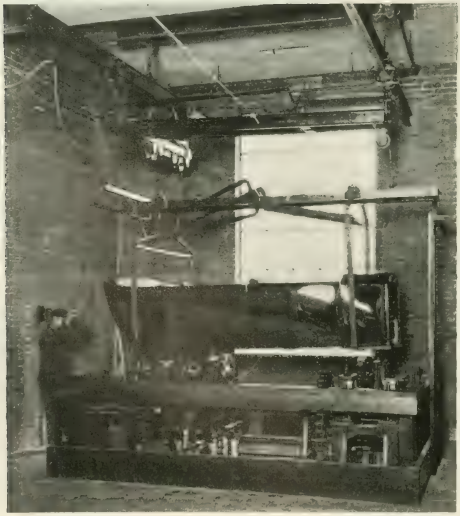
Conveying Automobile Bodies to Assembly

Efficient Handling Through Tunnel Under a Cleveland Street—Both Vertical and Horizontal Movement

CONVEYING equipment for various purposes is commonly used in the larger automobile plants and much of this has become standardized to a large extent. However, the arrangement of a plant often necessitates the use of handling equipment of a special type to meet the particular needs of that plant. This seems particularly true of equipment for handling automobile bodies, conveying equipment for which has not been standardized to the extent that it has for handling small parts or for assembling lines.







At Upper Left Is the Automatic Conveyor for Handling Finished Automobile Bodies in the Plant of the Chandler Motor Car Co., Cleveland. The endless chain vertical conveyor with attached arms carries the body from the fourth floor and deposits it on the horizontal conveyor, which carries it through a tunnel, at the opposite end of which it is picked up by another elevator

At Right Is the Horizontal Conveyor in the Tunnel

(At Left) After Being Elevated by the Last Conveyor, a Sling Grips the Body and It Is Raised by an Air Hoist and Moved Away on the Overhead Trolley and Deposited on a Body Truck on the Assembly Floor

The Chandler Motor Car Co., Cleveland, formerly conveyed its bodies on trucks from the fourth or finishing floor of its body department across a city street to the third floor of the assembling department. This was not an economical handling method and the company planned to build a bridge to connect the upper floors of the two buildings. However, the city refused to grant permission for a bridge over a public highway and the company's engineers were set to work to devise some other method of conveying the bodies.

Under the plan as adopted the two buildings were connected by a tunnel running under the street and a continuous automatic handling system was provided. This includes a special type of conveyor which lowers the bodies to the level of the tunnel under the body department, whence they are conveyed on a power conveyor through the tunnel to the assembling department. At the end of the tunnel another vertical conveyor similar to that used in the body department elevates them to the third floor of the assembling department. The distance covered is approximately a 75-ft. drop in the body department, 175 ft. through the tunnel and a 60-ft. elevation in the assembly department, and it takes 53 minutes to carry the body from its starting point to its destination.

The finished body is carried by hand-operated hoist to a point over the descending conveyor which is designed as a "lowerator." This consists of four endless chain conveyors, two chains six feet apart on each side of the elevator well operated by one driving unit. Attached to the chain 12 feet apart are arms on which the body is carried. The arms have a trip at the bottom and pass around the sprocket wheels that drive the chain and remain in the same position in their upward as in their downward course. The hoist drops the body on the projecting arms which carries it to the bottom of the shaft where it is deposited on the horizontal conveyor, the arms passing beneath the horizontal conveyor bed in their movement around the sprockets. A dog attached to the horizontal conveyor then comes in contact with the body and it is carried through the tunnel.

The horizontal conveyor operates at the same speed as the "lowerator" and the dogs are 12 feet apart or the same distance as the arms on the lowering mechanism. At the discharged end of the tunnel the dog is tripped and the body stands still a moment until the lifting arms of the elevator engage under it.

When the body reaches the top of the conveyor elevator it is gripped by a pair of steel slings. Lever-operated mechanism is provided for opening the arms of the slings and bringing them together under the body. The frame of the sling is suspended from an air hoist attached to a trolley, the track of which reaches over the elevator well. After the body is raised from the elevator it is moved away on the hand-operated trolley and deposited on a body truck.

The system has proved very efficient in the saving of labor and in the elimination of congestion of finished bodies on trucks as well as in the doing away of much handling by hand which often results in marring the finish of the bodies.

Ninth Annual Chemical Exposition

The chemical exposition this year is being held during the week immediately following the annual meeting of the American Chemical Society, as has been the custom in previous years. This society will meet during the week of Sept. 10 at St. Paul and, immediately after the close of the meeting, many of its members will entrain for New York in order to spend the week of Sept. 17 at the exposition. The usual meeting of the American Ceramic Society will be held in conjunction with the exposition in the Grand Central Palace on Sept. 19, probably extending over several days. The annual banquet and election of the salesmen's association of the American Chemical Industry will also be held during the week of the exposition, very probably at one of the Pershing Square group of hotels near the Grand Central Palace. The regular dinner during the Chemical Exposition of the American Institute of Chemical Engineers will be on Wednesday evening, Sept. 19, at the Park Avenue Hotel, reservation for which should be sent to Dr. John C. Olsen, the secretary, at 85 Livingston Street, Brooklyn, N. Y.

Steel Treaters to Hold Hardness Symposium

At Pittsburgh during the convention and international exposition of the American Society for Steel Treating to be held Oct. 8 to 12 the hardness committee of the National Research Council will again hold a symposium similar to the one this committee held during the convention at Detroit last year. The preparation of the program is under the direction of Major A. E. Bellis, president Bellis Heat Treating Co., New Haven, Conn., and he has been successful in arranging an interesting list of papers. The authors who will contribute to this session will be: A. V. DeForest, American Chain Co., Bridgeport, Conn.; A. L. Davis, Scovill Mfg. Co., Waterbury, Conn.; H. M. German, Henry Disston & Sons Co., Philadelphia. The hardness testing committee of the National Research Council also plans to have for examination and discussion a hardness testing machine from England.

The demand for exhibition space has been so heavy that it is necessary to use both the main floor of the Motor Square Garden and also the sub-floor. Located on the sub-floor is the meeting room, at which round tables and symposiums of the program will be held, while there will also be located on this floor an exact replica of King Tut and his tomb. The management of the exposition has, at considerable extra expense, given the meeting-room floor an entire Egyptian setting and the replica of King Tut and his last home is carrying out the general scheme of decoration. Besides the oriental music, decorations and the usual equipment that accompanies an Egyptian scene, many of the exhibits located on this floor are to be in operation.

School for Trade Association Secretaries

Retail and wholesale distribution will be a subject for special discussion at the coming session at Northwestern University, Aug. 19 to Sept. 1, of the National School for Commercial and Trade Executives. This course will be directed by Alvin E. Dodd, manager of the domestic distribution department of the Chamber of Commerce of the United States.

Commercial organization and trade association secretaries are expected to attend. Some of the courses to be given are psychology, economics, business and government, marketing and distribution, public speaking, journalism, salesmanship, industrial promotion and transportation.

Ways and means of accurately surveying the wholesale and retail purchasing power and capacity of a town or city will be one of the topics. This will be considered from the standpoint of the individual consumer and that of the commodity.

In preparation for this course the distribution department of the National Chamber, under the direction of Mr. Dodd, has compiled a large amount of data as to the feasibility of such a statistical compilation. One moderate size city has been surveyed and the results will be announced for the first time through these studies.

In another suit filed by the Allied Chemical & Dye Corporation in the Circuit Court at Chicago it is sought to enjoin the distribution to stockholders of the proceeds from the sale of the Steel & Tube Co. of America to the Youngstown Sheet & Tube Co. It is charged that the terms of the sale favored certain majority stockholders and that a banking firm in New York had a large influence in the business through directors selected by them.

WORLD POWER CONFERENCE

To Be Held in London in July, 1924—Ambitious Program Detailed

Next summer the British Empire Exhibition is to be held at Wembley, London. In July, by permission of the executive council of the exhibition, there is to be held in connection therewith a World Power Conference, initiated by the British Electrical and Allied Manufacturers' Association, Inc., but participated in by many technical and scientific institutions and industrial organizations in Great Britain and other countries.

It is the purpose of the World Power Conference to consider how the industrial and scientific sources of power may be adjusted nationally and internationally.

By considering the potential resources of each country in hydro-electric power, oil and minerals.

By comparing experiences in the development of scientific agriculture, irrigation and transportation by land, water and air.

By conferences of civil, electrical, mechanical, marine and mining engineers, technical experts and authorities on scientific and industrial research.

By consultations of the consumers of power and the manufacturers of the instruments of production.

By conferences on technical education, to review the educational methods in different countries, and to consider means by which existing facilities may be improved.

By discussions on the financial and economic aspects of industry, nationally and internationally.

By conferences on the possibility of establishing a permanent world bureau for the collection of data, the preparation of inventories of the world's resources and the exchange of industrial and scientific information through appointed representatives in the various countries.

The importance with which the conference is regarded in Great Britain is evidenced by the eminent engineers, scientists, industrialists and financiers connected with its organization and management. The president is the Earl of Derby.

American Participation

In response to invitations for American participation twenty-odd American engineering technical and industrial organizations have appointed representatives to a committee of arrangements which has planned the following organization:

Honorary Chairman: Hon. John W. Weeks, Secretary of War and Chairman of the Federal Power Commission; *Honorary Vice-Chairmen:* Hon. Hubert Work, Secretary of the Interior; Hon. H. C. Wallace, Secretary of Agriculture; Hon. Herbert Hoover, Secretary of Commerce; Gen. Guy E. Tripp, chairman Westinghouse Electric & Mfg. Co.; Owen D. Young, chairman General Electric Co.; Samuel Insull, president Commonwealth Edison Co., Chicago; Prof. L. P. Breckenridge, chairman United States Superpower Survey and Sydney Z. Mitchell; *General Chairman*: O. C. Merrill, executive secretary Federal Power Commission; *Vice-Chairman*: H. J. Pierce, president Washington Irrigation & Development Co., representing American Electro-Chemical Society and National Electric Light Association; *Secretary*: W. M. Steuart, Bureau of the Census, Washington; *Treasurer*: H. M. Addinsell, Harris Forbes & Co., New York; *Executive Committee*: William M. Steuart, Bureau of the Census; Col. Peter Junkersfeld, consulting engineer, New York, representing American Electro-Chemical Society, American Institute of Mining and Metallurgical Engineers and American Society of Mechanical Engineers; Calvert Townley, Westinghouse Electric & Mfg. Co., representing Federated American Engineering Societies, and American Institute of Electrical Engineers; H. M. Addinsell, Harris, Forbes & Co., New York, H. I. Harriman, president New England Power Co., representing United States Chamber of Commerce; Fred R. Low, editor of *Power*, McGraw-Hill Co., New York, representing American Society of Mechanical Engineers and Federated American Engineering Societies; John W. Lieb, New York Edison Co., representing American Institute of Electrical Engineers and Association of Edison Illuminating Companies.

Working committees have been appointed and General Chairman Merrill is now in London gathering information as to the scope and details of the expected American participation. Invitations will be extended to other organizations who may be interested and it is the purpose and hope to make a contribution to this first effort toward a systematic study of the world's power resources and their utilization commensurate with the part that America has played in the development of this "age of power."

BRITISH FOREIGN TRADE

Sharp Decline in June Steel Exports—Imports Show Little Change

Exports of iron and steel from Great Britain in June recorded a sharp decline from May, the year's maximum thus far. At 373,277 gross tons, the June export total was the fourth largest this year, and compares with 435,630 tons in May.

Imports in June were 130,066 tons, or close to the average for the previous five months. They were the third largest this year, the greatest volume having been in May, at 133,929 tons.

Comparative data for both exports and imports, scrap being included, are as follows:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Aver. per month, first quarter, 1923..	358,208	128,032
April, 1923	388,507	133,929
May, 1923	435,630	114,132
June, 1923	373,277	130,066
Aver. per month, second quarter, 1923	402,471	126,042
Average per month, 1922	295,980	82,215
Average per month, 1921	144,885	152,734
Average per month, 1920	274,881	128,685
Average per month, 1919	188,519	50,801
Average per month, 1913	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month

	1913	1922	June 1922	June 1923
Pig iron } Ferroalloys }	93,700	66,159	43,402 12,603	35,639 20,881
Steel rails	42,200	21,300	10,928	23,547
Steel plates	11,200	6,700	3,745	23,848
Galvanized sheets	63,500	43,600	35,432	47,756
Steel bars, rods, etc.	20,900	19,100	15,961	32,199
Tin plates	41,200	37,400	37,134	50,281
Black plates and sheets	11,700	18,700	18,964	32,561

Data as to importations of importance are as follows in tons per month:

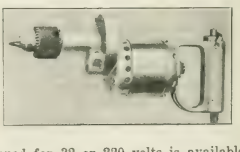
	1913	1922	Jan.-June 1923
Iron ore	620,000	289,400	551,125
Manganese ore	50,100	28,109	40,346
Pig iron and ferroalloys	18,000	12,800	11,432

Exports of scrap iron and steel in June were 8129 tons, or 11,066 tons per month for the first six months of this year, as compared with 12,880 tons per month in 1922. In 1913 there were 9600 tons per month.

Light Weight Electric Drill

A portable electric drill, weighing but 5½ lb., and having a drilling capacity up to ⅜ in. diameter in steel, has been placed on the market by the Jones Drill & Specialty Corporation, 245 Seventh Avenue, New York.

The machine will operate on either alternating or direct current. The standard tool is for 110 volts, but



Portable Electric Drill Having Capacity Up to ⅜ In. Light weight is a feature.

the machine equipped for 32 or 220 volts is available also. The size is 11 in., overall. A Jacobs 2A chuck is used, and equipment may be provided to convert the tool into a portable or stationary grinder, buffer, polisher, valve grinder or electric screw-driver. An automatic drill press of ⅜-in. capacity, arranged with automatic starting and stopping of the motor so that current is being used only when actually drilling, is also available.

Progress Shown in Soaking Pit Design

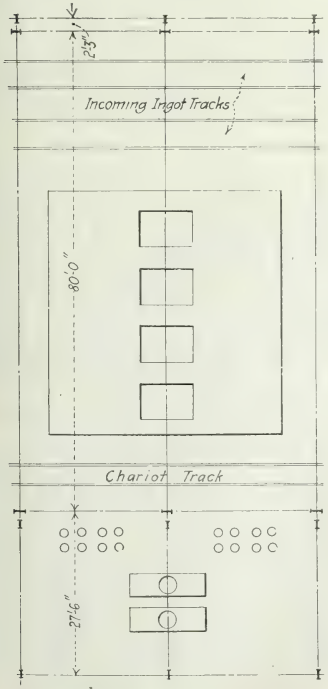
Both Arrangement of Holes and Design of Reversing Mechanism Made to Yield Results—Ingots Handled More Rapidly

A NEW soaking pit plant is being built at the Wisconsin Steel Works, South Chicago, of the International Harvester Co. that differs materially in design and arrangement from the usual practice in soaking pit construction. The company has embodied new and interesting features and has avoided other features, ordinarily found in soaking pits, that it regards as unsatisfactory.

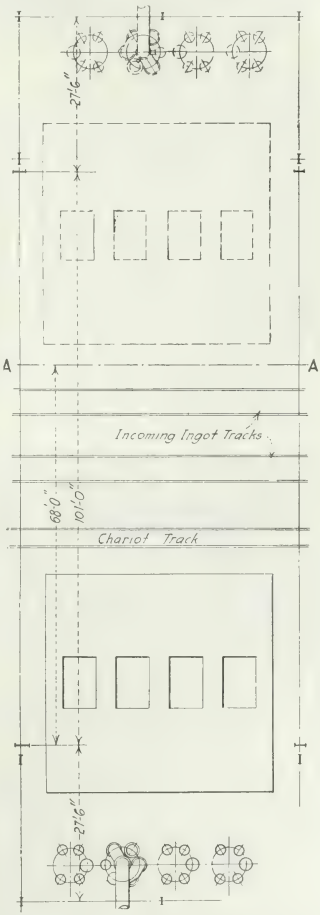
While great progress has been made in the development of the open-hearth furnace, steel plant engineers having centered their attention on open-hearth construction, soaking pit construction and operation have remained virtually the same as twenty years ago. That little or no advance has been made here is attributed to the fact that soaking pits were standardized years ago and the standard design has been generally followed without much attention being given to the improvement of their construction.

Another reason for the absence of progress in this field is that soaking pits are usually under charge of the blooming mill superintendent, who has so many other duties that he is unable to give them the attention they deserve. The operation of open-hearth furnaces, on the other hand, is under a superintendent who devotes all of his attention to them. In view of the fact that the output of many blooming mills is limited by the capacity to heat the steel properly, many steel plant engineers now maintain that the soaking pit deserves more consideration.

An objection to the usual soaking pit arrangement,



Typical Arrangement of Soaking Pit and Tracks



New Arrangement of Soaking Pit and Tracks, with Portion Above *AA* Showing Additional Pit on Other Side of Tracks. This arrangement, whether single or double, makes important improvements in several particulars

shown in Fig. 1, with the incoming ingot track on one side of the pit and the chariot track on the opposite side, is that it is necessary to carry the ingots both over the covers of the adjacent pits and over the mechanism for operating the covers, or to carry the ingots around the pits, which not only increases the time of operation but also greatly increases the travel and, consequently, the wear on the crane. Another main objection to the usual arrangement is that it necessitates the use of sixteen individual regulating valves located in the flues underground for controlling the air and gas in a four-hole pit.

When the reversing valves of a pit reverse, also, it is not customary to reset them; consequently the passages to the stack are contracted to the same size as are each of the incoming passages. Therefore, because the outgoing gases are so much hotter than the ingoing gases, the holes are in reality regulated by regulating the outgoing and not the ingoing gases. It is also pointed out that the use of these regulating valves adds greatly to the cost of the pit and complicates the design of the furnace.

Realizing the importance of these objections, the Wisconsin Steel Works has adopted the design shown in Fig. 2. The chariot track for the ingot going to the blooming mill and the two incoming ingot tracks are on the same side of the pits and the holes are parallel to the tracks. These are said to be the first soaking pits with modern type valves to be built with the holes parallel to the tracks. With this arrangement the ingot can be carried from any place on the tracks to the pits by the shortest route, without crossing any intervening hole or passing over any of the machinery. With this design the span of the crane is shortened and the elimination of regulating valves permits a decrease in the width of the building. The simplified construction and the decreased space required tend to cut down the construction costs.

Each hole is reversed by a separate McKee six-way regenerating reversing valve designed by Willis McKee, Cleveland, and described in THE IRON AGE June 7 last. The four valves required to reverse one pit are operated by one reversing mechanism. The tubes of these valves are lined with insulating brick so as to reduce the heat lost to a minimum. The motor and reversing mechanism for these valves are placed under the platform and raise, reverse and lower the four valves in the same way as the individual McKee valve previously described.

Each hole in each pit has its separate valve and each valve has its own gas-regulating and shut-off valve and two air-regulating stands. The valve is so designed that the regulation of the incoming air in each end of each hole is separate from that of the opposite end and does not contract the outlets; consequently a clear passage to the stack can always be obtained. The raising of the valve is accomplished by the cam on the operating rig and the toggle joint over each individual valve. The reversing is accomplished by the racks, which are in series. A separate stack damper is provided for each hole, and each valve has its separate lever for regulating the incoming gas; these levers are so interlocked that they must be shut off before the valves can be reversed.

This design when used in connection with a mill of large capacity can be modified by building two rows of pits, one on each side of the tracks. It is stated that these will decrease the travel of the chariot approximately 50 per cent, and will make it possible to get the ingot to the mill much quicker. With this design of pit it is possible to install any number of holes desired or for which space is available, while with most pits it is necessary to build the holes in units of four each.

To sum up, the advantages claimed for this type of pit include simplicity in design, decreased requirements in building space, shorter crane span and easier service on the crane, more rapid handling of ingots, elimination of individual control of the valves, elimination of the contraction of the path of the outgoing gases, doing away with all valve parts underground and the practicability of building any desired number of holes instead of having the holes in blocks of four.

These pits were designed by William Forrstrom, chief engineer of the Wisconsin Steel Works, under the direction of George Rose, general superintendent.

HELPING EMPLOYEES TO SAVE

Campaign of Cooperation in Cleveland Between Industries and Bank

An intensive campaign to develop the habit of saving among individual workers was inaugurated recently by the Union Trust Co., Cleveland. "The save at the shop plan," as it is called, does not differ materially from plans having the same object in view that have been followed by other banking institutions, but the methods adopted by the Cleveland bank to make the plan a success and to simplify its operation are said to be original.

As a first step in the installation of the plan, a representative of the bank thoroughly explains the plan to the foreman or superintendent of the plant. About a week prior to the installation of the plan a letter written on factory stationery and signed by one of the officers of the company is sent to all the employees of the plant. This outlines in detail the plan and explains its operation. This is followed by a letter to the employees from the bank written upon bank stationery and signed by an officer of the bank, further outlining and explaining the plan and pointing out some of the advantages of saving money regularly.

On the following pay day bank signature cards and authorization cards are inclosed in each pay envelope, the latter card authorizing the company to open a savings account for the man signing it, and indicating the amount which he wishes deducted from his pay and deposited for him each week. Little additional bookkeeping is required at the plant. Deposit slips with carbon sheets and receipts padded alternately are furnished by the bank. When a deposit slip is made a receipt for the employee is made out at the same time and the paymaster uses these in making the proper deductions in the payroll.

The deposit slips are then sent to the bank together with the company's check for an amount equivalent to the total of the deposit slips and the amounts on these slips are credited to the individual employee.

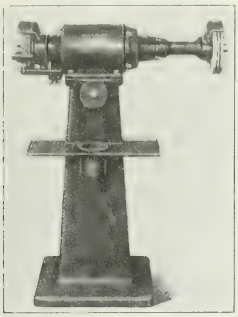
Later the bank makes a thorough canvass of the plant in an attempt to enroll as many employees as possible and secure on the spot their signatures to the authorization cards. The solicitation for membership in an intensive advertising campaign is continued with the use of shop posters, newspaper and street car advertising and billboards. The plan, which was first tried experimentally in one plant, has been adopted by over a hundred Cleveland plants and several thousand depositors have been secured.

Evidence obtained from the bank from executives of companies that have taken up the plan indicate that its adoption has proved a valuable aid in solving some of the problems of industrial management, particularly the matter of labor turnover and efficiency. It is pointed out that the morale of the workmen is improved when they are taught to save some of their earnings. The plan has supplied an objective which has transferred men who are drifters into steady workers who start saving with some definite object in view. It is found that some save simply to accumulate the money but the majority pick out a definite object which they desire to possess, such as an automobile, or a new home. One Cleveland plant executive stated that this industrial saving plan has demonstrated its value in his plant by stimulating attendance, punctuality, and reducing the borrowing habit among employees.

Combination Grinder and Buffer

A combination grinding and buffing machine with incased spindle construction and adapted for a variety of work requiring the use of grinding, buff, wire-brush or rotary-wire rasp wheels has been placed on the market by the Hisey-Wolf Machine Co., Cincinnati. The general design is new but in construction details the machine is similar to the company standard ball-bearing grinders and buffers.

The machine is made in 1 hp. size for alternating and direct current, the motor being direct connected as



Direct Motor-Driven Combination Buffing and Grinding Machine. The spindle extension is a separate unit connected to motor armature shaft by clutch

shown. The spindle extension is a separate unit and is connected to the motor armature shaft by a suitable clutch. Each shaft unit is supported by two ball bearings, a construction intended to make for rigidity. The standard a.c. machine is equipped with 60 cycle, single and three-phase motors running at 3500 r.p.m. at no load. Motors for 40 cycle and 25 cycle, running at 2400 r.p.m. and 1500 r.p.m. at 2/3 and ½ hp. respectively, are also available. Single phase machines are for operation from a lamp socket or lighting circuit line wires. Two or three-phase machines are for operation on corresponding power circuit lines only.

The direct current machines are regularly available for voltages of 115 and 230 volts, but may be furnished for special voltages from 80 to 250. The d.c. machines run at 3200 r.p.m. at no load.

Grinding and buffing wheels 8 x 1½ in., with ¾ in. hole, are used. A base for bench mounting is available. Connector cable, switch, wheel guard and grinding wheel are part of the standard equipment. Wire-brush wheel, buff or rotary rasp wheel are extras. The weight of the machine is 390 lb. net.

Invar and Other Nickel Steels

A recently revised circular issued by the U. S. Bureau of Standards, entitled "Invar and Related Nickel Steels," furnishes information on the properties of nickel steels of relatively high nickel content.

Particular attention is paid to Invar, nickel-iron alloy containing about 36 per cent of nickel and possessing an extremely small degree of thermal expansivity; and to Elinvar, a recently developed alloy containing 36 per cent of nickel and 12 per cent of chromium or its equivalent. The latter possesses an invariable modulus of elasticity as well as a low thermal expansivity. These alloys are used largely in cases where nonvariance of dimensions and elastic properties is required between the limits of temperatures ordinarily encountered (32 to 100 deg. Fahr.). They are used for measuring tapes in accurate surveying, standards of length measurement, various parts of precise measuring instruments, parts of watches, clocks, chronometers, etc.

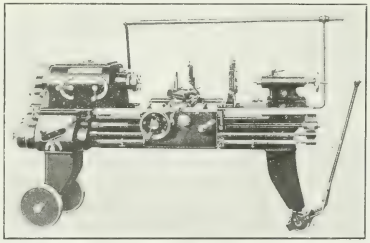
Nickel steels of different nickel content are used for a variety of purposes, such as gun tubes and other guns parts, pneumatic hammers and air drills, certain parts of gas engines, automobiles, airplanes, and other machines subject to severe stresses, boiler tubes, valves in sea water pumps, thermostats, rheostats, electric heaters, etc. Nickel steels of high nickel content possess the property of being highly resistant to corrosion by fresh water, sea water, and acid liquors. The circular gives considerable attention to the peculiar properties which permit these steels to be used for the purposes indicated.

These steels are described in Circular No. 58, Second Edition, of the Bureau of Standards, entitled "Invar and Related Nickel Steels." Copies of this circular may be obtained from the superintendent of documents, Government Printing Office, Washington. The price is 30c.

Portable Geared-Head Lathe

A Sundstrand 15-in. portable geared-head lathe for use in railroad shops and shipyards, and patterned after its 14-in. tool room machine, has been placed on the market by the Rockford Tool Co., Rockford, Ill. When motor driven the motor is mounted on the headstock, instead of on a bracket attached to the rear of the machine as in the standard tool room lathe.

Combining power and rigidity with symmetrical design has been the aim, convenience of control having been given careful attention also. The construction of the bed, headstock, spindle, carriage, apron and other members of the machine follows closely the 14-in. tool room machine. The swing is 15-in. over the bed and 8¾ in. over the carriage, the distance between centers, 6-ft. bed and tailstock flush with the end of the bed, being 32 in. Feeds from 6 to 368 per in. are available. Threads from 1½ to 92, including 11½ per in. may be cut. There are 12 spindle speeds and speed changes



Portable Geared-Head Lathe. When motor-driven, the motor is mounted on the headstock

can be made with the machine in operation. The drive pulley is 10 x 3¼ in. and runs at 350 r.p.m. The weight of the machine with 6-ft. bed is approximately 2250 lb.

Another Use of Sheet Steel Promised

The trench hat, the "old tin hat" that served in some measure to turn shrapnel hail on the war-swept fields of France, is coming into quite extensive use as a means of head protection against falls of rocks and ore in the mines of California, West Virginia, Oklahoma and many other States, according to R. V. Ageton, metal-mining engineer of the Bureau of Mines, Department of the Interior. The hats are being used in shaft sinking and in raising operations and around and in hoisting shafts, states Mr. Ageton. The "trench shoe" and similar heavy shoes are also being utilized by miners as a medium of foot protection.

PEARLITIC CAST IRON*

New Type of Iron Castings Developed in Germany—Use of Hot Sand Molds Affects Microstructure and Properties

The introduction of a new name for castings made under special conditions is always regrettable, and it is a question whether it was necessary to make the designation given by the title of this article to cover the product of a peculiar departure in the preparation of molds and selection of analysis for the castings in question. Since, however, these "pearlitic" castings are beginning to be extensively advertised in Europe, the matter will be of interest here.

The microscope in the iron foundry, while an excellent laboratory aid, has not proved to be of special value in the shop itself. This is natural enough, as once the castings have been made the microstructure is fixed, and only in very special and isolated cases will heat treatment be given the castings to change this condition—as, for instance, in the newly introduced centrifugally cast iron pipe made in steel molds. It seems, however, that these "pearlitic" castings do show a dominant microstructure which is pearlitic in character, whereas the ordinary run of work has much less of this component in its make-up.

Ordinary gray iron castings, considered microscopically, consist of varying proportions of graphite, ferrite, pearlite and free cementite—with some phosphide eutectic, iron sulphide and manganese sulphide, depending upon the sulphur content. The ferritic part of the metal is soft and weak, and the flakes of graphite that are present accentuate this fault. Cementite is a very hard and brittle iron carbide which is unstable and tends to split into its components, ferrite and temper carbon. By comparison with steel of 0.90 per cent carbon content which when annealed consists of pearlite only, and is strong and of excellent quality, a cast iron of pearlitic structure, even with the unavoidable graphite, must be of special value as a consequence of this situation.

In a recent issue of *Stahl und Eisen*, April 26, 1923, there is an article by Prof. O. Bauer on the subject, which states that this iron is obtained by pouring molten iron, a composition which would give white castings in sand, into highly heated sand molds, and thus gray fracture castings are obtained. The structure of such castings is pearlitic with the usual graphite plates interspersed. The trials were made in 1916, during the war, and the process is covered by German patent No. 301,913.

Two salient points are involved in the method. First, the selection of a composition which shall give as little graphite as possible if the iron were cast into ordinary sand molds. Further, the carbon, silicon and phosphorus should be low. The sulphur content can be considerable without detriment to the process. Second, the mold must be pre-heated to a point such that the setting of the iron is retarded long enough to allow the separating out of graphite in spite of the low silicon. If these two points of composition and mold temperature are balanced to a nicety, the results are very excellent.

A series of test bars was made from three kinds of cast iron. First, from an ordinary stove plate mixture; then from cylinder iron, and finally from the special mixture intended for this pearlitic cast iron. The analyses will be of interest as showing the differences in composition:

Variety	Total Graphite, Per Cent	Comb. Carbn. Per Cent	Silicon, Per Cent	Manganese, Per Cent	Phosphorus, Per Cent	Sulphur, Per Cent
Stove plate	3.25	0.36	2.79	0.56	1.15	0.084
Cylinder iron	3.51	0.67	1.74	0.66	0.50	0.076
Pearlitic iron	3.25	0.84	1.11	0.79	0.40	0.154

The microstructure of these irons shows the following: The stove plate iron contained graphite, ferrite and pearlite, with considerable phosphide eutectic. The cylinder iron showed more pearlite with less ferrite, some phosphide eutectic and coarse graphite flakes. The pearlitic iron consists of pearlite with fine graphite plates and no ferrite. As might have been expected, the transverse tests showed the highest strengths for the pearlitic iron, with the cylinder iron second and the stove plate last; similarly, for the tensile results. The Brinell tests, while running the same way, nevertheless exhibit but slight differences, showing that machinability has not been hurt by the heavy reduction in the silicon—as the combined carbon remained low.

*Abstracted and discussed by Dr. Richard Moldenke.

Advantages of Heating Molds

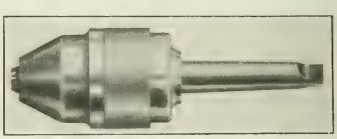
There must naturally be some obvious advantages obtained to offset the cost of heating the molds specially, apart from the better structure obtained. The comparatively longer cooling period, as the metal sets more slowly than ordinarily, must practically remove all the casting strains. Much is claimed for better wearing and higher resistance to the effect of blows. It is further claimed that the peculiar pearlitic structure can be checked up readily by the microscope as a matter of daily routine in the shop, which would make it about the first instance that this instrument can be used outside of the laboratory in an iron foundry.

In conclusion, the new departure is interesting from the following standpoint: In ordinary green-sand molding the rate of cooling of the molten metal is a little faster than when the molds are of dry sand. When a steel mold is used, the rate is very much faster even if the mold be hot. Now, with this new method of casting, the sand molds are not only dried but they are made very hot, and here is a case of a long retardation of the setting and cooling period. Perhaps it is the setting period that is most important, as graphitic castings are wanted from irons that would give white fractures ordinarily. The case is, therefore, different from the pouring of hand brake-wheels in the malleable foundry and removing them quickly after setting to highly heated furnaces to cool down slowly to prevent cracking. Here white iron is wanted and not gray; and the method is used to ease off the casting strains.

Quick-Change Drill Chuck

The drill chuck shown in the accompanying illustration, which is known as the Neudick automatic quick-change chuck, is being marketed by the MP Trading Co., Inc., Fifteenth and Mount Vernon Streets, Philadelphia. Quick changing of drills, simplicity of design, and durability are features emphasized. The chuck is for straight-shank drills and is available in three sizes with a drill range from 1/48 to 25/32.

Drills may be changed with the spindle running, and the chuck is said to have a firm grip which increases automatically as the drilling resistance increases. The release is claimed to operate so easily that the chuck



Drill Chuck with Quick Change Feature. Drills may be changed with machine spindle running

may be used on high-speed machines without danger of burning one's fingers when changing drills while the machine is in operation. A slight grip with the thumb and forefinger on the collar will open the chuck; releasing the collar instantly closes the chuck. Among the features of design are smooth cone-shaped roller jaws intended to hold and center the drill true and eliminate spoilage or breakage of drills. No bushings or collets, wrenches or keys are required in the operation of the chuck.

Designing and Making of Wire Springs

Operations of Coiling and Grinding—Proper Relative Dimensions of Coils—Character of Wire Best Suited for Springs

BY J. H. SULLIVAN*

WIRE springs are used to such a great extent, and the safe action and the load a spring can be built to appears to be known to so few outside the spring manufacturers, that some information as to the limits of the material and the labor required to make safe and uniform springs, with very little variation in diameter, height or load test, may prove interesting and of value to machine designers and engineers.

Automobile valve springs have to stand about as severe tests as any spring should be given. The fact that they are doing the work required of them, sometimes for years without sagging or breaking, proves that springs are very reliable when properly designed and manufactured.

Coiling the Spring

The first operation is coiling the spring. The automatic coiling machines feed in a predetermined amount of wire, close the end coils and cut the wire while the feed rolls are at rest. When the cutter recedes, the feed rolls again feed in wire. The pitch control is timed to spread the coils to the desired pitch, after the closed end coil is formed, and to recede in time to have the last coil formed without pitch. The rolls now stop feeding, when the cutter advances and severs the wire. This can be done at a speed of forty-five springs per minute, if there is not more than 4 ft. of wire in the spring. Springs requiring a greater amount of wire require more time to make.

An experienced spring maker can detect any slight change in diameter or height of spring and has means of controlling height and diameter while the machine is running. But as it is impossible for him to measure the springs as fast as they are made, where springs have to meet an exacting test, the springs are put on a mandrel of the diameter required and set to exact height before the springs are heat treated.

Coiling a spring stretches the molecules on the outside and compresses them on the inside. The smaller the diameter of spring, the more the wire is injured. But by heat treating, the molecules get back into place again, and the proof of this is shown by the heat treated spring being from 20 to 25 per cent better for lasting qualities than the untreated spring, and less subject to fatigue.

Grinding the Ends of Springs

The next operation is grinding the ends of the springs. As these springs have all been set to a uniform height and heat treated, both ends of the spring can be ground at the same time. Adjustment for keeping the emery wheels a proper distance apart, to compensate for wear of wheels, is provided. The springs are then compressed solid, with at least 100 per cent overload, and after two solid compressions all permanent set should be removed from the spring. A certain proportion of the order are now tested, and the plus or minus allowance marked on the dial of the testing machine. The balance of the order can be tested rapidly and there will be very few rejections if we are allowed 10 per cent plus or minus on the load required.

Small orders for springs are sometimes made by machinists on a mandrel, but they cannot get so nearly uniform results as when springs are made on spring coiling machines. If the wire should vary in hardness, it will show in a difference in the diameter, also in the pitch of the spring. Another reason for not obtaining uniform results is that the machinist cannot control the wire on a lathe so well as it is controlled by a spring coiling machine. To make uniform springs for the right price requires as much skill, practice and ingenuity as is called for by any other line of endeavor.

Proper Dimensions for a Valve Spring

The outside diameter should be not less than nine times the size of the wire from which the spring is made. The height of the spring should be not more than three times the outside diameter and the pitch or lead of spring not more than twice the diameter of the wire; that is, the space between the coils should be not more than the size of the wire from which it is made. Some engineers use even a greater factor of safety than this will give, but the majority call for springs designed to a higher fiber stress.

Almost every spring manufacturer has tables or slide rules, or both, that enable him to design springs rapidly and at little cost. Many automobiles have valve springs designed to a higher fiber stress apparently giving good service, but for safety and comfort the dimensions above should not be exceeded. The dimensions stated will make a satisfactory valve spring for any size engine. The finer the wire, the greater factor of safety there will be. In the finer sizes of wire, a spring so designed would not be strained over one-fourth of the capacity it could be built to, and would give long and satisfactory service.

Agricultural machinery compression springs are usually designed to the limit of material, as they are not used constantly and they seem to be doing satisfactory work, as they are not frequently replaced. When designed to the limits of the material, there is less weight to the spring, which of course helps to keep the spring cost down, but the method of manufacture is entirely different. The springs are coiled as much as 20 per cent higher than the spring is required to stand after solid compression. A bending strain comes when these springs are compressed solid, and they do not return to the original free height, but allowance is made for this and the springs come up to the height required. The plus or minus limits are usually much greater, if they are stated at all, than on valve springs. Consequently, as there will be hardly any rejections and no cost for testing, the selling price is much lower per pound than on valve springs.

Extension springs, while made from the same material as a compression spring, will not give the same action as a compression spring and, while it is possible to have it carry the same load, the action will be only about two-thirds of what can be had from a compression spring, as about one-third of the total load carried by the extension spring is tied up in initial tension. To explain, a spring of a capacity of 400 lb. would show an action of 1 in. for the first 200 lb., and then an action of 1 in. for the next 100 lb. and 1 in. for the third 100 lb.—3 in. action in all for 400 lb. Extension springs, if loaded beyond the elastic limit, will not go back coil to coil. This does not mean that the spring is worthless. It is still good for a load within the elastic limits, but the action will be greater. Once the initial tension is removed by strain or heat treatment, it will then give an action proportionate to the load applied. Compression springs are usually confined in a hole or used on a rod, and can stand considerable overload without a permanent injury.

*Superintendent, Superior Spring Co., Springfield, O.

Extension springs are not so safeguarded and are much more liable to be strained.

Character of Wire Used

Piano or music wire is the best grade of wire for springs. It is a crucible steel carefully melted, handled carefully all through the different operations necessary to get to size. It has considerably more work done on it than is done on the regular spring wire, hence it is of a much higher tensile strength and springs can be built to a higher fiber stress than with the ordinary open-hearth steel. It is rarely used in sizes larger than ⅛ in., but is used almost exclusively in the finer sizes—0.008 in. to 0.080 in. It is drawn more accurately to size and the wire is finely finished and polished after it has been drawn. Springs made from piano wire are seldom ordered blued, but they would be benefited even more than the ordinary wire if blued.

There is also a grade of wire that is oil tempered before being coiled into springs. The manner of tempering oil-tempered wire is somewhat similar to the treatment given the wire before being made into the premier grade. The wire is heated to a tempering heat, cooled in running oil. Temper is then drawn in lead and the wire is wound on split sheaves about 100 ft. distant from the lead furnace. This length of travel is required to give the wire a chance to cool before being wound on the split sheaves. This wire will show a higher tensile strength than ordinary spring wire, but not so high as the music wire. It is less liable to fatigue than premier wire, but springs made from this wire, built to a safe fiber stress of spring wire, will show no better results than the regular spring wire. It can be built to a greater pitch than premier wire, and in some cases it is the only wire that will meet the test.

Springs that are hardened in oil after being coiled can be built to meet any test that springs made from oil-tempered wire will give, that is, in the compression line. But they are hard to get perfectly straight for, when they are of a tempering heat and if not hardened in oil perfectly straight, they will become more or less crooked. One can nearly always tell a hardened spring from one made any other way, as it cannot be lined up perfectly straight unless the diameter of the spring is fully one-third the height of the spring. To oil temper an extension spring after it is coiled would remove all the initial tension from it, making it inferior to the ordinary wire for any purpose other than a scale or governor spring.

Kind of Section Required

Round steel is the best of all materials to use for springs. The work which can be stored up in a spiral spring is simply proportionate to the weight or quantity of material in it and we can store more energy in a spring formed from round wire than in one of equal weight of same material whose wire has any other than a circular section. While square wire will carry a greater load, it has considerably less action and is more liable to crack than round steel.

Flat wire springs are used when the requirements cannot be met with round wire, but as this wire has to be made flat after it is drawn round, the steel is more or less injured by rolling wire flat and it is usually done cold, except in the heavier sizes varying from 3/16 in. to ½ in., which seems to be harder on the material than drawing round wire through a die. Then if this wire has to be wound on edge it has to be stretched too much on the outer edge and is compressed considerably on the inner edge; so much so, that the coils cannot be closed solid at the outer edge of spring and heat treatment, while it benefits the wire, does not get it back to its original size.

Special Steels, Properly Handled, Are Costly

Vanadium steel has proved its superiority over carbon steel only when it has been given the proper heat treatment and extreme care used in the manufacturing by the steel maker, the wire mill and the spring maker. If there is any mistreatment of this steel by any one it appears to suffer more than the ordinary carbon steel. Open-hearth chrome vanadium spring steel may be better than plain carbon steel, if right treatment is given it at every point. As crucible steel is better than open-hearth steel, so the genuine chrome vanadium steel, when properly melted and properly treated at every point, will give best results and, while some engineers will call for springs made from this material, they are not willing usually to pay the price necessary to give the material the work required on it to get the best results.

Many people order high-priced steel and get no better results from it than could be had from carbon steel ordinarily handled. It has been stated time and again by experienced steel makers that the best steel, the most reliable under all circumstances, is that which comes nearest to pure iron and carbon. That is to say, such a steel, if overheated, overworked or subjected to any of the irregularities inevitable in shop practice, will suffer less harm than steel of equal initial strength which has less carbon and the additional strength is given by other substances. From this it seems it is only necessary to use a higher factor of safety for carbon steel, to obtain the same results as can be had from high-priced alloy steels and at a much lower cost. As the ordinary carbon steel wire can be designed to give years of satisfactory service as a valve spring, why change it?

Educating Employees in Industrial Economics

A strong plea for the education of industrial employees in the fundamentals of business economics and in the details of the businesses in which they are employed is made by Carl F. Dietz, president Bridgeport Brass Co., in a pamphlet recently issued by the fabricated production department of the Chamber of Commerce of the United States.

The methods employed by Mr. Dietz's company are unique. Employees are educated through lectures and by means of simple visual illustrations. In the place of charts and graphs blocks of colored wood are used.

Workers who perform certain operations on materials before they have reached an advanced stage toward completion often show little interest in their work because they never see the start and finish of the job on which they are employed. There is manifest at all times, declares Mr. Dietz, a real desire on the worker's part to know more about the business in which he is employed. Far-seeing managers, he adds, are seeking the best methods of imparting such information constructively, especially information regarding the relation of production to wages and the distribution of the dollar received for the product of the plant.

One real benefit to be found in this, Mr. Dietz points out, is that it is of great effectiveness in counteracting misinformation and propaganda. Copies of the booklet may be obtained by addressing the Chamber of Commerce of the United States, Washington.

American Puddled Iron Co.

Operation of the mechanical puddling plant at Warren, Ohio, by the American Puddled Iron Co., formed by Youngstown, Ohio, interests, is expected about Oct. 1. The mechanical puddling process to be employed in the new plant has been so far developed, it is claimed, that the need for hand puddlers will rapidly diminish. Among the largest puddling plants in the Middle West are those of the A. M. Byers Co., Pittsburgh, at Girard, Ohio, and the Youngstown Sheet & Tube Co., at East Youngstown. The Byers plant has 88 furnaces and the Sheet & Tube plant 50 single furnaces. When operating at capacity, these mills employ fully 500 puddlers and helpers. Within recent years it has become increasingly difficult adequately to man such plants because of the scarcity of puddlers.

At a special meeting recently stockholders of the Youngstown Steel Co. approved the sale of the Warren plant and the business to the American Puddled Iron Co., a new corporation with $3,500,000 capital, which will operate the property. E. L. Ford is the leading figure in the organization.

Piston Rods for Steam Drop-Hammers

Causes of Some Defective Rods—Specifications for Material Suitable for Best Service—Heat Treatment a Factor

BY A. A. BLUE*

THE value of a serviceable piston rod in the modern high-speed steam drop-hammer is of the highest importance in view of the considerable value of the rod itself, the overhead rate of the hammer, the loss in production due to shutdowns, the cost of removing the old rod and putting in a new one, etc. In spite of this great importance it is not uncommon to find these parts in such condition as to reflect careless methods in their manufacture. The following comments presuppose that the hammer has been lined up true and that, especially in cold weather, any chill has been removed from the rod.

*Technical manager, Duff Mfg. Co., Pittsburgh.

Defects and Their Causes

The nature of the service of drop-hammer rods is very severe as, unlike those of the ordinary forging hammer, these rods receive for the most part solid impacts resulting from the dies hitting together and not the cushion effect of a blow on soft metal between flat dies. For this reason, possibly, the breakage of rods has sometimes come to be regarded as inevitable. This

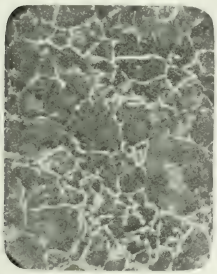


Fig. 1

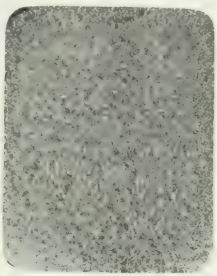


Fig. 2

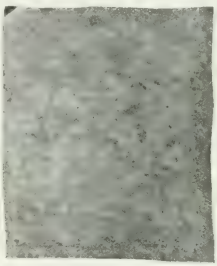


Fig. 3

Figs. 1, 2 and 3.—Photomicrographs of Three Rods which Failed Prematurely in Service

Figs. 4 and 5.—Methods Used in Quenching

Figs. 6, 7 and 8.—Photomicrographs of Steel Rods which Have Undergone the Heat Treatment Recommended

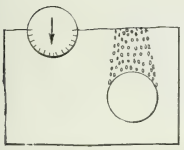


Fig. 4

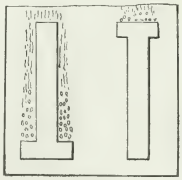


Fig. 5

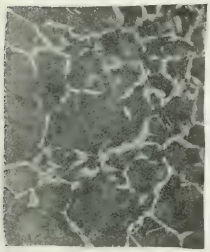


Fig. 6



Fig. 7

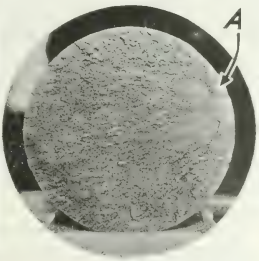


Fig. 8

attitude is both incorrect and dangerous to the best interests of the trade, for properly made rods can and do give surprisingly long runs. Examples of the faults often met with in improperly made rods are given below.

Composition.—Two features are desirable in connection with the composition of the steel used, (a) it should be the correct type of steel and (b) it should run uniform. The following are actual analyses taken from a number of rods purchased over a period of three years from one of the prominent sources of such material. All of the rods were represented as "chrome-vanadium."

	1	2	3	4	5	6	7	8	9
Carbon	0.27	0.28	0.29	0.34	0.35	0.35	0.36	0.41	0.56
Manganese	0.50	0.69	0.64	0.67	0.54	0.56	0.84	0.64	0.72
Phos.	0.009	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.024
Sulphur	0.03	0.03	0.03	0.04	0.03	0.02	0.03	0.02	0.026
Nickel	...	...	0.34	...	...	...	...	...	1.67
Chromium	0.82	1.26	0.98	0.47	1.23	0.97	1.26	1.13	0.83
Vanadium	none	0.20	none	0.23	0.20	0.21	0.19	0.21	none

An examination of the above results shows that, aside from No. 9, which was nickel-chrome steel and not chrome-vanadium at all, the carbon varies from 0.27 to 0.41; the chromium was from 0.47 to 1.26, and the vanadium from "none" to 0.23. These discrepancies do not occur, of course, in steel well cared for. The analyses indicate, also, that the steel has been made by the basic process.

Microstructure.—Photomicrographs were taken of samples from three rods that failed prematurely in service. Fig. 1 shows a rod sold with the steel in the forged condition, the structure being that of the steel as it left the forging press, annealing and heat treatment having been omitted. This rod failed after a few days' service. Fig. 2 shows a well annealed rod, but annealing will not put the grain of the steel in the condition necessary to give the longest life. Fig. 3 shows a steel with many large patches of slag, and the rod actually lasted but one hour in the hammer. The conclusion here, too, is that lack of care has been used in the manufacture of these rods, all-important though they be to the production of the hammer.

Heat Treatment.—Even with steel of the best composition and manufacture, the crude methods of heat treatment employed by some of the leading manufacturers of piston rods make impossible the proper service from the rods. The following will illustrate.

One manufacturer, using steel containing 0.25 per cent carbon, 3.50 per cent nickel, gives rods the following treatment: 1550 deg. water quench with 1200 deg. drawback. The critical temperature for steel of this composition is about 1375 deg., so that the final refining temperature which the steel with such treatment receives is 175 deg. above the critical range. Allowing for the heavy sections of some of the larger rods, this is too high to produce the best results.

Another bad practice is that of quenching the rod horizontally. The effect of this procedure is as follows: As the rod enters the quenching medium (see Fig. 4) the lower half is chilled before the upper half, thus setting up strains in the metal. After the rod is submerged, vapor bubbles arise from the upper half, the net result being that the under half of the rod is quenched in water and the upper half in vapor. Obviously, this produces an unevenly refined rod, which means uneven strains in the rod and, as the subsequent drawing operation cannot equalize the grain structure, this uneven effect is permanent in the rod, unless it should be re-heat-treated in the proper manner. These effects are more pronounced as the diameter of the rod increases.

The rod should, of course, be quenched vertically. In this manner the entire surface of the rod receives the same quenching effects and a uniform product results. In vertical quenching, should the rod have a solid head, the head should enter the quench last. (See Fig. 5.) Otherwise, with the big end down, vapor bubbles coming up from it surround the shank and prevent the liquid from producing the proper refining effects where most needed.

How to Secure Better Rods

The following paragraphs are offered as suggestions that may help to secure improved service from hammer rods where such precautions have not already been in force. Rods should be purchased under definite specifications, which should include the following:

Steel.—The steel should preferably be made by the acid open-hearth process, with ingots bottom poured in molds with hot tops. Either of the following compositions will give good results:

	No. 1 Per Cent	No. 2 Per Cent
Carbon	0.20 to 0.30	0.25 to 0.35
Manganese	0.50 to 0.80	0.50 to 0.80
Phosphorus	under 0.04	under 0.04
Sulphur	under 0.04	under 0.04
Nickel	3.25 to 3.75	.....
Chromium	.....	0.90 to 1.20
Vanadium	.....	0.15 to 0.25

Forging.—The rod should be forged from an ingot of such size that (a) where the head is to be shrunk on the reduction will not be less than 3:1, or (b) where the head is forged solid with the rod the reduction on the head will be not less than 2:1. A pressed forged rod is to be preferred to a hammered one, due to the better working of the metal in the interior of the piece.

Heat Treatment.—Rods of either of the above steels should be given the following treatment after forging:

A. Anneal thoroughly at 1600 deg., the time depending on size of rod.
B. Rough machine.
C. Heat to 1600 deg., quench vertically in water. (Remove rod at about 300 deg.)
Reheat to 1475 deg., quench vertically in water. (Remove rod at about 300 deg.)
Draw back to 1200 deg., cooling slowly.
D. Finish machine.

The effects of the above treatment on steel of composition No. 2 is shown in the photomicrographs. Fig. 6 shows a rod as received, it having undergone no treatment whatever after forging. A full section was cut off the end of this rod and given the above treatment. The resulting structure is shown in Fig. 7.

Fatigue Tests of Steel for Rods

The following tests are of further interest in the above connection. A method of test was desired that should simulate as closely as possible the conditions of a rod in the hammer. Fig. 8 shows a typical fracture of a hammer rod. This shows clearly the nature of these failures, how the fracture commences at some point "A" at one side and then progresses across the rod radially from this point. This indicates that the strains that cause such failure are vibratory, due often to the impressions in the dies not being axial with the rod. The Landgraf-Turner testing machine was selected as resembling this effect. In this machine, a test bar 6 in. long by ⅜ in. diameter is clamped at the lower end in a vise. The upper end of the bar extends into an opening, about 1 in. square, in a rocker arm. This arm is moved back and forth, both giving a blow to the test bar and also bending it somewhat at each stroke. The number of strokes required for failure is recorded automatically. The tests were made with vibrations at the rate of 300 per min. The following are the results obtained:

	Strokes
Chrome-vanadium steel—	
Sample from hammer as received, with structure as shown in Fig. 6	376 295
	Average value 335
Sample of same rod, but treated, with structure as shown in Fig. 7	520 479
	Average value 499
0.20 carbon, 3.50 per cent nickel steel—	
Sample given same treatment as above	504 463
(Section treated, 2½ in. sq.)	Average value 484

These show the heat treatment necessary to produce an increase of 50 per cent in the fatigue-resisting qualities of the chrome-vanadian steel. They also indicate little to choose between the chrome-vanadium and low carbon nickel steels for this purpose.

In view of the above considerations, it would seem profitable protection for the busy drop forge shop to install suitable heat-treating equipment for the handling of hammer rods. Rough turned rods, ordered to definite chemical composition, could be purchased from the heavy forge shop, and then analyzed when received.

If this analysis checks, the rod could then be treated properly, and sent out for finish machining. This, of course, involves a great deal of trouble to do what should have been done in the steel mill, but it is strictly comparable with the installation of a chemical laboratory which analyzes incoming steels. If these steels were always made and handled as they should be at the steel mill, this check analysis would be unnecessary.

OIL BURNING UNDER BOILERS

Savings in Labor Prominent—Atomizing of Fuel in Entering Burner

BY L. C. BREED

THERE is steadily increasing interest in the direction of the use of oil in place of coal in the steam plants of various industries. Of late years it has developed rapidly, owing in part to the higher cost of coal, and it is estimated that the yearly consumption is over 300,000,000 bbl. In some instances the change to burning oil in place of coal under the boilers is made in part only, and a careful comparative study is conducted for a considerable period.

A case in point is that of the Boston Woven Hose & Rubber Co. of Cambridge, Mass. It has three boilers of 600 hp. each, and has been conducting an experimental operation for the past six months under the supervision of an expert mechanical engineer. Prior to taking up the use of oil, the average daily consumption of coal was 120 tons. The company is now using about 20,000 gal. of oil daily for its requirements, in part, in the production of power, while carrying on its experiment to ascertain whether or not, all things considered, oil should be used in place of coal.

The American Sugar Refining Co. has been using fuel oil at its plant in South Boston, Mass., at 100 per cent for two years. The boiler capacity of the refinery is 6000 hp. As the result of the experience of two years' run on oil, it is found that it gives 78½ per cent efficiency as compared with 65 per cent in case of coal with 14,300 B.t.u. per pound. The oil has 18,300 B.t.u. per pound. The boilers formerly burned 180 tons of coal daily.

About two-thirds of the cost of installation was due to providing underground storage tanks for a month's supply of oil. Mechanical burners are used and a saving is effected as against the use of steam atomizers in connection with burners. In using mechanical burners, oil has to be heated very hot and pumped into the fire at high pressure—200 lb. pressure and 200 deg. Fahr., whereas steam carries 80 lb. pressure and 160 deg. Fahr. Exhaust steam is used to heat the oil. A great saving is effected through the elimination of the expense previously incurred for the removal of ashes.

Delivery of Fuel Oil to Plant

Establishments situated at a considerable distance from seaboard, which for that reason cannot be supplied from dealers' storage tanks, may obtain it by railroad if they are situated near the railroad track and their business is large enough to warrant providing storage for a tank carload of from 8000 to 10,000 gal. of oil. The oil companies have for some years supplied manufacturing plants throughout New England. In winter oil must be warmed to make it flow freely to the user's tank. The tank cars are provided with coils for the purchaser's use in applying steam.

Storage tanks are usually constructed of reinforced concrete, and in most localities are required to be placed under ground. There is no increase of expense for insurance, provided the regulations of the board of underwriters for the district have been complied with.

Among notable instances of the adoption of oil as fuel are those of the Amoskeag Mills, Manchester, N. H., where it is used under a battery of 64 boilers, and the American Woolen Co., the mills of which at Lawrence and Plymouth, Mass., and Weybosset, R. I., have very large boiler capacity. The Beacon Oil Co., Everett, Mass., Revere Rubber Co., Revere, Mass., American Rubber Co., Cambridge, Mass., and many others in New England are users of fuel oil.

Two Classes of Burners

There are on the market hundreds of styles of oil burners, all of which may be divided into just two classes, according to their design: (1), The mechanical atomizing type; (2), the steam or air atomizing type.

In the mechanical atomizing type, in case of some burners, the oil is forced by pumps or gravity pressure through the passageway and, reversing its direction of flow, is forced through the small openings and strikes an abutment, where by virtue of its momentum it is atomized. The oil thus atomized continues along the abutment to its edge, where it is picked up and further atomized by a small amount of expanding steam coming through the openings. In this almost gaseous state it is then carried by the steam to the burner tip, where it is burned. Efficiency in the combustion of fuel oil is largely dependent upon the degree of atomization. In laying out a fuel oil burning system in any plant, the following matters must be taken into account: Storage, heating, straining, pumping, regulating, burning and arrangement of furnace.

Firms interested in their introduction usually superintend the work of changing the equipment of a plant from the use of coal to the use of oil. In most plants workers in the boiler room are supplied with blue glasses for the protection of their eyesight.

Reasons for Changing to Oil Fuel

Among the reasons which have induced some firms to change from burning coal to burning oil are the following: After deducting the cost of changing the equipment, they state that the first year's operation showed a considerable saving. It would seem warranted to spread the cost of the change over a period of (say) five years.

Another factor to be considered is the superior steam-making properties of oil as compared with coal. This is occasioned through more complete combustion in case of oil, due to the control of air supply and the better mixing of the air with the fuel. In hand firing of coal, the opening of doors for charging or cleaning fires results in a variable percentage of heat, and a corresponding reduction in boiler efficiency.

The storage of oil does not require nearly so much space as with coal, and the saving in space can be utilized for storage of other commodities. The cost of handling is much less. There is a saving of labor in the boiler room and there is no ash removal to be done. Boiler depreciation is cut down approximately two-thirds, and the boiler does not have to be blown out so often as when coal is used, and it prolongs the life of furnace linings.

The absence of smoke and dust is a very desirable feature, and there are no sparks or spontaneous combustion as with bituminous coal. Oil burning equipment costs considerably less than coal burning equipment. Establishments situated at considerable distance from supply dealers can be rendered secure from interruption in service through providing extra burners for use in emergencies.

Concerning the approximate cost, if coal is $10 per gross ton fired and one ton equals 2.88 bbl. of oil, then the user could afford to pay $3.45 per bbl. of oil fired. The cost of firing is about 25c. per bbl.

Fuel Oil Heaters

An important device which may be used in connection with mechanical burners is the fuel oil heater. It is the usual practice to design fuel oil heaters so that the oil will be confined to the inside of the heat-

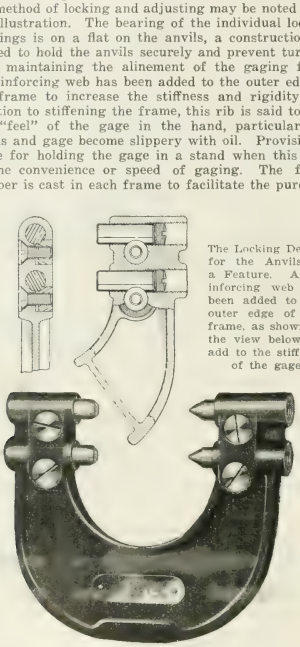
ing element, the steam being in the shell around the tubes or coils comprising the heating element. This operation may be reversed, but it is found to be preferable to use the oil tube type of heater rather than the steam tube type, both from the design and operating point of view. One company which manufactures these devices has found that two types of fuel oil heaters are necessary in order to handle all conditions of oil capacities—a coil type of heater adapting itself best to small quantities of oil, and the multi-pass tubular type of heater being best adapted for conditions where the quantities of oil are large.

Due to the tendency toward the use of heavy oils for fuel oil firing purposes, users are advised to purchase a fuel oil heater capable of handling the heaviest grades of oils obtainable. This procedure provides a heater which may be used with any grade of oil, irrespective of whether it may be a light or a heavy fuel oil, and enables the user to purchase oil from any source of supply that conditions may dictate.

Improved Snap Gage

A line of snap gages having a wide range of adjustment in each size has been placed on the market by the Greenfield Tap & Die Corporation, Greenfield, Mass.

The locking device for the anvils is a feature and the method of locking and adjusting may be noted from the illustration. The bearing of the individual locking bushings is on a flat on the anvils, a construction intended to hold the anvils securely and prevent turning, thus maintaining the alinement of the gaging faces. A reinforcing web has been added to the outer edge of the frame to increase the stiffness and rigidity. In addition to stiffening the frame, this rib is said to help the "feel" of the gage in the hand, particularly if hands and gage become slippery with oil. Provision is made for holding the gage in a stand when this adds to the convenience or speed of gaging. The frame number is cast in each frame to facilitate the purchase



The Locking Device for the Anvils Is a Feature. A reinforcing web has been added to the outer edge of the frame, as shown in the view below, to add to the stiffness of the gage

of similar gages or extra anvils. A name plate is provided for special marking.

The wide range of adjustment in each size is claimed to permit covering a given range of sizes with fewer gages, which in turn permits a saving on gages for special work or small production jobs, where it is frequently possible to reset from one size to another.

Building contracts awarded in July in 36 eastern States, according to the F. W. Dodge Corporation, amounted in value to $315,024,000, a drop of 15 per cent from the figures of June and of 22 per cent from those of July last year. The July total was about equal to the average July figures during the four years from 1919 to 1922 inclusive.

German Machine Industry Suffers Severely from Economic Disintegration

The machine industry of Germany suffered severely in 1922 from the effects of Germany's economic disintegration, according to the annual report of the Verein Deutscher Maschinenbau-Anstalton, summarized in the Industrie-und Handels-Zeitung of June 8. The association estimates the present production of the industry in weight is only half that of the pre-war period. Among the greatest difficulties that have hampered operation are the condition of Germany's currency and the resulting capital shortage, the 8-hr. day and excessive overtime wages, labor disputes, unsatisfactory supply of materials, injudicious taxation and the import restrictions of foreign countries.

These difficulties, Trade Commissioner F. W. Allport points out in a report to the Industrial Machinery Division of the Department of Commerce, have forced many hitherto unorganized manufacturers to associate, and as a result the number of organizations in the industry rose at the end of 1922 to 143, comprising 1150 concerns with between 500,000 and 600,000 workmen, about 90 per cent of producing power of the entire industry.

Supplies of raw and semi-manufactured materials apparently gave a great deal of trouble to the industry in the past year. Some factories were able to obtain but 30 per cent of the material needed, the shortage of bar iron and thin plates being particularly acute. Frequent changes in iron prices led to complete disorganization of quotations in the industry and necessitated a general agreement on uniform prices so far as practicable.

Stocks of Coke in Consumers' Hands

WASHINGTON, Aug. 11.—Incomplete returns from by-product coke and steel plants indicate that the reserve coal tonnage on hand at such plants on July 1, 1923, was about 5 per cent larger than on June 1, according to a survey undertaken by the Bureau of the Census and the Geological Survey under the authority of the Federal Fuel Distrjbuter. Operations at such plants were curtailed somewhat during June, and the days supply on July 1 was 27, against 25 on June 1, an increase of 8 per cent. The stocks held by these important groups of consumers are now twice those on hand Sept. 1, 1922, but in spite of this progress in replacing stocks that were so nearly exhausted during the miners' strike last summer, reserves on July 1 were below those on other dates when stocks were large. The supply on Jan. 1, 1919, and on March 1, 1922, was sufficient for about 40 days.

Surplus stocks of by-product coke were accumulated in June, and the total on hand on July 1 was 308,000 tons, an increase of 52.5 per cent over the supply on June 1. Despite this increase, however, stocks of by-product coke were less than half those on March 1, 1922, when the reserve tonnage was the heaviest.

Owing to the duplication of reports from one large producer who stores coal at the mines, the figures of mine storage recently published have been too high. The total held on July 1 by the producers that reported was 688,000 tons, against a revised figure of 778,000 tons on June 1. This was a decrease of approximately 12 per cent.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.*, Charles G. Phillips, *Vice-Pres.*, A. C. Pearson, *Treas.*, F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: Park Building. Boston: 140 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

A New Steel Works Epoch

The present week marks an epoch in the steel industry, in view of the change that will be made on Aug. 16 in several centers of production from twelve-hour to eight-hour working shifts. The change amounts almost to revolution, and might be called that but for the fact that it will be a matter of months. Many things will come from it of which not a word has been said in many pages of newspaper writing. Ultimately plant modernization to the highest degree is involved, and expenditures of money even beyond the prodigal scale that long has been forced on the industry by the march of processes and the modern economic trend. In scores of communities life must be adjusted to a new cycle and the personnel of the industry will undergo important changes.

If there is one thing that stands out more than any other, as the leaders in the industry take up their prodigious task, it is the spirit of the operating managers. Not only are these men making every effort to bring about the change, but they entertain no peradventure of failure. They are the ones who wrestle with the human problem and with every shortage of labor. It is they who must keep up production and at lowest possible costs. They could make formidable lists of objections and of reasons for delay in the face of pressure for output. Yet these men quite generally are enthusiastic for the change. Some of their expressions disclose long latent views in favor of the short workday. It is idle to suggest that this attitude is unanimous, but the number who still want to dwell on the difficulties is small and they raise no argument against the principle. The will to do among so many is sure to bring into line those holding back.

Improvement of plant facilities will have attention to a degree rarely known. The less fit plants naturally will go from high cost to higher, but cannot long remain so and be active. The need is not merely for more mechanical handling to replace manual labor or for automatic contrivances where perhaps none now exist. Capable plant managers are scarce. Lines of succession show gaps that must be filled. Similar aggregations of plant apparatus, with materials and facilities substantially identical, give results varying as much as 20 per cent. Management personnel has not kept pace in all cases with the physical development.

More than ever under the new régime, operating heads must have the make-up that can deal successfully with the human factor. Mastery of processes and of mechanism will be as essential as heretofore, but in the transition of which this week marks the beginning right insight into the man problem is of paramount importance.

The Quality of Galvanizing

Go into an ordinary hardware store and buy a galvanized turnbuckle, install it for some purpose out of doors, examine it after two or three months, and likely it will be found already to show evidence of rusting. Go into a ship chandler's store on the water front and buy almost any form of galvanized iron. It will be obvious to the eye that it is a substantial, well-coated article, producing a confidence in its durability. There is an industrial and economic lesson to be learned from these homely remarks.

There has been a good deal of discussion recently respecting the quality of the galvanizing that we are doing in this country. It has been charged that our galvanizers have thinned the zinc coating so that our galvanized sheets and wire are no longer durable. It has been alleged that this impairment of quality is jeopardizing both our domestic trade, wherein consumers may turn to substitutes, and our foreign trade, wherein we were supposed to be constrained to meet the competition of good foreign galvanized wares.

Dr. W. R. Ingalls has recently shown that the last representation is founded on a fallacy; that British sheet galvanizers have been doing the same thinning as American. As for the rest, however, there is substantial agreement. Zinc producers, who are naturally desirous of having the maximum use of spelter, make charges and galvanizers admit them. In truth, there is no controversy between zinc producer and galvanizer, but rather a community of interest, which, of course, will make it easy for them to cooperate.

The subject is in reality an economic one. To the ordinary user of galvanized ware it all looks

alike. Competition among galvanizers is so keen that everyone is constrained to pare costs as much as possible. If anybody increased his cost and consequently his price by putting more spelter on the steel he would lose business, inasmuch as users, generally ignorant, would not pay the price, but rather would take something looking the same and offered more cheaply. Mariners are not ignorant respecting this subject. Knowing what they want and demanding it, galvanizers give it to them, just as they would to other customers who were similarly informed and insistent. Therefore the real economic objective is the education of users, and for that reason the more discussion of the subject there is the better will it be for everybody. Galvanizers themselves could well afford to enter upon plans for educational propaganda.

The Price for Wheat

The price for wheat is low owing to the inability of this country to market its surplus abroad in competition with other wheat growing countries at anything but low prices, the diminished demand of Europe, owing to its poverty, being largely responsible for this. Also, Europe has been raising more wheat of its own. The price for copper is relatively low, for the same reasons, more or less. Copper is, however, an industry that is left to work out its own salvation. There are fewer than 100 copper producing companies. There are many thousands of stockholders, to be sure, but politicians pay no attention to them. The number of men engaged in the production of copper, from mines to the exit gateways of the refineries, is only about 50,000. On the other hand, there are 2,500,000 farmers in the principal wheat-growing States, and they are naturally the concern of politicians. Their position is indeed a concern of the whole country, for there can be no such thing as national prosperity when so large a percentage of the workers are in a state of despair.

However, the remedies that are proposed by charlatans, quacks and false prophets are so alarming by virtue of their disregard of the simplest principles of economics as to cause us to stand aghast. The suggestion that all of the people of the United States be led to eat more bread is indeed in conformity with the law of supply and demand, but if more bread be consumed than is needful there is a direct invitation to profligacy in living which must be at the expense of the creation of capital goods. The chances are that the townspeople are already eating all the bread they want, wherefore this suggestion is humorous rather than serious, although Mr. Gompers had previously offered it as a reason why the farmers should cooperate with organized labor and connive with the latter in its plans for higher wages.

The proposal that the farmers should correct the evils from which they suffer by curtailing their production is made in flat defiance of the economic principle that people live and prosper out of the goods that they produce, unless they divert their attention to something else, which probably is not what is intended. Otherwise this suggestion is equivalent to recommending that the American people should determine to live a self-contained existence, abandon their foreign trade, and become poor in goods and comforts, although all expressions in dollars might be written up enormously.

Other suggestions are that the farmers withhold their surplus wheat, or that the Government buy it, neither of which would ameliorate the situation, as anybody experienced in markets well knows. Finally, there has been the preposterous suggestion that the Government revert to the war policy of price-fixing. This would be a repudiation of the law of supply and demand that would be about as sensible as a denial of the law of gravitation.

What the wheat farmers need are broader markets and reduced costs. Rehabilitation of Europe is the great road to enlargement of markets, but in order to develop it we must let down the barriers in the return road from Europe to us. That would tend to reduce the costs in this country. The cure for existing industrial evils is the removal of economic restrictions, not the erection of more of them. We shall be bound always to hark back to this simple formula, though it may be a long time in obtaining, partly for the reason that the majority of people do not understand our economic position and partly for the reason that it is contrary to many selfish interests.

Habits in Forecasting

The physical details of the business cycle have been quite fully analyzed of late. Inasmuch as we do not all depend exclusively upon the charts in forming our expectations as to the future of business, but pay some attention to the recurrent reviews by the various authorities, it might be useful to construct some sort of chart of the changing views and arguments of the reviewers as the various stages of the business cycle are passed.

Such a chart would expose and emphasize some remarkable inconsistencies. With a little effort of memory one can readily recognize that the various physical facts of business are differently regarded and differently interpreted, by the same class of commentators, at different times. For a striking illustration, we have it that in time of depression one observes that much emphasis is placed upon real or supposed "needs" of the people, as an argument that business is going to become much better, and very soon, while little is said about the presence or absence of buying power. On the other hand, when industrial activity is on a high level and the reviewers feel it will be safer to begin talking the other way, little is said of either needs or buying power. Yet we know perfectly well that needs do not count if there is not the buying power to satisfy them, and from personal experience almost anyone is likely to conclude that if buying power exists and needs are not recognized the needs will promptly be thought up.

The mental attitude as to volume of production likewise changes from time to time. At one stage

low production is spoken of as if there were an economic law that low production is always a bad thing. At another stage high production is spoken of as the bad thing. That is because mental attitudes change with the times. Viewing at long range anyone can see that either low production or high production may be bad, in a given commodity, according to whether or not it fits the circumstances. High production is not necessarily excessive nor is low production necessarily deficient.

At nearly all times the reviewers are prone to underrate the importance of buying power. Industrial activity cannot slow down rapidly when there is large buying power. The collapse of 1920 is better understood now than it was at the time. Then there was much talk of there being "a buyers' strike." The later and more likely conclusion is that buyers did not deliberately go on strike. Their money ran out because some sellers were getting so much of it that there was none left to spend with other sellers.

Men who predict poorer business ahead may feel that they are doing their fellow men a service, but they should not neglect to realize the great responsibility they assume. For our advancement and prosperity we need goods and the money with which to buy them. When a business forecaster induces a manufacturer to curtail his production two things occur: the production of goods is decreased and the buying power is likewise decreased. The advice may be good and in the long run benefit may result. There is an equally heavy responsibility when advice is given to business men to enlarge their facilities and make capital outlays on the ground that better business is coming. It may be more profitable to defer expenditures. It is no light thing to urge men at one time to spend their money freely and at another time to advise them to stop circulating money. One has a right to ask that the same attitude and the same philosophy obtain at all times when the physical facts of the situation are up for comment.

While our imports of manufactured articles and of raw materials for manufacture have been growing, exports of corresponding classifications have also increased. For the fiscal year ended with June the imports of manufactures and raw materials, that is, imports other than foodstuffs, totaled $2,904,000,000 in value, or nearly 50 per cent more than came in during the preceding fiscal year. Meanwhile the exports rose to practically the same total, $2,901,000,000, though only one-seventh more than for the fiscal year ended with June, 1922. The classification is three-fold. The importation of crude materials for use in manufacturing reached a value last year of $1,476,000,000, or five-eighths more than for the year preceding, while the exports of such materials amounted to $1,018,000,000, or one-tenth more than for the year preceding. The importation of manufactures for further use in manufacturing was three-fourths more than the 1921-1922 importation, reaching $711,000,000, while the exports increased only 18 per cent, reaching $487,000,000. The imports of manufactures ready for consumption, however, increased only one-eighth, or to $717,000,000, while the exports of completed manufactures increased 15 per cent, or to $1,396,000,000. As noted above, exports, while not increasing at anywhere near the rate of imports, actually balanced the latter.

Wages Now Buy More

Figures compiled by the National Industrial Conference Board, New York, comparing the present situation with the so-called prosperity period of 1920, show that the real earnings of the American wage earner are higher today than then; that is, they have a higher purchasing power, to the extent of over 15 per cent, and 36 per cent higher than in 1914. This indicates that the worker is in a more prosperous condition than for a long time.

The calculation is based on a study of conditions in plants employing more than 600,000 hands. The figure for June, 1920, showed that the weekly earnings at that time were 2.40 times those of July, 1914, while the cost of living figured out at 2.03 times as much as in the earlier month. Thus the purchasing power obtained by dividing the wages by the cost of living showed 1.18 times as much as before. Since that time of exceptionally high prices and wages there has been a heavy decline in the cost of living and there was a temporary decline in wages. Wages, however, have gone back toward the high figure of 1920, until in May of this year they stood at 2.18 times the 1914 level. For the same month the cost of living was 1.603 times the 1914 figure. Thus the real weekly earnings based on purchasing power were 1.36 times as great as in 1914, that is, the wage earner was 36 per cent better off than before the war.

As is the earning status of the 600,000 reported on, so undoubtedly is that of most of the 10,000,000 industrial workers of the country. Such being the case, we have in this one item of increased purchasing power an important contribution to the present strength of the business structure.

COMING MEETINGS

August

American Institute of Mining and Metallurgical Engineers. Aug. 20 to 30. Quebec and other places in Canada. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

Lake Superior Mining Institute. Aug. 29, 30 and 31. Twenty-third annual meeting, Hotel Spalding, Duluth, Minn. A. J. Yungbluth, secretary.

September

Chemical Industries. Sept. 17 to 22. National exposition, Grand Central Palace, New York.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

Eight-Hour Day Summarily Established

(*Continued from page 400*)

ber of men now working 12-hr. turns, and where this is not possible, as much capacity will be kept on as there are men available. As has been announced previously, common labor employed in continuously operated departments is to be paid $4 per day of 8 hr. as against $4.80, now paid for 12 hr. No change in the rate of pay is contemplated among the workmen in blast furnace and open-hearth furnace departments who are rated higher than common laborers or who are paid on a tonnage basis, but there will be a good many promotions in the creation of the extra crews made necessary by the change and these promotions carry with them increased remuneration. Second helpers in open-hearth plants will be advanced to first helpers and first helpers to melters and these advances will bring higher wages, since they call for higher scales, all of which are based on the tonnage produced for the 24-hr. period of the entire department and not on the output of any one furnace or group of furnaces within a plant. Extra blowers will be required in applying the change at blast furnaces.

The fact that common labor in continuously operated departments are to receive $4 for eight hours' work, while those working around the noncontinuous departments will receive the same remuneration for ten hours, constitutes a problem that must receive early consideration if the noncontinuous departments are to avoid being riddled of common labor by the continuous departments providing the shorter workday. That is one problem that is bothering the independent steel companies and they also claim that the lack of sufficient housing facilities makes it impossible to bring in additional men. Most of them have enough business to keep going pretty full for the next 60 days and they hesitate about adopting the plan of reducing capacity to the extent of the available labor supply for three 8-hr. shifts.

Bar, plate and pipe mills now are on a 10-hr. basis and probably will continue so for the present. In wire mills, the 12-hr. day is common in the finishing departments and its elimination is going to be difficult, since wire drawing is one kind of work that does not attract men and for some time past a marked shortage of that kind of labor has existed. The change constitutes the least disturbance of all in the sheet and tin plate mills, which for years past have been on an 8-hr. basis.

A Year to Complete Change Expected in Chicago

CHICAGO, Aug. 13.—Both the Inland Steel Co. and the Illinois Steel Co. today took initial steps toward the elimination of the 12-hr. turns in their respective plants. Approximately 150 new blast furnace employees were added to the payroll at the Indiana Harbor plant of the Inland company and as soon as these men are broken in the blast furnace department will be operated on three shifts of 8 hr. each. The next step will be the conversion of the open-hearth department from a two-turn to a three-turn basis and then the by-product coke ovens. The greatest increase in labor will be required in the finishing department, where the change in the working day will be made last. The entire abandonment of the 12-hr. turn is a task full of complexities, and it is proposed to accomplish it deliberately, so that operations are not affected adversely. It is estimated that the complete change may take a year.

The hourly wage of common labor on the 8-hr. shifts has been advanced 25 per cent, or from 40c. to 50c. This will mean a daily wage of $4 as compared with $4.80 for a 12-hr. turn. A considerable number of men have expressed a desire to work two 8-hr. shifts, but this will not be permitted by the management.

The Illinois Steel Co. gave out no details regarding the steps it is taking to eliminate the 12-hr. day, but it is understood that it also is starting with the blast furnace departments of its respective works. The following statement on the subject was given out today by E. J. Buffington, president of the company:

"The Illinois Steel Co. is working on plans for the elimination of 12-hr. turns in its steel plants in conformity with the recent announcement of Judge Gary, as president of the American Iron and Steel Institute. The progress which we shall be able to make immediately depends upon the availability of additional workmen required for changing the hours of work at our mills. Effective today some of the 12-hr. turns at some of our steel plants will be eliminated by substituting therefor 8-hr. turns for some jobs and 10-hr. turns for others. It is impossible to state at present the extent of such changes or the number of workmen affected."

Preparing for the Change at Cleveland

CLEVELAND, Aug. 14.—Cleveland steel manufacturers will make careful preparations to abolish the 12-hr. day; in fact they have been doing so for months, but their efforts have been intensified since the American Iron and Steel Institute made the definite promise to President Harding that the change in hours would be effected as soon as possible.

The change at Cleveland plants will not be so revolutionary as might be supposed. The most important company affected involving the greatest number of men is the American Steel & Wire Co., but at its plants few employees, except in the coke, blast furnace and open-hearth departments, are working 12 hr. In the blooming mills, for instance, 8-hr. shifts are in effect, and in other rolling mills the men are on an 8-hr, or 10-hr. basis, with the exception of a few connected with power plants.

In some departments of the American Steel & Wire Co. the superintendents are now ready to make the change, but it will not be made until word comes from other plants of the Steel Corporation. For example, it would not do to introduce the 8-hr. shift in the blast furnaces in Cleveland and not do so at Lorain, only 20 miles distant, for instances are reported in which men who have had an opportunity to work the longer hours and make more money by going from one plant to another have done so. The Steel Corporation, in introducing the six-day week, found that some men chose to go where they could work seven days in order to make more money.

At the Upson nut plant of the Bourne-Fuller Co. the 8-hr. day was introduced several years ago. One of the officials of the company, in speaking of the change, said "it came about naturally without friction and without giving the men more pay per hour, and it has worked smoothly."

At the plants of the McKinney Steel Co. conditions are similar to those at the plants of the American Steel & Wire Co.; that is, the men are on the 12-hr. day in plants in which the processes are continuous. This company and the Otis Steel Co. have given much study to the problem and are ready to introduce the shorter day at an early date, but it is noteworthy that none of the responsible officials of any of the steel plants mentioned is willing to say that there will be any sweeping change next Thursday, the date which has been set as the beginning time for the change.

The Matter of "Loafing Time"

An important operating official among the steel plants when asked whether he had been able to obtain an expression of opinion as to the attitude of the men in regard to abolishing the 12-hr. day said: "We know very little about how the men feel. There was more or less

discussion before the announcement of the change was made in New York, but since a definite position has been taken by the steel manufacturers the men have kept quiet and we have very little information as to their attitude."

"Has the situation as to labor supply changed any recently?"

"Yes, it has improved. It has not been necessary for us to keep out our scouts looking for men. All the men we have needed of late have come to the plants and asked for work.

"I should like to correct one impression in regard to the men loafing on the job," said this operator of long experience in steel plants. "While some people think that the 12-hr. men are compelled to work very hard all the time, other people have the notion that there is a lot of loafing. It is true, of course, that common laborers have long periods in which they can sleep, or play cards, or do anything they want to do, but it is also true that most of the men around a steel plant have responsibilities from which they are never free while they are on duty. Their work has been compared with that of a housewife who leaves something on the stove cooking while she goes about other duties, or even visits with the next door neighbor. That is not a bad comparison. For the woman has her cooking on her mind, and so it is with most of the men about a blast furnace or steel plant. They must be awake, must be thinking of their work, and must be ready to act at any time.

"There is another thing. No one should imagine the men are not thinking. Many of them, of course, have had little schooling, but there are good minds among them, and, after all, that is the important thing."

The subject of costs is, of course, a highly important one. The accounting departments of the steel plants are working as they have seldom worked before in endeavoring to ascertain what the costs will be, but little that is definite can be said on this point at present.

Three Shifts Started in Milwaukee on Monday

The Bay View works of the Illinois Steel Co. at Milwaukee introduced the 8-hr. workday on Aug. 13 by placing the men in mill No. 29 on a three-shift instead of a two-shift basis. The change will be made in remaining departments as rapidly as additional men can be obtained and operating convenience permits.

The rolling department for the present will work on a 10-hr. basis without change in the wage rate.

GERMAN IRON AND STEEL MARKET

Quotations Based on Pound Sterling to Avoid Effects of Mark Fluctuation

(By Radiogram)

BERLIN, GERMANY, Aug. 13.—Iron and steel prices henceforth will vary automatically according to exchange rates between the mark and the pound sterling.

[Last week foundry iron No. 1 was quoted by the Pig Iron Association at 26,220,000 m. per metric ton, representing $11.99 per gross ton, at 45c. per 1,000,000 m. Steel ingots were held by the Stahlbund at 31,968,000 m. ($14.62); steel bars at 46,250,000 m. (0.94c. per lb.); thin steel sheets at 77,102,000 m. (1.57c. per lb.).]

Favors Selection of Immigrants Abroad

WASHINGTON, Aug. 14.—President Coolidge is in strict accord with Secretary of Labor Davis concerning the problem of immigration. This was made clear today at the White House following the first Cabinet meeting under the Coolidge Administration.

Announcement was made that the new Administration would follow the Harding policies and emphasis was laid on the fact that this includes the matter of immigration. Present at the meeting were all of the members of the Cabinet except Secretary of the Treasury Mellon, who is returning to the United States from an European trip.

Secretary of Labor Davis briefly outlined at the Cabinet meeting his observations during his recent trip in Europe regarding immigration, and it was said that he returns to the United States even more firmly convinced than previously that it is necessary in the selection of immigrants to the United States to depend on visés of American consulates. It was pointed out that President Coolidge strongly approves of this suggestion and that he is of the opinion that the only legislation concerning immigration at the next session of Congress will relate to the revision of the present law providing for selection abroad.

It was declared that the President took the attitude that it is necessary to obtain a reasonable number of immigrants, but that they must be of the very best type. It was pointed out that the President considers it necessary to obtain labor for industries in the United States, but that it is more fundamental to admit only the aliens who will be absorbed into the highest kind of American citizenship. Secretary Davis, the as declared, is prepared to take up several plans relating to immigration, but that the only prospective legislation now in contemplation will deal with the selection of immigrants in the countries where they originate.

To Make All Steel Household Refrigerators

A. H. Dillon and associates of Youngstown, Ohio, have organized the Metropolitan Steel Co. to manufacture all-steel refrigerators under the Walker Vacuum Refrigerator patent. Mr. Dillon was formerly assistant manager of sales of the Youngstown Sheet & Tube Co. and more recently president of the H. C. Tack Co., Cleveland, which was sold to the Atlas Tack Co., Fairhaven, Conn.

The Metropolitan Steel Co. has purchased a property at Mineral Ridge, in Trumbull County, consisting of a factory building previously intended for the manufacture of steel tubing. It reverted to the Austin Co., Cleveland, the builder, and was sold by them. The building has 60,000 sq. ft. of floor space, while the property contains seven acres, with railroad frontage.

Machinery is to be installed to have the plant in operation by fall. The plant, it is expected, will use about 1000 tons monthly of No. 16 gage enameling sheets. The company is capitalized at $350,000, with an Ohio charter.

Mr. Dillon is president of the company; Sheridan A. Walker, New York, is vice-president, and W. F. Pattengell is secretary-treasurer. The officers and James I. Stephenson and Sidney E. Anning, both of Cincinnati, comprise the board of directors. Mr. Walker will move to Youngstown to engage in the production department of the company. He is the inventor of the steel vacuum refrigerator, designed to replace wooden refrigerators used in the home. He is a pioneer in developing uses of pressed steel for household furniture and in passenger coaches.

Mr. Pattengell was formerly credit manager of the Brier Hill Steel Co. Mr. Anning is sales representative in the Cincinnati district for the Sharon Steel Hoop Co., while Mr. Stephenson is vice-president of the Guaranty Trust Co., Cincinnati, and a former president of the Cincinnati Iron & Steel Co.

Net earnings of the Class I railroads for the first six months of the year are reported by the American Railway Association at $443,912,000, or at the annual rate of 5.64 per cent on their tentative valuation. This compares with $349,069,000, or at the rate of 4.53 per cent, for the first half of 1922. The earnings are not evenly distributed, the New England district showing only 1.26 per cent, while the Great Lakes district shows 6.53 per cent. The others are between these two extremes.

Making Steel Castings Tough as Forgings

Preliminary Treatment to Produce Homogeneity in Austenite Essential to Ideal Metal Structure—Alloying Elements May Be Used to Advantage

BY L. R. MANN*

IT is a common belief among users of steel that where strength and toughness are requirements, the metal must be subjected to mechanical work previous to final heat treatment. In pursuance of this belief, the history of some such common part as an automobile crankshaft from the time the metal leaves the steel-making furnace to the time when it is ready for the machinist is a long and expensive one, whereas, in the majority of cases, the steel may be poured directly from the furnace into molds giving it its final shape. Then, by proper heat treatment, properties may be imparted to the metal which are comparable to those found in the best forged steels.

A preliminary requirement for such high-grade castings is the pouring into the molds of "dead," or thoroughly deoxidized, steel. For this reason the steel should be made, or at least finished, in the electric furnace. Such steel has approximately the same specific gravity as forged steel, so any superior qualities that may be found in the latter must be due to more suitable internal structure. Hot work followed by proper heat treatment gives to medium carbon steel a very fine-grained structure, and tiny particles of ferrite embedded in the sorbite matrix are completely isolated by the sorbite. In an untreated casting this weak ferrite is found in a network, or at least in a broken reticule. Subjected to *ordinary* treatment, this network is only slightly affected and remains in sufficient degree to differentiate cast steels physically from forged steels.

For a long time this was accepted as an unchangeable condition and no inquiry was made into the causes underlying the manner of ferrite separation. Recent theory, tested by experiment, is that the course of secondary crystallization of the ferrite, as the temperature falls through the critical range, depends on the degree of homogeneity existing in the austenite from which this separation takes place. A preliminary treatment to bring about homogeneity in the austenite is therefore necessary to obtain an ideal structure in cast metal. To show why the austenite lacks homogeneity, the course of cooling in an alloy of the solid solution type will be traced.

Consider *XZ* (Fig. 1) any binary alloy in which the components are soluble in all proportions in both liquid and solid states. Now an alloy of compositin *B*, being completely molten at temperature *t*, on cooling to *t'* starts to separate out crystals of composition *C*. On cooling, the composition of the solid separating out follows the solidus line *CF*, so that at temperature *t"* the separating solid is of composition *N*. Thus the nucleus, of composition *C*, is the center of a crystal consisting of layers *XZ* solid solution, ever becoming richer in *Z*. Now, should diffusion take place with infinite rapidity from the outer region of higher *Z* concentration toward the center, the difference in concentration between succeeding layers will disappear, and the line *CF* will at all times represent the composition of the entire solid portion. When *t'"* is reached, the composition of the solid separating coincides with the alloy composition, and the entire mass is solid.

Diffusion in a solid actually takes place, however, far too slowly to have the above ideal condition even approached in practice.

Diffusion acts just rapidly enough so that the nucleus of composition *C* becomes slowly enriched in *Z*, its composition following the line *CK* as the temperature falls. *CF* at any time represents at any temperature only the composition of the surface of the crystal. Line *CL* follows the average composition of the crystal and, as the average composition of solid separating out reaches the alloy composition, final solidification occurs at temperature *t'"*. The mass then consists of crystals whose internal composition varies from composition *C'* at the nucleus to *F"* at the periphery.

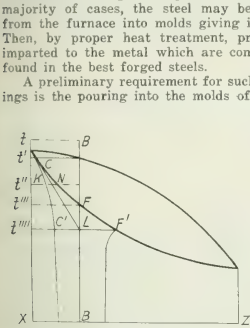


Fig. 1 (Left) Any Binary Alloy in Which the Components Are Soluble in All Proportions in Both Liquid and Solid States

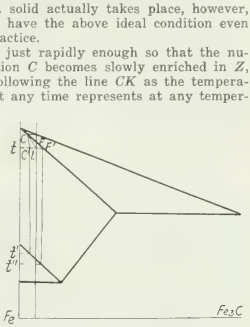


Fig. 2 (Right) Iron-Carbon Constitution Diagram

Throughout the range of steel composition and above critical temperatures, the iron-carbon diagram is of the solid solution type, in which cooling occurs as above described. As a result the austenitic crystals making up the mass vary individually in composition from a low carbon nucleus to a periphery high in carbon. The importance of this fact lies in the resulting effect on the manner of separation of the ferrite as the temperature descends through the critical range.

Reference to the iron-carbon constitution diagram (Fig. 2), shows that through the upper range of primary crystallization a condition occurs just as explained in detail regarding the solid solution alloy *XZ*. As a result, at temperature *t* the austenite consists of crystals having a low carbon nucleus of composition *C'* and a higher carbon periphery of composition *F"*. At an ordinary rate of cooling, diffusion has time to lessen this difference of composition very little, so that the low carbon nucleus reaches temperature *t'* at which ferrite starts to separate out some time before the periphery reaches the temperature of ferrite separation (*t"*). Thus the nucleus of primary crystal determines the nucleus of a ferrite crystal, and the ferrite congregates around a predetermined number of centers. The result is that ferrite accumulates in masses which touch in many places and form a ferrite network.

Considering a hypothetical case, assume now that the austenite is perfectly homogeneous. The temperature of first ferrite separation is then reached by the entire mass at the same instant. A multitude of nuclei then form throughout the mass and, in the resulting structure, tiny ferrite crystals will be uniformly dis-

*Sivyer Steel Castings Co., Milwaukee. Paper presented before Wisconsin Foundrymen's Association.

tributed. Steel of such structure has, in the highest degree, the qualities of strength, ductility and shock resistance.

Although a perfectly homogeneous austenite can never be completely realized in practice, such a close approximation may be obtained as to produce in cast steels a structure similar to that found in forgings. The necessary treatment consists of subjecting the steel to a temperature considerably above the critical range for a time long enough to permit the process of diffusion approximately to equalize the composition. The steel should then be cooled slowly to a temperature just above the critical range. A rapid cooling through the critical range then supplements the effect of the homogeneity treatment in bringing about the dispersion of the ferrite.

Quenching leaves the metal in a state of internal strain and a reheating or "drawing" is necessary to eliminate this. The structure of the eutectoid matrix is a function of the temperature at which this final operation is carried on and, in order that the eutectoid may consist of sorbite (unresolved pearlite), the "drawing" should be at a temperature of 550 deg. C. (1022 deg. Fahr.).

In a steel of 0.3 per cent carbon content, the ferrite is agglomerated in large crystals forming a practically continuous network. As ferrite has a tensile strength of only 36,000 lb. per sq. in., it is no wonder that such steel has inferior qualities. The properties of a 0.3 per cent carbon steel in such condition are about as follows:

Tensile strength	65,000 lb. per sq. in.
Elastic limit	35,000 lb. per sq. in.
Elongation	12 per cent
Reduction of area	5 per cent

Heat Treatment to Reduce Grain Size

The impact test, the importance of which is generally underestimated, shows very low shock resistance for such a steel.

An ordinary method of heat treatment in the steel foundry is simply to heat the castings to a temperature slightly above the critical range, and allow them to cool slowly. It is a common belief that such treatment reduces the grain size and is of considerable benefit. The austenite from which the second separation of ferrite takes place is substantially unaltered from its original condition, and it is hard to see why this treatment should be of material benefit, aside from a tendency to lessen internal strains incurred during first cooling. Even when the steel is quenched in oil after such treatment, there is little alteration of the original ferrite network. Average figures for a steel subjected to such treatment follow:

Tensile strength	67,000 lb. per sq. in.
Elastic limit	38,000 lb. per sq. in.
Elongation	15 per cent
Reduction of area	10 per cent

The impact resistance is also slightly increased.

It becomes evident that ordinary treatment does not give to cast steel properties comparable to those of good forged steels, and in the large interlocking grains of ferrite can be seen the reason.

Striking structural changes are brought about as a result of obtaining homogeneity in the austenite. In a preliminary treatment, which has been only partially effective, the steel was held for 5 hr. at 900 deg. C. (1652 deg. Fahr.). One specimen was furnace cooled, enough power having been left on so that the descent through the critical range required 2 hr. The ferrite grains were still rather large, but the treatment resulted in their independence and random placing. The other specimen was oil quenched through the critical range. The grain size was well reduced, but the effect of insufficient homogeneity in the austenite was still to be seen in the tendency of the ferrite to localize in distinct areas.

But in a homogeneity treatment as stringent as would be expedient in practice, both specimens were heated 7 hr. at 950 deg. C. (1742 deg. Fahr.). One specimen was slowly cooled and, although the ferrite thus had opportunity to dispose itself at will, it was found well distributed and the grains reduced in size and independent. When the other specimen was quenched in oil, after a sufficient preliminary treatment, all traces of continuity in the ferrite disappeared and the grain size became minute. The structure corresponds to that of the best forged steels. In testing cast steels of similar carbon content, Giolliti showed the following properties to be obtainable with such methods of treatment.

Tensile strength	90,000 lb. per sq. in.
Elastic limit	63,000 lb. per sq.in.
Elongation	24 per cent
Reduction of area	40 per cent

He also obtained a tensile impact resistance of 135 kg-m. as compared to 132 kg-m. in a properly treated forging of the same carbon content.

The steel foundry is in no way limited to the use of plain carbon steels in making castings. Alloying elements can be used with as great beneficial effects as in forgings. An alloy with from 2 to 3 per cent nickel, properly heat treated, shows properties about the same as a forged nickel steel. The same general considerations apply in the heat treatment of nickel steel as in the heat treatment of plain carbon steel. The effect of the alloying element is twofold: In solution in the ferrite it strengthens that element; it also tends to increase the number of nuclei appearing as the metal, on cooling, reaches the critical range.

JULY STEEL OUTPUT

Daily Rate 3,500 Tons Less Than in June—Year's Rate About 43,725,000 Tons

A new low record for the year in steel ingot production was registered in July, the daily rate having been about 140,600 tons, a decline of about 3500 tons per day from June.

According to statistics gathered by the American Iron and Steel Institute, the July production of companies which made 95.35 per cent of the country's total was 3,352,474 gross tons. This means a total for the country of 3,515,966 tons or 140,639 tons per day for the 25 working days. This is a decline of about 17,100 tons per day from the peak in April. The tables follow, in gross tons:

Monthly Production of Steel Ingots, January, 1922, to December, 1922. Reported by companies which made 84.15 per cent of the Steel Ingot Production in 1922

Months, 1922	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies
Jan.	1,360,809	331,851	822	1,891,857	75,764
Feb.	1,395,835	348,571	616	2,071,772	86,324
March	1,918,570	451,386	795	2,814,667	104,247
April	1,997,465	445,939	1,109	2,902,240	116,090
May	2,214,774	494,892	1,474	3,213,794	119,215
June	2,143,708	487,851	2,918	3,127,775	120,299
July	2,020,572	464,047	2,485	2,952,806	118,112
Aug.	1,807,310	404,379	2,893	2,629,256	97,380
Sept.	1,911,147	460,127	2,505	2,818,261	125,395
Oct.	2,352,207	518,010	2,198	3,410,265	131,164
Nov.	2,360,903	525,945	2,449	3,430,309	131,935
Dec.	2,241,104	536,214	2,572	3,300,416	132,017
Total	23,624,404	5,469,213	22,836	34,568,418	111,511

Monthly Production of Steel Ingots, January, 1923, to July 1923. Reported for 1923 by companies which made 95.35 per cent of the Steel Ingot Production in 1923

Months, 1923	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies
Jan.	2,906,892	728,270	9,467	3,822,369	141,569
Feb.	2,613,564	669,903	10,797	3,454,918	143,955
Mar.	3,046,309	789,325	12,841	4,046,854	149,883
April	2,974,578	772,485	13,933	3,944,412	157,776
May	3,136,558	847,418	16,719	4,195,800	155,400
June	2,821,339	737,845	15,483	3,748,890	144,188
July	2,660,094	680,884	11,496	3,515,966	140,639
7 Mos.	20,159,235	5,236,330	90,736	26,729,209	147,675

Preliminary estimates by the United States Geological Survey place the world's 1922 output of coal at 1,208,000,000 metric tons, of which the United States produced 417,646,000 tons, or 34.6 per cent. This compares with 1,136,000,000 tons, 459,392,000 tons and 40.4 per cent, in 1921. In 1918 the United States produced 46.4 per cent of the total of 1,331,000,000 tons.

RAILROAD OPERATING SITUATION

Heavy Traffic Well Handled, but Appeal to Level Off Peaks of Fall

WASHINGTON, Aug. 14.—Appeal is being made to shippers and consumers, by the car service division of the American Railway Association, to continue and augment during the next 30 days their efforts to level off the peak of shipments during the coming fall. This is one of the many steps being taken by the railroads to avoid car shortage, and reports coming to Washington indicate that the iron and steel industry is lending its cooperation to the fullest extent. The showing being made by the railroads, both from a point of net earnings and expediting of freight, is a source of gratification to officials in Washington, who are looking forward to a similarly facilitated movement in agricultural products. There is a growing belief that, barring unforeseen labor trouble and unusually bad weather conditions, the railroads will handle the transportation problem this fall and winter with more than ordinary smoothness, and with comparatively little or no inconvenience to industry. Should this eventuate, it has been pointed out, it will have a far-reaching effect on the railroads and the shipping community as a whole, especially the agricultural interests.

As is well known, all sorts of radical railroad legislation will be introduced at the next session of Congress but, if the railroads continue their present good showing in handling traffic and in netting fair returns, it is believed this will be the best possible specific to check railroad agitation by radicals in Congress. It is, of course, well known that President Coolidge would not approve radical legislation and that his veto power could prevent its enactment even in case such legislation passed Congress, although this in itself is not considered probable. Rather the apprehension shown relates to agitation and not to the likelihood of the passage of any wild legislation providing for Government ownership or operation of railroads, or other unsound proposals.

On July 31, the railroads had 76,453 surplus freight cars in good repair and immediately available for service, despite the record number of cars (1,041,044) loaded during the week ended July 28. The total number of surplus freight cars on July 31 was a decrease of 3257 compared with the number on July 22. Of the total on the former date, 57,831 were box cars and 6547 coal cars. At the same time, shortage in box cars totaled 9579, an increase since July 22 of 1679. The majority of the box cars shown as surplus are being held in the grain originating territories and will be used within the next two or three weeks as the grain movement becomes heavier. It is pointed out that the fact that there is no appreciable car shortage today should not serve as a basis for lessening efforts to move as much freight as possible before the fall period. The volume of traffic being handled is far in excess of that tonnage which it was anticipated would be offered the railroads.

Transverse Fissures in Rails Held Responsible for Accident

WASHINGTON, Aug. 14.—In a report announced today by the Interstate Commerce Commission concerning the derailment of a passenger train on July 13 on the Southern Railway at Larkinsville, Ala., the accident is attributed to a broken rail. The report of the bureau of safety of the commission says that examination of the rail showed that its failure was due to the presence of transverse fissures, these being discovered at four or five points at which the rail was fractured. The prevalence of the transverse fissures is attributed to the effect of the wheel loads introducing internal strains of tension in the head, which culminated in rupture of the rail in each of the several places where transverse fissures were disclosed. Tests showed, however, it is stated, that the quality of the steel was good. The track where the accident occurred was laid with 75-lb. rails.

Petition for Refund of Freight Charges on Ore

WASHINGTON, Aug. 14.—Iron ore interests have petitioned the Interstate Commerce Commission for a refund of charges collected under rates that were advanced while a former complaint in the so-called Adriatic Mining Co. case was pending. It will be recalled that the railroads in 1921 made an increase of 15 per cent in rates from the Gogebic and Marquette Ranges to Lake Superior ports. While the increases were protested the commission allowed them to go into effect but declared that its failure to suspend the rates was not an approval of the schedules.

Subsequently, the iron ore interests filed complaint against the rates and the applicants pointed out that in a supplementary complaint they asked for the keeping of an account of payments made under the increased rates and an order requiring refunds. It was stated also that at the hearing in Chicago they formally moved for an order, but upon assurance from the defendants that the keeping of accounts was unnecessary, the motion was withdrawn.

In its decision on the formal case the applicants point out, the commission said, that the increases were not warranted for the future and made an order requiring the rates to be reduced not later than June 1, 1923, and that the order was complied with on May 15 of the present year.

It is maintained that it is against the law to permit the railroads to retain the portions of the 1921 increases which were disapproved by the commission.

Steel from Illinois-Missouri Raw Materials

The monthly publication of the St. Louis Coke & Iron Co., Granite City, Ill., *Coke Breeze*, notes that on July 21 the company delivered to the National Enameling & Stamping Co.'s steel department the first basic pig iron made from materials all mined and shipped within a 100-mile radius of the Granite City and St. Louis industrial district. A half-tone illustration is given of the first plate rolled in the new plate mill of the National Enameling & Stamping Co. The pig iron from which the steel was made for this plate represents the use of 100 per cent Illinois coal and 100 per cent Missouri ore.

An important factor in the operations of the St. Louis Coke & Iron Co. is the new development under the direction of Leonard A. Busby, Chicago, at the historic Iron Mountain, Mo., mine. A concentrating plant has been built which is expected to have a daily output of 1000 tons of concentrates by Sept. 1, and ultimately a daily output of 2000 tons. A new shaft has been sunk to a depth of 329 ft., and most of the development work now under way is in ore.

Pacific Coast Steel Co. Expansion

Negotiations are under way which will result in due time in a very considerable expansion of the operations of the Pacific Coast Steel Co., San Francisco. The building of a modern blast furnace is included and sites have been under consideration, the choice being between South San Francisco and Long Beach, Cal. The city council of Long Beach has agreed to improve the harbor there to meet the requirements of the steel company, in case that district is selected. A statement made at San Francisco last week by D. E. McLaughlin, vice-president of the Pacific Coast Steel Co., indicated that several sites are in view for the new blast furnace, and that the new construction proposed by the company would ultimately require an outlay of more than $15,000,000.

Iron and Steel Markets

STARTING ON SHORT DAY

Added Cost Not Yet a Market Factor

Rail Prices Continue on 1924 Contracts—Steel Output Less

The change to the shorter workday that will be made this week at various Central Western iron and steel plants has had no traceable effect on orders or prices. Buyers show much interest in the new regime, particularly in the extent to which men can be had for the third shift because of lessened demand for steel. This factor cannot be measured today.

There is a similar lack of definite data on the increase in cost due to the employment of more men for a given output, but where detailed figures have been attempted they indicate that some estimates of the added cost have been high.

While the larger companies lead off in abolishing the 12-hour day, a good many of the smaller producers have made no plans. For some time their costs will be unchanged, and this is a competitive factor yet to be measured.

August started out with signs here and there of renewed buying of finished steel, but last week's observances brought quiet and thus far in the new week the demand has been for small amounts for specific purposes and for early delivery.

Encouragement is found in the volume of steel the railroads are taking for repair work and in the rail inquiries soon to come out for 1924. At Chicago pending business amounts to 90,000 tons, including 50,000 tons for the Norfolk & Western and a smaller tonnage for the Erie. Southwestern roads that were not expected to buy are also figuring, the Wabash wanting 10,000 tons.

The present rail price will apply on rails ordered for first quarter delivery, but the basis for second quarter contracts may not be fixed until late in the year.

Western steel plants apparently have the largest forward bookings on the heavier products. Youngstown and Pittsburgh plate, shape and bar mills, generally speaking, can make earlier deliveries than those at Chicago, while in plates particularly some Eastern mills could ship within a week or two.

The Steel Corporation's operating rate holds close to 90 per cent, with the prospect of maintaining that scale into the fall. The larger independents are nearer 80 per cent, while companies whose main output is one or two lines are at a somewhat less rate. Blast furnace shutdowns continue, and steel ingot output is at a less rate than in July.

Prices of all forms of finished steel are substantially those of recent weeks. At Buffalo plates for Canada sold at $2 a ton under the 2.50c. basis and at Pittsburgh a similar and usual concession was made on plates for a car plant.

In the fabricated steel field the long-expected buying of bridges is still awaited. Municipal and other public work is likewise in small volume. Of the 16,200 tons of awards, barely 1300 tons was for public undertakings and railroads did not figure in any.

Sales of 25,000 tons of pig iron are reported at Cleveland, chiefly foundry and malleable, and of 15,000 tons at Buffalo. In other districts there was a quieting down after recent activity. Prices showed no further decline, but it is not yet certain that merchant pig iron output has been cut down to the current rate of consumption. Foundry operations are quite well maintained in most districts, particularly in the East.

The report of recent buying of British pig iron for use in pipe works on the Eastern seaboard is without details except that the delivered price was close to $26. For several months British prices have not been competitive here.

A slight turn has come in the scrap market, which will be watched for its bearing on pig iron. At Pittsburgh open-hearth grades are $1 a ton higher. Coke, which for several months has kept pace with the decline in pig iron and scrap, shows more steadiness this week than at any time since April.

The Imperial Government Railways of Japan are in the market for 11,000 tons of 60-lb. and 75-lb. rails, with splice bars. A Belgian rail mill, which recently took a Japanese order at a low price, has now sold 10,000 tons to Argentina.

Welsh tin plate mills have sold several hundred thousand boxes of tin plate to the Far East for September-October delivery. July iron and steel exports from Great Britain were the smallest for the year at 307,000 tons, against 373,000 tons in June.

For the first time since early June there is no change this week in either THE IRON AGE composite price of finished steel or the pig iron composite. Steel remains at 2.775c. per lb. for the fourth successive week, while pig iron is $24.79 per gross ton.

Pittsburgh

Steel Orders Behind Shipments—Stronger Tone in Pig Iron—Scrap Higher

PITTSBURGH, Aug. 14.—Elimination of the 12-hr. work day in the steel industry, to be inaugurated this week by the Steel Corporation subsidiaries, now claims the attention of the trade for its probable effect upon output and prices. It is generally held that the change means a lower rate of production and higher costs, since the creation of an extra crew of workmen will be possible in many cases only by the closing down of some producing units. The actual increase in costs, however, can hardly be ascertained until the plant is in full operation and has been given a fair test, and such is not immediately possible in view of the fact that only a few of the independent steel companies in

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Aug. 14, 1923	Aug. 7 1923	July 17, 1923	Aug. 15, 1922
No. 2X, Philadelphia‡	$25.76	$25.76	$27.56	$33.14
No. 2, Valley furnace†	25.00	24.00	25.00	30.00
No. 2, Southern, Cin'ti†	27.55	28.05	29.05	24.05
No. 2, Birmingham, Ala.†	24.00	24.00	25.00	19.50
No. 2 foundry, Chicago*†	27.00	27.00	28.00	30.00
Basic, del'd, eastern Pa	25.00	25.00	26.50	27.25
Basic, Valley furnace	24.50	24.50	25.00	26.00
Valley Bessemer, del. P'gh	28.26	28.26	28.26	28.76
Malleable, Chicago*	27.00	27.00	28.00	30.00
Malleable, Valley	24.00	24.50	25.00	28.00
Gray forge, Pittsburgh	25.76	25.76	26.26	30.00
L. S. charcoal, Chicago	32.15	32.15	36.65	33.15
Ferromanganese, furnace	117.50	117.50	117.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
Oh. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	35.00
O-h. billets, Pittsburgh	42.50	42.50	42.50	35.00
O-h. sheet bars, P'gh	42.50	42.50	42.50	35.00
Forging billets, base, P'gh	47.50	47.50	47.50	40.00
O-h. billets, Phila.	47.67	47.67	47.67	42.67
Wire rods, Pittsburgh	51.00	51.00	51.00	42.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.25	2.25	2.25	1.90

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.325
Iron bars, Chicago	2.40	2.40	2.50	2.15
Steel bars, Pittsburgh	2.40	2.40	2.40	1.90
Steel bars, Chicago	2.60	2.60	2.60	1.90
Steel bars, New York	2.74	2.74	2.74	2.24
Tank plates, Pittsburgh	2.50	2.50	2.50	1.90
Tank plates, Chicago	2.80	2.80	2.80	1.90
Tank plates, New York	2.84	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	1.90
Beams, Chicago	2.70	2.70	2.70	1.90
Beams, New York	2.84	2.84	2.84	2.24
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
‡Silicon, 1.75 to 2.25. †Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Aug. 14 1923	Aug. 7, 1923	July 17, 1923	Aug. 15, 1922
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.75	3.75	3.85	3.15
Sheets, galv., No. 28, P'gh	5.00	5.00	5.00	4.15
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.40
Wire nails, Pittsburgh	3.00	3.00	3.00	2.40
Plain wire, Pittsburgh	2.75	2.75	2.75	2.25
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.05
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.50	$20.50	$20.50
Carwheels, Philadelphia	20.00	20.00	20.00	17.50
Heavy steel scrap, P'gh	18.00	17.00	18.00	17.50
Heavy steel scrap, Phila	16.00	15.50	16.50	15.00
Heavy steel scrap, Ch'go	16.00	16.00	17.00	15.75
No. 1 cast, Pittsburgh	21.50	20.00	21.00	19.00
No. 1 cast, Philadelphia	20.00	20.00	21.50	19.00
No. 1 cast, Ch'go (net ton)	17.50	18.50	19.00	18.50
No. 1 RR. wrot., Phila	18.00	18.00	18.00	18.00
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.50	14.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.50	$4.50	$4.50	$14.00
Foundry coke, prompt	5.25	5.25	5.25	15.00

Metals				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.50	14.75	15.00	14.12½
Electrolytic copper, refinery	13.87½	14.12½	14.50	13.75
Zinc, St. Louis	6.25	6.15	6.12½	6.15
Zinc, New York	6.60	6.50	6.47½	6.50
Lead, St. Louis	6.35	6.62½	5.90	5.55
Lead, New York	6.70	6.75	6.00	5.90
Tin (Straits), New York	38.50	38.37½	38.00	32.12½
Antimony (Asiatic), N. Y.	7.87½	7.60	6.85	5.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Aug. 14, 1923, Finished Steel, 2.775c. Per lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets		Aug. 7, 1923	2.775c
	These products constitute 88 per cent of the United States output of finished steel	July 17, 1923	2.758c
		Aug. 15, 1922	2.256c
		10-year pre-war average	1.689c

Composite Price Aug. 14, 1923, Pig Iron, $24.79 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham		Aug. 7, 1923	$24.79
		July 17, 1923	25.93
		Aug. 15, 1922	26.77
		10 year pre-war average	15.73

this and nearby districts yet have formulated a plan of action or decided upon a date for the introduction of the change. That is also the condition with many of the merchant producers of pig iron, who find that the men do not welcome the idea of exchanging a lower daily wage for a shorter work day and consequently are moving slowly in the adoption of a change in the working schedules.

Market-wise, the situation has been productive of little change. Orders for finished steel in practically all lines are running behind the shipments, and, while the gap here and there has been narrowed by a falling off in shipments, it is well established that order books steadily are dwindling in size. Inquiry is by no means absent, and there are fairly frequent requests for information as to how prices will be affected by the elimination of the long work day in continuously operated departments, but the demand is chiefly for small tonnages and usually for a specific purpose and for a specific delivery. Such business being easily filled, it does not add much to mill obligations. There are few mills which do not need business, particularly for delivery in the last quarter of the year, but any tendency actively to seek business is checked by the belief that this might produce lower prices just about the time that costs are moving in the other direction as a result of the change in working hours at the blast furnace, coke ovens, and open-hearth furnaces.

A slightly stronger tone is apparent in the pig-iron market, but this development reflects no important change in fundamental conditions, but rather that producers more generally take the position that they should not sell below costs. Demand shows no decided betterment, and supplies still are more than ample for requirements. We also note a stronger market in scrap, which is at least $1 a ton higher on the open-hearth grades on moderate purchases by melters and also because of a decline in offerings at recent prices. Coke production having been pretty well balanced with consumption, the market shows more real steadiness now than has been evident before since early April.

Change of working schedules will probably mean some reduction in the steel output of the Steel Corporation subsidiaries, but the change not applying very generally with independents, the week's total ingot production probably will show only a trifling decrease from that of last week. The Pittsburgh Crucible Steel Co. late last week banked its No. 3 furnace at

Midland, Pa. The stack of the Clinton Iron & Steel Co., Pittsburgh, will cease making pig iron this week. These are the only definite changes in the blast furnace list, and will leave 112 furnaces in this and nearby districts in production, two banked and 24 cold.

Pig Iron.—Consumers still are pursuing a hand-to-mouth policy in the matter of purchases, and while the week's business reaches a fair-sized total, it has been made up largely of small individual tonnages. Evidently $24, Valley furnace, no longer can be done on basic and foundry iron, as on such business as has been done in the week under review in those grades the price has been $25 minimum on foundry and not less than that price on basic. The Edgewater Steel Co., Edgewater, Pa., has covered against its recent inquiry for 2000 tons of basic and is understood to have paid $25, Valley furnace. The Pittsburgh Steel Foundry Co. was able to secure about 750 tons of this grade at a delivered price of slightly above $26, equivalent to less than $24.50 at Valley furnace, but the iron comes from a producer having a freight rate of 60c. to the consumer's plant. Another purchase of 2000 tons of basic at $25, Valley furnace, has been made by a producer whose present output is not sufficient to meet obligations. Only pickup tonnages of Bessemer iron have been sold and these all have gone at the former price of $26.50, Valley furnace. Sales of foundry iron for the week probably total around 2000 tons, made up of many sales of small tonnages. The lowest price done, even by middle interests, was $25, Valley furnace, for No. 2, and some producers claim to have made sales at $26 for the base grade. The Warren Tool & Forge Co., Warren, Ohio, was able to cover the 1000 tons of malleable iron it inquired for recently at $24, Valley furnace, basis. Such business as has been done here lately in low phosphorus iron has gone to an Eastern interest whose price is $28 at furnace, or $33.42, delivered Pittsburgh. The Valley maker of this grade has further reduced his price to $32.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$24.50 to $25.00
Bessemer	26.50
Gray forge	24.50 to 25.50
No. 2 foundry	25.00 to 26.00
No. 3 foundry	24.50 to 25.50
Malleable	24.50 to 25.50
Low phosphorus, copper free (nominal)	32.00

Ferroalloys.—Business is practically at a standstill, and prices are stationary because there is not enough doing on which to establish a change. Consumers generally are well protected against their requirements over the remainder of the year. Ferromanganese still is priced at $117.50, furnace or seaboard, with freight to Pittsburgh equalized, but it is doubtful if that price now could be obtained, except on small lots, since resale material has been offered round pretty freely as low as $111.50, without takers. Prices are given on page 443.

Semi-Finished Steel.—Open market activities still are limited and quotations merely are those which have been named on contract tonnages for the present quarter. It is pretty generally believed that any consumer who could use a round lot of billets, sheet bars or slabs would be able to buy at less than quotations, but nobody seems to have a need for more material than is being delivered on contracts, and producers naturally are not disposed to force sales. The market is entirely untested on these forms, and as there has been only a trifling decline in ingot production in the past 30 days, while non-integrated mills have in few instances specified fully their quotas, there is no question but that there has been some accumulation of steel at producing plants. Forging billets are hard to move, even at $47.50. Rods also are slow, although a couple of sales of coarse rods, amounting to a few hundred tons, have been made at the full price of $51, base. There have been no further sales of skelp since the recent purchase of the National Tube Co., in which a local independent, as well as one in Youngstown, participated. Prices are given on page 443.

Wire Products.—Makers here report excellent specifications against nail orders and state that buyers are not lying down on their wire orders, but business otherwise is pretty flat. The farmers are afield these days and have no time for building fences; this is reflected in the demand for barbed wire, staples, and woven fence. The trade is hopeful of a change for the better in these products in the next 30 days, but admit that present prices of farm products do not indicate very strong buying power among the farmers. There is no change in prices, but most makers now want business and promise fairly prompt deliveries, which contrasts strongly with the condition of a few weeks ago, when getting on mill books was akin to a favor. Prices are given on page 442.

Steel Rails.—Light rails rolled from old standard sections are said to have been offered as low as 1.90c., base, mill, but makers here rolling these sections from new billets or standard rail crops, still insist they are not shading the former base of 2.25c. Inquiries for light rails are more numerous than they were recently, but actual orders do not show a corresponding gain.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—It is the experience of most makers of steel pipe that there is a steady depletion of order books. This is especially true of lap-welded goods, in which there has been a considerable advancing of delivery promises. The most encouraging feature of the steel pipe business today is heavy consumption, as indicated by shipments, rather than by new business, which generally is not as good as it was last month. One independent interest, which had a card based slightly above that of other makers, recently withdrew its card and put its prices on the bases of other producers. Wrought-iron pipe makers are well caught up with their obligations and making very prompt deliveries on new business. Boiler tube specifications hold up well, but new business is light. Discounts are given on page 442.

Cold-Finished Steel Bars and Shafting.—A few fair-sized orders lately have appeared from the agricultural implement manufacturers, but otherwise business still is quiet both as regards orders and specifications, chiefly because the between seasons' slowing up of the automotive industry is not yet over. The established base of 3.25c. is well observed; makers cannot well shade that price in the face of higher costs of hot-rolled bars introduced through increased extras, but at the same time, it is admitted that these increases in extras are not sufficient to warrant higher prices for cold-finished bars. Ground shafting holds at 3.65c., base, f.o.b., mill.

Hot-Rolled Flats.—Recent downward revision of prices does not seem to have materially stimulated the demand, at least not in strips which, on account of the between seasons' period in the automotive industry, are moving slowly. The fact that some mills will take business in strips in competition with skelp or blue annealed sheets at 3c., base, also is a deterrent to orders. The "official" price now is 3.15c. on hoops, all gages and widths, bands and strips, but concessions probably are obtainable on all three products. Prices are given on page 442.

Cold-Rolled Strips.—All makers now are on a base of 5c., Pittsburgh, on this product and, despite the weakness in hot-rolled strips, there is fairly strict observance of that price.

Bolts, Nuts and Rivets.—A slightly stronger tendency is noted, but it is due less to an increase in the demand than to the fact that makers, in checking up the effect of the increased extras for size, cutting, etc., in hot-rolled bars, find present prices to be badly out of line with probable costs. It is learned that large producers are working on a new list of discounts, which is expected to become effective Sept. 1, and which will advance many sizes of bolts, nuts and rivets to take up the increased costs involved in the recently adopted extras on bars. Business is not materially better than it has been, but pressure to

sell is less heavy. Prices and discounts are given on page 443.

Track Fastenings. — Independent manufacturers lately have fallen in line with the American Steel & Wire Co. on the price of small railroad spikes, which now are generally quoted at $3.50, base, per 100 lb. Makers are not very well supplied with orders for small spikes, but have fair order books in the other sizes and in tie plates. New demands locally are few and small. Prices are given on page 443.

Alloy Steel Bars.—Demand is extremely light, in keeping with conditions in the automotive industry. There is some anxiety on the part of producers for business and it is no secret that, on attractive inquiries, quotations have been shaded as much as $5 per ton. Prices are given on page 443.

Iron and Steel Bars.—Real activity is lacking in steel bars, but pressure for business, even on the part of mills with light order books, is not heavy, and the regular market price of 2.40c., base, Pittsburgh, is closely observed. That price, however, carries very prompt delivery from a number of mills. A marked slowing up in the demand does not seem to weaken the price ideas or bar iron makers here.

> We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—Some increase in inquiries is observed, but not on the part of local fabricators, who lately have been getting new orders in very much reduced volume by comparison with completed jobs. It is no longer difficult to get on mill books for reasonably early delivery at the published quotation. Structural steel interests, however, hesitate to stock material at today's price, since their experience in quoting on new projects has disclosed that they cannot obtain awards on the basis of current plain material quotations. Most of the big projects in this district are dormant at present. Plain material prices are given on page 442.

Plates.—A relatively good demand upon mills continues, but it comes more from outside than from within the immediate district and finds its origin chiefly in the numerous oil storage tank inquiries now current. The Dravo Contracting Co., Pittsburgh, has been awarded 14 120-ft. barges by the Mississippi River Commission, for which about 1600 tons of plates and small shapes will be required, and six dump scows by the U. S. Engineers' office, Louisville, Ky., taking about 725 tons of steel. A local car builder recently bought and interest in fourth quarter tonnages seems to be mean no weakening in the price, since such consumers usually have a preferential price of $2 per ton below the accepted market price. Prices are given on page 442.

Sheets.—Specifications against old orders are fairly free, but new demands are moderate in the extreme and interest in fourth quarter tonnages seem to be chiefly as to prices, which some seem to think may be affected by the change in working hours in steel plants. The elimination of the 12-hr. day means little in the sheet mills, where the 8-hr. day has been in vogue so long that it is now an institution. Sheet prices are holding well, save in the case of black sheets, and even they are not publicly quoted under 3.85c. base. As low as 3.75c. base is being developed by definite offers and there are several mills which want prompt shipment business badly enough to take it at that price. Prices are given on page 442.

Tin Plate.—Ordinarily, prices for fourth quarter business should be out this week, since tomorrow is the day that specifications should be placed for October shipments. Present obligations of mills, however, will carry them into October and the matter of prices is being left for future adjustment. Production has been picking up lately, but shipments have not been sufficiently better to reduce the pressure of can makers for supplies.

Coke and Coal.—Demand for furnace coke is far from heavy, but is more nearly equal to the supply than it was recently, owing to continued curtailment of production, and the market now is quite steady at the basis of a week ago of $4.50 per net ton at ovens. Occasional sales are reported at $4.75, but it is not yet necessary to go that high except for small lots of special brands. Most producers have set $5 as their idea of last quarter contract tonnages. Spot foundry coke holds at $5.25 to $5.75. The coal market has been helped by an increased demand for domestic purposes. Pittsburgh steam coal now is selling at $2 to $2.10 per net ton at mines for mine run, with coking coal at $2.25 to $2.35 and gas grade at $2.40 to $2.50. With a number of mines in this district idle competition for orders is not as keen as it was recently.

Old Material.—The market has developed a much stronger tendency since last accounts, due partly to some fair-sized purchases by one of the Steel Corporation subsidiaries, which has taken a round lot of No. 1, railroad heavy melting grade, at $19, and sales to a West Virginia steel company of good heavy melting at $18. We now regard the market on this material at $18 to $19; certainly, recent efforts by both dealers and melters to secure tonnages at less than $18 have been futile. Scrap collectors are disposed to throw the material down and hold for higher prices, and it is believed railroad lists from now on will be smaller. Several steel makers are feeling out the market and there continues to be a well-sustained demand for the better grades from the steel foundries. Strength in these directions is toning up the market on the other grades. Through a typographical error, the maximum price on bundled sheet sides and ends last week was given as $15.50; it should have been $15. Norfolk & Western Railway will receive bids until noon, Aug. 15, on about 19,100 gross tons of scrap.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$18.00 to $19.00
No. 1 cast, cupola size	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 20.00
Compressed sheet steel	16.00 to 16.50
Bundles, sheets, sides and ends	15.00 to 15.50
Railroad knuckles and couplers	21.50 to 22.00
Railroad coil and leaf springs	21.50 to 22.00
Low phosphorus bloom and billet ends	23.50 to 24.00
Low phosphorus plate and other material	22.50 to 23.00
Railroad malleable	20.00 to 20.50
Steel car axles	21.00 to 21.50
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	21.50 to 22.00
Machine shop turnings	11.50 to 12.00
Sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	14.50 to 15.00
Short shoveling turnings	13.50 to 14.00
Heavy breakable cast	17.50 to 18.00
Stove plate	15.00 to 15.50
Cast iron borings	13.50 to 14.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.00 to 13.50

The Austrian Steel Industry

The Austrian iron and steel industry was very productive during May, the output of the Alpine Montangesellschaft exceeding that of any other month in 1923. Large orders for pig iron, ingots, steel bars and joints, mostly for export to Germany, were filled. The outlook for the immediate future is uncertain, however. Prices were reduced during May from 10 to 21 per cent, the greatest reductions being in the more highly manufactured products, Assistant Trade Commissioner E. M. Zwickel, Vienna, reports.

Ruhr Occupation Affects Swedish Ore Exports

For the first four and a half months of 1923 the Swedish iron ore exports were about 50 per cent normal. In the past about 65 per cent of the total Swedish ore has been exported to Westphalia, but the Ruhr occupation has closed this market. Shipments to all other countries have increased during 1923, especially those to the United States and Canada. The Swedish pig iron production has been lower than at any time since 1912, according to a report from Charge d'Affaires Johnson at Stockholm.

Chicago

Interest Developing in Fourth Quarter Steel Needs—Fair Pig Iron Business

CHICAGO, Aug. 14.—The market has passed through a quiet week, attributable in part at least to the cessation of business during the obsequies for the late President. Buying keeps up at the same restricted pace which has prevailed for the past three months, although it is to be noted that consumers generally are commencing to show interest in their fourth quarter requirements. The Inland Steel Co., which has been quoting 2.60c., 2.70c. and 2.80c., Chicago, respectively for bars, shapes and plates, expects to announce its fourth quarter prices soon. The Illinois Steel Co. continues to name 2.50c. on bars and 2.60c. on plates and shapes for delivery at mills' convenience.

While it is believed that the increased operating costs involved in the elimination of the 12-hr. day will eventually be passed on to the consumer, there have been no intimations that an immediate advance in prices is contemplated. There continues to be shading in sheets and bar iron is weak. Demand for rail steel bars is very slack and mills are taking advantage of the lull to shut down for repairs. The operations of blast furnaces and steel works remain substantially unchanged.

[In the introduction to this market in THE IRON AGE of Aug. 2, reference was made to the wheat crop in its relation to all agricultural products. The insertion of the word "wheat" instead of "wealth" in the following sentence seriously changed the meaning: "The value of the wheat harvested in 1922 was only 10 per cent of the total crops of American farmers, and barely 6 per cent of the total *wealth* produced by them in that year."]

Ferroalloys.—Scattering carload sales of spiegeleisen totaling about 200 tons have been made at the full market price. An inquiry from a local buyer calls for 50 tons of ferromanganese.

We quote 80 per cent ferromanganese, $125.06 to $125.88 for all deliveries; 50 per cent ferrosilicon, $88 to $90, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Pig Iron.—Demand has subsided again after the spurt of a week ago, but there is still a fair amount of business pending. Orders recently taken involve small lots but they were in such considerable number as to indicate that melters are running short of iron and are in imperative need of new supplies. Even those who bought as much as 500 or 1000 tons for delivery this quarter did not in most cases purchase their full requirements. There was also some business closed for fourth quarter delivery and one sizable inquiry called for shipment during the first quarter of 1924. New inquiries continue to make their appearance, although they are not so numerous as a week ago. Pending business in Milwaukee, consisting largely of small lots, totals fully 900 tons. Local iron is steady at a minimum of $27 base, furnace, and this price also appears to be the maximum figure on current sales. A local melter has closed for 500 tons of foundry iron for fourth quarter at that price. In central Michigan Cleveland iron has competed successfully with the Chicago, Detroit and Toledo products and in the northern part of the southern peninsula of that State Canadian iron in the high silicon analysis has been laid down at lower prices than those named by other furnaces. We note a sale of 700 tons of Canadian foundry iron to a user in the northern part of southern Michigan. An implement manufacturer in the Tri-cities has purchased 1000 tons of foundry for September to December delivery from St. Louis and Southern furnaces. The lowest Southern quotation reported is $23, base Birmingham. Sales of a total of 600 tons of silvery iron have been negotiated in Michigan at the full Jackson County schedule. A local melter has closed for 400 tons of low phosphorus iron. A steel works has bought 500 tons of 10 per cent Bessemer ferrosilicon.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50 to 28.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00 to 27.50
Malleable, not over 2.25 sil.	27.00 to 27.50
Basic	27.00 to 27.50
High phosphorus	27.00 to 27.50
Southern No. 2	30.01 to 31.01
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 35.00
Silvery, sil. 8 per cent	39.29

Plates.—Demand continues light, although some consumers are commencing to show interest in their fourth quarter needs. Mills east of here which are quoting 2.50c., base, Pittsburgh, are offering very expeditious deliveries, from 10 days to 3 weeks' shipments not being uncommon. The local mill situation is substantially unchanged. The Inland Steel Co., which has been quoting 2.80c., Chicago, on tank plates, will soon announce fourth quarter prices on all of its finished products. The Illinois Steel Co. continues to quote 2.60c. on plates for delivery at mills' convenience. No new oil storage tank awards have been reported, but additional business is said to be in prospect. Thirty tanks recently booked by the Chicago Bridge & Iron Works from the Sinclair Crude Oil Purchasing Co. will involve 10,500 tons of plates instead of 9000 tons, as first announced. The Sinclair interests are still figuring on tanks requiring 14,000 tons additional.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast-Iron Pipe.—Ecorse, Mich., has let a general contract to T. C. Brooks & Sons Co., Jackson, Mich., for 890 tons, which, it is understood, will be furnished by the American Cast Iron Pipe Co. The Superintendent of the Poor, Wayne County, Eloise, Mich., takes bids Aug. 15 on 160 tons of 4, 6 and 8-in. water pipe. Cleveland took bids Aug. 11 on 1000 tons of 24-in. pipe. Although the market is quiet, pipe shops are still behind on deliveries of the smaller sizes and prices are correspondingly firm.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Sheets.—Concessions of $1 to $2 a ton continue to be made on black and galvanized sheets, but blue annealed is firm. As would be expected, demand for blue annealed is better than for the other two classes of sheets. The market, as a whole, remains quiet, however, the only inquiries of note being from Japan for delivery before the first of the year. An inquiry from that country received during the current week calls for 3000 tons of light black sheets.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Structural Material.—Structural lettings and inquiries are few, but fabricators are still fairly busy on old business. Plans for the Ford Motor Co. plant at St. Paul, Minn., are being revised; the original specifications on which bids had been taken called for over 10,000 tons.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Demand for soft steel bars is somewhat better than for plates or shapes, although business during the past week was adversely affected by the suspension of trade during the funeral of the late President. Automobile builders are coming into the market rather actively for material for their new models, demand for which is heavier than they expected. However, the trade does not look for as heavy an output of motor cars during the last half of the year as in the

six months' period just completed. The farm implement industry is passing through its dull season, but it does not look forward to the fall with any great degree of confidence. While buying of soft steel bars is still in small volume, consumers generally are commencing to feel out the market on their fourth quarter requirements. In most cases their stocks are low and for this reason mills expect them to place orders in the near future. Demand for hard steel bars is very light, although prices are unchanged. The plant of the Inland Steel Co. at Chicago Heights will be down for repairs until Aug. 26, and it is probable that two other rail steel bar mills will also shut down. Bar iron is weak and concessions have brought out some business. Few, if any, orders are being placed at over 2.40c., mill.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c; bands, 3.95c.

Wire Products. — Specifications are somewhat heavier and the receipt of a number of rush orders for barbed wire is regarded as a good indication. A full-fledged fall demand, however, has not yet made its appearance. Deliveries from the mills are now fairly prompt on all products. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 442.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Rails and Track Supplies.—The Japanese Government is inquiring for 15,000 tons of rails and 1200 tons of angle bars for delivery before the close of the year. Local mills have booked orders for about 3000 tons of rails from frog and switch manufacturers. Pending inquiries from domestic railroads for rails total 90,000 tons, including 50,000 tons for the Norfolk & Western, a round tonnage for the Erie and the remainder for Western lines. The mills have not yet announced their rail price for 1924, and until they do so no general buying movement for that delivery can get under way. In the meantime the railroads are pressing the mills hard for shipments of rails and fastenings against their contracts.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts 4.90c. base.

Reinforcing Bars.—New bookings of dealers are still light as compared with the tonnage taken earlier in the year, but are nevertheless considered satisfactory for this season. There is considerable business pending, however, the largest individual project being 6250 tons for the North Side sewage treatment plant of the Sanitary District, Chicago. The general contract for this work has been let to the John Griffiths & Son Co., Chicago, and the placing of the bars is expected soon. Prices are unchanged at 3c. Chicago warehouse. Awards include:

Ford Motor Co., hydro-electric plant, St. Paul, Minn., 250 tons, to the Kansas City Bolt & Nut Co.

Road work, Grand Forks, Minn., 125 tons, to C. A. P. Turner Co.

Garage for P. C. Winn at 1217-31 Lawrence Avenue, Chicago, 200 tons, to Kalman Steel Co.

Stratford Arms Hotel, Detroit, Mich., 150 tons, to McRae Steel Co.

City of Chicago, bridges over Chicago River at California Avenue and Adams Street, 360 tons, to Truscon Steel Co.

Pending business includes:

St. Paul, Minn., water department, Mississippi River conduit, 500 tons.

University of Iowa, recitation building, Iowa City, 200 tons.

South Park Commissioners, Chicago, viaduct at Twenty-third Street and Illinois Central tracks, 150 tons, general contract awarded.

Fair Store addition, Chicago, 400 tons.

Old Material.—The market is still soft and there have been a few additional declines, although here and there a grade of scrap is commencing to show some signs of firmness. Short rails and frogs, switches and guards, for example, appear to be 50c. higher than a week ago. Demand for these grades has developed and supply has been found none too ample. Generally speaking, however, there is little interest in the market on the part of users. Activity is confined largely to dealers and there is a considerable demand for car numbers to apply against orders expiring this month. Although railroad offerings have been large, deliveries from them are said to be unusually slow. The Northern Pacific advertises 2300 tons; the Great Northern, 2500 tons; the Wabash, 2600 tons; the Texas & Pacific, 1700 tons; the Canadian National Railways, 1500 tons, and the Soo Line, 1000 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$21.00 to $21.50
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.00 to 20.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	16.00 to 16.50
Frogs, switches and guards cut apart	16.50 to 17.00
Shoveling steel	15.75 to 16.25
Drop forge flashings	10.00 to 10.50
Hydraulic compressed sheets	12.50 to 13.00
Axle turnings	13.00 to 13.50
Steel angle bars	17.25 to 17.75
Per Net Ton	
Iron angle and splice bars	22.00 to 22.50
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	25.50 to 26.00
Steel car axles	17.00 to 17.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.00 to 9.50
Cut forge	14.25 to 14.75
Pipes and flues	9.50 to 10.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	14.25 to 14.75
Steel knuckles and couplers	18.50 to 19.00
Coil springs	19.00 to 19.50
No. 1 machinery cast	17.50 to 18.50
No. 1 railroad cast	17.00 to 17.50
No. 1 agricultural cast	17.00 to 17.50
Low phos. punchings	16.00 to 16.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	8.00 to 8.50
Cast borings	11.00 to 11.50
Short shoveling turnings	11.00 to 11.50
Stove plate	14.50 to 15.00
Grate bars	12.75 to 13.00
Brake shoes	14.00 to 14.50
Railroad malleable	18.00 to 18.50
Agricultural malleable	16.50 to 17.00

Portugal Needs Steel Products

American metallurgical companies have a fertile field in Portugal, according to a report to the Department of Commerce from Consul W. S. Hollis, Lisbon, for the introduction and sale of rails, railway material, plates, angle iron, beams, piping, tin plate, wire, etc., especially for the exploitation of the Wolfram mines for which this country is noted. Tin plate is one of the biggest items of import through the port of Lisbon, a total of 90,541 boxes being imported from England during 1922. No tin plate was imported in America during that year, but it is believed that American manufacturers would do well to contest this trade during 1923.

Operations in Czecho-Slovakia

Current reports from Czecho-Slovakia received by the Department of Commerce, indicate no important change in the activity of the local iron and steel mills which are continuing to operate around 45 per cent of capacity as for two or three months past, with production on a basis of approximately 850,000 metric tons of steel annually. Of this quantity about 25 per cent is used in the domestic market and the remainder is exported to Germany in particular. Orders for export are declining and prices, while still unchanged, are showing a soft tendency. It is estimated that orders now on hand will keep the mills occupied until next August.

New York

Foundry Operations Well Maintained—New Structural Inquiries

NEW YORK, Aug. 14.—While the national observances of last week affected all markets, quite a number of new pig iron inquiries are now before New York sellers, the aggregate being 3000 to 4000 tons. Reports agree that foundry operations are holding up well in Eastern territory, and there are cases in which output is being increased. From the number and character of inquiries now coming in, it is inferred that a good deal of pig iron is yet to be bought for September delivery. Larger consumers as a rule are covered for the present. Inquiries that are new this week range from a few carloads up to 500 tons, including 500 tons, 200 tons and two lots of 100 tons for Connecticut delivery; 500 tons of No. 1 foundry for a New Jersey plant; 200 tons for eastern New York State delivery; 300 tons for a New Jersey foundry, with phosphorus specification below the usual. There is also a Canadian inquiry for 200 tons. Apparently the $25 basis is rather more firmly maintained than has been the case recently.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.81 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$27.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.27
East. Pa. No. 2, sil. 1.75 to 2.25	27.02 to 27.27
Buffalo, sil. 1.75 to 2.25	28.91 to 29.41
No. 2X Virginia, sil. 2.25 to 2.75	32.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—The ferromanganese market is practically stagnant, with sales in this territory of only two carloads reported. Demand for spiegeleisen is also very small, sales of a few carloads being noted at unchanged prices, some resale lots going at $45, furnace. There is practically no new demand for 50 per cent ferrosilicon and quotations are unchanged. Specifications on contract for these three alloys, however, continue heavy because steel output maintains a large volume. There are no developments noted in the manganese ore or ferrochromium markets.

Cast-Iron Pipe.—Demand for water pipe continues heavy and prices firm. Municipal tenders are decreasing in number but private buying is still a fairly large item. Producers are well booked into the fall. A current municipal tender is from the Department of Water Supply, Gas and Electricity, New York, and calls for bids from contractors on work involving about 700 tons of mostly 20-in. water pipe. Bids open Aug. 17. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.30; 4-in. and 5-in., $67.30; 3-in., $77.30, with $5 additional for Class A and gas pipe. While quotations continue weak in the soil pipe market, business shows a slight improvement, evidently stirred into activity by the large discounts now being offered. Makers are maintaining their recent policy of booking only a few carloads for prompt shipment at present prices, which they claim are too low for profit. We quote discounts of both Northern and Southern makers, f.o.b. New York, in carload lots, for prompt shipment, as follows: 6-in. standard, 39½ to 40¾ per cent off list; heavy, 49½ to 50¾ per cent off list.

Warehouse Business.—A number of warehouses in this district report better business during the first half of August than in the same part of July. Quotations on practically all products are unchanged, although reports of shading on bars and plates persist, despite lack of confirmation. The market on black and galvanized sheets is slightly firmer than for several weeks. While a range of 4.65c. to 5.00c. per lb. base on black and 5.65c. per lb. base on galvanized is still justified, the minimum on both black and galvanized is said to be more often 4.75c. and 5.75c. per lb. Satisfactory orders, however, will still bring out the lower quotation. The warehouse market on wrought iron and steel pipe is quiet, but shading is no longer prevalent, despite the fact that some dealers are reported as not overly anxious to carry heavy stocks. Brass and copper products have declined ¾c. to 1c. per lb. for material out of stock. We quote prices on page 460.

Finished Iron and Steel.—Outside of structural lines there is no activity of importance in the local steel trade. A fair volume of structural steel work is being placed and more inquiry is coming out, not in large amounts, but sufficient to give promise of enough work to last throughout the year. In addition to projects now actually in the market there is a prospect that subway construction work in New York will soon call for large tonnages, most of which, however, would not be delivered until next year or later. The price situation is unchanged, prices being firm on all products. There is not enough business to afford a real test of prices, but the views of the mills are firm, particularly in view of the change to the 8-hr. day beginning this week.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—An inquiry has come up for 2000 tons of blast furnace coke and a quotation of $4.75 per ton was made recently on 3000 tons of medium sulphur furnace coke. Standard foundry grades appear to be firmer. While $5.50 per ton can be done on prompt carloads on standard foundry coke, the range of current quotations extends as high as $1 above this figure. On by-product coke prices are $11.34, Newark, and $11.41, Jersey City.

Old Material.—Although the market is substantially unchanged, a better tone is reported and prices are as a rule firmer. No. 1 heavy melting steel delivered into eastern Pennsylvania is still $15.50 per ton, with railroad quality or equivalent bringing $16. The buying price New York of this grade ranges from $12.75 to $13.25 per ton, with No. 1 yard steel at $11.50 to $12 per ton. Stove plate is active, with shipments going forward to Harrisburg, Phoenixville, Pa., and to New Jersey foundries at $16.75 and $17 per ton, delivered, depending upon the freight rate. Specification pipe shows no change, $10.25 to $10.75 per ton about covering the present market based upon shipments to Lebanon, Pa., at $14.50 per ton, delivered.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$11.50 to $12.00
Steel rails, short lengths, or equivalent	12.75 to 13.25
Rails for rolling	16.00 to 18.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	9.50 to 10.00
Machine-shop turnings	9.50 to 10.00
Mixed borings and turnings	9.00 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25 to 10.75
Stove plate	12.75 to 13.25
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00 to 19.00
No. 1 heavy cast, not cupola size	16.00 to 17.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 17.00

Detroit Scrap Market Dull

DETROIT, Aug. 14.—There is no activity in the scrap market and prices are substantially unchanged.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.40 to $15.00
Shoveling steel	14.50 to 16.50
No. 1 machinery cast	17.00 to 19.00
Cast borings	9.75 to 10.75
Automobile cast scrap	21.00 to 23.00
Stove plate	14.00 to 16.00
Hydraulic compressed	11.50 to 12.50
Turnings	7.25 to 8.25
Flashings	9.50 to 10.50

Cincinnati

Buying Only for Definite Requirements—Dip in Southern Iron

CINCINNATI, Aug. 14.—Both sales and inquiries fell off during the past week as compared with the previous one, but the undertone of the market is considerably improved. Buyers continue to place orders for their immediate requirements, and it is only occasionally that any interest is shown in fourth quarter. Prices in the North are a little stronger as far as furnaces are concerned, but middle interests continue to quote 50c. a ton below the regular furnace prices. Most of the larger sales are being made at the lower prices. For instance, an Indiana melter bought two lots of 500 tons each at $25.50, Ironton basis, in competition with a Lake furnace. Another Indiana consumer bought several hundred tons at a price said to be $25.75, Ironton. Other sales ranging up to 200 tons were made direct by furnaces at $26. Resale Northern iron is now pretty well out of the way and it is expected that $26, Ironton, will be established as the southern Ohio market. A Terre Haute melter is reported to have bought 1000 tons of malleable iron at $26.50, Chicago. On Southern iron, $23.50 can be done on Tennessee irons, and some sales of small lots have been made. From the Birmingham district the lowest price heard of today is $27, furnace, the low-priced Alabama seller having withdrawn from the market. This price, however, can only be done on nearby delivery. There is no activity in Bessemer or basic irons, and only occasional sales of carload lots of silveries are reported. There is no change in the furnace situation in southern Ohio, Marting, Wellston and Hanging Rock furnaces still being in blast on foundry grades, Globe and Jisco silveries, and Portsmouth and two Ashland furnaces on basic.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.05
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	28.27
Basic Northern	27.27
Malleable	28.27

Tool Steel.—Improvement is noted in the demand for tool steel for the first time since the middle of June. Prices are unchanged, 18 per cent tungsten high speed steel being quoted at 75c. to 95c. per lb.

Finished Material.—Orders were light during the past week, more particularly in bars and structural shapes, and mills are now able to make some pretty quick deliveries on this class of material. Heavy plates are also moving slowly, but on light plates orders are more numerous. The demand for sheets has not sustained the improvement noted last week, but some "feelers" are being sent out by some of the larger manufacturers for fourth quarter requirements. There is little activity in wire products or track accessories. Bolts and nuts have been in good demand. Prices generally are being firmly maintained, and with the exception of reinforcing bars and hot strips no changes have been reported.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Warehouse Business.—Jobbers report a greater number of small orders than for some weeks, with prices being firmly maintained.

Coke.—There is little activity in coke, and distress shipments are being offered at slightly lower prices. Connellsville furnace is quoted at $4.75 to $5, ovens, and foundry coke at $5.50 to $7.50. New River foundry coke is quoted at $11 to $12; Wise County foundry, $6.50, and furnace, $5.75. By-product producers are quoting $9, Connellsville basis.

Old Material.—The scrap market in Cincinnati district is very quiet, but some sales have been made to Southern points. Prices are about the same as last week.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$12.50 to $13.00
Iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up	28.00 to 28.50
Rails for rolling	16.00 to 16.50
Heavy melting steel	14.50 to 15.00
Steel rails for melting	14.50 to 15.00
Car wheels	14.50 to 15.00
Per Net Ton	
No. 1 railroad wrought	12.50 to 13.00
Cast borings	9.00 to 9.50
Steel turnings	8.50 to 9.00
Railroad cast	16.00 to 16.50
No. 1 machinery cast	18.50 to 19.00
Burnt scrap	11.50 to 12.00
Iron axles	21.50 to 22.00
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	8.50 to 9.00

Birmingham

Pig Iron Stagnant—Orders Suspended—Early Change Expected

BIRMINGHAM, ALA., Aug. 14.—The drop to $24 failed to bring much business to the maker offering limited tonnage at that base price. Other makers, selling at $27, booked a few car lots. The Birmingham iron market was never more stagnant. The break is looked for toward the end of the month, when blast furnaces must earnestly consider new business, closing down stacks or piling iron on an uncertain price base. Melters have shown absolutely no interest except on taking as little iron, already contracted for, as possible. Hold-up orders are causing the same stock accumulations as last month. Up to the close of the week the merchant furnaces were still going as in July, the only closing down being a Tennessee company stack which was on ferromanganese. Foundry melt is not keeping the pace and lack of new business in stoves and other lines suggests early curtailment of present full operations in that quarter unless a change for the better occurs. The soil pipe makers are all out of the market and that cuts a considerable figure with Southern furnaces. Some Southern iron is understood to have sold in the Middle West under $24, and it is admitted that Birmingham can do no business there until there is a readjustment of base or a rise in price in other fields.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$24.00
Basic	24.00
Charcoal, warm blast	$33.00 to 34.00

Finishing Mills.—There has been no change at any of the finishing steel mills. All are on full turn, but new business comes in slowly. Wire mills are down to a four to five weeks' backlog. Cuba took 3500 tons of steel rails last week via Mobile, Havana, Cabana, Matanzas and other points dividing the cargo. The Tennessee company will put in effect the 8-hr. day when instructed by New York, and other concerns like the Gulf States Steel Co. say they will follow the example as additional men are procurable. Steel bars are quoted 2.65c., f.o.b. Birmingham.

Cast Iron Pipe.—It was a dull week in pressure pipe; many municipalities reported holding off for lower prices in view of weakness of the iron market. The base remains at $49, with all shops booked far ahead. Soil pipe is very dull at $50 to $55.

Coal and Coke.—Standard foundry coke is obtainable at $8, spot. Coal is slightly more active than usual for this time of the year.

Old Material.—The scrap market reports a dearth of new business and some requests to hold up deliveries. Extreme caution marks all industrial operations.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$16.00 to $18.00
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

Boston

Pig Iron Sales Contract—Some Foundries Not to Buy Until September

BOSTON, Aug. 14.—Pig iron sales have contracted sharply. The H. B. Smith Co., Westfield, Mass., reported to have bought 2000 to 3000 tons, silicon 1.75 to 2.25 per cent, fourth quarter iron at $27.65, delivered, now has sufficient iron to carry it through 1923, and will not purchase other contemplated tonnages. Other business put through was comparatively small, the grand total probably being around 6000 tons. The Westfield sale is not a fair market basis, inasmuch as the furnace giving the option at $24, furnace, is now quoting $25. Sales of Buffalo No. 2X and No. 1X were made at $25 and $25.50, respectively. All eastern Pennsylvania furnaces are on a $25, $25.50 or $26 furnace base and maintaining differentials, while Alabama and Virginia furnaces doing business in New England are holding prices. The market, therefore, appears steadier. Buying in New England during the recent price cutting was remarkably small. Several foundries say they will buy iron in September. The Sullivan Machinery Co., Claremont, N. H., wants 100 tons each of Northern iron, silicon 2.25 to 2.75 per cent, low phosphorus iron silicon 1.75 and 2.25 per cent, and Virginia or Northern iron, silicon 3.25 to 3.75 per cent, prompt shipment, the largest open inquiry in the market today.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$29.15 to $30.15
East. Penn., sil. 1.75 to 2.25	28.65 to 29.65
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.41
Virginia, sil. 2.25 to 2.75	32.42 to 32.92
Virginia, sil. 1.75 to 2.25	31.92 to 32.42
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Warehouse Business.—Although not as active as heretofore, the movement of iron and steel out of warehouses is running ahead of that for August, 1922. Certain sizes of steel bars are in limited supply, but generally speaking stocks are in fair condition. Stocks of wire nails, on the other hand, are broken, mills remaining several weeks behind on shipments. Tremont pattern 8-penny cut floor nails and 20-penny common now take an additional $1 to the regular base price. Producers find there are 30 per cent more of these nails to the pound than in a pound of Western pattern.

Soft steel bars, $3.61½ a 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steel, $3.71½; tire steel, $4.80 to $5.15; open-hearth spring steel, $8 to $10; crucible spring steel, $12; regular steel bands, $4.80; bands over 6 in. wide, $5.05 to $5.30; hoop steel, $5.80 to $6.30; cold rolled steel, $4.25 to $5.25; refined iron, $3.61½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.60 to $7.10.

Coke.—Melters continue to specify quite freely against contracts placed some time ago with New England makers of by-product foundry coke, the market for which is $13.50 a ton, delivered within New England. Ovens are making good shipments, notwithstanding heavy demands on them for domestic fuel. Some easing off in specifications is anticipated the last half of this month. Foundries are experiencing a falling off in new business. Jobbing foundries generally are operating on business picked up from week to week. Some, however, are booked into October. The General Electric Co., Lynn, Mass., is reported to have stopped placing business with forward delivery dates, and given order to clean up outstanding contracts. Manufacturers are beginning to think of year-end inventories. Gas companies are showing interest in run-of-oven Connellsville coke, one sale of 2500 tons at a price not made public having been made the past week. Foundries, however, show little interest in Connellsville fuel.

Old Material.—Holders of raw material are still indisposed to sell at going prices. One of the largest brokers in this territory, offering $15.50, delivered Pennsylvania, for heavy melting steel, has raised his price 50c. without attracting more than a car lot here and there. Offers of $12.50 on cars for delivery in New England likewise fail to stimulate business. A few car lots of mixed borings and turnings have been picked up at last week's prices, but the market for most other kinds of material, suitable for mills, is fully as lifeless as a week ago. One broker, unable to buy No. 1 machinery cast at prevailing rates, is sounding out the New York market. General sentiment in the trade is that business will not improve much before September, if then.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	15.50 to 16.50
Railroad malleable	24.00 to 24.50
Street car axles	21.00 to 21.50

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 rail wrought	12.50 to 13.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long)	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
Cast iron borings, rolling mill	10.50 to 11.00
Cast iron borings, chemical	11.50 to 12.00
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.00 to 13.50

St. Louis

Wabash Inquiring for 10,000 Tons of Rails—Pig Iron Inquiry Increasing

ST. LOUIS, Aug. 14.—An increasing number of inquiries for pig iron were received from melters in this district during the last week. Melters seem to feel that the market has about reached bottom, although some are still hesitant to buy more than for immediate needs. The principal transaction of the week was the sale of 2000 tons to a local melter, the order being divided among several makers. The original inquiry referred to in this column last week was for 5000 tons. The St. Louis Coke & Iron Co., which got a part of the tonnage just mentioned, also sold 200 tons of foundry iron to an Illinois melter and 150 tons to a local concern. An Indiana melter wants 1400 tons for fourth quarter delivery. An Illinois melter's inquiry is for 1000 tons, half Northern and half Southern, and a Missouri melter wants 175 tons of either. The market for Northern iron is at $26.50 to $27, Chicago, Southern makes $24, although some quotations are as high as $27.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	29.17

Finished Iron and Steel.—The first rail inquiry in some time from a St. Louis railroad was issued this week by the Wabash for 10,000 tons of 90-lb. section. The order for 1000 tons of reinforcing bars for the Cohakia plant of the Union Electric Co. went to the Scullin Steel Co. A marked increase of inquiries from manufacturers of steel products is reported, but not many have developed into orders. Jobbers are specifying against contracts to balance stocks, but are not placing new business to speak of. Railroads are inquiring for track equipment, such as frogs and switches, in small quantities. A Texas inquiry is for 500 tons of bars.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—The market for coke continues weak, production continuing greater than the demand. Connellsville coke has been sold as low as $5.50, ovens, although some of the best grades have brought as high as $7. By-product makers have been accumulating stocks.

Old Material.—The only buying by consumers is of a few specialties and but little of them. Dealers continue to absorb all railroad lists offered and are laying down material in yards in anticipation of an expected demand in September. One dealer bought 4000 tons, the scrap of 700 dismantled cars offered by the Cotton Belt. The Great Northern and Northern Pacific have lists amounting to 2000 tons each. Other lists, which will probably be taken care of by local dealers, include Mobile & Ohio, 3500 tons; Missouri Pacific, 1300 tons; Kansas City Southern, 320 tons, and Kansas City Terminal, 350 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$16.00 to $16.50
Rails for rolling	17.50 to 18.00
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00

Per Net Ton

Heavy axles and tire turnings	12.00 to 12.50
Steel angle bars	15.25 to 15.75
Iron car axles	25.00 to 26.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.00 to 19.50
Cast iron borings	12.00 to 12.50
No. 1 busheling	16.00 to 16.50
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	18.50 to 19.00
Railroad malleable	17.00 to 17.50
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	8.00 to 8.50

San Francisco

Moderate Buying of Pig Iron, but Scrap Business Quiet

SAN FRANCISCO, Aug. 8.—There has been no noteworthy variation in trade conditions in iron and steel during the last two weeks, except that which may be due in part to seasonal causes and to influences that have been felt in other parts of the country. While the published reports of this city's building permits show an increase as compared with last year, importers and handlers of steel used in construction say their business has slackened off during the last two months. The fact is that during the last few months there has probably been more construction of frame buildings, numerically speaking, but at the same time less demand for structural steel.

Pig Iron.—Business is of moderate volume, and while prices are not quotably lower than two weeks ago, importers report a noticeable undertone of easiness that may lead to a shading of present figures, in view of the downward tendency in Eastern districts. The imports by sea during July totaled about 2400 tons, the bulk of which was Scotch iron. A goodly portion was on account of orders booked last January and February for future delivery. During the last week there was a showing of firmness in Scotch iron, and it was advanced about 50 cents per ton, in view of the advance in price at ports of export. Present quotations range from $35 to $37 per ton, according to quality. Consumers are well supplied, and the activity is confined to small buying.

Coke.—For some weeks the market has been at a standstill. Practically all the coke ordered early in the year has arrived, and during July there were no imports by sea, although at least two cargoes have not yet come to hand. It is known that supplies are moderate, but how soon consumers will be obliged to replenish their stocks is a matter of conjecture. Much depends on how business shapes up in the near future.

Old Material.—Dealers report business very quiet, with available supplies plentiful for the next few months, if there should be no increase in requirements. Present quotable prices range from $13 to $15 per ton for the more desirable grades. Some dealers say they are getting as high as $16 per ton for the best grade of railroad iron. Receipts at points of accumulation continue liberal. Another cargo of about 2600 tons is en route from Chile, practically all spoken for now.

Buffalo

About 15,000 Tons of Foundry Iron Sold—Concessions on Plates Shipped to Canada

BUFFALO, Aug. 14.—While the general feeling among operators is that the tide has turned and that some buying may be expected, the volume of business has been small with four of five producers. The exception so noted is that one furnace has sold between 12,000 and 15,000 tons of foundry iron. The others have only sold small tonnages. Because many of these are going to large melters indicate these tonnages are "fill-ins." Most producers have abandoned any expectation of any life in the third quarter and are turning hopefully to possible fourth quarter developments. The base price of $25 is firm although all sellers continue to find unverified reports of concessions from this figure; certainly a desirable tonnage would bring concessions and a cut of $1 per ton on present schedules would be likely. All sellers are trying to maintain differentials but are not successful. No further reduction in furnace operations has occurred but the present price schedule is touching a point which Buffalo producers say is lower than cost.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$26.00
No. 2X foundry, 2.25 to 2.75 sil	25.50
No. 2 plain, 1.75 to 2.25 sil	25.00
Basic	26.00
Malleable	26.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—Price concessions on plates shipped to Canada are reported and 2.40c. has been made in several instances. For domestic use the 2.50c. price is firm and the same applies to shapes. New business in sheets is quiet, but some desirable inquiry is engaging attention and is expected to be placed here. Pipe and wire demand show no abatement and the call for bars continues lively.

We quote warehouse prices, Buffalo, as follows:

Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Coke.—Demand has been livelier. For prompt shipment prices range from $5.50 to $7.

Old Material.—Dealers have been buying small lots of heavy melting steel and piling them in the belief that stronger prices are near. The general market is stagnant and consumers are disinterested. One mill has shut down on incoming old material pending further notice.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 busheling	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

Philadelphia

Pig Iron Inactive and Prices Steady—Scrap Market Stronger

PHILADELPHIA, Aug. 14.—Steel business is extremely quiet and, following the recent buying movement in pig iron, there has been a cessation in demand, particularly for large tonnages. There is lacking in steel trade circles some of the optimism which was beginning to assert itself a week or two ago, the changed attitude being due largely, it appears, to the critical situation in Europe. Some of the Eastern mills are within 30 days of the end of their orders, and new tonnage is not coming in rapidly enough to give much encouragement. Delivery promises are shortening, and, on plates, one or two mills can give almost immediate shipment. While there has been no let-down in mill operations, some of the allied interests have felt the effects of reduced business in their operating schedules. For example, one Eastern bolt and nut plant is running only four days a week.

Prices of finished steel show unusual strength in view of the fact that many of the mills are now hungry for tonnage. Confident that the change to the 8-hr. day will help to restore the balance between supply and demand, the steel companies of this district count upon a continuance of present selling prices for the next few months at least. There is not this confidence, however, in the pig iron trade, which is trying to hold prices at $25 a ton for foundry iron, but is not yet certain that the demand will be sufficient over the next few months to maintain this level.

Pig Iron.—The recent buying movement has left a straggling volume of business in its wake in which the inquiries and orders are mostly small, though there has been a sprinkling of 1000 and 2000-ton lots in the past week. However, there has been a sharp falling off in sales as compared with a few weeks ago. Most of the furnaces are now holding firmly to a base price of $25 a ton for foundry iron, but this level is not firmly established as a minimum, sales having been made within the past few days at $24.50 for No. 2 plain and $25 for No. 2X. Some furnaces are piling some of this iron they are making, but on the whole there is probably less of this than during July, as more iron is now being called for by the foundries. Indications are that melters are going along on a hand-to-mouth policy, this being borne out by the frequency of requests to hurry shipments of carload lots. Barring an anthracite coal strike Sept. 1, it is the belief of pig iron sellers that the market will remain at just about its present price level for next the few months. Some see a possibility of lower prices, but, as the market level today is close to cost, there will undoubtedly be a further tendency to restrict production rather than to make further price concessions. Buyers are taking a conservative attitude and few of them are covering beyond October. A Virginia cast-iron pipe foundry has bought about 7000 tons of Virginia iron on which prices, it is stated, were shaded to below $26.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.26 to $26.64
East. Pa. No. 2X, 2.25 to 2.75 sil	25.76 to 26.14
East. Pa. No. 1X	26.26 to 26.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.17 to 31.67
Virginia No. 2X, 2.25 to 2.75 sil.	31.67 to 32.67
Basic delivered eastern Pa.	25.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	29.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	32.00 to 33.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.50
Low phos., copper free, guar. not over 0.035 per cent phos.	31.50
Continental, phos. 1.50; sil. 2 to 3	25.50

Ferroalloys.—The demand for ferromanganese is light. Prices remain at $117.50, furnace or seaboard, on domestic or foreign alloy.

Semi-Finished Steel.—Very little business in billets is being done and prices remain unchanged at $42.50, Pittsburgh, for open-hearth rerolling quality and at $47.50 to $50, Pittsburgh, for forging quality, but eastern mills do not seem anxious for business in forging billets at $47.50.

Plates.—One or two eastern mills are now offering shipments of plates in a week or less. There is a marked lack of orders and even the most fortunate mills have little, if any, more than 30 days' work ahead. Plate mill representatives deny most emphatically reports of a weakening in prices, which seemingly have emanated from a railroad purchasing office which was said to have obtained a concession of $3 a ton. According to all indications, the plate price remains firm at 2.50c., Pittsburgh.

Structural Material.—The Jones & Laughlin Steel corporation has taken the contract to fabricate 1100 tons for the Bulletin building annex. The largest new inquiry in the market is 1500 tons for a warehouse for the Pennsylvania Sugar Co., Philadelphia. Except for one Eastern mill which, needing tonnage, has made sales at 2.40c., Pittsburgh, the market appears to be firm at 2.50c.

Ore.—Receipts of ore at this port during the week ended were as follows: Iron ore from French Africa, 7800 tons; Sweden, 7400 tons; chrome ore from India, 2000 tons; manganese ore from British West Africa, 3467 tons.

Old Material.—Whether or not a turn has actually come, it seems to be the strong opinion of leading brokers and dealers that prices will go no lower, and there is at least one important advance, 50c. a ton, on heavy melting steel. A large Eastern buyer, being unable to obtain sufficient tonnage at $15.50, which was its price last week, came out on Monday with offers of $16, delivered, and there has been a sale to another eastern mills at $16.50. One leading broker says he would not consider selling a tonnage of steel scrap at less than $17. An indication that many brokers are of like mind on the possibility of a turn in the market is the scrambling that has been going on within the past few days to cover on old orders. Nearly every broker with orders in hand is now actively in the market to cover and this in itself has created a slightly firmer tone in prices.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap rails	16.00 to 16.50
Steel rails for rolling	17.00 to 18.00
No. 1 low phos., heavy 0.04 and under	21.50 to 22.50
Cast iron car wheels	20.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	13.50 to 14.00
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	13.50 to 14.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	18.00 to 19.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	18.50 to 19.00
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 15.50
Shafting	23.00 to 24.00
Steel axles	24.00 to 26.00

Bars.—From jobbers and manufacturing consumers are being received a fair number of orders for steel bars, mostly small lots for early shipment. Bar iron is not in large demand, but the price is being firmly held at 2.40c., Pittsburgh, by most of the makers. One company continues to make some sales at 2.35c., Pittsburgh. The price of steel bars remains strong at 2.40c., Pittsburgh.

Warehouse Business.—Local warehouses continue to

enjoy a fairly substantial volume of business. Prices are firm and unchanged. For local delivery we quote as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; square and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Cleveland

Steel Corporation Deliveries Not Improving—Few Cancellations—Round Pig Iron Sales

CLEVELAND, Aug. 14.—Occasionally a sale of ore is being made to a belated buyer and a very few furnaces that are buying on a hand-to-mouth basis are finding no difficulty in meeting their requirements. The movement from upper lake ports continues very heavy and it will not be surprising if the August movement is as large as that for July. The receipts at Lake Erie ports in July amounted to 7,682,275 tons, compared with 6,646,679 tons a year ago. The receipts for the season amounted to 19,119,757 tons, compared with 11,949,884 tons the corresponding period last year. The balance on dock Aug. 1 was 4,956,705 tons, compared with 7,296,842 tons a year ago. Although the ore movement from upper lake docks and also from Lake Erie docks to furnaces has been very heavy, the railroads are giving remarkably fine service and the docks are having no difficulty in handling the immense tonnage.

The possible effects of the introduction of shorter hours at blast furnaces and steel plants is the subject of much discussion. Some operators are inclined to believe that considerable confusion will result until the men become adapted to the new regime and that in rolling mills there will be a reduction of output, but this opinion is not shared by other operators, who expect the change from 12 hr. to 8 and 10 hr. to be made gradually and without any disturbance of the furnace or mill operations. There is, of course, doubt as to whether the mills will be compelled to absorb the additional cost which will result from the shorter turn system. It is believed that unless there should be a decided slump in business, prices will not recede below those now considered as minimum, and there may be an advance toward fall equal to the increased cost due to the shorter hours.

Deliveries by Steel Corporation subsidiaries are not improving as a rule, and new orders are fully making up for the few cancellations which have been received. Some independents which cater to prompt business are giving quick delivery and other independents have improved their deliveries, but with one large independent deliveries are not better than 90 days for plates, 30 to 60 days for shapes and 60 days for bars. Some buyers report that they are not receiving as prompt deliveries as have been promised in some cases.

The present war in gasoline prices, considered in connection with possible Congressional investigations and action by the Department of Justice, is regarded as worthy of attention on account of the psychological effect which it may have on general business conditions.

Pig Iron.—The tonnage sold by Cleveland companies during the past week has been a fair volume, amounting to nearly 25,000 tons. One firm sold 15,000 tons of foundry and malleable iron, including one lot of 8000 tons, one of 3000 tons, and one of 2000 tons. A company having a furnace taking $1.76 freight rate sold 5000 tons of foundry iron for delivery in the Pittsburgh district at $24.50, furnace, and another company sold somewhat less than 2000 tons on the basis of $25, Valley, for No. 2 foundry. A Lake furnace, which had been quoting $26.50, furnace, on No. 2 foundry, is now selling at $25.50. Reports of extremely low prices on foundry iron cannot be verified and, on the whole, the price situation seems to be somewhat improved. Apparently no more basic is to be had at $24, Valley, and $24.50 is minimum, while $25 has been done.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$24.50
Northern No. 2 fdy., sil. 1.75 to 2.25	26.50
Southern fdy., sil. 1.75 to 2.25	30.50
Malleable	26.50
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	32.00

Reinforcing Bars.—The storage warehouse to be built by the Nickel Plate Storage Co. at a cost of $160,000 is expected to call for a fair tonnage of reinforcing bars. Bids have not yet been called for. Many minor projects are being figured on. Rail reinforcing bars are still quoted at 2.30c. as the usual price.

Semi-Finished Steel.—The semi-finished steel market drags. Sometime ago it was fully expected that there would be activity by Aug. 1, but not a single transaction has been recorded recently and $42.50 is the nominal quotation.

Tool Steel.—Cleveland sellers of tool steel report that business has dropped off rapidly and that almost no orders are coming from Detroit. This change is attributed to temporary conditions, and it is expected that in another month there will be a decided increase in demand.

Bolts, Nuts and Rivets.—Although rivets continue to be quoted on a basis of $3 to $3.25 for structural and $3.10 to $3.35 for boiler rivets, the market is weak and concessions on desirable business to $2.90 and $3, respectively, are made. On bolts and nuts a fair amount of business is being done but concessions are sometimes granted. The outlook is that price revisions on cap and set screws may be announced soon.

Warehouse Business.—Jobbers in sheet and tin plate report that the business is not very brisk but that prices are being adhered to on tin plate and there is very little irregularity on sheets.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.90c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—Some foundries that cater to the automobile trade are not so busy, and demand for coke from such plants has decreased, but on the whole there is little change in the situation. Prices on foundry grades still range all the way from $5.50 to $7 for prompt shipment. No contracting is being done.

Old Material.—The market is extremely dull with no buying of consequence going on and prices are unchanged.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel, nominal	$15.75 to $16.00
Rails for rolling	17.25 to 18.00
Rails under 3 ft.	17.25 to 17.50
Low phosphorus melting	18.50 to 19.00
Cast borings	11.00 to 11.50
Machine shop turnings	9.75 to 10.00
Mixed borings and turnings	9.75 to 10.00
Compressed sheet steel	13.00 to 13.50
Railroad wrought	12.25 to 12.75
Railroad malleable	20.50 to 21.00
Light bundle sheet stampings	9.00 to 10.00
Steel axle turnings	14.00 to 14.50
No. 1 cast	18.50 to 19.50
No. 1 busheling	9.75 to 10.00
Drop forge flashings	9.75 to 10.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Pipes and flues	9.00 to 9.50

Finished Material.—Buying is not active but specifications are coming in satisfactorily and there is little change in prices. In some cases plate mills which have been getting 2.60c. are now accepting 2.50c. In structural material there is no cutting of the base price, but the fabricators are figuring very closely and

little new business has developed. Reports in regard to the automobile business vary somewhat, but representatives of steel companies in Detroit and Cleveland report to their principals that this business seems to be more stabilized than in past years and they say outlook for fall business, especially in replacing old cars, is very encouraging. Tubular business is extremely active and some companies are having difficulty in satisfying their customers with deliveries.

Very little is now heard of shading of sheet prices. Sheet manufacturers declare that with sheet bars apparently pegged at $42.50 and with conversion cost about $32 there is no money in selling sheets at 3.75c. for No. 28 black. They say further that if, as seems certain, short hours in the steel plants will increase the cost of semi-finished material several dollars per ton it will be necessary for sheet manufacturers to get more than present prices in order to break even.

Steel Ingot Molds in Place of Cast Iron

Experience of a German Steel Mill Shows Successful Results—Composition and Life of the Steel Molds

AS is well known, the majority of ingot molds are made of cast iron, and a great many are made of direct metal. There has, however, always been more or less interest in steel ingot molds and extensive experiments have been carried out at several plants without successful results. The usual material abroad is also cast iron, but from time to time there are indications that steel is being tried.

The latest information on steel molds is in *Stahl und Eisen*, Dec. 28, 1922, by Fr. Schivetz, who is operating manager at Krompach. He describes his successful experiences in replacing cast iron molds, purchased on the outside with steel molds made in his own foundry. The molds used are the ordinary square ones for 3-ton ingots. Before the war the average life was 150 heats. In 1915 and 1916 the life of the molds steadily sank, and the latter part of 1916 only 70 to 80 heats could be cast. At the beginning of 1917 the average number sank to 60 to 70. The steel was top cast into molds standing on stools.

This poor life and large expense for molds led him to recall a previous experiment with a steel mold (AO) made in his company's own steel foundry which, after 122 heats, was ruined by the bad pouring of a careless workman. Accordingly in the autumn of 1916, six molds were made and put in operation, and in the winter of the same year the cast iron molds for the 3-ton ingots began to be entirely replaced by steel molds; at Krompach steel molds have been used ever since. From each foundry heat from four to seven molds are poured. A table is given showing the analyses and life of 74 steel molds made from 13 heats. The average life of all the steel molds used so far is 235, with a constantly increasing life. Part of this table is given below to show the analyses of the steel used and the average life per foundry heat:

Table of Composition and Life of German Steel Ingot Molds

Mold	Heat	Carbon Per Cent	Manganese Per Cent	Phosphorus Per Cent	Sulphur Per Cent	Silicon Per Cent	Life in Heats
A 0	3244	0.38	0.75	...	...	0.17	122
A 1	3442	0.41	0.89	0.04	...	0.12	125
A 2	224	0.34	0.69	0.04	...	0.10	203
A 3	1124	0.42	0.65	...	...	...	300
A 4, A 5	1568	0.34	0.62	0.06	...	0.11	115.5
A 6	1881	0.35	0.71	0.08	...	0.14	305
A 7-12	2152	0.42	0.78	0.07	0.05	0.09	180.8
A 21-27	2514	0.47	0.53	0.07	0.05	0.18	206.1
A 36-41	2853	0.34	0.50	0.07	...	0.17	229.5
A 44-45	3206	0.32	0.66	...	0.06	0.18	214.8
A 50-53	3357	0.28	0.66	0.09	0.04	0.17	292
A 59-64	3523	0.32	0.41	...	0.06	0.10	226.6
A 81-86	3726	0.33	0.49	0.05	0.05	0.12	229.8
A 105-109	3914	0.39	0.44	...	0.04	...	251.8
A 117-122	4085	0.33	0.54	...	0.05	0.24	255.4
A 123a-127	627	0.42	0.55	...	0.04	0.16	324
A 134-138	842	0.31	0.50	...	0.04	0.15	229.8
A 146-151	1098	0.35	0.49	...	0.04	0.05	269.8
A 176-181	1432	0.28	0.44	...	0.04	0.05	261.3
AA	364	0.22	0.75	...	0.05	0.17	301

Great care must be taken when pouring into steel molds, as they are more easily burned than iron molds. Several molds had a short life on this account, indeed one of them, A151, was so badly and deeply melted by a green man that it was spoiled at the first cast. A great many were scrapped in a normal way, as in the case of iron molds because the cracks, tears, and wrinkles on their inner surfaces were so deep that it was either difficult to strip the ingots, or else the surface of the ingots was so furrowed and rough that they could not be rolled into particular sections.

The molds after use were placed on a rail-rack and only used again after 8 to 9 hrs. In only a few cases was distortion of the molds noticed, and it is believed this came from improper handling of the molds. Ribs on the molds have not been found necessary. Transverse cracks and bulging of the molds has not been noticed. It should be mentioned that in some cases a bad longitudinal crack was found after about 100 heats. It is believed this is because the molds are cast and used without annealing and that the interior strains cause these cracks when the inner surfaces become cracked, as they are apt to do after about 100 heats. In regard to dimensions, those that had been found satisfactory for cast iron were used without change and found acceptable, at least up to the present.

As shown in the table, the carbon varies from 0.35 to 0.45 per cent. A certain tensile strength is desirable, which could not be obtained with very soft steel. However, lower carbon can probably be used, and the table shows a mold with 0.22 per cent carbon which gave a life of 301 heats.

The manganese is usually from 0.5 to 0.8 per cent; the phosphorus shows a maximum of 0.09 per cent in the hardest steels; the sulphur 0.07 per cent as a maximum, which with the softer steels drops to 0.03 to 0.05 per cent. All the steels showed about the same silicon, and some aluminum was used. Recently several molds have been used with 0.20 to 0.25 per cent carbon; although they have so far stood only 80 to 100 heats, they have shown up as well as the harder steels.

Ordinary methods of molding are used, except that the cores are made of burned magnesite, used without any silica or other wash. This gives a very uniform and clean inner surface to the molds, and the cores can be removed very easily. After freshening, the magnesite can be used again. It is believed the good results obtained with the steel molds come from careful handling, and the present widespread mistrust of such molds would seem to be unfounded following the results obtained.

G. B. W.

To meet the demand for haulage work in metal mines, where requirements demand the use of a small locomotive on account of cage dimensions and where haulage is done on more than one level, the General Electric Co. has developed a 1½-ton locomotive fitted with a pantograph collector. The locomotive weighs 3000 lb. and is built for 18 or 20-in. gage. The overall length is 48 in., height 42 in., width 34 in. It is equipped with one 110-volt series motor giving a speed of 5 miles per hour.

The total production of the mining industry of the Santiago de Cuba consular district in 1922 was 468,340 tons of iron ore (hematite and magnetite) and about 20,000 gross tons of manganese ore containing about 30 per cent manganese, from which 4,100 tons of concentrated product was obtained. This shows a slight increase over 1921, due to greater activity in the steel industry in the United States.

British Iron and Steel Market

Pig Iron Dull—Semi-Finished Steel Sharply Up—Belgium Active in Selling Rails Tin Plate Firm

(By Cable)

LONDON, ENGLAND, Aug. 14.

Pig iron is quiet and easier. Sellers of No. 3 Scotch foundry iron are asking £5 2½s. ($23.37) f.o.b. Banking of furnaces has not yet affected business, domestic and export demand being almost stagnant.

Hematite is weak, with few important sales. Foreign ore is dull, sellers of Bilbao Rubio asking 22¾s. ($5.19) ex-ship Tees.

Steel is quiet and unchanged. Germany is inquiring for shipbuilding constructional material, but is not inclined to pay the figures asked. Several thousand tons of billets for the Continent were quoted at £8 10s. ($38.76) f.o.b., with no buyers.

Pig iron exports for July amounted to 36,938 tons; the total exports of iron and steel were 307,610 tons.

Continental position is complex. Belgian material is practically the only material being offered and the works are fully sold up to October. Prices are firm, with an upward tendency, but buyers are disinclined to place orders except in specialties. The Société Anonyme des Laminoirs, Hauts-Fourneaux, Forges, Fonderies et Usines de la Providence, Marchienne-au-Pont, has secured a 10,000-ton rail order from the Argentine. Japan has placed a 3,500,000 fr. rail order in Belgium, resulting from the visit of the Belgian industrial mission.

In Germany the works of Thyssen & Co., at Hamborn, are closed. The Gelsenkirchener Bergwerke are operating on short time.

Tin plate is firm. Wales has secured a substantial oil plate contract from the Far East, on the basis of the minimum price, for September-October delivery. The quantity involved is several hundred thousand boxes. There is improved general demand, with anticipations of more business.

Galvanized sheets are steady, with demand good but for small quantities. The works are sold out to the end of September.

There has been further Japanese buying of black sheets at £19 10s. (£3.97c. per lb.) f.o.b. The works are sold out for the remainder of this year. America is reported to be competing and booking orders for early shipment.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£2	1½s.		$9.46
Bilbao Rubio ore	1	1		5.47
Cleveland No. 1 foundry	5	10		25.08
Cleveland No. 3 foundry	5	2½	to £5 3s.	23.37 to 23.48
Cleveland No. 4 foundry	4	17½		22.22
Cleveland No. 4 forge	4	15	to 4 16	21.66 to 21.89
Cleveland basic	5	5		23.94
East Coast mixed	4	17½	to 4 18	22.23 to 22.34
Ferromanganese	£8	0		$32.08
Ferromanganese*	£8	10		$34.26
Rails, 60 lb. and up	£8	10	to 9 10	$38.76 to 43.32
Billets	£8	0	to 8 10	$36.62 to $38.76
Sheet and tin plate bars, Welsh	£9	2½		41.61
Tin plates, base box	£1	3	to 1 3½	$5.24 to $5.37 per lb.
Ship plates	£9	10	to 10 0	1.93 to 2.01
Boiler plates	£12	10	to 13 0	2.51 to 2.65
Tees	£10	0	to 10 10	2.01 to 2.14
Channels	£9	5	to 9 15	1.88 to 1.98
Beams	£9	0	to 9 10	1.82 to 1.92
Round bars, ¾ to 3 in.	£10	15	to 11 5	2.19 to 2.30
Galvanized sheets, 24 g.	£8	15	to 9 0	2.82 to 3.07
Black sheets, 24 gage	£13	10		2.75
Black sheets, Japanese specifications	£5	5		3.10
Steel hoops	£12	0	& 12 10*	2.14 & 2.50*
Cold rolled steel strip, 20 g.	£7	5		3.51
Cotton ties, Indian specifications	£5	0		3.65

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports. Delivery as Specified

Foundry pig iron:				
Belgium	£5	5s.	to £5 7½s.	$23.94 to $24.51
France	£5	5	to £5 7½	23.94 to 24.51
Luxemburg	£5	5	to £5 7½	23.94 to 24.51
Billets:				
Belgium	£7	5		33.06
France	£7	5		33.06
Merchant bars:				
Belgium	£8	0	to £8 5	1.63 to 1.68
Luxemburg	£8	0	to £8 5	1.63 to 1.68
France	£7	10		1.55
Joists (beams):				
Belgium	£7	12½	to £7 15	1.55 to 1.58
Luxemburg	£7	15		1.58
France	£7	10	to £7 12½	1.52 to 1.55
Angles:				
Belgium	£8	0	to £8 5	1.63 to 1.68
¼-in. plates:				
Belgium	£8	15	to £9 0	1.78 to 1.83
⅜-in. plates:				
Luxemburg	£7	15		1.58
Belgium	£7	10		1.52

Mining Engineers in Ontario and Quebec

The 128th meeting of the American Institute of Mining and Metallurgical Engineers will be held in Canada, the sessions and excursions covering the period of Aug. 20 to 31. Monday, Aug. 20, will be spent at Toronto. The evening will be given over to films of mining operations in northern Ontario. At 11 p. m. the party leaves on a special train for Sudbury, where visits will be made on Tuesday to the mines of the International Nickel Co. and other corporations. For Wednesday and Thursday the schedule provides inspection trips in the Cobalt district. At the session of Wednesday evening papers will be read on geology, mining and smelting. Friday will be spent in the Kirkland Lake gold district, and Saturday at Iroquois Falls, where the great pulp and paper mills of the Abitibi Power & Paper Co. will be inspected.

Saturday and Sunday will be spent in the Porcupine district and the party will arrive at Quebec Monday evening, Aug. 27. Tuesday will be given over to excursions, the special train leaving at midnight for the Thetford asbestos mines. Technical sessions will be resumed on Thursday at the Mount Royal Hotel, Montreal, the program including several papers on iron and steel, mining, milling, petroleum, geology and metallurgy. The formal banquet will be held on Thursday evening. There will be sight-seeing excursions on Friday, Aug. 31.

As part of the special train starting from Toronto Monday night, Aug. 20, there will be several cars bringing eastern members of the institute, leaving New York Aug. 19.

Mine Engineers to Meet

Announcement of the third annual convention of the West Virginia-Kentucky Association of Mine Mechanical and Electrical Engineers shows three technical sessions on Oct. 19 and 20. Topics include

"Mechanical and Electrical Equipment Records," by J. H. Edwards.
"All-Rubber Insulated vs. Ordinary Braid-Covered Cables," committee report.
"Purchased Power vs. Individual Plants," open discussion.
"Construction and Care of Transformers" (with slides), by L. G. Mason.
"Improving Efficiency of Mine Pumping," committee report.
"Service from Manufacturers in Supplying Repair Parts," by F. M. Reigher.
"Hoisting Equipment," by M. A. Maxwell.
"Fan Drives for Ventilation," by J. J. Fluck.

The convention will be held at the Frederick Hotel, Huntington, W. Va. Inspection of industrial plants, on Saturday afternoon, will conclude the program.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. . . . . 2.50c.

Structural Material

Beams, channels, etc., base, per lb. . . . . 2.50c.
Sheet piling . . . . . 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. . . . . 2.40c.
Soft steel bars for cold finishing . . . . . $3 per ton over base
Reinforcing steel bars, base . . . . . 2.40c.
Refined iron bars, base, per lb. . . . . 3.25c.
Double refined iron bars, base, per lb. . . . . 4.85c. to 5.00c.
Stay bolt iron bars, base, per lb. . . . . 3.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. . . . . 3.15c.
Bands, base, per lb. . . . . 3.15c.
Strips, base, per lb. . . . . 3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb. $1.62

Cold-Finished Steels

Bars and shafting base, per lb. . . . . 3.25c.
Strips, base, per lb. . . . . 5.00c.

Wire Products

Nails, base, per keg. $3.00
Galvanized nails, 1 in. and over. . . . . $2.25 over base
Galvanized nails, less than 1 in. . . . . 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. 2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg. 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg. 3.45
Cement coated nails, base, per cask keg. 2.70
Woven fence, carloads (to jobbers) . . . . 67½ per cent off list
Woven fence, carloads (to retailers) . . . . . 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads . . 60 and 10 per cent off list
Machine bolts, small, cut threads . . 50, 10 and 10 per cent off list
Machine bolts, larger and longer . . 50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads
50, 10 and 10 per cent off list
Cut threads . . . . . 50 and 10 per cent off list
Larger and longer . . . . . 50 and 10 per cent off list
Lag bolts . . . . . 60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads . . . . 50 and 10 per cent off list
Other style heads . . . . . 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.
45 and 10 per cent off list
Larger and longer sizes . . . . . 45 and 10 per cent off list
Hot pressed square or hex. nuts, blank . . . . . 3.75c. off list
Hot pressed nuts, tapped . . . . . 3.75c. off list
C.p.c. and t. square or hex. nuts, blank . . . . . 3.75c. off list
C.p.c. and t. square or hex. nuts, tapped . . . . . 3.75c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S. . . . . 80 per cent off list
⅞ in. and larger, U. S. S. . . . . 75 per cent off list
Small sizes, S. A. E. . . . . 80 and 5 per cent off list
S. A. E., ⅞ in. and larger . . . . . 75 and 5 per cent off list
Stove bolts in packages . . . . . 75, 10 and 5 per cent off list
Stove bolts in bulk . . . . . 75, 10, 5 and 2½ per cent off list
Tire bolts . . . . . 50, 10 and 10 per cent off list
Bolt ends with hot pressed nuts . . 50, 10 and 10 per cent off list
Turnbuckles, with ends, ½ in. and smaller
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller
70 and 10 to 65 and 5 per cent off list
Washers . . . . . 5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws,
65 and 10 per cent off list
Milled set screws . . . . . 65 and 10 per cent off list
Upset cap screws . . . . . 75 per cent off list
Upset set screws . . . . . 75 per cent off list
Milled studs . . . . . 50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $3.00 to $3.10
Large boiler rivets, base 100 lb. . . . . 3.10 to 3.20
Small rivets . . . . . 65 and 10 to 65 and 5 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.	$3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb.	3.50
Spikes, ⅜ in.	3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to	4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to	5.50
Tie plates, per 100 lb. . . . . 2.55 to	2.60
Angle bars, base, per 100 lb.	2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50⅛
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	58	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3½ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base. . . . . $3 per cent off list
Carbon 0.30 to 0.40, base. . . . . 81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage. . . .	15	2¼-in. O.D. 10 gage. .	20
2-in. O.D. 11 gage. . . .	16	3-in. O.D. 7 gage. . . .	39
2-in. O.D. 10 gage. . . .	17	1½-in. O.D. 9 gage. .	15
2¼-in. O.D. 12 gage. .	17	5⅝-in. O.D. 9 gage. .	55
2¼-in. O.D. 11 gage. .	18	5½-in. O.D. 9 gage. .	57

Tin Plate

Standard cokes, per base box. $5.50

Terne Plate

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
		25-lb. coating I. C.	16.20
8-lb. coating I. C.	11.30	30-lb. coating I. C.	17.35
12-lb. coating I. C.	13.70	35-lb. coating I. C.	18.35
15-lb. coating I. C.	13.95	40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. . . . . 3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. . . . . 3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. . . . 5.35c.

Galvanized

No. 28 (base), per lb. . . . . 5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb. . . . . 5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. . . . . 3.85c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export.	0.235	Cleveland	0.215	Kansas City	0.725
Baltimore, domestic.	0.31	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export.	0.225	Detroit	0.29	St. Paul	0.60
New York, domestic.	0.34	Cincinnati	0.29	Omaha	0.735
New York, export.	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic.	0.365	Chicago	0.34	Denver	1.27
Boston, export.	0.285			Denver (pipe)	1.215

Pacific Coast	$1.34		
Pac. Coast, ship plates	1.20		
Birmingham	0.58		
Memphis	0.56		
Jacksonville, all rail.	0.70		
Jacksonville, rail and water	0.416		
New Orleans	0.67		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 35c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$117.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.60 to $51.00	$43.00 to $46.00
Maryland	50.00 to 53.00	45.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	48.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to	9.50
Silica Brick:		
Pennsylvania	42.00 to	45.00
Chicago		52.00
Birmingham		48.00
Ground silica clay, per net ton		10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled, base, per lb.	2.00c. to 2.15c
Spikes, ⅜-in. and larger, base, per 100 lb.	$3.15
Spikes, ⅛-in. and ⅞-in., base per 100 lb.	$3.25 to 3.75
Spikes, ⅞-in., base, per 100 lb.	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill.	2.50c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
⅜-in.	5.50	6.00
⅝-in.	6.50	7.00
⅞-in.	9.00	9.50
½-in.	11.00	11.50
⅝-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Awards Again More Than 16,000 Tons While Total of Inquiries Falls

Private building projects make up the bulk of the fabricated steel purchases of the past week, all but 1300 tons of the 16,200 tons bought being of this general classification. Not much over 6500 tons of new projects came to light for figures. The awards are as follows:

Office building in Grand Central Station area, New York, Todd, Robertson & Todd, general contractors, 7500 tons, to Post & McCord and American Bridge Co.

Elizabeth Journal Building, Elizabeth, N. J., 650 tons, to Hedden Iron Construction Co.

Press Publishing Co. building, Frankfort Street, New York, 600 tons, to Harris Structural Steel Co.

Bank of the Manhattan Co., addition in Wall Street, New York, 200 tons, to Eidlitz & Ross.

Nassau Smelting & Refining Co., plant at Tottenville, Staten Island, 300 tons, to Levering & Garrigues Co.

Evening Bulletin Building annex, Philadelphia, 1100 tons, to Jones & Laughlin Steel Corporation.

Grade elimination work at Great Meadows, N. J., 200 tons, to Bethlehem Steel Bridge Corporation.

Wheeler Building, Bridgeport, Conn., 400 tons, to Bethlehem Fabricators, Inc.

Apartment building at 1009 Park Avenue, New York, 600 tons, to Hay Foundry & Iron Works.

Apartment building on Eighty-ninth Street, New York, 100 tons, to Hay Foundry & Iron Works.

Apartment building, Buffalo, N. Y., 1500 tons, Dwight P. Robinson & Co., general contractors, awarded to unnamed fabricator.

Chicago Motor Bus Co., Chicago, garage, 1000 tons, to Gage Structural Steel Co.

First National Bank Building, Davenport, Iowa, 423 tons, to American Bridge Co.

Municipal building, Chisholm, Minn., 126 tons, to American Bridge Co.

Bridges for State of Illinois, 744 tons, to International Bridge Co. and other fabricators.

Drawbridge for city of Saginaw, Mich., 225 tons, to Wisconsin Bridge & Iron Co.

Ninth-Vincent Building, Cleveland, 200 tons, to Massillon Bridge & Structural Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

General Baking Co. building, Waterbury, Conn., 200 tons.

Power plant at Buffalo, N. Y., to be erected by the Du Pont Engineering Co. for a client, 400 tons.

Southern Railway, viaduct in Virginia, 300 tons.

Pennsylvania Sugar Co., warehouse, Philadelphia, 1500 tons.

Baltimore & Ohio Railroad, bridge, 250 tons.

Louisville & Nashville Railroad, bridge work, 1600 tons, bids close Aug. 16.

McCall Publishing Co., printing plant, Dayton, Ohio, 500 tons, bids taken.

Texas Oil Co., two 55,000-bbl. oil storage tanks, 600 tons, bids being taken.

Detroit Institute of Arts, 1500 tons.

RAILROAD EQUIPMENT BUYING

No Car or Locomotive Purchases Reported, but New Car Inquiries

Railroad buying for motive power and rolling stock is largely for repair purposes, involving a large tonnage of steel but not in amounts for individual orders of a size to attract particular attention. No new equipment appears to have been bought in the past week, but fresh inquiries came into the market for 2160 cars. The chief items of interest are the following:

The Chesapeake & Ohio Railroad will inquire shortly for bids on repairing 1500 steel cars.

The Montour Railroad is in the market for 500 50-ton hopper coal cars.

Inquiries for freight cars which have been pending for some weeks are as follows: Erie Railroad, 498 coke cars to be converted into box cars; Canadian National Railways, 1000 box cars; Delaware, Lackawanna & Western, 200 refrigerator cars; Standard Oil Co., 10 gondolas; New York, Ontario & Western, 16 caboose car underframes; Minnesota Steel Co., 44 hopper cars; Santa Fe, 300 50-ton gondolas and 200 50-ton flat cars.

The Chicago & Alton is inquiring for 610 gondola cars and 250 automobile cars.

The Chicago & Northwestern has placed 100 center sills with the Western Steel Car & Foundry Co.

The Union Pacific is inquiring for 250 tank cars.

The Roxanna Petroleum Co., St. Louis, is in the market for 450 tank cars.

The Lake Superior & Ishpeming is inquiring for 200 steel ore cars of 50 to 75 tons capacity.

Better Conditions Reported from Youngstown

YOUNGSTOWN, Aug. 14.—Somewhat broadened sheet mill operation this week is the principal change in production schedules of Valley iron and steel plants. A district producer of reinforcing steel bars reports firm inquiry, with western demand offsetting loss in requirements due to letdown of roadbuilding demand in the East. Black sheet requirements are coming in more steadily, makers in this territory assert, at least as compared with July demand.

The General Fireproofing Co., maker of metal furniture and safes, reports July business was better than that of June, but that sales in several previous months exceeded the figures in both months referred to. The company has business in hand sufficient to insure capacity operations for some time.

Broader sheet mill operations are reported by the Youngstown Sheet & Tube Co., Sharon Steel Hoop Co. and Falcon Steel Co., this week.

Of the 51 independent open-hearth furnaces in the district, 44 are melting.

Active sheet mills this week are divided as follows: Youngstown Sheet & Tube Co., 27 mills, 12 at East Youngstown, 7 at Niles and 8 at Warren; Newton Steel Co., 17 mills; Trumbull Steel Co., 15; Republic Iron & Steel Co., 8; Sharon Steel Hoop Co. and Mahoning Valley Steel Co., 7 each and Falcon Steel Co., 6, or a total of 87 of the 115 mills in the Mahoning Valley.

Youngstown Sheet & Tube Appointments

The Youngstown Sheet & Tube Co., Youngstown, announces these appointments:

B. M. Stubblefield, superintendent of the by-product coke works at East Youngstown. He was previously assistant superintendent under Emil F. Vogel, advanced to assistant works superintendent.

J. F. Regan, assistant superintendent of the East Youngstown coke plant.

G. C. Williams, superintendent of the by-product coke plant at the Brier Hill works. He has been in charge of this department under Mr. Vogel.

F. D. Schreiber, assistant superintendent of the Brier Hill coke plant.

The Mining, Iron and Machine Association reports that the iron and steel production in Austria for the first quarter of 1923 was as follows: Steel-making pig iron, 71,212 metric tons; foundry pig iron, 21,479 tons; Bessemer steel, 11 tons; open hearth steel, 84,520 tons; puddled iron, 87 tons; puddled steel, 187 tons; refined steel, 7753 tons; finished products: Iron bars, 20,811 tons; steel bars, 9333 tons; girders, 2958 tons; rails, 5003 tons; sheet iron, 1021 tons; sheet steel, 694 tons, and rolled wire, 17,409 tons.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
7	14.62½	14.00	38.87½	6.70	6.50	6.50	6.15
8	14.62½	14.00	38.87½	6.70	6.50	6.50	6.15
11	14.50	14.00	....	6.70	6.45	6.55	6.20
13	14.50	13.87½	38.25	6.70	6.40	6.60	6.25
14	14.50	13.87½	38.50	6.70	6.35	6.60	6.25

*Refinery quotation, delivered price ½c. higher.

New York

NEW YORK, Aug. 14.

The markets are extremely inactive and in some there is hardly enough business to establish prices. The copper market has declined, with buying extremely light and the tin market has been inactive but fairly firm. Demand for lead is light, with prices easier in the West. The zinc market has advanced slightly. Friday, Aug. 10, no markets were open because of the President's funeral.

Copper.—Consumers still refrain from entering the market, although inquiries from some of them are fairly large. There has also been considerable slackening in export sales, due to unsettled conditions in Europe. Under these conditions the price of electrolytic copper has gradually sagged until it is freely admitted that desirable business can be placed at 14.12½c., delivered, at which level some business has been done. Lake copper is also lower at 14.50c., delivered.

Tin.—The Straits tin market is quiet but the tone is firm. There has been almost a complete absence of pressure to sell from any source, dealers not even being active. There are predictions that, if the price goes above 39c., there will be a renewal of short selling and, if it falls below 38c., good buying will follow. Undoubtedly the foreign political and economic situation is affecting both buyers and sellers in the London and New York markets. There was very little activity in yesterday's or today's markets and the quotation for spot Straits tin was 38.50c., New York. London quotations today were £1½ per ton higher than a week ago at £183 for spot standard, £184 for future standard and £186 10s. for spot Straits. Arrivals thus far this month have been 2370 tons, with the quantity afloat 5927 tons.

Lead.—There is a marked absence of inquiry and the market is in the midst of seasonal activity. The only change of consequence has been an easing in the Western market and prices have fallen nearly each day until lead for shipment from the West has sold on a basis of 6.35., St. Louis, for Eastern delivery. The New York price in the outside market is 6.70c., with the price of the leading interest unchanged at 6.50c., New York.

Zinc.—The chief news item of the week has been the publication of the July statistics of the American Zinc Institute which show an increase of 4067 tons of stocks in smelters' hands, the tonnage on hand July 31 having been 2124 tons. There was a slight increase in output, but the shipments kept up well considering the fact that July was a dull month so far as consumption was concerned. In spite of this the price of prime Western has advanced about 10 points to 6.25c., St. Louis, or 6.60c., New York. This is due partly to the continued high price of ore, to demand from dealers and to a disinclination of producers to sell. Demand from galvanizers is still very light.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Quotations for shot and ingot nickel in the outside spot market are 29c. to 32c. per lb.

Antimony.—The market is quiet but firm, with Chinese metal in wholesale lots quoted at 7.87½c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers, who can obtain it from their principals, at 26.50c. to 27c., New York, duty paid, in wholesale lots. No quotations are made public by the leading domestic producer.

Old Metals.—The market continues depressed and prices are easier. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	12.25
Copper, light and bottoms	10.75
Heavy machine composition	10.75
Brass, heavy	7.75
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	7.25
Lead, tea	4.75
Zinc	4.75

Chicago

CHICAGO, Aug. 14.—Copper and lead have declined while zinc has advanced. The market is still generally quiet, although some little business in copper has been placed at concessions and tin was fairly active for a few days last week until advances stifled further buying. Zinc appears to be firmer than the other metals. Among the old metals, copper grades have declined while tin grades have advanced. We quote in carload lots, Lake copper, 15c.; tin, 40c.; lead 6.45c; spelter, 6.30c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 4.75c.; zinc, 4c.; pewter, No. 1, 20c.; tin foil, 24c.; block tin, 30c.; all buying prices for less than carload lots.

Standard Tin Plate Specifications

WASHINGTON, Aug. 14.—Large attendance is expected at the meeting to be held tomorrow at the Bureau of Standards concerning specifications for tin plate. It will be attended by tin plate manufacturers, can makers, representatives of the National Canners' Association and other users of tin can containers. As pointed out in THE IRON AGE of June 28, page 1863, the National Canners' Association in developing the movement to set standards of tin plate filed a brief with the Bureau of Standards in which it criticised the quality of this product. Producers are expected to challenge this view strongly. Among other things, complaint is made that the tin coating lacks uniformity and request is made that a definite standard for the amount of tin coating should be established. The Bureau of Standards, however, proposes to listen to the contentions of the different sides and to provide help in arranging standards, only in the event this is agreeable to all concerned.

World Trade in Rubber Belting

WASHINGTON, Aug. 14.—Trade in rubber and balata belting has increased steadily since 1921, reflecting increased industrial and mining activity throughout the world, according to E. G. Holt, assistant chief of the rubber division of the Department of Commerce. At present United States manufacturers are the leading suppliers to foreign importers, with the United Kingdom a close second. While the volume of American exports exceeds that of British exports, the British product sells at a much higher price in world markets, which, Mr. Holt says, might account for the growing popularity of the American lines. The exports of rubber and balata belting from the principal manufacturing countries in 1922 totaled approximately 7,000,000 lb., and had a value of about $4,500,000. During 1922, the United States supplied approximately 37 per cent by volume of the total world export trade in rubber and balata belting. The United Kingdom secured about 34 per cent; France, 12 per cent; Germany, 9 per cent; Canada, 5 per cent, and Norway, 2 per cent.

BELGIAN PRICES HIGHER

Scarcity of Material for Export—Foundry Iron Inactive, but Curtailed Production Bolsters Prices

ANTWERP, BELGIUM, July 27.—Demand continues strong and in consequence the market is firm. Prices are much higher. The following prices are quoted today for domestic consumption per metric ton, f.o.b. trucks at maker's works:

	Fr.	Equivalent
Commercial iron No. 2	725	$35.40
Commercial iron No. 3	750	37.80
Commercial iron No. 4	875	42.60
Heavy sheets	750	36.60
Thin sheets	1,100	53.60
Bars	725	35.40
Rails	700	34.00
Heavy beams	700	34.00
Pickets	715	34.75
Open-hearth steel		
Ordinary	725	35.40
Half hard	900	44.00
Mild	800	39.00
Special	1,050	51.20
Rounds	1,400	68.20
Spring steel	1,350	55.00
Bessemer ingots	560	27.40
Blooms	590	28.80
Billets	630	30.75
Largets	650	31.75

Luxemburg works are offering semi-finished products in Belgium as follows per metric ton:

	Luxemburg		Lorraine	
	Fr.		Fr.	
Ingots	570	$27.80	570	$27.80
Blooms	600	29.25	600	29.25
Billets	645	31.40	650	31.75
Largets	660	32.20	670	32.75

The rate of exchange is about 20.50 Belgian francs to the $1. As this rate is even higher than the rate early in the month, the foregoing prices show clearly the decided increase of price. Early in July commercial iron No. 2 and bars were quoted at $32.50, billets at $28.75 and rails at $31.25. Steel billets are scarce. A few lots have been offered this week for export at a price close to 140s., or 660 fr. at present exchange $32.20. Demand is plentiful and all offerings are quickly taken. Ingots and blooms are available in larger quantities, but in general the quotations follow the same advance. The largest business has been done in bars. For export it is now quite impossible to obtain any quantity at the quoted price of $35.40 per ton, f.o.b. Antwerp. Rolled products are practically out of the export market even at prices much higher than the nominal quotation. Rods are quoted for domestic consumption at 900 fr. per ton (or $0.44). In general the situation is considered satisfactory and works are in most cases booked up to September.

The export of scrap iron is not yet permitted, but even if foreign sales were possible no large sales could be made abroad as domestic prices are rising rapidly. Foundry scrap is now about 430 fr. per ton ($21) and open-hearth material 320 fr. ($15.60).

The demand for foundry pig iron is not large. Prices, however, are high as the production is only sufficient to cover the requirements of regular customers. Prices are largely nominal:

	Fr.	
High phosphorus foundry iron No. 3	480	$23.40
Bessemer steel-making iron	425	20.80
Special Bessemer iron	440	21.40

Steel-making iron is not obtainable for export at the foregoing prices. It is reported that a few tonnages have been offered at about 100s., f.o.b. Antwerp, 475 fr., or $23.20 per ton. During July three blast furnaces were blown in.

Lorraine high phosphorus foundry iron is offered in Belgium at 480 to 500 fr. ($23.40 to $24.50), free at consumer's works. This price is also quoted f.o.b. Antwerp, but only for large tonnages and delayed shipments. Exporters would, it is believed, book orders at lower prices as in many quarters there is the impression that the market on foundry pig iron may be expected to decline as a result of the decreased demand for foundry pig iron. Belgian hematite pig iron is quoted at 520 fr. ($25.40). British hematite has been rather inactive because of the high rate of exchange. Business, however, may improve. British domestic prices are declining. East Coast makers are offering hematite as low as 108s., c.i.f. Antwerp (510 fr.). This quotation is based on 102s. per gross ton f.o.b. works, England. With this reduction of British prices, it is no longer possible to export Belgian foundry iron to England and Scotland. In fact, a price of 480 fr. f.o.b. Antwerp for high phosphorus foundry iron is equal to 102s., or about 110s., c.i.f. United Kingdom port. This price is too close to the nominal Scotch prices and is even higher than the quotation on Middlesborough foundry, No. 3. The latter was lately offered at 112s. to 115s., c.i.f. Antwerp, and Scotch foundry No. 3 was quoted at 115s. to 118s.

Coke is firm, prices remaining about the same. Production, although larger, is not sufficient to cover requirements. During the past month about 340,000 tons of coke was produced from 446,000 tons of coal. Of the total coal consumed about 203,000 tons was Belgian and 243,000 tons imported.

FAR EAST ASKING FOR RAILS

Japan and China Issue Government Tenders—Nippon Tin Plate Awarded—Germans Enter China

NEW YORK, Aug. 14.—There is an evident improvement in the number of foreign inquiries now appearing in the market, most of which are from the Far East. China continues active in requests for prices on wire shorts, galvanized sheets, some tin plate and second-hand plates, but actual transactions reported are few. From Japan there is an increasing interest in light gage black sheets, 27 to the bundle, but only a small tonnage is reported sold in proportion to the number of inquiries current. A large export interest, which was out of the market for export shipments of light gage black sheets for some time, is stated to have opened its books for orders recently and following a booking of about 2000 tons of light black sheets, mostly for November-December delivery to Japan, has again withdrawn from the market. There is a fair degree of inquiry for wire rods, which are being quoted by American sellers at about $61 per ton, c.i.f. Japanese port, and a few small orders are reported. Exporters are under the impression that considerable of the wire rod business is being placed by Japanese merchants and mills, in Continental markets. Tenders of rails have again revived.

Rail Tenders from Both China and Japan

Among the tenders for rails, which have been current during the past week, is one from the Imperial Government Railways for 11,160 tons of 60-lb. and 75-lb. rails with splice bars, bids on which were opened Aug. 15, and a smaller tender, also from the Government railroads, for 1100 tons of 60-lb. and 100-lb. short length rails, covering a range of 15 ft., 16 ft., 18 ft., 21 ft., 24 ft. and 30 ft., a small part without holes. From China, it is stated that there is a tender of the Government railroads, the Pekin-Suiyan line calling for bids on 500 tons of 85-lb. rails, British specifications. The railroad is reported to have arranged financing through an exporter and purchasing is said to be in the hands of Jardine Matheson & Co., 25 Madison Avenue, New York. The most recent inquiry of the Nippon Oil Co. for tin plate, about 19,000 boxes in the original tender, has been placed with Suzuki & Co. and Iwai & Co. of New York.

Germany Making Progress in China

Germany is making tremendous progress in industry in China, says a recent issue of the *Trans-Pacific*, published weekly in Tokio, Japan. They have joined with representative Chinese in establishing factories and mills in the interior and in working mines.

PERSONAL

W. A. Barrows, Jr., who was president and general manager of the Thomas Iron Co., Hokendauqua, Pa., until its recent absorption by the Reading Iron Co., Reading, Pa., has been appointed furnace superintendent by the Robesonia Iron Co., Robesonia, Pa. Mr. Barrows has had long experience in iron manufacture, first as chemist at the Sharpsville furnace, shortly after his graduation from Rutgers College in 1888. He subsequently was chemist for a number of furnaces in the Mahoning and Shenango valleys. His first position as blast furnace superintendent was with the Hannah Furnace Co. of the Mahoning Valley Iron Co., now the property of the Republic Iron & Steel Co. About 1899 he was appointed superintendent of the furnaces of the Shenango Furnace Co., and after a short time there went to the Everett furnace, owned by Joseph E. Thropp, returning to the Shenango Furnace Co. in 1901, remaining there until 1907. He then engaged in examination of ore properties in Minnesota, devoting considerable of his time as consulting engineer for the Northern Pacific Railroad in its ore developments. In 1916 he came East to become president and general manager of the Thomas Iron Co. Following his retirement from the Thomas Iron Co. he engaged in the selling of pig iron, coal, coke, ore, etc., with offices in the Widener Building, Philadelphia.

William S. Dickson, for many years with the Acme Machine Tool Co. and the Cincinnati Planer Co., both of Cincinnati, has been appointed manager of the Rochester, N. Y., office of Henry Prentiss & Co., machine tool dealers, 149 Broadway, New York, succeeding F. W. Schiefer, resigned. The Prentiss office in Rochester is in the Ellwanger & Barry Building.

Ward K. Angevine, secretary and director Garlock Mfg. Co., Rochester, N. Y., has been elected vice-president, succeeding James H. L. Gallagher, who has been with the company 20 years. Mr. Angevine will continue his duties as secretary.

Walter Mybeck, formerly assistant to O. J. Parks, general manager General American Tank Car Corporation at East Chicago, Ind., has been appointed sales manager of the Independent Equipment Corporation, Joliet, Ill., with headquarters at Chicago.

George S. Macrum, president and treasurer Mackintosh-Hemphill Co., Pittsburgh, has resigned and has been succeeded as president by J. Ramsey Speer. Mr. Speer took a leading part in the organization of the present Mackintosh-Hemphill Co., which is the combination of the A. Garrison Foundry Co., Pittsburgh; the Pittsburgh Iron & Steel Foundries Co., Pittsburgh, plant of which is at Midland, Pa., and the Woodard Machine Co., Wooster, Ohio, with the old Mackintosh-Hemphill Co. He was chairman of board of the Pittsburgh Iron & Steel Foundries Co. when the merger was effected and became a director of the new organization. Mr. Speer was born in Pittsburgh in 1870 and is a graduate of Massachusetts Institute of Technology. He is a descendant of the founders of the first foundry built West of the Alleghenies, his greatgrandfathers, Joseph McClurg and William McKnight, having started in 1803 the Pittsburgh Foundry, which later became the A. Garrison Foundry Co., on Smithfield Street, Pittsburgh, on the site of the present Park Building. His father was one of the founders of the Shoenberger Steel Co., Pittsburgh, plant of which now is the Shoenberger Works of the American Steel & Wire Co., and for several years prior to the absorption of the company Mr. Speer was its general manager.

J. J. Murphy, formerly Chicago representative for the Browning Engineering Co., Cleveland, has joined the Chicago sales force of the Orton & Steinbrenner Co., manufacturer of locomotive cranes, dipper shovels and buckets, 608 South Dearborn Street, Chicago.

Edward T. Oliver, who has been representing the Victor Tool Co. as general salesman, has become associated with the Whitman & Barnes Mfg. Co., Akron, Ohio, manufacturer of twist drills and reamers. He will represent the company in the Ohio territory with headquarters in Cleveland.

C. K. Everitt, works manager and director Edgar Allen & Co., Ltd., Sheffield, sailed for England on Aug. 4, after a visit of several weeks in the United States.

David Williams, formerly construction engineer at the Inland Steel Co., Indiana Harbor, Ind., has been appointed general manager and head of the sales department of the Famous Mfg. Co., machinist and founder, East Chicago, Ind.

Harry A. Boyd of Youngstown, treasurer of the Mahoning Valley Employers' Association, has returned from a trip to Central European countries.

J. R. Stuart, formerly sales engineer American Steel Foundries, New York, has recently been appointed as representative of the railroad department of the Standard Tank Car Co., Canadian Pacific Building, New York.

James C. Jones, president Cleveland Steel Co., started Tuesday on a business and pleasure trip of two months on the Pacific Coast.

J. Leonard Replogle returns from a European trip this week, arriving in New York on the Aquitania.

OBITUARY

ELMER G. HURLBUT, general manager Vulcan Iron Works, New Britain, Conn., died Aug. 7, at Grace Hospital, New Haven, Conn., following an operation for intestinal obstruction. Mr. Hurlbut was born in Elmwood, Conn., about 55 years ago, and had been associated with the iron works about 30 years.

L. H. BRIGHTMAN, formerly a resident of Cleveland, died at Long Beach, Cal., Aug. 9. Many years ago he was president of the Brightman Stoker Co., Cleveland, and was also engaged in the manufacture of machinery for turning shafting. He was 73 years of age.

GEORGE B. SHARPE, aged 46, an official of the Burroughs Adding Machine Co., Detroit, and president of the Association of National Advertisers, was drowned Aug. 10, at Algonquin Park, about 200 miles north of Toronto.

JOHN HOYES MCGOWAN, president John H. McGowan Co., pump manufacturer, Cincinnati, died at his home in that city Aug. 3, aged 93 years. He was born in Scotland in 1830 and came to America in 1832 finally settling in Cincinnati in 1836. In 1862, with his brother, T. J. McGowan, he formed the present company, which was incorporated in 1881. He served for 41 years as president of the company and retired from active participation in its affairs several years ago. He is survived by seven children.

COURTLAND VAN CAMP, president and founder Van Camp Hardware & Iron Co., Indianapolis, died at his home in that city Aug. 7, following a month's illness from heart disease. He was 71 years old.

JAMES E. ROBERTSON, president J. E. Robertson & Co., El Paso, Tex., died suddenly of apoplexy at his home in that city Aug. 5. Mr. Robertson was born at Appomattox Courthouse, Va., in 1871 and had been a resident of El Paso for nearly 25 years. He was one of the pioneer manufacturers' agents in the Southwest and had built up a large business in that section and in old Mexico. He is survived by his widow, three daughters and two sons, James E., Jr., of Los Angeles, Cal., and David W., with the H. H. Robertson Co.'s New York office.

CHARLES C. LEARY, master mechanic North End Mills, Illinois Steel Co. South Works, Chicago, died at his home in that city June 26, aged 47.

NEW TRADE PUBLICATIONS

Lock Washers.—The American Nut & Bolt Fastener Co., Ontario and Doerr Streets, Pittsburgh. Catalog No. 3 sketches the tempering process applied to American Lock Washers. Various patterns are illustrated and appear in sectional drawings. Specifications are given on S. A. E. standard bolts and machine screws. Other data appear together with price lists and simplified telegraphic code for ordering. Size 32 pages, 6 x 9 in.

Lamp Maintenance Hangers.—The Thompson Electric Co., 226 St. Clair Avenue, N. E., Cleveland. Supplement to catalog B-21, showing methods of wiring and lamp installation which eliminate climbing, reflectors being accessible from the floor for frequent cleaning.

Washers.—The American Nut & Bolt Fastener Co., Pittsburgh. Folder No. 8 gives manufacturers' standard list of wrought, square and axle washers, with dimensional data. Size 6 pages, 3 x 6 in.

Stowe Stoker.—LaClede-Christie Clay Products Co., St. Louis. A 16-page catalog describing a chain grate stoker of the sloping type with conveyor feed and designed for the use of mechanical draft. Its distinctive design includes stationary tuyeres, alternating with moving chains and a fuel retarding arrangement at the point where ash is discharged. These units effect a closely massed fuel bed of uniform thickness. Along with this catalog is an 8-page pamphlet giving results of tests of burning Pocahontas coal on Stowe stokers at the plant of the Gloucester Electric Co., Gloucester, Mass. There were four 250-hp. Babcock and Wilcox boilers which were operated at about 220 per cent of rating. The average gas analysis over a long period was given as 14 per cent CO_2, with combustibility in the ash running less than 10 per cent.

Thread Grinding Attachment.—Precision & Thread Grinder Mfg. Co., Philadelphia. Booklet of 25 pages describing and illustrating the use and features of the company's multi-graduated precision grinder and precision thread lead variator, designed for use in the manufacture of thread gages, taps, hobs, dies, chasers and used also in cylindrical and internal grinding. The variator controls the lead. A page is devoted to a comparison between lapping and grinding operations on this work. Instructions for setting up and operating the devices are given and several installations shown.

Wire Baskets.—John P. Smith & Co., New Haven, Conn. Booklet illustrating a variety of iron and galvanized, brass and copper, aluminum, monel metal and calido wire baskets for dipping, plating and heat treating. Directions for specifying the size of the wire cloth, mesh, space, and gage, are given. Size 4 x 6¾ in., 44 pages.

Lifting Magnets.—Cutler-Hammer Mfg. Co., Milwaukee. Publication No. 3015. Construction features of CH high duty lifting magnets are outlined and component parts illustrated. Methods of control are shown, and lifting capacities given. The illustrations include several views of the equipment in actual use.

Portable Electric Drills and Reamers.—Hisey-Wolf Machine Co., Cincinnati. Bulletin No. 106 describes the general construction and specifies sizes and capacities of universal motor hand drills, universal motor drills and direct current drills and reamers. Pages are devoted to drilling stands and electric drill attachments and accessories.

Riveting Hammers.—High Speed Hammer Co., Inc., Rochester, N. Y. Catalog C, 24 pages, 7⅝ x 10⅝ in. Describes and illustrates in half tones and line cuts various sizes and types of the company's riveting hammers. The illustrations are unusually large and clear. Several types of peins, anvils and drifts available are also shown, as well as the Model E 50 motor-driven sensitive bench drill press, for both tool room and production work.

Industrial Locomotives. — Bloomsburg Locomotive Works, Bloomsburg, Pa. Bulletin No. 137, 28 pages. The features and details of construction of the company's gasoline locomotives are described and illustrated, complete specifications also being given. Smokeless types of steam locomotives and steam-driven geared locomotive, oil burning, are likewise described. A table showing hauling capacities is included.

Air Compressors.—Ingersoll-Rand Co., 11 Broadway, New York. Booklet of 35 pages devoted to a description of the Imperial type XPV duplex steam-driven air and gas compressors. Distinctive features include use of balanced piston steam valves, an automatic cut-off oil pressure governor of the speed and pressure type, and the use of I-R plate valves for intake and discharge in air cylinders. The booklet is profusely illustrated.

Multistage Centrifugal Pumps.—De Laval Steam Turbine Co., Trenton, N. J. Catalog H, 8½ x 11 in., 20 pages. Features of the company's multistage series pumps, in which double suction impellers and volute diffusers are used, as in single-stage centrifugal pumps, are outlined. The connecting passages from stage to stage are, however, included in the pump case casting. The advantages claimed are hydraulic axial balance and high efficiency under varying loads. The pumps are made with two or three stages, and in the case of more than three stages, the use of two pumps operating in series and on the same base plate is recommended.

Oil Burning Equipment.—Tate-Jones & Co., Pittsburgh. Bulletin No. 172, devoted to auxiliary equipment for oil burners and includes oil pumping systems, fuel oil heaters, rotary gear type oil pump, pressure blowers, shut-off valves, air blast gates, and oil burners. General hardening furnaces and gas oven furnaces are also described.

Combustion Units.—Duquesne Burner Service Co., Pittsburgh. A 32-page catalog, with numerous halftones and diagrams, devoted to the efficient utilization of natural gas through the use of burners particularly designed for it. These are low-pressure burners for use in boilers with capacities from 5 to 500 hp. The unit is so arranged that it can be used also as a combination gas and oil burner. Its greatest advantage is stated to be eliminating guess work on the part of the foreman, thus securing maximum furnace efficiency on varying loads.

Gwynn Type E Gas Burners.—Duquesne Burner Service Co., Pittsburgh. 64-page catalog illustrating and describing burner equipment for natural gas, including combined rotary air damper, detachable nozzles, etc. The burners are supplied with three controlling valves and are arranged for automatic regulation. They are designed for low-pressure steam heating apparatus and for constant fuel consumption.

Bradshaw Burner.—Gas Combustion Co., Pittsburgh. 24-page catalog dealing with a burner for the efficient utilization of blast furnace gas when used in boilers or hot blast stoves. It is also designed for use as a burner of producer gas. A variant is the Bradshaw pressure burner, designed to obtain for the generation of steam additional gas that is now ordinarily wasted in the hot blast stoves. The burners are designed to hold constant that ratio of gas to air decided upon as most efficient in each particular case.

Falls Automatic Engine Stop.—Gas Combustion Co., Pittsburgh. 24-page catalog illustrating and describing three types of engine stop control—electrical closed circuit, electrical open circuit and mechanical. The electrical equipment is designed for either alternating or direct current. A particular feature is the ability of the stop to shut down an engine quickly in case of any such release of energy as is caused by a fly wheel rupture. This prevents a wrecking the engine and conserves safety of those in the engine room.

Recording Wind Velocity.—Esterline-Angus Co., Indianapolis. An 8-page pamphlet, Bulletin 623, describes the use of a recording anemometer at the plant of the Minnesota Steel Co., Duluth. The large areas of the cranes and ore bridges, etc., opposed to the heavy winds for that district, make it essential to guard against trouble. The graphic record permits study of the wind conditions and corresponding safeguarding of apparatus and men.

Low Pressure Mechanical Oil Burning.—Coen Co., Inc., 112 Market Street, San Francisco. Bulletin L of 40 pages and cover describes a system of burning oil without the use of steam or compressed air for atomizing purposes. It consists, primarily, of an oil pumping set, oil heaters, duplex suction and discharge strainers and the necessary burners. The bulletin is fully illustrated and contains a large amount of tabular matter.

Portable Tools.—Stow Mfg. Co., Inc., Binghamton, N. Y. Pamphlet G-3. Outlines features and gives dimensions of the company's portable buffer and grinder, direct connected, and combination grinder and drill for die sinking, which is available for specific work or combination.

Chain Drive Data.—Diamond Chain & Mfg. Co., Indianapolis. Loose-leaf booklet of 16 pages giving charts and information on the design and application of roller chain drives. A description of the new standard sprocket tooth form approved by the ASME is included. A chart designed to aid in the selection of chains and sprockets is given, as well as tables showing hp., working loads and speeds and other useful data.

Machinery Markets and News of the Works

MORE RAILROAD BUSINESS

Elgin, Joliet & Eastern Places Large Orders at Chicago

Willys-Morrow Co., Elmira, N. Y., Buying Considerable Number of Automatic Machines

Notwithstanding the general quietness of demand for machine tools by industrial plants, there is still a fair volume of railroad business. The Elgin, Joliet & Eastern has distributed orders at Chicago for about $100,000 worth of shop equipment and word comes from Detroit that the Pere Marquette is placing orders there against its recent list. The Illinois Central has bought several items at Chicago. Some American tool builders are asked to quote on a list of about 20 tools for the Canadian National Railways.

The Norfolk & Western has placed a number of orders with Cincinnati builders and the recent small list of the Southern Railway has been purchased. The Seaboard Air Line and the Virginian Railway are expected to be in the market shortly. At Pittsburgh the principal business in sight is represented in the pending lists of the Baltimore & Ohio and the Pennsylvania Railroad, Central Region, but there are no definite indications as to when orders will be placed. The Mobile & Ohio has issued a small list of miscellaneous tools.

Testimony to continued activity in the automobile trade is afforded by the purchase of $100,000 worth of automatic machines by the Willys-Morrow Co., Elmira, N. Y., affiliated with the Willys-Overland automobile interests. It is likely that the purchases, when completed, will run $200,000 or more.

The State of Michigan, which recently inquired for 15 lathes for the University of Michigan, is reported to have bought at least a part of this number. The Borough of Manhattan is in the market for a few tools.

New York

NEW YORK, Aug. 14.

THERE are a few bright spots in the machine tool situation but only a few tool manufacturers are being benefited. Taking the Eastern district as a whole, business is quiet and unsatisfactory in volume. The Willys-Morrow Co., Elmira, N. Y., has expended $100,000 or more for automatic machines, and its total investment will probably reach $200,000. The purchase includes Bullard, Lodge & Shipley and Potter & Johnson automatic machines. The Canadian National Railways are asking a few people in this market to bid on about 20 items on a new list for one of its shops, but it is likely that most of the equipment will be bought in Canada. The Brooklyn Union Gas Co. has purchased a 24-in. shaper, a 12-in. pipe machine, a 4-ft. radial drill, a 20-in. upright drill and a tool grinder from a local machinery dealer. The Pennsylvania Railroad has bought a 36-in. lathe.

The Eclipse Machine Co., Elmira, N. Y., announces through its Hoboken, N. J., plant that it has taken over the plant, equipment and business of the Bijur Motor Appliance Co., Hoboken, N. J., and the name of the latter company has been changed to the Bijur Lubrication Corporation. Some of the machine-tool equipment in the Bijur plant is being offered for sale.

The A. C. Chesley Co., Inc., 704 East 133rd Street, New York, manufacturer of hollow metal fireproof doors, windows, etc., has plans for the erection of a one-story addition, 120 x 200 ft. F. J. Murray, 141 East Fortieth Street, is architect.

The W. N. Best Corporation, recently organized under New Jersey laws, has taken over the plant and business of the W. N. Best Furnace & Burner Corporation, 11 Broadway, manufacturer of oil-burning equipment, annealing and other furnaces, etc., and plans for extensions. Joseph D. Sears is president and A. H. Best, vice-president.

The United Electric Light & Power Co., 12 West Tenth Street, New York, has plans for a new one-story power house, 60 x 105 ft., on Locust Avenue, near 134th Street, estimated to cost $80,000. Thomas E. Murray, 55 Duane Street, is architect. F. W. Smith is president.

The Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, has arranged an appropriation of more than $5,000,000 for extensions in its plants in different parts of the country, including the installation of additional machinery. The Linde company division is commencing the erection of a new plant at Tulsa, Okla., of which the first unit will cost about $250,000, with equipment.

The Davis Equipment Co., Inc., 50 Church Street, New York, is in the market for three 300-hp. water tube boilers and one 450 reciprocating or Corliss engine. The boiler should be suitable for attaching an underfed type stoker.

The Atlantic Industrial Alcohol Co., New York, care of Floyd S. Corbin, 300 Madison Avenue, has acquired 17 acres on the Arthur Kill Road, Tottenville, S. I., as a site for a new plant. Three buildings will be erected, 80 x 350 ft., 80 x 240 ft., and 80 x 160 ft. A dock, with pumping and other machinery will also be built. The cost is estimated at $200,000.

Manual training equipment will be installed in the three-story and basement junior high school to be erected at Amsterdam, N. Y., estimated to cost $450,000, for which bids are being received on a general contract. Niles & Daly, Amsterdam, are supervising architects.

A machine shop will be installed in the five-story automobile service building, 100 x 100 ft., to be erected at 111-17 West Eighty-ninth Street, New York, estimated to cost $500,000, for which plans are being drawn by Louis Brooks, 17 East Forty-fifth Street, architect. The owner's name is temporarily withheld.

The International Combustion Engineering Corporation, 43 Broad Street, New York, has closed negotiations for the purchase of the plants of the Raymond Brothers Impact Pulverizer Co. and the Raymond Brothers Engineering Co., Chicago, affiliated organizations, specializing in the manufacture of pulverized fuel systems and pulverizing machinery. The new owner has called a special meeting of stockholders, Sept. 7, to arrange for an increase in capital from 250,000 to 450,000 shares of capital stock, the proceeds to be used for the purchase and for extensions and improvements.

The Brooklyn Union Gas Co., 176 Remsen Street, Brooklyn, has plans for a one-story steam power house, 48 x 69 ft. at 44-46 Fifth Street, to cost about $80,000.

The Queens Gas & Electric Co., Flushing, L. I., will commence the erection of a new power plant to cost $90,000.

In connection with the purchase of the plants and business of the Cox Brothers Mfg. Co., Albany, N. Y., and Cleveland, manufacturer of automobile bumpers, by the Eaton Axle & Spring Co., Cleveland, the new owner is planning the establishment of branches at Philadelphia and Boston, as well as service and repair works at Cleveland and Albany.

The Willys-Overland Co., 1631 Broadway, New York, with plant at Toledo, Ohio, has tentative plans for additions for the production of Willys-Knight automobiles and parts, to provide for an increase of about 50 per cent in output. The expansion will be carried out late in the present year and early in 1924. John N. Willys is president.

The Municipal Improvement Corporation, 32 Court Street, Brooklyn, will build a one-story machine and repair shop at Jamaica, L. I., to occupy a portion of a building, 80 x 190 ft.

The Crane Market

Business in both overhead and locomotive cranes has been quiet the past week with few new inquiries reported and only a few orders placed. The Brooklyn Edison Co., Brooklyn, N. Y., is believed to have closed this week on the 25-ton overhead traveling crane that has been pending for some time. Among late inquiries is one from the United Shoe Machinery Co., Beverly, Mass., for a 15-ton, 28-ft. span electric traveling crane. The New York Steel Exchange, 233 Broadway, New York, has been receiving bids on two 30-ton hand power cranes, 23-ft. 2-in. and 22-ft. spans, for export to South America. Quick delivery is required and the prospective purchaser is willing to consider offers of used equipment. An inquiry which is fairly widespread among sellers of used equipment is from a Canadian company and asks for quotations on a used 75-ton wrecking crane. The General Electric Co., Schenectady, N. Y., is reported to have revived an old inquiry for an overhead crane.

Among recent purchases are:

Phoenix Utility Co., 71 Broadway, New York, two 2-ton, single I-beam electric cranes from the Whiting Corporation.

United Towns Electric Co., St. Johns, Newfoundland, a 10-ton, 30-ft. span hand power crane from the Whiting Corporation.

Walworth Mfg. Co., Boston, Mass., a 5-ton, 75-ft. span electric traveling crane, purchased in Chicago for Chicago plant, from the Milwaukee Electric Crane & Mfg. Co.

Ruberoid Co., Bound Brook, N. J., a 3-ton, single I-beam electric crane from the Shepard Electric Crane & Hoist Co.

Miehle Printing Press & Mfg. Co., Chicago, six 1-ton, suspended type, 17-ft. span, 2-motor electric traveling cranes from the Roeper Crane & Hoist Works.

Grantie Sheds Co., Elberton, Ga., a 5-ton, 27-ft. span, hand power crane from the Roeper Crane & Hoist Works.

Reading Steel Casting Co., Reading, Pa., a 1-ton, 20-ft. span hand power crane from the Roeper Crane & Hoist Works.

Pennsylvania Tank Car Co., Sharon, Pa., a 3-ton electric hoist from the Roeper Crane & Hoist Works.

Ajax Paper Co., Buck Run, Pa., a 1-ton electric hoist from the Roeper Crane & Hoist Works.

Sidney Blumenthal & Co., Shelton, Conn., a 2-ton, 1-motor, overhead traveling crane from the Roeper Crane & Hoist Works.

Mount Pleasant Foundry Co., Mount Pleasant, Pa., a 20-ton hand power crane from the Whiting Corporation.

Mees & Mees, Charlotte, N. C., a 15-ton hand power crane from the Whiting Corporation.

Rhinelander Light & Power Co., Rhinelander, Wis., a 10-ton hand power crane from the Whiting Corporation.

Canadian National Railways, Toronto, Ont., a 20-ton electric traveling crane from the Whiting Corporation.

Westinghouse Electric & Mfg. Co., West Pittsburgh, Pa., a 5-ton and 6-ton hand power crane from the Whiting Corporation.

American Sash Weight Foundry Co., Davenport, Iowa, a 5-ton hand power crane from the Whiting Corporation.

Akron, Canton & Youngstown Railroad, Akron, Ohio, a 10-ton hand power crane from the Whiting Corporation.

Kendallville Foundry Co., Kendallville, Ind., a 5-ton hand power crane from the Whiting Corporation.

Seelig & Finkelstein, 44 Court Street, Brooklyn, are architects.

The Perfect Service Auto Sales Corporation, 142 East 120th Street, New York, has leased the three-story building, 99 x 100 ft., at 528-40 West 162d Street, for a new service and repair works.

The Metal Stamping Co., Thirteenth Street, Long Island City, has acquired through its president, John F. Galvin, property in the vicinity of its plant at Fourteenth Street and the Boulevard for future expansion.

The Continental Can Co., 61 Broadway, New York, with main plant at Syracuse, N. Y., has preliminary plans for the erection of an addition to its plant on Fifteenth Street, Jersey City, N. J., estimated to cost $500,000 with equipment.

Manual training equipment will be installed in the four-story high school to be erected at Clifton, N. J., estimated to cost $500,000, for which bids will soon be asked on a general contract. Lee & Hewitt, 152 Market Street, Paterson, N. J., are architects.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, has plans for an addition to its refinery at Linden, N. J., to cost about $300,000, with equipment.

The Crocker-Wheeler Co., Fourth Avenue, Ampere, N. J., manufacturer of electrical machinery, will build a one-story addition to its power house.

David Neal, Bernardsville, N. J., and associates, have purchased the Bernardsville Electric Co. and plans for extensions in the plant and system.

Manual training equipment will be installed in the new high school to be erected at Madison, N. J., estimated to cost $300,000, for which bids will be called on a general contract at an early date. Frederick A. Miller is president of the Board of Education.

The Keystone Watch Case Co., 113 North Thirteenth Street, Newark, is arranging for a consolidation of its local works with the main plant at Riverside, N. J., and considerable machinery from the Newark factory will be removed to the last noted works, which will be extended for the expansion. It is purposed to close the Newark plant.

The Osborne Co., 759 Summer Avenue, Newark, manufacturer of paper products, will build a three-story and basement addition, 62 x 108 ft., to cost about $100,000 with equipment. William A. Bishop and Henry D. Scudder, Jr., 9 Clinton Street, are engineers and architects.

New England

BOSTON, Aug. 13.

ALTHOUGH the local machine tool trade suspended business from Thursday evening, Aug. 9, to Monday morning, Aug. 13, more machine tools were sold in this market the past week than in any similar period since June. The Norton Co., Worcester, is reported to have bought three radial drills, and four local manufacturers as many used presses. A Jackson, Mich., shop purchased the following used equipment: one 14 ft. x 6-in. lathe, one 20-in. drill, one large power hack saw, one 16-in. Kelley shaper and a Blount wet tool grinder. One Greater Boston manufacturer has revived inquiries on a large and high-priced mill, a 9-ft. radial drill and three or four large boiler shop tools.

Stone & Webster have purchased a 20-ton Niles crane for the new Edison plant at Weymouth and are inquiring for four power house cranes for a Ford plant.

Small tools are selling freely. The Brown & Sharpe Mfg. Co., Providence, has issued a new price list on high-speed and carbon cutters, which shows numerous advances as well as a larger discount. Quantity differential discounts on hack saw blades have been adopted in this market. Less than half gross lots are now 33⅓ per cent discount, one to five gross lots 40 per cent. and five gross and larger lots 40 and 10 per cent.

Gravity conveyor equipment is required for the manufacturing plant and warehouse addition contemplated by the Merchants Terminal Co., Charlestown, Boston. Monks & Johnson, 99 Chauncy Street, are the engineers.

Plans will soon be completed for an elementary school containing shops and manual training quarters to be erected by the city of Boston at Roxbury, to cost $450,000. Bids for equipment will not be asked for several weeks.

A bottling plant containing 80,000 sq. ft. of space and costing more than $250,000 to be erected by the Curran & Joyce Co., Lawrence, Mass., on a site formerly owned by the Mills Machine Co., Beacon Street, that city.

The Edward J. Lamothe Co., 31 Albany Street, Cambridge, Mass., is in the market for a used Horning press, Bliss No. 16, Niagara 13 or 14, V & O No. 42, or Leffler No. 2 or 3.

Manual training equipment will be installed in the new three-story high school to be erected at Beverly, Mass., estimated to cost $750,000, for which foundations are being laid. Adden & Parker, 177 State Street, Boston, are architects. Metal-working and woodworking equipment will not be purchased for about 18 months.

Hamilton & Hamilton, Jr., Inc., manufacturing jeweler, 166 Eddy Street, Providence, R. I., have let contract to the C. I. Bigney Construction Co., 184 Washington Street, for a one-story brick and mill factory, 50 x 200 ft., on Allens Avenue.

Foundations have been commenced for a new one-story and basement addition, 75 x 100 ft., at the plant of the Gillette Safety Razor Co., South Boston, to cost about $200,000. Charles T. Main, 49 Federal Street, Boston, is engineer.

The Connecticut Co., 22 Church Street, New Haven, Conn., operating a motor bus line, has plans for a one-story machine and repair shop, 68 x 208 ft., at Grand Avenue and Haven Street, to cost about $60,000. Charles R. Harte and H. R. Stamm are company engineers.

The Connecticut Light & Power Co., Norwalk, Conn., will commence the erection of a one-story power house to cost $50,000.

The Boston Consolidated Gas Co., 149 Tremont Street, Boston, will build a new one-story steam power house at 234 Victory Road.

Continuing its expansion program, the Hunt-Spiller Co., 281 Dorchester Avenue, Boston, manufacturer of gun castings, etc., has filed plans for a new one-story foundry to cost about $150,000, including equipment.

The Thinsheets Metals Co., Railroad Hill Street, Waterbury, Conn., has awarded contract to the Tracy Brothers Co. for a one-story addition, 25 x 62 ft., to replace a portion of its works recently destroyed by fire.

The Central Connecticut Power & Light Co., Essex, Conn., is concluding arrangements for the purchase of the local plant and system of the Essex Light & Power Co., recently sold to Bodell & Co., Providence, R. I., investment brokers. The new owner purposes to make extensions to cost about $500,000, including work at the power dam on the Salmon River.

Manual training equipment will be installed in the three-story high school to be erected at Needham, Mass., estimated to cost $280,000, for which foundations will be laid at once. The Thomas M. James Co., 3 Park Street, Boston, is architect.

The Textile Finishing Machinery Co., 171 Westminster Street, Providence, is having plans drawn for a new one-story forge shop, in connection with other structures. Lockwood, Greene & Co., 24 Federal Street, Boston, are architects and engineers.

The Westinghouse Lamp Co., 165 Broadway, New York, will raze four factory buildings at Hamlin and William Streets, Middletown, Conn., to make way for a new plant unit.

The Board of Light Commissioners, Wakefield, Mass., has plans for the erection of a new municipal power house. Lockwood, Greene & Co., 24 Federal Street, Boston, are engineers.

A three-story ice manufacturing and refrigerating plant, with portion of one floor to be equipped as a baking plant, will be erected at the Walker School, Simsbury, Conn.

The Oakville Co., Waterbury, Conn., manufacturer of metal clips, pins, etc., has awarded contract to the John W. Ferguson Co., Paterson, N. J., for a five-story addition.

Baltimore

BALTIMORE, AUG. 13

PLANS are under consideration by the Kelly-Springfield Tire Co., Cumberland, Md., for the erection of new works in Canada, for which a site is being selected.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Sept. 4 for a quantity of electric wire and cables for Eastern and Western yards, schedules 1207, 1208.

Beckerley & Trusler, 614 East Lombard Street, Baltimore, have inquiries out for a bolt-cutting and threading machine, large capacity, Landis type, second-hand.

The Baltimore & Ohio Railroad Co., Baltimore, plans the purchase of a number of machine tools, including shapers, engine lathes, drill press, centering machine and small tools.

The Asheville Light & Power Co., Asheville, N. C., is concluding negotiations for the purchase of the power plants and property of the North Carolina Power Co., including a steam-operated plant at Owenby, and hydroelectric generating stations at Craggy, Marshall and Big Ivy. Plans are being considered for extensions and the installation of additional equipment.

The Reliance Pump & Machine Co., Baltimore, recently organized, has acquired a three-story building at 120 South Calvert Street for the manufacture of automobile pumps and other pumping machinery. C. B. Dallam is president and H. C. Dougall, secretary and treasurer.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a narrow gage locomotive, gasoline operated, for industrial service; also, for one belt-driven air compressor, 8 x 8 in., second hand.

Manual training equipment will be installed in the high school to be erected at Hyattsville, Md., estimated to cost $90,000. The Board of Education, Upper Marlboro, Md., is in charge.

L. G. Neal, Atlanta, Ga., is organizing a company to build an ice-manufacturing plant. A mechanical laundry plant is also being considered. About $200,000 will be expended for building and machinery.

In connection with its proposed new foundry and plant at Norfolk, Va., estimated to cost $200,000, the Shamrock Propellers Co. will continue the operation of its works at Seattle, Wash., where executive headquarters are located. C. H. Boyles is general manager.

The National Show Case Co., Columbus, Ga., is in the market for an 80-hp. boiler and auxiliary equipment.

William W. Jones, 510 Tucker Building, Raleigh, N. C., has inquiries out for an electrically operated baling press.

The Speakman Co., 816 Tatnall Street, Wilmington, Del., manufacturer of steam supplies, plumbing equipment, etc., has awarded contract to John E. Healy & Son, 707 Tatnall Street, for the erection of three-story addition to its plant 60 x 75 ft., to cost $51,500.

J. E. Cousins, Jr., Prince George, Va., has inquiries out for a gas engine, well-drilling tools and machinery.

The Southeastern Portland Cement Co., recently organized, has established temporary offices at the Hotel Dempsey, Macon, Ga., to carry out construction plans and make purchases for its new plant at Ainslie, on which work will commence at an early date. It will have a capacity of 3000 bbl. per day, and is estimated to cost $2,000,000. The company will also install quarrying machinery, crushing and pulverizing equipment, etc., on a local limestone deposit. G. P. Dieckman is vice-president and general manager.

The Kendall Motor Products Co., recently organized to take over the business and patents of the Kendall Engineering Corporation, Washington, is perfecting plans for the establishment of a plant to manufacture piston rings and kindred automotive equipment. Robert L. Kendall is head.

The Harvey Co., 113 South Street, Baltimore, is in the market for steel tanks of 1000, 4500 and 10,000 gal. capacity.

William A. Morgart, Cumberland, Md., and associates, have acquired about 8000 acres of coal lands in Garrett County and plan the installation of mechanical and electrical equipment for development and operation, to cost about $75,000.

The Polan Katz Co., 621 East Baltimore Street, Baltimore, is desirous of getting in touch with manufacturers of sectional steel and other standardized buildings for industrial service.

The A. J. Baker Packing Co., Inc., Asheville, N. C., recently organized with a capital of $500,000, has plans for the installation of an ice and cold storage house in connection with a new meat-packing plant on the French Broad River, estimated to cost $250,000. The company will install conveying machinery, spiral chutes and other equipment in the main packing works. John A. Baker is president, H. C. Bruner secretary, both of Asheville.

The Leonhardt Wagon Mfg. Co., 417 East Saratoga Street, Baltimore, contemplates the erection of a plant at Eighth and Orleans Streets at a cost of about $90,000, to be ready for operation the first of the year. E. M. Leonhardt is president.

Beckerley & Trusler, 614 East Lombard Street, dealers in marine supplies, are inquiring for a large bolt-cutting and threading machine.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a triplex plunger pump, belt-driven, new or second-hand.

The Common Council, Pageland, S. C., is planning for the installation of a municipal electric lighting plant. The Ryan Engineering Co., Columbia, S. C., is engineer.

The Common Council, Walnut Grove, S. C., is perfecting plans for a new municipal hydroelectric power plant, estimated to cost $85,000.

The Logan-Robinson Fertilizer Co., 26 Broad Street, Charleston, S. C., recently formed with a capital of $100,000, is planning for the installation of mixing machinery, conveying equipment, power machinery and other apparatus in a local building. W. Hampton Logan is treasurer.

Philadelphia

PHILADELPHIA, Aug. 13.

BIDS are being taken until Aug. 22 by the Koelle-Greenwood Motor Co., 6025 Germantown Avenue, Philadelphia, for a two-story and basement service and repair building, 70 x 210 ft., on Chelten Avenue, to cost $100,000. P. S. Tyre, 1509 Arch Street, is architect.

The American Brush Manufacturers' Association, 505 Arch Street, Philadelphia, is in the market for nailing and trimming machines and other kinds of brush-manufacturing machinery.

A one-story power house will be erected at the textile mill of the Krout & Fite Mfg. Co., Allegheny and Emerald Streets, Philadelphia, for which plans have been drawn by W. E. S. Dyer, Land Title Building, engineer.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Zagreb, Jugoslavia, for American machine tools, saws, tools for machinists and tinsmiths, pipe and fittings; from Caracas, Venezuela, for rotary drying equipment; from Ludhiana, India, for 10-in. and 12-in. files, second quality, half-round and flat iron and steel files; from Havana, Cuba, for match-manufacturing machinery and machines for tipping shoe laces with metal ends.

The Atlantic Refining Co., 3144 Passyunk Avenue, Philadelphia, will commence the erection of a new building at its oil refinery to cost about $40,000.

Bids will be received by the Board of Education, Sixth Avenue and Fifteenth Street, Altoona, Pa., until Aug. 20, for an addition to its central power plant, with installation to include one watertube boiler, with stoker, fuel economizer and kindred equipment, and two turbo-generators, with switchboard and auxiliary apparatus. The Stewart A. Jellet Co., 1200 Locust Street, Philadelphia, is engineer. W. F. Eberle is president of the board.

The Chrome Products Co., Inc., Fuller Building, Philadelphia, operating with a capital of $100,000, has acquired the John Dunn property at Rock Springs, near Elkton, Md., and plans for the installation of quarrying machinery.

Charles W. Rigg, Pottsville, Pa., and associates have organized three new light and power companies, to install plants and systems in Tunkhannock Township and vicinity. The companies will be known as the Tunkhannock Township-Wyoming Electric Co., Lemon Township-Wyoming Electric Co., and the Falls Township-Wyoming Electric Co.

Fire, Aug. 6, destroyed a portion of the plant of the Myerstown Foundry & Mfg. Co., Myerstown, Pa., manufacturer of iron and steel castings, etc., with loss estimated at $50,000 with equipment. It is planned to rebuild.

The Harrisburg Light & Power Co., Harrisburg, Pa., will make enlargements in its generating plant on Cedar Street, with installation to include two turbo-generators, each 13,500 hp. capacity, seven watertube boilers, coal and ash-handling machinery and auxiliary equipment.

Due to conditions in the shipbuilding market, the Merchant Shipbuilding Corporation, Chester, Pa., is in process of liquidation and will cease active operations at its plant on Sept. 1.

The People's Fuel & Supply Co., York, Pa., operating coal-mining properties in Bedford County, is planning for the installation of electric power, hoisting and other equipment. Arrangements are being made for an increase in capital from $100,000 to $350,000, a portion of the proceeds to be used for equipment purchases.

The A. B. Rote Architectural Iron Works, 315 North Cherry Street, Lancaster, Pa., has acquired the plant and adjoining site formerly occupied by the Penn Iron Co., Ltd., North Plum Street, totaling about 7 acres. The new owner will remove its plant to the site following improvements in existing buildings, and will install additional machinery.

The Delaware & Hudson Coal Co., Scranton, Pa., is planning the construction of a new coal breaker at Olyphant, Pa., with capacity for handling the output of all local mines, with those at Blakeley, Dickson City and Throop.

Robert A. Feroe, Charlotte and Water Streets, Pottstown, Pa., manufacturer of paper boxes and containers, has commenced the erection of an addition to his plant, and will install considerable machinery, with motors, transmission equipment, etc.

The McConnellsburg Electric Light, Heat & Power Co., McConnellsburg, Pa., recently organized, is arranging for the installation of a plant and system for local service. G. W. Hays is treasurer. The same interests have also formed two other companies to operate in this district, to be known as the Todd Electric Light, Heat & Power Co., and Ayr Electric Light, Heat & Power Co. H. S. Daniels has been elected treasurer of the first noted, and D. H. Patterson, treasurer of the Ayr company, both of McConnellsburg.

The United Gas & Electric Corporation, Lancaster, Pa., a Connecticut corporation, has perfected plans for a merger with the Berkshire Corporation, operating light and power properties in adjoining territory in New York State, which in the future will be conducted under the United name. The consolidated company will have a capital of $57,500,000, and plans extensions in generating stations and system.

Pittsburgh

PITTSBURGH, Aug. 13.

MACHINE tool business in this district still is dull. The Westinghouse Electric & Mfg. Co. is a steady buyer, but this company follows the practice of issuing lists every three months and then closing against them to the extent of the quarterly appropriations. The trade is looking for orders before long from the Baltimore & Ohio Railroad, which a few weeks ago issued a list for its Glenwood shops, and also from the Pennsylvania Railroad, which has not yet begun to buy against the list of 34 tools for shops in its Central Region, issued a few weeks ago.

The Pittsburgh Board of Public Education about Oct. 1 will issue a list of tools for the South Hills vocational high school and in the meantime Samuel Diescher & Sons, engineers, Farmers Bank Building, Pittsburgh, will probably issue the formal inquiries for the tools for a large machine shop for the new Baltimore plant of the Standard Sanitary Mfg. Co.

Occasional inquiries are coming out for cranes, but sales are few and builders of rolling mills and rolling mill equipment, as well as of power equipment still find new business light. The Ohio Edison Co., which is to build a large power plant at Toronto, Ohio, will buy two 30,000-kw. turbines. This contract is being handled in New York.

The E. E. White Coal Co., Stotesbury, W. Va., is planning to rebuild its machine and repair shops recently destroyed by fire with loss of about $100,000, including equipment.

The McKenna Brass & Mfg. Co., First and Ross Streets, Pittsburgh, is perfecting plans for a branch plant at 483 Whitehall Street, Atlanta, Ga.

A machine shop and parts department will be installed in the one-story service building, 36 x 170 ft., to be erected by the Boylston-Chevrolet Motors, Inc., Bradford, Pa., representative for the Chevrolet automobile, on Boylston Street. C. H. Hope heads the company.

The Common Council, Parkersburg, W. Va., is considering the installation of electrically-operated pumping machinery in connection with extensions and improvements in the municipal water system. John M. Rice, Oliver Building, Pittsburgh, is engineer.

The Eureka Rubber Preserving Co., Huntington, W. Va., has tentative plans for the erection of a new local plant for the manufacture of rubber specialties. L. C. Basham, P. O. Box 511, Huntington, is general manager.

The Central Automobile Corporation, Fairmont, W. Va., will install a machine shop in its proposed two-story service building, 100 x 120 ft., estimated to cost $55,000.

H. L. Kreusler, 3301 Penn Avenue, Pittsburgh, is perfecting plans for the establishment of a new plant for the manufacture of concrete and cement blocks, and kindred construction products.

The Cheat River Railroad Co., Erwin, W. Va., recently organized to construct and operate a railroad from Erwin to St. George, W. Va., has tentative plans for a locomotive repair shop at the terminus. W. H. Mason and W. G. Wilson, both of Elkins, W. Va., head the company.

Manual training equipment will be installed in the new high school to be erected at Raymond City, W. Va., by the Poca District School Board, Poca, W. Va., for which plans will soon be drawn.

A lathe, bench tools and other equipment will be installed in the machine department in the new service building to be erected by the Kirk Motor Co., Bluefield, W. Va. E. S. Kirkpatrick is manager.

The Bessemer Gas Engine Co., Grove City, Pa., has construction under way on an addition, to be known as Building No. 26, comprising the last of a series of structures carried out under an expansion program involving $500,000.

The Virginia-Western Power Co., Ronceverte, W. Va., has acquired the properties of the Charlottesville & Albemarle Railway Co., Greenbrier Power Co., Staunton Lighting Co.,

and the Riverside Light & Power Co. Plans are under way for extensions, including the installation of additional equipment and transmission lines.

A machine shop will be installed in the two-story automobile service building, 66 x 200 ft., to be erected by C. J. Allen, City Deposit Bank Building, 6112 Penn Avenue, estimated to cost $100,000.

The American Sheet Glass Co., Huntington, W. Va., recently organized, has arranged for an increase in capital from $250,000 to $350,000. It will establish a local plant, with installation to include eight processing machines, power equipment and auxiliary machinery. H. E. Travis and Paul M. Robinson head the company.

Manual training equipment will be installed in the high school to be erected at Plymouth, W. Va., estimated to cost $100,000, for which the Board of Education will soon have plans prepared.

The Common Council, Franklin, W. Va., is perfecting plans for a municipal hydro-electric power plant on the Potomac River, with transmission system.

Chicago

CHICAGO, Aug. 13.

THE Elgin, Joliet & Eastern has distributed orders for a large part of its list of long standing, with the likelihood that purchases, when completed, will involve a total exceeding $100,000. Word comes from Detroit that the Pere Marquette is taking similar action on its extensive inquiry for its Grand Rapids, Mich., shops. The Illinois Central has closed for a 32-in. shaper, a 500-lb. power hammer, a 20-in. and a 36-in. drill press. Demand from industrial sources is still light. The Nash Motor Co. has purchased a few cylinder boring machines for its Milwaukee plant.

The Illinois Steel Co. is inquiring for a motor-driven 32-in. heavy duty engine lathe and a motor-driven 48-in. radial drill for its Gary works, and the Universal Portland Cement Co. is in the market for a 16-in. and an 18-in. engine lathe, both of which are to be motor-driven and geared head. These are for its Buffington, Ind., works. The State of Michigan, which has been inquiring for 15 engine lathes for the University of Michigan at Ann Arbor, is understod to have purchased at least a part of them. There is considerable interest in punch presses, one local user being in the market for nine medium-sized machines, while another manufacturer, who recently took an order for 400,000 locks for steel lockers, is inquiring for four presses of different sizes.

The Ford Motor Co., Detroit, Mich., has ordered two No. 8 cupolas from the Whiting Corporation, Harvey, Ill. The same builder has taken an order from the Charles Parker Co., Meriden, Conn., for a No. 2 cupola.

The Mi-Flier Mfg. Co., 1604 North Church Street, Decatur, Ill., recently incorporated with $25,000 capital stock, will manufacture kites and other novelties. The company has leased 5000 sq. ft. of factory space and its equipment will include a wire bending machine and a special machine to cut wire in lengths and loop it at the ends. Officers are Harvey A. Sellers, president; John Hohn, vice-president; B. T. Sellers, secretary, and B. K. Hohn, treasurer.

A. Epstein, 2001 West Roosevelt Road, Chicago, has prepared plans for a four-story reinforced concrete factory and warehouse, and a one-story power plant at the southeast corner of California Avenue and Thirty-first Street for the Federal Paper Co., represented by Oscar and Harry Gumbinsky of Gumbinsky Brothers Co., paper mill supplies, 2261 South Union Avenue, who organized the new company. The cost of the building is estimated at $4,000,000 and the machinery and equipment at $1,500,000.

The Crown Rheostat & Supply Co., 35 South Desplaines Street, Chicago, is having plans prepared for a two-story building, 50 x 72 ft., 1908-1914 Park Avenue, to cost $28,000.

The Interstate Public Service Co., subsidiary of the Middle West Utilities Co., Chicago, will erect an electric power plant to cost several million dollars on the Ohio River near Jeffersonville, Ind.

The Lindell Drop Forge Co. is laying a sidetrack from the New York Central Railway to the site of its new plant on which construction is being commenced.

The Michigan Agricultural College, Lansing, Mich., will construct a power plant to cost $150,000.

The American Sash Weight Foundry Co., located in a building erected by the Sears Tire Equipment Co. at Davenport, Iowa, will commence operations within a few weeks. The company was organized last spring with $200,000 capital stock. The principal product will be a sash weight patented by B. F. Aufderheide, Sr. Officers are president and treasurer, B. F. Aufderheide, Sr.; vice-president, Charles Robeson; secretary, Ray Nyemaster.

The Western Electric Co., Hawthorne, Ill., has acquired a 28-acre site at East Nashville, Tenn., where it plans to build a factory for the manufacture of electrical equipment. Details are not yet available.

The Chicago Motor Coach Co., which operates a bus system over the Chicago boulevards, plans the construction of a garage and repair shop to cost $350,000 on a site, 270 x 275 ft., adjoining the Chicago & Western Indiana Railroad.

The Yellow Cab Co., Chicago, plans the erection of a garage and service station on a site containing 60,000 sq. ft. on Halsted Street, which it recently purchased.

The Pullman Co., Chicago, has purchased from the Railway Steel Spring Co. a two-story building on the east side of Cottage Grove Avenue, north of 111th Street. The building is an L-shaped structure, 276 x 397, and 350 x 404 ft.

The Department of Public Works and Buildings, Springfield, Ill., has tentative plans for a new State-owned cement manufacturing plant estimated to cost $3,000,000, with machinery and power house. Edgar A. Martin, 304 South Wabash Avenue, Chicago, is architect. C. A. Miller is director of the department.

The Illinois Power & Light Corporation, Peoria, Ill., is disposing of a preferred stock issue of $2,059,000, the proceeds to be used for extensions, including the erection of an addition to the generating plant at Venice, Ill., to cost about $1,000,000; an addition to the power plant at Peoria and the installation of new equipment; extensions in transmission lines and the installation of additional power equipment for the electric railroad system at Springfield, Ill.

Manual training equipment will be installed in the new three-story junior high school to be erected at Winona, Minn., estimated to cost $210,000, for which bids will be called on a general contract in the fall. Croft & Boerner, Inc., 1006 Marquette Avenue, Minneapolis, Minn., are architects.

J. E. Decker & Sons, Mason City, Iowa, are planning the erection of a one-story machine shop, 75 x 100 ft., to cost about $45,000, including equipment.

Manual training equipment will be installed in the new high school to be erected at Edwardsville, Ill., estimated to cost $300,000. M. Kane, Bohm Building, is architect.

The Illinois Light & Power Co., Illinois Merchants' Bank Building, Chicago, has tentative plans for a new electric power plant on Lake Decatur, Decatur, Ill., estimated to cost $3,000,000, including transmission lines.

Manual training equipment will be installed in the new high school to be erected at Pawnee, Ill., to cost about $100,000, to replace a structure recently destroyed by fire. The Board of Education, A. S. Lupton, president, is in charge.

Buffalo

BUFFALO, Aug. 13.

PLANS are being prepared by the Crouse-Hinds Co., Syracuse, N. Y., manufacturer of electric wiring equipment, for a new one and two-story building at its Toronto works, Labatt Avenue, estimated to cost $150,000. Sproatt & Rolph, 1162 Bay Street, Toronto, are architects.

The Carhart Brothers Foundry Co., 1618 North Salina Street, Syracuse, N. Y., will soon take bids for extensions in its plant to cost approximately $25,000.

The Forness Oil Co., Inc., Bolivar, N. Y., is planning for the installation of additional equipment. E. W. Cady is head.

The Buffalo Housewrecking & Salvage Co., Sycamore Street and the Erie Railroad, Buffalo, has submitted a high bid to the War Department, Washington, for the plant of the Curtiss Aeroplane Co., Elmwood Avenue, and expects to take over the property at an early date.

Electric power equipment, conveying and other machinery will be installed in the three-story addition, 50 x 120 ft., to be erected at the plant of the G. & H. Cone Co., 619 East Catherine Street, Binghamton, N. Y., estimated to cost about $150,000.

The W. A. Case & Son Mfg. Co., Kensington Avenue, Buffalo, manufacturer of steam heating and plumbing equipment, has acquired the plant and business of the Walker Mfg. Supply Co., 203 Woodbridge Street, Detroit, specializing in a similar line. The Case company has been operating a branch at 2337 Beecher Street, Detroit, for some time, and the Walker business will be consolidated with this establishment.

The Rome Wire Co., Clyde Avenue, Buffalo, manufacturer of electrical wires and cables, etc., has purchased a block of property in the vicinity of its works, totaling over 4 acres, and will use it for expansion. Plans for the initial building have been arranged.

The New Fane Cold Storage Co., New Fane, Niagara County, N. Y., recently organized with a capital of $150,000, is arranging for a new ice-manufacturing and cold storage plant. The company is headed by B. S. Harwood and B. S. Pettit, both of New Fane.

J. E. Wells, Main Street, Salamanca, N. Y., is planning for the installation of a machine shop in a new automobile service works to replace a plant recently destroyed by fire.

Traveling ovens, electric power equipment, conveying machinery and other mechanical equipment will be installed in the new baking plant of the National Biscuit Co., Ellicott Street, Buffalo, on Urban Street, to be seven-stories, 134 x 205 ft., for which ground will be broken at once. An appropriation of $500,000 has been arranged for the building and machinery.

F. A. Carr and E. W. Ferguson, Flint, N. Y., have formed the Flint Cold Storage Co., capitalized at $200,000, to construct and operate a local ice-manufacturing and cold storage plant.

Manual training equipment will be installed in the new union school to be erected at Palmyra, N. Y., estimated to cost $325,000, for which ground will be broken at once. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Depew & Lancaster Light, Power & Conduit Co., Central Avenue, Lancaster, N. Y., has arranged for the issue of 25,000 shares of stock, the proceeds to be used for extensions in plants and system.

Cincinnati

CINCINNATI, Aug. 13.

AUGUST so far has shown a decided improvement over the same period in July in the machine tool industry. Last week some good orders were booked, largely from the railroads and automotive industry. A number of Western railroads which had been in the market for many months closed for part of their requirements, and more business is expected within the next two weeks. The Norfolk & Western Railroad has also bought a number of tools, and the recent list of the Southern Railway has been purchased.

The Seaboard Air Line is reported to be preparing a list of tools to be issued shortly, and the Virginian Railway is also expected to be a buyer. The Borough of Manhattan is in the market for a number of tools, and the Mobile & Ohio Railroad is also inquiring for miscellaneous machines. Old machinery is still in good demand, but used tools in good condition are very hard to get. Prices are very strong on both new and used machines.

The plant and equipment, including many machine tools, of the Equity Equipment Co., Cincinnati, was completely destroyed by fire Aug. 8, the loss being estimated at $75,000. No definite decision regarding rebuilding has been reached. C. Taylor Handman is president.

The Robert Neuman Co., Cincinnati, manufacturer of paper boxes, has been incorporated with a capitalization of $75,000. It will also manufacture filing cabinets and systems. New equipment will be required. Robert Neuman is president.

The Getgey-Jung Co., Cincinnati, has been incorporated with a capitalization of $25,000 to manufacture clothes pressing machines. The plant will be located at 105 West Central Parkway. No machine tool equipment will be required at once. George H. Jung is president.

The Williamson Heater Co., Cincinnati, manufacturer of furnaces and sheet metal clothes dryers, has completed the erection of its new sheet metal-working shop and an assembling plant for furnaces. Sheet metal-working machinery has been installed, and additional equipment will be added from time to time. The company is working to capacity.

The Kaufmann Metal Parts Co., Bellefontaine, Ohio, manufacturer of piston and gear rings, has purchased, at auction, the plant of the Modern Glass Co., Toledo, for a branch factory to take care of increasing business. The Toledo plant will employ about 300 men. J. S. Kaufmann is president.

The plant of the Lomar Shock Absorber Co., Trenton, Ohio, has been moved to Middletown, Ohio, to the building formerly occupied by the Willard-Middletown Machine Co.

The Lake Erie & Western Railroad Co. will make additions to its shops at Lima, Ohio, and install additional equipment at a cost of about $150,000.

Detroit

DETROIT, Aug. 13.

WORK will commence on a new electric generating plant at Iron River, Mich., of Diesel engine type, estimated to cost $250,000 with machinery, by the Peninsular Power Co., North Carroll Street, Madison, Wis. Other power plants are also contemplated in this section.

The Ford Motor Co., Highland Park, Mich., is planniig the erection of a new assembling plant at Salt Lake City, Utah, to cost about $200,000 with machinery.

The Ranney Refrigerator Co., Greenville, Mich., has awarded a general contract to the Owen-Ames-Kimball Co., Grand Rapids, Mich., for an addition to cost about $50,000.

The Auto Body Co., Lansing, Mich., has contracted with the Durant Motor Co., to furnish all bodies for the local works during the coming year, and will arrange increased facilities at its plant to handle the output.

The Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., manufacturer of paper products, has construction in progress on an addition to cost approximately $2,000,000 with machinery.

The Bennett Brass Co., Greenville, Mich., recently formed under State laws, has acquired the plant of the Regle Brass Co. for the manufacture of a general line of brass goods. Plans are under consideration for extensions. W. J. Bennet heads the new company; J. J. Siefen is general manager.

Wylie & Wilson, Inc., Saginaw, Mich., recently organized, has acquired the plant of the Brooks Mfg. Co., manufacturer of knock-down boats, etc., and plans extensions for larger output.

The Sand Lime Brick Co., 1008 Vinton Building, Detroit, will take bids early in September for a new plant at River Rouge, Mich., to cost about $75,000, including machinery and electric power equipment.

The Wolverine Motor Truck & Coach Co., Detroit, recently organized with a capital of $1,000,000, has acquired property at French Road and Gratiot Avenue for a new plant for the production of motor buses, to include the manufacture of motors, bodies, frames and parts. J. Milton Earle is president, and W. K. Ackerman, secretary and treasurer.

The Goodrich Mfg. Co., Charlotte, Mich., has acquired a building formerly occupied by the Charlotte Mfg. Co., and will operate it for the manufacture of foot dimmers and other automotive lighting specialties.

The Manitowoc Portland Cement Co., operated by the Newaygo Portland Cement Co., Newaygo, Mich., will take bids early in September for its new plant, to consist of a main one-story unit, 75 x 500 ft., with power plant and other buildings, estimated to cost $1,200,000. The MacDonald Engineering Co., 53 West Jackson Boulevard, Chicago, is engineer. Clay Hollister, 521 Fulton Street, Grand Rapids, Mich., is president.

Indiana

INDIANAPOLIS, Aug. 13.

BIDS will soon be asked by the Muncie Malleable Foundry Co., Highland Avenue, Muncie, Ind., for a one-story addition, 70 x 100 ft., estimated to cost $25,000.

The Interstate Public Service Co., Indianapolis, has acquired a tract of 105 acres of land at Jeffersonville, Ind., on the Ohio River, as a site for a new electric generating plant to cost $2,000,000 with machinery and transmission system. Harry Reid is president.

The International Rubber Co., Anderson, Ind., has plans for the rebuilding of the portion of its plant destroyed by fire Aug. 2, with loss estimated at $20,000. A new air compressor and other machinery will be installed. W. H. Lantz is one of the heads of the company.

The Fibre Conduit Co., Orangeburg, N. Y., manufacturer of insulating conduits, etc., has awarded a general contract to the John Mueller Co., Palladium Building, Richmond, Ind., for the first unit of its new plant at Richmond, to cost $400,000 with machinery. A power house will be built. S. R. Bradley is president.

The Apperson Brothers Co., Kokomo, Ind., manufacturer of automobiles, is planning for expansion to increase the output about 25 per cent. N. H. Van Sicklen is first vice-president and general manager.

The Van Camp Packing Co., Indianapolis, will break ground for a three-story oil refinery, 87 x 120 ft., on Shelby Street, Louisville, to cost $175,000. F. Erhart, Norton Building, Louisville, is architect.

Manual training equipment will be installed in the new high school to be erected at Milton, Ind., for which ground will be broken at once, estimated to cost $90,000. Charles Working & Son, Palladium Building, Richmond, Ind., are architects.

Additional electric power equipment will be installed by the Gary Street Railways Co., Gary, Ind., in connection with extensions in its system to cost about $1,000,000. Charles P. Chase is president.

Ovens, power equipment, conveying machinery, etc., will be installed in the two-story and basement addition to be built by the Calumet Baking Co., Hammond, Ind., for which plans are being drawn by the McCormick Co., 121 South Negley Street, Pittsburgh, architect and engineer.

The Forse Machine Co., Fourteenth Street and Fairview Avenue, Anderson, Ind., has tentative plans for a new one-story foundry. It is expected to start work late in the year. W. H. Forse is president.

The Stutz Motor Car Co. of America, Inc., Tenth Street, Indianapolis, is perfecting arrangements for the manufacture of six-cylinder automobile engines at its plant, with the continuation of the present output of four-cylinder motors. The former Stutz plant on the other side of Tenth Street has been taken over for increased floor area. William N. Thompson is president.

The Central South

ST. LOUIS, Aug. 13.

WORK will soon commence on a new plant at Kansas City, Mo., for the Walker Mfg. Co., Skidmore, Mo., recently organized for the manufacture of oil burners and oil-burning equipment. R. A. Walker is president and general manager.

The American Brake Shoe & Foundry Co., 30 Church Street, New York, has acquired a 4-acre tract at North Kansas City, Mo., and plans for the erection of a new works to cost $350,000, including machinery.

The Kansas Portland Cement Co., Federal Reserve Bank Building, Kansas City, Mo., will commence the erection of a new plant at Bonner Springs, Kan., with power house and machine shop, estimated to cost $1,000,000, including equipment.

The Kentucky Utilities Co., Louisville, a subsidiary of the Midwest Public Utilities Co., 72 West Adams Street, Chicago, has arranged an appropriation of $5,000,000 for extensions in its generating plants and system. The work will include the erection of a new steam-operated electric plant on the Cumberland River, near Pineville, Ky.; a new hydroelectric power plant on the Dix River; steel tower transmission lines to Lexington, Ky., Jeffersonville, Ohio, and other points; additional machinery at present stations, and other equipment.

The Rainbow Coal Co., Louisville, recently organized with a capital of $250,000, is planning the installation of electric power and other equipment at its new coal properties in the Kentucky fields. C. D. Saylers, Louisville, heads the company.

The Commercial Electric Supply Co., Broadway and Spruce Street, St. Louis, is in the market for an electric generator, 75 to 100 kw. capacity, direct-connected to simple slide valve or 4-valve steam engine, and auxiliary equipment.

The Hilton Collins Co., Inc., Louisville, has inquiries out for forge shop equipment, including a 100-lb. hammer, Bradley or similar type, punch, bulldozers and miscellaneous machinery.

The North American Co., 60 Broadway, New York, operating electric light and power properties in Missouri and other Mid-Western points, has preliminary plans for a hydroelectric generating station on the White River, Mo., utilizing a site of the Dixie Power Co., recently secured by Hugh L. Cooper & Co., 101 Park Avenue, New York, engineers, and who will be in charge of construction. The plant will develop an output of about 150,000 kw. and is estimated to cost $20,000,000. A steel tower transmission line will be built to St. Louis and other points.

An ice-manufacturing and refrigerating plant will be built in connection with the new two-story meat-packing plant, 60 x 135 ft., to be erected at Paducah, Ky., by the Magle Packing Co., affiliated with the E. Bucher Packing Co., Cairo, Ill., estimated to cost $100,000. M. P. Burt, Falls Building, Memphis, Tenn., is architect.

The Board of Works, Fort Smith, Ark., is planning the installation of electrically-operated pumping machinery in connection with proposed extensions and improvements in the municipal waterworks, estimated to cost $500,000.

The National Machinery Co., 116 Miners' Bank Building, Joplin, Mo., recently incorporated with a capital of $200,000, has leased a building for the manufacture of deep-well pumping machinery and parts. The installation is estimated to cost $35,000. P. E. Taber is president, and V. V. Kirkpatrick, secretary and treasurer.

Manual training equipment will be installed in the two-story high school to be erected at Lenora, Kan., estimated to cost $90,000, for which bids are being taken on a general contract. Smith & English, Nelson Building, Hutchinson, Kan., are architects.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for small vertical engines, 5 and 6-hp., second-hand.

The Tennessee Electric Power Co., Nashville, Tenn., is planning the erection of three hydroelectric power stations, two to be located on the Clinch River, and the other on the Powell River. The plants will cost more than $5,000,000 with transmission system.

The G. Nash Co., 2537 Broadway, Great Bend, Kan., operating a machine shop, is planning the installation of a lathe, drill press, emery stand and other equipment.

The City Ice Co., Enid, Okla., is planning the construction of a new ice-manufacturing plant estimated to cost $75,000.

C. C. Whitecraft, Hoisington, Kan., operating a machine and forge shop, is planning for the installation of a pipe-threading machine, power hammer, lathe and other equipment.

Manual training equipment will be installed in the new high school to be erected at Great Bend, Kan., estimated to cost $225,000, for which a bond issue is being arranged. The Board of Education will soon select an architect.

The Loeb Laundry Co., Memphis, Tenn., has inquiries out for a 75 to 100-kw. generator, 100 to 125 volts, d. c., with auxiliary equipment

A manual training department will be installed in the junior high school building at Oklahoma City, Okla., in connection with remodeling and extensions for a senior high school. Layton, Smith & Forsythe, 701 Southwest National Bank Building, are architects.

A manual training department will be installed in the new two-story school, 72 x 140 ft., to be erected at Binghamton, Tenn., for negro pupils, to cost about $75,000. Mahan & Broadwell, Memphis, Tenn., are architects.

The Kansas City Machine Works, 1303 West Eighth Street, Kansas City, Mo., is inquiring for an oil-operated engine, 50 to 200 hp., Fairbanks-Morse or similar type.

Manual training equipment will be installed in the new two-story high school to be erected at Chillicothe, Mo., estimated to cost $300,000, for which bids will be asked on a general contract early in September. R. W. Roberts, Chillicothe, is architect.

The Newport Rolling Mill Co., Newport, Ky., is in the market for a 54-in. second-hand roller leveler, with roll 3¾ diameter. Address the Purchasing Department.

Milwaukee

MILWAUKEE, Aug. 13.

MACHINE-TOOL business remains confined to scattering single orders. Inquiry is light but shows signs of improving. Confidence is expressed in all quarters that the passing of August will witness a resumption of inquiry and buying on a moderate scale. Machine shop activity in this district is well occupied but new business is developing slowly. The supply of used tools is plentiful, and includes a large percentage of equipment acceptable instead of new, at prices representing an obvious gain.

The Badger-Packard Machinery Co., Milwaukee, has bid in the equipment of the defunct Turner Mfg. Co., gas engines and tractors, Port Washington, Wis., having an appraised value of $183,705, for $39,000. The assets of Winther Motors, Inc., Kenosha, Wis., are to be sold Aug. 16, and the Mitchell Motors Co., Racine, on Sept. 12, but it is likely that both properties will pass in bulk.

The Milwaukee Tank Works, Fratney and Becker Streets, Milwaukee, has let contract to Otto Randolph, consulting engineer, 53 West Jackson Boulevard, Chicago, for a one-story brick and steel assembling shop, 80 x 115 ft., costing about $45,000 complete. It manufactures wood and steel tanks and pumps, and has recently entered quantity production of equipment for gasoline filling stations, garages and industrial purposes. E. A. Bienenstock is president.

The Green Bay Sugar Co., Green Bay, Wis., has contracted with the Larrowe Milling Co., 8047 Hamilton Boulevard, Detroit, to design and provide the equipment of a new beet pulp drying and feed manufacturing plant, which will represent an investment of $75,000. The H. J. Selmer Co., local contractor, is at work on the building. Charles H. Hine is general manager.

New Holstein, Wis., at a special election, authorized a bond issue of $130,000 for the construction of a municipal water works plant and sewage system, work on which will start next spring. W. G. Kirchhoffer, consulting engineer, Madison, Wis., has been engaged to prepare plans and supervise the project. Estimates on pumps, motors, pipe, tank, etc., probably will be taken before the end of the year.

The Fox River Paper Co., Appleton, Wis., is buying special pulp mill machinery, electric motors, tanks, etc., for a $65,000 addition to its Water Street plant. It will be 37 x 262 ft., one story. The general contractor is C. R. Meyer & Sons Co., Oshkosh, Wis.

Elling O. Weeks, 957 Forty-fourth Street, Milwaukee, inventor of automotive equipment and auxiliaries for gas engines, has organized the Weeks Stafull Co. of Milwaukee to manufacture a condenser attachment for automobile truck and tractor radiators. John E. Nelson and Walter F. Mayer, attorney, appear with Mr. Weeks as incorporators.

The Board of Education, Weyauwega, Wis., let the general contract to Fred C. Lemke & Co., Clintonville, Wis., for a new high school, with vocational training departments, designed by Auler & Jensen, architects, Oshkosh, Wis., and estimated to cost $150,000.

The Gulf States

BIRMINGHAM, Aug. 13.

A ONE-STORY machine shop will be erected by the Acme Carbon Mfg. Corporation, Monroe, La., recently formed with a capital of $250,000, at its proposed local carbon-black manufacturing plant, to cost about $125,000. Bids will be asked for building and tools early in the fall. L. N. Larche heads the company.

The Trinity Portland Cement Co., Dallas and Fort Worth, Tex., will place orders for machinery for its new plant near Fort Worth, within the next three or four months. The plant will have an output of 2500 bbl. per day and the equipment will cost about $350,000. The entire works will represent an investment of $750,000. L. H. McCourtie is president.

The People's Hydroelectric Co., Birmingham, is planning the erection of a hydroelectric power house at Lock No. 2, on the Coosa River, estimated to cost $2,500,000 with steel tower transmission system. Roswell C. Cobb is president.

The Constantin Refining Co., Tulsa, Okla., has acquired property in the Swastika oilfield, near Megargel, Tex., and plans the erection of a new refinery, estimated to cost $350,000 with machinery.

The North Fort Worth Ice Co., Fort Worth, Tex., is arranging for the erection of a new ice-manufacturing plant in the Arlington Heights section, estimated to cost $65,000. P. A. Heeger is president and E. P. Maddox, vice-president.

The Texas Creosoting Co., Orange, Tex., recently formed with a capital of $450,000, is planning the construction of a power house at its proposed tie and lumber-treating plant, to cost about $250,000. Pumping machinery, tanks, and other equipment will also be installed. R. S. Manley is president and general manager.

The Interstate Refineries Corporation, Kansas City, Mo., has taken over the refinery and property of the Ranger Refining & Pipe Line Co., Ranger, Tex., and Kansas City, recently acquired for about $300,000. Plans are under way for extensions in the Ranger refinery, which has been closed for two years, and the installation of additional equipment estimated to cost $100,000.

The Common Council, Pahokee, Fla., is contemplating the construction of a municipal ice-manufacturing plant. Plans are also being considered for the installation of electrically-operated pumping machinery in connection with a new municipal waterworks. A bond issue of $90,000 is being arranged.

The Morton Plow Co., Williston, Fla., recently organized with a capital of $125,000, is perfecting plans for works to manufacture tractor plows. It is purposed to have iron and steel castings made under contract, and bids will soon be asked on this work. Other agricultural equipment will be manufactured at the plant later. L. C. Hester is president.

The Neches Lumber Co., Beaumont, Tex., will build a new mill and power house to cost about $75,000, of which $40,000 will be used for the machinery. The plant will replace an old one, which will be dismantled.

The Texas Central Power Co., Harlingen, Tex., is concluding negotiations for the purchase of the municipal electric light and power plant. Upon acquisition, extensions will be made and additional equipment installed.

The Goodwin Coal Co., Dora, Ala., recently organized with a capital of $1,000,000, is planning the installation of electric power and other equipment at its properties. Olin Goodwin heads the company.

Manual training equipment will be installed in the new high school to be erected at Jeanerette, La., by the Iberia Parish School Board, Iberia, La., estimated to cost $150,000. An architect will soon be selected.

The Bon Secour Lumber Co., Bon Secour, Ala., recently organized with a capital of $250,000, plans the erection of a power house in connection with a new lumber mill, to cost $150,000. C. W. Stallworth heads the company.

Walter L. Ingram, 502 South Hull Street, Montgomery, Ala., is organizing a company to establish a plant for the manufacture of a patented metal signal device to be attached to automobiles for stop and direction service.

The City Council, Greenville, Tex., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks, for which a bond issue of $325,000 is being arranged.

The Lufkin Foundry & Machine Co., Lufkin, Tex., is planning for extensions and the installation of additional equipment. The total floor space will be increased to 90 x 450 ft.

The George F. Wheelock Co., Birmingham, manufacturer of sheet metal products, roofing, etc., has tentative plans for extensions, including the addition of new departments and the installation of equipment.

The Bronson Mfg. Co., Bronson, Fla., is perfecting plans for a new electric light and power house. It will also build an ice-manufacturing and cold storage plant. W. J. Epperson is president.

Manual training equipment will be installed in the new high school to be erected at La Compte, La., estimated to cost $100,000. The Rapids Parish School Board, Alexandria, La., J. W. Bolton, president, is in charge. Favrot & Livaudais, Hibernia Bank Building, New Orleans, are architects.

The Navarro Ice Co., Corsicana, Tex., is having plans drawn for a new ice-manufacturing plant on South Twelfth Street, estimated to cost $110,000, with machinery.

The Ajax Petroleum Co., San Antonio, Tex., is perfecting plans for extensions and improvements in its refinery, comprising the former plant of the San Antonio Refining Co., recently acquired. Additional machinery will be installed to develop an output of 1000 bbl. per day. L. H. Coursen is president.

The Florida Machine Works, Inc., 40 Riverside Avenue, Jacksonville, Fla., has filed plans for the first four buildings for its new plant on a 7-acre tract, recently acquired. The structures will be each one-story, comprising machine shop, foundry, pattern shop, and general warehouse and operating building, respectively, estimated to cost $200,000, with machinery. The foundry will be 80 x 212 ft., to be provided with an electric traveling crane; it will be given over to the production of steel, gray iron, brass and aluminum castings. Contract for electric furnaces has been let to the Pittsburgh Electric Furnace Corporation, Pittsburgh, and awards for other tools and equipment will be made at an early date. F. G. Russell is president; F. G. Russell, Jr., is general manager.

The Common Council, Mercedes, Tex., is arranging for a bond issue of $150,000 for the installation of a municipal light and power plant and waterworks system. J. E. Haynes, mayor, is in charge.

The Magnolia Petroleum Co., Dallas, Tex., has acquired 110 acres near Luling, Tex., and is said to have tentative plans for a new oil refinery to cost $500,000 with machinery.

The Southwestern Rubber Co., 202 West Travis Street, San Antonio, Tex., will have its products, including tubes and tires, manufactured under contract. Bids are being received by W. G. Colton, manager.

The Florida Steel & Wire Co., which as noted in THE IRON AGE of July 12 will engage in the manufacture of nails, wire and fencing at Jacksonville, Fla., has elected the following officers: W. A. Evans, president; J. C. Connally, vice-president; E. I. Carefoot, secretary and treasurer; John G. Palmer, general manager. The capital stock is $225,000, of which $150,000 is preferred and $75,000 common stock. The plant expects to have an initial capacity of 200 or more kegs of nails daily. Officers of the company are in the Professional Building and the Bentley shipyard property has been secured for manufacturing operations.

The Pacific Coast

SAN FRANCISCO, Aug. 14.

GROUND will be broken by the Coast Mfg. Co., Monrovia, Cal., manufacturer of automatic water heaters, etc., for a new plant to cost $25,000. George D. Wilcox is head.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, has awarded a general contract to the Dinwiddie Construction Co., Crocker Building, San Francisco, for a new two-story plant, 125 x 300 ft., at Emeryville, Cal.,

to cost $200,000. B. H. Prack, Sixty-second and Green Streets, Emeryville, is engineer.

Manual training equipment will be installed in the new high school to be erected at Sawtelle, Cal., estimated to cost $350,000. Russell & Alpaugh, 1106 Story Building, Los Angeles, are architects.

The Hawley Pulp & Paper Co., Oregon City, Ore., has plans for a three-story addition to replace the present Mill B on Main Street and the installation of additional machinery. A new power plant will also be erected.

The San Joaquin Irrigation District, Manteca, Cal., will erect a new hydro-electric power plant on the Stanislaus River, Calaveras County, to develop a capacity of 7500 hp., estimated to cost $390,000.

The Vitrified Products Corporation, San Diego, Cal., has plans for a new plant unit at Oldtown, for the manufacture of tile and kindred products, to cost about $100,000 with machinery. George W. Kummer is secretary and general manager.

The Palo Verde River Irrigation District, 517 East Adams Street, Phoenix, Ariz., is arranging for a bond issue of $23,-000,000, a part of the proceeds to be used for the construction of new hydroelectric power plants and steel tower transmission systems.

The Western Cotton Oil Co., Phoenix, Ariz., has plans for new works at Seventh Street and the line of the Arizona Eastern Railway Co., to cost more than $150,000. A power house will also be built. E. A. McDonald is general manager.

The Mt. Smiley Lumber Co., La Grande, Ore., plans the construction of a power house in connection with a new mill, estimated to cost $100,000. A. H. Strang represents the company.

The California-Oregon Power Co., San Francisco, is planning for a new hydroelectric power plant at Klamath Falls, Ore., estimated to cost $1,500,000 with machinery.

The Union Oil Co., Los Angeles, has plans for a new oil storage and distributing plant at San Luis Obispo, Cal., estimated to cost $250,000. C. E. Arnold is engineer.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Sept. 4, for one planing mill exhauster fan and one induction motor for the Mare Island Navy Yard, schedule 1200; also for one coil winding machine for the San Diego Navy Yard, schedule 1214; until Aug. 28 for wrenches and files for the San Diego Navy Yard, schedule 1201; and until Sept. 4 for one extractor and press for the Puget Sound Navy Yard, schedule 1213.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, will soon take bids for a new steam-operated electric power plant, 70 x 100 ft., estimated to cost $250,000. The company engineering department is in charge. It has also acquired property on Tenth Street, Richmond, Cal., for an addition to its power house.

The Yosemite Portland Cement Co., Simonson Building, Merced, Cal., recently organized, is arranging to commence construction of its new plant, estimated to cost $800,000 with machinery. A power house will also be built. Leigh Hunt, Kansas City, Mo., is engineer. George E. Nicholson, president of the National Cement Co., Kansas City, heads the new organization; C. S. Woody is vice-president.

The Butte Refining Co., Butte, Mont., has acquired property in the southwest section of the city for the erection of a new oil and gasoline refinery, estimated to cost $450,000 with machinery.

Canada

TORONTO, Aug. 13.

THE machine tool market in this territory continues active. Many new industrial plants and additions to old ones are under construction, and while a large amount of equipment has been purchased on this account, many concerns have not yet entered the market for the necessary requirements. A fairly good demand is also reported from electrical, waterworks, and sewerage plants and inquiries are in the market from several municipal governments for pumps and other equipment.

The Canadian Pacific Railway is expected to enter the market soon for equipment for a new plant under construction in British Columbia. Woodworking equipment is in active demand and Canadian builders and dealers have a number of good orders in prospect. A good demand continues for small tools and supplies.

C. Alfred Maguire, chairman of the Board of Control, City Hall, Toronto, will receive bids until Oct. 9, for the following equipment: One 80,000,000 Imperial gal. low lift centrifugal pump; one 25,000,000 Imperial gal. pumping engine; one alternating current generator; also 16-in. cast iron pipe; 36-in. cast iron pipe; 16 and 36-in. stop valves; 16 and 36-in. cast iron special castings; 72-in., 60-in and 48-in. valves.

Following an explosion, fire broke out in the carriage plant of Adam Spence & Sons and the Mickle Dyment & Sons planing mill at Brantford, Ont. The loss, which includes considerable damage to buildings and heavy machinery, is estimated at $50,000 to the Mickle Dyment plant and $15,000 to the Adam Spence plant. Mickle Dyment & Sons are preparing to remove their works to Toronto.

The Hydro Electric Power Commission of Ontario, University Avenue, Toronto, will build an addition to the transformer station on Davenport Road, to cost $150,000. F. A. Gaby is chief engineer.

The Woodstock Paper Box Co., Woodstock, Ont., proposes to build an addition to cost $150,000. J. Evans, Galt, Ont., is architect.

Metis Beach, Montreal, will install a waterworks plant and is in market for complete equipment. Address the mayor, care McDougall & Pease, 85 Osborne Street, Montreal.

Haileybury, Ont., proposes to install pumping equipment for fire purposes, including 3-stage centrifugal motor driven pumps, to cost about $20,000. H. A. Day is clerk.

The Ford Motor Co. of Canada, Ford, Ont., will build a by-products plant at a cost of $200,000. A. Kahn, Ford City, is architect.

The Brooks Steam Motors, Ltd., 1304 C. P. R. Building, Toronto, is contemplating the erection of a factory at Weston, Ont., to cost $500,000.

The Ever-Ready Auto Top Co. has leased a building in Galt, Ont., and will install equipment to manufacture automobile tops, etc.

The Canadian Non-Exhaust Pneumatic Machinery Co., a subsidiary of the Non-Exhaust Compressed Air Machinery Co., Boston, Mass., is contemplating the erection of a plant at Kingston, Ont. A. Rawson, Montreal Street, Kingston, Ont., is interested.

The Canadian Johns-Manville Co., Ltd., Asbestos, Que., has let the general contract to H. Levasseur, Victoriaville, Que., for the erection of a manufacturing plant.

The Town Council, Jonquiere, Que., will build an addition to the hydro-electric power development plant to cost $75,000.

The town of Wapella, Sask., contemplates installing an electric lighting plant.

The Sinclair Construction Co., Ltd., Excelsior Life Building, Toronto, has the general contract for the erection of a power house, foundations and tailrace at Dam No. 1, Trent River, Campbellford, Ont., in connection with the $250,000 development there for the Hydro-Electric Power Commission of Ontario, University Avenue, Toronto.

The city of Montreal has awarded the general contract to W. M. Irving, 26 Stanley Street, for the erection of a power house on Beaumont Street, to cost $45,000.

Foundations are in for a power development plant at St. Albans, Que., to cost $250,000 for La Cie Hydrolique de Portneuf, and the owners are in the market for two generators, 2000 C. V. motor and turbine. General contractors are the Estrup & Conradi Construction Co., St. Catharines, Ont.

Romeo Morrissettee, engineer, Cap de la Madeleine, Que., is asking for prices on the following equipment for La Cie Aqueduct, Batiscan, Que.: One wooden storage tank, capacity 100,000 gal.; one centrifugal pump, capacity 125 gal. per min.; one centrifugal pump, capacity 75 gal. per min.; also electric and gasoline motors.

John Hayman & Sons, 432 Wellington Street, London, Ont., is having plans prepared for a central heating plant and is asking for prices on material and equipment.

The Hill Rotors, Inc., New York, has been organized to manufacture a rotary air compressor described in THE IRON AGE, Feb. 1, 1923, and developed by the Hill Engineering Co., Inc., 42 Broadway, New York. The machine is available in capacities up to 7½ cu. ft. at 125 lb. It was shown at the International Exposition of Inventions and Investments held in New York, Feb. 16. The new company is licensing manufacturers to make and sell compressors, liquid pumps and other products. The Brown & Sharpe Mfg. Co., Providence, R. I., has acquired the rights for liquid pumps, and it is expected that these will be produced soon at the rate of about 2000 pumps per month. Myron F. Hill, president Hill Engineering Co., is also president of the Rotors company.

STEEL AND INDUSTRIAL STOCKS

Market More Affected by Foreign Than Domestic Conditions

Steadiness characterized the market for industrial stocks in the week just passed. Trading was listless and of insufficient breadth to establish a definite trend, though on the whole professional efforts developed more firmness. Signs of apprehension over the change in administration at Washington were lacking, but there was increasing uneasiness over the foreign situation.

The range in active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High
Allis-Chalmers...	39⅜	41¼
Allis-Chal. pf....	90	90
Am. Can	86⅜	89¾
Am. Can pf....	109¼	109¼
Am. Car & Fdy..	158	161¼
Am. Car & F. pf.	122	122
Am. Loco	71¼	74⅜
Am. Loco pf....	120	120
Am. Radiator...	78½	78½
Am. Stl. Fdries...	34	35
Baldwin Loco ...	111½	114⅜
Beth. Steel	46⅝	48½
Beth. Stl. 7% pf.	89⅜	90
Beth Stl 8% pf.	102½	102
Brr. Emp. Steel	7	7
Cambria Iron....	41	41
Chic. Pneu. Tool.	79	81¼
Colo. Fuel.....	26	27
Crucible Steel...	59	62¼
Crucible Stl. pf..	85⅜	85¾
Gen. Electric....	173½	175
Gt. No. Ore Cert.	26¼	27½
Gulf States Steel	68¾	71⅞
Inland Steel.....	33¼	33⅞
Int. Har.	72¼	74
Int. Har. pf.....	107	108¾
Lima Loco.	61	62⅜
Midvale Steel ..	24	25
Nat.-Acme	103	104
Nat. Enn. & Stm..	56	59⅜
N. Y. Air Brake.	30⅝	31¾
Otis Steel	7¾	8
Otis Steel pf....	50	50
Pressed Stl. Car.	49	51
Pressed Stl. pf..	90	90
Ry. Steel Spring.	102	103
Replogle Steel...	9¾	11¾
Republic	42⅝	44⅝
Republic pf.	89	91
Sloss	42	42
Steel of Canada.	68	68
Steel & Tube pf.	107½	110⅝
Superior Steel ..	24	24
Timken Roller...	37¼	38¼
Transue-Williams	31	31
Un. Alloy Steel..	301¼	304
U. S. Pipe.....	25	25¾
U. S. Steel.....	86½	89¼
U. S. Steel pf...	116¼	117¼
Vanadium Steel..	26⅝	30
Wick. Spenc. Stl.	7	7
Ygstown S. & T.	64⅞	65

Industrial Finance

The Inland Steel Co., Chicago, showed earnings in the first half of 1923 exceeding those for the full years 1922 and 1921. Net operating profits totaled $3,530,393 as against $2,434,023 for the full year 1922 and $1,728,031 in the full year of 1921. After bond interest, depreciation and depletion there remained a net profit of $2,459,635, or more than double the net of 1922 and nearly five times the net of 1921.

United Alloy Steel Co. stockholders have ratified an increase in the authorized preferred share capitalization from $5,000,000 to $10,000,000. It is not proposed to issue the new stock immediately.

In the six months ending with June last, sales of the Wickwire Spencer Steel Corporation amounted to $16,300,571, against less than $8,800,000 for the corresponding period last year. Operating costs and expenses amounted to $13,351,047, leaving a net of $1,949,524. With miscellaneous income added and charges deducted there was left a profit of $1,506,-444, contrasted with $230,461 for the like period last year. The profit, however, does not take into consideration depreciation charges and bond interest.

The Youngstown Sheet & Tube Co. and subsidiary companies report net earnings from operations of $5,779,718, after deducting charges for repairs and maintenance of $2,268,440. Deducting interest, taxes, etc., there remained $3,886,625 applicable for dividends. This allowed $1.25 on common shares. Surplus for the period was $2,402,898. The statement is exclusive of earnings of the Steel & Tube Co. of America.

The American Steel Foundries reports net income for the first half of 1923 of $3,459,324, compared with $1,452,359 for that period of 1922. President R. P. Lamont stated that final arrangements had been completed for the acquisition of the Damascus Brake Beam Co., Cleveland. The terms call for the exchange of one and one-half shares of American Steel Foundries preferred stock for one share of Damascus Brake Beam Co. stock.

Directors of Mesabi Iron Co. will issue 196,567 additional shares of common stock, which are being offered to stockholders at $8. Each holder of three shares of common is entitled to subscribe for one additional share. There are 589,700 shares of common outstanding. Offer is made to stockholders of record Aug. 3, and expires Aug. 15. Proceeds of the sale are to be used for installation of additional facilities to increase production to approximately 800 tons of sinter a day and it is estimated that $1,500,000 will be required for this purpose.

The General Motors Corporation reports gross sales of $362,918,353 in the first half of 1923, the largest semi-annual total in the history of the corporation. After all charges and taxes there was a surplus available for the various classes of stock amounting to $41,585,600, and after allowing for preferred and debenture dividends, there was reported a balance of $33,179,504, available for the 20,646,327 shares of common stock outstanding, or the equivalent of $1.85 a share.

The Reynolds Spring Co. reports net income for the quarter ended June 30 of $48,854, after depreciation and Federal taxes, equivalent to 24c. a share on 146,600 no par common shares. This compares with net income for the second quarter of 1922 of $49,196. Net for the first half of 1923 amounted to $138,026, or 75c. a share on common stock, after allowing for preferred dividends. This compares with net income of $65,765 for the first half of 1922. President Wiley R. Reynolds stated that orders booked for the ensuing six months far surpassed expectations and that these will likely prove the largest in the company's history. Contracts in bakelite and cold molded material now exceed a quarter of a million dollars.

Net earnings of the Sloss-Sheffield Steel & Iron Co. for the first half of 1923 were about $1,700,000, or, after allowing preferred dividends, equivalent to about $15 a share on common stock. Floating debt, which stood at $3,355,000 at the close of 1921 and at $2,631,000 on January 1 last, has been reduced to $475,000. Cash and receivables now aggregate $2,300,000 against $1,852,000 on December 31 last.

Net earnings of the Inland Steel Co. for the first half of 1923 were $2,459,636, more than $1,000,000 greater than those for all of 1922, which were $1,141,177. Plant improvements include the construction of six additional open-hearth furnaces and a new finishing mill, which will increase capacity about 25 per cent. Operations are at 80 per cent and production is sold up to October.

Assets of the Mitchell Motors Co., Racine, Wis., appraised at $1,819,851, will be offered for sale at public auction at the plant on Sept. 12, providing Herbert F. Johnson, trustee, does not receive an acceptable bid during the private sale now being conducted. The plant consists of 35½ acres of land and nine main buildings with an area of 504,800 sq. ft.

Bids are being taken until 5 p. m., Aug. 18, by Julius J. Goetz, 349 Broadway, Milwaukee, for the assets of the Christensen Engineering Co., 1813 Fond du Lac Avenue, Milwaukee, manufacturer of pneumatic appliances.

The United Alloy Steel Co. during the first six months of the year shows operating profits of $3,534,905, or $1,621,-792 larger than those for the first six months of 1922. Other income brought the total to $3,719,945, against $1,959,029 last year. For depreciation and interest $1,465,562 was set aside this year, against $684,106 in the first half of 1922. After taxes the net income on June 30 was $1,972,585, compared with $1,274,923 on the corresponding date in 1922. This year $1,000,000 in common dividends was paid out, or $600,000 more than the first half of 1922. Surplus for the first half of 1923 was $857,085 against $759,423.

The Otis Steel Co. showed manufacturing profit of $1,558,-493 in the first six months of 1923, as compared with $243,861 for the corresponding period last year. Operating profits were $1,068,560. Net income before depreciation was $809,-813, equivalent to $9.17 a share on the company's preferred stock on which 12¼ per cent is due. During the first six months of last year there was a deficit before depreciation of $617,225.

At Toledo, Ohio, Federal Judge Killits appointed Louis J. Hinde, Toledo, and Mark C. Cosgrave, Sandusky, Ohio, receivers for the Matthews Engineering Co., a subsidiary of the R. L. Dollings Co., which recently met financial reverses.

Trade Changes

The United States Electrical Tool Co., Cincinnati, has moved its Detroit district office from the Marquette Building to 50 Canfield Avenue, East, also its Columbus office from 430 North High Street to 509 North Park Avenue.

Luria Bros. Co., Reading, Pa., scrap iron and steel, has opened an office in the Franklin Trust Building, Philadelphia, in charge of Max Silberman, vice-president of the company. The company now has six branch offices and maintains yards in Lebanon, Reading, Coatesville, Donaghmore and Pittsburgh, Pa.

The Oilgear Co., Milwaukee, manufacturer of hydraulic presses, broaching machines, variable speed drives and variable delivery pumps, has moved its office and factory into larger quarters at 388-406 Thirty-eighth Street.

The Evergreen Electric Appliance Co., 411-12 Central Building, Seattle, Wash., has acquired the Bestov Appliance Co., has established a factory and expects to be ready for operation in a few weeks. Frank MacKean is president.

Changes are being made at the works of the Wisconsin Automotive Corporation, formerly the U. S. Tractor & Machinery Co., Menasha, Wis., to enlarge production to include motor trucks, passenger cars and general power farm equipment.

The Harrison Hardware & Furniture Co., St. Petersburg, Fla., has changed its name to the Harrison-Powell Co. W. P. Powell, for many years president, now will take an active

part in the business. Otherwise the status of the company remains unchanged.

The Palmer Steel Co., reinforcing bars and builders' iron work, has transferred its general offices to 274 Main Street, Springfield, Mass. Extensions at the company's Holyoke plant are completed.

F. H. Murray, formerly connected with the Detroit office of the New Britain Machine Co., New Britain, Conn., is now located in Room 1424, Century Building, 202 South State Street, Chicago, where he will handle the sales of New Britain products in the Chicago territory.

Edwin Harrington, Son & Co., Inc., Philadelphia, will change its name, commencing Aug. 1, to the Harrington Co.

Standard Steel & Bearings, Inc., has moved its Philadelphia plant to the new location at Plainville, Conn., which provides a spacious one-floor plant.

Plans of New Companies

The International Hammer Corporation, New York, has been incorporated with capital stock of $100,000 to manufacture electrically-operated hammers of new design. Future plans are not yet completed but it is expected that operations will be started in the near future. The incorporators are E. J. Ohnell, J. C. Barrett and D. A. Nease. Address care of T. F. Bourne, 41 Park Row, New York.

The Tel-U Signal Corporation, New York, has been organized with capital stock of $600,000 to manufacture electric signals and devices. Details of manufacturing will be taken up shortly upon completion of organization matters which will require several weeks. It is likely that the company will operate in New York. The incorporators are J. F. Hughes, V. Taylor and R. L. Deely. Address care of Mr. Fielding, Phillips, Leibell & Fielding, 51 Chambers Street, New York.

The Flanagan Equipment Co., 206 Amsterdam Avenue, New York, has been incorporated with capital stock of $20,000 to manufacture and deal in automobile equipment. It is not planning to undertake manufacturing immediately but will act as dealer for the present. B. A. Leerburger and M. Kurz are the incorporators.

Arthur A. La Porte, Inc., 39 East Fifty-eighth Street, New York, will manufacture hydraulic machinery and parts. Mr. La Porte is taking over a business with which he has been connected for several years. Actual manufacturing may be postponed but the company will operate a general repair shop.

The Horrocks Conveyor Co., Brooklyn, has been incorporated with capital stock of $15,200 to manufacture conveying equipment. Factory and offices are at 415 Schenectady Avenue. Machinery is installed and it is planned to begin operation on roller, gravity and belt conveyors about Sept. 1. F. H. Horrocks heads the company.

The Alarm & Burglar Proof Case, Inc., New York, capital $25,000, is to manufacture safes, metallic cases, etc. Temporary offices are maintained at 375 Fulton Street, Brooklyn, care of J. H. Conlon.

A. H. Peacock, Inc., Brooklyn, has been organized to manufacture electrical fixtures and other electrical equipment. J. F. Sweetman, W. B. McGee and A. H. Peacock, 1682 Myrtle Avenue, Brooklyn, are the incorporators.

The White Enameled Wire Goods Co., Brooklyn, has been organized to manufacture enameled wire products and other specialties. J. Spiegel and S. and F. Seltzer are the principals. Address care of Nelson K. Scherer, 217 Broadway, New York.

Steel-O-Graph, Inc., New York, has been incorporated with a capital stock of $250,000 to manufacture electrical equipment and appliances and radio instruments. Operations have already been started. W. C. Lamphier and J. Wood, Jr., are the incorporators. Address care of J. S. Twaddel, 261 Broadway, New York.

The New Matic Machine Corporation, New York, capital $40,000, will engage in manufacturing machinery. Present plans provide for erecting a plant and installing equipment. K. Lazar heads the company. Communications should be addressed care of Levisohn, Niner & Levisohn, 13 Astor Place, New York.

F. L. M., Inc., New York, has been organized to manufacture engine equipment and mechanical specialties. For the present the company will operate a repair shop. The incorporators are L. H. Goodkind, F. J. Phillips and M. E. Greenfield. Address care of Charles Pechner, 1540 Broadway, New York.

The Grimes Radio Engineering Co., New York, has been incorporated with capital of $25,000 to manufacture wireless equipment and appliances. Temporary address is care of George Agnew, 22 William Street, New York.

The Fox Hardware Co., 71 Warren Street, New York, has been organized with capital stock of $50,000 to manufacture hardware products. Harry L. Rosebaum heads the company.

Jacob & Co., Inc., Indianapolis, have been organized to manufacture metal products, composition specialties, etc. A building has been secured at 636 South Delaware Ave., and operations have begun. Paul R. Jordan heads the company.

The S. B. Sexton Mfg. Co., Baltimore, recently organized with capital of $150,000 to acquire and expand the business by that name at 501 West Conway Street, will continue under the same management with W. Elbert Sexton as president; C. K. Sexton, vice-president; Robert C. Dorr, secretary-treasurer.

The Kentucky Pump Mfg. Co., Evansville, Ind., has been incorporated with capital stock of $200,000, having taken over the business of the Kentucky Tire Pump Co., formerly located at Madisonville, Ky. It will continue making pumps for automotive use and later may add to its line. C. I. Phillips is general manager.

The Bonetto Aero Power Co., Inc., Roanoke, Ill., has been organized to manufacture fluid motor power systems. Manufacturing will be done under contracts. The machines are operated on an inclosed turbine mounted upon a tower and are designed to develop from 1 to 100,000 hp. to generate electricity. D. Bonetto is president.

The North Star Explosives Co., Ltd., has been incorporated with capital stock of $40,000 to manufacture explosives, powder, etc., as a subsidiary of the Hercules Powder Co., Wilmington, Del. Manufacturing will involve no new construction. H. H. Eastman is treasurer.

The Norwalk Enamel Products Co., Norwalk, Ohio, has been incorporated with capital of $500,000 and will engage in the manufacture of enameled signs, table tops, and other products. The plant will contain about 70,000 sq. ft.

The Belfont Iron Works Co., Ironton, Ohio, contemplates making some extensive improvements to its properties, including the installation of a pig-casting machine. All officers and directors were re-elected at the recent annual meeting.

Manganese Ore in 1922

Final statistics of the shipments of manganese and manganiferous ores in the United States in 1922, as compiled by H. A. C. Jenison, of the U. S. Geological Survey, show that 13,404 gross tons of ore containing 35 per cent or more of manganese was mined by 18 companies last year. Of ore containing 10 to 35 per cent of manganese, 344,674 tons was shipped, and of ore containing 5 to 10 per cent manganese, the shipments were 251,614 tons. Montana is credited with 9751 tons of the highest percentage ore and Arkansas with 2264 tons.

Imports of manganese ore and oxide of manganese in 1922 are given as 374,451 tons, Brazil furnishing 275,193 tons. Turkey in Europe supplied 27,561 tons of the total and India 24,548 tons.

Tin exports from the Straits Settlements in June retained the same level as in May, amounting to 5300 gross tons, an increase over the April figure of 4490 tons. Prices, however, showed considerable decline as a result of the release of the Government holdings April 1. The United States took 74 per cent of June shipments of tin against 59 per cent in May, and the United Kingdom, 5 per cent, against 26 per cent in May. Twenty-one per cent went to Europe, compared with 15 per cent the previous month.

The autumn meeting of the Institute of Metals will be held at Manchester, England, Sept. 10 to 13. The second annual autumn lecture on subjects of practical interest to those engaged in the non-ferrous metals industry will be delivered by Lieut.-Col. Sir Henry Fowler on the subject "The Use of Non-Ferrous Metals in Engineering."

The Hydro Forge Co., Alliance, Ohio, has purchased the plant of the Louisville Sheet Steel Co., Louisville, Ohio, which was declared bankrupt a few months ago. The purchase price was $70,000. It is expected that the purchaser will take immediate steps to install new machinery and to make necessary improvements to the plant.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:
- Refined iron bars, base price ..... 3.54c.
- Swedish charcoal iron bars, base ..... 7.50c.
- Soft steel bars, base price ..... 3.54c.

Hoops, base price ..... 5.19c.
Bands, base price ..... 4.39c.
Beams and channels, angles and tees
- 3 in. x ¼ in. and larger, base ..... 3.64c.

Channels, angles and tees under 3 in.
- x ¼ in., base ..... 3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier ..... 3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.80c.	....
Nos. 22 and 24	4.50c. to 4.85c.	5.10c.
No. 26	4.55c. to 4.90c.	5.15c.
No. 28	4.65c. to 5.00c.	5.25c.
No. 30	4.85c. to 5.20c.	....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.75c. to 5.10c.
No. 16	4.90c. to 5.25c.
Nos. 18 and 20	5.05c. to 5.40c.
Nos. 22 and 24	5.20c. to 5.45c.
No. 26	5.35c. to 5.70c.
No. 27	5.50c. to 5.85c.
No. 28	5.65c. to 6.00c.
No. 30	6.10c. to 6.50c.

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19 c. to 20 c.
High brass wire	19½c. to 20½c.
Brass rods	17¼c. to 18¼c.
Brass tube, brazed	27 c. to 28 c.
Brass tube, seamless	24½c. to 25½c.
Copper tube, seamless	26 c. to 27 c.

Copper Sheets

Sheet copper, hot rolled, 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$11.75	$10.50	IC	7.00	6.75
IX	13.00	11.75	IX	8.25	8.00
IXX	14.75	13.00	IXX	9.50	9.25
IXXX	16.50	14.75	IXXX	10.75	10.50
IXXXX	18.50	16.50	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	41c.
Bar	48c. to 53c.

Copper

Lake ingot	17½c.
Electrolytic	17 c.
Casting	16¾c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solder*

American pig lead	8c. to 8¼c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27c.
Refined solder	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	8¾c. to 9¼c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 32c. to 33c.

Old Metals

Business is very quiet and values are lower. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.25
Lead, tea	4.00
Zinc	3.75

THE IRON AGE

New York, August 23, 1923

ESTABLISHED 1855 VOL. 112, No. 8

Modern Iron and Steel Works in China

Comprehensive Survey of the Plants and Their Sources of Raw Materials—Combination of Machinery with Primitive Transport and Handling

BY K. E. HUMBERT*

BEFORE describing the latest addition to the blast furnace plants in China it will add interest to divide the pig iron producing districts into their respective groups. Tnese include the blast furnaces in the Hankow district, in Manchuria, in Korea, because of its connection with the mainland, and the newly created Peking district, containing the new blast furnace of the Lungyen Mining Administration. The location of these blast furnaces, as well as the important lines of railroad and water transport, are shown on the accompanying map.

Hankow District

Hankow is 585 miles inland from Shanghai on the Yangtse River and is accessible at all seasons to seagoing or coastal steamers. Communication with the port of Shanghai is obtained either entirely by steamship or by steamship to Nanking and thence by Shanghai-Nanking Railroad. Nanking is 215 miles from Shanghai by water and 193 miles by rail. There is also a direct rail connection north to Peking, 754 miles distant by the Peking Hankow Railroad. Wuchang, on the opposite side of the Yangtse River, is the terminal of the Canton-Hankow Railroad. When this line is finished to Canton, there will be a direct rail connection between Wuchang and Canton and Kowloon, on the mainland opposite Hongkong. The distance to Kowloon will be 831 miles. In this district are located the Hanyang iron and steel works and the Tayeh iron and steel works of the Hanyehping Co. and the Yangtse Engineering Works.

*With Perin & Marshall, engineers, New York.

Hanyang Iron and Steel Works

These works are located at Hanyang in Hupeh Province, at the junction of the Han and Yangtse rivers, with Hankow on one side of the Yangtse and Wuchang on the opposite side. Here, in addition to the only steel furnaces and rolling mills in China, are two blast furnaces of German design, each with a capacity of 250 tons of pig iron per day. There are also two 100-ton blast furnaces that are obsolete and have not been in use for some years.

The 250-ton furnaces have eight Cowper hot blast stoves and vertical stock hoists, for handling hand charging barrows to the charging platform. The furnace top arrangement is of the Langen type, with a bell shaped charging hopper, an inner bell which seats on the lower flange of the charging hopper, a gas seal which seats on the top flange and a central bleeder pipe. The furnace gases pass through the center of the inner



Entrance to the Hanyang Works, near Hankow, China, Showing Primitive Means of Delivering Coke into the Plant. The coolies carry it in baskets from small sail boats which have brought it down the Yangtse River

bell and the bleeder pipe to a vertical downcomer, which connects with a series of three dust-catchers.

Blowing equipment consists of two Parsons compound, condensing turbo-blowers. Steam is generated in Lancashire and Babcock & Wilcox boilers using coal and blast furnace gas as fuel.

The handling of raw materials, supplies, labor and finished products to and from the works is by boat, as there is no direct rail or bridge connection with either Hankow or Wuchang. Coke is shipped from the Pinghsiang collieries in small sailboats and is handled into the works in baskets, with coolie labor. Iron ore and limestone, shipped from Tayeh in barges, is unloaded by grab buckets suspended from a cantilever crane. Because of the great variation in the level of the Yangtse River, it is possible, at times, to unload with the barges close to the wharf; again they must be unloaded from a point as much as 130 ft. out, which

the Hanyehping Co. and the Hupeh Government. The Government finally opened this mine in 1919 and began marketing the ore. Loading equipment and shops were built, as well as an independent railroad to the Yangtse River.

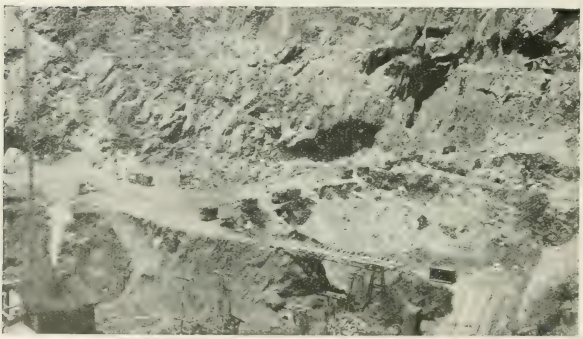
All of these iron ore deposits yield a high grade hematite with a ratio of ore to stripping of about 50 per cent. It is reported that they contain about 35,000,000 tons of ore. An average analysis of the ore will approximate the following percentages:

Fe	62	Al_2O_3	1.00
SiO_2	6.5	Ca	0.20
S	0.38	CaO	0.40
P	0.068	Moisture	2.90
MnO	0.42		

Coal and coke are obtained from the Pinghsiang collieries and coke ovens, at Anyuan in Kiangsi Province,



Ore for the Tayeh Works Is Obtained from the Tayeh Deposits, 19 Miles Away. It is an open pit working very rich in ore (Below)



Ore from the Working Face Is Carried in Baskets to the Mine Cars for Transfer to the Railroad (Above)

requires the use of a special crane with extra long cantilevers.

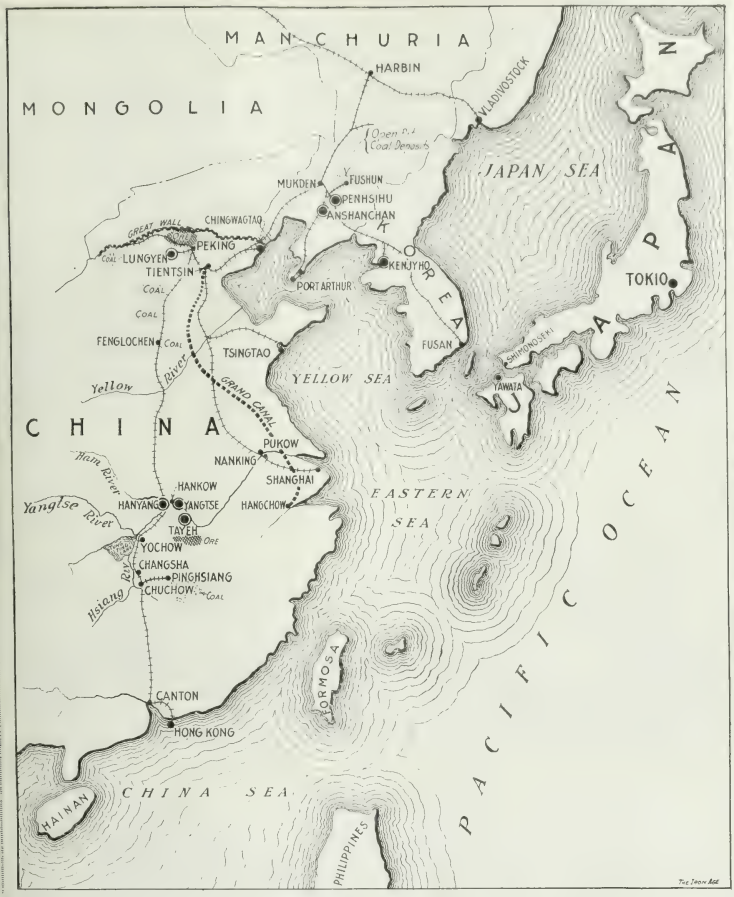
Iron ore is obtained from the Tayeh deposits in Hupeh Province, southeast of Hankow. These deposits include several mines known as Tiehtaowan, Tiehmankan, Shamantze and Tsinshan. From the present knowledge of these deposits the ore is confined to the tops of a range of hills, from which it is blasted, loaded into cars by hand and pushed to a double inclined plane. There are a number of such inclines which take the ore cars to a common level, leading to a crushing and sizing unit, and thence to a stocking trestle. The trestle is built over a tunnel so that ore can be drawn through gates into standard gage hopper cars. The ore cars are hauled a distance of 18 miles to the Yangtse River and an additional mile to the newly constructed Tayeh furnaces. This railroad is owned by the Hanyehping Co. The ore is unloaded by hand to a storage pile along the river and to barges for towing to the Hanyang works, or into steamships for delivery to Japan. The water haul to the Hanyang works is about 90 miles.

Adjacent to these ore deposits is the Ksiangpishan deposit, or generally known as Elephant Nose Mountain, whose ownership has long been disputed between

south of Hankow. The distance to the Hanyang works is about 315 miles. The normal means of transportation is by railroad to Chuchow, a distance of 60 miles, and thence by boat on the Hsiang River, Tungting Lake and the Yangtse River. In stages of low water an additional 32-mile rail haul is made from Chuchow to Changsha. With the completion of the Canton-Hankow railroad, between Changsha and Wuchang, there will be an all-rail connection between the mines and Wuchang, but it is doubtful whether, with the cost of rail transportation, the company will be able to compete with the combination rail and water route, with no direct connection between Wuchang and the works. The all-rail distance to Wuchang will be 378 miles.

The Pinghsiang mines are on the northern edge of the coal deposits which underlie a large part of the southwestern portion of Kiangsi and Hunan Provinces. The coal outcrop appears along the Ping River and extends in an easterly direction to Linkiang. The mines comprise an area of 5.2 square miles and were estimated by German engineers, before the war, to contain 500,000,000 tons of coal. There are two sections of these mines, the "adit," in which the coal is reached by tunnels, and the "shaft," which contains the shafts.

The coal is semi-anthracite, and is suitable for



The Seven Blast Furnace Plants in China Located

THREE plants centered around Hankow, in the South, draw their ore, coal and limestone from neighboring sources. Two plants in Southern Manchuria and one in Korea obtain their raw materials from those regions. The new Lungyen plant, near Peking, levies on ore and coal not far away, and other sources are being opened up.

Altogether, these seven plants contain fourteen blast furnaces, ranging from 100 to 400 tons capacity per day, but the two 100-ton furnaces at Hanyang are obsolete and may never again be operated. The active furnaces are as follows:

Hanyang	two of 250 tons
Yangtse	one of 100 tons
Tayeh	two of 400 tons
Penhsihu	two of 150 tons
Anshanchan	two of 200 tons
Kenjyho	two of 100 tons
Lungyen	one of 250 tons
Total daily capacity	2,550 tons

At 90 per cent of full operation, this would mean 840,000 tons per year.

coking. The coal measures incline from 15 to 20 deg., and the thickness varies from 8 in. to 35 ft., with many faults. Mining is confined to a seam which averages 16 ft. thick. The coal carries little sulphur and phosphorus, but the ash will vary from 20 to 35 per cent.

For coking, both native and foreign ovens are used. There are two batteries of German designed rectangular ovens aggregating 256 ovens, one on each side of a coal washery. No by-products are recovered. The average coke analysis by percentages follows:

Moisture	5 to 10	Ash	11.50 to 15.45
Volatile matter	1	Sulphur	0.50
Fixed carbon	82.50 to 62.99	Phosphorus	0.06

Tayeh Iron and Steel Works

This plant is located on the Yangtse River, in Hupeh Province, and 90 miles southeast of Hankow. It contains two modern blast furnaces, each with a rated capacity of 400 tons of pig iron per day. Construction work was started at the beginning of the war and the plant has only recently been completed.

The furnace site was originally at average high water level and has been filled an average of 11 ft., which is the highest known river level. The plant level is 59 ft. above the low water level, which indicates a possible variation of 48 ft. between the low and high levels. All of the filling material was obtained from surrounding hills, some of which had to be removed to make room for the plant and the town.

The two blast furnaces are located 131 ft. apart, with cast houses and slag granulating pit in the intervening space. The principal dimensions are: hearth, 15 ft. 6 in. diameter by 9 ft. 10 in. deep; bosh, 22 ft. diameter by 13 ft. 1½ in. high, and height of shaft, 90 ft. There is a straight 6-ft. section of shaft at the mantel, which tapers to the throat at ⅝ in. per foot. The brickwork in the hearth wall is 45 in. thick, while in the bosh wall it is 27 in. thick.

The hearth jacket is of steel plate, surrounded on the inside by a ring of cast iron cooling plates which are lipped over the steel jacket. The tuyere jacket is of cast metal, and the bosh is supported with a series of bands. The steel plate shell and mantle ring are carried on six cast iron columns. There are twelve tuyeres in the usual location and twelve auxiliary tuyeres directly below the mantle ring. There is also an auxiliary iron notch. The furnace bosh is cooled with bronze cooling plates.

The top platform is carried on a square 4-column steel structure extending from the ground level. There is a bridge connection between the two furnaces so that, in case of failure of one of the hoists, the charging hopper can be carried up the other skipway and transferred across this bridge. The furnaces have Kneeland tops and Otis electrically operated skip hoists. There is a single concrete steel trestle built over a tunnel, with gates through which the materials are charged into the Kneeland charging buckets.

Each furnace has three 22-ft. diameter by 100-ft. high 3-pass, hot blast stoves. The gas travels from the top of the furnace through a pair of downcomers, two dust catchers, a pair of tower washers, a pair of scrubbers and finally to the stoves and boilers.

The power house contains three Fraser-Chalmers blowers with Worthington surface condenser, two Fraser-Chalmers Rateau turbines connected to Vickers 1500-kw., 5000-volt generator, switchboard, etc. There are five 1000-hp. units of Babcock & Wilcox watertube boilers arranged to burn gas or coal and connected to a single concrete stack.

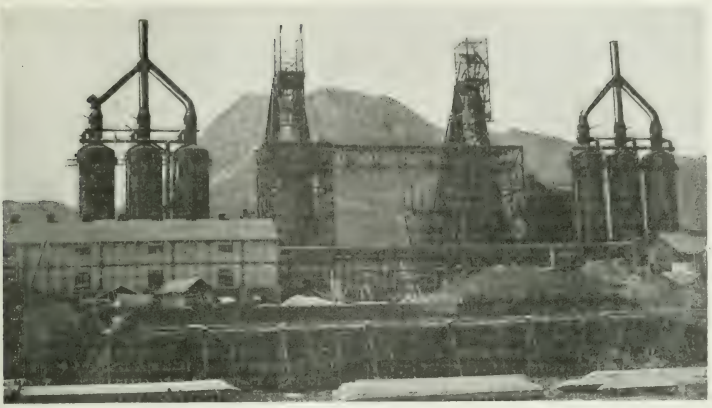
Water supply will be furnished by pumps located in a pump house with wheels to permit its being raised and lowered on the sloping river bank, to suit the varying levels of the Yangtse River. The water supply line is laid up the bank and contains several fittings with angle branches for connecting the pumps. The pipe line delivers water into a gravity water tunnel which leads to a settling, spraying and storage reservoir, from which it is pumped to a steel water tower.

The metal will be cast into 60-ton Pollock iron ladles and transported to a covered pig casting building, where it is poured into chilled pig beds. This building is served by a 10-ton crane and at each end there is an extension of the runway for storing pig iron.

The steel work for the blast furnace proper, consisting of hearth jacket, furnace shell, platforms, skip bridges, top and bottom rings for the stoves and the dome and cone bottoms for the dust catchers were furnished by Riter-Conley Co., Pittsburgh. The balance



Seven Miles East of Hankow, on the Yangtse River, Lies the 100-Ton Furnace of the Yangtse Engineering Works. The hoist house and counterweight tower appear at left of the skip hoist, with cast house in right foreground. There are four hot blast stoves



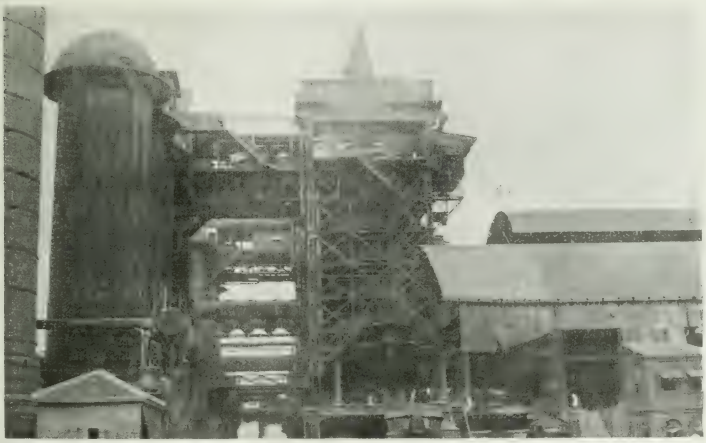
Casting Side of the Furnaces at the Tayeh Works. Each furnace has a capacity of 400 tons per day, the plant being modern in every respect and completed since the war ended

of the plate work was fabricated by the Yangtse Engineering Works from plate rolled at the Hanyang works. The castings were furnished jointly by the Yangtse engineering works and the shops at the Pinghsiang collieries.

Outside the works gate is a hospital and a building containing the police and fire departments and the town. The houses for the staff are two-story dwellings. They are built single, double and in blocks of varying design. There is a club house containing reception, reading, billiard and dining rooms and sleeping rooms for guests. The quarters for laborers are built in blocks. The town plot is well laid out and has all of the western modern improvements, including streets, lighting, sewage, water supply and fire protection.

Iron ore is obtained from the Tayeh deposits, which supply the Hanyang works also. The railroad haul is about 19 miles. Limestone is obtained from adjacent hills.

Coal and washed coal for coking are delivered by boat from the Pinghsiang collieries. The additional water haul of 90 miles makes the total distance from the mines 405 miles. The coal is unloaded by bucket and delivered over an overhead cableway to a large concrete



At Hanyang Are Two 250-Ton Furnaces of German Design, as Well as Two Obsolete Furnaces of 100 Tons Which Have not Been Operated for Some Years

storage pocket, located directly back of the boiler house. This pocket contains a series of hoppers which are elevated so as to discharge the coal into cars for shipment to beehive ovens, located back of the blast furnace. Coke is carried to the furnace skips in buckets ready for hoisting and charging.

Yangtse Engineering Works

This concern operates foundry, machine and structural shops near Hankow. During the war it was found difficult to obtain a source of pig iron at a reasonable price, so a 100-ton capacity blast furnace was built to insure a supply of iron. The plant is located on the Yangtse River about 7 miles east of Hankow and, like the Hanyang works, has no direct connection with a railroad. This furnace enterprise was based upon purchasing raw materials in the open market.

The furnace is of modern construction and has steel plate hearth and bosh jackets and shell, supported on six cast iron columns. The furnace top is of the double bell type. It is filled with a single skip bucket which travels on an inclined skipway. The dimensions of the furnace are: hearth, 8 ft. 5 in. diameter by 6 ft. 3 in. high; bosh, 13 ft. 3 in. diameter by 10 ft. 5 in. high; throat, 7 ft. 9 in. diameter, and shaft, 65 ft. high. There are four hot blast stoves, 14 ft. diameter by 70 ft high. The designs for the furnace were furnished by Perin & Marshall, engineers, New York.

Material Fabricated in the Works

All of the materials were made in the Yangtse shops with the exception of the steel plate, bricks, boiler tubes and engines. The company built four watertube boilers, which are arranged to burn blast furnace gas and coal. Because of the war it was impossible to secure suitable blowing engines and three old rolling mill engines were shipped from the United States and England. Allis-Chalmers Co. furnished drawings for the air ends and a few sample air valves. From these three blowing engines were built. One of the engines was connected through sheaves and rope drive to an electric generator and is arranged so that when used for this purpose the air end can be disconnected. The air ends connect with an underground air duct and a pair of vertical tubular water coolers for cooling the air and removing its moisture.

There are no mechanical means for handling and stocking the ore, coke and limestone, nor are there any arrangements for filling the skip bucket other than the usual hand buggies.

Iron ore is obtained from a number of sources, including the Hupeh Government mine at Tayeh. Coal and coke come from the Luhokou Coal & Coke Co., whose mines and native coke ovens are located in Honan Province, 13 miles from Fenglochen, on the Peking-Hankow Railroad. Fenglochen is about 448 miles north of Hankow.

This mine is operated with a single shaft extending 230 ft. to a 12-ft. seam of coal which contains about 0.35 per cent of sulphur and 0.045 per cent of phosphorus. Here coke is made in native ovens which are from 12 ft. to 18 ft. diameter and about 8 ft. deep, with walls projecting about 2 ft. above the ground. In the center is a fire hole leading to an air flue which leads to the outside surroundings and around the top of the projecting wall are draft holes. The coal fines are spread in the ovens and tamped in layers and the top covered with a coating of clay. The ovens are lighted at the bottom fire hole and the coking turnover is done in an 18-day cycle, with a recovery of one ton of coke from 1.8 tons of coal. The coke will average about 20 per cent ash. Coal and coke for the new furnace of the Lungyen mining administration will also be shipped from the Luhokou mines.

Manchurian District

In this district are located the furnaces of the Penhsihu Coal & Iron Co. and the Anshan Steel Works. Penhsihu is a joint Japanese and Chinese enterprise under the management of Okura & Co., while Anshan is one of the many industrial developments of the South Manchurian Railroad.

Penhsihu Coal & Iron Co.

This plant consists of two blast furnaces, each with a rated capacity of 150 tons of pig iron per day. The furnaces are at Penhsihu, about 45 miles southeast of Mukden, on the main line of the South Manchurian Railroad. One furnace was completed in 1914 and the second in 1918. The company operates a briquetting plant in connection with the blast furnace and a concentrating plant at Nanfen.

Manchuria contains large deposits of minerals, particularly magnetic iron ore, having an iron content averaging 35 per cent coal, etc., which lie around Penhsihu as a center. The ore for this furnace plant comes from Miaoerkow, 24 miles distant, and coal comes from mines at Penhsihu. Coking is done in beehive ovens.

This furnace plant and minerals were fully described in the Feb. 7, 1918, issue of THE IRON AGE, page 386.

Anshan Steel Works

This plant is located at Anshan, on a branch line of the South Manchurian Railroad which extends from Mukden to Port Arthur. There are two 200-ton capacity blast furnaces built in 1919 and 1920 and four batteries of Koppers by-product coke ovens.

Iron ore comes from mines at Anshan and coal from Fushun, about 22 miles southeast of Mukden. The Fushun coal mines are reported to contain 1,200,000,000 tons of bituminous coal, with seams varying in thickness from 78 ft. to 430 ft. Mining is carried on in open pit mines, with steam shovels, as well as in slope mines.

Korean District

At Kenjyho, on a branch line connecting with the South Manchurian Railroad at Hrijyo, is the Kenjyho Works. This plant, under the management of the Mitsubishi Co., contains two blast furnaces, each of 100 tons capacity per day, and a battery of 50 Wilputte by-product coke ovens.

Peking District

In 1918 the Lungyen Mining Administration was formed to develop minerals and build a blast furnace, with the Chinese Government holding a half interest in the company. A site for the furnace was selected at Shiechinshan, in Chili Province, about 11 miles from Peking on the Peking-Mentowkow Railroad and about 100 miles from Tientsin. The blast furnace represents the latest practice in American design, and is intended to be the first unit of the first steel plant in North China. Perin & Marshall are the consulting engineers.

Iron ore, oolitic in form and averaging about 50 per cent iron, will come from recently discovered iron deposits at Hsuanhwa, in Chili Province. The ore will be transported south, a distance of 110 miles, to the furnace over the Peking-Suiyuan railroad to Peking, and thence to the plant over the Peking-Mentowkow. Coal and coke will be secured from the Luhokou Coal & Coke Co.'s mines in Honan Province, and will be shipped from Fenglochen, north over the Peking-Hankow railroad, a distance of 306 miles. Limestone will come from newly opened mines 8 miles from the plant and will be shipped over the Peking-Mentowkow railroad.

There exist large undeveloped deposits of coal at Tatung, in Shensi Province, along the Peking-Suiyuan railroad, and which may be a source of future coal supply for this plant. By the use of Tatung coal, the delivery will be confined to a single railroad and the haul reduced from 306 miles to 230 miles.

(To be continued)

A cast steel frog, made of titanium treated steel, has been put on the market by L. A. Green, 1113 First National Bank Building, Pittsburgh. It is marketed under the name "Durabil Frog." Several advantages are claimed for its use.

X-Ray Examination of Irregular Metals*

New Method, Using Methyl Iodide as an Absorber, Described as Rapid, Inexpensive and Applicable Commercially

BY DR. ANCEL ST. JOHN

HITHERTO *X*-ray examination has been restricted to objects of nearly uniform thickness and regular outline; the inspection of such articles as those shown in Fig. 1 has been inconvenient and unsatisfactory. This group is made up of 5/16-in. hexagonal-head machine bolts, a piece of iron pipe, a brass lens-holder from an optical bench, a ⅜-in. hexagonal head machine bolt, two ¼-in. rough sections of 1-in. bar stock, a brass thumbscrew, a piece of ¼ by

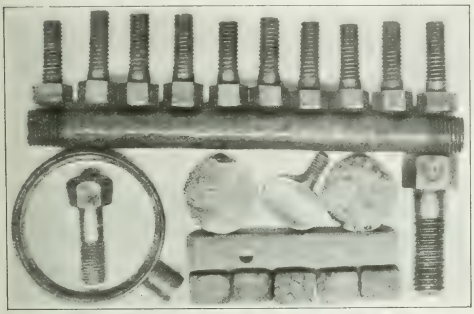


Fig. 1.—Group of Irregular Objects to Be Radiographed

½-in. brass bar, five pieces of cobalt, and half of a ½-in. cold-headed machine bolt which has been cut in two lengthwise.

The transparency to *X*-rays of all parts of the region exposed at one time must be of the same order of magnitude, otherwise the portions of the fluorescent screen or photographic negative corresponding to the most transparent parts will be materially overilluminated when the illumination for the least transparent parts is correct; essential details will consequently be obscured. This is shown in Fig. 2, which is a radiograph of the group of objects of Fig. 1 exposed so as to bring out the defect in the head of the ½-in. bolt and some cracks in the cobalt.

To overcome this difficulty, the author has developed a method of mounting specimens that makes possible the examination of such objects. Fig. 3 is a radiograph of the same group of objects by the new technique, exposed so as to bring out the defects referred to. Not only are the outlines of the objects clearly defined but many structural details, not apparent in Fig. 2, are easily discerned. The method is simple, rapid, and inexpensive and can readily be used on a commercial scale.

In this method, the specimens are surrounded with a medium of slightly different transparency to *X*-rays in a container with opaque walls and parallel transparency of the entire field is made of the same order of magnitude. If the absorptive power of the surrounding medium is less than that of the specimen, its transparency will be greater and more *X*-rays will pass through it than through the specimen, which will thus appear as a darker area, as shown in Fig. 3. But if the absorbing power of the medium is greater than that of the specimen, less *X*-rays will pass through it than through the specimen, which will then appear as a lighter area, as in Fig. 4. Here the absorber used for Fig. 3 has been replaced by a more opaque medium with a transparency less than iron or cobalt but greater than brass. In general, it is preferable to have the medium less absorbent than the specimen, as the time required for a satisfactory exposure increases rapidly with the absorption. There are cases where the more absorbent medium is useful; for instance, it is thus possible to distinguish indentations on the surface from cavities in the interior; the former, being filled with absorber, would be darker, while the latter, being empty, would be lighter.

Liquids as Absorbers

Before investigating the suitability of various materials as absorbers for use with tool metals a series of bars of tool stock was examined and a few containing interesting defects were selected as test specimens. Many absorbents were then studied. Granular substances give much the same appearance as spongy structures in the specimen and are useless. Fine powders are better but it is next to impossible to pack them uniformly when dry; when mixed with water, oil or grease to form a paste, they tend to occlude air, forming cavities indistinguishable from blowholes in the specimen. The best substance is a liquid.

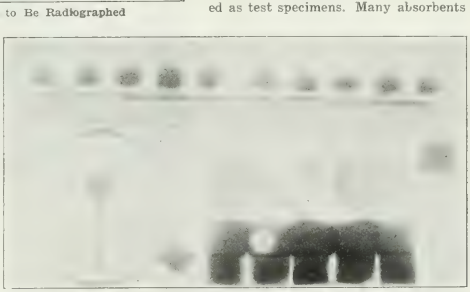


Fig. 2.—Radiograph When Transparency to X-Ray of All Parts Is Not of Same Order of Magnitude

The choice of liquids is restricted to compounds of high density, containing a constituent of high atomic weight so that the *X*-ray absorption may be high. Convenience demands that the liquid should not react appreciably with the materials to be examined, should mix in all proportions with a common liquid, and should be non-volatile. Of the numerous liquids tested, methylene iodide, CH_2I_2, has proved most satisfactory.

*Abstract of a paper to be presented at the Canadian meeting of the American Institute of Mining and Metallurgical Engineers in Montreal, Aug. 30. The author is with the Research Laboratories of the Union Carbide & Carbon Co., Long Island City, N. Y.

Its density is 3.34 gm. per cu. cm.; its principal constituent, iodine, has a very high *X*-ray absorption, so that it can be used with alloys containing 25 per cent of tungsten; it mixes in all proportions with benzine, so that dilutions suitable for use with less absorbent alloys can be made; it is less volatile than water; and it reacts but slightly with most metals. Its objectionable features are a characteristic and persistent odor, a tendency to react with aluminum, and a rather high price. The actual cost in service, however, can be kept low by rinsing specimens and containers in benzine after exposure, saving the rinsings, and using them to replace benzine lost by evaporation from the dilute solutions. In this way one lot has been used day after day for nearly six months with a wastage of about 10 per cent. The reaction with aluminum is a decomposition accompanied by the evolution of heat and the liberation of iodine vapor. It occurs suddenly after the metal and liquid have been in contact for some time and is apparently encouraged by the presence of other metals in contact with the aluminum, by heating, and possibly by exposure to *X*-rays. It can be avoided by rinsing specimens and vessels at once after making an exposure.

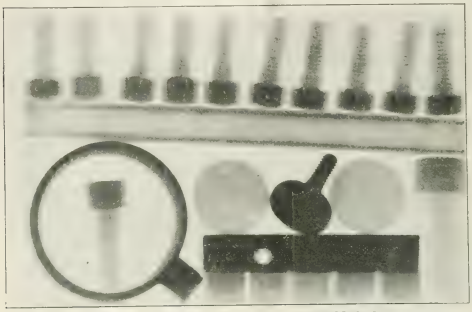


Fig. 3.—Radiograph Made by Author's Method

When the methylene iodide was first used, the specimens were immersed in the liquid contained in an aluminum pan. After an experience with the reaction mentioned, a container with lead walls and celluloid faces fastened together with celluloid cement was devised; this is shown in Fig. 5. These containers are easily made to suit any thickness of material and can be adapted for use with the faces horizontal, vertical, or at an intermediate angle, say 45 deg.

Smallest Cavities Which Can Be Found

To gain some idea of the size of the smallest cavity that could be detected with certainty, a penetration meter was made; this consists of a set of aluminum strips 0.008 in. thick fastened together with the ends offset to form a series of shallow steps. In Fig. 6, *A* shows the penetration meter on a bar 1 in. wide and 3/16 in. thick, containing no tungsten; *B* a 7/32-in. round rod of the same stock; *C* a 7/32-in. round rod containing 6 per cent tungsten; *D* a ¼-in. square bar containing 3 per cent tungsten; *E* a 5/16-in. square bar containing 16 per cent tungsten; and *F* a 5/16-in. round rod containing 5 per cent tungsten, all immersed in ½ in. of a 70-per cent solution of methylene iodide in benzine. A single step of the meter makes a distinct difference in the density of the radiograph; and as differences of the same character are observable in *B* it is evident that cavities only 0.008 in. thick can be detected. The outlines of bar *D* are distinguished with difficulty on account of the great similarity in transparency of this bar and the medium; this suggests the possibility of supporting small objects in frames of sheet metal, say copper, and diluting the liquid until its absorption is the same as that of the frames. These would then not be visible in a radiograph.

This figure also exhibits the three types of cavities observed during the investigation. The spots in *E*, the rounded portion of the large spot near the right-hand end of *D*, and the rounded part of the principal spot in *C* are blowholes. The jagged spots in *D*, the transverse spots in *F*, and the distinctly transverse spots in *B* are shrinkage cavities. The cloudy area near the left-hand end of *F*, the thread-like patches in *C*, and the faint patches in *B* are spongy structures like that in Fig. 6. None of these specimens had slag inclusions. Distorted remnants of these are, however, observable in Figs. 3 and 4. The straight filaments through the heads and even through the entire length of several of the 5/16-in. bolts are due to slag that has been drawn out during the rolling. The fact that these are not further distorted in the bolt heads shows that these bolts were cut from hexagonal bars and not cold-headed. In the latter case, they would have been spread out transversely, like the flaw in the fragment of the ½-in. bolt, which is known to have been cold-headed. The rest of the slag filament is probably in the other half of the bolt.

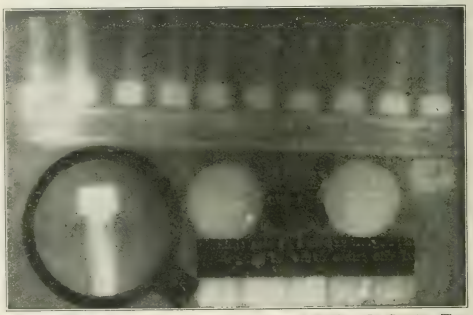


Fig. 4—Radiograph When Absorbing Power of Medium Is Greater Than That of Specimen

Variety of Objects Examined

To show the variety of objects examined in this way, a few examples have been selected at random. Fig. 7 shows a set of races for ball bearings; Fig. 8 shows 98 forged balls for use with such bearings, 90 of which have no detectable flaw, the remaining 8 being faulty. Fig. 9 shows two plug gages of tool metal containing considerable tungsten cast upon steel cores; one of these has no detectable flaw, the other has marked defects within 0.02 in. of the surface. These radiographs were all made on the rough forgings before any machine work was done. The faulty balls and the defective plug gage were, of course, rejected. Without inspection, the defect in the gage would have been encountered after considerable expensive machining had been done, that is, in the course of manufacture. The flaws in the balls would probably have escaped attention until they failed in service.

These two examples illustrate two cases in which routine *X*-ray inspection may be justified. In the first, it is a question of dollars and cents. If the manufac-

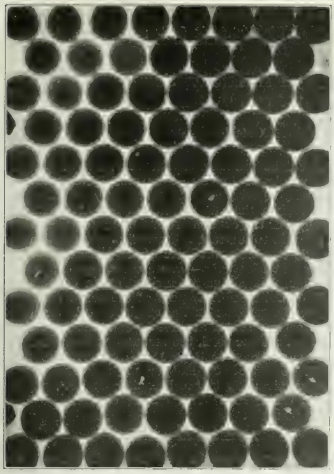


Fig. 8.—Radiograph of Forged Balls for Use in Bearings

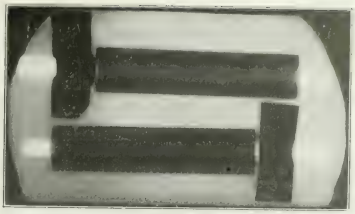
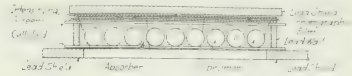


Fig. 9.—Plug Gages

successfully and by the difficulties encountered in mounting specimens of varying thickness or irregular shape. But Lester shows that steel 3 in. thick can be radiographed in ½ hr. with apparatus now on the market. When the demand justifies the expense, the makers of tubes and generating plants will undoubtedly develop apparatus extending this limit considerably. The present paper has shown that good radiographs of objects of any external form can be secured with the new procedure and that the procedure itself is simple. The limitations hitherto imposed by shape have thus been removed. It is therefore permissible



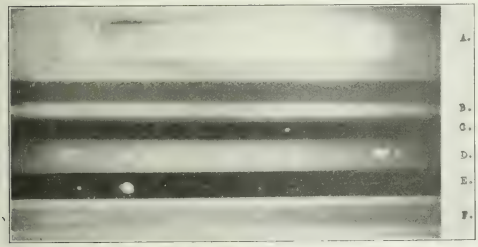


Fig. 6—Illustrating the Use of a Penetration Meter

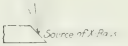


Fig. 5—Arrangement of Apparatus for Radiographing Objects of Varying Thickness

turing procedure cannot be developed so as to eliminate obnoxious defects, and if the cost of machining before the eventual rejection is large compared with the cost of *X*-ray examination, inspection before machining would be profitable. In the second case it may be a question of reputation, or even a question of human safety; in the latter case the cost should not figure. As a matter of fact, routine inspection should not be very expensive.

Value of the New Method

The value of radiographic examination in the development of new products and new processes cannot be too greatly stressed. A single radiograph gives more information as to the character and extent of cavities and inclusions than a great number, one is tempted to say than any number, of sectionings and does so without damaging the specimen. It is thus possible to submit a specimen containing known defects to various mechanical tests and to correlate the results to the internal structure disclosed by the radiograph, or to section it at the places most favorable for direct examination of the defects. This use of *X*-rays has been discussed by Lester.*

For a long time the use of *X*-ray examination in the metallurgical industry has been limited by the comparatively thin specimens that could be penetrated to say that any object that can be penetrated sufficiently by the *X*-rays can now be radiographed successfully.



Fig. 7—Ball-Bearing Race

*"X-Ray Examination of Steel Castings," *Chem. & Met. Eng.* (1923) 28, 261-267.

New Testing Methods for Castings—II*

Discussion of Elastic Limit, Modulus of Elasticity, Sound Tests, Compression Tests and the Bar Test—Comparisons With Brinell Hardness

DURING the war, Mr. Portevin had occasion to test a good many defective shells made of semi-steel. His opinion on the value of artillery methods was given previously. In consequence, he tried to find better and speedier methods for determining the value of castings. Although his observations refer only to semi-steel, they can be used also in foundries, because many defective shells were no better than ordinary castings with a low percentage of phosphorus. His methods should, however, be verified as regards higher phosphorus castings, before any definite conclusions can be drawn therefrom.

Having stated that test bars give an indication of the value of shells, Mr. Portevin made experiments to find the relation between those results produced by the bar under ordinary conditions and those tension and compression tests which were taken with all the possible care for giving precision as great as possible. The compression test was considered important, not only because castings are often used under compression, but because one of the most important points for shells is that the base should resist an enormous compression strain at the moment the shell is fired. The majority

It should be understood that the limit of proportionality employed by Mr. Portevin, instead of the elastic limit, figures on this table only in the case where a straight line can be more or less distinguished at the origin of the curves. It can be noted that, when it was possible to indicate a limit of proportionality, it is generally less than one-third of the breaking strain.

Modulus of Elasticity.—These curves permit determining Young's modulus for inclination on the axis of the loads of the rectilinear part of the curve (when it exists), or the tangent at the origin of this curve in the other cases. It can at once be seen that, contrary to what happens for steel, the modulus varies considerably. It runs from 4000 to 11,500 kg. per sq. mm. (5,700,000 to 16,350,000 lb. per sq. in.) and varies about proportionately to the breaking load *Rt*, as can be seen in the figures. This can be expressed by the empirical formula:

$$Mt = 325\,Rt + 1{,}150.$$

The strongest castings are those which have the highest modulus. They are therefore less deformable and a good deal more influenced by the parasitical

TABLE I

Reference to Diagram	CHEMICAL ANALYSIS: (c) Total Carbon	(c) Graphitic Carbon	Si	Mn	P	S	TENSION TEST (1): Load at Rupture Rt	Limit of Proportionality Et	Modulus of Elasticity Mt	COMPRESSION TEST (2): Load at Rupture Rc	Limit of Apparent Elasticity Ec	Diameter of Swelling a	Diametral Swelling s	Hardness Test (3) D	STATIC BEND TEST (4): Load at Rupture Rf	Deflection at Rupture f
	%	%	%	%	%	%	Kg/mm2	Kg/mm2	Kg/mm2	Kg/mm2	Kg/mm2	%		No.	Kg	mm
Fig. 9	3 82	3 25	1 50	0 75	0 12	0 14	7 1	...	2,900	36 6	22	9	0 17	105	...	...
Curve A, Fig. 11	3 65	2 95	1 56	0 77	0 11	0 15	13 4	(3)	6,600	62 1	27	15 9	0 27	131	675	0 28
Curve B, Fig. 11	3 67	2 93	1 48	0 64	0 10	0 16	11 7	...	6,300	64 1	30	17 5	0 27	143	725	0 35
Curve CN2, Fig. 10	3 48	2 86	1 47	0 61	0 06	0 12	11 8	...	6,100	65 5	32	18 7	0 34	149	740	0 32
220-shell swelled, Fig. 12	3 71	3 30	1 30	0 78	0 16	0 19	15 7	7	7,100	61 1	32 5	24 4	0 44	143	...	...
Curve CN1, Fig. 10	3 50	2 87	1 44	0 70	0 05	0 12	17 4	...	7,903	66 7	37	17 2	0 30	149	750	0 38
220-shell swelled, Fig. 13	3 23	2 70	1 13	0 62	0 09	0 19	20 0	4 4	9,600	77 7	39	24 4	0 41	163	...	...
Curve C, Fig. 11	2 97	2 65	1 27	0 65	0 07	0 22	21 4	(6)	9,300	100	50	28 1	0 50	187	925	0 30
Test bar, Fig. 14	3 44	2 73	1 24	0 76	0 16	0 14	26 7	7 4	11,500	105	50	23 8	0 35	207	...	...

(1) On a test bar 16 mm. (⅝ in.) in diameter and 150 to 200 mm. (6 to 8 in.) in length for the part calibrated.
(2) On a cylinder 16 mm. high and 16 mm. in diameter.
(3) Bar of 10 mm. (0.4 in.) load 3,000 kg. (6,600 lb.), hardness test for 15 seconds.
(4) On a test bar of 10 x 10 x 65 mm. (0.4 x 0.4 x 2.56 in.), distance between supports: 30 mm. (1.2 in.), knife edge width: 2 mm. (0.08 in.)

of defective shells that were tested had exploded on a firing test which was systematically made on some shells taken at random from each lot.

Realizing the importance of the ever-present bends on the results of tension tests, Mr. Portevin took special precautions to avoid all chances of error, by employing the long and tedious but sure method of mirrors.

Elastic Limit.—He found it difficult to determine a value for the elastic limit of castings. The curves obtained in observing the deformations corresponding to the strains, Figs. 9, 10 and 11, show no straight path. The properties of the metal, therefore, can be determined only by the complete curve. Figs. 12, 13 and 14 give the curves for some specimens. The nine castings experimented with gave breaking loads at tensions that varied between 7 and 27 kg. per sq. mm. (10,000 and 38,400 lb. per sq. in.). Table I sums up the total of the chemical and mechanical characteristics of these castings.

bends. This is another reason for forbidding the ordinary bending tests for castings.

Sound Tests.—The sound test was tried during the war by a special commission, as a means to investigate shells. It was found that:

(a) for steel shells the sonority test gives a useful indication, on the basis of the duration of the sound;

(b) in semi-steel shells the volume of the sound gives an idea of the quality of the metal; for a like model of shells, the duller the sound, the poorer the metal.

Consequently the sound test was retained, to give an idea of the quality of the metal in semi-steel shells and not for steel shells. The above conclusions relative to the modulus of elasticity explain the reason. It is known that the volume of the sound resulting from striking a solid depends on the speed of propagation of the sound in this solid. This speed increases as the square root of the modulus of elasticity. Now, for ordinary carbon steel the modulus is about the same, and the thermal treatments effect variations of only about 10 per cent, while for semi-steel they vary from 1 to 3, that is to say, 100 per cent either side of

*Paper presented by E. Ronceray, to the Institute of British Foundrymen, in the name of the Technical Foundrymen's Association. Translated by E. J. Lowry, Hickman, Williams & Co., Pittsburgh. The first section appeared in our issue of Aug. 16, page 393.

the average value. It is easy to find out from the sound which are the best shells in a lot. This remark may be of considerable interest in practice.

Compression Tests.—Castings in current practice are, as much as possible, employed at all times under compression. The start of the "shot" compresses the rear part of the shells so that the deformation by swelling, at this moment, can become extremely serious.

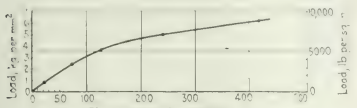


Fig. 9—Diagram of Tension Test of Test Bar Coming from a Semi-Steel Shell of 155 mm. (6⅛ in.) Diameter. Rupture occurred at 7.1 kg. per sq. mm. (10,100 lb. per sq. in.)

In fact, this is the only important deformation to consider when ascertaining the analysis of a metal for firing. Consequently, it seems important to determine the properties of the metal at compression. The compression tests call only for simple and short test bars. Hence, we have another reason for doing away with

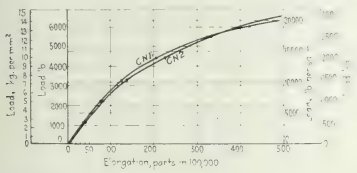


Fig. 10—Diagram of Tension Tests of Two Test Bars Coming from a Semi-Steel Shell of 220 mm. (8.66 in.) Diameter. Rupture of *CN*1 occurred at under 5480 kg. (12,080 lb.), representing 17.4 kg. per sq. mm. (24,750 lb. per sq. in.); of *CN*2 at 14.8 kg. per sq. mm. (21,050 lb. per sq. in.)

the tension test and using the compression test in its place.

Mr. Portevin has made experiments on cylinders of 16 mm. diameter and 16 mm. height (⅝ x ⅝ in.) and has recorded the diagram by means of a testing machine. The breaking strain and the elastic limit were

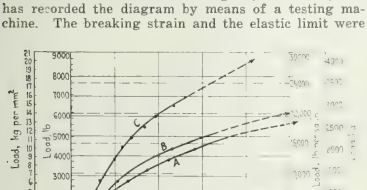


Fig. 11—Diagram of Tension Tests of Three Test Bars. Rupture of *A* occurred at under 2700 kg. (5950 lb.), representing 13.4 kg. per sq. mm. (19,050 lb. per sq. in.); of *B* at under 2950 kg. (6500 lb.), representing 14.7 kg. per sq. mm. (20,900 lb. per sq. in.); of *C* at under 4300 kg. (9480 lb.), representing 21.4 kg. per sq. mm. (30,430 lb. per sq. in.)

observed. Moreover there were measured on the test bars, after the test, the contraction and the expansion. Owing to the small length of the samples it has not seemed desirable to try to obtain the modulus of elasticity at compression. On the contrary, one of the advantages of the bending test is to give a chance to the investigator to calculate the coefficient of elasticity.

For the castings experimented with (see Table I), the loading strain at tension *Rt* is about one-fourth to one-fifth of the breaking strain at compression. The approximate empirical formula giving comparative results can be expressed thus:

$$Rc = 2.5\,Rt + 18.$$

From a much more extended series of determinations (about 100) results the elastic limit at compression, *Eac*, which can be expressed by the following empirical formula for the test bars of 16 mm. in length:

$$Eac = 0.2\,Rc + 20.$$

Limits and Elastic Moduli at Tension and at Compression

It would be absurd to compare the elastic limits at tension and at compression of Table I, as the experimental conditions were not sufficiently precise, and also because the definition is too conventional. The dimensions of the test bars for tension and compression are very different, and Mr. Portevin has thought it desirable

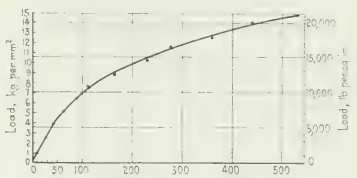


Fig. 12—Diagram of Tension Test of Bar Taken from Semi-Steel Shell of 155 mm. (6⅛ in.) Diameter, Swelled at the Base on Firing. Rupture occurred at 15.7 kg. per sq. mm. (22,650 lb. per sq. in.); the elastic limit was reached at 8.96 kg. per sq. mm. (12,650 lb. per sq. in.); modulus of elasticity, 7100 kg. per sq. mm. (10,100,000 lb. per sq. in.)

to make new tests to obtain precise data relative to the firing test on shells. Test bars of the same dimensions were chosen (Fig. 15). The same precise testing methods were employed.

To avoid all trace of imperfect results on the compression test bars, it was necessary to use short test bars. The length is twice the diameter, for the test of

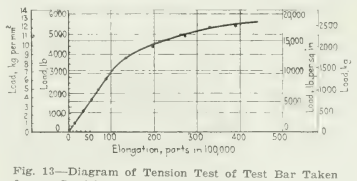


Fig. 13—Diagram of Tension Test of Test Bar Taken from a Semi-Steel Shell of 293 mm. (11.6 in.) Diameter. Rupture occurred at 20 kg. per sq. mm. (28,450 lb. per sq. in.); the elastic limit was reached at 4.4 kg. per sq. mm. (6250 lb. per sq. in.); modulus of elasticity, 9100 kg. per sq. mm. (12,940,000 lb. per sq. in.)

both tension and compression bars. The mirror method was employed. The distance between knives was from 50 to 55 mm. (2 to 2⅛ in.). Three tension test bars and three compression test bars were taken out in bars of 60 mm. (2⅜ in.) diameter, that had been run successively with the same ladle of semi-steel.

The enlargement of the longitudinal deformations was about 700 fold, while the diameter of the test bars was made to the hundredth of a millimeter (1/2540 in.). The variations in length were observed on two opposite points of generation and noted every 500 kg. (1102 lb.), which arrangement led to an approximate speed

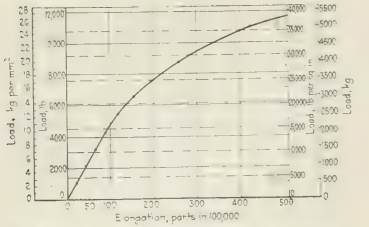


Fig. 14—Tension Test of a Test Bar from a Semi-Steel Shell

of 1200 kg. (2645 lb.) per minute. At the start the observation of the deformations under weak loads permitted the interposing of lead bushings in the mount-

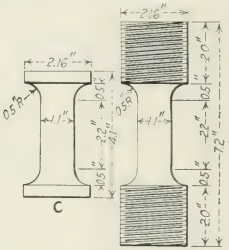


Fig. 15—Test Bars for Compression (*C*) and Tension (*T*) Tests. The cylindrical bodies at 28 mm. (1.1 in.) should be exactly calibrated. The base of the compression bar is squared off and accurately faced. Keep the center holes in the ends of the tension bar, these ends being threaded with a pitch of 5 mm. (about 5 threads per in.)

ings, so as to reduce the lateral strain to a minimum. The elongations and shortenings were determined at about 1/50,000 of the length of the measure.

The metal tested was of a quality of average

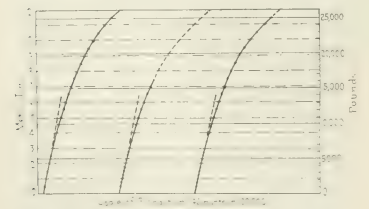


Fig. 16—Tension Tests of Semi-Steel Bars with Sections of 616 sq. mm. (0.955 sq. in.) Giving the Following Results (See Also Table II):

	TB1	*TB2*	*TB3*
Load at limit of proportionality in kg	2,000	2,500	2,250
In pounds	4,400	5,500	4,950
Limit of proportionality in kg. per sq. mm	3.2	4.1	3.6
In lb. per sq. in	4,550	5,830	5,120
Elongation per cent at the limit of proportionality	0.026	0.033	0.029
Modulus of elasticity at tension in kg. per sq. mm	12,700	12,250	12,650
In thousands of lb. per sq. in.	18,060	17,420	17,990

strength under tension, about $Rt = 25$ kg. per sq. mm. (35,500 lb. per sq. in.). The results of the experiments are shown in Table II, and the diagrams Figs. 16 and

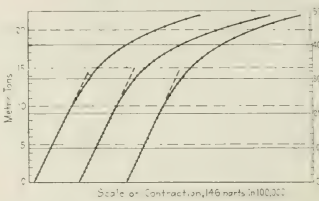


Fig. 17—Compression Tests of Semi-Steel Bars with Sections of 616 sq. mm. (0.955 sq. in.) Giving the Following Results (See Also Table II):

	CB1	*CB2*	*CB3*
Load at limit of proportionality in kg	8,000	7,500	6,500
In pounds	17,630	16,530	14,330
Limit of proportionality in kg. per sq. mm	13.0	12.2	10.6
In lb. per sq. in	18,500	17,350	13,070
Contraction per cent at the limit of proportionality	0.115	0.104	0.086
Modulus of elasticity at compression in kg. per sq. mm	11,300	11,800	12,300
In thousands of lb. per sq. in	16,070	16,780	17,490

17. It may be said that the limit of proportionality to tension is:

$Ept = 3.5$ kg. per mm.^{2} $= 4975$ lb. per sq. in.

Limit of proportionality to compression:

$Epc = 12$ kg. per mm.^{2} $= 17{,}040$ lb. per sq. in.

The following remarks can be made:

(a) The strengths under tension and at compres-

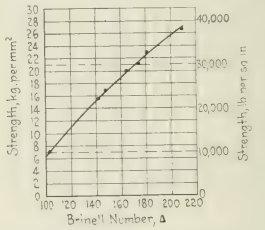


Fig. 18—Relation Between Brinell Hardness Number (Δ) of Semi-Steel and Its Strength in Tension

sion are about in the relation given by the empirical formula:

$$Rc = 2.5\,Rt + 18.$$

(b) The above formula gave for the values of Rt

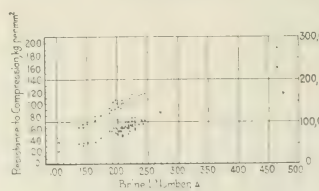


Fig. 19—Relation Between Brinell Hardness Number (Δ) of Semi-Steel and Its Strength in Compression. The dots in the upper band of plotted results represent $Rc\left(=\frac{\Delta}{2}\right)$, load at rupture under compression. The crosses in the lower band represent *Ec* or *Q4* (Δ—50) the limit of apparent elasticity under compression

and *Rc*, which are found on an apparent elastic limit, $Eac = 50$ kg. per mm.² (71,000 lb. per sq. in.), while the experiments have given only 32 kg. per mm.² (45,500 lb. per sq. in.). The reason is that the test bars were five times longer and also that the precision was greater. It can be seen by the form of curves that this can make a great difference.

(c) The rule often given, that the elastic limit at compression is equal to three times its elastic limit at tension, is absolutely fantastic. The relation between these two characteristics can vary from 1 to 4, following the conventional definition adopted and the precision of the measurements. This is because of the fact that the length of the test bars employed for the tension test and the compression test is very different. Consequently, a comparison will do no good.

(d) In the same way as for steel, the moduli of elasticity at tension and at compression are practically equal, the mean value being approximately 12×10^3 kg. per mm.² (17,040,000 lb. per sq. in.).

There is a considerable discrepancy between the values found by the limit of proportionality $Epc = 12$ kg. per mm.² (17,040 lb. per sq. in.) and the apparent limit of elasticity $Eac = 2$ kg. per mm.² (2,845 lb. per sq. in.), which, owing to the condition of the test, can be given as maximum and minimum limits of the actual limit of elasticity.

Hence it can be said that, for a semi-steel casting at 25 kg. per mm.² (35,500 lb. per sq. in.) of breaking load at tension, the limit of the permanent deformations at compression is between 10 and 30 kg. per mm.² (14,200 and 42,650 lb. per sq. in.). In fact, under a load of 20 kg. per mm.² (28,450 lb. per sq. in.) at compression, there is a slight permanent contraction of 0.013 per cent (the total contraction under load being 0.16 per cent), but to place it in evidence, it is necessary to have the measurements taken at about 1/50,000 of the length.

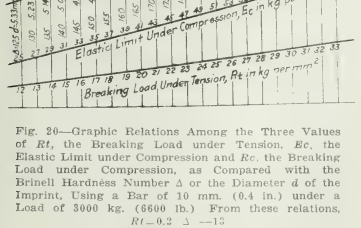


Fig. 20—Graphic Relations Among the Three Values of *Rt*, the Breaking Load under Tension, *Ec*, the Elastic Limit under Compression and *Rc*, the Breaking Load under Compression, as Compared with the Brinell Hardness Number Δ or the Diameter d of the Imprint, Using a Bar of 10 mm. (0.4 in.) under a Load of 3000 kg. (6600 lb.) From these relations,

$$Rt = 0.2\ \Delta - 13$$
$$Rc = 0.5\ \Delta - 5$$
$$Ec = 0.4\ \Delta - 25$$

Table II—Mechanical Tests
(Tension and compression on semi-steel at 25 kg. per mm² of tensile breaking strength)

Nature of the Test	Mark of the Test Bars	Limit of Proportionality (1)	Limit of Apparent Elasticity (2)	Deformation: Load at Rupture	Deformation: In Length—At the Limit of Proportionality (3)	Deformation: In Length—At the Rupture (4)	Deformation: In Section at Rupture (5)	Modulus of Elasticity
		Kg/mm2	Kg/mm2	Kg/mm2	%	%	%	Kg/mm2
Tension	TB. 1	3.25	21.5	21.5	0.0256	0.384	0.16	12,700
	TB. 2	4.06	26.5	26.5	0.0332	0.597	0.16	12,250
	TB. 3	3.65	25.5	25.5	0.0289	0.540	0.16	12,650
	Mean	3.65	24.5	24.5	0.029	0.5	0.16	12.5×10^3
Compression	CB. 1	13.0	32.0	90.0	0.115	16.0	34	11,300
	CB. 2	11.2	32.5	89.3	0.105	16.2	31	11,800
	CB. 3	10.6	32.8	90.5	0.086	16.4	37	12,300
	Mean	11.6	32.4	90	0.1	16.2	34	11.9×10^3

(1) Result by defective material.
(2) Related to the diagrams registered on the testing machine.
(3) Taken with the method of mirrors.
(4) Taken on 56 mm. (2.2 in.) in length. Results obtained by interposing lineally the last results given by the mirror method and by direct measurement of the compression test bar.
(5) Taken by breaking tension bars and at the center of the length of the compression bars.

Bar Test

Comparison with Tension Test.—The bar test has not yet been employed for the grading of castings. Moreover the exactness of the tension test, such as it is, would make worthless the comparison of the results obtained. Consequently the results of the precision tests made by Mr. Portevin present considerable interest as regards determining whether the bar test gives indications of any value, in relation to the strength under tension, compared to the strength of the castings.

If we take the figures of Table I, we see that the results obtained tally in a remarkable manner. This shows that there does exist a relation between the results of the bar tests and tension tests, when the latter are correctly made. The empirical formula giving this relation is:

$$Rt = 0.2\ \Delta - 13$$

Comparison with Compression Test.—Here we have a much larger number of determinations. Fig. 19 shows the relation and indicates that there is a sufficient correspondence between the Brinell number, the resistance at compression and the elastic limit at compression, determined, as above, on cylinders of 16 mm. diameter by 16 mm. length. The relations are expressed by the empirical formulæ:

$$Rc = 0.5\ \Delta - 5$$
$$Ec = 0.4\ \Delta - 25$$

Fig. 20 shows graphically the relation between the three values of *Rt*, *Rc*, *Ec*.

It must always be borne in mind that these bar tests were taken on machined shells, and that it is possible that some precautions are necessary to avoid errors when the test is made on rough cast bars. However, this test, which is so simple, is one of the most interesting ones if it is proved that it applies to ordinary castings, as it probably does.

These advantages prove that the test is simple, speedy, low priced, and that it entails no damage to the shell. It can be repeated as often as is desired and it admits of exploring the mass of the metal at any spot. It is individual and therefore grades the casting to be tested and not merely a test bar run off separately. Finally, it leaves an indelible mark, grading the value of the manufactured product itself.

Conclusion

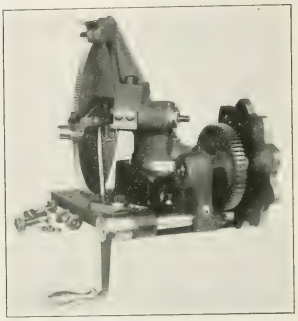
In conclusion the author calls the attention of the parent societies to the importance of the methods here shown for the progress of the art of the foundry. The methods employed heretofore were expensive and uncertain. It can be said that, provided an understanding is reached in a very short time between the societies interested, for standardizing the test bars and the conditions of testing, a considerable mass of data will be established.

Fixture for Graduating Beveled Dials

The fixture shown in the accompanying illustration, intended primarily for the graduating of beveled dials used on condensers for radio work, but adaptable also for other graduating work, has been placed on the market by the George Gorton Machine Co., Racine, Wis.

The indexing is positive and automatic, and any number of divisions up to 360 can be indexed. The crank is keyed to the lower shaft as shown and turns clockwise. The lower shaft has a small pinion on the inner end meshing with the gear on the upper shaft, to which shaft is also keyed the cam wheel, which transmits motion to the work holder mounted in a dovetail slide in the base. A stop is provided on the indexing wheel which will limit the graduations to any predetermined portion of the circumference. As the indexing movement stops exactly at the proper place, it is claimed no work will be spoiled even though the operator is not at the machine.

The points on the cam are made to suit the length of lines on the work to be graduated and if certain lines



Graduating Fixture. Indexing is automatic, and any number of divisions up to 360 may be indexed

are longer than others, that also may be taken care of. If each tenth line is longer, then one point on the ten-point cam will be proportionately longer than the other points. If every fifth and tenth line is longer than the others and also different from each other, then two points on the ten-point cam opposite each other will be longer in whatever proportion is necessary. If every fifth point is longer, a five point cam will be used and one point will be longer than the other four.

When cutting steel the spindle runs at 2000 r.p.m. The spindle speed for parts of cast iron is 2000 to 4000 r.p.m. and for brass and bakelite 4000 r.p.m. In the case of cast iron and bakelite dials the cut is said to be clean, no burrs being raised, and further operation unnecessary.

On dials of approximately 3-in. diameter and having 100 graduations on one-half the circumference, the actual time for cutting the graduations is said to be 40 sec. or less. Graduated around the entire circle, the time would be 80 sec. or less. As the time for changing the pieces should not be great, each piece should not require more than 1½ min., which would give a production of 320 per eight-hour day.

Under the title "Water Deactivation," Dr. Frank N. Speller, metallurgical engineer, National Tube Co., Pittsburgh, recently contributed a paper to the Engineers Society of Western Pennsylvania. This paper, which covers the development of means for the control of pipe corrosion by the removal of free oxygen from the water, has been printed in the July proceedings of the society and may be obtained for 50 cents a copy by addressing the society at the William Penn Hotel, Pittsburgh.

International Conference on Standardization

A conference of the secretaries of national industrial standardizing bodies was held in Switzerland, July 3 to 7. Thirteen countries were represented, including all of the more important industrial nations of Europe and America. The sessions were held in Zurich and in Baden.

A leading topic discussed by the conference was the interchange of information between the various national bodies during the development of the work in the different countries. At the first conference, held in London two years ago, arrangements were made for the systematic interchange of completed work, and, to some extent, of information on work in progress. Experience had shown such an early interchange to be extremely important for the work within the different countries from the national viewpoint alone, and quite irrespective of the question of international standardization.

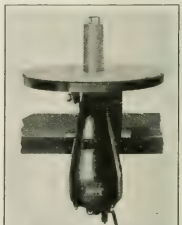
Provision now has been made for continuing the work of the conference on the many administrative problems of common interest, through a loose-knit continuing organization. An example of such work planned by the conference is the translation of technical terms of special importance or difficulty in standardization work. There will gradually be built up such a vocabulary of technical terms, mainly in English, French and German, but supplemented as far as may be feasible and necessary by the corresponding terms in other languages. Another example is the work undertaken by the conference on the classification and nomenclature of standards.

The conference was attended by Dr. P. G. Agnew for the American Engineering Standard Committee.

Bench Spindle Sander for Pattern Shops

An oscillating spindle sander intended for use in pattern or woodworking shops where there is not enough internal or irregular work to justify employing its larger machine, previously offered, has been placed on the market by the Porter-Cable Machine Co., Syracuse, N. Y.

The bench style machine is illustrated herewith, but a pedestal type is available if desired. The motor, which is of General Electric Co. manufacture, is totally inclosed as shown, and has a speed of 1725 r.p.m. It is connected direct through the spindle, which has an oscillating movement of 1 in., is equipped with ball bearings and provided with a 2¼ x 6 in. roll. The table of the machine is ground, is 16 in. in diameter, and is arranged to tilt 45 deg. down and 15 deg. up. The overall dimensions are 16 x 16 x 25 in., and the weight of the machine 75 lb.



Bench Spindle Sander for Use in Place of Larger Machine

The American Chamber of Commerce of Sao Paulo, Brazil, offers its services to American manufacturers in the matter of trade investigations and reports, in securing a representative or agent to furnish credit reports, in supplying trade mailing lists, arranging for the display of samples and in receiving catalogs of manufacturers. The address of the chamber is Caixa Postal 1527. K. Oberg, manager Ford Motor Co., is secretary.

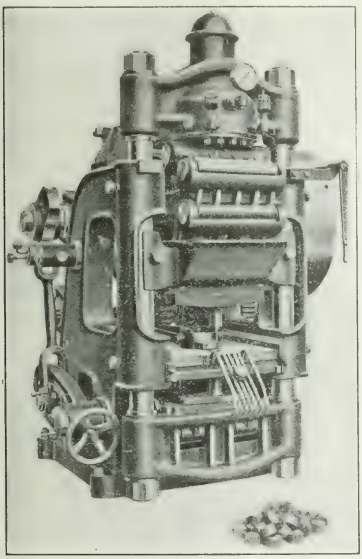
Sales of mechanical stokers in July involved a total of 52,518 hp. against 59,719 hp. in June, being the smallest monthly total so far this year. The average for the first half of the year was 77,400 hp. per month.

DUST AND METAL BRIQUETTING

De Gama Process for Recovery of Metal Turnings, Blast Furnace Dust and Ore Fines

From France has been brought into this country a briquetting process which appears to produce a briquet of unusual density without the application of moisture, heat or binder. The process is emphasized as being solely physical without involving chemical reactions, the results being obtained by means of a briquetting press employing unusual, if not new, principles. Marked success is claimed with flue dust and fine ores as well as with steel, cast iron or non-ferrous turnings and borings.

The process was developed out of war necessities



De Gama Machine for Briquetting Flue Dust or Metal Turnings Develops a Pressure of 660,000 Lb.

for steel in France by D. V. de Gama, a mechanical engineer of Portuguese origin and a graduate of the Universities of Paris and Madrid. He has now come to the United States with the idea that he can interest blast furnace plants in his method of handling flue dust and also large melters of borings and turnings in his briquetting of metal. The work may be done at point of production of the turnings or at point of melting, such as the foundry cupola or the blast furnace or the open-hearth furnace. Mr. de Gama has established an office at 347 Madison Avenue, New York.

From Theodore Kappeler, a mechanical engineer graduated from the Polytechnical University of Zurich, at present in this country, has been obtained some information regarding the development of the process in Europe. The de Gama process, patented under the name of "Procede de Gama pour l'agglomeration des tournures, minerais et residus metalliques a sec, a froid at sans agglomerat" (de Gama process for the agglomeration of turnings, ores and metallic residues, dry, cold and without binding material), has been in use in France since 1913 and "it gave remarkable results, both technically and economically, during the world war." It was introduced in France, according to Mr. Kappeler, by a company formed under the name of "Societe des Etablissements et pour l'Exploitation des Procedes De Gama." This company installed factories at Paris, Puteaux, Fumel and Feuquieres, where the briquetting of the different materials was accomplished.

"Instead of using the principle of briquetting material by shock, that is, sudden pressure from one side only, the de Gama process eliminates the air between the particles, using a pressure of approximately 154,000 lb. per sq. in., applied in a special way. This pressure is automatically equal on each side of the briquet and works in a progressive and uniform manner. The geometrical center of pressure at all times is at the geometrical center of the briquet. For the elimination of the air between the particles in the briquet, a special and patented device was designed."

The briquets have been used, he says, by the Acieries de Longwy, Hauts Fournaux de Pont-a-Mousson, Societe de Commentry Fourchambault et Decazeville, Acieries de Micheville, Societe de Construction des Batignolles, Hauts Fournaux et Acieries du Saut du Tarn, Societe de Chatillon Commentry et Neuves Maisons, Acieries de France, Societe de Construction de Fives, Lille, Laminoirs de Frouard, Societe de Senelle Maubeuge, Hauts Fournaux de Caen, Forges et Acieries de l'Ariege, and others.

They were employed for the manufacture of the fuses for the famous French 75-mm. shells, also for shells of 155-mm. and 280-mm. guns. They were utilized for the manufacture of gun barrels and field guns, in the latter case the briquets being made from specially selected high grade steel turnings.

The briquets are well adapted to loading and the unloading of cars by means of electromagnetic cranes. In the open-hearth furnace 40 per cent of the charge can be made with de Gama briquets. In the cupola the charge of these briquets may be as high as 50 per cent. In the case of cast-iron briquets, the foundries used to send their own turnings to the de Gama factories to be sure of the composition of the briquets returned to them. Shops in southern France sent their turnings at the rate of approximately 300 tons per day for several months to the nearest de Gama plant, to be transformed and returned, traveling a distance of 900 miles.

The accompanying illustration is a photograph of one of the presses. One of the features is that the table or platen containing the dies is in a measure floating within the machine so that the pressure brought to bear against the material being briquetted is applied in opposite directions, meeting the claim suggested by Mr. Kappeler that the geometrical center of pressure is at the geometrical center of the briquet. Another feature is that what corresponds to a shaking or agitation of the briquetted material is provided for to assist in driving off the air and bringing all particles into the intimate contact required for the density and cohesion desired. A given press may be arranged to produce two or three briquets simultaneously, so that large output may be achieved.

Mechanical Analysis of Foundry Sand

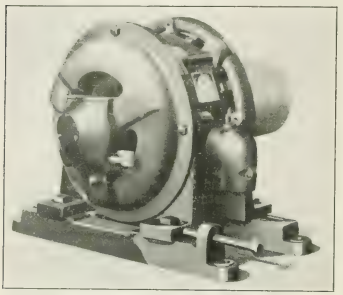
A mechanical analysis was recently made, using the air analyzer of the Bureau of Standards, of a sample of foundry sand which contained coal particles and coal dust. This sand had been sent with a request for some method of removing the coal so that the sand could be used again in the foundry. The results of the mechanical analysis indicated that the coal could not be effectively cleaned out of the sand by means of air separation. It is probable that in cases of this kind some method of washing must be used.

Electric hoist business in July, according to the Electric Hoist Manufacturers' Association, E. Donald Tolles, secretary, 165 Broadway, New York, was 12.95 per cent less in the number of hoists than it was in June and 12.85 per cent less in the value of hoists ordered. Shipments of hoists decreased 18.27 per cent as compared with shipments in June.

New Line of Induction Motors

A new line of induction motors designated as the type AA, for two and three phase alternating current circuits, has been placed on the market by the Reliance Electric & Engineering Co., Cleveland.

In the new machines the frames of motors up to 25 hp., 1800 r.p.m., are of riveted construction. The stator punchings are assembled with the end flanges under 10 tons pressure, and large rivets are inserted, the ends electrically heated and upset. The contraction of the rivets in cooling is said to aid in making of a tight and rigid core. The feet are cast integral with the flanges and the bottoms of the feet are planed parellel to the shaft. This operation and the machining of end flanges



New Squirrel Cage Induction Motor for Two and Three-Phase Alternating Current Circuits. The end brackets protect the motor winding

for the bracket fit are done after the riveting of the stator, which is intended to assure correct alinement. The slots in the stator punchings are semi-inclosed. Liberal opening at the top of the slot is said to facilitate winding and increase the overload torque capacity of the motor.

The wound stator is dried out in an oven and while hot is immersed in insulating varnish for 30 min., after which it is baked for 10 hr. This complete operation is repeated twice, making three treatments of insulating varnish, the winding then receiving a brush application of air drying varnish.

Bearing brackets protecting the heads of the stator coils are of rugged construction and are designed to guide the air from the rotor fans around the ends of the stator windings. A deep oil well with a pocket into which sediment may drain is provided in the bearing housing. An oil hole cover of the self closing type is provided, and the opening at the outside end of the bearing housing has a metal cover to keep out dust and dirt. Bearings are of phosphor bronze and are shouldered in the end bracket and locked against rotation. Oil is drained from pressure relief grooves at the ends of the bearings through a 3/16-in. hole and oil-throw collars are provided to prevent oil from creeping along the shaft.

The rotor core is made up of special sheets punched to receive the rotor bars, which are of hard drawn copper. An end ring of copper cast on to the extensions of the bars is said to make the rotor practically indestructible at a point which usually has been the cause of breakdowns. Fans at each end of the rotor core assist in ventilation.

The motors are regularly equipped with outlets for conduit wiring, and in making the connection the outlet is entirely removed, giving free working space. For motors of 7½ hp. and above, a Cutler-Hammer bulletin 9141 auto-transformer starter is included in the regular equipment.

A carving knife made in 1868 of Disston steel, in use in a household in Brooklyn, N. Y., is illustrated in the August issue of the *Disston Crucible*.

German Metal Workers Seek Employment in United States

How the depreciation of European currencies and notably the German mark is restricting emigration to the United States is indicated in a letter received by an American company in the Central West from a German mechanic. This letter, written in English, indicates that the writer and many others like him are anxious to seek work in this country, but are unable to accumulate the necessary funds to pay for their passage. The communication reads as follows:

Rothenburgerstersir. 30A
NUREMBERG (Germany), July 2, 1923.

Gentlemen:

I was told that in the large works of the metal industry of the United States is a great want of apprenticed laborers and skillful Germans, and that there would be a chance to become employed.

Some colleagues and I, tall and strong-men in the 30's, apprenticed mechanics and turners, wish to emigrate to America, but we have not the necessary means. We would be quite willing to bind ourselves, if there would be granted an advance for the passage, which could be deducted from our wages on commencing working. We therefore take the liberty of asking you whether you are in want of such men. Should this be the case, you may apply, for security's sake, to the office of the Hamburg-American Line, Nuremberg, Koenigstr., with which we have already put ourselves in connection.

We would be very much obliged to you in favoring us with an early reply.

Yours faithfully,
HEINRICH RUPRECHT.

Bookings of Steel Castings in July

WASHINGTON, Aug. 20.—The Department of Commerce announces that July bookings of steel castings, based on reports received by the Bureau of the Census, by companies representing over two-thirds of the commercial castings capacity of the United States amounted to 52,066 tons, as against 84,878 tons in June. The following table shows the bookings of commercial steel castings for the past seven months by 65 identical companies, with a monthly capacity of 96,900 tons, of which 38,300 tons are usually devoted to railroad specialties and 58,600 tons to miscellaneous castings.

	Total		Railway Specialties		Miscellaneous Castings	
Month, 1923	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January	100,605	103.8	47,879	125.0	52,726	90.0
February	90,152	93.0	39,845	104.0	50,307	85.8
March	143,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,788	101.3	50,705	86.5
June	84,878	87.6	42,773	111.7	42,105	71.9
July*	52,066	53.7	16,741	43.7	35,325	60.3

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

British Pig Iron and Steel in July

LONDON, ENGLAND, Aug. 20. (*By Cable.*)—The pig iron and steel production in July showed a decline from June and a further decline from the heavy output in May, its peak of the year. In July 665,100 gross tons of pig iron was made, which compares with 692,900 tons in June. The July output is the third largest this year. The steel ingot and castings output in July was 624,300 tons, a decrease of over 43,400 tons from June. The July figure is the largest for this year.

Comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	639,000
1920, per month	669,500	755,600
1921, per month	217,600	302,100
1922, per month	408,300	486,000
January, 1923	567,900	634,300
February	543,400	707,100
March	633,600	802,500
April	652,200	749,400
May	714,200	821,000
June	692,900	767,700
July	655,100	624,300

To Propose Terms for Defining Tin Plate

Conference of Makers and Canners Discusses Ways to Classify Tinned Container Material—Discoloration of Preserved Foods Baffling

WASHINGTON, Aug. 21.—The conference concerning the quality of tin plate at the Bureau of Standards last Wednesday voted to appoint a committee to propose standard terms for use in contracts for the purchase of tin plate, and also to classify grades of and adopt standard terms for waster plates. The committee is to be appointed from the different groups attending the conference and is to report back to their respective parent organizations. At the conference, which was presided over by Director G. K. Burgess of the bureau, were about 100 representatives of the interests concerned. They included manufacturers of tin plate and cans and canners, and wholesale grocers.

It is the view of manufacturers that the outstanding feature of the meeting was the opportunity given them to reply to and refute charges of canners and wholesale grocers that spoilage of food products packed in tin cans was due to the quality of the tin plate and cans used. It was readily conceded by both canners and grocers that American mills make as good tin plate as is manufactured anywhere in the world. They had, however, persistently held out that imperfections in the plates and cans were due to the quality of steel used, and this contention, which has been the subject of exhaustive technical research involving every conceivable mill and laboratory test and all kinds of experiments for the past 15 years, finally resulted in the National Canners Association's filing a brief with the Bureau of Standards in which charges were made against the quality of tin plate.

Position of Bureau of Standards

It was the purpose of the association to develop a movement to have the Bureau of Standards set up standards concerning the quality of tin plate and a uniform standard of tin coating. While Dr. Burgess had suggested to the conference the selection of a joint committee to make further research and determine facts looking to the possible importance of inspection in the manufacture of tin plate and improvements in other fields, he pointed out that the bureau had no police powers over the matter and that it was essentially a service bureau. Its research, he explained, is along cooperative lines to consider all problems concerned, whether of an experimental nature or otherwise. He made it plain, however, that the bureau would not take up the matter unless there was unanimous agreement among the various interested parties to do so, such an agreement to be arrived at on the basis of actual facts revealed at round table conferences. It was suggested that these facts be developed from further research, supplemented by a brief compilation of those already gathered by the Government and private organizations through past researches. This was not adopted.

Dr. R. A. Baker of the American Can Co., who vigorously defended the quality of both tin plate and tin cans, said frankly that he had become tired of research studies which his company has pursued vigorously, and, he pointed out, apparently without any great amount of interest being shown in them. He also maintained that nothing more than already is known would be learned and that therefore the effort only would involve a great amount of work and expense.

Sentiments of like character were expressed by W. D. Collins, formerly of the bureau of chemistry, Department of Agriculture, but now with the United States Geological Survey, who stated that he had been engaged in research work of this kind for 10 years and that it was his conclusion that no one knows what causes discoloration of food products against which the National Canners Association, through its committee, headed by Dr. W. E. Elwell of Portland, Me., complained.

He suggested that if anything by way of further research be done that it be through a careful and fundamental study of the characteristics of steel. He declared, however, that in view of the many studies of this kind that already had been made and the numerous tests of a base for the manufacture of tin plate, there was no assurance that the problem can be solved.

Amount of Tin Coating Declared Not a Factor

Others who were equally doubtful as to the ability of anyone to reach a solution, said that instead of steel's being at fault, tests indicated that discoloration, which, it was stated, affected sweet corn more than any other product, seems to be due to the chemical reaction of the product packed. Curiously enough, it was pointed out, as an instance, that corn from two adjoining fields in cans with identical steel properties and tin coating, had developed entirely opposite results. In the case of corn from one field, there was no discoloration, while in the case of corn from another field this objectional characteristic showed up quickly. This was assigned as one reason that some unknown chemical reaction is responsible for discoloration. It was charged that spoilage of food in some instances was due to poor merchandising. The declaration was made that experiments had shown that waster spots are not responsible for discoloration. Cans known to contain such spots were filled and the location of the spots was marked on the outside. In no case was discoloration found to have taken place near a waster spot, showing that the spot appeared to be a protection against such discoloration rather than a cause of it.

Mr. Collins, in declaring that no one knows what makes discoloration, made the interesting statement that tests had been made showing discoloration was greater in some cases in cans running 3 lb. of tin to the base box than in cans with only 1½ lb. to the box. Both tin plate manufacturers and tin can makers denied vigorously that the amount of tin coating had anything to do with the matter of discoloration and said that it had but little to do with the matter of perforation.

Position of Tin Plate Manufacturers

A clear statement of the position of tin plate manufacturers was made by Vice-President S. A. Davis of the American Sheet & Tin Plate Co., Pittsburgh. While he said that defects in tin plate can be minimized by careful work, he asserted that they cannot be entirely eliminated. He stated that changes in tin plate in the past had proved satisfactory and that changes in mill products are not advisable because they are now entirely adequate. He told the conference that it would be impossible to maintain exact uniformity without discarding 40 per cent of each ingot.

Apparently Dr. Burgess was impressed with the views of Mr. Davis, as shown by a statement he subsequently made in which he declared that the problem was not merely technical but also had an economic phase and that if further improvement in the manufacture of tin plate were to be proposed, it would be necessary to take into consideration added costs that would have to be passed on to the consumer.

Dr. Baker, in replying to charges about the use of waster plates employed in the manufacture of tin cans, readily admitted that they are so used and with equally as good results as when prime plates are used. He pointed out, however, that as a matter of course the waster spots are first removed before the steel is used in the manufacture of cans. E. E. Gibbs of the Southern Can Co., Baltimore, strongly defended tin plate producers in refuting charges of canners and grocers and

declared that the quality of tin plate both as to uniformity and its steel base, as well as in other ways, has been constantly improving and is of a high grade.

Cause of Discoloration of Food Products

Replying to a question by Dr. Burgess as to whether there was a variance in the quality of tin plate produced by different mills of a company, President E. R. Crawford of the McKeesport Tin Plate Co., McKeesport, Pa., said that the quality of tin plate is practically standard without regard to the manufacturer. It was pointed out by Dr. Baker in answering charges of Dr. Elwell and others respecting heavy spoilage of food due to defective cans, that can makers guarantee that not more than two cans out of 1000 will be defective and that if a greater number of defective cans are delivered, the canner is entitled to redress, because of grease, imperfect pickling, etc., declaring that it is not possible to avoid leakage altogether, and that there will always be a certain amount of seconds. He said that very few canners are complaining against the present cans being manufactured. He pointed out that the cans of today have an average of 0.262 split ends per 1000. This small number, Dr. Baker stated, does not justify sorting, because it would be cheaper to pay for the resulting food spoilage. It was also said that while a common form of food spoilage is black discoloration due to the formation of iron sulphide, this substance is quite harmless, although it spoils the appearance and taste of the food.

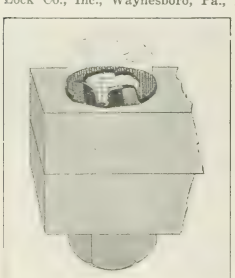
Claims that spoilage ran as high as 4.5 per cent, due to defective cans, were emphatically denied with the statement that from this cause the percentage does not exceed ¼ per cent. There was a great deal of interest shown in the statement of one spokesman that the controlling factor in black discoloration is evidently "hydrogen sulphide and collodial conditions in which it comes down to make iron sulphide, and so far no way has been found to overcome this reaction." Denial was made of charges of inadequate inspection, but it was pointed out by both tin plate manufacturers and can makers that they were just as anxious as canners and foodstuff interests possibly could be to eliminate any evils that exist.

Demand for Change in Tin Plate Terms

Dr. Elwell in an addendum to the brief of the National Canners Association, pointed out what the canners sought. In the course of this statement he reiterated charges that a considerable percentage of tin plate manufactured is of inferior quality, estimated at 15 to 30 per cent. He urged proper inspection and selection of sheet bars and the careful sorting of plates before tinning. He expressed the hope that the bureau would find it practicable to make a study of the various grades of tin plate and develop standard terms applicable to each. He stated the term "coke plate" under present day practices is a misnomer because coke no longer is used in its manufacture. He suggested the discarding of this term and the substitution of a more definite one and added that a similar criticism may be justly applied to the terms "charcoal plate" and "canners' special plate." He explained that charcoal is no longer used in the manufacture of tin plate and that canners' special "is not especially good for canners." He declared that the term "waster" is too general in its application.

Device for Keeping Nuts Tight

The nut lock shown in the accompanying illustration, which is being marketed by the Waynesboro Nut Lock Co., Inc., Waynesboro, Pa., is intended for use where nuts are subject to unusual shock or vibration. Special bolts or nuts are not required and the lock nuts may be applied with an ordinary wrench.



The device is said to operate on the principle of the alligator wrench, and may be tightened up but cannot be backed off. Upon tightening the nut the tooth engages the thread thereby preventing the nut from moving backward even with a wrench, and on account of the tooth having a rake or being located angularly to the center, the greater tendency to back off the tighter the lock becomes. When pressure is applied in the direction of tightening the nut, however, the tooth recedes and permits the nut to be tightened, after which the lock will function as before.

In a test of the device a rail joint made up with six bolts, equipped alternately with the lock illustrated and the usual split spring washer, was supported under a 2000-lb. hammer operating at the rate of 130 blows a minute for 1½ hr. It is claimed that at the end of this time it was found that the joint had stretched ½ in., thereby forging the bolts and causing them to become loose. A continuation of the hammering caused the nuts held by the spring washers to come off, the nuts illustrated remaining in their original positions. In a second test the bolts with spring washers were tightened with a wrench so that the spring washer was clamped to half its compression, the bolts equipped with the nut lock illustrated being merely screwed up by hand. The same hammer blows and weights were used as in the first test and it is claimed that the nut held by the spring washers came off four times, the nuts equipped with the nut lock illustrated remaining in their original position.

American Engineering Standards Committee Accepts More Specifications

Three specifications of the American Society for Treating Materials have recently been accepted as standard by the American Engineering Standards Committee, 29 West Thirty-ninth Street, New York. They are: Standard specifications for staybolt, engine bolt and extra-refined wrought iron bars, A84-21; for refined wrought iron bars, A41-18; and for wrought iron plates, A42-18. The preparation of these specifications is said to have extended from 1905 to 1913.

The approval of these specifications adds an important group of metal specifications to those already approved by the A. E. S. C. in this field, which include the following:

Specifications for Cold Drawn Bessemer Steel Automatic Screw Stock;
Specifications for Cold Drawn Open-Hearth Steel Automatic Screw Stock;
Specifications for Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars;
Specifications for Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars;
Specifications for Soft or Annealed Copper Wire.

The village of Corliss, in Racine County, Wis., has been granted authority to change its corporate name to Sturtevant by the county board of supervisors. The change is made as a mark of appreciation of the municipality that the B. F. Sturtevant Co., Hyde Park, Boston, has acquired the principal industrial activity at Corliss, the works of the defunct Wisconsin Engine Co., and is now rehabilitating it as a Western production unit, which is expected to begin operations about Oct. 1. The village was originally named Western Union Junction, but in 1893 the name was changed to Corliss in honor of Brown-Corliss Engine Co., which erected a large plant at this point. This interest was succeeded in 1905 by the Wisconsin Engine Co., which failed in 1913.

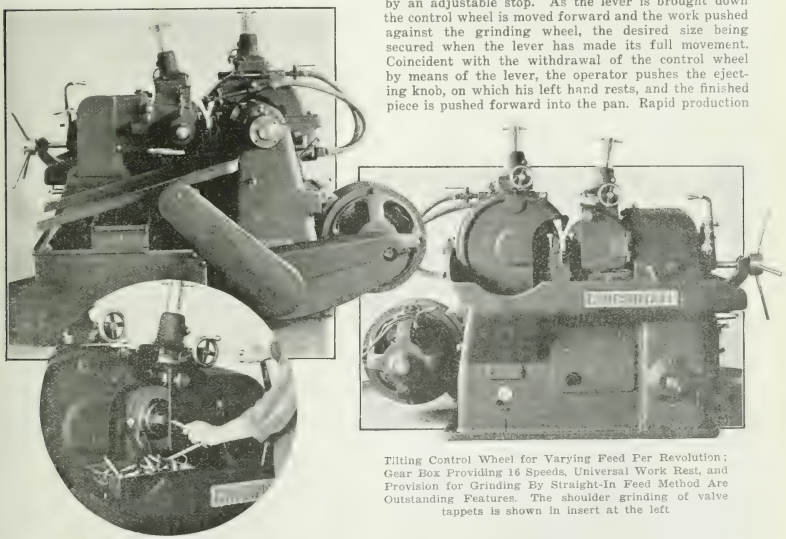
NEW CENTERLESS GRINDER

Shoulder and Straight Cylindrical Work Ground Rapidly—Sixteen Feed Variations Provided

A new model centerless grinder, designed not only to rough and finish straight cylindrical parts at high speed and to the desired limit of accuracy, but intended also to grind shoulder work more rapidly than by any other method, has been brought out by the Cincinnati Milling Machine Co., Oakley, Cincinnati.

With the standard work rest the capacity is for work from ⅜ to 1½ in. in diameter, but an optional work rest taking diameters from 1½ to 3 in. is available. The standard support blades take work up to 10 in. long. Accessories may be provided to permit grinding of work up to 8 ft. and longer, and diameters down to 1/16 in.

The tilting control wheel for varying the feed per revolution, gear box for providing 16 speeds of the



Tilting Control Wheel for Varying Feed Per Revolution; Gear Box Providing 16 Speeds, Universal Work Rest, and Provision for Grinding By Straight-In Feed Method Are Outstanding Features. The shoulder grinding of valve tappets is shown in insert at the left

control wheel, universal work rest for straight cylindrical work without shoulders, and the provision for grinding work by the "straight-in feed" method, are features of the machine.

Because the process of grinding is more nearly continuous on the centerless than on a center type machine, is a general reason given for the increased productiveness of the machine. Loss of time in loading and adjusting the wheel to the work is eliminated. It is also stated that heavier cuts may be taken because the work is supported by the control wheel at the point of grinding and extra operations, such as centering and the inspecting operations which follow, are eliminated. The amount of stock to be removed by grinding can be greatly reduced, which is said not only to save time but to reduce wheel wear.

Cylindrical work without interfering shoulders is ground by passing it transversely between two opposed abrasive wheels. As in the previous machine, the grinding wheel, which is 20 in. in diameter, is mounted on the left-hand end of the main bed of the machine, and feed or control wheel, which is 12 in. in diameter, is mounted opposite. The work is supported between the wheels by a work-support blade, which is mounted on a work rest between the wheels. The top of the support blade and the grinding wheel spindle are parallel to each other. The feed wheel is carried in a bracket which can be swung about a horizontal axis and clamped. Sizing is accomplished by moving the housing carrying the feed wheel forward in its slide to compensate for wheel wear. The work rest is universal to take care of work of different diameters, and means have been provided for convenient and accurate truing of both grinding and control wheels.

Work having shoulders, such as shackle bolts, yoke pins, king bolts, etc., is ground by the "straight-in feed" method. Where the portion to be ground is not more than 4 in. long a shoulder-grinding work rest is employed. The shoulder-grinding operation on a valve tappet is shown in the insert illustration. A 90-deg. movement of the lever in the operator's right hand moves the control wheel housing either forward or backward a distance of 0.030 in. When the wheel is withdrawn, the piece of work to be ground is placed upon the angular support blade and located endwise by an adjustable stop. As the lever is brought down the control wheel is moved forward and the work pushed against the grinding wheel, the desired size being secured when the lever has made its full movement. Coincident with the withdrawal of the control wheel by means of the lever, the operator pushes the ejecting knob, on which his left hand rests, and the finished piece is pushed forward into the pan. Rapid production of work of accurate size and free from chatter marks is claimed, successful operation being attributed largely to the work being carried upon a fixed rest during grinding, there being no non-rigid elements anywhere in the set-up. Work having a slight taper can be ground by this method, with suitable adjustments.

The main frame of the machine carries the grinding wheel spindle and all of the driving mechanism. In the lower part of the frame there is a constant-speed shaft, which may be driven either from a line shaft or by chain from a motor mounted on the bed. The main grinding wheel is driven from this shaft by a 5-in. belt. The drive for the feed wheel is taken from the same shaft and transmitted to a speed box at the front end of the bed. From the last shaft in the speed box a variable speed drive by means of a 3½-in. belt is taken up to the feed or control wheel spindle which is mounted in a tilting housing. The housing is gibbed to a sub-slide to which it can be locked. The sub-slide carries the work rest. Both the control wheel housing and the sub-slide can be moved forward as a unit or individually by means of the pilot wheel at the speed-box end. The independent adjustment of the upper and lower sides is said to permit of obtaining the proper

working set-up rapidly, which is emphasized as important where machines are used on jobbing work. To compensate for wheel wear during grinding, the upper and lower slides are moved forward as a unit. Fine adjustment of the slides is by means of an auxiliary crank and dial reading in ten-thousandths of an inch. Drive shafts in the lower part of the machine are fitted with ring oiling bearings, and centralized oiling for practically all other bearings is a feature.

The grinding wheel spindle is a heat-treated chrome-nickel steel forging and is mounted in the main frame of the machine, a casting weighing about 4000 lb. The spindle bearings are of the half box type. The spindle is held down in the bearings by the downward pull of the belt. A feature is the automatic oiling device, which is made up of large disk-type splashers which dip in the oil reservoirs and carry the oil up to collectors in the bearing cap, from where it is distributed over the bearing. Glass indicators are provided for observing the operation of this device. Adjustable shoes are provided as a safeguard in case the main driving belt should break. End thrust is taken up by a double row self aligning ball bearing, and the spindle may be adjusted while running.

Independent truing devices are mounted on each wheel guard, and are always ready for use. The universal work rest is a cast iron block mounted on the lower slide, carrying the work-support blade and four adjustable work guides. The guides, which are of high-speed steel, may be removed for resurfacing. Each guide section may be adjusted and locked independently and with this construction change may be made from work of one diameter to another without dismantling the machine. The standard work rest is equipped with two blades, a flat top and a 45 deg. angular or knife edge blade. The wearing surface of these blades is of Stellite electrically welded to steel. The flat top rest is for roughing and the angular rest principally for finishing.

A centrifugal pump of 15 gal. per min. capacity is mounted on a removable tank at the rear of the machine and is driven from the main shaft. The bed of the machine at the grinding wheel end is shaped to form a primary settling basin. The overflow runs into a secondary settling basin on top of the storage tank, and from there into the removable storage tank through a cloth bag of special texture. The secondary basin and storage tank may be removed for cleaning, and the settling basin in the machine may be drained and cleaned with a shovel.

Individual motor drive is recommended. The weight of the machine, net, is 5000 lb.

BLAST FURNACE SLAG

Accepted by Testing Society in Recent Specifications for Concrete Aggregates

One of the important developments of recent years has been the greater use of blast furnace slag as an aggregate in concrete. It is significant that at the annual convention in June of the American Society for Testing Materials this kind of slag was accepted as a standard in two divisions of one committee, or committee D 4, on road and paving materials, and that the same committee admitted this material to tentative specifications in three divisions, while another committee, C 9 on concrete and concrete aggregates, passed upon this slag as a tentative standard. The annual reports of these two committees give full details of three recommendations and changes.

At the same convention a special paper was presented by Raymond Harsch, junior assistant testing engineer U. S. Bureau of Public Roads, entitled "Blast Furnace Slag as an Aggregate in Concrete," which discusses in a general way the methods used in the production of slag, as found in the field investigation of over 30 commercial plants. The results of tests are given in detail and include weight determinations of each size of material produced by each plant.

Specimens have been made for testing at the age of one, two and five years. A series of corrosion tests have been planned to determine the relative corrosive effect of slag, gravel and limestone aggregates upon reinforcing steel. The following general conclusions are interpreted from the data resulting from this investigation:

The unit weight of blast-furnace slag as produced commercially has little if any effect upon the structural strength or the wearing property of the resulting concrete.

A limit of 70 lb. per sq. ft. would admit practically every well-graded crushed slag product.

The gravel used in these tests is one of accepted quality and is considered to be of average strength. The limestone used for comparison with the slag is somewhat superior to the average limestone used for concrete. The strength of all of the slag concretes exceeded that of the gravel concrete. The average strength of the slag concretes is equal to the strength of the limestone concrete.

Because of the excessive chipping at the edges of the wear blocks, the wear test is not considered a very favorable indication of the resistance of concrete to wear. It is a means of comparing the value of various types of concrete subjected to the action of the shot, and is interpreted as such by the author. On this assumption, the wear-resisting properties of slag concrete are equivalent to those of the limestone concrete and superior to those of gravel concrete tested in comparison.

The physical properties of the slag when tested by the usual rock tests do not seem to be an important factor in determining the quality of the concrete made with slag as the coarse aggregate.

Gun Steel in Basic Open-Hearth Furnaces

A statement was recently made at a meeting of the Société des Ingénieurs Civils de France, according to *Engineering*, to the effect that in 1917 the French works manufacturing steel for 75-mm. (2.952-in.) guns by the open-hearth process started from a charge consisting generally of 10 per cent to 40 per cent of first class quality Swedish or Chasse pig iron with 10 per cent to 65 per cent of Swedish iron, puddled iron, or ingots previously obtained on a basic hearth, the complement consisting of gun scrap. At that time, the statement added, certain works in the Loire district deemed it impossible to manufacture steel for guns otherwise than upon an acid hearth and starting exclusively from Swedish iron with gun scrap, and in this view had stored the necessary material to the value of several millions of francs.

Lucien Arbel, the well-known steel manufacturer whose works are in Northern France, has qualified this statement in the society's proceedings; he says that since the year 1912 his works at Douai and at Couzon have manufactured steel for 75-mm. and larger caliber guns and, notably, all the elements for the first 370-mm. (14.567 in.) mortar built in 1914 at Bourges Arsenal, in open-hearth furnaces having a basic hearth, using a charge consisting simply of French hematite pig iron and forge scrap. This process of manufacture has given perfectly regular results, the percentages of sulphur and phosphorus being below 0.04 per cent; this same method of manufacture has recently been followed again in exactly the same conditions in the case of a series of 155-mm. (6.102 in.) gun jackets, which gave every satisfaction at the tests. Experience has shown that the steel thus manufactured in the basic open-hearth furnace is perfectly reliable in actual use, and as an instance Mr. Arbel adds that one of the 75-mm. gun tubes manufactured at his Douai works, removed from the service after firing the number of rounds considered a maximum for guns of this caliber, showed a degree of wear at the grooves below the established limit governing the removal of such a gun from the army. Mr. Arbel took advantage of the statement referred to in the foregoing for calling attention to the possibility of manufacturing gun steel, using the ordinary type of basic open-hearth furnaces; these latter are now much more frequently met with than acid open-hearth furnaces.

Features in Manufacture of Mack Motors*

Unusual Fixtures and Methods in Machining of Gasoline Truck Engines—Extended Application of Diamond Tools Giving Satisfactory Results

BY L. S. LOVE

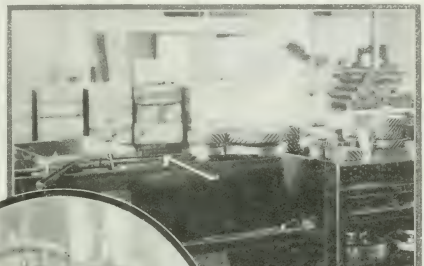
IN the making of the helical timing gears, all blanks are annealed before cutting and the practice has been to test gears for concentricity of the pitch line before the gears go to heat treatment. They are meshed with master gears in a testing bench and must run within 0.003 in. It was found that to secure this accuracy it was necessary to cut only one gear on an arbor, thereby avoiding spring and chatter due to placing more gear blanks on an arbor and applying cutting pressure farther from the hobbing machine face plate.

After hardening, the bore and hub face are ground in an internal grinder. The work spindle of this machine carries a ring chuck which fits the outside diameter of the gear. Three pins are placed about the gear between teeth at equi-distant points, and serve to center the gear on the pitch line and drive it as the chuck revolves. Flat wheels and cup wheels are used on the bore and hub face respectively.

After this operation these timing gears have been run through a lapping operation in a special machine built by the International Motor Co. for the purpose, when they were tied together in sets for assembly. The newest departure which will supplant some of the present operations is a gear tooth grinding machine for grinding helical gears developed at the Plainfield plant. This machine is somewhat different from a spur gear tooth grinding machine recently developed and built here for use of one of the company's other plants to grind transmission gears.

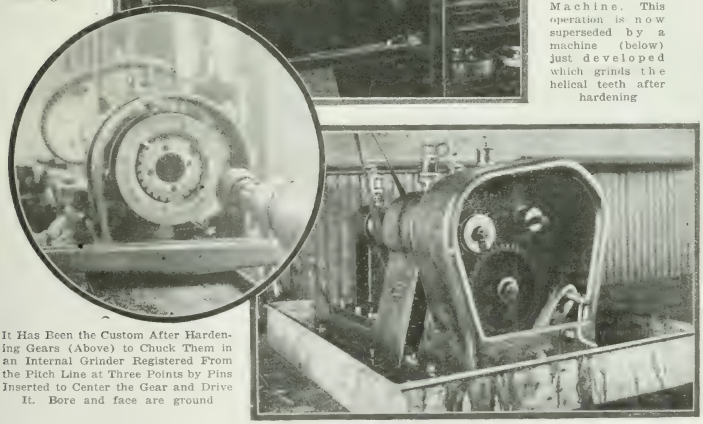
The heat treatment of castings between rough and finish machining is also followed in the case of aluminum. Crank cases are slab milled from the rough. This operation is performed two cases at a time, one on the top edge, the other on the bottom. The one milled on the top is then turned over, registering in the other half of the fixture from the milled top, the other case having been removed. This makes a completed case rough surfaced for every pass of the miller table. After this operation the cases are dipped for 15 min. in boiling water to remove strains. They are then stored until called for for the finish milling operation, which is handled in a similar fixture and manner.

A specially built type of machine is used for boring the main bearings before the babbitt lined bronzes are inserted and at the same time boring the cam shaft bearings. This machine is a reconstructed lathe with a special bar driving head mounted in front of the lathe head and operated by a floating drive by the main spindle. This driving head is so geared that two bars of different diameters are rotated at proper speed for



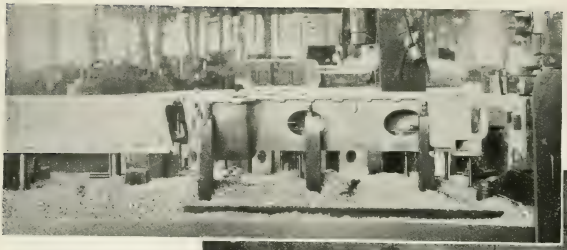
Timing Gears (At Right) Are Tested for Concentricity Before Going to the Hardening Process. On this test they must run true within 0.003 in. when meshed with a master gear

After the Bore Grinding Operation, Gears Were Lapped in a Special Machine. This operation is now superseded by a machine (below) just developed which grinds the helical teeth after hardening

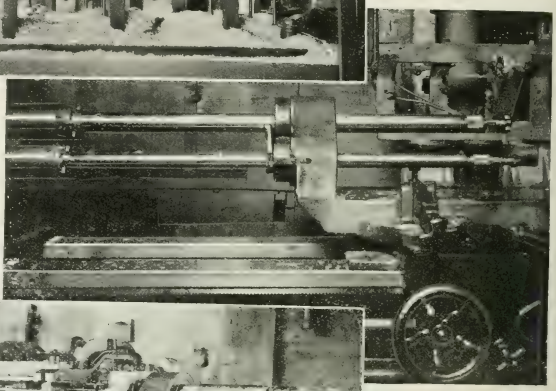


It Has Been the Custom After Hardening Gears (Above) to Chuck Them in an Internal Grinder Registered From the Pitch Line at Three Points by Pins Inserted to Center the Gear and Drive It. Bore and face are ground

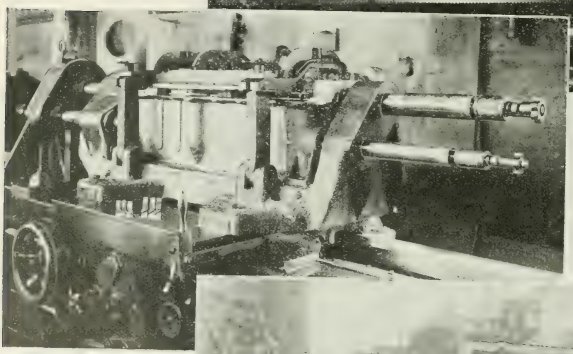
*Concluded from page 392 of THE IRON AGE of Aug. 16.



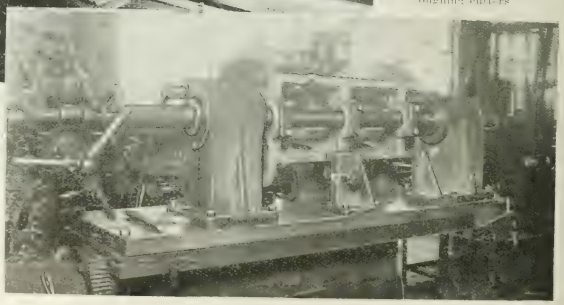
Aluminum Crank Cases Are Rough Surfaced in a Planer Type Milling Machine (At Left) Before Being Immersed in Boiling Water for 15 Min. to Remove Strains



Crank Bearings Before Receiving Bronze and Babbitt Liners Are Bored and Faced in a Special Boring Machine (At Right) the Bars of Which Carry Two Sets of Cutters, Either of Which May Be Set Out at the Will of the Operator by Adjustment at the End of the Bar



The Withdrawal Feature of the Cutters Permits Setting Up the Crank Case in the Cradle Without Removal of Bearing Caps. Both sets of cutters are then withdrawn and the bars inserted through cradle bushing and bearing, ready to extend the roughing cutters



Finish Boring of Crank Bearings Is Done in Babbitt Metal. A special fixture (at right) which supports crank case with cylinders bolted in place is operated by air cylinder. The boring bar carries diamond tools and is carried in ball bearing bushings which permit the high speed desirable for diamonds (right)

cutting on those diameters. The bars pass through bushings in a cradle type jig mounted on the carriage of the machine.

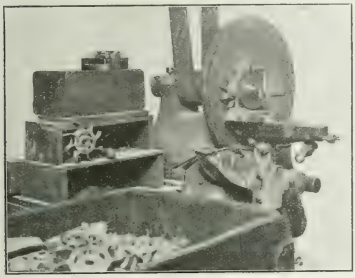
The crank case with the main bearing caps bolted in place is set in the cradle, ready for machining, when the carriage bearing the jig is traversed toward the head stock, the bars entering the work. These boring bars are unusual in that each carries two sets of cutters, one for roughing, the other for finish boring. These cutters, due to a cam action inside the bar and diagonal slots in the cutters proper, may be completely withdrawn into the bar, alternately or both sets simultaneously. This withdrawal permits the bars to pass through the guide bushings without removing the cutters. Withdrawal of one or both sets of cutters is effected through a star-type of hand nut at the end of the bar. Loosening the nut permits the cutter operating mechanism to be moved inside the bar and set in proper position by slots, in which a locating pin or key fits, when the nut is again tightened.

Thus, after the bar is in place, first the roughing cutters are extended, perform their functions and are withdrawn when the finishing cutters are extended, all in a minimum of time, without removing the bar or requiring another set up of the work. Micrometer adjustment of the cutters is possible by a knurled

sleeve on the cutter adjusting bar immediately in front of the star nut. This adjustment is not effected by the cutter withdrawal or extension. Facing of bearings is also performed in this set up.

After the above operation is complete, the bronze bearings are put in place, and the babbitt liners finished to size by diamond tools running at high speed. This work has been done successfully for some time past, with diamond tools giving twice the old output. The limit to which these bearings are bored is plus 0.00025 in. minus 0.00025 in. Due to the fact that there is practically no wear in the diamond tools from 1 hr. to 1½ hr. are saved daily which was formerly needed for tool upkeep. A set of tools seen had been working day after day for six weeks, turning out 20 to 22 cases per day without any adjustment whatever and still holding to the limits demanded. How long this set of tools will last it is impossible to say. It is, however, superior to the ordinary method of line reaming formerly practiced, even though the fixture used be the same old line-reaming fixture, not built for high speed.

A new fixture for high speed has just been completed. This will be used on a horizontal boring machine, with a speeder attachment at the front end of the spindle, so that roughing may be done at a speed obtainable from the changes in the machine driving mechanism. The high speed attachment may then be engaged to secure proper finish, which may best be done at high speed and fine feed, there being apparently no limit to the speed the diamonds will stand. In this changed operation, the cylinder castings will be attached to the crank case during the operation, so that the normal assembled strain may be on the case while being bored.

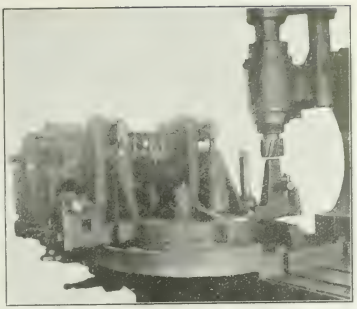


Difficulty in Sizing Water Pump Rotors Has Been Overcome by Grinding on a Disk Grinder with Suitable Fixture to Rotate the Casting

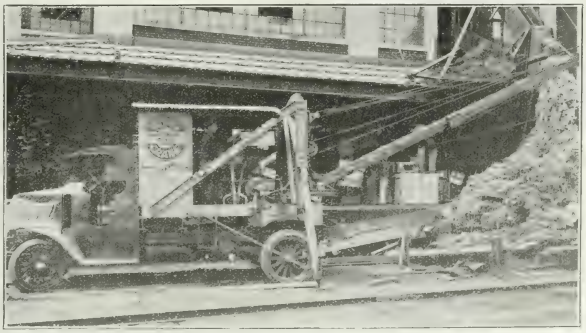
In the new fixture the job is placed with the bottom of the crank case against a setting up stop at the right. The weight of the cylinders is carried on adjustable spring supports at the back. With the case in position, two beveled end locating plungers are inserted in the cam shaft bearing holes, thereby drawing the case to the proper position, when it is clamped on the lower edge at the center against a stop. This registers the job from three points. The locating plungers are actuated by a double acting air cylinder mounted at the rear between the fixture housing. This cylinder is controlled by a two way valve at the operator's position. The piston rod, through a series of links and gear segments, is connected with the two plungers. To permit the high speed desirable, the guide bushings carrying the boring bar are mounted in ball bearings.

It was found difficult to machine the bronze pump impeller castings used to circulate water for cooling the motor without distortion, due to the lack of rigidity in the vanes. A method has been worked out to not only face off the ends of the vanes to produce a rotor of proper diameter, but also to finish the sides to conform to a gage in both contour and as to width of shaft hub. A fixture is mounted on the table of a disk grinder. On this fixture the rotor is mounted by a draw-in bolt. As the table is rocked, the operator rotates the impeller by a pinion and gear mechanism in the fixture, thus grinding the sides of the vanes. A similar fixture set at right angles is used to finish the ends of the vanes.

A fixture which indexes 180 deg. on a vertical milling machine table is used in machining a shoulder on each end of motor and radiator front support brackets. The height of cutter is determined by a hardened stop block on the fixture, a shell end mill



Radiator Support Brackets Are Milled on Two Shoulders in a Vertical Milling Machine With Indexing Fixture, Making a Convenient Method of Machining a Bulky Casting



A Lifting Magnet on the End of the Jib Crane Is Used for Loading Scrap into Freight Cars. A generator in the crane cab excites the magnet

being used. In this way an operation difficult because the piece is large and the operation insignificant is handled economically. The piece is quickly set and clamped by star head screw stops and rocker clamps.

A rather unusual method is employed at this plant in loading turnings and other scrap into cars for shipment. This consists of a Mack chassis on which is mounted a jib crane. The crane is operated by an individual gasoline motor inside the crane cab. This motor also operates an electric generator which is used to excite a lifting magnet with which the scrap is lifted into the car. Out-riggers are set to steady the machine while operating. The truck is also used for spotting cars and may be used for other miscellaneous work.

How a Leather Belt Transmits Power

Considerations of Tension on the Two Sides of the Belt—Relation of Speed and Friction to Power

BY J. EDGAR RHOADS AND DR. R. R. TATNALL*

IN any belt drive the two factors of power are (1) speed, and (2) pulley traction or grip.

(1) More power can be transmitted by running the belt faster. Except for the centrifugal effect, the power would be proportional to the speed—twice the speed would give twice the power. But since the unfavorable effect of centrifugal action is proportional to the square of the speed, this soon over-balances the other and, beyond a certain point, power begins to decrease as the speed increases. Since the centrifugal effect depends on the weight of the belt, it is advantageous to use the lightest stock and the thinnest and narrowest belt compatible with sufficient strength and reasonably long life.

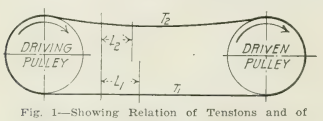


Fig. 1—Showing Relation of Tensions and of Creep in a Belt, Between the Driving and the Driven Pulley

(2) The second factor of power is *grip* or traction. This is the same as the frictional force of the pulley on the belt, and is equal to the difference of tension between tight and slack sides, $(T_1—T_2)$. The friction does not depend on the width of the belt, but does involve:

(*a*) Character of surface of belt—kind of leather, tanning, currying.

(*b*) Pulley surface—iron, steel, wood, paper, etc.

(*c*) Tension of belt, because this produces pressure of belt on pulley: the greater the pressure, the greater the traction.

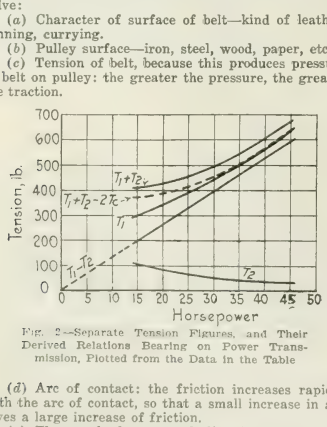


Fig. 2—Separate Tension Figures, and Their Derived Relations Bearing on Power Transmission, Plotted from the Data in the Table

(*d*) Arc of contact: the friction increases rapidly with the arc of contact, so that a small increase in arc gives a large increase of friction.

(*e*) The speed of creep and slip: friction between belt and pulley increases as the speed of slip or creep increases. In other words, the grip of the belt on the pulley is better when slipping, and the faster the slip the better the grip, up to a certain point. Evidently this must be true, else after slip begins, one could not get more power—the belt would simply slip faster.

*Both of J. E. Rhoads & Sons.

Data from an Actual Test

A 4-in. single leather belt was run at a speed of 2500 ft. per min. and made to transmit a load of 15.1 hp. The centrifugal tension at this speed was known to be $T_c = 17$ lb.

In the table, the first two columns and the last one, are observed, that is, obtained directly from the testing machine. The remaining six columns are computed from the data in the first two.

Data from Test of a 4" Single Leather Belt, Running at 2500 Ft. per Minute

Horse-power (p)	T_1+T_2 $-2T_c$	T_1+T_2	$T_1—T_2$	T_1	T_2	$\frac{T_1}{T_2}$	Coeff. of Friction (f)	Slip, % (s)
15.1	375	409	199	304	105	2.89	0.38	0.77
19.4	391	425	256	341	84	4.06	0.50	1.04
23.8	410	444	314	379	65	5.83	0.65	1.34
26.7	430	464	352	408	56	7.29	0.73	1.53
29.5	447	481	389	435	46	9.45	0.85	1.72
32.0	477	511	422	467	44	10.6	0.89	1.92
34.8	504	538	459	499	39	12.8	0.98	2.12
37.5	540	574	495	535	39	13.7	1.00	2.33
39.0	555	589	515	552	37	14.9	1.04	2.49
41.9	590	624	553	589	35	16.8	1.10	2.85

The tension shown by the testing machine, or the pull on the journal, was

$$(T_1 — T_c) + (T_2—T_c) = T_1 + T_2 — 2T_c = 375 \ lb.$$

If the belt had been running slowly, so as to have no appreciable centrifugal tension, the journal pull would have been 34 lb. more, or 409 lb. This is the sum of the actual tensions in the two strands of the belt, or $T_1 + T_2$.

Knowing the power and speed, we can calculate the difference in tensions $(T_1—T_2)$, and also the separate tensions in the two strands, which are T_1 and T_2. Thus, while transmitting 15.1 hp., this belt had a tension on the tight side of 304 lb., and on the slack side of 150 lb., as shown in the first line of the table.

$T_1—T_2$ is the traction of the belt on the pulley, and is proportional to the power transmitted. These tensions are also shown graphically in Fig. 2, plotted from the data in the table.

The ratio of the tight to the slack tension, T_1/T_2, can have almost any value. When there is no load, $T_1 = T_2$, so that $T_1/T_2 = 1$. As the load increases, the ratio T_1/T_2 increases and may reach a very large value. Each value of T_1/T_2 corresponds to a definite value of the coefficient of friction. This coefficient of friction is calculated from the ratio of the tensions by means of the formula $(T_1 — T_c)/(T_2 — T_c) = fa \times \log e = 0.4343\, fa$, in which f is the coefficient of friction, and a the arc of contact in radians.

The largest value of T_1/T_2 which we have so far obtained is about 70/1, corresponding to a coefficient of friction of 1.35.

In the table, the coefficient of friction and slip are both given, and it will be noticed that both increase with the load. This is shown graphically in Fig. 3. Evidently the increase in coefficient of friction is caused by the increased slip, since there is no other factor which is changing enough to account for it. After about 44 hp., in this test, the friction no longer

increases, and may even diminish. This may be near the point at which true slip begins. If so, it would indicate that the change in friction is due to creep rather than slip.

Fig. 4 shows the way in which the coefficient of friction increases as the slip (or creep) increases.

This property of leather belting, which gives an increase in its pulling power as the slip increases, is a most interesting and valuable one, whose significance was been appreciated for only a short time. It is this property which gives to leather belting, which has been properly tanned and curried, its wonderful capacity

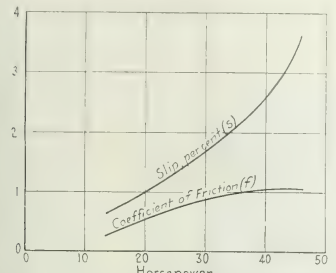


Fig. 3—Showing How Both Slip Percentage and Coefficient of Friction Increase With the Power Transmitted—the Former at a Highly Accelerating Rate

for carrying enormous overloads above the normal rating. With the best belts this reaches a point well over 100 per cent of its normally rated capacity.

In this connection, within the last few years, improved methods of tanning and currying adopted by the most progressive manufacturers have resulted in its being possible for a properly made leather belt to be rated for ordinary purposes at a materially higher figure than was generally considered safe a few years back. These improvements, chiefly to the surface of the leather, have resulted in conservatively estimating the

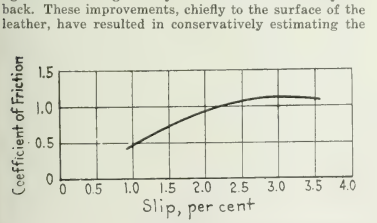


Fig. 4—Increase of Slip With Increasing Frictional Coefficient

capacity of a given leather belt at about one-third more than was general five years ago.

From a power standpoint, the main saving obtained through the use of the best leather belt, as compared with most fabric belts, is that the leather belt can run with a larger proportion of the tension on the bearings doing effective work. There can be less tension upon the slack side of the belt, consequently less waste of energy through bearing friction. On some drives this is a large factor, one which probably would of itself justify investment in the best type of leather belt at a much greater first cost, entirely disregarding the fact that the leather is usually a much longer lived belt.

That railroad traffic is heavier than ever before is shown by the fact that 1,033,130 cars were loaded in the week ended Aug. 4, the largest total, except for the 1,041,044 of the previous week, in our history.

Further Decline in Refractories Shipments in July

Lessening clay fire and silica brick shipments continued in July, according to the monthly report of the Refractories Manufacturers' Association, which shows that shipments of clay fire brick decreased about 3,000,000 9-in. equivalent brick, while the shipments of silica brick were down more than 1,000,000 brick, as compared with June. The fact that the iron and steel industry accounts for the consumption of such a large part of the production of these grades, as disclosed in THE Iron Age, Aug. 16, page 402, and that this industry has been a little sparing both in orders and specification in the past few months explains largely the continued decline in shipments, which, in the final analysis, are the real story of business.

Production of clay fire brick declined even more heavily in July than did shipments. Net new orders showed a slight gain, but stocks on hand July 31 were approximately 2,000,000 brick greater than one month before, while unfilled orders were down almost 10,000,000 from those of June 30. There was a substantial loss (almost 3,000,000) in new orders for silica brick. Stocks July 31 were slightly less than one month before, but unfilled orders dropped almost 4,000,000 brick.

The figures in detail, in 9-in. equivalents, figures in parentheses being the percentages to monthly economical producing capacity, follow:

	July	June
Clay Fire Brick		
Capacity reporting	74,591,977	75,341,977
Stock, first of month	155,573,382 (208)	152,193,088 (201)
Production	56,976,868 (76)	61,165,622 (81)
Shipments	54,607,581 (73)	57,785,328 (76)
Stock, end of month	157,942,669 (212)	155,575,382 (205)
New orders	45,773,421 (61)	44,875,776 (59)
Cancellations	605,177 (1)	594,192 (1)
Net new business	45,168,254 (60)	44,281,584 (58)
Unfilled orders	79,329,139 (107)	89,365,766 (118)
Silica Brick		
Capacity reporting	22,565,500	22,565,500
Stock, first of month	34,310,226 (152)	34,960,553 (155)
Production	11,980,788 (53)	12,608,422 (56)
Shipments	12,947,202 (53)	13,258,749 (59)
Stock, end of month	34,243,812 (152)	34,310,226 (152)
New orders	8,351,087 (37)	10,293,682 (46)
Cancellations	556,712 (2)	1,000 (0)
Net new business	7,794,357 (35)	10,292,682 (46)
Unfilled orders	30,775,050 (136)	34,927,877 (155)

Foundry Production Generally Maintained

Writing of conditions in the foundry trade, Rogers, Brown & Co., Cincinnati, say in their pig iron market letter of Aug. 18:

While foundry melt is lighter than that registered earlier in the year, it is moving along at a good seasonable rate with excellent prospects ahead. The falling off has been most noticeable in the soil pipe shops and those foundries supplying the machine tool industry. Other important lines show continued activity. Cast iron water pipe is in strong demand, while the sanitary ware, radiator and malleable shops in general are pushing their production. Some automobile foundries have had a slight let up, but on the whole they seem to be moving forward confidently and as the new season develops should be running to capacity. The agricultural implement manufacturers find much ground for optimism in spite of propaganda to the contrary and are planning on an active season starting the last of September or first of October.

On the same subject the Matthew Addy Co. says:

Here in the Middle West the consumption of pig iron is keeping up extremely well for this season of the year. Stove shops, automobile manufacturers, makers of malleable castings and steel castings have not shut down as they usually do during the heated term but have been operating straight through the summer.

French Iron and Steel Output This Year

The French production of pig iron for the first half of this year, according to statistics of the Comité des Forges de France, was 2,298,808 metric tons, of which 27,930 tons was made in electric furnaces.

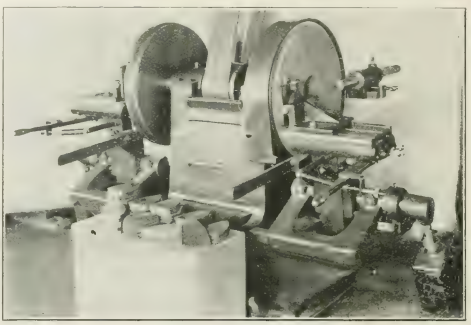
The steel output for the same half year was 2,183,765 tons, of which 2,129,953 tons was ingots. The output by processes was: Bessemer, 1,263,206 tons; open-hearth, 891,424 tons; crucible, 6826 tons, and electric 22,309 tons.

Power Operated Ring-Wheel Grinder

A new ring-wheel grinder, incorporating, among other features, power-operated lever tables, has been placed on the market by the Badger Tool Co., Beloit, Wis.

The machine shown in the accompanying illustration carries two 24-in. wide face abrasive wheels and two power-operated lever tables. This arrangement of the work table is intended to permit one man to operate both ends of the machine, one fixture being loaded while the work in the other is being ground. In addition to saving the labor of one operator, the arrangement is intended also to eliminate the heavy labor of feeding-in and rocking the work back and forth across the face of the wheel.

The wheel dressers are mounted at the rear side of the machine as shown, being placed so that they will not interfere with the grinding operation, and are at all times ready for use. Provision is made for alining the dresser slides in true relation to the machine spindle.



Ring Wheel Grinder Equipped with Power Operated Lever Tables. One man operates both ends of the machine

Power for rocking the work tables is transmitted by belt from the machine countershaft to a reduction gear box on the rear of the machine. Rocking motion is imparted to the work tables by the two straight levers shown. The work is held against the grinding wheel by adjustable spring tension through the hand lever on the work table.

In operating the machine the table rocking lever is disconnected, the hand lever grasped and the work table drawn slightly back from the grinding wheel, the table being rocked forward at the same time until it is clear of the grinding wheel. The piece to be ground is placed in the fixture and the table is swung back into the grinding position where the table rocking lever engages and rocks the work slowly back and forth across the face of the wheel. The adjustable spring tension supplies the necessary in-feed, leaving the operator free to repeat the operations outlined at the opposite end of the machine, while work is being ground by one of the wheels.

The machine illustrated is equipped with fixtures for grinding the tops and bottoms of electric iron sole plates. The fixtures are of the floating type, which permit the castings to locate themselves against the face of the wheels in order that only a minimum amount of stock need be removed to clean up the castings.

The weight of the machine, fully equipped, is approximately 3100 lb.

Cast Iron Pipe for Enameling Purposes

The Bureau of Standards has received a number of specimens of typical enameling castings, and these are now being enameled with several commercial cast iron enamels. The chemical analysis of the castings has been made, and the Bureau also plans to make up typical bodies of cast iron in its metallurgical division. The specimens thus obtained will also be analyzed chemically and enameled. An attempt will be made to correlate the blistering of the enamel and the chemical composition of the cast iron, with the object of obtaining a good commercial cast iron which will not produce blisters.

Manganese Losses in Washing Caucasian Ores

Wasteful methods in the washing of manganese ores, produced in the Kutais district in the Caucasus, are depriving the world of enormous supplies of this material, according to a statement made today to the Institute of Politics, meeting at Williams College, Williamstown, Mass., by C. E. Julihn, representing the Department of the Interior. Such waste is of international interest, Mr. Julihn emphasizes, because of the relatively small reserves of high grade manganese known to exist and the importance of such ores in the manufacture of steel.

A study of the preparation of the Kutais ores, made by J. W. Furness, associate mining engineer of the Bureau of Mines, develops the fact that the tremendous wastes now occurring are due to the desire to meet an unreasonable and unnecessary trade requirement calling for manganese of 52 per cent grade. An annual production of approximately a million tons of ore containing 52 per cent manganese is made from the Kutais deposits by washing ore which averages 47 per cent of the original manganese. This means in effect that, in order to make an improvement of 5 per cent in grade, about one-half the manganese mined is lost in washing.

The Bureau of Mines investigation developed that about 20 per cent of the production from these deposits is marketed in the United States, 40 per cent in Great Britain, and the remainder in France, Germany and Italy. To these countries, which are the great steel producers, the conservation of high-grade manganese is especially important.

It was pointed out by Mr. Julihn that there are no established international agencies authorized to consider such unwarranted wastes of the world's precious natural resources. The consumers, he declared, are most concerned with obtaining the highest possible grade of material without thought or responsibility as to the future of world industry. It is hoped that the calling of attention to these serious manganese losses may lead to some means of remedying the situation and thereby establish a precedent for the correction of other unsound international trade practices.

Portland Cement Production

July output of Portland cement reported by the United States Geological Survey amounted to 12,620,000 bbl., compared with 12,382,000 bbl. in June and 12,910,000 bbl. in May. These three months showed the greatest production of any three months in the history of the industry.

Shipments in July at 13,712,000 bbl. were higher than in June, but lower than in May. No month's shipments this year have reached the high figure established in August, 1922, at 14,361,000 bbl.

Spring Meeting of Electrochemical Society

The annual spring meeting of the American Electrochemical Society will be held at Philadelphia, April 24, 25 and 26. Two symposia definitely decided upon for that meeting are "Organic Electrochemistry" and "Recent Progress in Electrolytic Refining."

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: Park Building. Boston: 416 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London: Eng. 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Merchantable Bar or Scrap?

Statistics on the production of electric furnace steels and alloy steels are often quoted to measure the startling growth of the "quality" idea in the steel trade. Without denying that specifications are becoming more rigid, it must be remembered that a steel is not necessarily good because it comes out of an electric furnace or contains a little alloy. A more significant sign of the pressure which purchasers are bringing to bear may lie, therefore, in the fact that producers of tonnage steels are giving serious study to ways and means whereby the percentage of scrap may be reduced, and whereby a greater part of the metal cast into ingots may be worked into products that will stand severe punishment in subsequent manufacturing operations.

It is a very complex problem, this problem of sound steel, really *sound* steel. The traditional expedient of tool makers is not available—to melt cleanest raw materials and at leisure. Nowadays a pile of miscellaneous scrap and cheap pig iron must be converted into steel by tons instead of pounds.

Nevertheless it is by no means hopeless. More and more evidence is accumulating that defective steels are generally dirty steels. The converse also appears to hold: the same troublesome steel will produce a better and better bar, both as to external and internal soundness, as the ingot is less segregated and contains fewer non-metallic inclusions, both solid and gaseous.

The inquisitive heat-treater and metallographist has furnished much of the evidence indicating a relationship between soundness and cleanliness; but the metallurgist in the steel plant naturally must rely upon his own brains and skill to keep these inclusions to the economical minimum. He in turn is confronted by such problems as: "What is this dirt, anyway?" "Is it a product of an essential steel-making reaction?" "Can it be entirely eliminated under any circumstances?" "What is the safe limit for my product?"—things about which the wisest know very little.

Fortunately he can draw upon the lore of the crucible melter, verified completely by experience with artillery steels from the open-hearth and supported by principle holding throughout the science of metallurgy: Fine steel must be killed in the furnace. Everyone knows that the wildest metal can be quieted by additions to the ladle and even to the mold. Little thought is needed, however, to realize that there is small chance for the tiny particles of slag and bubbles of gas resulting from the reaction to be washed out of the metal. Such steel, made in the ladle, is dirty and subject to defects of greater or less seriousness, first cousin to the flakes, laminations and woody structure which kept munition makers awake at night.

It may be said that some of the above propositions are debatable. Granted. But there is such a wealth of collateral evidence from practice and such a mass of theoretical considerations supporting the main conclusions—namely, that cleaner steel will produce less scrap, and that cleanest steel must be deoxidized in the furnace—that more than one plant in trouble has turned to the expedient of operating awhile with these principles in view. The worst that could happen would be a longer heat, but that is not so important. A smaller number of good ingots that can be sold is much to be preferred to a greater number headed straight for the scrap pile!

The Farmer's Automobile

A statement recently attributed to the Department of Public Works of Nebraska was that the farmers of that State would incur this year an expense of $135,000,000 for running their automobiles, while the value of their wheat and corn, their principal crops, would be only $88,000,000. We have seen some grave editorial comments respecting this, but none saying: "Impossible; it couldn't be done."

This is another warning not to accept such statements without critical analysis, not even when they are fathered by a Government body. In this instance the cost of automobiling to the farmer is obviously overestimated, and there is no intimation that the value of his other produce may greatly exceed that of his wheat and corn. Nevertheless, the situation with respect to this uplift in the scale of living is sufficiently serious.

Let us take the nearby State of Minnesota, which lately reflected its discontent by rejecting the regular Republican candidate in a senatorial election. The crops of that State this year are expected to realize about $500,000,000, but in truth the total will be less than that, for the corn and hay, valued at about $125,000,000, will be used mainly at home in raising livestock, dairy and poultry products, etc.; so that eliminating these duplications the actual yield of Minnesota's agriculture this year may be about $400,000,000.

Minnesota has about 180,000 farmers. In the neighboring States the percentage of farmers who own automobiles ranges from 85 to 95. If we conjecture only 83 1/3 per cent for Minnesota the number operated by farmers in that State will be 150,000 (out of the total registry of 340,000 passenger cars in 1922). At an average operating cost of $500 per annum (the Nebraska Department of Public Works says $553) the cost to the Minnesota farmers would be about $75,000,000. Of course this estimate for cost is for direct operation, with no allowance for depreciation.

The $400,000,000 worth of products is gross realization, not net. Out of it comes cost of supplies, hired labor, taxes, upkeep, etc. The taking of $75,000,000 for automobiling out of such a gross is rather staggering at first sight; or, for that matter, at second sight. Either the Minnesota farmer is doing better than his complaints indicate or he is doing too much automobiling. There is probably something in both ideas.

The Governor of South Dakota recently made a bid for popularity by effecting an uneconomic reduction in the price for gasoline. So simple was his expedient that the crusade spread like wildfire, and even Mayor Hylan thought of winning such easy glory if newspaper reports were correct. Yet if these governors had the welfare of their people really at heart they should have prayed for higher gasoline, not lower.

Folly of the War Bonus

Bonus payments to the men who went to war, or adjusted compensation, as more euphoniously phrased, would have to be provided from taxes paid by the American people, either individually or through industry. Since the level of taxes is such as to form already a severe handicap to industry on the one hand, and on the other an incentive to the purchase of tax-free bonds, it is hard to look with equanimity upon pending efforts to force a bonus bill through Congress.

Careful analysis by the National Industrial Conference Board indicates that such legislation would call for approximately $4,000,000,000. This would represent a tax of some $175 upon every family in the land. Much of this tax would be derived from industry, causing a rise in the price of manufactured commodities and increasing the cost of living. This would not only nullify in large extent the benefits which those receiving the bonus could expect from it, but add heavily to the burdens of everbody else. A further rise in prices (cost of living) might be expected to follow the sudden demand for "consumption goods," caused by the rapid expenditure of the sums received.

To what extent this added taxation would force industries to curtail operations is purely speculative. Whatever unemployment this might cause, however, would add a further bad effect to the fiscal elements already outlined. Another point made by the investigating board that well may be taken into account, is that the bonus would seriously hamper the Government in caring for disabled veterans or in meeting the increasing demands that will be made upon it for pensions.

Steel for the Oil Industry

Steel manufacturers have never shown much disposition to forecast the demand for steel in the oil industry by the position of oil itself, and the practical experience of the past few months justifies their reserve in this matter.

Three or four months ago, when declines in crude oil prices began to attract attention, predictions were not uncommon that drilling would be largely arrested, and that accordingly the steel industry would have a much lighter demand from the oil trade. There is, perhaps, one of those cases that so often arise, of cause and effect being confused. The tendency to drill may be the cause of excessive production, instead of excessive production removing the tendency to drill. It is not necessarily the case, in other words, that oil is produced for the direct purpose of marketing it as soon as produced. The condition in many fields is as a matter of fact a different one. The actual attitude of the producer is that he wants to get the oil out of the ground before some one else gets that oil. This is the situation in the majority of the newer fields, and it is the newer fields that furnish the chief demand for steel.

Complication arises from the fact that the oil industry uses steel in four large ways, apart from many minor uses, and these four ways are totally distinct. They are not only distinct, but some of the uses tend to vary inversely with each other.

While there is a term "oil country goods" the term includes two distinct classes of material, tubular goods used at oil wells and line pipe used in transporting oil. A third large use of steel in connection with oil is in tanks for oil storage. A fourth is in tin cans for exporting oil.

In large measure the drilling of wells, as intimated above, may depend upon local conditions in the field rather than upon demand for oil. Surplus production may or may not restrict the drilling of wells. However, it usually does increase the demand for storage tanks, and frequently a large amount of steel goes into that use. Again, other things being equal, abstention from the laying of pipe lines may cause demand for tanks to arise. Then a line may be laid and the tanks are not needed. Finally, if the domestic demand for oil decreases more oil is exported, and that causes demand for tin plate. Any large export movement of oil will produce a heavy demand for tin plate. A general rule is that the less the demand for oil the more the demand for tin plate from the oil industry.

There is no other steel consuming industry

that presents these peculiarities and complications. Other industries call for more or less steel from time to time according as they are more or less prosperous or active.

To illustrate the divergences, in recent weeks the oil industry has been calling for a fair though a slightly decreased tonnage of oil country tubular goods, apart from line pipe, has been buying practically no line pipe, has been buying storage tanks in spurts and has been inquiring about tin plate. Not much tin plate actually has been bought, as the mills cannot furnish early deliveries, but later in the year there is likely to be a large movement in oil plate. Mills have not entirely finished their line pipe orders, booked months ago, and a fresh buying movement may develop soon in that direction.

Railroads Functioning Well

Freight car loadings in the week ended July 28 were the greatest for any week in the history of American railroading, and loadings in the following week, while showing a slight decrease, were otherwise the largest, yielding only to the preceding week. The numbers were 1,041,044 cars and 1,033,130 cars respectively. Car loadings are a prompt and ready index to the volume of freight movement, but are, of course, not as accurate as the ton-mileage, the figures for which are belated, and less useful only on that account. The ton-mileage in May was 39.6 billion, the greatest for any May, the May record having previously been held by the 38.6 billion of May, 1917.

It is one thing, of course, for the railroads to break their records and another thing for them to furnish the service desired of them. In addition to record loadings the railroads have been showing car surpluses, there being a net surplus of 60,000 cars at last report. They also have cars coming to them, having had 86,716 new freight cars on order on Aug. 1, with deliveries being made steadily.

Early in the year there were numerous predictions that before this time the railroads would become congested and would not be able to render the service required by shippers. These predictions have failed entirely of verification. The peak load always comes in October. According to records of recent years this may be 5 or 10 per cent above the present traffic. Some authorities mention 15 or 20 per cent as a possible increase, but the idea in such estimates may be to stimulate the railroads to prepare very fully. They have done very well in recent weeks in car and locomotive repairs and still have much rolling stock to be repaired and returned to service, so that their prospect is good.

This excellent functioning of the railroads would naturally be expected to discourage efforts at hostile legislation in the forthcoming session of Congress. It has appeared, however, that the legislators or prospective legislators who have busied themselves, chiefly on the platform, with railroad matters, are in reality enemies of the railroads rather than friends of good service. They seem to wish to tear down rather than to build up.

COKE LUXEMBURG'S PROBLEM

Ruhr Receipts at Low Ebb and Stocks Declining—Only 25 Blast Furnaces Operating

LUXEMBURG, Aug. 4.—During July, improvement in the Luxemburg iron and steel industry has been continuous, but there is still a pessimistic attitude in some quarters. Inquiry has been more active and prices have increased slightly, but this has been an insufficient compensation for the sacrifices resulting from the depreciation of the Belgian franc. Regular arrivals of coke are not sufficient to meet the actual requirements of the works, and stocks, which had been greatly increased by shipments received from Great Britain and America, are decreasing again. It is felt that there is no hope of receiving further supplies from the Ruhr for some time; on the contrary, the complete exhaustion of stocks is feared before the ovens can be put on blast again and no tonnage of any size is expected from Belgium. As heavy buying of foreign coke, at actual cost of the dollar, sterling and florin, is unprofitable in view of the quality of such fuel, which suffers by successive transshipment, the Luxemburg iron and steel industry once more faces complete stoppage of industrial activity.

Offers, f.o.b. Antwerp, are now more numerous and prices are maintained in contrast with Belgian and Lorraine quotations. Casting pig iron No. 3 is quoted at 455 to 460 fr.; basic ordinary pig iron, 450 fr., delivered to Belgian railroad stations; basic ingots, 550 fr.; blooms, 575 fr.; billets, 625 fr.; largets, 640 to 650 fr., and bars, 750 to 760 fr. or a little higher than the Belgian product, which is sold f.o.b. Antwerp at 730 to 750 fr. (Belgian currency). Large beams are quoted at 740 fr.; small beams, 725 fr. Heavy plates are £8; heavy sheets, 750 to 770 fr.; hoops, 925 fr., and wire rods, 1,000 fr., f.o.b. Antwerp.

Number of Luxemburg Furnaces in Blast in July

	Number in Blast	Total Furnaces
Arbed:		
Esch	5	6
Dudelange	5	6
Dommeldange	1	3
Terres Rouges		
Belval	4	6
Hadir		
Differdange	6	10
Rodange	3	7
Steinfort	2	3

The total pig-iron production of Luxemburg furnaces in June was 89,785 metric tons, of which 86,860 tons was basic grade. The total steel ingot production was 74,351 metric tons, of which 72,419 tons was basic material, 1160 tons open-hearth and 322 tons electric furnace.

COMING MEETINGS

August

American Institute of Mining and Metallurgical Engineers. Aug. 20 to 30. Quebec and other places in Canada. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

Lake Superior Mining Institute. Aug. 29, 30 and 31. Twenty-third annual meeting. Hotel Spalding, Duluth, Minn. A. J. Yungbluth, secretary.

September

Chemical Industries. Sept. 17 to 22. National exposition, Grand Central Palace, New York.

Machine Tool Exhibition. Sept. 18 to 21. Mason Laboratory, Yale University, New Haven. New Haven branch, American Society of Mechanical Engineers, 400 Temple Street, New Haven, Conn., in charge.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

One Mill's Experience with 8-Hour Day

A Leaf From the Book of the Tyler Tube & Pipe Co.—Costs Increased and Efficiency Lessened

BY E. TYLER DAVIS*

I HAVE been reading with interest of late in THE IRON AGE experiences and views in the iron and steel industry on the 8-hr. day, especially as to what the change from 12 to 8 hr. will bring forth. Our plant consists of a forge, rolling mill and tube works. Prior to 1918 only our rolling mill and forge were unionized, and about that time our welding department was unionized. Our rolling mill and forge, although unionized, work under the charging time conditions of the Amalgamated Association, which means a 9 to 10-hr. working day usually in the rolling mill department, and about eight hours of continuous work in our forge department.

Shortly after being unionized our welding department, which prior to that time had operated on the 10 and 12-hr. basis, was changed to the three-shift plan of continuous operation, it being anticipated that an increase in hourly production, and consequently in total production, would take place. In changing our basis of operation at that time hourly rates were advanced to a higher basis than that paid by any mill in the Pittsburgh district, in which we are located, but at that our skilled and semi-skilled welding department employees have not been able to earn as high total daily earnings as in similar departments of other mills where 11 and 12, and 10 and 12-hr. shifts prevail. A factor leading to our trial of three 8-hr. shifts was the local labor situation in this community, which is primarily a glass-making town, an industry to which the 8-hr. day and the three-shift basis are particularly adapted.

Plan Attracts Less Efficient Workers

The following conditions sooner or later became apparent as we operated under the three-shift plan:

1. Short hours attract less efficient workers. Our daily earnings ceased to attract industrious workers from other tube mills, because of lower daily earnings, but they did attract the less desirable men seeking short hours and the relatively high hourly rates. Furthermore, our industrious labor, more especially the foreign, left us to seek the greater earnings to be had elsewhere, where longer hours obtained.

2. Decreased production. Instead of our total production per furnace hour increasing, and the production per day increasing, it actually decreased on the three 8-hr. turns. For some considerable time it was thought that this was due to less effort upon the part of our men, but close observance of furnace conditions and operations demonstrated to us that roll changes, adjustments, mechanical interruptions, and the ever necessary fixing of bottoms were actually causing from three-quarters to one hour's loss of work on each 8-hr. turn, whereas most of these things on the two-shift basis had been done between turns and at the noon hour. If anything, the loss of production was aggravated by the very interest of the men themselves in going ahead with their work, oftentimes before their bottoms were in a proper condition, which led to defective product and to another stoppage of work. Our experience led us in July of this year to discontinue the third shift, although we still continue to work an actual 8-hr. day.

How Costs Increase

3. No compensating increase of effort—same pace on short as long workday. The men on all positions around our welding furnaces during the summer months are actually employed on their jobs only one-half of the time they are in the plant; that is, they work 15 minutes and rest 15 minutes. At the time the three-shift 8-hr. basis was adopted with us no concession was made in this matter of spell hands, nor has any yet been made. Scarcity of labor and the efforts of the union have been effective in maintaining crews and working conditions unchanged in face of shorter hours and less real need for spell hands. In other words, practically all the men on our furnaces are actually working at their occupation during the summer months only four hours out of 24, although in the mill eight hours. Even in winter they are all resting not less than one-third of their time spent in the mill. No increased productive effort on the part of our men has been obtained to compensate the company for the increased rates on 8-hr. turns. There is no increase in the number of heats per hour, the pace today being practically the same as when on the long turns.

4. Eight-hr. day increases costs even if rates were unchanged. On the three 8-hr. shifts there was a great increase in the number of non-productive man hours due to the necessity of paying the full crew for stoppages of work, such as mentioned under paragraph two above. At these times only part of the crew was employed, and in addition to the actual labor costs for the full crew there was no compensating production.

On the two-shift basis, whether actual 8-hr. shifts or 10 and 12-hr. shifts, practically all the payment for this lost time is avoided, as the roll changes, making of bottoms, etc., is done at noon hour and between turns, and only the men actually employed are paid for this work. While the two 8-hr. shifts eliminate the excessive labor cost for lost time, we nevertheless have the increased idle machine and equipment time of the plant due to its being idle so many more hours in 24 than it would be on either the continuous operating basis or the two long shifts, and the consequent increase of overhead and fixed charges because of this circumstance. The inevitable non-productive man hours on three 8-hr. turns of continuous operation, or its alternative of increased idle plant time on two 8-hr. shifts, lead in either instance to an increase in cost as compared with the two long shifts.

More at Stake Than Wages and Hours

Having pointed out some of our experiences, and being every day concerned with the problem of bringing back our working conditions that they may compare favorably with those in other mills, I am convinced that no general plan of work day can apply successfully to all branches of the iron and steel industry, and that much more is at stake than the mere matter of wages and hours. Appreciating that union relationships possibly may complicate matters, nevertheless I am convinced that merely shortening the hours of labor will not change the pace of a man, and that in making these changes it must be considered whether man power or machine is the controlling factor.

No one would welcome the return of the 12-hr. turn, where it has departed, and eventually it will disappear from American industry. On the other hand, where physical effort governs the rate of production, increased effort must be put forth by the worker on the short turn, either directly or by sacrificing some of the rest periods now enjoyed. Labor must give this effort, which it is not now giving, or production per man will suffer and branches of the industry depending upon physical effort will decline. Four hours of actual labor in 24, our present condition, is not a fair day's work

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for the worker, and eventually would be eliminative in competitive industry for the employer unless it universally obtained.

I have submitted the above to you, believing that at least part of it will prove useful if it only serves to bring home the thought that concessions are much more easily given than withdrawn and that it is much easier to maintain advantages than to regain them.

Progress in Short Work Day Chiefly at Blast Furnaces

PITTSBURGH, Aug. 20.—Elimination of the 12-hr. day in the steel industry still is largely a Steel Corporation effort, as outside of Youngstown few of the independent companies here or in nearby districts yet have passed beyond the consideration of plans for the change. While the shorter workday is being set up in Steel Corporation plants as rapidly as possible, it has been for the most part concentrated on the blast furnace departments. When the corporation has completed the movement in that direction it will move on to the open-hearth and Bessemer steel departments and then to the coke plants.

It is quite evident that full establishment of the shorter day is not going to be easily accomplished, for already there are some signs of dissatisfaction among the men, which is not confined entirely to those who will lose income as a result of the change. Men employed in the departments of noncontinuous operations, whose hours of labor and compensation are not disturbed under the plan outlined by the American Iron and Steel Institute committee, here and there are inclined to object because they are getting no more for a 10-hr. day than those employed in the continuously operated departments receive for 8 hr. The fact that independent companies in some localities where there are plants of the Steel Corporation are not doing much toward making the change tends to hold back the efforts of the latter to some extent, since it is a pretty general condition that most men would prefer to work the longer turn for the greater compensation and will go to the plants where this is possible. It is necessary, therefore, for the Steel Corporation subsidiary companies to move with caution to avoid losing too many of their men. These are a few of the many problems which the transition involves.

National Tube Co. Retains 6-Day Week

The Carnegie Steel Co., as noted in THE IRON AGE of Aug. 16, began the abolishment of the 12-hr. day last Thursday by setting up three 8-hr. shifts at its blast furnaces. On the same day, other subsidiaries of the Steel Corporation also made a start. The National Tube Co. already has all four of its blast furnaces at McKeesport, Pa., on three 8-hr. shifts, and has gone over in part to that arrangement at its Riverside works, Benwood, W. Va., and Lorain, Ohio, works. Its plan for the application of the change is somewhat different from that of the Carnegie Steel Co. The latter is along the lines indicated in a special report in THE IRON AGE, Aug. 16, page 399, which in brief provides for a 32-hr. layoff for the men every six weeks, but does not entirely eliminate the 7-day week. The National Tube Co. plan calls for seven turns of eight hours each week, with every man taking a layoff of 24 hr. in every seven days, thus preserving a 6-day week. Since this company still is concentrating on reducing the hours of labor at its blast furnaces, it is too soon to say anything as to the number of extra men that will be needed in rounding out all continuous departments to the new working schedules.

The American Sheet & Tin Plate Co. has started to put its workmen, not already on the short workday, on the new schedules. This involves only a small percentage of the total, since the 8-hr. day for years has been the workday for tin mill men. Crane operators, millwrights, power house men are the principal classes of help affected at all plants, excepting only that at Vandergrift Pa., where the company maintains its only steel works.

The efforts of the American Steel & Wire Co. also are directed for the present toward getting the blast furnaces on a three 8-hr. shift basis. Many of the men employed around the furnaces of this company have been on the work for as long as 30 years and do not welcome the change, which means a smaller envelope each semi-monthly pay, and means closer watching of their expenditures and probably a change in their modes of living.

Youngstown Adjustments in Connection with the Shorter Day

YOUNGSTOWN, Aug. 21.—Some labor troubles marked the initial steps in the Mahoning Valley to eliminate the 12-hr. shift in blast furnace, open-hearth and by-product coke oven departments. Much of the friction was due to misunderstanding on the part of the workmen and largely had been ironed out, for the time being, by the first of the week. The tube mill department of the Republic Iron & Steel Co. was affected for a time. First reports indicated that there had been some trouble at the plants of the Youngstown Sheet & Tube Co. and the Carnegie Steel Co. While many of the men in both of the latter two plants expressed dissatisfaction over the methods of the change and the rates of pay, nevertheless there was no walkout and little suspension of operation.

At the Republic Iron & Steel Co.'s plant, upward of 1000 men were at first affected. There was no assemblage of the workmen and no disorder of any kind. Details of workmen called on the management and discussed grievances and ways and means of effecting satisfactory adjustments. Most of the men agreed to remain in their places until details of the change are more fully worked out.

In the case of the Youngstown Sheet & Tube Co. the efficacy of the employees' representation plan was demonstrated. Anticipating that misunderstandings would arise, and that some inequalities would remain to be worked out, the management previously had consulted with employees, through their chosen representatives, in round-table discussions. In fact, the change had been frequently discussed, and the men had been told in advance that whatever inequalities might exist at the start would be adjusted later.

One independent employer in this district still had on Aug. 16 about 38 per cent of its workmen on the 12-hr. turn. This company during the past few years had been abolishing the long day gradually and hoped to continue this process. During the summer, over 400 workmen, largely men in the open-hearth department, and the higher priced employees, including many tonnage men, had gone on an 8-hr. basis. Many of them had asked for the change. As a general rule, the foreign-born workmen prefer the longer work-day, and the Americans the shorter day, if they receive a comfortable wage which will enable them to live according to the American standard.

What the men will do with the additional idle time suddenly thrust upon them is a question mill operators have had under advisement and consideration for some time, but as yet have not devised plans that can be regarded as a solution of the problem. The men, especially the foreigners, will be encouraged to attend day and night schools as far as possible, to congregate at Y. M. C. A.'s and at other points where the environment is wholesome. Another plan which is being encouraged in the Mahoning Valley is for the men to purchase small plats of ground, and raise garden produce. This plan is meeting with some favor, but naturally little can be done with it until next season.

There appears to be an ample supply of workmen

available for the three-shift plan, so far as it has been introduced. Many men who heretofore have done odd jobs in the mills have applied for steady positions under the short day. Recent blast furnace suspensions in the district have also provided a good many workmen.

Reduced Operation in Mahoning Valley

YOUNGSTOWN, Aug. 21.—The principal change in operating schedules of Mahoning Valley iron and steel properties this week is in reduction of active blast furnace and sheet mill capacity.

The Youngstown Sheet & Tube Co. has suspended both of its stacks in the Hubbard group, while No. 3 blast furnace in the Haselton battery of the Republic Iron & Steel Co. has been blown out for relining and repairs, which work will start at once. Of the 66 open-hearth furnaces in the Valley, including both Steel Corporation and independent units, 56 are operating.

Of sheet mills but 78 of 117 mills were scheduled at the beginning of the week. At its East Youngstown plant, the Sheet & Tube company is operating but 8 mills, as compared with 15 the previous week, while the Mahoning Valley Steel Co. at Niles, is operating but four mills, half of its complement, comparing with six active units the week before. The active sheet mills in the Valley are divided as follows: Sheet & Tube, 20; Newton Steel Co., 17; Trumbull Steel Co., 15; Republic Iron & Steel Co., 8; Sharon Steel Hoop Co., 7; Falcon Steel Co., 7, and Mahoning Valley Steel Co., 4.

The A. M. Byers Co., Pittsburgh, is operating 72 of its 88 puddling furnaces at the Girard works, and one skelp mill, in addition to its blast furnace. Its puddle mill operation is somewhat larger than usual and progressive improvement from now on is anticipated. Slackening of sheet mill activity has diverted men to the puddle mills, heretofore retarded by lack of labor supply.

The Trumbull Steel Co., at Warren, Ohio, is operating close to capacity, with 24 tin mills scheduled this week, 14 at the Trumbull plant and 10 at the Liberty works, 13 sheet mills and two jobbing mills, a total of 39, of 44 units in all. The blast furnace, seven open-hearth furnaces and all of the company's strip mills are active.

Rate on Iron and Steel Products to Pacific Coast to Be Lowered

The next supplement to the transcontinental all-rail freight tariffs on iron and steel products, it is reported, will establish a rate on these products from Pittsburgh to the Pacific Coast of $1.15 per 100 lb. This compares with the published through rate of $1.50 and the combination of the Pittsburgh to Chicago and the Chicago to the Pacific Coast rates, which results in a rate of $1.34. The latter rate is now in common use and is permissible under Article 4 of the tariff. The date the new rate becomes effective is not yet known, but when it does it will result in a reduction to intermediate points in the far western tier of States, which otherwise would have higher rates than to the Pacific Coast proper.

Steel Furniture Stock Business in July

WASHINGTON, Aug. 21.—Shipments of steel furniture stock goods in July by 22 manufacturers amounted to $1,247,605 as against $1,401,950 in June and $945,768 in July, 1922, according to the Bureau of Census. The following table gives comparative figures for the first seven months of 1923 and 1922:

	1923	1922
January	$1,362,470	$983,834
February	1,307,173	967,125
March	1,709,206	1,087,228
April	1,520,286	1,058,382
May	1,596,852	1,056,735
June	1,401,950	1,015,463
July	1,247,605	945,768

Tariff Commission Investigation of Pig Iron Costs

WASHINGTON, Aug. 21.—The field investigation by the metals division of the Tariff Commission of pig iron producton costs in the United States has been completed. This work was taken up through the application of Eastern merchant blast furnace interests for an increase in the import duty of 75c. per ton on pig iron under the flexible provisions of the Fordney-McCumber act. The agents of the commission, acting under Paul M. Tyler, chief of the division, through questionnaires and personal investigation, visited virtually all of the merchant furnaces in the various sections of the country. They will now compile the data obtained and later it is expected to make an investigation in pig iron producing countries of Europe. In the event authority for the trip abroad is granted by the commission it is proposed that the work be done by Mr. Tyler, F. M. Leonard, an iron and steel expert of the division, and two accountants. The unsettled conditions in Europe make it uncertain when the trip abroad will be made but it is hoped that it will be sometime this fall.

Revised Extras on Rivets Show Average Advance of $5 a Ton

The Pittsburgh Screw & Bolt Co. has issued a revised list of rivet extras which will become effective Sept. 1, and will apply on all orders and contracts after that date. It is stated that these new extras are to take the advances recently made by all steel manufacturers on their standard bar card extras.

An innovation in connection with the new list is that after Sept. 1 there will be only one base price on rivets, instead of two base prices, one on structural rivets and one on boiler rivets, as has been the custom in the past. Structural rivets in the future will be base, and when boiler rivets are specified, an extra of 20c. per 100 lb. will apply.

The company is also preparing new list prices on machine, carriage, blank and tapped bolts, lag screws, nuts, etc. The new steel bar extras also are the occasion for this revision, which becomes effective on Sept. 1.

The new list of base sizes and extras on rivets, which shows an average increase of about $5 per ton will probably be adopted by makers generally, as follows for button-head structural rivets:

Base Sizes

$\frac{3}{4}$ in., $\frac{7}{8}$ in., 1 in. diameter.
Longer than 2 in. up and including 2½ in. packed in kegs or bags weighing 200 lb or more.

Standard Extras

½ in. diameter	$0.75
$\frac{5}{8}$ in. diameter	.35
$\frac{7}{8}$ in., ¾ in., ⅛ in., and 1¼ in. subject to the same diameter extra as nearest smaller diameter, plus 25c. net per 100 lb.	
Rivets larger than 1⅛ in. diameter	$0.25
Lengths 1 in. and shorter	.75
Lengths longer than 1 in. up to and including 2 in.	.25
Lengths 5 in. and longer	.50
Swell necks	.25
Annealing rivets for cold driving	.50
Rivets packed in 100 to 199 lb. packages	.40
Reinforcing kegs or packing in bags for export 25c net extra per package.	
Packing in boxes for export, price on application.	
Cone or button head boiler and tank rivets	$0.20
Steel head rivets	.45
Countersunk head rivets	.45
Bull head rivets	.70
Pan head rivets	.45

Special shape or sized heads other than style and standard above listed, price on application.
We prefer not to break kegs, but where necessary to ship less than 100 lb. of a size, $1 net extra will be added for each broken keg.
Cost of testing and inspection, if any, to be at customer's expense.

The Associated Employers of Indianapolis are sending out a monthly digest of labor conditions in Indianapolis to the members of the association. The digest will also contain a review of labor conditions throughout the United States.

EUROPEAN FOUNDRY SITUATION

Survey of the Conditions in England and Western Europe

The following information bearing on the opportunities for the sale of American foundry machinery and equipment in England and parts of western Europe has been received from the representative of an American manufacturer now in Europe:

England—The foundry business in England is at a very low ebb—in fact, is as bad if not worse than at any time since the war. I spent the last week of July in England and found the managers of the English foundries now rather optimistic, feeling that the crisis had been passed and a pickup in the foundry industry likely. The Belgian foundrymen with their exchange handicap have been able to underbid English steel foundries to such an extent that they are now making the bulk of the steel castings purchased in England. However, I do not feel this will last very long.

France—The foundry business in France is much better than in England, but the sale of American equipment is very slow on account of the recent wild fluctuation of the franc. We find it impossible to sell American machines under such conditions. The low exchange rate does not so much affect the sale of American machinery as the fluctuation. When the exchange becomes stabilized for a certain length of time, say two or three months, with a variation of possibly 1 or 2 per cent, the manufacturers start to purchase, but under a fluctuation of 10 or 15 per cent within two or three days' time, they are always fearful of results and hold off from buying.

Belgium.—Foundrymen seem to be fairly busy and while they are not buying much machinery due to the high cost of the dollar, nevertheless they are turning out more steel castings than any other country in Europe. In fact, we have sold more equipment in Belgium in the past three or four months than in any other country in Europe.

Switzerland—The foundries in Switzerland are not very busy. They are in the same position regarding their sale of goods as the Americans. The Switzerland franc is nearly at par, and the high cost of production limits their markets. Very little factory equipment has been purchased in Switzerland in the past two years.

Italy—The foundry business in Italy has been at a low ebb since 1920; in fact, we have done no business whatever in Italy since that time. While optimistic as to the future, they hesitate to commit themselves.

GERMAN PRICES ON POUND BASIS

Effort Made to Stop Depreciation—Dullness in Unoccupied Area—Fewer Bankruptcies as Mark Declines

BERLIN, GERMANY, Aug. 6.—The policy of the Reichsbank of rationing foreign currency allotted for import purposes and fixing the exchange rate has largely been responsible for the extensive scarcity of some foodstuffs. Coal prices have been increased again, about 143 per cent in the occupied districts and about 125 per cent in other parts of the country, effective Aug. 2. This new price includes for the first time a depreciation factor to allow for the difference in exchange on the day of delivery and the receipt of payment at the mining companies.

In order to insure revenue the railroads intend introducing non-depreciating prices for freight rates and fares on Sept. 1. The railway charges are to be altered in accordance with an index taking into account wages and the prices of coal, iron, etc. This arrangement is expected to introduce a new, unstable factor into the calculation of prices of goods. The wholesale price index has advanced 131 per cent to 183,510 times pre-war prices. Despite this tremendous rise, the prices have not gone up proportionate to the decline of the mark. The last official cost of living index on July 30 is given at 71,476 times the pre-war.

Iron and Steel Prices Stabilized

The Eisenwirtschaftsbund (Iron Trade Association) has issued the new pig-iron prices for the first half of August which are calculated on the basis of 5,000,000 marks to the pound sterling. Prices are to vary with the exchange and payment is to be made according to the last official exchange before the day of payment. Base prices for Siegerland pig-iron are not definite yet, as prices on the raw material have not been fixed. They are given at 18,988,000 m. for steel-making iron and 19,654,000 m. for spiegeleisen of 8 to 10 per cent manganese, both subject to change. Contrary to the practice on other grades, these prices are not determined in relation to the exchange, but bills have to be paid in a shorter time and to partially protect the works against depreciation half of the probable amount of the bill has to be paid in advance. On payments in foreign exchange a rebate of 2 per cent is granted and interest is paid on advance payments in exchange. Hematite blown in with German fuel is quoted at 26,250,000 m. per metric ton; blown in with imported fuel at 28,750,000 m. Foundry iron No. 1 is 30,000 m. cheaper, foundry iron No. 3 3000 m. cheaper and Luxemburg quality 10,000 m. cheaper.

The occupation is not only hampering the iron and steel industry in the occupied area, but is affecting other parts of the country. The Siegerland iron industry is still well-employed in pig-iron, sheets and bar iron. Business in the engineering industry is, however, quiet on domestic as well as foreign account. Supplies of raw material and fuel have been inadequate lately. In sheets and tin plate manufacturers are finding it difficult to compete abroad. As a result of the stoppage of supplies to the Rheinische Westfalian districts the Siegerland ore mines are unable to dispose of their production and have to pile a large part of it.

New Guiding Prices Fixed for Steel

The steel combine has fixed works base prices for the first half of August at the rate of 5,000,000 m. to the pound sterling. There is no differential now between the prices of basic and open-hearth material. The following table gives the guiding prices in marks per metric ton:

Guiding Prices

	Bessemer and O.-H. Aug. 5	O.-H. Material July 28
Ingots	31,968,000	14,175,000
Blooms	36,532,000	16,175,000
Billets	38,991,000	17,262,000
Sheet bars	40,481,000	17,911,000
Shapes	46,085,000	20,156,000
Iron bars	46,250,000	20,250,000
Hoop iron	57,637,000	25,001,000
Wire rods	49,008,000	21,473,000
*Sheets:		
No. 6 and heavier	52,124,000	22,871,000
Nos. 6 to 11	58,236,000	25,394,000
Nos. 11 to 20	68,255,000	29,861,000
Nos. 20 and lighter	77,102,000	33,577,000

*United States Standard Gage.

The Reichswirtscraftsminister (Minister for Economic Affairs) in June threatened to take action against firms refusing delivery of imported goods or those partly made of foreign material unless the customer agreed to bear the loss resulting from the rationing of foreign exchange.

Increase in Mergers and Decrease in Bankruptcies

The Linke-Hoffmann-Lauchhammer Co. is negotiating with the Wilhelmschütte Co. engineering works, and foundry at Eulau, near Sprottau, for an Interessengemeinschaft. The Wilhelmschütte is manufacturing machines, wooden and sheet iron products and castings. The Eulau works produce boilers, mining machinery and pumps, and has lately been engaged in locomotive repairs for the state railroads. The Ober-Salzbrunn plant of the company manufactures lifting and transport appliances. The company employs 1500 men.

With every downward movement of the mark the number of bankruptcies is decreasing and only 17 insolvencies were declared during July against 35 in June and 78 in July, 1922.

Conference Relations Aid to the Short Day

Chances for Promotions as Men Are Trained for Responsible Places on the Third Shift—Merchant Blast Furnaces Waiting

BY BRADLEY STOUGHTON

THE experience of the past week in changing from the 12-hr. day at iron and steel works has proved to be very much easier in those plants which have a closer personal contact and communication with their men. As forecast in the previous article, a change made summarily could not avoid some minor injustices and inequalities of treatment, or at least dissatisfaction because of apparent inequalities. At one plant there was actually a walkout of some of the men, but this was soon settled by negotiation and conference. In this incident the situation was greatly helped by the fact that an employees' representative system was in vogue at the plant, which had established mutual confidence and good will and which afforded the machinery for quickly smoothing over the difficulty. Instances of this kind can scarcely be avoided, but can be quickly ironed out when the men are made to understand that any injustice will be rectified as soon as possible. The important desideratum is to maintain contact with the men and to retain their confidence and good will. Without some degree of mutual concessions and cooperation the change can scarcely be made.

Undoubtedly one of the most important considerations in this will be the policy adopted by almost all the plants which have some system of employee representation, namely, taking the men fully into the confidence of the management on the one hand, and on the other rigorously avoiding any discrimination because of the acts of the employees' representatives or because of things expressed by them in their representative capacity. It has proved in several cases to be difficult to secure frankness of discussion on the part of the employees, without considerable encouragement.

Getting an Understanding with Employees

One plant which has been conspicuous in its operation of the two-shift system for a period of years, and which also maintains a system of employee representation, supplements this by a still further system of keeping in personal communication with its employees: First, by a series of weekly letters which are of interest and attractive in character, but not necessarily having anything to do with the company's business or with the relations of the company and its men. These letters are attached to bulletin boards which are situated at all the gates. The purpose of the letter is merely to attract attention, and on the boards are also notices posted by the men themselves. I noticed, for example, several notices of "Bording Houses," "Hound pups for sale." By establishing the bulletin board as a point of interest in this way, the company then uses it for any message it wishes to get across to the employees. The second method is the house organ of the company, which is published every month and is sent to each of the several thousand employees at their homes. Third is a series of circulars, often accompanied by a letter from the vice-president and works manager of the company, sent to a selected list of about 500 employees, including all superintendents and all foremen and all members of the employee representative group.

Finally, and this seems to be the most important item for establishing close relations and mutual confidence, are the meetings of the foremen held in the company's auditorium approximately once a month. In these meetings the vice-president talks to the men very frankly regarding the company's business, the general industrial situation in the country, the condition of orders on the books, cost of production, the meaning of stock dividends, the importance of satisfying the stockholders as well as the workmen, the meaning and importance of reserve, etc. On one occasion, when the situation seemed to demand it for maintaining a basis of complete confidence, a selected number of employees from one of the mass meetings were taken in to examine the books of the company. If the company has made a mistake in any of its dealings with the men no attempt is made to try to cover this up, but it is acknowledged frankly in the "foremen's forum." Important lessons are taught in this forum, such as the importance of waste or loss through defective material, how little wealth each individual would get if all the world's capital were divided. The experience is that the men do not always understand, but they quickly sense a false note or appreciate a frank and sincere discussion of policies, and they are satisfied if they believe the management is doing the best it can for their interests.

In changing from the 12-hr. day one difficulty is sure to arise, namely, the disposition of some of the men to avoid making their best efforts and endeavoring when possible to create a necessity for extra hours of employment. It has been said that this would be particularly noticeable where an added rate of compensation is paid for overtime. On the other hand, it has been found in at least one case to help the situation greatly when the gang whose turn it is to work daylight hours on Sunday, or on certain of the holidays such as Christmas and the Fourth of July, receives pay at time and a half rate.

Chances for Promotions

The recent change whereby men who have been working 12 hr. are reduced to 8 hr., with an increase of 25 per cent on the hourly rate, involves a reduction in daily wage, except that a large additional number of skilled laborers are going to be required to work the three-shift system and these extra men will be promoted from lower positions. Thus, some second helpers will become first helpers and some of the better class of laborers will be promoted to positions of skill. These promotions will all involve an increase in the hourly rate over and above the 25 per cent increase. In the case of men who are reduced from the 12-hr. work to 10-hr. work without increase of hourly rate, and men who were working 10 hr. before and after the change and have no increase in rate, they may be encouraged by the prospect of promotion due to the larger number of higher priced jobs available. They can also anticipate a possible reduction to 8 hr. labor at the same daily wage as a promotion when deserved. There will undoubtedly be a great deal of labor working two turns of 10 hr. each. This will include not only the millwrights, electricians, repair men and common laborers, but also many rolling mill crews. In a great many plants the rolling mill capacity, if worked continuously, is greater than the steel making capacity. If, therefore, there is sufficient soaking pit capacity

to act as a reservoir, two 10-hr. turns in the rolling mills, with 2-hr. periods at either end for repairs and adjustments, for change of rolls, etc., will become very common practice.

If Demand Revives

The change from the 12-hr. day is made possible at this time through the circumstance of a slight falling off in the demand for product. If the autumn brings an increased demand, securing sufficient labor to operate three shifts may at that time occasion real difficulties. It is of the utmost importance that the extra crews needed should be trained as soon as possible and that changes in equipment, general overhauling and tuning up of the apparatus to respond to the more intensive operation on the three-shift system, the discovery and elimination of bottlenecks, the installation of modernized equipment and of labor-saving devices, should begin as soon as possible. Undoubtedly this is going to call for a good deal of capital expenditure and it is very probable that some plants, and especially some merchant blast furnaces, may be hard pressed by competition. This is especially the case at blast furnaces and open-hearth furnaces which are still lacking in such common labor-saving devices as oxygen for opening the tap holes (including both blast furnaces and open-hearth furnaces), mud guns for closing them, mechanical devices for recarburizing in the open-hearth ladle, electrical operation of open-hearth doors, etc. Long runners into slag and metal buggies at blast furnaces are a source of a great deal of waste of labor owing to the care of skulls, and this is often the fault of the original furnace design and cannot be remedied without costly tearing down or excavating. So much has been accomplished in the way of improvement in design, equipment, labor-saving devices and operation by the technical staff during the past ten years, especially at blast furnaces and open-hearth furnaces, that we can look forward with justified optimism to what may be accomplished as soon as it is realized what a great saving of labor will result if and when the peak loads can be lightened by mechanical devices or by adjustment of conditions so as to produce greater regularity.

Consider the peak load which comes five times a day at the blast furnace and two to three times a day at every open-hearth furnace. The actual amount of man-hours represented by the upper third of this peak is very small, indeed, but it nevertheless represents in cost-saving one third of the total labor bill of the skilled men on the furnace. This point is discussed in more detail in Chapter 19 of "The Twelve Hour Shift in Industry" (New York, 1922). If the open-hearth operation could be so well controlled that the furnaces would tap within approximately regular time intervals, it might be possible to make great savings by carrying the peak load of all the furnaces by an extra gang, which would go a long way toward paying the total cost of the change at the furnaces to three shifts. The ingenuity and initiative for which American technical men and executives are famous may very probably solve this and many other like questions when necessity becomes the mother of invention.

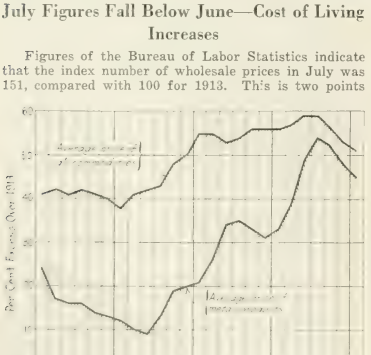
Merchant Furnaces Not Yet Changing

Thus far there has been no change to three shifts on the part of any merchant blast furnaces. Such furnaces will be called on to deal with the matter, however, where they are in the same locality with steel company blast furnaces that are changing over. Buffalo is an example, and there are similar situations in the Cleveland and Chicago districts. At Buffalo the producing companies have been in conference to devise means by which in due time all blast furnace employees will be working under the three-shift plan.

WHOLESALE COMMODITY PRICES

July Figures Fall Below June—Cost of Living Increases

Figures of the Bureau of Labor Statistics indicate that the index number of wholesale prices in July was 151, compared with 100 for 1913. This is two points lower than the 153 in June and four points lower than the 155 of July, 1922. Declines occurred in every item of the list except for house furnishings, which were stationary at 187—the third largest item recorded, being exceeded only by building materials and by clothing.



As Shown in the Chart Prices of Metals Have Been Below the General Level of Prices Continuously for More Than Two Years

Metals and metal products at 145, compared with 148 in June, were prices well below the general average, as has been the case constantly during the past two years. Comparative figures are given in the table and shown graphically in the diagram.

Cost of Living

Figures of the National Industrial Conference Board for July show the cost of living, based on the workmen's budget, at 61.9 per cent above the figure for July, 1914, compared with 60.1 per cent excess in June.

Food, rent and clothing all increased, while there was a slight decrease in fuel and lighting. These figures have shown comparatively little change in the past two years and more, the highest percentage of excess over 1914 having been 64.8 in September, 1921, while the lowest was 54.5 in August, 1922. There has been a fairly steady rise since last February, but its amount has been small.

Index Numbers of Wholesale Prices, by Groups of Commodities

	1920 Peak	1922 July	1923 May	1923 June	1923 July
Farm products	247	135	139	138	135
Foods	248	142	144	142	141
Cloths and clothing	346	180	201	198	193
Fuel and lighting	281	254	190	186	183
Metals and metal products	203	121	152	148	145
Building materials	300	170	202	194	190
Chemicals and drugs	213	121	134	131	128
Housefurnishings	275	173	187	187	187
Miscellaneous	208	114	125	123	121
All commodities	247	155	156	153	151

Scrap Metal from Discarded Warships

Estimate of 322,000 Tons of Steel Plates, Shapes and Armor from Twenty Battleships and Battle Cruisers —Four Ships to Be Used as Targets

WASHINGTON, Aug. 21.—Upon the signing last week of the Four-power Treaty for the Limitation of Armaments, Acting Secretary of the Navy Theodore Roosevelt announced that the Navy will start at once to scrap all ships coming under that treaty. They include 24 vessels. Of these seven are battleships under construction and four are battle cruisers under construction, while 13 are old vessels long ago completed. Of these vessels the battleship Washington, which is of the latest type of construction, and the old battleships South Carolina, Virginia and New Jersey likely be sunk as the result of experiments and tests. Because of this, these vessels are eliminated from calculation of the scrap that might be recovered. It is estimated that the scrap in these vessels totals 63,500 tons, of which 27,600 tons is credited to the Washington, and 12,000 tons each to the three others.

Calculated on the percentage of their completion, it was estimated that the ships under construction would involve 203,500 tons of scrap, while those completed will involve 118,470 tons, making a total of 321,970 tons of steel, exclusive of machinery. The estimate of non-ferrous metal from all 20 vessels to be scrapped is 11,000 tons.

The vessels to be scrapped, exclusive of those to be subjected to tests, and the scrap tonnage involved, are shown in the following table:

Ships	Average Percentage of Completion	Probable Tons of Scrap
Indiana, South Dakota, Montana, North Carolina, Massachusetts, Iowa (battleships)	29	117,500
Constitution, United States, Constellation, Ranger (battle cruisers)	16	86,000
Michigan, New Hampshire, Kansas, Vermont, Minnesota, Connecticut, Louisiana, Rhode Island, Nebraska, Georgia (old battleships)	100	118,470

Plans for getting bids for the old ships and other methods of disposing of them were officially announced by Mr. Roosevelt as follows:

The Navy Department has adopted three different methods in dealing with the problem. They cover in brief the three situations with which it is confronted: First, ships under construction at private yards; second, ships under construction at navy yards; third, older ships already built.

In the case of vessels building at private yards, the builders have been requested to submit estimates for

(a) The purchase of the ship on the stocks "as is," to be cut up into scrap sizes at their own expense.

(b) For the cutting up of the ships into scrap sizes, in order that the Navy may sell them as scrap.

(c) A total figure for the complete and final settlement of all claims in connection with the construction, the cancellation of contract, and the scrapping of the vessels, the scrapped material to remain the property of the ship builders.

Vessels building at navy yards will be advertised for sale in the near future, the proposals to invite bids as follows:

(a) For ships in present condition on the stocks, to be cut up into scrap sizes and removed by purchaser.

(b) For the scrap material cut up into scrap sizes by the Navy.

Ships already built, the older vessels out of commission at Navy yards, will be sold under terms somewhat similar to those governing the sale of battleships heretofore sold, such as the Maine, Missouri, Ohio and Kentucky.

The terms of sale in the case of vessels to be scrapped will be slightly different from terms of previous sales of vessels. The Department will require:

(a) The removal of certain material which can be used to advantage by the Navy.

(b) That the vessels be scrapped within a specific time.

(c) That the vessels will be sold only to citizens of the United States.

(d) That the purchaser give adequate bond that the terms of sale will be carried out.

In case the vessels that are to be the object of experiments and tests are not sunk, they will be disposed of by sale for scrapping within the time limit provided by the treaty. No action is being taken at present for the disposition of the battleships Delaware and North Dakota, now abroad on the midshipmens' practice cruise, as the treaty does not require that these vessels be scrapped until the Colorado and West Virginia are placed in commission, the ceremony being scheduled for Sept.1 and Oct. 15, respectively. It is the present intention of the Government to dispose of the Delaware by sale for scrapping and to convert the North Dakota into a target ship. It is estimated that the Delaware will net about 15,000 tons of scrap.

Of the eleven ships under construction which are to be scrapped, the Iowa and South Dakota were being built at the New York Navy Yard; the Montana at the Mare Island Navy Yard, Cal.; the North Carolina at the Norfolk Navy Yard; the Massachusetts at the Bethlehem Shipbuilding Corporation, Quincy, Mass.; the Iowa at the Newport News Shipbuilding Co., Newport News, Va.; and the Washington, New York Shipbuilding Corporation, Camden, N. J.; the Constitution and United States at Philadelphia Navy Yard and the Constellation and the Ranger at Newport News.

The table shows the gross tons of ferrous and non-ferrous materials and machinery estimated to be in each of the 10 old battleships to be salvaged and the average weight of ferrous metals in each of these old vessels. The average of the newer types of ships and cruisers runs somewhat higher:

	Average Weight in Tons	Percentage of Total Weight of 12,830 Tons
Ferrous Materials		
Plates, shapes, bolts, rivets	5,948	43.01
S.T.S. or nickel steel plates	377	2.73
Piping and tubing	124	0.90
Casting	945	6.83
Forgings	830	6.00
Armor	3,623	26.19
Total ferrous materials	11,847	85.66
Non-ferrous metals		
Composition castings	342	2.47
Brass pipe and tubes	69	0.50
Copper pipe, tubes and wiring	68	0.49
Lead, babbitt and zinc	12	0.09
Copper and brass plate	14	0.10
	505	3.65
Machinery		
Generators		71.26
Pumps		37.68
Blower engines		12.8
Fans, reversible engines and ice machines		8.88
Secondary and auxiliary batteries and miscellaneous		262.32
Motors for turret turning gears and for turret ammunition hoist and torpedo launching tube fittings		26.95
		429

The Chemical exposition will not be held in 1924, according to a recent vote taken among the exhibitors by the management. The results of a mail vote on the question of whether the exposition should be held every year or every other year ended on July 28 and showed about 60 per cent of exhibitors voting were in favor of a biennial exposition. The vote by mail was taken by the management as a result of the meeting of exhibitors held at the Chemists' Club, New York, on July 28, at which time a vote on the question by those present resulted in a tie. It was then decided that all exhibitors should vote again by mail and that this should be considered the final decision in the matter. Following the 1923 Chemical exposition, which will be held during the week of Sept. 17 to 22 at the Grand Central Palace, New York, the next exposition will be held in 1925 by the same management.

Iron and Steel Markets

MORE RAILS FOR 1924

Total Already Placed for Next Year, 350,000 Tons

A Good Week in Structural Steel—Turn in Pig Iron Still Awaited

Rail buying is the main point of interest in a market that has not yet given definite advance signs of fall activity. At Chicago four western roads have just closed for a total of 68,000 tons for 1924, following the extension of the $43 price to cover deliveries in the first half of next year. Inquiries for 40,000 tons more are pending. The total of rails already placed for 1924 is put at 350,000 tons, and it is estimated that contracts yet to come will reach twice that figure.

It is too early to know what the car buying program will be. Some roads will place orders this fall, but others, particularly grain carriers, have little to offer. Western carbuilders have orders that will carry them into November and some of them will require fall orders to avoid curtailment. Purchases of 1300 cars and contracting for underframes and for general repairs made the past week the best in two months in the equipment field.

The change to the short day at Central Western works is not yet a market factor, though it is expected to be a stabilizer, in view of added costs and somewhat lessened output. The new regime has increased the uncertainties of the outlook. While buyers concede that it tends to sustain prices, the policy of many of them is still to avoid forward contracting.

The adjustment of output to demand continues, and in the Pittsburgh and Youngstown districts six blast furnaces went out in the past week. In some cases these shutdowns have furnished men for the new third shift. Labor supply on the whole has been greater than was expected, but as yet only a beginning has been made.

In structural steel the week was outstanding in both sales and inquiries. Of 16,000 tons bought, one-third was for railroads and nearly one-third each for public service work and for industrial companies. Inquiries exceeded 32,000 tons, with nearly one-half for public institutions, including 8800 tons for schoolhouses, chiefly in New York. The one-half for private enterprises included 4500 tons for a club house in Chicago and 5600 tons for factories.

The volume of business in July, 125,000 tons, was substantially as large as that in June, and two-thirds as large as the average for the first half of the year.

The weakness in sheets in the past two months is not surprising in the light of sales of but 92,000 tons in July by the independent mills reporting. This is the smallest tonnage, in relation to capacity, since January, 1922, being 80,000 tons less than for June and 150,000 tons less than for May. Shipments in July were 100,000 tons more than sales and unfilled orders at the opening of August were 263,000 tons.

Wire mills have an average of 30 days' business ahead, but as the leading interest is sold considerably farther than that, some independent companies can make very prompt deliveries. Revival of agricultural buying is still distant.

Tin plate mills will carry over into the fourth quarter large deliveries scheduled for the third. The Texas Co. is in the market for 75,000 boxes of oil can sizes for December-February shipment.

Irregularity continues in bolts, nuts and rivets, in spite of the new list prices effective Sept. 1 that take account of the higher extras on steel bars.

Pig iron markets have not yet shown any real strength, but one or two weak spots have disappeared. The tendency of producers is to hold present quotations more firmly, but it is possible that further tests of the market are to come because of the excess of production over demand. Selling is more active in the Central West than in the East, particularly at Cleveland, where 20,000 tons has been sold. Sales of Valley basic iron totaling 2500 tons have apparently established the market at $25, furnace, after the cleaning up of iron from second hands that had sold down to $24 and $24.50.

Old material shows a firmer tendency in the East that is not yet discernible in the West and is having closer watching for its influence on pig iron.

The Bethlehem Steel Co. has the order for 11,000 tons of rails, with splice bars, for the Imperial Government Railways in Japan. Tin plates for Japan are also an item in recent export business, 40,000 boxes going to a Wheeling mill and 20,000 boxes to a British maker.

For the fifth successive week, THE IRON AGE finished steel composite price stands at 2.775c. per lb., after remaining for eleven weeks at 2.789c. One year ago it was 2.412c.

THE IRON AGE composite price of pig iron this week is $25.29, or 25c. above last week's. The change is entirely in steelmaking iron, foundry iron having not yet made the turn.

Pittsburgh

Waiting the Market Effect of Short Workday —Basic Iron Firmer

PITTSBURGH, Aug. 21.—The steel situation reflects a slightly more cheerful feeling. It is due less to a material expansion in demand, although there has been some quickening of buyer interest, than it is to the expectation of increased producing costs incident to the abolishment of the 12-hr. day and of solidified prices around current levels. If the application of the shorter day means some reduction in productive capacity and a stabilized market, it is believed buying will be freer than it has been. As yet the prospect has been productive only of a better inquiry and no very marked increase in the size of individual purchases. Buyers are not convinced that higher prices are ahead and

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
No. 2X, Philadelphia†	$25.76	$25.76	$26.56	$33.14
No. 2, Valley furnace	25.00	25.00	25.00	33.00
No. 2, Southern, Cin'ti†	27.55	27.55	29.05	24.05
No. 2, Birmingham, Ala.†	24.00	24.00	25.00	20.00
No. 2 foundry, Chicago*	27.00	27.00	27.50	30.00
Basic, delid, eastern Pa.	25.00	25.00	25.50	28.64
Basic, Valley furnace	**25.00**	24.50	25.00	26.00
Valley Bessemer, del. P'gh	28.26	28.26	28.26	31.76
Malleable, Chicago*	27.00	27.00	27.50	30.00
Malleable, Valley	24.50	24.50	24.50	31.50
Gray forge, Pittsburgh	25.76	25.76	26.26	34.76
L. S. charcoal, Chicago	32.15	32.15	32.15	34.65
Ferromanganese, furnace	117.50	117.50	117.50	67.50

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Rerol. billets, Pittsburgh	42.50	42.50	42.50	37.50
O.-h. billets, Pittsburgh	42.50	42.50	42.50	37.50
O.-h. sheet bars, P'gh	42.50	42.50	42.50	37.50
Forging billets, base, P'gh	47.50	47.50	47.50	43.00
O.-h. billets, Phila.	47.67	47.67	47.67	42.67
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.25	2.25	2.25	1.90

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.325
Iron bars, Chicago	2.40	2.40	2.50	2.15
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.60	2.60	2.60	2.35
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.80	2.80	2.80	2.20
Tank plates, New York	2.84	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.70	2.70	2.70	2.35
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black No. 28, P'gh	3.75	3.75	3.75	3.35
Sheets, galv. No. 28, P'gh	5.00	5.00	5.00	4.35
Sheets, blue an'ld, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.60
Plain wire, Pittsburgh	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.15
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.50	$20.50	$21.00
Carwheels, Philadelphia	20.00	20.00	20.00	19.00
Heavy steel scrap, P'gh	18.00	18.00	17.00	18.25
Heavy steel scrap, Phila.	16.00	16.00	16.00	17.50
Heavy steel scrap, Ch'go	16.00	16.00	17.00	19.00
No. 1 cast, Pittsburgh	21.50	21.50	20.50	19.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	19.00
No. 1 cast, Ch'go (net ton)	17.50	17.50	18.50	19.50
No. 1 RR. wrot., Phila.	18.00	18.00	18.00	18.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.50	15.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.50	$4.50	$4.50	$12.00
Foundry coke, prompt	5.50	5.25	5.25	13.00

Metals—				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.50	15.00	14.12½
Electrolytic copper, refinery	13.75	13.87½	14.50	13.75
Zinc, St. Louis	6.45	6.25	6.10	6.22½
Zinc, New York	6.80	6.60	6.45	6.57½
Lead, St. Louis	6.45	6.35	6.10	7.60
Lead, New York	6.70	6.70	6.25	5.90
Tin (Straits), New York	39.37½	38.50	39.62½	32.50
Antimony (Asiatic), N. Y.	7.62½	7.87½	7.00	5.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business

Composite Price Aug. 21, 1923, Finished Steel, 2.775c. Per lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Aug. 14, 1923,	2.775c
July 24, 1923,	2.775c.
Aug. 22, 1922,	2.412c
10-year pre-war average,	1.689c

Composite Price Aug. 21, 1923, Pig Iron, $25.29 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 14, 1923,	$25.04
July 24, 1923,	25.68
Aug. 22, 1922,	26.86
10-year pre-war average,	15.72

since there is nothing in sight to suggest mills will not be able to make and deliver all the steel that will be required over the remainder of the year, departure from a policy of purchasing in strict accordance with nearby requirements is not discernible.

It is too soon for any of the manufacturers to state definitely what the actual increase in costs attendant upon the new working hours in the departments of continuous operation will be, as the movement is not yet very general and to a degree is still in the experimental stage. The Youngstown Sheet & Tube Co. put down two blast furnaces to insure itself of having sufficient help to maintain operations of its larger units, but in all other instances the change of working hours has been effected without reduction of capacity. This is rather impressive as an influence upon steel consumers in view of the oft-repeated assertion as to the necessity of finding the men to permit of the change.

There is no occasion to make any change in the prices of the major products, because there are few mills that have not enough business to keep them going until the situation has passed to a positive stage as to costs. Price cuts, it is held, would not bring out orders if the material is not wanted. Buyers are taking all the steel due them on old orders without much prompting, and there are some cases, as in merchant pipe, where they still are exerting much pressure upon the mills for deliveries. This is interpreted to mean sustained consumption, but there is also the factor that invoice prices on much of the tonnage leaving the mills are below those now quoted.

Some increase in the inquiry for pig iron suggests to producers that the market may be on the verge of larger actual sales and some firming up of prices. The market does seem to be firmer on Valley basic iron, which has sold at $25, and does not appear to be available at less. The coke market shows a stronger tendency, due to the fact that supplies no longer exceed the demand. Speculative activity in the scrap market seems to have frightened off the consumers, who feel that purchases at this time would only put prices up on themselves.

Pig Iron.—Such sales of basic iron as have been made by Valley furnaces in the past week, and they include one of 1000 tons and another of 1500 tons, have been at $25 and the claim is made that none of this grade is available at less. A Sharon, Pa., steel company is reported to be seeking 5000 tons of this grade and another melter in the same locality is expected to enter the market soon for at least half that amount.

But this grade still is available outside of the Valley district at a lower equivalent price. A Pittsburgh district melter has a price of $26.13, which, figured back to a Valley basis, means $24.37. Bessemer iron still is at $26.50 at Valley furnaces, but only small tonnages are moving at that price. A sale of 500 tons of malleable iron to a Pittsburgh melter at $24.50, Valley furnace basis, makes impossible any advance in the minimum price, although most furnaces are asking at least $1 a ton higher. Foundry iron sales still are being made at prices ranging from $25 to $26, Valley furnace, for No. 2, but only small tonnages are involved. There is one 600 ton inquiry for No. 2 for last quarter shipment from a Pittsburgh melter and the Westinghouse Electric & Mfg. Co. wants 250 tons of this grade for its Cleveland plant for September shipment. Some interest is apparent in low phosphorus iron but competition for orders is too keen for prices to show much strength. An Alliance, Ohio, steel foundry recently bought a fair sized tonnage at $32, Valley furnace. The Bethlehem Steel Co. put down one of its Johnstown furnaces Aug. 16 and the stack of the Clinton Iron & Steel Co. went out of blast the day before. One Republic Iron & Steel Co. furnace and the two Hubbard stacks of the Youngstown Sheet & Tube Co. also were blown out since a week ago. There are now 109 furnaces making iron, 2 banked and 24 idle in this and nearby districts. At the most recent peak 126 furnaces were making iron.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton

Basic	$25.00
Bessemer	26.50
Gray forge	$24.50 to 25.50
No. 2 foundry	25.00 to 26.00
No. 3 foundry	24.50 to 25.50
Malleable	24.50 to 25.50
Low phosphorus, copper free	32.00

Ferroalloys.—Quotations show no change, but there is almost no demand and they represent merely sellers' valuations. It is believed that the appearance of a sizable inquiry for ferromanganese would result in lower prices; indeed, the fact that resale material goes begging and several dollars a ton below the quoted price, is a fair indication of the present market. It is doubted that all producers of 50 per cent ferrosilicon would insist rigidly on $82.50, delivered, if a chance for a sizable sale was offered. Prices are given on page 513.

Semi-Finished Steel.—There has been no increase in open market activities, but the market is firmer at $42.50, Pittsburgh or Youngstown, for billets, slabs and sheet bars than it was recently, presumably because it is believed that any excess profits this price permits will be taken up by increased labor costs incident to the abolishment of the 12-hr. day. Interest in forging billets is low and activity in rods is lacking. The latter are firm in price, because production has been reduced to a point more in keeping with actual requirements and few makers have much surplus tonnage to sell. Demand for skelp also is limited. Loss of steel production in this district, as a result of the introduction of the shorter workday, as yet has been negligible. Prices are given on page 513.

Wire Products.—While some makers note greater interest in the market on the part of jobbers, prompted by a desire to be covered in the event that the increased labor costs incident to the introduction of the shorter workday in the steel industry may lead to higher price, the more common condition among manufacturers is that orders, outside of nails and plain wire, are exceedingly light. There is nothing to indicate an immediate revival of demand from the agricultural districts; the farmers are afield and the prices of farm products still relatively too low to suggest much gain in farmer buying power. On an average, producers have about 30 days' capacity business on their books, chiefly nails and plain wire, and at today's operating rate of about 75 per cent are probably stocking a portion of the production. Jobbers' stocks are not so lean as they were earlier in year. There is no pressure for orders, however, with the possibility that the increase in labor costs may be added to present prices. Quotations are [illegible] page 512

Steel Rails.—Makers of light rails, rolling them from billets or new standard rail crops, although admitting that demand is slow, disclaim any shading of the base price of 2.25c. It is not surprising that business is slow at that figure, with rerolled rails available as low as 1.90c. base, mill, and that price being quoted against rails weighing less than 25 lb. per yd., on which there is an extra on billet rails.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—The fact that buyers still are insisting strongly on the delivery of pipe against old orders, which is taken to indicate a sustained consumption, is the most encouraging feature of the present situation. New orders, particularly of lap-welded pipe, still are running behind shipments with most makers, and because of decreasing order books delivery promises are being steadily shortened. In boiler tubes conditions are much the same as in pipe, with pressure strong for deliveries on old orders, but not much new buying. Discounts are given on page 512.

Cold-Finished Steel Bars and Shafting—Real activity still is lacking and the firmness of prices still finds its chief explanation in the higher cost of hot-rolled bars rather than in the size of orders or specifications. Makers here are all holding to 3.25c., base, for carloads. Ground shafting holds at 3.65c., base, f.o.b. mill, for carloads.

Hot-Rolled Flats.—Conditions are more favorable to buyers than sellers at the moment. Most makers need business to round out mill schedules and while the regular market price is 3.15c., base, Pittsburgh, as low as 3c. still is being done on strips and less than 3.15c. probably can be done on hoops and bands. Prices are given in full on page 512.

Cold-Rolled Strips.—All makers are on a basis of 5c., base, Pittsburgh, for this product and deviations from that price are few.

Bolts, Nuts and Rivets.—Makers of bolts and nuts are more anxious to sell than buyers are to buy and prices do not show much strength. Bolts have sold below 60 per cent off list for large machine bolts, as against the public quotation of 50, 10 and 10 per cent off list. The fact that new list prices are under compilation, which will recognize the higher extras on steel bars and become effective Sept. 1, does not appear to be stampeding buyers. Rivets have settled pretty generally to $3 to $3.10 base, per 100 lb. for large button heads, but even those prices are not minimum with some makers whose order books are slim. Price discounts are given on page 512.

Track Fastenings.—New business in products under this heading is rather slow with manufacturers here, but pressure for orders is not heavy and recent prices hold. They are given on page 512.

Iron and Steel Bars.—Demands still run almost exclusively to small lots for early delivery. Forward buying is lacking, but specifications are said to be free against old orders. There is no change in prices of either steel or iron bars.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—While actual orders to local fabricating shops are few and do not involve large demands upon the mills, inquiries are surprisingly good, and this finds reflection in more numerous requests upon the mills for protection. There has been such firm adherence to quoted prices by the mills that expectations of a drop are not as general as they were recently. Plain material prices are given on page 512.

Plates.—Oil storage tank inquiries are so numerous as to encourage hopes of good sized orders for plates among local makers, but actual orders are not keeping pace with hopes. It has been a quiet week for local and nearby mills in the matter of new business. We

note no important deviations from the regular price. Quotations are given on page 512.

Sheets.—Sentimentally, the market shows some improvement, with buyers showing more interest at least to the extent of trying to find out what the shorter workday in the steel industry is going to mean in connection with future steel and sheet prices. The idea that a decline in price is ahead seems to be disappearing, but at the same time there is no pronounced tendency by buyers to load up at today's quotations. Actual requirements still govern most purchases. It is still possible to buy black sheets at 3.75c., base, but regular quotations on other finishes are well observed. Prices are given on page 512.

Tin Plate.—Cooler weather has resulted in some increase in production, but not to an extent that manufacturers have any hope that they will be able to complete present quarter obligations by the end of the period. There will be a considerable carryover of third quarter tonnage into the succeeding quarter and October shipments will be against late August and September quotas. The Texas Co. is in the market for 75,000 boxes of oil can sizes for December, January and February shipment.

Cut Nails.—Leading makers still are quoting $3.25, base, per keg, f.o.b. mill, but lower prices are coming out on attractive orders.

Old Material.—Activity of dealers rather than of the mills is the sustaining factor in prices. Recent buyers for consumption have withdrawn from the market and their places have not yet been taken by others. There has been some opening up of consuming points hitherto closed to shipments and this has caused dealers short of material, sold at prices well above those now current, to cover and pay more than consumers would. Dealers are bullish on the market as a general rule, chiefly because they believe the mills have reduced their stocks of scrap and soon must be buyers. There is little change in the prices at which sales into consumption can be made.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$18.00 to $18.50
No. 1 cast, cupola size	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 19.50
Compressed sheet steel	16.50 to 17.00
Bundles, sheets, sides and ends	15.00 to 15.50
Railroad knuckles and couplers	21.50 to 22.00
Railroad coil and leaf springs	21.50 to 22.00
Low phosphorus bloom and billet ends	23.50 to 24.00
Low phosphorus plate and other material	22.50 to 23.00
Railroad malleable	19.00 to 19.50
Steel car axles	21.00 to 21.50
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	21.50 to 22.00
Machine shop turnings	11.75 to 12.25
Sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	14.00 to 14.50
Heavy breakable cast	18.50 to 19.00
Stove plate	15.00 to 15.50
Cast iron borings	14.00 to 14.50
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	18.00 to 18.50

Coke and Coal.—So evenly balanced is production and consumption of furnace coke that it no longer takes a really big demand to stiffen prices. There have been a few fair sized inquiries for spot tonnages in the past week and buyers have found practically no standard coke available below $4.75 per net ton at oven, and as high as $4.90 has been quoted. Negotiations for fourth quarter tonnages have started in a quiet way, but no actual business yet has been consummated; producers are talking $5.50 for that period, but that is well above what furnace men are willing to go just now. Spot foundry coke also is slightly stronger, in that there no longer seems to be any standard grade available below $5.50. Increased demand is giving some firmness to coal prices, although the market is not materially higher than a week ago, save on steam coal, which has sold as high as $2.30 for mine run Pittsburgh vein coal of the best quality as against $2.15, the recent maximum. Fairmount steam coal is priced at $1.75 to $1.90 and ordinary Pan Handle steam coal at $2 to $2.10. Mine run coking coal is at $2.35 per net ton at mine, and that price also is the going price on gas grade.

Youngstown

Fall Buying Not Yet Manifest—Semi-finished Steel Advance Suggested

YOUNGSTOWN, Aug. 21.—Both steel producers and consumers are watching market developments closely in view of changes predicted to follow the elimination of the 12-hr. day. Sales executives state that business in general this month shows improvement, the orders being more numerous and involving larger tonnages. Fall buying has not yet become manifest, however. There has been recent betterment in the demand for black sheets, though this is not yet reflected in mill operations.

There is a firmer tone to the pig iron market and inquiries for fall delivery are appearing. In this district basic iron is firm at $25, No. 2 foundry and malleable at $26 and Bessemer grades at $26.50. This stabilization of the market follows recent price cutting, when standard basic is reported to have sold below $24.

There is likewise considerably more firmness in the scrap market, as a number of melters are looking around for fourth quarter requirements. In consequence, prices, which have been weak, show stronger tendencies, and heavy melting steel, lately held at $18, is now quotable up to $19. Dealers are buying from the railroads and accumulating stocks against an anticipated heavier demand in the fall.

Inquiry in the sheet market, while improved, is still in moderate volume and lacks the vigor which marked it earlier in the year. While Valley mills claim to be holding to 3.85c. for black sheets, it appears that business has been done at $2 per ton less, or on a 3.75c. basis. The full finished sheet situation is characterized as satisfactory by the leading district independent interest, though requirements of the automobile industry have appreciably slackened the past month.

In face of an at least temporarily quiet steel market and of the estimated profits per ton on shipments the past six months, it is considered probable that there will be no general steel price advance at this time. Special conditions as affecting certain products such as tin plate, steel plate or merchant steel pipe might force an advance in these lines.

In one quarter it is suggested that there might be an advance on semi-finished steel. In that way competitors of integrated steel makers would be obliged to bear a part of the higher production cost of raw steel, while consumers of finished steel products made by such interests would not be obliged to pay higher prices. Current low fuel costs would appear to operate against an advance on semi-finished steel.

Passing of Control in Ashtabula Sheet Plant

Control of the Ashtabula Steel Co., Ashtabula, Ohio, passed Aug. 18 to the Davey interests of the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, following the approval of the stockholders of action previously taken by the board of directors for a disposal of the property. The purchasers include W. H. Davey, president Mansfield company, and several brothers. Owners of 88 per cent of the stock approved the transfer. The plans as adopted provide for the reorganization of the company and the reduction of the present capital stock. It is understood that under the terms the Davey brothers will invest $300,000 in the new securities of the Ashtabula company. The plant, which has eight hot and two cold mills, was placed in operation in 1922. One of the mills will be rebuilt as a 42-in. jobbing mill and blue annealed sheets will be added to the present products. The plant, for the present at least, will be operated as an independent unit. It will be supplied with sheet bars by the Mansfield company.

Chicago

Broad Buying Not Yet a Fact—Beginnings of 1924 Rail Bookings

CHICAGO, Aug. 21.—The placing of 68,000 tons of rails by four western roads marks the beginning of what is expected to be a generous buying movement following the extension of the present $43 price to cover deliveries during the first half of 1924. Inquiries for 40,000 tons from western lines are now pending and other carriers are about to enter the market. The Imperial Government Railways of Japan, which were inquiring for 11,000 tons of rails with splice bars, have placed the order with the Bethlehem Steel Co.

Although prospects for rail business are good, there is still some doubt as to the future for car buying. Railroad car builders have unfilled orders which will keep their plants busy until November or December, but unless they get new business soon they will find it difficult to avoid shutting down. Before they commence the execution of new orders they need fully three months to get deliveries of the necessary steel. The attitude of the railroads toward further car purchases is not uniform. Some roads have indicated that they expect to enter the market. Other lines, particularly the grain carriers, complain that their traffic is light. This situation is probably explained by the fact that Federal loans to the farmers have enabled them to hold their crops rather than to market them immediately following harvesting.

There are also some railroads which are waiting for lower prices. The car builders, whose quotations are governed by what they have to pay for materials, especially finished steel, do not look for any material change. They point out that the elimination of the 12-hr. day, now under way, means higher mill costs, and while it is true that the full effect of these added costs will not be felt for some time, owing to the gradual change to the new mode of operation, the trend of costs will be steadily upward in coming months.

The iron and steel market remains quiet, although current bookings of mills are somewhat better than during the exceedingly dull month of July. Buyers continue to purchase small lots for filling in purposes and nothing resembling a broad fall buying movement has made its appearance. All producers are gaining on their obligations, some in greater degree than others. The leading local producer of heavy finished steel, however, is not yet able to offer anything resembling early delivery.

Further progress has been made in the elimination of the 12-hr. day. The Inland Steel Co. has not yet completed the reorganization of its blast furnace department on a three-shift basis, and until that is accomplished will not proceed with the conversion of other departments to the new plan. The Illinois Steel Co. is effecting the change as rapidly as labor supply will permit, but has given out no details as to what departments of its works are now being reorganized. Mill and furnace operations in this district remain unchanged.

Pig Iron.—Although current business is at a better rate than in July, it is apparent that a broad buying movement has not yet developed. Prices, however, are unchanged and local iron in particular is steadier than for some time past. Sellers find encouragement in the fact that a local buyer for plants located throughout the country has put out inquiries for 3500 to 4000 tons. Of this total 1000 tons of malleable iron is for a Chicago district plant, 1000 tons of basic is for an Ohio works, 1000 tons of low phosphorus is for an Eastern seaboard plant and 500 to 1000 tons of 14 to 16 per cent Bessemer ferrosilicon is for various destinations. September to November delivery is desired. In connection with this pending tonnage, trade observers point out that large purchasers generally lead the way in a new buying movement. A Wisconsin melter is in the market for 700 tons of malleable for fourth quarter and a like tonnage for first quarter. A local user has closed for 500 tons of low phosphorus iron, thereby cleaning up the yard stocks of a producer in this district. There have been a few carload sales of silvery and an inquiry for a car of 10 per cent is still pending. This commodity is firmer owing to the shutting down of a Jackson County furnace and the withdrawal from the market of a hydroelectric maker whose operations are adversely affected by low water. No sales of Southern iron are reported in this district.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00
Malleable, not over 2.25 sil.	27.00
Basic	27.00
High phosphorus	27.00
Southern No. 2	29.51 to 30.01
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 35.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—Producers continue to quote $117.50, seaboard, on ferromanganese, but resale is available at $115. A down-State steel works has closed for 100 tons at $115, f.o.b. New Orleans. Three car lot inquiries for spiegeleisen are in the market, and as low as $50.80, delivered, has been quoted from one furnace, but no sales at that price have yet been reported.

We quote 80 per cent ferromanganese, $125.06 to $125.88 delivered from producers; $122.50 delivered resale; 50 per cent ferrosilicon, $88 to $90, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Coke.—Demand for foundry coke is still limited, although specifications against contracts are liberal. Local by-product foundry remains unchanged at $13.50, delivered Chicago switching district. Greater firmness in beehive foundry coke is indicated by a sale to a local user of 200 tons for 60 days' delivery at $5.75, Connellsville.

Plates.—An inquiry from the Shell Oil Co. for storage tanks involving 6000 tons of plates has been abandoned and approximately 12,000 tons of additional pending tank work for the California fields is understood to be dormant. The Sinclair Crude Oil Purchasing Co. remains in the market for tanks requiring from 6000 to 14,000 tons. The Illinois Central is inquiring for a car ferry taking 1200 tons. Mill bookings are still comparatively light and progress in the reduction of past obligations continues to be made. The leading local interest, however, is not yet in a position to offer anything approaching early delivery on new business. Prices are steady and unchanged.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—While demand still lags, pipe shops have not yet caught up sufficiently to offer early deliveries on the smaller sizes. Prices, on the whole, remain firm. Hibbing, Minn., takes bids today on 500 tons of 6 and 8-in. Joy, Ill., will receive tenders tomorrow on 200 tons of 4, 6 and 8-in. Evansville, Ind., receives bids Aug. 24 on 140 tons of 12-in. Detroit is expected to close some time this week for 3264 tons of 6 and 8-in., on which it took bids early this month. Chicago contemplates entering the market for several hundred tons of 6 and 8-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Sheets.—While concessions in black and galvanized continue to be made, they are not yet numerous enough definitely to establish the market on a lower price level. Demand is still very light.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Structural Material.—The building industry is showing unexpected buoyancy, although it is to be noted that individual projects are largely small. A large local fabricator quoted on 50 separate jobs during the past week, but the total quantity of steel involved was only 3000 tons. The market is not entirely devoid of sizable tonnages, however. New figures have been asked on ore docks for the Great Northern at Duluth, covering 2300 tons. The award of the Ford Motor Co. plant at St. Paul, requiring 10,000 tons, is expected shortly. An Elks' Club building at San Francisco calls for 1100 tons and a legislative building at Olympia, Wash., will take 1000 tons. Figures have been asked on the Lakeshore Athletic Club building, on the north side of Chicago, which will involve 4500 tons. Fabricating awards are more numerous than for several weeks. Two railroad lettings alone account for 3500 tons. Plain material prices remain unchanged, but fabricators appear to be in no hurry to replenish their stocks.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Demand for soft steel bars continues more active than for plates, shapes and sheets, although buying is still largely for filling in purposes. For one large local mill new business booked in bars in the first part of August was nearly double the tonnage taken in the corresponding period in July. Specifications also showed an improvement. Local prices remain firm and some business for early shipments from mills east of here continues to be placed at 2.40c., base Pittsburgh. Bar iron is still weak, although concessions in price appear to have developed some business. Most orders are being placed at 2.40c., Chicago mill, although some small lots continue to bring as high as 2.50c. and on particularly desirable specifications as low as 2.35c. has been done. New business in rail steel bars shows slight improvement with prices unchanged.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—Fall demand is a little late in developing, but the trade is confident it will make itself felt soon. Most mills are now in a position to make fairly early shipments against new business. For prices, which are unchanged, see Finished Iron and Steel, f.o.b., Pittsburgh, page 512.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Rails and Track Supplies.—With the extension of the present rail price of $43 a ton to cover deliveries over the first half of 1924, the railroads are proceeding to complete their purchases for that period. Four western lines have placed a total of 68,000 tons with a local mill. Among these were the Union Pacific, which was inquiring for 50,000 tons, and the Wabash, which was in the market for 10,000 tons. Including the orders placed earlier in the summer on an open price basis, rails placed by all American lines for 1924 delivery are estimated at more than 350,000 tons. Pending rail inquiries from western roads total 40,000 tons. Practically all the carriers that have not bought are preparing to enter the market and orders to be placed early this fall are expected to aggregate twice the tonnage thus far contracted for. Necessary angle bars are in most cases bought with the rails, while the practice of the various roads with reference to the other track supplies varies. In some instances they are ordered with the rails, but more often they are placed separately.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts 4.90c. base.

Bolts and Nuts.—Prices are still unsteady, with demand light.

Reinforcing Bars.—While there are still a number of attractive projects on the market involving concrete bars, building construction as a whole appears to be on the decline and competition for such business as is coming up is keen. No action has yet been taken toward the purchase of the bars required for the north side sewage disposal plant of the Sanitary District, Chicago, which will involve 6000 tons. Despite the advanced season, considerable road work is still being undertaken. Fully 1000 tons for Illinois state bridge work is pending. Lettings include:

St. Paul, Minn., water department, Mississippi River conduit, 500 tons, to C. A. P. Turner Co.

Illinois State road and bridge work, 250 tons, to Concrete Steel Co.

Minnesota road work, 100 tons, to Kalman Steel Co.

Filter house and dryer building, Jones Island, Milwaukee, Wis., 100 tons, to Kalman Steel Co.

Grenada apartment building, Chicago, 150 tons, to Olney J. Dean.

Pending business includes:

Evanston, Ill., city filtration plant, 200 tons, bids in.
State of Illinois, bridge work, 1000 tons.
Golden Rule Building, St. Paul, Minn., 800 tons.

Old Material.—The market is exceedingly quiet in all departments. Even trading among dealers is at a low ebb. Prices show little change, but the feeling of the trade is more optimistic, probably because of evidences of strength in market centers east of here. Railroad offerings include the Santa Fé, 4000 tons; the Chesapeake & Ohio, 800 tons; the Missouri, Kansas & Texas, 1700 tons; the Chicago Great Western, 600 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$21.00 to $21.50
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.00 to 20.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	16.00 to 16.50
Frogs, switches and guards cut apart	16.50 to 17.00
Shoveling steel	15.75 to 16.25
Drop forge flashings	10.00 to 10.50
Hydraulic compressed sheets	12.50 to 13.00
Axle turnings	13.00 to 13.50
Steel angle bars	17.25 to 17.75
	Per Net Ton
Iron angle and splice bars	22.00 to 22.50
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	25.50 to 26.00
Steel car axles	17.00 to 17.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.50 to 10.00
Cut forge	14.25 to 14.75
Pipes and flues	9.50 to 10.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	14.25 to 14.75
Steel knuckles and couplers	18.50 to 19.00
Coil springs	19.00 to 19.50
No. 1 machinery cast	17.50 to 18.50
No. 1 railroad cast	17.00 to 17.50
No. 1 agricultural cast	17.00 to 17.50
Low phos. punchings	16.00 to 16.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	8.00 to 8.50
Cast borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Stove plate	15.00 to 15.50
Grate bars	12.75 to 13.00
Brake shoes	14.00 to 14.50
Railroad malleable	18.00 to 18.50
Agricultural malleable	16.50 to 17.00

The plans for the industrialization of the Old Hickory Powder Plant at Jacksonville, Tenn., are to continue, although an incorrect impression has gone forth to the contrary, owing to an arrangement between the Government and the Nashville Industrial Corporation, involving a receivership for the Nashville Industrial Corporation. There is apparently to be no stop in developing an industrial city out of this war expenditure and all sales contracts made by the Nashville Industrial Corporation and now existing will be taken over and consummated by the receivers, who will operate as the Old Hickory Powder Plant receivers.

New York

Steel Bookings at Half Second Quarter Rate—Pig Iron Shades $25

NEW YORK, Aug. 21.—Without what may be called a buying movement, a fair amount of business is being done in pig iron. Of the 500 tons of foundry iron recently inquired for by a malleable interest 250 tons was bought, and a New Jersey foundry took 500 tons of iron having a narrow range in phosphorus content. The Ingersoll-Rand Co. has inquired for 1500 tons, manganese 0.80 to 1.10 per cent and phosphorus 0.30 to 0.50 per cent, and is expected to close at once. Deliveries are to be made within 30 days. Generally the new inquiries are for small lots. A coupler company is asking for 1000 tons of malleable for delivery at the rate of 200 tons a week beginning Sept. 1. The same company is reported in the market for basic. There is some difference of statement regarding the extent to which the $25 base is being maintained. It is still possible to do $24.50, and this applies to the Buffalo district, which latterly has been regarded as on the $25 basis. A number of buyers are holding down their inventories, and there are cases in which iron is being called for sooner than was counted on. For the most part the price situation is unchanged from a week ago and there are indications that present conditions will continue into September, signs of weakness alternating with claims of greater firmness.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$27.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.27
East. Pa. No. 2, sil. 1.75 to 2.25	$27.02 to 27.27
Buffalo, sil. 1.75 to 2.25	28.91 to 29.41
No. 2X Virginia, sil. 2.25 to 2.75	32.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—A sale of 100 tons of ferromanganese for prompt shipment is the largest one noted in some time. There have also been a few carload lots disposed of. Some resale alloy has brought lower prices than the regular contract price of $117.50, seaboard and furnace, but it is stated that this has all been cleaned up. Spiegeleisen is in light demand at prevailing quotations, which is also true of 50 per cent ferrosilicon and of ferrochromium.

Cast-Iron Pipe.—Prices continue firm with makers generally sold well up to the end of the year. A few municipal tenders are appearing from time to time. Although new bids have been submitted on the 20,500 tons of water pipe for Porto Rico, no report has been made yet on the opening of the bids. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.30; 4-in. and 5-in., $67.30; 3-in., $77.30, with $5 additional for Class A and gas pipe. The soil pipe market is still weak with sellers desirous of considering only prompt deliveries at the prevailing discounts. We quote discounts of both Northern and Southern makers, f.o.b. New York, in carload lots, for prompt shipment, as follows: 6-in. standard, 39½ to 40¾ per cent off list; heavy, 49½ to 50¾ per cent off list.

Finished Iron and Steel.—Business in steel products being put on the books of the mills is probably not over 50 per cent of the volume which was booked during the best months of the year, March, April and May. The only important new tonnage is in structural projects. The total volume of such is not impressive, but it is fairly good considering the quiet in all other lines. Prices are holding firm, the only exception being that slight concessions have been made on plates for Pacific Coast shipment, but this business has of late come to be regarded very much as is export trade, hence concessions are not unusual. The total structural steel contracted for for buildings in second quarter in the metropolitan district (not inclusive of bridges, tunnels, subway work, etc.) has been computed by L. F. Caproni of the Hay Foundry & Iron Works, New York, to be 72,000 tons. This shows quite a drop from the first quarter, when such work put under contract totaled 143,000 tons. As the capacity for such work in the shops of the New York district is 150,000 tons per quarter, the total for the first half of the year was about 70 per cent of capacity, while for the second quarter alone the total business was only little more than 40 per cent of capacity. The Erie Railroad is expected shortly to distribute orders for 35,000 tons of rails.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Warehouse Business.—Business continues fairly active, although the improved mill shipments now being made to the larger consumers are undoubtedly curtailing some of the buying from stock that was prevalent when mills could only offer rather extended delivery. Prices generally are unchanged. Sheets continue weak with sales at as low as 4.50c. per lb. base for black and 5.50c. per lb. base for galvanized. Business in wrought iron and steel pipe is quiet but discounts are unchanged. There is still some slight shading reported on small lots of soft steel bars but sheets continue the weakest spot in the warehouse market in this district, as some sellers, it is pointed out, are disposing of stocks of sheets on a basis of original cost rather than cost of replacement and figuring profits on a very narrow margin. We quote prices on page 530.

Old Material.—On some grades the market seems to be slightly firmer this week, but there is apparently a difference of opinion among dealers and brokers as to the actual underlying tendency. No. 1 heavy melting steel is stronger by about 50c. per ton, being quotable at $16 delivered eastern Pennsylvania with shipments going forward to Coatesville, Pottsville and Harrisburg. Shipments to Conshohocken, Pa., are reported to have been held up temporarily. While railroad grade or equivalent is still quoted at $16 per ton delivered eastern Pennsylvania, there are rumors of prices as high as $16.50 per ton, delivered, being paid and some yards in this district are said to be holding out for the higher price, which they claim is obtainable. On the other hand, brokers claim that they cannot pay above $16. Stove plate continues firm with shipments going forward to a Harrisburg consumer and New Jersey foundries, paying about $17 or more delivered. A fair range on this grade is $13 to $14 per ton, New York. Borings and turnings are still quoted at $12.50 per ton, delivered to Bethlehem, Pa., machine shop turnings at $13.50 and $14 per ton, delivered Phoenixville, Pa., and some shipments of borings are reported going to Harrisburg at $14.50 per ton. Specification pipe is still quiet with practically the only activity at present in shipments to Lebanon, Pa., at $14.50 per ton. About 1000 tons of rerolling rails is reported bought last week by an eastern Pennsylvania mill at $18.50 per ton. The few shipments going to Weirton and Monessen, Pa., are reported to be at $17.50 and $18 per ton delivered, but practically none of this tonnage is moving from this district.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$12.00 to $12.50
Steel rails, short lengths, or equivalent	12.75 to 13.25
Rails for rolling	15.00 to 17.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	10.00 to 10.50
Machine-shop turnings	9.50 to 10.00
Mixed borings and turnings	9.00 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25 to 10.75
Stove plate	13.00 to 14.00
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00 to 19.00
No. 1 heavy cast, not cupola size	16.00 to 17.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 17.00

Coke.—The market is stronger than for several weeks, in part because of the emphatic disagreements in the anthracite conferences. Standard foundry coke

is firm at $5.75 to $6.75 for well-known brands, and standard furnace coke ranges from $4.75 to $5.25 per ton. Renewed demand for crushed coke for domestic consumption has sprung up and the price has advanced above $6, as high as $7 being quoted. By-product coke from New Jersey ovens continues at $11.41, Newark and Jersey City. Contract sales of such coke have been in considerable volume and the price has not been affected by the recent weakness in Connellsville coke.

Cincinnati

Slight Improvement in Inquiry and Prices Practically Unchanged

CINCINNATI, Aug. 21.—The pig iron market was quiet during the past week, and only a few sales ranging from carloads to 200 tons were reported. There is a slightly improved tone to the market this week, and several fair sized inquiries, mostly however from other districts, are being worked on. A large automobile manufacturer is inquiring for 1400 tons of silvery iron for fourth quarter, a steel castings manufacturer for 1000 tons of low phosphorus iron and a stove company for 500 tons of Southern foundry. A nearby melter is also in the market for 600 tons of foundry iron for September delivery. A number of other inquiries, ranging up to 200 tons, have come out, some of them being for special analysis irons. Sales last week included one of 500 tons of Northern iron and 400 tons of silvery to a Michigan melter and 400 tons of Southern charcoal iron to a roll maker in the Pittsburgh district. Prices generally show no change, although it is said that resale iron can still be had below the furnace schedules, which are now being firmly held; $26, Ironton basis, continues as the market, with $23.50, Birmingham, the price asked by Tennessee furnaces on standard Southern iron. Alabama furnaces continue to quote $27, Birmingham, but this price has not been tested by an inquiry of any size. Silveries are unchanged. Jisco furnace in Jackson County has gone out for relining.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.05
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	28.27
Basic Northern	27.27
Malleable	28.27

Finished Material.—Orders were scarce with most companies last week, those being placed being for immediate shipment. Some interest is being shown in fourth quarter prices, however, particularly on sheets. Some of the independent mills are reported to have indicated to their regular customers that fourth quarter prices will be practically the same as those of third quarter, with the possible exception of an advance of $2 per ton on blue annealed grades. Bars, shapes and plates are quiet, but there are no evidences of lower prices being quoted. On reinforcing bars, however, some mills are willing to accept 2.30c., while others are quoting 2.40c. and 2.50c. Plates and shapes are selling at 2.50c. There is little activity in wire nails and other wire products, the large buyers being already under contract. Some wire mills are said to be in need of business. Bolts and nuts are quiet. There has been some little inquiry for cast iron pipe, and the City of Newport, Ky., is expected to purchase against its recent inquiry. Covington, Ky., will also shortly be in the market for several hundred tons.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Structural Material.—The Louisville & Nashville Railroad has awarded 450 tons of crossings work to the American Bridge Co., and 400 tons to the Mt. Vernon Bridge Co. Bridge work, involving 1000 tons, on which bids were taken last week, will not be awarded at this time. Frank Hill Smith, Inc., is low bidder on the general contract for the McCall Publishing Co.'s new plant at Dayton, Ohio. A number of new projects, involving less than 100 tons, are up for figures. Opening of bids on the Kosair Temple, Louisville, Ky., in which about 450 tons of steel are involved, has been postponed till Aug. 28.

Warehouse Business.—Local jobbers report some improvement in the demand for warehouse materials, more especially in bars, plates, small angles and sheets. Wire products are also showing a slight improvement. Prices are unchanged.

Coke.—A better tone is evident in the coke market, and more activity in foundry and domestic fuels is noted. Prices are unchanged from last week.

Old Material.—A steel mill in this district bought about 3000 tons of heavy melting steel last week at $17.50, delivered. This was the outstanding transaction. Inquiries are more numerous, but some dealers are inclined to regard them more as feelers than an intention to purchase. Prices are firmer, but not any higher. On cast grades carload lots continue to be the only activity.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton
Bundled sheets	$12.50 to $13.00
Iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up	28.00 to 28.50
Rails for rolling	16.00 to 16.50
Heavy melting steel	14.50 to 15.00
Steel rails for melting	14.50 to 15.00
Car wheels	14.50 to 15.00
	Per Net Ton
No. 1 railroad wrought	12.50 to 13.00
Cast borings	9.00 to 9.50
Steel turnings	8.50 to 9.00
Railroad cast	16.00 to 16.50
No. 1 machinery cast	18.50 to 19.00
Burnt scrap	11.50 to 12.00
Iron axles	21.50 to 22.00
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	8.50 to 9.00

St. Louis

Pig Iron Buying Broadening Somewhat—Dealers Stocking Old Material

ST. LOUIS, Aug. 21.—Further improvement in actual sales and inquiry features the pig iron market. Reserve stocks of consumers are running low, and with the melt continuing at its present pace, a real shortage is in prospect with many important plants unless they replenish in the near future. During the past three weeks there has been a steady growth in the ordering of small lots up to 100 tons, and where such sales are made the seller is urged to effect prompt delivery, and even furnish car numbers where possible. Both mills and foundries have booked a satisfactory volume of small orders of late, and sentiment is generally optimistic as to business during the fall. The largest transaction reported during the past several days was 1000 tons of foundry iron to a Davenport, Iowa, melter for delivery through fourth quarter or sooner. A local brokerage interest purchased 250 tons, and a jobbing foundry took 150 tons for spot shipment. The leading producer reports sales aggregating 500 tons, of which 175 tons went to a St. Louis machinery manufacturer. Inquiries pending approximate 3000 tons. Southern iron is quoted here in a range from $23.50 to $27, and a small resale tonnage went as low as $22.50. Northern is unchanged on a basis of $26.60 to $27, Chicago. The leading local producer quotes $27.50 to $28.50, f.o.b. Granite City.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	29.17

Finished Iron and Steel.—While no large inquiries or sales were reported, producers and selling agencies are enjoying a persistent steady small business, which

in the aggregate makes an excellent showing. This is true particularly of structural steel interests, who report numerous small orders ranging from 25 to 75 tons. Since the second week of August there has been a slight improvement in sales of the warehouses. July business of boiler makers and machinery builders show gains of 14 to 42 per cent over the same month in 1922. Railway supply interest also report sales well in excess of last year, but the peak seems to be passed with them, as totals in July were under those of May and June. A sharp decrease in orders for all varieties of materials from the oil fields is noted. A local automobile maker has ordered 750 tons of steel for delivery through October.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—The market continues dull and featureless on all grades and varieties. The recent extreme heat served to accentuate slowness on the part of domestic buyers, and dealers do not look for improvement before early in September. By-product manufacturers are operating at or near capacity, and their stock piles are assuming large proportions. Despite this fact no price concessions have been made, mainly for the reason that the producers believe they will be able to market easily all surplus in the event of a strike of anthracite coal miners. Thus far, however, users of anthracite have failed utterly to display any excitement over the coal mine labor situation. The only sale of metallurgical coke of any size was 1000 tons to an Iowa consumer for shipment over the remainder of 1923.

Old Material.—Save for a few purchases of cast grades by job and stove foundries, buying continues at a minimum. Dealers, however, have been increasing their holdings, and yard stocks are now larger than at any time in more than three months. Recent heavy offerings by the railroads have been readily absorbed by the dealers, who, conditions considered, paid good prices for all material offered. Stocks in melters hands are light, and sellers are being pressed for deliveries of certain materials. Stove plants are planning to increase operations early in September, and are buying some scrap. New railroad offerings included 2700 tons by the Wabash, 2000 tons by the Missouri, Kansas & Texas and 4500 tons by the Rock Island.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton
Iron rails	$16.00 to $16.50
Rails for rolling	17.50 to 18.00
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00
	Per Net Ton
Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	15.25 to 15.75
Iron car axles	25.00 to 26.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.00 to 19.50
Steel rail borings	12.00 to 12.50
No. 1 busheling	16.75 to 17.25
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	18.50 to 19.00
Railroad malleable	17.00 to 17.50
Machine shop turnings	11.50 to 12.00
Champion high steel scrap	8.00 to 8.50

For the new cold-rolled strip steel plant to be started at Warren, Ohio, by C. G. Thomas and associates, Barton R. Shover, Oliver Building, Pittsburgh, has been retained as consulting engineer. As announced in THE IRON AGE of Aug. 16, a company has been in process of organization to take over the plant of the Eastern Ohio Mfg. Co. The equipment is to include two stands of 12-in., four stands of 10-in. and four stands of 8-in. cold strip mills, with all auxiliary equipment.

Boston

Pig Iron Sales Show Further Shrinkage—Scrap Prices Firmer

BOSTON, Aug. 21.—Pig iron sales show a further shrinkage, New England foundries not covered for fourth quarter showing little inclination to buy. Certain local representatives of furnaces maintain the past week was the quietest experienced this year. Interest centered in the purchase of 300 tons by the Sullivan Machinery Co., Claremont, N. H. Details are not verified, but the company is credited with buying 100 tons of Buffalo malleable iron at $24.50, furnace, 100 tons of silicon 2.25 to 2.75 per cent of New York State iron at $24.50, furnace, and 100 tons of silicon of 3.25 to 3.75 per cent of eastern Pennsylvania at $25.50, furnace, this sale being the largest individual one reported. On regular foundry iron, Buffalo furnaces apparently are holding at $25 base with 50c. differentials, although on attractive tonnages the latter undoubtedly would be wavered. Eastern Pennsylvania furnaces quote $25 base and 50c. differentials, but No. 2 plain, No. 2X and No. 1X are offered at $25. Western Pennsylvania prices are somewhat unsettled, it being intimated $24.50, furnace base, and possibly less, can be done on attractive tonnages. Car lots of Virginia sold the past week at $26, furnace base, with regular differentials, and although very much out of line with other irons, Alabama in car lots sold at $27 base with differentials. Additional sales of local charcoal iron at $40 to $60 a ton, depending on quality, are reported. Furnace stocks are now down to the vanishing point and prospects of blowing in are rather remote.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$29.15 to $30.15
East. Penn., sil. 1.75 to 2.25	28.65 to 29.65
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.41
Virginia, sil. 2.25 to 2.75	32.42 to 32.92
Virginia, sil. 1.75 to 2.25	31.92 to 32.42
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Warehouse Business.—Demand for iron and steel holds up well. Buying of bolts and nuts is broader due to a belief that new prices, to be issued around Sept. 1, will show advances. Rivets also are selling more freely from warehouse stocks. Local supplies of nails, particularly wire, are more or less broken, and mills continue several weeks behind on shipments. The American Steel & Wire Co., Worcester, Mass., has sufficient business on its books to keep the plant operating at capacity two months.

Soft steel bars, $3.61½ a 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steel, $3.71½; tire steel, $4.80 to $5.15; open-hearth spring steel, $8 to $10; crucible spring steel, $12; regular steel bands, $4.80; bands over 6 in. wide, $5.05 to $5.30; hoop steel, $5.80 to $6.30; cold rolled steel, $4.75 to $5.25; refined iron, $3.61½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.60 to $7.10.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. are maintaining a price of $13.50, delivered, in New England on by-product foundry coke. Foundries are specifying against contracts a little more freely than heretofore, and ovens are making fairly prompt shipments. Some delay in shipments of crushed coke to foundries has been experienced, however, due to the pressure on ovens for deliveries of domestic fuel.

Old Material.—Quotations on certain kinds of old material are firmer. Business continues exceptionally quiet even for August, but general opinion is there will be a decided improvement next month. The firmer prices therefore are due to growing optimism, to conditions in other markets and to an effort to establish prices at which holders of material will sell. The market for heavy melting steel averages 50c. a ton higher, while railroad and yard wrought have strengthened even more. Slightly better inducements are offered by brokers on turnings and borings. Foundries

display little interest in machinery cast scrap, however, and prices remain unchanged.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	16.00 to 17.00
Railroad malleable	20.00 to 21.00
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 rail wrought	14.00 to 14.50
No. 1 yard wrought	13.00 to 13.50
Wrought pipe (1-in. in diam., over 2 ft. long)	10.00 to 10.25
Machine shop turnings	8.25 to 8.75
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

Philadelphia

Slight Pick-Up in Demand for Finished Steel —Scrap Market Stronger

PHILADELPHIA, Aug. 21.—With the iron and steel trade waiting for signs that will indicate what may be expected in the way of business developments, mid-August has brought little that is either encouraging or discouraging. Both buyers and sellers are still marking time, yet in finished steel there are a few straws that seemingly point to an early broadening of the demand. In a few products, notably sheets, strip steel and other light forms of finished steel, there has been a better inquiry, some of it covering fourth quarter requirements. In plates, shapes and bars the situation is pretty much unchanged, though the tonnage being placed on mill books is probably slightly greater than that of July. There is an absence of specific tonnage of important size. The easing up of the plate demand is indicated by the request of the Pennsylvania Railroad of some mills to suspend shipments of car plates to Altoona, where material has been received faster than it can be handled, whereas not more than 60 days ago the Altoona shops were urgently seeking plates for early shipment.

Pig iron demand has not increased during the week and is made up mostly of a fair number of small-lot orders. In scrap there is a firm undertone, marked by a few price advances, while dealers are holding material for 50c. or $1 a ton above today's nominal quotations.

Ore.—Last week's receipts of iron ore from abroad totaled 21,950 tons, of which 12,400 came from Cuba, 2350 from Sweden and 7200 from French Africa.

Ferroalloys.—There is very little demand for either domestic or foreign ferromanganese, both of which are still quoted at $117.50, seaboard or furnace. Occasional carloads of resale material are being sold at about $115.

Pig Iron.—Nearly all of the eastern Pennsylvania furnaces now name $25 as their minimum on foundry iron, this price applying to No. 2 plain, with 50c. differentials for No. 2X and No. 1X. It is not quite established, however, that quotations at least 50c. a ton lower are not still being made, though there is no definite confirmation that such is the case. Two inquiries now pending of 1500 tons each, one from a New England company and the other from a New Jersey machinery plant, may determine when closed just how firmly the $25 base is being held. The volume of business in the past week has not been large, but there is a fair number of orders ranging from a carload to 100 or 200 tons. In Virginia the pig iron situation is much more unsatisfactory from the producer's point of view than in this district. Virginia operators are finding it difficult to obtain $26, base, for their product, and quotations of $25.50 have appeared more frequently, and it is intimated that on an attractive tonnage one or two furnaces might quote $25. A Virginia cast iron pipe company, which recently closed for 7500 tons, is expected to buy 2500 tons more this week. Eastern Pennsylvania makers of copper bearing low phosphorus iron have reduced quotations from $32 to $30, furnace. Two or three inquiries for low phosphorus iron total 1500 to 2000 tons.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.26 to $26.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.76 to 26.14
East. Pa. No. 1X	26.26 to 26.76
Virginia No 2 plain, 1.75 to 2.25 sil.	30.67 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	31.17 to 31.67
Basic delivered eastern Pa.	25.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	29.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	30.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.50
Low phos., copper free, guar. not over 0.035 per cent phos.	31.50
Continental, phos. 1.50; sil. 2 to 3	25.50

Semi-Finished Steel.—There is a little weakness in billets, but scarcely enough business has come out recently to test the market. It is possible that $42.50, Pittsburgh, has been shaded for open-hearth rerolling billets, but this is based only on the fact that one or two mills have lost business on which they have quoted that price. Eastern mills name $50, Pittsburgh, on forging billets, but doubtless $47.50 would have to be quoted to take any attractive business.

Plates.—Plates are very easy to obtain for prompt shipment. Some rollings can be had in less than a week. Few of the eastern mills have more than two weeks' active specifications on their books. Two months ago the Pennsylvania Railroad was searching for plates for prompt shipment for car repair work at Altoona, but within the past week repair material has been shipped to the road's car shops so freely that requests for suspensions have come to some mills. On eastern business the plate price remains firm at 2.50c., Pittsburgh, but on Pacific Coast orders slight concessions, usually about $2 a ton, have been made, which is not an unusual occurrence on western business. California business now pending totals close to 2000 tons.

Structural Material.—Not many new building projects are coming out for bids. Local fabricators expect to have before them soon plans for a new hotel at Broad and Locust Streets, which will take 5000 to 6000 tons of steel. The price situation remains unchanged, with one eastern mill quoting 2.40c., Pittsburgh, and others 2.50c.

Bars.—Mills still have considerable steel bar business on their books and there is no anxiety about new specifications. The price of steel bars remains firm at 2.40c., Pittsburgh, while bar iron is equally firm at the same figure, the only exception being occasional quotations of 2.35c. by one maker.

Sheets.—Inquiry for sheets for delivery over the remainder of third quarter and for fourth quarter requirements have been received in the past week. Less is now heard of price concessions, even black sheets, which had been selling occasionally at 3.75c., Pittsburgh, apparently being firm at 3.85c. Blue annealed at 3c. and galvanized at 5c. have at no time recently shown any weakness.

Warehouse Business.—Local jobbers continue to do a very satisfactory business in steel out of stock. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finish, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.85c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼ in., 5.10c.; ⅜ in., 5.80c.; spring steel, 5c.; round cold-rolled steel, 4.75c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ¾-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Coke.—Although furnace coke is still obtainable at $4.50 and foundry coke at $5.50, Connellsville, furnace operators seem less disposed to quote $4.50 on furnace coke, due probably to the expectations of an anthracite coal strike, and some brokers name $4.75 as a minimum.

Old Material.—A few eastern steel scrap consumers have evidenced more interest in buying, but offers of more than $16, delivered, have been made in only one or two instances. If business is closed this week it probably will be on a basis not less than $16.50, some brokers and dealers holding for $17. The situation today is that dealers are more anxious to buy than to sell, believing that the market is due for a rise over the next few weeks. Most of the quotations on other grades of old material, as shown in the table below, are nominal in that any business to be done within the next week will probably be at 50c. to $1 a ton above these figures. Among the items which have advanced slightly with increased demand are machine shop turnings for steel works use, bundled sheets and pipe, the latter being up at least $1 a ton.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap rails	16.00 to 16.50
Steel rails for rolling	17.00 to 18.00
No. 1 low phos., heavy 0.40 and under	21.50 to 22.50
Cast-iron car wheels	20.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	14.00 to 14.50
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.00 to 14.50
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	18.00 to 19.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 17.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Buffalo

Less Interest in Pig Iron—Pressure for Sheet Deliveries

BUFFALO, Aug. 21.—The flurry felt here earlier in the month has not kept up and recent sales are of the ordinary variety. Two unusual inquiries have served to break the monotony; one for 1500 tons of foundry iron of silicon 2.25 to 2.75 per cent for shipment to Phillipsburg, N. J., is engaging the attention of local sellers, but it is not expected that the business will be placed here. A railroad equipment maker is inquiring for 1000 to 2000 tons of basic iron for delivery at Depew, N. Y. The rest of new business offered is the usual run of car loads or 100-ton lots. The $25 base price continues to hold firm, but $24.50 is encountered in competition. Sellers do not look for any immediate advance in prices, nor do they think that the market will touch any lower figure. There is no disposition on the part of the consumers to buy for more than three of four weeks' needs. Total sales do not exceed 8000 tons.

We quote f.o.b. gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$26.00
No. 2X foundry, 2.25 to 2.75 sil.	25.50
No. 2 plain, 1.75 to 2.25 sil.	25.00
Basic	24.00
Malleable	26.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—Specifications have been heavier and both inquiries and new business is on a good scale. Prices are firm and the 2.40c. price on bars and 2.50c. price on shapes and plates has not been disturbed. There is an extraordinary demand for pipe and inquiries running as high as 200 tons have been general. The general run of sheet inquiries is for 100 to 150 ton lots. The 3.85c. price on black sheets is generally quoted but 3.75c. is encountered in stiff competition. Sheets are being used as fast as received and pressure for delivery is just as strong. Two unusual bolt orders have been placed outside of Buffalo; one order of three carloads for shipment to Rochester developed sharp competition.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—A general renewal of confidence is apparent on all sides but is not reflected in the volume of new business. There is widespread expectation that there will be unusual buying before Sept. 15, because all stock piles are depleted. Demand for cast scrap is good and the supply is scarce. Only one mill is interested in buying heavy melting steel and is offered $17, but has not been able to pick up any large tonnages at this offer.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 busheling	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

Cleveland

Reviving Demand from Automobile Foundries—Advance in Scrap

CLEVELAND, Aug. 21.—A St. Louis consumer purchased 25,000 tons of Lake Superior ore in the week, this being the only sale of any size reported recently. Ore firms are looking for little more buying this season. While some consumers did not purchase early in the season all the ore that they were expected to need, it is believed that with the slowing down of pig iron production few consumers will find it necessary to buy more ore to tide them over until spring.

Pig Iron.—There is still a fair demand for pig iron in foundry and malleable grades, mostly in small lots. One local interest sold 10,000 tons during the week, another 4000 tons and other sales probably made up a total of 20,000 tons. These sales included one 1500-ton lot and another nearly as large. Weak spots in the market are disappearing and prices below $25 for foundry in the Valley district seem no longer in evidence. As a result the local price situation has firmed up somewhat, although the commoner quoted Cleveland price of $26 for foundry iron was shaded to $25.75 during the week. However, it is doubtful if a Cleveland quotation of below $26 can now be secured. One Cleveland producer during the week opened its books for contracts for the fourth quarter at $26 for foundry iron and a canvas of its trade brought out quite a few inquiries. Buyers evidently have come to the conclusion that prices will go no lower and some large consumers of foundry iron who have been buying from hand to mouth for some time are now figuring on their requirements for the remainder of the year. Among the sales was one fair-sized lot that was placed subject to the prices prevailing at the time of shipment. In addition to the sales of malleable iron to automobile foundries recently reported, an Ohio foundry specializing on automobile castings purchased 5000 tons of malleable iron in the week, this being divided among several producers. Following somewhat of a lull in the foundry end of the automotive industry, now that production is getting under way on new models, large specifications for pig iron for September shipment are being sent out by some of the automobile foundries and the indications are that the consumption by this industry will be

heavy during the remainder of the year. Basic iron is inactive, with the market apparently well established at $25, Valley furnace. The American Rolling Mill Co. blew out two furnaces this week, one at Columbus, Ohio, and one at Ashland, Ky.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.90 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	26.50
Southern fdy., sil. 1.75 to 2.25	29.50
Malleable	26.50
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace, $31.50 to	32.00

Bolts, Nuts and Rivets.—Price irregularity is in evidence in bolts and nuts, and concessions to the extent of 5 per cent from the regular discounts are being made by some manufacturers. Among new rivet inquiries is one from a Western oil company for 200 tons. Sharp competition still exists for desirable orders. The market is quotable at 3c. for structural and 3.10c. for boiler rivets for round lots, but in some cases makers are getting $2 a ton higher.

Sheets.—The demand from Detroit automobile companies for blue annealed and body sheets has improved now that some of the car builders have started production on new models, but the demand is generally confined to early requirements. In other respects the market continues dull and some mills are in need of orders. Prices appear firm, except on black sheets, on which some mills are making a concession of $2 a ton to 3.75c.

Reinforcing Bars.—New demand shows an improvement. Among inquiries is one for 170 tons for a sewage disposal plant for Euclid, Ohio. Other projects requiring unnamed tonnages include the Babies' and Children's Hospital, Cleveland, and a county home, Erie, Pa. Rail steel bars are unchanged at 2.30c. to 2.35c.

Semi-Finished Material.—A local producer has made several reservations of sheet bars for the fourth quarter subject to prices prevailing at the time of shipment. Without a recent test of prices, quotations on sheet bars, billets and slabs are unchanged at $42.50, and it is expected that the introduction of the 8-hr. day will have a tendency to keep the market firm.

Finished Iron and Steel.—The market has a firmer tone and consumers seem to have come to the conclusion that present prices will be maintained. New demand is light, although some mills report a slight improvement. However, most consumers are following a hand-to-mouth policy in placing orders. Generally deliveries are better. This was brought out during the week in an inquiry for 900 tons of structural material and 600 tons of plates for a new power house in Cleveland for the Standard Oil Co., which was placed with a Massillon fabricator. Deliveries within three weeks were asked for and two or three leading producers were able to meet the dates. However, only a portion of the steel has yet been placed. The demand for plates is better than for most other lines, and local mills are booking about as much tonnage as they are shipping. However, some Eastern mills are now finding it difficult to take orders in this territory on the 2.50c. mill basis, owing to the fact that Pittsburgh district mills are now able to make better deliveries. Local mills quote plates at 2.50c. to 2.60c., the high price being usually for boiler steel. Inquiry in the building field shows some gain. Among new projects for which bids are expected to be asked for shortly is the Brotherhood of Locomotive Engineers Bank Building, Cleveland, that will require 3000 tons or more of structural material.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.50c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, square and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—The coke market is dull and prices of standard Connellsville foundry coke are unchanged at $5.50 to $7 per net ton at oven. A price advance of 50c. has been made on medium sulphur furnace coke used for heating purposes in foundries, which is now quoted at $4.50 to $5.

Old Material.—Prices have stiffened as a result of the release of shipping orders for machine shop turnings by a leading Cleveland consumer and by some new demand that has developed from steel plants. A West Virginia steel company is understood to have purchased a round tonnage of heavy melting steel and compressed sheet steel, and other consumers are reported to have done considerable buying in a quiet way. Borings and turnings have advanced about $1.50 a ton. Grate bars and stove plate have advanced $3 a ton as a result of an active demand and limited supply, and the general tendency of the market appears to be upward on all grades. Dealers are offering $18 for heavy melting steel and $16.25 for compressed sheet scrap to fill recent orders from a West Virginia consumer and $16.50 for heavy melting steel for delivery to a Cleveland steel plant.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.00 to $16.25
Rails for rolling	18.00 to 18.50
Rails under 3 ft.	17.50 to 18.00
Low phosphorus melting	19.00 to 20.00
Cast borings	12.00 to 12.50
Machine shop turnings	11.00 to 11.50
Mixed borings and turnings	11.75 to 12.00
Compressed sheet steel	13.75 to 14.00
Railroad wrought	13.50 to 14.00
Railroad malleable	20.75 to 21.25
Light bundle sheet stampings	11.00 to 11.25
Steel axle turnings	14.50 to 15.50
No. 1 cast	19.50 to 20.50
No. 1 busheling	11.00 to 11.25
Drop forge flashings	10.50 to 11.00
Railroad grate bars	15.00 to 15.50
Stove plate	14.50 to 15.00
Pipes and flues	10.00 to 11.00

Making of Steel Disk Wheels

The solid, disk-type automobile wheel of the present day, growing use of which has consumed increased quantities of steel, harks back in design to early days of civilization, according to Walter Page, general manager of the Forsyth Brothers Co., a unit of the Motor Wheel Corporation. In an article in "The Pure Iron Era," published by the American Rolling Mill Co., Middletown, Ohio, he points out that the first wheel was probably a thick log cut from a tree trunk.

In the Forsyth plant 10 operations are performed by eight men from the steel sheets as received to the finished product. The entire operation in a single disk consumes but 15 sec., and thus a total of 2400 disks can be made in a 10-hr. day. They are stamped out of steel of 0.118 to 0.125 gage.

Warren G. Harding's efforts in relation to the elimination of the 12-hr. shift in the steel industry were made the subject of a tribute paid to his memory by Dean Mortimer E. Cooley of the University of Michigan and president of the Federated American Engineering Societies. "His moral support of the work of the engineering profession, his quiet and self-effacing manner and his sacrifice of self for the interests of the nation have been a source of inspiration and of stimulation to the engineers in their desire and endeavor to render an essential public service."

For superintendent of construction vacancies in the central office of the Veterans Bureau, Washington, the United States Civil Service Commission, Washington, will hold an examination for which application must be made by Sept. 25.

The Sullivan Machinery Co., Chicago, has formally opened its new plant at Michigan City, Ind., for the construction of heavy mining machinery.

Lake Erie-Ohio River Canal Opposed by Iron Maker

Some extravagant claims made by the proponents of the Lake Erie and Ohio River Canal, particularly as to the tonnage that would be available for such a waterway and the suggestion that lake vessels would come straight through from the great Lake Superior ore fields and other lake ports to Pittsburgh without change of crews or cargo, are sharply refuted by George L. Collard, general manager Shenango Furnace Co., Pittsburgh, in a communication to the Chamber of Commerce of Pittsburgh, and published in "Pittsburgh First," the official organ of that body.

As the Shenango Furnace Co. is engaged in the mining and transportation of ore, Mr. Collard, it is held, can speak with authority on the subject of lake transportation, and the tonnages of ore and coal moving on the Great Lakes. He points out with regard to the possibility of having lake boats come through the proposed canal to Pittsburgh, that the vessels carrying ore and coal on the lakes draw from 20 to 21 ft. of water, while the depth of the canal is to be only 12 ft. and that the depth of the Ohio River, with its modern dams, is only 9 ft. The lake boats vary in length and beam, Mr. Collard states, but the modern ones are over 600 ft. long and run as wide as 64 ft. at beam. The locks in the proposed canal are to be 340 ft. long and 45 ft. wide, dimensions, which he says, would not permit the entrance into them of even the smaller of the lake craft.

It has been claimed by supporters of the canal project that 107,000,000 tons of freight annually have been pledged. As to that Mr. Collard states:

"Such a tonnage as this would include practically all the ore and coal now transported by rail from all districts. Total ore tonnage through the Soo locks amounts to 60,000,000 tons in a big year. Less than one-third of this comes to Pittsburgh. The soft coal tonnage from all sources through the Soo locks amounts to 20,000,000 in a big year. It is hardly likely there will be much coal tonnage available for the canal as a great deal now originates in fields far removed from the rivers and the only means of shipping is the trunk railroads.

"W. C. Wilkins, formerly a prominent engineer of Pittsburgh, made an exhaustive study and published a report in 1917 showing that the building of this canal is impractical from the water standpoint and would not be a profitable venture if built. David Jamison, former member of the Canal Commission of Pennsylvania, also made an exhaustive study and an adverse report."

Dictionary of Specifications

Work has been started at the Bureau of Standards on the compilation of material for a dictionary or handbook of specifications for supplies purchased by Federal, State and municipal governments and public institutions. This work grew out of a meeting held in May, 1923, of State purchasing agents from all over the country, at which the cooperation of the various States was assured in this matter.

On July 11 a conference was held of various national organizations interested in the preparation and unification of purchase specifications and in their use from the point of view of both the producer and the consumer. This conference was called for the purpose of organizing an advisory committee to cooperate with the Department of Commerce and the national conference of State purchasing agents in the work of formulating purchase standards, specifications, and tests. Although no meeting of this advisory committee has yet been held, the various organizations represented are cooperating actively in the actual work of compiling the material for the dictionary, and a great deal of information has been supplied.

Correspondence conducted with the officers of trade associations and the purchasing agents of a large number of municipalities and public institutions has established the fact that all the individuals and groups for which the dictionary of specifications is being prepared will welcome its appearance enthusiastically and cooperate actively in the preparation.

A collection is now being made of all available specifications prepared by the various departments and independent establishments of the Federal government and those used by State and municipal governments, public institutions, and the important national trade associations and technical societies. These specifications are being thoroughly card-indexed and classified. Care is being taken to pick out those specifications which are most urgently needed.

Blast Furnace Plant for Everett, Mass.

The Mystic Iron Works, Everett, Mass., has incorporated under Massachusetts laws, with a personnel closely identified with the Massachusetts Gas Companies, Boston. It is proposed, provided State and city authorities give consent, to erect a blast furnace for the production of pig iron on the Mystic River, Everett, in close proximity to the New England Coal & Coke Co.'s by-product coke ovens. The coke company is a subsidiary of the Massachusetts Gas Companies.

Present plans call for the erection of a modern type furnace of 500 tons daily capacity, which with stoves and other equipment will involve an investment of between $3,000,000 and $4,000,000. It will require a year or longer to complete the plant, which will be the first of its kind in New England, the others being charcoal furnaces of relatively small capacity. From time to time in the past 15 years the proposal for a Boston harbor blast furnace has been brought forward.

Interests back of the present project stress the advantage a furnace located in the Boston district would have in the matter of freights to New England foundries, which now obtain their pig iron from furnaces in the Buffalo district, eastern Pennsylvania, Virginia, and also from central and western Pennsylvania. The New England Coal & Coke Co. will supply the Mystic Iron Works with coke. Limestone will be obtained from deposits in Maine reported to be of excellent quality and accessible to water transportation. It is proposed to use Nova Scotia ores as well as Swedish and possibly Spanish, African and other foreign ores, all of which will be transported to Everett by water. The New England Fuel & Transportation Co., another subsidiary of the Massachusetts Gas Companies, owns and operates a fleet of modern steamers.

Nick-Bend Test for Wrought Iron

All of the laboratory work in connection with the investigation of the nick-bend test for wrought iron has been completed, and the report is being assembled for publication by the Bureau of Standards. The general conclusions which the results appear to warrant are given below: Crystalline areas appear most readily in the fractures obtained in the nick-bend test of those wrought irons in which the individual slag threads are small and uniformly distributed. The presence of steel in wrought iron, since it is conducive to this condition, favors the formation of such crystalline areas. The converse, however, is not true.

A crystalline area in the fracture is not a sure indication of the presence of steel in such wrought iron. The test cannot be used as a means for detecting high phosphorus iron. A rapid application of the load in the nick-bend test, usually by impact, is necessary for the formation of the crystalline areas. Distinction should be made between the crystalline areas on the tension and on the compression sides of the tested bar. The latter, in general, are not to be regarded as indicative of the structural condition of the metal.

The total shipments of iron ore from Canadian mines during the year 1922, according to the Dominion Bureau of Statistics, amounted to 17,971 net tons, as compared with 59,509 tons shipped in 1921. The production for 1922 was the lowest in the past 21 years, and included 300 tons of roasted siderite, and roasted magnetite to the extent of 15,890 tons produced in Ontario.

British Iron and Steel Market

Pig Iron and Finished Steel Weak—America Gets Rail Order from Japan—Tin Plate Steady

(By Cable)

LONDON, ENGLAND, Aug. 21.

Foundry and forge pig irons are weak. Market supplies have been increased by the Stockton race week holiday. Both domestic and export demand are poor.

Hematite is firm, on a slight improvement in the demand and decreased production. Seven furnaces now have been blown out and others are expected to be banked shortly.

Finished iron and steel are weak, though prices generally quotable are unaltered. A good line of angles has been sold at £8 10s. (1.73c. per lb.) f.o.b. There is good demand for plate cuttings, from China, and there are fair inquiries for plates and sheets, from Japan.

There is moderate demand for Continental iron and steel, but buyers are cautious. Belgian works are sold out up to October or November. Hongkong has bought wire nails at £17 2½s. (3.48c. per lb.) cost and freight. Japan has bought wire rods at £12 7½s. ($56.43) cost and freight.

America has secured from Japan an order for 10,000 tons of 60 to 75-lb. rails, at a price not disclosed. Belgium had quoted £7 14½s. ($35.22) f.o.b. on it.

In Belgium on Aug. 1 there were 39 blast furnaces blowing. The Société Anonyme des Forges de Clabecq is building a third furnace to cope with orders. Belgian output of pig iron is reported now at record volume since pre-war figures.

Tin plate is steady but there has been no substantial increase in demand. The recent oil-plate order now totals 400,000 boxes.

The Grovesend Steel & Tin Plate Co., Ltd., Gorseinon, Wales, has purchased the Duffryn, Mardy and Dynevor tin plate plants, at Duffryn, Gorseinon and Pantyffynon, respectively, in Wales, at a price of about £600,000 ($2,730,000). The Grovesend steel capacity now is 6000 to 7000 tons per week, with 54 tin plate mills and 22 sheet mills.

Galvanized sheets are firm, but the demand is only moderate.

Black sheets are firm on Far Eastern buying. Negotiations are proceeding regarding the formation of a central selling agency for thin black sheets for Japan. All works except two are reported to have joined.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£2	1½s		$9 16
Bilbao Rubio ores	1	4		5 47
Cleveland No. 1 foundry	5	7½		24 51
Cleveland No. 3 foundry	5	1½	to 15s.	24 12 to $27 2
Cleveland No. 4 foundry	4	16½		22 00
Cleveland No. 4 forge	4	15	to 4 16	21 66 to 21 89
Cleveland basic	5	5		23 94
East Coast mixed	4	18	to 4 19	22 21 to 22 57
Ferromanganese	£8	0		$2 08
Ferromanganese*	£8	10		$4 36
Steel billets, 60 lb. and up	£8	10	to 9 10	$38 76 to 43 17
Billets	£8	5	to 8 10	37 62 to 38 76
Sheet and tin plate bars, Welsh	£9	2½		41 61
Tin plates, base box	1	2	to 1 3½	$ 24 to $ 27
				C. per Lb.
Ship plates	£8	10	to 10 0	1 93 to 2 04
Boiler plates	£12	10	to 13 0	2 51 to 2 65
Tees	£10	0	to 10 10	2 04 to 2 14
Channels	£9	5	to 9 15	1 88 to 1 98
Beams	£9	0	to 9 10	1 83 to 1 93
Round bars, ¾ to 3 in.	£10	15	to 11 5	2 19 to 2 29
Galvanized sheets, 24 g.	£8	15	to 19 0	3 82 to 3 87
Black sheets, 24 gage	£13	15		2 80
Black sheets, Japanese specifications	£5	5		5 10
Steel hoops	£12	0	& £12 10s	2 41 & 2 51
Cold rolled steel strip, 20 g.	£7	5		3 51
Cotton ties, Indian specifications	£5	0		3 0

*Export price. †Ex-ship, Tees, nominal

Continental Prices, All F. O. B. Channel Ports. Delivery as Specified

Foundry pig iron:					
Belgium	£5	5s	to £5 7½s	$23.94	to $24.51
France	£5	5	to £5 7½	23.94	to 24.51
Luxemburg	£5	5	to £5 7½	23.94	to 24.51
Billets:					
Belgium	£7	5		33.06	
France	£7	5		33.06	
Merchant bars				C. per Lb.	
Belgium	£8	0	to £8 5	1.63	to 1.68
Luxemburg	£8	0	to £8 5	1.63	to 1.68
France	£7	10		1.53	
Joists (beams)					
Belgium	£7	12½	to £7 15	1.56	to 1.58
Luxemburg	£7	15		1.58	
France	£7	10	to £7 12½	1.53	to 1.55
Angles:					
Belgium	£8	0	to £8 5	1.63	to 1.68
¼-in. plates:					
Belgium	£8	15	to £9 0	1.78	to 1.83
⅜-in. plates:					
Luxemburg	£7	15		1.58	
Belgium	£7	10		1.53	

Very Little Improvement in Pig Iron or Steel—Shipbuilding at Low Ebb

LONDON, ENGLAND, Aug. 9.—So far it is impossible to report any cheerful conditions. On account of the continued slow demand, Cleveland iron has been reduced further, and No. 3 is now quoted at 102s. 6d. per ton, while East Coast hematite ranges from about 98s. to 100s. The inevitable outcome of the slack demand and the difficulty in reducing costs of production is seen already in the fact that three furnaces have been damped down, while it is expected that before long a fourth will be added to the list of non-operative units. Trading conditions in regard to other makes of pig iron here are also very slow and, in the opinion of makers, this is the leanest period experienced for several years.

In manufactured iron and steel conditions show a little improvement. Of course, this is still more or less a holiday period in this country, but in Scotland the annual holiday is now over, and conditions there do not yet show much sign of returning activity, except perhaps in regard to sheets, for which it is understood, some fair orders have been received from abroad.

Of course, the condition of the steel trade in the north largely hinges upon the position of the shipyards, and unfortunately output continues to be retarded by the boilermakers' dispute. The position generally at Clyde yards is very discouraging. Apart altogether from the labor troubles, there is a lack of new business coming along, and a steady decrease of work on hand, so that, with the labor dispute on the top of this, the shipbuilding trade has been practically brought to a state of stagnation. It is a rather remarkable fact that not one vessel for commercial purposes was floated during the month of July—an unprecedented circumstance. The total launched came to only 754 tons and consisted of four small pleasure craft and a dredger. With the exception of last April, the figure is the lowest on record. It is rather interesting to note that during the past three months the tonnage of motor vessels being built in the United Kingdom increased by over 40 per cent, while that of steamers decreased 16 per cent.

No domestic iron ores were mined in Nova Scotia during 1922, but the British Empire Steel Corporation continued to operate its iron mines in Newfoundland. Shipments from Newfoundland during the year, which were about three times greater than those of the previous year, comprised 1,123,327 tons, of which 311,482 tons was shipped to Nova Scotia, the balance being exported to Europe.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base .....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb.....3.15c.
Bands, base, per lb.....3.15c.
Strips, base, per lb.....3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.62

Cold-Finished Steels

Bars and shafting base, per lb.....3.25c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base.....2.90
String wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per cent per keg.....2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 10 per cent off list
Machine bolts, small, cut threads..50, 10 and 10 per cent off list
Machine bolts, larger and longer..50, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads
50, 10 and 10 per cent off list
Cut threads .....50 and 10 per cent off list
Larger and longer .....50 and 10 per cent off list
Lag bolts .....60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.
45 and 10 per cent off list
Larger and longer sizes .....45 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....3.75c. off list
Hot pressed nuts, tapped.....3.75c. off list
Cap. and t. square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, tapped.....3.75c. off list
Semi-finished hex. nuts:
⅝ in. and smaller, U. S. S.....80 per cent off list
⅞ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list
Bolt ends with hot pressed nuts..50, 10 and 10 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws,
65 and 10 per cent off list
Milled set screws .....65 and 10 per cent off list
Upset cap screws .....75 per cent off list
Upset set screws .....75 per cent off list
Milled studs .....50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb..$3.00 to $3.10
Large boiler rivets, base, per 100 lb.....3.10 to 3.20
Small rivets .....65 and 10 to 65 and 5 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb....$3.15
Spikes, ⅛ in., ⅞ in. and ⅝ in., per 100 lb.....3.50
Spikes, ⅞ in. 3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, ⅞ in. and larger, base, per 100 lb..4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..5.00 to 5.50
Tie plates, per 100 lb.....2.55 to 2.60
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	10½	⅛ to ¼	+11	+9
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1¼	30	13
1 to 3	62	50½			

Lap Weld

2	55	42½	2	23	7
2½ to 6	58	45½	2½ to 3	26	11
7 and 8	56	42½	3½ to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	21½	2 to 3	61	50½
¼ to ⅜	47	30½	½ to ⅝	+19	+54
½	53	42½	¾	21	7
¾	58	47½	⅞	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	52	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	29½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+8
3 in.	40	2 to 2¼ in.	— 2
3½ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes			
Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	22		
Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....38 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼ in. O.D. 10 gage...	20
2-in. O.D. 11 gage....	16	3-in. O.D. 12 gage....	25
2-in. O.D. 10 gage....	17	3-in. O.D. 9 gage....	15
2¼-in. O.D. 12 gage..	17	5½-in. O.D. 9 gage...	55
2¼ in. O.D. 11 gage..	18	6¼-in. O.D. 9 gage...	37

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	25-lb. coating I. C....	$14.90
		25-lb. coating I. C....	16.20
8-lb. coating I. C....	11.30	30-lb. coating I. C....	17.35
12-lb. coating I. C....	12.70	35-lb. coating I. C....	18.35
15-lb. coating I. C....	13.35	40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, No. 22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Manufacturers have pinholing which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.255	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.31	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

St. Louis	$0.43	Pacific Coast	$1.34
Kansas City	0.735	Pac. Coast, ship plates	1.20
Kansas City (pipe)	0.705	Birmingham	0.58
St. Paul	0.60	Memphis	0.56
Omaha	0.735	Jacksonville, all rail	0.70
Omaha (pipe)	0.705	Jacksonville, rail and water	0.415
Denver	1.27	New Orleans	0.67
Denver (pipe)	1.215		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 70,000 lb. and there is an extra charge of 3c. per 100 lb. on carloads of a minimum of 80,000 lb. Cast-iron soil pipe, wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on lower intercoastal lines via the Panama Canal are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, corrugated wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and heavier, 40c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.30
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$117.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.50 to $51.00	$43.00 to $46.00
Maryland	50.00 to 53.00	45.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	48.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 9.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	48.00	
Ground silica clay, per net ton	10.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled, base, per lb.	2.00c. to 2.15c
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅞-in. and ⅝-in., base per 100 lb.	$3.25 to 3.75
Spikes, ⅜-in., base, per 100 lb.	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000	
	S. A. E.	U. S. S
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb
2100*(1½ % Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

STRUCTURAL STEEL BOOKED

July Contracting Practically at Rate of June but Two-thirds That of First Half

WASHINGTON, Aug. 20.—The Department of Commerce announces July sales of fabricated structural steel, based on figures received by the Bureau of Census. Total sales of 113,331 tons were reported for July by firms with a capacity of 224,640 tons per month.

Tonnage booked each month by 175 identical firms, with a capacity of 229,575 tons per month, is shown below, together with the per cent of shop capacity represented by these bookings. For comparative purposes the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month.

1922	Actual Tonnage Booked	Per Cent of Capacity	Computed Total Bookings
April	200,588	87	217,500
May	184,638	81	202,500
June	168,498	73	182,500
July	157,631	69	172,500
August	156,011	68	170,000
September ..	146,146	64	160,000
October	132,450	58	145,000
November ..	111,794	49	122,500
December ..	138,024	60	150,000
1923			
January ...	172,415	75	187,500
February ..	183,938	80	200,000
March	218,997	95	237,500
April	185,385*	81	202,500
May	131,291*	57	142,500
June	116,609**	51	127,500
July	113,331***	50	125,000

*Reported by 174 firms with a capacity of 229,375 tons.
**Reported by 170 firms with a capacity of 228,160 tons.
***Reported by 156 firms with a capacity of 224,640 tons.

Railroads Figure in Structural Awards—Large Increase in Inquiries

With upward of 16,000 tons put under contract, including over 5000 tons for railroads and some 32,500 tons of new inquiries, the past week was a bright one in a relatively dull steel market. About half of the inquiries covered business buildings and dwellings and nearly as many were for school houses and other public buildings. The awards included the following:

Baltimore & Ohio, bridge, 250 tons, to Bethlehem Steel Bridge Corporation; several small bridges totaling 300 tons to Fort Pitt Bridge Works.

Southern Railway, viaduct in Virginia, 300 tons, to Virginia Bridge & Iron Works.

Philadelphia Inquirer, addition to building now under construction, 1000 tons, to American Bridge Co., which also has contract for about 6000 tons for main building.

Crescent Development Co., 500 tons for 50 houses to be built in Astoria, L. I., to unnamed fabricator.

Judd office building, Hartford, Conn., 450 tons, to Levering & Garrigues Co.

Public School No. 74, New York, 1600 tons, to A. E. Norton, Inc.

Chicago, Rock Island & Pacific Railroad, plate girder spans, 2535 tons, to American Bridge Co.

Southern California Edison Co., shop buildings, Alhambra, Cal., 1980 tons, to Llewellyn Iron Works.

Oklahoma Gas & Electric Co., boiler house, Harrah, Okla., 1130 tons, to Kansas City Structural Steel Co.

Ford Motor Co., additional unit for plant at Iron Mountain, Mich., 700 tons, to Worden-Allen Co.

Public school building, Central Avenue and Grace Street, Chicago, 400 tons, to Vierling Steel Works.

Fiber Conduit Co. plant building, Richmond, Ind., 300 tons, to Insley Mfg. Co.

Great Northern Railroad, bridge trestle at Des Lacs, N. D., 920 tons, to Milwaukee Bridge Co.

Louisville & Nashville Railroad, bridge work, 450 tons, to American Bridge Co., and 400 tons, to Mount Vernon Bridge Co.

McCall Publishing Co., printing building, Dayton, Ohio, 500 tons, general contract to Frank Hill Smith, Inc.

Standard Oil Co., power house, Cleveland, 1700 tons, to the Massilon Bridge & Structural Co.

Nickel Plate Railroad, extension to machine shop at Stoney Island, Ill., 150 tons, to Fort Pitt Bridge Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Motor repair shop for City of New York, Avenue C and Sixteenth Street, 1200 tons.

City of New York, four school buildings in Manhattan and Brooklyn, 8000 tons.

Apartment buildings in New York, one on Sixty-seventh Street, 1500 tons; one 655 Park Avenue, 1200 tons; one on Ninety-sixth Street, 700 tons, and one on West Seventy-fourth Street, 700 tons.

American News Co. Building, Varick Street, New York, 400 tons.

Building for Sonn Brothers, New York, 1500 tons.

Roth loft buildings, one of 1200 tons and one of 800 tons both to be built on Thirty-fifth Street, New York.

High school building, Hartford, Conn., 400 tons.

Hillside Coal & Iron Co., coal breaker at Pittston, Pa 1200 tons.

Vanderbilt University, Nashville, Tenn., 400 tons.

Lakeshore Athletic Club Building, Chicago, 4500 tons

Great Northern Railroad, ore docks, Duluth, Minn., 2300 tons.

Elks' Club Building, San Francisco, 1100 tons.

Legislative Building, Olympia, Wash., 1000 tons.

Court house and jail, Cedar Rapids, Iowa, 600 tons.

Certainteed Products Corporation, plaster mill, Grand Rapids, Mich., 300 tons.

Compania Carbonifero De Sabanias, crane runway, Rosita, Mex., 160 tons, bids being taken by Allen & Garcia, engineers, Chicago.

U. S. Engineers' Office, Louisville, Ky., will open bids Sept. 11 for nineteen steel barges, 110 x 26 x 6.5 ft., involving approximately 1500 tons of steel.

Hetch Hetchy water system, San Francisco, several small bridges, 1500 tons.

Great Northern Railroad, bridge work, 400 tons, new bids taken

Masonic Temple, South Bend, Ind., 250 tons, bids taken

RAILROAD EQUIPMENT BUYING

Best Week in Two Months, But Immediate Future Not Promising

Purchases of 1300 cars and contracting for underframes and for general repairing as well as fresh inquiries for repairs and underframes make the past week a bright one in comparison with those of the last two months. Car builders have manufacturing facilities unscheduled for the last month or two of the year, with little promise that the immediate future will see that capacity pre-empted. The chief items of the week are:

New York Central has awarded 500 box car repairs to the Ryan Car Co. and 200 box car repairs to the American Car & Foundry Co.

The Chesapeake & Ohio is in the market for repairs on 1500 cars.

The Pere Marquette is inquiring for 300 to 500 underframes for refrigerator cars, which it will build in its own shops.

Swift & Co., Chicago, is in the market for 100 steel underframes for refrigerator cars.

The Erie is inquiring for 40 suburban coaches.

The Canadian National Railways have awarded 1000 box cars to the Pressed Steel Car Co.

The Pere Marquette has ordered 300 refrigerator cars from the Pressed Steel Car Co.

The New York, Chicago & St. Louis has closed for 100 steel underframes for box cars with the Pressed Steel Car Co

The Long Island Railroad has asked authority of the Interstate Commerce Commission for issuance of $1,710,000 in equipment trust certificates to purchase 40 motor passenger cars, 30 passenger cars, 20 trailers and two combination mail and baggage cars.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
14	14.25	13.75	39.37½	6.70	6.40	6.65	6.30
16	14.25	13.75	39.37½	6.70	6.40	6.70	6.35
17	14.25	13.75	39.25	6.70	6.40	6.80	6.45
18	14.25	13.75	....	6.70	6.40	6.80	6.45
20	14.25	13.75	39.50	6.70	6.40	6.80	6.45
21	14.25	13.75	39.37½	6.70	6.45	6.80	6.45

*Refinery quotation; delivered price ⅛c. higher.

New York

NEW YORK, Aug. 21, 1923.

The markets continue quiet and featureless. Buying of copper has been a little more general but prices are lower. There has been very little activity in the tin market. Lead demand continues light with prices practically unchanged. Zinc is the strongest market and prices are quite a little higher.

Copper.—More buying of electrolytic copper is reported in the past week than in some time but the volume is not large as judged by normally active markets. Several million pounds were sold last week to domestic consumers and there are inquiries in the market for several million more. One seller characterizes the market as sustained by export sales, which have been fairly large recently to both England and France. The combined domestic and export sales have been of such a volume as to encourage copper producers and sellers, and it is believed by many that the present minimum price of 14c., delivered, is close to, if not actually, the bottom on this movement. The statistical position is considered healthy and the undertone, as exemplified by the prospects of consumers, is firm. Lake copper is quoted from 14.25c. to 14.37½c., delivered.

Tin.—The only active day in the Straits tin market the past week was on Aug. 15, on which sales of 300 to 400 tons are reported at 39.25c. to 39.50c. Most of the buying was done by dealers, although some tin plate makers are reported to have participated. On other days the market was dull and featureless. The quotation for spot Straits tin today was 39.37½c., New York, in a very quiet market. In London quotations today were about £4 per ton higher than a week ago, with spot standard quoted at £187, future standard at £188, and spot Straits at £190 10s. The strength of the London market is attributed to speculation and the advance has been based upon relatively small sales, there being no encouragement, because of business done on this side. Arrivals thus far this month have been 4570 tons, with 3902 tons reported afloat.

Lead.—Demand for lead is very moderate, with most of the sales apparently made by independent producers. The metal has sold at 6.45c., St. Louis, where the market is steady, with the New York market quoted at 6.70c. The leading interest continues to quote 6.50c., New York. There is no rush of orders, and there are indications that producers have not much metal for prompt shipment, with some of them sold out for September.

Zinc.—The chief interest in this market centers in the export possibilities, and some sales have already been made for shipment to England, the price there being more nearly in line with the price here, enabling such business to be done. Domestic demand continues very light. Other considerations which have caused the prime western market to advance recently are labor problems in the West, the continued high price of ore and the disinclination of producers to press for sales. Quotations today for prime western for August and September shipment are 6.45c. to 6.50c., St. Louis, and 6.80c. to 6.85c., New York.

Nickel.—Quotations for shot and ingot nickel are still 29c. to 32c. per lb., with electrolytic nickel sold at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c.

Antimony.—The market is somewhat easier with demand slack and wholesale lots of Chinese metal for early delivery quoted at 7.62½, New York, duty paid. Jobbing lots are quoted at 8c. to 8.50c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers, when they can obtain it from foreign producers at 26.50c. to 27c., New York, duty paid. The leading domestic producer continues to keep its quotations unpublished.

Old Metals.—Business is very quiet and values are uncertain. Dealers' selling prices are as follows:

	Cents Per Lb
Copper, heavy and crucible	13.75
Copper, heavy and wire	12.75
Copper, light and bottoms	10.75
Heavy machine composition	10.75
Brass, heavy	7.75
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.75
Lead, tea	4.75
Zinc	4.75

Chicago

Aug. 21.—Copper has receded, while tin and lead have advanced. Copper producers are trying to stimulate sales and for the first time in months are quoting lower than brokers. Both lead and spelter are in a stronger position because of the shutting down of a number of smelters owing to labor trouble. The prices of used metals are unchanged. We quote in carload lots, Lake copper, 14.75c.; tin, 40.50c.; lead, 6.50c.; spelter, 6.30c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c. copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 4.75c.; zinc, 4c.; pewter, No. 1, 20c.; tin foil, 24c.; block tin, 30c.; all buying prices for less than carload lots.

Buffalo Foundry & Machine Co. Acquires Chicago Company

The Buffalo Foundry & Machine Co., builder of the Buflovak and Buflokast vacuum drying and chemical apparatus, has taken over the interests of the Cannon-Swenson Co., Chicago, known to the sugar industry as consulting and contracting engineers. Martin J. Kermer, formerly the chief engineer and general manager of the Cannon-Swenson Co., is to remain in charge of the Chicago office with headquarters at 1636 Monadnock Block, as the accredited representative of the Buffalo Foundry & Machine Co. in the Chicago territory. He has had a wide experience in the field of general and chemical engineering and is regarded as an authority on sugar plant design and operation.

The policy of the Buffalo Foundry & Machine Co. in taking over this company and maintaining a Chicago office has been primarily to afford a closer cooperation with customers located in that territory.

Coke Production in July

WASHINGTON, Aug. 21.—The production of by-product coke improved slightly during July, according to the Geological Survey. The total output is estimated at 3,255,000 net tons, an increase of 89,000 tons over the figures for June. Reports from the 69 plants now in existence show that 64 were active and five were idle. The output from the active plants was 87.1 per cent of the total capacity of all plants.

Unlike by-product coke, the production of beehive coke continued to decline steadily and the output was 1,582,000 tons against 1,755,000 tons in June. This was a decrease of 173,000 tons, or nearly 10 per cent and the rate of production was less than the monthly average in any recent year except 1921 and 1922.

The total output of all coke in July was 4,837,000 tons against 4,921,000 tons in June. Thus it is seen that in spite of the decrease at beehive ovens, the rate of production of all coke exceeds the average monthly rate during the years for which such records are available.

PERSONAL

J. P. Moses of Joseph T. Ryerson & Son, Inc., has been appointed general manager of railroad sales, with offices in Chicago, to succeed H. A. Gray, who has resigned to enter another field of business. Mr. Moses has been with the firm of Joseph T. Ryerson & Son,



J. P. MOSES



H. T. BRADLEY

Inc., for over twenty-two years, and is well known in railway circles. For years he has specialized in a refined iron, known as Ulster Special, used largely by the railroads for staybolt purposes. H. T. Bradley, who has been serving the railroad field for many years in the East, has been appointed manager of Eastern railroad sales, with offices in New York. Mr. Bradley came with the Ryerson company in 1906 and spent a great deal of his time as a sales engineer in its machinery department. For the past seven years, however, he has been associated with the railroad division as assistant manager. Although the Ryerson company sells a complete line of iron and steel products to the railroads, he has concentrated his efforts largely on staybolt iron and special railroad machinery.

Eugene L. Beisel, formerly with the Reeve-Fritts Co., Chicago, has become associated with Charles H. Besly & Co., Chicago, and will further the interests of his company in the States of New York and Pennsylvania, with headquarters at 79 Norwalk Avenue, Buffalo, N. Y.

Robert S. Beecher, formerly manager of the stoneware department of the General Ceramics Co., has been made sales manager for the George F. Hurt Engineering Corporation, New York.

A. E. Tiffault, formerly with the American Sheet & Tin Plate Co., Pittsburgh, and Raymond I. Caspers, formerly with the Illinois Steel Co., have been placed in charge of the Chicago office of the Surplus Steel Exchange., Inc., New York, with quarters at 2257 Oakdale Avenue, Chicago.

E. H. Yetter has been appointed general superintendant of the Zanesville works of the American Rolling Mill Co. He had been employed in the Middletown works of the company for a number of years. In the World War he served as a first lieutenant of infantry and participated in the Piave campaign in Italy.

H. D. Jenkins has been appointed sales representative of the Mahoning Valley Steel Co., manufacturer of steel sheets, Niles, Ohio, with office in the Otis Building, Chicago. Until 1917 he was Western sales manager of the Sandusky Cement Co., with headquarters at Chicago, and since that time has been a manufacturer's agent and steel jobber at Chicago.

William B. Gillies has been named district manager of the Chicago district of the Youngstown Sheet & Tube Co. He was formerly works superintendent of the Indiana Harbor plant of the Steel & Tube Co. of America. In his new capacity he will have charge of the properties at Indiana Harbor, South Chicago, Evanston, Ill., and Kalamazoo, Mich. The other district of the Youngstown Sheet & Tube Co. is the Youngstown district, of which E. T. McCleary, formerly assistant general superintendent, is general manager.

James Holihan, who was for years connected with Frank Briscoe in the Briscoe Mfg. Co., will be in charge of sales at Detroit for the General Accessories Co., Pontiac, Mich., recently organized by Mr. Briscoe.

M. D. Hopkins, who represented the Angelus Sanitary Can Machine Co., Los Angeles, in Middle Western territory, will represent the Max Ams Machine Co., New York, in Chicago after Sept. 1, with headquarters at 20 East Jackson Boulevard.

H. O. Pond has been appointed vice-president and general manager in charge of automobile painting and refinishing of the United Finishing Co., Third and Grand Streets, Hoboken, N. J.

A. L. Kern has resigned his connection with the Richards-Wilcox Mfg. Co., Aurora, Ill., as efficiency and developing engineer. As yet he has not made any definite plans for the future.

F. J. Winder has been made manager of the Pittsburgh district of the Surface Combustion Co., with offices at 927 Union Arcade Building, Pittsburgh. A. J. Euston will have charge of the Buffalo district, with headquarters at 45 Andrews Building, Buffalo.

Hollinshead N. Taylor, president N. & G. Taylor Co., manufacturer of tin plate, Philadelphia, has returned from a motor trip through southwestern England and the Welsh tin plate district.

Guy W. Vaughan has resigned as operating head of the Marlin-Rockwell group and president of Standard Steel & Bearings, Inc., effective Aug. 1, to become interested in other undertakings. He joined the Marlin-Rockwell Corporation two years ago as vice-president and general manager of Standard Steel & Bearings, Inc., and shortly after became vice-president and operating head of the entire group.

James A. Stairs has joined the staff of the Calorizing Co. at the home office, Pittsburgh, to assist in the development of calorized tube recuperators. He was previously associated with E. L. McGary in consulting engineering work and during that time had charge of early installations of open-hearth furnaces and mills for the Sharon Steel Hoop Co., Sharon, Pa. From 1904 to 1909 he was superintendent of rolling mill for the Nova Scotia Steel & Coal Co., New Glasgow, Nova Scotia, and was vice-president and superintendent of the Brown Machine Co., Ltd., at New Glasgow until 1918, when he became general superintendent of the Harroun Motor Corporation, Wayne, Mich.

D. L. Santee has resigned as manager of the Sharon Pressed Steel Co., Sharon, Pa., and will enter business in East Liverpool, Ohio.

John P. O'Connor, associated with E. C. Atkins & Co., Indianapolis, manufacturers of steel saws, at Seattle, Wash., for many years, has been appointed manager of the Seattle branch.

Caleb Davies has been appointed assistant general superintendent of the Republic Iron & Steel Co., Youngstown. He will be assistant to Peter Gordon, general superintendent. He has been superintendent of the company's by-product coke department. R. B. Marshall, previously assistant superintendent of the coke works, has been advanced to superintendent.

Albert W. Zahniser, formerly manager of the schedule department of the Midvale Steel & Ordnance Co., has become connected with the sales department of the Eastern Steel Co. in its office in the Pennsylvania Building, Philadelphia.

J. F. Hinterleiter has been appointed manager of the coal department of the Debevoise-Anderson Co., New York.

OBITUARY

FREDERICK N. BEEGLE, president Union Drawn Steel Co. and the Standard Gauge Steel Co., Beaver Falls, Pa., died at the Beaver Valley General Hospital, New Brighton, Pa., Aug. 17. He was taken sick on Tuesday, Aug. 14, complaining of a severe pain in his side. Pneumonia later developed and was the immediate cause of his death. Mr. Beegle was born in Millersburg, Ohio, May 21, 1860, and went to Beaver Falls in 1880 to enter the employ of the Hartman Steel Co., which later was absorbed by the Carnegie Steel Co. In 1899 he became associated with the Union Drawn Steel Co. as assistant superintendent and moved up to the head of that company. When the Union Drawn Steel Co. took over the Standard Gauge Steel Co. a few months ago Mr. Beegle became president of that company. He was president of the Beaver County Clay Co., Beaver Falls; vice-president of the First National Bank, Beaver Falls; a director of the Bank of Pittsburgh, Pittsburgh; a member of the board of trustees of the Beaver County Home for the Aged and the Beaver County Children's Home, and was a member of the Beaver Valley Country and Tamaqua clubs, Beaver Falls, and the Duquesne and Americus clubs, Pittsburgh. He is survived by Mrs. Beegle and one son, Clifford Beegle, who is connected with the Union Drawn Steel Co.



F. N. BEEGLE

THOMAS ELLIS BROWN, for 27 years chief engineer of the Otis Elevator Co. and for the last 10 years chief consulting engineer of the company, died suddenly of heart disease at Morristown, N. J., Aug. 15. He was born in New York 67 years ago. He attended the School of Mines, Columbia University, and was assistant to Professor Fhunk on railroad and topographic surveys. Subsequently he was assistant engineer on New York elevated railroad structures and had charge of design and construction of the Ninth Avenue elevated structure. The original elevator in the Eiffel Tower was designed by Mr. Brown. He developed high-speed elevators, designed several incline railways and perfected the Brown Bascule or movable bridge. At the time of his death he was active in the Century and Engineers' clubs, New York, the American Institute of Consulting Engineers and the American Institute of Mining and Metallurgical Engineers.

WILLIAM D. SWAN, for 37 years general superintendent of the American Tube Works, Somerville, Mass., died Aug. 17 at his home in Swampscott, Mass. He was born in Acton, Mass., Nov. 2, 1851.

WILLIAM WILLIAMS, works manager of the mills of Interstate Iron & Steel Co. at East Chicago, Ind., died following an apoplectic stroke at his home, Aug. 20.

The Champion Engineering Co., Kenton, Ohio, builder of electric overhead cranes, a controlling interest in which was held by the Dollings Co., Columbus, Ohio, has been forced by the failure of the holding company to close down permanently. It is reported that the orders on which the Champion company had begun work have been taken over by a well-known crane builder for completion.

A competitive examination for an assistant Patent Office examiner is to be held Oct. 4, 5 and 6 by the United States Civil Service Commission, Washington.

Middle Man Service in Contract Work

The placing of contract work for certain kinds of manufactured metal products is only an occasional occurrence for the average organization, and often there is difficulty in finding those shops which can do the work best and most economically. Sources of information in published lists and catalogs are, as a rule, of a general character and do not indicate the nature of the equipment contained in a plant or specifically the kind of work for which it is best adapted. An organization may be listed as "machinist and founder," but this will not indicate to the prospective purchaser whether the company undertakes large or small work, or its capacity, or the current condition of its bookings.

Believing that there is a place in the metal industry for a broker who will bring together the buyer and seller of contract work, the H. M. Harper Co., First National Bank Building, Chicago, started business early last spring. At first it operated as an unincorporated organization, but recently has taken out a corporate charter. The company keeps in touch with a large number of manufacturers in the metal industry. The character of the equipment and the facilities of each are catalogued, and in addition the organization has become familiar with the managements of these companies and the kind of work they are best fitted to undertake. By continuously keeping in touch with this clientele, definite knowledge is obtained as to the deliveries and prices available on various classes of work.

That there is a place for service of this character is indicated by the company's experience up to date. Inquiries and orders received have come from companies with ratings averaging $500,000. Although the Harper company is located in Chicago, as many inquiries have been received east of Lake Erie as west. All prices quoted to the buyer are net from factory. The commission obtained by the Harper company is paid by the manufacturer obtaining the business. H. M. Harper, organizer of the company, has been engaged for several years in the manufacturing end of the metal industry.

For the Foundrymen's Meeting at Paris

Indications are that the delegation of American foundrymen and representatives of foundry equipment firms in attendance at the Paris convention of Sept. 12 to 15 will number 25 persons. In addition to the names already given in THE IRON AGE, the following appear on the list most recently compiled: C. Earnill, assistant superintendent Fay & Scott, Dexter, Me.; L. Sexton Lehmann, S. B. Sexton Stove & Mfg. Co., Baltimore; W. E. Dunn, Jr., secretary Southern Metals Trades Association, Atlanta, Ga.; W. H. Nicholls, president W. H. Nicholls Co., Inc., Brooklyn; James Linklater, superintendent Michigan Malleable Iron Co., Detroit; Robert E. Turnbull, Chicago representative Arcade Mfg. Co., Freeport, Ill.; August Van Lantschoot, metallurgist, Iowa Malleable Iron Co., Fairfield, Iowa; Peter J. Krentz, works manager, Buffalo Foundry & Machine Co., Buffalo; George H. Kramer; Ralph H. West, West Steel Casting Co., Cleveland.

Sheet Sales Lowest in Eighteen Months

PITTSBURGH, Aug. 21.—Dependence of customers of independent sheet makers upon deliveries on old orders rather than upon fresh purchases is well illustrated in the monthly report of the National Association of Sheet and Tin Plate Manufacturers for July. This report shows total sales for July of 92,358 net tons, the smallest tonnage booked in relation to capacity for any month since January, 1922. Sales for July were about 80,000 tons less than those for June and 150,000 tons less than those of May. Shipments last month exceeded sales by about 100,000 tons and there was a like reduction in the unfilled orders. Net obligations of those makers reporting as of Aug. 1 were given as 263,738 tons.

JAPAN BUYS RAILS

Eleven Thousand Tons Awarded to Leading Independent—Frog and Switch Inquiries—Tin Plate for Japan

NEW YORK, Aug. 21.—Foreign inquiry continues active, particularly from Far Eastern markets, but the volume of actual business transacted, except from Government sources, is still small. The extended deliveries now being offered by United Kingdom mills on light gage black sheets have undoubtedly turned many inquiries for this product back to the American market, but quotations of American sellers are not much better than the British offers, with the leading interest out of the market for export and prices several dollars per ton higher.

The demand for wire rods continues active, but much of this business is reported going to foreign sellers, particularly to Canada. China is still looking for wire shorts and has inquired for some small lots of tin plate. Welsh tin plate makers continue to book orders in the Japanese market. The latest purchase of the Nippon Oil Co. totaled 60,000 boxes of tin plate, awarded to Iwai & Co., of which 40,000 boxes is understood to have been placed with an American independent interest and 20,000 boxes with a British maker. A number of small inquiries, ranging from 500 to 1000 boxes or more, are reported current.

Iwai & Co. also were awarded the contract on the 11,160 tons of 60 and 75-lb. rails and splice bars purchased by the Imperial Government Railways, bids on which opened Aug. 15, and is understood to have placed the business with the leading independent interest in this country. The Imperial Government Railways are receiving bids on another tender for rails, calling for about 1100 tons of special lengths, 65 and 100-lb. sections, bids on which opened Aug. 20.

Purchase of 30 sets of manganese steel frogs and switches included in a tender issued by Osaka municipality, is reported to have been postponed on the ground that bids submitted were too high. The South Manchuria Railway Co. will open bids on Sept. 8 on 130 sets of manganese steel frogs and switches. Additional business in this equipment is in prospect from the Chilian State Railways with New York office at 141 Broadway. Specifications on about 40 manganese steel crossings will be issued through the New York office in about a week. The State railroad shops are equipped to fabricate the switches in Chile.

An inquiry upon which bids have been submitted by a few Japanese export houses is from Dai Nippon Sato Boeki Kaisha (Nippon Sugar Refining Co.), Tokio, Japan, and calls for about 2000 tons of structural steel for a new sugar refinery.

FRENCH MARKET STEADY

Prices Unchanged, with Few Concessions Reported —Ruhr Coke Receipts Improve Slightly

PARIS, FRANCE, Aug. 6.—The market in France continues steady. There has been but little activity in inquiry from the domestic market, although a slight improvement is generally reported. Prices have not been increased. Pig iron continues firm, with no prospect of concession. Export business has been satisfactory as a result of the depreciation of the franc, but, on the other hand, manufacturers are paying a higher price for imported raw materials.

Coke.—As was foreseen, only 70,000 tons of Ruhr coke was received in July, against 161,000 tons in June. Since the last days of July and the beginning of August, however, arrivals have been better and from Aug. 1 to 6 about 25,000 tons of coke have been received. If this increase continues it is hoped to avoid any further purchasing of British and American cokes.

The occupation authorities have decided to resume operation of certain ovens abandoned by the Germans, as sufficient supplies of coking smalls and labor are assured. If supplies from the Ruhr continue at the same rate as last week it is hoped that an increase in price for September will be avoided.

Iron Ores.—Normal movement of iron ores has not been resumed and there are still considerable stocks to be utilized. Prices are as follows: Thionville, 12.50 fr.; Briey, 15 to 16 fr.; Longwy, silicous, 11.50 to 12 fr.; Normandy iron ore, 35 fr.; and hematite of the Pyrenees, 30 to 32 fr.

Pig Iron.—In an effort to accumulate stock to tide over a shortage, buyers are placing deferred shipment orders. Inquiry for immediate consumption is small. Prices are firm, No. 3 P.L. chill cast foundry iron, 2½ to 3 per cent silicon, is quoted at 390 to 395 fr., according to tonnage, and 10 fr. lower for the P. R. Pig iron, 3 to 3½ per cent silicon, is quoted at 400 fr. The Association Cooperative des Fondeurs has established its price for July at 380.70 fr. per ton, against 373.55 fr. in June. For export Lorraine works have quoted casting pig iron at 395 to 400 fr. per ton and basic Bessemer iron at 385 to 390 fr., f.o.b. Antwerp.

On July 1, 106 blast furnaces were actively in blast in France, including 71 in the East and Lorraine areas, compared with:

January	116
February	90
April	75
May	85
June	99

Of the remaining furnaces 48 are being repaired and 64 are in condition to be blown in. The total output of pig iron in June amounted to 447,000 metric tons, of which 152,000 tons was from Lorraine. The June output showed an improvement of 54,000 tons over May, but a deficiency of about 66,000 tons from December, 1922.

Semi-Finished Steel.—Mills are well booked for two months in advance. Lorraine prices are about equal to those of the Nord and Pas-de-Calais, especially in basic steel. Export has been good lately. Prices have been increased again and basic material is quoted as follows per 100 kg.:

	Fr. Domestic	Fr. f.o.b. Antwerp
Ingots	48 to 49	
Blooms	49 to 53	50 to 52
Billets	53 to 57	53 to 55
Largets	58 to 60	56 to 57

In June a total of 427,000 metric tons of steel was produced, including 139,000 tons from Lorraine. This included 417,000 metric tons of ingots and 10,500 metric tons of castings. The June output was 39,000 tons higher than that of May and 13,000 tons lower than that of December, 1923.

Rails.—As some rolling mills are operating again, an increase in production is noticed, and a decline in price is expected. A mill in the Northeast recently quoted 513 fr. per ton on a tonnage of standard rails.

Rolled Steel Products.—There is a good current of orders and prices are steady, although slight concessions are still being made, as in a recent order for 100 tons placed at 55 fr. per 100 kg. Bars are quoted at 63 to 64 fr. in the North, round iron at 61 fr. in the East, and plates at 62 to 63 fr. In Lorraine, the base price ranges from 57 to 62 fr. per 100 kg. For export Lorraine steel products are quoted at about 610 fr. per metric ton (French currency). Hoops are being quoted at 80 to 82 fr., at mills, in the East and wire rods at 74 to 76 fr. per 100 kg.

Sheets.—Business is quiet and prices remain on the same level. Heavy plates are quoted for domestic consumption at 64 to 66 fr. per 100 kg.; heavy sheets at 65 to 70 fr.; medium sheets at 75 to 80 fr., and light sheets at 93 to 97 fr. per kg.

Iron and Steel Tubing.—Since the war France has become a larger producer of iron and steel tubing, and controls 60 per cent of the Mannesmann Works Co. in the Sarre. An active campaign has been instituted urging the substitution of iron and steel pipe for cast iron and non-ferrous metal tubing. For export, there has been active business lately, especially with South American countries.

Machinery Markets and News of the Works

PERE MARQUETTE BUYS

Michigan Road Places Large Orders for Machine-Tool Equipment

Buying by Industrial Companies Remains Exceedingly Light in All Sections

The Pere Marquette Railroad has closed for a considerable number of machine tools for its shops in Michigan. The orders were placed last week at Detroit. One Eastern machine-tool company received an order for 18 large machines and a number of small tools. It is believed the road's purchases will total $200,000 or more.

The Elgin, Joliet and Eastern Railroad has completed its buying at Chicago, its whole list costing in the neighborhood of $100,000. The Central Railroad of New Jersey has authorized the purchase of a dozen or more tools recently inquired for and orders are expected shortly. The Baltimore & Ohio is preparing a list of tools, which will probably be sent out for bids soon. Several tools are being inquired for by the American Locomotive Co.

These are the high spots of railroad purchasing, which continues as the most important feature of machine-tool activity. Industrial companies are buying very little, and present indications are that August will be the poorest month of the year so far for many machine-tool dealers and builders.

The number of inquiries now being quoted on is not large, but a good deal of the business in prospect promises to develop into orders in September, and from this the trade takes some encouragement that a slightly better demand may be expected in the fall.

New York

NEW YORK, Aug. 21.

RAILROAD business continues as the only outstanding feature of Eastern machine tool markets. An Eastern machine tool builder has received an order from the Pere Marquette Railroad for the following machines: Three 5-ft. radial drills, one rod borer, one 42-in. vertical milling machine, one 36-in. slab milling machine, one 53-in. boring and turning mill, one 44-in. boring and turning mill, one 36-in. planer, one 100-in. tire boring and turning mill, one locomotive axle journal turning lathe, one 1500-lb. steam hammer, one of 2500 lb. and another of 6000 lb. capacity, three axle lathes, one plate flanging clamp. There were also a number of smaller machines, such as lathes, milling machines and shapers. The Baltimore & Ohio Railroad, it is reported in the trade, will soon issue a fairly large inquiry for tools and the Central Railroad of New Jersey is expected to send out orders within a week or so for the machines it recently inquired for, formal approval of the purchase having been made by the officials of the road. The demand for tools by industrial companies continues light in volume.

The New York Central Railroad Co., C. S. White, Room 344, 466 Lexington Avenue, purchasing agent, will receive bids until Aug. 30 for one 20,000-kw. turbo-generator and surface condenser for installation at the Port Morris power station, as specified in serial contract No. 24—1923.

The American Ammunition Co., Mosler Building, Guadalajara, Jallsco, Mexico, has inquiries out for machinery for making brass shells for various kinds of ammunition; also, the company is in the market for cartridge-loading machinery.

The Wheeler Salvage Co., 224 Bush Street, Brooklyn, has inquiries out for pumping equipment for fuel oil service; also, for steel tanks to operate at 100-lb. pressure.

Ovens, power equipment, conveying apparatus and other mechanical equipment will be installed in the new baking plant to be erected at 506-10 East Seventy-sixth Street, New York, by the Fink Bread Co., 438 East Seventy-second Street, estimated to cost $85,000. L. S. Beardsley, 116 West Thirty-ninth Street, is architect.

Fire destroyed a portion of the plant of the Panther Motor Co., Inc., 481 Vernon Avenue, Long Island City, with loss estimated at $300,000, including equipment. It is planned to rebuild.

The Seneca Copper Corporation, 120 Broadway, New York, operating properties in Keweenaw County, Mich., has arranged for a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and improvements. A merger has been perfected with the Gratiot Mining Co., with plant in the same district, under the Seneca name. Thomas F. Cole is president.

Bids will soon be asked by the Department of Works, Borough of Richmond, Borough Hall, West New Brighton, for the construction of an automobile service and machine repair shop on the Clove Road, near Castleton Avenue, for municipal motor trucks and cars.

The International General Electric Co., 120 Broadway, New York, has taken a contract from the Paulista Railway, Brazil, for the electrification of 38 miles of line at a cost of $1,000,000, including equipment, completing the system from Tatu to Jundiahy, about 63 miles.

The Board of Water Supply, Mount Vernon, N. Y., has acquired property at Oak and North West Streets, West Mount Vernon, heretofore used as a factory site, and plans for the installation of a new electrically operated pumping plant for booster service for the municipal waterworks.

Electric power equipment, conveying machinery and other mechanical equipment will be installed in the four-story distributing plant to be erected on Third Avenue, Brooklyn, by the Borden's Farm Products Co., 110 Hudson Street, New York, estimated to cost $350,000, with machinery.

Fire, Aug. 12, destroyed two mechanical repair shops at the West Albany, N. Y., yards of the New York Central Railroad Co., Grand Central Terminal, New York, with loss estimated at $70,000, including equipment. It is proposed to rebuild.

The Saranac River Power Corporation, Plattsburg, N. Y., recently formed with an active capital of $200,000, plans for the construction of a power plant and steel tower transmission system for neighboring service. The company is headed by C. H. Allen and A. J. Eckert. Dunmore Ferrus & Dewey, Utica, N. Y., are representatives.

The Cities Service Co., 60 Wall Street, New York, has acquired the plants and properties of the Citizens' Light & Power Co. and the Lenawee Gas & Electric Co., both operating in the vicinity of Adrian, Mich., for a consideration stated at $1,000,000. Plans are being arranged to merge the properties, including extensions and improvements for greater capacity.

The Empresas Electricas Asociadas of Lima, Peru, has disposed of bonds in an amount of about $7,000,000, a large portion of the proceeds to be used for extensions and improvements in the local light and power plants and system, including the installation of additional generating machinery and auxiliary equipment.

The Thew Shovel Co., 30 Church Street, New York, with headquarters at Lorain, Ohio, manufacturer of gasoline and electric power excavating shovels, is arranging an expansion program at its plant, to include the acquisition of additional property for the erection of new buildings.

The Nassau Smelting & Refining Works, Ltd., 603 West Twenty-ninth Street, New York, has awarded contract for the erection of a new plant at Tottenville, S. I., to cost in excess of $50,000.

The State Government, Bolivia, South America, is planning for the construction of locomotive and car repair shops in connection with the building of a new standard gage rail-

The Crane Market

PRICE seems to be the question of paramount importance in sales of both overhead and locomotive cranes. Competition is extremely keen and purchasing has slackened somewhat. A fair volume of business is still pending. The order of the Brooklyn Edison Co., Brooklyn, N. Y., for a 25-ton overhead traveling crane was probably placed this week and the two 15-ton special overhead cranes for the Railway Steel Spring Co., 30 Church Street, New York, is also reported closed.

Among current inquiries is one from Okura & Co., 50 Church Street, New York, for a 105-ton, 49-ft. span, 4-motor overhead traveling crane with 20-ton auxiliary for export to Japan. The New Jersey Zinc Co., Chrome, N. J., is receiving bids on an 8000-lb. monorail hoist. The Fitzgibbons Boiler Co., 47 West Forty-second Street, which originally inquired for a 20-ton, 23-ft. 8-in. span electric traveling crane, either new or used, and later reduced the specifications to a 15-ton crane, has revised its inquiry to a standard 10-ton, 23-ft. 8-in. span electric traveling crane. The General Electric Co., Schenectady, N. Y., is considering revised prices on two 10-ton overhead cranes inquired for several weeks ago and postponed at the time to await the necessary appropriation.

One of the large locomotive crane inquiries still pending is that of the American Telephone & Telegraph Co., New York, for three locomotive cranes of 15 to 20 tons capacity. In the bids on a 15-ton, 55-ft. span, 4-motor, overhead traveling crane, opened Aug. 15 by the United States Bureau of Yards and Docks, for Puget Sound Navy Yard, the Pawling & Harnischfeger Co. is reported as low bidder. The 31 small single I-beam hand-power cranes recently inquired for by a Japanese buyer are reported to have been placed with Herbert Morris in England. Among recent purchases are:

Isbell-Porter Co., 46 Bridge Street, Newark, N. J., a 20-ton locomotive crane for the Iroquois Gas Co., Buffalo, N. Y., from the Brown Hoisting Machinery Co.

E. R. Clark Management Corporation, Columbus, Ohio, a 50-ton, 50-ft. span, 3-motor overhead crane for the Tennessee Utilities Corporation, from the Cleveland Crane & Engineering Co.

Pennsylvania Railroad, Philadelphia, Pa., eastern region, eleven 1000-lb. and one 2000-lb. electric pillar cranes and twenty 1000-lb. and one 2000-lb. electric jib cranes, from the Whiting Corporation.

American-La France Fire Engine Co., Elmira, N. Y., a 10-ton, 17-ft. 3½-in. span electric traveling crane, from the Bedford Foundry & Machine Co., through Philip T. King, 30 Church Street, New York.

Chesapeake & Ohio Railway Co., Richmond, Va., a 20-ton locomotive crane, from the Industrial Works.

American Brake Shoe & Foundry Co., West Mahwah, N. J., a 20-ton locomotive crane, from an unnamed builder.

Warren Webster & Co., Camden, N. J., a 20-ton and a 1½-ton hand power cranes and a 3-ton electric traveling crane, from Maris Brothers.

Electric Power & Equipment Co., Philadelphia, a 1-ton, double I-beam crane with electric hoist, from Maris Brothers.

John Robertson & Co., Brooklyn, N. Y., a 25-ton electric hoist to operate on a double I-beam crane.

Indiana Electric Co., Indianapolis, Ind., a 30-ton, 30-ft. span overhead traveling crane and a 20-ton stationary hoist for power station service, from the Northern Engineering Works.

Studebaker Corporation, Detroit, Mich., a 4-ton electric transfer crane, from the Northern Engineering Works.

Steel Car Forge Co., Ellwood City, Pa., a 10-ton, 80-ft. span crane, from the Shaw Electric Crane Co.

Illinois Electric Power Co., a 75-ton, 4-motor, overhead traveling crane for Peoria, Ill., from the Whiting Corporation.

road from Cartagena to a connection with an existing line at Antioquia, about 300 miles. American equipment will be used, as well as American contractors for the construction of the road. Alfred L. Cameron, 49 Garden Place, Brooklyn, N. Y., attorney, is acting as local representative for the project.

The Board of Education, Asbury Park, N. J., is planning for the establishment of a vocational training school, in cooperation with the State Board of Institutions and Agencies, Bureau of Vocational Training, Trenton. It is proposed to use existing school property and have the department ready for service in October. The State Board also has tentative plans for the installation of vocational departments in present schools at Long Branch and Red Bank.

The Public Service Electric Corporation, Public Service Terminal, Newark, is awarding contracts for primary equipment for its new generating plant on the Hackensack River, Kearny, N. J., to cost in excess of $10,000,000, and will place orders for miscellaneous electrical and mechanical equipment in the near future. Fifteen watertube boilers, each with capacity of 2300 hp., will be furnished by the Babcock & Wilcox Co., Bayonne, N. J.; nine fifteen-retort stokers have been ordered from the Sanford-Riley Stoker Co., Worcester, Mass., and six sixteen-retort stokers from the American Engineering Co., Philadelphia; two surface condensers, totaling 50,000 sq. ft. surface, will be supplied by the Allis-Chalmers Co., Milwaukee, which will also furnish eighteen 15,000-kva., 132-volt power transformers. The power station will be built by the Public Service Production Co., an affiliated organization. N. A. Carle is chief engineer, in charge of purchases.

Officials of the Lehigh Coal & Navigation Co., 437 Chestnut Street, Philadelphia, have organized a subsidiary to construct and operate a new plant at Perth Amboy, N. J., for the manufacture of anthracite coke for domestic service. A tract of 15 acres of land has been purchased, adjoining the works of the National Fireproofing Co., on the Raritan River, and work will commence on the initial plant unit, to cost in excess of $50,000, with machinery. It is expected to be ready for operation in November. A power house will be built.

The New York Terminal Co., New York, recently organized under Delaware laws, Henry J. Hemmens, 64 Wall Street, representative, has tendered a proposition to the Board of City Commissioners, Bayonne, N. J., for the construction of an industrial and marine terminal on local waterfront property, extending from the plant of the American Radiator Co., Forty-ninth Street, to that of the Standard Oil Co., about one mile. The application states the ultimate cost as $150,000,000, including industrial buildings and warehouses, power plant, docks, loading machinery, traveling cranes and other mechanical equipment. It is purposed to complete the project in five years. A special meeting of the commissioners will be held on Sept. 11 to consider the proposal.

The Associated Utilities Co., care of William Braun & Co., 30 Church Street, New York, engineers, will take bids for the erection of its proposed new ice manufacturing and cold storage plant at Newark, comprising an eight-story structure, 105 x 165 ft., to cost $1,000,000, with machinery. John Decker, 19 Ridgewood Avenue, West Orange, N. J., is architect.

The Vreeland Motor Co., Inc., Chestnut Street, Hillside, Newark, manufacturer of motor trucks and buses, is arranging an expansion program for extensive increased production. E. E. Vreeland is president.

The Herdman Motor Co., 313 Central Avenue, Newark, will install a machine repair and service works on the second floor of the two-story building at Central Avenue and Hudson Street, recently leased for expansion.

The New York Edison Co., Irving Place and Fifteenth Street, New York, has plans for a three-story power house, 41 x 200 ft., at 27 West Forty-seventh Street, estimated to cost $190,000. William Whitehill, 709 Sixth Avenue, is architect.

New England

BOSTON, Aug. 21.

THE improvement in machine tool sales in this territory, noted last week, proved to be a flash in the pan, the market having settled back into an inactive condition. Most machine tool dealers look for no notable improvement this month, but do anticipate increased business in September. This belief is based on intimations made by prospects that business under negotiation may be closed next month. Of the business put through last week, the purchase of a 36-in. Gray planer and a 400-ton Ryerson wheel press by the Central Vermont Railroad is the most important. The Rutland Railroad in all probability will purchase some shop equipment next month, but its appropriation, it is understood, has been somewhat reduced. Other New

England railroad prospects have become inactive. A 14-in. vertical surface grinder to a Massachusetts maker of textile machinery, a small punch and shear to a steel mill, a high speed upright drill to a South Boston concern, a used No. 2 power press and a used Milwaukee milling machine to a Reading, Mass., shop are illustrative of the minor importance of current business. Gray & Davis, Inc., Cambridge, Mass., automobile accessories, is about to close on three or four milling machines, and is negotiating on lathe equipment. The small tool business holds up remarkably well.

The J. N. Lapointe Co., New London, Conn., broaching machines and broaches, is operating overtime, including Sundays, and several other New England machine tool builders have sufficient business on their books to keep plants operating at capacity for several weeks. New business, however, is light.

The Underwood Machinery Co., 110 Mt. Vernon Street, Boston, has been awarded contract for a coal handling system to be erected by the Boston Elevated Railway at Everett, Mass.

No date has been set for bids to close on a proposed one-story, 52 x 100-ft. manufacturing plant and warehouse to be erected by the Acme Mfg. Co., South Main Street, Bangor, Me., pipe clamps, etc.

Battery, operating and machine rooms constitute the four-story, 57 x 64-ft. addition to sub-station No. 12, Chatham Street, Boston, being erected for the Edison Electric Illuminating Co., 39 Boylston Street, Boston.

The City of Boston has under consideration two plans for enlarging the Mechanic Arts High School, Belvidere Street. One plan involves taking occupied land by eminent domain and the other building on Dalton Street vacant land. In either case various workshops will be provided and additional metal working equipment will be needed. The purchase of the latter will not be made for several months.

The State of Connecticut will shortly start the erection of a two-story, 50 x 90-ft. manufacturing plant at the Connecticut State Prison, Wethersfield, which will contain a machine shop.

The Thin Sheet Metals Co., Railroad Hill Street, Waterbury, Conn., has awarded to Tracy Brothers' Co., that city, a contract for the erection of a 25 x 62-ft. mill addition.

The Supply Officer, United States Navy, Newport, R. I., will take bids at once for one electric hardening furnace, ordnance requisition 9-1924.

Contract has been let by the French Worsted Co., Woonsocket, R. I., to O. D. Purington & Co., Providence, R. I., for the erection of a new two-story machine shop at its mill, to be equipped for textile machinery repairs and parts manufacture. Walter F. Fontaine, Woonsocket, is architect.

The Connecticut Foundry Co., Rocky Hill, Conn., has awarded a contract to Charles P. Waterman, Inc., for the erection of a new addition, 20 x 30 ft., to be equipped for cupola service.

The New England Power Co., 50 Congress Street, Boston, is arranging an appropriation of about $10,000,000 for extensions and improvements, to include the construction of a large electric generating plant at Davis Bridge, near Whitingham, Vt.

Manual training equipment will be installed in the new three-story high school addition to be erected at Lewiston, Me., estimated to cost $100,000, for which bids have been called on a general contract. H. S. Coombs, 11 Lisbon Street, is architect.

The State Prison Department, Hartford, Conn., has plans in preparation for the construction of a two-story building 50 x 90 ft., at the state prison, Wethersfield. It will be equipped as a machine shop and for other mechanical service. Buck & Sheldon, Inc., 60 Prospect Street, Hartford, is architect and engineer.

The Danbury & Bethel Gas & Electric Light Co., Danbury, Conn., will issue bonds for $600,000, a portion of the proceeds to be used for extensions in electric generating plants and system. The property is operated by Henry L. Doherty & Co., 60 Wall Street, New York, Henry L. Doherty, president.

The Magee Furnace Co., Taunton, Mass., manufacturer of furnaces and stoves, plans for the installation of a press for sheet metal work, about one-ton capacity.

The Shawmut Engineering Co., 24 Milk Street, Boston, will commence the erection of a new one-story mechanical shop at the rear of 185 Freeport Street, estimated to cost $22,000.

A one-story power house will be erected by the board of directors, Woonsocket Hospital, E. Harris Rathbun, president, 115 Cass Avenue, Woonsocket, R. I., in connection with a new three-story and basement hospital addition. K. Taylor & Co., 142 Berkeley Street, Boston, are architects.

The F. W. Mann Co., Inc., Milford, Mass., manufacturer of automobile jacks, etc., recently acquired by new interests, has been reorganized, and has plans under consideration for expansion. James R. Kimball has been elected president; L. M. Vesey, vice-president; Philip S. Kimball, treasurer, and Walter B. McFarland, secretary.

The Bridgeport Hardware Mfg. Corporation, Iranistan Avenue, Bridgeport, Conn., has filed plans for the erection of a one-story addition.

G. N. Lawson, 242 Freeport Street, Dorchester, Mass., operating a boat-building plant, is planning for the installation of a surface planer, 18 or 20 in.

Manual training equipment will be installed in the new two-story East Side high school to be erected at Boston and Central Avenues, Bridgeport, Conn., estimated to cost $500,000, for which bids will be asked on a general contract early in September. E. B. Caldwell, Jr., 886 Main Street, is architect.

The Parker Wire Goods Co., Washington and Lamartine Streets, Worcester, Mass., purposes to develop a metal-stamping business, in connection with its regular standard and special wire goods production, and has enlarged the stamping department for immediate requirements. The new plant, recently completed, is now in operation and will be advanced to maximum output.

The Moore Drop Forging Co., Fisk Avenue, Springfield, Mass., has awarded a contract to the Adams & Ruxton Construction Co., Springfield, for extensions and improvements in its local plant.

Philadelphia

PHILADELPHIA, Aug. 21.

CONTRACT has been let by the Parsons Specialty & Machine Works, Hancock Street, Philadelphia, to the George Kessler Contracting Co., 1733 North Marvine Street, for the erection of a new one-story plant on Courtland Street, near Fifth Street, estimated to cost $23,000.

C. M. Roswell, 1162 Marlin Road, Philadelphia, machinery dealer, has inquiries out for one steam turbine-generator, 300 to 500 kw., 150 to 175 lb. steam pressure, with condenser and accessories; also for two or three transformers, 25,000-volt high to 380-volt low tension, to operate 500 kw. rotary converter.

A one-story power house will be constructed at the new plant of the Colonial Knitting Mills, Inc., Clearfield and B Streets, Philadelphia, to cost about $200,000, for which a general contract has been let to the Austin Co., Jefferson Building.

The Adams & Westlake Co., Philadelphia, manufacturer of hardware products, has taken title to the four-story factory property at 2214-26 West Ontario Street, heretofore held by the Adlake Co., for a consideration of $154,500.

The Steel Heddle Mfg. Co., Twenty-first Street and Allegheny Avenue, Philadelphia, manufacturer of steel heddles for textile looms, etc., has tentative plans for enlargements at its local plant, to include the installation of additional equipment. Work will commence on the proposed new branch plant at Greenville, S. C., for which plans recently were drawn, estimated to cost $100,000 with machinery.

John M. Greene, Drexel Building, Philadelphia, has inquiries out for one 48 in. x 14 ft. horizontal return tubular boiler, with auxiliary equipment, to operate at 80 lb. pressure.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until Sept. 4 for 2000 high compression pistons and miscellaneous spare parts for Liberty engines, for use at the naval aircraft plant, Philadelphia, schedule 1224.

The Budd Mfg. Co., Twenty-eighth Street and Hunting Park Avenue, Philadelphia, manufacturer of steel automobile bodies, is said to be planning for the installation of a number of traveling cranes in its new six-story addition, 100 x 325 ft., for which bids on a general contract have been asked. The Ballinger Co., Tweifth and Chestnut Streets, is architect.

The Public Ledger Co., Independence Square, Philadelphia, has awarded a contract to Doyle & Co., 1519 Sansom Street, for the erection of a one-story service and machine repair building for company motor trucks and cars at 1214-16 North Twenty-sixth Street, to cost about $23,000.

Elevating and conveying machinery, power equipment and other mechanical equipment will be installed in the eight-story warehouse and distributing plant to be erected by the Terminal Warehouse & Transfer Co., Green Street and Delaware Avenue, Philadelphia, at Front and Brown Streets, to cost $300,000, for which a general contract has been let to the Turner Construction Co., 1713 Sansom Street.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Monterey, Mexico, for American machinery for the manufacture of

door butts, door bolts, etc.; also, from a concern at Bucharest, Rumania, for caterpillar road tractors or other models of tractors for heavy transportation on poor roads; from a company at Diember, Dutch East Indies, for American brass cloth; and from a company at San Juan, Porto Rico, which desires to get in touch with American manufacturers of tungsten filament lamps.

The Cattie Brothers Corporation, 2115 Vine Street, Philadelphia, manufacturer of galvanized metal products and operating a general galvanizing works, has acquired the one-story factory at 1712-26 North Ninth Street, for a consideration of $31,500, for a new plant.

Manual training equipment will be installed in the new three-story junior high school to be erected at Twelfth Street and Pennsylvania Avenue, North Wildwood, N. J., estimated to cost $130,000, for which bids will soon be called on revised plans. H. Rex Stackhouse, 1120 Locust Street, Philadelphia, is architect.

The York Gas Co., York, Pa., will install additional machinery at its plant to increase the capacity from 2,300,000 to 5,300,000 cu. ft. per 24 hr.

The Glen Alden Coal Co., Jefferson Avenue and Mulberry Street, Scranton, Pa., has plans for the erection of a one-story hoisting plant, 54 x 97 ft., estimated to cost $60,000 with machinery. W. W. Ingils is president.

The Davis-Murray Motor Co., 1921 Union Avenue, Altoona, Pa., is planning for the erection of a one-story service and repair building, 25 x 100 ft., in connection with new local headquarters, estimated to cost $100,000. J. R. Davis is president.

Fire, Aug. 10, destroyed a portion of the plant of the Pittston Stove Works, William Street, Pittston, Pa., with loss estimated at $30,000. It is planned to rebuild.

Officials of the Bethlehem Fabricators, Inc., manufacturer of structural steel shapes, and the Pharo Mfg. Co., manufacturer of mechanical specialties, both of Bethlehem, Pa., have organized the Pharo Governor Co., with capital of $30,000, to establish and operate a local plant for the manufacture of governors for internal combustion engines, automotive equipment and metal goods. Officers of the new company will include Richard Chapman, G. C. Pharo and R. P. Heilstrom.

The Board of Education, New Albany, Pa., is having plans drawn for the erection of a two-story and basement vocational school, 80 x 100 ft., estimated to cost $50,000. H. C. Childs, 404 Lincoln Street, Sayre, Pa., is architect.

The Hamburg Plow Works, Hamburg, Pa., manufacturers of plows and other agricultural implements, have purchased property adjoining their plant for enlargements.

J. M. Frable, Palmerton, Pa., has plans for the construction of a large planing mill on Franklin Avenue. A list of machinery to be installed, including motor-driven tools, will be arranged at an early date.

A machine shop will be installed in the one-story automobile service building, 50 x 125 ft., to be erected by the H. Noel Co., Minersville, Pa., for which plans are being drawn by G. C. Freeman, Sixth and Court Streets, Reading, Pa., architect.

The Sullivan & Reilly Coal Co., Wilkes-Barre, Pa., has plans for the construction of a new coal breaker, to cost in excess of $55,000, including machinery.

The Metropolitan Edison Co., Reading, Pa., has arranged for an increase in stock from 90,000 to 300,000 shares, a portion of the proceeds to be used for extensions and improvements, including the construction of an electric generating plant in the vicinity of Middletown, Pa., and transmission system.

The Sherman Lumber Co., Rock Glen, Pa., has acquired a large tract of timber land in the Beaver Valley section, near Rock Glen, and plans for the erection of a saw mill, power house and other mechanical buildings.

P. B. Sawyer and C. M. Walter, Allentown, Pa., represented by Thomas J. Perkins, Allentown, are organizing three new electric power companies under the names of the Lisock, Greenwood and Armstrong Power & Light companies, to install and operate plants and systems in portions of Loyalsock, Greenwood and Armstrong Townships, Lycoming and Columbia Counties.

Donnelly & Co., Philadelphia, has been obliged to obtain new quarters owing to the construction of the Delaware River bridge and are moving from 531-35 North Fourth Street to 478 York Avenue. Extensive improvements are being planned on the purchased site, which extends from York Avenue to Fifth Street. Several buildings will be razed to make room for a new warehouse. Bids for construction will be advertised within a month. Donnelly & Co. handle blacksmiths' supplies, heavy hardware, metal lath, builders' supplies and coal and mine equipment.

The Grantville Electric Co., Grantville, Pa., recently organized, is arranging for the installation of a plant and system for light and power service in East Hanover Township. H. C. Stambaugh and S. S. Seyfert head the company.

Baltimore

BALTIMORE, Aug. 20.

THE United Railways & Electric Co., Continental Building, Baltimore, will erect four automatic substations for the operation of its car system. The cost will be about $750,000.

D. C. Elphinstone, 408 Continental Building, Baltimore, has inquiries out for two 18-ton, 36-in. gage and two 30 to 50-ton standard gage saddletank locomotives.

Architects have been selected for nine school projects in Baltimore, most of which will include vocational training departments. The selection of architects was made by a joint committee representing the Architectural Commission, Public Improvement Commission and Board of School Commissioners and approved by the Architectural Commission.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until Sept. 4, for one motor-driven power brake for use at the Norfolk, Va., navy yard, schedule 1225; also, until Sept. 11, for steel balls and bearings, schedule 1228; and until Sept. 11 for miscellaneous pumping machinery and spare parts for the Boston navy yard, schedule 1233.

A machine shop will be installed in the new service building to be erected by the Etheredge Motor Co., 219 West Fourth Street, Charlotte, N. C., estimated to cost $100,000 with equipment. Lockwood, Greene & Co., Piedmont Building, are architects and engineers.

John J. Hanson, superintendent of Lamps and Lighting, City Hall, Baltimore, will take bids until Aug. 29 for a quantity of plain iron lamp posts for gas-lighting service, as per specifications on file.

The Eastern Sewer Pipe & Brick Co., Hagerstown, Md., recently formed with a capital of $350,000, has acquired property on the Opequon River for the erection of a new plant to cost approximately $150,000 with machinery. A power house and machine shop will be built.

The City Council, Hagerstown, Md., has arranged a series of hearings with the Public Service Commission to perfect plans for a bond issue of $300,000, for the construction of a municipal electric power plant.

The Quartermaster, United States Marine Corps, Washington, D. C., will take bids until Aug. 27 for electrical equipment, including 26,000 dry batteries, flashlights, etc., schedule 89.

The Tiger Tire & Rubber Corporation, 749 Equitable Building, Baltimore, has been organized with a capital of $1,000,000 as a subsidiary of the Tiger Tire Co., a Canadian concern. Property has been acquired at Havre de Grace, Md., for the erection of a new plant with initial capacity of 300 tires per day, estimated to cost $150,000 with machinery. A power house will be constructed. Horace H. Hastings and Edward Fetter, both officials of the Canadian company, head the new organization.

The Southern Supply Co., Calvert & Saratoga Streets, Baltimore, manufacturer and dealer in pipe, plumbing equipment, etc., has awarded a contract to the Consolidated Engineering Co., Calvert Building, for the erection of a four-story and basement addition to its works, 73 x 100 ft., at 315-19 North Calvert Street.

The Board of Works, Baltimore, has concluded arrangements with the Crook Shipbuilding Co. for the purchase of its local plant for a consideration of $440,000, and will utilize the property in connection with harbor development and improvements.

The Stanley Coal Co., Hutton, near Oakland, Md., has plans under way for the installation of electric power and mechanical equipment on a local tract of 800 acres of coal lands, recently acquired, to include elevating, conveying and other machinery.

The Carter's Production Works, Inc., 210 South Front Street, Wilmington, N. C., machine equipment, has inquiries out for machinery for a new sawmill with initial capacity of 15,000 ft. per day. A power house is planned in connection with the plant. O. Carter is general manager.

The Northern Electric Co., Elkton, Md., will make extensions and improvements in the plant and system of the Gilpin Falls Electric Co., recently acquired, including the installation of additional equipment and transmission lines.

A machine shop will be installed in the new automobile service building, 60 x 150 ft., to be erected at Greenville, S. C., on East Washington Street, leased by W. M. Thompson, automobile dealer. It will cost about $90,000. The general contract has been let to the Potter-Shackleford Construction Co., Greenville.

The Board of Commissioners, Maryland Penitentiary, Forest and Eager Streets, Baltimore, is having plans drawn for the erection of a new one-story foundry at the institution, to cost in excess of $50,000 with equipment. Colonel C. B. Sweezy is in charge.

The Georgia Railway & Power Co., Atlanta, Ga., will commence the construction of a new power house at Summerville, Ga., for service at Summerville, Berryton and vicinity, to cost about $95,000.

The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., is perfecting plans for the development of its plant for the manufacture of locomotives and parts, in connection with a present locomotive repair department, now in operation. Expansion will also be arranged in the line of manufacture of steel automobile wheels, water turbines, etc., utilizing buildings heretofore devoted to shipbuilding work. The foundry at the yard is being developed for commercial casting production, including steel, brass, bronze and malleable iron products; the steel forging department will likewise be expanded for commercial production.

J. W. Morgan, Riverton, Va., has inquiries out for electrically-operated pumping machinery for installation in a local plant.

The Board of City Commissioners, Raleigh, N. C., has rejected bids recently received for pumping machinery, tanks and other equipment for the municipal waterworks, and will call for new bids on revised specifications at an early date. W. C. Olsen, Kinston, N. C., is engineer.

Manual training equipment will be installed in the new high school for boys to be erected at Macon, Ga., estimated to cost $100,000. The Board of Education is in charge.

The Cascade Mills, Inc., 306 North Main Street, Lexington, N. C., is planning for the construction of a new power plant in connection with extensions and improvements in its textile mill at Mooresville, N. C. The plant will have an initial capacity of 750 hp. Lockwood, Greene & Co., Charlotte, N. C., are architects and engineers.

The Common Council, Graham, Va., has tentative plans for the installation of electrically-operated pumping machinery in connection with proposed extensions to the municipal water system.

C. H. Ferrelle, P. O. Box 838, Savannah, Ga., is planning for the purchase of machinery for stamping out designs in sheet metal and tin, for installation in a local plant to be devoted to the production of stamped metal specialties.

Manual training equipment will be installed in the new high school to be erected at Valdosta, Ga., estimated to cost $150,000, for which bonds will be voted on Sept. 20. The Board of Education is in charge.

A boys' industrial and mechanical building and cold storage plant will be constructed at the Caswell Training School, Kinston, N. C., in connection with a number of other structures, for which bids are now being taken on a general contract, estimated to cost $200,000. H. A. Underwood, 916 Commercial Bank Building, Raleigh, N. C., is engineer.

A machine shop will be installed in the new one-story service building to be erected by the Radford Motor Co., Radford, Va., 50 x 150 ft., estimated to cost $55,000, for which bids will be called at once on a general contract.

Manual training equipment will be installed in the new high school to be erected at Hickory, N. C., for which bonds for $250,000 have been voted. Plans will be prepared at an early date. The Board of Education is in charge.

Pittsburgh

PITTSBURGH, Aug. 20.

SALES of individual machine tools have shown some increase in the past week, but the market has not emerged from the dullness of the past two months. New projects involving the installation of several tools are not numerous, and those pending are not moving toward the closing stage with much speed. So widespread was the recent tool inquiry of the Pennsylvania Railroad, Central Region, circulated that the purchasing department had a real job in tabulating the bids, and while some expect awards to be made of some of the tools this week, the more common belief is that purchases are still a few weeks off. Purchases of the tools for the new plant of the Standard Sanitary Mfg. Co., at Baltimore, also are some distance off, since the plans are yet to be approved and the appropriation granted.

In heavy equipment the most interesting project now up is a new bar mill for the Jones & Laughlin Steel Corporation; prices for estimating purposes have been asked for. It will be a 9-stand mill, to be equipped with synchronous motors.

Barton R. Shover, Oliver Building, Pittsburgh, is consulting engineer for C. D. Thomas and others, who are projecting a company to manufacture cold-drawn steel in Warren, Ohio.

Cranes sales in the week have been few, but there has been fair inquiry. The Pittsburgh Plate Glass Co. wants a 6-ton crane for its new Creighton, Pa., works and the Carnegie Steel Co. has put out an inquiry for 14 open-hearth jib cranes of about 3 tons capacity for its Edgar Thomson works. The Pittsburgh & Lake Erie Railroad is in the market for a 30-ton locomotive crane, which can be equipped with a magnet.

The Fort Pitt Bedding Co., Pittsburgh, Pa., is in the market for an automatic riveting machine.

Plans have been authorized by the Board of Commissioners, Allegheny County Court House, Pittsburgh, for the erection of a three-story and basement addition, 70 x 325 ft., to the county mechanical shops and work shops at Blawnox, formerly Hoboken, Pa., estimated to cost $200,000, with equipment. S. F. Heckert, Bessemer Building, is architect.

The Oakland Motor Car Co., 4601 Baum Boulevard, Pittsburgh, with headquarters at Detroit, will make extensions and improvements in its local service and repair building, Baum Boulevard and Craig Street, to cost about $25,000.

The Guyan Machine Shops, Logan, W. Va., machinery dealers, have inquiries out for one engine lathe, 18 to 20 in. by 10 ft.; also for a slitting punch and shear to handle ½-in. plate stock; hydraulic wheel press, about 250 tons capacity, and hydraulic press for truck tires, similar capacity; one coil winding machine; a number of transformers, 1 to 20-kw. capacity; one cylinder grinder for automotive service, and a quantity of natural gas burners for hot-water furnace service.

The Borough Council, Smethport, Pa., is considering the installation of electrically operated pumping machinery in connection with the proposed acquisition of the local waterworks and extensions and betterments.

Manual training equipment will be installed in the two-story high school to be erected at Avalon, Pa., estimated to cost $180,000, for which bids will be asked on a general contract at an early date. The M. C. Kressley Co., 13 Fourth Street, Harrisburg, Pa., is architect.

A machine shop will be installed in the new two-story automobile service building, 50 x 70 ft., to be constructed by Bartey Brothers, West Liberty Avenue, Dormont, Pittsburgh on McFarlane Road, to cost about $50,000.

The City Council, Charleston, W. Va., is planning for the installation of electrically operated pumping machinery in connection with extensions and improvements in the South Hill municipal water system.

The Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, will build a new pumping plant at its works at Creighton, Pa.

Manual training equipment will be installed in the new two-story high school to be erected at Ridgway, Pa., estimated to cost $125,000, for which bids are being received on a general contract. The M. C. Kressley Co., 13 Fourth Street, Harrisburg, Pa., is architect.

The Westover Borough Clearfield Public Service Co., Clearfield, Pa., recently organized, has tentative plans for the installation of an electric power plant and system for service in Westover Borough. C. C. Savering, Johnstown, Pa., is treasurer.

A one-story pumping plant will be erected by the Equitable Gas Co., 435 Sixth Avenue, Pittsburgh, a subsidiary of the Philadelphia Co., at its works at Elrama, Pa.

Manual training equipment will be installed in the new three-story high school to be erected at Logan, W. Va., estimated to cost $150,000.

A lathe, drill press and other tools and equipment will be installed in the machine department in the new two-story and basement automobile service building, 40 x 70 ft., to be erected by the W. H. Frest Co., Warren, Pa., on Liberty Avenue, estimated to cost $45,000.

C. R. Geisler, Ferguson Building, Pittsburgh, architect, has plans in preparation for the erection of a one-story radiator repair and mechanical works on Craig Street, to cost about $16,000, for which the owner's name will be announced at an early date.

The Buffalo, Rochester & Pittsburgh Railroad Co., Rochester, N. Y., has closed its locomotive shops at Du Bois, Pa., temporarily, for the purpose of making improvements and repairs in cranes and other machinery, including the installation of other equipment.

The Deep Run Coal Co., Cumberland, Md., will install mechanical and electric power equipment at properties in the Elk Garden district, near Elkins, W. Va. About $300,000 will be expended in opening up new properties and installing machinery. Benjamin Robinson, Sr., Frostburg, Md., is consulting engineer.

Manual training equipment will be installed in the new high school at Fayetteville, W. Va., for which ground has been broken, estimated to cost $100,000. The Board of Education, C. C. Janutolo, architect, is in charge.

A machine shop will be installed in the one-story and basement automobile service building, 60 x 190 ft., to be erected on Penn Avenue, Pittsburgh, by W. W. Martin, 5847 Center Avenue, for which a general contract has been let to J. G. McLean, 4910 Baum Boulevard, estimated to cost $45,000.

Buffalo

BUFFALO, N. Y., Aug. 21.

CONTRACT has been awarded by the Harrison Radiator Corporation, Lockport, N. Y., manufacturer of automobile radiators, to the Charles R. Hedden Co., Inc., 342 Madison Avenue, New York, for the erection of a one-story addition on South Street, 155 x 396 ft., estimated to cost $500,000, with equipment. It will be used largely for the production of radiators for the General Motors Corporation. H. B. Harrison is president.

The controlling interest of John N. Willys, president of the Willys-Overland Co., Toledo, Ohio, and associates, in the United States Light & Heat Corporation, Highland Avenue, Niagara Falls, N. Y., manufacturer of industrial lighting equipment, storage batteries, etc., has been acquired by C. O. Mininger and C. H. Kelly, Toledo. Plans are being considered for expansion.

The Roulette Glass Co., Corning, N. Y., G. S. Goff, president, recently organized, is perfecting plans for the construction of its proposed initial plant at Roulette, Pa., to cost about $300,000, including machinery. A power house is planned.

The Houde Engineering Corporation, Buffalo, has acquired a tract of three acres of land on Northland Avenue, near Fillmore Avenue, as a site for the erection of a new plant, to cover practically the entire area. It will cost more than $75,000, with machinery.

A machine repair and service department will be installed in the new automobile and warehouse building to be erected by the Rhodes Brothers Trucking Co., 409 Baldwin Street, Elmira, N. Y., estimated to cost $100,000. F. Rhodes heads the company. H. Tiffany, Phelps Building, Binghamton, N. Y., is architect.

The Eastman Kodak Co., Kodak Park, Rochester, N. Y., is perfecting plans for the erection of a five-story and basement addition at State and Brown Streets, 87 x 197 ft., with wing extension, 22 x 88 ft., to cost more than $85,000.

Fire, Aug. 14, destroyed the machine shop and automobile service works of Henry Austin, South Main Street, Avoca, N. Y., with loss estimated at $13,000. It is planned to rebuild and install new machine tools and other equipment.

An appropriation of $1,000,000 has been arranged by the American Lithographic Co., 111 Swan Street, Buffalo, for the erection of a new plant on Amherst Street, to include electric power machinery, conveying equipment and other mechanical equipment, for which a list will soon be available.

Detroit

DETROIT, Aug. 21.

WORK will commence soon on a one-story addition to the plant of the Federal Screw Co., 3400 Martin Street, Detroit, estimated to cost $20,000.

Plans are being considered by the Great Western Smelting & Refining Co., 5205 Lorain Avenue, Detroit, for the erection of a one-story addition to its foundry on Russell Street.

Manual training equipment will be installed in the new three-story high school addition to be erected at Alpena, Mich., estimated to cost $100,000. The Warren-Holmes-Powers Co., Tussing Building, Lansing, Mich., is architect.

The McLean Motor Car Co., Fort Huron, Mich., has concluded negotiations with the local Chamber of Commerce for a tract of property in the South Park section for the construction of a plant for the manufacture of a popular-priced automobile. The temporary address of the company is care of the secretary of the Chamber of Commerce.

The Castle Mining Co., Ramsay, Mich., is planning for the installation of a lathe, drill press and other equipment, including hoisting machinery and elevating equipment. E. W. Hopkins is in charge.

The Stearns Motor Car Co., North Gaylord and Filer Streets, Ludington, Mich., manufacturer of automobiles has tentative plans for the construction of a two-story addition, 50 x 150 ft. J. S. Stearns is head.

The Motor Wheel Corporation, Lansing, Mich., has taken over the manufacture of steel automobile wheels at its plant, heretofore produced at the works of the Midland Steel Co., formerly the Detroit Pressed Steel Co. The company acquired the patents of the Disteel wheel a number of months ago, and in connection with the transferring of operations, is considering plans for plant expansion.

The Olds Motor Works, Lansing, Mich., manufacturer of automobiles, has preliminary plans for plant expansion for the manufacture of four and eight-cylinder cars. It is purposed to arrange an appropriation of not less than $1,500,000 for additional buildings and machinery.

Manual training equipment will be installed in the proposed addition to be erected at the high school, Ludington, Mich., to cost about $75,000, for which an architect will be selected to prepare plans at an early date. The Board of Education is in charge.

Dodge Brothers, Inc., Detroit, will build a power plant at its automobile manufacturing plant, in connection with an expansion program inaugurated a number of months ago involving $5,000,000 for new buildings and equipment. A cyanide building will also be constructed. A six-story assembling plant, 75 x 1000 ft., has been completed and will soon be placed in service.

The Michigan Seating Co., Jackson, Mich., manufacturer of car seats, etc., has plans in progress for the erection of a five-story addition, 75 x 133 ft., to cost in excess of $75,000, with equipment. H. L. Mead, Grand Rapids, Mich., is architect.

Manual training equipment will be installed in the proposed high school to be erected by the Board of Education, Ironwood School District, Ironwood, Mich., estimated to cost $925,000.

Chicago

CHICAGO, Aug. 20.

IN an exceedingly quiet market railroad buying is the chief feature of interest. The Elgin, Joliet & Eastern has completed purchases of machine tools amounting to $100,000. The Pere Marquette, through its purchasing office at Detroit, has bought all of the machine tools included on its list for the Grand Rapids shops, but no word has been received here as to the size of the purchase in the aggregate. The Santa Fe has placed orders for two hydraulic wheel presses, and the Burlington has bought a few minor items left over from its Denver, Colo., list. Buying by industrial companies remains exceedingly light, but there are signs of renewed interest in the market on the part of automobile manufacturers. While none of the automotive plants in the territory adjacent to Chicago is now active in the market, word comes from Detroit that the Hudson Motor Car Co. has bought seven standard turret lathes and that the Ford Motor Co. has authorized a large expenditure for additional manufacturing equipment.

The Brunswick-Kroessheil Co., manufacturer of ice machines, Chicago, which is erecting a new plant, has placed an order for a 5-ft. radial drill. The Rock Island Lines are inquiring for a 6-ft. radial drill. The Biddle Purchasing Co., Chicago, is in the market for a 48 x 48-in. x 12-ft. planer. Unless the market takes a quick turn for the better, it is probable that August will be the leanest month of the year for local dealers. Here and there a manufacturer of a certain line of tools is finding business slightly improved. A maker of hand screw machines and turret lathes has booked considerably more orders thus far this month than during the same period in July.

Ground has been broken at Grand Rapids, Mich., for a plant to cost $250,000 for the Certainteed Products Corporation, formerly the Acme Cement Plaster Co.

The Columbus Machine Works, Columbus, Ind., plans to move its plant to Crothersville, Ind.

The Wayne Tank & Pump Co., Fort Wayne, Ind., will erect a one-story plant addition, 60 x 110 ft., to house stores, engineering, laboratory and production departments. A second building which will be constructed is an addition to the factory, 40 x 315 ft., which will be devoted entirely to the assembly and testing of pumps. The cost of improvements is placed at $80,000.

The Coons Mfg. Co., recently incorporated with $100,000 capital stock, will erect a plant at Abingdon, Ill., for the manufacture of silos and other wooden products.

The American Brake Shoe & Foundry Co., Chicago, has purchased a 4½-acre site in North Kansas City, Mo., for the erection of a plant.

The Wolff Mfg. Co., manufacturer of plumbing supplies, Chicago, has purchased the foundry of the Brady Foundry Co., Chicago, a plant containing 100,000 ft. of floor space at

the northeast corner of Western Avenue and Forty-fifth Street. With additions and alterations now being planned the Wolff Mfg. Co. will convert this plant into one of the largest bath tub foundries in the country. The initial capacity contemplated is 900 bath tubs a day.

The Chicago Window & Door Screen Co., 5118 South State Street, Chicago, will take bids for the erection of a new two-story addition, 58 x 112 ft., estimated to cost $50,000. Milton Eichberg, 64 West Randolph Street, is architect.

The Domestic and Foreign Commerce Department, Chicago Association of Commerce, 10 South La Salle Street, has received an inquiry from a company at Guadalajara, Jalisco, Mexico (No. 2317), desirous to get in touch with American manufacturers of aluminum containers, and now in the market for 5000 such containers as per specifications on file. The company, it is stated, uses 100,000 aluminum containers annually.

Manual training equipment will be installed in the new high school to be erected at Orange City, Iowa, estimated to cost $80,000, for which ground will be broken at an early date. Beuttler & Arnold, Grain Exchange Building, Sioux City, Iowa, are architects.

The Wayfinder Mfg. Co., 1111 Fifteenth Street, Denver, Colo., is in the market for a quantity of malleable iron castings; also for 1-in. stamped or cast grooved pulleys.

J. J. Benas, 144 West Kinzie Street, Chicago, operating a machine shop, is planning for the installation of a punch press.

The W. T. Rawleigh Co., 101 South Liberty Avenue, Freeport, Ill., has plans in preparation for the erection of a one-story power plant, 100 x 110 ft., estimated to cost $180,000, with machinery. J. R. & E. J. Low, First National Bank Building, Madison, Wis., are engineers.

The State Board of Control, Des Moines, Iowa, is having plans prepared for the construction of a four-story and basement addition to the state-owned chair manufacturing plant at Fort Madison, estimated to cost $75,000, with machinery. H. F. Liebbe, State Capitol Building, Des Moines, is state architect.

The Public Service Co. of Northern Illinois, Chicago, is arranging for a stock issue to total $498,000, the majority of the proceeds to be used for extensions and improvements in generating plants and system.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Proctor, Minn., estimated to cost $85,000, for which bids will be called on a general contract in September. E. F. Bromhall, Alworth Building, Duluth, Minn., is architect.

The State Board of Administration, Bismarck, N. D., will take bids for the construction of a one-story and basement power house at its buildings at Dunseith, N. D., estimated to cost $40,000. Keith & Burke, Equity Building, Fargo, N. D., are architects.

The Reynolds Electric Co., 2650 West Congress Street, Chicago, manufacturer of electrical equipment, will build a one-story addition, 50 x 75 ft.

Cincinnati

CINCINNATI, Aug. 20.

ORDERS for machine tools continue fair, and some manufacturers report that the month of August will be better than July if present rate of bookings is maintained. While no large purchases were made, there was some railroad buying and the automotive industry also took a number of tools, the General Motors Corporation in particular being a good buyer of drilling machines. Orders continue to be for one and two machines and new inquiries generally run to the same number. No action has yet been taken on the list recently issued by the Big Four Railroad, but it is expected that something definite will develop within the next two weeks. The Pennsylvania and Baltimore & Ohio lists have not been bought, but it is expected that orders will be placed against the latter this week. While some shops have slightly reduced their operations, generally speaking there has been little change. Most of the manufacturers are booked up till the middle of September, and on some machines it is not possible to get delivery promises better than late October. Manufacturers of automatic screw machines are reported to have enough orders on books to keep them operating at present schedules until December.

The Middletown Machine Co., Middletown, Ohio, has been incorporated with capitalization of $150,000 by C. W. Shartle and H. D. Martindale. They recently purchased the plant of the Willard-Middletown Machine Co., which, it is understood, will be operated as an adjunct of the Shartle Bros. Machine Co. The Weber Tool & Die Co. has leased part of the plant.

The Linde Air Products Co., Columbus, Ohio, has awarded contract for the erection of a factory building, 106 x 141 ft., on Marion Road

The Corelock Tube & Rubber Co., Washington Courthouse, Ohio, has been incorporated with a capitalization of $50,000 to manufacture a puncture-proof inner tube for automobiles. J. E. Stewart is one of the incorporators.

Gohmann Bros. & Kahler, New Albany, Ind., have just completed the erection of an addition to their foundry building, doubling its capacity for production of gray iron and brass castings.

The Louisville Gas & Electric Co., Louisville, Ky., is planning extensive improvements to its Riverside power plant, involving the expenditure of approximately $500,000. Work will be started in the fall and completed next spring.

The River-Rail Transfer Co., Cincinnati, has been incorporated with a capitalization of $150,000, and will erect an unloading plant on the Ohio River to facilitate the shipment and receipt of heavy freight from barges. Julian A. Pollak of the Pollak Steel Co. is president.

The General Electric Co. is reported to have purchased the plant of the Circleville Strawboard Co., Circleville, Ohio, which manufactures fiber containers for shipping purposes. It will be placed in operation in about 30 days.

The City of Newport, Ky., is contemplating the expenditure of $500,000 for improvements to its waterworks system. Included in the expenditure will be considerable for pumping equipment.

Milwaukee

MILWAUKEE, Aug. 20.

THE aspect of business in machine tools and general foundry and machine shop equipment has improved perceptibly during the past week. Inquiry for tools has shown an upward trend from the low point reached during the first week in August, and while buying has continued of a scattering nature, the aggregate of sales was slightly higher, with prospects of further gains. The local trade feels that the demand has passed the off-peak period and is due for a steady incline. Inquiry emanated mainly from railroad and automotive sources and covered miscellaneous requirements, no sizable lots being embraced in requests for quotations or delivery dates.

The Allis-Chalmers Mfg. Co., Milwaukee, has taken a contract from the Public Service Co. of New Jersey, involving approximately $1,000,000, to furnish and install eighteen 15,000-kva., 137,000-volt, power transformers and two large surface condensors in a new steam generating plant to be constructed at Kearney, N. J., during the coming year. Delivery will cover a period of five months beginning about Feb. 1, 1924.

The city of Milwaukee has accepted the bid of the Link Belt Co., Chicago, to furnish and install the complete coal and ash handling system required for the new Riverside pumping station, municipal water works plant, at $44,800.

The Milwaukee Gas Light Co., 182 Wisconsin Street, Milwaukee, expects to let contracts this week for the construction of a new gas holder, 140 ft. high, at Twenty-fifth Street and St. Paul Avenue, estimated to cost $1,000,000. R. B Brown, vice-president and general manager, left for New York Aug. 18 to attend to final details of placing contracts for the complete work.

J. J. Schmidt, Prairie du Sac, Wis., is starting work on the erection of a public garage, sales and service building, 50 x 95 ft., two stories and basement, estimated to cost $22,000 with equipment.

The Chicago Iron & Metal Co., Chicago, has acquired the entire equipment and machinery of two large sawmills, planing mill, machine and locomotive maintenance shop and other buildings of the J. S. Stearns Lumber Co., Odanah, Wis., which has completed its timber cut and is retiring from business.

The Milwaukee Board of School Directors, Tenth and Prairie Streets, is taking bids until Aug. 30 for furnishing all material and installing complete water purification systems in the swimming pools of the Washington High School, Sherman Boulevard and Wright Street, and the Bay View High School, Montana and Lenox Streets. Frank M. Harbach is secretary and business manager.

The village of Ellsworth, Wis., accepted the bid of the Pittsburgh-Des Moines Steel Co., Des Moines, Iowa, for installing a new steel tank and rebuilding the present steel tower of the reservoir of the municipal water works system at $5,488.

William Hyink & Sons Co., 727 North Water Street, Milwaukee, manufacturer of special machinery and conducting a jobbing machine shop, will build a new shop, 60 x 100 ft., at Ogden Avenue and Market Street, and is inquiring for additional miscellaneous equipment. The total investment will be about $50,000. Lawrence Hyink is works manager.

The Board of Education, Stevens Point, Wis., is about to take figures on equipment for sheet metal working and for printing, the first departments to be installed in a $150,000 addition to the high school now being completed to provide vocational training facilities. Later courses in machine shop practice, plumbing and steamfitting, brass and aluminum casting and other vocations will be established.

The Prairie du Chien Mfg. Co. has been incorporated with $20,000 capital at Prairie du Chien, Wis., to take over and develop a business established several years ago on a small scale for the manufacture of a combination electric lamp and talking machine. Additions to shop and equipment will be made at once. The principals are J. H. Frazer, Len Palmer, L. C. Cornelius, W. D. Cowall, H. E. Seipp and W. F. Erni.

The City of Green Bay, Wis., is having plans and estimates prepared by A. E. Kringel, city engineer, for the replacement of the present steam boiler equipment of the municipal water works pumping station with gas engine and electric motor equipment, requiring new pumps and auxiliaries. The work will cost in the neighborhood of $75,000. Frank Cartier is general superintendent.

The Board of Education, Kenosha, Wis., is preparing to ask bids for the construction of a new high school costing $1,000,000 and a new junior high and vocational training institute costing $400,000, designed by John T. Chubb, architect, 109 North Dearborn Street, Chicago. Ella F. Powers is secretary of the board.

The City of Portage, Wis., has approved plans by Pearse, Greeley & Hamilton, consulting engineers, 39 West Adams Street, Chicago, for a complete water purification installation with a daily capacity of 1,500,000 gal., to include a new pumping plant with electrically operated pump. The main work will be started early next spring, but bids on the preliminary work, namely, an intake crib and 360 ft. of submerged pipe line in the Wisconsin River at the foot of Pierce Street, are being taken until Aug. 27 by C. J. Loomis, city clerk.

The Milwaukee Steel Foundry Co., 127 South Water Street, has plans for a one-story brick and steel casting shop addition, 50 x 80 ft., and is inquiring for miscellaneous equipment. Fred A. Weiss is vice-president.

Indiana

PLANS are nearing completion for the erection of a new one-story addition to the plant of the Kokomo Steel & Wire Co., Kokomo, Ind., 90 x 400 ft., to cost about $75,000. It will replace a structure recently destroyed by fire and will be equipped primarily for wire-drawing and kindred service. Harry Backert is chief engineer.

Manual training equipment will be installed in the new high school to be erected at Portland, Ind., estimated to cost $125,000, for which plans will be prepared early in the fall. The Board of Education is in charge.

A one-story power house will be erected at the plant of the Thieme Brothers Knitting Co., Fort Wayne, Ind., in connection with other extensions and improvements, to cost about $75,000.

The Studebaker Corporation, South Bend, Ind., has leased property at Capitol Avenue and North Street, Indianapolis, for the establishment of a new automobile service and repair plant.

Stockholders of the Crawford & McCrimmon Co., Brazil, Ind., manufacturer of mine engines, pumps, etc., are perfecting plans for a reorganization of the company with increased capitalization to provide for expansion.

Manual training equipment will be installed in the new high school to be erected at Twenty-fifth and Poplar Streets, Terre Haute, Ind., estimated to cost $700,000, for which bids will be asked on a general contract in the near future. Johnson, Miller & Miller, 30 North Fifth Street, are architects.

Robert H. Hassler, Inc., 1535 Naomi Street, Indianapolis, manufacturer of shock absorbers for automobiles, is arranging to devote a large portion of its plant to the production of a new type of friction shock absorber for heavy service. The company has recently completed the erection of a new service and repair building at Meridian and St. Joe Streets. Robert H. Hassler is president.

Electric power equipment, conveying machinery and other mechanical equipment, will be installed in the new one-story and basement plant to be erected at Fifteenth and Senate Streets, Indianapolis, 60 x 90 ft., by the Crown Bottling Works, care of C. E. Bacon, 605 I. O. O. F. Building, architect.

Manual training equipment will be installed in the proposed high school to be erected at Sellersburg, Ind., estimated to cost $80,000, for which an architect will soon be selected to prepare plans. The Board of Education is in charge.

The Central South

ST. LOUIS, Aug. 21.

EQUIPMENT for an initial daily capacity of 75 tons of brake shoes and castings will be installed in the proposed new plant of the American Brake Shoe & Foundry Co., 30 Church Street, New York, at North Kansas City, Mo., to consist of several units, with power house, estimated to cost $350,000, including machinery. Bids will soon be asked.

A manual training department will be installed in the three-story high school to be erected at Sedalia, Mo., estimated to cost $400,000, for which bids will be asked on a general contract early in September. T. W. Bast, Sedalia, is architect; W. B. Ittner, Board of Education Building, St. Louis, is consulting architect.

The Davis Electric Co., 201 Second Avenue, Dodge City, Kan., is planning for the installation of a power lathe for metal working.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., has arranged for the purchase of the plant and property of the Southern Oklahoma Power Co., and will make extensions and improvements, including the installation of additional equipment and lines. A note issue of $2,100,000 is being sold to provide for the acquisition and expansion.

Manual training equipment will be installed in the new three-story high school to be erected at Almena, Kan., estimated to cost $90,000. Smith & English, Nelson Building, Hutchinson, Kan., are architects.

The Day-Evans Iron Works, Inc., Knoxville, Tenn., is arranging a list of equipment to be installed in its proposed local plant for the manufacture of mine cars, wheels and kindred mechanical products. It will consist of four buildings, comprising foundry, machine shop, forge and blacksmith shop, and carpenter and woodworking shop, estimated to cost $200,000, with machinery. A. W. Evans, Petros, Tenn., is general manager and engineer.

The Allen-Combs Motor Co., Dodge City, Kan., is planning for the installation of a drill press and other equipment.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for a number of engine lathes, 24-in. swing, 6, 8, 10 and 12 ft.; also, for a steam feed, 10 x 36 ft., for sawmill carriage, with piston rod, bracket, etc.; and for several tons of spikes, ½ or 9/16 in. by 5½ in.

The Southern Railway Co., Richmond, Va., is perfecting plans for the construction of new shops and freight yards at Caswell, near Knoxville, Tenn., to cost in excess of $2,000,000, with equipment. A power house is planned.

A machine shop will be installed in the three-story and basement service building, 75 x 120 ft., to be erected at Sixth and Seminole Streets, Okmulgee, Okla., by the X. R. Gill Motor Co., same location, estimated to cost $115,000. Smith & Senter, 401 Commercial Investment Building, are architects. W. R. Mershon is secretary.

The North American Edison Co., operating the Union Electric Light & Power Co., St. Louis, is disposing of a bond issue of $8,000,000, a portion of the proceeds to be used for extensions and improvements in generating plants and system. The company is a subsidiary of the North American Co., 60 Broadway, New York. Edwin Gruhl is president.

The Common Council, Thayer, Mo., has tentative plans for the installation of deep-well electrically operated pumping machinery in connection with waterworks extensions and improvements, estimated to cost $40,000.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, manufacturer of sanitary enameled iron products, will commence the erection of the superstructure for a one-story addition to its foundry on Shipp Street, Louisville, 100 x 150 ft., estimated to cost $100,000, with equipment. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

The Security Metal Products Co., 2416 East Eighteenth Street, Kansas City, Mo., will commence the erection of a new two-story and basement plant, 41 x 305 ft., at 2800 East Thirteenth Street, for which a general contract has been let to John Gosling, 242 Railway Exchange Building. Sunderland & Besecke, Interstate Building, are architects.

Barker Brothers, 619 Third Street, Dodge City, Kan., operating a general cabinet works, are planning for the installation of additional equipment, including a lathe and belt sander.

A power house and machine shop will be constructed at the proposed new textile mill to be erected at Pine Bluff, Ark., estimated to cost $900,000. A company is being formed to build and operate the plant. J. E. Boyce, Chamber of Commerce, is in charge.

Manual training equipment will be installed in the two-story wing to be erected at the East Side junior high school at Chattanooga, Tenn., to cost about $175,000. The Board of Education, Fred F. Frazier, president, is in charge.

A one-story machine shop will be installed in the new automobile service building, 100 x 140 ft., to be erected at 227 West Washington Street, Oklahoma City, Okla., by Frederick Jones, 220 West Reno Street, to cost about $40,000. G. A. Nichols, Inc., 115 North Harvey Street, is architect.

Electric power machinery, conveying equipment and other mechanical equipment will be installed in the proposed plant to be erected by the Plough Chemical Co., Memphis, Tenn., estimated to cost $500,000, with equipment. Abraham Plough is president.

The Common Council, Scammon, Kan., is planning for the installation of electrically operated equipment at the local water plant to replace present steam-driven apparatus. M. Snowden is general superintendent.

Kennedy Brothers, Dodge City, Kan., operating a machine shop, are planning for the installation of a drill press and other equipment.

Bonds have been voted at a special election at Lawrenceburg, Tenn., for $80,000 for the construction of a municipal electric power plant at Shoal Creek, Freeland. Roberts & Co., Independent Life Building, are consulting engineers in charge.

The Pacific Coast

SAN FRANCISCO, Aug. 18.

TENTATIVE plans are under way for the erection of a new plant by the California Tube & Tire Co., Baker-Detwiler Building, Los Angeles, recently organized with a capital of $1,500,000. The first unit will be used for the manufacture of tubes, with capacity of 1000 per day, and the second unit equipped for the production of tires. A power house will also be built. The plant will cost about $450,000. The new company is affiliated with the Chillicothe Tire & Rubber Co., Chillicothe, Ohio, and S. S. Wortley, vice-president of the last noted company, will be an official of the new organization Melville Dozier, Jr., will be president.

The Truscon Steel Co., 709 Mission Street, San Francisco, manufacturer of standardized steel buildings, with headquarters at Youngstown, Ohio, is planning for the construction of a new plant at Pittsburg, Cal., for a Pacific Coast works.

E. E. Joslin, 262 South Wilton Place, Los Angeles, has plans for the construction of a one-story machine shop, 40 x 122 ft., at 1001 Slauson Avenue.

The Southern Sierras Power Co., Riverside, Cal., will commence the construction of a new hydroelectric power plant on Mill Creek, San Bernardino Mountains, to cost about $5,000,000, including steel tower transmission system.

The Star Drilling Machine Co., Portland, Ore., has awarded a contract to Camp & DuPuy, 424 East Alder Street, for the erection of a new two-story plant at 541 East Fourteenth Street.

The Hammond Lumber Co., Astoria, Ore., has preliminary plans for the construction of a new local plant, with power house, to cost in excess of $400,000. The structure will replace a mill destroyed by fire a number of months ago. All machinery will be electrically operated.

A machine shop will be constructed in connection with the new automobile service building to be located at 284 South Twenty-first Street, Oakland, Cal., estimated to cost $65,000, to be built by W. E. Travis, 366 Fourteenth Street, Oakland. J. R. Miller, Lick Building, San Francisco, is architect.

The Perfo Piston Ring Co., Los Angeles, will take bids for the erection of a one-story works, 50 x 90 ft., on West Twelfth Street, for which plans have been prepared by Stromwell-Halperin, Inc., 300 Ferguson Building, architect.

The Hammer-Bray Co., Oakland, Cal., manufacturer of stoves, ranges, etc., is planning for extensions and improvements in its plant in the Fruitvale industrial section, to include the installation of additional equipment.

The Southern Pacific Railroad Co., Arcade Station, Los Angeles, has filed plans for the erection of a one-story machine and mechanical shop at its repair plant on Alhambra Avenue, 85 x 498 ft., estimated to cost $390,000, with equipment.

The Portland Mfg. Co., Portland, Ore., has plans for the construction of a one-story power house at its plant, foot of Erie Street.

The S. T. Johnson Co., Oakland, Cal., manufacturer of oil burners and oil-burning equipment, is arranging for the removal of its plant to a new building at Arlington and Lowell Streets, and will expand the works at this location for increased output.

The California Metal Enameling Co. has engaged Hamm & Grant, Inc., industrial engineers, 607 Ferguson Building, Los Angeles, to design and construct additions to its plant on East Fifty-first Street, Vernon. One building will be 60 x 75 ft., of structural steel with sawtooth roof, and the other a wood frame truss roof structure, 50 x 120 ft. Erection will be completed early in September.

Canada

TORONTO, ONT., Aug. 18.

INQUIRY for machinery and machine tools continues fair and dealers are of the opinion that an active demand will prevail throughout the remainder of the year. In the Machinery Hall of the Canadian National Exhibition, Toronto, Ont., which will open on Aug. 25, machinery and tool manufacturers from Canada and the United States are preparing for operating demonstrations of their lines. Exhibition officials say that the entire space available has been reserved and that installations of equipment for the opening of the exhibition are proceeding rapidly.

The Ottawa River Power Co., Ltd., 145 St. James Street, Montreal, Que., is in the market for transmission and power machinery to be used in connection with a proposed 60,000 hp. power scheme.

The Lion Mead Rubber Co., Hull, Que., has completed the erection of its new plant there and will install machinery. It is expected that the plant will be ready for operation about Oct. 1.

The Wood Steamers, Ltd., 754 Broadview Avenue, Toronto, Ont., is contemplating the erection of a plant in Scarboro Township for the production of steam motor cars, for which equipment will be required.

The Canadian Westinghouse Co., Hamilton, Ont., will erect a new foundry building on Aberdeen West, to be one story, 205 x 550 ft., steel frame reinforced concrete construction. Bids are being received by B. H. Frack, architect, Main Street East, Hamilton, Ont., and 50 Bay Street, Toronto.

The Canadian Pacific Railroad is asking for bids on a marine terminal building to be erected on Belleville Street, Victoria, B. C., at a cost of $200,000.

The Berliner Gramophone Co., Montreal, Que., has awarded contract to E. B. Evans, 74 Easton Avenue, Montreal West, for erection of a factory.

The Hydro-Electric Power Commission is carrying on negotiations for the purchase of the plant of the insolvent Georgian Bay Power & Milling Co., Meaford, Ont., to which extensive alterations will be made, including the installation of additional equipment.

The Town Council of Bagotville, Que., has awarded contract for hydro-power plant equipment to Albert Forton, general contractor, at $125,000. Engineer J. F. Grenon, Chicoutimi, Que.

The Ottawa & Hull Power Co., Ltd., Hull, Que., has been incorporated with a capital stock of $1,625,000 by Edgar R. Parkins, Howard S. Dunn, Reginald H. Dean and others of Montreal as provisional directors. The Ottawa & Hull Power Co., now producing 40,000 hp. electric energy at Chaudiere Falls, between Ottawa and Hull, will have a production of 100,000 hp. when the plans of the company are carried to completion. A new development will be undertaken at Calumet, about 50 miles up the river from Ottawa.

The plant of Ledoux Jennings Carriage Co., Osborne and Mountain Streets, Montreal, Que., was totally destroyed by fire Aug. 12, with a loss to building and equipment amounting to $500,000.

An agreement has been reached between the city of Fort William, Ont., and the Great Lakes Pulp & Paper Co., whereby the latter will undertake the erection of a plant within the city to cost not less than $3,000,000, one unit of which, the pulp mill, will cost $800,000, shall be completed and in operation within one year, and the paper mill to cost $2,200,000 is to be completed and in operation within two years. The plant will have a capacity of 100 tons of newsprint daily and not less than 600 men will be employed for 250 working days each year.

The City Council, Ottawa, Ont., is in the market for the following equipment: 1 truck and hoist, 1 continental axle stand, tools for garage, power hammer, cement gun.

The Gulf States

BIRMINGHAM, ALA., AUG. 20.

GROUND will soon be broken for the erection of a new plant at Monroe, La., for the Owen Bottle Mfg. Co., Toledo, Ohio, consisting of a number of units with power house and machine shop, estimated to cost $1,000,000, with machinery.

A. H. Johnes and associates, New Orleans, La., are formulating plans for the organization of an electric light and power company, capitalized at $5,000,000, to construct and operate a generating plant in the lower section of the city, estimated to cost $1,000,000, with equipment. The new company also proposes to develop the plant and property of the Citizens Light & Power Co., with which it will be affiliated, and will enlarge the local power plant of the company, installing additional machinery.

The Dallas Power & Light Co., Dallas, Tex., has plans for the construction of a new power house at North Dallas, and will soon break ground.

Manual training equipment will be installed in the new two-story high school to be erected at Smithville, Tex., estimated to cost $80,000. H. F. Kuehne, Austin, Tex., is architect.

The Mountain State Pipe Line Co., Amarillo, Tex., recently organized with a capital of $35,000,000, has tentative plans for the erection of a new oil refinery on local site, primarily for gasoline production, to cost about $1,000,000. The company also purposes to construct a 28-mile pipe line to oilfields in this section, with pumping plants. It is affiliated with the Producers' & Refiners' Corporation, California Building, Denver, Col. Charles E. Sutton is general manager.

The Common Council, Talladega, Ala., is planning for the installation of electrically operated centrifugal pumping machinery at the municipal waterworks, in connection with extensions and improvements.

A machine shop will be installed in the new automobile service building to be erected on First Street, Miami, Fla., by W. M. Burdine's Sons Co., Miami, to be two-story, 100 x 120 ft., estimated to cost $50,000. Henry La Pointe, Miami, is architect.

Manual training equipment will be installed in the new two-story high school to be erected at Brookhaven, Miss., estimated to cost $125,000, for which bids have been asked on a general contract. Emmett J. Hull, Daniel Building, Jackson, Miss., is architect.

The Board of Public Works, Austin, Tex., is planning for the installation of electrically operated pumping machinery in connection with extensions and improvements in the municipal waterworks, for increased supply from the Barton Springs Section, estimated to cost $450,000.

Manual training equipment will be installed in the new junior high school to be erected on South Wesley Street, Greenville, Fla., estimated to cost $100,000. Linsey & Kilmer, Greenville, are architects.

A lathe, drill press and other machine equipment will be installed in the machine shop to be erected by Hulsey & Holtsinger, Tampa, Fla., to be two-story, 100 x 150 ft., estimated to cost $50,000. R. B. Gambier, Tampa, is architect.

The Luverne Oil Mill Co., Luverne, Ala., has inquiries out for an oil-operated engine, 50 to 75 hp., with auxiliary equipment. F. M. Douglas is president.

Manual training equipment will be installed in the new high school to be erected at Aberdeen, Miss., estimated to cost $125,000, for which ground will be broken at an early date. R. A. Heavner, Jackson, Miss., is architect.

The Common Council, Fort Pierce, Fla., is perfecting plans for the installation of additional equipment in the steam-operated electric municipal power plant.

Industrial Items

The Century Steel Co., Poughkeepsie, N. Y., manufacturer of crucible tool and high speed steel, will be liquidated by the Industrial Plants Corporation, 25 Church Street, New York. Equipment to be sold includes complete machine shop with lathes, planers, tools, shapers, grinders, saws, alligator shears, steel jib cranes, gas producer, 20 annealing and tempering furnaces, 50 crucible furnaces and 8 steam hammers, ranging from 600 to 3500 lb. About 400 tons of high carbon steel billets and tool steel will also be sold. These items will be offered at public auction in the early part of September.

The Anniston Electric Steel Corporation, Anniston, Ala., has discontinued its forge and machine shops and in the future will concentrate on foundry business. This was found advisable owing to the large expansion in the two cast steel and gray iron foundries. The company's machine and forging shops are being offered for rent.

Plans of New Companies

A radiator foundry, employing for initial operation about 250 persons, will be constructed immediately by the Miller Engineering Co., Norfolk, Va., on a site near the municipal terminal project, at a cost of approximately $250,000. The property, consisting of about five acres, was purchased from the Norfolk City Council. The company is financed by Baltimore and Norfolk interests but names have not yet been disclosed.

The McArthur Turnbuckle Corporation, Salamanca, N. Y., with capital of $35,000, will begin the manufacture of locomotive turnbuckles immediately. Additional equipment and machinery will probably be purchased. Address care of A. Edward Krieger, 33 Main Street, Salamanca.

The Economy Combustion Corporation, 82 State Street, Albany, N. Y., has been organized to manufacture a forced draft system of coal combustion. Installations will be made by contracts with heating engineers. The company is in the market for forced draft blowers, also air pipe and blast gate in diameters from 6 to 24 in. Harry C. Heilbronner is secretary-treasurer.

The Acme Cushion Wheel Co., 2 Columbus Circle, New York, recently incorporated with capital stock of $200,000, expects to be in production about Oct. 1, manufacturing steel disk wheels. Drop forged and stamped parts will be let out on contract and assembled in the company's plant. It will need a tire press, lathes and buffers when production begins. D. W. Cornfield heads the company.

The Remington Automotive Corporation, organized with capital stock of $100,000, will manufacture automotive equipment. A plant will be established in about five months and at that time stamping and screw machines will be installed. In the meantime assembly processes will be done by outside companies, contracts already having been placed. C. A. Mandolini, 17 West Sixtieth Street, New York, is president.

The Brady Fireproof Partitions Corporation, care of E. H. Gale, 200 Broadway, New York, has been incorporated to manufacture fireproofing products. The company holds patents on fireproofing materials which have been approved by the city construction department and it is likely that it will undertake manufacturing at a later date. The incorporators are M. E. Williams and E. O. Meyer.

The Western Illuminating Corporation, New York, has been organized to manufacture electric lighting fixtures and kindred products. Plans for operation will not be taken up for several weeks. M. L. Finkelstein and M. and B. Stecker are the incorporators. Corporate representative is Samuel Mandelbaum, 277 Broadway.

The Bronmore Bronze Corporation, New York, has been organized with capital stock of $10,000 and will manufacture brass and bronze lighting fixtures. Operations are now under way at the plant located at 117 East 129th Street. L. H. Fischer, 33 Union Square West, is president.

The Midwest Air Filters, Inc., New York, recently organized with capital stock of $200,000 will distribute filtering equipment, engines and like products, but will not be actively engaged for several months.

The Brandes Products Corporation, organized to manufacture radio headsets for C. Brandes, Inc., 237 Lafayette Street, New York, has started operation in a factory at 196-204 Mt. Pleasant Avenue, Newark, N. J. Frederick Dietrich is president.

The Warner Speed Control Corporation of America, Inc., New York, has been incorporated with capital stock of $20,000 to manufacture motors, engines and like products. It is yet in the formative stage. The incorporators are W. G. Lovatt, G. and A. Worsnop. H. S. Hechheimer, 1540 Broadway, is corporate representative.

The Helmerair Conditioning Corporation, New York, incorporated with capital stock of $50,000, will manufacture air-conditioning machinery. Temporary office will be at 149 Broadway, care of W. F. Kimber.

The Master Reproducing Needle Co., 510 South Twenty-first Street, Irvington, N. J., has been incorporated with capital of $200,000 to manufacture talking machine parts. Special machinery is being built, but the company has not found a permanent location. Carl Luebke is representative.

The Salem Handle Co., Salem, Ind., will manufacture axe, pick, sledge, railroad and mining tool handles. A plant has been leased and equipment purchased for immediate needs. O. P. Lind is president.

The Thomas Plow Co., Brunswick, Me., has been organized to manufacture tractor snow plows and equipment to be used in conjunction with the Fordson tractor. Its requirements include various kinds of iron and bolts. H. S. Thomas heads the company.

The Ohio-Kentucky Fluorspar & Lead Corporation, Inc., has been formed to operate fluorspar properties in Ohio and Kentucky. J. H. Kennedy, 607 Mahoning Bank Building, Youngstown, Ohio, is president.

The American Piano Plate Co., Racine, Wis., has been organized as a subsidiary of the American Skein & Foundry Co., Racine, and will take over the piano plate business of the parent company which has manufactured this line for 12 years. Additions have been made in the plate department and new equipment installed. W. F. Walker is president.

The Watson, Frye Co., 213 Front Street, Bath, Me., has been incorporated with capital stock of $200,000 to operate a general machine shop and foundry. It will take over plant and equipment of the Watson, Frye Co., Ltd., which went into receiver's hands. The company will manufacture paper mill machinery, grinder parts, cylinder molds, special machinery and castings. Orrin F. Frye is agent.

The National Standard Threadless Coupling Co., Bayonne, N. J., formed with capital of 2000 shares, no par value stock, will manufacture hose couplings. An assembly plant is established at 280 Broadway and operations have begun. Aaron A. Milniker, Union Trust Building, Bayonne, represents the company.

The Master Furnace Co., St. Louis, has been organized to manufacture furnaces and heating equipment. All requirements have been filled. J. C. Wilson, R. E. Gardner and J. F. Gillespie are the incorporators.

The Mountain Accessory Co., Emporium, Pa., has been incorporated to manufacture automobile parts and equipment. Present production provides for assembling parts to be purchased outside. Requirements for the first few months have been filed. Guy S. Felt is treasurer.

The Yale Welding Works, 487 Grand Avenue, New Haven, Conn., has been formed to do electric and oxy-acetylene welding and cutting. Future plans have not been determined. William J. Hayward heads the company.

The Auburn Electric Co., Butler, Ind., has been incorporated to acquire a partnership in the manufacture of electric specialties. The company is now operative. N. Ridlen heads the company.

The Neilan Corporation, 602 West Building, Houston, Tex., has been organized to manufacture oil well pumps, pumping machinery and check valves. It is still in the experimental stage but when manufacturing begins it will be done by contract. W. F. Haven is secretary.

Jacob & Co., Inc., Indianapolis, has been incorporated to manufacture metal products and composition specialties. A building has been leased at 635 South Delaware street and work has begun on a limited scale. Paul R. Jordan heads the company.

Trade Changes

The Oilgear Co., Milwaukee, has appointed the E. A. Kinsey Co., 235 South Meridian Street, Indianapolis, as selling agent for Oilgear products—broaching machines, hydraulic presses, variable delivery pumps and variable speed drives—in the states of Indiana, Kentucky and Tennessee.

On or about Sept. 1, the Taylor Machinery Co., 78 Batterymarch Street, Boston, engaged in the machine tool business, will remove to 261 Franklin Street, that city.

All changes necessary in the moving of business and employees of the Standard Steel & Bearing Co., Inc., from Philadelphia to Plainville, Conn., have been completed. W. H. Hill, purchasing agent; L. Spangler, assistant purchasing agent; L. A. Cummings, consulting engineer; A. W. Fawley, metallurgist; E. C. Whener, specialist; K. A. Johnson, sales manager, and Bernard Shallow, assistant sales manager, are now located at Plainville.

Purchase of the Penn iron property at Lancaster, Pa., by Andrew B. Rote, president A. B. Rote Architectural Iron Works, has been announced. The property includes about seven acres and was successively the site of the Penn Iron & Steel Mill and the Norris Locomotive Works.

After Oct. 1, the Philadelphia office of Power Specialty Co., manufacturer of Foster superheaters, economizers and oil heaters, will be located in the Atlantic Building, Broad and Spruce Streets, Philadelphia.

The Pawling & Harnischfeger Co., Milwaukee, manufacturer of excavators, cranes and machine tools, has appointed the Laughlin Barney Machinery Co., Pittsburgh, as representative in Western Pennsylvania and Eastern Ohio, to handle P&H horizontal boring, drilling and milling machines.

The Austin Co. of California has moved into new quarters at 733-37 A. G. Bartlett Building, Los Angeles, Cal.

Uehling Instrument Co., Paterson, N. J. has appointed the Connor-Hudson Co., Southwestern Life Bldg., Dallas, Texas; Gibbens & Gordon, Inc., 532 Canal Street, New Orleans, La. and the Cornell Mathews Co., Orlando, Fla., representatives.

NEW TRADE PUBLICATIONS

Power Pumps and Water Systems.—F. E. Myers & Bro. Co., Ashland, Ohio. Catalog No. P. P. 56. Describes and illustrates self-oiling bulldozer power pumps of 500 to 9000 gal. per hr. capacity; also pumps for mine use and for handling crude oil, kerosene or gasoline. A section is devoted to self-oiling bulldozer working heads for deep wells and a variety of pump jacks. Cylinders and working barrels for hand or power use are shown and a section is devoted to hydro-pneumatic pumps and cylinders for hand or power water supply systems. Spray outfits and accessories are included. A number of pages are given to engineering data regarding pumps and their operation. The size is 6 x 9, 192 pages, indexed. Illustrations are numerous and include sectional views.

Farm Operating Equipment.—F. E. Myers & Bro. Co., Ashland, Ohio. In a booklet of 180 pages, 3½ x 6 in., under the title of "Talking Points About the Myers Line," the features of the company's wide line of pumps, working heads, spray outfits, hay and grain unloading tools and door hangers are described and illustrated.

Steel as Applied to Structural Work.—Dayton Structural Steel Co., Dayton, Ohio. In an 8-page pamphlet illustrations and descriptions are given of the use of steel, not only in large buildings and other structures, but in the formation of racks, both stationary and portable, and in the shape of steel lumber for carrying the light floor loads of residential and similar buildings. Drawings are given showing how the materials may be used, and illustrations of structural work under way, using the materials mentioned.

Twist Drills, Reamers and Other Tools.—Clark Equipment Co., Buchanan, Mich. Catalog No. 18, 5 x 7½ in., 127 pages. Supersedes previous issues. Illustrates and gives list prices and dimensions of a wide variety of Celfor high-speed twist drills, also oil tube, axle centering, ratchet, three and four fluted drills, flat twist, bonding, track bit, flat and flue sheet drills and countersinks. A section is devoted to various types of reamers, including also, end mills, spiral end mills and end mills with center cut. A miscellaneous section includes drill chucks and sockets, lathe tool holders, tool bits, and other items. Tables of feeds and speeds, tap sizes, Morse taper shanks and other useful information is included.

Thread Generator.—Fellows Gear Shaper Co., Springfield, Vt. Booklet of 24 pages describing the company's thread generator, the features of which were outlined in THE IRON AGE of June 21. The equipment represents a new application of the gear shaper cutter, a rapid production machine for accurately generating thread shapes such as those used on taps and worms. The booklet is well arranged and liberally illustrated.

Hose Clamps.—Newark Stamping & Foundry Co., Newark, Ohio. Price list No. 15. Includes sizes available and prices of clamps for water, steam, air, railroad and other hose. Construction features are briefly outlined.

Blow-Off Valves.—Perolin Co. of America, 122 South Michigan Avenue, Chicago. Booklet describes and illustrates the construction and operation of the company's "double-service" blow-off valve. Few parts, long service, freedom from jamming, automatic regrinding and adjusting of disk to its seat, proper timing of opening and closing and straightway passageway through the valve are among the features emphasized.

A new organization, known as the Wright Machine Co., has taken over the former plant of the R. B. Phillips Mfg. Co., Grand Street Court, Worcester, Mass. It proposed to manufacture screw machine products. The company will be incorporated within the near future with George M. Wright president, and George B. Cunningham, treasurer. These gentlemen and George F. Wright, George F. Wright Steel & Wire Co., and A. R. Lemieux will constitute the board of directors. Mr. Lemieux is general manager of the new concern.

The Ware Foundry Co., Pine Street, Ware, Mass., resumed operations last week. Most of the plant was destroyed by fire June 7. The capacity of the foundry has been slightly increased. F. J. Quinn is owner.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x 1½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.80c.	.....
Nos. 22 and 24	4.50c. to 4.85c.	5.10c.
No. 26	4.55c. to 4.90c.	5.15c.
No. 28	4.65c. to 5.00c.	5.25c.
No. 30	4.85c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.75c. to 5.10c.
No. 16	4.90c. to 5.25c.
Nos. 18 and 20	5.05c. to 5.40c.
Nos. 22 and 24	5.20c. to 5.45c.
No. 26	5.35c. to 5.70c.
No. 27	5.50c. to 5.85c.
No. 28	5.65c. to 6.00c.
No. 30	6.10c. to 6.50c.

No. 28 and lighter, 26 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	½ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¾ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1¼ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
⅞ in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19 c. to 20 c.
High brass wire	19½ c. to 20½ c.
Brass rods	17¼ c. to 18¼ c.
Brass tube, brazed	27 c. to 28 c.
Brass tube, seamless	24½ c. to 25½ c.
Copper tube, seamless	26c. to 27 c.

Copper Sheets

Sheet copper, hot rolled, 22¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Prime 80 lb.	Seconds 90 lb.
IC	$11.75	$10.50	$6.55	$6.30
IX	13.00	11.75	6.65	6.40
IXX	14.75	13.00	6.75	6.50
IXXX	16.50	14.75	8.25	8.00
IXXXX	18.50	16.50	9.50	9.25
			IXXX 10.75	10.50
			IXXXX 12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straights pig	41c.
Bar	48c. to 53c.

Copper

Lake ingot	17c.
Electrolytic	16½c.
Casting	16¼c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8c. to 8¼c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27c.
Refined solder	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	32c. to 33c.

Old Metals

The market is discouraged and uncertain and business is quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.25
Lead, tea	4.00
Zinc	3.75

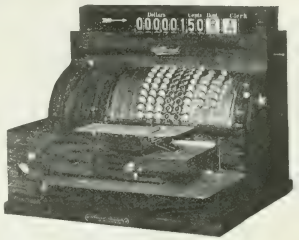
THE IRON AGE

New York, August 30, 1923

ESTABLISHED 1855 VOL. 112, No. 9



Manufacturing Methods in Making the National Cash Register



BY L. S. LOVE

MANUFACTURING methods that have proved themselves are always worth knowing. When most of them are adaptable to the average metal goods manufacturing plant, they have an intensely practical value. When back of them is the record for signal success such as belongs to the internationally known National Cash Register Co., the practices have a special appeal. The giving up for publication of details of metal working procedure at the National cash register works is at once a stamp of dependability and of the bigness of the company. It is not uncommonly characteristic of the successful manufacturing institution to find it a free contributor to helps in solving industrial problems, establishing thus a reputation for initiative, originality and resourcefulness which reputation is not dimmed nor commercial advantage injured by any necessarily delayed adoption by close competitors of its broadly useful methods. Naturally references to this great industrial development are bound to reflect the evidences of the leadership, far-sightedness, enterprise and genius of the late John H. Patterson, to whom Dayton, Ohio, the home of the company, as well as the cause of industrial and civic improvement, owe so much.

The present purpose is to describe in a general way the processes of manufacture of a cash register as carried on by the N. C. R.; as the company builds some five hundred sizes and models, it is manifestly impossible to go into full detail in an article of this nature. Emphasis will be laid on a number of the labor-saving or high production features and what the company has found necessary to do to hold its equipment sufficiently flexible to cover the range of work and still maintain large production.

The National is a machine not merely for use in retail stores. It is made not only for cash registering, but also for time and record keeping, suitable for a wide variety of business uses. The company's latest product, the National accounting machine, for banks and other business institutions, keeps a completely balanced record of the business at every moment of the day. The company manufactures also a telephone system for credit department use in stores where charge accounts are carried and also charge account record files which keep charge accounts posted to the minute.

The idea of the cash register was first conceived by James Ritty in 1879, from his study of a dial recording the revolutions of an ocean liner's propeller. The first cash register, patented by Mr. Ritty, had a dial type of indication. In 1881 all patent rights in the cash register were sold to the National Mfg. Co. About this time John H. Patterson was a stockholder in the Southern Ohio Coal & Iron Co., and manager for the company at Coalton, Ohio. In connection with the mines the company operated a general store, which did a good business but made no money. Mr. Patterson heard about a cash register being made in Dayton and purchased two. The store soon showed a profit. Later two registers were installed in the retail coal offices in Dayton, operated by Mr. Patterson and his

MANUFACTURING on a high production basis *and at the same time* **maintaining a flexibility of equipment** *to accommodate changes to some five hundred models and sizes is the achievement of the National Cash Register Co. How this is accomplished in tool designing and making, and what has been done in developing the manufacturing methods and in the employment of special machines as well as adaptations of standard machine tools are told in the latter parts of the accompanying article. A rather unique material handling system and an outline of the welfare and employee education methods, with which are closely linked the name of the late John H. Patterson, are among features of the article calculated to have a wide appeal to the metal goods manufacturing industry, owing to the general adaptability of the information.*

brother, and these uncovered a leak that had cost $1,200 in two years. These experiences showed Mr. Patterson the value of a cash register, and in 1884 he purchased a controlling interest in the National Mfg. Co., which name was changed later that year to that of National Cash Register Co. From the modest shop in a single second story room with two employees, the business has grown in about forty years to occupy a plant of some 44 acres of floor space and some 10,000 employees, with ramifications to every quarter of the globe.

In the scheme of management the pyramid plan is employed, with the general manager at the head. To him report the manufacturing superintendent, the chief engineer, the research engineer, and the head of the future demands department.

The superintendent controls the machine division, including tool design and tool making, the assembly, stock, transportation, wood shop, rate making and the efficiency engineering division.

Under the chief engineer are not only the invention and model departments, but also the tool supply and making of petty tools. But most important is the inspection, which, being under the engineer, is entirely separated from the manufacturing divisions and thereby calculated to insure quite impartial inspection. This inspection covers incoming materials, manufactured parts, and final assembly.

One of the first impressions received by the visitor is that the institution is essentially an organization of young men. A second impression is the broadminded attitude of the management in sharing its manufacturing methods with the world, so to speak, and its willingness to show the visitor just what they are doing and how they do it. In fact, many tools, jigs and fixtures, and special machines originated by this company are illustrated and described in text books, or in some cases are a part of the regular line of machine builders. Noteworthy is the number of men sent out into other lines of business from this institution, who because of the training received have become prominent figures in the world's work. Outstanding is an evidence of esprit de corps, which can be defined by three words: Loyalty, cooperation and pride—loyalty to the company; cooperation with the rest of the organization and pride in the establishment.

In a description of the manufacturing processes, it is desirable to understand the company's policy with regard to machinery. Naturally on a highly specialized product, in many cases, it is not possible to use standard commercial equipment. It is the aim of the company wherever possible to adapt to its uses such equipment as can be purchased in the market, and the bulk of its equipment of some 5000 machines is of this nature. Many machines required to give greatest production cannot be bought outside, and for this purpose a special engineering department, headed by an efficiency engineer, reporting to the superintendent, has as a part of its duties that of the selection of proper equipment and the design of such special machines as cannot be purchased. These machines are built outside or in the company's own shop, a general machine shop being maintained for the purpose. A special machine must show that it can pay for itself in one year in saving of cost over old method. Or it must produce greatly improved quality. Otherwise it is not considered a profitable investment.

Before arranging to buy or design and make new tools or fixtures the "future demands" department will report to the factory on a probable future demand and the turn it will take when these reports show sufficient leaning on the part of the public toward requiring a certain function, the engineering division is instructed to design a machine or changes in an existing model to accomplish the ends desired. For this purpose a corps of inventors and designers is maintained.

After a new design has been perfected and approved, a model is constructed and tested for proper working. For this work there are maintained three separate machine rooms. One a school for model makers, whence men are graduated into the department which manufactures models and their parts or into the department where the models are assembled and tested. After passing the test, drawings of the new models, improvements or changes in existing models, are sent to what is known as the tool supply department with the improvement or change number to be made in an existing pattern or with a new number to classify a new design.

The tool supply department, which is under the chief inspector, calls together a processing committee, consisting mainly of the head of the tool supply department, the supervisor, foreman and job foreman of the department in charge of that particular type of register, the head of the tool making department and the head of the tool designing division, and the man in the tool supply department in charge of tools, models and blueprints for the particular type of register under consideration. This committee lists the proper tools and sequence of operations through the factory for the improvement or new part.

As a result of this committee meeting the tool supply department issues an order known as a tool list, on the stock ordering department, with copies to all other departments interested. This is the stock ordering department's notification to arrange for new or changed usages of raw materials. Individual tool orders are also written from this tool list for the designing and making of the new tools or the changing of present tools to produce the new and changed parts required. As soon as the changed tools are completed, a second list, called the approved tool list, is issued by the tool supply department to the stock ordering department, with copies to all other departments interested. This new list takes care of any changes in operation, methods of manufacture, or other corrections which might have developed during the process of tooling up the job. From the approved tool list the stock ordering department issues orders on the various production starting departments for the quantities of the various kinds of register parts required, depending on their usage. When tools are completed they are returned to the tool supply department to be inspected and checked against the print of the tool and the print of the part.

The tool supply department also issues orders for the maintenance of all tools and machinery in the production division. It maintains 23 tool supply rooms throughout the factory. It stores and indexes all patterns; carries all models and blueprints. It furnishes from the stock room all material for making tools on orders through the material section.

The duties of the tool design department are clearly defined. On receipt of orders from the tool supply department to design tools for the production of a certain part they receive the list of machines on which the tools are to be used. They may recommend changes in machines contemplated if such changes seem desirable.

One important consideration to be borne in mind by the tool design department is that frequent changes, due to comparatively small lots, are made in the tools, consequently simple set-ups are essential. There are 30 employees in this department who are divided into sections and specialize on jigs and fixtures, punches and dies, screw machine tools, and small tools, respectively. This department designs every class of tool for use in the production departments, even to form cutters, special cutters, reamers, etc.

The method of procedure referred to in describing the duties of the tool supply division is as follows: Upon receipt of order accompanied by blue prints of parts and list of machines to be used in production, these are turned over to the particular tool designer delegated to design the tools for the job. He makes a sketch of the tools he proposes and submits it to the job foreman for suggestions before proceeding with a completed drawing. When the latter is completed it is submitted for approval to the head of tool design, the head of tool making, production department supervisor on the class of work covered, the foreman of the department and the job foreman, before working drawings are made. With all of this checking mistakes are avoided and useless tools are not made before any possible mistake in design is discovered. The original is filed in the usual manner and prints are sent to the tool room.

(*To be continued*)

THE PRESIDENT AND BUSINESS

Attitude of Administration Toward Economic Questions Suggested by Chamber of Commerce

WASHINGTON, Aug. 28.—American business as represented by a committee of the Chamber of Commerce of the United States, made its first call upon President Coolidge at the White House last week and announced its position regarding a number of important economic questions. One policy advocated by the business representatives for administering the flexible provisions and definitely opposed by the administration concerns the advocacy by the chamber of the creation of a separate tariff adjustment board "so that the tariff commission may continue uninfluenced, its functions as a research and reporting body." It was made clear at the White House that President Coolidge feels that the tariff commission itself is capable of and best qualified to handle this new departure in tariff making.

A Flexible Tariff

While it already is proving to be a complicated matter, and apparently will be more so for some time, it is maintained that the task of investigation and conducting hearings under these provisions is so closely related to the general work of the commission, that it would not be wise to set up a new board. To do so, it is contended, would in fact produce more or less complication and duplication of effort, and would add to the already great number of government bureaus and boards. It also was pointed out that the tariff commission is a bipartisan body and that it certainly is not supposed to be influenced from any source and is as free from influence as would be any additional board that might be set up.

Present indications seem to be that President Coolidge will follow the Harding policy concerning the flexible provisions, although it remains to be seen whether he has as great faith in their efficacy as Mr. Harding did. The representatives of the chamber in their conference with President Coolidge took occasion to advocate the principal of a flexible tariff, their only point being that there should be a change in the procedure of administering it.

Merchant Marine

Concerning the merchant marine, the chamber representatives told the President that they are opposed to the government engaging in commercial business and urged further efforts to evolve a plan of private operation before entering upon direct government operation. The chamber, the committee told the President, is in favor of a ship subsidy, in an attempt to equalize operation disadvantages of American ships. The proposal of the chamber on this subject, it is believed, has the sympathy of the President.

It is well known, that like the chamber, he is opposed to the government's engaging in commercial business. At the same time, it has been explained, the government finds itself with a merchant marine and so far has been unable to dispose of it on a satisfactory basis to private citizens. President Coolidge was in favor of the ship subsidy bill sponsored by the late President Harding, but with the failure of the Senate to act upon the measure, the Shipping Board had to turn to other alternatives. It did make an effort to sell ships to private owners but offers submitted were not satisfactory and while it has not definitely foregone this idea, it apparently is not hopeful of its successful execution in the near future.

Meanwhile the board is trying to develop a policy with the approval of the President of readjusting regular trade routes for American ships, looking to the highest possible efficiency under the government ownership in the carrying of exports and imports and the best possible service to American shippers. Briefly, a subsidiary corporation under the Shipping Board is suggested to have charge of the operation of the different units of an American merchant fleet, which would be concentrated on given ocean lines. There has been some question as to the legality of this proposal and it is understood that President Coolidge is seriously considering the appointment of a committee not only to study this program but also to investigate other plans with a view to determining a merhcant marine policy. The committee to study such a policy, it is stated, would be made up of the Chairman of the Shipping Board, the Secretary of Commerce, the Secretary of the Treasury, the chairman of the House Committee on Merchant Marine and Fisheries and the chairman of the Senate Committee on Commerce and the Attorney General. Some government officials are strongly of the opinion that the best possible service American business could render to the merchant marine would be a campaign urging shipping in American vessels.

Tax reforms urged by the chamber likely will not eventuate at the next Congress. While it seems altogether likely that these reforms or at least a large portion of them, meet with the approval of the President and the Secretary of Treasury Mellon, it is seriously doubted that the proposals would stand a chance of being adopted by Congress.

Selective Immigration

Concerning immigration, the committee told the President that the chamber believes in restriction and that the principle of selection should be a controlling factor in immigration legislation. At the White House it has already been indicated that the only immigration legislation which President Coolidge will urge at the next session of Congress will be in favor of the plan of Secretary of Labor Davis for the selection abroad through American consulates of immigrants coming to the United States.

Wright Machine Co. to Manufacture Screw Machine Products

The plant of the R. B. Phillips Mfg. Co., Worcester, Mass., with its equipment for the manufacture of screw machine products on a large scale, has been purchased from the owner, the American Steam Gauge & Valve Mfg. Co., Boston, by a new corporation, controlled by Worcester men, to be known as the Wright Machine Co. At its head is George M. Wright, who was president of the Wright Wire Co. until its absorption in the Wickwire-Spencer Steel Corporation,

It is proposed to start up the factory, which has been idle for three years, under the management of A. R. Lemieux, formerly with the Reed & Curtis Co., Worcester, later head of the Hampden Mfg. Co., Springfield, Mass., and, when that business was bought by the Ansonia Mfg. Co., head of its screw machine products department. Recently Mr. Lemieux has been receiver of the A. R. Moseler Co., New York. The Phillips plant, operating at capacity, employs about 400 people. The company proposes later to add a standard product of its own.

The Worcester Machine Co. will be capitalized for $1,000,000, of which $400,000 is in bonds, $250,000 in preferred stock, and $350,000 in common stock. The officers will be: President, George M. Wright; treasurer, George B. Cunningham, long associated with Mr. Wright in his business; directors, the above officers and Mr. Lemieux, George F. Wright, head of the George F. Wright Steel & Wire Co., Worcester, and J. Verner Critchley, president of the Reed-Prentice Co. and Walden-Worcester, Inc., who as head of the Critchley Machine Screw Co. built the Phillips plant.

Complaint Against Freight Rates to St. Louis

WASHINGTON, Aug. 28.—Complaint has been filed with the Interstate Commerce Commission by the Jones & Laughlin Steel Corporation, against rates on manufactured iron and steel products from the Pittsburgh district to St. Louis and points in Illinois and Indiana. It is contended that these rates are unreasonable and discriminatory.

The fall meeting of the Electric Power Club will be held at the French Lick Springs Hotel, French Lick, Ind., Nov. 19 to 22. S. N. Clarkson, 900 Keith Building, Cleveland, is executive secretary.

Lungyen Blast Furnace Plant Near Peking

First Unit of the Mining Administration's Plans Is of 250 Tons Capacity Per Day and Is the First Modern Furnace in North China Proper

BY K. E. HUMBERT*

IN the initial Lungyen project is included one 250-ton per day blast furnace, capable of being enlarged to 300 tons by relining, with raw material handling equipment and storage, boiler plant, power house and water supply development. The arrangement provides for future installation of additional blast furnaces, by-product coke oven plant, steel plant and rolling mills for producing a diversified line of products. The plan of the new plant and a typical cross section through the plant are shown.

The furnace stock system is of the tunnel type and comprises a two-track concrete trestle and a larry tunnel extending the length of this tresle. The concrete tunnel is 14 x 14 ft., the roof provided with a series of bin bottoms, each with a segmental type of gate, operated from the scale car platforms. The discharge chutes of the coke bin have screens for the removal of braize. Two scale cars, furnished by the Atlas Car & Mfg. Co., Cleveland, Ohio, are the side dump type, of 120 cu. ft. capacity each.

Storage capacity is provided for six weeks' supply of ore and one week's supply of limestone. The steel coke bin is located on the center line of the furnace, ore and limestone being stored on either side. The bin is 70 ft. long, with capacity for one day's operation. The coke bin is covered, ore and stone storage being in the open.

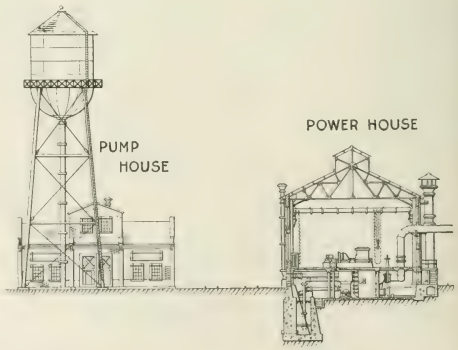
The skip incline is double tracked for two 110 cu. ft. skip cars of the bucket type, also provided by the Atlas company. It is placed at an angle of 60 deg. to the horizontal. The skips are operated by an Otis Elevator Co. double-drum steam-engine-driven hoist. The drums are 72 in. in diameter, grooved for 1⅛ in. diameter hoist ropes. The hoist has a rope speed of 375 ft. per min. and is designed for an unbalanced load of 10,000 lb. An automatic steam brake is provided. The hoist is located in a steel frame, corrugated steel covered building, utilizing in part the extended coke bin columns.

Here are also housed the steam operated bell cylinders, and the indicators for the furnace stock testers. A 5-ton trolley hoist provides for repairs or for lifting from the ground. The operator from his position can see both the furnace top and the skip pit. Stairways lead from the hoist house along the skip bridge to the furnace top, or down to the trestle level, and thence to the ground.

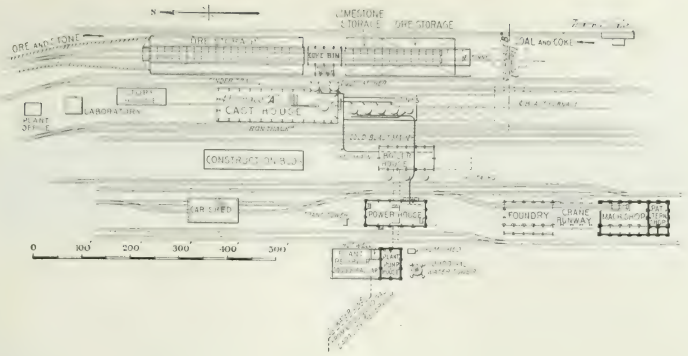
The furnace top is of the standard double bell design. The gas is taken off the furnaces by four uptakes, leading to four bleeders, surmounted with explosion valves. There is a cross connection for each pair of bleeders, about 15 ft. above the furnace top platform. From each cross connection a downcomer leads off. The four uptakes are spaced to equalize the flow of gas over the entire top area and reduce the gas velocity, with a resultant decrease in the dust carried off by the gas. In addition, the height of the cross-pipe connection retards the dust from getting into the downcomer, so that with this type of top a decreased amount of dust is made, compared to the design of top where the downcomers are taken off practically at the top platform level.

These bleeders also serve to carry the bell beam platform, eliminating the separate structure required for this on some tops. The top platform is made large enough to allow ample working space for making repairs. Platforms are provided at all essential points, with substantial guard rails. A 5-ton jib crane provides for raising material to the top platform. Access is had to the top platform by interrupted flight stairs on the skip bridge, or by stairs leading from the ground to the stove top platforms and thence to the furnace.

*With Perin & Marshall, consulting engineers, New York. This article is the second portion of that on "Modern Iron and Steel Works in China," begun on page 461 of our Aug. 23 issue.



SECTION (Looking North) Through the Lungyen Furnace Plant, Showing Logical Sequence of the Several Elements. The hot metal track is the one nearest the cast house, between the furnace and the boiler house. The furnace is of 250 tons daily capacity, but has a lining so thick that it can be changed, on relining, to 300 tons. Plans for the future call for a second blast furnace, by-product coke ovens, a steel mill and rolling mills

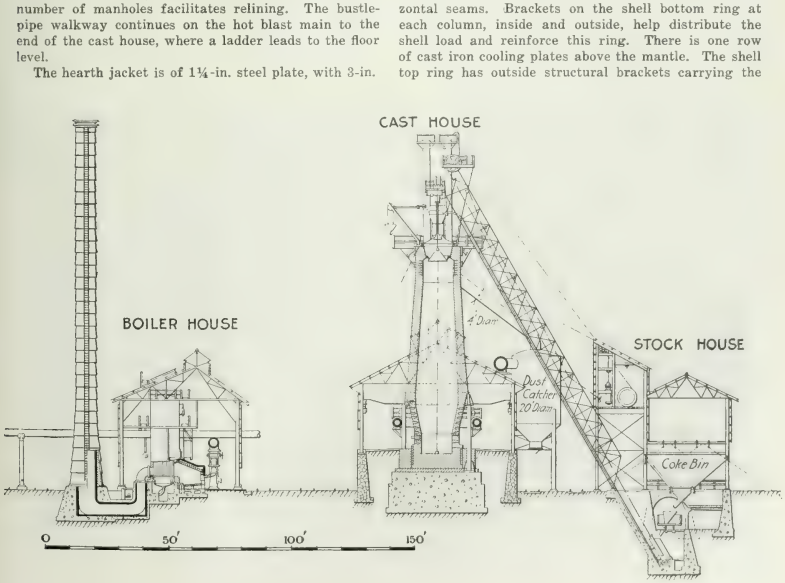


This Plan of the Lungyen Plant of the Lungyen Mining Administration, at Shiechinshan, 11 Miles From Peking, Shows the Arrangement for Later Development into a Two-Furnace Plant. Ample water supply is afforded by means of the 20-in. pipe line from the west, drawing by gravity from a 60,000,000-gal. reservoir in the side of a hill alongside the Yung Ting River

The furnace is 85 ft. high, its bosh diameter is 18 ft., and the capacity is 14,000 cu. ft. It is set on a sub-base of rock, much of which had to be excavated, as it extended above the required level. There are eight structural columns placed on a 27-ft. diameter circle, allowing for enlarging of the hearth and bosh in the future. Brackets on the columns support the bustle pipe, circle pipe and waste water trough. The bustle pipe is 42 in. diameter, of ⅜ in. plate, with 9 in. brick lining, and is carried on cast iron saddles free to move on the column brackets, thus providing for expansion. An ample number of manholes facilitates relining. The bustle-pipe walkway continues on the hot blast main to the end of the cast house, where a ladder leads to the floor level.

The hearth jacket is of 1¼-in. steel plate, with 3-in. thick cast iron water cooled circular plates between it and the furnace brickwork. The tuyere breast is of 1-in. steel plate, with openings for the eight tuyeres and two rows of bronze cooling plates. The bosh jacket is of the solid plate type, ⅞-in. plate being used here. There are six rows of bronze cooling plates in the bosh. The mantle is built up of 1-in. plate and heavy angles, and has a trough for collecting shell spray water.

Bottom and top rings of the furnace shell are of butt strap construction, and the intermediate rings have triple lap-riveted vertical and double lap-riveted horizontal seams. Brackets on the shell bottom ring at each column, inside and outside, help distribute the shell load and reinforce this ring. There is one row of cast iron cooling plates above the mantle. The shell top ring has outside structural brackets carrying the





Lungyen Furnace Plant at Shiechinshan, in Chili Province, viewed from the North-West. The long, low construction building lies between the observer and the cast house (left center). The stack at right of the four hot-blast stoves is designed to serve also the four additional stoves, to be erected for the second furnace, which will be farther to the right. Two more boiler house stacks then will be added to the three now up. The water tower will hold 110,000 gal.

top platform and inside cast steel brackets supporting the large bell hopper. Four steel plate gas uptakes also lead from the top ring.

The furnace brick lining is of the Harbison-Walker "Woodland" brand. Stock line protection consists of small unit cast steel wearing plates, laid integral with the lining.

In addition to the regular iron notch, an auxiliary notch, 22½ in. higher, is provided. The working cinder notch is 90 deg. from the iron notch. There is also an auxiliary cinder notch.

The cast house labor required for producing and handling such a large tonnage of sand cast foundry iron has been greatly reduced by the installation of a Shutts-Goodwin pig bed molding machine, which is cylindrical in shape, with four offsets on which the patterns are placed. It is mounted on a shaft with a bail attached, by which it is drawn over the sand, the cast house crane being utilized for pulling it. Beds are made up this way in about 15 minutes in comparison to 2 or 3 hr. required for hand molding. Cinder will be run into Pennsylvania Engineering Works side dump cinder ladles of 300 cu. ft. capacity, air operated.

The cast house is 63 ft. span, 218 ft. long from the center of the furnace, has corrugated steel siding, ¼-in. plate roof, and a monitor throughout its length. A 10-ton crane is installed to handle cast house materials, and for the operation of the pig bed molding machine. Water lines with hose connections extend along both sides. A Berg-Brosius safety mud gun is provided.

Gas from the furnace top is led through two 4-ft. diameter downcomers, each of which enters the top of a 20-ft. diameter barrel type dust catcher, with capacity exceptionally large for a furnace of this size. It is expected that this, in conjunction with the furnace top design, will result in a gas with comparatively low dust content. Further gas cleaners may be installed should they be desired later. From the dust-catchers the gas enters a common 5-ft. 9-in. diameter main leading a short distance to a large downleg, from which are taken the branches leading to the stoves and the boilers.

The four stoves are of the two-pass, side combustion type, 20 ft. in diameter by 85 ft. high, and have 36,200 sq. ft. of heating surface each. Brick linings for the stoves and all mains were made in China by the Kailan Mining Administration. Fittings include 24-in. cold blast, 27-in. hot blast, 24-in. gas burner, 36-in. chimney and 12-in. air relief valves and three 21-in.



Because of Doubts Regarding the Stability of the Soil at Lungyen, Foundations for the Furnace and Stoves Were Carried Down Through the Solid Rock of a Stone Quarry



Lungyen Furnace Plant from the North-East. The ore storage is between the cast house (left center) and the "high line" fill in foreground, which takes the place of the usual trestle.

cleaning doors, all in the bottom ring, and three 30-in. cleaning doors in the top ring.

All mains and flues are overhead. The hot blast main is 4 ft. diameter with 9-in. brick lining. The gas main is also 4 ft. diameter, with 4½-in. lining, and 3-ft. downlegs at each stove. A 5-ft. 9-in. diameter chimney flue, with 4½-in. lining, leads to a 7-ft. inside diameter x 175-ft. high self-supporting brick lined steel stack The cold blast main is 24 in. in diameter. A 10-in. equalizer line leads from the cold blast to the hot blast main, around the stove farthest from the furnace. A counter weighted relief valve and the usual snort valve are provided. The complete system of platforms around the stove tops is reached from the furnace top platform, or by means of stairs extending alongside of the stove and supported by them.

(To be concluded)

NITROGEN IN STEEL

Distillation and Combustion Method of Analysis Compared

Starting with the assumption that no conclusions concerning the effects of nitrogen on the physical properties of steel can be more reliable than the methods used for determining the quantity of nitrogen present, C. Baldwin Sawyer, the Brush Laboratories Co., Cleveland, in a paper entitled "Nitrogen in Steel," prepared for the annual summer meeting of the American Institute of Mining and Metallurgical Engineers at Montreal, Aug. 30, describes the work undertaken to establish some additional conditions required by the customary distillation method for reliable and accurate determinations. Results by a combustion method of analysis for total nitrogen content are presented. These indicate that all of the nitrogen in steel, exclusive of that contained in blow-holes, may be determined by the distillation method. Results have been obtained which bear on the following divisions of the general subject, based on these more sound and more reliable analyses: Nitrification of steel by melting in nitrogen, nitrification of steel by heating in ammonia, decomposition of nitrified steel by heating, and thermal analysis of nitrified steel.

Ingots of pure iron melted under various pressures of nitrogen, when examined for nitrogen content using only the distillation method, were found to contain nitrogen which varied as the square root of the pressure applied. Thin disks of sheet iron, when nitrified in ammonia only until they contained up to 4 per cent nitrogen, when reheated were found to contain a reduced amount of nitrogen equal to an amount definitely related to the reheating temperature and expressible by a curve. A summary of the author's results is as follows:

Summary

For obtaining the most accurate results with the distillation method for determining nitrogen in steel, a Kjeldahl trap and a glass-wool strainer should be inserted between condenser and distillation flask. The condenser tube should be of some material other than glass, which yields alkalis to the distillate.

A 2.42-per cent gain in weight by thin sheet iron, because of cyanide hardening, is 97.5 per cent accounted for by results of analyses for carbon and nitrogen, indicating the recovery by the distillation method of all nitrogen introduced into steel by case-hardening processes.

The combustion method for carbon is adapted to total nitrogen determinations. Results so far obtained by this method indicate complete recovery by the distillation method of all nitrogen introduced into steel by any method. A specially designed phosphorus pipette can absorb from 3 to 4 liters of oxygen at a rate of from 15 to 20 cubic centimeters per min.

Iron melted under an atmosphere of nitrogen absorbs it in accord with the formula: $\%N = k\sqrt{P_n}$, where

$\%N$ = per cent of nitrogen in cooled ingot;

k = a constant having value of 0.020,

P_n = pressure in atmospheres of nitrogen during melting and solidification.

Microscopic examination of ingots melted under nitrogen discovers no trace of nitrogen up to approximately 0.03 per cent, and indicates a solid solution of nitrogen in ferrite. Above 0.03 per cent, many needles were found.

Iron catalyzes the dissociation of ammonia at elevated temperatures and is denitrified by hydrogen so formed; it is therefore difficult to produce uniformly nitrified steel by passing ammonia over it.

Uniformly nitrified thin steel disks, containing up to 1.70 per cent nitrogen, can be produced by heating non-uniformly nitrified disks containing from 3 to 4 per cent nitrogen to different temperatures for different degrees of decomposition. Decomposition so produced can be represented by a curve of per cent nitrogen against temperature; its general shape is that corresponding to similar curves for volatile solutes in nonvolatile solvents.

Transformation points obtained from sets of these disks clearly indicate an iron-nitrogen diagram of appearance similar to the iron-carbon diagram.

Results of photomicrographic examination of the disks are in accord with general findings of transformation-point determinations, and place the eutectoid point at 1.70 per cent of nitrogen. No nitrogen constituent was visible in ferrite up to a content of 0.030 per cent.

Results of bend tests on disks show a great loss in ductility for nitrogen contents above 0.015 to 0.030 per cent, confirming statements in the literature.

In non-uniformly nitrified disks containing 3 to 4 per cent nitrogen, the existence of a second eutectoid is indicated both microscopically and by thermal analysis.

The report of the Ohio State Foundrymen's Association for July shows an increase over operations for the preceding month, as the industry operated at 85.32 per cent of normal in July compared with 81.27 per cent in June. The normal melt figure of the foundries reporting is 29,504 tons and the production of castings was 25,183 tons. Total stocks on hand show a decline in June figures, the figure for July being 37 per cent of normal. Non-ferrous operations show a very slight decline as compared with June, the July figure being 77.22 compared with 77.25 in June.

Further Decline in Iron and Steel Exports

Imports for July Also Are Less, Though Ferroalloys Are the Second Highest of the Year—Exports of Semi-Finished Lowest in 18 Months

WASHINGTON, Aug. 28.—Exports of iron and steel products in July totaled 168,558 gross tons, valued at $21,582,626, as against 171,183 tons, valued at $21,242,193, in June; while imports amounted to 53,464 tons, decrease under imports for the same month of last year, when they were 71,971 tons, but for the seven months ended with July of this year, the total of 569,287 tons was a heavy increase over the corresponding period of last year, when the total was 187,648 tons. Imports of manganese ore in July of this year totaled 23,824 tons, while iron ore imports were 439,367 tons.

Exports of machinery with a value of $26,469,980 represented an increase of almost $3,000,000 over machinery exports in June with a total of $26,631,349. Imports of machinery in July were valued at $796,596 valued at $2,147,112, as compared with 68,019 tons, valued at $2,597,159. For the seven months ended with July of this year exports were 1,141,569 tons and imports aggregated 569,287 tons. While the exports for July were greater than those for the same month of last year, when they amounted to 157,169 tons, they were less for the seven months of the current year, when compared with the 1,345,129 tons of the corresponding period of last year.

Imports for July of this year showed a sharp decrease as against $911,901 in June. Machine tool exports in July totaled 5176 in number with a value of $503,283, as against 7567, with a value of $443,645 in June.

Steel rails constituted the greatest export movement

Machinery Exports

By Value

	July 1922	July 1923	Seven Months Ended July 1922	Seven Months Ended July 1923
Locomotives	$289,250	$867,443	$5,471,714	$2,693,218
Other Steam Engines	193,519	91,733	1,431,407	737,650
Boilers	133,565	216,752	560,701	621,627
Accessories and parts	101,454	162,654	657,472	622,103
Automobile Engines	551,189	275,969	3,773,086	3,566,018
Other Internal Combustion Engines	333,669	682,057	2,448,708	3,828,476
Accessories and Parts for	194,653	265,502	1,537,006	1,920,219
Electric Locomotives	33,085	287,234	456,997	2,464,012
Other Electric Machinery and Apparatus	444,901	742,258	5,479,097	4,830,488
Excavating Machinery	89,834	117,019	850,290	928,344
Concrete Mixers	93,702	55,041	538,346	325,956
Road Making Machinery	85,640	114,139	189,522	719,025
Elevators and Elevator Machinery	381,714	424,936	2,342,842	2,314,279
Mining and Quarrying Machinery	500,710	850,289	3,587,713	5,294,274
Oil Well Machinery	445,806	696,523	2,718,997	3,582,798
Pumps	474,452	572,955	3,270,705	4,155,515
Lathes	61,443	96,780	463,935	461,065
Boring and Drilling Machines	28,059	67,505	363,087	387,347
Planers, Shapers and Slotters	33,881	32,538	181,861	130,512
Bending and Power Presses	7,351	19,030	246,676	115,673
Gear Cutters	25,791	20,371	63,094	94,878
Milling Machines	27,597	17,913	186,242	240,380
Thread Cutting and Screw Machines	16,756	27,913	103,591	268,100
Punching and Shearing Machines	9,581	16,666	106,130	103,449
Power Hammers	8,973	20,005	64,771	82,721
Rolling Machines	129,881	6,010	154,385	17,749
Sharpening and Grinding Machines	54,483	87,102	439,979	562,849
Other Metal Working Machinery and Parts of	493,410	392,209	3,162,418	2,644,242
Textile Machinery	1,471,016	650,165	10,314,101	5,416,426
Sewing Machines	640,470	916,922	3,468,550	4,790,367
Shoe Machinery	127,087	112,427	584,114	833,219
Flour-Mill and Gristmill Machinery	181,233	107,622	821,691	574,244
Sugar-Mill Machinery	365,755	431,361	1,543,890	1,522,967
Paper and Pulp Mill Machinery	130,335	141,300	1,220,553	1,396,466
Sawmill Machinery	25,575	41,734	341,752	312,893
Other Woodworking Machinery	161,386	71,974	736,052	625,251
Refrigerating and Ice Making Machinery	101,256	157,689	1,214,420	1,411,805
Air Compressors	166,475	158,746	1,180,899	1,411,889
Typewriters	879,527	1,112,923	6,807,701	8,340,639
Power Laundry Machinery	74,524	82,078	354,518	576,344
Typesetting Machines	207,176	231,947	2,249,822	1,974,240
Printing Presses	218,062	342,330	2,253,640	2,455,264
Agricultural Machinery and Implements	2,429,149	5,609,825	13,003,517	28,154,335
All Other Machinery and Parts	7,466,898	9,074,211	50,611,187	57,501,235
Total	$19,840,273	$26,469,980	$137,337,180	$161,000,790

Imports of Iron Ore by Countries

(In Gross Tons)

	July 1922	July 1923	Seven Months Ended July 1922	Seven Months Ended July 1923
Spain	4,891	56,291	20,869	184,000
Sweden	54,878	145,508	124,648	546,559
Canada	567	9,472	1,321	23,010
Cuba	56,275	96,500	133,572	430,351
Other countries	50,300	131,596	93,997	583,933

Imports of Pig Iron by Countries

(In Gross Tons)

	July, 1923	Seven Months Ended July, 1923
England	9,554	158,428
Belgium	3,524	12,817
Scotland	2,400	16,671
France	1,804	56,009
Canada	1,262	38,483
Germany	750	20,740
British India	215	8,918
China	200	950
Sweden	51	585
Austria	....	299
Total	19,760	313,900

Exports of Iron and Steel

(In Gross Tons)

	July 1922	July 1923	Seven Months Ended July 1922	Seven Months Ended July 1923
Pig iron	1,943	2,966	15,773	17,811
Ferromanganese	179	4	908	3,220
Ferrosilicon	....	82	249	573
Scrap	3,939	4,598	49,298	25,871
Ingots, blooms, billets, sheet bar, skelp	10,149	6,480	111,710	69,917
Iron bars	....	716	....	9,918
Steel bars	*12,927	14,531	*114,428	98,499
Alloy steel bars	146	635	2,781	3,849
Wire rods	1,844	1,577	34,135	13,127
Plates, iron and steel	6,932	8,599	65,902	75,266
Sheets, galvanized	9,245	9,454	73,312	76,949
Sheets, other steel	12,820	7,471	182,868	63,407
Sheets, black iron	923	1,274	7,562	8,876
Hoops, bands, strip steel	3,237	2,695	19,855	23,391
Tin plate, terne plate, etc.	4,038	13,029	49,452	65,335
Structural shapes, plain material	8,676	10,861	63,636	76,861
Structural material, fabricated	3,221	7,014	24,443	42,351
Steel rails	29,919	24,521	184,363	142,332
Rail fastenings, switches, frogs, etc.	3,500	4,836	21,995	22,986
Boiler tubes, welded pipe and fittings	11,879	17,671	105,904	108,609
Cast iron pipe and fittings	2,948	2,317	15,203	15,411
Plain wire	9,529	7,117	78,394	57,516
Barbed wire and woven wire fencing	10,250	8,384	42,187	49,378
Wire cloth and screening	154	188	776	863
Wire rope and cable	620	550	2,601	4,037
Wire nails	2,881	3,730	42,160	22,370
All other nails and tacks	760	619	5,421	5,354
Horseshoes	145	83	485	547
Bolts, nuts, rivets and washers, except track	1,725	1,719	10,436	11,053
Car wheels and axles	1,524	2,815	10,453	11,464
Iron castings	749	1,000	5,982	6,033
Steel castings	108	426	1,358	2,329
Forgings	238	246	1,500	1,866
Machine screws	11	....	98	....
Total	157,169	168,558	1,345,129	1,141,569

*Includes both iron and steel bars.

Iron and Steel Exports by Countries
(In Gross Tons)

	July, 1923	Seven Months Ended July, 1923		July, 1923	Seven Months Ended July, 1923
Plates:			*Galvanized Sheets:*		
Canada	6,999	64,108	Canada	3,643	23,758
Cuba	122	620	Cuba	1,229	8,461
S. America..	119	815	Philippine Islands ...	653	4,246
Mexico	87	461	Mexico	560	3,837
Philippine Islands ...	45	167	Argentina ..	129	3,346
Black Steel Sheets:			Colombia ...	341	3,552
Canada	4,007	35,852	*Tin Plate:*		
Japan	2,368	18,327	Canada	2,980	17,098
Argentina ..	275	1,639	British India	2,928	2,931
Cuba	166	1,135	China	1,873	5,797
Philippine Islands ...	54	160	Japan	2295	16,315
Galvanized Wire:			Argentina ..	933	3,085
Japan	1,864	13,467	Cuba	769	3,197
Brazil	1,282	5,389	Hong Kong.	683	1,941
Canada	954	9,299	Uruguay ..	483	1,956
Argentina ..	659	1,262	Mexico	224	1,260
Chile	615	3,521	Chile	213	1,190
Australia ..	346	3,382	Italy	...	2,264
Cuba	294	1,609	*Steel Rails:*		
Mexico	248	2,071	Cuba	8,202	27,250
Barbed Wire:			Canada	6,776	27,159
Cuba	1,495	6,481	Japan	3,961	41,781
Australia ..	1,053	5,134	Kwang Tung (leased territory).	1,960	11,142
Brazil	1,011	6,303	Colombia ...	861	2,109
British South Africa ...	844	4,030	Philippine Islands ...	352	2,625
Colombia ...	630	3,068	Argentina ..	325	1,834
Central America ..	570	2,172	Mexico	216	2,571
Mexico	567	2,047	Honduras ..	139	1,332
Canada	56	4,416	Chile	...	2,116
West Indies ...	...	6,153	Chosen (Korea)..	...	8,754
Argentina ..	...	6,410	New Zealand	...	400

in July, with a total of 24,521 tons, and also for the seven months ended with July, with a total of 142,332 tons. Cuba was the leading export market in July for steel rails, taking 8202 tons, while Canada came second

Machine Tool Exports, by Number and Value

	June, 1923 Quantity	June, 1923 Value	July, 1923 Quantity	July, 1923 Value
Lathes	64	$96,385	70	$96,780
Boring and drilling machines	367	44,710	204	67,595
Planers, shapers and slotters	17	26,855	16	32,538
Bending and power presses..	21	10,703	14	19,030
Gear cutters	89	9,971	7	20,571
Milling machines	29	34,830	13	17,913
Thread-cutting and screw machines	54	36,384	27	27,913
Punching and shearing machines	300	14,890	28	16,666
Power hammers	9	7,158	74	20,005
Rolling machines	2	485	13	5,010
Sharpening and grinding machines	1,824	72,034	1,452	87,102
Chucks, centering, lathe, drill and other metal-working tools	3,818	24,344	2,271	36,504
Pneumatic portable tools....	1,033	64,896	987	54,946
Total	7,567	$443,645	5,176	$503,283

with 6776 tons. The second largest export movement of July consisted of boiler tubes and welded pipe, the total for the month being 17,671 tons, while steel bars with a total of 14,531 tons ranked third, and tin plate, 13,029 tons, fourth. Beginning with July the Bureau of Foreign and Domestic Commerce has separated iron and steel bars instead of consolidating them as was done previously.

Of the imports, the heaviest item was, as usual, pig

Imports of Iron and Steel in Gross Tons
(Monthly Averages)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl....	26,505	†14,132	....	....
1914 to 1918, incl....	23,351	4,645	3,281	$47,155
1919 to 1921, incl....	23,901	5,703	3,710	37,115
1922	59,545	31,954	9,117	31,204
January, 1923	120,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	36,371	7,221	14,071
May	76,885	39,764	10,422	12,734
June	68,019	30,033	12,794	36,138
Six months' average...	85,964	49,706	8,980	13,535
July	53,464	19,760	12,381	23,824

*Not included in "total imports."
†Includes ferroalloys.
‡Average for three years, 1916 to 1918, only.

Imports of Machinery
(By Value)

	July 1922	July 1923	Seven Months Ended July 1922	Seven Months Ended July 1923
Metal-working machine tools and parts.....	$14,757	$28,549	$127,589	$250,583
Agricultural machinery and implements....	199,275	198,387	1,644,179	1,803,261
Electrical machinery and apparatus	.....	20,791	.....	351,161
Other power generating machinery	.....	48,183	.....	1,410,841
Other machinery	271,154	221,488	1,605,983	1,475,803
Vehicles, except agricultural	120,118	279,198	857,510	1,757,190
Total	$605,304	$796,596	$4,235,261	$7,138,839

iron, with a total of 19,760 tons. For the seven months ended with July the total imports of pig iron aggregated 313,900 tons. Previously the Bureau had credited an import movement of 4100 tons of pig iron to Cuba

Exports, January, 1922, to July, 1923, Inclusive
(Gross Tons)

	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914...	2,406,218	221,582	145,720
*Average, 1915 to 1918...	5,295,332	438,462	1,468,026
Calendar year 1919.....	4,239,837	309,682	258,907
Fiscal year 1920.....	4,212,732	248,126	288,766
Calendar year 1920.....	4,861,851	217,958	216,873
Fiscal year 1921.....	4,168,619	129,541	82,549
Calendar year 1921.....	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,682
February	133,975	1,430	6,627
March	208,843	2,724	10,662
April	198,820	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922.....	1,721,418	28,330	63,127
July	157,169	1,942	10,149
August	145,640	1,791	9,353
September	129,475	5,203	6,810
October	132,924	1,553	8,364
November	127,782	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922.....	1,986,297	30,922	107,201
January, 1923	123,190	2,482	10,563
February	133,902	2,788	7,733
March	163,820	2,881	11,416
April	177,471	1,844	11,247
May	203,389	1,848	12,824
June	171,183	2,960	9,652
Fiscal year 1923.....	1,816,329	31,891	113,377
July	168,558	2,966	6,480
Seven months	1,111,569	17,811	69,917

*Calendar years.

in April, but it develops that this tonnage was scrap so that this change has resulted in the revision of the pig iron and scrap import tonnages for the seven

Imports of Iron and Steel into the United States
(In Gross Tons)

	July 1922	July 1923	Seven Months Ended July 1922	Seven Months Ended July 1923
Pig iron	18,828	19,760	45,227	313,900
Ferromanganese	25,841	11,314	53,134	58,949
Ferrosilicon	2,300	1,067	7,076	8,422
Scrap	9,795	14,216	38,960	130,862
Steel ingots, blooms, billets, slabs and steel bars	530	1,097	7,625	9,044
Rails and splice bars..	4,077	1,126	20,435	15,650
Structural shapes	34	2,091	275	6,074
Boiler and other plates	....	2	....	484
Sheets and saw plates	156	224	329	932
Bar iron	10,131	759	11,531	5,063
Tubular products	....	529	....	2,742
Castings and forgings	....	380	....	1,796
Nails and screws.....	....	72	....	776
Tinplate	37	92	2,118	9,471
Bolts, nuts, rivets and washers	....	6	....	128
Wire rods	244	148	974	2,135
Round iron and steel wire	....	312	....	2,550
Flat wire and strip steel	....	224	....	755
Wire rope and insulated wire, all kinds.....	....	45	....	454
Total	71,971	53,464	187,684	569,287
Manganese ore	70,318	23,824	218,547	104,212
Iron ore	166,711	439,367	374,407	1,767,358
Magnesite	8,156	5,666	62,566	59,367

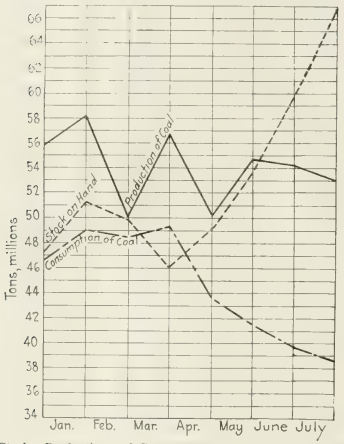
months. The greatest pig iron tonnage from any single country in July came from England, the incoming shipments being 9554 tons. For the seven months the total imports of pig iron from England amounted to 158,428 tons, or more than half of the entire pig iron imports for the period.

FIFTY-DAY COAL SUPPLY

National Association of Purchasing Agents Does Not Consider Outlook Alarming

The survey of industrial coal consumption for the month of July by the National Association of Purchasing Agents covering the industrial consumption of hard and soft coal in the United States and Canada indicates that the volume of business for the month of July was at about the same rate as during the preceding month. The consumption in July was slightly below that of the month of June, estimated at 783,000 tons, or a difference of about 2 per cent. For June the association recorded a decrease in business of 4.3 per cent; for May a decrease of 5 per cent, and for April a decrease of 10 per cent. The report says:

"July reflected further declines in some lines of



Stocks, Production and Consumption of Coal in United States and Canada in 1923

business, other lines remained stationary and a considerable number recorded an increase. Of the total number of industrial coal consumers reporting for the month of July, 53.6 per cent showed further decreases, 16.4 per cent remained stationary, and 30 per cent recorded increases over the preceding month. These figures indicate that the downward trend of business has reached bottom, and that, as stated last month, there is a possibility that the beginning of an upward swing will be recorded for the month of August.

"The lines on the chart showing the consumption and stocks of coal are drawn from data supplied from all parts of the United States and Canada by commercial consumers of coal, and represent all lines and branches of business industry. The line showing the production of coal is drawn from figures given out by the U. S. Geological Survey. The chart includes both bituminous and anthracite coal, and covers the total stocks in the hands of commercial consumers, the total tonnage consumed and the total production by months. (Coal consumed by the householder and his stocks are not included.)

"The stocks of hard and soft coal in commercial consumers' bins on Aug. 1 were 7,214,000 tons greater than on July 1. Expressed in number of days, the supply on Aug. 1, based on the July consumption, was sufficient to meet the industrial requirements of the United States and Canada for a period of 53 days on the average.

"The estimated total production of hard and soft coal in the United States during the month of July was about 1,247,000 tons less than during the month of June.

"The United States Geological Survey shows that consumers of soft coal in the United States held in storage piles on July 1 approximately 45,000,000 tons and that the rate of consumption in June was about 9,500,000 tons per seven-day week. This would indicate a supply sufficient for 33 days on the average on July 1. We reported for the same period that the commercial consumers had in storage approximately 59,723,000 tons, this figure including both hard and soft coal for the United States and Canada, and according to our figures the stock was sufficient to last 45 days on the average.

Market Conditions

"The bituminous market remained soft and sluggish during the month of August. The month of September, however, will most likely find the market in an unsettled condition, providing that there is a suspension of work in the anthracite region, and prices may temporarily show an upward tendency.

"If a suspension does come in the anthracite region it should not result in a fuel shortage, for the reason that bituminous coal, coke and fuel oil may be substituted for anthracite coal. Another factor to be taken into account is that the bituminous mines and coke ovens have ample capacity to meet the additional demand that would result due to a suspension in the anthracite region. We should also in this connection take into consideration that the lake season is drawing to a close, and that coal that has been going to the upper lake docks will soon have to find other markets.

"The production of coke continues to show a downward trend, but the market remains soft with coke in easy demand. This, however, may change if there is a suspension of work in the anthracite mines. If a suspension occurs, coke will then under such circumstances, to a considerable extent, be substituted for anthracite, and if the suspension is prolonged, coke prices will stiffen. This will be particularly true of the East.

"The association desires reports on stocks and consumption of coal from all industrial consumers, and is not confining its efforts to its membership, but asks that all who are willing to cooperate send the names of their purchasing agents to Mark Kuehn, chairman, national fuel committee, 10600 Quincy Ave. S. E., Cleveland."

Stocks on Hand

	Net Tons
May 1, 1923	49,022,000
June 1, 1923	53,669,000
July 1, 1923	59,723,000
Aug. 1, 1923	66,937,000

Consumption

Month of April	43,659,000
Month of May	41,532,000
Month of June	39,720,000
Month of July	38,937,000

Production

Month of April	50,209,000
Month of May	54,735,000
Month of June	54,309,000
Month of July	53,062,000

(Of the July production 44,673,000 tons was soft coal and 8,389,000 tons was hard coal.)

The figures shown for stocks and consumption are estimates based on reports supplied monthly by consumers.

Rogers, Brown & Co. Acquire Naylor & Co.'s Business

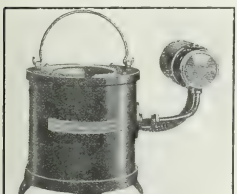
Naylor & Co., Inc., 100 Broad Street, New York, announce the taking over of their business by Rogers, Brown & Co., 30 Church Street, New York. Naylor & Co. have been for many years the American representatives of Naylor, Benzon & Co., Ltd., London, England, dealers in foreign ores, pyrites, pig iron and metals, and Rogers, Brown & Co. now succeed them as correspondents in the United States of the London firm. G. F. Murray, for many years associated with Naylor & Co., will join Rogers, Brown & Co. in their foreign trade department. Rogers, Brown & Co. also make announcement of the change, and in addition state that they have appointed Naylor, Benzon & Co., Ltd., as their London representatives.

The famous London firm has a history of a century and a quarter, its stationery carrying the legend, "Established prior to 1800." Naylor & Co. were for many years a conspicuous figure in the iron ore, pig iron and metal trades in the United States. The personnel of the Pittsburgh office of the firm is well remembered by iron and steel men of the Middle West. In the days of Charles S. Guthrie, a Pittsburgh partner, who in 1899 became the first president of the American Steel Hoop Co., the business through the Pittsburgh office had wide ramifications. In the same year Samuel G. Cooper and C. F. Banning, with Mr. Guthrie as a partner, organized Banning, Cooper & Co., Ltd., which took over the Pittsburgh business of Naylor & Co. Some of Naylor & Co.'s large deals in Bessemer pig iron and Bessemer steel billets are particularly well remembered. The advance in pig iron that came in 1895, after two dragging years following the panic of 1893, was marked by several noteworthy Naylor transactions. One of these was the sale of large blocks of Bessemer pig iron to the Carnegie Steel Co. In the Eastern trade in iron ore, pyrites and pig iron in the early nineteen-hundreds and later, Naylor & Co. were important factors.

Solder Pot With Automatic Heat Control

A new electric solder pot with automatic heat control, for heating babbitt, white metal, wax and other materials which are slow conductors of heat, has been placed on the market by J. D. Wallace & Co., 1405 West Jackson Boulevard, Chicago.

Elimination of overheating and therefore of oxidation of the solder and elimination of time lost in watching the pot are advantages claimed. When the solder has been heated to 600 deg. Fahr. an automatic control goes into action, maintaining a uniform temperature. This control is said to be an adaptation of the principle used in the steam gage. A volatile substance actuates a Bourden tube which makes and breaks the electric current, regulating the temperature of the pot.



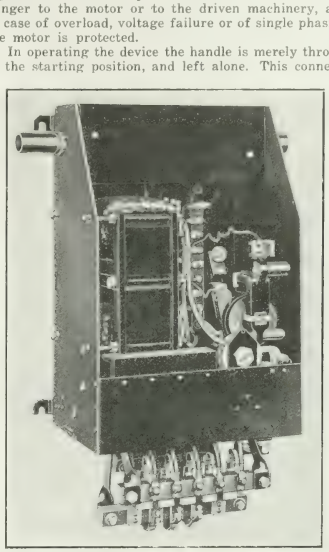
Proper Head Is Maintained Automatically. Elimination of overheating and waste of time in watching the pot are advantages

The capacity of the pot is for 15 lb. of solder, which it is said to heat to 600 deg. Fahr. in 25 minutes. Quick action in heating is attributed to a 900-watt heating element which is built around the container. The pot weighs only 13 lb. and may be carried and placed conveniently to the work. It operates on either 110 or 220-volt alternating current or on direct current.

New Device for Starting A. C. Motors

A type ZK manual automatic compensator, which is claimed to eliminate the objectionable features of the so-called hand compensator and to include all the advantages, except remote control, of the automatic compensator, has been placed on the market by the Electric Controller & Mfg. Co., Cleveland. The device is designed to automatically accelerate the motor without danger to the motor or to the driven machinery, and in case of overload, voltage failure or of single phasing the motor is protected.

In operating the device the handle is merely thrown to the starting position, and left alone. This connects the motor through transformers in the compensator to the line, and after the motor has accelerated to a speed where it can be safely thrown across the line a relay operates a mechanism in the compensator, which automatically throws the device from the starting to the running position. It is emphasized that by means of the device a motor may be started as easily as throwing a knife switch.



Manual Automatic Compensator. The motor is accelerated automatically and is fully protected

At the top of the compensator there is a panel with inverse time element overload protection, obtained by means of an expansion wire overload device. No-voltage protection is also provided, so that in case of overload or failure of voltage, it is necessary to go back to the compensator and throw the handle to start the motor again.

Development of a power site has begun at Hemmings Falls, near Drummondville, Que., on the St. Francis River. The contract for construction has been let to the Foundation Co., Ltd., of Canada, which is associated with the Foundation Co. of New York. The design and construction is in charge of J. S. H. Wurtele, plant manager of the Southern Canada Power Co., Ltd., and the purchase of building materials will be looked after by the contractors. The purchase of machinery and equipment will be made through the purchasing department of Southern Canada Power Co., L. C. Haskell, Coristine Building, Montreal. At Hemmings Falls it is proposed to develop 30,000 hp.

The Society of Automotive Engineers will hold its annual meeting in Detroit, Jan. 22 to 25, 1924, simultaneously with Detroit's automobile show. Meetings will be held in the General Motors Building.

BLAST FURNACE SLAG

Desulphurizing Power of Certain Kinds Based on Solubility of Calcium Sulphide

"The Desulphurizing Power of Iron Blast Furnace Slags" is the subject of a paper to be presented by Richard S. McCaffery, professor of metallurgy, University of Wisconsin, and Joseph F. Oesterle, assistant professor of metallurgy, before the Montreal meeting of the American Institute of Mining and Metallurgical Engineers, Friday, Aug. 30. It contains the report of an investigation to determine the quality of different iron blast furnace slags as desulphurizing agents, and the possibility of using in the blast furnace materials of higher sulphur content than those at present employed. In such a case, higher sulphur iron ores for pig iron and cokes containing more sulphur than usual could be used with the attendant result of the economical manufacture of iron and steels containing less sulphur than usual.

The authors state that it is generally assumed that the sulphur which reaches the lower part of the iron blast furnace is removed from the iron in the form of calcium sulphide because of its forming a combination with the lime. Sulphur as it comes into the blast furnace is usually in combination with iron or manganese in the ore or as a carbide compound in the coke. Iron and manganese sulphides are more soluble in iron than calcium sulphide but, as the latter is more soluble in the slag, this tends to free the metal from sulphur. The reaction which takes place requires a high temperature and strongly reducing conditions in the presence of lime.

The authors then discuss at some length the scientific work on the constitution, fusibility and viscosity of blast furnace slags by Vogt, Akerman, Rankin and Wright, Feild and Royster, giving diagrams by which the results of the present investigation can be coordinated with some of those mentioned.

Following this, there is a discussion of the solubility of calcium sulphide in slag constituents. The principal constituents involved were anorthite, gehlenite and calcium bisilicate. The values of the calcium sulphide solubility which were determined are given in the following table:

Scrap.—Carbon, 0.15 per cent; phosphorus, 0.04 per cent; silicon, 0.03 per cent; manganese, 0.70 per cent; sulphur, 0.06 per cent.

No. 2 Furnace with McKune Ports at Hamilton, Ontario Record for June, 1922

Number of heats	90
Total charge, net tons	8,566
Ingots produced, net tons	7,518
Average charge per heat, net tons	95.18
Average production per heat, net tons	83.53
Average yield of ingots per heat, per cent	87.77
Average time of heats	7 hr. 55 min.
Average time of charging	3 hr.
Total time taken when making up between heats	0.45 hr.
Total delays for month	13 hr. 45 min.
Total coal used, net tons	1,557
	414 lb. per ton of ingot
Percentage of hot metal, per cent	35
Cold metal, per cent	65
Outlet temp. before waste heat boiler and after valve, deg. Fahr	900
Length of life of roof, heats	350 to 400
Length of life of ports, heats	250 to 300
Side walls—back, heats	250 to 300
Side walls—front, heats	150 to 200

Average for Three Furnaces—October, 1922

Fuel practice, lb	501
Total B.t.u. per ton ingots	6,920,814
Pig metal (hot), per cent	35
Average size heats, tons	80
Average time, heats	9 hr. 30 min.
Average boiler hp. at waste-heat boiler	348 per hr.
Fuel equivalent of steam at waste-heat boiler, per ton of steel, lb	165
Net equivalent fuel per ton of steel, lb	336

Comparison of Old Type with McKune Type

	Old Design	McKune Design, April, 1922
Average weekly tonnage, tons	1,110	1,475
Fuel per ton, lb	590	495
B.t.u. per ton	8,250,000	6,900,000
Number of heats per week	14	18.7
Tonnage per heat	79.1	79.1
Time of heat	11 hr. 10 min.	8 hr. 25 min.
Coal gasified per hour, lb	4,160	4,660
Tonnage increase, per cent	....	33
Fuel saving, per cent	....	15

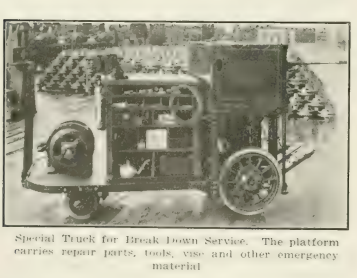
Bethlehem Steel Co. (Two Months)

	Old Design	McKune Design
Average heats per week	13.0	18.1
Tons per heat	78	78
Fuel per ton, lb	603	487
Tonnage increase, per cent	....	39
Fuel saving, per cent	....	19

Truck for Emergency Breakdown Service

An electric truck for use in industrial plants to carry equipment for repairs in the case of breakdowns when the services of millwrights or electricians are required, has been brought out by the Elwell-Parker Electric Co., Cleveland.

Having an assembly of first aid equipment ready to



Special Truck for Break Down Service. The platform carries repair parts, tools, vise and other emergency material

dispatch at a moment's notice when a break necessitates a shutdown, has been the practice in some plants, the standard type of electric truck being used for the purpose. The truck illustrated, made special for this service, is equipped with a steel and wood case which occupies about two-thirds of the platform and carries an assortment of repair parts, such as belting, belt fasteners, lamp bulbs, carbons, bushings, fuses, brushes, etc., and a supply of oil and grease. The balance is reserved for a motor, tool-kit and fire extinguishers. A pipe vise is mounted on the partitioned rack and there is room for one or two repair men to ride on the platform. The truck can be loaded with this emergency equipment and kept ready for instant departure from the repair or maintenance department. It can be driven at three times the walking speed.

The truck is driven by a battery carried in a large compartment over large rubber-tired drive wheels ,and steers on four wheels so that, it is stated, it can usually be driven to any point at which it is wanted around a plant. It is equipped with an electric horn and is foolproof, so that it does not require an experienced operator. It cannot be started unless the operator is standing on the pedals, and will stop within its own length when he steps off.

Steel & Tube Company Suit Postponed

CHICAGO, Aug. 25.—The hearing in the circuit court here on the petition filed Aug. 8 by the Allied Chemical & Dye Corp., New York, to prevent distribution among the Steel & Tube Co. of America stockholders of the proceeds of the sale of its properties to the Youngstown Sheet & Tube Co., did not come up this week as was expected. The defendants will file a petition asking that the case be transferred to the United States District Court of Northern Illinois.

Foreign orders from South America and Australia for motor trucks, with the right-hand drive have been received by the Springfield, Ohio, works of the International Harvester Co. Production schedule is now 35 trucks a day.

First Half Pig Iron Production Largest on Record

Special Statistical Bulletin No. 4 of the American Iron and Steel Institute shows that the production of pig iron in the United States for the first half of 1923 amounted to 21,016,475 tons, of which the production of coke pig iron, including ferroalloys made with electricity, was 20,874,240 tons, the largest tonnage for any half year in the history of the industry. The next largest was 20,826,914 tons in the second half of 1918. The total for the year 1918 was 39,054,644. In the record year, 1916, when the production was 39,434,797, the production for the first half was 19,619,522. The production of charcoal pig iron in six months of 1923 was only 133,469 tons and of anthracite iron, 8766 tons. No anthracite pig iron was produced in 1922.

HALF-YEARLY OUTPUT OF PIG IRON BY STATES.

HALF-YEARLY PRODUCTION OF ALL KINDS OF PIG IRON.

States	Blast furnaces *				Production—Gross tons (Includes spiegeleisen ferro-manga., ferro-silicon, ferro-phosphorus, etc.)		
	In blast Dec 31, 1922	June 30, 1923 In.	Out.	Total.	First half of 1922.	Second half of 1922	First half of 1923.
Massachusetts	1	0	1	1		1,084	1,309
Connecticut	0	0	2	2			
New York	15	24	4	28	833,488	938,837	1,489,701
New Jersey	1	2	2	4			
Pennsylvania	90	125	28	153	4,339,560	5,392,228	7,794,398
Maryland	4	5	1	6	140,885	275,106	446,797
Virgina	4	6	11	17			
Alabama	25	30	13	43	963,019	1,267,600	1,460,813
Georgia	0	0	2	2			
Texas	0	0	1	1			
West Virginia	3	4	1	5	240,822	219,489	355,291
Kentucky	1	2	5	7			
Mississippi	0	0	1	1			
Tennessee	6	7	10	17	17,585	106,322	142,879
Ohio	58	67	13	80	2,898,846	3,585,316	4,978,327
Illinois	18	24	2	26	1,237,877	1,387,367	1,899,231
Indiana	14	16	0	16	1,252,733	1,473,994	1,825,759
Michigan	13	12	1	13			
Wisconsin	4	5	2	7	102,809	278,221	396,958
Minnesota	3	3	0	3			
Missouri	0	0	3	3			
Iowa	0	0	0	0	163,387	103,329	225,009
Colorado	3	3	2	5			
Total	263	335	105	440	12,191,011	15,028,893	21,016,475

*Completed and rebuilding

HALF-YEARLY PRODUCTION OF COKE PIG IRON.*

Connecticut	0	0	0	0			
New York	15	24	3	27	833,488	939,159	1,489,701
New Jersey	1	2	2	4			
Pennsylvania	90	124	24	148	4,339,560	5,392,228	7,785,632
Maryland	4	5	1	6			
Virginia	4	6	11	17	140,885	275,106	446,797
Georgia	0	0	1	1			
Texas	0	0	1	1			
Alabama	24	28	12	40	949,566	1,255,839	1,448,404
West Virginia	3	4	1	5	240,822	219,489	355,294
Kentucky	1	2	5	7			
Tennessee	6	6	8	14	17,585	106,322	140,762
Ohio	58	67	13	80	2,898,846	3,585,316	4,978,327
Illinois	18	24	2	26	1,237,877	1,387,367	1,899,231
Indiana	14	16	0	16			
Michigan	4	4	0	4	1,256,880	1,463,838	1,892,703
Wisconsin	3	4	2	6			
Minnesota	3	3	0	3			
Missouri	0	0	2	2			
Iowa	0	0	0	0	190,716	264,284	437,389
Colorado	3	3	2	5			
Total	251	322	90	412	12,106,225	14,888,948	20,874,240

*Includes pig iron and ferro-alloys made with electricity, electricity and coke, etc.

HALF-YEARLY PRODUCTION OF ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

Pennsylvania	0	1	2	3			8,766
Total	0	1	2	3			8,766

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.

Massachusetts	1	0	1	1			
Connecticut	0	0	2	2		762	1,309
New York	0	0	1	1			
Pennsylvania	0	0	2	2			
Alabama	1	2	1	3			
Georgia	0	0	1	1	13,453	11,761	14,526
Tennessee	0	1	2	3			
Mississippi	0	0	1	1			
Michigan	9	8	1	9			
Wisconsin	1	1	0	1	71,333	127,422	117,631
Missouri	0	0	1	1			
Total	12	12	13	25	84,786	139,945	133,469

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Coke*	231	322	90	412	12,106,225	14,888,948	20,874,240
Anthracite†	0	1	2	3			8,766
Charcoal	12	12	13	25	84,786	139,945	133,469
Total	263	335	105	440	12,191,011	15,028,893	21,016,475

*Includes pig iron and ferro-alloys made with electricity, electricity and coke, etc.
†Includes mixed anthracite and coke pig iron.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States	First half of 1922	Second half of 1922	First half of 1923
New York, New Jersey	428,536	385,697	508,343
Pennsylvania—Allegheny County	1,248,060	1,575,825	1,864,180
Other counties	1,100,324	1,468,217	2,240,880
West Virginia, Alabama, Kentucky	641,200	691,170	849,848
Ohio	1,257,315	1,424,495	2,040,027
Indiana, Illinois	1,534,969	1,722,927	2,232,602
Michigan, Wisconsin, Minnesota, Colo.	179,472	188,160	375,434
Total	6,389,876	7,451,491	10,181,323

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

Connecticut, New York	50,541	94,975	189,467
Pennsylvania	1,516,802	1,865,347	2,754,665
Md., West Va., Ky., Ala., Tenn.	163,115	232,927	471,270
Ohio	1,159,416	1,547,878	2,138,504
Indiana, Illinois, Iowa, Wis., Colorado	552,730	562,472	849,284
Total	3,512,601	4,300,599	*6,372,987

*Includes 149,251 tons of low-phosphorus pig iron.

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON AND FERRO-SILICON.

Massachusetts, Connecticut	870	1,084	1,309
New York, New Jersey	308,129	353,606	587,348
Pennsylvania	305,792	296,126	500,990
Maryland, Va., West Va., Ky., Tenn.	36,853	168,283	320,925
Alabama	459,563	708,348	731,271
Ohio	219,069	280,172	443,335
Indiana, Illinois	82,192	119,096	138,732
Michigan	130,763	295,685	313,013
Wisconsin, Minnesota, Iowa, Colorado	86,868	125,016	162,512
Total	1,629,229	2,347,202	*3,205,435

*Includes 134,029 tons of ferro-silicon.

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York	35,348	66,462	161,042
Pennsylvania, Maryland	17,945	45,208	59,118
Ohio	195,036	287,811	296,138
Indiana, Illinois, Mich., Wis., Minn.	179,669	224,016	298,073
Total	427,998	623,497	814,371

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New Jersey, Pennsylvania	65,845	56,184	118,513
Alabama	10,181	11,998	10,496
Ohio	26,858	43,144	50,676
Total	102,884	111,326	185,625

HALF-YEARLY PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania, Maryland, Ala., Tenn.	96,555	127,003	188,835
Total	96,555	127,003	*188,835

*Includes 124,025 tons of ferro-manganese and 64,810 tons of spiegeleisen.

HALF-YEARLY PRODUCTION OF OTHER GRADES.

New York, New Jersey	4,269	33,333	25,143
Pennsylvania	1,443	3,029	5,181
Maryland, Va., West Va., Tenn., Ala.	14,858	24,658	29,478
Ohio	1,152	1,816	9,790
Indiana, Illinois, Minnesota	10,143	5,539	7,307
Total	31,865	67,775	67,899

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1923.

Grades	For sale.	For maker's use	Total. Gross tons
Basic	1,108,965	9,072,358	10,181,323
Bessemer and low-phosphorus	500,490	5,872,497	6,372,987
Foundry, including ferro-silicon	2,954,036	250,499	3,205,435
Malleable	773,983	40,388	814,371
Forge or mill	103,611	82,014	185,625
Ferro-manganese	41,512	82,513	124,025
Spiegeleisen	53,193	11,617	64,810
All other grades	53,529	14,370	67,899
Total	5,550,319	15,466,156	21,016,475

National Safety Council Program

The program of the twelfth annual safety congress of the National Safety Council at Buffalo, Oct. 1 to 5, has been announced. The Metals Section will convene on Wednesday and Thursday mornings, and will be presided over by T. H. McKenney, superintendent of labor and safety, Illinois Steel Co., Chicago. Walter Hart, Jones & Laughlin Steel Corporation, Pittsburgh, will be vice-chairman, and J. A. Northwood, Cambria plant, Bethlehem Steel Co., Johnstown, Pa., acting secretary. The following papers will be presented:

"Handling Material in a Foundry," by Benjamin F. Faunce, superintendent steel car department, Cambria plant, Bethlehem Steel Co., Johnstown, Pa.

"Safety on the Plant Railway," by C. F. Dullenkopf, superintendent of yards, Bethlehem plant, Bethlehem Steel Co., Bethlehem, Pa.

"Fire Protection in Steel Mills and Foundries," by J. M. Woltz, Youngstown Sheet & Tube Co., Youngstown, Ohio.

"Relation of Medical and Safety Departments," by G. H. McKinstry, M. D., Spang-Chalfant Co., Pittsburgh.

In a general round table meeting on Thursday afternoon "A Scene in a Foundry," a playlet by workers of the Edgar Thompson Works of the Carnegie Steel Co., Braddock, Pa., will be presented, and there will be general discussion of "Getting Safety Across to the New Man—The Non-English Speaking Men and Men Working in Scattered Small Groups." In a general session Monday afternoon one of the principal speakers will be Royal B. Meeker, commissioner Pennsylvania Department of Labor and Industry, who will discuss "International Aspects of the Safety Problem." A session of the Automotive Section will be devoted to a general discussion of "Punch Press Safeguarding" and "Forging Hazards." In the session of the Engineering Section Wednesday afternoon the report of the Committee on Flywheels, E. B. Tolsted, Fonda-Tolsted Co., Chicago, chairman, is expected to be of particular interest.

Plans of Quad City Foundrymen

The board of directors of the Quad City Foundrymen's Association held its first meeting after the summer recess at the Rock Island Club, Aug. 22, with 100 per cent attendance. A program of work for the coming year was outlined and it was agreed that the following major subjects should be given special attention during the year:

Pig Iron, including technical discussion on charcoal pig iron, coke pig iron and Mayari pig iron.

Coke, a technical discussion on the production of coke by both the by-product and beehive process. Also a comparison of coke made from Eastern and Western coals.

Industrial Education. This subject is in the hands of a special committee, Fred Kirby, Marseilles Works, East Moline, chairman. It is proposed to do constructive work on the matter of apprenticeships and develop interest of the school authorities and the factories in industrial education.

Steel: All processes. Several of the best authorities in the country have expressed a willingness to handle this topic.

Cupola: New and improved methods of cupola practice; speaker to be a prominent equipment manufacturer.

Molding Sand: This will be taken up after the first of the year after a special committee, Henry Bornstein, Deere & Co., chairman, has had opportunity to make a report. It is also planned to get one of the best sand men from the Milwaukee district to cover this subject.

Costs: While all plants naturally have their own cost system, it is thought that much good can be accomplished by educating the foremen in the plant to appreciate the value of the cost record and have them realize that in order to get correct costs they must give the office correct information regarding time and materials used.

Malleable Iron, including the melting of gray iron in an air furnace and also electric furnaces.

Other subjects suggested for consideration through the year include piece rates, inspection and where the foundry's responsibility ceases, safety first, annealing on malleable iron, purchasing scrap, chilled work, green sand cores, electric furnaces, molding machines, sand handling machines, centrifugal process of molding, sand-throwing machines.

The first meeting of the year will be held Sept. 17 at the LeClaire Hotel.

The board of directors elected at the May meeting for the ensuing year is as follows: President, A. E. Hagebeock, Frank Foundries Corporation, Moline, Ill.; vice-president, John Ploehn, French & Hecht, Davenport; secretary and treasurer, H. C. Cooper, John Deere Harvester Works, East Moline, Ill. Directors, A. K. Reading, Zimmerman Steel Co., Bettendorf, Iowa; H. A. Soverhill, Davenport Locomotive Works, Davenport; Leon Mitchell, Rock Island Stove Co., Rock Island, Ill.; Martin Carlson, Barnard & Leas Co., Moline; P. T. Bancroft, John Deere Harvester Works, East Moline.

Iron and Steel Institute's Milan Meeting

The technical program for the fall meeting of the Iron and Steel Institute at Milan, Italy, Sept. 27 and 28, is as follows:

"Alloys in the Ternary System Iron-Chromium-Carbon," by C. R. Austin, E. D. Campbell, W. L. Fink and J F. Ross.

"The Iron-Iron Carbide Equilibrium in Dry Hydrogen at 950 deg. C.," by E. D. Campbell, J. F. Ross and W. L. Fink.

"The Relative Efficiency of Dry and of Moist Hydrogen on the Decarburization of Steel at 950 deg. C., and the Effect of Hydrogen on the Phosphorus Content," by E. D. Campbell, J. F. Ross and W. L. Fink.

"A Note on Coarse Corrugation in Mild Steel Sheets," by C. A. Edwards and L. B. Pfeil.

"The Iron and Steel Industry of Italy," by G. E. Falck.

"The Complex Action of Manganese and of Other So-called Deoxidizing Agents in the Manufacture of Steel," by F. Giolitti.

"The Change Points in Some Nickel-Chromium Steels," by W. T. Griffiths.

"The Influence of Nickel and Chromium Upon the Solubility of Steel (in Relation to Corrosion)," by W. H. Hatfield.

"The Iron Ore Mines of Nurra (Sardinia)," by Cesare Martelli and Tito Sotgia.

"The Morphology of Pro-Eutectoid Cementite," by A. Portevin.

"The Corrosion Cracking of Steel Under the Influence of Internal Stresses," by A. Portevin.

"The Effect of Low Temperature Annealing on Some Mechanical Properties of Cold Drawn Steels," by S. H. Rees.

"Theory and Practice of Steel Refining," by H. Styri.

"The Manufacture of Heavy Steel Castings from Small Converters," by C. Vanzetti.

"Grain Growth in Iron and Steel," by H. C. Wang.

At the conclusion of the meeting visits have been arranged to Florence, Rome, Piombino, Leghorn, Genoa and Turin.

Chicago Machinery Club Enlarges

The Machinery Club of Chicago, Machinery Hall, Clinton Street and West Washington Boulevard, Chicago, has taken the remainder of the fourth floor of that building, thereby increasing its floor space 25 per cent. The additional space which is now being remodeled to conform with the appointments in the remainder of the club, will include billiard and pool tables, a barber shop and toilet and shower baths. The room now occupied by the billiard and pool tables will be added to the dining hall, increasing its capacity about 70 per cent. The club is located in what is known as the "machinery district" of Chicago, where all of the important machine tool dealers are grouped, and is enjoying a steady growth. More than two hundred members and guests have luncheon in the club rooms daily and the rapid increase in patronage makes enlargement of facilities imperative. The active membership of the club is now nearly one thousand.

Automobile Production in July

Although falling below the figures for each of the four preceding months, July provided the fifth successive month when more than 300,000 motor vehicles were produced. Figures of the Department of Commerce for the first seven months of 1922 and 1923, divided between passenger cars and trucks, are given in the table. The total for seven months in 1923, amounting to 2,126,895 passenger cars and 227,055 trucks, exceeds by 68½ per cent the 1922 aggregate of 1,261,267 cars and 136,323 trucks. In each year trucks have numbered just under 10 per cent of the total production.

Automobile Production

	Passenger Cars		Trucks	
	1923	1922	1923	1922
January	223,706	81,693	19,398	9,416
February	254,650	109,171	21,817	13,195
March	319,633	152,959	24,681	19,761
April	344,474	197,216	37,527	22,342
May	350,180	232,431	*43,018	23,788
June	*337,143	263,027	*40,616	25,984
July	297,104	224,770	29,998	21,837

*Revised by the Department of Commerce.

Lift Truck for Single-Piece Loads

A lift truck, with provision for carrying its load beyond the front axle and designed for the handling of a single-piece load up to 2500 lb. by one man, has been brought out by the Elweil-Parker Electric Co., Cleveland. The platform or forks may be lowered to the floor or may be stopped at any height between upper and lower limits. The forks are shaped at the outer ends to permit their insertion beneath a



Lift Truck for Single Piece Loads Up to 2500 Lb. The forks are shaped to permit of easy insertion beneath a box or bundle

bundle, box, bale, barrel, casting or any irregular shaped piece.

The length of the forks depend upon the weight carried, as the load handled balances an equal weight of the truck back of the axle. To carry the load, a heavy axle with wide tread and equipped with large roller bearings is provided, this being mounted on dual 10 by 3 in. wheels. These as well as the rear driving wheels are steerable. The raising mechanism consists of a separate motor with worm gear reduction attached to a removable platen supported on the truck frame by three rocking links. This electric lift mechanism is simple in construction and assembled as a unit.

The propelling unit consists of a heavy-duty motor and controller direct connected through a flexible coupling to a worm and wheel with bevel pinion differential running in oil. Drive shafts with chrome vanadium universal joints and with clutch plates bolted to the outside of the wheels complete the full-floating drive axle. The drive wheels turn on 7-in. double-row ball bearings. The knuckles on both the drive and front wheels are located close to the center of the tires in order to assure easy steering and to avoid any "kick-back" at the steering handle when the tires strike floor obstructions.

Italy as an industrial machinery market has been recently studied by the Department of Commerce. Of the total imports of machinery and apparatus by Italy in 1922, valued at about 400,000,000 lire, Germany supplied one-half and the United States 7.4 per cent. An attempt was made to estimate the value of industrial machinery as distinguished from non-industrial machinery and the total for 1922 of industrial machinery is put at 280,000,000 lire. Of this Germany supplied 46.8 per cent and the United States only one-tenth as much. Switzerland supplied about 14 per cent, and Great Britain practically as much. One explanation of the German predominance is the depreciated value of the mark.

Less Employment and Lower Wages

Figures of the Bureau of Labor Statistics, Washington, show a falling off between June and July of about 2 per cent in the number of men employed in metal working establishments, a decrease of nearly 6 per cent in the weekly payroll and a drop of almost 4 per cent in the contents of the average pay envelope.

The figures relate to 1420 establishments which in June employed 1,015,070 wage earners, with a payroll of $30,725,626, or an average of $30.27 per wage earner. In July the same establishments had 996,514 employees with payrolls aggregating $28,984,283, or an average of $29.09 per wage earner. The present average wage is 21.7 per cent higher than one year ago, although the identity of the establishments is not the same, and only half as many employees were involved in the 1922 figures.

Men engaged in car building and repairing showed the greatest increase in average wage, with 59 per cent. Iron and steel workers come next with 37.4 increase. Employees of foundries and machine shops, agricultural implement factories, electrical apparatus, hardware, stoves and steel shipbuilding plants, increased between 14 and 15 per cent.

Automobile workers showed the lowest increase, with 8.2 per cent, but they have still the highest wage rate of any of the steel working groups, and are the only one showing an increase from the June figures. At $32.44 per week, the automobile workers have 21 per cent higher wages than the iron and steel workers, and their figure has been consistently higher than the others for some time.

Details of the report are covered in the table.

Periods	Number of Establishments	Number of Men	Week's Payroll	Average Weekly Pay	Increase in One Year
Iron and Steel:					
June, 1923...	176	232,563	$6,994,331	$30.08	
July, 1923...	176	225,478	6,037,142	26.78	37.4%
July, 1922*..	125	144,211	2,816,975	19.49	
Automobiles:					
June, 1923...	190	274,250	$8,846,767	$32.26	
July, 1923...	150	265,740	$ 619,594	32.44	8.2%
July, 1922*..	106	146,625	4,394,135	29.97	
Car Building and Repairing:					
June, 1923...	217	177,489	5,351,411	30.15	
July, 1923...	217	176,026	5,157,713	29.30	59.0%
July, 1922*..	101	54,122	942,349	18.42	
Foundry and Machine Shops:					
June, 1923...	508	148,659	4,446,203	29.91	
July, 1923...	508	149,120	4,368,926	29.24	14.3%
July, 1922*..	149	73,828	1,422,561	19.58	
Miscellaneous†					
June, 1923...	329	182,109	5,086,714	27.93	
July, 1923...	329	179,829	4,806,507	26.69	14.9%
July, 1922*..	153	101,137	2,346,715	23.23	
Metal Workers: (The five groups above)					
June, 1923...	1,420	1,015,070	30,727,626	30.27	
July, 1923...	1,420	996,514	28,984,283	29.09	21.7%
July, 1922*..	634	498,723	11,919,119	23.90	

*As present reports cover many more plants, the 1922 figures are of interest chiefly as indicating changes in wage rates.

†Agricultural implements, electrical apparatus, hardware, steel shipbuilding and stoves.

Merger in Powdered Coal Business

An agreement has been consummated whereby the Fuller Engineering Co. will act as sole licensees in the United States and Canada for all new business of the Quigley Fuel Systems, Inc. The engineering personnel of the Quigley institution has become associated with the Fuller company. In the future the pulverized fuel equipment business of the Quigley Fuel Systems, Inc., will be conducted through the main and branch offices of the Fuller Engineering Co.

W. O. Simpson, manufacturers' agent in Mexico City, P. O. Box 1277, Apartado, Mexico, D. F., an American who has lived in Mexico for 25 years, writes that he is willing to supply information to American concerns planning business in Mexico, as regards ratings and other matters of importance in respect to potential buyers.

NEW ENGINE LATHE

Back Gears Placed Beneath the Spindle—Motor Mounted in Cabinet Leg—Other Features

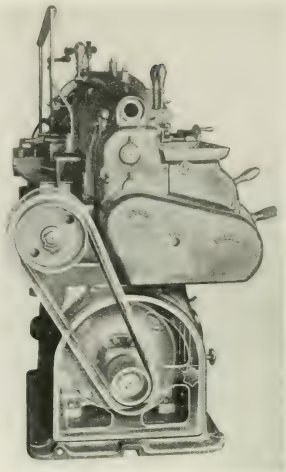
A 16-in. engine lathe designated as the model B, said to be newly designed throughout, and which incorporates several noteworthy improvements, has been placed on the market by the Pratt & Whitney Co., Hartford. Although primarily designed for individual motor drive, using a geared head, the machine may be adapted readily to single pulley drive or a cone head with countershaft drive.

Placing the back gears, which usually project from the rear of the headstock, directly beneath the spindle, thus figuratively making them "under gears," is an outstanding feature. In addition to a neat design, the compactness obtained is said to permit of a much stronger head with greater strain-resisting qualities. This arrangement also permits the proper light reaching the work centers, and does not interfere with the operator's arm freedom in filing and similar operations.

The motor drive arrangement, having the motor accessible but out of the way, is a feature. A 5-hp. motor is mounted in the cabinet leg on a hinged platform, which serves as a belt-tightening device. A belt from the motor drives a shaft at the rear, which connects with the spindle through a friction clutch and headstock gears. The clutch is operated by the overhead stop rod extending the length of the lathe. Fully inclosed electrical equipment, such as low voltage protection, master switch, etc., is provided, and the motor is started and stopped by means of a push button switch.

Other conveniences include the system of controls for both the spindle speeds and the carriage feeds. A set of four speed transmission gears operated by two interlocking levers on the front of the headstock provides convenient spindle control. These gears in conjunction with the back gears give eight spindle speeds, ranging from 13 to 525 r.p.m. in geometrical progression. Control of the back gears is through the lever just beneath the spindle nose, and the back gear lock is operated through a lever on the headstock. Headstock gears are of chrome-vanadium steel hardened, and all gears are cut on the Maag system.

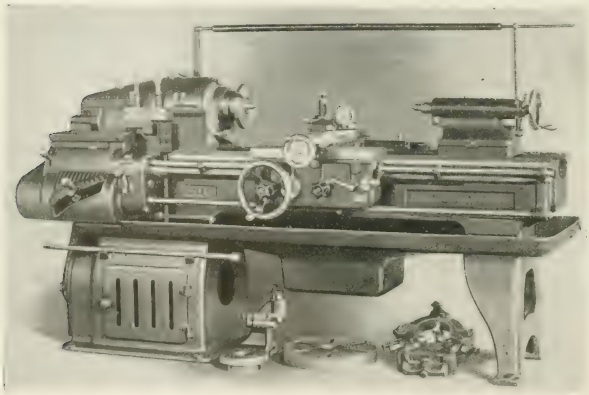
Driving from the spindle gears a train of large spur gears leads down to the feed gear box on the front of the machine. By means of two levers and a direct-reading index plate any number of threads per inch or feed per revolution may be set instantaneously, tables and charts being unnecessary. The process of setting these levers is similar to plotting a point on a curve, the ratio lever controlling the three possible ordinates or vertical settings, while the abscissae are controlled by the twelve feed gears operated by the rocker lever. Among other advantages this arrangement provides a check on the lathe setting, not only to the workman but also to the foreman.



The Motor Is Mounted on a Hinged Platform Which Acts as a Belt Tightening Device. Absence of overhanging back gears may be noted also from view above

A further feature in the feed mechanism is the small pinion within the rocker arm supporting sleeve. This pinion drives the larger rocker gear and the feed gear cone, and was formerly supported by its own small driving shaft within the sleeve. It is now supported on an extension of its own periphery, which fits inside the supporting sleeve, serving as a secure support for its driving shaft and increasing the stability of the whole mechanism.

Features in the carriage and apron design include a quick withdrawing device for thread cutting, by means of which it is only necesasry to give a hand-wheel a quarter turn at the end of a thread, and the tool is withdrawn completely. A positive stop permits the tool to be returned to its initial depth by the same hand-



Motor - Drive Arrangement and Mounting of Back Gears Directly Beneath the Spindle Are Outstanding Features of the Geared Head Lathe Shown at the Left. The system of controls for both spindle speeds and carriage feeds is also a feature and a quick withdrawing device for thread cutting has been incorporated. Lubrication of the geared head is by the splash method

wheel, while a graduated disk and wheel on the tool slide provide for further settings. Use of the carriage for ordinary turning operations is not impaired, as the tightening of a set screw throws the device out of action and makes a fine screw available for cross feed use.

The geared headstock is fully inclosed and the gear mechanism lubricated by the splash method. The friction clutch and intermediate gear meshing with it are submerged in the oil, and the next gear in line is half submerged and serves as the splash gear. Oil is thrown upward against the cover, and projecting ribs carry it downward to the various gears. Centralized oiling is used for parts such as the apron, the remainder of the machine being lubricated through oil holes.

The spindle is large and is carried in heavy bearings. The spindle is ground over its entire length and the bearing surfaces are hardened and lapped. The spindle nose is provided with threads, a cylindrical seat and a taper seat, and it is said to be so carefully worked out that face plate changing cannot effect the accuracy of seating. The tailstock spindle is locked by a long wedge placed so that the center position cannot be displaced by the locking strain. The lead screw provides ample surface for minimizing wear. The use of lapped thrust washers, and using spur gears at the reversing clutch in place of the usual bevel gearing, is said to make accurate threading doubly certain.

On the geared head lathe a brake is applied when the control rod is thrown to the extreme right to open the clutch, thus stopping the spindle quickly. The same idea has been applied to the cone head in the form of a hand brake on top of the front bearing housing. Another feature is a conveniently located lever for reversing or stopping the travel of the carriage. This lever operates a stop rod with a rotary motion which carries stop dogs for automatic control in either direction when desired. Large rings, graduated to correspond with micrometer readings, and a graduated tailstock spindle are among other details incorporated. A complete line of special equipment is available.

The swing over the bed is 16½ in. and over the carriage 9⅝ in. Beds 7, 9 and 11 ft. are available, maximum center distances being 39, 63 and 87 in. for geared head machines and 36, 60 and 84 in. for cone head. The length of the machine is the length of bed plus 1 ft. 8 in. and the width 3 ft. 3 in. in all cases, including taper attachment. The height is 4 ft. 10 in. The weight of the geared head machine with regular equipment, 7 ft. bed and without motor, is 3900 lb. net.

TRANSVERSE FISSURES IN RAILS

This Insidious and Elusive Type of Fracture Is Prevalent on Certain Railroads

In a report on transverse fissures, prepared by Dr. James E. Howard, engineer physicist with the Interstate Commerce Commission, analysis is made of the locations of this type of rail fracture with regard to the analysis of the metal, as shown by the heat from which the rail was made; of the position of the ingot in its numerical order in the pouring of the heat; of the position of the particular rail with regard to the head of the ingot from which it was rolled; of the location of the rail with regard to traffic conditions of the road, etc. The age of the rail forms an important link in the chain of evidence, while the location of the fissure—whether on the gage side or the outside of the track—has also been studied.

Causes

As stated in the report, transverse fissure begins in the interior of the head of the rail and defies detection until it has reached an advanced state of development, making its appearance at the periphery of the head or resulting in the sudden and unexpected rupture of the rail. Starting from a central point or nucleus, it progressively increases in size, weakens the rail and culminates ultimately in rupture. The interior origin of such a transverse fissure is caused by a zone of metal in the top of the rail head acquiring a state of internal compression. This is a direct result of the cold rolling action of the wheels on the running surface of the rail. The necessary reactions put the interior of the head into a state of tension, resulting in transverse fissures in this particular zone.

Generally speaking, transverse fissures occur in all weights of rails, even the heaviest, of 136 lb. per yard, not being immune. They appear in rails from all parts of the ingot, from all rail mills in the country, and from both the Bessemer and open-hearth processes. There is a distinct relation between density of traffic and age of fissured rails, ranging on different railroads from three years or more up to 15 years. On double and multiple track roads, these fissures predominate on the heavy tonnage tracks. It is thus evident that the quantity of wheel loads contributes largely to their formation. Some roads with light traffic have reported no transverse fissures at all.

Almost Unknown Abroad

In Great Britain and on the Continent of Europe, transverse fissures are not prevalent. A distinguished English metallurgist explained this by saying: "In Great Britain the rails are not treated in the barbarous fashion customary in the United States." He referred no doubt to the question of wheel loads, as this is the chief difference between English and American practice. Until European roads reach the same condition of severity of loading they will probably not have this trouble to combat.

The results of the compilation made do not hold out a promise that transverse fissures can be eliminated under those conditions of service which have now been reached. Internal strains must be reckoned with. There is no recourse against their introduction. It is questionable whether increased weight of rail, far beyond the heaviest now being rolled, would overcome their destructive effects.

Girder strength, abrasive resistance to the action of the wheels and cold rolling effects of wheels on the head of the rail are given as the three main problems in rail making. The first and second can be met without difficulty. The third feature, however, is a vital one and admits of solution only by the proper regulation of wheel loads. This means cooperation by the designer of rolling stock with the designer of the rails in so distributing wheel loads that the excessive cold rolling action now experienced may be reduced. Collaboration between the trunk line railroads and the steel mills will be necessary in working out this problem in such a way as to overcome the present difficulty.

A Different Viewpoint*

Great weight must be given Mr. Howard's latest report on transverse fissures (dated April 23, 1923), because he writes as a keen observer, one of the most expert of physicists, and with an experience of many years devoted to studies of steel and the behavior of rails. It is certainly with no intentional disrespect for his views that the question of the formation of transverse fissures is discussed without complete acceptance of his theories; for, after, all, Mr. Howard's explanations are more theoretical than would be the case if sustained by more extensive experimental data.

As a matter of fact, the prevalence of transverse fissures is not nearly so alarming as an impressionist would gather from reading Mr. Howard's report. A total of 5000 heats from one mill, on one road, has shown fissures in about 3.6 per cent of the heats in about twelve years of service, and in approximately one rail in 1500. That case probably represents fair average conditions and by no means indicates a frequency of occurrence that need alarm the traveling public, for the same lot of rail has yielded one other type of failure in each 190 rails, or about eight times as many failures of other kinds as of fissures. Nevertheless, rails containing fissures constitute the most dangerous and, therefore, important class of failures with which the railroads are now involved, for they may give no warning prior to complete rupture, and trains are badly

*From *Railway Age*, Aug. 11.

wrecked by the sudden failure of a rail containing one. But other wrecks of a serious nature have occurred from other types of rail failures; for instance, broken bases, often involving complete fractures, have probably given as much trouble in the past, and perhaps occasioned quite as much argument as fissures now afford. Failures due to broken bases have been almost completely eliminated; some might say by changing the design of the section and others by superior manufacturing methods; but, at all events, the disease finally yielded to treatment and the fissure problem should not be despaired of easily.

Mr. Howard's well known determinations of the strains in rails due to cold rolling are open to no argument. That compressive strains, caused by the rolling action of the wheels on the surface metal of the rail head, must be balanced by tensile strains in the interior, is admitted. But whether these tensile strains alone, and positively by the aid of no other agency, actually rupture the interior metal, in good steel and bad, and so produce internal fissures is obviously unproved, and will not be conceded without an abundance of supporting facts. It is true that very little is known about the effects of internal strains, or even of the fatigue of metals; but considerable advance has been made in other directions which, from a metallurgical point of view, quite invariably throws suspicion, if not entirely fixing the blame, on the character of the steel that does not possess the satisfactory qualities of its neighbor when under the same conditions of service.

The collection of data pertaining to the occurrence of fissures is interesting and gives information that, of course, should have been produced by the rail users long ago. In some respects they do not go far enough, for the locating of each fissure in the track is not especially impressive by itself, except as showing that certain locations have been so susceptible to the development of fissures that railroad travel was extremely hazardous. It would vastly increase the importance of the data to show the location of the failures by head numbers, and then the heats by mill rollings, and in that way bring out the point, if possible, that quite regardless of location certain heats are more prone to develop fissures than others.

The rails comprising 25 consecutive miles of line on one road produced several hundred fissures—so many that an accurate count was quite impossible, yet there was comparative freedom from fissures in the track for many miles on either side. That short stretch of track was composed chiefly of rails from one rolling of 61 heats. Following the removal of these rails the matter of fissures fairly subsided on the remaining 3000 miles of track and, except in sporadic cases, has not been a serious matter since. Another case is recorded where the rails of a single heat developed fissures, although laid on different lines of the same road in four different States.

These, and similar cases, in no way reflect on Mr. Howard's general theory, but emphatically show that some rails are much more apt to develop fissures than others subjected to precisely the same effects productive of cold rolling strains. Thus, in general, his theory is sustained, but with the important reservation that there may be a contributory, if not a prime, defect in the steel to account for the great differences in the effect of cold rolling strains. If split heads differ from regular fissures chiefly because of the presence of an internal seam in the steel, why may not some other inherent defect provoke the original nucleus of the transverse fissure?

Not infrequently the rails of a single rolling give peculiar results in service, and emphasize the point that some frailty of the steel may greatly facilitate the development of fissures. The rails of 61 heats rolled in three days at one mill have yielded over 40 fissures in 10 years of service on a certain railroad, and those fissures have been confined to 13 of the heats. Critics of Mr. Howard's theory will ask why 80 per cent of the heats, or say 99.5 per cent of the rails in this case, have been immune from fissures, notwithstanding the effects of cold rolling that must have been produced in all of them by practically identical traffic conditions. True, the answer is difficult, but an analysis of many similar instances points so strongly to the possible, and probable, presence of some defect of good mill practice that the matter becomes one for further study and investigation, rather than an admission that all rails are dangerous because the wheel loads are too heavy.

A fourth feature should be added to the list in Mr. Howard's concluding remarks on what he regards as constituting the rail problem. Manifestly of more importance than any other feature of the rail problem is the matter of obtaining a good sound steel, properly treated and rolled into a rail. The first item in the list therefore should be "Quality of Steel." In many respects that is the crux of the rail problem. On it to a very large extent depends the success of the rail as a girder; the abrasive resistance to the wheels; and, not remotely, the influence of the wheels toward cold rolling with which may be associated matters involving the load carried by the small contact between wheels and rails. Good steel is an asset, bad steel is a terrible liability.

High-carbon open-hearth rails, and the process of making them, are a comparatively new thing. Their production and use have been developed largely by force of circumstances. In some respects they have not given the results anticipated, and certainly many details of manufacture have not been given the studious attention required of such an important product. Is the composition usually specified for present day rails (and frequently not obtained) the best suited, or has it been arrived at by mere rule of thumb? Are the large ingots used, weighing from 8000 to 14,000 lb., suitable for the rapid reduction to common section rails in from 18 to 30 passes? Are the common soaking pit methods of treating those ingots adequate assurance against the evils to which high-carbon steel is so susceptible? What are the actual effects of sonims in steel, and if the presence of some impurities can be restricted by proper furnace practice and control, why venture the risk of introducing them by some later additions?

C. W. GENNETT, JR.
Manager Rail Department, Robert W. Hunt Co., Chicago.

Arcade Malleable Iron Co. Expands by Consolidation

The business of the Arcade Malleable Iron Co. division of the Baldwin Chain & Mfg. Co., Worcester, Mass., and that of the Springfield Malleable Iron Co., Springfield, Mass., are to be consolidated under the ownership of a new Massachusetts Corporation, which will retain the name of the Arcade Malleable Iron Co. Henry P. Blumenauer, general manager of the Arcade Malleable Iron Co. division, and also of the Springfield Malleable Iron Co., will be general manager and president of the new company. The Baldwin company will sell the foundry end of its business to the new corporation, but will continue otherwise without change in management and personnel of its officers. Mr. Blumenauer will probably remain a vice-president.

The Arcade Malleable Iron Co. will be capitalized with $550,000 in first mortgage 7 per cent gold bonds, $500,000 in 8 per cent preferred stock and 10,000 shares of no par value common stock. The board of directors as planned will consist of Frank A. Drury, president Merchants National Bank, Worcester; Frank J. Weschler, president Hendee Mfg. Co., Springfield; Arnold Whittaker, vice-president Moore Drop Forging Co., Springfield; Bowen Tufts, vice-president C. D. Parker & Co., Boston; J. Verner Critchley, president Reed-Prentice Co. and Walden-Worcester, Inc., Worcester, and Henry P. Blumenauer.

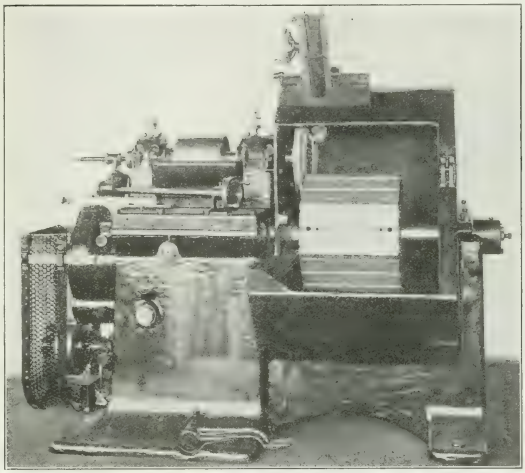
The Baldwin company bought the business and plant of the Arcade company in 1921, and a large foundry was erected and equipped with modern facilities for manufacturing castings. The Springfield Malleable Iron Co. was organized within a year, taking over the plant of the Harley Foundry, renovating it and building a large foundry arcade.

Henry P. Blumenauer went to the Arcade company as general manager in 1919, from the Eastern Malleable Iron Co., Naugatuck, Conn., of which he was the sales manager. He is a Cornell man, and before entering the malleable iron business was for five years with the Standard Oil Co. in the Straits Settlements.

New Semi-Automatic Disk Grinder

An 18-in. semi-automatic grinder for parts requiring the finishing of but one flat surface at a time, has been placed on the market by the Gardner Machine Co., Beloit, Wis. With this machine the operator is left free to devote his time to the loading and unloading of the fixtures. In addition to increased production as compared with the ordinary single-end disk grinder, rugged construction and provision for proper truing of the grinding wheel are said to permit also of unusual accuracy.

Parts to be ground are carried in fixtures which are mounted upon an eight-sided revolving drum, the faces of which are 7 in. wide and 14 in. long. The speed of the drum is varied by means of four change gears. The drum is slotted on each side with two T-slots and one straight groove to receive a tongue, which is usually placed on the bottom of any fixture to assure correct alinement of work with the grinding wheel. The drum shaft is of large diameter and is supported on both sides of the drum. The thrust load is carried by a self-alining thrust bearing, which bears directly against the end of the shaft.



Semi-Automatic Disk Grinder. Work is placed in fixtures on the drum, and as it comes to grinding position, the grinding member advances automatically. The foot lever controls starting and stopping of drum, and the handwheel at the left is for adjustment of grinding member to compensate for wheel wear

As the work approaches the grinding position, the grinding member advances automatically until it reaches a positive stop. This member approaches the work under an adjustable spring pressure governed by a cam, and it advances only as rapidly as the stock is removed, giving a constant pressure against the work being ground. It is returned to the open position by the action of the same cam and the work, as it returns to the loading position is removed and the fixture reloaded. The revolving of the drum is controlled by the foot lever, which operates a double disk dry clutch at the left-hand end of the machine.

The spindle construction is a feature emphasized. The spindle is of alloy steel, heat-treated, and bearings are of bronze. The latter are tapered on the outside and fitted into tapered cast iron sleeves, the bearings being drawn into the taper of the sleeve to compensate for wear. Thrust is carried by a hardened and ground steel collar, which bears directly on the spindle bearing, adjustment for end thrust being provided by a nut and locknut on the spindle at the opposite end of the bearing. The spindle bearings are grooved and lubrication is by means of sight-feed oil cups.

The grinding head is a one-piece casting which weighs 275 lb. It is mounted upon a sub-base and is adjustable by means of a conveniently located handwheel operating through a screw. The handwheel is graduated, each graduation representing a movement of 0.005 in., this arrangement being intended to permit of quick and accurate adjustment of the grinding member, to compensate for wheel wear. This head also has a lateral movement governed by the adjustable spring pressure described.

For dry grinding the grinding member consists of an 18-in. diameter steel disk wheel faced with an abrasive disk. When coolant is required the machine is equipped with an abrasive ring wheel carried in a special chuck. A backing plate fills the center hole of the grinding wheel, the plate being part of the hollow shaft, which passes through the machine spindle, and is used for carrying coolant for wet grinding. The grinding member is supported by the entire grinding head. The flange carrying the grinding wheel is of large diameter, providing a rigid support which extends well out toward the periphery of the wheel. A hood guards the grinding member as shown, and shields are provided for attachment to a dust exhaust system. The truing device is an integral part of the machine. The dressing operation does not interfere with the setup, and in many cases the dresser may be used without stopping production. The dresser is mounted on a slide carried by the hood and lateral adjustment to compensate for wear of the grinding wheel is by means of a screw. During the dressing operation the dresser travels in a vertical slide and is operated by a handwheel working through a rack and pinion.

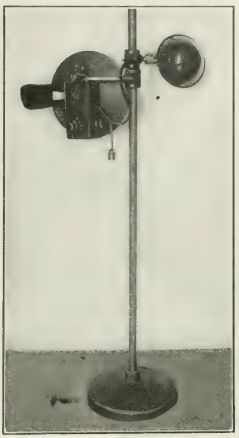
The arrangement for supplying coolant at the proper point is a feature emphasized. The tube carrying the coolant passes through the hollow spindle, connection being made at the outer end with the pump and the inner end terminating in the backing plate. The tube is provided with a number of holes at a point just behind the backing plate, through which the coolant flows.

The machine is designed for belt drive only. The height of the spindle from the floor is 40 in., and the operating floor space required is 7 x 9 ft. The power required for maximum duty is 10 hp.

The Charter Gas Engine Co., Sterling, Ill., will build next year a complete new machine shop, erecting floor, and a new foundry for heavy iron castings. This will not be an addition to the present plant, but in another location. The land has been purchased.

Device for Studying Moving Parts

An instrument known as the Rotostat for studying the action of moving parts, making revolving objects appear to stand still or to move slowly, has been placed on the market by the Rotostat Instrument Co., 600 West Lehigh Avenue, Philadelphia.



Revolving Objects Appear to Stand Still or Move Slowly, Permitting Study of Motion

Errors of timing of interlocking parts, unexpected interference, deformation of parts under centrifugal stress, and instantaneous and periodic speed variations are said to be observable. The instrument is intended to permit of locating the trouble and of finding the weak points which limit operating speeds. Erratic motion due to backlash of gears, slipping of belts, and errors of balance is said to be easily detected. In the field of metal cutting it is said that the tool may be seen in a stationary position with the chip as the only moving part. In observing centrifugal pumps and blowers through the instrument, it is claimed that the formation of eddies with the resulting losses may be shown by the passage of colored fluids and smoke. In the sale of complicated machinery it is expected that the instrument may be used to advantage in showing the operation directly, eliminating technical explanation.

The device is essentially a stroboscope. A slotted disk, motor driven, is revolved in approximate synchronism with the object to be studied. When the observer peers through the hood, the aperture of the revolving disk permits him to obtain momentary images of the object. When the disk and the object being observed are in synchronism, the object appears to stand still. When the disk moves slightly faster or slower, the object appears to move slower, according to the differences of the speeds. The disk speed is controlled by two rheostats, giving coarse and fine adjustment, respectively.

Operation is from a lamp socket, and the two knobs are manipulated until the object appears stationary or slowly moving, as desired. As shown in the illustration, the instrument is mounted on a standard and is adjustable in all directions. Special illumination is not required, an adjustable lamp and reflector being mounted on the standard. A dim light is said unnecessary and the use of a battery or special electrical equipment is not required. The case is of aluminum and the disk of a flexible material to avoid injury in case of accidental contact. Optical parts are finished in dull black to eliminate reflection and glare.

The Federal Machinery Sales Co., Chicago, has given up the sale of Sidney engine lathes in Chicago territory and will represent the Monarch Machine Tool Co., Sidney, Ohio, instead.

Manning, Maxwell & Moore, Inc., 27 North Jefferson Street, Chicago, has taken on the sale of Monarch Machine Tool Co. engine lathes, with the exclusive right to sell the railroads in Chicago territory.

New Three-Wheel Tractor Truck

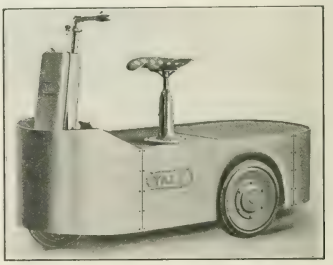
A three-wheel tractor truck, designated as the K24 and intended as a small load carrying unit for service in congested places, has been placed on the market by the Yale & Towne Mfg. Co., Stamford, Conn. Its platform area is 15 sq. ft. and the machine passes a 3 ft. doorway or a 7 ft. elevator. Low center of gravity is a feature and "bucking" or overturning against stalling loads or tipping over sidewise while rounding a corner are said to be eliminated.

The frame, which is of pressed steel, is formed by the bumper plates and battery container welded to form one solid unit, and is suspended on helical springs over each wheel. The seat is provided with an additional spring and is of the swivel type to permit the operator to get on and off the machine with facility, and to look or reach back to the coupling point. The clear deck permits clear vision to the draw-bar.

The truck is designed with a minimum number of parts which are grouped into self-contained major units and easily accessible. The company's spur-gear unit power axle is incorporated, being the same as used in the other "K" models, except that the wheel bearings are rigidly mounted on the end of the housing. Control of the machine is simple and direct. The controller handle is directly connected by a spur gear to the controller drum and has the Z-slot neutral stop. The steering handle is rigidly mounted on top of the steering column and the single brake pedal provided may be easily locked down by throwing a button with the other foot.

The draw-bar pull is 300 lb. normal, and 1800 lb. maximum. The maximum speed empty, on level concrete, is 8½ miles per hr. With four loaded trailers, a 16,000-lb. load on level floor, the maximum speed is 4½ miles per hr. The turning radius of the outside edge of the tractor is 58 in. and of the inside edge 3 in. The wheel base is 42½ in. and wheel tread 31¾ in. The platform height is 24¼ in., the ground clearance 5 in., and the overall length, width and height of the tractor is 82 x 35 x 56 in., respectively. The weight of the machine without the battery is 1650 lb. and equipped with a lead battery, 2400 lb.

The wheels are of pressed steel, disk type, and the front wheel is a semi-steel casting. The brake is of the external contracting double-shoe type mounted on the motor shaft, and is operated by foot pedal, which also opens the cut-out switch. The coupler is the company's pin and socket type extending completely around the vehicle.



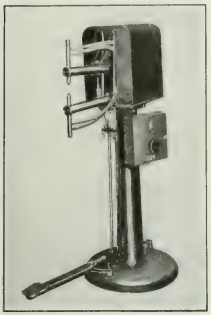
Tractor Truck for Small Load Carrying in Congested Places. Low center of gravity is a feature

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Absorption of the Dominion Radiator Co. by the American Radiator Co. has been completed, it was announced at Toronto Aug. 24. The Toronto stock exchange has listed $1,548,000 of the 7 per cent stock of the Dominion Radiator & Boiler Co., Limited, New York, the American Radiator's new subsidiary, for operating the Old Dominion Co. in Toronto and its own Canadian branch at Brantford, Ont.

Machine for Spot Welding Light Stock

Close position of the transformer to the electrodes and the use of an oil dashpot switch, which is said practically to eliminate sparking at the switch points, are features of the electric spot welding machine illustrated, which is being marketed by the H. J. Ness Mfg. Co., 305 Broadway, New York. The machine is primarily for operation on alternating current, but direct-current machines from stock welders, wound to work with the company's rotary converters, are available also.



The transformer is located within 2 in. of the rear ends of both horns and midway between them. It is claimed that the closer the transformer is to the electrodes the higher will be the efficiency of the machine, current losses which occur when low-voltage high-amperage current is conducted any considerable distance being lessened. The lead to each of the electrodes being about the same length, more uniform heating of the electrodes is claimed. From No. 30 wire to ¼ in. rod may be welded with a 10 amp. fuse in the circuit.

In addition to eliminating sparking at the switch points and thus lessening deterioration at those points, the oil dashpot is said to make the equipment sensitive by reducing the lag between the switch and the electrodes.

The machine is available in two sizes and may be arranged for motor-belt or foot operation. Pieces to be welded are placed between copper electrodes which are supported on the ends of two copper horns. The upper horn is carried by a rocking arm which is lowered on the work by depressing the foot pedal. The upper electrode comes in contact with the work under spring pressure, the spring being further depressed until the current is turned on. The pieces are heated instantly to welding temperature after which the current is automatically turned off. The weld is completed under spring pressure, which may be adjusted to suit conditions. Finally the electrodes are opened and the work released.

A selector switch provides three welding steps for each voltage, to suit the different thicknesses of material handled. Both 110 and 220 volt current may be supplied to the machine, the lower voltage being used for work up to No. 10 wire, and the higher for No. 9 to ¼ in.

Additional welding steps are optional where 220 volt current or more is available. In the three-step switch the only moving part is the knife. In tests made when using the first step in welding No. 15 English gage iron wire, 3.75 amp. is said to have been consumed. Using the second step in welding No. 14 gage iron wire 4.4 amp. were consumed, and using the third step in welding No. 10 gage iron wire, 5.5 amp.

There are seven adjustments for regulating the height between the horns and the pressure applied to the electrodes in welding. The treadle position may be shifted 35 deg. The horns are of cold-drawn copper bars, 2 in. in diameter, and are adjustable and water cooled.

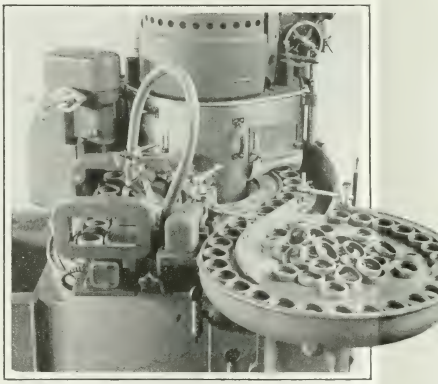
The electrodes are secured in the horns by means of a hand-operated lever and cam lock on each horn. The distance between horns when closed is 5 in. on the standard machine, and on slide horn machines with horn at top of slide the distance is 5 in., with horn at bottom of slide, 16 in. The greatest movement of the upper electrode is 2½ in. The distance from floor to welding electrodes is 42 in.

Surface Grinder with Dial Loader

Dial loading has been added as a feature of the No. 16-A automatic surface grinder of the Blanchard Machine Co., Cambridge, Mass., which was described in THE IRON AGE of March 1. The previous machine was loaded by hand, the grinding, maintaining of size, demagnetizing and chuck cleaning being automatic.

The modified machine is for the grinding of rings, washers and similar circular work, which is placed upon a circular table rotating at a slightly higher peripheral speed than the magnetic chuck. A large number of pieces are placed on this rotating dial from which they are fed continuously onto the revolving magnetic chuck. The operator's work is intermittent, this arrangement releasing him for moving containers of rough and finished pieces.

After placing the work upon the dial, operation is entirely automatic. The chuck is non-magnetic at the loading position but just before the work reaches the waterguards inclosing the grinding wheel, the chuck becomes magnetic, the piece being gripped magnetically and carried under the wheel. Grinding to size is completed in one pass under the wheel, the exact size of the pieces being maintained by a wheel control caliper which automatically makes the necessary adjustments of the wheelhead to compensate for wear of the wheel. After the work leaves the wheel control caliper, the chuck becomes non-magnetic and the work leaves the chuck, and after passing through the demagnetizer is discharged into containers. A washing machine may



Surface Grinder with Dial Loading Feature. After placing work upon the dial the operation is entirely automatic, the operator's work being but intermittent

be added, in which case the pieces are discharged washed and demagnetized.

Four chuck speeds are provided, and the feed, as mentioned, is controlled automatically to an amount just enough to compensate for wheel wear. The base of the machine forms a tank for coolant, and holds 180 gal.

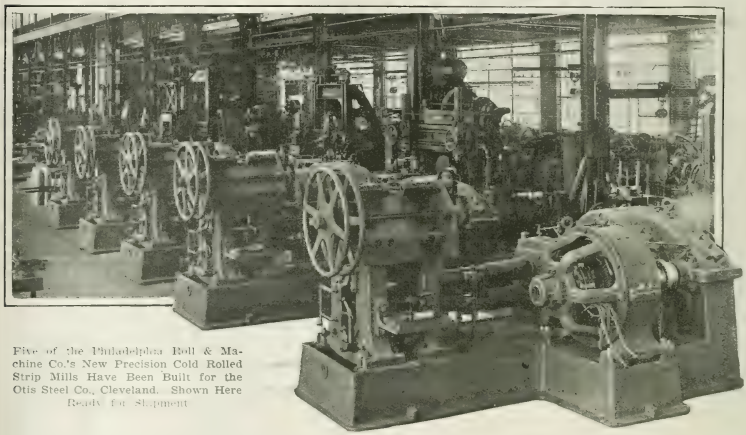
It is claimed that the machine will maintain size to within limits of plus or minus 0.0005 in., and will hold work parallel to within 0.0003 in. Removing 0.010 in. from each of two sides, ball race rings of hardened steel, 3 5/32 in. in diameter, are said to be finished ground at the rate of 630 pieces, 1260 surfaces, per hr. Ball thrust washers of carburized steel, 2⅜ in. x 1 9/16 in., outside and inside diameter respectively, have been finished ground at the rate of 550 pieces, 1100 surfaces per hr., 0.013 in., stock being removed from each of the two sides. In addition to high rate of output lower wheel cost per piece is claimed for the operation of this machine.

COLD ROLLED STRIP MILL

Machine of Precision Type Developed by Philadelphia Company

A cold rolled strip mill of improved design, of which the outstanding feature, according to its designer, is absolute rigidity for precision work, has been developed by the Philadelphia Roll & Machine Co., Grays Avenue and Fifty-second Street, Philadelphia. Five of the mills have been built for the Otis Steel Co., Cleveland, and are now being installed in that plant.

The new mill is of the so-called low type, the company having for some time made high-type mills and will continue in that line in the larger sizes, such as 12 and 14-in., building low-type mills principally in sizes ranging from 6 to 10 in. The new low-type mill is regulated to 0.001 in., and it is claimed that its rigidity of construction does away entirely with chatter marks on the strips.



Five of the Philadelphia Roll & Machine Co.'s New Precision Cold Rolled Strip Mills Have Been Built for the Otis Steel Co., Cleveland. Shown Here Ready for Shipment

A feature of the mill is its inclosed gears, which are rendered easily accessible by the removable of a one-piece cap, which exposes all journals and gearing, including the top mill pinion. To remove the cap it is necessary only to disconnect the flexible coupling and not necessary to disturb the motor with its soldered leads. The motor is also easily accessible as it is on a level with the shoes.

The delivery speed of the mill is another point emphasized. In single units it will deliver 75 to 150 ft. per min., while in tandem operation, which is adjustable, it will also deliver 75 to 150 ft. per min.

No part of the mill requiring attention is over 6 ft. above floor level, and consequently all parts, including the sight feed lubricators, can be reached from the floor without the use of a ladder.

The construction of the mill is similar to that of the other mills made by the same company. All large castings such as gear and pinion housings, roll housings and bed plates are made of charcoal air-furnace iron. Shafts, screws and mill pinions are of open-hearth forged steel, heat treated if required to obtain proper physical properties. Gears and pinions, including the mill pinions, have double helical teeth and run in oil. The roll housings are of the closed-top type.

The top roll of the mill is counterbalanced by springs set on top of the housings and the top roll suspension rod is so arranged that the housing fittings may be removed by merely loosening the spring, it not being necessary to remove the rod.

Bearings in the roll housings and the combined gear and pinion housings are of phosphor bronze. Bearings in the combined gear and pinion housings are furnished with oil by a gear-driven pump. This oil is taken from a settling tank and after lubricating the bearings it flows back into the combined gear and pinion housing and thence into the settling tank. Gears which do not dip into the oil are lubricated by a stream of oil flowing on the teeth at the points of contact with the pinions.

Reduced Italian Tariffs on Pig Iron and Scrap

WASHINGTON, Aug. 28.—Iron and steel products are particularly prominent in the list of articles on which tariff rates have been reduced by the Italian Government and for which special conventional duties had already been established by commercial treaties entered into with France, Switzerland and Austria. Owing to the fact that the reduction from the old general duties has reduced the benefit derived from the treaty concessions, says a report received by the Department of Commerce from Commercial Attache H. C. MacLean at Rome, a special list of new conventional duties on a number of articles has been drawn up which will apply to nations receiving most favored nation treatment, which includes the United States.

In general small reductions have been made in many coefficients of increase on iron and steel products. The duty on cast iron scrap has been eliminated and the coefficient applying to pig iron has been reduced from 2.5 to 1.5 making the duty now lire 3.125 per metric quintal instead of lire 4.375 per quintal. A similar change has been made in the coefficient applying to spiegeleisen containing 15 to 25 per cent manganese, while a coefficient of 0.6 has been applied to ferro-alloys, on some of which the coefficient was formerly 1 and on others 0.5.

"The reduction of the tariff on pig iron should facilitate the running of the steel plants, and now that cast iron scrap is free of duty it will be more readily available for conversion into pig iron in the electric furnaces," says the report. "Italy is now equipped with 9 powerful coke blast furnaces, and 113 electric steel furnaces of large and medium capacity and 60 small ones."

A cast-iron carwheel foundry to have a capacity of 500 carwheels a day is to be erected at Hegewisch, Ind., by the Western Steel Car & Foundry Co.

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York, H. M. Swetland, *Pres.*, Charles G. Phillips *Vice-Pres.*, A. C. Pearson, *Treas.*, F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 416 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Dissolve the United Mine Workers

As we write this, the outlook is that a strike of the anthracite coal miners will begin on Sept. 1. The one thing that may avert it is the mediation that has been undertaken by the Governor of Pennsylvania. The previous negotiations between operators and miners broke up over the bald demands of the miners for a large increase in wages, which the operators refused, at the same time offering to submit the matter to arbitration and abide by the verdict thereof. The miners would not assent even to that. So far the record is clear.

The miners alleged that the operators could grant the increase that they demanded and take it out of their profits. The operators said they could not do it without passing it on to the public in the form of increased price for coal. We may imagine that the operators would be willing to give the miners anything they want, if they could recoup themselves. Economically it is the public that pays, anyhow. The operators, having broader economic vision than the labor leaders, can better foresee the danger of forcing the public to the use of substitutes and thereby leading to the eventual extinguishment of capital in the anthracite business.

With the imminence of a strike the Federal Government, representing the public interest, was brought into the affair. The Coal Commission exhibited its futility. After all its long and costly work it had neither thrown any new light upon these recurring controversies nor offered any good suggestion for averting the impending one. The best it could recommend in its first report was Governmental assumption of mining. But how could the Government make the miners work except on their own terms if they be unwilling?

The Administration appears wisely to have thought of that and to have adopted as its logical course the organization of distribution of bituminous coal as a substitute for anthracite. This is economically sound and politically sound. If put into effect and if loyally supported by the public, as it should be, it will constitute a terrible threat to the anthracite industry, even the risk of extinction. We may imagine the mines filling with water, roofs caving and machinery deteriorating, the companies losing their markets, while miners are sitting idly by and losing their own jobs. But we submit that this is neither the only thing nor the best thing that the Government might do.

Would it not be absurd if, while possessing an abundance of anthracite, we should conclude that the public might not enjoy it because the industry would not produce it? That a great industry should die just because we could not run it? Let us ask why there should be such impotent deadlock in anthracite mining and never in any other branch of mining and see if the answer be not artificial economic restrictions? Let us then consider if the keystone thereof be not a regime of organized labor that is so complete that the possibility of competition has been atrophied.

We do not think that the legal advisers of the Government would have to strain their minds very severely to find the United Mine Workers an organization that is inimical to public welfare and illegal in its practices. The United States Coal Commission believes that there is ample authority to punish a conspiracy of operators or miners or both, directed against the general welfare of the people. If the United Mine Workers is not a conspiracy, what is?

President Harding, in a state paper last year, declared that it was the pitiful truth that we were then "at the mercy of the United Mine Workers." President Coolidge, in trying to promote the use of substitutes merely avoids saying the same thing. How do the proud people of the great republic like to be at the mercy of 150,000 laborers led by a handful of professional guides? If thus in anthracite coal, why not in other essential things? Then would our days be numbered.

It would be the bold and courageous thing now to proceed to dissolve the United Mine Workers as an organization directed against the public welfare, restore the constitutional right of every man to work as he pleases, and remove impediments to the operation of the law of supply and demand, so that anthracite mining might begin to function with the freedom of other industries and

let the people have the coal they want, just as they get their iron and copper. If legal authority for such action cannot be found, then Congress should be summoned to enact it.

Progress in X-Ray Analysis

Both producers and consumers have long recognized the value of some method of locating injurious defects in steel before expensive labor has been put upon it. In a notable contribution to the study of X-ray examination of metal, to be presented this week at the Montreal meeting of the mining engineers and published in large part in THE IRON AGE last week, Dr. Ancel St. John describes a new method by which objects of irregular shape and thickness can be examined quickly and cheaply so as to reveal hidden defects. It involves a simple modification of present equipment, principally by the use of a special absorbent medium, methyl iodide. By a combination of chemistry and physics the author apparently has made possible the commercial application of a most important principle. He demonstrates the feasibility of locating defects in rough forgings or other materials before they have been machined or fabricated.

The value of such a development can scarcely be exaggerated, particularly in the possible savings in cost. It places the X-ray on a definitely practical basis in metallurgical industry and gives a new guaranty of safety to the user of metals in cases where defects may be the cause of serious failures. The X-ray and magnetic analysis, which also has recorded signal advances recently, seem to promise the early realization of non-destructive examination for most of the forms of metal in commercial use.

A Half Year's Pig Iron

Pig iron production in the United States in the first half of this year was 21,016,475 tons, of which 133,469 tons was charcoal iron, leaving 20,883,006 tons of the grades reported by THE IRON AGE, the total of our monthly figures in the six months having been 20,841,534 tons. The difference, 41,472 tons, is one-fifth of 1 per cent, or eight hours' production at the June rate.

The remarkable ascent in pig iron production within the space of 24 months is shown by the figures of the last four half-years as follows, the output in the second half of 1921 having been the smallest in 14 years, or since the first half of 1908:

	Gross Tons
Second half, 1921	7,157,145
First half, 1922	12,191,011
Second half, 1922	15,028,893
First half, 1923	21,016,475

The successive gains were 70 per cent, 23 per cent and 40 per cent, making a cumulative increase of 194 per cent. Production in this last half year fell only 2 per cent short of being three times that of the half-year 18 months earlier. Yet the previous half-year record, made in the second half of 1918, was broken by only nine-tenths of 1 per cent.

These figures alone are sufficient to indicate that fluctuations in iron and steel production are due not wholly to variations in ultimate consumption, but in part represent alternate accumulation and liquidation of stocks. To a considerable extent the stocks may be not in pig iron or rolled steel but in manufactures of steel, machinery, implements, tools, etc.

Distribution of pig iron production as to grades has varied but little of late, so that the relative positions of Bessemer steel, of open-hearth steel and of iron castings may be regarded as more or less established until important changes occur in basic conditions. The analysis by grades has been as follows, low phosphorus being included with Bessemer and ferrosilicon with foundry iron:

Per Cent of Grades of Pig Iron

	Year 1921	Year 1922	First Half 1923
Basic	46.5	50.8	48.5
Bessemer	32.5	28.7	30.3
Foundry	15.4	14.6	15.2
Malleable	2.7	3.9	3.9
Forge	0.7	0.8	0.9
Ferromanganese	0.6	0.5	0.6
Spiegeleisen	0.3	0.3	0.3
All other	0.3	0.4	0.3
	100.0	100.0	100.0

The proportion of merchant pig iron has not shown much change, being 22.4 per cent in 1921, 23.9 per cent in 1922 and 26.4 per cent in the first half of this year, the percentage naturally rising as demand increases.

Railroad Earnings and Legislation

We commented last week on the recent remarkable performance of the railroads, with loadings exceeding a million cars a week. From the viewpoint of possible attempts at hostile legislation, these service records are more encouraging than their earnings exhibits. From this legislative viewpoint there is an unfortunate fact, that while the railroads are performing record service they have been making a little money. Preliminary figures indicate that the June return on tentative valuation was at an annual rate of 5.47 per cent, against 4.86 per cent in June, 1922, and 6.33 per cent in May of this year. The prescribed return, for rate-making purposes, is 5¾ per cent, this following the 6 per cent rate that was nominally the rule during the first two years of the Transportation Act.

The railroads have been earning of late something near what they ought to earn, and it is to feared that their success will furnish a fresh incentive to certain politicians to hit them. Until very recently the roads were falling very far short of the level set up. In August, September and October of last year the roads were earning at about 4 per cent, or 30 per cent less than they were entitled to earn, and in the Congressional campaign of that period many statements were made calculated to give hearers the impression that the Government was "guaranteeing" a return. If those who made the statement believed it they should feel that the Government owes the railroads an extra return, now that traffic is unprecedentedly heavy. At any rate it is to be hoped that the fact that the railroads are making some money after years of leanness will not be

used as a basis for attacking them afresh. That they are giving such good service is reason for letting them alone.

Ten years ago it was commonly said that the electric furnace could not compete with other melting and refining mediums for producing small steel castings. Developments in this field in recent years have completely refuted this prediction. The 1922 statistics of output, compiled by the American Iron and Steel Institute, show that last year not only was the production of small steel castings by the side-blow converter, the crucible and the electric furnace nearly twice that of 1913—or 203,760 gross tons as against 107,280 tons—but that electric furnaces melted 76 per cent of the 1922 total as compared with only 8.4 per cent in 1913. The swing has been from the converter to the electric process, for 75.2 per cent of the small castings produced in 1913 were made in converters. In fact, last year the electric steel castings output of 154,980 tons was considerably in excess of the total of small castings production in 1913. Thus it is demonstrated again that it is not wise, in prophesying concerning industrial developments, to stake too much on the continuance of existing conditions, or count too much on the retarding influence of initial difficulties. It was current talk in the early days of the electric process that it could never be a factor in the production of rolled steel. This has suffered the fate of the other prediction, for electric steel ingots now constitute more than half the electric steel output of the country.

JAPANESE MARKET ACTIVE

Heavy Purchases of Wire Rods From Canadian Interest—More Tin Plate Bought—Chinese Market Quiet

NEW YORK, Aug. 28.—While a considerable improvement is manifest in the Japanese market, Chinese buyers are quiet following the recent activity. At present Chinese merchants seem to be largely confining inquiries and purchases to wire shorts, nails and sheets. There has been some fair purchasing of cut nails lately and an order for steel hoops (seconds). Wire shorts are only moderately active at present prices which Chinese buyers still consider too high. Recent inquiries for medium gage sheets have specified shipment in two to three weeks and hence were without result.

Japan seems to have entered upon a period of at least temporary buying activity. Inquiries and orders on wire rods continue a prominent feature in Japanese buying, although a great many of the orders have been placed by the exporters with a large Canadian interest, which until quite recently booked a considerable part of this tonnage at $53.50 and $54 per ton, c.i.f. Japanese port. This was several dollars per ton less than the quotation of mills in the United States, which held at about $58 per ton, although this price is believed to have been shaded in some cases. The Canadian price is said to be higher today, with delivery fairly good.

Japan has also been fairly active on structural material and it is reported that one large export steel interest has booked a total of about 3000 tons in the past ten days. Sheet inquiries continue fairly numerous but little buying is reported. This is attributed in some quarters to the attitude of the mills, the two leading interests being reported out of the market on light gage sheets of 13 to the bundle and 27 to the bundle. Prices are still reported at nominally $106 per ton up for No. 30 gage. On the other hand British mills are well sold up to the end of the year, although it is believed that a firm offer at about £21 5s. per ton, c.i.f., might bring out a few hundred tons from the smaller makers. As is the case with American mills, plenty of 10 sheets to the bundle (No. 28 gage) sheets are available for reasonably early delivery and about £16, c.i.f., could probably be done on this gage, which, however, is not in as great demand with Japanese buyers as the lighter sheets.

The Nippon Oil Co., which recently closed on 60,000 boxes of tin plate through a Japanese export house, will open bids Aug. 29 on 19,000 boxes of tin plate. It is said that the monthly consumption of this company is about this amount. Requirements today may be larger than this as a result of the reported activity by the Japanese in oil exploitation in Northern Saghalien.

The recent rail order of the Imperial Government Railways for 11,160 tons of 60 and 75-lb. sections is reported to have been placed at between $44.60 and $46 per ton, c.i.f. Japan, based on an ocean freight rate of $6 per ton. Although Osaka municipality at first demurred at the prices submitted on the 30 sets of manganese frogs and switches for the municipal railroads, the award was finally made to Suzuki & Co., New York. In addition to the 120 sets of manganese steel frogs and switches, bids on which the South Manchuria Railway will open Sept. 8, and 10 sets opening in October, the road is in the market for 3000 locomotive boiler tubes. This is one of several lots recently purchased.

Orders for new equipment totaling $1,000,000 for electrification of 35 additional miles of the Paulista Railway, Brazil, have been placed with the International General Electric Co. The first electrification contract placed by this railroad was in 1920 when equipment for 28 miles of double track was purchased from the International General Electric Co. This latest purchase brings the total electrified mileage of the railroad up to 63 miles from Jundiahy north to Tatu, one-half the total mileage of the road. Included in the recent order are five 62-ton electric switching locomotives, a complete substation of 4500 kw. step-down transformers, switchboards, switchgear and other auxiliary equipment, overhead line material and transmission for the extension.

COMING MEETINGS

September

Chemical Industries. Sept. 17 to 22. National exposition, Grand Central Palace, New York.

Machine Tool Exhibition. Sept 18 to 21. Mason Laboratory, Yale University, New Haven. New Haven Branch, American Society of Mechanical Engineers, 400 Temple Street, New Haven, Conn., in charge.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

October

National Safety Council. Oct. 1 to 5. Twelfth annual meeting, New Statler Hotel, Buffalo. W. H. Cameron, 168 North Michigan Avenue, secretary.

American Society for Steel Treating. Oct. 8 to 12. Annual convention. Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention. Statler Hotel, Cleveland. J. E. Bartholomew, Peoria, Ill., president.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

German Iron Trade in Critical Condition

Shortage of Paper Marks, Which Are Passing Out in Business Transactions—Fuel Imports Increase—Statistical Position of Industries of Germany

BERLIN, GERMANY, Aug. 13.—Economic conditions in Germany are rapidly reaching a climax. The situation is already at such a pitch that only great patience on the part of the workers and swift action by the Government will avert a catastrophe. Conditions have become more acute during the past few days as a result of the tremendous increases in cost of commodities. Wages and salaries that are paid out one day have very often lost half their value by the day following. Consequently, employers are forced to pay out wages practically every day, and a great number of the staff is occupied in counting the huge bundles of currency used. The scarcity of mark currency has become pronounced. The Reichsbank is unable to print sufficient, and many companies are, therefore, experiencing great difficulty in paying wages and salaries.

Employment in the metal and engineering industry has altered but little. The Metal Workers Union reports 2.9 per cent unemployed, and 9.9 per cent working on part time. Unemployment is partly a result of the scarcity of raw material and the decrease in domestic business because of advances in prices. The paper mark is rapidly passing out of use except for hour to hour transactions. Many countries, including the General Electricity Co., are compiling accounts and valuing stock in gold marks. Shortage of working capital, which was acute during the exchange crisis of late 1922, is not yet complained of; but industrial and municipal long-term borrowings are done almost exclusively on a rye, coal or gold valuation basis. Of 386,000,000 000 marks bonds issued in July only 9,000,000,000 were paper mark issues.

The effect of the Ruhr occupation and the collapse of the mark are also reflected in the German foreign trade balance. The official statistics for June show an increase in imports of about 800,000 tons and a decrease in exports of 40,200 tons. The increased imports are largely composed of coal, which totalled about 3,000,000 tons against 2,500,000 tons in May. Coal imports are now three times the 1922 monthly average. The import of coke has also increased and is about five times the 1922 average. The import of iron ore, however, is only about one-fifth of last years figures, although it has slightly improved in comparison with May. The export of rolled material and heavy hardware has decreased and amounted to 59,171 tons compared with 81,734 tons in May and 193,015 tons, the monthly average last year.

The continued occupation of the Ruhr has given greater importance to the Upper Silesian industry on both sides of the German-Polish frontier. With the decision that the Rheinbaden coal mine remains with Germany, the definite amount of coal that falls to this country can be ascertained at 8.5 per cent of the estimated 90,000 million tons available. Using the 1913 figures as a basis, 23.7 per cent of the coal production, 17.5 per cent of the dressed zinc ore, 29 per cent of the dressed lead ore, and 30 per cent of the blast furnace works remain with Germany.

The changes that had to be affected in Upper Silesia on the new frontier separating German works from their coal mines, and in some cases the production of raw material from the rolling mills and other consuming works are almost completed. Most of the works producing raw material have fallen to Poland, while Germany retains the greater part of the engineering and manufacturing plants. German industry is endeavoring to extend the scope of its manufactures and to bring skilled workmen into the district. The scarcity of dwellings is, however, restricting these efforts at present.

Difficulty is encountered in maintaining the coal production in the German part of the area, as some of the mines are nearing exhaustion. Sinking of new shafts was projected, but has been postponed because of the excessive cost under present conditions, especially as a large number of homes for workmen would have to be erected. An increase in output can only be effected by improved production and the extension of the existing mines in the Gleiwitz and Hindenburg districts and the Beuthener Valley. The coal produced in this valley is of inferior quality. It is estimated that the output may be increased by about 3,000,000 tons annually in a few years. That would not be more than 10 per cent of the total loss of output to Germany, but it means a 30 per cent increase on the 1913 production from the same area.

The coal production of East Upper Silesia (Poland) has increased lately and totals about 490,000 tons per week, of which about 30 per cent remains in Polish Upper Silesia, while 20 per cent is shipped to other sections of Poland, 6 per cent to German Upper Silesia, 26 per cent to other parts of Germany and 10 per cent to Austria. The rest is going to Switzerland, Austria and Czecho-Slovakia and an effort is being made to increase exports to Denmark, Holland and Sweden. Many technical improvements have been made at the mines, and a large number of houses have been built to provide dwellings for an increase in the number of men employed. From its own part of Upper Silesia, Germany receives about 5,000,000 tons per year. Before the war all Upper Silesia supplied about 20 000,000 tons of coal to Germany. The supplies from all Upper Silesia (Polish and German) are therefore falling considerably short of the tonnage supplied before the war, and the deficiency must be made up by imports from other countries. At present the supply of German rolling stock for the transport of coal from Polish Upper Silesia is wholly inadequate and stocks at the mines are increasing rapidly.

The iron and steel industry in Upper Silesia is handicapped by its unfavorable position for export, and its present boom is entirely a result of the Ruhr situation. A great deal of business has also come to the industry through the depreciation of the mark. Only 30 per cent of the pig iron production, 28 per cent of the rolled iron and steel production, and 43 per cent of the iron and steel foundries remained with Germany. The production of the engineering works in German Upper Silesia is now double the amount of the output of the mills and the foundries, and present development is leaning more toward the finishing side of the industry. Conditions are not favorable for the production of pig iron, especially as there are no iron mines in German Upper Silesia and as the blast furnaces would require complete modernizing to insure profitable production. The industry is not only handicapped by the decline in the exchange and the high cost of transportation, which are both restricting imports of ore, but also by the poor quality of the Upper Silesian furnace coke, which requires low furnaces.

The new frontier also includes in Poland all the Upper Silesian metal furnace works, which means a great loss to Germany, as the lead production of these works has been of considerable importance, furnishing more than two-thirds of the German lead exports in 1913. With the loss of the zinc works Germany has become an importing instead of an exporting country in zinc. The whole production of sulphuric acid, which amounted to 256,000 tons has also gone to Poland, and the coke ovens in the German section now have to import their acid for the production of fertilizers. A lead deposit with an estimated capacity of 6700 tons, on state-owned land in the German area, requires the erec-

tion of lead works, which, because of the abnormal economic situation, will not be possible for some time. The Upper Silesian lead and zinc industries employed about 25,000 men prior to the war, which was about 13 per cent of the number employed in the entire mining industry of Upper Silesia. The pre-war output of the lead mines amounted to 53,000 tons in 1913 and that of the zinc mines to 521,000 tons, which is 48 and 75 per cent of the respective totals of German production. The lead and zinc production of Upper Silesia totalled 40,000 and 168,000 tons respectively.

The supply of electricity for industrial purposes comes mainly from the two stations of the Upper Silesian Electric Co. at Chorzow and at Zaborze. The first has gone to Poland and the latter to Germany. Chorzow is producing about 81,000 kw. and Zaborze is being brought up to 47,600 kw. The lines of the company are spreading eastward as far as the former Russian frontier and on the other side over a part of German Upper Silesia. The Genf treaty has not interfered with existing arrangements and simply gave the Polish State the right to acquire the Chorzow works.

EXCHANGE A BELGIAN FACTOR

Exports Increase, But Domestic Market Is Hectic —Upward Price Tendency—Coke Shortage Still Felt

ANTWERP, BELGIUM, Aug. 11.—The most important feature of the market seems to be the unforeseen rate of exchange. The Belgian franc has been declining rapidly for several days. The dollar is quoted as high as 22.50 fr. and the pound sterling is worth 104 fr., while the ratio with French currency is 132 Belgian to 100 French francs. Such changes greatly disturb parts of the market almost as much for domestic as for export business. For example, British coking coals have become more and more expensive, which is also true of British hematite pig iron, so that for Belgian consumers prices are much higher than a fortnight ago, notwithstanding the decided reductions in England. Export, however, may become possible now for products, which, in the past, could not find an outlet abroad. It is, therefore, quite impossible for an exporter to make a firm offer at present, as future developments in exchange are, at best, speculative. In general, Belgians are optimistic and anticipate a certain recovery of the franc, pointing out that the financial situation is not bad enough to justify a depreciation as great as the present decline. Industry is prosperous and export of finished products is continuing on a larger scale than formerly, so that a higher exchange value of the Belgian franc may indeed become a fact sooner than is expected.

In general, prices are still firm, with a slight upward tendency. Bars range from 750 to 775 fr. per ton; heavy beams 725 to 750 fr.; rods 925 to 950 fr., and heavy sheets 800 and 825 fr. These prices show in general a minimum increase of 25 to 50 fr. per ton. Steel products and thin sheets are particularly scarce for export. Semi-finished products are firm, as several large works are fully booked for several months ahead. British buyers have, however, stopped most of their purchasing. With British prices reduced and the value of the franc declining rapidly, British buyers expect to purchase at still better terms within a few days.

Domestic prices are as follows, per metric ton, f.o.b. maker's works:

Domestic prices are as follows, per metric ton, f.o.b. maker's works:

	Fr.	
Commercial iron No. 2	750	$33.80
Commercial iron No. 3	775	35.00
Commercial iron No. 4	875	39.40
Heavy sheets	750	33.80
Light sheets	1,125	50.50
Iron bars	750	33.80
Rails	750	33.80
Heavy beams	725	32.60
Rods	900	40.50
Bars, o.-h., ordinary	725	32.60
Rounds	1,450	65.35
Spring steel	1,400	63.00
Ingots, Bessemer	550	24.80
Blooms, Bessemer	590	26.60
Billets, Bessemer	630	28.10
Largets, Bessemer	660	29.80

Lorraine works have recently offered ingots and blooms at somewhat lower prices than Belgian mills quoted, but the increasing decline of the Belgian franc soon equalized these quotations with Belgan domestic prices. Some business has been done in finished products for export, prices resulting favorably for producers as a result of the declining exchange. The demand for foundry iron is satisfactory, but not large. Prices have again developed an upward tendency. Makers are not yet disposed to quote for September delivery, as the coke price for this month has not yet been fixed. An increase of price for coke in expected, and as there are no large quantities of pig iron available, prices will undoubtedly follow the upward movement in coke. The following prices on high phosphorus foundry iron, per metric ton, are largely nominal:

	Fr.	
Belgian, No. 3	480	$21.60
Luxemburg, No. 3	470	21.20
Lorraine, No. 3	470	21.20

It is reported that few works in Luxemburg or Lorraine are quoting these prices now, quotations ranging up to 500 fr. (Belgian) or $22.50, and 510 fr. (French) or $23. All these prices are delivered consumer's works or f.o.b. Antwerp. Bessemer pig iron is quoted at 450 to 480 fr., $20.20 to $21.60. Available stocks are low and a further increase of price for this grade of iron is expected. British hematite has not been sold in large quantities since the rise in the rate of exchange. Prices have been reduced to 106s. and 108s., c.i.f. Antwerp, or about $24.40 per ton. These reduced quotations are still too high compared with Belgian and French hematite, which are about 540 fr. ($24.20) or 106s.

Coal, especially industrial grade, is very scarce. Demand is heavy and prices maintain an upward tendency. Wages have been increased 5 per cent since Aug. 1. Quantities received from Germany during July were not so large as expected. Prices for coke are unchanged for August, as follows:

	Fr.	
Washed coke	185.00	$8.35
Crushed coke	215.00	9.70
Heavy coke, half washed	160.00	7.40
Ordinary coke	144.00	6.50
Special foundry coke	195.00	8.70
German furnace coke, at frontier	152.50	6.87

The Pennsylvania Water and Power Resources Board has disapproved the application of the Jones & Laughlin Steel Corporation, Pittsburgh, for the construction of a river transportation dock on the Monongahela River at its South Side works, and for permission to build an unloading dock at its Aliquippa works, Woodlawn, Pa. Refusal of the board to approve the projects, which had been approved by the Federal authorities, does not mean the permanent abandonment of the construction. Modification of the plan submitted to the board to overcome its objections probably will be made.

Italy now has 9 coke blast furnaces, and 113 electric steel furnaces of large and medium capacity and 60 small ones. Production in 1922, according to the Association of Metallurgical Industrialists, amounted to 943,000 tons. The total number of employees and workmen engaged by iron and steel working plants is about 100,000, and the capital invested is estimated at $100,000,000.

The plant of the Palmer Foundry & Machine Co., Palmer, Mass., will be sold at auction under foreclosure proceedings at noon, Sept. 17. For about two years the plant has been operated under the management of William J. Breen, William J. Breen & Co., 148 State Street, Boston, dealers in pig iron, and has been devoted to the production of soil pipe.

Gradually Reducing the Hours of Labor

Progress in Establishing Three Shifts Being Made at Chicago More Rapidly Than Was Expected—Some Companies Moving Slowly

CHICAGO, Aug. 28.—Chicago district steel producers continue to make progress in eliminating the 12-hr. shift in their continuous process departments. They are not yet willing to hazard a guess as to the extent to which their costs will be increased under the new plan, because there is no possibility of accurate calculation at this time. Much will depend upon the manner in which the working forces are reorganized and the extent to which labor-saving equipment can be advantageously employed. It is possible that experience will show that men working eight hours can be held responsible for more duties than they discharged under the two-shift plan, and if such be the case, a reclassification of the duties of employees of all ranks may ensue.

One effect of the change to three shifts which has been largely overlooked is the fact that the reduction in the daily wage is to a great extent compensated for by promotions. In recruiting men for shifts, the steel companies are dependent on their old employees for the nucleus of the extra organization. The new men employed are taken on as common laborers, while those who have become familiar with the work are promoted a step or two above their previous rank. The result is that whereas the new common labor rate is $4 a day, or 80c. less than the wage for the 12-hr. shift, a majority of the old employees are actually receiving as much or more per day than under the old regime.

Local producers are inclined to revise their original estimates as to the time it will take to eliminate the two-shift plan completely. It was first thought that the change in its entirety might take a year, but it is now believed that the transition can be effected much sooner, labor supply permitting. The Inland Steel Co. has converted three continuous process departments to the three-shift plan. For the blast furnaces, which were the first units to be affected, 150 additional men were employed. For the coke ovens and the open-hearth furnaces, which are not yet fully manned, 100 and 250 new men respectively have been added. Fully 1200 additional employees will be required to put all departments on the new basis, or an increase of 20 per cent in the total enrollment of the plant. Fully 35 per cent of the company's employees at Indiana Harbor were on 10-hr. shifts before the elimination of the 12-hr. turn was inaugurated and these men will not be affected by the change.

Changes Being Made at Independent Plants

PITTSBURGH, Aug. 27.—Reports to the general offices of the Carnegie Steel Co. here indicate that the elimination of the 12-hr. day in the continuous process departments is working smoothly and that so far it has gone along with no loss of production or of active capacity. The change is said to have caused some increase in costs in some plants, but an actual reduction in others and that present costs do not average materially higher than those under the old working schedules. There has been an ample supply of men for the creation of the extra shift.

The Pittsburgh Steel Co. today began the elimination of the long workday in its open-hearth and blast furnace departments, but is the only independent company in the Pittsburgh district proper which has inaugurated the change. It is reported to be working well with that company, which is pursuing the plan worked out and applied by the Carnegie Steel Co., outlined in THE IRON AGE, Aug. 16. The Jones & Laughlin Steel Corporation is yet to make a start, but probably will in the near future go along with the movement.

Wheeling Steel Corporation Policy

The Wheeling Steel Corporation has begun the elimination of the 12-hr. day at its various plants, located in this city, Beech Bottom, W. Va., and at Steubenville and Portsmouth, Ohio, but the change is being applied gradually, as according to an official of the corporation consideration must be given to how other companies having plants in the same districts in which plants of the Wheeling Steel Corporation are located are making the shift. This is to avoid possible disruptions of working organizations and also to satisfy the men themselves. There are three classes of labor in the steel plants, this official states. The first embraces those who are satisfied merely to earn enough for their bare existence; the second includes those who, while good workmen, are disposed to spend all they make, and the third consisting of those who work and save with the hope of some day achieving comfort.

The first type of workman is anxious to earn as much as possible as promptly as possible and if he is able to make enough to sustain himself for a few days, is apt to lay off. The second class embraces a more constant workman, but who because of a desire for some of the luxuries of life, involving the spending of about all that he earns, does not welcome a change of working hours that means some loss of earnings. The thrifty workman is the most desirable type, since he will readily adjust himself to the new working order, but unfortunately, there are few plants in the country where such men are in the majority. It will take time to work out a plan of procedure which will satisfy all of the men and it is the attitude of the Wheeling Steel Corporation that it is better to make the change slowly and be sure of its ground first rather than run into trouble by too prompt application of an untried plan. Since the disposition of most of the men involved in the reduction of working hours prefer the longer day with its greater compensation, the Wheeling corporation cannot move any faster than any of its nearby competitors, since the men would seek work in the plants where the longer day was continued.

The H. D. Conkey Co., Mendota, Ill., has appointed the Florandin Equipment Co., 110 West Fortieth Street, New York, district sales agent for its line of hand power and small capacity electric cranes. The Florandin Equipment Co. is also New York district sales representative for the American Engineering Co., Philadelphia, manufacturer of electric hoists.

Agnew, Batteiger & Co., Widener Building, Philadelphia, merchants in coal, coke, ores, alloys, fluxes, pig iron, scrap and kindred materials, announce the opening of an office at 1601 Oliver Building, Pittsburgh, in charge of M. E. Nolan as district manager.

Iron and Steel Markets

AUGUST BUYING BETTER

Railroad. Structural and Automobile Demands Lead

Production Somewhat Less—Generally Stable Prices in Finished Lines

As August ends, the volume of new business in rolled steel shows an increase, making the month a better one than July for most producers. The improvement seen in the past week has not been uniform, being more marked in the case of some independent companies whose order books for some time have carried relatively less business than those of the Steel Corporation.

A stiffening in coke prices has come with the increasing prospect of an anthracite strike, and the appearance of a larger demand for by-product coke for domestic use. But the capacity of bituminous mines has been so much in excess of the demand that with pig iron production still declining blast furnaces have shown no haste to contract for fourth quarter coke. Admittedly an anthracite strike would tend to eliminate some of the soft spots in pig iron, but stocks of iron are large and lately have increased.

A further decline in both steel and pig iron production took place in August. The Steel Corporation is running today at 85 to 90 per cent of its capacity in steel ingots, while the principal independent companies are on a 75 to 80 per cent basis. August operations of the leading independent averaged 75 per cent.

There is a general expectation in the steel trade of larger buying in September, in view of indications that manufacturing consumers have been drawing on their stocks while with few exceptions they have taken full deliveries from the mills.

Prices of finished steel are holding in a way indicating no material change from the present level in the next few months. The weakness in sheets that has lasted since early summer is still in evidence, but plates, shapes, bars, wire products, tin plate and pipe are practically without change. In northern Ohio a $40 price on slabs appeared in one transaction and in New England billets have been bought at $40, Pittsburgh, without effect on the general market.

The outstanding feature of the market is the promptness of the deliveries some mills are able to give. Under such conditions buyers naturally keep close to the mills and hold their stocks down.

Western roads have placed 35,000 tons of additional rails for 1924 and a frog and switch works has bought 12,000 tons of rails and 5000 tons of bars. New inquiries include 35,000 tons for the Canadian National Railways and 10,000 tons for the Baltimore & Ohio. Of the Norfolk & Western's 50,000 tons bought recently about 21,000 tons went to Bethlehem and most, if not all, of the remainder to the Steel Corporation.

With the outlook generally unpromising for rolling stock orders, one road has just bought 200 cars, another has practically closed on 500, and a third has entered the market for 610. The average of weekly purchases in the last two months has been less than 400 cars.

Fabricated steel bookings of the past week exceeded 43,000 tons, the largest total since the first week of June. One item was 22,000 tons for the first section of the Central Railroad of New Jersey bridge over Newark Bay. Of 14,000 tons of fresh inquiries, railroad bridge work calls for 3500 tons.

The cost of boats is holding back business from the yards on the Great Lakes. In the past week at Cleveland prices were asked on 10,000 tons of steel for two freighters, but three days later it was withdrawn when the inquiring vessel interests decided not to build.

Automobile manufacturers are placing liberal orders for both soft steel and alloy steel bars, as well as for sheets and strip steel, and in some cases have contracted for fourth quarter requirements. Drop forging plants which largely serve the automotive industry are also in the market for steel bars. They estimate their needs for the fourth quarter will exceed their present rate of consumption.

The report that the American Sheet & Tin Plate Co. had opened its books for fourth quarter business was premature. The impression is general that present prices will be retained, however. In the bar market a reported Buffalo quotation f.o.b. mill instead of Pittsburgh has caused a ripple.

Despite conservative buying in pig iron throughout the country, the total placed in Chicago in August was larger than for any month since spring, and that market was quite active last week. At Pittsburgh orders for basic amounted to 10,000 tons, and buying for cast iron pipe plants in Ohio footed up 10,000 tons. At Cincinnati and Cleveland further price concessions were reported.

Blast furnaces have been blown out at Joliet, Ill., Columbus, Ohio, Ashland, Ky., and Milwaukee, and others are expected to go on the idle list soon.

The scrap market has grown more active and prices have advanced in some centers, but business is largely between dealers.

Pittsburgh

Pig Iron More Active—Dealers Pay More for Scrap—Coke Is Firmer

PITTSBURGH, Aug. 28.—A fairly cheerful tone still pervades the steel situation, due to the fact that both inquiries and sales show some increase as compared with last month, and this is taken to mean that buyers who long have been expecting some weakening in prices have come to the conclusion that elimination of the 12-hr. day means an increase in costs sufficient to prevent much price cutting. This inference does not recognize the law of supply and demand, and on the other side of the picture is the well-established belief, finding some support by leading manufacturers, that higher prices are not immediately ahead. Lacking the stimulus of a possible advance in prices, buyers are expected

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Aug 28, 1923	Aug. 21, 1923	July 31 1923	Aug. 29, 1922
No. 2X, Philadelphia†	**$26.26**	$25.76	$26.26	$31.14
No. 2, Valley furnace	25.00	25.00	25.00	32.00
No. 2, Southern Cin'ti	27.55	27.55	28.05	27.05
No. 2, Birmingham, Ala.‡	24.00	24.00	24.00	23.00
No. 2 foundry, Chicago*	27.00	27.00	27.00	30.00
Basic, del'd, eastern Pa.	25.00	25.00	25.50	28.64
Basic, Valley furnace	25.00	25.00	25.00	30.00
Bessemer, Pittsburgh	28.26	28.26	28.26	33.76
Malleable, Chicago*	27.00	27.00	27.00	30.00
Malleable, Valley	24.50	24.50	24.50	33.00
Gray forge, Pittsburgh	25.76	25.76	26.26	34.76
L. S. charcoal, Chicago	32.15	32.15	32.15	36.15
Ferromanganese, del'd	117.50	117.50	117.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	38.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	38.00
O.-h. sheet bars, Pgh.	42.50	42.50	42.50	38.00
Forging billets, base, Pgh.	47.50	47.50	47.50	43.00
O.-h. billets, Phila.	47.67	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.25	2.25	2.25	2.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.325
Iron bars, Chicago	2.40	2.40	2.50	2.25
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.60	2.60	2.60	2.35
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.80	2.80	2.80	2.20
Tank plates, New York	2.84	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.70	2.70	2.70	2.35
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

Sheets, Nails and Wire,	Aug. 28, 1923	Aug. 21, 1923	July 31, 1923	Aug. 29, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.60
Plain wire, Pittsburgh	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.15
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.50	$20.00	$22.50
Carwheels, Philadelphia	**21.00**	20.00	20.00	19.00
Heavy steel scrap, P'gh.	18.00	18.00	17.00	18.50
Heavy steel scrap, Phila.	**16.50**	16.00	16.00	15.50
Heavy steel scrap, Ch'go.	16.00	16.00	16.50	17.00
No. 1 cast, Pittsburgh	21.50	21.50	20.00	19.00
No. 1 cast, Philadelphia	**21.50**	20.00	20.00	19.00
No. 1 cast, Ch'go (net ton)	**18.50**	17.50	18.50	20.00
No. 1 RR. wrot. Phila.	18.00	18.00	18.00	18.50
No. 1 RR. wrot.Ch'go(net)	**15.00**	14.00	14.00	15.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$4.75**	$4.50	$4.25	$10.00
Foundry coke, prompt	5.50	5.50	5.25	12.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.25	14.25	14.87½	14.12½
Electrolytic copper, N. Y.	13.75	13.75	14.37½	13.75
Zinc, St. Louis	6.42½	6.45	6.30	6.25
Zinc, New York	6.77½	6.80	6.65	6.60
Lead, St. Louis	**6.65**	6.45	6.65	5.55
Lead, New York	**6.75**	6.70	6.75	5.90
Tin, New York	**40.75**	39.37½	38.75	32.30
Antimony (Asiatic), N. Y.	7.50	7.62½	7.70	5.25

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Aug. 28, 1923, Finished Steel, 2.775c. Per lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Aug. 21, 1923,	2.775c.
July 31, 1923,	2.775c.
Aug. 29, 1922,	2.412c.
10-year pre-war average,	1.689c.

Composite Price Aug. 28, 1923, Pig Iron, $25.38 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 21, 1923,	$25.29
July 31, 1923,	25.38
Aug. 29, 1922,	29.52
10-year pre-war average,	15.72

by not a few to confine their takings to nearby requirements. So while the last quarter of the year probably will be better in respect to new business than the current one, no such rush of buying as marked the first quarter of the year is expected.

Shifting from the long to the short workday in the continuous process departments of the steel industry still is slow, save in the case of the two larger local subsidiaries of the Steel Corporation. A true measure of what the change means in the way of costs cannot yet be taken, but there has been no loss of active capacity, nor appreciable loss of production, and not much variation in costs with at least one of these units. An announcement that the American Sheet & Tin Plate Co. had opened its books for fourth quarter business in sheets and tinplate carried by daily papers was premature, but the impression is pretty general that this company will continue present quotations when it does formally open its books for orders.

Another week has gone with no change in finished steel prices, although there have been reports that a Buffalo maker of bars is quoting f.o.b. mill, instead of Pittsburgh, which would mean a lower Pittsburgh equivalent on Eastern business. It may be safely said that the market is no easier as to prices, but it is easier on practically all products as to deliveries. Plates are available from some mills as promptly as a week or ten days. Specifications against old tonnages are increasing, but all new business coming out is for prompt delivery, and present competition is greater in deliveries than on prices. Reports are increasing in numbers that less than the quoted prices on semi-finished steel is being done, but positive evidence of shading is difficult to uncover for reasons given elsewhere.

The pig iron market is more active both as regards sales and inquiries, but all sales are not yet at the prices that makers are asking. As far as this and nearby districts are concerned, the supply of pig iron exceeds probable requirements over the remainder of the year, and only through a reduction in the production or the appearance of buying from outside districts will prices stiffen.

Dealers are paying more for scrap than the mills, but unless there is a supporting demand from the latter it is hard to figure how the prices made on dealer purchases can be maintained.

Possibility of a strike of the anthracite coal miners with the attendant demands upon coke and soft coal as substitutes are responsible in a large measure for firmness in the local situation.

Pig Iron.—Sales of basic iron closed in the past week total 10,000 tons, which is the largest of any week in several months. Included in the business was one lot of 5000 tons of standard basic, 1 per cent and under in silicon, at $25 Valley furnace, to a furnace interest buying against its inability to fully meet its contractual obligations; 1000 tons to a Sharon, Pa., melter at the same price and about 4000 tons to another Sharon, Pa., melter, who was able to buy the tonnage outside the Valley at a delivered price of $25, which is equivalent to $24.50, Valley furnace basis. It is said that this latter lot of iron was not strictly standard in analysis, running up to 1.25 in silicon. But this not being the report of the buyer, it is barely possible it is an excuse for a low-priced sale. All Valley makers are holding firmly to $25 for basic, but this sale at a lower equivalent price removes the buyer from the market to the extent of his purchase and makes harder sales at the quoted figure. A Brackenridge, Pa., steel company is said to be looking for 5000 tons of basic. This interest recently bought a small tonnage of Bessemer iron at $25.50, furnace, but it was not, it is said, strictly standard iron. The Monongahela Iron & Steel Co. has an inquiry out for 1000 tons of Bessemer for last quarter shipment. On Valley iron of this grade $26.50 is as low as any sales are reported. The Westinghouse Electric & Mfg. Co. closed for 250 tons of No. 2 foundry for its Cleveland plant at $25.50, Cleveland furnace. This company has entered the market for 500 tons each of No. 1 and No. 3 foundry and 200 tons of No. 2 for September delivery to its Trafford, Pa., works. It has been quoted a delivered price $26.13 on No. 2, and 50c. above on the No. 1 and 50c. below on the No. 3. This would mean that Valley furnaces would have to go to $24.37 at furnace to match that price on No. 2, as against the present minimum of $25, Valley, on that grade. As high as $26 is asked, but only rarely obtained. The most recent business in malleable iron was at $24.50, against asking prices up to $26. The National Transit Pump & Machinery Co., Oil City, Pa., is in the market for 1200 tons of No. 2 foundry for September delivery.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.50 to 25.50
No. 2 foundry	25.00 to 26.00
No. 2 foundry	24.50 to 25.50
Malleable	24.50 to 25.50
Low phosphorus, copper free	32.00

Ferroalloys.—This market is absolutely without change. A domestic producer of ferromanganese recently took an order for a single carload at $117.50, furnace, for shipment to Utah. This is the only sale of this material noted here lately, and it is a surprise, since resale material could have been had for much less. Few consumers of ferroalloys lack sufficient supplies to carry them through the remainder of the year and possibly longer, since present indications are that steel works operations will be on a smaller scale in the last quarter than they have been since the year began. There is no interest yet in 1924 requirements. Prices are unchanged, but they are merely nominal. They are given on page 575.

Semi-Finished Steel.—It is difficult to uncover real evidence of any lower prices than the mills for several weeks have been quoting. There are reports that business in billets, sheet bars and slabs has been lost at $42.50, but whether purchases actually were made at less is not ascertainable. It is also intimated that self-contained sheet makers, lacking an outlet for finished sheets up to the steel supply, have welcomed orders for sheet bars at $40. Neither buyers nor producers of sheet bars are disposed to admit lower prices, the former because of the possible effect upon sheet prices and the latter because it might lead to adjustment of prices on contract tonnages. Much is heard as to the probable effect of higher labor costs incident to the introduction of the shorter workday in steel works and blast furnace departments, but no very convincing testimony has been presented and buyers incline to the belief that if lower prices are ahead, based on supply and demand, the change in working hours will not prevent them. Open market activity still is limited in all kinds of semi-finished steel, particularly forging billets, which reflect the between models period in the automotive industry. Prices are given on page 575.

Wire Products.—Order books of most makers still are dwindling, as new orders are not coming along nearly so fast as old ones are being completed. The leading interest now is promising nails in four weeks and independents can make deliveries as early, if not a little earlier. There is a better order book in manufacturers' wire than in any of the other products, with coated nails running next in point of standing orders. Demands from the agricultural districts still are light and a moderate fall business now is expected from that source. Efforts to stimulate orders on the basis of a possible advance on account of the change in working hours in the steel works and around blast furnaces have been unfruitful, but reports that nails have sold below $3 base, per keg, are denied. Prices are given on page 574.

Steel Rails.—Makers of light rails, rolling them from new billets, insist that such business as they are getting is at 2.25c., base, for 25 to 45-lb. sections. One maker here reports a sale of 500 tons at that figure. It remains something of a mystery how that price can be maintained with rerolled light rails available at from 1.90c. to 2c., base, which in these rails calls for sections anywhere from 12 to 45-lb. per yd.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Cold-Finished Steel Bars and Shafting.—The market still is rather slow as far as new business is concerned and is not overly active with regard to specifications. Consuming industries received pretty heavy shipments over the first half of the year and now are disposed to reduce rather than add to their inventories, particularly as there is nothing in sight to suggest that there will be any serious interference with production and shipments over the remainder of the year. There is good adherence to quoted price of 3.25c. base, but much material still is owed against lower-priced purchases and their is a disposition by buyers to seek shipments on these purchases rather than to make fresh commitments. Revision of extras on hexagon hot-rolled bars was pretty steep and some members of cold-finished bars believe extras on cold-finished hexagons should be increased. Ground shafting holds at 3.65c., base, f. o. b. mill, for carload lots.

Bolts, Nuts and Rivets.—The proposed advances in list prices of bolts and nuts, scheduled to take effect Sept. 1, which discount the increases in bar costs involved in the standard extras card recently adopted, are partly offset by the fact that discounts lately have been increased. Competition for business still is so keen that large machine bolts have sold as low as 60 and 10 per cent off list and the published quotation now is 60 and 5 per cent off list, as against 50 and 2 tens, the former public quotation. Rivets also are weak, due to the fact that a number of makers have slim order books and want business. The outside quotations are more of an ornament than selling bases. Prices and discounts are given on page 574.

Iron and Steel Bars.—Reports that the price of steel bars has been shaded $1 a ton and that some mills are quoting f.o.b. mill instead of Pittsburgh, cannot be confirmed. Buying is not heavy, but buyers are specifying fairly well on old tonnages. The quoted price carries very prompt delivery with several makers. Iron bars are holding at former prices.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Tin Plate.—The common impression is that present prices will be continued on fourth quarter tonnages, this being based upon the promise that few mills will complete their third quarter orders within the period.

Much oil can and general line tin plate has been backed up by the fact that food container requirements right along have been given preference in production and shipments.

Hot-Rolled Flats.—The market is a shade stronger as a result of the fact that the past few weeks have been productive of increased orders. As a general rule, makers now are holding firmly to 3.15c. base for hoops, bands and strips, save in the wider sizes of the latter, where competition from skelp and blue annealed sheets is sometimes met. Hot-rolled strips for cold rolling, of course, sell at 3c. base. Price of cotton ties advances a cent a bundle next Saturday. Prices are given on page 574.

Cold-Rolled Strips.—There is enough business to go around and concessions from the regular base of 5c., Pittsburgh, are too infrequent to be worthy of notice.

Track Fastenings.—Fair demand is observed for large spikes, but activity is lacking in other lines under this heading. Prices are showing no change. They are given on page 574.

Structural Material.—Fabricating shops are seeking protection against a fairly large amount of plain material, but actual orders still are moderate. Not much structural business is active in this immediate territory, but there is a fair run of small jobs, and with some railroad bridges appearing, the trade is cheerful, especially as inquiries are fairly numerous. Plain material prices are given on page 574.

Plates.—There is close adherence to the quoted price, although most of the orders coming out are for small tonnages and these for very early delivery. About 2500 tons of plates will be required for 19 barges for the U. S. Engineers', Louisville, Ky., office, bids on which will be opened Sept. 11. Prices are given on page 574.

Tubular Goods.—The story still is one of active pressure upon the market for deliveries against old orders, but only a moderate amount of buying and this for small tonnages for early delivery. Most of the steel pipe makers find it difficult to keep their customers fully supplied; at least, letters from the latter still indicate they could dispose of more tonnage than they are getting and it is considered unlikely there would be this pressure for shipments if consumption were materially lighter than it has been. Present production of the leading interest of all kinds of tubular goods is practically at capacity and shipments are in keeping with output. Discounts are given on page 574.

Sheets.—The leading interest notes a considerable quickening of interest on the part of its customers, but this is not altogether the experience of the independents, some of which still are finding orders and inquiries few. Specifications are heavier with practically all makers, but not much fourth quarter business is coming out, probably because of a desire by buyers to see what the prices are going to be. The lack of black sheet business still is noticeable. A better supply of men has enabled the leading producer to slightly increase production. Prices are given on page 574.

Coke and Coal.—Furnace coke for spot delivery is in scant supply and while demands are few they are sufficient to keep prices very firm. Some tonnage is still available at $4.75 per net ton at ovens, but some producers, sensing a demand for coke to replace hard coal in the event of a strike of the hard coal miners, are turning to producing coke for domestic uses and are not interested in furnace business at less than $5. Foundry coke for prompt delivery still is quoted at $5.50 to $6 at ovens. Negotiations for fourth quarter tonnages of furnace coke are not yet making much progress, buyers being held in check by uncertainty as to the future of the pig iron market. Much strength marks the coal market in the domestic sizes; indeed, the market as a whole is helped by the possibility of a strike of the hard coal miners. We quote mine run steam coal at $2.15 to $2.40 and mine run gas and coking coal from $2.25 to $2.50. Lump coal commands $2.50 to $2.75 for ¾-in. and $3 to $3.50 for 1¼-in.

Old Material.—There are two distinct markets in scrap iron and steel at present, one made by dealers and the other by the mills. The highest price paid recently on heavy melting steel by a melter was $18.50, delivered, Midland, Pa., and this on a very small tonnage. Dealers have been offering that price and even $19 for tonnages for shipment against old contracts to other points in the district. This movement is regarded in well-informed circles as nothing more or less than an effort by dealers to boost the market for the purpose of unloading some of the low-priced material recently accumulated. Signs of the effort are seen in some of the originating points, notably Detroit, where dealers, glad recently to sell machine shop turnings at $7, Detroit, now are holding them at $10 or more, this being equal to $14.25, delivered Pittsburgh. Melters generally are buying close to actual needs and there are no signs of an early abandonment of this policy.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$18.00 to $18.50
No. 1 cast, cupola size	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 20.00
Compressed sheet steel	16.50 to 17.00
Bundles, sheets, sides and ends	15.50 to 16.00
Railroad knuckles and couplers	22.00 to 22.50
Railroad coil and leaf springs	22.00 to 22.50
Low phosphorus bloom and billet ends	24.00 to 24.50
Low phosphorus plate and other material	23.00 to 23.50
Railroad malleable	19.00 to 19.50
Steel car axles	21.00 to 21.50
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	22.00 to 22.50
Machine shop turnings	11.75 to 12.25
Sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	14.50 to 15.00
Heavy breakable cast	18.50 to 19.00
Stove plate	15.50 to 16.00
Cast iron borings	15.00 to 15.50
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	18.00 to 18.50

Earnings of Lake Superior Corporation Show Increase

Net earnings from the operation of the subsidiary companies of the Lake Superior Corporation, Sault Ste. Marie, Ont., excluding the Algoma Central & Hudson Bay Railway Co., showed a big increase over the previous year, according to the annual report just made public for the fiscal year ended June 30, 1923. These earnings, however, were largely wiped out by the deduction of the deficit from the previous year. The results of the year again failed to permit of payments of interest on the income bonds.

The net earnings for the year totaled $866,582, which compares with $330,000 from similar sources for the previous year. There was deducted from these earnings the sum of $763,813, which was the deficit brought forward from the previous year. This left a total available for distribution of $102,768. After a deduction of dividends and interest on bonds, on bank and other advances and rentals, along with amounts set aside for depletion and depreciation of properties, as well as the income tax, the deficit for the year amounts to $1,307,949, as against $763,813 a year ago.

A survey of operations over the year under review, according to President W. H. Cunningham, showed conditions much the same as in the preceding year in the Algoma Steel Corporation, Ltd. "The rail mill was closed down from Sept. 1 to Feb. 19," the President points out, "and since resumption the mill has been operated at capacity. The 18-in. mill was closed down for more than half a year on account of lack of orders and for the greater part of the remainder of the time was on single turn. The 12-in. mill operated for about three months on a single turn, and for the remainder of the period was closed."

Chicago

August Makes Good Showing in Pig Iron Sales—Rail Buying Continues

CHICAGO, Aug. 28.—Buying by the railroads continues to be the feature of the market. Orders from Western roads for 35,000 tons of rails bring the total placed within the last two weeks up to 103,000 tons. In addition a frog and switch manufacturer has closed for 12 000 tons of rails, as well as 5000 tons of soft steel bars.

There are still no signs of a revival of railroad car buying, but builders look for inquiries to appear some time in September. There is some doubt as to the extent of the orders which can be expected in view of the attitude of certain carriers toward prices. One important Western line recently decided to postpone buying when investigation showed that car specialties alone had advanced an average of 40 per cent over six months ago, or a total of approximately $200 per car.

New oil storage tank inquiries call for 6000 tons of plates and a number of promising fabricating projects have appeared. A plant for the Ford Motor Co. at River Rouge will involve 3700 tons, and a lock and dam at Lockport, Ill., will require 2150 tons. For a local sewage disposal plant 6250 tons of reinforcing bars were placed with a local mill. A number of the leading automobile companies are buying rather liberally, in some cases for the remainder of the year, indicating that their orders for new models have been in good volume. Inquiries for finished steel from all sources are more numerous, but current bookings of mills still fall short of shipments. Producers are gradually catching up on their deliveries, and the leading interest, which continues to quote 2.50c. on bars and 2.60c. on plates and shapes, is probably not more than three months behind on those commodities. The foremost independent expects to announce its fourth-quarter prices tomorrow.

Additional blast furnace capacity has become idle during the past week, but steel output is substantially unchanged. The blowing out of a blast furnace at Joliet reduces the active list of the Illinois Steel Co. to 24 out of 27 steel works stacks. It has also put out its merchant furnace at Bayview. Its steel production, however, continues at the rate of 92 per cent of ingot capacity. The output of the Inland Steel Co. remains unchanged at between 75 and 80 per cent.

Pig Iron.—Buying continues to broaden and orders for fourth quarter are more numerous, indicating increasing confidence in present prices. In few instances, however, are melters contracting for their full normal requirements, but this is probably due to the fact that orders for castings are slow in coming in. While foundry operations in this territory are well maintained, melters are hampered in gaining their future needs by a hand to mouth buying policy which extends to the ultimate consumer. Notwithstanding the caution which has characterized purchases of pig iron during the past month, the tonnage placed in August was the heaviest since last spring. Sales of all producers in this section are believed to exceed 125,000 tons. As the month draws to a close, a number of sales of fair size are being made. A Milwaukee plant has ordered 3000 tons of foundry and 100 tons of 7 per cent silvery. An Indiana automobile maker has closed for 1400 tons of silvery. A local buyer for plants located throughout the country has placed a total of 3800 tons of various grades. Of this amount, 1000 tons of low phosphorus and 500 tons of malleable are for works in this territory. For an Ohio works 1000 tons of basic is understood to have been placed at less than $25, Valley furnace, while 1000 tons of low phosphorus for an eastern Pennsylvania destination brought less than $28.75, delivered. Three hundred tons of 14 to 16 per cent electrolytic ferrosilicon for delivery at various plants is reported to have been closed at $42.50, f.o.b. New York State furnace. A Wisconsin melter has closed for 800 tons of malleable for fourth quarter and a North Chicago user for 1500 tons of foundry iron for the same period. Local prices are steady at $27 base, Chicago furnace. Milwaukee district stacks, however, have taken some business recently at $27, f.o.b. furnace, thereby giving melters in that immediate section the advantage of the difference between the freight from Chicago and the local switching charge. The Bayview furnace at Milwaukee has been blown out, leaving only two active stacks in that district, the Thomas furnace and one Mayville furnace. No sales of southern iron are reported. A local cast iron pipe company has closed for 10,000 tons of off-grade iron for its Ohio plants at a reported price of less than $24.50, Valley.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging si. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00
Malleable, not over 2.25 sil.	27.00
Basic	27.00
High phosphorus	27.00
Southern No. 2	29.51 to 30.01
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 35.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—Outside of a few car lot sales of spiegeleisen and a car of resale manganese sold at $115, seaboard, the ferroalloy market has been without features.

We quote 80 per cent ferromanganese, $125.06 to $125.88 delivered from producers; $122.56 delivered resale; 50 per cent ferrosilicon, $88 to $90, delivered; spiegeleisen, 18 to 22 per cent, $53.58, delivered.

Plates.—Two inquiries from California for 10 oil storage tanks each involve an aggregate of 6000 tons of plates. This is the only tank business of any consequence pending. A local railroad has closed for 1000 tons of plates, shapes and bars for car repairs. The carriers in this section have practically completed their repair programs, but Southwestern roads contemplate considerable additional work. No orders or inquiries for new cars are reported, however. Inquiries for plates from the general trade are somewhat more numerous, but mills are still booking less than they are shipping. Deliveries are slowly improving, although prices are unchanged and firm. At 2.60c., Chicago, plates can now be bought for delivery in three months and in occasional instances for earlier shipment when the specifications desired fit into existing rolling schedules. The leading independent, which continues to quote 2.80c., Chicago, expects to open its books for fourth quarter during the current week.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—New bookings of pipe makers are declining for the reason that purchases made at this time of the year consist largely of small sizes for small extensions to existing water works or gas systems or to supplement tonnage ordered earlier. As pipe producers are heavily booked in the smaller size, prices on those dimensions are very firm, while the larger sizes are somewhat easier. Chicago takes bids Sept. 5 on 860 tons of 6, 8 and 18-in. Detroit has awarded 1505 tons of 8-in. to the Lynchburg Foundry Co. and 1375 tons of 6-in. delavaud centrifugal pipe to the United States Cast Iron Pipe & Foundry Co. The latter company has also booked 1000 tons of 24-in. for Cleveland, 500 tons of 6 and 8-in. for Hibbing, Minn., and 160 tons of 4, 6 and 8-in. for Elois, Mich. The National Cast Iron Pipe Co. has taken 220 tons of 4, 6 and 8-in. for Joy, Ill.; 165 tons of 12-in. for Evansville, Ind., and 200 tons of 6-in, for Flint, Mich.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Sheets.—The market remains quiet and unchanged in its general features. Japanese buyers are understood to have placed a considerable quantity of light black sheets with mills in the East at prices which were not attractive to Western mills which had a big freight disadvantage to absorb. Local mills, which have not been factors in the market for some time, are expected to open their books for fourth quarter soon. Inquiries for that delivery received by the local inde-

pendent indicate that its available tonnage will be absorbed by its regular customers.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 33c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Structural Material.—Although fabricating lettings fell off during the past week, several promising inquiries appeared. The new plant building for the Ford Motor Co. at River Rouge, Mich., will require 3750 tons, and it is understood that three additional units of the same size are contemplated. A lock and dam at Lockport, Ill., for the waterways division of the State Department of Public Works will involve 2150 tons. An inquiry from Milwaukee for a coal unloader calls for 1700 tons. Plans for the Ford Motor Co. plant at St. Paul are to be completely revised. The original specifications called for 10,000 tons.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Automobile manufacturers are placing liberal orders for both soft steel and alloy steel bars, as well as for sheets and strip steel, and in some cases have contracted for their fourth quarter requirements. Drop forging plants, which, in large part, serve the automotive industry, are also in the market for soft steel bars and estimate that their fourth quarter needs will exceed their present consumption. A local frog and switch manufacturer has placed an order with a local mill for 5000 tons of bars. Railroad purchases of bars for car repair work, however, have fallen off.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.40c. Chicago; rail steel, 2.30c. Chicago mills.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—The expected fall seasonal demand has not yet made its appearance and mills are catching up on their deliveries on barbed wire, netting, woven wire fencing, and to a less extent on nails. Dealer demand for nails has fallen off in agricultural sections, but is as urgent as ever in industrial centers where building work is still active. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 574.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Rails and Track Supplies.—Western roads have placed 35,000 tons of standard section rails for 1924 delivery with local mills. At the same time, a local frog and switch manufacturer has closed for 12,000 tons of rails. Notable among inquiries are 35,000 tons wanted by the Canadian National Railways and 10,000 tons inquired for by the Baltimore & Ohio. The Pennsylvania will soon enter the market and the Nickel Plate and Chesapeake & Ohio are said to contemplate placing orders.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts 4.90c. case.

Reinforcing Bars.—The contract for 6250 tons of concrete bars for the North Side Sewage Treatment Works of the Sanitary District, Chicago, has been placed with the Inland Steel Co. This is the largest letting reported in months. Deliveries will be made from month to month as work on the project progresses. Outside of this tonnage, few orders exceeding 100 tons are reported. Inquiries are more numerous, but they are largely for small tonnages for one and two-story building additions to be constructed before cold weather sets in. A considerable amount of highway work is still pending with the prospect that bar dealers will book a susbtantial tonnage for that purpose in coming weeks. The warehouse price for concrete bars remains unchanged at 3c., Chicago.

Lettings include:

North Side Sewage Treatment Works, Sanitary District, Chicago, 6250 tons to Inland Steel Co.
Illinois State highway work, 135 tons to Concrete Steel Co.

Pending business includes:

E. K. Pond Packing Co., Chicago packing plant, 15,000 tons, Hoffman Building, Chicago, 125 tons.
Evanston, Ill., city filtration plant, 200 tons, general contract awarded to W. J. Newman, Chicago.
Elks Club building, Milwaukee, Wis., 500 tons.

Bolts and Nuts.—Specifications are more liberal, particularly from the automobile makers, some of whom are now asking for fourth quarter contracts. Farm implement manufacturers, on the other hand, are buying little and in some instances are cancelling orders. Bolt and nut discounts are still weak, as is evidenced by the fact that some buyers are able to find sellers who will concede as much as 5 per cent off the generally accepted prices. The tendency, however, is in the direction of a steadier market, particularly because of the higher bar extras which bolt and nut makers must pay the mills. In fact, certain leading manufacturers are preparing new discounts to compensate for these added costs. A horizontal advance is not contemplated, but rather an adjustment which will take account of the new bar extras as they affect different products and at the same time will wipe cut certain inconsistencies between various items which had not previously been corrected. The new prices will probably not be ready by Sept. 1, as was expected.

Coke.—A local melter has closed for 250 tons of foundry coke at $5.75, Connellsville. Another sale at the same price involved 150 tons. Local by-product foundry remains unchanged at $13.50, delivered Chicago switching district.

Old Material.—The market is notably stronger and prices of numerous items have advanced. Demand for foundry grades has improved and a fair tonnage of rolling mill grades has been ordered by consumers. Low phosphorous grades are scarce with prices strong. On the whole, however, the change in the market is largely a sentimental one. Encouraged, no doubt, by the upturn in scrap centers East of here, holders of material boosted their prices when approached by dealers to cover against sales of heavy melting to a local mill. Orders placed by this mill, which did not exceed 20,000 tons, were on the basis of $16 delivered, as against $16.50 up to $17 now asked by scrap yards. Poor deliveries from the railroads have also tended to stiffen prices. One important line has placed an embargo on gondola cars except for coal traffic. In general, however, slow shipments from the carriers are probably due to their selling farther forward than usual in an attempt to keep a step ahead of declining prices. New railroad offerings include the Burlington, 7000 tons; the St. Paul and the Chicago & Alton, 1500 tons each; the Chesapeake & Ohio and the Monon, 500 tons each, and the Big Four, a blind list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$21.50 to $22.00
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	21.00 to 21.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	20.00 to 20.50
Heavy melting steel	16.00 to 16.50
Frogs, switches and guards cut apart	16.50 to 17.00
Shoveling steel	15.75 to 16.25
Drop forge flashings	11.00 to 11.50
Hydraulic compressed sheets	12.50 to 13.00
Axle turnings	13.00 to 13.50
Steel angle bars	17.50 to 18.00
Per Net Ton	
Iron angle and splice bars	22.50 to 23.00
Iron arch bars and transoms	23.50 to 24.00
Iron car axles	25.50 to 26.00
Steel car axles	17.50 to 18.00
No. 1 busheling	13.00 to 13.50
No. 2 busheling	10.00 to 10.00
Cut forge	14.50 to 15.00
Pipes and flues	9.50 to 10.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	14.50 to 15.00
Steel knuckles and couplers	19.00 to 19.50
Coil springs	20.00 to 20.50
No. 1 machinery cast	18.50 to 19.50
No. 1 railroad cast	18.00 to 18.50
No. 1 agricultural cast	18.00 to 18.50
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	15.50 to 16.00
Machine shop turnings	8.50 to 9.00
Cast borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Stove plate	15.50 to 16.00
Grate bars	13.50 to 14.00
Brake shoes	14.00 to 14.50
Railroad malleable	18.50 to 19.00
Agricultural malleable	17.00 to 17.50

New York

Expectation of Strike of Miners Affects Coke and Pig Iron Markets

NEW YORK, Aug. 28.—The probability that the anthracite coal miners will go on strike Saturday, Sept. 1, is having a marked influence on the market, especially as to coke and pig iron. Prices on both of these products are firmer, but whether they are to be permanent is doubtful. At such a time of impending strike it is natural for sellers to take advantage of the situation. Owing to uncertainty as to delivery of coal and pig iron, some furnaces are slow to urge buyers to contract for the last quarter.

Pig Iron.—Although the market is very dull and some selling has been done at low prices, the present condition is one of greater strength, owing largely to the expectation that coke prices will be higher, causing increased cost of making pig iron. Interest has centered in the purchase by the Ingersoll-Rand Co. of 1500 tons of No. 2 at $25.25 delivered. The tonnage was divided equally between two companies, the furnace price being about $24.60. If the usual differential were allowed, this would make a low price for No. 2 plain, but little attention has been paid to differentials for some time, and it is doubtful whether less than $24.50 could be done on No. 2 plain. While some Buffalo companies are still quoting $25, $24.50 is probably nearer the price on most of the limited number of transactions that have taken place. It is expected that Brooke furnace will go out this week and that several others will follow at an early date.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$27.27 to $28.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	26.77 to 27.77
East. Pa. No. 2, sil. 1.75 to 2.25	26.77 to 27.77
Buffalo, sil. 1.75 to 2.25	28.91 to 29.41
No. 2X Virginia, sil. 2.25 to 2.75	32.94
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Ferroalloys.—There is a little more inquiry for ferromanganese reported, consisting principally of carload lots for early delivery. It is believed that such resale alloy as was available at slightly under the prevailing price of $117.50 has been disposed of. Imports continue very heavy, the July statistics just published showing the receipts to have been 11,314 tons, bringing the total for the first seven months of this year to 58,049 tons, or about 8300 tons per month. The spiegeleisen market is without feature and without any change in prices, except possibly that such business as is going can be placed at $45, furnace, for even small lots. There are no developments in the manganese ore market and the imports for July, according to data just published, were 23,824 tons, bringing the total for the seven months to 104,212 tons, or about 14,900 tons per month, the movement thus far this year having been exceedingly small. Sales of a few carloads of 50 per cent ferrosilicon are noted at $82.50 to $85, delivered. The ferrochromium market is featureless.

Cast-Iron Pipe.—The market continues firm, with makers of pressure pipe booked well into the fall. One maker in this district is filled up on the large sizes of water pipe until Jan. 1, is in a position to deliver up to the end of November on the medium sizes and is booked well into October on the smaller sizes. On the recent opening by the Department of Water Supply, Gas and Electricity, City of New York, of two sets of bids, one for about 3000 tons of 20-in. and 30-in. pipe, the other for about 700 tons of 20-in. and 30-in. pipe, award was made to local contractors and the pipe has not yet been purchased. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. Makers of soil pipe report better demand and have increased prices by 5 points in the discounts, effective Aug. 24. Practically all the low-priced business is reported to have disappeared from the market. Even at present prices makers are evidently not anxious to book very far in advance and are generally specifying shipment within 30 days or at sellers' convenience. Jobbers' stocks are not believed to be large and although the season of dullness in this market is approaching, makers are optimistic of the future. We quote discounts of both southern and northern makers, f.o.b. New York, in carload lots, for prompt shipment, as follows: 6-in. standard, 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Warehouse Business.—A fairly active demand for material out of stock is generally reported, inquiries and small purchases of bars and plates, of which there is evidently a slight scarcity in this district, being particularly notable. Despite this reported scarcity, however, reports of shading on bars continue. In a few instances it is reported that as much as 10c. per 100 lb. has been conceded on bars. With these exceptions, which, it is claimed, are not numerous, the market is evidently strong and August is expected to compare favorably with July from the standpoint of business. Black and galvanized sheets still are a distinctly weak item in this district and as low as 4.50c. per lb., base, on black, and 5.50c. per lb., base, on galvanized, seems to be a fairly consistent quotation on the part of some sellers. It is said, however, that this base could not be obtained on some sizes, of which there is a slight scarcity. Discounts on wrought iron and steel pipe are unchanged and the market is quiet. We quote prices on page 590.

Finished Iron and Steel.—The larger mills, which always need large back logs, are showing definite interest in fourth quarter contracts and some are directing salesmen to cover for that delivery. The small mills show no concern, believing that demand will develop in sufficient volume to give them round tonnages with a possibility that with mill space for quick deliveries they may get higher than the current market levels, which are being made the basis of the last quarter's business. Nothing tangible has developed to show an increasing demand, but some fair-sized sales prove the firmness of current prices. The general impression is that stocks in the hands of manufacturing consumers are larger than they were some months ago but that they are still subnormal. The amount of fabricated steel work contracted for in the past week was notably large and with the considerable tonnage still pending there are signs of some stiffening in fabricating prices. A fair amount of business is being done in reinforcing bars, with the billet steel bars moving at the 2.40c., Pittsburgh, basis, but rail steel and other rerolled bars at 2.25c. to 2.35c.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The threatened coal strike has exercised a stiffening influence on the coke market and while $4.75 per ton might still be done for prompt shipment of a few carloads, the market today is probably nearer $5 to $5.25 per ton on standard furnace coke. Standard foundry is quotable at $6 to $6.50 per ton. Operators are not inclined to consider extended deliveries on either furnace or foundry coke, in view of the uncertainty of future costs. By-product coke from New Jersey ovens is still quoted at $11.41, Newark and Jersey City.

Old Material.—While the price offered by eastern Pennsylvania consumers for No. 1 heavy melting steel, both railroad and yard quality is unchanged, there is evident a strongly developed feeling among sellers, dealers and brokers that an upward movement of the market is in sight. Some small dealers are reported to be holding out for a price from brokers of better than $16 per ton eastern Pennsylvania, and some brokers are said to have bought steel with a future upward turn of the market in view. On the other hand, the producers of scrap are not reported holding back at present prices. Some of the present strength of the local market is attributed to the strength of the market in western Pennsylvania, where No. 1 heavy melting

steel is reported at about $18.50 per ton, delivered, but at present practically no tonnage is moving from this district for western Pennsylvania consumers. Stove plate is firm at about $17.25, delivered eastern Pennsylvania, and about $17 per ton to New Jersey consumers. Borings bring about $14.50 per ton delivered eastern Pennsylvania. Borings and turnings are still going forward to Bethlehem and Sparrows Point. Turnings are being shipped to Phoenixville. The price of specification pipe has been increased by $1 per ton delivered to Lebanon, for this delivery, $16 per ton now being offered. On the whole the market is stronger, but the present strength seems to be largely confined in this district to the dealers and brokers, who are anticipating higher prices.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.00 to $12.50
Steel rails, short lengths, or equivalent	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	10.00 to 10.50
Machine-shop turnings	9.75 to 10.25
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.75 to 12.25
Stove plate	13.50 to 14.50
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

St. Louis

Tennessee Maker Quotes Pig Iron at $23.50, Birmingham

ST. LOUIS, Aug. 28.—The only sale of consequence of the last week was 1000 tons of basic by the St. Louis Coke & Iron Co. to a melter in the St. Louis district proper. Other sales were confined to carload orders, and were for immediate shipment. Although melters are taking more interest in the market, their purchases are still on a hand-to-mouth basis, buying only when they actually need the material. There are no inquiries of consequence before the market. Light buying is due to the combination of vacations among buyers and sellers, and a mixed sentiment among melters. Some believe the market has reached the bottom, while others believe there will be still lower prices. The market is firm. It is a problem what will happen when buying does begin on a large scale, which many makers of pig iron believe will be soon. One Tennessee maker is quoting $23.50, Birmingham, for Southern iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 31 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern Fdy., sil. 1.75 to 2.25	28.67 to 29.17

Coke.—The sale of 400 tons of coke to an industrial user here is reported. More interest is being shown in domestic grades. All of the by-product plants in the district are producing to capacity, and are accumulating stocks, as demand is still less than production. The price of Connellsville coke ranges from $5.50 to $7.

Finished Iron and Steel.—Delivery is the most important factor in the trade now. Buying is of small quantities, but purchasers want the material at once. Jobbers particularly are following a policy of buying only for immediate needs. Some inquiries are coming from the railroads, but only for carloads or less of frogs, switches and plates, shapes and bars. The order for 10,000 tons of 90-lb. rails for the Wabash Railway, which inquiry already has been reported, is expected to be placed soon. An inquiry for 500 tons of reinforcing bars for a new unit of the Bonner Portland Cement Co., Bonner Springs, Kan., and one for 275 tons of reinforcing bars for the Delmar Avenue Viaduct, St. Louis, have been received.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Old Material.—The market for old material seems to be stiffening. Dealers here continue to show their faith in the market by takings of heavy railroad offerings. Most business is in specialties, although rolling mill grades are showing some activity. No. 1 busheling is in good demand. Railroad lists include: Chicago, Milwaukee & St. Paul, 1200 tons; Chicago, Burlington & Quincy, 7000 tons; Standard Oil Co. (Indiana) at Woodriver, Ill., 250 tons; Terminal Railway of St. Louis, 1400 tons, and Big Four lines, blind list.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$16.00 to $16.50
Rails for rolling	17.50 to 18.00
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00

Per Net Ton

Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	15.25 to 15.75
Iron car axles	25.00 to 26.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.00 to 19.50
Cast iron borings	12.00 to 12.50
No. 1 busheling	16.75 to 17.25
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	17.00 to 17.50
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	8.00 to 8.50

Birmingham

Furnaces Unable to Sell at $27, but Still Hold to That Price—Scrap More Active

BIRMINGHAM, Aug. 28.—The majority of Birmingham foundry iron producers some time ago sold a substantial percentage of most grades of pig iron through October and November and seemingly prefer to tenaciously hold spot and forward quotations at $27, base, rather than attempt to stimulate a substantial buying movement by shading the present base price. Within the past week, inquiries have been received soliciting prices on round lots ranging from 500 to 3000 tons, but no sales have resulted from the $27 quotation. Sellers, however, have treated inquiries for the larger tonnages as trade feelers. The one Alabama interest which recently entered the market on a base price of $24, Birmingham, has now withdrawn. One observer sizes up the situation as follows:

"The Birmingham pig iron market today is analogous to the Northern pig iron market of several months ago when the base price spread was several dollars in favor of Northern iron. At that time Birmingham iron was exceedingly active and penetrated into extreme Middle Northern territory points where it had not been sold for several years past. However, today conditions have changed and No. 2 foundry iron is quoted by Chicago furnaces at the same price which Birmingham furnaces are stubbornly holding their base price—$27 f.o.b. furnaces. Even Virginia furnaces are quoting at $26 f.o.b. furnaces for silicon 1.75 to 2.25 with heavy freight differentials in their favor over Birmingham. The Valley furnaces are quoting $25 base

price. Therefore, in the face of these stern facts there is but one answer to Birmingham iron, and that is the faith of the producers in an assumed position that the bottom has been reached in Northern, Tennessee and Virginia prices; and that with the change to 8-hour shifts staring the iron and steel industry in the face, cost prices must correspondingly change upward, and there will shortly be a stiffening in prices when once the majority of substantial producers shall have placed a comfortable tonnage of low-priced orders on their books as 'back logs.' A similar situation has already occurred with one furnace interest in Alabama which was in the market for a short period at $24 base price, then withdrew when the 'back log' was secured."

Southern iron being quoted at $23 to $23.50, f.o.b. Birmingham, refers to LaFollette, Tenn., iron. However, the LaFollette furnace enjoys a freight differential of $1.65 to $1.80 per ton over Birmingham iron. The demand for charcoal iron is in keeping with coke iron demands. One of the two stacks on charcoal iron in the State is out of commission.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.50 to $24.00
Basic	24.00
Charcoal, warm blast	$33.00 to 34.00

Cast Iron Pipe.—With the price of Birmingham pig iron unchanged, there has been no chance of decline in either sanitary pipe or high pressure pipe. New business of even fair volume is lacking, and producers are primarily rocking along filling the scant orders which they have in hand. Prices are unchanged at $49 for high pressure and $50 to $55 for soil pipe.

Scrap.—There has been a rather brisk demand for scrap, particularly No. 1 machine scrap, due largely to the high cost of pig iron. The general foundry trade is inclined to use larger percentages of scrap for miscellaneous castings.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$16.00 to $18.00
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

Buffalo

Foundries Show More Interest, But Sales Are Few and Prices Irregular

BUFFALO, Aug. 28.—Foundries are generally indicating more interest and producers are encouraged that with the close of the vacation period Sept. 1, some life may be expected. Current demand is slow and total sales in the district are less than 8000 tons. The total volume of inquiry measures up better than the preceding week, but there is a big gap between the tonnages and inquiries that find their way to the actual order stage. The $25 base price is the uniform quotation for silicon 1.75 to 2.25, but there is no question that this price has been shaded. One broker has quoted $25 uniformly on every inquiry and has not placed a ton of iron; the fact that most of these quotations are in eastern New York and New England indicates that Buffalo iron is still at a disadvantage in competition with eastern Pennsylvania furnaces at those points. Foundries generally show melting going on without decrease and most of the current inquiry is from small melters. The Gould Coupler Co., has bought 2000 tons of basic for shipment to Depew, N. Y., from a local furnace, but the consideration is not given. The same furnace has sold 1000 tons of basic to meet the additional requirements of a New York State car builder. The remainder of new business is small, the largest order not exceeding 200 tons. The 50c. differential is being maintained. An improvement in shipping instructions on tonnages now on the books is a new encouraging note.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$25.50 to $26.00
No. 2X foundry, 2.25 to 2.75 sil.	25.00 to 25.50
No. 2 plain, 1.75 to 2.25 sil.	24.50 to 25.00
Basic	26.00
Malleable	25.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—Fourth quarter buyers are becoming more interested and prices remain firm on bars, shapes and plates. Any tendency to cut prices is offset through the advent of the 8-hr. day and producers say that fourth quarter prices will hold through the remainder of the year and that any change would be upward. Bar demand has been good at 2.40c., but plates are not sought for in the same proportion. The largest users of local plates in this territory are the local car builders and they are not interested and are understood to be well stocked for present needs. Pipe demand continues on the same high level; an inquiry for 2500 tons for shipment to South America, put out by a Canadian buyer is engaging local attention. No large bar tonnages are out, but the general run of small ones brings about a good average.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Coke.—Threat of an anthracite strike has brought about a stiffening in prices and foundry grades now range from $6 to $7 per ton for spot shipment.

Old Material.—A few inquiries from outside the district for heavy melting steel makes the only break in the monotonous condition of this market. Buffalo dealers cannot compete on this business and are generally unconcerned with trying to place business except in the immediate area. One mill continues to offer $17 for heavy melting steel, but is not able to buy because dealers are willing to pay more.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 bushelings	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

Canadian Scrap Market

TORONTO, ONT., Aug. 27.—Trading in iron and steel scrap continues dull in the Canadian market. Consumers are showing but little interest in their requirements and orders dealers are now receiving are for small tonnages for immediate delivery with no future buying reported. As a result of the limited demand for scrap on consumption account, dealers in their turn have become conservative buyers and are showing little interest in replenishing their yard holdings except when some special bargain is offered. Both Toronto and Montreal dealers are holding to old price lists, but it is stated that a softening tendency is beginning to feature the market.

Dealers' Buying Prices—Gross Tons

	Toronto	Montreal
Steel turnings	$10.00	$9.00
Machine shop turnings	10.00	9.00
Wrought scrap	8.00	8.00
Rails	14.00	14.50
No. 1 wrought scrap	14.00	15.00
Heavy melting steel	14.00	13.00
Steel axles	16.00	18.00
Axles, wrought iron	18.00	22.00
Net Tons		
Standard car wheels	15.00	17.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	19.00	21.00

Boston

Not Enough Pig Iron Inquiry to Determine Status of the Market

BOSTON, Aug. 28.—During the past week, there was not enough inquiry for pig iron in this territory to determine the status of the market. There was but one sale of note, 1500 tons to the General Fire Extinguisher Co., Providence, R. I., the very limited number of others in no instance being of more than 50 tons. Of the 1500-ton order referred to, 600 tons was Northern No. 2X at just under $30 delivered, the rest being No. 1X, reported to have been bought at about the same delivered price as the No. 2X. Thus it is still apparent furnaces are disregarding differentials on round tonnages, notwithstanding reports of firmer markets. Buyers say western Pennsylvania iron is offered at $24 furnace base, but a small tonnage of No. 2X sold the past week at $25.50. Textile machinery, stove and most of the machine tool foundries are operating on full schedule, but the average jobbing foundry is running on a hand-to-mouth basis with the daily melt about 60 per cent of capacity. Practically all foundries have sufficient iron on hand to carry them through September or longer. Consequently increased inquiry is not expected by the trade here much before another fortnight.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$29.15 to $30.15
East. Penn., sil. 1.75 to 2.25	28.65 to 29.65
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.01 to 30.41
Virginia, sil. 2.25 to 2.75	32.42 to 32.92
Virginia, sil. 1.75 to 2.25	31.92 to 32.42
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Finished Material.—Bookings of wire mill products for third quarter delivery have been heavy in this territory the past week or ten days. Bars also are in good demand with some slight shading of 2.40c., base Pittsburgh, by independent mills reported. A wire manufacturer has just closed on 500 tons of billets at $40, base Pittsburgh, and is about to close on an equal tonnage at the same figure. Street railroads have bought $50,000 to $60,000 of track work and one company is inquiring on 1500 tons and 800 tons of rails for fourth quarter delivery. Steam railroads show little interest in rails. Boiler shops are placing round tonnages of plates, mostly for stock purposes, at full market prices, and railroads are ordering considerable material for repair work. The market for structural steel is somewhat quieter with prices firm and unchanged.

Soft steel bars, $3.61½ a 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steel, $3.71½; tire steel, $4.80 to $5.15; open-hearth spring steel, $8 to $10; crucible spring steel, $12; regular steel bands, $4.80; bands over 6 in. wide, $5.05 to $5.30; hoops steel, $5.80 to $6.30; cold rolled steel, $4.75 to $5.25; refined iron, $3.61½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.60 to $7.10.

Coke.—The New England by-product coke producers are fairly deluged with domestic fuel business and prices in at least some instances have been raised $1 a ton. In addition, the tendency among foundries in this territory is to increase rather than cut down specifications against contracts. With all this pressure, shipments of foundry coke have slowed down somewhat. One producer is about 60 cars behind on deliveries of such fuel. Slightly more interest is shown by foundries in Connellsville fuel, with some business put through the past week at $7 on cars oven or $12.55 delivered. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote by-product foundry coke at $13.50 delivered in New England.

Old Material.—The willingness of holders of certain kinds of old material to sell has made for slightly more activity in this market. A large percentage of the business put through recently has been applied to old contracts. While quotations in general are the same as a week ago, a marking up of railroad malleable, wrought pipe, machine shop turnings and mixed borings and turnings gives the market a slightly firmer appearance. Where advances have taken place, they average 50c. a ton. For mixed borings and turnings $8.50 and $9 on cars was paid the past week. Recent shipments of such material have been rejected, mills, in such cases, demanding price adjustments which have run as high as $3 a ton. Although average prices offered for chemical borings are $12 to $12.50, sales are reported at $12.60, and one lot of 150 tons fetched better than $13, on cars. Car lots of heavy melting steel, generally at $12.50 on cars, also are noted, and foundries have shown a little more interest in machinery cast. The Watertown Arsenal is asking bids on various lots of old material, some of it in the form of ingots.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	16.00 to 17.00
Railroad malleable	21.00 to 21.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 rail wrought	13.50 to 14.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe 1 in. in diam. over 2 ft. long)	11.00 to 11.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

Cincinnati

Pig Iron Dull and Weak—Trading Between Dealers Enlivens Scrap Market

CINCINNATI, Aug. 28.—The market continues dull and weak, particularly on Northern irons, and one furnace is now openly quoting $25, Ironton basis. Several others, while not quoting this figure, are understood to be willing to consider offers for attractive tonnages. On Southern irons there is no change in the situation, the demand continuing light, and prices unchanged from last week at $23.50, Birmingham. Sales for the most part are confined to carload lots, though occasionally orders for 100 and 200 tons are booked. The principal transaction of the week was a sale of 1400 tons of silvery iron to a Michigan automobile maker at the full schedule. We also note a sale of 500 tons of Tennessee iron to a northern Ohio melter at $23.50, Birmingham base. A sale of 500 tons of Northern was made on the basis of $25, Ironton, and several smaller lots went at $25.50. Inquiry is light, the largest being for 500 tons of high silicon Southern from a Louisville melter. An inquiry for 1000 tons of fluorspar is pending. The production of iron in southern Ohio and northern Kentucky district has been further curtailed by the blowing out of one Columbus and one Ashland stack of the American Rolling Mill Co., both of which had been running on basic.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.05
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	27.27
Basic Northern	27.27
Malleable	27.27

Structural Material.—The only new project to come out was the Kresge Building, Cincinnati, requiring 350 tons on which bids were taken at Detroit. The L. & N. Railroad, which took bids on bridge work recently, awarded about 850 tons, but took no action on work involving 1000 tons. Bids closed this week on Kosair Temple, Louisville, Ky., involving 450 tons. The steel work on the building being erected for the McCall Publishing Co., at Dayton, Ohio, 500 tons has been awarded to the Dayton Structural Steel Co. and the Burger Iron Works Co.

Sheets.—A slightly improved demand for sheets is reported, but orders continue for carload lots and

quick delivery is usually asked for. For instance, a manufacturer in this district inquired for 1000 tons of tin mill black, and is understood to have placed the order with two independent mills for shipment within the next four weeks. Prices are at last quoted, the only deviation from the regular schedule being in black sheets, which are from $2 to $3 per ton below the published price. Blue annealed sheets are in fair demand, and prices are very firm.

Warehouse Business.—Jobbers report business fair, though the size of the orders has materially decreased. Prices are being maintained.

Reinforcing Bars.—Orders generally are for carload lots. No projects of any size have come up recently. Roadwork in adjoining States is responsible for a steady demand for bars. Prices are inclined to fluctuate. Rail steel bars are quoted at 2.30c., and reports are heard that 2.20c. can be done. Bars rolled from new billets generally are quoted at 2.40c., but some mills are reported to be getting 2.50c. on the smaller orders, while others are reported to be meeting the prices of the rerolled bar makers.

Tool Steel.—Orders are light, but at least more of them are reported this month than for the month of July. Prices are unchanged. On 18 per cent tungsten high speed steel, the price ranges from 75c. to 95c. per lb., according to brand.

Finished Materials.—Business is quiet, most of the orders placed being for one or two carloads for immediate shipment. Specialties, such as car wheels, boiler tubes, and molds, have been in fair demand recently, but large orders were not prominent. On bars, shapes and plates, one and two carload lots are being booked, but the larger buyers have not shown much interest in the market. Prices continue firm, however, and while some of the mills can make very quick deliveries, there are no indications of a resort to price shading to develop orders. With one or two exceptions, mills are in need of wire business, and very quick deliveries can be made now. Prices are being shaded on bolts and nuts, with orders light.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—The threatened coal strike has created a demand for domestic coke, and has firmed up prices considerably in the Connellsville district, where $6 for foundry fuel is now reported as minimum, with nothing less than $5 quoted on furnace grade. Prices from other districts are firm and unchanged from last week.

Old Material.—The scrap market is showing a little more activity, but most of this can be traced to trading between dealers. Consumers generally continue out of the market, but some sales have been made of both cast and steel grades at prices slightly higher than last week. Railroad lists closing are bringing higher prices, dealers taking materials to lay down on yards. The market generally is at least $1 a ton higher, with borings being sought at $2 a ton above last week's prices, largely on account of an inquiry for 2000 tons from Pittsburgh district. A Southern melter is inquiring for 4000 tons of mixed grades of cast.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$15.50 to $14.00
Iron rails	16.00 to 16.50
Relaying rails, 50 lb. and up	29.00 to 29.50
Rails for rolling	17.00 to 17.50
Heavy melting steel	15.50 to 16.00
Steel rails for melting	15.50 to 16.00
Car wheels	15.50 to 16.00
Per Net Ton	
No. 1 railroad wrought	13.50 to 14.00
Cast borings	10.00 to 10.50
Steel turnings	9.50 to 10.00
Railroad cast	17.00 to 17.50
No. 1 machinery cast	19.50 to 20.00
Burnt scrap	12.50 to 13.00
Iron axles	22.50 to 23.00
Locomotive tires (smooth inside)	14.50 to 15.00
Pipes and flues	9.50 to 10.00

Cleveland

Weak Spots in Pig Iron Market—Finished Material Sales Gain in August

CLEVELAND, Aug. 27.—Ore shipments continue heavy and the movement up to and including Aug. 24 indicates that it will be approximately 10,000,000 tons for the month as compared with 10,411,248 tons in July. The consumption of Lake Superior ore fell off 68,783 tons during July, being 5,747,356 tons as compared with 5,816,139 tons in June, and with the peak consumption of 6,118,540 tons during May. During July, 1922, the consumption was 3,582,715 tons. Consumption by lake front furnaces include Canadian furnaces during the month was 2,223,294 tons, or an increase over June, the falling off being in other districts. Interior furnaces in the central district consumed 3,071,322 tons, Eastern furnaces 304,208 tons, and all rail furnaces 148,532 tons. On Aug. 1 there was 27,503,482 tons of ore on hand at furnaces and Lake Erie docks as compared with 22,800,252 tons on July 1, and with 31,127,303 tons on Aug. 1, 1922. Stocks at furnaces Aug. 1 were 22,546,777 tons as compared with 18,288,462 tons on July 1.

Pig Iron.—Orders for foundry and malleable iron continue to come out in fair volume in medium-sized lots either for early shipment or for delivery through the remainder of the year. There seems to be more of a disposition among consumers to cover for more extended deliveries than for some months as is shown by a number of purchases for the fourth quarter. Locally the market has declined 50c. to $25.50 for foundry and malleable iron for local delivery and to $25 at furnace for outside shipments. Outside of Cleveland weak spots continue to appear in the market and some business in foundry and malleable grades was taken during the week at $24.50. Shading below $25 is not general, however, as is indicated by the purchase of 300 tons of foundry iron at that price by a consumer in Newark, Ohio, a highly competitive point, because its freight rate is the same from four Ohio producing centers. Basic iron is firm at $25. Three sales in 1000-ton lots are reported at that price, two lots going to a Sharon, Pa., consumer from nearby furnaces, and one lot to an Alliance, Ohio, melter. One Cleveland interest during the week sold 8000 tons of foundry and malleable iron, including two 1000-ton lots and one 1500-ton lot. Another local selling agency booked orders for 10,000 tons, including 2000 tons of malleable iron for Eastern shipment. The Westinghouse Electric & Mfg. Co. purchased 250 tons of foundry iron for its Cleveland plant and 1500 tons for Trafford City. A northwestern Ohio melter purchased 500 tons of foundry iron for prompt shipment. Low phosphorous iron is weak. One Eastern furnace is quoting copper free iron at $28.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.76 to 2.25	26.00
Southern fdy., sil. 1.75 to 2.25	29.50
Malleable	26.00
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	$31.00 to 32.00

Alloy Steels.—Demand, which has been light for some time, shows considerable improvement. Some of the automobile companies are buying for early requirements and a few have placed contracts for the fourth quarter. With good deliveries by mills, car builders are keeping their stocks low. Prices are firm.

Bolts and Nuts.—Following the weakness noted last week, bolt and nut makers have reduced prices 5 per cent on machine, carriage, lag and tire bolts, and contracts are being revised to the new prices. No reductions were made on any kind of nuts or on stove bolts. There seems to be no connection between the price reductions and the new price lists that are to be issued this week to become effective Sept. 1. These lists have been revised not only because of the increased extras on

steel bars but to eliminate certain inequalities in prices that have existed because of changes in production methods and costs, price lists not having been revised for several years.

Sheets.—There is some demand from the automobile industry for blue annealed and full finished sheets, but car builders as well as other consumers are buying carefully and placing small orders. Some consumers have enough sheets under contract to carry them well into the fourth quarter. Galvanized sheet prices have been shaded slightly on desirable orders, and on black sheets 3.75c. can still be done, although this price is not openly quoted.

Reinforcing Bars.—There is a good volume of new inquiry for small lots. Bids have been taken for the Rogers Building, Cleveland, requiring 150 tons. Rail steel bars have settled down to 2.30c., and this price is being shaded for desirable orders.

Warehouse Business.—Weakness has developed in warehouse prices on sheet, and quotations of 5.50c. on galvanized and 4.40c. on black are reported, or a concession of $6 a ton on the former and $5 a ton on the latter. Other prices are being maintained.

Rivets.—The new extras on rivets, announced last week will be generally adopted by manufacturers Sept. 1. Some objection to these extras is being made by consumers, particularly to the extras for length. Prices are unchanged.

Semi-Finished Steel.—A local producer during the week took 1000 sheet bars at $42.50, this being the first order booked in this market for several weeks. Some additional reservations have been made for the fourth quarter, mostly for sheet bars.

Finished Material.—New business booked in this territory during August will show some gain over July, which was a better month than June. The demand continues fair, but is almost wholly in small lots for early requirements. Much of the business is in orders for material to be entered to replace steel shipped on previous orders. Generally the demand for plates and structural material is better than for bars. Little new inquiry is coming out in the building field. The cost of building boats is holding back business in the lake shipbuilding industry. During the week an inquiry came out for 10,000 tons of steel for two boats, but this was withdrawn three days later when the vessel interest decided not to purchase the boats. Mills are getting a good volume of orders for forging bars from drop forge shops making automobile forgings, and generally the outlook in the automotive industry is regarded as very promising. Small lot plate orders for early shipment are still being taken by Eastern mills at 2.50c. at mill, equivalent to about 2.65c., Pittsburgh, and local mills continued to take some plate business on the 2.60c. basis. Hot-rolled strip steel in wide material is weak owing to the competition with blue annealed sheets and light plates. Some mills are quoting this at 3c. and in some cases extras are being waived.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—Prices on foundry coke have stiffened because of a possibility of an anthracite coal strike and standard Connellsville foundry coke is now quoted at $6 to $7.50 for prompt shipment. Several producers are declining to make quotations for contracts.

Old Material.—The upward price trend has continued with an advance in quotations of from 50c. to $2 a ton during the week. The advances appear to be due more to the release of old orders and to speculative buying by dealers rather than to any marked increase in orders from consumers. Machine shop turnings and mixed borings and turnings are particularly strong, having advanced over $1 a ton, and consumers are now taking these grades in liberal quantities. Dealers are paying $12 to $12.50 for turnings to lay down as compared with $9 to $9.50, at which some sales were made early in the summer. Heavy melting steel has advanced to $18.50 in the Valley district. The price advances are not bringing out a great deal of scrap, as producers and dealers are holding material for further advances.

We quote dealers' prices f.o.b. consuming plant per gross ton:

Heavy melting steel	$18.00 to $18.50
Rails for rolling	20.00 to 20.50
Rails under 3-ft.	19.00 to 19.50
Low phosphorus melting	20.00 to 21.00
Cast borings	13.25 to 13.50
Machine shop turnings	12.25 to 12.50
Mixed borings and short turnings	13.00 to 13.25
Compressed sheet steel	14.50 to 15.00
Railroad wrought	15.00 to 15.50
Railroad malleable	21.50 to 22.00
Light bundle sheet stampings	11.50 to 12.00
Steel axle turnings	15.50 to 16.50
No. 1 cast	21.00 to 21.50
No. 1 busheling	12.00 to 12.25
Drop forge flashings	12.00 to 12.00
Railroad grate bars	15.50 to 16.00
Stove plate	15.50 to 16.00
Pipes and flues	10.00 to 12.25

San Francisco

Summer Dullness Prolonged—Small Lots of Chinese Iron Expected

SAN FRANCISCO, Aug. 22.—While there is a tendency in some quarters to indulge in expressions of optimistic opinion as regards business conditions, there is no denying the fact that a gradual slowing down process is in its initial stage; in fact, has already assumed definite form in many branches of trade. In iron and steel, business is quiet and the outlook seems to be devoid of features which might be considered as favorable for an early resumption of activity. While there has been no material shortening of operations, the fact is noticeable that deliveries are being made more promptly and orders for account of new business are considerably less in volume than a few weeks ago. There is practically nothing in fourth quarter developments, but prices maintain a better equilibrium than might be expected under existing conditions. Neither importers nor traders have any explanations to offer for the growing quietness other than the generally admitted fact that the usual decreased activity incident to the summer season is being prolonged beyond the customary limits of the last two years.

Pig Iron.—The demand is of very moderate proportions and most of the current trading is confined to small lots. Sellers say the consumers are still fairly well supplied and with a shortage of orders for finished material there is no reason for stocking up for the present. Prices are described as easy, but are sustained for the moment. Desirable lots are quoted at from $35 to $37, duty paid basis, on landed or out-turn weights. There is an undercurrent of sentiment that prices will be lower before they are higher, but thus far sellers say they are not shading asking figures to induce trade. On the other hand, consumers say that they have no reason to seek concessions in price because they do not need the material. Most consumers are well supplied and do not feel disposed to make additional purchases. It is stated that several small parcels of Chinese iron, chiefly in 100-ton lots, are expected within the next few weeks.

Coke.—There is practically nothing being done in this line and in the absence of demand, importers have no quotations to announce. The bulk of receipts is for railroad account and use, and cuts no figure in the trade conditions. The railroads usually bring in for their own use from 500 to 800 tons per month.

Old Material.—The decrease in demand shows a decided growth during the past month and particularly for the last two weeks. The price for delivery at the mill remains fairly steady at $15 to $15.50 per gross ton, although the report is current that the minimum figure has been shaded during the last day or two. However this may be, it would have to be an exceptionally desirable lot to bring the maximum price. The chief products here are shapes, plates and reinforcing steel and for all these the demand has fallen off. So with the lack of new business there is necessarily decreased buying of old material. Dealers say that while they have hopes for an early betterment there is little of an encouraging nature in sight at the moment.

Philadelphia

Coke Prices Advance—Some Soft Spots in Pig Iron Market Disappear

PHILADELPHIA, Aug. 28.—This pre-holiday week has brought no indications of a gain in business in the early fall. There has been a stiffening in coke prices, due to the threat of an anthracite coal strike, and a consequent elimination of some of the soft spots in pig iron. On a very small volume of business the scrap market has moved to higher price levels on the more important grades. The steel market is exceedingly quiet, though the volume of business booked in August is generally reported as better than that of July, but a considerably heavier volume will be necessary to maintain the present mill production rate throughout the remainder of the year. The steel trade is confident that much improvement will come next month. With the holiday next week and the fact that this is the fag end of the vacation period, little has been expected this week, so the trade has not been disappointed.

Pig Iron.—The effect of merchant iron producers is to establish foundry pig iron at a minimum of $25, furnace, for No. 2 plain, and it seems this week to have more nearly reached that level, though some Eastern transactions have netted the furnaces less than $25. One Eastern furnace has raised its minimum to $25.50, and names $26 for No. 2X and $26.50 for No. 1X, but few sales are being made at these prices. The same furnace is offering no iron for fourth quarter, believing that prices for that period will be slightly higher, particularly if there is an anthracite coal strike. Practically none of the Eastern furnaces has covered for fourth quarter coke. Spot coke prices have jumped 25c. or 50c. per ton several times within the past week since the coal strike threat became ominous, and the minimum today was said to be $5, Connellsville, for spot furnace coke, with some brokers naming as high as $5.75. Foundry coke was quoted from $6 to $6.50. Unless there is a coal strike, the future of the pig iron market for this year looks none too encouraging. At least three Eastern furnace companies have upward of 35,000 tons each of iron piled in their yards, with no immediate prospect of moving it. It is recognized that the only salvation for the market, aside from a coal strike, is the blowing out of several furnaces, but there is no indication of a general move in that direction. The Robesonia furnace is preparing to come in blast late in September on foundry and copper-bearing low-phosphorus iron. The low-phosphorus iron market is weak. One maker of copper-bearing grade has named $28, furnace, a reduction of $2 a ton, while copper-free iron is probably to be had at $29 or $30, furnace. Foreign low-phosphorus iron has been sold to a Philadelphia consumer at slightly over $30 a ton, delivered. A shipment of 1014 tons of pig iron from British India was received here last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.76 to $26.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.26 to 27.14
East. Pa. No. 1X	26.76 to 27.14
Virginia No 2 plain, 1.75 to 2.25 sil.	30.67 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil..	31.17 to 31.67
Basic delivered eastern Pa.	25.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	29.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.50
Low phos. copper free, guar. not over 0.025 per cent phos.	31.50
Continental, phos. 1.50; sil. 2 to 3	25.50

Ferroalloys.—There is very little demand for ferromanganese or spiegeleisen and prices remain nominal at $117.50, seaboard or domestic furnace, for the former, and at $45, furnace, for the latter.

Semi-Finished Steel.—While $42.50, Pittsburgh, has been shaded on open-hearth rerolling billets, the market now seems a little firmer at that figure. Forging billets are quoted from $47.50 to $50, Pittsburgh.

Plates.—The plate market continues weak as to demand, but firm as to prices. August business has been a little better than July, but there is room for much improvement. Deliveries may be had in a week or less. There is no reported shading of the 2.50c. prices.

Structural Material.—The Bethlehem Steel Co. has been awarded 400 tons for the Freeman Building, 1810 Chestnut Street, Philadelphia, and 600 tons for an addition to the Penn-Harris Hotel, Harrisburg. Except for the 2.40c. quotations of one Eastern mill, the market seems fairly well established at 2.50c., Pittsburg. Demand is light.

Bars.—Makers of bar iron and iron bands have announced a new schedule of extras, effective Sept. 1, which is in line with the new extras on steel bars announced several weeks ago.

Warehouse Business.—The demand for steel out of stock continues at about the same rate as in recent weeks. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 2 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; square and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Ore.—Receipts of iron ore from abroad last week were as follows: Sweden, 7038 tons; French Africa, 8100 tons; Germany, 880 tons; Cuba, 7500 tons. Manganese ore from British West Africa received here amounted to 5657 tons.

Old Material.—While the scrap market is not active it has shown some price strength during the past few days. Prices had gone so low that it is now almost impossible for consumers to buy at the low levels which had been reached, and on actual transactions prices on a number of grades have advanced 50c. to $1 a ton. Nearly all of the Eastern consumers of heavy steel scrap are now offering $16.50 for small lots and dealers are asking $17. No. 1 cast scrap has been sold to a large local consumer in the past week at $21.50.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap rails	16.50 to 17.00
Steel rails for rolling	17.00 to 18.00
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Cast-iron car wheels	21.00 to 22.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	18.00 to 18.50
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	14.00 to 14.50
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	15.00 to 15.50
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	19.00 to 20.00
No. 1 cast	21.50 to 22.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 17.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

British Iron and Steel Market

Pig Iron Slightly Stiffer—Semi-Finished Steel Weak—Belgium Is Relighting Blast Furnaces—Tin Plate Stronger

(By Cable)

LONDON, ENGLAND, Aug. 28.

There is improved export demand for No. 3 foundry pig iron and slightly stiffened quotations but other grades are unchanged.

Hematite is firmer, though inquiry generally is still poor. Foreign ore is dull, shipments of Bilbao Rubio being held up by strikes, and price quotations nominal.

There is moderate demand for finished iron and steel but makers are anxious for orders for heavy materials. Germany is inquiring for 2000 tons of ship plates and sections. China is buying plate cuttings. South Africa and Australia have purchased plates, angles and sections.

Continental position is practically unaltered. There is fair demand from India and the Far East, but orders are not passing through traders here.

In Belgium, the Société Anonyme d'Athus-Grivegne at Athus and the Société Anonyme des Acieries d'Angleur at Tilleur are relighting their fourth furnaces.

In France the Ruhr arrivals of coke are unsatisfactory.

In Luxemburg, blowing out of furnaces is feared imminent, owing to the fall in the exchange value of the Belgian franc. At present 26 out of 47 blast furnaces are blowing. The Acieries Reunies de Burbach-Eich-Dudelange has ten furnaces operating out of fifteen; Belval has four out of six; the Société des Hauts-Fourneaux et Acieries de Differdange, six out of ten.

There is slightly increased activity in tin plate, especially in 28 x 20's of light weight, which are in short supply. The recent oil orders now total about 700,000 boxes.

Japan is still buying black sheets at £19 10s. (3.95c. per lb.) f.o.b. Works are heavily sold. The Central Selling Agency for thin black sheets for the Far East will operate from Sept. 1.

Baldwin's, Ltd., has bought the Wern Tinplate Co., Ltd., Briton Ferry, Glamorgan County, Wales. [The plant in 1922 consisted of four mills with a capacity of 3000 boxes per week. The capital was given as £24,290.]

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.54 per £1, as follows:

Durham coke, delivered	12	18.	to 12 11s.	$3 31 to $3 42
Bilbao Rubio ores	1	1		5 44
Cleveland No. 1 foundry	5	7½		24 40
Cleveland No. 3 foundry	5	2		23 15
Cleveland No. 4 foundry	4	18½		21 91
Cleveland No. 4 forge	4	15		21 57
Cleveland basic	5	2½		23 27
East Coast mixed	4	18½	to 5 0	22 36 to 22 70
Ferromanganese	18	0		81 72
Ferromanganese*	18	10		82 99
Rails, 60 lb. and up	8	10	to 9 10	38 59 to 43 15
Billets	7	15	to 8 10	33 19 to 38 59
Sheet and tin plate bars, Welsh	9	2½		41 43
Tin plates, base box	1	3½	to 1 3¼	5 25 to 5 28
				C. per Lb.
Ship plates	9	5	to 9 15	1.87 to 1.98
Boiler plates	12	10	to 13 0	2.53 to 2.63
Tees	10	0	to 10 10	2.02 to 2.15
Channels	9	5	to 9 15	1.87 to 1.98
Beams	9	0	to 9 10	1.82 to 1.93
Round bars, ¾ to 3 in.	10	15	to 11 5	2.18 to 2.28
Galvanized sheets, 24 g.	18	10	to 18 15	3.75 to 3.80
Black sheets, 24 gage	13	15		2.79
Black sheets, Japanese specifications	15	5		3.09
Steel hoops	12	0	& 12 10*	2.43 & 2.53*
Cold rolled steel strip, 20 gage	17	5		3.50
Cotton ties, Indian specifications	15	0		3 04

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports. Delivery as Specified

Foundry pig iron:				
Belgium	£5	5s.		$23.84
France	5	5		23.84
Luxemburg	5	5		23.84
Billets:				
Belgium	8	0	to £8 2½s.	$36.32 to $36.80
France	7	5		32.92
Merchant bars:				C. per Lb.
Belgium	8	0	to 8 5	1.62 to 1.67
Luxemburg	7	17½	to 8 5	1.60 to 1.67
France	7	10		1.52
Joists (beams):				
Belgium	7	12½		1.55
Luxemburg	7	12½		1.55
France	7	10	to 7 12½	1.52 to 1.55
Angles:				
Belgium	8	0	to 8 5	1.62 to 1.67
⅛-in. plates:				
Belgium	8	15	to 9 0	1.77 to 1.82
Germany	8	10		1.72
¼-in. plates:				
Luxemburg	7	15		1.57
Belgium	7	10		1.52

ASSIGNED CAR CASE

Attorneys Consult in Regard to Beginning Legal Proceedings

WASHINGTON, Aug. 28.—No indication has been given by the Interstate Commerce Commission that it intends to postpone its order in the assigned car case, and this has developed consultation among attorneys for the owners of private cars and railroads with a view of bringing legal action to defend what they call their constitutional rights. Iron and steel manufacturers have taken a leading part in vigorously protesting against the decision of the commission in this case and have filed petitions urgently asking for its reopening and a rehearing. Whether or not they contemplate court action is not known here. Unless the commission takes action in the meantime, its order will become effective on Oct. 1.

Attorneys for railroads and some of the industries owning private coal cars have indicated that they would seek redress through injunction at the hands of the courts. At least it is most probable that this would be the course pursued by the railroads. With the private car owners, the matter is not so well defined. The latter were not parties to the investigation by the commission and the order does not run against them. At the same time, however, they have stated in their petitions for rehearings and intervention that the result of the order would be to deprive them of the beneficial use of their property, despite the fact that the statute recognizes their right to own private cars and offer them for transportation over the rails of common carriers. Because of this right, the steel and other private owners of cars have pointed out in their petitions that they have made large investments in cars. Owners of private cars also take the stand of the railroads that by reason of the fact that the law recognizes their right to own mines, the right to use cars for hauling coal is as much a part of their property as the mine itself, and that anything depriving them of the right to use the cars in times of shortage is a taking of property without due process. Contention also is made that there is no competition between the railroad and industrially owned mines on the one hand and commercial mines on the other, because the coal from the mines of the railroads and industries is consumed by their owners and is not put on the market.

It is the view of railroads and industries owning cars that the order of the commission, applicable only in times of shortage, will deprive them of the use of their mines at the time they are most necessary. It is maintained that during periods of shortage the rule will have the effect of requiring the railroads and the private owners to forego the usual practice of getting their coal by compelling them to release some of their cars for loading at commercial mines.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base .....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb.....3.15c.
Bands, base, per lb.....3.15c.
Strips, base, per lb.....3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.62

Cold-Finished Steels

Bars and shafting base, per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 2100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per 100 lb.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....3.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60, 10 and 5 per cent off list
Machine bolts, small, cut threads.....60 and 5 per cent off list
Machine bolts, larger and longer.....60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
  Smaller and shorter, rolled threads...60 and 5 per cent off list
  Cut threads .....50, 10 and 5 per cent off list
  Larger and longer .....50, 10 and 5 per cent off list
Lag bolts .....65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list
  Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
  Larger and longer sizes .....45, 10 and 5 per cent off list
Hot pressed square or hex. nuts, blank.....3.50c. off list
Hot pressed nuts, tapped.....3.25c. off list
C.p.c. and t. square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, tapped.....3.75c. off list
Semi-finished hex. nuts:
  ⅞ in. and smaller, U. S. S.....80 per cent off list
  1⅛ in. and larger, U. S. S.....75 per cent off list
  Small sizes, S. A. E.....80 and 5 per cent off list
  S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller.....55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller.....70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws.....65 and 10 per cent off list
Milled set screws .....65 and 10 per cent off list
Upset cap screws .....75 per cent off list
Upset set screws .....75 per cent off list
Milled studs .....50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb..$3.00 to $3.10
Large boiler rivets, base 100 lb.....3.10 to 3.20
Small rivets .....65 and 10 to 65 and 5 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb....	$3.15
Spikes, ½ in., ⅞ in. and ⅝ in., per 100 lb.....	3.50
Spikes, ⅝ in.	3.50
Spikes, boat and barge, base, per 100 lb.....	3.50
Track bolts, ⅝ in. and larger, base, per 100 lb..	4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..	5.00 to 5.50
Tie plates, per 100 lb	2.55 to 2.60
Angle bars, base, per 100 lb.....	2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	¼	22	2
½	56	42½	⅜	28	11
¾	60	48½	1 to 1½	30	13
1 to 3.....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½.....	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1¼ in. .....+18	
2½ to 2¾ in.....	37	1⅜ to 1⅞ in.....+ 8	
3 in.....	40	2 to 2¼ in.....— 2	
3½ to 3¾ in.....	42½	2½ to 3 in.....— 7	
4 to 13 in.....	46	3½ to 4½ in.....— 9	

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn.			
1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1⅝ in.	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		
		Hot Rolled	
3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base .....83 per cent off list
Carbon 0.30 to 0.40, base .....81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage..	15
2¼-in. O.D. 12 gage..	17	5⅝-in. O.D. 9 gage..	55
2¼ in. O.D. 11 gage..	18	6½-in. O.D. 9 gage..	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Manufacturers have pamphlets which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic..	$0.32	Buffalo	$0.265	St Louis	$0.43
Philadelphia, export...	0.25	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.31	Cleveland, Youngstown		Kansas City (pipe)...	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic...	0.34	Detroit	0.29	Omaha	0.735
New York, export.....	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export.....	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast $1.24
Pac. Coast, ship plates 1.20
Birmingham 0.58
Memphis 0.56
Jacksonville, all rail.. 0.70
Jacksonville, rail and water 0.415
New Orleans 0.67

The minimum carload for most of the foregoing points is 6,000 lb. For the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 50,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron..... $6.45
Old range non-Bessemer, 51½ per cent iron..... 5.70
Mesabi Bessemer, 55 per cent iron..... 6.20
Mesabi non-Bessemer, 51½ per cent iron..... 5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian..... 11½c.
Iron ore, Swedish, average 66 per cent iron... 10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal..... 43c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus..... 41c
Manganese ore, Brazilian or Indian, nominal 42c.
Tungsten ore, per unit, in 60 per cent concentrates..... $8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard..... $18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York..... 75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton..... $117.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid..... 117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace..... $45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton..... 44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton..... 82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace..... 43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace..... 46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace..... 50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace..... 54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace..... 59.10
Silvery iron, 6 per cent, per ton, furnace.... 32.00
Silvery iron, 7 per cent, per ton, furnace.... 33.00
Silvery iron, 8 per cent, per ton, furnace.... 34.50
Silvery iron, 9 per cent, per ton, furnace.... 36.50
Silvery iron, 10 per cent, per ton, furnace.... 38.50
Silvery iron, 11 per cent, per ton, furnace.... 41.80
Silvery iron, 12 per cent, per ton, furnace.... 45.10
Ferrotungsten, per lb. contained metal..... 88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered..... 12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb..... 11.50c.
Ferrovanadium, per lb. contained vanadium.. $3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton..... 200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines..... $22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines..... 23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.60 to $51.00	$43.00 to $46.00
Maryland	50.00 to 53.00	45.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	48.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 9.50	

Silica Brick:

Pennsylvania	42.00 to 45.00
Chicago	52.00
Birmingham	48.00
Ground silica clay, per net ton	10.00

Magnesite Brick:

Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick: Standard size, per net ton	50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over..... $42.50
Rolling billets, 2-in. and under..... 42.50
Forging billets, ordinary carbons..... 47.50
Sheet bars, Bessemer..... 42.50
Sheet bars, open-hearth..... 42.50
Slabs..... $42.50
Wire rods, common soft, base, No. 5 to ¼-in..... 51.00
Wire rods, common soft, coarser than ¼-in... $2.50 over base
Wire rods, screw stock..... $5 per ton over base
Wire rods, carbon 0.20 to 0.40..... $3 per ton over base
Wire rods, carbon 0.41 to 0.55..... $5 per ton over base
Wire rods, carbon 0.56 to 0.75..... $7.50 per ton over base
Wire rods, carbon over 0.75..... $10 per ton over base
Wire rods, acid..... $15 per ton over base
Skelp, grooved, per lb..... 2.40
Skelp, sheared, per lb..... 2.40
Skelp, universal, per lb..... 2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton..... $43.00
Rails, light, new steel, base, per lb..... 2.25c.
Rails, light, rerolled, base, per lb..... 2.00c. to 2.15c
Spikes, ⅞-in. and larger, base, per 100 lb..... $3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb. $3.25 to 3.75
Spikes, ⅜-in., base, per 100 lb..... 3.25 to 3.75
Spikes, boat and barge, base, per 100 lb..... 3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb. 4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.. 4.75 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, per 100 lb..... 2.75
Bars, common iron, base, per lb., Chicago mill. 2.50c.
Bars, common iron, Pittsburgh mill..... 2.40c.
Bars, rails, steel reinforcing, base, per lb..... 2.15c. to 2.25c.
Ground shafting, base, per lb..... 3.65c.
Cut nails, base, per keg..... $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$4.80	$4.80
⅜-in.	5.50	6.00
⅜-in.	6.50	7.00
⅞-in.	9.00	9.50
½-in.	11.00	11.50
⅝-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyzes. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

STRUCTURAL STEEL BOOKED

Awards Largest Since First Week of June—Railroads Figure in Fresh Inquiries

With upward of 43,000 tons of fabricated steel work bought in sizable jobs, the past week shows the largest tonnage of sales since the first week of June. The first section of the Central of New Jersey bridge over Newark Bay, taking 22,000 tons, supplied, of course, one-half the total. About 12,500 tons were purchased for private enterprises, such as apartment houses and industrial and factory buildings. Fresh inquiries calling for about 14,000 tons appeared. Besides the five or more school houses for New York on which bids have been taken, among other large buildings pending in New York are five or six apartment hotels of an average of 15 stories and three loft buildings in the Pennsylvania zone of the city. Following the notably large contracting of recent weeks, these prospects are held as likely to stiffen the prices of fabricators. The awards of the week include:

Standard Oil Co., fourth section of building, New York, 800 tons, to Levering & Garrigues Co.

Motor repair shop, New York, Sixteenth Street and Avenue C, 1200 tons, to McClintic-Marshall Co.

Klaus apartment house, New York, 1000 tons, to Hinkle Iron Co.

Apartment hotel, Grand Central area, 5000 tons, to the American Bridge Co., the Thompson-Starrett Co. to do the erecting.

Central Railroad of New Jersey, first part, about one-half, of the bridge to cross Newark Bay, 22,000 tons, to the American Bridge Co.

Jerome Avenue sheds, Interborough company, 3000 tons, to the Levering & Garrigues Co.

Loft building, Thirty-fifth Street and Seventh Avenue, 1200 tons, to Hay Foundry & Iron Works.

Loft building, Thirty-sixth Street and Seventh Avenue, 850 tons, to Hedden Iron Construction Co.

Apartment building for Dwight P. Robinson & Co., Park Avenue, 1400 tons, to the Hedden Iron Construction Co.

Siegel apartment house, New York, 600 tons, to the Paterson Bridge Co.

Schoolhouse, New York, 1500 tons, to the Lehigh Structural Steel Co.

Legislative building, Olympia, Wash., 979 tons, to Poole & McGonigle, Portland, Ore.

Missouri Pacific, girder spans and repairs to bridge No. 102, cenfral division, Gleason, Ark., 151 tons, to American Bridge Co.

Portland Railway, Light & Power Co., power station, Portland, Ore., 131 tons, to Puget Sound Iron & Steel Co., Tacoma.

Chicago Great Western, four 70-ft. deck plate girder spans, 138 tons, to American Bridge Co.

Certainteed Products Corporation, plaster mill, Grand Rapids, Mich., 300 tons, to unnamed fabricator.

Science and Law building for Marquette University, Milwaukee, 125 tons, to Lakeside Bridge & Steel Co.

Power Specialty Co., New York, buildings, 120 tons, to Lakeside Bridge & Steel Co.

McCall Publishing Co., Dayton, Ohio, printing building, 500 tons, to Dayton Structural Steel Co. and Burger Iron Works Co.

Columbia River paper mills, Vancouver, Wash., 350 tons, to Lehigh Structural Steel Co.

Cleveland Stone Co., building at Amherst, Ohio, 220 tons, to the Forest City Steel & Iron Co.

Pere Marquette Railroad, bridge over Saginaw River, 500 tons, to American Bridge Co.

Fairfax Exchange building, Bell Telephone Co., Pa., Pittsburgh, 500 tons, to Jones & Laughlin Steel Corporation.

High school, Woodlawn, Pa., 250 tons, to Jones & Laughlin Steel Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Western Electric Co., power house, Kearny, N. J., 1500 tons.

Four public schools in New York, mentioned last week, averaging 1500 tons each, No. 196 in Brooklyn and Nos. 98, 75 and 78 in the boroughs of Manhattan and Bronx.

Parochial school, Brooklyn, 250 tons.

Isbell-Porter Co., Buffalo, retort house, 700 tons.

Washington and Lee University, Lexington, Va., stadium, 250 tons.

Norma Co. of America, Stamford, Conn., 300 tons.

Pan-American Petroleum Co., ten oil storage tanks for California fields, 3000 tons.

U. S. Gypsum Co., plant at Sweetwater, Tex., 400 tons.

Ford Motor Co., plant building, River Rouge, Mich., 3750 tons.

Illinois Department of Public Works, waterways division, lock and dam, Lockport, Ill., 2150 tons.

Bridge work for State of Illinois, 500 tons, general contracts to be awarded Sept. 10.

County Commissioners, Cleveland, Hillside Road bridge, 200 tons.

Kresge Co., store building at Cincinnati, 300 tons, bids in.

Milwaukee Lodge No. 46, B. P. O. E., general contract for the superstructure of clubhouse let to Rauif Co., Patton Building, Milwaukee, on revised specifications embracing about 350 to 400 tons of structural steel and 600 to 700 tons of reinforcing bars, instead of 2615 tons of structural shapes in original design and 1500 tons in first revised design; contractor to sublet steel and bars about Sept. 1 or 3.

RAILROAD EQUIPMENT BUYING

New Inquiries for Cars, But Situation Shows No Notable Change

Nothing significant has developed in the railroad equipment field in respect to purchases of rolling stock or motive power. The chief new items are the following:

The Pere Marquette has placed 300 underframes with the Pressed Steel Car Co. for refrigerator cars to be built in its own shops.

The Union Pacific has ordered 200 refrigerator cars from the Standard Tank Car Co.

The Santa Fe is expected to place orders tomorrow against its inquiry for 200 flat and 300 gondola cars.

The Chicago & Alton has revived its inquiry for cars and is now in the market for 250 gondola cars and 360 all-wood gondola bodies with steel center sills.

The Chicago & Northwestern, which placed an order with the General American Car Co. earlier in the year for 1000 box cars, has specified that the type be changed to stock cars.

The Department of Trade and Commerce, Ottawa, Canada, has received from Trade Commissioner D. H. Ross copies of tender forms and specifications for the following equipment for the Victorian Government Railway Department Melbourne, Australia: 10 mountain type locomotives; 10 Pacific type locomotives.

Economic Survey of China

In a 40-page booklet the American Bankers Association, through its commission on commerce and marine, has presented a comprehensive study of China, its industries and possibilities of trade. Analyzing the machinery market, Chinese imports are shown to have increased from $5,224,000 in 1913 to $28,042,000 in 1920 and $42,292,000 in 1921. Textile machinery alone in 1921 was nearly four times the total machinery in 1913. Imports of electrical machinery and fittings indicate a growing demand for lighting equipment. Some of the plants are now being run through the day as well as through the night.

The iron and steel trade is reported as having been most gloomy because of the great drop in silver exchange. There was a recovery toward the end of the year.

China's purchasing power may be gaged roughly from the exports of raw silk, which decreased from 21,159 net tons in 1913 to 15,320 tons in 1920 and then partially recovered to 18,386 tons in 1921. Similar decreases are shown in the tea exports, the figure for 1913 having been 55,003 net tons, falling to 19,454 tons in 1920 and partially recovering to 26,946 tons in 1921.

The Cleveland Crane & Engineering Co., Wickliffe, Ohio, tramrail division, has appointed George Perley Morse a distributor of tramrails in the Brooklyn and Long Island territory, with office at 110 William Street, New York.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, Electrolytic	New York Lake	Straits Tin New York	Lead New York	Lead St Louis	Zinc New York	Zinc St Louis
Aug. 22	14.25	13 87½	40 00	6.50	6.15	6 85	6.50
23	14.25	13 87½	40 12½	6.50	6.45	6 85	6.50
24	14.25	13.75	39 87½	6.50	6.50	6 85	6.50
25	14.25	13.75	....	6.50	6.50	6 80	6.45
27	14.25	13.75	40 30	6.75	6.65	6 77½	6 42½
28	14.25	13.75	40.75	6.75	6.65	6 77½	6 42½

*Refinery quotation, delivered price ¼c. higher.

New York

NEW YORK, Aug. 28.

The general situation has changed but little and the demand continues light. The copper market is again dull and slightly easier after some strength last week. The tin market has been quite active at advancing prices. Lead is a little stronger with the demand somewhat improved. Demand for zinc has fallen off and prices are a little easier.

Copper.—Last week was a fairly active one, with considerable buying for this time of year, both for foreign and domestic consumption. Prices advanced about ⅜c. early last week, but since then the demand has fallen off and the market is again lower and slightly easier. Electrolytic copper is quoted at a minimum of 14c., delivered, but it is not unlikely that an attractive order would be taken at a shade under this price. There is little interest on the part of either foreign or domestic consumers at present and inquiry is exceedingly light. The sudden turn downward in the market late last week is attributed to the publication, by the leading producer of finished copper and brass products, of lower list prices. Lake copper is quoted from 14.25c. to 14.37½c., delivered.

Tin.—Since last Tuesday, Aug. 21, the market for Straits tin has been more active than in a long time. The total sales since then are estimated at about 1400 tons. The feature is that consumers have been the largest buyers. On Wednesday, Aug. 22, about 200 tons, mostly futures, changed hands and, after a quiet day Thursday about 250 tons was sold on Friday, Aug. 24, with 200 tons changing hands on Saturday. Most of this business also was futures. Yesterday was by far the most active day, a conservative estimate placing the total sales at around 700 tons. Sales of spot were made early in the day at 40.25c. with 40.37½c. realized late in the day. The same range applied also to future deliveries. Yesterday's business was the largest in a long time. Today the market has been moderately active, with the quotation at 40.75c., New York, for spot Straits. Because of the transactions in the past week, the London market has advanced sharply, until today spot standard was quoted at £192 15s., future standard at £193 15s. and spot Straits at £196 15s., all about £5 and £6 per ton higher than a week ago. The arrivals thus far this month have been 6360 tons, with 2327 tons reported afloat.

Lead.—The leading interest advanced its price yesterday, Aug. 27, from 6.50c. to 6.75c., New York, bringing it practically on a level with the prices prevailing for some days in the outside market. Up to that time independents were selling lead on a basis of 6.50c., St. Louis, but, with the advance referred to, that market stiffened until today the quotation is 6.60c. to 6.70c., St. Louis. In the eastern market some independents are asking as high as 6.80c., New York. During most of the week demand has been moderate but steady, consisting mostly of small lots. Some predict a considerably stronger market in the near future.

Zinc.—After sales of prime Western for export, variously estimated at 5000 to 8000 tons, last week, the market has turned exceedingly quiet and slightly easier, with quotations for early delivery at 6.40c. to 6.45c., St. Louis, or 6.75c. to 6.80c., New York. Domestic demand continues exceedingly small and new business is insignificant. There continues to be no pressure on the part of producers to sell and other conditions have changed but slightly in the week.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c.

Antimony.—Wholesale lots of Chinese metal for early delivery quoted at 7.50c. to 7.60c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26.50c. to 27c., New York, duty paid, in such cases where they can obtain it from foreign producers. No quotations are published by the leading domestic producer.

Old Metals.—The market generally shows little change. Business has been a little more active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.75
Copper, heavy and wire	12.75
Copper, light and bottoms	10.75
Heavy machine composition	10.75
Brass, heavy	7.75
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	5.00
Zinc	5.00

Chicago

AUG. 27.—Tin, lead and zinc have advanced on improved demand. Copper remains weak with price shading not uncommon. Among the old metals lead pipe and zinc have advanced. We quote in carload lots, Lake copper, 14.75c.; tin, 41.50c.; lead, 6.50c.; spelter, 6.50c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5c.; zinc, 4.25c.; pewter, No. 1, 20c.; tin foil, 24c.; block tin, 30c.; all buying prices for less than carload lots.

Connellsville Region Prepared to Increase Coal and Coke Production

UNIONTOWN, PA., Aug. 25.—There is considerable speculation in the Connellsville coke region as to the prospects for an anthracite suspension on Sept. 1. This has been accentuated by the number of inquiries for both coal and coke which have come into the region during the week just closed and the requests for options on tonnage for September and October. The coke region is in excellent condition to meet extra demands made upon it by reason of any suspension in the anthracite field.

There is a surplus of labor and mines and ovens not now in operation can be started up on short notice. There have been some rumors of some sympathetic action on the part of workers, but these are without foundation.

During the past 30 days there has been considerable activity among certain groups of union men and sympathizers, but close observers believe that this centers principally in a controversy between the regular union men, Lewis men, and the insurgents.

Coke quotations strengthened during the week and there has been an increased production although not a material gain. Furnace coke quotations are $4.75 and $5; foundry coke, $5.50 to $6; Sewickley steam coal, $1.50 and $1.65; Pittsburgh steam coal, $1.40 and $1.75; three-quarter lump, $2.15 to $2.40; slack, $1.50 to $1.65; by-product, $2.25 to $2.50.

The Dravo Contracting Co., Pittsburgh, was low bidder for a steel derrick boat for service in the Kanawha River, bids for which recently were opened in the United States Engineers' office, Huntington, W. Va. The Dravo company bid was $25,870.

PERSONAL

Edward Adams Mead, assistant in metallography, Massachusetts Institute of Technology, Cambridge, Mass.; Stanley A. Richardson, instructor in metallurgy, Lewis Institute, Chicago; Irving B. Smith, manufacturer of electrical apparatus, Philadelphia, and Igor N. Zavarine, instructor in metallography, Massachusetts Institute of Technology, Cambridge, Mass., have been proposed for membership in the Iron and Steel Institute, and their names will be presented at the September meeting in Milan, Italy.

S. H. Keller, Marion, Ohio, district sales agent, the Berger Mfg. Co., Canton, Ohio, has retired after a long period of service and has been succeeded by A. G. Schreiner, who has also been with the Berger Mfg. Co. for many years. Henry Resch, who represented the company in the Canton, Ohio, district, has also retired and has been succeeded by J. W. Wirth.

W. G. Mather, president Cleveland Cliffs Iron Co., and Samuel Mather, of Pickands, Mather & Co., Cleveland, sailed for Europe last week.

C. E. Hoyt, secretary of the American Foundrymen's Association, sails from New York on the George Washington, Sept. 1, and will join the American foundrymen's tour in London, going later to Paris for the International Foundrymen's Convention.

John Howe Hall, consulting engineer, New York, has been chosen by the board of awards of the American Foundrymen's Association as the first recipient of the J. H. Whiting gold medal, which was established by a $5,000 gift announced at the association's convention of 1922. Mr. Hall's selection is on the score of his achievements in metallurgy in the steel casting industry. The same board of awards has named Enrique Touceda, consulting metallurgical engineer and professor of metallurgy at Rensselaer Polytechnic Institute, Troy, N. Y., to receive the John A. Penton gold medal, which was also established in 1922. The award is in recognition of Mr. Touceda's work in the development of practice in the American malleable casting industry. The presentations will be made at the 1924 convention of the American Foundrymen's Association.

J. Leonard Replogle has resigned as president of the Vanadium Corporation of America, but will retain his large holdings and will continue as a director. Col. Merrill G. Baker, vice-president, will assume the duties of president pending the election of Mr. Replogle's successor, which will probably take place immediately after the annual meeting scheduled for Sept. 10.

W. B. Duncan has accepted the professorship of Mechanical Engineering at the Georgia School of Technology, Atlanta, Ga., having resigned his position as professor of Mechanical Engineering at the University of Idaho.

Dr. Thomas Addison has retired at his own request as Pacific Coast manager of the General Electric Co., and will be succeeded by J. A. Cranston, formerly Northwestern manager. Dr. Addison has been with the company for thirty-three years, and has held his present position since 1892.

Emory W. Jones has been appointed district sales representative of the Carborundum Co., refractory division, Perth Amboy, N. J., with offices in Cleveland and Detroit. His territory will include northwestern Pennsylvania, northern Ohio and the lower peninsula of Michigan.

Olaf E. Oleson has resigned as president of the Edward Valve & Mfg. Co., East Chicago, Ind., and W. H. Crawford has been elected to succeed him.

C. F. Freeman of the Surface Combustion Co., New York has been transferred from the position of manager of the Pittsburgh district to that of chief engineer. His address is now 366 Gerard Avenue, New York.

John F. Cunningham, Jr., has been appointed assistant manager of the production department of the Schenectady works of the General Electric Co.

Walter Van Cleve, formerly of the New York office of the Crucible Steel Co. of America, has been transferred to the Cincinnati sales office.

J. H. Kempster has been appointed general superintendent of the Buffington plant of Universal Portland Cement Co. at Buffington, Ind., succeeding the late C. O. Soderquist.

J. T. Kauffman has resigned as secretary and treasurer of the Ohio Steel Foundry Co., Lima, Ohio, to devote his time to the Vapo Stove Co., Lima, Ohio, of which he is president.

J. H. Bode, who has been chief engineer for several years of the Mackintosh-Hemphill Co., Pittsburgh, recently was elected vice-president of the company in charge of operations. W. L. Ditgas, has been promoted from the position of chief draftsman to assistant chief engineer of the company.

Louis Davidson, Buffalo, one of the controlling factors in the Union Drawn Steel Co., Beaver Falls, Pa., has been elected president of the company, succeeding the late Frederick N. Beegle. Mr. Davidson will continue to make his home in Buffalo, and E. S. Hoopes will have active charge of the plant, having been elected vice-president and general manager. Mr. Hoopes was with the company until the outbreak of the World War, when he entered the Army, and more recently had been engaged in the oil business.

William E. Cross, treasurer of Clemson Brothers, Inc., manufacturer of hack saw blades, Middletown, N. Y., recently completed a four months' business and pleasure trip through Europe and England, including Germany, France, Belgium, Holland, Denmark, Sweden and Norway.

By-Product Coke for House Heating

Tests of by-product coke for house heating were recently conducted by the Bureau of Mines at its Pittsburgh and Minneapolis experiment stations. With different types of steam boilers suitable for heating 7 or 8-room houses as high efficiencies were obtained with by-product coke as with anthracite coal. The efficiencies obtained with Pittsburgh and Illinois bituminous coal were 8 to 20 per cent lower than those obtained with coke.

The anthracite used in these tests was a mixture of egg and nut sizes and was considerably cleaner than that ordinarily obtained in the Pittsburgh market. The by-product coke tested at Pittsburgh was of domestic size, made from a mixture of several coals from the Klondike region near that city. The by-product coke tested at Minneapolis was of domestic size and made from eastern coal.

With the same attention to the fire, the Bureau of Mines found that coke gives much more uniform temperature than bituminous coal. In addition, coke is a clean fuel and makes neither smoke nor soot, an advantage difficult to express in exact figures. It is nearly as good a fuel as the domestic sizes of anthracite, and if anthracite is unavailable at reasonable prices a by-product coke makes a good substitute.

The following condensed instructions as to proper methods for the burning of coke in house-heating equipment are given by the Bureau of Mines:

Carry a deep bed of fuel; one about 18 in. thick gives the best results.

Use very little draft after the fire is started, and keep it always under control. The success of even heating depends on careful draft regulation.

Do not stir the fuel bed; clean the fire in the morning.

Use sized coke: ½ to 2 in. for furnaces, boilers and stoves; ½ to 4 in. for open grates.

Do not allow ash to accumulate in the ash pit.

The results of the foregoing tests are given in technical paper 315, by Henry Kreisinger, John Blizard, H. W. Jarrett and J. J. McKitterick. Copies of this paper and of technical paper 242, giving detailed instructions as to the use of coke for domestic heating, may be obtained from the Department of the Interior, Bureau of Mines, Washington.

OBITUARY

Waldo H. Marshall

WALDO H. MARSHALL, chairman of the board of directors and president of the Consolidated Machine Tool Corporation of America, and former president, from 1906 to 1917, of the American Locomotive Co., died Aug. 23 at his summer home at Barnstable, Mass., after an illness of about a week. His wife died a few weeks ago. A son, Ralph Marshall, of the Chicago Pneumatic Tool Co., and a daughter, Mrs. D. B. Sterrett, Warm Springs, Va., survive.



WALDO H. MARSHALL

Mr. Marshall, who was 59 years old, devoted the early years of his business life to railroad operating work. From 1897 to 1899 he was assistant superintendent of motive power for the Chicago & North Western Railroad, then becoming superintendent of motive power, general superintendent and finally general manager of the Lake Shore & Michigan Southern Railroad, leaving it in 1906, when he became president of the American Locomotive Co.

In 1917 Mr. Marshall was associated with J. P. Morgan & Co., and in January, 1918, he was appointed chief of the Production Division of the Ordnance Department, U. S. Army. He had also been a member of the Naval Consulting Board, and of the Committee on Industrial Preparedness of New York, which made a State survey of industrial resources. He was a director of the American Brake Shoe & Foundry Co., the Bucyrus Co. and the Chatham & Phenix Bank, New York.

In March, 1923, upon the death of C. K. Lassiter, who was president of the Consolidated Machine Tool Corporation, Mr. Marshall, who was then chairman of the board of directors, also took over the duties of the president and continued in that dual capacity up to the time of his death.

JOHN E. SNYDER, president and founder of the business of J. E. Snyder & Son, Inc., Worcester, Mass., manufacturer of upright drilling machines, died suddenly, Saturday, Aug. 25, in the wilderness of Nova Scotia, where with his wife and daughter he was spending a vacation. Mr. Snyder was born in Lubec, Me., in 1850 and as a boy was for some time a sailor. As the Civil War was ending he was a cabin boy on a revenue cutter. He went to Worcester in his young manhood and learned the machinist's trade with Lathe & Morse, who were among the first of American engine lathe builders. In 1872, with but $600 capital, Mr. Snyder established his own shop for the building of drills, developing the business to its present prosperous proportions. His only partner was his son, Milton C. Snyder, treasurer of the company.

MILTON R. HILL, one time president M. B. Hill Mfg. Co., Worcester, Mass., and a well-known inventor, died Aug. 24 in that city. Mr. Hill was 72 years of age.

DAVID BENTON JONES, chairman board of directors of the Mineral Point Zinc Co., Chicago, died at his summer home at Lake Forest, Ill., Aug. 22, at the age of 69.

FAUSTIN PRINZ, founder and president-treasurer Prinz & Rau Mfg. Co., Milwaukee, died Aug. 18, aged 72 years. In 1888 he founded the Prinz & Rau Mfg. Co. to manufacture flour mill equipment. His eldest son, Carl Prinz, vice-president of the company, has had active charge of the business for the past two years, and succeeds his father as president.

VICTOR WHITE, Western sales manager of the Flat Top Fuel Co., and well known in the coal and coke trade, died at his home in Fort Thomas, Ky., Aug. 24, after an illness of one year.

PHILIP WEISS, for 30 years manager of the Philadelphia office of the Ingersoll-Rand Co., New York, died recently at Dayton, Ohio. His home was at Jersey City. He was 68 years old. He leaves a wife, two sons and a daughter.

FRANK A. DOEPKE, owner of the Doepke Metal Pattern Works, Milwaukee, died Aug. 19 from a stroke of apoplexy. He was born in Milwaukee in 1864 and founded the business in 1907.

Proposed Rate Reductions from Chicago to the Pacific Coast

WASHINGTON, Aug. 28.—Sharp reductions in rail rates on iron and steel products, together with a number of other items, from Chicago and points west to the Pacific Coast, are proposed in an application filed with the Interstate Commerce Commission by the Transcontinental Freight Bureau. The bureau has asked the commission to set a hearing at an early date and, if possible, to hold only one hearing. This request is made because of the importance of the application. The proposed reductions, the bureau said, are necessary to meet competition of the Panama Canal. It is proposed to reduce the rate on general iron and steel products from the farthest east group from $1.075 to 75 cents. On rails and rail fastenings the proposed reduction is from $21.79 to $15 per ton. The proposed reduction on wire goods and wire cable is from $1.275 to 90 cents.

As stated in THE IRON AGE last week, the railroads are considering the filing of an application which would reduce the rate on iron and steel products from Pittsburgh to the Pacific Coast to $1.15. This application also would involve Detroit and Atlantic seaboard territory.

Two applications are being considered by the Southern Pacific railroad. One would place the through rate from New York and other Atlantic ports to the Pacific Coast by way of the Morgan steamship line on substantially the same basis as those charged by intercoastal shipping companies. In some instances the reductions would be as much as 50 per cent from the present rates. The Southern Pacific also is giving consideration to filing an application to make lower rates from Gulf to Pacific Coast ports.

American Shipping Losing Its Grip

Department of Commerce figures showing tonnage of vessels entered and cleared in the foreign trade give a total of ship entries for the fiscal year ended June 30, 1923, at 66,888,096 net tons, compared with 61,232,543 tons in the 1922 fiscal year. This represents an increase of 9.2 per cent.

Ships under the American flag included in the total entrances increased from 29,920,203 net tons to 30,702,396, this gain being 2.6 per cent. Ships under foreign flags increased from 31,312,340 tons to 36,185,700 tons, or 15.6 per cent.

The American proportion of the total fell from 48.9 per cent to 45.9 per cent.

Secretary of the Interior Hubert Work, in a letter addressed to Secretary James H. Dunlap of the American Society of Civil Engineers, in explaining the retirement from office of Director A. P. Davis, of the Reclamation Service, said the change was due to the natural development of this work past the stage where the services of engineers were to be considered of first importance. It was stated by Secretary Work that instead of engineering problems the Government now faced the necessity of dealing "with the problems of water users and the collection of the original cost of the project as contemplated by the law."

Machinery Markets and News of the Works

NO GAIN IN BUSINESS

Machine Tool Trade Is Quiet, But Improvement Is Expected

General Opinion in Various Centers Is That a Better Volume of Orders Will Come Next Month

The machine-tool trade is looking forward to a better demand for machines as soon as the fall plans of manufacturing companies have been formulated, probably next month. The past week has been exceeding quiet. There is a fair demand for single tools, particularly used tools in good condition, but on the whole the lack of interest in buying tools is not unusual of this time of year.

Few of the dire predictions about the falling off in automobile production have come true. Instead, the automobile manufacturers appear to be very busy making plans for the 1924 season, and inquiries for tools, especially automatic equipment, are coming from both car builders and auto parts makers. Gray & Davis, Inc., Boston, has an inquiry out for 15 to 20 small screw machines and several automatic screw machines. Other inquiries from the automotive field include several for turret lathes and for automatic screw machinery in lots up to eight or ten machines.

Very few important orders are being placed. One of the most interesting was an order from the Brazilian Navy Department for eight engine lathes, which went to a Cincinnati builder. A Cleveland school order for 18 machines, metal and woodworking, was divided among several dealers. An inquiry has been put out by the Bullard Machine Tool Co., Bridgeport, Conn., for 14 miscellaneous tools for its own shops. The Pullman Co. is inquiring at Chicago for five tools.

New York

NEW YORK, Aug. 28.

AUGUST has been one of the lightest months of the year for the majority of machine-tool sellers. Business has not shown any improvement in the past week. A few railroad orders are being placed, but nothing unusual has developed. An Eastern machine-tool builder has received an order for a large planer, 15 x 10 x 30 ft. from the Hooven, Owens & Rentschler Co., Hamilton, Ohio, and the Pittsburgh Plate Glass Co., Pittsburgh, has ordered a 6-ft. horizontal boring, drilling and milling machine.

Immediate plans of the Brooklyn Edison Co., 360 Pearl Street, Brooklyn, provide for an expenditure of more than $6,500,000, for machinery for power plants, cables and system equipment, and other electrical and mechanical apparatus. The total expenditure for this purpose throughout the year will aggregate $23,000,000.

The International Harvester Co., 960 Broadway, Albany, N. Y., with headquarters at Chicago, is having plans drawn for the construction of a two-story local automobile service and repair building, 50 x 210 ft., for motor truck service, estimated to cost $80,000.

The Noble Machinery Co., Inc., 3 Howard Street, New York, has inquiries out for a number of automatic screw machines, Brown & Sharpe type.

A machine shop will be installed in the two-story automobile service and repair building, 100 x 145 ft., to be erected at 250-56 Bradhurst Avenue, New York, by the Watson Home Co., 291 Broadway, M. Wertheim, head, estimated to cost $100,000. Meisner & Uffner, 543 East Tremont Avenue, are architects.

The National Lead Co., 111 Broadway, New York, has awarded a general contract to the Rufus H. Brown Co., 356 Pearl Street, Brooklyn, for the erection of a five-story and basement addition to its plant at 105 York Street, Brooklyn, 47 x 80 ft., estimated to cost $100,000. Frank H. Quimby, 110 William Street, New York, is architect.

A two-story addition, 40 x 60 ft., will be erected at the steam power plant of the Brooklyn Borough Gas Co., Brooklyn, at West Twelfth Street and Canal Avenue. Bloch & Hesse, 18 East Forty-first Street, New York, are architects.

A machine shop and parts department will be installed in the new five-story automobile service building, 75 x 120 ft., to be erected by the Albany Garage Co., 28 Howard Street, Albany, N. Y., estimated to cost $275,000. A lathe, drill press and other equipment will be installed. T. L. Gleason, 45 Maiden Lane, is architect.

The Fox-Gelberg Holding Corporation, C. J. Fox, president, 1254 Fifty-first Street, Brooklyn, is perfecting plans for the construction of a ten-story ice and refrigerating and industrial building, 140 x 250 ft., on Washington and Little West Twelfth Streets, New York, to cost approximately $1,000,000, with equipment.

Edward H. Jewett, 948 Penobscot Building, Detroit, and associates, have consummated arrangements for the purchase of a controlling interest in the DeForest Radio Telephone & Telegraph Co., 1391 Sedgwick Avenue, New York, manufacturer of wireless instruments and equipment, for a consideration of about $1,000,000. Immediate plans provide for considerable expansion in manufacturing facilities for larger output. Dr. Lee DeForest, heretofore head of the company, will continue in close association with the new organization, of which Mr. Jewett has been elected president.

A one-story automobile service and repair building will be erected by Cushman's Sons, Inc., 461 West 125th Street, New York, in connection with a new three-story baking plant at 28-30 Lawrence Street, to be used for company trucks and cars. L. S. Beardsley, 116 West Thirty-ninth Street, is architect. Lewis A. Cushman is president.

A machine shop will be installed in the new eight-story automobile service and repair building, 100 x 350 ft., to be erected by Gahran-Pinchbeck Co., Inc., 130 Quail Street, Albany, N. Y., on Central Avenue, to cost about $160,000, for which a general contract has been let to the J. M. Myers Engineering & Contracting Co., 25 Euclid Avenue.

The Pioneer Instrument Co., New York, manufacturer of aircraft instruments, will remove and consolidate its plant with that of Brandis & Sons, Inc., 754-58 Lexington Avenue, Brooklyn, manufacturer of engineering and nautical instruments, recently purchased. The combined production facilities will be extended, both organizations continuing operations as individual units. William F. Brandis will continue as president of the Brandis company.

Manual training equipment will be installed in the new high school to be erected at Clifton, N. J., estimated to cost $175,000, for which bids will be received on a general contract until Sept. 14. Lee & Hewitt, 152 Market Street, Paterson, N. J., are architects.

A complete machine shop and parts department, with lathe, drill press, cylinder grinding machines and other equipment will be installed in the service and repair building to be erected by the Union Garage Co., 374 King Street, Perth Amboy, N. J., to be one-story, 91 x 152 ft., estimated to cost $90,000. The company is local representative for the Peerless and Buick automobiles. Morgan F. Larson is president, and Alvin B. Fox, secretary and treasurer.

The Royal Motor Coach Co., Inc., 285 Bloomfield Avenue, Caldwell, N. J., recently organized with a capital of $500,000, is negotiating for the purchase of property in the vicinity of Rahway, N. J., for the establishment of a new plant for the manufacture of automobile buses. Equipment will be provided for an initial monthly production of about 5 cars, to sell for $7,000, each, and which will be increased to

The Crane Market

Both locomotive and overhead traveling cranes are quiet this week with few new inquiries reported but a fair volume of business is still pending. An inquiry is reported from the Worthington Pump & Machinery Corporation, Harrison, N. J., for a 5-ton hand power crane with electric hoist, preferably used equipment, for installation at the Blake & Knowles plant, Cambridge, Mass. The Phoenix Utility Co., 71 Broadway, New York, which has closed on a 100-ton and a 60-ton overhead crane, is not yet reported to have placed its order for a 15-ton gantry crane, pending for some time. The General Engineering & Management Corporation, 165 Broadway, New York, is receiving bids on a 15-ton overhead traveling crane. It is stated that the hoists for the 33 jib and pillar cranes recently purchased by the Pennsylvania Railroad, eastern region, were furnished by the American Engineering Co., Philadelphia. The report that has been current of a large purchase of electric hoists by a company in Connecticut was probably a result of an order placed by the American Brass Co., Waterbury, Conn., with the Franklin Moore Co., Winsted, Conn., duplicating a number of Franklin Moore hoists that the company has had in operation for a number of years. A recent purchase of a list of eight overhead cranes was made by the Edward G. Budd Mfg. Co., Philadelphia. It included one 15-ton, 68-ft. span and a 10-ton and six 5-ton overhead cranes of 22-ft. span.

Among recent purchases are:

Fitzgibbons Boiler Co., 47 West Forty-second Street, New York, a 10-ton, 23-ft. 8-in. span electric traveling crane from the Bedford Foundry & Machine Co., through Philip T. King, 30 Church Street, New York.

Phoenix Utility Co., 71 Broadway, New York, a 100-ton overhead crane from the Niles-Bement-Pond Co. and a 60-ton overhead crane from the Cleveland Crane & Engineering Co. A 15-ton gantry crane is still pending.

Dutton Lumber Co., Poughkeepsie, N. Y., two hammer head type, portal cranes with capacity of 5-tons at 90-ft. radius similar to two others recently purchased for Providence, R. I., from Heyl & Patterson.

New York Central & Hudson River Railroad, for the Big Four, a 160-ton wrecking crane from the Industrial Works.

Poughkeepsie Foundry & Machine Co., a monorail system of about 500 ft. for hand power operation, from the Chisholm-Moore Mfg. Co.

Arthur Rehberger & Son, Newark, N. J., a 3-ton underhung hand power crane from the New Jersey Foundry & Machine Co. and a 2-ton chain hoist, from the Chisholm-Moore Mfg. Co.

Railway Steel Spring Co., Latrobe, Pa., a 15-ton, 86-ft. span, two hook overhead traveling crane, from the Shaw Electric Crane Co.

American Sheet & Tin Plate Co., Pittsburgh, a 15-ton trolley for the Shenango works, New Castle, Pa., from the Alliance Machine Co.

Scullin Steel Co., St. Louis, a 15-ton electric traveling crane from the Whiting Corporation.

Kohler Co., Kohler, Wis., four 5-ton electric traveling cranes, from the Pawling & Harnischfeger Co.

Peninsula Power Co., Madison, Wis., a 10-ton hand power crane, from the Whiting Corporation.

Hubbard-Floyd Co., Boston, Mass., a 10-ton hand power crane, from the Whiting Corporation.

Kansas Electric Power Co., Kansas City, Mo., a 10-ton hand power crane, from the Whiting Corporation.

Boston Elevated Railroad, Boston, Mass., a 20-ton hand power crane, from the Whiting Corporation.

15 machines at an early date. The new company is headed by Ralph De Camp, Livingston, N. J., now operating a motor bus line in this section, and C. Easman Jacobus, 111 North Mountain Avenue, Montclair, N. J.

The Thatcher Furnace Co., St. Francis Street, Newark, manufacturer of furnaces for domestic service, etc., will concentrate all operations at its local plant, utilizing the new Thatcher Building at 38-41 St. Francis Street. The executive offices will be removed from New York. The branch plant at Garwood, N. J., will be continued as heretofore.

The Manufacturers' Development Co., Charles Lefkowitz, president, 354 South Street, Newark, is having plans prepared for the construction of a number of one-story individual plant units on a 16-acre tract of land on South Street, to cost in excess of $200,000. The structures will be leased and occupied for metal-working, machine shops and other kindred service.

William C. Ridway and Herman Ringel, receivers for the Hoboken Paper Mill Co., Hoboken, N. J., with plant and properties at Rossman and Stockport, N. Y., have been authorized to sell the property of the company at the last-noted place.

The Driver-Harris Co., Harrison, N. J., has advised the trade that reports that its plant was recently damaged by a fire which destroyed the Newark ball park, which adjoins its plant, are not correct. No damage was done to plant or equipment and deliveries are not being held up as a result of the fire.

The Vanadium Corporation of America, Bridgeville, Pa., has placed two crushers, one a special Blake type and one a special Dodge type, for crushing ferrovanadium, with the Allis-Chalmers Mfg. Co.

Export Opportunity

A well known firm in Poland (Inzynier Marczynski i Spolka, Ul. 27 Grudnia, Poznan, Poland) is desirous of obtaining an agency of American manufacturer of various machinery, such as metal and wood working machinery, also electric motors. If possible, exclusive agency for Poland is desired, or at least for the territory of Poznan and Pomorze. Credit references and additional information may be obtained upon application in person or by letter or telephone at the American Polish Chamber of Commerce, 953 Third Avenue, New York.

New England

BOSTON, Aug. 28.

AUGUST will be a more profitable month with some of the New England machine tool dealers than anticipated. For that reason, and because quite a number of old prospects have come to life again and new ones have developed since last reports, the trade is more optimistic. The most important new inquiry is from the Bullard Machine Tool Co., Bridgeport, Conn., covering 14 items, including a Heald cylinder grinder, a Pratt & Whitney vertical shaper, a Gilbert & Barker furnace, an Economy furnace, a cam milling machine, a Nazel air hammer, a plain type grinder, a shaper, two radial drills, a lathe and a universal milling machine. Actual bookings the past week showed a slight increase over the previous week, but were spread out thinly over the trade and in most instances tools bought were unimportant. Two new 54-in. vertical boring mills taken by a Chicopee, Mass., textile mill, a used 20 ft. plate planer by a local boiler works, and a used 36 in. x 10 ft. iron planer bought by a Massachusetts textile machine interest were perhaps the most important tools involved.

Used tool dealers are cleaned up on certain kinds of machinery. One local firm the past week bought considerable equipment in New Jersey to replenish stocks. Many used tool dealers as well as representatives of large users of metal working equipment are in town to attend the auction sale this week of a large amount of machinery used during the war in a local plant. This sale will be followed by another within the near future at Portsmouth, N. H., Navy Yard.

The Franklin Moore Co., Winsted, Conn., cranes and hoists, has sufficient business on its books to keep the plant running at capacity until after the turn of the new year.

The Winsted Edge Tool Co., Winsted, Conn., has awarded a contract to the Torrington Building Co. to erect a 40 x 80 ft. plant addition at Meadow and Lake Streets.

Conveying machinery will be required by the Pickering Coal Co., Lynn, Mass., for a coal handling plant addition to be erected, plans for which are being drawn.

John J. Grothe Co., Inc., Everett Street, Woburn, Mass., truck manufacturer, contemplates the erection of a one-story, 100 x 200 ft. plant. A. B. McKay is general manager.

The engineer has been selected to draw plans for repairs

to be made to the plant of the New England Boiler Works, Summer Street Extension, South Boston. Bids for the work will be asked in about a week.

Plans are in progress for a one-story, 30 x 39 ft. shop to be erected by J. Nagle, 16 Harrison Street, Worcester, Mass., tinsmith.

The Bird Machine Co., East Walpole, Mass., has awarded the contract for foundations for a one-story, 80 x 140 ft. machine shop to be erected in South Walpole. The Lockwood, Greene & Co., 24 Federal Street, Boston, are engineers.

Bids will be asked in about four months for the erection of a three-story school having 75 class rooms, including shops, laboratories, etc., on Warren, Townsend and Harrison Streets, Roxbury, for the city of Boston.

Plans are in progress for a one-story, 40 x 100 ft. plant contemplated by Julius Nicholson, Wareham Street, Boston. The new plant will be erected on Lexington Street, Hyde Park, Bosfon.

Wilcox-Crittenden Co., Middletown, Conn., marine hardware, has plans drawn for a three-story plant addition to be used for shipping, grinding and shop departments. The addition will be completed in about six weeks.

The Franklin Machine Co., Providence, R. I., has sold property on the west side of West River Street to the Rhode Island Co. for approximately $30,000. The latter company will make improvement, but details have not been worked out.

The R. H. Long Motor Co., Worcester, Mass., which recently acquired the plant of the R. H. Long Co., Millbrook Street, that city, in which it was planned to manufacture automobiles, announces such plans have been abandoned. Manufacture will continue in the Framingham, Mass., plant of the company. The Worcester property will be rented for industrial purposes.

The Wilcox-Crittenden Co., Inc., 3 South Main Street, Middletown, Conn., manufacturer of marine hardware, has awarded a general contract to C. O. Stone & Son, Inc., Middletown, for the erection of a three-story adition, 60 x 60 ft.

Bids on revised plans will soon be called by the Board of Education, Vernon, Conn., for the erection of a two-story high and manual training school, 100 x 130 ft., estimated to cost $300,000. W. B. Chambers, 111 West Fortieth Street, New York, is architect.

Fire, Aug. 17, destroyed a portion of the plant of the Davitt Foundry Co., 191 Liberty Street, Springfield, Mass., with loss estimated at $75,000, including equipment. Donald J. Davitt is head.

The Magee Furnace Co., Agricultural Avenue, Taunton, Mass., manufacturer of furnaces and heating equipment, has awarded a contract to F. D. Williams, 15 Broadway, for the erection of a new one-story addition, 25 x 140 ft.

The Municipal Light Department, City Hall, Taunton, Mass., is having plans prepared for the erection of a new power house at 40 Court Street, to cost about $250,000, with equipment. Jackson & Moreland, 387 Washington Street, are engineers.

The Winsted Edge Tool Works, Inc., Winsted, Conn., has awarded a contract to the Torrington Building Co., Torrington, Conn., for the erection of a new addition, 40 x 90 ft.

Hamilton & Hamilton, Inc., 66 Eddy Street, Providence, R. I., jewelry manufacturer, will commence the erection of a new one-story plant, 55 x 200 ft., on Allen Avenue, to cost about $45,000, with precision and other equipment.

The Mianus Diesel Engine Co., Stamford, Conn., has been formed with a capital of $1,500,000, to take over and expand the plant and business of the Mianus Motor Works, Inc. The new company will continue the manufacture of internal combustion engines and Diesel units. It is headed by Mark E. O'Connell and Charles F. Bailey, 2226 Loring Place, Nw York.

The Textile Finishing Machinery Co., 171 Westminster Street, Providence, R. I., will take bids immediately for the erection of a one-story machine and forge shop, to cost about $100,000, with machinery. Lockwood, Greene & Co., 24 Federal Street, Boston, are architects and engineers.

The Standard Steel & Bearings Co., Plainville, Conn., has awarded a contract to the Lawrence & Coe Construction Co., 372 Trumbull Street, for the construction of a new one-story forge shop addition, 60 x 100 ft.

New interests are negotiating for the purchase of the plant of Stevens-Duryea, Inc., Chicopee, Mass., manufacturer of automobiles, for a consideration of $450,000, with intention of improving and occupying the works for a kindred line of production. The plant is now being held by F. G. Shaw and H. G. Fisk, receivers.

A machine shop will be installed in the one-story automobile service and repair building to be erected at Broad and Fisk Streets, Providence, R. I., by Harry Fisher, Tribune Building, estimated to cost $45,000, for which a general contract has been awarded to Mahoney & Tucker, 72 Weybosset Street.

Manual training equipment will be installed in the new three-story high school to be erected at Edgewood Avenue and Beers Street, New Haven, Conn., estimated to cost $900,000, for which superstructure work will soon be commenced. C. S. Palmer, 114 Whitney Avenue, is architect.

Philadelphia

PHILADELPHIA, Aug. 28.

PLANS have been completed by the Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, for the erection of an addition to its electric battery plant at Broad Street and Lehigh Avenue.

A machine and repair shop will be installed in the two-story automobile service building, 60 x 80 ft., to be erected at 2444 Germantown Avenue, Philadelphia, by the J. McCaffrey Co., Germantown Avenue. J. Sticker heads the company.

Work will commence on a new one-story power house on the Schulykill River for the University of Pennsylvania, Philadelphia, with initial capacity of 2600 hp., estimated to cost $80,000.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Lahore, India, desiring to be placed in direct contact with American manufacturers of grinding wheels and abrasives. Also, from a concern at Christiania, Norway, for tobacco machinery of American manufacture; from a company at Milan, Italy, in the market for steel balls, ball bearings, crankshafts and kind products, also desiring to be placed in touch with American exporters of pig iron, scrap iron, alloys, ores, etc.; and from a company at Singapore, Straits Settlements, for automobile parts and accessories.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, will remodel and equip the freight car shop at its Altoona, Pa., repair works for a new engine house, with the installation of equipment for engine repairs, coal-handling, etc.

The plant and machinery of the Badenhausen Boiler Co., Cornwells, Pa., will be offered for sale by the Committee in Liquidation on Sept. 17 and 18, with disposition to include locomotive crane; machine tools; steam hammers; 5, 10 and 30-ton traveling cranes, generator sets, etc.

The Therapeutic Devices Co., 140 West Forty-second Street, New York, manufacturer of surgical equipment, etc., has acquired the plant and business of the New York Piano Stool Co., Stroudsburg, Pa. The works will be continued in operation, and extensions and improvements are planned.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Morrisville, Pa., estimated to cost $100,000, for which bids are being asked on a general contract. T. B. Stockham, Morrisville, and P. L. Fowler, Fitzcharles Building, Trenton, N. J., are associated architects.

W. F. Dalrymple, Sugar Grove, Pa., is planning for the installation of a lathe, drill press and other equipment in the machine department at his automobile service works.

The National Engineering & Machine Co., Sharpsburg, Pa., plans to soon call for bids for the erection of a one-story addition to its plant at Nineteenth Street and the Pennsylvania Railroad, to cost about $50,000, including equipment. W. H. Caldwell is president.

Manual training equipment will be installed in the new three-story and basement high school to be erected on Third Street, Palmerton, Pa., estimated to cost $150,000, for which bids will be called on a general contract early in September. W. H. Lee, 32 South Seventeenth Street, Philadelphia, is architect.

The Superior Wire Cloth Co., Turnpike, Pa., has work in progress on a new one-story addition, 125 x 150 ft., and will install machinery for considerably increased production.

Schwartz Brothers, Washington Road, Mount Lebanon, Pa., have plans for the construction of a two-story addition to their automobile service and repair building, 53 x 67 ft., and plan for the installation of additional tools.

Manual training equipment will be installed in the two-story senior high school to be erected at Twelfth and Northampton Streets, Easton, Pa., estimated to cost $1,000,000; for which work will soon be commenced. W. M. Michler, Drake Building, is architect.

The Pacific Coast

SAN FRANCISCO, Aug. 28.

A FOUNDRY building will be erected at the new plant of the Western Cordage Co., Orange, Tex., on site recently acquired on West Palm Avenue, fronting on the line of the Santa Fe Railroad, to be 150 x 600 ft., estimated to cost $125,000.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is planning for the erection of an addition to its machine shop and truck repair works at Davis, Cal., estimated to cost $40,000.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, and San Francisco, manufacturer of sanitary enameled iron products, will soon take bids for the erection of a five-story factory branch, 100 x 180 ft., at Ninth and Brannan Streets, San Francisco, to cost about $90,000. Weeks & Day, 315 Montgomery Street, are architects.

The Utah Power & Light Co., Salt Lake City, Utah, is perfecting plans for the construction of a new power plant in the vicinity of Soda Springs, Idaho, with initial capacity of 20,000 hp., estimated to cost $2,500,000, including steel tower transmission system.

The General Electric Co., Seattle, Wash., has awarded a general contract to the Austin Co., for the erection of a one-story machine and repair shop at its local branch, 30 x 120 ft.

Work will commence on a new vocational and manual arts building at the Union High School, Huntington Park, near Los Angeles, to cost about $100,000. Alfred W. Rea and Charles E. Garstang, 905 Savings & Trust Building, Los Angeles, are associated architects.

The Los Angeles Gas & Electric Co., South Hill Street, Los Angeles, is disposing of a bond issue of $4,000,000, a portion of the proceeds to be used for extensions and improvements.

The Sacramento Pipe Works, Seventh and R Streets, Sacramento, Cal., plans for the installation of an electric traveling crane in its proposed one-story addition, 100 x 150 ft., to cost about $50,000.

Work is under way on a one-story manual training building at the Edison school, Long Beach, Cal., estimated to cost $28,000, and arrangements for the equipment installation will soon be made. W. Horace Austin, 222 First National Bank Building, is architect.

Albert Anderson, Grants Pass, Ore., and associates, are perfecting plans for the construction of a new hydroelectric power plant on the Coquille River, to develop a total of 13,000 hp. It is estimated to cost $350,000. Application has been made to the state engineer for permission. It is purposed to organize a company to carry out the project.

Baltimore

BALTIMORE, Aug. 28.

PROPERTY totaling about 230 acres of land at East St. Louis, Ill., has been purchased by the Baltimore & Ohio Railroad Co., Baltimore and Charles Streets, Baltimore, as a site for the construction of new repair shops for locomotive and car work, engine terminal, storage and classification yards, estimated to cost $1,750,000, with machinery.

The Virginia-Western Power Co., Clifton Forge, Va., is arranging for an increase in capital from $4,000,000 to $10,000,000, a portion of the proceeds to be used for extensions in power plants and systems, including the installation of additional machinery. The company recently acquired the Riverside Light & Power Co., and the Charlottesville & Albemarle Railway Co., and affiliated properties.

The Crown Mining & Mfg. Co., P. O. Box 1751, Atlanta, Ga., recently organized with a capital of $1,000,000, and headquarters at Dahlonega, Ga., is planning for the operation of metal properties and is interested in receiving information regarding mining machinery, power plant and electrical, transportation equipment, etc.

Lester F. Hobbs, Inc., Norfolk, Va., has inquiries out for a steam shovel, Erie or Marion type, with ¾-yd. capacity bucket, mounted on crawler, with extra boom.

The Bureau of Accounts and Supplies, Navy Department, Washington, D. C., will receive bids until Sept. 4, for 27 electric power circuit breakers, for use at the Portsmouth, N. H., navy yard, schedule 1235.

The Mutual Light Co., Harrisonburg, Va., recently organized, is planning for the installation of a power plant and system for local light and power service. Samuel H. Callender is president, and N. E. Bowman, secretary.

John W. Wood, Linden, Va., has inquiries out for a stationary steam engine, about 4 hp., with auxiliary equipment.

The Central of Georgia Power Co., Atlanta, Ga., has plans for extensions in its main hydroelectric generating plant to increase the capacity to 21,000 hp., estimated to cost $4,000,000, with machinery and steel tower transmission line.

The Longborough Development Co., 234 Southern Building, Washington, D. C., has tentative plans for the construction of a new industrial terminal and plant in the West Washington district, consisting of a number of plant and warehouse structures, power house, loading machinery, traveling cranes, etc., estimated to cost $10,000,000. R. F. Beresford, Southern Building, is architect. A. E. Walker is president.

The Delaware Steel Products Co., New Castle, Del., recently organized by Professor M. Boyd, metallurgist, and associates, has acquired a tract of land adjoining the plant of the Deemer Steel Casting Co., lately reorganized and interested in the new company, for the erection of a plant for the production of alloy materials, steel products, etc. Plans will be prepared at an early date. Seldon S. Deemer, formerly president and general manager of the Deemer company, is understood to be connected with the new company.

A. Carver, Rougemont, N. C., has inquiries out for waterwheels, generator and auxiliary equipment for a local hydroelectric power plant.

The Leonhardt Wagon Mfg. Co., 417 East Saratoga Street, Baltimore, will soon take bids for the erection of a new one-story plant at Eighth and O'Donnell Streets, 60 x 250 ft., estimated to cost $90,000, to be equipped for the manufacturer of wagons and parts. J. Lester Barr, 202 North Calvert Street, is engineer. E. M. Leonhardt heads the company.

The Rondo Chair Co., Rondo, N. C., is planning for the purchase of a single spindle boring machine, saddle seat machine, self-feed ripsaw, dowel machine and other equipment, for installation in its local plant.

The Waynesville Veteran's Bureau School, Waynesville, N. C., is planning for the erection of a one-story mechanical and industrial shop, 48 x 112 ft., in connection with a number of other structures, for which plans are being completed.

A vocational shop building, 106 x 112 ft., will be erected at the new three-story high school for boys to be located at Macon, Ga., with machine shop, welding shop and other departments, estimated to cost $400,000, for which plans will soon be completed. Curran R. Ellis, Macon, and G. Lloyd Preacher, Augusta, Ga., are associated architects.

The Board of Water Commissioners, Macon, Ga., is planning for the installation of electrically-operated pumping machinery at its proposed new 10,000,000 gal. station for the municipal waterworks on the River Road.

The Miller Engineering Corporation, Norfork, Va., has preliminary plans for the erection of a new foundry and plant in the Sewell's Island section, for the manufacture of radiators and other kindred equipment, estimated to cost $200,000, with machinery.

The International Engineering & Construction Co., Baltimore, is perfecting plans for the erection of a new mechanical works on local site, estimated to cost $200,000, with equipment.

The General Purchasing Officer, Panama Canal, Washington, D. C., will take bids until Sept. 4, for 19 planer jacks; 3,000 ft. plow steel cable; 500 steel machine bolts; 15 sets of storage batteries; 48 tackle blocks, and other mechanical equipment for canal zone service, circular 1553.

The Bakersville Roller Mills, Inc., Bakersville, N. C., is considering the construction of a one-story ice-manufacturing plant, for which a list of equipment will be arranged at an early date.

C. W. Bryan & Son, Oxford, N. C., have inquiries out for an oil-operated engine, about 50 hp., with auxiliary equipment.

The Mica Corporation, Martinsville, Va., operating properties in Franklin and Henry Counties, Va., has tentative plans for the erection of a local plant for the manufacture of mica specialties, with installation to include forming and molding machinery, power equipment and transmission apparatus. J. T. Mulhaney is president.

The Peerless Truck & Motor Corporation, Richmond, Va., with plant at Cleveland, represented by Thomas B. Gay, Richmond attorney, has voted to purchase the Collins Motor Car Co. General expansion and consolidation plans are being arranged. R. H. Collins has been elected president of the Peerless company.

The North Georgia Marble Products Co., Whitestone, Ga., has inquiries out for steam-operated hoisting machinery, 25 to 30 hp., 36 to 40 in. drum diameter.

The Common Council, Greenville, S. C., plans for the installation of electrically-operated pumping machinery in

connection with proposed additions to the municipal waterworks, to cost about $300,000. Bond have been voted. The Water Commission is in charge.

J. C. Steele & Sons, Statesville, N. C., manufacturers of clay-working machinery, have inquiries out for a milling machine, large size, new or used in good condition.

Pittsburgh

PITTSBURGH, Aug. 27.

THE machine tool market here reflects the improved sentiment which is appearing in business in general. No important lists have appeared lately, but the trade is working diligently and with much confidence on those now up, chief of which are the tools for several shops of the Pennsylvania Railroad, Central Region. A good many orders for individual tools have been closed this month and with some of the trade August has been the best month in point of sales of any since the fore part of the year. The crane market does not show much life with respect to actual orders, but prospective business is gaining and makers of steel mills have something to look ahead to in the new 9-stand bar mill on which the Jones & Laughlin Steel Corporation has taken prices for estimating purposes and the mills for the new cold-rolled strip mill to be started at Warren, Ohio, by C. G. Thomas and associates, and for which Barton R. Shover, Oliver Building, Pittsburgh, is consulting engineer. These mills probably will be placed this week.

Plans are being drawn for the erection of a new one-story addition to the plant of the Pittsburgh Malleable Iron Co., Thirty-fourth and Smallman Streets, Pittsburgh, to cost about $150,000, including equipment. Peter Dietz, Lyceum Building, is engineer.

The Lewistown Motor Co., Lewistown, Pa., will install a machine shop in its proposed new service and repair building to be erected on South Main Street, to cost in excess of $60,000. The structure will replace a former works destroyed by fire a number of months ago.

The American Steel Band Co., Pittsburgh, has acquired property adjoining its plant on Nixon Street for a consideration of about $45,000, for proposed enlargements.

The Carnegie Steel Co., Pittsburgh, has work in progress on additions to its power plant at its Munhall, Pa., works, to include the installation of engines, boilers and auxiliary equipment.

The Thacker Coal & Coke Co., Williamson, W. Va., with headquarters at Cincinnati, T. E. Houston, president, has arranged an appropriation of about $500,000 for extensions and improvements in its local coal-mining plant, to include the construction of a new tipple, hoisting and conveying machinery, electric power and other mechanical equipment.

A. S. Burger, Beechbottom, W. Va., operating local coal properties, is planning for the organization of a company to construct and operate a new tipple, estimated to cost $75,000, with the installation of electric power and mechanical equipment at the present works.

The Venango Mfg. Co., Franklin, Pa., manufacturer of castings, mechanical equipment, etc., has commenced the erection of a new addition to provide for an increase of about 15,000 sq. ft. floor area. The company is completing a one-story extension, 50 x 100 ft., for pattern service.

F. Hodgson, care of H. Westenhaser, 712 South Virginia Street, Martinsburg, W. Va., architect, has plans in preparation for the construction of a three-story automobile service and repair building on King Street, 75 x 80 ft., to cost about $75,000. A machine shop will be installed.

The Deer Run Coal Co., Cumberland, Md., has authorized plans for the construction of a one-story machine shop at its properties in the Elk Garden district, near Elkins, W. Va., in connection with other extensions to cost about $300,000. A tipple and power house will also be built. Benjamin Robinson, Sr., Frostburg, Md., is engineer.

The Clarion River Power Co., Johnstown, Pa., is perfecting plans for the construction of a hydroelectric generating plant at the Piney dam, now in course of building. The company will also construct other similar power plants in this same section, with total investment to exceed $1,000,000.

M. Friedman, Uniontown, Pa., plans for the installation of a machine shop in the two-story automobile service and repair building, 125 x 150 ft., to be erected at Fayette and Wilson Streets, estimated to cost $45,000.

The State Board of Control, Charlestown, W. Va., will take bids on a general contract until Sept. 28 for the construction of five new industrial and vocational school buildings at Prontytown, W. Va., with main structure, three-story, 70 x 150 ft., estimated to cost $100,000. R. A. Gillis, American Building, Fairmont, W. Va., is architect.

A machine shop will be installed in the three-story and basement service building, 100 x 120 ft., to be erected on Fairmont Avenue, Fairmont, W. Va., by the Central Auto Co., 419 Hull Avenue, estimated to cost $55,000. C. Wilson heads the company.

Milwaukee

MILWAUKEE, Aug. 27.

WHILE the amount of business passing in the machine-tool trade remains limited as to volume, inquiry is increasingly active and the number of orders is growing. August bookings compared favorably with those made in June and July, and in most instances were reported above those in August last year. Operations of manufacturers of milling machines are well maintained despite the absence of large-lot orders. Activity of machine-shops has increased during the past two weeks and the outlook for an improved industrial demand for tools is correspondingly better.

Formal transfer of the complete plant of the bankrupt United States Gear Shift Co., Eau Claire, Wis., to B. R. L'Hommedieu and associates of Madison, Wis., has been accomplished and the new owners intend to reinstate operations shortly after Sept. 1.

The Perfection Table Slide Co., Watertown, Wis., let the general contract to Omar L. Gaston, local, for erecting a brick and mill manufacturing building, two stories, 75 x 150 ft., estimated to cost $80,000. Inquiry is being made for miscellaneous machinery, including cut-off saws, jointers, facers, groovers, etc., all with individual motors. William C. Schultz, 603 Clyman Street, is president and general manager.

The International Harvester Co., 217 Oregon Street, Milwaukee, will close bids Aug. 30 for the erection of a four-story concrete and brick building, 100 x 150 ft., at Reed and South Water Streets, to be equipped as an assembling shop and warehouse. It will cost about $160,000 complete. W. J. Jens is manager.

The Milwaukee Board of Industrial Education, Archie C. Muehl, secretary, is asking bids until Sept. 4 for the construction of a foundry charging floor in the new Milwaukee Vocational School at Seventh and Prairie Streets, to provide for the installation of a ½ to ¾-ton electric furnace designed for class instruction. Bids for the furnace and auxiliaries will be taken later.

The Carbon Engineering Co., Milwaukee, has been incorporated with a capital stock of $20,000 to engage in the manufacture of carbon brushes and similar specialties for the electrical industry. The principals are John Hurum, G. F. Helwig and Walter O. Helwig, Eighth and Morgan Avenues. A small shop will be equipped at this location at once.

The Riley-Fredericks Co., 209 Grand Avenue, Milwaukee, has taken the contract to furnish and install the coal and ash handling system in a $30,000 steam generating plant addition for the Forsyth Leather Co., town of Wauwatosa, Milwaukee county. The engineers are Cahill & Douglas, 217 West Water Street, Milwaukee.

The Peterson-Egeland Mfg. Co., Sturgeon Bay, Wis., has been incorporated with $25,000 capital stock to manufacture a patented steel motor stand for Ford service stations and general automotive repairshops, designed by George Peterson, who with Dr. G. R. Egeland and H. L. Peterson, are the incorporators. The former Johnson machine shop has been leased and is being remodeled for production and assembling.

The Helm Cut Stone Co., 578 Locust Street, Appleton, Wis., will erect a new plant costing about $45,000 at Outagamie Street and College Avenue, on the "Soo Line" tracks. It will be 50 x 100 ft., two stories, and will require complete new machinery, including one 5-ton and one 2-ton hand operated crane, several smaller chain hoists, carborundum saws, polishing machines and electric motors.

The Safety Highway Engineering Co., Milwaukee, recently incorporated with $100,000 capital stock to manufacture patented traffic regulating devices, highway signs, etc., has perfected its organization by electing these officers: President, Bernard Minn, 1409 Fifteenth Street; vice-president, H. C. Hoppmann; secretary-treasurer, W. A. Richter. A suitable building will be leased and equipped for finishing and assembling cast and stamped parts to be purchased for the present.

William Hyink & Sons Co., 727 North Water Street, Milwaukee, let contracts Aug. 22 for the erection of a new machine shop, 60 x 127 ft., part two stories, at Ogden Avenue and Market Street, designed by Frank Howend, architect, 65 Wisconsin Street, and estimated to cost $45,000. Miscellaneous supplemental equipment is being purchased.

The Charles W. Gindele Co., Chicago, has taken the general contract for improvements costing $400,000 in the Monona yards of the Chicago & Northwestern Railroad Co. at Madison, Wis. Construction work embraces a 24-stall roundhouse, heater room and washroom; power house; machine shop; car repair and workshop and store building; ice house; sand warehouse, and several smaller buildings. The contract specifies completion of the project by Jan. 1, 1924.

Mead & Seastone, consulting engineers, Madison, Wis., are taking bids until Sept. 15 for switchboards, supervisory controls, power transformers and miscellaneous auxiliaries for the new $600,000 hydroelectric generating plant being built at Caldron Falls, Peshtigo River, near Ellis Junction, Wis., by the North East Power Co., subsidiary of the Wisconsin Public Service Co., 559 Marshall Street, Milwaukee.

The stockholders' reorganization committee, Dr. E. W. Timm, 922 Third Street, Milwaukee, chairman, is the successful bidder for the entire assets of the bankrupt Winther Motors, Inc., Kenosha, Wis., at $130,000. The only other bidder for the property in bulk was the E. L. Easley Machinery Co., 78 West Water Street, Milwaukee, at $127,500. The property inventoried at more than $250,000. The public sale was held Aug. 16 but no bulk bids appeared and at a meeting of creditors on Aug. 23 the stockholders' committee and the Essley company entered tenders.

Herbert F. Johnson, trustee of the bankrupt estate of the Mitchell Motors Co., Inc., Racine, Wis., has issued a circular giving notice that he will receive bids for the purchase of the entire property at private sale up to and including Sept 1. If no bids are received, the assets will be offered for sale at public auction on Sept. 12. The plant consists of 35.46 acres, with nine main buildings containing 604,800 sq. ft., and it is stated that a formal appraisal made Oct. 7, 1922, revealed a going value of $3,840,000, exclusive of materials and supplies.

Detroit

DETROIT, Aug. 28.

SUPERSTRUCTURE work will commence on a new one-story addition, 80 x 200 ft., at the plant of the Mason Motor Truck Co., Fenton Road, Flint, Mich., estimated to cost $25,000, for which a general contract recently was let to the H. G. Christman Co., Lansing, Mich. M. C. Day is secretary.

The Michigan Stamping Co., 11,631 Mack Avenue, Detroit, has filed plans for the erection of a one-story addition, estimated to cost $25,000. Albert Kahn, 1000 Marquette Building, is architect.

A. N. Haskell, 1045 Hibbard Avenue, Detroit, has inquiries out for a lathe of Le Blond type and drill grinder.

The Hupp Motor Car Co., Hamilton Street, Detroit, has awarded a general contract to the Everitt-Winters Co., Book Building, for the erection of a new one-story addition, for which ground will be broken at once.

The Trippensee Closed Body Corporation, 5685 Twelfth Street, Detroit, will commence the erection of a one-story addition to its automobile body manufacturing plant. Plans have been filed.

The Detroit Lubricator Co., 5938 Trumbull Street, Detroit, manufacturer of lubricating devices and equipment, will soon break ground for the erection of a new six-story addition, 108 x 140 ft., estimated to cost about $630,000, for which plans have been drawn by Smith, Hinchman & Grylls, 800 Marquette Building. Work is now in progress on a two-story top extension to the present four-story plant, 90 x 125 ft., to cost approximately $65,000, exclusive of equipment. Herbert Lord is second vice-president.

The Ford Motor Co., Highland Park, Mich., is perfecting plans for the erection of its proposed assembling plant at Norfolk, Va., on site recently acquired at the function of Virginian Railway and the eastern branch of the Elizabeth River. It will consist of two main assembling units, each five story, 350 x 750 ft., with capacity of 300 cars per day. A general operating and storage building, 350 x 500 ft., will also be built. The works will cost in excess of $500,000, with machinery.

The Richard Brothers Dye Works, Inc., Milwaukee Avenue, near New Orleans Street, Detroit, has awarded a general contract to J. I. Miller and J. A. McGrath, Goebel Building, associated, for the erection of a two-story addition, estimated to cost $32,000.

Manual training equipment will be installed in the new high school to be erected at Paw Paw, Mich., estimated to cost $160,000, for which foundations will be commenced at an early date. The Board of Education is in charge.

The Big Rapids Water Power Co., Big Rapids, Mich., is planning for the installation of hydroelectric generating equipment at its power plant, with auxiliary machinery. Burd & Giffels, Powers Theater Building, Grand Rapids, Mich., are engineers.

In connection with additions now in course of construction at the plant of the Durant Motor Co., Lansing, Mich., it is proposed to install equipment to provide for an increase from 400 to 550 automobiles per day. H. W. Alger is general manager of the plant.

The Fisher Body Corporation, 725 Piquette Street, Detroit, has filed plans for the erection of a new one-story addition to cost about $25,000, exclusive of equipment.

The Common Council, Ithaca, Mich., plans for the installation of deep-well pumping machinery at the municipal water plant. Burd & Giffels, Powers Theater Building, Grand Rapids, Mich., are engineers.

Cleveland

CLEVELAND, Aug. 27.

MACHINE tool builders report a decided improvement in the volume of inquiries. While sales for most part are still confined to one or two machines, actual business shows some gain over last month. The new inquiries are coming largely from the automobile field, both from car builders and manufacturers of parts and accessories. Gray & Davis, Inc., Boston, have an inquiry out for 15 to 20 small screw machines and several automatic screw machines. Other inquiries from the automotive field include several for turret lathes up to six machines and for automatic screw machinery in lots of various sizes up to 8 or 10 machines. Other inquiries include one from the Falls Hollow Staybolt Co., Cuyahoga Falls, Ohio, for 30 deep hole drilling machines. Business is fair with machinery houses but most of their orders are for single tools. The order for 18 metal and wood-working machines for the West Technical High School, Cleveland, has been placed, the business being divided among several local dealers. The recently organized Brightman Brothers Co., Columbus, Ohio, which will equip a new plant for the manufacture of shafting and other products, is in the market for machinery equipment. The Universal Crane Co., Elyria, Ohio, has purchased several tools.

The Austin Co., Cleveland, has recently taken the following orders: Four-story plant for Colonial Knitting Mills, Philadelphia; complete paper mill plant for the Columbia River Paper Mill, Vancouver, Wash.; machine shop, 30 x 60 ft., for the Petroleum Iron Works, Sharon, Pa., to be built in Beaumont, Tex.; office building and foundations for warehouse for the American Steel Band Co., Cincinnati; warehouse in Chicago for the Colonial Steel Co., Pittsburgh. The order recently taken by the Austin Co. for the expansion for the plant of the Fisher Body Corporation, Cleveland, will include one building 140 x 300 ft. and another 95 x 600 ft.

The Elyria Iron & Steel Co. and the Columbia Steel Co., Elyria, Ohio, will erect a joint power plant and have organized a new company to erect this plant. This will be known as the Columbia-Elyria Power Co., of which H. B. Wicks of the Elyria Iron & Steel Co. is president. The plant will have sufficient capacity to take care of the power requirements of the two steel companies. The company will select an engineer shortly to prepare plans.

The Universal Crane Co., Elyria, Ohio, is in the process of reorganization, and if present plans are consummated, control of the company and all ownership of common stock will pass to the Thew Automatic Shovel Co., Lorain, Ohio. Already owners of over 50 per cent of the stock have assented to the reorganization.

The S. M. Jones Co., Toledo, Ohio, has purchased the property and plant of the Toledo Car Wheel & Foundry Co. to provide additional room for expansion. The Jones company has recently completed a two-story machine shop, 80 x 200 ft., and a one-story sucker rod plant, 50 x 200 ft.

The Hercules Motor Corp., Canton, Ohio, has been organized to operate the plant of the Hercules Motor Co., which was recently purchased from the receiver by E. A. Langenbach. Mr. Langenbach is president; H. H. Timken, chairman of the board of directors; Charles Balough, vice-president, and H. P. Blake, secretary.

The Acme Cultivator Co., Salem, Ohio, has concluded a deal for the removal of its plant to Leetonia, Ohio.

The Lorain Stucco Steel Co., Lorain, Ohio, will establish a plant for the manufacture of metal lath and channels for stucco buildings. Among those interested are G. Fraser, Ravenna, Ohio, and H. Reynard, Cleveland.

Harry J. and Charles J. Dockray have opened a new foundry in Zanesville, Ohio.

The Defiance Automatic Screw Co., Defiance, Ohio, has increased its capital stock from $15,000 to $50,000.

Buffalo

BUFFALO, Aug. 28.

PURCHASE has been made by the American Radiator Co., Buffalo, with headquarters at Chicago, of the local plant of the Curtiss Aeroplane Co., Elmwood Avenue, for a consideration of $755,000. It consists of 79 acres of land, with buildings aggregating 1,300,000 sq. ft. of floor area. The new owner will equip and occupy a portion of the property for a new works for the manufacture of heating equipment and purposes to lease the remainder to outside manufacturing interests. A subsidiary to be known as the American Terminal Warehouse Corporation, capitalized at $1,000,000, has been organized to take over and operate the portion of the property to be occupied by other companies.

The new plant of the Houde Engineering Corporation, 1392 West Avenue, Buffalo, to be located on site recently purchased on Northland Avenue, will be used for the manufacture of shock absorbers for automotive service. It will be one-story, estimated to cost $75,000.

The Anderson Motor Sales Co., Third Street and Prendergast Avenue, Jamestown, N. Y., is planning for the purchase of a lathe, drill press and other equipment.

Excavations are under way for the erection of a new one-story plant, 60 x 200 ft., for the Buffington Co., Inc., 342 Madison Avenue, New York, manufacturer of metal furniture, etc., at Oswego, N. Y., estimated to cost $50,000.

Bids will be received by the Commissioner of Public Works, Municipal Building, Buffalo, until Sept. 4, for 150 flanged gate valves for use at the city filter plant, consisting of thirty 30-in., thirty 24-in., sixty 20-in., and thirty 10-in. valves, as per specifications on file.

H. Weinstein, 90 Monroe Street, Buffalo, is planning for the installation of a lathe, cylinder grinder and other equipment at his automobile service and repair building, 421 Niagara Street.

A one-story machine shop will be erected by the Superintendent of Public Works, Capitol Building, Albany, N. Y., in connection with a new grain elevator on the Barge Canal, River Street, Oswego, N. Y., to cost in excess of $400,000.

Manual training equipment will be installed in the new three-story high school to be erected at Hamburg, N. Y., estimated to cost $350,000, for which revised plans are being prepared. Frank Spangenberg, 250 Delaware Avenue, Buffalo, is architect.

A lathe, drill press and other equipment will be installed in the machine shop at the automobile service works to be established by F. J. Lewis, 1630 Bailey Avenue, Buffalo.

The Niagara Steel & Wire Co., Buffalo, has acquired the plant of the Pennsylvania Steel & Wire Co., Stroudsburg, Pa., recently secured at a receiver's sale by Henry S. Myer. The works, previously, were operated under the name of the Monroe Steel & Wire Co. The new owner plans to remodel and improve the property for a new branch plant.

The Hudson-Oliver Motor Co., Buffalo, has leased property at Main and Northampton Streets, for the establishment of a new service and repair works.

Cincinnati

CINCINNATI, Aug. 27.

MACHINE tool orders continue to be booked in fair volume, but it is noticeable that most of the orders being placed are for single tools. There has been some clearing up of outstanding quotations, and on the whole, manufacturers are somewhat more optimistic for the future. Inquiry is still good, but large lists are conspicuously absent. The largest order reported was for eight engine lathes from the Brazilian Navy Department. Some outstanding railroad inquiries are expected to be closed this week, and it would not be surprising if several large lists were sent out by a number of roads about Sept. 1. Cincinnati machine tool manufacturers are running at about the same rate as maintained for some months past.

The assembling plant of the Chevrolet Motor Co., recently completed at Norwood, Ohio, is now in production, operations having commenced last week. The plant will have a capacity of 300 cars per day. Automobile bodies will be built in a part of the plant by the Fisher Body Corporation. Full operation is expected to be reached shortly after Labor Day.

The Gates Radio Co., Cincinnati, has been incorporated with a capitalization of $1,000,000 to manufacture radio equipment. The company is now looking for a manufacturing plant in the downtown section of the city, but eventually will build a plant in one of the suburbs. The company will buy some machine tool equipment. L. J. Ainsworth, 607 Dixie Terminal Building, is president.

The Dayton Pump & Mfg. Co., Dayton, Ohio, manufacturer of water systems and gasoline pumps and storage tanks, has awarded contract for an extension to its plant. It is expected the addition will be ready for occupancy in 60 days.

The Superior Gas Engine Co., Springfield, Ohio, has awarded contract to the Austin Co., for an addition to its foundry building, 80 x 110 ft. The company is also contemplating the erection of a large warehouse.

The Thomas Mfg. Co., Springfield, Ohio, will again manufacture lawn mowers, discontinued a number of years ago, when the company standardized on grain drills and haying machinery. Production of lawn mowers will start about Oct. 1.

The Standard Sanitary Mfg. Co., Louisville, Ky., has awarded contract for a combined office, recreation and storage building, to cost approximately $60,000.

A plan is being formulated to lift the receivership of the Star Mfg. Co., New Lexington, Ohio, mine car manufacturer. The company was placed in receiver's hands in 1921, but lately has been operated profitably. Paul Gordon, New Lexington, is receiver.

The City of Newport, Ky., has awarded contract to the J. N. Chester Engineering Co., Pittsburgh, for the installation of a modern water supply system. The system will entail an expenditure of $500,000. Considerable pumping equipment will be required, as well as water pipe, and reinforcing bars for a storage reservoir. Joseph Herman is mayor of Newport.

The new plant of the Mengel Body Co., Louisville, Ky., will commence operations about Sept. 1.

Chicago

CHICAGO, Aug. 27.

THE volume of sales shows no change for the better, but inquiries for machine tools are more numerous, and dealers hope for a more active market in September. At the same time, prospective buyers are showing renewed interest in inquiries which have lain dormant throughout the summer months. In a few instances, in fact, users have hastened to add to their equipment as quickly as possible, indicating that they have taken unexpected business for the execution of which their existing facilities would not suffice. A cutter and tool manufacturer placed a telephone order for three 14-in. tool-room lathes for delivery before Sept. 1. There continues to be a moderate activity in punch presses, five medium-sized presses having been purchased by a local maker of office appliances. Dealers also report scattered sales of used machinery, among them several single orders for second-hand turret lathes. No further railroad buying is reported, but the Pullman Co., Chicago, has put out an inquiry for the Pullman Railroad, including the following machines, all of which are to be motor driven:

One 30-in. x 12-ft. geared head engine lathe.
One 4-ft. high duty plain radial drill.
One 12-in. x 6-ft. geared head engine lathe.
One 36 x 36-in. x 12-ft. medium duty planer with two heads on cross rail.
One 2-in. bolt cutter.

The Whiting Corporation, Harvey, Ill., has booked the following orders for foundry equipment: Four special 72-in. cupolas for the Studebaker Corporation, South Bend, Ind.; one 48-in. cupola for the Jeffrey Mfg. Co., Columbus, Ohio; one 24 x 36-in., one 26 x 48-in. and a 42 x 72-in. tumbling barrel for the Niagara Machine & Tool Works, Buffalo, N. Y.

The plant and equipment of the bankrupt Mitchell Motors Co., Racine, Wis., will be sold at auction Sept. 12. Recent sales of machine tools at both public and private offerings have brought out very low prices. In extreme cases machines have been sold at 10 per cent of the purchase price.

Contracts have been awarded for the construction of the first unit of the Ford Motor Co. plant at St. Paul, Minn. In addition to the manufacturing plant, which will contain 1,000,000 sq. ft. of floor space, a large hydro-electric power plant is to be built. It is intended to have the factory in operation by the spring of 1924.

Elmer Mattern, secretary-treasurer Wabash Foundry Co., Wabash, Ind., has been appointed temporary receiver pending a hearing on a petition to make the receivership permanent.

Work is under way on the construction of a stove manufacturing plant, 70 x 302 ft., for the Leonard Range Co., at Washington, Ind. It is expected that the new company will be able to start operations by Jan. 1.

The Crown Ehrostat & Supply Co., 77 South Des Plaines Street, Chicago, is receiving bids through an architect on a two-story factory, 50 x 72 ft., 1908-1911 Parker Avenue, to cost $25,000.

The Ajax Tank & Tower Co., 1407 West Thirty-seventh Street, Chicago, has leased from the trustees of the Central Manufacturing District, 10,000 sq. ft. in West Thirty-eighth Street opposite to the C. G. Spring Co. for 15 years with option to purchase. A one-story plant to contain 4500 sq. ft. is now being constructed on the property and will be occupied on completion about Oct. 1, for the manufacture and storage of sprinkler and tower tanks.

The Chicago Steel & Wire Co., 103rd Street and Torrence Avenue, Chicago, is having plans prepared by L. G. Hallberg & Co., 116 South Michigan Avenue, for a one-story plant addition, 110 x 390 ft., to cost $80,000.

The Washington Parlor Furniture Co., 1304 North Wood Street, Chicago, is taking bids through David S. Klafter, 64 West Randolph Street, on a two-story factory, 75 x 125 ft., 1312-22 Wicker Park Avenue, to cost $75,000.

The Chicago Window & Door Screen Co., 5118 South State Street, Chicago, is receiving bids on a two-story factory addition, 57 x 112 ft., to cost $45,000.

The Federal Electric Co., 31 West Eighty-seventh Street, Chicago, has let a contract for a one-story plant addition, 24 x 58 ft., to cost $5,000.

The Blaska Mfg. Co., 4825 South Rockwell Street, Chicago, has placed a contract for a one-story tin shop, 75 x 77 ft., 4132-36 Belmont Avenue, to cost $14,000.

The American Plywood Wheel Co. has purchased a site in Howell, Mich., for a plant for the manufacture of disk automobile wheels. Ground will be broken for the building soon.

The Moline Iron Co., Moline, Ill., will build additions to cost $17,000. Improvements at its plant at Second Street and First Avenue include a three-story brick pattern vault, 24 x 45 ft., and a one-story core room, 50 x 75 ft., with a battery of core ovens. At the Thirty-sixth Street plant a two-story pattern vault, 40 x 54 ft., and a one-story core room, 40 x 50 ft., with a battery of core ovens, will be constructed.

The Auto Specialties Mfg. Co. has started the construction of an addition to its plant at St. Joseph, Mich., to cost $200,000. The present floor space will be increased 50,000 sq. ft. The new building will be in the form of an "L" and will be devoted to the manufacture of malleable castings.

A machine shop will be installed in the one and two-story and basement automobile service building, 50 x 250 ft., to be erected at Wilcox and West Adams Streets, Chicago, by the Chicago Motor Bus Co., 124 Rosemont Avenue, for which excavations are being made, estimated to cost $400,000. J. A. Ritchie is president.

The Western Fruit Express Co., St. Paul, Minn., has selected a local site, fronting on the line of the Great Northern Railroad Co., for the erection of a new central car repair shop, estimated to cost $150,000, with machinery.

A one-story power house will be erected by the Board of Trustees, Macalester College, Grand and Macalester Avenues, St. Paul, Minn., for service at the institution, for which bids will soon be asked. W. M. Ingeman, 637 Endicott Building, is architect.

The Rockville Granite Co., Cold Spring Minn., has inquiries out for an electric traveling crane, 3 to 10-ton capacity, with span 40 ft. or over, provided with 220-volt d.c. motors.

The Public Service Co. of Colorado, has been organized as an interest of Henry L. Doherty & Co., 60 Wall Street, New York, operating the Cities Service Co. and other electric power utilities. It will be capitalized with $3,500,000 preferred stock, and $15,000,000 common stock. The new company will take over the Denver Gas & Electric Co., and the Western Light & Power Co., Boulder, Colo., and has plans for extensions and improvements, to include a new steam-turbo generating plant at Valmont, Colo., additional equipment in present stations, and the construction of steel tower transmission lines.

Manual training equipment will be installed in the new two-story high school to be erected at Glencoe, Minn., estimated to cost $225,000, for which bids will be asked on a general contract in the near future. Stebbins & Haxby, Auditorium Building, Minneapolis, Minn., are architects.

The D. O. James Mfg. Co., 1120 West Monroe Street, Chicago, manufacturer of cut gears, etc., will soon commence the erection of a three-story addition, estimated to cost $55,000. Ronneberg, Pierce & Hauber, 10 South La Salle Street, are architects.

A machine shop will be installed in the two-story Ford automobile service building, 75 x 220 ft., to be erected on West Main Street, Danville, Ill., by the Barker Motor Co., 222 West Main Street, estimated to cost $75,000. Lewis & Dougherty, Adams Building, are architects.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Sheldon, Ill., estimated to cost $80,000, for which construction will be placed in progress at once. McCoy & Skadden, Temple Building, Danville, Ill., are architects.

The Gulf States

BIRMINGHAM, ALA., Aug. 27.

A NEW electric power company, to be known as the Frisco-Lina Utilities Co., Frisco, Tex., is being organized to take over the local electric plant as well as the power plant at Celina. Extensions and improvements will be made, with plans including the construction of a new central generating plant for service throughout this district. Transmission lines will be constructed. H. E. Blumberg, Dallas, Tex., is president of the new organization.

Thee H. C. Walton Co., Monroe, La., has acquired property near Swartz, La., and plans for the construction of a new gasoline refining plant. A list of equipment to be installed will soon be arranged.

The Southern Glass Co., Bastrop, La., has acquired the local plant of the Ouachita Glass Co., and will take immediate possession. Extensions and improvements are planned, including the installation of additional equipment. The plant will be used for the manufacture of jars, bottles, etc.

The West Texas Utilities Co., Coleman, Tex., is negotiating for the purchase of the municipal electric power plant. Upon acquisition, it is proposed to make extensions, including the installation of additional equipment for service in this section.

A machine shop will be installed in the one-story automobile service building to be erected by the Bradentown Sales Co., Bradentown, Fla., 100 x 200 ft., on Broad Street. A drill press, lathe and other equipment will be installed.

Fire, Aug. 15, destroyed a portion of the power plant and ice-manufacturing plant of the Oakdale Ice & Light Co., Oakdale, Tex., with loss estimated at $50,000. It is planned to rebuild.

Inquiries are being made by the L. M. Anderson Dental Supply Co., Tampa, Fla., for conveying, digging and other machinery for installation on a tract of Fuller's earth property in this section. Fower equipment will also be installed.

The Kansas City Southern Railway Co., Kansas City, Mo., is perfecting plans for the erection of a new one-story car repair shop at its works at Shreveport, La., to cost about $160,000, with equipment. The structure will replace a building recently destroyed by fire.

C. L. Archer, Corinth, Miss., is arranging for the organization of a company with capital of $40,000, to construct and operate a local plant for the manufacture of brick, tile, etc. A list of equipment to be installed, including presses, conveying apparatus and electric power equipment will be prepared at an early date.

A locomotive crane will be installed in the new plant to be constructed by the Texas Creosoting Co., Orange, Tex., recently organized with capital of $450,000. High pressure pumping machinery, conveying equipment and other mechanical equipment will also be purchased. E. B. Shipley, 1053 Century Building, Pittsburgh, consulting engineer, will be in charge of machinery proposals.

Fire, Aug. 17, destroyed a portion of the oil storage and distributing plant of the Humble Oil & Refining Co., Dallas, Tex., at Webster, near Houston, Tex., with loss estimated at $150,000. It will be rebuilt.

The Texas Power & Light Co., Dallas, Tex., will commence the erection of a new power house on Tuttle Street, estimated to cost $65,000.

The Common Council, Dothan, Ala., has plans for the construction of a municipal hydroelectric power plant at Chalkers Bluff, near Dothan, with initial output of 3000 hp., estimated to cost $750,000, with machinery and transmission system. The Ludlow Engineers, Inc., Winston-Salem, N. C., is engineer.

The Hubert F. Young Lumber & Land Co., Birmingham, Ala., is considering the construction of a power house in connection with a new lumber mill at Waterloo, Ala., to cost in excess of $80,000.

Two mechanical and vocational shops will be installed in the new high school to be erected at Corsicana, Tex., estimated to cost $235,000, for which ground will be broken at once. Equipment bids will be asked at an early date. William B. Ittner, Board of Education Building, St. Louis, is architect.

A machine ship, with lathe, drill press and other equip-

ment, will be installed in the new one-story automobile service building to be erected on South Alamo Street, San Antonio, Tex., by J. Steves, 509 King William Street, estimated to cost $55,000, for which work will commence at once.

Manual training equipment will be installed in the new junior high school to be erected at Mirror Lake Drive and Third Avenue, St. Petersburg, Fla., estimated to cost $160,000, for which ground will soon be broken. The local Board of Education is in charge.

The Common Council, Gibsland, La., will take bids for equipment for the municipal electric lighting plant, including one 100-hp. oil-operated engine; generating apparatus, motors, switchboard, etc. E. T. Archer & Co., Merchants Building, Shreveport, La., are engineers.

The Central South

ST. LOUIS, Aug. 28.

TENTATIVE plans are being prepared by the Louisville Hydro-Electric Co., Louisville, for the construction of a new hydroelectric generating plant at the Ohio River Falls, near Louisville, with capacity of 75,000 hp., for which a permit has been issued by the Federal Power Commission. It will cost in excess of $500,000, with equipment and transmission system.

The Crawford Brothers Co., Cimarron, Kan., operating an automobile service works, is planning for the installation of a drill press, lathe, cylinder grinder and other equipment.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for an engine lathe, 10 to 12 ft. between centers, 24 to 30 in. swing, for general repair operations.

The Day-Brite Reflector Co., 222 South Eighth Street, St. Louis, is arranging for the installation of a plant for the manufacture of lighting reflectors, including polishing, buffing and other machinery. O. W. Klingsick is president.

The Sinclair Pipe Line Co., Sinclair Building, Tulsa, Okla., will commence the erection of a one-story machine shop at Wheeling Street and the line of the Santa Fe Railway, 60 x 100 ft., estimated to cost $25,000. Blair Brothers, 310 Palace Building, are architects.

The Tennessee Hydro-Electric Co., Chattanooga, Tenn., has tentative plans for the construction of a series of hydroelectric generating plants on the Clinch River, totaling 150,000 hp., 130,000 hp., 50,000 hp. and 30,000 hp., respectively, estimated to cost $6,000,000. Application has been made for permission to the Federal Power Commission.

Manual training equipment will be installed in the new Barstow school, 225 x 470 ft., to be erected at Kansas City, Mo., estimated to cost $150,000. Smith, Rea & Lovitt, Kansas City, are architects.

M. B. Parker, Chattanooga, Tenn., has inquiries out for electric welding equipment, suitable for locomotive repair work.

Manual training equipment will be installed in the new high school now in course of construction at Oklahoma City, Okla., estimated to cost $100,000.

The Louisville Gas & Electric Co., Louisville, is planning for extensions and improvements in its power plant on Washington Street, to include the installation of steam power and other machinery to increase the capacity to 120,000 hp., estimated to cost $500,000.

A machine shop will be installed in the new one-story service building to be erected at 504 Broadway, Nashville, Tenn., by the Chevrolet-Nashville Co., 19 Third Avenue, local representative for the Chevrolet automobile, estimated to cost $50,000. A. W. Davis is general manager.

E. A. Zweig, 1310 Central Street, Dodge City, Kan., operating an automobile service works, is planning for the installation of a lathe, emery wheel, cylinder grinder and other equipment.

The Bull Creek Coal Co., Inola, Okla., will install electrical and mechanical equipment for mining service at its local properties, including steam shovel, conveying equipment, etc. A. D. Rushmart, Locust Grove, Okla., is general manager, in charge.

The Bryson Novelty Mfg. Co., Fayetteville, Tenn., is in the market for machinery for the manufacture of gasoline gages and kindred products.

Receivers for the Constantin Refining Co., Tulsa, Okla., deny published reports that they contemplate the erection of a new refinery. The company now has two refineries in Oklahoma which have been shut down for the past six months and the receivers say no expansion of any kind is contemplated.

Indiana

INDIANAPOLIS, Aug. 27.

ARRANGEMENTS are being made by the Elgin Motors, Inc., Indianapolis, for the operation of its local plant at Lafayette and Fifteenth Streets, formerly the works of the Federal Motor Car Co., early in the fall. The works comprise three main buildings on a 2½-acre site, and will be given over entirely to the manufacture of automobiles and parts. The company has removed machinery from Chicago to the new location and will install additional equipment as required. Joseph H. McDuffee is president.

Manual training equipment will be installed in the new junior high school to be erected on Fourth Street, Marion, Ind., estimated to cost $150,000, for which bids will soon be asked on a general contract. W. C. Findt, Board of Education, is architect.

The Board of Trustees, Indiana State Normal School, Muncie, Ind., is perfecting plans for the construction of a one-story power house at the institution, to cost about $60,000. Kibele & Garrard, 335 Johnson Building, are architects.

The Kramer Mfg. Co., 602 South New Jersey Street, Indianapolis, manufacturer of furniture, has plans for the erection of a new plant at 233-55 South La Salle Street, comprising main one-story works, 70 x 240 ft.; power house, 28 x 48 ft.; three-story office and other miscellaneous structures, estimated to cost $250,000, with machinery. All tools will be motor-driven. For the first few months the company will use central station electric service, and will then install generating and auxiliary machinery for individual electric power. Edward F. Kramer is president and L. B. Mosiman, secretary-treasurer.

Gray Brothers, Petersburg, Ind., operating coal properties, are planning for the installation of electric power and mechanical equipment, including stripping machines, etc., on property recently acquired in southern Monroe Township.

The Common Council, Bluffton, Ind., is considering the installation of electrically operated pumping machinery in connection with extensions and improvements in the municipal waterworks. J. W. Moore, 835 Indiana Pythian Building, is engineer.

The Indiana Rolling Mill, Newcastle, Ind., is planning for the installation of a shear, gate type, with capacity for handling material up to 12 ft. long.

The Crawford & McCrimmon Foundry & Machine Co., Brazil, Ind., has been reorganized and has plans for expansion to develop a line of mining machinery and parts. The new company is headed by Hugh Stevens, president of the First National Bank of Brazil; J. B. Mershon, Brazil, and Charles G. Huestis, Greencastle, Ind. The last noted will act as chief engineer.

The Knox & Sullivan County Light & Power Co., Sullivan, Ind., has plans for the installation of a plant and system at Merom, Ind.

Manual training equipment will be installed in the new two-story and basement high school addition to be erected at Alexandria, Ind., estimated to cost about $85,000, for which bids will soon be asked on a general contract. R. Watkins, Farmers' Trust Building, Anderson, Ind., is architect.

Plans are being arranged for the early erection of an addition to the municipal light and power, and waterworks plants at Columbia City, Ind., to cost about $30,000. The installation will include boilers, stokers, superheaters and other equipment. C. Brossman, 1503 Merchants' Bank Building, Indianapolis, is consulting engineer.

The Board of Works, Logansport, Ind., is considering the construction of a one-story service and repair building for municipal motor trucks and cars. It is purposed to install a machine shop. D. Kinneman, City Hall, is city clerk.

Canada

TORONTO, ONT., Aug. 28.

THE demand for machinery and machine tools is holding well up to that of the past several weeks. The automotive and electrical trades are furnishing the greater part of the present demand, while at the same time a good demand has recently developed for equipment for waterworks and sewage plants. Machinery dealers and builders are looking to the Canadian mining fields as an outlet for large quantities of machinery and it is expected that within the next couple of months considerable buying will develop from this source. The demand for machine tools on replacement account continues active, while some good sales have recently been announced on new works account.

The Toronto Transportation Commission has just closed the following business for equipment for the new car shops

now under construction in Toronto: 2 oil bypass awarded to Alfred Herbert, Ltd.; 14 15-ton electric hoists awarded to Lyman Tube & Supply Co.; 1 one-ton hoist awarded to Rudel-Belnap Machinery Co.; and in addition an order for several Universal electric drills was awarded to Charles S. Wright.

C. Alfred Maguire, Chairman of the Board of Control, Toronto, Ont., will receive bids until Sept. 4, for the supply of one 3-motor electric traveling crane, hoist and appurtenances. Specifications and form of tender may be had from Room 12 City Hall.

Fred R. James, Town Engineer, Walkerton, Ont., will receive bids up to Sept. 5, for the supply of 2 gasoline engines and pump, 1000 gal. per min.; 3 small motor-driven pumps, automatic, etc.

T. C. Ephgrave has the general contract for addition to plant of the De Laval Co., Park Street, Peterborough, Ont., manufacturer of cream separators, etc.

The Northern Ontario Light & Power Co., Cobalt, Ont., will install additional equipment in its plant so as to enable it to double the power supply to Kirkland Lake.

The Campbell Aladdin Gas Maker Co., Ltd., Fort Erie, Ont., has been incorporated with a capital stock of $250,000, by W. E. Hunt, F. W. Campbell, John L. Comfort and others. The company has already started operations in a plant at Smithville, Ont., and has opened a branch office at 9 St. Paul Street, St. Catharines, Ont.

The Beeby Range Co., Ltd., Eastview, Ont., is asking the Town Council for a fixed assessment and a free site in return for which it will erect a manufacturing plant to cost $100,000 within the next year.

Trade Changes

Beginning Sept. 1, the products of the American Wire Fabrics Corporation and the hardware products of the Wickwire-Fabrics Corporation and the hardware products of the Wickwire-Spencer Steel Corporation will be sold in certain sections of the country through one selling organization to be operated under the direction of the American Wire Fabrics Corporation. Separate sales representatives will, however, be continued on the Pacific Coast and in a few States immediately east thereof. The general selling offices of the combined companies will be located at 41 East 42nd Street, New York, under the direction of John A. Denholm, general sales manager. Western Sales Offices will be at 208 S. La Salle St., Chicago, under the direction of L. G. McDonald, Western sales manager. In addition to the above, offices operating under the new plan will be located at Worcester, Mass., Buffalo, Cleveland, Philadelphia, Jacksonville, Fla., and New Orleans. The sales policy will be taken care of by John A. Denholm, L. G. McDonald, and C. K. Sanderson president American Wire Fabrics Corporation. The accounting department will be moved to New York and the main office will remain in Chicago.

The Deemer Steel Casting Co., New Castle, Del., announces the election of the following officers: President, Newlin T. Booth; vice-president and treasurer, Charles F. Jenkins; secretary, George B. Harvey.

The Van Camp Hardware & Iron Co., Indianapolis, has elected the following officers: R. P. Van Camp, president, E. Van Camp Martindale, vice-president; C. J. Prentiss, vice-president; C. B. Crets, vice-president; A. B. Caldwell, secretary and treasurer and G. E. Varney, assistant secretary and treasurer. The new president succeeds the late Cortland Van Camp, who died Aug. 7.

The Consolidated Machine Tool Corporation of America will move its executive and general sales offices from 17 East Forty-second Street, New York, to Rochester, N. Y., on Sept. 1. The company will continue a New York sales office at 17 East Forty-second Street in charge of the salesmen who cover the New York territory.

The Triumph Electric Co., Cincinnati, has opened a district office at 500 S. Brevard Street, Charlotte, N. C., with J. McL. Jones as district manager. Mr. Jones has been connected with the electrical industry in North and South Carolina for a number of years, with the Southern Utility & Power Co., under James B. Duke.

The Crane-Schiefer-Owens, Inc. will succeed the Crane Machinery Co. and will establish offices in Buffalo, Rochester, and Syracuse, N. Y. Robert L. Crane, general manager of the Crane Machinery Co., and formerly Western New York manager for Henry Prentiss & Co. for 23 years, will have charge of the home office in Buffalo. Frederick W. Schiefer, manager for Henry Prentiss & Co., Rochester, for the past nine years, will be in charge of the Rochester office. Joseph F. Owens, sales manager for the past eleven years of the Lapointe Machine Tool Co., Hudson, Mass., will be in charge of the Syracuse office.

The Beardsley & Piper Co., manufacture of foundry machinery, has moved its office and factory to 2541 North Keeler Avenue, Chicago. The new plant is 90 x 206 ft., and provides an increase in capacity from two to six machines a week.

The United Metal Products Co., recently incorporated in Ohio and located at Canton, has purchased the properties of the former Central Metal Products Corporation and will continue in the manufacture of hollow metal doors and trim as well as rolled and drawn steel and bronze moldings for the architectural, automotive and other fields. H. R. Grable is general manager.

The Mianus Diesel Engine Co., Inc., Stamford, Conn., and the Mianus Motor Works, Inc., Stamford, have consolidated under a new Connecticut charter with a capital of $1,500,000, under the name of the first mentioned company.

The C. & G. Cooper Co. and allied companies, the Chapman Engineering Co. and the Chapman-Stein Furnace Co., are discontinuing both their New York and Pittsburgh branch offices, and are asking that all communications be addressed to the home office at Mount Vernon, Ohio. In recent years so much of their work has involved an engineering service that they find they can respond to requests for quotations and special service much more quickly when these requests are sent direct to the home office at Mount Vernon. The chief products of these companies are steam and gas engines, air and gas compressors, special heavy machinery, gas producers, complete producer gas plants and industrial furnaces.

Industrial Items

Work has been completed on a new factory building for the A. J. Braasch Heater Co., Orange Drive, Hollywood, Cal., and the company plans to increase its output of gas heaters and furnaces.

The Automobile Specialty Mfg. Co., Inc., Harrisburg, Pa., is manufacturing the Brennan radiometer motor temperature indicator and a number of other automobile specialties, doing some of the manufacturing itself, but letting some of the remainder on contract. Edward J. Brennan is vice-president and general manager of sales.

The Diamond Alloy Tool Co., Toledo, Ohio, recently incorporated to take over the manufacture of the line of tool steel previously made by the Kent-Owens Machine Co., has been financed by the sale of 250.000 of preferred stock and 12,000 shares of no par common stock. Hugh Ross is president, Walter Brown, vice-president, and Harold Fraser, secretary.

The annual meeting of the Pittsburgh Steel Co. will be held Oct. 30, at which time stockholders will be asked to vote on the proposition of increasing the capitalization from $24,500,000 to $30,000,000 by an issue of new common stock. If the plan is approved, shareholders will then be asked to authorize a 35,000 common share stock dividend out of the accrued surplus profits, the shares to be delivered in the ratio of one-quarter new share for each share held.

The Hi-Power Battery Mfg. Co., Hillsboro, Tex., recently incorporated with a capital of $5,000 to manufacture storage batteries and equipment, is manufacturing everything that goes into a storage battery with the exception of the rubber jars and the wooden case or box.

Stockholders of the Pittsburgh Steel Co., Pittsburgh, will meet Oct. 30 to act upon an increase in the common stock from $14,000,000 to $19,000,000. Thirty-five thousand shares ($3,500.000) of the new stock will be distributed to common stockholders at the rate of one share of new stock for four shares now held.

Cost of Public Education

In a 32-page pamphlet the Chicago Association of Commerce presents results of a study of public education cost in Chicago and elsewhere, finding that the cost of elementary education in 1920 in all cities of over 300,000 population was $50.59 per pupil, against $105.85 per pupil in high schools.

Expenditures for high schools and other higher education are increasing much more rapidly than population because both factors, high school attendance and unit cost per pupil, are increasing. Since 1890 the total expenditure on high school education has multiplied by eight, while population has not doubled. Between 1908 and 1918 high school enrollment more than doubled, although population increased only 15 per cent. Between 1910 and 1920 expenditures for high school education were multiplied by 4.71 against 2.12 for elementary schools and 2.46 for all educational needs.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.80c.	.....
Nos. 22 and 24	4.35c. to 4.85c.	5.10c.
No. 26	4.40c. to 4.90c.	5.15c.
No 28	4.50c. to 5.00c.	5.25c.
No. 30	4.70c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.10c.
No. 16	4.75c. to 5.25c.
Nos. 18 and 20	4.90c. to 5.40c.
Nos. 22 and 24	5.05c. to 5.45c.
No. 26	5.20c. to 5.70c.
No. 27	5.35c. to 5.85c.
No. 28	5.50c. to 6.00c.
No. 30	5.95c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel			*Wrought Iron*		
	Black	Galv.		Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18½c. to 19½c.
High brass wire	19 c. to 20 c.
Brass rods	16¾c. to 17¾c.
Brass tube, brazed	26½c. to 27½c.
Brass tube, seamless	24 c. to 25 c.
Copper tube, seamless	25½c. to 26½c.

Copper Sheets

Sheet copper, hot rolled, 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55 $6.30
		90 lb.	6.65 6.40
		100 lb.	6.75 6.50
IC.	$11.75 $10.50	IC.	7.00 6.75
IX.	13.00 11.75	IX.	8.25 8.00
IXX.	14.75 13.00	IXX.	9.50 9.25
IXXX.	16.50 14.75	IXXX.	10.75 10.50
IXXXX.	18.50 16.50	IXXXX.	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	42c.
Bar	48c. to 53c.

Copper

Lake ingot	17c.
Electrolytic	16½c.
Casting	16¼c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8c. to 8¼c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27c.
Refined solder	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 32c. to 33c.

Old Metals

There has been a little more activity during the past week, but prices are on about the same level. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	8.00
Lead, heavy	5.50
Lead, tea	4.25
Zinc	4.00

THE IRON AGE

New York, September 6, 1923

ESTABLISHED 1855 VOL. 112, No. 10

Savings Effected in New Radiator Plant

Emphasis on Minimizing Numbers and on Special Skill of Workers Has Resulted in Equipment and Design of Unusual Originality

BY M. C. LIPPITT

FOUR ideas have motivated the general and detail plan gradually being consummated at the plant of the Republic Boiler & Radiator Co., in Woodberry, Baltimore, Md. The plant is located in a section of the country where the absence of radiator plants would necessitate the expense and inconvenience of importing all experienced labor, and to many this would seem an insurmountable difficulty. The solution of this problem can lie only in some method of manufacturing radiators by unskilled and inexperienced labor; and in the application of such a method there is not only the saving effected by the employment of less costly help but also the virtual elimination of the constant labor turnover expense.

With the possibility of minimum wage rates being established, the second aim was to bring the number of employees down to a minimum. Labor-saving machines, combined with an efficient plan of production eliminating all waste motion, were the logical solution of this problem.

A natural desire of a new concern is the minimizing of equipment costs. To achieve this end it is necessary so to plan the equipment that not only will the usual initial outlay be reduced, but also the expense connected with the upkeep of and addition to the original installation. Provision for future expansion is becoming recognized more and more as a necessity in the design of new factories, and to this end the initial plans may wisely extend far beyond the small unit with which it is often necessary to start.

The attainment of these four desirable features has been the aim of the Republic Boiler & Radiator Co., and what success has been achieved may be judged from the following description of the method of operation employed in the Baltimore plant.

The first operation in which the advantage of inexperienced help appears is in the making of cores. Prepared core sand is fed from an overhead bin in a uniform supply into pairs of pans carried by an horizontal conveyor beneath the bin. The weight of the sand as it drops from the height of the bin packs the sand, and the pans pass immediately under three strike-off bars which are at different heights and angles, the last one being the proper height to make a complete strike.



Traveling on Rails at a Speed of 5 In. per Min., a Combination Sand Cutter and Molding Table Leaves Molds Stacked Three Deep in its Wake

The conveyor deposits these pans in pairs on a venting table, where, by means of a small foot-operated hydraulic lift, one pan is pressed upward against a venting plate which, by leaving its imprint in the sand, forms the required vent. The pair of pans is then removed to the booking table, where a closing device operating like the closing of a book by a second small foot-operated hydraulic lift brings the two halves together. The closed core is moved to the opposite side of the booking table, where a third small foot-operated hydraulic lift raises the top pan without jarring the core. The core is then ready for the oven, and it may easily be seen that, with a few moments of instruction, green help can efficiently perform the important operation of core-making.

The molding operation is accomplished with almost as little skilled labor. A combination molding turntable and sand cutter starts at one end of the molding floor, where the sand lies just as it has been left after the previous shaking out. The car is on tracks 9 ft. apart, and the sand is between the tracks, extending for a length of 200 ft. for each floor. The car, motor driven, moves 5 in. per min., and as it moves revolving paddles at the front of the car cut the sand and throw it to the center, where it is elevated by a bucket conveyor. The sand is dropped into a gyratory sieve from the bucket elevator, and is sieved into a hopper, the bottom of which is the size of the flask used.

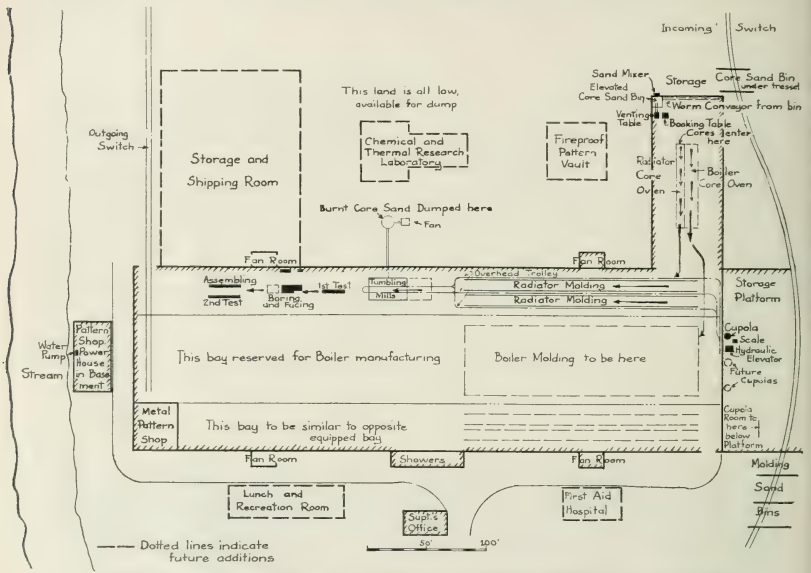
The turntable on the car has four stations, at each of which one operation of radiator molding is performed. A pair of metal patterns is bolted to matched plates at each station. Chaplets are entered in patterns and flask is put in place at the first station. The second station places the flask directly under the sand hopper. A lever operates the shutter bottom of the hopper, allowing the required amount of sand to drop into the flask. At the third station the sand is rammed, and at the fourth the mold is lifted by a foot lever and placed behind the car, one end resting on the car rail to give the proper angle for pouring. Inasmuch as the molds are stacked three deep, the completed molds for a day's work will just comfortably fill the 200-ft. length.

Every effort has been made to eliminate unnecessary and superfluous motion. The handling of raw materials which, in the radiator business, are of necessity heavy and bulky, involves the first saving in number of employees. The incoming switch, which bears all raw materials, is elevated above the plant floor level, and passes over core and molding sand bins into which sand may be dropped directly from hopper-bottom cars. The core sand bin is located near the end of the core room, a generous storage space intervening between it and the point of distribution of the sand. Two-wheeled carts are filled to measure the batch, and these are dumped directly into the sand mixer, which is lowered to a convenient height. The mixer is located immediately outside the building and a chute from the point of discharge through the building wall allows sand to slide into the boot of a bucket elevator within the building. This elevator delivers the sand to the overhead storage bin from which, as has been described, core pans are filled.

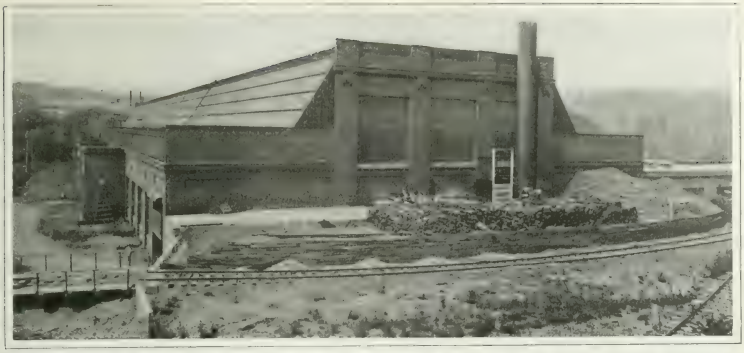
Molding sand is stored in similar bins at the opposite site end of the plant where it may be conveniently wheeled into the foundry.

Midway between core sand and molding sand bins the incoming track passes the cupolas at a distance of about 40 ft. The platform to which materials are unloaded extends the full width of the main building, and it is at a height to be in line with the floor of cars on the track. Iron and coke are easily unloaded by gravity conveyors run from the floor of the car to almost any point on this large storage platform. This same platform, being sufficiently elevated above the plant floor line, is the charging platform height, and iron and coke, in made up charges, are moved from storage directly to the charging doors of the cupolas via an adjacent scale. Gates and sprues to be remelted are deposited close to the charging doors by means of a hydraulic elevator from the plant floor below.

The same economy displayed in the handling of raw materials has been applied to the general plan of pro-



Besides Showing Method and Scheme of Production, the Plan Indicates Provision for Future Expansion



The Railroad Siding at the Cupola End Allows for Direct Delivery of Materials to the Elevated Storage Platform and Passes Directly Over Sand Pockets. One Shown at Extreme Left

duction. With, of course, the exception of the charging platform, all operations are at one floor level and virtually under one roof, and movement is in a direct line toward the storage room.

This idea takes form in the core room where, instead of numerous small ovens, there is one long, continuous oven, into the far end of which the green cores are entered, and from which, at the end adjacent to the foundry, baked cores emerge. Not only does this conform to the straight line production plan, but it greatly increases the ease with which the cores may be watched and practically eliminates the possibility of burning. The oven, furnished by the Gehnrich Indirect Heat Oven Co., is equipped for both gas and coke, gas being very practicable on account of the low rates prevailing in Baltimore. The heat travel is in a direction opposite to that of the core cars; so that as the core cars advance the temperature to which they are exposed increases, and the moisture from green cores is carried off away from the more nearly baked cores. Since cars must enter one at a time at one end, they emerge one at a time at the opposite end; and when one car is ready for removal, all cars behind it have been in the oven for a shorter period of time than this first car. Therefore, there is no danger that any of the others may have been baking too long. And obviously, though there be twenty cars in the oven, it is only necessary to watch the one which will emerge first.

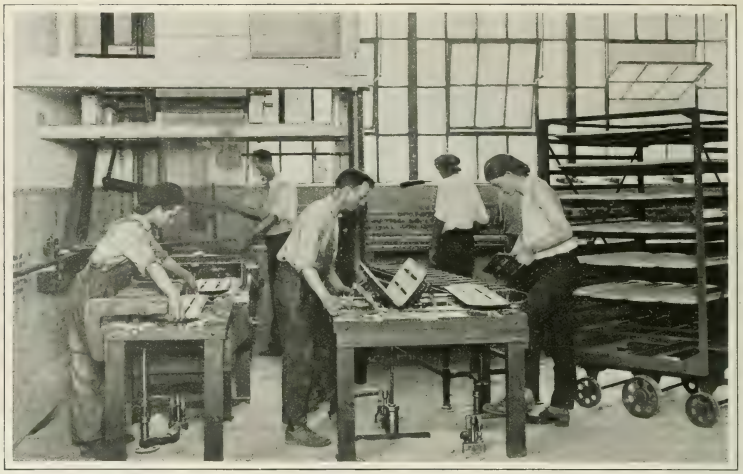
The straight path of production prevails also in the foundry. The cupolas are located at the end of the main building, and molding operations extend about half way down the length of the building. Overhead trolleys furnished by the Louden Machinery Co. facilitate the pouring of iron by following each line of completed molds. Overhead trolleys, small platform trucks, and gravity conveyors enable the castings to be handled with ease from the molding floor to each of the successive operations, the last of which locates the finished product, without having touched the floor, at the other end of the building from the cupola, whence they are removed for storage and shipping. Plans include a large shipping and storage room as a wing at the end where the product is finished. The outgoing switch runs close to this, and is at a height to bring the car floor on line with the shipping room floor.

Each operation has been planned with the aim of reducing labor to a minimum. The sand cutting process, always long and tedious when done by hand, is entirely eliminated, as has been shown, by the sand cutting molding table. The shaking out has been facilitated by the use of loose pins in the flasks.

Tumbling barrels, made by the Kennett Square Foundry & Machine Co., are used for cleaning, and these are located in a covered pit which brings them to a convenient height. The overhead trolley facilitates the carrying of castings to be tumbled. The mills are square so as to fit the shape of the tier of castings which goes into each, and the fact that they operate



This View of the Republic Radiator Plant Shows Core Room at Extreme Left and Power House at Right

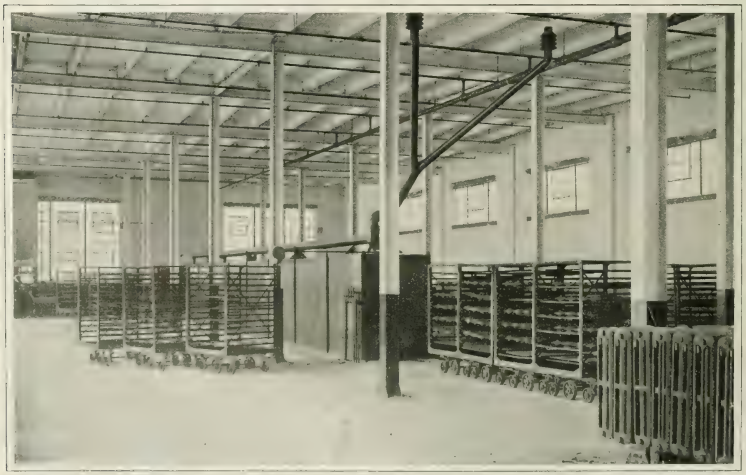


In a Simplified Process of Core-Making, Sand Falls from the Bin into Core Pans, Which are Hidden by Strike-Off Bars. One pan, filled and struck off, can be seen emerging from last strike-off bar

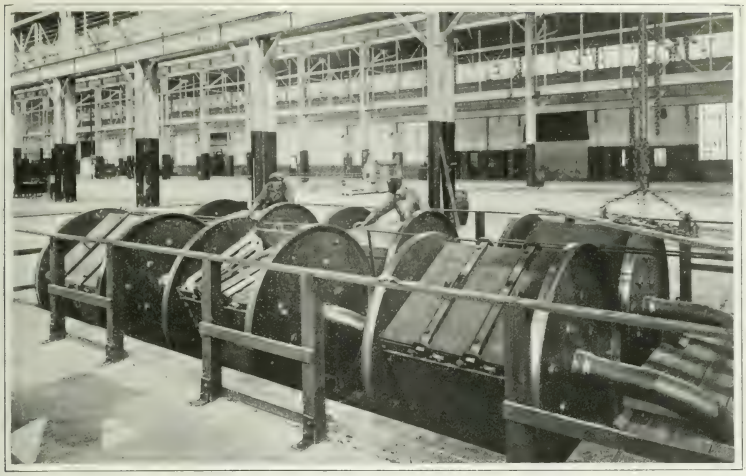
on rollers without any gears make them comparatively noiseless. An exhaust system, furnished by the Dixie Mfg. Co., and connected to each mill, not only keeps the mills dustless but also removes from the castings burnt core sand, carrying this with the dust under the floor to a dumping point at some distance from the plant.

Individual castings are tested by hydrostatic pressure. The outlet at the top through which the water must rise, instead of being open, is connected to an inclosed air chamber of proper size to contain all of the air in the casting. When the water is turned on at the bottom of the casting, air is compressed into the chamber above, leaving the casting full of water. This not only eliminates the nuisance of overflowing water, but it adds the pressure created in the air chamber to the weight of the water, causing the casting to be quickly emptied after the test.

The special boring and facing machine has been designed to receive castings in a vertical position. Castings are more conveniently handled in this position, and time is saved thereby. The eight tools used for the



Core Room Has a 75-Ft. Oven with Exhaust Pipes, Which, by the Aid of a Suction Fan, Carry Off Gases and Smoke Through Ventilators in Roof



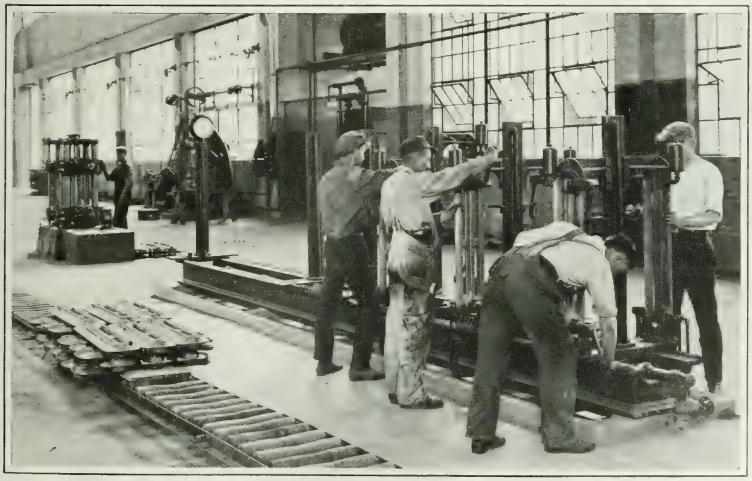
In Line with the Molding Floor Are the Tumbling Barrels Set in a Pit for Convenient Handling of Radiator Castings and with Exhaust Pipes as Shown

operation may be separately or simultaneously adjusted, saving the possible loss in castings caused by lack of proper adjustment between facing and reaming tools.

The assembling machine is operated by hydraulic pressure, and is so designed that both heads move toward each other, cutting in two the time required when only one head moves.

Because the plant is located in a settlement of working people, it is not difficult to secure and retain desirable labor. Still there are numerous advantages which emphasize the desirability of working in this particular plant. Built by the Government just before the close of the war, the building has unusual attributes in the way of head room, producing a superabundance of light and splendid ventilation. Not only is there an adequate heating system for cold weather whereby heated air is blown into the building, but in summer the same fans can supply cool air when needed, since the coils over which they blow contain cold water. The foundry is thus quite comfortable in the most extreme warm weather.

All equipment was designed and purchased with the view of keeping both initial and upkeep costs low. Steel flasks made by the Truscon Steel Co. are used



Next Beyond the Tumbling Barrels Are the Stands for Hydraulic Testing of the Radiator Sections



Radiator Is Completed on the Assembling Machine. In the distance may be seen the boring and facing machine, the testing stand, the tumbling barrels and finally the molding floor

exclusively. While the original price of these is somewhat high, it was estimated that their wearing qualities render them more economical in the end. The stacking of the molds three deep reduces the required number of bottom boards and top plates, which are also of steel.

Molding table, testing machine, boring and facing machine and assembling machine are from original design and built by the Republic Boiler & Radiator Co. Since all patterns for these belong to the company they can be duplicated at a relatively small cost.

Cranes, hoists, industrial railways and such handling apparatus have been replaced by methods which employ gravity whenever possible and involve very little equipment. A large expense item is thereby eliminated.

No core removing equipment is required, since the exhaust system which carries away the dust from the tumbling mills disposes also of the burnt cores. Expensive wear on the fan used for this exhaust system has been prevented by the particular design of the system. The fan creates a very strong suction, which draws the sand from the castings, but by the use of a separator the sand is dumped automatically before it reaches the fan.

Pattern equipment for the production of radiators is always a large item. Here each pattern is bolted to a jigged aluminum plate which fits on the turntable. Obviously this eliminates expensive match plate equipment. Also on account of the use of the molding turntable, the molding process is so divided as to make the number of patterns required per man much less than in piece work. This results naturally in a considerably reduced pattern equipment.

Inasmuch as all castings are submitted to a hydrostatic test at least twice, the water consumption is very large. An inexhaustible supply is furnished by a pump



Special Boring and Facing Machine, in Which Casting Is Placed in Vertical Position and Tools Approach Casting on Both Sides

connected to a stream flowing adjacent to the plant. By the use of this water not only have water bills been greatly reduced but the need of settling tanks and such expensive equipment, required when the metering of all water renders it desirable to use again the sand laden testing water, is obviated. Indeed, the cost of water for other than drinking purposes has been so reduced by taking advantage of this stream that the operation cost of the hydraulic elevator to the charging platform is negligible.

Only a small part of the plant of the Republic Boiler & Radiator Co. is now employed; but its present capacity may be quadrupled without change in the original layout. Of the three bays in the main building the two outside bays will be used for radiator molding while the center will be reserved for boiler molding. Foundations for two additional cupolas were installed with that of the first.

Likewise in the core room, a pit which provides for the burning of coke under a future second core oven (which will be for boiler cores) was put in at the time the first oven was built. Here also care has been taken to provide a core sand supply for greater future needs. A worm conveyor from the core sand bin will deliver prepared sand to any point at the back of the core room. A second radiator core-making apparatus may be installed at any time the need arises.

Provision has been made for additional tumbling mills to complete the requirements of the full capacity of the first bay; likewise two or three more boring and facing machines all driven from the present motor location may be added. The testing stand is built for the doubling of its present capacity by the equipping of additional stations.

There is sufficient unoccupied property adjoining the plant to allow of unlimited additions to the present plans.

The method of manufacture and all equipment were designed by the company's general superintendent, William C. McKeown.

ELECTRIC STEEL IN CHINA

Only One Furnace Operating—Steel Casting Prices and Imports—Costs

The use of the electric furnace in the steel industry of China is discussed by L. W. Hoyt in a long article, "China's Iron and Steel Industry," in the London *Iron and Coal Trades Review* of Aug. 3 and 10. He says in part:

At present there is only one electric steel furnace in China proper. This is installed in the foundry of the Kiangnan Dock & Engineering Works at Shanghai. An electric furnace is operating in the British colony of Hongkong, but, strictly speaking, there is not today a single steel foundry in China—either Bessemer, open-hearth, malleable or electric.

The only city in China where an electric furnace (either ferrous or non-ferrous) could be profitably operated at the present time is Shanghai. This city has greatly increased its municipal supply of electric power, and the international settlement power house at Shanghai is as modern and efficient as any station in the world. The cost of electric power to large users of current is low. Power is delivered to cotton mills in Shanghai at less than 1¼ gold cents (0.625d.) per kwhr.

Electricity is supplied on what is known as the "bulk" system of charging, whereby two separate and distinct charges are made. These charges are known respectively as the "capital charge" and the "running charge."

The capital charge is based upon the amount of capital which the Shanghai electricity department has to expend in order to meet a definite demand. This naturally varies to some extent with location of such demand in relation to the position of the municipal generating station.

The running charge is based almost entirely upon the actual cost of generating energy, and is naturally greatly influenced by the cost of fuel for the time being in force. To meet this variable factor a basic charge per kilowatt-hour is made, based upon the assumption that fuel can be purchased at a cost of 1.6 gold cents (0.8d.) per 100,000 B.t.u. In the event of this assumed cost being either greater or less than the figure given, then a proportionate increase or decrease in the basic running charge is made effective. The equity of this arrangement will be apparent when it is borne in mind that the cost of fuel is outside the control of the municipal authorities.

The cost of power in electric furnace practice in America usually constitutes one-third the cost of the steel in the ladle. Under conditions obtaining at Shanghai a very accurate estimate of electric hot-metal costs can be made, as nearly all materials entering into these costs have a known value in Shanghai, although none of these materials have ever been utilized in steel foundry practice there.

Let us assume that a 3-ton acid electric furnace is to operate in Shanghai, and that a rate of 1 1-7 gold cents (0.5715d.) per kwhr has been contracted for from the city electricity department. With this assumption the figures given below have been deduced from what are known values for the scrap alloys, refractories and labor necessary to place an electric heat in the ladle. Electrode costs cannot be quite as accurately estimated, because no electrodes have hitherto been imported into China:

6000-Lb. Charge (Figures in Net Tons)

Materials	Price Per Ton	Consumption, Lb.	Cost per Heat £ s. d.
Plate scrap, 35 per cent.	£ s.	1,500	3 6 0
Punchings 10 per cent.	4 4	600	1 1 8
Axle turnings, 25 per cent.	3 12 (local)	1,500	2 15 0
Operating scrap, 40 per cent	3 12 (local)	2,400	4 15 0
Loss, 4 per cent	3 18	240	0 6 6
Ferromanganese	0 3	50	0 7 8
Ferrosilicon	15 2	25	0 3 8
Aluminum	14 6	5	0 4 0
Gannister	7 12	150	0 4 0
Silica sand	.. ..	50	0 0 0
Electrodes	.. ..	65	1 6 0
Brick	40 0	....	0 6 6
Ladle drying	.. ..	....	1 0 0
Electricity	0.5715d. per kw-hr.	1,800 kw-hr.	4 2 4
Labor	.. ..	....	0 4 0
Laboratory expense	.. ..	....	0 0 9
Total per heat	.. ..	6,585	29 12 1
Total per ton	.. ..		9 17 6

The Chinese are excellent pattern-makers and molders, and have been used to iron foundry work for generations. There is every reason to suppose that they would, with capable supervision, readily and efficiently grasp the details of steel foundry operations. Electric steel can be melted in Shanghai as cheaply as in most cities of the world, and owing to this steel's freedom from oxygen it would be the kind of metal best suited to Chinese practice.

A great advantage in the Chinese market is the high price for finished steel castings. Prices for steel castings in Shanghai range from 1s. to 1s. 3d. per pound, and where emergency work is required even higher prices could be demanded by a steel foundry located there.

The Chinese customs returns do not show steel castings as being a product of much value in imports. These customs statistics, however, do not go into detail, and while thousands of tons of steel castings enter China each year, they are grouped for the most part under the general term, Machinery.

In a test in Glasgow to determine acid resistance, Monel metal gave better results than the other materials used, which included, in order of their resistance, Monel bronze, nickel bronze, phosphor bronze, aluminum bronze, etc., etc., with mild steel at the bottom of the list. Jets of bad feed water were directed upon disks of the materials tested for 500 hr. and judgment was by appearance.

Lungyen Blast Furnace Plant Near Peking

Power Plant Equipment and Use of Furnace Gases—Special Settling Arrangements Needed to Avoid Trouble from Loess in the Water Supply

BY K. E. HUMBERT*

A GAS main 4 ft. in diameter continues to the boiler house, which is 46 x 114 ft. and 35 ft. 8 in. high, of steel construction, with corrugated steel roof and siding. The roof is of the offset monitor type. Five Wickes vertical water tube boilers in 500-hp. units are installed, designed to operate at 200 lb. pressure and 165 deg. superheat. Power Specialty Co.'s Foster superheaters are used. The boilers are gas fired, with the Beaton type of gas burner.

Particular care has been taken, in the design of the boiler house gas piping that units may be taken off without gas leakages into the house. A bleeder is provided at the end of the gas main, removing excess gas to the outer air. Grates have been provided for alternative coal firing. There is a self-supporting steel stack, 6 ft. 6 in. inside diameter and 150 ft. high, brick lined, for each pair of boilers. Flues are underground. The blow-off lines are led in a trench to one end of the house, where they exhaust into a blow-off tank.

Other boiler house equipment includes Stets feed water regulators, Golden-Anderson triple-acting non-return steam valves and Everlasting blow-off valves. There is a complete series of platforms, suspended from the roof trusses, making all points easy of access for the operators. Trap doors in the roof over each boiler, with a walkway on the roof extending the length of the boiler house, simplify the work of removing or replacing boiler tubes. The 8-in. feed water line from pumps in the power house, and the 12-in. steam line to the power house, are in an underground trench.

Of steel construction, the power house has brick walls and corrugated steel roof. It is 50 x 120 ft. and 28 ft. high from the operating floor, which is 8 ft. above yard level. For supplying the blast there are two Ingersoll-Rand turbo-blowers designed to operate with steam at 175 lb. pressure and 150 deg. superheat. Each has a capacity of 28,000 cu. ft. of air per minute at 12 lb. pressure or 25,000 cu. ft. at 16 lb. When (and if) the size of the furnace is increased it is only necessary to change the steam nozzles to secure the larger amounts of blast required.

There is a separate 30-in. diameter air intake for each blower, extending above the power house roof, and with a connection allowing the air to be drawn from inside the house, this provision being necessary on account of severe dust storms at times. The air regulating device is the single Venturi type. Ingersoll-Rand multiport check valves are installed in the discharge line from the blowers. The cold blast main leads through the boiler house directly to the stoves.

All electric power required at the plant is direct current, generated by two General Electric 250-kw. 150 r. p.m., 250-volt, self-excited, direct current 3-wire generators, driven by 20 x 32-in. Nordberg-Todd unaflow engines. The engines operate non-condensing, but condensers may be added if desired.





Outcrop of Ore, Showing Formation as Well as Ease of Working

For the Ingersoll-Rand turbo-blowers there are two C. H. Wheeler Mfg. Co. low level jet condensers maintaining a 28-in. vacuum. Condensers and their auxiliaries are located in the basement. Condensing water is taken from a sump in the basement, which in turn is supplied from the plant reservoir. The discharge water returns to a hot well at the plant reservoir. Other units in the power house basement include two Worthington 20 x 12 x 15-in. horizontal duplex pot-valve type boiler feed pumps, a Richardson-Phoenix continuous oil filter system and a 150 cu. ft. per minute Sullivan Machinery Co. air compressor, with receiver. The feed water meter is of the Venturi type, installed in the discharge line from the pumps. A register indicator-recorder is placed on the operating floor.

All equipment of the power house except turbo-

*With Perin & Marshall, consulting engineers, New York. This is the third and concluding installment of a story on Chinese blast furnace developments. The first part appeared Aug. 23, page 401, the second, Aug. 30, page 451.



Changchunlin Limestone Quarry, with a Native Lime Kiln in Left Foreground. The high peak in center is almost solid limestone, furnishing a virtually inexhaustible supply

blowers and power units is in the basement and all steam and water lines are kept beneath the main floor, resulting in a very finished appearance. All steam and water lines enter or leave by underground concrete trenches. A 10-ton hand-operated crane facilitates maintenance work. Particular attention was paid to the number and location of stairs leading from operating floor to basement.

Electric distribution is underground from the power house to a steel main distributing tower. From this tower the lines are carried on a reinforced concrete pole system to the various units. The plant lighting system is of the 3-wire 115-230 volt type. Yard lighting has been given as careful consideration as the internal lighting of various units.

Using Muddy Water

The water system required considerable study, as unusually severe conditions had to be dealt with. It may be divided into three subdivisions: river pump house and settling basins; main or 60,000,000-gal. reservoir; and the plant reservoir, pump house and distributing system. The Yung Ting River is the source. Ample water is available, but has the great disadvantage that it carries a large amount of loess as suspended matter. The presence of this loess is what gives the rivers of China their characteristic yellow appearance.

At certain times the loess content is as high as 50 per cent of the total, and it is impossible to use the water. Therefore a storage reservoir was required to tide the plant over such periods. The river pump house contains two 2500 g.p.m. 70 ft. head Cameron pumps, driven by 75-hp. motors and primed by means of a Wheeler rotrex vacuum pump. The river intake had to be especially designed to provide for removal of the settled loess, the water being pumped to a system of gravity settling tanks.

One favorable feature in this connection is that the loess settles out rapidly, tests showing 98 per cent had settled out in 4 hr. Water is pumped in and allowed to stand until settled, before it goes by gravity flow through a buried concrete flume to the main reservoir. Valves are then opened and the settled loess is flushed back into the river.

With the installation of the large 60,000,000-gal.



Another View of Changchunlin Quarry and a Native Kiln. Small limestone mixed with coal is put in layers 8 in. thick between layers of lump, to form a short cylindrical mound. Larger lump stone is laid as a wall around the outside and the whole held with ropes. The shell does not burn the ropes, nor is it burned to lime. The ashes finally are sifted out



Native Coke Ovens of the Lu ho kou Coal & Coke Co. near Fenglochen, 448 Miles North of Hankow on the Peking-Hankow Railroad. The ovens are 12 to 18 ft. diameter and about 8 ft. deep, with walls 2 ft. above ground. Coking is done in an 18-day cycle, one ton of coke being recovered from 1.8 tons of coal.

reservoir the river system may operate at the most favorable periods, but with the plant water supply assured. The main reservoir has been designed in part to work in with the plant system. It is built so that a gravity flow results to the smaller plant reservoir. A hill was utilized for one side, and three sides were built, with walls 20 ft. high, 10 ft. wide on top, and 90 ft. wide at the bottom. A 15-ft. depth of water is maintained in this reservoir.

The warm cooling water from the blast furnace and stoves is led to a far point in this reservoir and the water from the jet condensers in the power house is sprayed here also in a 4000-g.p.m. Yarnall-Waring spray system. The shore operating levers of this system are a particular advantage in this case. A 20-in. cast iron pipe carries the water from the main reservoir to a 500,000-gal. plant reservoir. A float operated valve in the line at this plant reservoir maintains a predetermined water level, governed also by an overflow.

The plant pump house is at one end of the small reservoir, out of which the general water service pump suctions lead. Two 2000-g.p.m. 128-ft. head Cameron pumps are provided for this purpose, driven by Moore steam turbines. They pump into a 110,000-gal. water tower furnished by the Chicago Bridge & Iron Works, which supplies the general water system, but a by-pass provides for pumping direct into the system. From the water tower the main line leads to the blast furnace and stoves. This water on its return may go to the small reservoir or to the main reservoir. Outlets at the furnace and stoves are sufficiently high so that it returns by gravity to either place.

The condenser supply water has an independent line from the plant reservoir to the sump in the power house, thus preventing any failure in supply. The discharge water from the condensers as well as turbo-blower cooling water returns to a sump in the small reservoir, from which two 4000-g.p.m., 70-ft. head Cameron pumps, handling water at 110 deg. Fahr. and driven by Moore turbines, pump it to, and through, the spray system in the 60,000,000-gal. reservoir.

The plant pump house building is of brick and concrete. In addition to the pumps it houses a Sorge-Cochrane hot water process water treating plant for treating boiler feed water. Exhaust steam from the power units and feed pumps in the power house, and from the pump turbines, is utilized for heating the feed water, after which it is treated, filtered and run by gravity to the feed pumps. Lines for general service water are taken off the water tower.

All pipe lines for live steam are insulated with 85 per cent magnesia, hot water and exhaust lines with air cell sectional insulation. Traps provided for the steam lines return a large part of the condensate to the plant reservoir. Water lines have been designed particularly to avoid pockets, and may be completely drained in case of shutting down the plant.



Open Pit Coal Mine at Fushun, 22 Miles South East of Mukden, Manchuria. These mines have been estimated to contain 1,200,000,000 tons of bituminous coal in seams from 78 to 180 ft. thick. Steam shovels are used extensively to dig coal and load cars, several drags of which appear at right center

Plant repairs and maintenance are handled in a complete machine shop. While at present the furnace product will be disposed of as foundry pig iron, it is the intention, as soon as conditions warrant, to produce commercial iron products. The designs therefore include a complete machine shop, pattern shop and foundry, with a common crane runway forming a storage yard between them. The machine and pattern shops have been installed in one building, but are separated by a fire wall; the runway and foundry will follow later. The building is of steel frame with brick walls and corrugated steel roof. It is 48 x 140 ft., with a one-story leanto housing the office, tool room and small tools, along one side.

In the machine shop proper are the large tools, including 36-in. lathe, 48-in. planer, 20-in. shaper, 5-ft. radial drill and 62-in. boring mill. A locomotive repair kit is also included. A 10-ton electric crane serves the shop and the storage yard, or may even serve the foundry. The pattern shop is of two stories, the working tools, which include 24-in. planer, matcher and molder, 24-in. rip saw, two 36-in. band saws and 16-in. wood lathe, being on the first floor. The second is reserved for pattern storage.

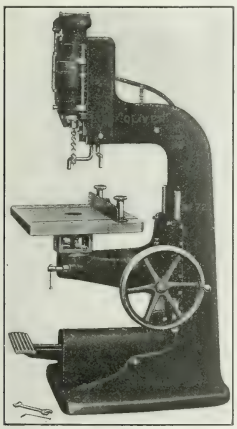
The foundry building, of steel construction with corrugated steel roofing and siding, is 48 x 100 ft. There is a leanto in which most of the equipment is housed, the main building being reserved for the casting floor. Equipment will include a cupola, capacity 6 tons per hour, with a motor-driven blower, core oven, molding machines, tumbler, etc. A standard gage track runs through the foundry, under the crane runway, and into the machine shop. There is also a 2-ft. gage industrial track connecting these units.

Construction has been under the management of the administration, with the services of a superintendent from the United States. Perin & Marshall, New York, have acted as consulting engineers for the administration. The work was carried on largely with Chinese construction equipment and with Chinese labor. This labor proved surprisingly capable of adapting itself to the kind of work involved and good progress resulted. There is a resident staff of Chinese engineers, most of whom were educated in the United States.

Electric Borer for Pattern Shops

A No. 72 single-spindle vertical borer with the rotor of the motor connected directly to the spindle of the machine, and having a blower also mounted on the spindle, has been placed on the market by the Oliver Machinery Co., Grand Rapids, Mich.

The motor-in-head arrangement is intended to eliminate belting, countershafts, pulleys and most of the bearings, saving floor space and decreasing the power required. The blower serves to blow the dust or borings away from the work. Because of its extra



The Machine May Be Moved About the Foundry By a Crane. Any size of mold may be rammed, the capacity being 10 cu. ft. of sand a minute

capacity, the machine is said to be especially suited to pattern shops, the distance from center of spindle to the column being 18 in., which is convenient for handling large or odd-shaped patterns.

The machine will bore up to 2 in. in diameter, 6 in. deep, with one stroke, and to the center of 36 in. Vertical movement of the table is 14 in. and the maximum stroke of the motor head is 6½ in. The table swivels completely around and tilts up to 45 deg. in any direction.

The motor housing consists of two halves bolted together and forming a unit with planed dovetailed ways at the rear. The motor stator is clamped concentrically inside of the two halves, air passages for adequate ventilation being provided. The rotor of the motor is keyed to the spindle running in ball bearings at the outer ends of the two halves. The lower half of the housing has a lug at the back through which a connecting link and a counterbalanced lever system reaching to the foot lever supply the downward motion of the head, a compression spring providing quick return. A stop lug at the right hand side of the housing operates between two adjustable stops for setting the length and position of the stroke.

The table, which is 20 x 24 in. and of cast iron, is finished at top as well as all four sides and bored for wood screws to fasten wooden tables or forms for special work. An opening at the center of the table permits chips to drop through and provides bit clearance. The knee which carries the table is gibbed to the main column in dovetailed ways and is moved vertically by means of spiral gears, square threaded screw and the handwheel at the right hand side of the machine.

The regular equipment includes motor, switch, fence on table, two hold-down fingers and five boring bits. The floor space occupied is 31 x 39 in., and the height is 72 in. The weight of the machine with regular equipment is 1200 lb., crated.

Malleable Castings in July

WASHINGTON, Sept. 1.—The Department of Commerce announces statistics on the production of malleable castings manufactured for sale, by months, based on reports received by the department. The figures for June are revised to include reports received since the preliminary bulletin for that month was issued. The returns include only those castings manufactured for sale as such and do not include those used in the plant or finished and sold as other products:

Production of Malleable Castings by Months

Month	Plants report-ing	Total produc-tion, tons	Total shipments, tons	Orders booked, tons	Monthly capacity of plants, tons	Per cent of total capacity operated
May	90	64,726	62,802	52,898	91,174	71.0
June	100	65,168	64,668	42,067	96,240	67.7
July	103	57,881	60,102	41,723	98,241	58.9

Figures are also shown comparatively for May, June and July covering the operations of 88 identical establishments for which reports were received each month:

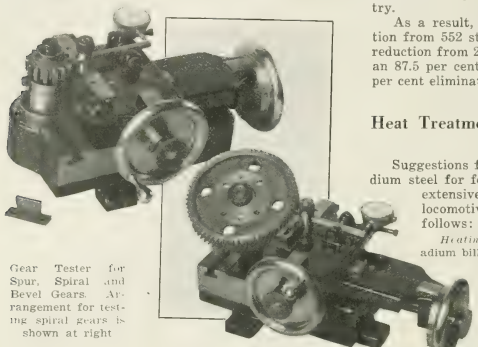
Comparative Summary for 88 Identical Establishments

Month	Total production, tons	Total shipments, tons	Orders booked, tons	Monthly capacity, tons	Per cent of capacity operated
May	62,273	60,465	50,470	87,698	71.0
June	58,140	58,072	36,240	87,357	66.9
July	50,111	51,783	36,252	87,585	57.2

Develops Gear Testing Machine

The American Grinder Co., 6534 Benson Street, Detroit, has placed on the market a gear tester for developing, checking and charting involute curves and testing tooth spacing. While intended primarily for ground gears, it is said to be used equally well on cut gears. The normal capacity is for spur, helical and bevel gears from ½ to 8 in., but spur gears up to 12 in. may also be tested.

The component elements of the machine may be noted from the illustrations. A transverse slide is mounted on a longitudinal slide, which in turn is mounted on the base. The slides are moved by means of handwheels shown, which have micrometer graduations. The gear to be tested is mounted on the stud seen at the left end of the base. A contact finger or



Gear Tester for Spur, Spiral and Bevel Gears. Arrangement for testing spiral gears is shown at right

needle and an indicator, by which the readings are taken, are mounted on the transverse slide as shown.

In developing an involute curve for spur gears an adapter with base circle disk and steel tapes 0.005 in. thick are used. The adapter is made to the desired height and diameter, the latter being the diameter of the pitch circle times the cosine of the pressure angle. In taking readings the two tapes are tightened and the transverse slide and the handwheel, which is friction driven, is set at zero. The gage is used to set the finger or needle at right angles to the slide, after which the gear is set on the stud, with the indicator reading zero. If the tooth being tested is a true involute the indicator will remain at zero. The amount of deviation is shown on the indicator, and a chart may be plotted by using, as a basis, the handwheel graduations. A plunger provided automatically retards the handwheel every 0.010 in. The true involute will give a straight line on the chart and modified curves give concave or convex lines.

Tooth spacing is checked by using a fixed contact finger clamped to the slide in connection with the indicating device and 90 deg. spacing is checked by means of the set-up shown in the right-hand illustration. The indicating needle may be reversed in cases where it is impossible to reverse the gear. When it is desired to maintain a master curve or duplicate an established form, the longitudinal slide is used, first plotting the master and then checking the other gears with the chart. By making spiral adapters spiral and bevel gears may be checked for spacing and contour.

Consisting almost wholly of illustrations, an attractive 64-page booklet, issued by the Mesta Machine Co. of Pittsburgh, and measuring 5⅛ x 7 in., features both the plant and the product, mainly the latter. There are only two pages of text, the story being told by the pictures and their captions. In nearly all cases the illustrations are full-page.

Fence Manufacturers Agree to Simplified Program

WASHINGTON, Sept. 4.—Eighty per cent of the manufacturers of farm, field and poultry woven wire fences of the United States, representing over 90 per cent of the country's annual production of that commodity, have signified their intention of accepting the simplified practice recommendation promulgated at the Commerce Department on July 11 and 12.

Woven wire fence manufacturers, distributors and consumers, representing at least 85 per cent of the national capacity, met with W. A. Durgin, chief of the Division of Simplified Practice, at the Department of Commerce, in July, in an effort to get together on some mutually satisfactory plan for eliminating excessive varieties of styles and containers existent in that industry.

As a result, this conference recommended a reduction from 552 styles of woven wire fence to 69; and a reduction from 2072 sized packages to 138. This means an 87.5 per cent elimination in the former, and a 93.4 per cent elimination in the latter.

Heat Treatment of Carbon Vanadium Steel for Forgings

Suggestions for the heat treatment of carbon vanadium steel for forgings—a steel now being used quite extensively for heavy forgings for railroad locomotives—have been formulated recently as follows:

Heating for Forging: In heating carbon vanadium billets or blooms for forging it is only necessary to follow out the usual good practice for ordinary carbon steel billets. Heat the billets slowly, uniformly and thoroughly to a temperature of 1900 to 2000 deg. Fahr., which corresponds to a light yellow color in the diffused daylight of the ordinary forge shop. As carbon vanadium steel billets are somewhat harder than ordinary carbon locomotive forging billets, there is slightly more danger of cracking or bursting them, if charged into a furnace that is very hot. It is general knowledge that cold steel should not be charged into a hot furnace.

Forging: Carbon vanadium steel forges the same as standard carbon locomotive forging steel, the only noticeable difference being that it is slightly stiffer. The forging should be finished at a low temperature, about 1300 deg. Fahr., or a cherry or full red.

Normalizing or Air Annealing: Forgings should not be put into service as they come from the hammer or press, particularly forgings made from medium hard steel, such as locomotive forgings. They should be reheated to refine the grain, remove forging strains, and to secure the maximum combination of strength and toughness. The forgings should be reheated slowly, uniformly and thoroughly in a furnace to a temperature at which scale will just form on the forgings. This temperature is 1500 to 1600 deg. Fahr., or a light or bright cherry in the diffused daylight of the ordinary forge shop. In case the furnace available is one in which the flame would play directly on forgings, as in the case of a flanging furnace, a temporary brick baffle should be put in to protect them. After the forgings have been brought uniformly up to heat, they should be held at temperature for at least one hour per inch of diameter or thickness, then removed from the furnace and allowed to cool freely in the air, protected from rain or snow.

"River Shipping in Industry" is the title of a booklet published by the American Rolling Mill Co., Middletown, Ohio. In the past two years interest of steel manufacturers in transportation by water has been keen and a larger tonnage has been shipped on the Ohio and other rivers than ever before. Hence, this compilation of historic river shipping data on the Ohio River and its tributaries will be welcomed by those who are interested in this subject. The booklet includes a chapter on foreign inland waterways shipping and also one on Ohio and Mississippi River terminals. The company originally compiled the data for its own information, but decided to publish it for the benefit of all who might be interested.

Position of Tin Plate Makers Explained

Vice President Davis of American Sheet & Tin Plate Co. Answers Complaints and Says Some Proposed Changes Could Not Be Adopted

WASHINGTON, Sept. 4.—The position of the tin plate manufacturers with regard to the complaint of canners and grocers about the quality of tin plate was clearly set forth by Vice-President S. A. Davis of the American Sheet & Tin Plate Co., Pittsburgh, at the conference on Wednesday, Aug. 15, at the Bureau of Standards. While Mr. Davis was briefly reported in THE IRON AGE of Aug. 23 in connection with the conference, the address of Mr. Davis was so able and is considered to have been such a complete answer to charges against the quality of tin plate that the address is worthy of being presented more fully. It covers a problem that the tin plate manufacturer and the can maker have been working on ever since the tin plate industry was begun in the United States and shows plainly the progress that has been made in providing a high quality tin plate for the canning trade.

Mr. Davis began his remarks by pointing out that such irregularities and fluctuations as exist in the processes of manufacture of tin plate may be minimized by the most careful work, but cannot be eliminated. He explained that they have always existed, probably to a greater degree in years gone by than at present, and the generally satisfactory performance of tin plate for the canning trade in the past cannot, in the opinion of Mr. Davis, be ignored at this time. He stated that he thought this argues forcibly that tin plate as manufactured has been satisfactory for the purpose intended. Mr. Davis stated that certain discriminations for certain products to be packed may be desirable, in the light of present day knowledge, but he expressed the belief that anything tending to change generally the character of tin plate would be a decided step in the wrong direction, with untold possibilities of harm throughout the various interested industries. He told the conference that manufacturers of tin plate have regularly expended large sums of money in scientific research and in investigation covering mechanical equipment, methods, quality of materials entering into the manufacture, uniformity of weight and the amount. and distribution of coating.

He asserted that inasmuch as tin plate manufacturers are at all times seriously studying their problems in the interest of improving their practice to the greatest extent possible, they should not be burdened with unnecessary restrictions or limitations which would seriously handicap their operations. Mr. Davis continued as follows:

Making Black Plate

"Black plate for coke tin plate is made from standard soft steel, both of Bessemer and open-hearth quality, either of which should and will perform the service reasonably required satisfactorily. The steel must be of a quality which lends itself to the mechanical operation of rolling in a satisfactory manner, and when finished in the form of tin plate must satisfactorily respond to the operations of the can maker and the packer. This quality is inherent in Bessemer steel as it leaves the converter. It may not be so with open-hearth, under which condition certain elements or metalloids must be added and an approximate Bessemer analysis obtained. At this point it may be well to consider that the quality of the black plate may be entirely satisfactory, but failure or irregularities occur from the use of too light a gage for the purpose. Expert investigation only can reasonably determine this feature.

"Starting with a well-made steel of either Bessemer or open-hearth quality, uncontrollable features immediately manifest themselves. Steel by either process may be of satisfactory chemical composition and homogeneity in the molten state, but due to the impossibility of uniform cooling and to the normal process of segregation, this homogeneity does not maintain in the material as cast in ingot form; and to obtain uniformity evidently, in the minds of some, approximately 40 per cent of the top end of each ingot would, of necessity, have to be discarded, the discarded portion representing a serious economic loss and being suitable probably only for melting stock. This would mean approximately 140 per cent steel production to obtain 100 per cent requirement of the tin plate manufacturer. While absolute uniformity of chemical composition does not maintain, we believe no necessity exists for this and that for all practical purposes the present day practices are entirely adequate.

Bar Rolling Limitations

"The next step in the operation is the reduction from ingot to bar form, and at this stage irregularity in weight is first introduced by bar rolling limitations. This variation, together with the variation of chemical composition, has always been and must be accepted by the tin plate maker as representing good practice. We know of no way to improve the bars as produced, neither is there a way to assort or classify if such were desirable or necessary.

"Tin mill operations are made up of many conditions, most of which are variable and can only be controlled within certain well-known limits. Starting with the inherent irregularity in bar weights, we must contend with variations in heating and in four distinct operations and variations in drawing packs with complete accuracy. Rolls must be turned concave so that when brought to the proper working temperature they will be as nearly parallel as possible. It is evident that in warming up the mills, or bringing the rolls from a cold to a fully expanded state, variations must and do occur. When proper rolling temperature has been attained, it is practically impossible to maintain this uniformly notwithstanding the use of many well-known mechanical appliances adapted for the purpose. Tables have been prepared showing thickness of plate for the various gages expressed in ten thousandths of an inch, and it should be appreciated at this point that both in the thickness of the black plate and weight of coating we are dealing with factors almost infinitesimal and difficult to comprehend.

Important Operations

"The intermediate operations between hot mill department and tinning department, comprising pickling and annealing, are of the utmost importance; the pickling operation influencing weight variation in removing both heavy and light oxides resulting from rolling operation and to some extent etching the plate properly to receive the coating. The annealing operation is of the utmost importance in eliminating rolling strains and bringing about proper ductility. This operation is now undergoing evolution from the personally controlled old-style furnace to modern pyrometrically controlled equipment, with general improvement in uniformity in the annealing of the product.

"Probably in no part of the operation has more thought or scientific research been devoted than to the tin house or coating department. Tin plate is made in various grades of coating, ranging from coke quality to high grade charcoal quality carrying 5 to 6 lb. of tin per box; these grades are always obtainable and can be specified for by the customer when his requirements demand. The equipment has been changed frequently in the interest of uniformity of coating, baths maintained as as uniform a temperature as possible by pyro-

(*Continued on page* 649)

LABOR-SAVING USE OF CRANES

Material Handling Methods Feature New Plant of Alfred Box & Co.—Layout Outlined

Saving labor by the liberal use of cranes of various types, each type being selected as most suitable for a given service, is an outstanding feature of the new plant of Alfred Box & Co., Inc., Ontario Street and Trenton Avenue, Philadelphia. A comparatively small personnel has been found sufficient because of the extensive application of cranes and hoists.

The product of the company includes standardized electric traveling cranes of 5, 10, 15 and 20 tons capacity; hand-operated traveling cranes of cable and drum type; portable monorail electric hoists, chain hoists; I-beam trolleys; and grab bucket operating cranes of a patented three-motor, double-drum type. Manufacture is on a production basis; parts are made to stock and requisitioned from stock for assembly.

The new building is of improved monitor design, of brick and steel, and is 250 ft. long and approximately 110 ft. wide with two 30-ft. side bays and a 50-ft. central bay. The building has a temporary end for contemplated extension. The main or central bay is used for assembly work exclusively. The west bay is occupied by the machine shop, and the front part of the east bay for a distance of 100 ft. is taken up by the finished storeroom, the balance of this bay being used for the assembly of small crane bridges. The height of the main bay is 31 ft. under the truss and 25 ft. under the crane rail. The side bays are 19 ft. high under the trusses.

Machine work follows a line from the front end of the west bay to the rear, and is delivered to stock or to the east bay if for small parts assembly or to the central bay if for immediate use in assembling a large crane. Parts are handled progressively from one machine to the next and also assembled progressively, completely assembled cranes ending up at the test pit located in the center of the central bay. After testing, the cranes are loaded on freight cars adjacent to the test pit, a railroad spur leading through the main bay up to the pit having been provided to eliminate extra handling of cranes ready for shipment.

The test pit, which is of concrete, is 10 by 16 by 12 ft. deep, and contains sets of weights for testing cranes and hoists from 500-lb. to 15-ton capacity under actual working conditions. The cranes are tested to 25 per cent overload capacity and electric current consumption under various loads is recorded. Hoisting cable racks are located adjacent to one end of the test pit, the cable being put on the equipment just before the test. The cable is on reels and is uncoiled directly from the reels on which it is received.

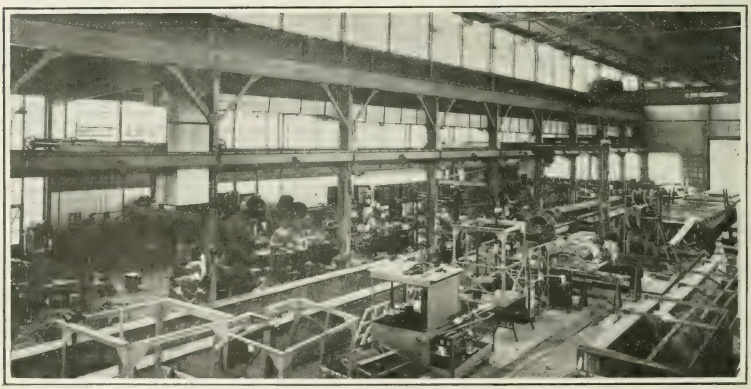
Throughout the plant small cranes have been installed at various points as auxiliaries to the larger traveling cranes. The practice has proved highly economical, not only because of the cost saved in operating the smaller cranes in place of the larger ones on the same duty, but also because it eliminates delay in operations at various points of the shop pending the availability of the larger crane.

The central bay is served by a 10-ton overhead traveling crane and four one-leg gantry cranes, which travel along the side of the bay. Three overhead traveling cranes serve the west bay or machine shop, three swing-bracket jib cranes with electric hoists being also provided for service to specific machine tools. Material is kept off the floor by the use of large ball bearing box trucks, which are loaded with semi-finished material at the storeroom, pushed to the machine shop, passed from machine to machine and finally delivered to finished stores or to assembly.

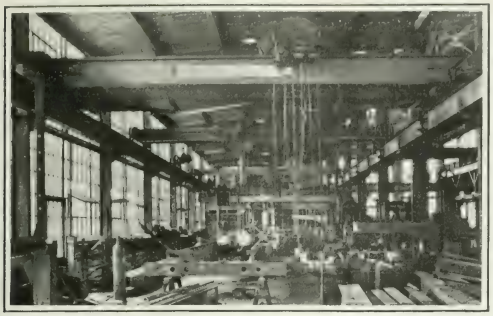
Two overhead travelers equipped with electric hoists and fitted with drill presses for drilling structural material serve the east or small assembly bay, and with this equipment it is said that one man can handle work up to 3 tons in weight without assistance. From the east bay the crane runway extends 60 ft. into the yard at the rear of the building, a 5-ton three-motor crane being used for yard and inside service. A second railroad siding leads up to the rear entrance of this bay, structural material received on cars being unloaded by the crane directly on to the storage piles and racks. It is planned to extend this crane runway 100 ft.

An auxiliary unit which has been found unusually economical is a self-supporting jib crane installed at the shipping platform, the arrangement of which may be noted from the accompanying view of the front end of the plant. This unit greatly facilitates the loading and unloading of trucks, leaves the larger crane in the main bay free for heavier service, and is always ready when needed. Material being shipped is placed on the scale by this crane and, after being weighed, is picked up and placed on the trucks. The shipping platform is recessed below the floor level, an arrangement intended to facilitate loading. Steel rolling doors at the front end of the building may be shut, thus providing a closed-in shipping platform, which is comfortable in winter, and partly loaded trucks may be held at the shipping platform overnight, the loading being resumed immediately upon arrival in the morning.

The tool room, locker and washroom and superin-

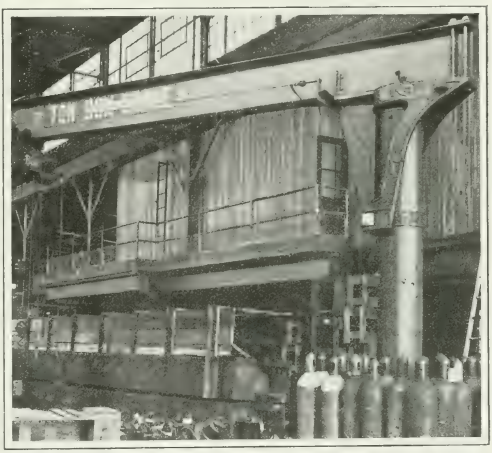


View of the Main Erecting Floor. A crane trolley is mounted over the test pit, and the cable racks adjacent to the pit may be clearly seen. The railroad siding running up to the pit may also be noted; the cranes being loaded directly upon the adjacent freight cars after test. Beyond the erecting floor may be seen part of the machine shop bay and the tool room



View Showing Crane Arrangement In the East Bay, Which Is Used for Assembly of Small Cranes. Special cranes, equipped with drills and electric hoists, may be seen in the background

The Self Supporting Jib Crane, an Auxiliary Unit Used to Serve Shipping Platform and Scale, Is Shown Below. The crane occupies practically no floor space and has been found an unusually economical unit



tendent's office are in an offset from the west or machine shop bay, and take up space of 15 ft. by 120 ft. long. The superintendent's office is located centrally between the ends and projects a few feet into machine shop, windows in the front sides permitting of a full view up and down the shop.

Careful attention has been given to the lighting. Lights are arranged so as to eliminate shadows. There are overhead lights, side lights on posts, and individual lights for precision machine tools. A flood light at the front end lights the entire shop at night and is used by the watchmen when making inspection tours. Wall plugs for portable electric tools are located at each column. Heating is by means of hot air circulated under pressure, the same outfit being used in summer for circulating air within the shop. Drinking fountains equipped with sanitary coil coolers are placed about the shop, so that it is unnecessary for workmen to walk more than 60 ft. from any point in the shop to get a drink.

Electric power is used throughout, alternating current being converted into direct current by synchronous converters located in a room at the forward end of the east bay. A balcony extending along the east wall and adjacent to the main office permits a full view of the shop from above. The pattern shop and storage is located in a separate one-story building which is 40 x 120 ft. in size.

Routine of Handling Orders

Orders received are sent to the engineering department, which issues simultaneously a drawing list to the shop and a bill of material to the storekeeper. The storekeeper requisitions parts from stock or issues work orders to the shop to make necessary parts that are not in stock. When all material is on hand an assembly order is issued, which is the shop's authority to assemble and prepare a given crane for shipment. Theoretically, the shop is continuously working against work orders for stock material. A perpetual card inventory is kept, one card for each piece that makes up the product. On these cards is noted the maximum quantity to be worked up at any one time and also the minimum quantity to be kept in stock. When the card record shows a minimum quantity on hand, unless previous orders have been issued to curtail or increase production, the storekeeper instructs the purchasing department to order the maximum amount of raw material, which on receipt is worked up to replenish the stock. Thus the stock is always maintained to the predetermined quantity.

Alabama Power Co. to Build Large Water Power Plant

BIRMINGHAM, Sept. 1.—One of the largest, if not the largest, hydropower dams in the entire South will be constructed at once at Cherokee Bluffs, on the Tallapoosa River, by the Alabama Power Co., Birmingham. The dam will be 120 ft. high and 800 ft. long and the plant is planned to develop ultimately 132,000 hp. O. G. Thurlow, chief engineer of Alabama company and its subsidiary, the Dixie Construction Co., estimates that it will require over 2½ years to complete construction. Three units generating 44,000 hp. each are to be installed.

A camp will be built at the site to house employees and their families, and accommodations for a minimum of 3000 will be provided. A water supply system with modern filtering plant and sewerage connections will be built, as well as a hospital, recreation hall, motion picture show, commissary and the like.

The plant will have an initial installation of about 88,000 hp. The Dixie Construction Co. will make no purchases until the end of the present or the beginning of the coming year.

ERA OF EDUCATED WORKMAN

Secretary Davis's Address at Birmingham—President Coolidge's Characteristics Described

BIRMINGHAM, ALA., Sept. 4.—The United States has reached a new era for labor, the era of the educated workman, said Secretary of Labor James J. Davis in an address here yesterday at an open meeting for the citizens of Birmingham.

The address consisted in part of a tribute to the late President Warren G. Harding because of his efforts to establish industrial peace. It was declared that President Coolidge will be a true friend of the American workman. It was through Mr. Harding's "untiring industry and devotion to the ideals of American labor that this Labor Day finds that archaic institution the 12-hr. workday and the seven-day week practically eliminated from the great basic industry of our country, the steel industry," Mr. Davis said. "Following his leadership, the Department of Labor has secured an agreement among manufacturers of boxboard looking to the end of the 12-hr. day in that industry. It is my confident belief that the spirit of President Harding will continue to fight for the cause of American labor, and that the time is not far distant when no workman in this country will be forced to work more than eight hours a day, six days a week. There can be no higher ideal for American labor than President Harding's wage creed, which may well become one of his greatest monuments, reared in the heart of every true American."

Turning to the Trades

Amplifying his statement regarding the educated workman, Secretary Davis pointed out that the people of the United States have always prided themselves on their thirst for education, but within the past few years, since the great war, educated Americans have been turning more and more to the manual and mechanical trades.

"We are making progress away from the fetich of the white collar job," said the Secretary. "The patriotic impulses of the war, together with the increased wages caused by war demands for production, taught many of our young men that in the ranks of manual labor they could find healthy employment at remunerative wages. Most of these young men were of the so-called educated classes, and they brought to the field of manual labor an educational standard which has been bearing results, for the intelligent workman trained in his craft is the best workman, for himself, for his employer and for his community. That education which combines the training of head and heart and hand is the education which will elevate labor to its proper place in the human scale of things.

"Both employer and employee in America are steadily realizing the importance of cooperation, are more and more convinced that they are partners in production, and that intelligent working together offers the best results for both of them. As standards of intelligence among our workers improve, they are reaching the point where they stand on a more nearly equal basis with the employer in their negotiations and in their daily life. Many causes are contributing to this better feeling between the workers who make industry possible and the men who manage industry. Labor in many crafts has already established apprentice schools, where beginners may be trained in the trades, and where at the same time they may have their full share of academic instruction. Labor is coming to know that the worker who can visualize his completed task, the carpenter who can see in the future the great building for which he saws the board, is the worker who gets the most out of life in material and spiritual returns."

A President of Heart and Brain

Secretary Davis declared President Coolidge's devotion to duty and principles has marked his progress from the beginning of his public life.

"In my association with him at the Cabinet table I have found him ever warm-hearted, with a generous and active sympathy for the problems of others," the Secretary asserted. "More than once he has given me that word of sympathetic help which is the truest aid in times of weariness and stress and difficulty. America will find in him not alone a brain and conscience to lead, but a kindly heart to help. He will be a true friend of the American workman, for he has known hard work all his life. He will follow no wild phantasies in a search for the millennium, no will-of-the-wisp of thoughtless experiment. He will move forward step by step, guided by the light of progress, by experience and by studious reasoning. He preaches the gospel of the square deal, and in whatever lies before him he can be depended upon to be just, fair and kindly."

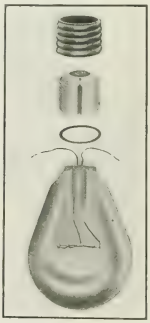
Etching Pits

A well-illustrated article in the *Revue de Metallurgie* for June, by Albert Portevin, discusses the action of various etching solutions; more particularly, etching figures or etching pits. In addition to the numerous illustrations there are a great many references so that the article is quite comprehensive on the interesting subject of etching pits.

The treatment recommended to develop them for ordinary iron or steel specimens is to etch with a 12 per cent aqueous solution of copper ammonium chloride for 2 to 4 min., followed or not by a second attack of about 30 sec. in 10 to 20 per cent solution of strong nitric acid in water. In many cases it is best to give a preliminary etching followed by a light repolishing before the final attack. The form, number, development and clearness of the figures depend on the nature and concentration of the solution, on the temperature and the length of time of attack. They are only clearly observed on crystalline grains of sufficient size; that is, in metals and alloys of coarse texture which are usually not of much value for their mechanical properties. They are of great value in determining the crystalline orientation, although not of general application in the technical and industrial uses of metallography. G. B. W.

Theft-Proof Electric Light Bulb

To prevent theft of electric light bulbs from industrial plants and other buildings, Lester Kulp, 143 West Austin Avenue, Chicago, is placing on the market the bulb illustrated, which although of special design, is said to fit any standard light socket.



It may be noted that guards, locks, keys or springs are not used. One of the contacts is at the top just as in an ordinary lamp, and the other is a brass ring, fastened at the bottom of a porcelain plug. The plug has a groove which is filled with plaster of paris, lightly holding the brass shell in place. After the lamp is screwed into the socket an extra turn breaks the plaster of paris seal, so that the lamp is free to turn in the shell, and at the same time maintains electrical contact. The shell, however, cannot be turned in the socket. The shell being spun over the ring, is said to screw up so close to the socket that fingers or tools cannot grasp it. The bulb is said to be easily removed for replacement when burned out. Standard sizes are available.

The framework girders of the new navy airship ZR-1, which are of duralumin, an alloy of aluminum and copper, so light and strong that a 10-ft. length of one of them can be easily lifted on a man's little finger, yet if supported on its ends can carry all the men who can find room to sit on it. It takes more than 13 cu. ft. of gas to lift each pound weight, and the ZR-1, as long as a dreadnought, weighs little more than a Pullman car.

ZIRCONIUM IN STEEL

Neutralization of the Embrittling Effect of Phosphorus—Summary of the Entire Investigation.

Further information concerning the effects of zirconium in the manufacture of steel is contained in a paper, "Some Effects of Zirconium in Steel," by Alexander L. Feild, research metallurgist Electro Metallurgical Co., New York, presented at the summer meeting of the American Institute of Mining and Metallurgical Engineers at Montreal, Aug. 30. In THE IRON AGE, May 10, 1923, an article was published on the same subject by F. M. Becket, chief metallurgist of the same company. It contained preliminary information on some phases as presented before the spring meeting of the

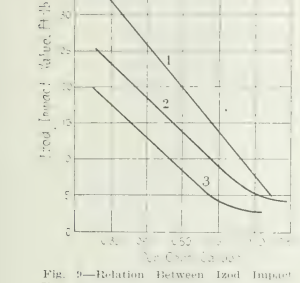


Fig. 9—Relation Between Izod Impact Values and Carbon Content for: (1) Ordinary Low Phosphorus Steels; (2) High Phosphorus (0.140 per cent) Steels Treated with Zirconium; (3) Same High Phosphorus Steels Not Treated with Zirconium. Tests made in annealed state.

American Electro-Chemical Society in New York, May 5.

Zirconium and Phosphorus in Steel

One important effect resulting from the use of zirconium in steel refining was necessarily omitted from the latter paper. This point is, however, discussed in Mr. Feild's contribution, which also goes into the details of all phases of the matter, giving data and tests on the results obtained. The portion of the more recent contribution, which is regarded as distinctly new,

Table 15.—Mechanical Properties of Annealed Carbon Steels, High-Phosphorus Series, Ladle A Treated with 0.20 Per Cent Silicon and 0.04 Per Cent Zirconium as Silicon-Zirconium

Percentage

Heat Number	Carbon	Phosphorus	Yield Point, Lb. per Sq. In.	Ultimate Strength, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent	Brinell	Izod Number Ft.-lb.
200	0.172	0.141	40,887	65,406	35.5	60.8	109	35.6
167	0.170	0.144	46,658	70,772	35.6	59.6	119	33.0
142	0.184	0.124	45,894	68,983	34.6	63.2	119	45.3
201	0.264	0.154	46,297	75,363	32.3	57.0	130	30.4
220	0.258	0.165	45,335	76,582	32.1	59.9	126	25.5
183	0.302	0.174	49,695	82,500	31.3	52.4	127	15.2
147	0.420	0.122	55,002	94,901	25.8	45.2	159	19.0
215	0.482	0.171	48,611	90,233	28.4	40.2	163	10.3
222	0.586	0.118	53,440	104,655	21.4	41.4	174	11.8
137	0.624	0.162	51,297	110,770	18.0	27.0	207	4.1
135	0.788	0.128	55,960	120,573	17.5	27.3	192	3.5
Av.	0.377	0.146	49,280	87,358	27.3	48.1	148	

has to do with the effects on phosphorus in steel in the presence of zirconium or as a result of using this metal. The extract is as follows:

A favorable effect of zirconium on the Izod number of annealed high-phosphorus steel was observed early in the present work. Accordingly, the mechanical properties of steels containing carbon, phosphorus, and zirconium in varying proportions were investigated. Tables 15, 16, and 17 contain the results obtained for a series of 11 heats with carbon contents covering the

Table 16.—Mechanical Properties of Annealed Carbon Steels, High-Phosphorus Series, Ladle B, Treated with 0.20 Per Cent Silicon as 20 Per Cent Ferrosilicon

Percentage

Heat Number	Carbon	Phosphorus	Yield Point, Lb. per Sq. In.	Ultimate Strength, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent	Brinell	Izod Number Ft.-lb.
200	0.132	0.147	42,500	63,781	36.0	65.2	109	44.7
167	0.162	0.149	46,875	72,968	35.6	59.6	119	37.9
142	0.186	0.124	44,059	67,008	35.8	64.7	119	43.8
201	0.236	0.153	43,307	72,079	34.1	60.4	130	34.1
220	0.254	0.161	46,420	74,466	34.7	56.1	126	18.4
183	0.288	0.166	48,231	77,735	32.6	55.0	126	22.2
147	0.424	0.129	56,623	95,422	24.3	40.1	162	12.7
214	0.468	0.169	51,821	91,145	27.6	42.9	163	8.2
222	0.566	0.119	55,226	103,578	22.6	36.7	174	10.0
137	0.632	0.168	60,417	114,383	18.8	30.7	199	3.2
135	0.788	0.133	52,061	112,453	16.9	22.7	217	2.3
Av.	0.376	0.147	49,776	85,911	28.7	48.3	149	

range 0.13 to 0.79 per cent. Ferroalloy practice was the same as in the low phosphorus series.

The effect of 0.15 per cent added zirconium in increasing Izod number is especially to be observed. Fig. 9 shows graphically the relation between carbon content and Izod number of ordinary low phosphorus steels, of steels containing on an average 0.14 per cent phosphorus and treated with 0.15 per cent zirconium, and of the same high phosphorus steels not treated with zirconium. These curves are based on much more complete data than are given in Tables 15 to 17.

The effect of zirconium upon the Izod number is essentially a neutralization of the embrittling effect of phosphorus, as the Izod number of ordinary low phosphorus steels is not appreciably affected. No evidence of actual chemical combination between zirconium and phosphorus has been obtained by chemical or microscopic examination. As notch toughness is intimately related to the properties of the intercrystalline material, there is reason to infer that zirconium in high phosphorus steels favorably modifies the structure and com-

Table 17.—Mechanical Properties of Annealed Carbon Steels, High-Phosphorus Series, Ladle C, Treated with 0.20 Per Cent Silicon and 0.17 Per Cent as Silicon-Zirconium

Percentage

Heat Number	Carbon	Phosphorus	Yield Point, Lb. per Sq. In.	Ultimate Strength, Lb. per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent	Brinell	Izod Number Ft.-lb.
200	0.130	0.153	39,457	64,803	37.1	65.3	109	47.8
167	0.162	0.149	47,880	72,333	35.0	64.0	119	46.4
142	0.186	0.124	51,393	66,104	36.7	61.5	119	50.6
201	0.238	0.154	45,356	73,886	35.6	59.2	130	37.5
220	0.232	0.160	35,300	76,048	32.9	57.8	126	21.8
183	0.278	0.166	35,341	76,411	32.4	59.3	137	28.3
147	0.418	0.126	44,956	94,375	26.6	43.8	159	14.6
215	0.490	0.162	41,852	84,328	27.0	40.5	160	13.5
222	0.568	0.117	40,895	99,117	24.2	40.8	170	12.1
137	0.632	0.167	45,560	111,191	19.2	30.0	199	6.1
135	0.782	0.132	47,917	116,805	17.7	26.4	210	4.1
Av.	0.380	0.146	41,713	85,928	29.5	49.8	148	

position of this material, possibly because of its concomitant action on oxygen and nitrogen.

Summary

The author's summary of the entire investigation follows:

In this paper, there have been presented some of the results obtained in the experimental manufacture and testing of steels treated with zirconium. Data are given in support of a number of conclusions regarding the chemical behavior of zirconium toward the major impurities in steel, namely, oxygen, nitrogen, sulphur, and phosphorus, and the resultant effects produced on mechanical properties. It is shown that:

1. Zirconium combines chemically with oxygen, nitrogen and sulphur, in the order given, and is able to neutralize the embrittling effect of phosphorus in whole or in part.

2. A relatively small addition of zirconium makes possible the satisfactory rolling of steels containing as high as approximately 0.30 per cent sulphur, which without zirconium treatment break to pieces on the first pass through the rolls.

3. Plain carbon steels treated with approximately 0.15 per cent zirconium exhibit in the heat-treated condition tensile properties that closely approach those of alloy steels, especially in that range of drawing temperatures between 300 and 450 deg. C.

4. Zirconium reduces the total oxygen content of steel and operates to prevent the occurrence of emulsified slag and "banded" structure.

5. Zirconium combines with the nitrogen dissolved in molten steel to form a crystalline microconstituent of a bright lemon-yellow color, which is, in large part, removed from the steel while the latter is still molten.

6. Zirconium forms, with the sulphur content of steel, an acid-insoluble sulphide and eliminates from high-sulphur steels the last traces of iron sulphide.

Besides the work reported in this paper, the Electro Metallurgical Co. has accumulated during a period of several years information on the commercial application of zirconium; these results it is intended to publish at some future date.

McKUNE OPEN-HEARTH FURNACE

Operating Results of Blower Torch Type in a Canadian Plant

In an article entitled "Canadian Open-Hearth Practice," in a recent issue of the London *Iron and Coal Trades Review*, results are published based on the experience of the use of the McKune open-hearth furnace at the Hamilton Works of the Steel Co. of Canada. The article contains a description and drawings of the McKune furnace as built. In THE IRON AGE of June 2, 1921, page 1479, was published a complete description of the Egler furnace, which closely resembles the McKune furnace in principle.

The data in the article from which the following extracts are taken were furnished by John Miles of the London office of Freyn, Brassett & Co., and they are based on the working results of a furnace of the latest and most efficient type, which has been in successful operation at the plant referred to for over a year.

After a somewhat detailed description of the construction of the furnace and the fuel used, the author discusses the cost of total repairs for a plant using the McKune furnace and says that this was 1s. 4d. per ton of ingot produced at a shop where four of these furnaces are installed; this includes bricks, dampers and overall general shop repairs for the period of one year.

When using waste-heat boilers with the McKune furnace, there is a decrease in the net steam produced per ton of ingot, owing to the decrease in fuel consumption, but per unit time of 24 hr. there is approximately the same amount of evaporation with or without the McKune ports. At the Hamilton works all the furnaces are equipped with waste-heat boilers, and if the amount of fuel required to generate the same amount of steam under boilers were deducted from the fuel used in the gas producers for the open-hearth furnaces, there would be a decrease in coal consumption per ton of ingot of 30 per cent. The following are analyses of gases, coal and the record of the furnaces:

Producer gas.—CO_2, 5.2 per cent; CO, 23.2 per cent; H_2, 12.6 per cent; CH_4, 2.4 per cent; N_2, 56.4 per cent; C_2H_4, 0.2 per cent; O_2, nil. B.t.u. per cu. ft., 145.

Coke-oven gas.—CO_2, 1.6 per cent; CO, 0.4 per cent; H_2, 53.4 per cent; CH_4, 26.7 per cent; N_2, 6.9 per cent; C_2H_4, 2.6 per cent; O_2, 0.4 per cent. B.t.u. per cu. ft., 521.

Coal.—Moisture, 1.87 per cent. Analysis of air-dried sample: Moisture, 0.32 per cent; vol. comb. matter, 56.36 per cent; fixed carbon, 56.36 per cent; ash, 8.12 per cent; sulphur, 1.26 per cent.

Hot and cold metal.—Carbon, 4.0 per cent; phosphorus, 0.35 per cent; manganese, 1.2 per cent; silicon, 1.0 per cent; sulphur, 0.05 per cent.

Scrap.—Carbon, 0.15 per cent; phosphorus, 0.04 per cent; silicon, 0.03 per cent; manganese, 0.70 per cent; sulphur, 0.06 per cent.

No. 2 Furnace with McKune Ports at Hamilton, Ontario
Record for June, 1922

Number of heats	96
Total charge, net tons	8,566
Ingots produced, net tons	7,518
Average charge per heat, net tons	95.18
Average production per heat, net tons	83.53
Average yield of ingots per heat, per cent	87.77
Average time of heats	7 hr. 55 min.
Average time of charging	3 hr.
Total time taken when making up between heats	0.45 hr.
Total delays for month	13 hr. 45 min.
Total coal used, net tons	1,557
Total coal used	414 lb. per ton of ingot
Percentage of hot metal, per cent	35
Cold metal, per cent	65
Outlet temp. before waste heat boiler and after valve, deg. Fahr	900
Length of life of roof, heats	350 to 400
Length of life of ports, heats	250 to 300
Side walls—back, heats	250 to 300
Side walls—front, heats	150 to 200

Average for Three Furnaces—October, 1922

Fuel practice, lb	501
Total B.t.u. per ton ingots	6,920,814
Pig metal (hot), per cent	35
Average size heats, tons	80
Average time, heats	9 hr. 30 min.
Average boiler hp. at waste-heat boiler	348 per hr.
Fuel equivalent of steam at waste-heat boiler, per ton of steel, lb	165
Net equivalent fuel per ton of steel, lb.	336

Comparison of Old Type with McKune Type

	Old Design	McKune Design, April, 1922
Average weekly tonnage, tons	1,110	1,475
Fuel per ton, lb	590	495
B.t.u. per ton	8,250,000	6,900,000
Number of heats per week	14	18.7
Tonnage per heat	79.1	79.1
Time of heat	11 hr. 10 min.	8 hr. 25 min.
Coal gasified per hour, lb	4,160	4,660
Tonnage increase, per cent	....	33
Fuel saving, per cent	....	15

Bethlehem Steel Co. (Two Months)

	Old Design	McKune Design
Average heats per week	13.0	18.1
Tons per heat	78	78
Fuel per ton, lb	603	487
Tonnage increase, per cent	....	39
Fuel saving, per cent	....	19

Vulcan Mold & Iron Co.'s New Plant

The Vulcan Mold & Iron Co.'s new ingot mold foundry at Latrobe is now producing about 50 tons daily. The company is specializing in high-grade split molds for crucible and electric furnaces running in all sizes and shapes, and through the purchase of the entire mold business of the Blairsville Iron Works has on hand patterns and equipment for the manufacture of most sizes used by tool steel companies. It also specializes in small solid molds and particularly those of intricate shape such as corrugated and fluted molds and those of the Gathmann type.

The plant, which occupies five acres, consists of the main foundry, 180 ft. by 300 ft., in which all molding is done by molding machines, and one building, 70 by 90 ft. Auxiliary buildings include machine and pattern shops.

The authorized capital stock of the company is $500,000, which is nearly all owned in Latrobe, Pa. The board of directors and officers are as follows:

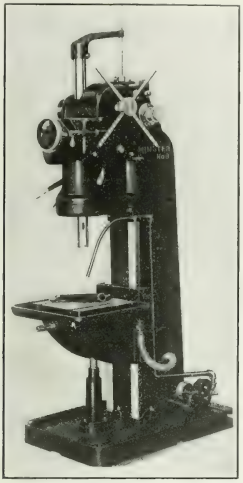
E. H. Williams, president; D. T. Sipe, chairman; C. M. Semler, M. W. Saxman, Joseph E. Barnett, F. B. McFeely, H. H. Smith, secretary and treasurer.

M. Lomchakoff of the Technical University of Prague is now in this country to study industrial problems, including power development, generation of gas, and the use of pulverized fuel and lignite. He is being aided in his task by officials of the Engineering Federation, the Feleral Power Commission and the U. S. Bureau of Mines.

New Production Drilling Machine

A new high-duty drilling machine, having a capacity of 1½ in. in solid steel, has been brought out by the Minster Machine Co., Minster, Ohio. The machine is designated as the No. 9, and although intended primarily for production work, it is claimed that various features provided permit its use on work of wide range.

Three types of drive are available, one with tight and loose pulley, another having single pulley with single friction clutch mounted on the driving shaft to



High Production Drilling Machine. Three types of drive are available. The speed range is from 73 to 550 r.p.m. and feeds are from 0.006 to 0.159 in. per revolution of spindle. Power and hand feeds and a rapid traverse are provided for the spindle

transmit forward motion, the third being a single pulley drive with double friction clutch mounted on the driving shaft to transmit power for both forward and reverse motion. The latter provides a drive for a tapping attachment, the reverse speed of which is one and one-half times that of the forward speed.

The machine has two mechanical speed changes, which with a series of change gears provide a spindle speed range of from 73 to 550 r.p.m. These gears are conveniently located on the front of the machine. The change gears are close to the extreme lower end of the spindle, an arrangement intended to reduce torque to a minimum. The sliding gears giving the two speed changes are shifted by a lever conveniently located on the left side of the machine. The sliding gears giving the two speed changes are shifted by a lever at the left side of the machine.

Two mechanical feed changes are provided through sliding gears, which in addition to a series of change gears provide a feed range of from 0.006 in. to 0.159 in. per revolution of spindle. Hand feed for the spindle is obtained by placing the sliding feed gear shifter lever in neutral position. The feed length of the spindle is 15 in., which is emphasized as being unusually long for a machine of this size. The spindle is equipped with a guide rod upon which is mounted an adjustable stop which can be set to trip the feed at any predetermined point. When the spindle reaches this point on its downward course the feed mechanism is automatically disengaged, and if desired the spindle can be adjusted to automatically return to its upward position.

The machine is provided with a heavily ribbed plain table which is gibbed to a wide bearing on the column. The table has ample oil grooves and is reinforced to permit a boring bar to pass entirely through. If desired the machine will be provided with a compound instead of a plain table. The compound table is of heavy construction and gibbed for heavy service. The base of the machine has slots for receiving adjustable motor bases, the motor being mounted directly upon this base. A 5-hp. constant-speed motor running at 1100 to 1300 r.p.m. is recommended.

A reservoir for the cooling compound is located in the base, the coolant being delivered to the tools and worked by a rotary geared pump. The lower part of the main head casting acts as an oil reservoir and at the lower end of the vertical clutch shaft there is a geared oil pump which is located below the oil level. This pump forces the oil up through the vertical clutch shaft and discharges it over the miter gears at the top of the shaft, the oil gravitating to the gears below.

The principal dimensions of the machine are as follows: Distance from the center of spindle to face of column, 10½ in.; end of spindle to plain table, 30 in., and to compound table, 24 in.; end of spindle to base, 44 in. The vertical adjustment of plain table is 13 in. The finished surface of plain table, 16 x 16 in. and of compound table, 12 x 31 in. The spindle has a No. 4 Morse taper.

The net weight of the machine with plain table is 2100 lb. and with compound table, 2500 lb.

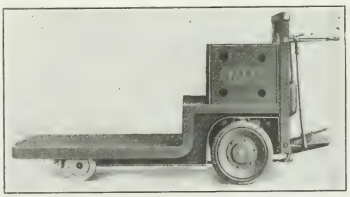
New Low Platform Truck

Another addition to the K model trucks of the Yale & Towne Mfg. Co., Stamford, Conn., recently described in THE IRON AGE, is the K-23 low platform truck illustrated. This is a general utility unit for handling loads of a miscellaneous character, the low platform facilitating the piling of heavy loads on the truck either by hand or auxiliary crane equipment.

The rated capacity is 4000 lb. The wheel base is 55¼ in. and the wheel tread 33¾ in. The length is 110¾ in., the width 38 in., and the height 53⅜ in., overall. The platform is 38 x 60 in., or 16 sq. ft., and the height is 11 in. The ground clearance is 5 in.

The turning radius of the outside edge of the truck is 89 in., the inside radius 35 in. Four-wheel steering is provided. The maximum speed of the truck is 8 miles per hour, empty, on level concrete, and loaded to 4000 lb., the maximum speed is 6¼ miles per hour on level concrete.

Parts are grouped in self-contained major units, and the spur-geared unit power axle used is inter-



Low Platform Truck for Economical Movement of Miscellaneous Material. Parts grouped into self-contained major units is a feature

changeable with that used in the other trucks of this series. The frame is of pressed steel, the main longitudinal members being of one piece, the wheels being also of pressed steel, and of disk type. The motor is series wound, totally inclosed, and of 36 volt, 45 amp., 1800 r.p.m. continuous rating. The controller is the company's drum type with renewable contact and cut-out switch. The brake is of the external contracting double-shoe type, on the motor shaft, and is operated by foot lever. The weight of the truck with Exide battery is 2500 lb.

Mechanical Characteristics of Castings*

Examination of Semi-Steel Tensile and Compressive Strength, Elasticity and Shearing Resistance, Compared with Its Hardness—Semi-Hard Steel Also Considered

BY ALBERT PORTEVIN

IT is well known that considerable application was given semi-steel during the World War. This overcame the difficulties which would have resulted otherwise from the insufficient production of steel shells. As a result of this increased use of such castings, extensive examinations of the physical properties of this metal have been carried on.

In general, these tests related to castings called semi-steel, which has a relatively low percentage of carbon (less than 3.2 per cent), part of which is in graphitic form so as to permit easy machining, while still presenting a sufficient proportion of combined carbon (at least 20 per cent of the total carbon) to obtain the high strength desired—a strength not less than 25 kg. per sq. mm., (35,500 lb. per sq. in.) under tension. This proportion is obtained by a judicious selection of the

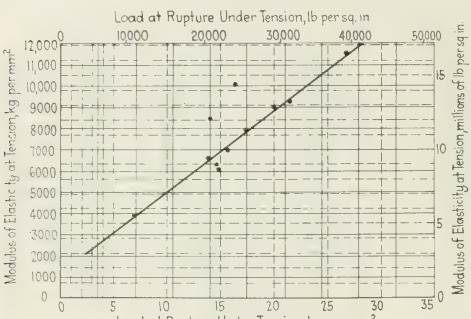


Fig. 21—Relation of Modulus or Coefficient of Elasticity, M, of Semi-Steel in Tension to Its Rupturing Load, R, per Unit Section. The inclined line drawn through the observed and plotted "points," fulfils the equation $M=385R+1150$

percentages of carbon, silicon and manganese, and by the speed of cooling and consequently the thickness of the section.† For this purpose semi-steel was prepared by melting pig iron and steel scrap in the cupola, or by recarburizing open-hearth or electric furnace cast steel and additions of ferroalloys.‡

In fact, as the tests were made on shells of all calibers, of quite different sections, and to a great extent on products which had been rejected by inspectors, it appears that these castings, although manufactured by the processes just indicated, have widely varying physical proportions. The percentage of carbon also did not always come within the limits characterizing semi-steel. Hence, with the wide range of products examined it was possible to assemble data which afford conclusions applicable not only to semi-steel, but also to castings in general. In all cases we have to deal here only with irons which have not undergone further thermal treatment.

The French artillery department imposed the following conditions of acceptance for lots of semi-steel castings:

1. The tension and shock test shall be made on test bars run in molds separated from those of the shells. The tension bars were tested after being turned to a 60 mm. (2⅜ in.) diameter, and the shock bars, 40 x 40 mm. (1.6 in. square) were broken, in the unfinished condition, by successive blows of the drop hammer.
2. The tension test was made on a certain number of shells selected at random from each lot.

From the point of view of the qualification of the metal used for shells, it was difficult to make any worse selection as to the kind of mechanical tests imposed. Inasmuch as the properties of castings are essentially a function of the speed of cooling of the size of section and of the chemistry of the product, it is foolish to determine them by test bars poured in separate molds.

As to the shock test, we have come to the conclusion that it has no significant value. We have, therefore, deliberately omitted it from this investigation. Not only is the process by successive shocks now out of style and condemned, but the dynamic tests do not offer any information as regards the castings. This is because the castings show only one style of breakage—the intergranular. Finally Mr. Fremont* has shown experimentally and decisively that there is no relation between the results from such shock tests and the strength of the casting. Test bars broken by the blow of a "drop" from an inconsiderable height presented a resistance to shearing varying within the extremes, and yet within the same limits as those broken under greater heights.

We will, therefore, review successively:

1.—The results furnished by the tension test, especially as regards the modulus and limit of elasticity.

2.—The results of the compression test, with a special comparison between the elastic limits under tension and under compression.

3.—The application of the bar test for castings, and the experimental relations existing between the Brinell hardness number and the results of the tension and compression tests.

As to the static bending and shearing tests, we have established only a relatively restricted amount of data. The examinations of Mr. Fremont** have moreover nicely shown that they constitute only selective methods for ascertaining the mechanical qualities of the castings.

Tension Test

The characteristic and primary fact of the results obtained by the tension tests of raw pig iron†† is the weakness of the elongation at the fracture, which is always under 1 per cent—that is to say, under the order of experimental measuring errors, practically nil. It results from this that the small ductility which accompanies the tension test is a cause of the early breakage. Because of the small amount of elongation present in cast iron and because of the difficulty in obtaining precise measurement, the results obtained are practically useless.‡‡ It is known, however, that it is impossible to eliminate these efforts of elongation which occur in industrial tension tests.

Whoever has proceeded to determine elastic elonga-

*Translated by E. J. Lowry. Hickman, Williams & Co., Pittsburgh.

†The empirical rules of Mr. Frachebourg expressed by the following formulæ for an average admixture of Mn of 0.5 per cent:

Si + C equals 4.5, for shells of small and medium caliber.
Si + C equals 4.2, for shells of large caliber.

‡In the same way, it is possible to add to the hot metal cast turnings that are little carburized, to mix the liquid cast iron and liquid steel, or to decarburize the cast iron partly in the converter, to arrive at the proper analysis.

tions in tension by the method of the mirrors at two points which are opposed by a test bar has noted these deformations of supplementary elongation by the difference of variation of reflected light lengths obtained. Sometimes their results have been directly opposite, proving the difficulties experienced in obtaining correct elongation of cast iron. It does, indeed, entail the greatest difficulties and necessitates long test bars with threaded heads, and also demands before each and every test a minute adjustment of the jaws holding the test bars, wedges and lead bushings, to make it possible to harmonize to some extent the results obtained by these tests.

A tension test on castings can be considered correctly executed only when the operation is thus performed, and we shall here consider solely results obtained with these experimental conditions. Moreover, this method of mirrors is the only one which permits one, as the elongations are so small, to trace the "curve load deformations" necessary to compare properly the elastic features, modulus and limits of proportionality.

Moreover, such tests, aside from imposing on the observer the necessity of minute precautions and a great deal of patience, require considerable time, hence they go entirely beyond the reach of practical possibilities. Tension tests as currently executed are always accompanied by more or less important ductile efforts. Hence a value of the breaking load can be obtained for the castings which has often only a remote relation to the strength of the metal. All that can be said is that the strength is less than the actual breaking load, from which it differs in a variable and unknown extent.

It is necessary to pay attention to the speed of the breaking of the test bars in tension tests. It is often possible to take up a test bar once broken in the jaws

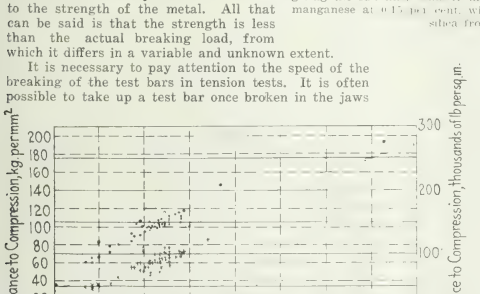


Fig. 23—Relation Between Brinell Hardness Number Δ of Semi-Steel and Its Strength in Compression. The dots in the upper band of plotted results represent $Ec = 0.5\,\Delta$, load at rupture under compression. The crosses in the lower band represent $Ec = 0.4\,(\Delta - 50)$, the limit of apparent elasticity under compression

of the machine and, by restarting the tension test, to obtain values of breaking loads which are 20 to 30 per cent higher than that of the first test.

Elastic Limit

Definition of the elastic limit by examination of the curves of the deformations caused by loads is essentially conventional and arbitrary. As these curves have no relation to the casting, we have adopted the limit of proportionality, that is to say, the intensity of stress at which the deformations under load cease to be proportional to the stress. This corresponds to the point where the curve of the load deformations ceases to be a straight line.

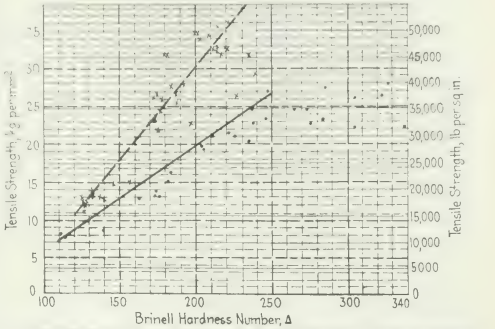


Fig. 22—Relation of Tensile Strength to Brinell Hardness Number of Two Series of Gray Iron Castings Investigated in Germany in 1913 and 1914. The small crosses, giving rise to the dash line, represent the work of Wüst and Meissner on irons constant in silicon at 1.5 per cent, with carbon varying from 2.5 to 4 per cent and manganese from 0.1 to 2.46 per cent. The dots, giving the full line, come from Wüst and Kettenbach, on irons constant in manganese at 0.15 per cent, with carbon varying from 2 to 4 per cent and silica from 0.45 to 3.24 per cent

The deformation-load curves have been shown by a dotted line which resulted from the mirror method. This permits, by an enlargement of about 700 diameters, the calculation of the alterations of the deformation. This corresponded, on an average of the test bars used, to about $\frac{1}{150{,}000}$ of the length measured. Under these conditions it is noted that the curves thus obtained do not, for certain specimens, present any rectilinear appearance. (See Figs. 9, 10 and curve *B* of Fig. 11, page 471, Aug. 23.) It is, therefore, impossible to indicate a limit of proportionality. The properties of the metal in tension can be defined only by its complete curve, hence in Figs. 9 to 14 (pages 471 and 472, Aug. 23) curves are established for nine castings, with breaking loads varying from 7 to 27 kg. per sq. mm. (10,000 to 38,400 lb. per sq. in.). Table I (page 470) sums up the total of the chemical and mechanical data — tension, compression, hardness, elongation—obtained on these castings. It should be understood that the limits of proportionality figure on this table only in case the points which were plotted in the tracing of the curves present at their origin a straight alinement.

Undoubtedly, with more determinations and with a diagram at a reduced scale, it would have been possible to arrange matters so as to find what has by tolerance come to be called the apparent limit of elasticity, but this would be a mere illusion.§ With these conditions determined, the limit of proportionality, when it was

**See "New Testing Methods for Castings," page 393, THE IRON AGE, Aug. 16.

†† In the case of reheated castings (malleable castings), the elongations at rupture may reach values a good deal higher—20 to 25 per cent—owing to the quite different form of the elements of graphite (solid graphite).

‡‡The same trouble arises when it is desired to test by tension any hardened and untempered steels which are also without elongation at rupture. Results are obtained which have no sense. Hence, we were obliged to give up the tension test also when we examined the influence of the duration of heating before tempering on the properties of hard steels. See Bulletin of the Society for Encouragement of Industries, Vol. CXXI, page 207, 1914 (in French).

§The opinion of Bouasse may here be quoted: "A metal must be defined industrially for the phenomena of tension by its tension curve. It means a loss of time and exhibits a mediocre spirit scientifically to stick either to a limit of elasticity which does not exist, or to pseudo-scientific definitions the gravest defect of which for the engineer is to lead to practical consequences which may become disastrous."

thought necessary to indicate an approximate value, was almost always one-third lower than the breaking load.

Modulus of Elasticity

These curves permit of establishing Young's modulus of elasticity by the inclination on the axis of the load

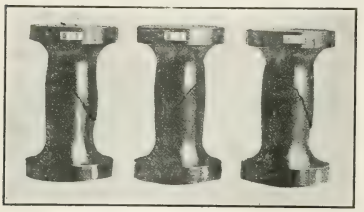


Fig. 24—Appearance of Three Test Pieces After Being Ruptured in Compression

of the rectilinear constituent when this factor exists, or of the tangent at the origin of the curve in the other cases. The values obtained are shown in Table I (page 470, Aug. 23). It is at once noticed that, contrary to what is true for steels, the modulus varies extensively. It runs from 4000 to 11,500 kg. per sq. mm. (5,700,000 to 16,350,000 lb. per sq. in.). As is shown by Fig. 21 the modulus *Mt.* varies almost linearly as a function of

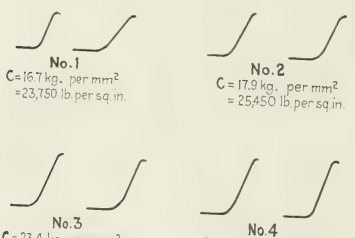


Fig. 25—Diagrams from Shearing Tests of Semi-Steel on Sections 6 x 8 mm. (0.24 x 0.31 in.). On the original drawing the scale was 0.053 to 1 for abscissae, with ordinates 50.1 kg. per mm. (2800 lb. per in.)

the breaking load *Rt*, so that the results of our experiments can be pretty exactly represented by the empirical formula:

$$Mt = 385\,Rt + 1150.$$

The most resistive castings are therefore those which have the highest modulus; hence they are subject to less deformation and a good deal more influenced by the elongation at the beginning of the tension test. Hence, the more resisting a casting, the greater the chance of the tension test being affected by errors. The result will then be less than the actual strength. This had already been pointed out by Mr. Fremont as a consequence of his tests with castings.* So we have here another reason for forbidding the present tension test to establish the mechanical properties of castings.

Tests of Bar Hardness

Comparison with the Tension Test.—In 1913 and 1914 Wüst, Kettenbach and Meissner investigated the influence of carbon, silicon and manganese on the mechanical properties of gray iron castings and published† the numerical results of the tension, bending, shock and hardness tests taken with a series of gray iron castings of variable percentages in C, Si and Mn. They did not go into the relation which might possibly exist between these different characteristics, but in approaching the tension and hardness values given for each sample, we arrive at the diagram shown in Fig. 22.

The quantitative points obtained cover the quasi-totality of the surface. Those who consider the tension test as the one test, intangible and infallible, would infer from this that the bar hardness cannot serve to grade castings. But we know, from what has been said in the preceding, what to think of the value of the ordinary tension tests taken with castings.

On the other hand, when making use of the figures shown in Table I, for which the tension tests were taken, with the precautions indicated which alone per-

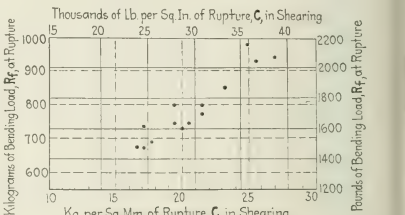


Fig. 26—Relation Between Bending Load at Rupture and Shearing Rupture per Unit Area, with Semi-Steel Test Pieces of 6 x 8 mm. (0.24 x 0.31 in.) Section for Shearing Tests and 10 x 10 mm. (0.39 x 0.39 in.) Section for Bending or Transverse Tests, the Supports in Transverse Tests Being 30 mm. (11.8 in.) Apart

mit to accord them some credence, the representative points aline themselves in a remarkable manner (Fig. 18). (See page 472, Aug. 23.) It is thus shown that there does actually exist a relation between the results of the bar test and tension test when this latter test is correctly executed.

Hence the bar test will inversely permit us to check and recognize the exactness of the tension test on castings. The numerical results found can be expressed in the empirical formula:

$$Rt = 0.2\,\triangle - 13,$$

in which $\triangle$ is the Brinell hardness number (in French dureté), determined with a ball of 10 mm. (0.39 in.) diameter, load of 3000 kg. (6600 lb.), length of test 15 seconds.

In all experiments taken with the view to compare the results of the different mechanical tests with the Brinell hardness, the impression of the 10-mm. ball was always effected on the test bar itself, which was serving for the mechanical tests, or on the metal immediately in contact with this test bar.

Comparison with the Compression Test.—Here we have a much greater number of determinations, which are graphically represented in Fig. 23, and carry, on the abscissas, the Brinell hardness number, and on the ordinates the corresponding values for the breaking load at compression *Rc*, and of the elastic limit at compression *Ec*, for the same metal. These tests are determined, as has been said before, on cylinders of 16 mm. (⅝ in.) diameter and 16 mm. height.

The grouping and alinement of these points indicate that there exists, in experimental errors, a certain

*In the graphical showing presented by Mr. Fremont as representing the coefficient of elasticity of castings as a function of the resistance to bending, Fig. 28 of his paper "New Methods of Mechanical Tests on Castings," this coefficient decreases when the breaking strength increases. This is due to the fact that Mr. Fremont has taken as a measuring angle the coefficient of elasticity at the bend, this giving the inclination of the diagram on the axis of the stress, while Young's modulus expresses the inclination on the axis of the deformations. These are two complementary angles, therefore, varying in inverse directions.

†F. Wüst and K. Kettenbach. (In German:) "About the Influence of Carbon and Silicon on the Mechanical Properties of Gray Cast Iron." Ferrum, vol. XI, pages 51 to 65, 1913.

‡F. Wüst and R. Meisner. (In German:) "About the Influence of Manganese on the Mechanical Qualities of Gray Cast Iron." Ferrum, vol. XI, page 97, 1914.

‡The values of the resistance to bending were obtained under experimental conditions differing from those of Mr. Fremont. They are indicated in Table I (page 470, Aug. 23).

dependence between $\frac{A}{}$ on the one hand and Rc and Ee on the other. This dependence can be expressed by the following simplified empirical relations:

$$Rc = 0.5 \frac{A}{} - 5$$
$$Ee = 0.4 \frac{A}{} - 25$$

Thus the bar test can be used for determining the qualities of castings, and not only can take the place of the tension test but, owing to its advantages, this new test may be substituted also for the compression test. These advantages may briefly be restated:

1.—It is simple and speedy. Its execution demands only a very brief time.

2.—It calls only for the machining of test bars, and can be taken without any deterioration of the product itself.

3.—It can be repeated as often as is desired and permits exploring the mass of the metal at all points.

4.—It is individual and will therefore tell about the object tested, and not merely about a test bar which is run separately and the properties of which may possibly not have any relation to the casting.

5.—It is capable of a check and leaves a controllable test mark.

In the case of direct tests on foundry pieces, precautions must be taken to obviate the errors which were pointed out to us by Mr. Fremont, and which result from the surface crust at the contact of the walls of the mold and from the eventual presence of underlying blow-holes. This can be made sure by repeating the tests and making the imprints, after having applied the grinder on the surface.

Remarks

About the Bending and Shearing Tests.—After Mr. Fremont's examination on the bending and shearing tests, it would be useless to make new determinations. However, some persons who consider semi-steel as a separate material, in the constitution of the chemistry of castings, might not dare to extend to semi-steel his conclusions relative to the correspondence between the results of the shearing and bending tests. To establish this point, we have made a certain number of determinations and now give in Fig. 25 some examples in a shearing diagram, and in Fig. 26 a graphical representation which shows the correlation existing between the results.‡

These two tests for semi-steel adhere to the original importance which was pointed out for castings in general by Mr. Fremont.

Limits and Moduli of Elasticity under Tension and under Compression of Semi-Hard Reheated Steel.—To be able to draw general conclusions about the deformations at the firing start of the shells, we have proceeded with semi-hard steel to establish data identical with those which have been brought forth for semi-steel, relative to the comparison of the elastic characteristics under tension and under compression.

The semi-hard steel which was used came from the same semi-hard bar of steel, of the variety 56 kg. per sq. mm. (79,600 lb. per sq. in.) in the reheated condition. The absence of segregation had been verified by micrographic examinations. The test bars (of the type of Fig. 15, page 472, Aug. 23) were heated together at 850 deg. C. (1562 deg. Fahr.), after rough turning in a lathe. By examining the bar anyone can make sure of the homogeneity and identity of hardness of the test bars.

The experimental conditions are exactly the same as those described in the foregoing. The numerical results of the test are summed up in Table III (next page) and the curves of deformations reproduced by Figs. 27 and 28.

The moduli of elasticity have the same value at tension and at compression. It can be said that they are practically the same for the apparent limits of elasticity, as well as for the limits of proportionality, which are determined by

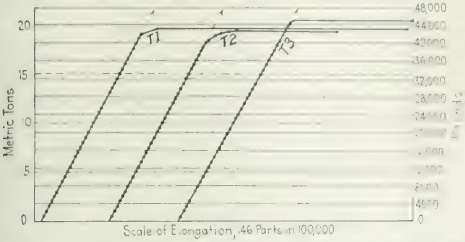


Fig. 27—Tension Tests of Semi-Hard Steel with Test Pieces of 614 sq. mm. (0.952 sq. in.) Sectional Area (but *T2* Was of 615 sq. mm. or 0.953 sq. in.) The results were:

	T1	*T2*	*T3*
Load at limit of proportionality:			
In kilograms	18,750	18,500	20,250
In pounds	41,350	40,800	44,650
Limit of proportionality:			
In kg. per sq. mm.	30.5	30.1	33.0
In lb. per sq. in.	43,370	42,800	46,925
Elongation in per cent at limit of proportionality	0.149	0.146	0.164
Modulus of elasticity in tension:			
In kg. per sq. mm.	20,400	20,600	20,100
In thousands of lb. per sq. in.	29,000	29,300	28,600

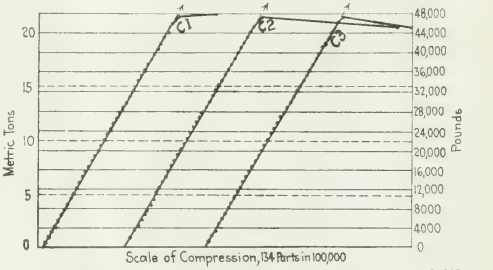


Fig. 28—Compression Tests of Semi-Hard Steel with Test Pieces of 615 sq. mm. (0.953 sq. in.) Sectional Area. The results were:

	C1	*C2*	*C3*
Load at limit of proportionality:			
In kilograms	20,500	20,500	21,000
In pounds	45,200	45,200	46,300
Limit of proportionality:			
In kg. per sq. mm.	33.4	33.4	34.1
In lb. per sq. in.	47,500	47,500	48,500
Contraction in per cent at limit of proportionality	0.161	0.162	0.166
Modulus of elasticity in compression:			
In kg. per sq. mm.	20,700	20,600	20,500
In thousands of lb. per sq. in.	29,435	29,300	29,150

figuring the longitudinal deformations at about $\frac{1}{50,000}$ of the length of measure.

The results of establishing the data on the elastic characteristics at tension and at compression, for steel and semi-steel, have been useful, having brought to us the interpretation of the tests of shells, and the rôle played by those tests, and in clearing up conceptions rather far removed from the ones currently admitted.

Table III (Mechanical Characteristics of Castings)

Mechanical Tests of Tension and Compression on Semi-Hard Steel at 56 kg. per sq. mm. (79,600 lb. per sq. in.)

Load at Rupture Under Tension

Nature of Test	Mark of the Test Bar	Limit of Proportionality kg. mm²	Apparent Limit of Elasticity (1) kg. mm²	Deformations Under the Maximum Load Applied: Maximum Load Applied kg. mm²	In Length at the Limit of Proportionality (2) %	In Length (2) %	In Section %	Module of Elasticity kg. mm²
Tension	T 1	30.5	32.2	40.7	0.149	2.9	2.4	20,400
	T 2	30.9	33.6	40.6	0.146	3.2	2.4	20,600
	Mean	31	32.6	40.7	0.164	2.9	2.6	20,100
Compression	C 1	33.4	34.8	40.7	0.15	3	2.5	20.5×10^3
	C 2	33.4	34.3	81.4	0.161	12.0	17.9	20,700
	C 3	32.1	35.3	81.4	0.162	11.6	15.4	20,600
	Mean	35	35	40.7	0.166	1.1	2.3	20,500
				....	0.16	....	....	20.6×10^3

(1) Shown on the diagram registered by the testing machine.
(2) Measured at the mid-length.
(To convert kg. mm² into lb. per sq. in., multiply by 1422.)

PERMANENT MAGNET STEELS*

Suggested Specifications for Various Grades and Uses

BY ELLIS H. CRAPPER

PRONOUNCED demand for permanent magnet steels for magneto-magnets, other than those required for telephone sets, has brought into prominence the necessity for grading such steels into ordinary and special brands of permanent magnet steels. During the last ten years the electrical engineer has evolved designs resulting in the production of magnetos of superior quality and reliability, and has been materially assisted by the metallurgical engineer, who has provided permanent magnet steels of the required quality.

It appears to the writer that the time has arrived when it is not only possible, but essentially necessary, to grade such steels. The following suggested specification is consequently offered tentatively as one which makes reasonable demands upon the steel maker and, with the exception of one or two specific magnetic constants, nothing is introduced that cannot be readily understood by those acquainted with the elementary principles of the magnetic circuit, and the graphical representation depicting the results of magnetic tests in the form of the complete hysteresis loop. Such a diagram gives the relationship existing between the resulting values of the flux-density B, as the magnitude of the magnetizing force H is varied and reversed between the definite maximum values.

For the purposes of the design of ordinary dynamo-machines, in which magnetically soft iron is utilized, the relationship existing between the flux-density B and the magnetizing force H is perfectly definite, and the application thereof is a simple matter. But in the case of the magnetically hard materials of which permanent magnets are made, the constant B is not so definite as a criterion of the nature and value of the steel for purposes of design.

The constant I, technically known as the intensity of magnetization, or the magnetic moment per unit volume, is given by the well-known relationship, $B = 4\pi I + H$, and it is suggested that the magnetic element which best specifies the inherent magnetic nature and quality of a permanent magnet steel is $I = \frac{B - H}{4\pi}$. For some purposes $4\pi I$ or $B_i = B - H$ (which is obviously the ferric inductivity of the material), is perhaps the magnitude which specifies the quality and condition of the material.

The values included in the table are suggested as a basis for comparison, and the values given for the coefficient of retentivity will obviously be found to differ slightly from the values generally quoted, in consequence of using B_i instead of B. The remanent flux-density, $B_{rem.} = 4\pi I_{rem.}$

Steels for permanent magnets are, for the purpose of this specification, divided into three grades, denominated:

I. Ordinary grade permanent magnet steel.
II. Higher grade magneto-magnet steel.
III. Special grades of permanent magnet steel.

*From *Engineering* (London)

I. The ordinary grade magnet steels include plain carbon and chrome steels as well as tungsten steel, suitable for the manufacture of permanent magnets which will not be subjected to vibration, shock or rough usage. These steels, when properly treated thermally and tested ballistically in the form of a closed magnetic circuit, should possess magnetic characteristics or constants superior to the minimum volumes in column I of the table, when the maximum value of the applied magnetizing force $H_{max.}$ is not less than 400 C.G.S. units.

II. The higher grade magneto-magnet steels include special chrome steels, tungsten steels and chrome-tungsten steels of such composition as will meet the requirements of magnetos intended for use with internal-combustion engines associated with motor, sea-craft and aircraft services. The specific requirements for these services are a high degree of constancy of the magnetic characteristics, as well as higher values of the magnetic constants, than those of grade I.

The minimum acceptable values, when tested under the specified conditions, are given in Column II of the table.

III. The special-magnet steels include the more recently introduced cobalt steel and chrome-cobalt steel alloys, which are characterized by exceptionally high values of coercive force H_c, and satisfactory values of remanent flux-density and other magnetic constants. The tests for these steels must be made with magnetizing forces of which the maximum value, $H_{max.}$, is not less than 1500 C.G.S. units.

These steels should be easily worked, and not liable to crack unduly in the making and hardening processes. The minimum acceptable values of the magnetic constants of these steels are given in Column III of the table.

	I	II	III
Coercive force, H_c in C.G.S. units	58	65	200
Remanent flux-density, B_r	10,000	.....	.....
Remanent intensity, I_r	.....	760	800
Coefficient of retentivity, $\frac{B_r}{B_{max.}}$	0.65	0.7	0.625
The product, $H_c \times c$	40	50	125
Magnetic strength, $H_c \times B_r$	56,000	600,000	2,000,000
Specific reluctivity at the remanence-point, $\frac{H_r}{I_r}$	0.07	0.085	0.25
Available external magnetic energy (approx.)	240,000	399,000	600,000 to 1,000,000

A resolution declaring "emphatically and unreservedly" against the steel trade practice known as "Pittsburgh plus" was adopted Aug. 28, at the annual convention of the National Association of Attorneys General at Minneapolis, Minn. The resolution declared that the "plus" plan was "unjust and uneconomic" and pledged the organization's support in the campaign being waged against it.

The first International Motor Transport Congress in the United States will be held in Detroit, May, 1924. The congress is under the auspices of the National Automobile Chamber of Commerce. It is to last four days, during which time subjects of direct bearing on the economic development of international motor transport will be discussed.

The "Stainless" Metals of Commerce

A Discussion of Their Properties and Heat Treatment—Large Possibilities in Iron-Chrome Complex—The Place of Non-Ferrous Alloys

BY J. KENT SMITH

EVEN the casual student of metallurgical history must have been struck by the changes in nature of the demands made upon commercial metals during the last decade or so. The patient research of hundreds of metallurgists has succeeded in a large number of these cases in fulfilling demands; in fact, the revolutionary work of the last ten years may be said at this time to have brought us to the shore of a new metallurgical continent in which vast regions for exploration exist. Results have not been attained by any mysterious means, nor has the worker possessed of real insight attempted to run up against any natural law. For when the wise man finds and recognizes that he is up against a natural law he quits without wasting any more time. If he recognizes some fundamental attribute as appertaining to a particular element which forms the base of his work, he does not waste time in attempting to develop properties from it which he knows cannot inherently be there. Rather he seeks in the first place a suitable compound with that element of another element, from which compound all manifestations of the attribute shall have vanished. This modification he then uses as a base upon which to build.

Persistence of Old Nomenclature

Of the discoveries which have been made and developed during the last portion of the present generation none is more striking than the so-called "stainless" metals. Already in these pages the writer has deprecated the name, in which accuracy has been sacrificed to brevity. As it stands, the interpretation of the name by the technologist is severely limited mentally. The danger of confusion is not so much in the present, perhaps, as in the future. A typical instance is very familiar to us in steel nomenclature. Less than half a dozen generations ago every pound of steel made in the world was manufactured by processes all calling into requisition for their performance temperatures far below the melting point of the steel itself; that is, by practice of a cementation process, followed by the repeated piling, welding and subsequent shaping of the carburized product. Nor is this plan of procedure extinct even today. In unexpected parts of Sheffield old converting furnaces still rear their heads and are in active, if restricted, operation.

Then Hunstman of Attercliffe introduced to our forebears of the period his process for producing homogeneous steel by melting it. He cast the fluid mass into ingots, which were then reheated and hammered out to the shapes required—mainly, be it noted, for the manufacture of tools. His melting was always done in crucibles, and his product became known as "cast steel." Today the trade use of the name "cast steel" signifies only the steel product of the crucible; yet the steel products of the crucible form but a tiny fraction of the total products of the steel industry, practically all of which have been cast from a fluid condition. Which points the advisability of care in the bestowal of a name.

There are many variants of "Stainless" metals now familiar to us, and fresh ones are being brought before our notice frequently. Obviously the first classification of them which leaps to the eye is their grouping as ferrous or non-ferrous. In other words, by the first we mean those "Stainless" metals of which iron forms the primary constituent, and by the second those metals in which iron occurs only as an impurity, more or less—and an innocuous one at that. Between the two lies a "no man's land" occupied by a group of metals containing a considerable—but by no means preponderating—proportion of iron, which iron has but little metallurgical significance. The commercial exposition of this type of metal is almost entirely centered round the nickel-chromium-iron alloys—generally known as the Nichrome metals—of which many trade variants are now on the market.

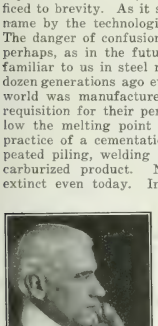
What "Stainless" Implies

The description "stainless" as applied to a metal refers to one whose polished surface neither corrodes nor dissolves in the circumstances of its legitimate use, nor takes to itself in such use any marking whose removal requires solution or abrasion other than that involved in its wiping with a damp cloth. Such description embraces the phenomena of rusting, pitting, marking by food acids, and atmospheric tarnishing. As is reasonably to be expected, the main research began among the ferrous alloys, its definite object being in the first place to preserve them from the attacks of their age-long and powerful enemy—rust. It early became quite evident that the only effectual means of combating this must be made inherent in the metal itself. Previously most attempts had been directed toward the finding and application of some protective coating. Obviously no protection of the surface only could be thoroughly effective. The moment that such surface was disturbed or destroyed—possibly even by scratching it—chemical action would begin between the portion of metal left unprotected and the exciting agent, and the last state would possibly be worse than the first.

Again, a dozen years ago, the efforts of the scientific investigator were directed to the known steels, which had simple iron as their base. Complete deoxidation of the magma forming the base, its greater or less denitrogenization, and the solid solution in it of small amounts of extraneous elements such as copper, led to some retardation of rusting. Certainly any measures such as these did not eliminate rusting, nor in the nature of things could they.

In order to make the reason clear it may be permissible here to reiterate certain simple truths. But it is

(Continued on page 650)



J. KENT SMITH, metallurgist of Sheffield, England, received his training in chemistry at Liverpool and entered the steel industry in connection with special experimental work. He spent ten years subsequently in the industry in close practical investigation of the problems of tin plate, seamless hydraulic tube drawing, coal gasification and by-product work. He directed his attention early to the alloy steels and their development, coincidently with the early developments in the automobile industry. Twenty years ago he was known in England as "the automobile metallurgist," and a few years later made a considerable stay in the United States introducing vanadium steel in automobile manufacture. His work on vanadium and his writings in that connection are well known on both sides of the Atlantic. Mr. Smith was made an officer of the British Empire in recognition of his metallurgical services to England in the world war.

ROLLING BROAD-FLANGED BEAMS*

Limitations of the Mill and Use of Vertical Rolls—Layout Best Adapted to Success

BY K. RAABE

IN the Grey mill at Differdingen, for rolling broad-flanged beams, the plant consists of a blooming mill, an intermediate mill and a finishing mill, as shown in Figs. 1 to 3. The ingot is first rolled down into an H-shaped bloom with a web from 7 to 12 times the thickness of the web of the finished section. The bloom is then further rolled down in the intermediate mill, consisting of two pairs of rolls, in which the web is

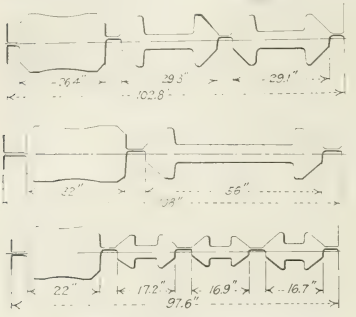


Fig. 1—Blooming Rolls for Broad-Flanged Beams. Upper view is for 40-in beams; middle view, for 18-in. beams; lower view, for 8-in. beams

reduced to 1¾ or 2 times the finished section. The steel is finally passed through the finishing mill, consisting of a pair of horizontal and one pair of vertical rolls. On the return pass the web is kept in a vertical position when passing through the first stand.

When perusing the literature relating to the rolling of broad-flanged beams two points stand out:

(1) Very little is said about the blooming mill, showing that not much importance is attached to the manner in which the ingot is roughed down. This is a mistake, and there is no doubt that in future more attention will have to be paid to the blooming mill.

(2) It is held that all sections from 140 to 1000 mm. (5½ to 39⅜ in.) deep can be, and are usually, rolled in the same finishing mill. As a matter of fact, it would never occur to the mill foreman to roll all ordinary standard sections on one and the same mill, although the series in this case consists of fewer sections than that of broad-flanged beams.

With the blooming mill, there are two main fundamental principles to be observed: (1) The plant must be arranged so that it should be possible to finish the section at a good heat. (2) The ratio in the cross-sectional areas of web and flanges of the finished product should be reached at as early a stage as possible during rolling, and should always be adhered to in subsequent stages.

Bearing in mind these two points, the usual type of blooming mill, with rolls 1100 mm. (43 in.) diameter and a prime mover of 6000 to 8000 hp., is not suitable for a modern type of special girder mill. The standard ingot as used on the ordinary type of blooming mill weighs from 3 to 5 tons. A 5-ton ingot 6 ft. 6 in. long has a mean cross-sectional area of 576 sq. in. For rolling a broad-flanged beam 1000 mm. (39⅜ in.) deep, it would be necessary to have an ingot 1500 mm. (59 in.) wide weighing 12 tons, and for a broad-flanged beam 400 mm. (15¾ in.) deep, an ingot exceeding 40 in. in width and weighing 8 tons.

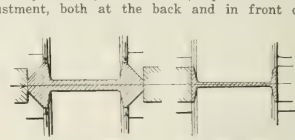
It is obvious that it would not be possible to roll down quickly enough in an ordinary mill an ingot of the dimensions required to produce a beam 40 in. deep. Reductions of more than 15 mm. (0.6 in.) are impossible if the rolls are not to break or the engine is not to be stalled. For beams 16 in. deep the maximum reduction must not exceed 20 to 25 mm. (0.8 to 1 in.). It is essential to be able to roll the ingot for heavy sections at average reductions of 30 mm. (1.2 in.) and for medium sections at 50 mm. (2 in.).

Fig. 1 shows the rolls for broad-flanged beams 40 in. deep. As will be seen, this particular blooming mill has a shaping and an up-set pass. The body length of these rolls is 108 in., but, when dealing with beams of less depth, it is possible to arrange two or three shaping passes and one or two up-set passes. If it were desired to effect a reduction of 30 mm. (1.2 in.) with this roll, a roll diameter of 64 in. would not be large enough. On the other hand, to reduce the weight of the rolls, the up-set pass would have to be dispensed with. By doing this, there is the advantage that the blooming roll would not exceed 6 ft. 6 in. in length, and a diameter of 56 in. maximum would be sufficient to produce the desired reduction. The prime mover would have to develop 12,000 to 15,000 hp.

But there are other and more important reasons for dispensing with the up-set pass. As already stated, the ingot for a broad-flanged beam 40 in. deep has a width of 59 in. Since the shaping pass is only 56 in. wide, the bloom, end up (Fig. 4) must first be reduced to the requisite width in four passes, then laid on its side and the rolling in the shaping rolls begun. As the bloom has to be reduced in the shaping rolls by about 330 mm. (13 in.), some 23 passes are necessary.

While doing this the bloom must be squeezed down, end on, at least twice and sometimes even more often. For each up-set pass the bloom must be up-ended, and given one pass to and fro, then laid down on its side and passed through the rolls again. This takes a great deal of time and results in much loss of heat in the bloom. Hence it is impossible to comply with the first fundamental principle as regards temperature. This disadvantage is not so obvious, of course, in beams up to 18 in. deep, while in the smaller sections it practically does not exist.

A mill must, however, be so designed as to be able to deal with all sections. Dealing first of all with the heavy sections, the up-set pass must in this case be done away with. To take its place the blooming mill should be designed as a special mill with a pair of cylindrical, vertical rolls, capable of horizontal adjustment, both at the back and in front of the



First Pass Last Pass

Fig. 2—Intermediate Mill

blooming rolls, each pair of these vertical rolls being capable of being put out of action by mechanical means at will. This arrangement is shown in Fig. 5, as is also the shape of the blooming rolls.

In this arrangement the two vertical rolls (which are driven) in front of the blooming rolls would seize the bloom and force it through the horizontal rolls. The bloom would then pass through the rear vertical rolls, which now run idle but are so adjusted as to compress the bloom. On returning, the bloom would be sized by the rear vertical rolls (which are now driven) and then compressed in the front pair of vertical rolls, now running idle but set tighter, so as to compress the section slightly. In this way the beam would be rolled out wider during each passage through the horizontal rolls.

This rolling out is of great importance. Where a bloom is not properly up-set during its numerous

*Translated from *Stahl und Eisen*, by *Iron and Coal Trades Review*, London, England.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

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Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Calamity in Japan

In the disaster that has overwhelmed Japan the American impulse to help has found expression in the starting of a relief fund that may be expected to mount quickly into millions. It has been hard under the conditions that have prevailed for years, fostered by jingoes in both countries, to get a true measure of the feeling of friendliness for Japan that exists in the United States. Now there will be no bounds to the sympathy of the American people. Nor can we doubt that from this most appalling visitation of the destructive forces of nature in all history will come such an outgoing of good-will as shall insure peace between the two nations, not only for our time but for the generation to come.

From the material viewpoint the catastrophe seems a picture of unrelieved loss—so many hundred thousand lives taken, so many hundred millions in property destroyed. But humanity has such a way of gathering courage in misfortune and of rising out of desolation which seems to hold no germ of hope, that time may be counted on again to be the miracle worker.

The story of destruction is still untold, and barely hinted at, but already men are busy with plans of reconstruction. In a single sentence one of her journals cables that Japan's material progress has been set back a generation. But that judgment will be revised not many days hence, when we shall be hearing that plans for a greater Japan are already under way and that to that end the moral and material encouragement of the people of the United States has been offered without stint.

Light Alloys, Present and Future

The recent launching of the great navy airship, Z R 1, is an impressive reminder of the advance that has been made in the metallurgy and the fabrication of light alloys. A massive cigar-shaped frame, 680 ft. long and 79 ft. in diameter at its largest section, has been fabricated of an aluminum alloy only a little more than one-third the weight of steel but having the strength of mild steel. The entire structure contains only about 15 tons of metal and yet in size it approaches some of the modern ocean liners. Progress in the metallurgy of light alloys and advances in their rolling and heat treatment have made possible this spectacular achievement. The difficulties in the manufacture of this particular alloy have been mastered in large measure and assurance is given that the perfecting of heat treatment has made it more resistant to fatigue strains.

Other light alloys, particularly those in which magnesium is the base, are being much improved. Some of these are lighter than the aluminum alloy referred to and possess nearly the same physical properties. The efforts of Henry Ford to get control of hydroelectric power in various localities point to the greater use of light alloys in the automobile industry. The all-aluminum or light alloy car is more than a possibility.

Only the problem of more economical methods of manufacture of all such metals and alloys stands in the way of their wider use. They have contributed much to the triumphs of heavier-than-air flying machines, whose real usefulness is only in its beginning. In the opinion of a leading American metallurgist, if the amount of steel used each year be divided by the total of light alloys, the quotient is destined to become smaller and smaller with every passing year.

Steel Production and Exports

Our iron and steel exports have been showing no definite trend upward since the collapse of the 1920 boom. During the war they ran somewhat above 5,000,000 tons a year and in the first two post-war years between 4,000,000 and 5,000,000 tons. Since then, or for two and a half years, the rate has been, roughly speaking, about 2,000,000 tons a year. For the first half of this year the total was only slightly above that for the second half of last year, while it was below that of the first half by a larger amount. In July of this year, the last month reported upon, the movement was 4 per cent above the average of the six months preceding, but 8 per cent below the average of the three months preceding.

While our exports have varied but little in the

past two and a half years our domestic production has varied greatly, the domestic customers of the steel mills being much less regular in their purchases. To the many proofs already in the statistical record, another has been added, that we cannot even in a small way make up for a light domestic demand by exporting steel.

With the rate of export not materially changed, but with record high production, steel exports in the first seven months of this year represented a lower percentage of the current production than has been shown for many years. In these seven months the so-called "total iron and steel exports" amounted to 1,141,559 gross tons. In this total are scrap, pig iron, semi-finished steel, rolled steel in general, cast and wrought pipe, etc. Various details as to exports were given in THE IRON AGE of last week, page 538. Deducting from this total the pig iron, ferromanganese, scrap, iron bars, castings, etc., there is left 1,060,000 tons, which may be regarded as rolled steel. Our total production of rolled steel runs about 75 per cent of our ingot production, and accordingly about 1,410,000 tons of ingots was represented, which is 5.3 per cent of the 26,729,209 tons reported as the ingot production of the seven months. This is the smallest percentage for many years. Practically every year 1912 to 1920 inclusive the proportion, similarly computed, ran above 10 per cent.

It is true we export a considerable quantity of steel in the form of machinery, with weight not reported, but on the other hand the exports of pig iron and iron castings are practically nothing compared with our production of foundry iron and the same is true of rolled iron.

The Coal Strike and Coal Supply

The statistical position of coal, now that the anthracite suspension has begun, may be summarized briefly. The production of anthracite in the present coal year, since April 1, has been very large, and there are fairly large stocks of bituminous coal.

The curve of anthracite production was a constantly ascending one until in the calendar year 1911 90,464,067 net tons was produced. In the two war years, 1917 and 1918, nearly 100,000,000 tons was produced, but with the exception of that period the production has been below that of 1911 more often than above. It may be taken, as a general principle, that production of anthracite has been stationary for a dozen years, apart from seasonal variations, at 90,000,000 net tons a year. As consumption of fuel in the territory served by anthracite a dozen years ago has been increasing it is evident that a process of substitution has been in progress, and even in a not very pressing emergency such substitution can be forced further without much difficulty.

Production of anthracite in the five months of the coal year, April 1 to Aug. 31, has been about 42,400,000 tons, or 47 per cent of a normal year's total. Whatever the "stocks" at one point or another, the amount of unburned anthracite above ground is large.

Coming to bituminous coal, the Geological Survey has just reported an estimate of stocks, Aug. 1, of 51,000,000 tons, increases having been 4,000,000 tons in June and 5,000,000 tons in July. Stocks Sept. 1 may be guessed at 56,000,000 tons. Maximum stocks reported were 63,000,000 tons, both on Armistice Day and on April 1, 1922. Never except on these two occasions was there nearly as large a stock as 56,000,000 tons. The studies made by the National Association of Purchasing Agents, referred to in THE IRON AGE of last week, page 540, would indicate somewhat larger stocks than stated by the Geological Survey.

As to bituminous coal production possibilities, the majority of districts are now assigning their lost production to "no market." It would be misleading to cite the large percentages of loss thus assigned, because a small increase in demand might throw the lost production into the "transportation disability" or "labor shortage" column, and in turn a slight increase in car supply or man supply might throw the loss into the other column. There are, however, production possibilities of no small consequence. Aside from these various coal marketing districts, the Connellsville region will be able to supply very considerable amounts of coke.

What of Russia?

Travelers, senatorial and others, return from Russia with words of quasi-wisdom. The Bolshevik Government has found itself and is a wonderfully efficient thing. The people are becoming happy. They are going to export grain. Etc., etc. Others dissent. In truth nobody knows what they are talking about. The daily papers publish interviews with them, for even the words of an ass may be news. The editors offer neither endorsement nor criticism. It's all the same to them.

We laugh at the foreigner who comes to the United States, makes a hasty transcontinental trip, and essays to size up our economic position. We have some trouble in that sizing up ourselves! What, then, of the casual traveler in Russia, who knows neither the language nor the mysteries of a strange people? The expert sitting in London or New York, getting many reports and studying data, knows far more.

Russia is in ruins. Its railroads are in deplorable condition. Its heavy industries are all but wrecked. There is some production in the light industries, which have passed back into private control. The peasants have things in about their own way. The Bolsheviks have taught them to pay taxes. That's all. The harvest will be better this year than last. Probably there is no danger of famine. But Russia will not be an exporter of grain. Absurd to think it. Well, then, what is going to happen politically and economically? They are much the same thing.

Communism was admittedly a failure. Then was substituted the "new economic policy," or state capitalism. That also is a failure. Even the virile Trotzky says pitifully that private enterprise used to operate industry profitably but the

Government cannot do it. Back to straight capitalism is the next thing. The Bolshevik Government is already close to the end of its rope. The reign of terror is ended. Already is the new revolution developing strongly and swiftly. It still lacks coherence, lacks leadership. It does not show on the surface. It is like the sap spreading up through a tree. Some day the new thought will bud over night, as a tree buds in spring. It will seem sudden, but will not be really so. The red Government will simply step out and a moderate one will step in. This may be a year hence, may be two years. Who can time such things closely?

What after that? Russia is essentially an agricultural country. We know that such countries can recuperate quickly. Russia is rich in natural resources. It is not unreasonable to expect that within five years after the change of government, barring agricultural adversities, Russia may become the most prosperous country of continental Europe.

There are many confusing conditions entering into consideration. In the beginning the Bolsheviks stupidly set out to annihilate management, the intelligence of the country which they associated with capitalism. After slaughtering hundreds of thousands they awoke to the realization that if they kept on with such extinction nobody would be left to direct industries. By that time they had come to appreciate that the proletariat and peasantry did not know how and could not learn. It will remain for time to show whether with the recovery from that madness they saved enough of the brains of Russia.

In a country like the United States such a loss would be fatal. It would spell the downfall of our civilization. In a backward, essentially agricultural country like Russia it may not be so serious. In our optimistic forecasts we give expression to that thought.

There may be even an important offsetting thing in the knowledge gained by millions of peasants while they were prisoners of war in Germany, who were put mainly to work on the farms and thus had the opportunity to see that steel plows are better than a crooked stick and that iron-shod wheels are an improvement upon those of wood alone. Such knowledge has now spread all over Russia. Life in the army, too, created new desires, such as that for sugar with which the soldiers were supplied, and which they found to taste good. In rejuvenated Russia the people may want to work hard in order to get new things.

Zirconium and Phosphorus

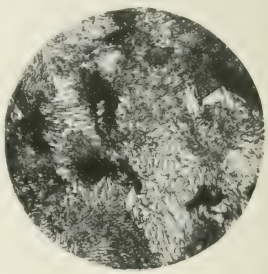
Several months ago announcement was made in these columns of some remarkable results from the use of zirconium in the manufacture of steel. Its scavenging capacity and the notable effects in the presence of sulphur were prominent. Another chapter has just been added to the story of zirconium. Elsewhere are given extracts from a paper read at the Montreal meeting of the mining engineers last week, discussing the effects of this metal on phosphorus in steel. It has been found that there is essentially a neutralization of the embrittling effect of phosphorus, or that after zirconium treatment the Izod impact values of steels containing about 0.14 per cent phosphorus are markedly superior to those for untreated steel of the same composition.

If these results can be regularly duplicated in commercial practice, their practical value is manifest. It means not only that higher phosphorus steel can be used more extensively, but also that in rail manufacture the phosphorus problem is simplified, for in rails a metal is needed as resistant to shock as possible. If the expectations of the investigators are realized, many of the troubles incident to the presence of phosphorus and sulphur, particularly the latter, will disappear or be lessened, so that ores now regarded of little value may become available. There might even follow eventually some modifications of steel specifications.

CORRESPONDENCE

Pearlitic Cast Iron and Microscopy in the Foundry

To the Editor:—We have read with much interest the article on "Pearlitic Cast Iron," which appeared in your Aug. 16 issue. We are taking the liberty of calling attention to the fact that the type of iron described



Photomicrograph of True Pearlitic Cast Iron.
Etched with picric acid, 500 diameters

is that considered best, in so far as metallic matrix is concerned, by most metallurgists, and for certain sections such iron is being produced commercially without using special molds. As you know, the rate of cooling and the composition are the major factors influencing the structure of the iron. It has been shown that in sound metal the structure determines the physical properties. Various devices used for controlling the rate of cooling (such as the molds mentioned, chills, size section, pouring temperature, heat treatment, etc.), are in a general way capable of producing the same changes of structure more commonly secured by means of changes in composition. Production of a "pearlitic" matrix, while important, is not the only essential in producing high quality metal, the nature of the graphite size and distribution exerting an even more profound influence. This, we may say, has been amply demonstrated by the researches carried out in the Niles laboratory of the Niles-Bement-Pond Co.

The statements relative to the practical value of microscopy are true, if they are meant to imply that microscopy is not generally used in gray iron work. There are a number of firms which have found microscopy a valuable aid, and in this laboratory we consider it the best of the tools we have when used for solution of everyday foundry problems. Indeed, one of the most practical of methods for getting a line on the physical properties in the casting, as in heavy machine tool castings, is microscopic examination. It would be more satisfactory to include microscopic specifications for certain types of castings than specifications for analysis and physical tests.

We are inclosing a micrograph (500 diameters, etched with picric acid) of a true pearlitic cast iron, as regularly produced here. The following are two typical analyses of this type of iron:

Sil.	Manc.	Phos.	Sul.	C Carbon	Total Carbon
1.08	0.59	0.37	0.134	0.80	3.28
1.17	0.56	0.41	0.133	...	3.34

J. W. BOLTON.
Metallurgist Niles Tool Works Co.
Hamilton, Ohio, Aug. 23.

Iron and Steel Papers at Montreal

Program Important, but Final Sessions of Mining Engineers' Meeting Are Meagerly Attended—Discussions on Zirconium, X-Ray Tests of Steel, Effects of Nitrogen and Chrome-Iron Alloys

IT is more than unfortunate that a large technical organization should schedule an important program of papers on new developments in steel at a summer session which, under ordinary circumstances, would be but sparsely attended by those interested in the subjects discussed. The American Institute of Mining and Metallurgical Engineers closed a ten-day mining excursion to various localities in Canada with technical sessions at the Mount Royal Hotel, Montreal, Canada, on Thursday, Aug. 30. Besides two sessions on mining and milling and on geology, there were scheduled morning and afternoon meetings on iron and steel at which the following program was carried out:

"X-Ray Examination of Irregular Metal Objects," by Ancel St. John.

"X-Ray Examination of Steel Castings," by H. H. Lester.

"Nitrogen in Steel," by C. Baldwin Sawyer.

"Desulphurizing Power of Iron Blast Furnace Slags," by Richard S. McCaffery and Joseph F. Oesterle.

"Effect of Silicon on Equilibrium Diagram of System Carbon-iron, near the Eutectoid Points," by H. A. Schwartz, H. R. Payne and A. F. Gorton.

"Some Commercial Alloys of Iron, Chromium and Carbon in the Higher Chromium Ranges," by C. E. MacQuigg.

"Some Effects of Zirconium in Steel," by Alexander L. Feild.

"Selecting Material for Formed and Drawn Parts," by L. N. Brown.

The trip of the institute ended with about 125 members arriving at Montreal, Wednesday evening, Aug. 29, while at one time the party numbered as many as 200 members and guests. Despite this fairly good representation on the excursion, the iron and steel sessions were practically unattended. The average number of persons present in the morning and afternoon was about eight, with the maximum at 16. The sessions were to be presided over by J. V. W. Reynders, but in his absence William Kelly, Vulcan, Mich., occupied the chair. In noting the small attendance, the chairman said that it was an occasion for congratulation to see so many present because after 10 days of dissipation the "pilgrims" were not in a position to consider abstruse technical subjects.

X-Ray Examination of Steel

At the morning session Dr. H. H. Lester's paper was read by Dr. Ancel St. John. The Watertown arsenal has been making laboratory tests on the X-ray examination of metals, but they are more and more considering this work as being of commercial importance for routine testing. Their practice is to shoot 3 in. of metal 13 in. from the tube, using 195,000 volts and 7 milliamperes.

Doctor St. John explained the difficulties encountered in X-raying with such high voltages—difficulties in insulation, danger from the rays, necessity of parallelism, etc. Increase of power by current intensity shortens the exposure, while increase of voltage increases the penetration, since the penetrating power is a function of the voltage. Doubling the voltage will give about eight times the penetration. Taking the arbitrary figure of 30 min. as the time of exposure, a voltage of 400,000 would allow penetration of 6½ in. to 7 in. of metal. On the other hand, as the penetration increases, the size a cavity must be in order to be detectable also increases, so that it may be said that the flaw which is detectable must be from 1/50 to 1/100 of the thickness of the metal being examined.

The paper entitled "X-Ray Examination of Irregular Metal Objects," which was published largely in full in THE IRON AGE of Aug. 23, was presented by the author. He discussed the difficulty due to X-ray examination of irregular objects, where the contrast is too great between the screened and unscreened portion of the negative. If tungsten is present in the steel, for example, the part of the negative shielded by the specimen may get less than one-millionth the exposure that falls on the unscreened part. The former method of using lead powder is slow and troublesome. By using a liquid higher in absorptive power than the specimen, it is possible to differentiate between defects which are inside or outside of the specimen.

Dr. St. John's paper also points out the possibilities of distinguishing between "blowholes" and "shrinkage cavities." Summing up the two papers, Dr. Lester's shows the present limitations of X-ray examination of metals, while Dr. St. John's shows some useful kinks.

In a written discussion of Dr. St. John's paper, Dr. Lester pointed out that the Watertown specimens were too large for immersion in a liquid, or might otherwise be unsuitable for immersion. They use lead powder imbedded in wax. He also thought that Dr. St. John's method might lead to scattering of the rays.

Dr. Coolidge, General Electric Co., inventor of the famous tubes, in a written discussion of Dr. St. John's paper, said that the author had apparently eliminated the worst limitation of X-ray examination, namely, that due to the shape of the object. He was glad to be able to announce that apparatus will soon be available with 50 milli-amperes and 250,000 volt crest. Under ½ or 1 milli-meter of copper, this gives 15 times the X-ray intensity used by the medical profession.

Nitrogen in Steel

The paper on "Nitrogen in Steel," by Dr. C. Baldwin Sawyer, the Brush Laboratories Co., Cleveland, was presented by the author. A brief abstract was published in THE IRON AGE, Aug. 30. Among the items the author stressed were that the absorption of nitrogen by steel is proportional to the square root of the nitrogen pressure; that nitrogen forms a solid solution up to 0.03 per cent nitrogen; that nitrogen is lost by heating the steel, as in the critical point tests, and that it is similar to carbon in its effect on the equilibrium diagram. The eutectoid is at 1.7 per cent nitrogen. Some of Dr. Sawyer's slides of the nitrogen structure showed a remarkable likeness to carbide.

In a written discussion by James A. Aupperle of the American Rolling Mill Co., it was pointed out that uncertainty exists as to the reliability of some of the

analytical results. He (Mr. Aupperle) stated that nitrogen was reputed to be nine times as embrittling as phosphorus. He had also found that some samples which contained three times as much nitrogen as other samples also showed three times the corrosion loss of the lower nitrogen samples. Speaking of combined nitrogen, he called attention to the fact that some oxyacetylene welds contained 0.04 per cent nitrogen, while electric welds contained 0.16 to 0.20 per cent.

Blast Furnace Slag as a Desulphurizer

Richard S. McCaffery presented his paper, "Desulphurizing Power of Blast Furnace Slags," and discussed the complex models which had been constructed to visualize the relationships found between the chemical and mineralogical constituents. He stated that it would take at least 10 years to complete the investigation of the constitution of the slags in certain regions, but that the work already had served to clear up and explain some of the inconsistencies of metallurgical writers concerning the behavior of magnesia and alumina. His work shows that it is wrong to figure magnesia as calculated to its lime equivalent and that the chemical constitution of the slags is of less importance than their temperatures.

In oral discussion of this paper, Dr. Alfred Stansfield, Montreal, called attention to the paper's importance and predicted the methods would be found useful in investigation of the influence of titanium in slags, which was of great interest in Canada because of the titanium content of the Canadian iron ores.

A. L. Feild, Long Island City, N. Y., discussed the paper, pointing out the directions for profitable future attack, to permit a better control of sulphur in the blast furnace.

H. A. Schwartz discussed his own paper briefly. Its discussion in the meeting turned solely on the question of the possibility of having two solid solutions coexistent in the same alloy. A. L. Feild stated that he did not believe it was contrary to the precepts of physical chemistry and Dr. St. John stated that there appeared to be good ground to think that such a condition was possible. Mr. Schwartz said that Dr. Rosenhaim had rejected that possibility.

Zirconium in Steel

A. L. Feild, research metallurgist, Electro Metallurgical Co., New York, presented his paper, "Some Effects of Zirconium in Steel." Extracts from the paper are published elsewhere in this issue. In a written discussion by I. A. Billiar, superintendent open-hearth department, Standard Steel Works, Burnham, Pa., it was stated that zirconium had proved quite successful in the open-hearth department. While no change was noted in physical properties, it seemed to be a more powerful deoxidizer than others they use. They had also used zirconium on crucible steels up to 0.25 per cent sulphur and their results checked Feild's on sulphur fixation.

A written discussion by Dr. H. W. Gillett of the Bureau of Mines, Ithaca, N. Y., expressed his skepticism of the efficacy of zirconium as an addition agent for steel and he cited work of the government bureaus where nickel steels had not been improved by zirconium additions. He did admit the benefit which comes from making high sulphur steels rollable and also the improvement in the zirconium steels due to reduction of the banded structure or ghost lines.

Chrome-Iron Alloys

The paper entitled "Some Commercial Alloys of Iron, Chromium and Carbon in the Higher Chromium Ranges," by C. E. MacQuigg, metallurgist, Research Laboratories, Union Carbide & Carbon Co., Long Island City, N. Y., was presented by the author. The paper discusses the development in some of the properties in alloys of iron chromium and carbon in ranges of chromium much higher than had heretofore been commercialized. Besides their properties of oxidation resistance, these alloys have other valuable properties, such as resistance to acid and mine waters, forgeability, hardness, etc. An abstract of this paper will be published in an early issue of THE IRON AGE.

M. W. Alexander to Report on Europe's Economic Problems

Magnus W. Alexander, managing director of the National Industrial Conference Board, who has been studying industrial and economic conditions throughout the allied nations and Central Europe for the board, arrived in New York on the Resolute, Aug. 31. On his trip he interviewed leaders in industry, finance and in political life and also spoke at meetings of industrialists in England, Germany and Austria. The results of his inquiries will be made known formally at the next meeting of the National Industrial Conference Board on Sept. 20 at the Hotel Astor, New York.

In commenting briefly on the effects of the Ruhr occupation, Mr. Alexander said:

"Superficially the struggle is on between France and Germany. Yet I believe that the real struggle is taking place between France and Great Britain. Politically France is today the dominating power in Europe, and the spirit of Napoleon is again stalking over that Continent. Such dominating supremacy is contrary to the traditional policy of Great Britain, which is naturally seeking to reestablish the conditions of the pre-war period in which its own prestige and power at home and abroad were of the first magnitude.

"Faced at the present time with the gigantic war machine of France and of such allies of France as Poland, Czechoslovakia and Belgium, Great Britain is forced to act with the greatest caution and must bide her time. At present France has gripped the economic heart of Germany in the Ruhr and Rhine sections. She would like to establish herself there permanently, but realizing that she cannot do so, France is already making strong efforts to enter into an economic relationship with Germany.

"The question to us Americans is, where we will stand in the economic life of the civilized world, if on the one hand we are to face a combination of French and German heavy industry, or of English and German on the other?

"Meanwhile Germany is going through a series of financial, social and political convulsions, and these offer a fertile ground for Communism and all the forces of destructive action to rear their heads. Yet I firmly believe that in spite of riots and bloodshed that may continue in Germany for the next few months, communism and its allies will eventually receive a decisive blow, and the directing influence of Moscow, so strongly exerted now through Radek in Berlin, will in time be effectively checked."

Changes in Westinghouse Electric Personnel

A number of changes have been made in the personnel of the district offices of the Westinghouse Electric & Mfg. Co. A. D. Stewart has been appointed branch manager, Butte, Mont., office. L. C. LaMont has been appointed office manager, Los Angeles office, succeeding J. R. Deering, resigned. A. G. Crocker, formerly special power representative, has been appointed manager, industrial division, Detroit office, succeeding E. A. Wooten, who has been assigned to other work. A sub-office of the Baltimore office has been established at Norfolk, Va., with William Ives in charge.

Marting Company Installs Three Shifts

IRONTON, OHIO, Sept. 4.—The 8-hr. day has been established at the blast furnace of the Marting Iron & Steel Co. and reports indicate that the change is working out very well. There have been few complaints from workmen involved. The Marting company is the first merchant interest in the district to put in the three-shift plan, but others are said to be preparing to establish it in the immediate future. At least one of the silvery furnaces in the Jackson-Wellston district has established the short turn, and it is expected that all furnaces operating in the Southern Ohio and Northern Kentucky district will have made effective the shorter hour arrangement before the first of the year.

Japan Offered Aid by American Steel Trade

Preferential Consideration to Be Given for Steel Needs—Many Emergency Inquiries but Real Buying Months Away—Relief Measures the Call of the Hour

NEW YORK, Sept. 4.—In the first few hours of the first business day following the earthquake, tidal wave and fires that have laid waste a number of the cities in central Japan, including Tokio and Yokohama, Japan through Japanese exporting houses in this city was assured of preferential consideration in needs for steel by representatives of producers. Quite generally, the attitude was one of trying to help in a tangible way, though there was a realization that food and other relief measures must come first.

Flood of Emergency Steel Inquiries

At this writing the market has become flooded with inquiries, but few, if any, have emanated from the stricken country. Instead they appear to be forehanded requests for material which it is believed will be needed for emergency construction. Great quantities are not thought likely for a number of months, for it will first be necessary to get order out of chaos, and new construction will doubtless be taken up in a deliberate fashion, as was the case after the fires of San Francisco and Baltimore. That large quantities of steel will be needed goes without saying, largely through measures which will be taken to prohibit construction which does not resist earthquakes. How far structural steel or reinforced concrete will share in new developments cannot be foretold, but the large consumption of sheet steel characterizing Japanese buying for some time, in part the result of fire protection ordinances, will undoubtedly continue on an enlarged scale. In a word, it is expected that a new Tokio will rise freed from old and flimsy structures which had become an increasing menace with the concentration of population.

The scale and scope of the expected emergency buying are forecasted by the inquiries appearing today. One called for 2,000,000 ft. of pipe, others for 100,000 kegs of wire nails. Included were large lots of sheets, several lots of 10,000 boxes of tin plate, round tonnages of both plates and shapes and even several thousand tons of wire rods, the latter apparently for finishing mills in Osaka or elsewhere capable of converting the rods into needed forms of wire and wire products. Owing to the fact that the Japanese houses here had not heard from principals in the devastated zones, little was done beyond reiterating the promise to expedite rolling and shipment when the orders eventuate and, of course, at current prices. No concern was expressed over entering definite orders on the score of ability to pay and numerous were the expressions of regard for the Japanese as respecters of the sanctity of a contract, though admittedly strict in demanding the fulfillment of the letter of a selling agreement.

The American branches of the large Japanese export houses and other interests with export connections in Japan are entirely without instructions as to the present situation and future action to be taken by them. Most of the large Japanese export and import houses have main offices in Tokio with branches in other cities,



THE Area of Destruction, as Far as Is Known, Is Represented by the Shading. To the west it probably included Nagoya. Less than 50 miles away is Osaka, Japan's chief industrial city, which, not being on water navigable for ocean-going vessels, uses Kobe as a port. To the north of the devastated area, or in the eastern section, are the oil and lumber industries as well as some manufacturing plants. In the western section, including Osaka and Kobe, are copper mines, a large number of galvanizing plants, steel works, particularly the great Government works at Moji and the port of Nagasaki. Beyond lies Korea, the seat of further Japanese resources

including Osaka and Kobe, and it has been from the former city that practically all the cables have been received thus far.

While most of the Japanese exporters have taken no action toward suspending shipment of iron and steel under order, it is believed that some method of control over tonnage will be instituted to avoid dangerous congestion of freight at Kobe, which is practically the only available port on the east coast, near to the devastated area and in a large industrial section. Although Osaka is the great industrial city of Japan, its harbor is not navigable for ocean carriers and the weight of all arriving shipments would fall upon Kobe, which, it is believed, will also be the receiving port of much of the food sent into the stricken area from abroad.

Japanese representatives of export companies in Japan point out that the devastated area was not the greatest industrial section of Japan, but, at the same time, contained many small and long established manufacturers, as it was one of the old sections of Japan. There are numerous shipyards and several cotton spinning mills as well as steel works, fertilizer manufacturers, glass factories, electric wire works, india rubber manufacturers, lead pipe makers, tanners, match works, etc., in Tokio. Tokio is the headquarters of 17 Japanese mining companies, 9 railroads, the two largest steamship lines, the Nippon Yusen Kaisha and the Toyo Kisen Kaisha, and many forwarding agents. There are 140 offices of importers and exporters in Tokio alone. In Yokohama and vicinity are a number of shipbuilding, engine and iron works, wire manufacturers, and numerous warehouses. Yokohama had 91 offices of importers and exporters.

With all the destruction of industry that has taken place in this area, it is pointed out that the largest and most important industries of the country are largely in the untouched areas to the north and south. In northeastern Japan are the lumber and oil interests and south of these are some manufactories, including numerous galvanizing plants. In the southwest is the great Imperial Steel Works at Moji, the copper mines and a number of galvanizing plants and steel works. Actually in the devastated area, between Tokio and Yokohama, was the Fuji spinning mills, the largest in the country, and the large naval yards and station at Yokosuka is reported largely destroyed.

So far as exports go, this country stands to face a check for some time, and this is of some importance, seeing that Japan has lately been the chief buyer of the United States. However, it is proper to emphasize that no one in the steel trade voiced anything respecting this fact, all expressions being uniformly a demand for haste in helping Japan by money contributions and otherwise.

Urges Liberal Subscriptions to the Relief Fund

JUDGE ELBERT H. GARY, chairman United States Steel Corporation, was profoundly affected by the news of the great catastrophe in Japan. Since his visit to Japan, a few years ago, Judge Gary has been its ardent friend. He has numerous personal friends in Japan and has many times defended that country when the motives of some of its leaders have been questioned.

In his office Tuesday Judge Gary paid an earnest tribute to the Japanese people and said that he believed that Japan was worthy of special commendation on account of its attitude at the Washington Conference for the Reduction of Armament and for its faithful carrying out of international obligations. "I believe," said Judge Gary, "that now is the time for the people of the United States to express in a very substantial way their friendship for the people of Japan. Our own Steel Corporation has enjoyed for many years a fairly profitable business with Japan. Not only for that reason but also for the sake of humanity it ought to subscribe and I have no doubt will do so as soon as the attention of the finance committee is called to this matter. At the time of the San Francisco disaster we subscribed $115,000. I trust that the subscriptions among the great banks of the country, all kinds of companies and the people in general will be liberal."

On being asked as to Steel Corporation vessels in Japanese waters, Judge Gary said: "We have three ships in Japanese waters, one of which has been badly damaged and is now beached at Yokohama. We have received as yet no communication from our representative in Tokio. So far as I know, we have lost only one man."

By direction of Henry W. Taft, president of the Japanese Society, an organization of about 1500 members in New York, a committee of members has been formed under the chairmanship of Judge Gary to appeal to the members of the society for contributions toward a fund to furnish immediate relief to the Japanese sufferers. Checks are to be sent to Mortimer M. Schiff, 52 Beaver Street, New York, treasurer of the committee.

Japan's Consumption of American Steel

WHILE the first thought in connection with the appalling disaster in Japan must necessarily be of relief to the stricken people, at the same time it is in order to survey the situation with regard to the particular needs which must be met in iron and steel and in copper, zinc and the other nonferrous metals, as well as machinery.

Stocks of iron and steel products, mainly imported and located in Tokio, Yokohama, Kobe and other important centers, were reported at the end of last November to amount to 141,288 tons. In the middle of January these stocks were said to be diminishing rapidly. In particular, the tin plate and thin steel plates had been almost exhausted.

In the calendar year 1921 shipments to Japan included 127,230 gross tons of steel sheets, representing 65.8 per cent of the entire American exports of that commodity, 48,827 tons of structural steel, 42,239 tons of steel rails, 31,077 tons of tin plate, 31,037 tons of steel plates and 29,017 tons of welded pipe.

In connection with these items it was reported in the fall of 1921 that the structural steel being shipped was principally for office buildings in Tokio. These are the ones which were being put up by the George A. Fuller Co., New York, and recently have been completed. It was further given out that the thin steel sheets which were going over the Pacific in such large quantity were being galvanized in Japan for building and other uses. In connection with this galvanizing, 68 per cent of the zinc exported from the United States in the first 10 months of 1921 was consigned to Japan.

During the first few months of 1921 Japan was the largest customer of the United States for iron and steel products, having temporarily displaced Canada from a position of many years' standing. In January Japan led in steel rails, galvanized sheets, black sheets (taking 89.5 per cent of this item exported), tin plate, galvanized wire and wire nails. This large movement was attributed partly to the fact that the Japanese iron and steel industry was greatly depressed owing to its inability to produce as economically as the industries in the United States and other countries, where the operations have long been organized on an efficient basis.

In the calendar year 1922 the exports to Japan

included 133,134 tons of steel rails, 159,089 tons of black sheets, 31,944 tons of galvanized sheets, and 27,756 tons of tin plate.

Imports into Japan reported by the Japanese customs authorities for the first nine months of 1922 included the following items: Copper, 19,497 metric tons; tin, 1995 tons; lead, 30,533 tons; zinc, 32,452 tons.

Steel Frame Buildings in Japan

In an interview published in the *New York Herald*, Sept. 4, James Baird, president George A. Fuller Co., which has built about $15,000,000 worth of buildings in Tokio in the past three years, expressed himself as confident that they had passed through the earthquake with only superficial damage. They "went through a stiff earthquake at Tokio a year ago. The four large buildings which were completed recently were designed by Japanese engineers, and contained steel skeletons of extra weight and strength to resist earthquakes. They are powerfully wind braced and earthquake braced, with extra plates used to join the steel beams to the steel columns. This stiffens the entire skeleton and causes it to move as one piece. Earthquakes do their damage on buildings that yield because part of the building is thrown in one direction and part in another. The buildings in question range up to a maximum of 10 stories, with wooden and concrete piles used for foundation, down through the sand upon which the city of Tokio is built.

"It is probable that the earthquake stripped the exterior of these buildings, the surface being of colored tiles laid on superficially. If the fire has raged throughout the city the interiors may have been burned out. The largest of these buildings, the Marunouchi Building, was the largest office structure in Asia, being eight stories high and covering a plot measuring 300 by 350 ft. It was built of steel frame with reinforced concrete arches and concrete floors and it is 100 ft. high —the highest structure permitted by the Tokio building laws. The cost was about $5,000,000."

An exporter who was in Japan shortly after the earthquake of last year told THE IRON AGE representative that the structural steel buildings in Tokio suffered in that earthquake in so far as their brick or tiled veneer is concerned. The steel skeletons remained intact, but the greater part of the brick walls fell and left the framework exposed. In repairing these buildings stiffening braces were put in, apparently along the lines indicated above, so that the buildings might better resist future earthquake movements. Whether any definite step was taken to put on a covering for the exterior which would be equally immune to earth tremors is not known.

Steel Sheets

In THE IRON AGE of Jan. 26, 1922, page 274, appears a well-illustrated article devoted to the use of American steel sheets in Japan. Their use was furthered by more rigid fire laws which called for the gradual abolition of the flimsy construction materials used in most buildings throughout Japan. All new buildings in Tokio since May, 1919, have had to have non-inflammable roofs, such as tiles or steel sheets. These regulations also required the reconstruction within four years, which have now expired, of old roofs in congested districts and also those in close proximity to railroads. One of the photographs reproduced in that article shows the Marunouchi Building in course of construction. More than 5000 tons of American structural steel were put into it, besides large amounts of galvanized corrugated sheets.

Among the varied uses of galvanized sheets in Japan, that article lists roofing and siding of buildings, particularly moving picture houses, with which Japan is full, fencing, gutters, leaders and drain pipes, copings for walls, lining for wooden pipe, stove pipe, buckets and pails, sign boards, merchandise carts and wagons, sliding doors, shutters and double doors for warehouses and for showcases, paneling of various types, display boards for posters and various kitchen utensils. Locks and door trimmings, shovels, stamped ware, enameled cups, plates, basins and spoons, clothes chests, etc., are made also of black sheets, some of them being enameled or otherwise finished.

JAPAN'S TRADE AT STANDSTILL

Exporters Await Instructions on Shipments—Wire Rod Buying Heavy—Much Cancellation Not Expected

NEW YORK, Sept. 4.—Export to Japan is today at a standstill, with practically all exporters to the Far East awaiting advices from their Japanese offices. As a great majority of the export of iron and steel to Japan is handled through Japanese owned export companies and most of these houses have their main offices in Tokio, action is temporarily paralyzed until instructions have been received. The only information that has thus far arrived has been from branch offices in Osaka. In practically all cases, Japanese exporters are making no effort to suspend shipments until instructed to do so from the home office.

As most of the recent purchasing has been by the Imperial Government or large oil interests and railroads and the merchant buying has been small because of price considerations, it seems to be generally felt that there will be a minimum of cancellation of orders, as practically all the material under order will be needed more keenly than before the present catastrophe. Of the tonnage of structural material recently booked for Japan by a leading independent export interest a part was for the Nishi flour mills, near Tokio, and a fair-sized tonnage for the Hattori Building in Tokio, which it was intended should compare favorably with the great Marunouchi Building, although not on as large a scale. A few smaller projects were included in this tonnage.

Rail Business

Japanese purchasing of rails has been particularly keen. Of a recent inquiry from a privately owned railroad, which totaled 3000 tons of 16-lb., 18-lb., 20-lb., 25-lb. and 30-lb. sections, slightly less than 300 tons of 25-lb. and 30-lb. rails were placed with the Mitsubishi Shoji Kaisha, New York, and 500 tons with Asano Bussan & Co., New York.

An inquiry pending for some time, from a privately owned line in Korea, connecting with the Korean State Railways, has been awarded to the Mitsubishi Shoji Kaisha. It calls for about 24 miles of 60-lb. rails. The 1100 tons of special length 60-lb. and 100-lb. rails, recently asked for by the Imperial Government Railways has been awarded to the New York branch of a Japanese export house and placed with an American mill. Among a number of smaller inquiries for rails from private sources is a request for prices on about 15 miles of 45-lb. sections and an inquiry for between four and five miles of light rails. Whether many of these small inquiries from private sources will materialize into business, in view of the possibly unfortunate situation of these buyers, seems doubtful.

While the purchasing of wire rods for shipment to Japan continued until the earthquake, most of the business was booked with Canadian interests, and the recent increase in quotations by the Canadian sellers evidently effected a slight curtailment of the volume of this business. Exporters point out that Japanese consumption of wire rods has been replacing gradually the heavy buying of wire as more and more plants were established for drawing wire. Most of these plants have been equipped for drawing only the standard gages, and special specifications must still be imported. How much of an effect the earthquake has had in destroying this industry is, of course, not yet known.

Sales to Chinese merchants continue light, with the chief feature of this market a moderate volume of business in wire shorts. South American business continues to appear in small lots, but a large part of this purchasing is undoubtedly being placed with European sellers at lower prices than those quoted by American mills. The South Australian Harbors Board, Adelaide, South Australia, is in the market for four electric coal-unloading cranes of 7 tons capacity. Bids on this tender will be opened Oct. 30 and complete specifications for bidding are in the hands of the Bureau of Foreign and Domestic Commerce, at the New York, Chicago and Philadelphia offices of the bureau.

RAILROADS PROTEST

Object to Proposed Decrease of Rates on Iron and Steel from Chicago to Indianapolis

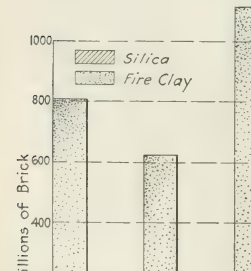
WASHINGTON, Sept. 4.—Railroads serving the iron and steel industries in the Pittsburgh, Ohio and Chicago districts, have filed a protest with the Interstate Commerce Commission against a proposed decrease in the rate on iron and steel articles from Chicago and Gary, Ind., to Indianapolis from 25c. to 15.5c. per 100 lb. The proposed reduction in the rate from Chicago and Gary to Indianapolis was filed to become effective Sept. 15. This tariff was filed by the Chicago, Indianapolis & Louisville, and the Chicago, Indianapolis & Western railroads, the lowered rate to apply over their own lines only. The protesting railroads, including the Baltimore & Ohio; Erie; Pennsylvania; New York Central; Lake Erie & Western; the Chesapeake & Ohio, and the Norfolk & Western, in seeking suspension of the proposed Chicago-Gary-Indianapolis rate, contend that the reduction would result in a general disruption of the iron and steel rate adjustment in Central Freight Association territory and that it would have a disastrous effect on the revenues of the carriers. The lines proposing the reduction acted on the theory that they could not justify the present rate of 25c. from Chicago and Gary to Indianapolis because there is a commodity rate of 15.5c. from Chicago to Terre Haute, Ind., involving a haul of but six miles less than to Indianapolis. It also was pointed out that a 15.5c. rate exists from Chicago to Decatur and Springfield, Ill., 12.5c. to Peoria, Bloomington, and Danville, Ill., and 17.5c. to St. Louis.

It was estimated by W. J. Holliday & Co., Indianapolis, in a protest against the suspension of the proposed Chicago-Gary-Indianapolis rate, that they are at a disadvantage of $3.32 per ton, in competing with other steel and iron distributing points in their territory. This company also maintained that the proposal would reduce the disadvantage to $1.32 per ton and to that extent increased its opportunity to compete with distributors at Chicago, which, it was stated, pay no railroad freight because the price of steel at Chicago is approximately the same as at Pittsburgh. This steel price relationship between Chicago and Pittsburgh has existed for about a year, the Holliday petition said, "although the idea of the steel market is that the Pittsburgh price plus or minus the freight rate, according to the point quoting steel." The petition declared that such a condition meant that the rate between Chicago and Indianapolis represented the approximate difference in cost to the distributors and manufacturers at Indianapolis in comparison with competitors at Chicago. The Pittsburgh-Indianapolis rate is 31c. The petition of the Indianapolis company said that the rate situation involved brought about a condition which makes it impossible to distribute steel to various points in Indiana, eastern Illinois, and western Ohio in competition with Chicago. Local business in Indianapolis was said to be insufficient to take the product of a modern steel plant.

While the protesting carriers stated that the 25c. rate grew out of the decision of the commission in the so-called Disque scale case, the Indianapolis Chamber of Commerce has presented comparisons intended to show that the proposed rate of 15.5c. would not be out of line with rates from Chicago to Moline, Ill., Milwaukee and other points.

Manufacture of Fire Clay and Silica Brick

In reporting upon the manufacture of all brick, terra cotta and similar products during the calendar years 1919, 1920, 1921 and 1922, the Department of Commerce segregates the fire brick, both of the clay and of the silica types. The main items of information



Production of Refractory Brick in the United States During Four Years

are covered in the table. It may be noted, however, that the 1922 figures for clay fire brick include 21,438 M. of high alumina brick valued at $802,479, on an average of $37.43 per M. The figures for the three preceding years do not differentiate between the two types.

In addition to the silica brick listed, the 1922 returns show other non-clay refractories, including 10,569 M. of magnesia or magnesite brick valued at $2,629,393; carborundum, chrome and bauxite brick, produced in the order named, to the amount of $979,845; refractories other than brick amounting to $2,690,949 and 61,454 net tons of refractory cement valued at $262,532. In 1921 the production of the magnesite brick and other items listed as above amounted to $2,533,209, no details being given. For 1919 and 1920 there were no data covering these items.

Clay and Refractory Products Made in the United States

	1922	1921	1920	1919
Total value*	$335,518	$278,492	$388,747	$286,261
Or which				
Brick and tile.....	229,436	186,589	266,953	197,488
Pottery	91,986	84,149	106,717	77,858
Non-clay refractories	14,096	7,754	15,077	10,915
Fire brick, M.....	329,191	621,009	1,114,809	963,439
Value*	$31,214	$24,833	$53,416	$38,016
Value per M.....	$37.65	$40.00	$47.91	$39.46
Silica brick, M.....	186,547	104,990	250,582	211,420
Value*	$7,533	$5,221	$15,077	$10,915
Value per M.....	$40.38	$49.72	$60.17	$51.63
Stove lining*	$1,224	$800	$780	$684
Miscellaneous clay products*†	6,345	4,587	8,981	8,840

*Thousands of dollars.
†Includes gas retorts, wall coping, flue lining, prepared clay, etc.

Mackintosh-Hemphill Co. Personnel

The new official personnel, the Mackintosh-Hemphill Co., Pittsburgh, as a result of recent changes, most of which already have been given individually in THE IRON AGE, is as follows:

F. Ramsey Speer, president; F. E. Fawell, vice-president, in charge of sales and engineering, as heretofore; J. H. Bode, formerly chief engineer, vice-president in charge of operations; D. H. Baum, secretary and assistant treasurer; J. C. McFee, assistant secretary and assistant to the president; E. C. B. Gould, assistant sales manager; William L. Ditges, assistant chief engineer; S. R. Willock, manager miscellaneous equipment sales; C. H. Paul, comptroller; H. A. Lomax, manager roll sales; Samuel McMillan, general superintendent, Pittsburgh plants and F. K. Acker, purchasing agent.

IMPROVEMENT IN FRANCE

Coke Situation Easier Increased Exports with Lower Franc

PARIS, FRANCE, Aug. 24. Buyers of raw materials are showing caution in the placing of orders, but exporters find a large improvement in business, on account of the depreciation of French money—which is not quite so acute this week, however. On the part of raw materials producers there is a desire for moderation in the prices, thus to allow the exporting of finished products under favorable conditions.

Coke.—During the first 20 days of August, the SCOF received 78,000 tons of Ruhr coke, or a daily average of 3900 tons, showing marked progress on July. Loading operations were made more rapidly. Consequently, the hope is to do without foreign coke, except for Belgian and Dutch supplies, which are still accessible in price. The quality of the Ruhr coke has also been improved, mechanical loading being no longer used.

At the Rheine-Elbe cokeries, not only has sabotage been avoided, but work and production have not been stopped for one moment, so that for about a week the battery furnishes its average production of 300 tons daily. Some other coke plants, which had stopped work for some time, are now again in good working order through the help of French engineering personnel and will be relighted shortly.

Owing to the increase in the price of German coke, which is now as high as that of imported coke in Germany, and owing also to the rise in the cost price of French coke made of British and Dutch fuels, the SCOF price will be raised to 200 fr. per ton, dating from Sept. 1.

Pig Iron.—Owing to the limited coke supplies, output is but slowly progressing, and consequently is being sold very easily. Delivery dates have been extended and prices firm. For export, there is some business done with Great Britain for chill cast foundry pig iron, and with the United States (1681 metric tons in July), Norway, Italy and Switzerland, for hematite pig iron.

During August, a Muerthe-et-Moselle firm has sold 8000 tons of casting pig iron, No. 3 P. L. (2.75 to 3.50 sil.) for 380 fr. a ton, f.o.b., but this is an exceptional price. The last quotations made were more around 395 to 400 fr. for the same grades, and even 410 fr. for the best quality (3 to 3.5 to 4 per cent sil.). If the No. 3 P. L. remains at 400 fr. for September, this will be considered a minimum price, especially as the price for coke will be increased on Sept. 1.

In hematite pig iron, the prices tend toward 500 fr., as was recently quoted by a southwestern plant for first choice small tonnages. Calais blast furnaces have nothing on hand for the time being. In the East, iron is quoted 465 to 475 fr. and in the Center, 460 fr.

Ferroalloys.—The Comptoir Electrometallurgique has established prices for ferrosilicon as follows, dating from Aug. 17:

	Delivered Free
25 per cent	750 fr.
45 per cent	1000 fr.
75 per cent	1700 fr.
90 per cent	2100 fr.

(Showing an increase in that price of 50 fr. a ton).

These are official prices, but according to last sales 50 tons of 45 per cent ferrosilicon have been sold for 910 fr. a ton, f.o.b., Meurthe-et-Moselle; 20 tons of 90 per cent ferrosilicon, for 1900 fr. in the Paris area; 50 tons of 70 to 80 per cent ferromanganese have been sold for 1455 fr., delivered Spanish frontier and customs duties excluded.

Semi-Finished Material.—The marketing of production is well assured up to the middle of September. Prices are generally firmer. The following quotations are made:

Ingots	48 to 49 fr.
Blooms	50 to 53 fr.
Billets	53.5 to 55 fr.

Domestic market for basic steel, per 100 kg. f.o.b. East and Lorraine works.

For open-hearth grade, prices range from 2.50 to 4 fr. higher, per 100 kg.

Rolled Steel Products. In the domestic market, demand is rather satisfactory, as it is for export. Buyers are showing some reserve and are waiting for the liquidation of stocks seized in the Ruhr. These stocks were seized either as a fee for the non-execution of the French orders, or for the non-payment of taxes. The devastated regions will be given the priority on these products, and the prices scheduled for the different grades of rolled steel products are about the same as those applied on the inland market.

The prices for French products range according to the orders booked in the works, favorable if the orders are numerous and composed mostly of the same sizes. There is an upward tendency on beams; sales are made on the basis of 60 to 62 fr. per 100 kg., f.o.b. Rolled steel products are generally quoted 60 to 64 fr. in Lorraine and in the East regions, but in order that the basis price of 60 fr. be applied, orders must involve an average of 100 tons comprising a limited number of sizes. Delays for delivery are of about 6 to 8 weeks, for ordinary sizes, and 8 to 10 weeks for others.

Sheets.—Sheets are comparatively less active because there is very little business for export. Prices are about the same as the week past. Large plates, 64 to 66 fr.; heavy sheets, 65 to 68 fr.; medium sheets, 75 to 85 fr., according to region and grade; light sheets, 95 to 100 fr. per 100 kg., on trucks. Boiler sheets have been sold at 75 fr. per 100 kilos, f.o.b.

Castings.—Business is very quiet. The State Railways have adjudicated prices of steel castings: 50 kg., 41 kg., and 80 kg. for 178 fr., 181 fr. and 188 fr. per 100 kg. respectively; brake wedges in pig iron for 70 to 74.90 fr. per 100 kilos.

Proposed Reduction of Rate on Steel Products to Texas

WASHINGTON, Sept. 4.—In a tentative report prepared by Examiner John T. Money, recommendation has been made to the Interstate Commerce Commission that the rate of 73c. per 100-lb. on iron and steel plates, galvanized roofing, angles, and rivets, from points of production in Ohio, Kentucky, Indiana, Alabama, Illinois, New York and Missouri, to Dallas, Fort Worth and Harry's, Texas, be reduced.

The examiner said the commission should find the rates assailed were unreasonable to the extent they exceeded, prior to July 1, 1922, 60c. to Dallas and 61.5c. to Fort Worth and Harry's and from and including July 1, 1922, 54c. to Dallas and 55.5c. to Fort Worth and Harry's, from St. Louis and points taking the same rates, and that 54c. to Dallas and 55.5c. to Fort Worth and Harry's will be reasonable rates from St. Louis and points taking the same rates for the future. He said the commission should further find that the rates from other points of origin described were and are unreasonable to the extent they exceeded or may exceed the rates suggested from St. Louis, plus the established differentials. He said reparation should be made to the basis indicated on shipments made within two years prior to the filing of the complaint.

Complaint against the rates was made by the Atlas Metal Works, which has plants at the points of destination to which the examiner recommended that the rates be reduced.

Puddling Rate Unchanged

The puddling rate for September-October will remain unchanged at $13.88 per ton, the rate paid in July-August, as a result of the bimonthly examination of sales sheets last week at Youngstown. The average price of bar iron shipments for the 60 days ending Aug. 31 was disclosed at 2.50c. per lb., the same as two months previously.

The settlement was conducted between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. James H. Nutt acted for the employers and M. F. Tighe of Pittsburgh for the employees.

AUGUST IRON OUTPUT

Smallest Daily Rate Since February—Decline from July 7840 Tons Per Day

Thirty-three Furnaces Out or Banked and Five Blown In—Net Loss of 28

The decline in pig iron production which set in during July gathered added momentum in August, according to blast furnace statistics collected largely by telegraph. The net loss in furnaces blown out or banked during the month was 28 as compared with 25 in July. The loss in output per day in August of 7840 gross tons compares with 3892 tons in July, or nearly twice as much.

Production of coke and anthracite pig iron for the 31 days in August amounted to 3,435,313 tons or 110,816 tons per day, as compared with 3,678,334 tons in July, a 31-day month, or 118,656 tons per day. The August decrease from July was 243,021 tons or 7840 tons per day. There were 33 furnaces blown out or banked in August and 5 blown in, a net loss of 28 furnaces.

The total number of furnaces in blast on Sept. 1 was 270 as compared with 298 on Aug. 1. The capacity of the 270 furnaces operating Sept. 1 is estimated at 106,590 tons per day as compared with 114,200 tons per day for the 298 furnaces operating on Aug. 1.

The August ferromanganese output of 22,045 tons, while less than that of July, was larger than in any month in the first half of this year. Only 5586 tons of spiegeleisen was made last month.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from August, 1922, is as follows.

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
August, 1922	45,872	12,914	58,786
September	53,856	13,935	67,791
October	66,060	19,032	85,092
November	72,177	22,813	94,990
December	75,179	24,398	99,577
January, 1923	79,991	24,190	104,181
February	80,684	26,251	106,935
March	87,881	25,792	113,673
April	90,145	28,179	118,324
May	96,029	28,735	124,764
June	90,907	31,641	122,548
July	88,798	29,858	118,656
August	86,022	24,794	110,816

The figures for daily average production, beginning with January, 1917, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1917—Gross Tons

Jan.	101,843	97,799	106,525	97,264	77,945	52,063	104,181
Feb.	94,473	82,835	105,006	102,720	69,187	58,214	106,935
Mar.	104,882	103,648	99,685	108,900	54,468	65,675	113,673
Apr.	111,165	109,607	82,607	91,327	39,768	69,070	118,324
May	110,238	111,175	68,002	96,812	39,394	74,409	124,764
June	109,002	110,792	70,495	101,451	35,494	78,701	122,280
July	107,820	110,354	78,340	98,931	27,889	77,592	118,656
Aug.	104,772	109,341	88,496	101,529	30,780	58,586	110,816
Sept.	104,465	113,942	82,932	104,310	32,850	67,791	.....
Oct.	106,550	112,482	69,116	106,212	40,215	85,092	.....
Nov.	106,859	111,802	79,745	97,830	47,183	94,990	.....
Dec.	92,997	110,762	84,944	87,222	53,196	99,577	.....
Year	104,619	105,496	83,789	99,492	45,325	73,645	.....

Among the furnaces blown in during August were the following: No. 4 New Castle furnace of the Carnegie Steel Co. and No. 3 Shenango furnace in the Shenango Valley; No. 4 River furnace in northern Ohio; the Philadelphia furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama, and the Helen furnace in Tennessee.

Among the furnaces blown out or banked in August were the following: Buffalo C furnace, Harriet Y furnace and the Standish furnace in New York; F furnace of the Bethlehem Steel Co., one furnace of the New Jersey Zinc Co. and the Carbon furnace in the Lehigh Valley; B furnace of the Bethlehem Steel Co. at Coatesville and the Brooke furnace in the Schuylkill Valley; No. 4 furnace of the Bethlehem Steel Co. at Steelton in the lower Susquehanna Valley; G furnace of the Bethlehem Steel Co. and the Lebanon Valley furnace of the Lavino Furnace Co. in the Lebanon Valley; one Lucy furnace of the Carnegie Steel Co., one Midland furnace of the Pittsburgh Crucible Steel Co. and the Clinton furnace in the Pittsburgh district; the Sharpsville furnace in the Shenango Valley; E and G furnaces of the Bethlehem Steel Co. at Johnstown, Pa.; the two Ashland stacks in Kentucky; the Top Mill furnace of the Wheeling Steel & Iron Co. in the Wheeling district; No. 3 furnace of the Republic Iron & Steel Co. and the two Hubbard furnaces of the Youngstown Sheet & Tube Co. and the Anna furnace in the Mahoning Valley; one furnace of the Columbus works of the American Rolling Mill Co. and one River furnace in central and northern Ohio; the Belfont and Jisco furnaces in southern Ohio; No. 2 Joliet furnace of the Illinois Steel Co. in Illinois; the second Bay View furnace of the Illinois Steel Co. in Wisconsin; No. 2 City furnace and the second Hattie Ensley furnace of the Sloss-Sheffield Steel & Iron Co., and the Alabama City furnace of the Gulf States Steel Co. in Alabama.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for August and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	Aug. (31 days)	July (31 days)	June (30 days)	May (31 days)
New York	246,347	265,406	253,625	266,658
New Jersey	19,449	18,920	26,033	24,605
Lehigh Valley	89,529	90,231	91,078	93,493
Schuylkill Valley	105,448	116,428	117,779	123,061
Lower Susquehanna and Lebanon Valleys	56,884	74,645	64,374	64,609
Pittsburgh district	713,314	759,159	737,839	789,330
Shenango Valley	117,133	142,419	164,969	169,708
Western Pa.	193,611	205,659	201,026	223,369
Maryland, Virginia and Kentucky	81,826	91,443	89,164	107,613
Wheeling district	159,418	155,324	149,067	157,071
Mahoning Valley	338,466	366,681	378,170	383,068
Central and Northern Ohio	287,641	286,021	289,498	309,261
Southern Ohio	46,779	72,120	74,798	77,402
Illinois and Indiana	630,045	643,043	620,281	646,913
Mich., Minn., Mo., Wis. and Colo.	121,172	139,330	159,254	160,456
Alabama	230,468	236,049	239,589	249,810
Tennessee	17,783	16,056	19,901	23,267
Total	3,435,313	3,678,334	3,676,445	3,867,694

Capacities in Blast Sept. 1

The following table shows the number of furnaces in blast Sept. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Aug. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Sept. 1 — In Blast	Sept. 1 — Capacity per Day	Aug. 1 — In Blast	Aug. 1 — Capacity per Day
New York:					
Buffalo	22	18	7,120	20	7,670
Other New York	6	2	650	4	870
New Jersey	4	2	625	2	610
Pennsylvania:					
Lehigh Valley	16	6	2,060	8	2,340
Spiegeleisen	2	1	110	2	210
Schuylkill Valley	15	10	3,185	12	3,760
Lower Susquehanna	9	5	1,000	6	1,170
Ferromanganese	1	1	80	1	65
Lebanon Valley	6	1	200	2	345
Ferromanganese	2	1	80	1	120
Pittsburgh district	55	49	22,560	52	23,760
Ferro and spiegel	4	2	335	2	235
Shenango Valley	19	11	4,300	10	3,850
Western Pennsylvania	25	16	6,120	13	6,495
Ferromanganese	1	1	120	1	120
Maryland	5	4	1,285	4	1,400
Ferromanganese	1	1	100	1	110
Wheeling district	15	11	4,840	12	5,010
Ohio:					
Mahoning Valley	28	21	9,930	25	11,650
Central and Northern	26	19	8,500	20	8,925
Southern	16	5	1,400	7	1,760
Illinois and Indiana	42	37	19,800	38	20,090
Mich., Wis. and Minn.	12	9	3,390	10	3,410
Colorado and Missouri	6	1	100	1	350
The South:					
Virginia	18	6	900	6	830
Kentucky	7	0	.....	2	505
Alabama	39	24	6,920	25	7,310
Ferromanganese	1	0	.....	1	80
Tenn., Ga. and Texas	16	5	570	4	500
Total	419	270	106,590	298	114,200

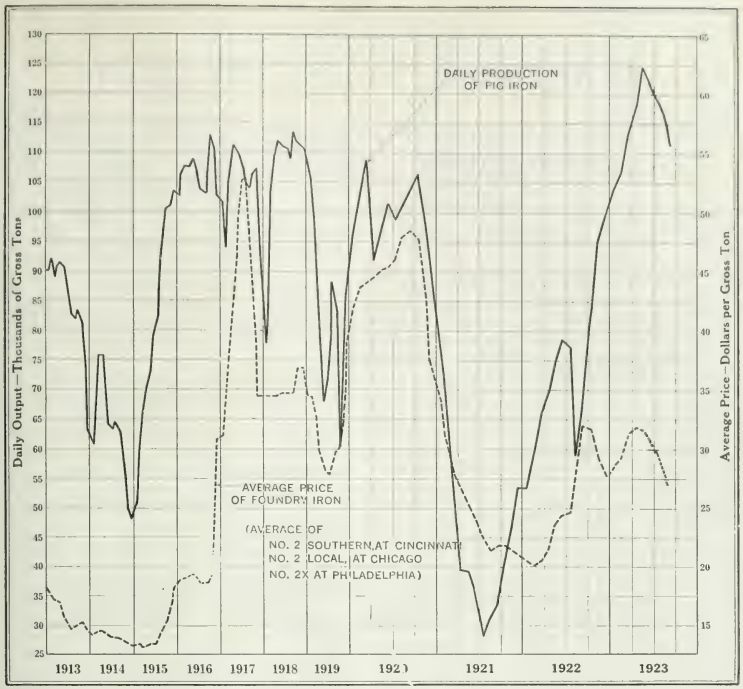


Diagram of Pig Iron Production and Price

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1919—Gross Tons

	1919	1920	1921	1922	1923
Jan.	3,302,260	3,015,181	2,416,292	1,644,951	3,229,604
Feb.	2,940,168	2,978,879	1,937,257	1,629,991	2,994,187
Mar.	3,090,243	3,375,907	1,595,522	2,035,920	3,523,868
Apr.	2,478,218	2,739,797	1,193,041	2,072,114	3,549,736
May	2,108,056	2,985,682	1,221,221	2,306,679	3,867,691
June	2,114,863	3,043,540	1,064,833	2,361,028	3,676,445
½ year.	16,033,808	18,138,986	9,428,166	12,050,683	20,841,534
July	2,428,541	3,067,043	864,555	2,405,365	3,678,324
Aug.	2,743,388	3,147,462	954,193	1,816,170	3,435,313
Sept.	2,487,965	3,129,323	985,529	2,033,720	.....
Oct.	1,863,558	3,292,597	1,246,676	2,637,844	.....
Nov.	2,392,350	2,934,908	1,415,481	2,849,702	.....
Dec.	2,633,268	2,703,855	1,469,086	3,086,898	.....
Year*	30,582,878	36,414,114	16,543,686	26,880,383	.....

*These totals do not include charcoal pig iron. The 1922 production of this iron was 224,731 tons.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production 1922	Total Production 1923	Spiegeleisen and Ferromanganese 1922 Fe-Mn	1922 Spiegel	1923 Fe-Mn	1923 Spiegel
Jan.	1,306,045	2,479,727	6,874	1,230	19,358	12,056
Feb.	1,311,170	2,259,154	3,610	4,320	21,383	3,657
Mar.	1,629,982	2,724,305	11,600	2,095	20,730	13,832
Apr.	1,707,902	2,704,360	14,998	4,211	20,808	7,440
May	1,879,180	2,976,892	15,432	4,902	19,568	9,533
June	1,876,023	2,727,208	13,273	4,817	19,717	18,289
6 mos.	9,710,312	15,871,646	70,787	22,185	121,564	64,807
July	1,931,138	2,752,738	18,873	7,176	26,493	12,876
Aug.	1,415,832	2,686,871	11,402	7,925	22,045	5,586
Sept.	1,615,696	.....	10,681	4,235	.....	.....
Oct.	2,047,873	.....	9,193	12,283	.....	.....
Nov.	2,165,295	.....	13,222	4,192	.....	.....
Dec.	2,330,545	.....	17,007	10,591	.....	.....
Year.	21,216,691	.....	151,175	68,587	.....	.....
8 mos.	.....	21,291,055	.....	.....	170,102	83,269

Reports that the Harbison-Walker Refractories Co., Pittsburgh, is to build a $600,000 works at Bessemer, Ala., are declared by officials of the company to be decidedly premature. While it is admitted that such a project is in contemplation, it is stated that not a move yet has been made in the direction of drawing plans. Repair work now in progress at the Southern properties of the company will be completed before anything is done about the new Bessemer plant. The report probably originated in some real estate purchases recently made by the company in Bessemer.

Iron and Steel Markets

STEEL FOR JAPAN

Considerable Inquiries for Relief Construction—Sheets Will Figure Largely

Pig Iron Output Again Drops Sharply—Lower Steel Prices at Chicago

Relief for Japan has been the first concern of the steel trade, and even as this is written New York offices of the leading producers have before them good-sized inquiries from Japanese exporters representing expected needs in steel for emergency work. These houses were assured that all expedition would be given to the shipment of relief material.

Items in the inquiries already received are 400 miles of pipe, 100,000 kegs of wire nails, several thousand tons of wire rods, a number of 10,000-box lots of tin plates and round tonnages of sheets, plates and structural material.

Large shipments of sheets for temporary fireproof housing are already planned. For many months Japan has been buying American sheets in quantities to comply with new fire protection laws of Tokio, these shipments from this country in the fiscal year ended June 30, 1922, being nearly a quarter of a million tons.

Recalling how deliberately new steel buildings went up in San Francisco in 1906, the steel trade believes it will be months before the real reconstruction demand from Japan will be felt. Time will be required to determine the character of permanent structures. Meanwhile continued shipments of sheets on a large scale are expected. Our London cable reports that Japanese houses there are buying sheets feverishly.

In the domestic market the further cutting down of pig iron output in August has been of chief interest. Production for the month was 3,435,313 tons, or 110,816 tons a day, as against 3,678,334 tons in July, or 118,656 tons a day, a falling off of 6.5 per cent.

August showed a net loss of 28 blast furnaces, on top of the loss of 25 in July. The capacity of the 270 furnaces in blast Sept. 1 was 106,590 tons a day, as compared with 114,200 tons a day for the 298 furnaces in operation as August opened.

It is estimated that steel production in August will show somewhat less falling off than that in pig iron.

In finished steel products reports agree that the past month's shipments were well in excess of new orders, but with buyers following the policy of keeping close to the mills, new September orders are expected to reach fair proportions.

At Chicago the leading independent steel company has announced prices for the fourth quarter at 2.50c. for bars and 2.60c. for structural shapes and plates, as against its third quarter prices of 2.60c. for bars, 2.70c. for shapes and 2.80c. for plates.

Fabricated steel made a good showing for a normally quiet period, upward of 16,000 tons being bought, including 3700 tons for the first section of the Ford steel plant near Detroit.

While some sheet mills report a better demand, others are in need of orders. Black sheets can still be had at 3.75c., Pittsburgh, and on all sheets warehouse prices show irregularity.

The American Sheet & Tin Plate Co. opens its books for fourth quarter tin plates this week at the present price of $5.50 per box. Owing to the large orders carried over, the company has for sale one month's production in the fourth quarter. In sheets it can offer two months' production.

Rail buying is still the feature at Chicago, mills there having booked 80,000 tons for 1924 in the past week. The Chesapeake & Ohio is inquiring for 30,000 tons and the Hocking Valley for 5400 tons.

In the Pittsburgh district a contract for 30,000 to 40,000 tons of billets and slabs has been closed for September and fourth quarter delivery at $42.50. Cleveland reports sales of 12,000 tons of sheet bars at the same price. However, a billet sale at Pittsburgh was at $40 and a Cleveland consumer was able to buy at $42, delivered.

Increased firmness in the pig iron market in the East is attributed to the strike of anthracite miners, which is responsible for the advancing quotations on coke, and prices of some foundry grades have been marked up 50c., but Pittsburgh has had a decline of 50c. Birmingham furnaces, which had been holding at $27, have at last gone down to $24, but $23.50 is the ruling figure in the South, where a reduction of active soil pipe capacity has caused decreased demand in pig iron. It is expected that stocks there will show an increase of 30,000 to 40,000 tons in the past month. From Buffalo 3000 tons of foundry iron has been shipped by lake to Milwaukee and two like shipments will follow. Prices of foreign ores are declining.

Railroad rates and wages in Germany went on a gold mark basis in August, causing steel prices to rise rapidly, often beyond world market levels, orders stopping in consequence.

Pittsburgh

August a Heavy Month in Production and Shipment of Steel

PITTSBURGH, Sept. 4.—High lights for the week locally include the formal opening of its book for fourth quarter tonnages by the American Sheet & Tin Plate Co. at unchanged prices; the first contract of any considerable size of billets and slabs for delivery in the last quarter of the year and this at a basis of $42.50, Pittsburgh; the appearance of fresh weakness in foundry iron on moderate sales, the discovery upon complete compilation of the record that locally last month was a pretty heavy one in both production and shipment of steel and that the first effect of the strike of the anthracite coal miners upon the fuel situation here has been much milder than had been expected.

The books of the American Sheet & Tin Plate Co.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 4, 1923	Aug. 28, 1923	Aug. 7, 1923	Sept. 5, 1922
No. 2X, Philadelphia†	**$28.76**	$26.26	$25.76	$36.14
No. 2, Valley furnace†	*25.50*	25.00	24.00	35.00
No. 2, Southern, Cin'ti†	27.55	27.55	28.05	29.05
No. 2, Birmingham, Ala†	*23.50*	24.00	24.00	35.00
No. 2 foundry, Chicago*	27.00	27.00	27.00	32.00
Basic, del'd, eastern Pa	25.00	25.00	25.00	32.00
Basic, Valley furnace	25.00	25.00	24.50	30.00
Valley Bessemer, del. Pgh.	28.26	28.26	28.26	34.77
Malleable, Chicago*	27.00	27.00	27.00	32.00
Malleable, Valley	24.50	24.50	24.50	33.00
Gray forge, Pittsburgh	25.76	25.76	25.76	34.76
L. S. charcoal, Chicago	32.15	32.15	32.15	36.15
Ferromanganese, furnace	*112.50*	117.50	117.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	38.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	38.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	40.00
Forging billets, base, P'gh.	47.50	47.50	47.50	43.00
O.-h. billets, Phila.	47.67	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	*2.15*	2.25	2.25	2.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.42
Iron bars, Chicago	2.40	2.40	2.50	2.25
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	*2.50*	2.60	2.60	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	*2.60*	2.80	2.80	2.30
Tank plates, New York	2.84	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	*2.60*	2.70	2.70	2.20
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Sept. 4, 1923	Aug. 28, 1923	Aug. 7, 1923	Sept. 5, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.60
Plain wire, Pittsburgh	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh.	2.80	2.80	3.80	3.15
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$20.00**	$19.50	$19.50	$22.50
Carwheels, Philadelphia	21.00	21.00	20.00	20.00
Heavy steel scrap, P'gh	18.00	18.00	17.00	18.50
Heavy steel scrap, Phila.	**17.00**	16.50	15.50	15.50
Heavy steel scrap, Ch'go	**16.50**	16.00	16.00	17.50
No. 1 cast, Pittsburgh	**22.00**	21.50	20.00	19.00
No. 1 cast, Philadelphia	21.50	21.50	20.00	19.00
No. 1 cast, Ch'go (net ton)	**19.50**	18.50	18.50	21.50
No. 1 RR. wrot. Phila.	18.00	18.00	18.00	18.50
No. 1 RR.wrot.Ch'go (net)	**16.00**	15.00	14.00	17.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$5.00**	$4.75	$4.50	$10.00
Foundry coke, prompt	**6.00**	5.50	5.25	12.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*14.00*	14.25	14.75	14.12½
Electrolytic copper, refinery	*13.50*	13.75	14.12½	13.75
Zinc, St. Louis	**6.50**	6.42½	6.15	6.25
Zinc, New York	**6.85**	6.77½	6.50	6.60
Lead, St. Louis	**6.70**	6.65	6.62½	5.55
Lead, New York	**7.00**	6.75	6.75	5.90
Tin (Straits), New York	**41.50**	40.75	38.37½	32.50
Antimony (Asiatic), N. Y.	7.50	7.50	7.60	5.37½

Composite Price Sept. 4, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Aug. 28, 1923,	2.775c.
Aug. 7, 1923,	2.775c.
Sept. 5, 1922,	2.412c.
10-year pre-war average,	1.689c.

Composite Price Sept. 4, 1923, Pig Iron, $25.38 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 28, 1923,	$25.38
Aug. 7, 1923,	25.04
Sept. 5, 1922,	30.52
10-year pre-war average,	15.72

are to be opened Sept. 6 for such tonnage as this company can take for shipment in the final quarter of the year. The company does not expect now to have more than one month's production of tin plate available and the opening of its books again is merely a formality for an allocation of its output.

All companies shipped steel freely last month, and with the Jones & Laughlin Steel Corporation a new high record in this respect was established with a total outward movement of more than 180,000 tons, equal to about 90 per cent of its theoretic capacity. Since in very few lines new orders have been even approximately as great as completed ones, the effect of the heavy deliveries of the month must have been to not only provide consumers with generous supplies, but also to have materially cut down mill order books.

Business of the week in pig iron has disclosed afresh that the market still is largely in buyers' control. Business pending a week ago and since closed, has in most instances been at below full quotations, as named by Valley furnace interests. There is too much iron available for buyers to be at all nervous about supplies for the remainder of the year. One merchant furnace has been banked since a week ago and three others will go down in the next week or ten days, so unfavorable does the situation appear from either the supply, demand or profits viewpoint. The suspension of these furnaces naturally throws back upon the market the coke contracted for this month's shipment, but its effect upon prices has been slight, because there was an outlet for part of the released supply and there was sufficient warning for the producers to adjust operating schedules. The strike of the hard coal miners has not yet had much effect upon the fuel market here, other than to stimulate some buying of foundry coke for reserves. The strike may yet be settled before there is any considerable loss of production or before present stocks are down to the danger point. Buyers are not beginning to be panicky over the situation and there is a commendable disposition on the part of coke and coal producers to keep the market out of the hands of the speculators.

Much has been said lately about the improved sentiment in steel trade circles, but evidently the improvement is sentimental and nothing more. Certainly, few companies can boast of as large order books as they had a month ago, and so long as shipping conditions are as free as they are now, there is every reason to suppose that buyers will continue to buy close to their immediate requirements. Suggestions of higher prices as

a result of the change of working hours in continuous process departments are fainter, and it now is quite apparent that no change from present prices is immediately ahead. Railroads not only are functioning fully, but are reporting surplus car supplies.

Pig Iron.—A week ago it was noted in this report that Westinghouse Electric Mfg. Co. was in the market for 1200 tons of foundry iron for September shipment, the National Transit, Pump & Machinery Co. for a like tonnage for delivery this month, and the Monongahela Iron & Steel Co. for 1000 tons of Bessemer iron. All of this business has since been closed and only on a very small part of the total tonnage was the recent Valley furnace price obtained, this being on some of the Westinghouse purchase, on which $25 was paid. The sales of foundry iron taken as a whole were generally at $24.50 to $25 and we revise our prices accordingly, although one merchant producer in the week advanced his base price from $25 to $26 on foundry iron. The Bessemer iron was sold by the Wheeling Steel Corporation at the Valley price of this grade f.o.b. furnace in conjunction with a sale of coke by interests controlling the purchasing company at a lower price than the Wheeling company had been able to secure elsewhere. The Verona Steel Casting Co. has bought 500 tons of basic and a quotation of $35 Valley furnace was not interesting to it. The Brackenridge steel interest reported a week ago as seeking 5000 tons of basic iron has not yet closed and expects to be able to secure the tonnage at less than $25 Valley furnace. A Cleveland furnace interest has taken 1500 tons of malleable for the Link Belt Co., Indianapolis, at slightly under $24.50, furnace. This grade also is quotable at the same figure at Valley furnace, although some producers continue to quote up to $26. Dover furnace of the M. A. Hanna Co., Canal Dover, Ohio, will go out of blast late this week and the Claire furnace, Sharpsville, Pa., is scheduled to go down Sept. 12. the furnace of the McKeefrey Iron Co., Leetonia, Ohio, also will stop making iron soon and the stack of the Struthers Furnace Co. already has been banked. No. 3 Shenango furnace, Sharpsville, Pa., again is making iron after being banked for a month and No. 4 Newcastle furnace, Carnegie Steel Co. blew in a week ago.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.00 to 24.50
No. 2 foundry	24.50 to 25.00
No. 3 foundry	24.00 to 24.50
Malleable	24.50 to 25.50
Low phosphorus, copper free	31.00 to 32.00

Ferroalloys.—Sales of ferromanganese, aggregating 1500 tons, have been made in the past few days to consumers west of this district at $112.50, seaboard. About 1000 tons was British material and the remainder domestic. The business at least partly establishes the market at that level, but there is some doubt that even this price can be maintained, as resale British alloy still is offered at $111.50. Local consumers are well covered against their requirements for most of the remainder of the year and since the average price was not over $110, they are not disposed to enter the market at the new level. Small lots of spiegeleisen now are to be had at $45, furnace, for 20 per cent, leaving open the inference that less would be done on sizable tonnages. Prices are given on page 643.

Semi-Finished Steel.—A contract has just been closed involving between 30,000 and 40,000 tons of billets and slabs for September and last quarter delivery to a local finishing mill at $42.50, Pittsburgh. This is the first fourth quarter business that has been reported and constitutes the largest bit of business done in several weeks. Embracing tonnage for September shipment, it establishes the market locally at $42.50, but as $40, Pittsburgh, has been done on billets recently, the quotable market on billets is from $40 to $42.50. Mills in this territory are holding very firmly to the latter figure on sheet bars, but not much business is up at present and buyers are not specifying very fully on their third quarter engagements. Skelp is inactive and rods are slow in keeping with conditions in the finished products. Prices are given on page 642.

Wire Products.—Books of most makers now are open on fourth quarter business, but it cannot be said that buyers are yet very eager to place orders for that period. While there is nothing to indicate lower prices in the near future, signs of an advance likewise are lacking and the buyer therefore feels there is nothing to lose by taking his time. New business was better in August than in July, but the gain was not sufficient to prevent mills from making inroads on their backlog business and there are few products on which delivery cannot now be made promptly. Prices are given on page 642.

Steel Rails.—Local makers of light rails continue to quote 2.25c., base, 25 to 45-lb. sections, and claim sales at that price, but competition from rerolled rails is beginning to tell, as on some attractive orders, 2.15c., base, has been done. Rerolled rails still are priced at 1.90c. to 2c., base, 12 to 45-lb. sections. A better market is looked for in the near future, as the strike of the hard coal miners is expected to bring about an increased demand for soft coal, which will mean the starting up of a good many bituminous operations, which have been idle because of low prices and unprofitable operation.

We quote light rails rolled from new steel at 2.15c. to 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Hot-Rolled Flats.—The market shows more resistance to efforts to secure tonnages at less than the quoted prices than was the case recently. This is due to the fact that a comfortable amount of business recently has been booked and makers can afford to take a more independent position. The weakest spot still is in the wider sizes of strips and in rim stock, in which bookings have not gained as much as in the other sizes. It is reported that a Western maker of rim stock has been going as low as 2.90c., base, for desirable orders, as against 3c., the regular base on this material. Hot-rolled strips for cold-rolling also are priced at 3c., base, and wide strips go that low in competition with blue annealed sheets or skelp. Otherwise, 3.15c., base, is the quotation. Prices are given on page 642.

Iron and Steel Bars.—Specifications on old steel bar orders are free, but this may be partly due to the fact that the application of the new extras adopted by leading makers as of July 1 does not affect old tonnages. Oct. 1 is the date the new extras become effective with some makers. Reports of shading of the base price of 2.40c. are not well founded. Prices of iron bars also are holding, though demands are dwindling.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—The Carnegie Steel Co. will furnish the steel, slightly under 4000 tons, for the first unit of the steel plant of the Ford Motor Co., River Rouge, Detroit, recently awarded the McClintic-Marshall Co. No other big tonnages are noted in recent bookings, although much tonnage is involved in the protection sought by fabricators bidding on pending structural projects. There are no intimations that less than 2.50c. is being done on plain material. Prices are given on page 642.

Tin Plate.—Prices on such tonnage of tin plate as the American Sheet & Tin Plate Co. can take for last quarter shipment, about six weeks' production, will be $5.50 per base box, Pittsburgh. Books will be formally opened on Sept. 6. Independent companies will probably adopt this price. All makers are well behind their orders, most of them at least a month.

Cold-Finished Steel Bars and Shafting.—With the automotive industry operating more smoothly on the 1924 models, there has been some increase in the orders and specifications for these bars. Other consuming industries are still buying sparingly and jobbers are not laying in stocks as far ahead as usual owing to the excellent delivery service now provided the mills by the railroads. The price holds at 3.25c. base, Pittsburgh, and on ground shafting at 3.65c. base, f.o.b. mill, for carload lots.

Bolts, Nuts and Rivets.—It is still a good deal of a buyers' market in these products, as makers still need orders. As low as 62 per cent off list recently was quoted on large machine bolts on an attractive railroad inquiry and quoted discounts often increased as much as 5 per cent. Only small lots of rivets are selling above $3 base per 100 lb. for structural rivets and even that price is being shaded on attractive business. Prices and discounts are given on page 642.

Plates.—The market is holding well as to price, but sales are generally of small lots for early delivery, and there are many mills which can accommodate such a demand. Prices are given on page 642.

Tubular Goods.—Pressure for shipments of old orders shows no let up, but new business still lags behind shipments with most makers. The best market is in the butt welded sizes of merchant pipe. One maker reports specifications and new orders for the month of August to have exceeded shipments by 400 tons. On lap-welded pipe, shipments will exceed the new orders, but it is observed that of the shipments a large percentage are direct to consumers, indicating little or no adding to distributors' stocks. Line pipe business still is moderate though the Ashtabula Gas Co. recently distributed orders with three independent mills for 28 miles of 10¾, 31.20-lb. pipe. The story of wrought iron pipe is much the same as that in steel pipe. Boiler tubes are being specified well, but bought rather sparingly. Discounts are given on page 642.

Sheets.—The American Sheet & Tin Plate Co. will open its books for such fourth quarter sheet business as it can take, estimated at about two months' production on Thursday, Sept. 6, at the present prices of 3.85c., base, for black, 5c., base for galvanized; 3c., base for blue annealed and 5.35c., base (No. 28 gage), for automobile body stock. The announcement confirms earlier impressions. It is probable that independent companies following a policy of selling by quarterly periods will name the same prices, but it remains to be seen whether all mills will observe these prices, since there are several which need orders, particularly of black sheets. Orders generally are somewhat heavier than they were recently, but they still are running behind shipments on old purchases. The Japanese disaster has been followed by a heavy call for sheets for temporary housing facilities. Prices are given on page 642.

Track Fastenings.—Prices show no change and demands are along recent lines, being fairly good in large spikes, but still slow on small spikes. Prices are given on page 642.

Coke and Coal.—It is no longer safe for buyers to figure on buying standard furnace coke at less than $5 per net ton at ovens, for while less recently has been done, there is such even balance between supply and demand that offerings now are pretty scant and promise to be more so with more capacity likely to be devoted to the production of heating coke in the event that the strike of the hard coal miners is not speedily settled. More blast furnaces are going out than are going into blast, and this means a limited demand. Nothing yet has developed in connection with fourth quarter contracts, because the pig iron market still is unprofitable for most merchant furnaces. Foundry coke has advanced 50c. a ton under demands for reserve supplies. The minimum now is $6 per net ton at ovens, with as high as $7.50 quoted on some brands. Coal prices reflect the slowing down in industrial demand rather than the possibility of demands as a substitute for hard coal. Mine run steam coal is priced at $2.20 to $2.30 per net ton at mines for Panhandle coal and $1.85 to $2 for Fairmont grade, coking coal $2.25 to $2.35 and gas coal $2.50 flat. Screened coal demands $2.50 to $2.75 for ¾-in. and $3 to $3.50 for 1¼-in.

Old Material.—Strength locally seems to be largely a surface condition and is based more upon the activity of dealers, who having become alarmed that offerings are lighter than they were recently, are showing some anxiety to cover short sales before their profits are wiped out. There has been some opening of consuming points, which recently were closed by embargoes or congestions, but no real revival of consumer buying. Melters generally are disposed to pursue a hand-to-mouth buying policy and efforts of sellers to secure more money have not been successful. A Youngstown steel maker recently bought about 6000 tons of heavy melting and compressed sheet scrap, paying $18.50 for the former and $17 for the latter grade. Mills here and nearby still are out of the market. Steel foundries are evincing some interest in supplies and the grades they take are really firm. An advance in pig iron would help scrap values, but stocks are so heavy that an advance is hardly likely until they have been reduced, either through a larger demand or a curtailment of production. Bundled sheet sides and ends are hard to sell at above $15 and the market here is out of line with primary points on turnings and borings. On the basis of recent sales in Detroit, heavy melting steel should be fetching $19 to $19.50, Pittsburgh, borings $17 to $17.25 and turnings $15 to $16. Railroad lists are running somewhat lighter, but contain some very desirable bridge material.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$18.00 to $18.50
No. 1 cast, cupola size	22.00 to 22.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 20.00
Compressed sheet steel	16.50 to 17.00
Bundles, sheets, sides and ends	15.00 to 15.50
Railroad knuckles and couplers	22.50 to 23.00
Railroad coil and leaf springs	22.50 to 23.00
Low phosphorus bloom and billet ends	24.50 to 25.00
Low phosphorus plate and other material	23.50 to 24.00
Railroad malleable	19.00 to 19.50
Steel car axles	21.50 to 22.00
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	22.50 to 23.00
Machine shop turnings	12.50 to 13.00
Sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	19.00 to 19.50
Stove plate	15.50 to 16.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	18.00 to 18.50

No Change in Steel Prices Expected in Youngstown District for Fourth Quarter

YOUNGSTOWN, Sept. 4.—Mahoning Valley steel makers look for continuance of current steel prices in the fourth quarter. Formal price announcements are expected shortly.

President J. A. Campbell of the Youngstown Sheet & Tube Co. voices belief that prevailing levels will be continued. "The volume of business is much improved," he states. "I look for September and October to develop good buying." He points out that the steel industry learned in 1921 the futility of cutting prices to stimulate demand.

Chicago

Rail Buying Continues—Pig Iron Shipped by Water From Buffalo

CHICAGO, Sept. 4.—The foremost local independent which has been taking business for some months at 2.60c., Chicago, for soft steel bars, 2.70c. for structural shapes and 2.80c. for plates, has opened its books for fourth quarter at 2.50c. for bars and 2.60c. for plates and shapes, thereby putting its prices on a parity with those of other local producers. This change in the price situation indicates that all local mills are now able to make satisfactory deliveries and that those producers which have followed a policy of booking ahead for but limited periods are no longer able to sell at higher figures for prompter service rendered.

Rail buying continues to be the feature of the market, a total of about 80,000 tons having been placed with local mills during the week. Inquiries for 30,000 tons have been received from the Chesapeake & Ohio and 5400 tons from the Hocking Valley and it is probable that a substantial part of this tonnage will be bought here.

Other forms of finished steel are in better demand, although a broad buying movement has not yet developed. An active fall in building may be forecast by the week's lettings of reinforcing bars. Awards over 100 tons each numbered 12 and involved a total of 3235 tons. For the new sewage disposal plant of the Chicago Sanitary District 2800 tons of cast-iron pipe and 750 tons of structural steel have been bought in addition to the 6250 tons of reinforcing bars placed a week ago. Steel works and blast furnace operations in this district are unchanged.

Ferroalloys.—Several carlots of spiegeleisen have been sold at $45, Eastern furnace, or $50.80, delivered, Chicago. A number of sales of ferromanganese have been made at $115 Eastern seaboard and, acording to an unconfirmed report, as low as $112.50, Eastern seaboard, was done on a resale lot of material.

We quote 80 per cent ferromanganese, $123.38 delivered from producers; $122.56 delivered resale; 50 per cent ferrosilicon, $88 to $90, delivered; spiegeleisen, 18 to 22 per cent, $50.80, delivered.

Plates.—The Inland Steel Co. has opened its books for fourth quarter at 2.60c., Chicago, a reduction of $4 a ton from its previous price. Its present quotation is the same as that which the leading local interest has been quoting for some time. The Canadian National Railways have ordered 1000 box cars from the Western Steel Car & Foundry Co. The plates, shapes and bars, amounting to about 12,000 tons, will be furnished by the Illinois Steel Co. No new oil storage tank business is reported. Shipments from local mills continue to exceed bookings, but inquiries for plates are more numerous than during the past two months.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Pig Iron.—The steamship Griffin docked in the Menomonie River, Milwaukee, Saturday, Sept. 1, with a cargo of about 3000 tons of Susquehanna iron from Buffalo. The iron, which is of No. 1 foundry grade ranging from 2.25 to 2.75 per cent silicon content, will be marketed in the Chicago district by Rogers, Brown & Co. Two additional shipments of about the same size will probably be made. This is the third time the Great Lakes have been used for long pig iron hauls within a year. In 1922, 12,000 tons of merchant iron was shipped by boat from Buffalo to Chicago and 10,000 tons from Duluth to Buffalo. Water transportation again promises to be a factor in the shipment of pig iron from the South, Southern foundry for rail and water shipment being quoted at $28.65, delivered, Chicago. The price of Southern iron for all-rail shipments is unchanged, although three leading producers which had held to a nominal quotation of $27, base, Birmingham, are now quoting $24. Sales of Southern foundry are confined to carload lots and will probably not become much of a factor until delivered prices in this district are more nearly competitive with those from Northern furnaces. Local iron remains steady at $27, base, furnace, with orders coming in at an encouraging rate. Although caution on the part of buyers has not disappeared, more melters are placing their requirements for the remainder of the year and some interest is being shown in first quarter needs. There is no doubt that the coal strike, with its possible effects on blast furnace production costs, is causing buyers to become concerned about their supplies. An Illinois melter is inquiring for 3000 tons of foundry for fourth quarter and another user in the Western part of the State is in the market for 1000 tons for first quarter. A Wisconsin plant wants 500 tons of malleable for fourth quarter delivery. A Milwaukee melter has closed for 1000 tons of foundry and malleable for shipment over the rest of the year.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer,s yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00
Malleable, not over 2.25 sil.	27.00
Basic	27.00
High phosphorus	27.00
Southern No. 2	28.65 to 30.01
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 35.00
Silvery, sil. 8 per cent	39.29

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has been awarded 2800 tons for the north side sewage disposal plant of the Sanitary District, Chicago. Saginaw, Mich., takes bids on 120 tons of 6-in. Sept. 4.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Sheets.—Inquiries are more numerous and prices are steadier than for some weeks. It cannot be said, however, that a real buying movement is under way. Neither of the local producers has yet opened its books for fourth quarter, although they continue to take current business at unchanged prices. Some mills are not particularly anxious to take heavy forward commitments at this time in view of the uncertainty of costs. A coal strike might increase costs materially and the elimination of the 12-hr. day by producers of semi-finished material carries with it the possibility of an advance in sheet bars.

Mill quotations are 2.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Structural Material.—Demand for plain material still falls short of current shipments from the mills, but building activity in this section is keeping up surprisingly well for this season. Structural awards are fewer than a week ago, but considerable tonnage is pending. The foremost independent has opened its books for fourth quarter at 2.60c., Chicago, a reduction of $2 a ton from its prior quotation. The prices of all local mills are now on the same basis.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Inquiries for soft steel bars are more numerous, but in most cases they involve comparatively small tonnages. In some quarters this is interpreted as an indication of continued caution on the part of buyers, but in the case of manufacturing consumers it may be due to the fact that orders for their fabricated products are slow in coming in. Industrial operations, however, show little recession. Local prices on soft steel bars are now on a single level, the price of the Inland Steel Co. having been reduced $2 a ton to 2.50c., Chicago, for fourth quarter delivery. Mills east of here continue to sell soft steel bars and angles in lots of 50 to 100 tons when they can make quicker shipment than local mills. This business is moving at 2.40c., Pittsburgh.

A new national classification of extras on iron bars and bands was put into effect Sept. 1. This is the first time bar iron extras have been changed since Dec. 3,

1895. One of the most important features of the classification is that the extras are net to the customer as shown on the card instead of one-half of the published figures as formerly. The new extras on ovals, half-ovals, half-rounds, hexagons and bands are the same as those adopted for soft steel on July 1. On rounds and squares the extras are the same as those for soft steel for sizes from 3-16 in. up to 11-16 in., but differ on the larger sizes. The extras for flats also differ from those on soft steel. Quantity differentials and extras for cutting to length are identical with those on steel. For machine straightening an extra of 10c. per 100 lb. has been named.

Demand for bar iron shows no material change. Some mills continue to quote 2.50c., Chicago, but the ruling market is 2.40c. New business in rail steel bars is light, but producers continue to adhere to 2.30c., mill.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.65c. for rounds and 3.95c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—The market situation shows little change, although demand for barbed wire is good and specifications from manufacturing consumers are improving. For mill prices, see finished iron and steel, f. o. b. Pittsburgh, page 642.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Rails and Track Supplies.—Approximately 80,000 tons of rails have been purchased in the Chicago market during the week, while in the South the Louisville & Nashville has placed 30,000 tons with the Tennessee Coal, Iron & Railroad Co. The Chesapeake & Ohio is inquiring for 30,000 tons and the Hocking Valley for 5400 tons.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts 4.90c. base.

Reinforcing Bars.—Following a quiet August, the demand for concrete bars is showing a marked revival with the approach of the fall. Lettings have been numerous during the past week and several attractive new projects have made their appearance on the market. Awards include:

Golden Rule Building, St. Paul, Minn., 600 tons to Concrete Steel Co.

Illinois Central R. R., track elevation work, 400 tons to Truscon Steel Co.

Evanston, Ill., filtration plant, 205 tons to Concrete Steel Co.

First National Bank Building, Davenport, Iowa, 200 tons to Truscon Steel Co.

Illinois State highway work, 200 tons to Truscon Steel Co.

Tuttle Building, South Bend, Ind., 200 tons (rail steel) to Pollak Steel Co.

Recitation Building, University of Iowa, Iowa City, 180 tons to Concrete Steel Co.

South Park Boulevard viaduct, Chicago, 150 tons to Barton Spiderweb System Co.

North High School Building, Minneapolis, Minn., 100 tons to C. A. P. Turner Co.

Indianapolis Times Building, Indianapolis, Ind., 100 tons to Corrugated Bar Co.

North Side Sewage Treatment Works, Sanitary District, Chicago, 6250 tons to Inland Steel Co.

Illinois State highway work, 135 tons to Concrete Steel Co.

Pending business includes:

John Marshall High School Building, Minneapolis, Minn., 600 tons.

Filtration plant, Evansville, Ind., 240 tons, bids on general contract to be taken, Sept. 6.

Alvernia High School Building, Chicago, 315 tons, general contract awarded to Barry Byrne & Ryan, Chicago.

Bolts and Nuts.—Manufacturers announced revised list prices on machine and carriage bolts, effective Sept. 1. These are the first list changes since Aug. 1, 1912. Examination of the new prices reveals that machine bolts ¾ to 1¼ in. are unchanged; 9-16 and ⅝ in. have been advanced an average of about five per cent for all lengths; ¼ to ½ in. bolts inclusive show varying advances up to a maximum of 14 per cent for lengths to 6 in., but for 6½ in. and longer have been marked up from 20 to 45 per cent. One feature of the new list as contrasted with the old one is that all prices are in multiples of five, there being no odd figures. Prices of 3-16 and ¼ in. carriage bolts in lengths 1½ to 6 in. inclusive are unchanged; for lengths 6½ to 20 in. inclusive there has been a flat advance of 75c. per 100. A flat advance of $1.30 per 100 has been made on all lengths of ¾-in. carriage bolts. For the shortest lengths the prices of 5-16 and ⅜ in. bolts are unchanged and up to 6 in. in length the advances are gradual, reaching a maximum of 10 per cent. Advances in 7/16 in. bolts range from 14 to 19 per cent for lengths up to 6 in. For lengths greater than 6 in. advances on 5/16, ⅜ and 7/16 in. bolts range from 30 to 40 per cent. Advances on 9/16 and ⅝ in. bolts average less than 5 per cent for all lengths. Advances on ½ in. bolts are negligible up to and including 6 in. lengths. For longer sizes the advances range from 10 to 15 per cent. The advances have had the effect of bringing out heavier specifications from buyers.

Coke.—The anthracite strike has stimulated demand for coke. A Michigan melter has closed for 2,500 tons of West Virginia foundry coke at $10.50, f.o.b. ovens. Connelisville foundry is selling more freely and has stiffened, now bringing from $6 to $6.50, ovens. Local by-product foundry coke remains unchanged at $13.50, delivered, Chicago switching district.

Old Material.—Speculative buying by dealers has caused a general advance in prices. Although the last heavy melting bought by a steel works did not bring more than $16.50 per gross ton, brokers have paid from 50c. to $1 a ton more. For the time being the dealers have the market to themselves, as users have thus far refused to pay the prices that are being asked. Railroad offerings include the Pennsylvania, Southwestern Region, 5500 tons; the Pennsylvania, Northwestern Region, 2500 tons; and the Michigan Central, the New York Central and the Erie, blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$21.50	to $22.00
Cast iron car wheels	20.00	to 20.50
Relaying rails, 56 and 60 lb.	28.50	to 29.50
Relaying rails, 65 lb. and heavier	32.00	to 35.00
Rolled or forged steel car wheels	22.00	to 22.50
Rails for rolling	17.50	to 18.00
Steel rails, less than 3 ft.	20.50	to 21.00
Heavy melting steel	16.50	to 17.00
Frogs, switches and guards cut apart	17.00	to 17.50
Shoveling steel	16.25	to 16.75
Drop forge flashings	11.50	to 12.00
Hydraulic compressed sheets	13.00	to 13.50
Axle turnings	13.50	to 14.00
Steel angle bars	18.50	to 19.00
	Per Net Ton	
Iron angle and splice bars	22.50	to 23.00
Iron arch bars and transoms	22.50	to 23.00
Iron car axles	25.50	to 26.00
Steel car axles	18.00	to 18.50
No. 1 busheling	13.50	to 14.00
No. 2 busheling	10.00	to 10.50
Cut forge	15.00	to 15.50
Pipes and flues	10.00	to 10.50
No. 1 railroad wrought	16.00	to 16.50
No. 2 railroad wrought	15.00	to 15.50
Steel knuckles and couplers	19.50	to 20.00
Coil springs	20.50	to 21.00
No. 1 machinery cast	19.50	to 20.00
No. 1 railroad cast	18.50	to 19.00
No. 1 agricultural cast	18.50	to 19.00
Low phos. punchings	17.50	to 18.00
Locomotive tires, smooth	16.00	to 16.50
Machine shop turnings	9.00	to 9.50
Cast borings	11.00	to 11.50
Short shoveling turnings	11.00	to 11.50
Stove plate	16.00	to 16.50
Grate bars	14.00	to 14.50
Brake shoes	14.50	to 15.00
Railroad malleable	19.50	to 20.00
Agricultural malleable	17.50	to 18.00

Twenty-one teachers of engineering from as many widely separated colleges and universities spent the month of July at the East Pittsburgh works, Westinghouse Electric & Mfg. Co., renewing their contact with industry in the interest of better teaching.

New York

Pig Iron Prices Firmer, With Moderate Buying—Coke Market Stronger

NEW YORK, Sept. 4.—The largest inquiry pending in the New York pig iron market is from the American Tube & Stamping Co., Bridgeport, Conn., for from 4000 to 5000 tons of basic for last quarter delivery, which it is expected will be placed in a day or two. Sales of the past week have been moderate and owing to the holiday interruption have not got fairly started this week. The largest sale reported was for 1500 tons of foundry iron. Other sales amounted to probably not over 5000 tons, made up largely of tonnages ranging from 100 to 500, mostly for delivery in the fourth quarter, although some of the tonnage is for September and 200 or 300 tons for the first quarter of next year. Pending inquiries for foundry iron foot up about 3000 tons. Prices are firmer, with $25 the minimum at Buffalo and $25.50 the prevailing quotation on No. 2X and No. 2 plain, eastern Pennsylvania.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$28.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.77
East. Pa. No. 2, sil. 1.75 to 2.25	27.77
Buffalo, sil. 1.75 to 2.25	29.41
No. 2X Virginia, sil. 2.25 to 2.75	31.94
No. 2 Virginia, sil. 1.75 to 2.25	31.44

Ferroalloys.—The ferromanganese market is exceedingly quiet and quotations have been reduced to $112.50, seaboard. Demand is confined to carload and small lots. The same situation prevails in the spiegeleisen market, where prices continue as last reported. There is no demand of any consequence for 50 per cent ferrosilicon and prices are unchanged. The ferrochromium market is entirely featureless.

Cast Iron Pipe.—Firmness continues and makers of pressure pipe are booked for several months. Continued demand strengthens the belief that jobbers' stocks are low. November and December delivery is offered by one maker for medium and small sizes, but it is booked through the year on large sizes. Bids will be opened Sept. 7 on 4000 tons of 6-in. to 20-in. pipe by the Department of Water Supply, Gas and Electricity, City of New York. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. Demand for soil pipe has quickened in the face of the recent price increase. Even though dullness will soon be in order, makers look for a good volume of business during the coming weeks. Most business is for immediate or 30-day delivery, and this is generally taken to signify that stocks are low. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, for prompt shipment, as follows: 6-in. standard, 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Warehouse Business.—Prices seem to be slightly firmer, although there is some evidence of shading on certain products. The demand for bars and structural material continues active and plates of about ¾ in. are an active item, but this latter activity is largely attributed to the low stocks of plates in warehouses. Sheets are reported firmer and shading is said to have almost disappeared from this market. Today a fair price in the black and galvanized sheet market is 4.75c. per lb. base on black and 5.75c. per lb. base on galvanized. The market on wrought iron and steel pipe is quiet, but discounts are reported as holding firm. No change is reported in prices of brass and copper products. We quote prices on page 664.

Finished Iron and Steel.—A week normally dull was not helped in the domestic market by the shock of the Japanese calamity and even in structural lines little was placed and little new business appeared. Practically nothing was done in the railroad equipment field. As yet no progress can be reported on fourth quarter contracting. The fact that Japan in the course of some months will need steel is a firming influence and particularly in black sheets, the one item in which there has been occasional weakness. It is not expected, however, that Japan can be a buyer for a number of months.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The strike of anthracite coal miners has increased the demand for coke for domestic uses and the market in general is firmer, with prices a shade higher. Standard foundry coke is quotable at $6.25 to $7 for prompt delivery and furnace coke at $5 to $5.50. By-product coke from New Jersey ovens is still quoted at $11.41, Newark and Jersey City, which is on the basis of $7.50 for Connellsville coke.

Old Material.—Prices are generally firm, although there seems to be considerably less anticipation of an immediate rise in prices by the smaller dealers. No. 1 heavy melting steel shipped into eastern Pennsylvania is bringing $16 per ton delivered. Specification pipe is still firm at $16 per ton delivered to Lebanon and stove plate has shown a slight advance, New Jersey foundries now offering $18 per ton. Stove plate is still going forward to Harrisburg, but at $17.50 per ton delivered, which with a $3.78 per ton freight rate brings the buying price New York considerably lower than on the stove plate purchased for the New Jersey foundries. Borings and turnings are still fairly active and machine shop turnings are also going forward to eastern Pennsylvania consumers.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.00 to $12.50
Steel rails, short lengths, or equivalent	13.00 to 13.50
Rails for rolling	15.00 to 17.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	10.00 to 10.50
Machine-shop turnings	9.75 to 10.25
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.75 to 12.25
Stove plate	14.00 to 15.00
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Detroit Scrap Market

DETROIT, Sept. 4.—The melters in this district are still buying from hand-to-mouth on their metal requirements and the actual melt does not show much deviation from the second quarter of the year. The automotive industry shows an increase over July, with schedules pretty well set for September and October. One of the largest producers is offering approximately 2500 tons of turnings, borings, flashings and regular hydraulic compressed on a competitive basis for September delivery. Turnings and compressed are active.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.00 to $15.00
Shoveling steel	14.00 to 15.00
No. 1 machinery cast	17.00 to 19.00
Cast borings	10.00 to 11.00
Automobile cast scrap	21.00 to 23.00
Stove plate	14.00 to 16.00
Hydraulic compressed	13.00 to 14.00
Turnings	10.00 to 11.00
Flashings	10.00 to 11.00

Cincinnati

Pig Iron Dull and Weak, With Low Prices on Southern Grades

CINCINNATI, Sept. 4.—There is practically no change in the pig iron market either as regards activity or price. Buyers continue to place orders for immediate needs and most of the sales reported range from carloads to lots of 100 tons. Inquiry, too, is light, one and two carloads being the general run. There is, however, one inquiry of note, a nearby melter being in the market for 2500 tons of foundry for first half of next year. This iron will probably be bought this week, as it is said the melter has intimated that he would place an order at today's price and it is understood a number of furnaces are seriously considering the proposition. Twenty-five dollars, Ironton, can still be done, while in the South $23.50. Birmingham represents the market, although the Birmingham district furnaces which had been holding for $27 have reduced their prices for September shipment to $24. One of these furnaces is reported to have sold 500 tons in Louisville at $24, but the majority of the sales are of Tennessee iron at $23.50 with some resale material said to be available at $23. There is no activity in basic or silvery irons.

Based on freight rates of $4.95 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.05
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	27.27
Basic Northern	27.27
Malleable	27.27

Sheets.—Orders are more numerous, though for small tonnages. More inquiry is current for fourth quarter, and when prices are named by the leading interest, it is expected that there will be a rush to get under contract. Prices generally are holding to the regular schedule, with the exception of black sheets, quotations of 3.75c. still being made by some of the smaller mills. Reports of price shading in galvanized sheets cannot be confirmed.

Structural Material.—The only new inquiry of consequence is for the Rowland Building, Columbus, Ohio, 200 tons, bids on which closed Sept. 5. An inquiry for 100 tons for a hotel at Portsmouth, Ohio, is also current. The U. S. Engineers' Office, Louisville, Ky., will take bids Sept. 29 on six steel derrick boats, estimated to require about 900 tons. The L. & N. Railroad is expected to come into the market shortly for a small quantity of bridge work. The principal award last week was the Kresge Building, Cincinnati, 350 tons, to L. Schreiber & Sons. Fabricating shops in this district are generally in good shape for work during the next 60 days, and have fair stocks of materials on hand.

Warehouse Business.—Local jobbers report orders more numerous during the past week, with prices holding firmly.

Finished Material.—The latter part of the week brought an influx of orders, some of them of considerable tonnages, and the outlook for business in this territory is now more promising than it has been for some weeks. Some business developed in cold-finished bars and shafting, and while reports are heard that lower prices than those regularly quoted have been made, these are hardly borne out by the facts, as some buyers who supposedly have been quoted lower than 3.25c. have placed orders at this price. On plates and shapes, the price continues to be firm at 2.50c. Pittsburgh, with bars at 2.40c. A slightly improved demand for wire products is reported, but orders are not heavy. Some orders also were placed for spikes, but these were generally confined to carload lots.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—Demand for domestic fuel keeps up very well, but activity is lacking in furnace and foundry grades. We note, however, one sale of 50 cars of foundry coke for the remainder of the year. Prices are unchanged at last week's levels.

Old Material.—There is little demand from local consumers for scrap and any activity noted is directly traced to trading between dealers. Local dealers report more activity in the South and some good sales were reported in that section last week. Prices are unchanged from last week.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.50 to $14.00
Iron rails	16.00 to 16.50
Relaying rails, 50 lb. and up	29.00 to 29.50
Rails for rolling	17.00 to 17.50
Heavy melting steel	15.50 to 16.00
Steel rails for melting	15.50 to 16.00
Car wheels	15.50 to 16.00
Per Net Ton	
No. 1 railroad wrought	13.50 to 14.00
Cast borings	10.00 to 10.50
Steel turnings	9.50 to 10.00
Railroad cast	17.00 to 17.50
No. 1 machinery cast	19.50 to 20.00
Burnt scrap	12.50 to 13.00
Iron axles	22.50 to 23.00
Locomotive tires (smooth inside)	14.50 to 15.00
Pipes and flues	9.50 to 10.00

Boston

Pig Iron Sales Increase but Are Still Far from Active

BOSTON, Sept. 4.—Pig iron sales are somewhat larger, but the market is still far from active. Individual sales reported the past week in no instance exceeded 450 tons, and in a majority of cases involved car lots, with the aggregate probably in the neighborhood of 6000 tons. Western Pennsylvania furnaces are the most active with sales at $25 base and a shade lower. Buffalo iron is second in activity with $25 base being generally maintained although differentials are still occasionally disregarded. Eastern Pennsylvania iron is comparatively quiet, with most furnaces quoting $25 base with full differentials. One furnace usually active in this territory has advanced from $25 to $25.50 base and $26 for silicon 2.25 to 2.75, and $26.50 for silicon 2.75 to 3.25. Not enough business was transacted in Virginia and Alabama irons the past week to establish a market. It is intimated prices on at least one of these irons will be shortly reduced.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$29.15 to $30.15
East. Penn., sil. 1.75 to 2.25	28.65 to 29.65
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.01 to 30.41
Virginia, sil. 2.25 to 2.75	32.42 to 32.92
Virginia, sil. 1.75 to 2.25	31.92 to 32.42
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Coke.—The Providence Gas Co., Providence, R. I., has announced that until further notice it will sell by-product foundry coke at $13.50 a ton delivered in New England against September contract shipments. This price is the same as quoted by the company last month. The New England Coal & Coke Co., Boston, has made no official announcement regarding its September price, but it is intimated there will be no immediate change. The attitude of both producers indicates precaution made necessary by possible developments in the hard coal labor situation. They are fairly buried under orders for domestic coke. Deliveries of by-product foundry coke fell further behind the past week. Little Connellsville foundry coke is offered in this territory, but the market appears on a firmer foundation.

Old Material.—Old material dealers have been more interested in stocking up yards in preparation for an anticipated active market than they have in trying to dispose of holdings. Prices being quoted by the trade are the same as a week ago. The movement of material out of New England into Pennsylvania shows a material reduction due, presumably, to back orders having been filled. Reports of cancellations by steel

mills, therefore, are at a minimum. A New England maker of brake shoes is sounding out the market on a considerable tonnage of stove plate and is expected to buy shortly. The market for heavy melting steel shows more life than that for any other material. Borings and turnings are not coming out as freely as anticipated inasmuch as holders are waiting for higher prices.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	16.00 to 17.00
Railroad malleable	21.00 to 21.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 rail wrought	13.50 to 14.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe 4-in. in diam. over 2 ft. long	11.00 to 11.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and build skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

St. Louis

Local Furnace Company Advances Prices of Pig Iron and Makes Sales

ST. LOUIS, Sept. 4.—The St. Louis Coke & Iron Co., which advanced its price for pig iron to $28 to $29, Granite City, sold 1000 tons of foundry iron to a melter in the district and 300 tons in scattering lots. Another concern sold 500 tons of malleable to a local melter. Outside of these sales, business was quiet. Melters are still buying only small quantities as they need the iron, there still being a mixed sentiment as to what prices will do. Northern iron is still quoted at $27, Chicago. Three Southern makers are quoting $27, Birmingham, although very little is being sold on that basis. The companies that have been quoting $24, and less, are said to have sold up for some time at that price, and have withdrawn from the market. July sales of stove manufacturers reporting to the Federal Reserve Bank of St. Louis were 44.5 per cent larger than in July, 1922, and 19.7 per cent in excess of June, 1923. A local steel concern wants 50 to 100 tons of spiegeleisen.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	$28.67 to 29.17

Finished Iron and Steel.—The Wabash Railway placed an order for 10,000 tons of 90-lb. rails with Inland Steel Co. and the Illinois Steel Co. The San Antonio & Aransas Pass Railway bought 85 car wheels and two tons of nails. Inquiries from the railroads generally have been light. Jobbers continue to buy sparingly. Fair sized orders for bolts and nuts were placed by Texas jobbers in this market.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—The St. Louis Coke & Iron Co. announces an advance in foundry coke to $12, Granite City. Connellsville coke is reported in better demand, and prices higher as a result of this and curtailed production. Sales were made at from $6.50 to $7.50. Domestic coke is in better demand.

Old Material.—Dealers continue to take all railroad lists offered, most of their purchases being for stock. Consumers have not yet begun to buy anything except a few specialties, although they are taking a little more interest in what is going on. Competition is keen among dealers, and the railroads are getting good prices for their old material. Rails for rolling, frog switches and guards cut apart, cast iron borings, cast and railroad malleable are higher. The rest of the list is unchanged. New lists include: Dodge Brothers, Detroit, 2400 tons; Pennsylvania lines, Central region, 9000 tons; Northwestern region, 3000 tons; Southwestern region, 4000 tons; Wabash, 500 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Rails for rolling	18.00 to 18.50
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	17.50 to 18.00
Per Net Ton	
Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	15.25 to 15.75
Iron car axles	25.00 to 26.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.50 to 20.00
Cast iron borings	12.00 to 12.50
No. 1 busheling	16.75 to 17.25
No. 1 railroad cast	19.00 to 19.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	17.50 to 18.00
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	8.00 to 8.50

Birmingham

Nominal Price of $27 on Pig Iron Finally Abandoned—Stocks Increase

BIRMINGHAM, Sept. 4.—Early last week, one of the largest foundry iron producers of the Birmingham district reached the decision to openly quote a base price of $24 per ton, f.o.b. furnaces. By the middle of the week all other foundry iron manufacturers had reached the same decision, with the exception of one which claims not to be openly quoting the price, but will take care of old customers when and if they come in the market for their requirements. The lowering of $27 price to $24 has had some little effect thus far in closing up comparatively small size tonnages—ranging from 500 to 1000 tons. It remains to be seen what the general effect is to be. The large pipe consumers have not yet shown a disposition to "scramble in" on the $24 price. During the week the Sloss-Sheffield Steel & Iron Co. blew out two furnaces—one at Birmingham and one at Sheffield. While figures are not yet available for iron stacked on yards at the end of August, in all probability the total will be between 115,000 and 125,000 tons, as against about 85,000 tons July 31. One of the principal curtailments in Southern iron consumption has resulted from closing down of approximately 50 per cent of the soil pipe foundries. The pressure pipe foundries, stove foundries and radiator plant continue to operate on practically full time, but machinery plants and general castings plants are far below average operations.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.50 to $24.00
Basic	24.00
Charcoal, warm blast	33.00 to 34.00

Cast Iron Pipe.—So far as building of all kinds is concerned there has been no great falling off in the Southern and Southwestern territory, but contractors seem to be "side stepping" sanitary pipe and fittings in some form; or else the pipe plants are taking care of the business from stocks on hand at idle plants. There has been no reduction in price, though the buying public is expecting a reduction with the announcement of pig iron price reduction. The high pressure pipe plants claim to have orders on their books sufficient to keep them running through the remainder of the year at practically same rate of present operations.

Coal and Coke.—Anticipating the anthracite coal strike, coal buyers in the South and Southwest came into the market more freely for seasonal requirements than at any time since April last. Prices have not been advanced, but the volume of business transacted has increased 25 per cent to 30 per cent. There has been no change in coke prices, foundry coke being quoted nominally at $8 to $8.50 per ton at the ovens. Coke business is more or less stagnant.

Scrap.—There has been no material change in the old material market. The demand for both No. 1 and No. 2 machinery scrap constitutes 45 to 50 per cent of the total business booked. The largest buyer of steel scrap in the South is out of the market at the present time.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$16.00 to $18.00
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

Philadelphia

Foundry Pig Iron Advances 50 Cents—Coke Market Is Firmer

PHILADELPHIA, Sept. 4.—The strike in the anthracite coal fields has brought about firmer prices in blast furnace and foundry coke, which have now become fixed at $5 to $5.50, Connellsville ovens, for the former, with 72-hr. coke quoted at $6 to $6.50, while foundry grades of pig iron have moved up 50c. per ton. The indications seem to be for further increases in prices of coke in the immediate future, though it is not certain that pig iron prices will maintain an upward trend of so sharp a tone as is reflected in the coke market. There is an absence of a rush to either the coke or pig iron market, but unquestionably there is a greater desire to cover on fuel requirements and coke producers in the Connellsville region, evidently anticipating marked increases, are not selling beyond the third quarter. The strike also has increased, but to a lesser extent, interest in the pig iron market and consumers are accordingly putting out more inquiries and are closing for new tonnages of foundry.

Neither inquiries nor sales of pig iron have been large, but the latter have been sufficient to justify a 50c. increase in foundry grades. Fair inquiries for and one sale of 1000 tons of copper bearing low phosphorus iron have developed. Sale of foreign iron is limited and the market on Continental foundry, 2.50 to 3.25 silicon, is down to 50c. to $26. f.o.b. Philadelphia, while foreign low phosphorus is down $2.50 to $29. Domestic steel making iron is quiet, but firmer in tone, yet the absence of actual sales leaves the quotation unchanged, though an upward turn is predicted by furnace interests. It is likely also that the foundry grades of domestic iron still could be purchased at the prices quoted last week where attractive tonnages are involved, but on small and moderate sized requirements the higher prices are prevailing. The higher coke prices, it is claimed, make the increased pig iron prices mean nothing except to cover cost of production. It is a question here as to what the market will do when the anthracite strike comes to an end and bituminous coal and coke are in less demand as substitutes for anthracite. The feeling is that the strike will be of only limited duration, some forecasting that it will not last longer than 30 days, when the miners, thinking they have the better of the situation through the Pinchot plan of settlement, will return to work.

The steel market generally is quiet and production in most lines is said to exceed new business. The result has been the lightening of order books somewhat by shipping on backlog tonnages. The spread between production and consumption, however, is causing no anxiety, much of it being attributed to seasonal conditions. Railroads are ordering less, but this is due, it is stated, to the fact that they have been receiving steel tonnage faster than they can use it. For a short time they held up shipments, but have resumed now that they have taken up the slack of excess shipments. The Pennsylvania Railroad for a short time faced the situation at its Altoona shops in building and repairing cars. Steel makers deny as wholly unfounded the report that the railroads have begun a program of retrenchment and have ordered cancellations.

Pig Iron.—Increases of 50c. per ton in foundry grades of domestic iron have been brought about by the anthracite coal strike, resulting in greater inquiry for coke and bituminous coal as substitutes for domestic use and reflecting higher coke prices. The coke prices of $5 to $5.50, Connellsville ovens, for 48-hr. fuel, quoted one week ago, have become firmly fixed with a higher tendency and foundry coke is quoted at $1 over blast furnace fuel. Should the strike be of extended duration, it is the belief of the trade that coke will see further sharp rises, some predictions being that it will go as high as $7.50 to $8, ovens. This situation has increased inquiries for pig iron and brought about the advance on domestic foundry grades, based on actual sales. So far the sales have been small. It is claimed that consumers are not well covered for the fourth quarter, and stocks at furnaces are said to represent a considerable tonnage of off-iron and therefore are not considered to be an important market factor in this district. The market for basic iron is firmer in tone, but sales of consequence have not been reported. The market therefore is still quotable at $25, delivered, though some makers are asking from $25.25 to $25.50. The new prices on foundry iron are $26.26 to $26.63 for eastern Pennsylvania No. 2 plain, $26.76 to $27.13 for eastern Pennsylvania No. 2X and $27.26 to $27.63 for eastern Pennsylvania No. 1X delivered. Copper bearing low phosphorus iron has become established at the reduced price of $28, furnace, at which one maker sold 1000 tons during the past week. Small demand is being made for foreign iron and sales are limited at lower prices. Continental foundry 2.50 to 3.50 silicon is down 50c. at $26 and foreign low phosphorus is down $2.50 at $29, f.o.b. cars, Philadelphia. Imports of pig iron to Philadelphia the past week included 4986 tons from England and 507 tons from British India. The following changes have been made the past week:

Ferroalloys.—Considerable ferromanganese for resale is on the market here, although inquiries are coming to furnaces in somewhat better volume. They involve only small lots, generally 100 tons. Consumers are said to be comfortably covered with stocks and this has reacted against any marked activity. English producers last Friday announced a reduction in price to $112.50, Atlantic seaboard, and the price has been met by domestic furnaces. Standard spiegeleisen continues to be quoted at $45, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$26.26 to $26.63
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.76 to 27.13
East. Pa. No. 1X	27.26 to 27.63
Virginia No 2 plain, 1.75 to 2.25 sil.	30.67 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	31.17 to 31.67
Basic delivered eastern Pa.	25.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	29.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Foreign Pig Iron.

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.00
Low phos., copper free, guar. not over 0.035 per cent phos.	29.00
Continental, phos. 1.50; sil. 2 to 3	25.50

Ore.—Imports of iron ore to the Philadelphia district during the past week included heavy shipments, 25,250 tons coming from Cuba and 23,398 tons coming from Sweden.

Bolts, Nuts and Rivets.—The market for bolts, nuts and rivets is only fair. No business of good size on the new price basis on bolts and rivets has been done in this district. Producers, however, report themselves as being satisfied with conditions and prospects. The new lists became effective Sept. 1 and makers have

published the recently adopted schedule on bolts and are about to issue the new rivet list. The list affects machine, common carriage and lag bolts and rivets. The only sizes of machine bolts affected are ¾, 5/16, ⅜, 7/16, ½ and ⅝ in. The only sizes of lag bolts affected are ¼ and 5/16 in., ⅜, 7/16 and ½ in. All sizes of common carriage bolts are affected. Increases were only slight. The most important change was to establish a structural base with a 20c. differential for boiler rivets. Deliveries of bolts, nuts and rivets are being made out of stock up to three weeks.

Semi-Finished Steel.—The market for semi-finished steel in this district is quiet. Prices continue to be quoted at $42.50, Pittsburgh, for open-hearth rerolling billets, while forging billets are quoted at $47.50 to $50, Pittsburgh.

Plates.—New business for plates is only of moderate proportions. Railroads and other consumers still are closing for requirements, but not on so large a scale as they have been. Producers are reducing tonnages on their books through shipments. For a short time some of the railroads held up shipments because they were receiving tonnages in excess of consuming capacity. The Pennsylvania Railroad up to recently found itself with greater tonnages on hand at its Altoona, Pa., shops than it could immediately use, and after stopping shipments until it caught up by expanding work at other shops, has resumed taking shipments. It is declared that the railroads have only begun to cover actual requirements and that they are expected to return to the market in the not distant future for large requirements. The market continues at 2.50c., Pittsburgh.

Iron and Steel Bars.—The market for iron and steel bars is quiet. No important business has been reported on the basis of the new schedule of extras, effective Sept. 1.

Warehouse Business.—The labor holiday has left the warehouse market quiet, but a return to normal demands is expected to develop soon. Prices remain unchanged.

Old Material.—The general tone of the market for old material is slightly firmer. The improvement, however, has not inspired any important buying movements. No. 1 heavy melting steel, bundled sheets and stove plate have increased 50c. per ton on account of transactions closed at the higher prices, but machine shop turnings for steel works use have declined 50c. It is reported that there is a scarcity of bundled sheets, a fair sized tonnage of which was sold several days ago to a nearby steel maker. One good sign in the market is the fact that neither dealers nor consumers have large stocks on hand.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.00 to $17.50
Scrap rails	16.50 to 17.00
Steel rails for rolling	17.00 to 18.00
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Cast-iron car wheels	21.00 to 22.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	18.00 to 18.50
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (for equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	19.00 to 20.00
No. 1 cast	21.50 to 22.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 17.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Structural Material.—Inquiries for small sized tonnages of structural material have increased the past and some makers report that they are more brisk than they have been for a long period. Mills are catching up on backlog business and with better facilities available are making heavier shipments. The only sizable job awarded the past week involved 1500 tons for a building in Philadelphia for the Pennsylvania Sugar Refining Co. The business went to the McClintic-Marshall Co. The general market still is quoted at 2.50c., Pittsburgh, although one Eastern maker continues to quote 2.40c. for desirable tonnage.

Cleveland

Semi-Finished Material More Active—Pig Iron Buying of Small Lots

CLEVELAND, Sept. 4.—Iron ore shipments fell off slightly during August, the movement for the month being 10,296,133 gross tons as compared with 10,411,248 tons during July. The August movement has been exceeded only in one month previous to July and was the fifth month in which shipments have exceeded 10,000,000 tons. The August movement was 1,279,707 tons less than in August, 1922. The movement up to Sept. 1 was 36,892,864 tons, an increase of 10,882,925 tons, or 40 per cent over the corresponding period last year.

Pig Iron.—Furnaces continued to book a good volume of orders monthly for foundry iron, but buying is in smaller lots than during the few previous weeks and the aggregate tonnage booked has fallen off. Sales during the week included one 1000-ton lot, but for the most part were for lots less than 500 tons. Some consumers are buying for the remainder of the year and others only for early deliveries, their purchases being limited to the requirements of orders for castings already on their books. Prices are being maintained close to recent levels. Locally foundry iron is quoted at $25 for outside shipment and $25.50 at furnace for local delivery, although some Cleveland consumers seem to have been able to buy at the latter price delivered. In the Valley and southern Ohio districts $25 is the common quotation, but it is doubtful whether the $24.50 price reported last week has disappeared. While consumers of foundry and malleable iron generally are taking all the iron they have purchased, some consumers of basic iron are holding up shipments. Small lot sales of Southern iron are reported at $23.50 for Tennessee and $24 for Alabama iron. The Hanna Furnace Co. will blow out its Dover furnace about Aug. 15.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$25.50 to 26.00
Southern fdy., sil. 1.75 to 2.25	29.50
Malleable	25.50 to 26.00
Ohio silvery, 8 per cent	37.52
Standard low phos. Valley furnace	31.00 to 32.00

Sheets.—Some of the mills report an improvement in demand, but several are in need of orders. Regular prices appear to be holding firm except on black sheets, which some mills are still quoting at 3.75c.

Bolts, Nuts and Rivets.—Bolt and nut makers are getting a good volume of specifications, but mostly for small lots. Prices are firm at the quoted discounts. A market test of the revised list of rivet extras has not yet been made. The announcement of the new extras had the effect of bringing out considerable business before Sept. 1, when the change became effective.

Warehouse Business.—There is considerable irregularity in sheet prices. Quotations are being made down to 4.40c. on black, 5.40c. on galvanized and 3.60c. on blue annealed sheets.

Finished Iron and Steel.—Some of the mills report an improvement in the demand, but buying is confined almost wholly to small lots. A canvass of some of the larger consumers in the bolt and nut and automobile accessory fields in this territory by a steel interest has brought report from these manufacturers that they expect a very good volume of business during the remainder of the year. Inquiries for round tonnages for

building and other specific work are lacking. Deliveries of some products continue to improve, particularly hoops and bands and bars in some sizes on which one leading producer is now promising shipments in four to six weeks. Structural shops have been able to obtain concessions of $2 a ton to 2.40c. on bar size angles and this quotation now seems to be general. Otherwise prices are firm at regular quotations. The demand for plates in small lots for prompt shipment is fair. Car lot orders are being booked by Eastern mills at 2.50c. at mill for quick delivery. Quotations on rail steel reinforcing bars range from 2.25c. to 2.30c.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.. No. 9 galvanized wire, 3.70c., No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c., No. 16 blue annealed sheets, 3.75c. to 4.00c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Semi-Finished Steel.—The market is more active than for some time. We note the sale of 6000 tons of slabs and billets per month for the fourth quarter and one lot of 8000 tons of sheet bars and other lots aggregating about 4000 tons for the same delivery at $42.50. The market seems well established at that price, although a Cleveland consumer is understood to have purchased billets at $42 delivered.

Coke.—The foundry coke market is firm, with producers quoting standard Connellsville coke at $7 to $7.50, but only for spot shipment.

Old Material.—Prices have further advanced from 25c. to $1 a ton on most grades. The market is fairly active in heavy melting steel, borings and turnings, and compressed sheet steel, but the activity is largely on the part of dealers who in many cases are paying fully as much for scrap as mills are willing to pay. While there is some buying by the mills, the advance in prices seems to have been due largely to the release of material by consumers on old contracts. Some mills that have been holding up scrap are now taking material freely. Dealers are offering $19 for heavy melting steel for Youngstown district delivery and as high as $19.50 has been paid, although one consumer outside of the Valley district has bought this grade at $18.50. Dealers are offering $18 for heavy melting steel for Cleveland delivery. A local mill is offering $13 delivered for turnings which is below dealers present asking prices.

We quote dealers prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$17.75 to $18.00
Rails for rolling	20.00 to 20.50
Rails under 3 ft.	19.50 to 20.00
Low phosphorus melting	20.50 to 21.00
Cast borings	13.50 to 14.00
Machine shop turnings	13.00 to 13.25
Mixed borings and short turnings	13.25 to 13.50
Compressed sheet steel	15.00 to 15.50
Railroad wrought	16.00 to 16.50
Railroad malleable	22.00 to 22.50
Light bundle sheet stampings	12.00 to 12.50
Steel axle turnings	16.00 to 16.75
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.00 to 13.25
Drop forge flashings	13.25 to 13.75
Railroad grate bars	16.00 to 17.00
Stove plate	16.00 to 17.00
Pipes and flues	13.50 to 14.00

Trade Changes

The United States Electrical Tool Co. has opened an office in Toledo, Ohio, at 110-12 Eleventh Street. J. E. Hauser has been appointed district manager.

J. R. Collins has resigned his position as purchasing agent of the Liberty Motor Car Co. and has purchased the plant of the Detroit Appliances Co., which he has reincorporated under the name of the Collins Stamping & Mfg. Co. and will engage in the manufacture of light stampings, extention lamps, closed car window regulators and household electrical appliances.

The E. L. Essley Machinery Co., 555 West Washington Boulevard, Chicago, has been appointed exclusive agent for the sale of engine lathes manufactured by the Sidney Machine Tool Co., Sidney, Ohio, in Chicago territory, including Wisconsin, the western half of Michigan, the northern halves of Indiana and Illinois, and Iowa.

Briggs & Turivas, Westminster Building, Chicago, have purchased all the forging bars, alloy bars, strip steel and sheets in stock at the plant of the Mitchell Motors Co., Racine, Wis., which recently went into the hands of receivers. Over 1600 tons was involved in the purchase.

Agnew, Batteiger & Co., Widener Building, Philadelphia, dealers in pig iron, ores, scrap, etc., have opened an office in Washington, at 1211 Woodward Building, in charge of Herbert H. Moffitt, and an office in Pittsburgh, at 1601 Oliver Building, in charge of M. E. Nolan. Mr. Moffitt formerly represented the Midvale Steel & Ordnance Co. in Washington and Mr. Nolan was in charge of pig iron sales in the Pittsburgh territory for the Midvale and Cambria furnaces.

Plans of New Companies

The Miller Traffic Expediting Service has been organized, with offices at 1642 Widener Building, by George Irvin Miller, who was for several years transportation director under H. C. Crawford, general traffic manager of the Midvale Steel & Ordnance Co. Mr. Miller was before that associated with the operating department of the Pennsylvania Railroad and the Philadelphia & Reading and the Greater Northern Railroads.

The Pacific Brass & Hardware Mfg. Co., Los Angeles, Cal., was first organized in 1908 and recently, in order to refinance, the Delaware corporation was organized. It is not at present in the market for equipment. The officers are: Lester C. Hicks, president, general manager; W. E. Sprague, vice-president; Fred E. Subith, attorney, secretary-treasurer; Jack I. Cairns, sales manager.

COMING MEETINGS

September

Chemical Industries. Sept. 17 to 22. National exposition, Grand Central Palace, New York.

Machine Tool Exhibition. Sept. 18 to 21. Mason Laboratory, Yale University, New Haven. New Haven Branch, American Society of Mechanical Engineers, 400 Temple Street, New Haven, Conn., in charge.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition. Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

October

National Safety Council. Oct. 1 to 5. Twelfth annual meeting, New Statler Hotel, Buffalo. W. H. Cameron, 168 North Michigan Avenue, secretary.

American Society for Steel Treating. Oct. 8 to 12. Annual convention, Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

West Virginia and Kentucky Association of Mining, Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention, Hotel Frederick, Huntington, W. Va.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention. Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb.....3.15c.
Bands, base, per lb.....3.15c.
Strips, base, per lb.....3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.62

Cold-Finished Steels

Bars and shafting base, per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (to jobbers)....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Carriage Bolt List

Effective Sept. 1, 1923

Diam. and Length	⅜ in.	½ in.	⅝ in.	¾ in.	⅞ and 1 in.	1¼ and 1½ in.	1¾ in.
1½ in.	$1.00	$1.40	$1.90	$2.50	....	....	....
2 in.	1.10	1.55	2.10	2.75	....	....	....
2½ in.	1.20	1.70	2.30	3.00	$3.25	$6.00	$9.80
3 in.	1.30	1.85	2.50	3.25	3.55	6.40	10.30
3½ in.	1.40	2.00	2.70	3.50	3.85	6.80	10.80
4 in.	1.50	2.15	2.90	3.75	4.15	7.20	11.30
4½ in.	1.60	2.30	3.10	4.00	4.45	7.60	11.80
5 in.	1.70	2.45	3.30	4.25	4.75	8.00	12.30
5½ in.	1.80	2.60	3.50	4.50	5.05	8.40	12.80
6 in.	1.90	2.75	3.70	4.75	5.35	8.80	13.30
6½ in.	2.75	3.65	4.65	5.75	6.40	9.20	13.80
7 in.	2.85	3.80	4.85	6.00	6.70	9.60	14.30
7½ in.	2.95	3.95	5.05	6.25	7.00	10.00	14.80
8 in.	3.05	4.10	5.25	6.50	7.30	10.40	15.30
8½ in.	3.15	4.25	5.45	6.75	7.60	10.80	15.80
9 in.	3.25	4.40	5.65	7.00	7.90	11.20	16.30
9½ in.	3.35	4.55	5.85	7.20	8.20	11.60	16.80
10 in.	3.45	4.70	6.05	7.50	8.50	12.00	17.30
11 in.	3.65	5.00	6.45	8.00	9.10	12.80	18.30
12 in.	3.85	5.30	6.85	8.50	9.70	13.60	19.30
13 in.	4.05	5.60	7.25	9.00	10.30	14.40	20.30
14 in.	4.25	5.90	7.65	9.50	10.90	15.20	21.30
15 in.	4.45	6.20	8.05	10.00	11.50	16.00	22.30
16 in.	4.65	6.50	8.45	10.50	12.10	16.80	23.30
17 in.	4.85	6.80	8.85	11.00	12.70	17.60	24.30
18 in.	5.05	7.10	9.25	11.50	13.30	18.40	25.30
19 in.	5.25	7.40	9.65	12.00	13.90	19.20	26.30
20 in.	5.45	7.70	10.05	12.50	14.50	20.00	27.30

Welded Pipe

Inches	Steel Butt Weld Black	Steel Butt Weld Galv.	Iron Butt Weld Inches	Iron Butt Weld Black	Iron Butt Weld Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Inches	Steel Lap Weld Black	Steel Lap Weld Galv.	Iron Lap Weld Inches	Iron Lap Weld Black	Iron Lap Weld Galv.
2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Inches	Butt Weld, extra strong, plain ends Black	Galv.	Inches	Black	Galv.
⅛	41	34½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Inches	Lap Weld, extra strong, plain ends Black	Galv.	Inches	Black	Galv.
2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1¼ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2½ in.	— 2
3¼ to 3¾ in.	42½	2¾ to 3 in.	— 7
4 to 13 in.	46	3½ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carload, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30 base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	2¼-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	1¼-in. O.D. 9 gage..	15
2¼-in. O.D. 12 gage..	17	2¾-in. O.D. 9 gage..	55
2¼ in. O.D. 11 gage..	18	2¾-in. O.D. 9 gage..	57

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Manufacturers have pamphlets which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Revised Machine Bolt List

Effective Sept. 1, 1923

Diameter Length	¼ in.	⅜ in.	⅝ in.	½ in.	⅞ and ¾ in.	¾ in.	⅞ in.	1 in.	1⅛ in.	1¼ in.
1½ in.	$1.70	$2.00	$2.40	$3.00	$3.70	$5.50	$7.70	$10.50	$15.10	$22.50	$30.00
2 in.	1.80	2.10	2.60	3.25	4.00	5.90	8.25	11.20	16.00	23.70	31.50
2½ in.	1.90	2.30	2.80	3.50	4.30	6.30	8.80	11.90	16.90	24.90	33.00
3 in.	2.00	2.45	3.00	3.75	4.60	6.70	9.35	12.60	17.80	26.10	34.50
3½ in.	2.10	2.60	3.20	4.00	4.90	7.10	9.90	13.30	18.70	27.30	36.00
4 in.	2.20	2.75	3.40	4.25	5.20	7.50	10.45	14.00	19.60	28.50	37.50
4½ in.	2.30	2.90	3.60	4.50	5.50	7.90	11.00	14.70	20.50	29.70	39.00
5 in.	2.40	3.05	3.80	4.75	5.80	8.30	11.55	15.40	21.40	30.90	40.50
5½ in.	2.50	3.20	4.00	5.00	6.10	8.70	12.10	16.10	22.30	32.10	42.00
6 in.	2.60	3.35	4.20	5.25	6.40	9.10	12.65	16.80	23.20	33.30	43.50
6½ in.	3.70	4.50	5.40	6.50	7.70	11.50	13.20	17.50	24.10	34.50	45.00
7 in.	3.80	4.65	5.60	6.75	8.00	9.90	13.75	18.20	25.00	35.70	46.50
7½ in.	3.90	4.80	5.80	7.00	8.30	10.30	14.30	18.90	25.90	36.90	48.00
8 in.	4.00	4.95	6.00	7.25	8.60	10.70	14.85	19.60	26.80	38.10	49.50
9 in.	4.20	5.25	6.40	7.75	9.20	11.50	15.95	21.00	28.60	40.50	52.50
10 in.	4.40	5.55	6.80	8.25	9.80	12.30	17.05	22.40	30.40	42.90	55.50
11 in.	4.60	5.85	7.20	8.75	10.40	13.10	18.15	23.80	32.20	45.30	58.50
12 in.	4.80	6.15	7.60	9.25	11.00	13.90	19.25	25.20	34.00	47.70	61.50
13 in.	....	....	8.00	9.75	11.60	14.70	20.35	26.60	35.80	50.10	64.50
14 in.	....	....	8.40	10.25	12.20	15.50	21.45	28.00	37.60	52.50	67.50
15 in.	....	....	8.80	10.75	12.80	16.30	22.55	29.40	39.40	54.90	70.50
16 in.	....	....	9.20	11.25	13.40	17.10	23.65	30.80	41.20	57.30	73.50
17 in.	....	....	....	....	14.00	17.90	24.75	32.20	43.00	59.70	76.50
18 in.	....	....	....	....	14.60	18.70	25.85	33.60	44.80	62.10	79.50
19 in.	....	....	....	....	15.20	19.50	26.95	35.00	46.60	64.50	82.50
20 in.	....	....	....	....	15.80	20.30	28.05	36.40	48.40	66.90	85.50

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	43c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	41c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$112.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	112.50
Spiegeleisen, domestic, 13 to 21 per cent, per ton, furnace	$45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$46.00 to $48.00	$40.00 to $45.00
Maryland	50.00	45.00
Ohio	45.00 to 46.00	40.00 to 42.00
Kentucky	45.00 to 46.00	40.00 to 42.00
Illinois	48.00	45.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 9.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	52.00	
Ground silica clay, per net ton	10.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00 to $42.50
Rolling billets, 2-in. and under	40.00 to 42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Sl.elp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅞-in. and ⅝-in., base per 100 lb.	$3.25 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.25 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill.	2.50c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (1.25% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200* (Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyres. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Awards Over 16,000 Tons and Inquiries for 7000 Tons

Awards of some sixteen projects in fabricated steel work in the past week cover 16,000 tons. Over half is for private buildings and one-fourth for public service institutions. Most of the fresh inquiries, totaling nearly 7000 tons, are for private ownership. The awards include:

Long Island Railroad, bridge work, 150 tons, to Harris Structural Co.

Pennsylvania Sugar Co., warehouse, Philadelphia, 1500 tons, to McClintic-Marshall Co.

Edison Electric Illuminating Co., Boston, power house, 500 tons, to Jones & Laughlin Steel Corporation.

Seaboard Air Line, bridge work, 250 tons, to unnamed fabricator.

Isbell-Porter Co., Buffalo, retort house, 900 tons, to Bethlehem Steel Bridge Corporation.

Chesapeake & Ohio Railroad, 200 tons, to Bethlehem Steel Bridge Corporation.

Friedenburg loft, Forty-seventh Street, New York, 1100 tons, to Hay Foundry & Iron Works.

Apartment-hotel, Sonn Brothers, New York, 1200 tons, to Hay Foundry & Iron Works.

Elks' Club Building, San Francisco, Cal., 1280 tons, to Golden Gate Iron Works.

Sewage disposal plant, Sanitary District, Chicago, 750 tons, to Continental Bridge Co.

Courthouse and jail, Cedar Rapids, Iowa, 610 tons, to Iowa Steel & Iron Works.

Western United Gas & Electric Co., power house, Aurora, Ill., 160 tons, to Garbe Iron Works.

Fair Store, Chicago, girders for shoring up walls, 140 tons, to Hansell-Elcock Co.

Don M. Morris, 13-story apartment building, Wilshire and Catalina Streets, Los Angeles, Cal., 1500 tons, reinforced concrete construction substituted for fabricated steel.

Apartment-hotel building on East Ocean Avenue, Long Beach, Cal., 1000 tons, reinforced concrete construction substituted.

Graystone Apartment Co., 14-story apartment-hotel, Hollywood, Cal., 1000 tons, reinforced construction substituted.

Milwaukee Gas Light Co., gas holder, 3000 tons (shapes and plates), to Riter-Conley Co.

Milwaukee Electric Railway & Light Co., boiler house addition, 160 tons, to Wisconsin Bridge & Iron Co.

Kresge Building, Cincinnati, 350 tons, to L. Schreiber & Sons.

Ford Motor Co., first unit of steel plant, Detroit, 3700 tons, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Pennsylvania Railroad, machine shop, Olean, N. Y., 150 tons.

Office building, Jersey City, 1100 tons.

Glens Falls Portland Cement Co., Glens Falls, N. Y., 250 tons.

Henry L. Doherty & Co., in Colorado, 500 tons.

Mead, Morrison & Co., Chicago, coal unloader, for Milwaukee, 1700 tons.

Union Pacific, plate girder spans, 150 tons.

Goss Printing Press Co., Chicago, addition, 300 tons.

State highway bridge, Peshtigo, Wis., 180 tons, bids close Sept. 13.

Rowland Building, Columbus, Ohio, 200 tons, bids opened Sept. 5.

Hurth Hotel, Portsmouth, Ohio, 100 tons, bids being taken.

U. S. Engineers' Office, Louisville, Ky., six steel derrick boat hulls, about 900 tons, bids close Sept. 29.

Knights of Columbus Building, Rochester, N. Y., 1200 tons, revised bids taken.

Little Railroad Equipment Buying

The Central Railroad of New Jersey has awarded repairs on 200 steel underframes to the Pressed Steel Car Co. The St. Louis Southwestern is inquiring for four coaches, two baggage cars, two baggage and mail cars and one cafe and observation car. The Minnesota Steel Co. has awarded 20 flat cars to the Standard Steel Car Co.

Locomotives in need of repair on Aug. 15, totaled 11,571 or 18.1 per cent of the number on line, according to reports filed by the carriers with the car service division of the American Railway Association.

This was an increase of 16 locomotives over the number in need of repair on Aug. 1.

Lake Iron Ore Shipments in August

Shipments of iron ore from the Lake Superior region in August were larger than those in August, 1922. This year they were 10,296,133 gross tons, which compares with 9,016,426 tons in August, 1922. This increase over last year was therefore 1,279,707 tons or 14.19 per cent. The totals by ports, with season shipments and a comparison with 1922, are given below:

	August, 1923	August, 1922	To Sept. 1, 1923	To Sept. 1, 1922
Escanaba	875,772	900,975	3,995,467	2,505,105
Marquette	442,370	465,380	1,778,343	1,314,145
Ashland	1,081,635	1,134,577	4,149,251	3,713,633
Superior	3,359,005	2,338,080	11,007,586	6,703,043
Duluth	3,498,358	2,896,979	11,823,332	8,023,724
Two Harbors ..	1,038,993	1,280,435	4,138,885	4,050,289
Total	10,296,133	9,016,426	36,892,864	26,309,939
Increase	1,279,707		10,582,925	

The increase in season shipments to Sept. 1, 1923, has been 10,582,925 tons or 40.22 per cent as compared with an increase for the same period a year ago of 11,561,867 tons or 78.39 per cent.

Of the season's total to Sept. 1, the Great Northern dock contributed 26.36 per cent as against 22.90 per cent a year ago. Duluth is credited this year with 32.05 per cent of this season's total as compared with 30.49 per cent a year ago.

Introducing Three Shifts at Cleveland

CLEVELAND, Sept. 3.—Considerable progress in the elimination of the 12-hr. day has already been made in the Cleveland district by plants of the American Steel & Wire Co. and in the Lorain plant of the National Tube Co. The former company is gradually placing the reduced working hours in effect in its blast furnace, open-hearth, coke oven and continuous galvanizing departments. The National Tube Co. already has its coken oven plant and pipe mill operating entirely on an 8-hr. schedule. The McKinney Steel Co. during the week made a start in establishing the 8-hr. day in the open-hearth department of its Cleveland steel plant and plans to gradually introduce the shorter day in the other departments that are now operating on a 12-hr. schedule.

While sufficient labor is not available to entirely eliminate immediately the 12-hr. day in Cleveland plants, the labor supply is fair and mills are getting men about as fast as they are needed for placing the three shifts in effect. The shorter day is attracting considerable labor that heretofore has not been employed in the steel industry.

Youngstown Plant Activities

Youngstown, Sept. 4.—Independent iron and steel makers in the Youngstown district quite generally observed the Labor Day holiday by suspensions, except in departments, such as blast furnaces, open hearth furnaces and by-product coke ovens, requiring continuous operation. Plants of the Carnegie Steel Co. operated as usual.

There is considerable piling of iron by blast furnaces in this territory and further suspensions in this direction are not unlooked for, in event iron demand does not improve.

Of the 66 open hearth furnaces in the Mahoning Valley, 56 were melting at the beginning of this week, and 78 of the 117 sheet mills were scheduled for rolling. All Bessemer departments are on the active list.

With exception of six idle tin mills at the plant of the Trumbull Steel Co., all tin plate units in the Valley are active.

This week the Truscon Steel Co. started operations in a new unit completed for the manufacture of its steel joist department.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
29	14.12½	13.50	40.75	6.90	6.70	6.77½	6.42½
30	14.12½	13.37½	40.87½	7.00	6.70	6.77½	6.42½
31	14.00	13.50	40.62½	7.00	6.70	6.80	6.45
Sept.							
1	14.00	13.50	....	7.00	6.70	6.85	6.50
4	14.00	13.50	41.50	7.00	6.70	6.85	6.50

*Refinery Quotation; delivered price ¼c. higher.

New York

NEW YORK, Sept. 4.

The let-up in business, incident to Labor Day, has affected all markets. A fair business has been done in copper at lower prices. The tin market has been strong but quiet. Demand for lead is good and prices are higher. In a quiet market zinc has been steady and a little higher.

Copper.—Sales in the past week are given as close to 2500 tons of electrolytic copper to one company, and this has been the feature of the market. Buying outside of this has been only moderate. Reports that the price during the past week fell below 13.62½c., delivered, is denied. Today the market is stronger because of an advance in London of at least £1 19s. per ton in the last two days. Today some business has been done at 13.75c., delivered, which is regarded as the minimum, with some business reported at 13.87½c. The strength of the London market is not satisfactorily explained, but the effect here is marked. The export market is moderately active and strong. Optimism generally pervades the situation and the opinion is expressed by some that copper has touched the bottom.

Copper Averages.—The average price of Lake copper for the month of August, based upon daily reports in THE IRON AGE, was 14.41c. The average price of electrolytic copper was 14.12c., delivered.

Tin.—Sales of Straits tin on Tuesday, Aug. 28, are reported to have been 300 tons, which, with the heavy sales made on the day before, amounting to about 700 tons, records the most active business for some time. The feature of this buying was the large amount taken by consumers, particularly some large independent tin plate makers. Since then the market has been very quiet, with only small sales reported, and the holidays Saturday and yesterday have tended to slow up all business. The market today has been quiet, with spot Straits tin quoted at 41.50c., New York, the higher price due largely to the stronger market in London, where all metals advanced sharply today. In that market spot standard was quoted at £196 5s., future standard at £198 5s. and spot Straits at £201 5s. per ton. Deliveries into consumption in August were 5510 tons, with 2887 tons reported in stock and landing Aug. 31. The deliveries are considered very good and likely to grow larger as the effect of the shutting down of American electrolytic plants begins to be felt. This is conservatively estimated to involve about 1000 tons a month. Arrivals during the month of August were 6360 tons, and total imports for the eight months of this year are given as 47,662 tons.

Lead.—The market is firm and becoming stronger. Since the advance by the leading interest last week to 6.75c., New York, the New York market has grown stronger until today it is quoted at 6.70c., St. Louis, or 7c., New York. Spot lead is reported scarce and has sold at 7c., Eastern delivery.

Zinc.—So far as quotations go the market is somewhat stronger, due possibly to sentiment and to some foreign inquiry from both England and Italy, the latter being regarded as possibly a war inquiry. Prime Western for early delivery is quoted and has sold at 6.50c., St. Louis, and 6.85c., New York. Most sellers look for better business in the coming weeks.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 7.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26.50c. to 27c., New York, duty paid, in such cases where they can obtain it from foreign producers. No quotations are reported by the leading producer.

Old Metals.—Quotations on red metals are lower, while white metals are firm. Business is quiet. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.50
Copper, light and bottoms	10.50
Heavy machine composition	10.50
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.25
Lead, heavy	6.25
Lead, tea	5.25
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

Sept. 4.—Tin, lead and zinc have advanced, while copper has declined. Although buying of the three first named metals has been on an improved scale, it has not been as heavy as one would expect in view of the advances. The rise in lead is attributable, in large part, to an advance of one quarter of a cent by the leading producer. Among the old metals there have been no changes outside of a slight decline in zinc. We quote in carload lots, Lake copper, 14.50c.; tin, 42.50c.; lead, 6.75c.; spelter, 6.55c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5c.; zinc, 4c.; pewter, No. 1, 20c.; tin foil, 24c.; block tin, 30c.; all buying prices for less than carload lots.

GOLD MARK FAILS TO SATISFY

Prices on Gold Basis Rising Rapidly in Germany Leipzig Fair a Fizzle—Exports Dwindling

(By Radiogram)

BERLIN, GERMANY, Sept. 1.—Heavy demand for iron and steel continues but there is increasing depression in the metal-consuming manufacturing branches, particularly machinery and electrical plants.

Railroad rates and wages last month were put on the gold mark basis, with the result that prices are rising rapidly and already often exceed world market prices. Hence both domestic and foreign buyers have suspended giving orders and there are numerous discharges of workmen.

The Leipzig August Fair, which is a good indicator of business conditions, was extremely dull.

Exports are declining, being only 109,000,000 gold marks in July, against 380,000,000 in June and 680,000,000 in May.

Production in Connellsville Region

UNIONTOWN, PA., Sept. 4.—Prospects of a strike in the anthracite field were reflected during the latter part of the week in increased quotations for coke in the Connellsville region although no material increase in production was recorded. Production in the region for the week ending Aug. 25 was 250,000 tons and that for the week just concluded will average about the same figure. Output for the week of Labor Day will undoubtedly show a little scaling off because of the Labor Day holiday. No change is noted in the coal production or market with the exception of stiffening of inquiries.

BLAST FURNACES STOPPING

Thirty Now Idle in the Pittsburgh and Adjoining Districts

PITTSBURGH, Sept. 3.—There was a net loss of seven active blast furnaces in the Pittsburgh and nearby districts in August, but loss of pig iron production will be greater than is thus indicated by reason of the fact that two furnaces were banked practically all of last month and another made very little iron from Aug. 7 on for the rest of the month owing to an accident to one of the blowing engines. At the end of July the triangle formed by Johnstown, Pa., Wheeling, W. Va., and Warren, Ohio, in which are located 138 furnaces, 115 were making iron, one was banked and 22 were cold. At the end of August 108 were making iron, two were banked, one out of production on account of repairs and 27 were down.

The Carnegie Steel Co. lost one furnace in the Pittsburgh district, but gained in the Shenango Valley and at the end of the month was making iron in 47 of its 59 furnaces. The Pittsburgh Crucible Steel Co. banked one of its furnaces at Midland, Pa., on Aug. 8 and it still is out of production. The stack of the Clinton Iron & Steel Co., Pittsburgh, was blown out Aug. 15. In the Mahoning and Shenango Valley districts two stacks of the Youngstown Sheet & Tube Co. at Hubbard, Ohio, and one Hazelton furnace of the Republic Iron & Steel Co. were blown out, while the stack of the Struthers Furnace Co., Struthers, Ohio, was banked and the furnace of the Sharpsville Furnace Co., Sharpsville, Pa., has been out of production since Aug. 7 as a result of an accident to one of the blowing engines. Against these losses is the blowing in of No. 4 New Castle furnace, Carnegie Steel Co., and the resumption of iron making in No. 3 furnace, Shenango Furnace Co., Sharpsville, Pa., which was banked at the end of July.

Bethlehem Steel Co. put down one of the Johnstown, Pa., furnaces early in August, but there have been no other changes in the western Pennsylvania group of furnaces and the same number of furnaces was active in the Wheeling district at the end of August as one month before.

The record of furnaces in and out as of Aug. 31, in comparison with July 31, is as follows:

		Aug. 31		July 31	
Steel Works Blast Furnaces	Total	In	Out	In	Out
PITTSBURGH DISTRICT					
American Steel & Wire Co.	4	4	0	4	0
Carnegie Steel Co.	34	29	5	30	4
Jones & Laughlin Steel Corporation	12	11	1	11	1
Pittsburgh Crucible Steel Co.	2	*2	0	2	0
Pittsburgh Steel Co.	2	2	0	2	0
National Tube Co.	4	4	0	4	0
Merchant Furnaces					
Clinton Iron & Steel Co.	1	0	1	1	0
Total	59	52	7	54	5
MAHONING AND SHENANGO VALLEYS					
Steel Works Furnaces					
Carnegie Steel Co.	15	13	2	12	3
Republic Iron & Steel Co.	7	4	3	5	2
Sharon Steel Hoop Co.	1	1	0	1	0
Trumbull Cliffs Furnace Co.	1	1	0	1	0
Youngstown Sheet & Tube Co.	9	6	3	6	1
Merchant Furnaces					
A. M. Byers Co.	1	1	0	1	0
Hanna Furnace Co.	3	2	1	2	1
Reliance Coke & Furnace Co.	2	1	1	1	1
McKeefrey Iron Co.	1	1	0	1	0
Sharpsville Furnace Co.	1	†1	0	1	0
Shenango Furnace Co.	3	2	1	*2	1
Struthers Furnace Co.	1	*1	0	1	0
Stewart Furnace Co.	1	1	0	1	0
Valley Mould & Iron Corporation	1	0	1	0	1
Total	47	35	12	37	10
WESTERN PENNSYLVANIA					
Steel Works Furnaces					
Cambria Steel Co.	11	8	3	9	2
Merchant Furnaces					
American Manganese Mfg. Co.	2	1	1	1	1
Kittanning Iron & Steel Mfg. Co.	1	0	1	1	0
McKinney Steel Co.	3	3	0	3	0
Total	17	12	5	14	3
WHEELING DISTRICT					
Steel Works Furnaces					
Carnegie Steel Co.	7	5	2	5	2
National Tube Co.	2	2	0	2	0
Wheeling Steel Corporation	5	4	1	4	1
Weirton Steel Co.	1	1	0	1	0
Totals	15	12	3	12	3
Grand totals	138	111	27	116	22

*One furnace banked. †Not making iron on account of repairs.

Coke More Active Owing to Anthracite Strike —Statistics as to Supply

WASHINGTON, Sept. 4.—With mining of anthracite coal stopped by the strike and plans made by the Government to provide soft coal and coke as substitutes in hard coal consuming sections, added interest is being shown in stocks of soft coal held by large consumers including industrial plants, railroads and public utilities. While officials in Washington insist that there will be an adequate supply of soft coal and coke to make up the deficiency of anthracite coal for domestic use, and claim that because of large stocks of soft coal on hand, together with production, there will be little, if any, effect on industry from the anthracite strike, the fact remains that even a threat of the anthracite strike developed greater demand for soft coal and coke and brought about higher prices, despite the fact that soft coal production is said to be only 60 per cent of capacity. The movement of soft coal and coke for domestic use under the direction of Federal Fuel Distributor Wadleigh will involve longer rail hauls than are involved when anthracite mines are in production and will call for a greater amount of coal cars. This has raised a question as to whether one of the effects of the strike will be to develop a shortage of this class of rolling stock. Such a shortage would necessarily affect the iron and steel and other industries.

According to a report prepared by the Bureau of Census and the Geological Survey under authority of the Federal Fuel Distributor, commercial consumers had on hand approximately 51,000,000 net tons of soft coal on Aug. 1, an increase of 5,000,000 tons since July 1. At the rate of consumption in July the stocks of Aug. 1 were sufficient to last 44 days on the average, based on the assumption that the stocks were evenly divided, although this is never the case, and the figure, therefore, is given only for general comparisons. Stocks held by steel plants on Aug. 1 represented 35 days' supply, the supply of steam coal being sufficient for 31 days and of gas coal for 42 days. By-product coke plants continued to accumulate stocks during July and the total surplus coke on hand on Aug. 1 was 430,000 tons. This was an increase over the supply on July 1 of 122,000 tons, or nearly 40 per cent. The supply of coal at by-product plants on Aug. 1, was sufficient to last 27 days, and was evenly divided between low and high volatile coal. The report of the Fuel Distributor points out that the importance of consumption is strikingly illustrated by stocks on hand at by-product plants and steel works. The tonnage held at by-product plants on Aug. 1, was 91 per cent larger than on Aug. 1, 1921, and at steel plants it was 27 per cent larger, while the days' supply was 13 and 24 per cent less, respectively. Estimates of railroad fuel stocks based on reports made by the American Railway Association place the total quantity held by the railroads in stock piles, cars and chutes on Aug. 1 at 13,800,000 tons, a supply sufficient for 39 days. In comparison with July 1, this was an increase in days' supply of 39 per cent.

Southern Ohio Pig Iron and Coke Association Meeting

The next meeting of the Southern Ohio Pig Iron and Coke Association will be held at Columbus, Ohio, Sept. 18. The members of the association will be the guests of W. H. Hoagland, president of the Marble Cliff Quarries Co., during their stay in the city, and following a luncheon will be taken on a tour of inspection of the company's plant. Following the visit to the plant, there will be golfing and a dinner at the Country Club. Many important questions will be discussed at the meeting, particularly in respect to the association's activities in the matter of coal requirements of the blast furnaces and coke plants in the district represented by the members.

PERSONAL

S. J. Hammitt, acting manager of the Tokyo office of the United States Steel Products Co., cabled to New York on Monday that the staff in that office escaped safely from earthquake and fire.

A number of changes in personnel of the district sales offices of the Youngstown Sheet & Tube Co., incident to recent absorption of the Steel & Tube Co. of America by that company have been announced by Walter E. Watson, general manager of sales. Edward S. Rooney, who opened the Pittsburgh office of the Youngstown Sheet & Tube Co. in 1906 and since has been in charge of it, will open and have charge of a new district sales office in Cincinnati. His successor in Pittsburgh will be Glenn W. Christopher, now attached to the Chicago district sales office of the company. W. H. Bruce, who has been Southern sales agent of the Steel & Tube Co. of America, will continue in that capacity, with headquarters at New Orleans for the combined companies. B. T. Bechtel, who has been general manager of sales of the Steel & Tube company will continue with the Youngstown company as Chicago district sales manager, with offices in the Conway Building, Chicago, formerly occupied by the Steel & Tube company. F. A. Lathrop, who has been Chicago district sales agent of the Youngstown Sheet & Tube Co., remains in Chicago as assistant district sales manager. Edward S. Rooney, new district sales agent of the company in Cincinnati, has been identified with the Youngstown Sheet & Tube Co. for more than 17 years and with the steel industry in a sales capacity for more than 23 years, having been with the Carnegie Steel Co. in its Cincinnati sales office for about six years before going with the Youngstown company. Mr. Rooney is a native of Cincinnati and in assuming his new post will not only be quite at home but will have the added advantage of more intimate contact with the trade he has cultivated in both of his steel company connections. He has been active in committee work in the Chamber of Commerce of Pittsburgh.



E. S. ROONEY

C. B. Wheeler has been appointed general manager of the Cincinnati Screw Co., Loveland, Ohio, succeeding I. W. Pettingill, who resigned recently to assume the management of the Cincinnati, Milford & Blanchester Traction Co.

E. C. Rebeske, secretary and treasurer Union Drawn Steel Co., Beaver Falls, Pa., has been elected president of the Standard Gauge Steel Co., Beaver Falls, succeeding the late Frederick N. Beegle. Since the same interests control both companies, Mr. Rebeske will continue in his present position with the Union Drawn Steel Co., with which he has been affiliated for 34 years. Herbert A. May, treasurer Standard Gauge Steel Co., has been elected vice-president of the company.

Horace C. Finkle, secretary and treasurer Portland Foundry Co., Portland, Conn., was presented a watch by the employees of the company last week. Mr. Finkle will leave this week for Detroit, where he will represent the W. & B. Douglas Co., Middletown, Conn., pump manufacturers.

Henry J. Bailey, formerly vice-president Consolidated Machine Tool Corporation of America, has been elected president, succeeding the late Waldo H. Marshall. Mr. Bailey started as office boy with Hillis & Jones, Wilmington, Del., 33 years ago and was president at the time of its absorption by the Consolidated Machine Tool Corporation.

Morris Llewellyn Cooke, consulting engineer, Philadelphia, has been appointed by Governor Pinchot director of the so-called Pennsylvania giant power survey authorized by the Pennsylvania legislature and looking to the production of power by large power stations, as at mines, at water falls and at tide water, to secure economies of production, distribution and utilization and stabilization of coal mining operations.

G. D. Harris, founder and general manager U. S. Tractor & Machinery Co., Menasha, Wis., which has been reorganized as the Wisconsin Automotive Corporation, has resigned as general manager and will remain vice-president in charge of the sales department. Adolph F. Reinecke has been appointed general manager.

F. L. Estep of the firm of Perin & Marshall, consulting engineers, New York, returned on Aug. 24 after several months absence in India.

Hugh C. Boyle, who has been in charge of the wire mill of the American Copper Products Co., Elizabeth, N. J., and who recently accepted an offer from the American Insulated Wire Co., Chicago, was tendered a farewell dinner by the staff of the American Copper Products Co. at the Elks' Club, Elizabeth, Thursday evening, Aug. 30. He had been connected with the American Copper Products Co. for about 25 years—almost from the inception of the Waclark Wire Works, its predecessor. Hamilton C. Carpenter presented Mr. Boyle a watch, suitably engraved. Besides Mr. Carpenter, general manager of the American Copper Products Co., Wylie Brown, vice-president and secretary, W. R. Conklin, assistant treasurer, W. F. Heroy, assistant secretary and William J. James, purchasing agent, spoke. Mr. Boyle has left for Chicago to begin at once superintending the erection of a rod and wire mill for the American Insulated Wire Co.

Obituary

CLINTON L. POSTON, Athens, Ohio, one of the oldest and best known coal operators in Ohio, and the last of the pioneer producers of the Hocking field, died at his home Aug. 23, aged 76 years.

CHARLES CROCKER BUSSEY, chemist, Brooklyn, N. Y., died suddenly at the home of his sister, Mrs. Harry Cool, in Canaan, Me., Aug. 29. Mr. Bussey was the inventor of the Bussey process of distillation of fuels. He was born in Newburgh, Me., Jan. 16, 1866. His business experience began with the Walworth Mfg. Co., Boston, where he soon showed marked ability in scientific research. At the age of 24 he entered Massachusetts Institute of Technology, graduating in 1895. Mr. Bussey then entered the foundry business, but subsequently became associated with the Worthington Pump & Machinery Co., Boston, and Rand Drill Co. During the World War he carried on extensive work in Brooklyn under the supervision of the War and Navy Departments.

JOSEPH BAKER, one of the founders of the Baker Stove Works, Belleville, Ill., 35 years ago, died in that city Aug. 29. He was 77 years old and had been blind for two years. Mr. Baker was born in Pennsylvania and as a young man was a moulder. He fought in the Union Army during the Civil War, after which he came to St. Louis. He is survived by one son, George E. Baker, head of the business, and five daughters.

THOMAS A. FURLONG, for many years an electrical engineer on the staff of the Allis-Chalmers Mfg. Co., was killed in an automobile accident at Detroit on Aug. 27. He resided in Milwaukee until a few years ago, when his headquarters were transferred to Chicago.

CHARLES P. RUSSELL, formerly president Wiley & Russell Co., Greenfield, Mass., which is now a part of the Greenfield Tap & Die Corporation, and inventor of the screw plate method of making taps and dies, died at his home in Greenfield, Aug. 27, aged 83.

British Iron and Steel Market

Pig Iron Drops 2½s.—Billets, Rails and Shapes Lower by 5s. to 10s.—Belgium to Roll Rails for Poland—Sheets and Tin Plate Strong

(By Cable)

LONDON, ENGLAND, Sept. 4.

Pig iron continues weak but sales still are limited. Export demand is almost stagnant. Domestic consumers are covering only their urgent requirements.

Foreign ore is idle. Best Bilbao Rubio quotations are nominal. Hematite is firmer on reduced output.

Twelve Northeastern furnaces now are blowing. The total of all Cleveland furnaces operating is 40.

There is improved demand for finished iron and steel, particularly from the Far East for angles, plates and sections.

New shipbuilding contracts are scarce. The Clyde output for August was 9 vessels launched, totaling 1865 tons gross register.

Continental position remains obscure. There is good demand from India and the Far East but the business is not handled here, evidently being transacted by the Continental merchants direct.

It is reported that the stocks of rolled material in the Ruhr total 600,000 tons, with possibly two-thirds of it already sold.

Belgian prices are firmer, billets being quoted at £7 ($31.64) f.o.b., but there are no buyers.

In France coke has advanced 15 fr. to 200 fr. ($11.25). It is reported that the Compagnie des Forges et Acieries de la Marine et d'Homecourt is shortly to start its Saint Marcel plant.

In Belgium the Société Anonyme des Acieries d'Angleur is reported to have secured an important Polish order for steel rails.

Tin plate demand is improving, especially from the Far East. Inquiry is spreading into March. Merchants are sold on January-March at 22½s. ($5.09) basis, IC, f.o.b. There is good business with South America.

Galvanized sheets are quietly steady. The works are well sold to the end of the present month and not disposed to reduce prices on forward contracts.

Black sheets are strong on continued Far East demand. Japanese export houses are buying feverishly, up to £19 15s. (3.99c. per lb.) f.o.b. buying paid for cold rolled flat sheets, 30 to 31 gage, 3 x 6 ft., 13 sheets in 107-lb. bundles. The works are asking £20 (4.04c. per lb.) for February shipment. The central selling agency is entitled Oriental Steel Co., Ltd.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.52 per £1, as follows:

Durham coke, delivered	£2	1s.	to £2	1½s.	$9.27 to $9.39
Bilbao Rubio ore†	1	4			5.42
Cleveland No. 1 foundry	5	5			23.73
Cleveland No. 3 foundry	4	19	to 5	0	22.39 to 22.60
Cleveland No. 4 foundry	4	15			21.47
Cleveland No. 4 forge	4	12½			20.91
Cleveland basic	5	0			22.60
East Coast mixed	4	18½	to 5	0	22.26 to 22.60
Ferromanganese	18	0			81.36
Ferromanganese*	18	10			83.62
Rails, 60 lb. and up	8	0	to 9	0	36.16 to 40.68
Billets	7	10	to 8	5	33.90 to 37.29
Sheet and tin plate bars, Welsh	9	2½			41.25
Tin plates, base box	1	3/4	to 1	3¼	5.23 to 5.26
					C. per Lb.
Ship plates	9	5	to 9	15	1.87 to 1.97
Boiler plates	12	10	to 13	0	2.52 to 2.62
Tees	9	15	to 10	5	1.97 to 2.07
Channels	9	0	to 9	10	1.82 to 1.92
Beams	8	15	to 9	5	1.77 to 1.87
Round bars, ¾ to 3 in.	10	15	to 11	5	2.17 to 2.27
Galvanized sheets, 24 g.	18	10	to 18	15	3.74 to 3.78
Black sheets, 24 gage	13	15			2.77
Black sheets, Japanese specifications	15	5			3.08
Steel hoops	12	0	& 12	10*	2.42 & 2.52*
Cold rolled steel strip, 20 gage	17	5			3.48
Cotton ties, Indian specifications	15	0			3.03

*Export price †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Foundry pig iron:				
Belgium	15	5s.		$23.73
France	5	5		23.73
Luxemburg	5	5		23.73
Billets:				
Belgium	7	0		31.64
France	7	0		31.64
				C. per Lb.
Merchant bars:				
Belgium	8	0	to 8 5s.	1.62 to 1.67
Luxemburg	7	15½	to 8 5	1.59 to 1.67
France	7	10		1.54
Joists (beams):				
Belgium	7	12½		1.54
Luxemburg	7	12½		1.54
France	7	10	to 7 12½	1.51 to 1.54
Angles:				
Belgium	8	0	to 8 5	1.62 to 1.67
½-in. plates:				
Belgium	8	15	to 9 0	1.77 to 1.82
Germany	8	10		1.72
⅜-in. plates:				
Luxemburg	7	15		1.56
Belgium	7	10		1.51

Sheet Sales to Far East Extend Into January—Germany Buyer of Shapes and Plates

LONDON, ENGLAND, Aug. 23.—Conditions in the iron and steel markets do not as yet show much sign of improvement. Business has been interfered with in the first place by the holidays in Scotland, at the beginning of the month, and now by those in force on the Northeast coast. Moreover, this time of the year is always a slack one. The political situation on the Continent naturally has a bad effect upon business, consumers the world over being disinclined to enter into any substantial commitments until there is a sign of price stabilization. In some quarters it is thought that if the Ruhr chaos were cleared up, prices in this country would come down with a run. On the other hand, makers maintain that even selling at today's figures leaves little or no margin of profit.

The supplies of pig iron have been enhanced somewhat by the closing of works, and in consequence prices have a decidedly easier tendency, No. 3 Cleveland being at about 101s. 6d. and East Coast mixed numbers at about 98s. to 99s.

In finished iron and steel there has been a steady demand from the Continent, particularly Germany, for heavy plates and sections, and some good business has been done. The demand for lighter material, however, continues strong, the Far East being a good buyer of thin black sheets, in fact, to such an extent that nearly all the works here have sold their output for the rest of the year, and some of them for shipment as far ahead as January. In this connection a note of interest is that a central selling agency is being established, which will handle the whole of the output of the thin black sheets made by the Welsh makers.

That there is a tendency toward amalgamations is still prominent, the latest being that of the Grovesend Steel & Tin Plate Co., which has just acquired the Dyffryn, Mardy, and Dynevor tin plate works, which now gives the Grovesend possession of 54 tin plate mills and 22 sheet mills, while the output of the steel works controlled by the company will amount to between 300,000 to 400,000 tons a year.

Stockholders of the Wheeling Steel Corporation, Wheeling, W. Va., at a recent meeting authorized a closed bond issue of $75,000,000 against all the properties of the corporation. Bonds of this issue to the amount of $10,000,000 will be available for the redemption of $8,000,000 3-year secured 6 per cent gold notes issued June 21, 1923. These notes were sold under terms permitting their conversion at any time at the option of the holder into Wheeling Steel Corporation, first and refunding mortgage 5½ per cent gold bonds series "A" due July 1, 1948 at 98 per cent, with an adjustment of interest.

Position of Tin Plate Makers Explained

(*Continued from page 603*)

metrical control, and many other features inaugurated, all in the interest of general improvement. Notwithstanding this we are as yet unable to uniformly distribute the coating over the surface of the plate or to maintain any fixed tin yield on any of the equipment. The variation in weight of coating increases considerably as the size of the plate increases and as the weight of coating is made heavier. Each tin house unit, or pot, has a capacity of say from 40 to 100 base boxes per turn of eight hours, and it is apparent that large numbers of such units are necessary to coat the product. This, of itself, is a detrimental factor in maintaining uniformity, as the personal element must always to a considerable extent enter into the operation of each unit as well as the features of temperature, mechanical equipment, etc.

Classifying the Product

"Following the coating operation the product is cleaned and assorted, and classified as 'primes,' 'seconds,' 'menders' and 'waste waste.' Prime and second sheets are shipped properly identified to the purchaser. Menders are returned to the department for re-treatment, and waste waste consigned substantially to scrap and sold as such. Seconds are so classified on account of irregularities discernible in the assorting operation and are made up of small uncoated spots, turned down corners, irregular shearing, ragged edges, blisters, etc. It should be borne in mind that large areas of such plates are not affected by the irregularities above referred to, and such sections are of 'prime' quality.

"The tin plate manufacturer does not presume to determine the gage or weight of plate to be used for any particular can or size of can, accepting the gage specification of the can makers without question and having no detailed information as to the manner in which the plate is to be used. Unfavorable comment has been made from time to time on the variation in the weight of tin plate, and it is, therefore, not a new subject, having been considered from time to time. In fact, we may say it has been continuously considered since the manufacture of tin plate was first undertaken in this country.

An Impossible Proposition

"It has never been the practice in this or any other country, so far as we can learn, to assort tin plate for weight, the product being generally acceptable to the trade as produced. It is practically impossible, both from a physical standpoint as well as from that of cost, to institute such a practice. If mechanical appliances were available (and they are not) to mechanically assort for weight, rejecting each individual sheet outside of a fixed permissible variation of, say, 2.5 per cent, there would be rejected at this point from 30 to 40 per cent of the product, this rejection being divided between heavy and light plate; and there would consequently be at least three, and probably more, distinct gage classifications for every gage, size and different weight of coating produced. The multiplicity of sizes the tin plate makers are called upon to produce, varying in dimension by as little as ⅛-in., together with other physical impossibilities, renders favorable consideration of this feature out of the question at producing plants.

"Material rejected in assorting would be practically unsalable and it would mean that the manufacturer would be called upon to produce 130 per cent to 140 per cent of product on every specification entered; 30 per cent to 40 per cent of which would be unsuitable for the purpose intended and much of it for no purpose whatever. The position of the tin plate manufacturers, therefore, must be that any or all material required more accurate to weight than is possible under the present manufacturing methods must be assorted by the consumer, and the present practice of selling tin plate as produced be maintained.

Present Plan Favored

"Any chemical specification which might be adopted or physical tests outlined to determine quality can be of no value unless it is possible for the consumer to check and determine whether material as specified is being received; and the manner in which such tests are taken and the quantity of material they represent are of the utmost importance and consequence. Lack of ductility or failure to respond to manufacturing operations might result from the use of an entire heat of improperly made steel.

"This steel reaches the tin plate maker in units of approximately six to eight tons of Bessemer and 50 to 80 tons of open-hearth. In the course of manufacture this steel cannot be identified, so that the quantity to be accepted or rejected by such tests as it might be possible for the customer to make would not only be important, but it will be readily seen cannot safeguard the customer, and might seriously penalize the manufacturer. Again, failures might be the result of improper annealing, which operation is carried on in units of probably less than five tons, and no doubt considerably less than this quantity would be affected.

"Variation in weight of coating is in evidence not only on the output of each individual tinning stack, but the product of each pot will vary from time to time and constantly during the entire operating period; and this, so far as is known to the art today, is uncontrollable.

"The above is not intended to be in detail, but presents the matter in a manner which will clearly indicate the impossibility of checking up specifications with reasonable fairness to all concerned.

Questions as to Tests

"It would be difficult to determine to what extent tests should be made and what quantity each test should represent. To undertake the analysis of a sheet from each box would be an enormous undertaking, and even then would not insure that the material accepted or rejected was or was not within the specification. In determining the amount of coating carried on the plate and if it conforms to the specifications, we asume this can be done only by chemical method, which would disclose little or nothing beyond the amount of tin contained in or on the sheet analyzed. This would mean to the manufacturer substantially a spot test, or, in other words, to insure acceptance of his product and to bring the areas of lighter coating within the specification, he would of necessity be forced to adopt the practice of coating the entire product so heavily that minimum points would come within the specification. This would mean the consumption of a very excessive amount of tin of no value whatever to the customer and would represent serious economic loss. It would probably mean increasing the amount of tin now used for material to the canning trade of from ¾ to 1-lb. per base box. We might calculate the cost of this additional amount of tin at a fixed price per lb., and we could calculate the cost of other features in our operation as a result of this change in practice. We cannot, however, even attempt to estimate the influence the additional consumption of pig tin would have on the tin market. This market is a very sensitive one and closely controlled abroad, subject to serious and excessive fluctuations. During the late war, pig tin reached a price of $1.10 per lb.; under normal conditions it has reached 65c. per lb., and it is safe to assume that any substantial increase in the quantity consumed in this country would immediately sky-rocket the price of tin probably to a point not as yet dreamed of."

Cooperation between the professional engineers of both Czechoslovakia and Poland and the Federated American Engineering Societies is being established, according to the president of the federation, Dean Mortimer E. Cooley. Dr. Bedrich Stepanek, who recently resigned as minister of Czechoslovakia to the United States, will spend six months in this country studying industrial, agricultural and social conditions, principally in the South and West.

Herbert Hoover has been elected to honorary membership in the Czechoslovak Engineers and Architects Association, the honor being conferred at the annual conference of the association held recently at Kosice.

The "Stainless" Metals of Commerce

(*Continued from page* 615)

with the greatest trepidation on the writer's part that the lines immediately following are written, since to the metallurgist they must appear so elementary. They are written in the hope that this short treatise may appeal to some who do not describe themselves as metallurgists.

Plain carbon steel in its physical make-up has been aptly likened by a celebrated chemist to an igneous rock. The carbon it contains combines chemically with a definite atomic proportion of iron, and the chemical compound so formed alloys itself with more "free" iron, the particles of the alloy thus formed being interspersed more or less regularly through any remaining "structurally" free iron. It will be readily apparent that at a certain limiting proportion of carbon there can be no structurally free iron left, the whole of the steel mass being composed of the alloy pearlite. At such a point, which in plain carbon steel is reached at 0.89 per cent carbon content, the steel is described as a "saturated" one. Below this point we should call it "subsaturated," and above it "supersaturated," for in the last named the compound of iron and carbon begins to make its appearance as a separate entity.

On subjecting the steel to a temperature only in the order of half that required to melt it, the pearlite alloy becomes dissociated, and the chemically compounded carbide of iron passes into solid solution in the uncombined iron. If we cool the heat-soaked mass slowly, the carbide of iron once more separates out; if on the other hand we abstract the heat very quickly from it, we retain the solid solution—as an intensely hard and brittle mass which we call martensite. But on the incorporation of certain metals with steel in sufficient quantity profound changes are brought about in these respects. The percentage of carbon with regard to the point of saturation is materially altered, and concurrently the chemical and physical properties of the main mass may be altered completely.

Effect of Nickel Additions

Let us take as an example the case of the addition of nickel to a subsaturated steel. Up to a certain point progressive increments of nickel strengthen and toughen the steel, which retains its pearlitic character. On reaching this point—whose location depends very largely on the original carbon content of the steel—further increments of nickel render the steel intensely hard automatically. As a matter of fact, without the intervention of any heating and rapid cooling it becomes naturally martensitic.

There is, however, a limitation of the hardening and embrittling effects of the nickel additions, the point of limitation being again determined mainly by the percentage of carbon in the steel. And beyond this point the metal changes its character again as the result of the addition of still more nickel, becomes soft, pliable, and malleable, has a homogeneous microstructure, and possesses new physical characteristics as to electrical resistivity, reaction to chemicals, magnetic properties, and measures of contraction and expansion. In effect, we have attained another base, complex instead of simple, and differing entirely from our original base in its chemical and physical properties, though iron is the major constituent of it.

Austenitic Iron Alloys

Reverting to generalities, the natures of complex iron-containing bases will naturally differ radically in properties according to their secondary metallic components. As a class they may be described as "austenitic" or "polyhedral" iron alloys, though they are not all simple "austenites." Many contain free carbides also and consequently can be hardened on suitably heating and quenching. It should be pointed out, also, that their mechanical distortion in some cases brings about transformation, and consequent "throw-back" in properties.

It is significant that the revolutionary ferrous advances of the last dozen years lie in the domain of complexes such as have been described generally, and it is the considered opinion of the writer that in the development and modification of those complexes—whether already known or to be discovered—our chief future advances in ferrous metallurgy will be made.

"Manganese" steel was the forerunner, "nickel valve" steel was the immediate successor, "high-speed" steel followed, and subsequently came "stainless" steel, far and away the most epoch-making of them all. The high-speed steel of 20 years ago was little more than the plain complex or iron and tungsten. The "super" high-speed steels of today are examples of the development of that complex. Is it not logical to regard that member of the "stainless" series most familiar to us today, viz., "stainless" cutlery steel, as one example of partial development of the iron-chrome complex, in the further development of which complex great strides can be made? It cannot be too insistently enunciated that the word "stainless" as applied to steel is a descriptive name covering a wide series and not merely one particular type. Too often is the name associated only with cutlery steel, because this happens to be the type of the series which is most familiar to us.

Proper Heat Treatment Essential

It must next be realized that stainlessness in steel, even in the restricted sense hereinbefore defined, is the result of development by physical means of an inherent property; in other words, "stainless" steels must not merely be suitably compounded, but suitably heat treated also, in order to get maximum results. Broadly it may be said that the more its chrome-cementite is retained in solid solution in the polyhedral chrome-iron alloy the better will be its stainless properties. But the passing of chrome-cementite into solid solution is slow, and needs a high heat; wherefore hardening must be carried out at temperatures very considerably above those incident to the treatment of plain carbon pearlitic steels. As compensation, however, the solid solution is much more stable in comparison, hence subsequent tempering can be carried out at correspondingly higher temperatures. Since one of the most important functions of tempering is to release hardening strains, and since release of those strains is much more efficiently performed as temperature rises, this attribute is very valuable.

"Stainlessness" at Varying Temperatures

A brief description of some emperical tests in demonstration may be of interest. The "stainless" steel used was somewhat lower in chromium and somewhat higher in carbon contents than the variant used for cutlery; therefore temperatures must be regarded comparatively rather than literally. Five sample pieces of it were quenched respectively at 950, 1000, 1050, 1120 and 1200 deg. C. After quenching, the microscope showed that the first quenched piece contained a fair amount of free carbide; the second less; the third only traces; while the fourth and fifth contained none. The action of vinegar on them showed a very decided stain on the first, less staining on the second, barely traceable staining on the third, and complete non-attack of the fourth and fifth. Subsequent tempering of the pieces, repolishing them after each tempering treatment, showed tempering up to 550 deg. C. to cause no visible modifications of power of resistance to vinegar attack, while tempering at 600 deg. C. lessened resistance to staining in each case. Samples of "stainless" cutlery steel were next correctly hardened, as checked by the microscope, and respectively tempered at 500, 550, 600 and 700 deg. The first showed no diminution of resistance to staining; the second decided diminution of resistance; the third, very marked, and the fourth still more marked diminution.

The pioneer work in connection with chromium "stainless steels" will always be associated with the name of that gifted practical scientist, Harry Brearley. Their development is being ably carried on by many workers, of outstanding prominence among whom is Dr. W. H. Hatfield. His monumental work on stainless steels—as also on the corrosion of metals generally—must enshrine his name permanently in metallurgical history.

A brief review of the non-ferrous and "Borderland" stainless metals may not be without interest. Since stainless steel had its first exposition with regard to table cutlery, it is reasonable to suppose that non-ferrous articles of table furnishings would be the first to receive attention. And this has been so. But here two fresh considerations must come into play. First, in contradistinction to knife blade manufacture, the majority of the work on them—especially in the later stages—has to be done cold, and for carrying it out very expensive tools are necessary. The stainless non-ferrous alloy, therefore, must be very amenable, otherwise the increased cost due to restriction of output and destruction of tools would prove prohibitive. Second, the question of color comes into play. It may be said that this is merely an aesthetic consideration. But the nature of demand creates the nature of supply, so that the point of color becomes a very commercial one.

Nickel-Chrome and Nickel-Copper

Of all the stainless metals of commerce none are, or, in the writer's judgment, can be equal in power of corrosion resistance to metals of the nickel-chromium series. But, as far as our present knowledge of them extends, they must be ruthlessly ruled out of the category of commercial stainless metals, whose exponents are consumed almost entirely in the fabrications of articles of table furnishing or of ornamental function. Nickel-chromium alloys are very stubborn in their cold working, and enormously destructive to fine tools. As to color, the fact has to be faced that any alloy of which nickel forms the preponderating component shows lack of the desirable silvery whiteness. Where, however, nickel represents less than half the make-up—in some cases very considerably less—the silvery white luster is attainable.

Monel metal, which typically may be described as an alloy containing 70 per cent of nickel and 30 per cent of copper, and which has corrosion resisting qualities of a high order, is thus also sequestered from present consideration, on the question of its color, which is unfortunate, since the metal is quite reasonably amenable mechanically.

German or Nickel Silver

Articles of table furnishings or of somewhat allied description are almost invariably made from one of the series of alloys known generally as German, or nickel, silver. They may de described as containing a proportion in the order of three-fifths of copper, one-fifth (or less) of nickel, and one-fifth (or more) of zinc. The article fabricated from it is usually plated by the electro-deposition on its surface of a protective and ornamental simple metal. Some of the nickel-silvers, high in nickel content, are polished as they stand, with appearance results quite satisfactory. Regrettably, such metal articles—whether plated or unplated—stain, corrode, tarnish and discolor badly in their legitimate use. The principle of composition of most of the so-called "stainless nickels" on the market may be broadly described as modifications of the present nickel silver to the extent of cutting out the zinc, at the same time greatly increasing the nickel proportion, and incorporating with the alloy a small quantity of some other constituent, such as tin or phosphorus.

The Nickel-Cobalt-Chrome Series

New trade variants are constantly being presented to us, but details of their composition and manufacture are secretively guarded. The advisability of the use of cobalt as an additive metal in reasonable proportion is strongly indicated from our present knowledge. The writer is firmly of the impression that, provided prices be not prohibitive, the best of the non-ferrous stainless alloys will be found in the nickel-cobalt-chrome series. Such alloys, naturally, will always be comparatively expensive.

It is no idle dream that in the fairly near future developments will take place in the ferrous stainless alloys which will result in their power amply to fill those requirements which at present can be met only by the non-ferrous stainless metals.

Reference should be made to the progress that is being made with one of the expensive metals most familiar to us, namely silver. Here the experimenter is severely limited, for by law an article of silver which legally can be described as such must contain at least 92.5 per cent of silver. While the subject of non-corrosive silver, or stainless silver, has not been tackled with finality, great progress has been made in a modified direction. One of silver's worst enemies is tarnish, the visible result of action brought about by atmospheric, though not oxidizing, influences. There has been placed upon the market lately (and the facilities for its production are practically unrestricted) a sterling silver, legally acceptable, and indistinguishable as to its appearance and behavior from the ordinary silver known to us, which even under intensive conditions does not tarnish or lose its color as to its unprotected polished surface.

In fine, we may now be said to have entered upon an era of "stainless" metals. In that era the predominant rôles will be played by the nickel complexes and by the iron complexes, and chromium will prove one of the most helpful allies. There remains much to be accomplished, but the movement is well under way. Even silver has awakened from its Rip Van Winkle sleep of centuries.

NEW TRADE PUBLICATIONS

Charging Equipment for Vehicle Motive Power Batteries.—General Electric Co., Schenectady, N. Y. A 12-page folder, bulletin 43976, illustrating and describing equipment as designated in the heading, and including not only the motor generator sets, but switchboards of all capacity and semi-portable sets.

Riveters.—Hanna Engineering Works, 1765 Elston Avenue, Chicago. A 64-page catalog of pneumatic and hydraulic riveters of large and small capacity and great variety of form and design. Air hoists and trolleys for supporting riveters or other weights are also featured. The catalog makes a point of providing easy ordering of spare parts by the use of diagrams, names of parts, weights and code words. The largest riveter shown has a reach of 21 ft. and exerts 100 tons pressure. Other types with smaller reach go as high as 150 tons pressure.

Expanded Lath. General Fireproofing Co., Youngstown, Ohio. A 16-page pamphlet devoted to solid partitions based on metal lath and with particular reference to saving space by the thinness of the partitions, and to making them sound-proof. Detailed drawings are given, showing construction arrangements.

Bare and Insulated Wire and Cables.—American Insulated Wire & Cable Co., Chicago. A flexible cover booklet of 128 pages, measuring 3½ x 6 in., and devoted to descriptive matter covering weatherproof and bare copper wire, concentric and rope lay strand copper cable, galvanized steel strand, bare iron and steel wire and other material. Nearly half the book is devoted to tabular matter concentrated on the subjects most applicable to the wire using industries, including wire tables, metric units, pole line data, copper statistics and other cognate matter.

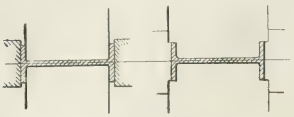
Electro-Plating and Buffing Apparatus.—A. P. Munning & Co., Matawan, N. J. Not only is this 276-page book a catalog of apparatus and supplies for all industries doing electro-plating and buffing, but it also is a compendium of useful information to those engaged in this class of work. It contains chemical and electrical information of distinct value to electro-platers. It lists and briefly describes 229 chemicals used in various electro-plating industries, and gives a reference list of scientific articles and bulletins of the Bureau of Standards covering specific portions of the literature of the industry. An index at the back makes it easy to find information desired, while the illustrations, both half-tone and line-cut, are numerous.

Induction Motors.—Reliance Electric & Engineering Co., Cleveland. Bulletin No. 5018 descriptive of type AA induction motors for two and three-phase alternating current circuits. Illustrations are numerous and include sectional and exploded views. A table of ratings and general outline dimensions are given. Salient features of design are discussed.

Rolling Broad-Flanged Beams

(*Continued from page 616*)

passages through one and the same pass, the flanges are full at the end, while at the center they vary. The result is a variation in the dimensions of the flanges, which causes much trouble during subsequent rolling. This trouble is overcome in the suggested arrangement by the constant flattening out in the shaping pass of the blooming mill.



Main Stand First Stand

Fig. 3—Finishing Mill

In the suggested arrangement the bloom is rolled end-on a number of times at the very beginning, until the requisite width of flange is attained. Hence the flanges are thickened at the outset. This is necessary because, when the bloom goes through the shaping pass, the flanges are subject to very slight pressure as compared with the web. The result is that the formation of fins on the web is enhanced the more the latter is compressed. This, however, contravenes the second principle of establishing, as early as possible, the ratio of cross-sections between flange and web of the finished beam and maintaining this ratio throughout the rolling.

With two pairs of vertical rolls it is possible, by suitably adjusting the distance apart of the rolls, to exert a constant horizontal pressure on the flange. This pressure need not be so great as in the special mill. It is even desirable in the blooming mill to apply stronger pressure for a time to the web than to the flanges, as the ingot is not so dense inside as on the outside, and because the lack of density in the inside can be remedied by the heavier pressure applied to the web, the bloom being at this moment still at welding heat. It would be sufficient in the case of beams 40 in. deep to make the width of the bloom 64 in., or at most 68 in., and to reduce this down to 56 in. at the final pass. It is sufficient, then, if the vertical rolls can be adjusted within 8 in. on either side.

The H-shaped bloom is then passed from the blooming mill to the special mill. The rolling can be finished in a single mill of this kind with one or two stands. At Differdingen, however, an intermediate mill, also with four rolls in the same plane, has been installed, which is an improvement owing to the fact that the material to be rolled is distributed over three plants and hence output is increased. Further, the rough-rolled material leaves the blooming mill with a thicker web and flanges, and the final ratio of cross-sectional areas between flange and web is reached at an earlier stage in the rolling.

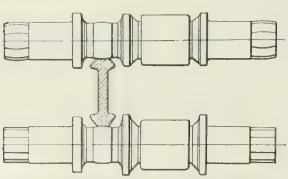


Fig. 4—Blooming Rolls for 40-In. Beams

This intermediate mill at Differdingen has been more generously dimensioned than the finishing mill, from the correct standpoint that the pre-rolled section must be rolled here as quickly as possible, if the beam is to be finished with the metal at a reasonably high temperature. The intermediate mill at Differdingen, however, is not designed on lines similar to the finishing mill, but has only one stand. It is therefore necessary to limit the width of the flange in this intermediate stand. This arrangement would not be desirable in any proposed new plant; the intermediate mill should be arranged just like the finishing mill, but the diameter of the rolls should be increased, as has been done at Differdingen.

There are two important reasons in favor of this proposal. Since the whole of the work of rolling in the intermediate mill is carried out on one stand, it has been found necessary to chamfer the edges of the flange, as shown in Fig. 1, with a view to preventing the formation of burrs in the intermediate mill. The advocates of this idea maintain that this chamfering in the blooming mill has its special advantages, the material of the flange being squeezed toward the junction between flange and web, and therefore preventing the formation of hollows.

This opinion, however, is based on a false conclusion.

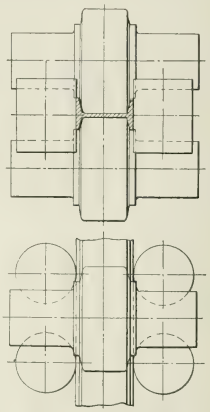


Fig. 5 — Blooming Stand with Vertical Cylindrical Rolls

A glance at Fig. 1 will show that the material forced from the edges of the flanges does not get to the junction between web and flanges. The edge of the flange is finished long before the web attains its final thickness. Moreover, it is obvious that the rolled-down material flows toward the ends of the flanges, because the bloom is partly not shaped at all and partly only very roughly shaped. Should the material not be sufficiently ductile, there is a danger of the edges of the flange becoming cracked—a serious drawback.

This chamfering is even more risky in the intermediate mill (Fig. 2). In this case the whole principle of correct rolling goes by the board. Owing to the blooming roll being chamfered, it is impossible to get a shape in which the correct ratio between the sectional areas of the web and flange is established. On scrutinizing the first pass in the intermediate mill (Fig. 2), it will be seen at once that, due to the chamfering or beveling, the flange has much too small a cross-section compared with that of the web. This must necessarily lead to the formation of a fin on the web, and set up internal stresses in the rolled product. This fact alone condemns any chamfering or beveling. Further, the material of the flange, due to the lower pressure, is not properly worked, and instead of strengthening the junction between flange and web, the material escapes through the free passage left between the vertical and the horizontal rolls.

If the intermediate mill is designed in the same way as the finishing mill, but stronger, all broad-

flanged girders over 24 in. deep should be finished on the intermediate mill. In this way it is possible to apply greater pressure and so finish the product with the minimum loss of heat. For sections from 5½ to 24 in. deep, it is desirable, in view of high production, to distribute the work over three stands. In the case of heavier sections, where two 10-ton or 12-ton blooms are always in course of being rolled, the diameter of the rolls in the intermediate mill should be 56 in., while 48 in. to 50 in. should be sufficient for the rolls of the finishing mill. This assumes that the maximum width of flange does not exceed 16 in.

The position of the intermediate mill relative to the blooming mill will naturally depend on the available site and space. If there is sufficient room, the intermediate mill should be laid down in a line with the blooming mill, but there is no great objection to installing the two mills side by side. As regards the finishing mill, it is well for this to be at the same level as the intermediate mill.

It will generally be necessary to crop the bloom, probably at both ends, on leaving the blooming mill. For this purpose large hydraulic shears with specially shaped blades are not recommended. Large saws on sledges and running at a high speed, and with large centrifugal masses, are more suitable.

As regards the finishing mill (and the remarks will apply to the intermediate mill also, if it is designed on the same principle), for new mills cylindrical vertical rolls are preferable to double-conical rolls (Fig. 6). One of the advantages of the former type is that the bottom roll and the vertical rolls do not require to be adjusted vertically, but only the top roll. With double-conical rolls it is necessary either to adjust both horizontal rolls in a vertical direction, while the vertical rolls are not moved in a direction perpendicular to the former, or the bottom roll can be made a fixture, the vertical rolls and the top roll being arranged so as to be adjustable vertically in the fixed ratio of 1 to 2. Mill workers do not care for adjusting the bottom roll. The only alternative course is to make the vertical rolls adjustable in both directions and to displace them vertically in the ratio of 1 : 2 relatively to the top roll. This is difficult, because of the unequal wear due to the unequal pressure borne by the bearings of the top roll and the vertical roll.

All these difficulties are avoided by using cylindrical vertical rolls. They have the further advantage of needing support only at the bottom and are quite free at the top. They butt against two smooth rolls which take up the whole of the horizontal pressure (Fig. 7). By this arrangement the correct rolling of the beam is controlled automatically.

Assuming that the vertical rolls are not truly perpendicular to the flange, but too tight at the bottom; the vertical roll in that case would bear hard on the ball bearing and cause overheating. If, on the other hand, they were too tight at the top, then the roll, due to want of support, would be lifted up. The attendant would therefore have only to watch that the vertical rolls are running smoothly to be sure that the section was being rolled with the flange at a true right-angle to the web.

Wear of the rolls is a very troublesome feature in the rolling of beams with broad flanges without taper. In this particular the special rolling mill is in a different position from the ordinary rolling mill, where wear is of considerably more importance. As an example, let us take a roll which was set once or twice for rolling 12-in. broad-flanged beams. The rolls were then turned down and the mill used for beams of 11.6 in., and after being run once or twice, the rolls were further turned down and the mill used for rolling beams 11.2 in. deep.

This process can be continued until the diameter of the roll becomes so small as to make it impossible to adjust the vertical rolls. This, of course, occurs at an earlier stage than the possibility of turning down the roll for the next smaller section. The same remarks apply to the larger sections, in which case it is found possible to dress the roll four or five times

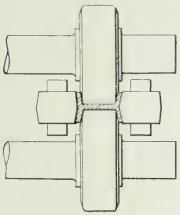


Fig. 6 — Mill for Rolling Beams; with Double-Conical Vertical Rolls

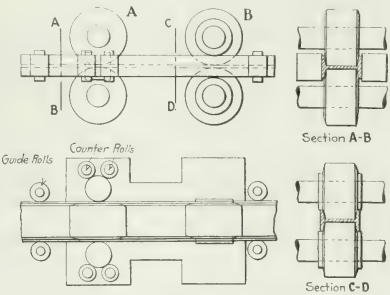


Fig. 7—Rolling Mill with Two Pairs of Stands

In normal production before being obliged, due to wear of the sides, to turn down the roll to the next lower section.

The smallest section hitherto rolled in these special mills is a beam 140 mm. (5½ in.) deep. But there is no reason why broad-flanged beams 120 or even 100 mm. deep (4¾ in. or 4 in.) should not be so rolled.

In conclusion, it is essential to get a straight run for the finished beam. For this purpose the Differdingen Works have already fitted guide rolls behind the finishing rolls. Such guide rolls should be used not only behind the rolls, but also in front of them, and not only in the finishing mill but in the intermediate mill.

The Struthers Furnace Co., operating a merchant stack at Struthers in Mahoning county, has banked the furnace owing to stagnation in the pig iron market. Just prior to closing, the stack had been pouring on foundry iron, but previously had been producing basic for steel makers' requirements. There is piled in the furnace yard a sufficient stock of iron to care for customers for some time. By the time of exhaustion of these stocks, it is expected conditions will have so shaped themselves that the furnace will either resume or will be blown out. It has operated since early in the year, except for a period of idleness in mid-summer for repairs. Suspension of this unit, and resumption of a stack of the Shenango Furnace Co., gives the district 32 active furnaces, of 46.

Machinery, steel and equipment of the Century Steel Co., Poughkeepsie, N. Y., comprising a complete crucible steel plant, will be sold at public auction on the premises, Sept. 14, starting at 11 a. m., by the Industrial Plants Corporation, 25 Church Street, New York.

President Coolidge's Position on the Tariff

White House Believes Business Should Not Be Unnecessarily Disturbed—Increase Proposed on Pig Iron and Decrease on Magnesite Under Flexible Provision of Law

BY L. W. MOFFETT

WASHINGTON, Sept. 4.—The White House statement last week that President Coolidge will exercise great caution in changing import duties under authority of the flexible provisions of the Fordney-McCumber tariff act has had the effect of confirming the general view that the President would go slow in making use of this new departure in tariff making. While some adhere to the opinion that the statement credited to the President was equivalent to a decision to make no changes at all in tariff rates under the flexible provisions, this is held to be an extravagant and unwarranted interpretation of the position of the President. A few sought to support this view by claims that Mr. Coolidge, in contrast to the late President Harding, who sponsored the flexible provisions, is decidedly cold, if not actually hostile, to them. But, it is pointed out, this opinion is not justified. Further discussion of the subject by the President showed that what he had in mind was that business needs assurances of stability and confidence and knowledge that the country is to go ahead without any great changes. The President was said to feel that stability in tariff duties is an important influence. At the same time, the President was declared to hold the opinion that, if the Tariff Commission makes the report showing a wide variation in figures upon which rates in the tariff were based by Congress, he should make use of the powers given him and change the duties, but only in clearly defined cases where the need for changes is apparent.

Question as to Constitutionality

It is well recognized by the Administration that the flexible provisions sooner or later will be the object of attack in court as to their constitutionality and it seems altogether likely that these provisions will have to be passed on and their status determined by the Supreme Court of the United States. The principal attack made against the provisions from a point of law is that Congress, charged by the constitution with the duty of raising revenues, has no power to delegate to the President the right to change tariff rates which obviously affect revenues. Several means of preventing the application of changed rates are reported to be in contemplation, but so far these reports have not been verified. Among the reports was one that injunction proceedings might be sought. The object of the injunction has been variously mentioned as the Tariff Commission, which has authority to recommend new rates; the President, who has authority to order them put into effect, and the Treasury Department, which through its customs officers would collect revenue under the new rates. There are other provisions in the tariff which are also likely to be the object of legal attack, including the retaliatory clause, which its opponents claim violates commercial treaties between the United States and "most-favored" nations. Attack on any new tariff law of course is nothing new; it is the usual thing. The chief interest in the present attack relates to the flexible provisions because the latter represent a new form of tariff regulation for the United States.

The construction placed upon the legality of the flexible provision necessarily affects the business interests of the country. So far, only three investigations under the flexible provision of interest to the iron and steel and related trades have been ordered by the Tariff Commission. One relates to pig iron, the second to files, and the third to magnesite and magnesite brick. The domestic end of the pig iron and file investigations has been completed and authorization from the commission is being awaited to begin the investigations abroad. The magnesite investigation was ordered recently.

Appeal of Eastern Companies

Application for the pig iron investigation was made by the tariff committee of Eastern pig iron manufacturers representing producers of pig iron and the Eastern seaboard section of the United States and representing 23 blast furnaces. The committee consists of Robert C. Lea, chairman, secretary and treasurer Robesonia Iron Co., Ltd.; Richard Peters, Jr., former manager of sales Pulaski Iron Co., now with the Robesonia Iron Co., and John W. Logan, secretary Alan Wood Iron & Steel Co.

The companies represented by the committee are the E. & G. Brooke Iron Co., Central Iron & Steel Co., Colonial Iron Co., Delaware River Steel Co., Eastern Steel Co., Pulaski Iron Co., Replogle Steel Co., Reading Iron Co., The Robesonia Iron Co., Ltd., Thomas Iron Co., Witherbee, Sherman & Co., Alan Wood Iron & Steel Co.

The pig iron application was filed with the Tariff Commission last December. An examination of it shows that not only is the charge made that pig iron from Europe was being sold in the United States at less than the cost of production in this country, but in some cases, it was said, there was reason for believing that English pig iron was being sold in the United States at prices less than cost of production in the country of origin, which would come under the anti-dumping act.

The petition of the American pig iron interests in part says:

"It is urged upon your honorable commission that in considering our application for an investigation it should be borne in mind that the situation of blast furnaces east of the Alleghenies in relation to the competition of foreign iron is very different from that of inland furnaces whose markets are protected to a very large if not an entire degree by freight rates from ports of entry to inland points, and therefore that statistics having to do with the American pig iron industry as a whole do not necessarily apply to that part of the industry which is located in the Eastern seaboard section. Thus it will be found at the present time that there is a greater degree of activity among inland furnaces than among those located in the East. Despite the fact that the present is a time of relatively large activity in the iron and steel markets, there are in the Eastern section modern well-equipped furnaces which are unable to operate through inability to compete with the foreign pig iron."

Recent Competition

"During recent months pig iron from England and the European Continent has been available and has been bought in large quantities in the markets served by the blast furnaces which this committee represents at prices which were and are not only much lower than the prices of domestic pig iron, but also in many instances lower than the cost of producing pig iron at the furnaces which this committee represents, which constitute the majority of the merchant furnaces and some of the steel works furnaces in the Eastern seaboard section. There is also some reason for believing, particularly with reference to certain tonnages of English pig iron which have been and are being imported, that some of this foreign iron has been sold at prices less than its cost of production in the country of origin, thus perhaps coming under the anti-dumping clauses of the existing tariff law. However, at the present

stage of its investigation of these matters, this committee is not prepared to prove this particular item of its allegations, but merely offers the same as a reasonable surmise based upon general information.

"The disparity between the prices of foreign and domestic iron has recently been lessened by a sharp decline in the price of domestic iron brought about very largely by the competition of the foreign material. It remains the fact, however, that both British—and to a greater degree, Continental iron—can be obtained at prices below present or any probable future costs of production of domestic iron.

"It is the unanimous belief of the companies represented by this committee that the pig iron industry of the eastern seaboard is seriously threatened by the competition of foreign pig iron, and relief under Section No. 315 of the tariff act is most earnestly sought at as early a date as may be possible."

Proposed Reduction on Magnesite

The application for investigation in the magnesite situation seeks maximum reduction on magnesite by 50 per cent. The application was filed by Special Representative John Joseph Ernster, Boulevard de Holbrich, Luxembourg, for the following foreign producers: Austro-American Magnesite Co., Steirische Magnesit Industrie, Magnesitwerke Eichberg-Aue Gesellschaft. The magnesite petition to a large extent renews arguments which were made during the tariff hearings. It is maintained that before the war about 90 per cent of the United States requirements of magnesite were furnished by works in the former Austro-Hungarian monarchy and that it was the "main endeavor of the Austro-Hungarian industry to displace from the market substitutes for magnesite consisting principally of dolomite and chrome, which were at all times used in the United States. They succeeded to a large extent, as the United States steel industry, after using magnesite, was soon convinced of its superior qualities. Though chrome and dolomite were cheaper than magnesite, they were, therefore, largely displaced owing to their inferior quality and shorter durability."

The petition maintains that quality of domestic magnesite which was stimulated when the Austrian sources were cut off by reason of the war did not "reach up to that of Austrian magnesite." At some length the petition sets forth the arguments made in connection with the tariff on magnesite, attacks a domestic producer of magnesite for the import rates asked and says the tariff finally passed with a duty of $11.50 per net ton of calcined magnesite and $15 plus 10 per cent per ton of magnesite bricks. The petition goes so far as to state that the Western producers of magnesite had stopped production since Jan. 1, 1921, "not because they were unable to compete but chiefly for the purpose of demonstration, and they have not to date resumed work, even after imposition of the tariff, presumably in order to show the impossibility of competing successfully with their products on the Eastern market owing to the high freight, the reduction of which they are striving for."

Claims of Foreign Producers

After attacking statements of domestic producers as to selling prices of Austrian magnesite, the petition continues:

"The first effect of the new tariff was that prices for magnesite rose by about the height of the tariff. Before the tariff was passed, the average price of calcined magnesite in America was $29 to $30 per ton, and $50 to $55 per ton of magnesite bricks, whereas after the introduction of the tariff calcined magnesite sold at $40 to $43 per ton and magnesite bricks at $70 to $75 per ton. The price of bricks was recently reduced to $65 per ton.

"Of course, the industries using magnesite are much affected and the tariff does them considerable damage. They are now compelled either to pay for magnesite the increased price due to tariff or they have to go back to the use of cheaper and inferior substitutes such as chrome and dolomite they had discarded before the war as being of poor quality. According to numerous reports, American steel manufacturers seem to have decided to use these cheaper substitutes, chiefly chrome ore and chrome bricks, which are still free from import duty. Chrome ore sells at present at $16 to $18 per short ton c. i. f. Philadelphia or Baltimore, chrome bricks at $50 per short ton f. o. b. American port. Chrome is found in the United States in relatively small quantities and is mainly imported from Greece and New Caledonia. It is much more used now because the high tariff has come into force. This is also proved by the fact that before introduction of the tariff chrome was used for refractory purposes only, the quantity being about a tenth that of magnesite.

"The fact that chrome is more used shows that American magnesite works themselves have suffered from the new tariff and the consequent increase of magnesite prices, sales having much decreased, owing to the revival of substitutes. Naturally, Austrian magnesite works suffer in a still higher degree from conditions caused by the tariff which practically prohibit the shipment of Austrian magnesite to America. The importance of the effect tariff had on Austrian magnesite works can be judged from the fact that previously the average export to America was 60 to 70 per cent of the entire Austrian magnesite output. The Austrian magnesite works employ about 6000 workmen, and American capital to the extent of about $3,000,000 is invested in the Austro-American Magnesite Co., Radenthein."

BRITISH FOREIGN TRADE

July Steel Exports the Smallest This Year—Imports Show Little Change

A sharp decline in British iron and steel exports was registered in July. The total, including scrap (6852 tons) was 314,522 gross tons, or the lowest this year and the smallest since September, 1922. The July exports were nearly 120,000 tons less than in May. Imports in July were 128,486 tons or close to the average for the first half, comparative data for both exports and imports, scrap being included, were as follows:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Aver. per month, first quarter, 1923	358,208	128,032
April, 1923	398,507	133,929
May, 1923	435,630	114,132
June, 1923	373,277	130,066
Aver. per month, second quarter, 1923	402,471	126,042
July, 1923	314,522	128,486
Average per month, 1922	295,980	82,215
Average per month, 1921	144,885	152,734
Average per month, 1920	274,881	128,685
Average per month, 1919	188,519	50,801
Average per month, 1913	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month

	1913	1922	July 1922	July 1923
Pig iron	93,700	66,159	27,615 23,058	36,938 16,512
Ferroalloys				
Steel rails	42,200	21,300	6,955	24,473
Steel plates	11,200	7,400	6,258	13,851
Galvanized sheets	63,500	43,600	37,739	40,527
Steel bars rods, etc	20,900	19,100	20,221	29,646
Tin plates	41,200	37,400	40,809	39,993
Black plates and sheets	11,700	18,700	18,785	29,808

Data as to importations of importance are as follows in tons per month:

	1913	1922	Jan.-July 1923
Iron ore	620,000	289,400	541,255
Manganese ore	59,100	28,109	39,910
Pig iron and ferroalloys	18,000	12,800	11,325

Exports of scrap iron and steel in July were 6852 tons, or 10,464 tons per month for the first seven months of this year, as compared with 12,880 tons per month in 1922. In 1913 there were 9600 tons per month.

The Youngstown Sheet & Tube Co., Youngstown, has declared a quarterly dividend of $1.25 per share on common stock, and $1.75 on preferred, both payable Oct. 1 to stock of record Sept. 15. Disbursement of this common dividend will make a total of $3.50 per common share paid this year.

Russia Slowly Improving in Iron and Steel

Production Increases as Communistic Methods Are Abandoned—Ural District Sells to Manchuria—New Currency Gradually Replacing Paper Rubles

BERLIN, GERMANY, Aug. 16.—In spite of an occasional relapse, Russia's iron and steel industries continue their slow recovery. The recovery is quite evidently associated with the decrease in communistic control, particularly as it is manifest in the growth of semi-independent trusts, the leasing to private interests of former nationalized undertakings, the restoration of transport and banking, and the spread of the new gold-secured currency in "tchervonetz" units, each equal to ten gold rubles. On July 1, 13,500,000 "tchervontsi" were in circulation against 200,000 on Dec. 1, 1922. The "tchervonetz," being fully secured according to the law of July, 1922, has maintained its exchange value, while the paper rubles which also circulate continue to depreciate. Part of the wages in some of the metal working plants are now paid in "tchervontsi." The state banks' present aim is to accumulate sufficient high-exchange currencies by export of grain and oil to provide security for a much larger "tchervonetz" circulation, so that the paper ruble will be gradually displaced and finally repudiated.

Acute Fuel Shortage

The fuel shortage is still acute. Coal production in all Soviet Russia increased from 30,500,000 puds in Sept., 1922, to 60,100,000 puds in December, after which the improvement was interrupted, production in January declining to 50,700,000 puds increasing in February to 61,400,000 puds, and declining again in March to 55,400,000 puds. These figures are gross. For April, May and June only net production, after supply of immediate needs was reported. The net figures are: April, 32,824,000; May, 43,837,000, and June, 50,500,000 puds. The last figure, being net, makes a new high record. The official *Izvestiya* reports that in June for the first time the coal output and the number of miners working reached 100 per cent of the official program. The Don basin's gross coal production in the first half (October, 1922, to March, 1923) of the current business year is officially put at 253,000,000 puds. The electrification of the whole Don mining district has been undertaken.

Iron Ore Output Still Very Low

The iron ore production is stated to be increasing. The Southern ore trust (Yuzhno-Rudni) reports an output of 1,050,000 puds in April; 1,532,000 puds May; 1,660,000 puds June, and (estimated) 1,580,000 puds for July. The iron ore production of all Russia in 1922 increased from 996,000 puds in January to 1,722,000 puds in December. The official program for 1923 was 3,250,000 puds per month, but this, it seems, will not be realized. In spite of the improvement, ore production is still a mere fraction of the pre-war production, when one leading group of mines, the Krivoi Rog, produced 90,000,000 puds a year. The export trust, however, complains that native Russian industry cannot consume the ore output, hence the export to Germany in the first eleven months of 1922 of 4,400,000 puds. This export has ceased with the general collapse of German ore imports as a result of the Ruhr situation.

Increasing Make of Pig Iron

The Soviet press reports a pig-iron famine. Commissary Bogdanoff lately rendered a report stating that the old reserves of pig iron had been used up, and that the new output of the blast furnaces is insufficient to meet even the very moderate domestic demand. The production program of the Southern furnaces for the first half of the current business year was 6,250,000 puds. The pig iron production of all Russia, according to a revised report of the Moscow Financial-Economical Bureau, was:

	Puds	Gross Tons
October, 1922	1,010,000	16,263
November, 1922	1,217,000	19,596
December, 1922	1,324,000	21,319
January, 1923	1,723,000	27,749
February, 1923	1,548,000	24,927
March, 1923	1,876,000	30,208
April, 1923	1,555,000	25,039
May, 1923	1,680,000	27,052

The latest figures for open-hearth steel production show 2,861,000 puds for March, of which 1,154,000 puds came from the Urals; April, 2,809,000 puds, of which 1,270,000 puds was produced in the Urals; May, 2,905,000 puds, of which 1,308,000 puds was from the Urals. Of rolled materials March figures show 2,548,000 puds; April, 2,319,000 puds; May, 2,450,000 puds and June, 2,656,000 puds.

Iron and Steel Deliveries to Asia

Despite the domestic shortage, the Urals have resumed delivery of iron and steel to northern Manchuria. The chief buyer, it is stated, is the Chinese Eastern Railroad. A Soviet law of July 17 restores to private individuals the right to prospect for metals, and gives them a preferential right in exploiting their discoveries. Concerning Russia's electrical industries it is reported that on June 1, 26 works were operating, employing 14,083 men. The output of electrical machines and apparatus in the first ten months of 1922 exceeded that of the same months of 1921 by 108 per cent.

Community Effort in the Location of New Industries

R. R. Shuman, for a number of years president of the Shuman-Haws Advertising Co., delivered an address before the Chamber of Commerce and other organizations of Appleton, Wis., on "Industry Finding," indicating the lines on which the efforts of civic organizations should be directed in the establishment of new industries. The classes of industries which it should be the aim to locate are described as follows:

1. More industries such as now succeed in the locality.
2. Industries producing equipment and supplies bought in large quantities by present industries.
3. Industries using products already produced in the town—converting plants.
4. Agricultural industries.
5. Industries producing commodities sold in large quantities by local jobbing houses.
6. Branch plants.
7. Industries using raw materials found locally.
8. Industries to take up excess in any kind of labor.
9. In the case of Appleton especially, industries in which low power cost is an important factor in production.

The address also points out what forms of promotion work may be best undertaken:

1. Make a scientific survey of industrial conditions as they are, uncolored by local pride or prejudice.
2. Determine upon the ten types or classes of industries which you most need and can best support.
3. Prepare a specific brief for each of these ten classes of prospects and mail a copy of it to all the well-rated Eastern and Central West firms in those industries.
4. Tell your specific story in the form of a double page or a colored insert in the trade magazines in each of these ten classes—a different story for each class—and offer to send a copy of a brief to responsible inquiries in each class.
5. Prepare a general industrial brief and do some general industrial advertising, enumerating your general advantages as well as your specific needs.
6. Advertise to industrial workers through national magazines and local newspapers, telling the human side of your community.
7. Foster cooperative promotion, inspection, pack, advertising and marketing of local farm products.

Machinery Markets and News of the Works

INQUIRIES MORE NUMEROUS

Automotive and Railroad Buying Looked for —Few Large Lists

American Steel & Wire Co. and Westinghouse Air Brake Co. Inquire for Several Tools

Improvement in inquiry has been noted in several centers, and prospects for business are considered better than a month ago. However no large lists have been issued, requests for prices being for the most part for one to three machines, actual sales being largely for single items also.

At least two manufacturers in the automotive field are expected to place orders in the near future, and resumption of railroad buying is looked for after the first of October.

The Ford Motor Co. is understood to have placed orders for considerable equipment during the past two weeks, and has other inquiries pending. Business from other Detroit automobile companies is in prospect. In Milwaukee the automotive industries appeared as the main source of inquiry.

New business that has developed includes a list of 27 machine tools issued by a textile interest for a new Southern mill.

Inquiries involving considerable equipment have come out from the American Steel & Wire Co., for its Trenton plant, and from the Westinghouse Air Brake Co., Pittsburgh. Gray & Davis, Inc., Boston, has purchased engine lathes, shapers and sensitive drills and are contemplating further purchases.

Railroad buying included drilling machinery taken by the Norfolk & Western. Purchases were also made by the Central Railroad of New Jersey, Seaboard Air Line, and the Elgin, Joliet & Eastern Railroad.

Interest in used tools centered largely in the auction sale at the Victory Plant, Squantam, Mass. At least 100,000 varities of equipment were offered, machine tools bringing good prices, and better, it is said, than anticipated.

New York

NEW YORK, Sept. 4.

THE market is extremely quiet, both industrial and railroad inquiries being at a low ebb. Some railroad business is reported placed and a fair degree of activity is noted in used tools. The Central Railroad of New Jersey has closed on its list, the purchase including one locomotive axle journal turning lathe, a car-wheel borer and a punch and shear from one builder, and two large turret lathes from another. Another fair-sized list recently closed was that of the Seaboard Air Line, which bought a 3000-cu. ft. air compressor and one of smaller capacity, a 36-in. punch and shear and a 60-in. punch and shear, two vertical wheel presses, three flue-welding machines and some woodworking machinery. The Elgin, Joliet & Eastern Railway has purchased a list including a 30-in. planer, an axle lathe, a car-wheel lathe and a 44-in. boring mill. Gray & Davis, Inc., Boston, Mass., who are reported to have closed on the recent inquiry for 5 engine lathes, 4 shapers and several small sensitive drills, are said to be contemplating further purchases. Sing Sing Prison has purchased a 50-ton hydraulic press. The Southern Railway is said to have received bids on two large turret lathes.

Property on 139th Street, near the Southern Boulevard, New York, 75 x 100 ft., has been acquired by the Multi Metal Co., 251 West Nineteenth Street, manufacturer of wire and screen cloth, etc., as a site for a new plant, for which plans will soon be prepared.

Work is in progress on a new ice-manufacturing and cold storage plant at 513-23 West Fortieth Street, New York, for the Ice Service Co., 68 Ninth Avenue, to be equipped for an initial output of 300 tons per day, and storage capacity of 4000 tons, estimated to cost $1,000,000, including machinery. James S. Maher, 431 West Fourteenth Street, is architect.

The Pavan Garage Co., 104 East 126th Street, New York, is planning for the installation of a lathe and other tools in its machine shop.

The Middle States Oil Co., 383 Madison Avenue, New York, has acquired a controlling interest in the Maar Oil Co., with plant at Eldorado, Ark. Plans are under advisement for extensions and improvements in the present plant, including the installation of additional equipment for larger capacity.

A machine shop, with lathe, drill press, cylinder grinder and other equipment will be installed in the five-story automobile service building, 100 x 100 ft., to be erected at 117 West Eighty-ninth Street by a new corporation, now being organized and whose name will be announced at an early date. It will cost about $500,000, with equipment. Louis Brooks, 17 East Forty-fifth Street, is architect in charge.

The Empire City Iron Works, Tenth Street, Long Island City, has awarded a general contract to the Gillies Campbell Co., 101 Park Avenue, New York, for the erection of a new two-story addition at Tenth Street and East Avenue. Leopold Heffner is president.

The Harlem Metal Corporation, 502 East 133rd Street, New York, is planning for the installation of additional metal-working tools and equipment.

The Martin-Parry Corporation, 61 Broadway, New York, manufacturer of commercial automobile bodies, with main plant at York, Pa., has leased a portion of the building of the Standard Steel Car Co., William Street and Ely Avenue, Long Island City, totaling 27,000 sq. ft., for a new branch plant.

Samuel S. Glauber, Inc., 242 East Seventy-ninth Street, New York, manufacturer of pipe, plumbing equipment, etc., will commence the construction of a new two-story works 100 x 135 ft., at 521-29 East Seventy-ninth Street, to cost about $170,000, for which a general contract recently was awarded to the Turner Construction Co., 244 Madison Avenue.

Plans are being perfected by the Department of Plant and Structures, Municipal Building, New York, Grover A. Whalen, commissioner, for the erection of a large central machine and repair shop, with parts manufacturing department, for automobiles and trucks used by the fire, police, street-cleaning and other city departments. An appropriation of $3,500,000 has been granted for the building and machinery. It will be located at Avenue C and Sixteenth Street and is expected to be ready for service within six to nine months.

Bids will be received until Sept. 10, by the Transit Commission, 49 Lafayette Street, New York, for the construction of an addition to the repair and equipment shops of the Interborough Rapid Transit Co., Lenox Avenue and 148th Street. The City Engineering Department, Municipal Building, is engineer.

The Western Electric Co., 195 Broadway, New York, has plans for the construction of a power plant at Kearny, N. J., to cost in excess of $150,000, with machinery, to be used in connection with its proposed new electric instrument works at this location, to cost more than $5,000,000, complete.

A machine shop with lathe, drill press and other tools, will be installed in the four-story automobile service building, 100 x200 ft., to be erected in the vicinity of Mt. Edan Avenue, estimated to cost $85,000. It will be owned and operated by H. A. Hoffman, care of H. A. Koeble, 114 East Twenty-eighth Street, New York.

The Crane Market

FROM the standpoint of new inquiries the market has been quiet the past week, but there is still a fair volume of pending business and a number of good inquiries seem to be expected from projects now under construction. Among current inquiries is one from Henry L. Doherty & Co., 60 Wall Street, New York for a 100-ton overhead traveling crane. Other inquiries still pending are two 10-ton cranes for the General Electric Co., Schenectady, N. Y., a 15-ton gantry crane for the Phoenix Utility Co., 71 Broadway, New York, a 15-ton overhead traveling crane for the General Engineering & Management Corporation, 165 Broadway, New York, the 25-ton overhead crane for the Brooklyn Edison Co., Brooklyn, N. Y., a used 5-ton electric traveling crane for the Worthington Pump & Machinery Co. for its Blake & Knowles plant, Cambridge, Mass., three 20-ton locomotive cranes for the American Telephone & Telegraph Co., New York, a 20-ton crane, for export, to Viele, Blackwell & Buck.

Among recent purchases are:

Foundation Co., 120 Liberty Street, New York, a 20-ton locomotive crane from the Brown Hoisting Machinery Co.

Viele, Blackwell & Buck, 49 Wall Street, New York, a 20-ton locomotive crane from the Browning Co.

S. A. Dunn & Sons, Rensselaer, N. Y., a 7-ton crawl tread locomotive crane with ¾ cu. yd. bucket from the Orton & Steinbrenner Co.

Brown Paper Mill Co., West Monroe, La., through H. S. Ferguson, consulting engineer, 200 Fifth Avenue, New York, a 12-ton, 46-ft. span, 5-motor overhead traveling crane with two 6-ton trolleys from the Chesapeake Iron Works and a 15-ton, 52-ft. 4-in. span, 5-ton, 13-ft. 3-in. span, 8-ton, 51-ft. 10-in. span and 8-ton, 53-ft. 4-in. span, hand power cranes from the Reading Chain & Block Corporation.

Florida Machine Works, Jacksonville, Fla., a 5-ton, 40-ft. span single I-beam crane from the Shepard Electric Crane & Hoist Co.

In the Pittsburgh district, inquiries lately have come out for several cranes. The Pennsylvania Railroad, Central Region, is asking bids on one 3-ton, 3-motor, 46-ft. span crane for its Olean, N. Y. shops. The Gulf Refining Co., Pittsburgh, has an inquiry out for two 15-ton, 3-motor, 45-ft. span cranes for its Port Authur, Tex., refinery. The Pennsylvania Casting & Machine Co., Pittsburgh, N. S., is in the market for a 3-ton, 3-motor 37-ft. span, floor operated crane.

The Westinghouse Electric & Mfg. Co., has placed two 10-ton, 5-ton auxiliary cranes, 47 ft. 2½ in. span, for its Essington, Pa., plant, with Alliance Machine Co.

The Hooven-Owens-Rentschler Co., Hamilton, Ohio, has placed a 3-ton, 2-motor cab operated monorail hoist with the Milwaukee Electric Crane & Mfg. Co.

A. O. Smith Corporation, Milwaukee, Wis., two 5-ton monorail trolleys to Shaw Crane Co.

The Continental Can Co., 61 Broadway, New York, has employed Francisco & Jacobus, 511 Fifth Avenue, consulting engineers, to prepare plans for the proposed addition to its plant at Fifteenth and Sixteenth Streets, Jersey City, N. J., to be five stories and basement, 200 x 200 ft., estimated to cost $500,000, including machinery.

Manual training equipment will be installed in the proposed three-story high school to be erected on Curtis Street, Linden, N. J., estimated to cost $300,000, for which plans are being drawn by H. B. Brady, 333 North Broad Street, Elizabeth, N. J., architect.

New England

BOSTON, Sept. 3.

BUYING during the past week has been confined for the most part to single items, although a notable exception was the purchase of three plain and two universal milling machines and a small lathe by a Cambridge, Mass., maker of automobile accessories. Other sales of milling machines, both new and used, have been made to textile mills and companies identified with that industry. In other tools, a 36-in. lathe taken by a textile mill, and a squaring shear capable of cutting material 11 ft. long, bought by a Lynn, Mass., manufacturer, gear cutting machinery, which went to a Bridgewater, Mass., company and several sensitive drills mostly to local manufacturers, are noted.

In new business a list of some 27 machine tools required by a textile mill for a new Southern plant, is conspicuous. A majority of these tools, however, are specified, and consequently there probably will be little competition for the business. With the exception of an advance of about 15 per cent in one line of gear-head lathes, which brings it in line with other makes, prices for machine tools remain unchanged. Aside from an inquiry for a 30-ton unit wanted by a Rhode Island utility company, the crane market here displays little life.

Interest in used tools has centered largely in the auction sale at the Victory Plant, Squantum, Quincy, Mass. This plant was built during the war for the Fore River Works, Bethlehem Shipbuilding Co., Ltd., and covers 730 acres. It is proposed to dispose of practically all the equipment there, the few remaining units to be used in building aircraft. During the past week's sale there were at least 100,000 varieties of equipment offered. One of the largest prices obtained was $41,500 for a power plant. A 12-in. boring mill brought $3,000. Other machine tools brought good prices and better, it is said, than anticipated. A quantity of miscellaneous material will be auctioned off Sept. 18.

The town of Middleboro, Mass. has postponed indefinitely the erection of a power house and other civic improvements.

Permit has been granted the New England Fuel & Transportation Co., 111 Devonshire Street, Boston, to erect a one-story coke crushing plant at Everett, Mass.

Bids closed Sept. 5 for a 28 x 56 ft. boiler house contemplated by the H. B. Smith Co., Westfield, Mass.

The Cumberland Power & Light Co., Portland, Me., plans to erect a power station, the location to be decided later. G. E. Haggas, Congress Street, that city, is the engineer.

No date has been set for the closing of bids on the proposed repair shop for the East Providence, R. I., works of the Union Tank Car Co., 21 East Fortieth Street, New York. The company is taking bids for a one-story, 90 x 150 ft. mill.

Permission has been granted to receivers of Bateman & Companies, Inc., Grenloch, N. J., to sell at public auction the Massachusetts properties of the company. These properties are the Richardson Mfg. Co., Worcester, Mass., and Belcher & Taylor Co., Chicopee Falls, agricultural tools and implements.

Work is in progress on a three-story machine shop and general manufacturing works, 51 x 220 ft., at the plant of the Judson L. Thomson Mfg. Co., South Street, Roberts Station, Waltham, Mass., manufacturer of rivet-setting machines, tubular rivets, etc., to cost about $100,000, with machinery, for which a general contract recently was awarded to the W. H. Whitcomb Construction Co., 6 Beacon Street, Boston.

Manual training equipment will be installed in the proposed new high school to be erected at Cape Elizabeth, Me., estimated to cost $100,000. The Board of Education is in charge.

Basil & Hutchins, Tremont and Camden Streets, Boston, are planning for the installation of a machine and repair shop in their proposed new automobile service building to cost about $55,000, including a lathe, bolt-threading machine, hack saw, drill press and other tools.

The new Method Die Co., 100 Sudbury Street, Boston, is planning for the installation of a motor-driven air compressor, mechanical suction fan, and kindred equipment.

The Norma Co. of America, Inc., Anable Avenue, Long Island City, N. Y., manufacturer of ball bearings, etc., has asked bids on a general contract for the erection of the first unit of its proposed new plant on property recently acquired at Glenbrook, near Stamford, Conn., to be one-story, 100 x 400 ft. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects.

Manual training equipment will be installed in the new high school to be erected on North Main Street, Middleboro, Mass., estimated to cost $110,000. Edward I. Wilson, 109 State Street, Boston, is architect.

Manual training equipment will be installed in the two-story high school to be erected at Gorham, N. H., estimated to cost $110,000, for which bids are being taken on a general contract. William Potter, 22 East Seventeenth Street, New York, is architect.

Baltimore

BALTIMORE, Sept. 3

ERECTION will soon commence on a one-story addition to the plant of the Lobdell Car Wheel Co., Christiana Avenue, Wilmington, Del., manufacturer of railroad car wheels, for which plans have been completed.

Bids will be received by the Chief of Air Service, United States Army, Washington, D. C., until Sept. 18, for 250 standard engine control assemblies, and 200 fuel oil pumps, circular 24-20. Also, until Sept. 17, for 250 Nelson gun control operating cable and bracket units, and 250 gun thrust rod assemblies, circular 24-17. Until Sept. 11, for 500 wheel assemblies, 36 x 8, circular 24-14; and until Sept. 10, for 250 single pole, double throw toggle switches, 250 single pole double throw switch guard plates, and 250 flush tumbler switches and plates, circular Q.R. 2418.

The Consolidated Gas & Electric Co., Lexington Building, Baltimore, has plans for the erection of a one-story machine and repair shop, 118 x 170 ft., at Constitution and Monument Streets, estimated to cost $70,000.

Bids will be received on a general contract until Sept. 12, for the erection of the proposed three-story boys' high school at Macon, Ga., estimated to cost $400,000. A machine and mechanical shop, 23 x 122 ft., one-story, will be built adjoining the main structure. A list of machinery to be installed will soon be arranged. Curran R. Ellis, Mason, and G. Lloyd Preacher, Augusta, Ga., are associated architects.

The Virginian Railway Co., Norfolk, Va., has plans in preparation for the construction of a new electric generating plant on the New River, with initial capacity of 90,000 hp., to be used in connection with the electrification of its line from Roanoke, Va. to Mullins, W. Va., 213 miles, for which latter work plans are being consummated. A number of branch power houses and steel tower transmission system will also be built. The entire project will involve approximately $15,000,000.

Price Brothers, Inc., Church and Second Streets, Frederick, Md., has inquiries out for a six-spindle drill, new or second-hand in good condition; also, for one punch press, for handling material 4 in. in diameter and $\frac{7}{8}$-in. thick.

H. T. Holt, 717 Hull Street, Richmond, Va., operating an automobile service works, is planning for the installation of a lathe, drill press and other equipment.

A machine shop, with lathe, cylinder grinder and other equipment will be installed in the three-story automobile service building, 60 x 115 ft., to be erected at Greenville, S. C., by C. O. Allen, estimated to cost $75,000, for which a general contract has been let to Potter & Shackelford, Inc., Greenville. J. E. Sirrine & Co., Inc., Greenville, is engineer.

The National Gold Arsenic Corporation, Room 2001, 25 West Forty-third Street, New York, plans for the construction of a power house in connection with a new plant on site to be selected in Georgia, estimated to cost $200,000, with machinery. L. P. Jubien is secretary.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a flywheel, 20 ft. in diameter, 12 in. face, and 14 in. bore, for use on a Corliss engine; also, for a centrifugal pump, 400 to 600 gal. per minute capacity, operating against an 80 ft. head, motor or belt-driven, second-hand in good condition; five 3-phase, 60 cycle, 2200-volt electric motors, four of which to be suitable for direct connection, and one with starting equipment; three outdoor type transformers, each 500 kva. capacity; several 60 cycle transformers, about 37½ to 50 kva. capacity, each.

C. M. Wall & Son, Lexington, N. C., have inquiries out for a Corliss engine, 300 to 375 hp., left-hand, operating at 110 to 120 lb. steam pressure, and auxiliary equipment.

Fulton & Barnes, 1643 West Broad Street, Richmond, Va., operating an automobile repair works, plan for the installation of a drill press and other equipment.

Frederick Noble, Cedartown, Ga., operating a plant for the manufacture of paper boxes and containers, is perfecting plans for the establishment of a new plant at Rome, Ga., where production will be concentrated. The present works will be removed to the new location and additional machinery installed.

The Virginia Truck Body Co., 19 South Linden Street, Richmond, Va., is in the market for a drag scraper, complete with ½-yd. capacity iron scoop, chains, etc., for 300 ft. travel.

The Chicago Nipple Mfg. Co., 1966 Southport Avenue, Chicago, manufacturer of nipples and other engineering products, has acquired a building on First Street, Baltimore, adjoining its local branch plant, and will install equipment at an early date for increased output. This represents the third expansion in the Baltimore works since established a number of months ago.

The General Purchasing Officer, Panama Canal, Washington, will take bids until Sept. 20, for electric hoists, chains, electric motors, drills, wrenches, valves, and kindred mechanical equipment for canal zone service, circular 1555.

Morton Jones & Co., Inc., Ashville, N. C., recently reorganized, is perfecting plans for the establishment of a new local plant for the manufacture of hot-air heating furnaces and parts, to consist of a foundry, machine shop and assembling works, to cost in excess of $55,000, including equipment. Morton Jones is president.

A. R. Hall, 1623 West Broad Street, Richmond, Va., operating an automobile service works, plans for the installation of a shaper and other equipment in the machine department.

The Shenandoah Caverns, Inc., Woodstock, Va., H. B. Chapman, head, has inquiries out for stone-cutting and polishing machinery, with power equipment for operations.

Philadelphia

PHILADELPHIA, Sept. 3.

THE American Ice Co., 633-35 North Eden Street, Philadelphia, will commence the erection of an addition to its plant, 56 x 100 ft., to cost approximately $50,000, for which plans recently have been completed by C. Leslie Weir, architect.

The Dodge Steel Works, State Road and Hellerman Streets, Philadelphia, plans for the early installation of equipment in the addition to their foundry, estimated to cost $25,000, for which a general contract was awarded recently to the Austin Co., Bulletin Building.

The Trenton Flint & Spar Co., Marian Street, Trenton, N. J., operating a grinding and finishing plant, has awarded a general contract to Bainford & Turner, Trenton, for the erection of a one-story addition.

The John A. Roebling's Sons Co., 612 South Broad Street, Trenton, N. J., will build a new one-story power house at its wire and cable works, Clinton Avenue, to be 42 x 100 ft.

The Victor Talking Machine Co., Camden, N. J., is perfecting plans for the installation of machinery in its new addition now under way, estimated to cost $1,000,000, with equipment.

The American Briquet Co., Land Title Building, Philadelphia, plans for the construction of a power house at its proposed plant at Lykens, Pa., for the manufacture of fuel briquets, estimated to cost $350,000, including machinery. A. D. Parker, Philadelphia address, is in charge.

The York Mfg. Co., York, Pa., manufacturer of ice and refrigerating machinery, has acquired a tract of land totaling about 80 acres in the southern section of the city, for $75,000, for extensions. Plans are under consideration for the erection of a large foundry for the production of gray iron castings, to cost more than $150,000, with pattern shop adjoining. Other buildings will be constructed later.

The Allentown Fence Works, Third and Chew Streets, Allentown, Pa., manufacturer of wire fencing, is installing additional equipment for increased production, including a punching and shearing machine, air compressor and other machinery. Practically all equipment in the future will be electrically-operated and motors installed for this purpose. Tilghman Reuber heads the company.

Manual training equipment will be installed in the proposed high school to be erected at Mauch Chunk, Pa., estimated to cost $100,000, for which it is expected to select an architect to prepare plans at an early date. The Board of Education is in charge.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is planning for the erection of additional buildings in connection with its new steel car repair shops at the Enola, Pa., yards, now under way, for which it is proposed to break ground in September.

Manual training equipment will be installed in the two-story senior and junior high school to be erected at Midland, Pa., estimated to cost $300,000, for which bids will be called on a general contract at an early date. W. G. Eckles, Lawrence Savings & Trust Building, New Castle, Pa., is architect.

The Barry & Zechner Co., East Fulton Street, Lancaster, Pa., manufacturer of machinery and parts, is taking bids until Sept. 10 for the erection of a new two-story machine shop, 60 x 100 ft., estimated to cost $25,000. R. M. Reilly is president. W. P. Erisman, 422 Woolworth Building, is architect.

Manual training equipment will be installed in the proposed three-story junior high school to be erected at Lancaster, Pa., estimated to cost $200,000, for which preliminary plans are being prepared by C. E. Urban, Woolworth Building, architect.

Manual training equipment will be installed in the proposed two-story and basement high school to be erected at Shamokin, Pa., estimated to cost $150,000, for which an

architect will be selected to prepare plans in the near future. The Board of Education is in charge.

The Lebanon Brass Works, Lebanon, Pa., is in the market for a high speed direct-connected polishing and buffing lathe.

Pittsburgh

PITTSBURGH, Sept. 3.

THERE is still a fairly good movement of single tools, but not much action against the lists, on which the trade has been working for several weeks, among them that of the Pennsylvania Railroad, involving 34 tools, for its shops in the Central Region of the system. So far as can be learned, no awards yet have been made against this list. Rolling mill equipment is showing greater activity. Bethlehem Steel Co., recently closed for all the auxiliary equipment for a blooming mill at its Johnstown, Pa. works. A shear, intensifier, gage mill tables and a manipulator went to the Mesta Machine Co., Pittsburgh, while the depressing and runout table and the scale and slab conveyor went to the Wheeling Mold & Foundry Co., Wheeling, W. Va., and the United Engineering & Foundry Co., Pittsburgh, was awarded the shear approach table and manipulator. Jones & Laughlin Steel Corporation is gathering data on drives for a new bar mill and once this matter is definitely settled, formal inquiry will be issued for the mill and several cranes to serve it.

Plans have been filed by the American Steel Band Co., 886 Progress Street, Pittsburgh, for the erection of a new one-story plant on property recently acquired on Nixon Street, estimated to cost $25,000, and for which foundations will be laid at once.

The Penn Public Service Co., Vine Street, Johnstown, Pa., has plans in preparation for the erection of a two-story service and repair building, 56 x 105 ft., on Lind Street, with installation to include a machine shop, for company motor trucks and cars, estimated to cost $75,000. C. J. Lane is company engineer.

The Peerless Sand Co., Oliver Building, Pittsburgh, is planning for the rebuilding of its plant at Cheswick, Pa., destroyed by fire, Aug. 22, with loss estimated at $90,000, including conveying, digging, loading and other kindred machinery, and power equipment.

The Rainey Tool Co., Grove City, Pa., is being organized under State laws to take over and expand the local plant and business of Rainey Brothers, manufacturers of mechanics' tools, operating for about two years past. Increased production is planned. The new company is headed by W. J., F. L. and J. C. Rainey.

A machine shop will be installed in the two-story addition, 25 x 110 ft., to be erected at the service building of the Mervis Garage Co., 414 East Eighth Avenue, Munhall, Pa., estimated to cost $45,000. A. G. Wickerham, 517 McClure Avenue, Homestead, Pa., is architect.

The Shenango Furnace Co., Oliver Building, Pittsburgh, has commenced the rebuilding of the machine shop at its plant at Sharpsville, Pa., recently destroyed by fire with loss of about $50,000.

The Carnegie Steel Co., Carnegie Building, Pittsburgh, will install a stationary gantry crane at the proposed new coke-unloading dock to be constructed at its Mingo Works, on the Ohio River, for which application has been made to the local Federal engineers. Two ice-breakers and other equipment will be installed. The company is also planning for the installation of conveying equipment for barge-loading service at its works at Wilson, Pa.

The West Penn Co., West Penn Building, Pittsburgh, operating electric light and power properties, has arranged for a preferred stock issue of $50,000,000, a portion of the proceeds to be used for extensions and improvements in generating plants and system.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Koppel, Pa., estimated to cost $125,000, for which plans have been prepared by W. G. Eckles, Lawrence Savings and Trust Building, New Castle, Pa., architect.

Manual training equipment will be installed in the proposed new junior high school to be erected at Clarksburg, W. Va., estimated to cost $90,000, for which an architect will be selected to prepare plans at an early date. The Board of Education is in charge.

The Atwood Borough Electric Co., Atwood, Pa., is being organized to install and operate a local electric power and system. A. M. Mitchell and G. E. Murrie head the company, which is represented by McCahill, McCahill & Talbot, 908 West Penn Building, Pittsburgh. The new company will also operate a plant at Dayton, Pa., to be known as the Dayton Borough Electric Corporation.

Detroit

DETROIT, Sept. 3.

CONTRACT has been let by the Woodland Piston Co., Muskegon, Mich., for the erection of the first unit of a new plant on the Lake Shore Drive, to be one-story, 60 x 120 ft., to cost approximately $30,000. It will be equipped for the manufacture of patented sleeve rings for piston service. It is purposed to prepare plans for a second plant unit at an early date.

The National Standard Co., Niles, Mich., manufacturer of railroad jacks, air compressors, etc., is said to be arranging a list of equipment for installation at its proposed new plant at Akron, Ohio, for which property recently was acquired.

The Cadillac Motor Car Co., 2060 Clark Street, Detroit, has engaged the Austin Co., 1954 Penobscot Building, to prepare plans and construct the proposed new foundry additions at its plant, on site at Clark Street and Scotten Avenue, estimated to cost $500,000, with machinery.

The Schoonmaker Motor Truck Co., Hudson, Mich., recently organized, has perfected its organization, with W. N. Derbyshire as president, and purposes to operate a local plant for the manufacture of commercial trucks and parts, for which plans will be consummated at an early date. Walter Eberly, mayor of the city, will be a director of the new company, as will G. C. Lowe, also of Hudson.

The Hudson Motor Car Co., Jefferson Avenue, Detroit, has awarded a general contract to the Brayton Engineering Co., 6500 Epworth Boulevard, for the erection of a one-story addition, 65 x 280 ft., on Conners Avenue, estimated to cost $100,000, including equipment.

The Ford Motor Co., Highland Park, Mich., has preliminary plans in preparation for the erection of a new one-story foundry at its River Rouge, Mich., plant, 600 x 1800 ft., estimated to cost $650,000. Plans are also in progress for the construction of a new coal by-products plant at the same works, to cost in excess of $500,000, with machinery. Albert Kahn, 1000 Marquette Building, Detroit, is architect for both projects.

The Peninsular Power Co., North Carroll Street, Madison, Wis., is completing plans for the initial unit of its proposed electric generating plant at Iron River, Mich., estimated to cost $250,000, and will arrange for the equipment installation at an early date. Mead & Seastone, Journal Building, Madison, Wis., are engineers.

W. A. Klein, Lapeer, Mich., formerly located at Columbiaville, Mich., is organizing a local company to establish and operate plant for the manufacture of a line of metal products. Space has been leased in the Krolick building, and it is purposed to install equipment at an early date, having the plant ready for service before the close of September.

Buffalo

BUFFALO, Sept. 3.

WORK will commence on the erection of an addition to the foundry of the American Brass Co., Military Road, Buffalo, including remodeling and improvements in present building, and the installation of electric casting and other machinery, estimated to cost $700,000.

A machine shop, with lathe, drill press and other tools, will be installed in the two-story and basement automobile service building, 60 x 140 ft., to be erected at Niagara Street and Hertel Avenue, Buffalo, by W. H. Linford, address noted, estimated to cost $85,000. G. Morton Wolfe, 137 Main Street, is architect.

The American La France Fire Engine Co., Elmira, N. Y., manufacturer of motor-driven fire equipment, has plans for the erection of a new two-story addition, estimated to cost $80,000.

The Rochester Gas & Electric Co., Rochester, N. Y., has tentative plans for the construction of a new power dam and hydroelectric generating plant on the Genesee River, near Mount Morris, N. Y., estimated to cost $6,500,000.

The Penn Yan Boat Co., Penn Yan, N. Y., is having plans drawn for the construction of a two-story addition to its boat-building plant on Liberty Street, for mechanical and repair work, etc., estimated to cost $60,000. C. A. Herman is one of the heads of the company.

A merger has been arranged between the Rochester Forge Co., Rochester, N. Y., and the Burke Steel Co., Inc., with local plant at 85 Mortimer Street, under the last noted name. Extensions and improvements are planned.

Crane-Schaefer-Owens, Inc., Buffalo, recently organized will succeed to and expand the business of the Crane Machinery Co. Branches will be operated at Rochester and Syracuse, N. Y.

The Standard Table Co., 92 Steele Street, Jamestown, N. Y., is said to be arranging a list of equipment for installation at its plant, including lathes, spraying machines, woodworking tools and transmission equipment. L. G. Cowing is secretary.

The Board of Public Utilities, Jamestown, N. Y., is planning for the installation of electrically-operated pumping machinery in connection with extensions and improvements in the municipal waterworks, for which a bond issue of $280,000 is being arranged.

Fire, Aug. 28, destroyed the machine and repair shop and other portions of the automobile service building of the Colton Garage Co., Medina, N. Y., near Park Avenue, with loss estimated at $45,000. It is planned to rebuild.

The Common Council, Churchville, N. Y., plans for the installation of electrically-operated pumping machinery in connection with the installation of a new waterworks plant and system, estimated to cost $80,000. R. E. Gaskin, 207 Cutler Building, Rochester, N. Y., is engineer.

Conveying and elevating machinery, electric power and other mechanical equipment will be installed in the eight-story and basement warehouse, 80 x 155 ft., to be erected at Mount Hope Avenue and Fourth Street, Rochester, N. Y., by the Rochester Carting Co., 162-64 Andres Street, estimated to cost $1,000,000, with equipment. Gordon & Kaelber, 125 Sibley Block, are architects.

Chicago

CHICAGO, Sept. 3.

THE market has relapsed into a condition of extreme quiet. Machine tool dealers have booked few orders during the week and inquiries have declined sharply. Industries are not showing much interest in new equipment at the moment, but selling organizations are hopeful for a revival of activity as soon as manufacturing plants feel the full force of fall seasonal business. Encouragement is derived from the fact that certain industrials already report a substantial increase in their orders over bookings in the summer months. Railroad buying, which has been the mainstay of the machine tool market during the past three months, is at a low ebb. The Santa Fé and the Union Pacific have decided to make no further purchases until the new year. The Burlington list is still pending and action on it will probably not be taken for a month or two.

The Brainerd Foundry Co., Brainerd, Minn., recently incorporated, is constructing a foundry, 30 x 80 ft., for the manufacture of gray iron, brass and crucible steel castings. Purchases of equipment have not yet been made. Officers are C. E. Parker, president and treasurer; E. O. Webb, vice-president; and F. E. Kinsmiller, general manager and secretary.

The American Car & Foundry Co., Railway Exchange Building, Chicago, has purchased a 10-acre tract between the south branch of the Chicago River and the Chicago, Burlington & Quincy Railroad, just east of Canal C, adjoining the company's present tool plant. The new acquisition will be used eventually as the site for a new freight car works, although there are said to be no immediate plans for its construction.

The Wisconsin Steel Works, 10871 Torrence Avenue, Chicago, has let a contract for a one-story machine shop, to cost $23,000.

Fire seriously damaged the plant of the Lincoln Brass & Spinning Works, 3262 Grand Avenue, Chicago, Aug. 24.

The Daniel Boone Woolen Mills Co., 1735 Diversey Parkway, Chicago, will erect a factory and woolen mills at Davenport, Iowa. The building will cost $75,000 and the equipment $200,000.

The Belle City Malleable Iron Co. Racine, Wis., will erect a foundry addition at Kewaunee and Albert Streets, to cost $100,000.

The Wabash Railroad Co., St. Louis, has awarded a general contract to Townsend B. Smith, Gushard Building, Decatur, Ill., for the erection of an addition to its local locomotive repair shops, Seventh Street, estimated to cost $175,000, including equipment. A. O. Cunningham is chief engineer.

The Service Oil Co., 322 Hamm Building, St. Paul, Minn., has plans in preparation for the erection of a three-story oil storage and distributing plant on the line of the Chicago, Milwaukee & St. Paul Railroad Co., estimated to cost $150,000, including equipment.

The Wisconsin Steel Works, 104th Street and Torrence Avenue, Chicago, has filed plans for the erection of a new one-story shop addition, 40 x 128 ft., estimated to cost $25,000, and will commence work at once.

Manual training equipment will be installed in the new three-story and basement junior high school to be erected at Council Bluffs, Iowa, estimated to cost $250,000, for which bids will be received on a general contract until Sept. 12. J. C. Jensen, 2534 Avenue B, is architect.

The Watson Co., 520 Brown Block, Rockford, Ill., G. Watson, head, has inquiries out for a drill press, air compressor and other equipment for local machine shop service.

The Goss Printing Press Co., 1535 South Paulina Street, Chicago, is taking bids on a general contract for the erection of a new plant at Wood Street and Fifteenth Place, 100 x 500 ft., estimated to cost $275,000, including machinery. R. G. Schmidt & Co., 7 West Washington Street, are architects.

The Milwaukee Electric Railway & Light Co., Milwaukee, Wis., is disposing of a bond issue of $10,000,000, a portion of the proceeds to be used for extensions and improvements. John I. Beggs is president.

Manual training equipment will be installed in the new two-story high school to be erected at Bartley, Neb., estimated to cost $100,000, for which foundations will be laid at once. R. A. Bradley & Co., Scottsbluff, Neb., are architects.

A one-story automobile service building, 80 x 200 ft., for company motor trucks and cars, will be erected on Lake Park Avenue, near Twenty-fourth Street, Chicago, by the Hydrox Beverage & Ice Cream Co., Lake Park Avenue, estimated to cost $50,000. A machine shop, with lathe, cylinder grinder and other equipment will be installed.

The Polar Wave Ice & Fuel Co., 3626 Olive Street, St. Louis, has tentative plans for the erection of a new plant along the line of the Wabash Railroad at Decatur, Ill., 100 x 200 ft., estimated to cost $175,000, including machinery.

The Pacific Coast

SAN FRANCISCO, Aug. 28.

BIDS will soon be asked for the erection of a two-story addition to the plant of the Pelton Water Wheel Co., Nineteenth, Florida and Alabama Streets, San Francisco, estimated to cost $100,000, including machinery. W. W. Hanscom, 848 Clayton Street, is engineer.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in the new baking plant to be erected in the Beverly Hills section, by the Holsum Baking Co., 1802 Hooper Street, Los Angeles, estimated to cost $115,000, with machinery.

Out of an initial appropriation of $10,462,339 for extensions and improvements in power plants and system, the Los Angeles Gas & Electric Co., South Hill Street, Los Angeles, has an available fund of $4,500,000, and plans to use a portion of the amount for further additions and machinery installations at an early date.

Paul Mosedian & Co., Zante (Tulare County), Cal., has plans under way for the construction of a new ice-manufacturing and cold storage plant, estimated to cost $60,000.

The American Can Co., Seattle, Wash., has plans in preparation for the construction of a four-story addition to its local plant on Clay Street, to cost close to $200,000, with equipment. R. A. Gillespie is plant superintendent.

The Bratlie Brothers Mill Co., Ridgefield, Wash., will rebuild its local lumber plant, recently destroyed by fire, on a larger scale, installing additional machinery for considerable increase in capacity. The fire loss, estimated at $100,000, will be exceeded by more than one-half in the rebuilding expenditure. Electric power equipment will be installed for machinery operation.

The Great Western Smelting & Refining Co., 75 Folsom Street, San Francisco, has plans out for bids for the erection of its proposed one-story foundry, 138 x 275 ft., at Spear and Folsom Streets, estimated to cost $75,000. Excavations will soon be placed in progress. Morrow & Garrien, Chronicle Building, are architects.

The Mergenthaler Linotype Co., 130-36 West Montgomery Street, San Francisco, will commence the erection of a three-story and basement addition, to cost in excess of $80,000. A. A. Cantin, 58 Post Street, is architect.

The Los Angeles Mfg. Co., 2500 Leonard Street, Los Angeles, manufacturer of riveted steel well casing and water pipe, steel tanks, etc., has awarded a contract to J. S. Fluor, Santa Ana, Cal., for the erection of a one-story addition, 100 x 100 ft.

The Superior Iron Co., Lodi, Cal., formerly known as the Superior Mfg. Co., will develop its local plant for the manufacture of pumping machinery for mining service and other mining machinery. Otto Spenker is president.

The Barton-Brown Engineering Co., 1111 Santa Fe Avenue, Los Angeles, has awarded a contract to V. P. Gilbert, Citizens National Bank Building, for the erection of a one-story mechanical shop, 50 x 60 ft.

A manual training department will be installed in the proposed new junior high school to be erected at Eureka, Cal., for which a bond issue of $500,000, is being arranged. The Board of Education will soon select an architect to prepare plans.

A power house will be erected by the American Laundry Co., 3338 Seventeenth Street, San Francisco, in connection with its proposed new mechanical laundry plant, estimated to cost $100,000, with equipment. Shea & Shea, Chronicle Building, are architects.

Allen R. Moore, Mount Vernon, Wash., and associates, are perfecting plans for the construction of a hydroelectric generating plant on Swift Creek, a branch of the Baker River, estimated to cost $100,000. Application for permission has been made to the state engineer.

Milwaukee

MILWAUKEE, Sept. 3.

SEPTEMBER prospects for the machine-tool trade are considered brighter than those at the beginning of any month since May. Inquiry, which has been improving for several weeks, was increasingly active in the last week of August. Automotive industries appeared as the main source of inquiry, and while no lots of size were involved, a fair aggregate is represented. Sales, while by no means brisk, show betterment. General industries are maintaining a steady employment and production and are buying tools in a small way against urgent needs rather than to increase capacity.

The Milwaukee Electric Railway & Light Co., Public Service Building, Milwaukee, let the general contract to Paul W. Bringe Co., 940 Third Street, local, for a brick and reinforced concrete addition, 50 x 71 ft., to the boiler house of the Oneida Street steam generating plant, Edison Avenue and Oneida Street. The contract for a two-story sub-station, 35 x 55 ft., at North Milwaukee, has been let to the Dahlman Construction Co., 221 Grand Avenue, local. Equipment is now being purchased. S. B. Way is vice-president and Fred H. Luber is architect.

The Cobb Canning Co., Cobb, Wis., has let contracts for the erection of a $100,000 vegetable preserving plant with a separate steam generating plant, 42 x 40 ft., to be ready early in 1924. Purchases of equipment, including two 100-hp. boilers, 300-400-kw. generator, electric motors and special canning factory machinery probably will not be made until November or January. Henry Terens is secretary and general manager.

The Glancy Malleable Corporation, Waukesha, Wis., is a new Wisconsin company organized with a nominal capital of 1000 common shares having no par value, to manufacture malleable castings, machinery, tools, etc. While nothing definite concerning its plans will be announced until later, it is reported that the new concern intends to take over a local foundry now operated under lease by a large automotive interest. The incorporators are P. T. E. Ward, L. A. Avery and M. P. Hocking.

The Triumph Stove & Heater Co., now occupying leased quarters at Forty-ninth and State Streets, town of Wauwatosa, is concluding negotiations with the Chamber of Commerce, Appleton, Wis., with a view of relocating the plant and offices. A suitable building is available which would permit of an increase of from 250 to 300 per cent in the present capacity. Herman Klein is president and general manager.

The New Silent Washer Co., Clintonville, Wis., has been incorporated with a capital stock of $30,000 to take over the assets of the former Silent Washer Co., rehabilitate its plant and resume the manufacture of power-driven washing machines. The new owners include J. H. Spearbraker, Henry Kuth, T. L. Teleson and D. T. Robser, all of Clintonville.

The Racine Investment Co., Racine, Wis., has plans by Edmund B. Funston & Co., architects, for a $50,000 garage, sales and service building, 82 x 120 ft., two stories and basement, at 401-407 Lake Avenue. Bids will be taken after Sept. 10 or 15. The identity of the occupant is withheld for the present.

The Board of Education, New London, Wis., expects to select designs and appoint an architect Sept. 15 to plan the proposed new high school, foundations of which are to be laid this fall and the building completed next spring. It will cost $250,000 and contain a vocational training department. R. J. McMahon is city superintendent of schools.

The Texas Co., 209 Jackson Street, Milwaukee, will build a branch refinery, warehouse, power plant, tank storage and office building in West Milwaukee, Wis., at an estimated cost of $65,000. Bids will be taken about Sept. 10 by J. L. Daniels, 1350 McCormick Building, Chicago.

The Milwaukee Central Board of Purchases, City Hall, is asking bids until Sept. 7 for furnishing a complete boiler makeup water purification plant to the Riverside pumping station of the municipal water works system. Joseph W. Nicholson is chief buyer.

The Grimm Aluminum Casting Co., Manitowoc, Wis., let the general contract to Matt. S. Dempsey, 1911 Marshall Street, local, for erecting a brick and steel foundry building 60 x 150 ft., at Twenty-first and Franklin Streets. The investment in buildings and equipment will be about $50,000. The architect is W. J. Raeuber.

Indiana

INDIANAPOLIS, Sept. 3.

MANUAL training equipment will be installed in the new two-story high school to be erected at Sullivan, Ind., estimated to cost $150,000, for which bids will be asked on a general contract about Sept. 15. J. P. Bayard, 231½ Main Street, Vincennes, Ind., is architect.

A machine shop will be installed in the one-story and basement service building, 40 x 130 ft., to be erected at Nineteenth and Columbia Streets, Lafayette, Ind., by the J. F. Horner Automobile Co., Sixth and Columbia Streets, estimated to cost $35,000, exclusive of equipment. A drill press, lathe, hand tools, etc., will be installed.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Greenfield, Ind., estimated to cost $110,000, for which plans are being prepared by O. P. Gordon, 412 Mechanic Street, architect.

The Board of Trustees, Purdue University, West Lafayette Ind., is planning to issue an early call for bids for the erection of a new one-story and basement electrical equipment and instruction building at the institution, estimated to cost $100,000, with machinery. Nicol, Scholer & Hoffman, 308 Main Street, Lafayette, Ind., are architects.

A machine shop, with lathe, drill press and other equipment will be installed in the one-story and basement automobile service building 80 x 95 ft., to be erected at Princeton, Ind., by the E. Robinson Co., on South Main Street, to cost about $30,000, exclusive of equipment. Osterhage & Sutton, Citizens Bank Building, Vincennes, Ind., are architects.

Cincinnati

CINCINNATI, Sept. 3.

THOUGH orders are somewhat scattered, inquiries are more numerous, and prospects for business are considered to be much improved over those of a month ago. No large lists are coming out, the requests for prices being from manufacturers who desire to buy from one to three machines. At least two manufacturers, in the automotive field, are expected to buy a large number of machine tools in the near future, and it is expected that railroad buying will be resumed shortly after the first of October. Orders during the week include that of the Allis-Chalmers Mfg. Co., which bought six machines for its West Allis and Cincinnati plants. The U. S. Engineers office at Portland, Ore., placed four large engine lathes, and the Norfolk & Western Railroad purchased drilling machinery recently inquired for.

The J. H. Day Co., Cincinnati, manufacturer of baking, paint, and special machinery, has purchased 10 acres of land in the Bond Hill section. There are no immediate plans for improvement of the property, the site being purchased with a view to future expansion.

The plant of the Walter L. Lille Co., Columbus, Ohio, manufacturer of woodwork, which was destroyed by fire Aug. 23, will not be rebuilt.

The International Harvester Co., which is building a new plant at Fort Wayne, Ind., is understood to have completed plans for the manufacture of the larger automobile trucks, now being carried on at Akron, Ohio., in the new plant. Production of the light truck will be continued at the Springfield, Ohio, plant. The company is now producing 35 light trucks daily, and is reported to have sufficient orders booked to maintain this rate for the rest of the year.

The foundry of the Indiana Reformatory, Jeffersonville, Ind., has been closed, pending the completion of the new building at Pendelton, Ind., which will be equipped with modern machinery. The old buildings have been sold to Colgate & Co., soap manufacturers.

The Columbus Machine Works, Columbus, Ind., has been sold to a group of Crothersville, Ind., business men, and the plant of the company will be moved to that city. W. P. Rider has been elected president of the company, and H. C. Dent secretary-treasurer.

The Wellston Mfg. Co., Wellston, Ohio, has broken ground for an addition to its machine shop. The company will install some new equipment, including a 5-ton electric traveling crane.

The American Railway Equipment Co., Dayton, Ohio, has been organized to manufacture and market a machine for registering fares and printing transfers for street car lines. The company is now being financed, and will shortly announce the location of its plant. C. B. Fisher heads the company.

The Gulf States

BIRMINGHAM, Ala., Sept. 3.

CHARLES E. NAVEK, Gulfport, Miss., engineer, has inquiries out for drilling, stamping and polishing aluminum products, for installation in a local plant.

The Southern Utilities Co., St. Augustine, Fla., has plans for enlargements in its local electric power plant, to include the installation of a new 1500 kw. turbo-generator and auxiliary machinery, including boilers, stokers, condenser and switchboard.

Manual training equipment will be installed in the new high school to be erected at Floydada, Tex., estimated to cost $100,000, for which work has been placed in progress. The Board of Education is in charge.

A machine shop, with lathe, drill press, cylinder grinder and other equipment will be installed in the new one-story service building, 115 x 135 ft., to be erected by the Oliver Motor Co., West Palm Beach, Fla., at Third Street and Railroad Avenue, estimated to cost about $65,000, exclusive of equipment.

Manual training equipment will be installed in the new three-story high school to be erected at Oak Cliff, Dallas, Tex., estimated to cost $500,000, for which bids will be asked on a general contract early in October. DeWitt & Lemon, Dallas, are architects.

The Eureka Foundry Co., North Sixth Street, Gadsden, Ala., has preliminary plans for enlargements in its plant for the production of iron and steel castings, including the installation of additional equipment. E. J. Owen is president.

H. W. Dexter, in the machinery and mill equipment business, Bisbee Building (P. O. Box 665), Jacksonville, Fla., is in the market for a 50-hp. gasoline, crude oil or kerosene oil engine to operate a sand pump; also 2000 ft. of 8-in. I-beams for monorail trolley usage and 500 ft. of 8-in. spiral riveted pipe for the sand pump.

Cleveland

CLEVELAND, Sept. 3.

WITH the issuance of a number of good inquiries, the improvement in the machine tool market noted last week is still in evidence. The Ford Motor Co. is again an active buyer, and some business is in prospect from other Detroit automobile companies. The Ford company is understood to have placed orders for considerable equipment during the past two weeks and has some other machinery inquiries pending. New inquiries involving considerable equipment have come out from the American Steel & Wire Co. for its Trenton, N. J. plant and from the Westinghouse Air Brake Co., Pittsburgh. The Nickel Plate Railroad, which issued a list of about 15 machines early in the summer, but which deferred buying, is now planning to place this equipment within the next week or two. Business with local dealers continues quiet. Sales are limited mostly to single machines and little new inquiry is pending.

The Erie Railroad will enlarge its ore handling capacity in Cleveland and has placed an order with the Wellman-Seaver-Morgan Co. for a 15-ton Hulett unloader. The latter company has also taken a contract from the Adirondack Light & Power Corporation, Schenectady, N. Y., for two 15,000-hp. hydraulic turbines, and another contract from the Northern New York Utilities Corporation for a 4000-hp. turbine for its Flat Rock plant.

The Metropolitan Steel Co., Youngstown, Ohio, has been organized to manufacture all-steel refrigerators and has purchased from the Austin Co., Cleveland, a manufacturing plant located at Mineral Ridge, Ohio. Considerable new equipment will be installed. The company has been incorporated with a capital stock of $350,000. A. H. Dillon is president, S. A. Walker, vice-president and general manager, and W. F. Pettingill, secretary and treasurer.

The Norwalk Enamel Product Co., Norwalk, Ohio., has been organized to manufacture various enamel products, including signs, electrical equipment, stove parts, and other flat ware products. The company has been incorporated with a capital stock of $510,000, and plans to build a new plant shortly. Fred W. Cook is president, Thomas E. Adkins, vice-president, Frank Dudley, secretary, and E. W. Taylor, treasurer.

The Buckeye Castings Co., Lima, Ohio, will increase its capital stock by the issue of $25,000 in common shares in order to provide for plant expansion.

The Packard Electric Co., Warren, Ohio, will enlarge its plant by the erection of a two-story factory building, 110 x 220 ft., and will also build a new power house.

The New Cumberland Glass Works, New Cumberland, West Virginia, plans shortly to begin the erection of a new plant to replace one that was recently burned.

The Martin-Perry Co., manufacturer of bodies for motor trucks will establish a branch plant in Toledo, Ohio, having leased a portion of the plant formerly operated by the Milburn Wagon Co. that was recently purchased by the General Motors Corporation.

The National Standard Co., Niles, Mich., has purchased a factory building, 60 x 200 ft., in Akron, Ohio, which it will equip for the manufacture of automobile and railroad jacks and air compressors. W. E. Parkin is secretary-treasurer.

The H. B. Freeman Co., Lima, Ohio, was recently organized to deal in steel sash, metal lath, and other building equipment. H. B. Freeman is president. The Galion Iron & Mfg. Co., Galion, Ohio, is having plans prepared for a one-story factory building 50 by 100 ft.

The Central South

ST. LOUIS, Sept. 3.

PLANS are being perfected by the Dixie Consolidated Graphite Co., Birmingham, Ala., for the construction of a new plant on site selected at Chattanooga, Tenn., to include a power house and machine shop, in conjunction with main manufacturing plant, estimated to cost $250,000, including machinery. C. E. Watson is president.

The National Metal Trades Association, 414 Odd Fellows Building, St. Louis, has inquiries out for a drill press, medium size, for installation in its metal-working instruction shop.

The Keltner Mining Co., Picher, Okla., has tentative plans for the rebuilding of the portion of its mill and power house, recently destroyed by fire with loss estimated at $100,000, including machinery.

The Department of State Institutions, Nashville, Tenn., Lewis S. Pope, commissioner, will commence the erection of a new power plant in connection with other buildings at the Deaf and Dumb School on the Island Home property, Knoxville, Tenn., to cost in excess of $350,000. Marr & Holman, Nashville, and Barber & McMurray, Knoxville, are associated architects.

The West Side Garage, 900 West Douglas Avenue, Wichita, Kan., is planning for the purchase of a lathe and other equipment for installation in its machine shop.

Manual training equipment will be installed in the new two-story junior high school to be erected at Iola, Kan., estimated to cost $150,000, for which bids will be received on a general contract until Sept. 17. T. W. Williamson & Co., Central National Bank Building, Topeka, Kan., are architects.

The Oil Products Co., Inc., Fifth and Jefferson Streets, Lexington, Ky., is planning for the installation of additional rotary pumping machinery at its plant, to provide for about 3000 gals. capacity. A new addition, 25 x 80 ft., will be constructed. Stanhope Wiedman, P. O. Box 473, is president and general manager.

Negotiations are under way by O. H. Hyde and L. R. Gifford for the purchase of the plant and business of the Buffum Tool Co., Louisiana, Mo. The new owners propose to reorganize the company and install additional equipment at the plant. The same interests are also arranging for the local plant of the Louisiana Sash & Door Co., and will operate in conjunction with the tool works. Extensions will be made and additional machinery installed.

The Board of Commissioners, McAlester, Okla., will take bids until Sept. 18, for two 1400-gal. per minute capacity duplex power pumps, and two like capacity centrifugal pumps, for installation at the municipal waterworks. F. T. Archer & Co., New England Building, Kansas City, Mo., are engineers.

A machine shop will be installed in the new two-story automobile service building to be erected at 291 Union Avenue, Memphis, Tenn., by the Graham-Merrin Co., estimated to cost $60,000, exclusive of equipment. E. L. Harrison, Memphis, is architect.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:
- Refined iron bars, base price....3.54c.
- Swedish charcoal iron bars, base....7.50c.
- Soft steel bars, base price....3.54c.

Hoops, base price....5.19c.
Bands, base price....4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base....3.64c.
Channels, angles and tees under 3 in. x ¼ in. base....3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier....3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel Black	Galv.	*Wrought Iron* Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¾ in. Butt	—46	—32	¾ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High brass sheet	18½c. to 19½c.
High brass wire	19 c. to 20 c.
Brass rods	16¾c. to 17¾c.
Brass tube, brazed	26½c. to 27½c.
Brass tube, seamless	24 c. to 25 c.
Copper tube, seamless	25½c. to 26½c.

Copper Sheets

Sheet copper, hot rolled, 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$11.75	$10.50	IC	7.00	6.75
IX	13.00	11.75	IX	8.25	8.00
IXX	14.75	13.00	IXX	9.50	9.25
IXXX	16.50	14.75	IXXX	10.75	10.50
IXXXX	18.50	16.50	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	43c.
Bar	48c. to 55c.

Copper

Lake ingot	16¾c.
Electrolytic	16¼c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8½c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27c.
Refined solder	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic....9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....32c. to 33c.

Old Metals

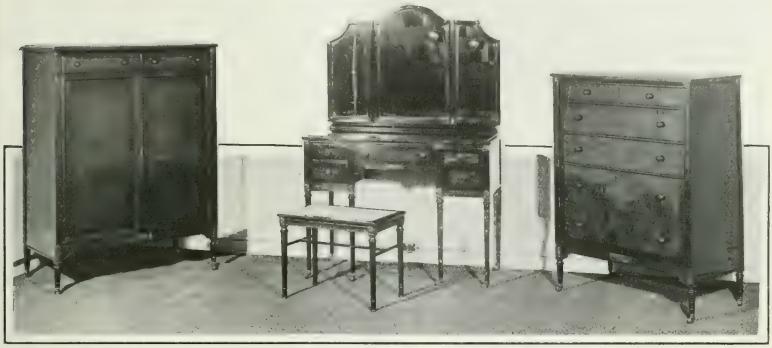
Business is very quiet and values are lower except for white metals, which are firm. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	7.75
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.25
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, September 13, 1923

ESTABLISHED 1855 VOL. 112, No. 11



Furniture–An Important New Use for Steel

Simmons Company at Kenosha Plant Has Inaugurated Comprehensive Program for Manufacture of Complete Bed Room Suites from Steel

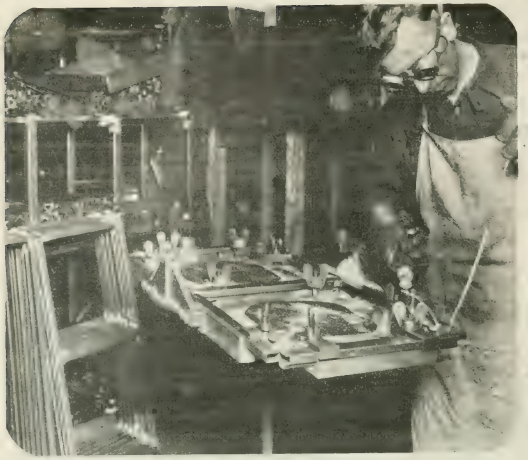
BY GILBERT L. LACHER

IN new uses for rolled steel are to be found one of the greatest promises for the continued growth of an industry which owes much of its present high state of development to the uninterrupted expansion in the utilization of the metal for an ever increasing diversity of purposes. Uses for steel which are still relatively new, now take a large proportion of the tonnage rolled in American mills. The all-steel railroad car, the automobile and the fabricated steel skyscraper are all products of the last two or three decades. The use of steel for beds was also developed during that period and in relatively recent years the manufacture of steel office furniture had its inception. Now steps are being taken which forecast the use of steel for manufacturing all articles of furniture which are now made from wood.

It is not surprising that the first to enter this broad field is the Simmons Co., New York, long a leading



Steel Bed Room Furniture in the Finished State



Drawer Frames are Fabricated by Fitting Together Tubing Cut to Proper Length on a Jig. The workman is shown brazing the joints together with an acetylene torch

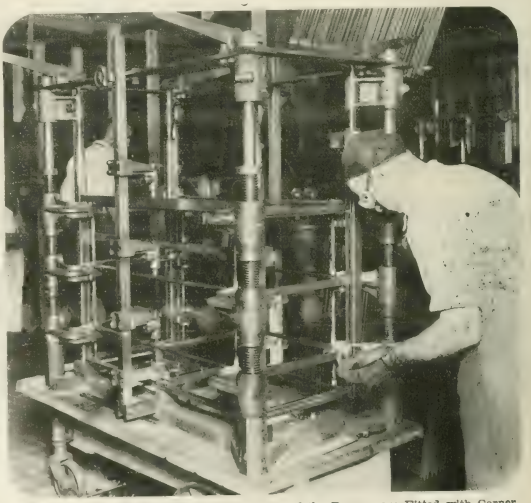
factor in the metal bed industry. As late as March of this year experiments were initiated which have led to the inauguration of steel furniture manufacture on a production basis. This work has been done at the company's parent plant at Kenosha, Wis., and so well satisfied is the management with the results achieved that it is now constructing a large new factory building there which will be devoted entirely to this new branch of its business. Thus far only bedroom furniture has been made, but it is not unreasonable to assume that the same advantages which led to the manufacture of chamber suites will cause steel to be employed also in making other classes of household furniture.

The present program, even though limited to bedroom furniture, is a comprehensive one, including nine distinct suites, consisting of ten or eleven separate pieces, exclusive of beds. The different articles made comprise dresser, chiffonier, chifforette, chifforobe, full vanity, semi-vanity, bench, chair, rocker, bedside table and dressing table. In some of the suites the dressing table is omitted. Special pieces include grip stand, writing desk, and a combination wardrobe and desk known as a chiffrodesk.

The present production of these articles is 300 pieces a day, but with the completion of the new plant building next winter the output will be increased ten-fold. This structure, now under construction, will be 100 x 280 ft. and six stories high. The first floor will be used for the storage of steel, the second and third stories for manufacturing, the fourth for packing, and the fifth and sixth for finishing. Dressers, chiffoniers and dressing tables will be made in this building and the remaining pieces will continue to be produced in the main works pending the erection of further additions which, according to present plans, will comprise three structures of the same size as the one now being built.

The materials used for making the furniture consist largely of two classes of steel, cold-finished sheets and cold-rolled strip steel. The framework of each piece is made from seamless tubing electrically welded, which is drawn from No. 20 and No. 28 cold rolled strip in widths ranging from 8 in. down to 2 in. Five shapes of tubing are used for most of this work. Irregular shapes used, for example, for certain designs of legs and mirror posts, are formed from tubing in swaging machines. The tops of the furniture and the fronts of doors are made from No. 20 gage cold-finished patent-leveled black sheets. The sides, backs and bottoms are formed from No. 24 gage cold-finished black sheets. The proportions of sheets and strip steel used are in the ratio of 60 to 40.

The amount of steel used for a bedroom suite, exclusive of the beds, averages 750 lb. Upon the completion of the new plant within the next few months, production will be raised to 300 suites a day, requiring



The Drawer Frames and the Bottom Frame of the Dresser are Fitted with Corner Pillars, Forming a Framework Which Is Inverted on a Jig and Brazed Together. The workman is shown brazing one of the joints

225,000 lb. At this rate the consumption of steel annually will be 20,250 tons of sheets and 13,500 tons of strip. This, of course, is only a beginning and does not indicate the great possibilities for the expansion of the industry.

Offhand, it might be assumed that steel, while adapted for the simpler designs of furniture, could not be put on a competitive basis with the hardwoods for types of products in which beauty of finish and grace of lines are embodied. At first glance, this seems a logical assumption and probably explains why the possibilities of steel for this purpose were not developed long before this. Needless to say the Simmons Co. did not make the new venture until it had satisfied itself that intricacies of design and excellence of finish are not insurmountable obstacles to the successful employment of steel for furniture.



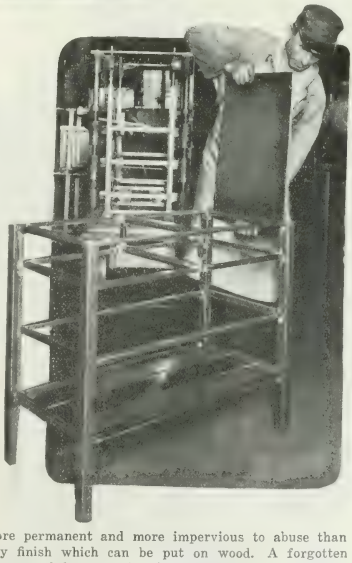
At Left: The Top of the Dresser Is Made Separately With Careful Attention to Deadening. The top sheet is laid on a work bench bottom side up and the frame and stiffeners are brazed and soldered into place. Underneath the stiffening members are strips of deadening material. The workmen are shown soldering the stiffeners to the top sheet

Below: After Being Assembled, the Framework of the Dresser Is Turned Right Side Up and the Sheets Forming the Sides and Back Are Inserted

In developing its metal beds it had made great progress in improving the finish of its product. It was not until this year, however, that it succeeded in producing what is known as a piano finish and in simulating the grain of hard wood so that it could not be distinguished from the genuine except by the most experienced eye. Of course, the thought occurs that there is often initial prejudice against an imitation merely because it is an imitation, but this consideration is outweighed by what are regarded as more important factors. From the standpoint of finish, for example, steel has a marked advantage over wood. Steel can stand the high temperatures necessary for the baking of enamel—something which is impossible with wood.

When giving steel furniture a so-called wood finish, the first operation is to put on a priming coat of a solid color. Then workmen of great skill paint on the coarser grain. The next step is to give the piece another solid coat of darker hue, following which the finer grain is put on. This is accomplished by drawing brushes intermittently across the surface, the brushes serving to remove the second solid coat and to expose the first in a fine stippled effect. Both of the graining operations are entirely free hand with the consequence that the work entirely lacks the artificial appearance of a printed or stenciled grain.

After the priming and graining, the furniture is given one, two, or three coats of varnish, depending on the selling price of the suite. After each coat of varnish has been applied the furniture is placed on small tray cars and run into kilns where it is baked one hour at 300 deg. Fahr. Following the final baking, the furniture is given a "pummy" rub and then it is polished. Furniture is also enameled in solid colors, in which case it is baked at 180 to 200 deg. Fahr. for four to five hours, subsequently receiving the same pummy rubbing and polishing as the wood-finish pieces. The enamels and varnishes baked in kilns are obviously more permanent and more impervious to abuse than any finish which can be put on wood. A forgotten cigarette left on a piece of steel furniture will burn itself out without spoiling the finish. No perfume or ordinary cleanser will damage it.



In addition to possessing an advantage in finishing possibilities, steel is also far more substantial than

wood. Caster spindles will not split the legs of steel furniture. Rough handling will not loosen the members of any piece, nor cause chipping and marring which require refinishing. Changes in temperature do not affect the easy sliding qualities of drawers. Notwithstanding that the danger of damage has been reduced to a minimum, construction of the furniture is such as to permit the easy removal of tops and sides for replacement from the company's stocks of spare parts.

An important feature of steel construction which should not be overlooked is that the cheapest bedroom suite differs not one iota from the most expensive in strength and durability. The lower price is not, as in the case of wood, an indication of less substantial construction; it merely means a less intricate design perhaps, or fewer coats of finish.

The fabrication of steel furniture can best be described by following the various operations in the manufacture of one of the commoner pieces — a dresser. The drawing of the tubing is done on a royalty basis and this work at the instance of the patentee is kept secret. From the time the tubing comes from the mill there are 280 separate operations on a dresser before it is ready for painting and enameling. Many of these are done on punch presses, there being fully forty power presses for the furniture department alone, not counting those employed on bed work. The presses, of course, employ a large number of dies to perform the numerous operations required on both the tubing and the sheets. All sheets go through a patent level-



Dresser Drawers Are Assembled Entirely from Five Separate Sheet Stampings—Front, Back, Bottom and Sides. The workman is shown hanging the lipped sides on to the bottom. When he has assembled the drawer he brazes the bottom corners

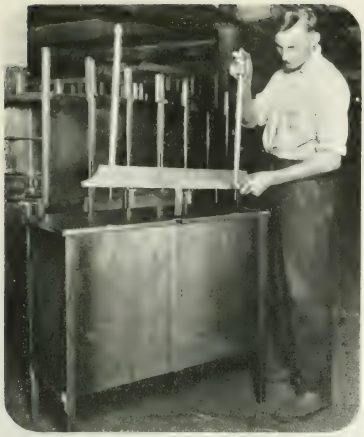


A Frame Is Slipped Over the Top of the Drawer Before Brazing the Top Corners

ing process before they receive any other treatment. This is a stretching process which takes out all waves in the surface of the metal, and is performed on a special machine built by the Torrington Mfg. Co., Torrington, Mass., in which the power for stretching is supplied by hydrostatic pressure up to 3000 lb.

After the various parts of a dresser have been formed, they are brazed, welded and bolted together. The first fabricating operation is the forming of the drawer frames. This is accomplished by fitting together tubing cut to the proper length, on a jig and then brazing the joints with an acetylene torch, using borax as a flux. The bottom frame is similarly assembled on a jig, following which a bottom sheet is electrically welded to the frame members. Then the corner pillars are fitted into the bottom and drawer frames, whereupon the resulting framework is inverted on a jig and brazed together. Only the front corners, where a dresser undergoes the greatest strain, are lock-jointed, the back corners of the frames being brazed butt up against the pillars. The legs of the dresser, it is to be noted, are integral with the corner pillars and are hollow at the extremities so that casters may be inserted or removed at will. The taper in the legs is formed by cutting triangular pieces out of two opposite corners of the four corners of the tubing and then pressing the edges together and steel welding them. After welding, the tapered surface is ground and polished.

Following the assembling of the framework of the dresser, it is turned right side up and the sheets forming the sides and back are slid in from the top through grooves in the corner pillars. The top is made separately with careful attention to deadening so that it will not give forth a metallic sound upon impact with another object. The top sheet, which is stamped out so that it has lips extending at right angles from it on the front and sides, is laid on a flat work bench for the insertion of the frame. The main frame, consisting of four pieces of rectangular tubing laid inside the four



Bolts Projecting from the Mirror Posts Are Used to Fasten Mirror to Dresser. A brace extending from the base rail into a socket in the back of the dresser makes the construction even more secure

sides of the top sheet, is brazed together and to the inside of the lips of the sheet at the corners. Then three narrow strips of deadening material are laid parallel lengthwise across the bottom of the top sheet, and three cross braces of tubing are superimposed on the strips. The next step is the soldering of the braces to the top sheet. Two cups, or "locating pommels" are brazed to the rear corners to locate the top accurately when it is inverted on the framework of the dresser. To neutralize the acid used before applying the solder to the braces, the entire bottom of the top is thoroughly painted after it has been assembled. To permit of the easy removal of the top from the framework of the dresser, bolt fastenings are used.

Dresser drawers are assembled entirely from five separate sheet stampings—front, back, bottom and sides. The stampings are provided with lips on edges which fit together, while those edges which remain exposed in the assembled drawer are rolled to prevent the cutting of fingers or the tearing of clothing.

In assembling a drawer the initial operation is the fitting together of the five parts. The bottom stamping is first placed bottom side up on a flat top frame. On top of this stamping is placed a sheet of deadening material and then the side stampings are hung on. After the lipped front and back pieces have been fitted over the sides, the bottom stamping is brazed at the corners to the other four pieces. The drawer is then turned right side up and a frame is slipped over it to hold the top corners firmly together for brazing.

Both the frames used in assembling are made with extreme care, as it is essential that drawers be assembled accurately within 1/32 in. to fit the drawer frames in the dresser. After the corners of the drawer have been brazed both at the bottom and at the top, the lips projecting over the corners are electrically spot welded. To facilitate this operation indentations are made in the lips of the stampings before they reach the drawer assembling department. To prevent the deadening sheet from bulging out from the bottom of the drawer, a retainer button located in the center of the deadener is spot welded to the drawer.

The advantage of steel construction over wood is again apparent in the manner in which the mirror posts are fastened to the dresser. Bolts from the mirror posts pass through the base rail and engage nuts in the framework of the dresser. The posts are fastened to the base rail by set screws located in the back of the rail. These screws hold in place a pommel in which the mirror post is anchored. The effect of the pommel is to hold the post securely to the rail without preventing one from turning the post when screwing the fastening bolt into the framework of the dresser. A brace extending from the middle of the bottom of the base rail is inserted in a socket in the back of the dresser and is then bolted to the framework. This method of fastening is so secure that a dresser may be pulled by a post across a bedroom without loosening post or base rail a particle.

The mirrors are held in their frames by small fastening plates bolted on the back. This method of holding the glass is more secure than fastening with finishing nails tacked against cardboard, such as is the practice with wooden frames, and at the same time permits the quick removal of the mirror for replacement.

The advantage of steel construction is even more pronounced for some bedroom pieces of less compact design than a dresser. Dressing tables, for example, have long spindly legs which, when constructed of wood, frequently get out of true or are loosened to the extent of necessitating repairs. In steel construction the legs are screwed on and extend the entire distance from the floor to the top of the table, being anchored in sockets in the inside of the corners of the drawer frames. This insures a maximum of rigidity and enables the steel dressing table to stand fully ten times as much weight as a wooden table.

In such minor particulars as embossed decorations, steel furniture is also superior to its wooden competitor. Rosettes on wooden furniture are either carved from wood or die cast from wood pulp. In



The Lips Projecting Over the Corners of the Drawer Are Electrically Spot Welded

either case, the rosette is glued to the furniture. Rosettes used on steel furniture, on the other hand, are die cast from brass and are riveted in place.

Throughout all assembling operations prior to enameling, the steel parts used are kept thoroughly coated with oil to prevent rusting.

What of the cost and weight of steel furniture as compared with the wooden product? Costs are sufficiently low to permit the Simmons Co. to sell at lower prices than those quoted on high-grade hardwood furniture. The weight of steel furniture is only 12 per cent greater than that of hardwood.

AUGUST STEEL OUTPUT

Daily Rate 4294 Tons Less Than in July—Year's Rate About 42,380,000 Tons

Another low record for the year for steel ingot production, measured by daily rate, was registered in August. Despite the fact that this month's total exceeded July, the daily rate was 4294 tons per day less, or 136,276 tons compared with 140,570 tons, due to the larger number of working days—27 for August against 25 for July.

According to statistics gathered by the American Iron and Steel Institute the August production of companies which made 95.35 per cent of the country's total was 3,508,347 gross tons. This means a total for the country of 3,679,441 tons or 136,276 tons per day—a decline of 21,500 tons per day since the peak in April. The tables follow in gross tons:

Monthly Production of Steel Ingots, January, 1922, to December, 1922, Reported by Companies which made 84.15 per cent of the Steel Ingot Production in 1922

Months 1922	Open-hearth	Bessemer	All other	Calculated monthly production all companies	Approximate daily production all companies Gross tons
Jan.	1,260,809	331,851	822	1,891,857	72,764
Feb.	1,395,835	348,571	616	2,071,772	86,324
March ..	1,918,570	451,386	795	2,814,667	104,247
April ..	1,897,465	445,929	1,109	2,902,240	116,090
May	2,214,774	494,893	1,474	3,218,794	119,215
June	2,143,708	487,851	2,918	3,127,775	120,299
July	2,020,572	464,047	2,485	2,952,806	118,112
Aug.	1,807,310	404,379	2,893	2,629,256	97,380
Sept.	1,911,147	460,127	2,505	2,818,261	108,395
Oct.	2,352,207	518,010	2,198	3,410,365	131,164
Nov.	2,360,902	525,945	2,449	3,430,309	131,935
Dec.	2,241,104	536,214	2,572	3,300,416	132,017
Total ..	23,624,404	5,469,213	22,836	34,568,418	111,511

Monthly Production of Steel Ingots, January, 1923, to August, 1923, Reported for 1923 by Companies which made 95.35 per cent of the Steel Ingot Production in 1922

Months 1923	Open hearth	Bessemer	All other	Calculated monthly production all companies	Approximate daily production all companies Gross tons
Jan. ..	2,906,882	728,270	9,467	3,822,369	141,569
Feb. ..	2,613,564	669,903	10,797	3,454,918	142,955
March .	3,046,209	799,525	12,841	4,046,854	149,883
April ..	2,974,579	772,485	13,933	3,944,412	157,776
May	3,136,558	847,418	16,719	4,195,800	155,400
June	2,821,239	737,845	15,483	3,748,890	144,188
July ..	2,658,449*	680,884	11,496	3,514,241*	140,570*
Aug. ..	2,797,962	701,059	9,326	3,679,441	136,276
Total ..	22,955,552	5,937,389	100,062	30,406,925	146,187

*Revised.

Plant Operations in Alabama

BIRMINGHAM, ALA., Sept. 10.—Repairs are being rushed on the blooming mill of the big Ensley steel plant of the Tennessee Coal, Iron & Railroad Co. The Gulf States Steel Corporation has plenty of basic iron to supply four open-hearth furnaces while the blast furnace is being repaired. The Ingalls Iron Works and other steel fabricating plants here are busy on structural steel work.

The Louisville & Nashville Railroad announces placing an order for 50,000 tons of steel rails, delivery during first half of 1924 in equal monthly installments with the Tennessee Coal, Iron & Railroad Co., Birmingham. Intimation is given that further orders may be placed by the road.

Two blast furnaces are under repairs in this State, the Gulf States Steel Co.'s stack at Gadsden, and the Shelby Iron Co.'s charcoal iron producer at Shelby. The Sloss-Sheffield Steel & Iron Co. will not start up the two furnaces blown out last month until the demand improves and a considerable part of its iron in the yards has been removed.

Machine Tool Exhibition at Yale University

The machine tool meeting and exhibition to be held at Yale University, New Haven, Sept. 18 to 20, will provide the following papers: Tuesday, Sept. 18, 8 p. m., "Yale and the Machine Tool Industry," by Prof. Charles H. Warren, dean of the Sheffield Scientific School; "Broader Aspects of Machine-Tool Application," by H. L. Seward, professor of mechanical engineering, Sheffield Scientific School. Sept. 19, 8 p. m., "The Origins of Machine-Tool Building," by J. W. Roe, professor of industrial engineering, New York University, and president of the Society of Industrial Engineers; "An Industrial Birthplace of Pioneer Machine Builders," by Guy Hubbard, engineer, National Acme Co., Windsor, Vt. Sept. 20, 8 p. m., "Operating Demonstration of New Machine Tools," by E. P. Bullard, Jr., president Bullard Machine Tool Co., Bridgeport, Conn., who will introduce the Contin-U-Matic chucking and turning machine.

It will be recalled that the meeting will be held under the joint auspices of the New Haven section of the American Society of Mechanical Engineers, the New Haven Chamber of Commerce and the mechanical engineering department of Yale University. The committee in charge is as follows: A. C. Jewett, chairman, A. F. Breitenstein, E. B. Crawford, Starr H. Barnum, N. E. Horn, C. E. Hulse, H. L. Seward, J. S. String, E. O. Waters, George E. Wood, S. W. Dudley and J. D. Marsh.

Coal Operators Oppose Assignment of Cars for Mine Purposes

WASHINGTON, Sept. 11.—Bituminous coal operators through a special committee on transportation last week filed a brief with the United States Coal Commission in which it was declared that the only effective remedy for the transportation problem, as it applies to the soft coal industry, "is the prevention of nation-wide strikes in the mine and rail industries." It was declared that shortages of the greatest duration and violence, in coal and transportation, have proceeded from strikes of national combinations of mine and rail workers. While it was stated that increased transportation would mitigate these shortages, it would not prevent them. Request was made by the operators that there be no assignment of cars for railroad fuel and that during periods of car shortage no open top cars be furnished wagon mines. It was urged that railroads receiving loaded coal cars from connections during periods of coal car shortage return an empty car for each loaded car received. The operators also suggested, as a means of protecting the supply of open cars, that every railroad engaged in coal traffic furnish its share of open top cars and keep the coal moving over its lines.

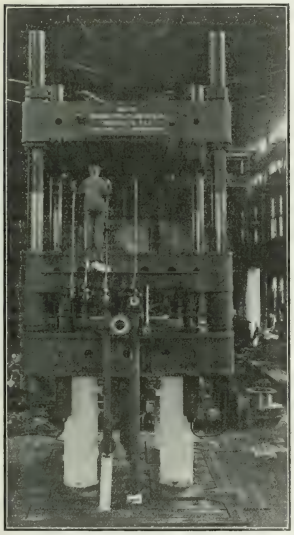
The National Association of Farm Equipment Manufacturers will hold its thirtieth annual convention at Cleveland, at the Hotel Statler, Oct. 24 to 26 inclusive. Among subjects which will be discussed are the simplification of agricultural machinery and machinery parts, transportation as it affects the implement industry, domestic and foreign trade, and modifications of the Federal Reserve Act in the light of recently enacted rural credits legislation.

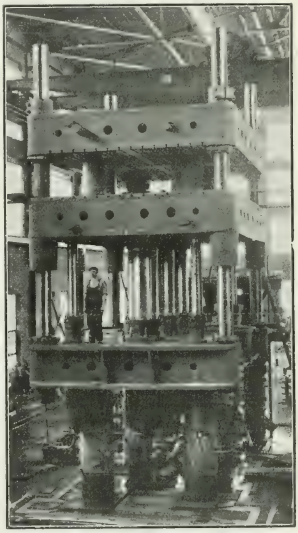
LARGE FLANGING PRESS

One-Piece Platens and Unique Valve Arrangement Are Features of 1200-Ton Unit

What is believed to be the largest press employed in flanging locomotive heads and saddles has been built recently by the Birdsboro Steel Foundry & Machine Works, Birdsboro, Pa., for the Altoona shops of the Pennsylvania Railroad, which has found it necessary to increase the tractive power of its heaviest locomotives. Boilers to generate higher steam pressures and give greater evaporation than used heretofore have had to be designed. Larger and heavier plates and fewer riveted joints have been found necessary to withstand the increased loading and assure a high measure of safety.

In building the press, two views of which are shown herewith, the design of the heavier parts and the problems involved in their transportation presented difficulties. The incorporation of single-piece machined open-hearth steel platens, made possible largely by new machine tool equipment, is a feature especially emphasized by the makers.





For Flanging Heads and Saddles for Locomotives at the Altoona Shops of the Pennsylvania Railroad, the Birdsboro Steel Foundry & Machine Works Built a Four Column Type Machine of 1200 Tons Capacity. Each column is 13 in. in diameter and 30 ft. in length. The platens are 15 x 18¼ ft. in size, giving a flanging bed 15 ft. square

The machine is the moving-up four-column type and has a capacity of 1200 tons, using an accumulator pressure of 1500 lb. per sq. in. The illustrations show the press on the erecting floor before shipment. When installed the machine will be placed in a foundation pit 18 x 25 x 18 ft., so that the floor level is slightly below the face of the middle platen, which is the moving member. The operating levers in the foreground indicate where the operator will stand.

There are four columns, each of which is 13 in. in diameter and 30 ft. in length. The clearance between the columns is 15 ft. one way and 11 ft. 11 in. the other. The platens are 15 ft. x 18 ft. 3 in., which is ample to permit flanging of the largest steel plates, a flanging bed of 15 x 15 ft. being available. The top and moving platens are provided with machined T-slots as shown, to permit of bolting of dies. The columns have long threads on the upper ends, thereby providing an adjustment of 12 ft. maximum to 5 ft. minimum between the top and moving platens. The inner nuts supporting the upper platen are in halves, the outer nuts being split on one side to permit the use of a wedge for slackening them while they are being raised or lowered in changing the clearances.

Six different pressures may be exerted. The press has three main cylinders and plungers, each 26 in. in diameter, with a lift of over 6 ft. By admitting 1500 lb. accumulator pressure to the center cylinder, 400 tons pressure will be exerted on the work. If pressure is admitted to the other two 26-in. cylinders simultaneously, 800 tons will be exerted and by applying pressure to the three cylinders 1200 tons are obtained. Three additional pressures may be exerted by using the four jack rams in conjunction with either of the three pressure combinations noted. These rams are 9 in. in diameter, and are used also for raising and controlling the motions of the moving platen while running idly up to the work, and to perform light flanging.

For stripping the work from the dies an auxiliary cylinder mounted on the center of the moving platen and moving with it, is used. Hydraulic pressure is transmitted to this cylinder through a set of swivel joints. Controlling valves are of the balanced metal-seated type, and are of a size to reduce friction and obtain quick up and down speeds. The speed of lifting and lowering the moving platen up and off the work is 25 ft. per min.

Power saving devices include an arrangement for the prefilling of the three main cylinders with water taken from an auxiliary tank, not shown, located approximately 20 ft. above the floor, while accumulator pressure is applied to the jack rams only. It is claimed that in this way the platen is lifted through the full stroke by using approximately 80 gal. of 1500-lb. pressure water, whereas if accumulator water were used on the three main cylinders, 500 gal. would be used.

A unique valve arrangement, requiring precise machine work, is incorporated. All the valves are hand operated, and have a minimum of packings. They have forged steel bodies bored from the solid, and bronze spindles and seats. One three-way valve is used for raising, checking and lowering the stripper ram, and another three-way valve is for controlling the stripper

ram and jack cylinders. A special valve is provided for filling, cutting off access to the tank, applying pressure, releasing pressure and exhausting the center main cylinder. A fourth valve, of large dimensions, is used for filling the two outside 26-in. cylinders, cutting off communication between these cylinders and the tank, applying the 1500 lb. pressure, releasing pressure and exhausting the two outside cylinders. The piping between the valves and the cylinders is either of open-hearth steel castings or double extra strength pipe.

The press weighs more than 300 tons. It is of cast steel throughout except for the plungers, which are of chilled iron, ground and polished, and the tension bolts, which are of forged steel. The latter were forged from ingots, made in the Birdsboro company's steel foundry. The magnitude of the castings may be judged from the manner of shipping the three large platens, which were loaded on special 12-wheel well cars. With the required blocking and suspension devices, the shipping limits were within 2 in.

Features of a French Automobile Plant

Andre Citroen Installs Tube and Billet Mills—Rapid Handling of Cars by Paint Drying System

ANDRE CITROEN, who is the largest manufacturer of automobiles in Europe, has what undoubtedly is in many respects the most complete automobile factory in the world in that he has been forced to make a larger number of his accessories than is necessary in this country. Thus he has established departments that few automobile concerns in this or any other country have had to include in their equipment.

For instance, in order to obtain tubes drawn from the proper stock and of the proper diameter he put in a complete tube mill. One of the accompanying illustrations shows a piercing press which is used in piercing the billets for drawing the tubes. This is one of the hydraulic presses he used during the war for making shells. The plant also has a tube press which performs a second operation on the tubes, after which they pass the regular draw benches and are drawn to the required diameter and thickness.

The Citroen factory also had difficulty in obtaining certain forms of bar stock and hence had to install a small rolling mill and purchase billets to make the special composition bars required for certain parts of its automobiles. A view is given of one of the rolling units in this mill. The department is in reality a small jobbing rolling mill turning out stock of the exact specifications required by the engineers.

This half tone also illustrates the constant tendency of the French to beautify their building by pleasing lines, the end of the building facing the street being ornamented with three arched windows.

The plant also has a complete electrical department in which are made the magnetos, the starters and all of the electrical equipment necessary for the car.

The French market still calls for individuality in cars, so that a plain japanned finished car cannot be sold to every Frenchman.

In order to take care of the drying of the paint in specially painted bodies which have to be given a considerable number of coats, with the necessary rubbing down after each coat, it has been necessary to install a paint drying system and a view of this is presented. The paint drying ovens are arranged in batteries with four in a line and two high, and the cars are put into the ovens by the use of power-driven transfer cars which bring in the automobile opposite the oven in which it is to go. It is then put on an elevator and can be run directly across this and into the lower tier of ovens or lifted and run into the upper tier of the ovens.

In the illustration (on the next page) the elevator in the foreground is delivering a car into the lower tier of ovens, while the elevators in the background are delivering into the upper tier of ovens. Similar elevators are arranged at the other end of the ovens for taking the cars out and passing them through to the rubbing departments. The equipment as installed makes it possible to handle the cars very rapidly, and by the proper control of the humidity in the ovens a rapid drying of the paint is assured, and at the same time the paint is so manipulated as to give a long life surface.

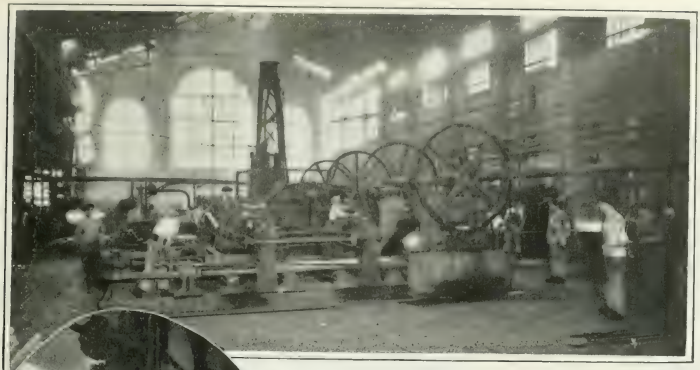
Advisers from Industry for Carnegie Institute

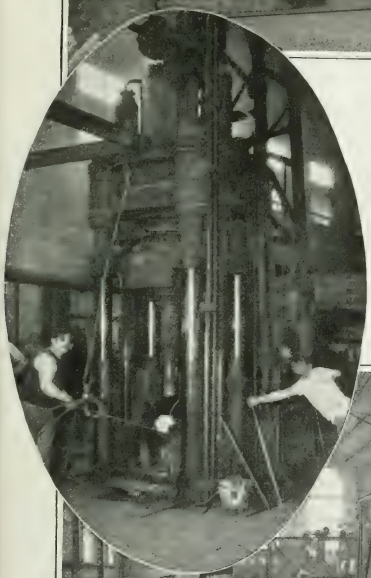
An advisory board of Pittsburgh business and scientific men has been organized to cooperate with the work of the department of mining and metallurgy of the Carnegie Institute of Technology. C. W. Heppenstall, president Heppenstall Forge & Knife Co., has been elected chairman of the board which includes the presidents, managers and executives of 22 large industrial firms in the Pittsburgh district.

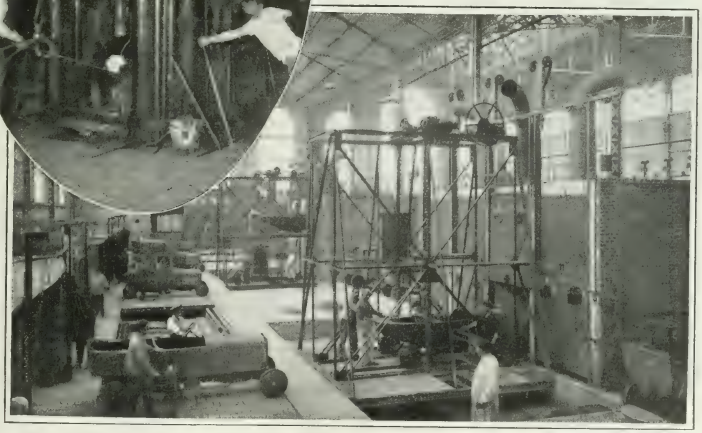
The membership of the board includes, in addition to Mr. Heppenstall: F. B. Bell, president Edgewater Steel Co., Oakmont, Pa.; Earl Blough, technical director Aluminum Co. of America; V. B. Brown, general superintendent Allegheny Steel Co.; E. L. DeMare, manager Union Electric Steel Co.; A. N. Diehl, general superintendent Duquesne Steel Works, Carnegie, Pa.; George H. Faunce, president Pennsylvania Smelting Co.; A. C. Fieldner, United States Bureau of Mines; W. C. Fownes, Jr., Standard Seamless Tube Co.; J. O. Handy, Pittsburgh Testing Laboratory; F. B. Hufnagel, president Pittsburgh Crucible Steel Co.; Roy A. Hunt, vice-president Aluminum Co. of America; T. D. Lynch, Westinghouse Electric & Mfg. Co.; D. A. Lyons, chief metallurgist and supervisor of experimental stations, United States Bureau of Mines; C. F. W. Rys, chief metallurgical engineer Carnegie Steel Co.; F. N. Speller, chief metallurgical engineer National Tube Co.; S. G. Stafford, vice-president Vulcan Crucible Steel Co., Aliquippa, Pa.; B. N. Zimmer, manager American Zinc & Chemical Co.; F. I. Gaston, Jones & Laughlin Steel Co; Sidney A. Grayson, general manager Jessop Steel Co., Washington, Pa.; O. J. H. Hartsuff, general superintendent Edgar Thomson works, Carnegie Steel Co., Braddock, Pa.; W. E. Moore, president Pittsburgh Electric Furnace Corporation; and the following officials of Carnegie Institute of Technology: Dr. Thomas S. Baker, president; W. E. Mott, director College of Engineering; Fred Crabtree, head of the department of mining and metallurgical engineering; F. F. McIntosh, associate professor of metallurgy.

Cast Iron Pipe Produced in June and July

According to figures collected by the Department of Commerce, the June production of cast iron pipe was 81,208 tons, while the shipments amounted to 88,318 tons. Orders for pipe to be shipped from stock







Above: Rolling Mill at the Citroen Automobile Plant in Paris. This mill produces bars of special composition required for the Citroen car

The Press at the Left Was Built in War Time for Shell Forgings, But Is Now Used for Piercing Billets to Prepare Them for the Tube Mill

Below: Handling Appliances for Automobile Bodies. The paint drying ovens are arranged in batteries of four and double decked so there are eight ovens in each battery, and in front of the ovens there are elevators and transfer cars as shown, which handle the automobiles rapidly as they go in and out of the paint drying ovens

aggregated 17,905 tons; orders for pipe to be made on order reached 199,271 tons, while orders for pipe not specified as to sizes reached 4366 tons.

Similar figures for July production included 79,528 tons of pipe produced and 77,828 tons shipped. Orders under the classifications above aggregated respectively 16,839 tons, 183,130 tons and 4215 tons.

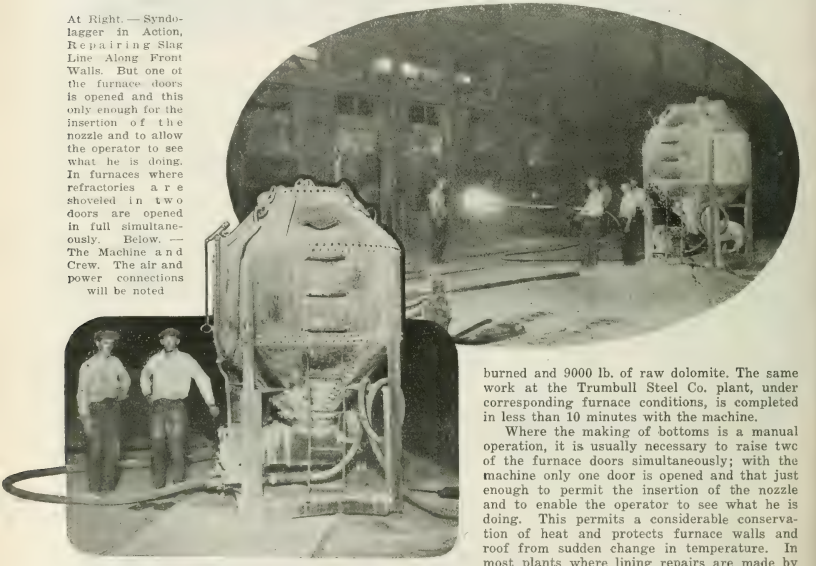
In both cases the great bulk (in number of pieces) consisted of 6-in. and 4-in. pipe, in that order, with 8-in. in third position; 12-in. and 10-in. pipe came next. These five sizes covered nearly 95 per cent of the number of pieces involved. The largest size listed was 72 in., of which seven pieces were called for in June and three in July.

MAKING OPEN-HEARTH BOTTOM

A Machine Which Economizes in Time and Materials

Without the labor-saving devices developed in the past two decades there could have been no such progress in the elimination of the 12-hr. day in the steel industry as already has been made. Not enough workers could have been found in so short a time to man a third shift in the continuous processes, had hand labor been employed in the old way. The charging machine for open-hearth furnaces, the skip hoist, pig-casting machine and bin system at blast furnaces have been fairly revolutionary. Among more recent developments in this category is the syndolagger, a mechanical device for making and repairing slag lines and bottoms of open-hearth furnaces.

The machine is operated by means of compressed air and a small electric motor. It conveys refractory material, ⅜-in. and under in size, from a steel tank through a 2½-in. hose and nozzle into the furnace and is sufficiently flexible to repair slag lines along the back wall, port ends and front wall, the latter being reached by use of a curved nozzle. It also may be used for repairing puddle holes in the bottom of the furnace. The Basic Products Co., Pittsburgh, holds the patents on the machine, which has been in operation in the plant of the Trumbull Steel Co., Warren, Ohio, for more than a year.



At Right. — Syndolagger in Action, Repairing Slag Line Along Front Walls. But one of the furnace doors is opened and this only enough for the insertion of the nozzle and to allow the operator to see what he is doing. In furnaces where refractories are shoveled in two doors are opened in full simultaneously. Below. — The Machine and Crew. The air and power connections will be noted

The illustration shows one of the two machines which have been in use at that plant. The tank has a capacity of 13,000 lb. of refractory material, which can be discharged at the rate of 500 lb. to 1500 lb. per minute. When the machine is put to use it is conveyed from the filling bins and placed in front of the furnace by the overhead crane serving the charging floor of the furnace department. The floor is provided with the necessary air and power connections and the setting up of the machine preparatory to use is a matter of a few minutes.

Repairing slag lines and bottoms of furnaces is one of the most arduous tasks of open-hearth workmen. In the average plant, having furnaces capable of producing from 75 to 125 tons a heat, from six to eight men are engaged in repairing furnace walls and bottoms after the tapping of each heat. If more than an hour elapses between the tapping and charging periods, the excess is referred to as "lost time." Such lost time generally is computed to be worth $1 a minute. Men who have the interest of their company at heart, or who realize that their bonus is based upon the steel produced, do not loaf, therefore, while furnaces are being prepared for an additional heat.

At the Trumbull Steel Co. plant, the average time between tapping and charging has been cut down from the arbitrary period of one hour to that of 30 minutes since the syndolagger was introduced. Frequently the elapsed time is less than 15 minutes. In a plant in the Pittsburgh district having furnaces of like capacity to those at Warren, Ohio, it takes seven men slightly over 30 minutes to make the necessary refractory repairs after each heat. They shovel in about 13,000 lb. of refractory material, including 4000 lb. of burned and 9000 lb. of raw dolomite. The same work at the Trumbull Steel Co. plant, under corresponding furnace conditions, is completed in less than 10 minutes with the machine.

Where the making of bottoms is a manual operation, it is usually necessary to raise two of the furnace doors simultaneously; with the machine only one door is opened and that just enough to permit the insertion of the nozzle and to enable the operator to see what he is doing. This permits a considerable conservation of heat and protects furnace walls and roof from sudden change in temperature. In most plants where lining repairs are made by hand the furnace is allowed to empty before the work begins; with the use of the machine, the front wall slag line is rebuilt while the steel is going into the ladle. With the use of the machine, none of the crew engaged in bottom making is exposed to direct heat for more than five minutes, while the shoveling method usually keeps the men in front of the furnace almost constantly for at least 30 minutes. The saving of man power is readily apparent.

The consumption of refractories at the Trumbull plant has been reduced appreciably by the use of the machine. A study of reports showing the consumption of lining materials at numerous open-hearth steel plants indicates that the Trumbull company is using less than half as much refractory material as some other plants of similar type employing burned and raw dolomite. At one Central Western steel works having 75-ton furnaces, where raw stone is used almost altogether, more than 100 lb. of raw stone per ton of steel is shoveled into the furnace after each heat, and in addition some synthetic material. While the initial cost of raw stone is low, two tons of

(*Concluded on page* 721)

Steel Foundries and Cooperative Research

Results Achieved Among Five Electric Plants in Operations, Costs and Merchandising—New Uses for Thin Castings

BY W. J. CORBETT*

IN the United States it is estimated that industries are spending $70,000,000 every year for research, and that the expenditure results in a saving of $500,000,000 annually to the country. This saving is enormous when compared with the amount expended for carrying on industrial research investigations.

Research investigations are not limited to a single company or corporation in an industry. Competitors with limited resources have begun to realize that great benefits can be derived by pooling their knowledge and experience for the purpose of conducting cooperative research work. Not so long ago, it was unheard of for competitors in an industry to get together and exchange opinions and results of their experience. Divulgence of these assumed trade secrets to competitors was thought to be a gift of some of the assets of those companies. Fortunately, such old-fashioned ideas have been cast aside, and it is probably safe to assume that the most progressive and broad-minded industrialists and business men are always willing to exchange ideas with one another even though they be competitors.

Some of the direct results to be obtained by research and cooperation in industry may be said to be the following:

1. Decreased costs of production and elimination of waste.
2. Improvement of present processes and products and development of new processes and products.
3. Standardization of manufacturing operations, quality of products and methods of analysis and control.
4. Development of new uses for known products.
5. Development of efficient merchandising methods.

It does not require a very vivid imagination to realize that some or all of the above results should be the outcome of well directed cooperative research investigations in an industry.

[The author gives here an account of the formation and operation of the Electric Steel Founders' Research Group, familiar to most readers of THE IRON AGE.]

Technical Cooperation and Research

Inspection Standards.—One of the first steps taken by the Electric Steel Founders' Research Group was to establish inspection standards which are uniform for all the five companies. These standards are much more rigid than those included in any commercial specifications at the present time. Upon the adoption of these inspection standards, each company in the group increased its inspection personnel or installed an inspection department in order that there would be strict observance of the inspection standards. The inspection department at each plant is indirectly under the supervision of the research director of the group, and the latter scrutinizes carefully the inspection methods during his periodic visits to the plants in order to ascertain if the quality of the castings is being maintained. The ultimate object aimed at by this procedure is the elimination of extra finishing and cleaning and delays in assembling castings at plants of customers, by shipping to them castings that are clean and true to pattern.

Sand for Cores.—Research investigations on molding sand and core sand mixtures at Sivyer Steel Casting Co., Milwaukee, Wis., and at Fort Pitt Steel Casting Co., McKeesport, Pa., have furnished valuable data for practical use in the production of small steel castings having thin sections. The sand used in a steel foundry making castings of intricate design and having thin sections of metal must have the most exacting refractory qualities if clean castings are to be produced. It is necessary that the surface of the sand molds be able to withstand the tendency to fuse to the castings caused by the exceedingly high temperature of steel from the electric furnace. The sand must also have certain physical properties to prevent the formation of blow-holes in the castings. Definite information has been obtained from the experiments on molding and core sand mixtures, concerning the character of the raw sand, the method of mixing the sand in the foundry, the amount of moisture allowed, the ingredients to be used for giving bond to the sand mixture so that it can be molded, and the daily analysis and control of the sand mixtures in the shop.

Heat Treatment.—Extensive experiments performed under ordinary shop conditions at Michigan Steel Casting Co., Detroit, Mich., on the heat treatment of steel castings have conclusively determined the best practice to follow. The heat treatment of steel castings is a very important subject and consumers are beginning to recognize this. Proper heat treatment methods must be used in a steel foundry if the product is to have the best physical properties. The experiments on this subject have furnished such essential data as the temperature for annealing, the soaking time, and the method of cooling from the maximum temperature.

Slag and Aluminum.—The prevention of the presence of slag in steel castings is of great importance. Investigations made at Lebanon Steel Foundry, Lebanon, Pa., on slag in castings, have enabled the foundries in the group to adopt methods which reduce to a minimum the evil of occluded slag in steel castings.

Research investigations on the use of aluminum in making steel castings, have resulted in the conclusion that there is a definite maximum amount of aluminum per ton of steel that may be used without having deleterious effects on the ductility of the steel. The investigations of the group have proved that aluminum has no effect on the physical properties of steel castings if a certain amount per ton of steel is not exceeded. The use of an amount in excess of this maximum has a very pronounced bad effect on the physical properties of steel.

Cooperation in Cost Accounting

In the survey of about 30,000 manufacturing establishments in the United States by the Federal Trade Commission, it was found that only 10 per cent had an adequate knowledge of costs. This was an astonishing situation and has been corrected to some extent by the activities of various bodies. The Federal Trade Commission, United States Chamber of Commerce, manufacturers' associations, cost associations, the Interstate Commerce Commission, and the establishment of the Federal Income Tax, have all been influential in causing business men to adopt methods of accounting which provide useful cost data for the formulation of policies.

It is not uncommon for some companies to have an elaborate monthly cost summary, and make no use of the data in it for determining the cost of specific articles which they produce. It is merely an average cost for all articles produced during the month, and it gives no indication whatever of the cost of an individual product when a number of different articles are made. For example, in a steel foundry, the total average cost for a month might be $300 per ton of good castings produced, and included in this average there would

(*Concluded on page 731*)

*Abstract of a paper read before the Industrial Cost Association in Pittsburgh at its June meeting. The author is industrial engineer of the Electric Steel Founders' Research Group.

PAY FOR TEN HOURS RAISED

Adjustment Similar to That of Men Reduced to Eight Hours Announced

Judge Elbert H. Gary, chairman United States Steel Corporation, and Eugene G. Grace, president Bethlehem Steel Corporation, on Sept. 7 issued statements in regard to the progress being made in overcoming the problems which have arisen in the steel industry as a result of elimination of the 12-hr. day. Judge Gary said that "existing conditions will not permit a general increase of wage rates" but he points out that the men whose hours of work have been reduced from 12 to 10 hours a day will receive an increase in wages equal to 10 per cent of the hourly rate. Those men whose hours were reduced from 12 to 8 received an increase of 25 per cent. Judge Gary's statement said:

"At the time the directors of the American Iron and Steel Institute publicly stated that total elimination of the 12-hr. day would be immediately commenced it was said that employees connected with continuous process would be reduced from 12 to 8 hours and that their wage rates would be so adjusted as to afford earnings equivalent to a 25 per cent increase in hourly and base rates; also that all other workmen would be on 10 hr. or less and their present hourly and base rates would be continued, though whenever it should be practicable, by promotions or changes in position, daily earnings would be accordingly adjusted.

"Since that time the industry has proceeded as rapidly as possible to bring about changes of hours and also to make such changes in position and otherwise as would permit equitable adjustments in regard to the 10-hr. men. However, as time has elapsed, it appears that there is a larger number of 12-hr. men reduced from 12 hr., not connected with continuous process, than it was then expected. Consequently, there is now a considerable number of 10-hr. men, some of whom formerly worked 12 hr. and others on a straight 10-hr. day basis, and it seems to the employers that there should promptly be made adjustments in regard to the wages of these workmen.

"Existing conditions will not permit a general increase of wage rates. The adjustments which have been and are being made, as suggested, arise entirely from the circumstances growing out of the total elimination of the 12-hr. day."

President Grace said that "substantial progress has been made in the elimination of the 12-hr. day in the company's steel plants. The rearrangement of forces and working conditions has proceeded very satisfactorily," he added, "and the problems involved in transferring employees from 12 to 10 hr. are being adjusted, as in the case of the workers transferred from 12 to 8 hr., on an individual basis, the company sharing with the employees the loss in their daily earnings."

Under new arrangement the men who have been working 10 hr. will receive the equivalent of 11 hr. pay at the rate of 40c. an hour, bringing their daily wage from $4 up to $4.40.

Plant Operations at Philadelphia

Almost all of the iron and metal-working plants at Philadelphia are running at close to normal capacity, with employment of full working forces, while the turn of September has brought an overtime schedule in a number of factories. At the works of Henry Disston & Sons, Inc., Tacony, maximum production is being maintained in the saw and file manufacturing departments, while a night shift has been adopted in several plant divisions. The Electric Storage Battery Co. is running full at its main Philadelphia plant for the manufacture of batteries for automobile, radio and other service, and some departments have been placed on an overtime basis; at its new Crescentville works production is going forward to the maximum extent of machinery now installed, and it is expected to advance the operating schedule just as soon as other equipment is in place. Orders on hand and incoming business insure the present production basis well into the coming year. A total of 4000 persons is now on the payroll.

The William Cramp & Sons Ship & Engine Building Co. is operating at capacity in its hydroelectric machinery department, known as the Morris Works. The J. G. Brill Co., manufacturer of cars and trucks, is running at slightly over 80 per cent of capacity, with indications for an increase in the near future. The Baldwin Locomotive Works has adopted a capacity schedule, giving employment to about 21,000; it is expected to hold to this basis till well after the turn of the year, with present trend making curtailment very indefinite. At Camden, N. J., the New York Shipbuilding Co. is developing heavy production in its structural steel department, with incoming orders insuring the present rate of output for several months. The Victor Talking Machine Co. has adopted the largest production schedule in its history. A new plant addition costing close to $1,000,000 will be placed in service at once.

Coke By-Products in 1922

The Department of the Interior makes public the final statistical results of the Geological Survey's canvass of the coke industry in 1922. Preliminary estimates of the production of coke made in February were substantiated by the final returns from the producers. These returns show a total output of 37,124,012 net tons of coke, comprising 28,550,545 tons of by-product coke and 8,573,467 tons of beehive coke. Except 1921, when business was extremely depressed, each year since 1911 has witnessed a larger total output of coke than 1922. The production of beehive coke was the smallest since 1888, except that in 1921. The output of by-product coke, however, was the largest recorded since the beginning of the industry, except only that in 1920. As compared with 1920, the last normal year, 1922 showed decreases of 29 per cent in the total production of coke, 8 per cent in by-product coke, and 58 per cent in beehive coke.

By-product coke continued to exceed beehive coke in quantity, as it has since 1918. Only 23 per cent of the total came from beehive ovens in 1922, against 22 per cent in 1921 and 40 per cent in 1920.

Salient Figures of the Coke Industry in 1922

Ovens:	Beehive	By-product	Total
In existence Dec. 31, 1922	63,957	11,212	75,169
Daily capacity (net tons of coke)	107,418	119,898	227,316
Coal charged into ovens (net tons)	13,285,868	41,052,670	54,338,538
Value of coal charged into ovens	$35,082,804	$194,015,725	$229,098,529
Coke produced (net tons)	8,573,467	28,550,545	37,124,012
Value of coke produced	$50,036,556	$188,276,767	$238,313,323
Average yield of coke from coal (per cent)	64.5	69.5	68.3
Coke used by producer (net tons)	1,071,886	21,106,823	22,178,709
Furnace coke sold (net tons)	6,105,003	2,934,924	9,039,927
Value of furnace coke sold	$33,724,440	$20,636,494	$54,360,934
Foundry coke sold (net tons)	1,164,716	1,601,733	2,766,449
Value of foundry coke sold	$8,334,400	$15,921,431	$24,255,831
Domestic and other coke sold (net tons)	179,670	3,865,751	4,045,421
Value of domestic and other coke sold	$1,086,014	$34,407,054	$35,493,068
Screenings and breeze: Produced (net tons)	83,917	2,395,286	2,479,203
Sold: Quantity (net tons)	41,533	526,157	567,690
Value	$132,448	$1,583,399	$1,715,847

Sale of Battleships and Battle Cruisers to Be Scrapped by Treaty Agreement

The Navy Department announces that 21 battleships and battle cruisers to be eliminated from the United States Navy, in accordance with terms of the Treaty for the Limitation of Armament, will be sold for salvage, under sealed proposals, each ship to be sold as a whole and to be scrapped by the purchaser within 18 months from the date of ratification of the treaty, which became effective Aug. 17, 1923. Details of the plans of the Navy were given in THE IRON AGE of Aug. 23, page 497.

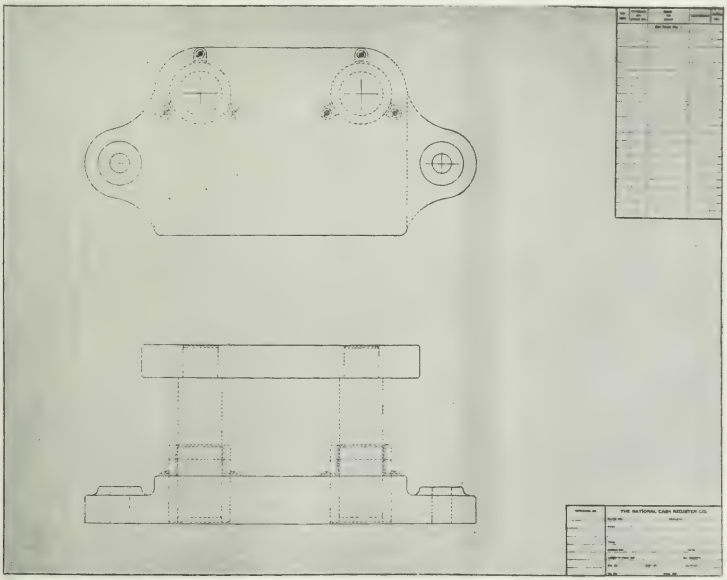
Tool Making in Cash Register Manufacture*

Stock Designs and Stocks of Standardized Parts—Tool Room Operators Specialists—Factory Telephones and Messengers—Master Gages Furnished Workmen

IN connection with the design of tools, the National Cash Register Co. has worked out an exceptionally effective method of saving time for the tool designer and the labor of actually making drawings. Standard tool design books are available for the use of the designer to assist him in working out his problem of fitting the tools to do the required work. With these standard designs as a guide he can more quickly arrive at a practical design, although strict adherence to standard design is not imperative.

In the making of designs for tools a distinct schedule is adhered to. The improvement number of the part to be tooled is listed and a due date registered for completion of the design. This date is arrived at by estimating the number of hours required for designing the drawing with a rubber stamp, instead of requiring the draftsman's time to print in. Special machine designs and the more important work are traced in ink on regular tracing cloth.

Many parts are standardized and drawing printed on vellum, requiring only the filling in of dimensions. Some of these are automatic screw machine cams, graduated, requiring outlining of the cam and insertion of dimensions; punch holders and die shoes of different sizes; automatic screw machine cutting off and forming tools; jig bodies and parts. Standards are maintained on jig patterns, lids, lid stops, feet, posts and lid thumb screws, hinges and hinge pins, fixture plates and angle plates, stops, clamps, bushings, and indicator bases for dial indicators. These parts are all carried



Tool Designing is so Systematized That Certain Types of Tools and Fixtures are Printed in Outline on Vellum, Requiring Only the Insertion of Dimensions or Minor Detail to Produce a Finished Drawing Ready for Blue Printing. Punch holders and die shoe designs are available in a number of different sizes

the tools and the number of men available who are familiar with that particular class of work. Effort is made to have the due date for tools correspond with the arrival of stock in the factory.

To assist in the mechanical part of tool designing, many time-saving features have been adopted. The common run of work is drawn direct on vellum, requiring no tracing nor duplication of effort. Standard instructions such as "harden and grind" are put in as standard designs, so that all the designer has to do is select, for instance, the proper size jig body, lay out the holes for standard bushings, select the proper hinge parts, lid stops, etc., and fill in dimensions.

In the case of special fixtures standard clamps and jacks or stops are used. A sample is the knife edge clamp for profile fixtures or for holding any work of a thin nature. A very interesting stop or jack to support thin work while being machined has been evolved at this plant. It consists of a hardened pin operating vertically in a hardened bushing by means of a wedge sliding beneath it. The final design evolved after a number of trials is dust protected. This jack

*Continuation of a comprehensive article by L. S. Love, begun on page 531 of the issue of Aug. 30, giving in unusual detail methods followed in the making and maintenance of machinery and tools for manufacturing products requiring metal cutting and other operations.

is now the standard support stop used in all special or large machining fixtures. This evolution is shown in the accompanying drawings.

Another point on which standardization has been carried through is the making of interchangeable vise jaws of different forms. In other words even the tool designing in this plant is standardized on a production basis with tests and checks along the line to assure correctness.

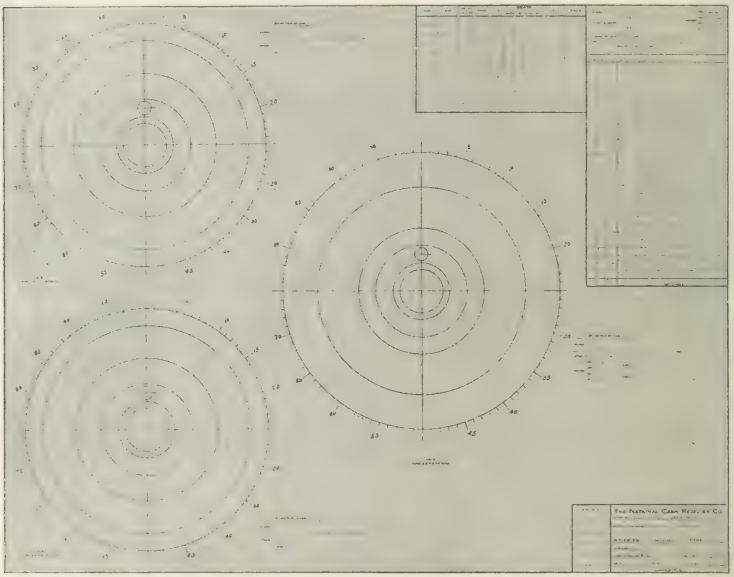
The largest section of the tool making division is devoted to the producing of jigs, fixtures, punches and dies, and gages. In this department at the present time there are employed 260 men, although it has a capacity for accommodating about 280 men. Repairs and changes on punches, dies, jigs, and fixtures, etc., are also taken care of in this particular section. There are 41 employees of the department devoted to that particular class of repair work. The employees are divided into sections devoted to machining, to new punch and die work, to punch and die repairs, to new jig, fixture and gage work, and the repairing of jigs, fixtures and gages.

About 60 per cent of the work of this section is on punch and die making. Reference has been made in a description of the work of the tool design division to the standardized jig bodies, fixture parts, punch holders and die shoes, of which there are approximately 180 parts carried in stock in the stock room of this section. This stock includes punch holders and die shoes of different sizes, jig bodies of different sizes, parts for jig bodies including hinges, hinge pins, hinge bushings, lids, lid stops, drill bushings, common wing nuts and ball wing nuts, knurled thumb screws, and other clamping devices for jigs and fixtures. There are also carried in stock guide pins for die assembly as well as standardized vise jaws.

This section is run on a production basis and the employees are specialists on the particular class of work in which they are engaged. They are not the usual type of all-round tool makers, it having been found that specialization in the tool room pays as it does in the production shop. In the machining division of this section, the allotment of machinery averages about 1¼ machines per man, whereas in the ordinary tool shop the average is 1 machine per man. This may look like excess of equipment, but it is not, being compensated for by the fact that when a man is ready for his machine he has a machine at his disposal at practically any time he may be ready for it, and there are no enforced delays.

When a design with details is received covering a fixture or die set which is to be made, materials for it are ordered by the stock order department. This includes the ordering of patterns, castings, forgings, acetylene welding, or any special work which may be required. Further, all supplementary orders for material or work are issued by that department against the particular tool order number.

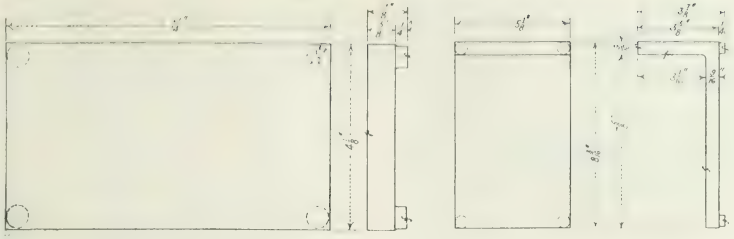
When the raw material enters this section, it goes to the machine division, where no work is done on it which might handicap the bench man. The machine operator is required to remove enough of the surplus metal, thereby not leaving more than the bench man can conveniently remove in his finishing operation to produce an accurate job in a minimum of time.

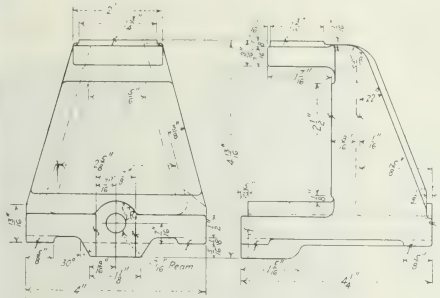


Automatic Screw Machine Cams Printed on Vellum Require Only the Cam Outline and Dimensions to Effect a Complete Drawing

Material ordered for a particular tool order is held in the material stock room and a separate requisition for the stock is issued for it as the workman is ready for it. This avoids having material charged to the tool order number before it is ready to go into processing. Were the material all drawn at once and should the order be held up for some reason or other, a large quantity of material not in process would be piling up on various orders and crowding the department.

For convenience in maintenance work or the repairs of jigs, fixtures, etc., which have been damaged or worn in the production department, a large stock of finished tool steel is carried. This avoids loss of time required for machining such tool steel to sizes required





Typical Fixture Plates (above left) Angle Plates (above right) and Cast Iron Jig Bodies (left) are Used in Designing Fixtures and Are Carried in Stock in the Tool Making Department. A variety of sizes of jig bodies (below) are standardized to assist the tool designer in designing suitable fixtures for machine operations. Such standard parts are carried in great variety, classified in different groups. Slip bushings are made in 26 styles, each style having a number of sizes; one for instance has 124. These bushings are carried for purposes of ready replacement in the departments using them, as indicated by a schedule

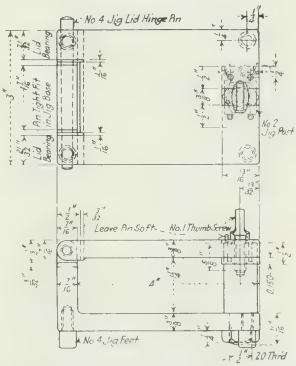
as the finished size can be drawn from stock, it simply being necessary to cut the piece to length required.

Some of the methods employed in handling work in this department will be of value to those interested in the producing of this class of tools. In the majority of cases work is delivered back and forth between workmen by messengers of whom there are four employed in this department. The system is by an annunciator, the workman having at his bench a push button to call a messenger, signifying that he has finished with one job and is ready for another.

All time tickets are carried in a central office as is the case in the small tool division and the same sort of telephone system is employed. A man reports in when he starts on a job and that job is carried along against his time until he reports starting on a new job. The switchboard on this telephone has 20 instruments which will indicate the thought devoted to this layout toward saving of the time of the workman in non-productive effort. Time tickets are written at the central office in duplicate. The duplicate is filed with the original order so that attached to the order is first hand information instead of depending on a transcribed record.

The company has devoted a great deal of attention to the progress in shaving dies, which are made by this particular section of the tool making division. These shaving dies are used for finishing of cams, ratchets, racks, etc., after blanking from sheet stock, the work being held to very close limits. This method saves considerable in the expense of production as compared with milling on the same class of work, the finished product being as accurate as a milled job.

To assist the bench hand in finishing dies, there has been developed for use of this department a bench filing stand. These stands employ a common type of motor-driven bench filing machine, but instead of the filing machine being mounted on a standard work bench and the hand sitting on an ordinary stool, the filing machine is mounted on a structural frame on which is also mounted the seat for the hand doing the filing. This arrangement permits the die to be pushed against the file without having the stool on which



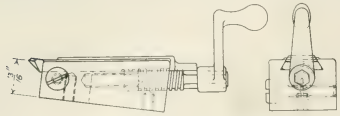
the operator sits pushed away from the bench. There are 18 of these stands in use in the department and they have proved very satisfactory in operation.

There are very few special machines employed in this section, although several unusual machine operations are noticeable for their use on work of this nature. Much of the work is handled on screw machines. Practically all cast iron die shoes, etc., are milled in vertical milling machines, planers being very little used in this shop. In this milling work shoes are finished with cuts wider than the spread of the cutter, which is contrary to ordinary milling practice on accurate work, but this company has been able to produce work of this kind with absolutely matched cuts.

One special machine has been designed and built by the company for use of this department. This is a portable boring head for bench use. It is employed

in connection with a jig or fixture for line boring or reaming and has saved considerable time on this class of work, although not suitable for drilling operations.

Naturally it is necessary for punches, dies, etc., to be hardened. It was formerly the practice to have hardening furnaces for use of the various bench



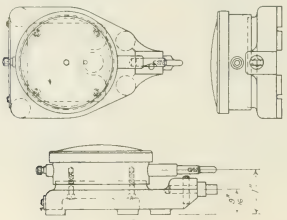


Cash Register Frames are Thin Castings Requiring Profile Operations on Many Bosses. To hold them firmly without cramping, a knife edge clamp has been developed

workers to harden dies on which they were working. The company found that with this method there was little uniformity in the hardening of dies and there was excess breakage and wear due to this non-uniformity, shrinkage cracks, etc. All hardening is now done in a central heat-treating department and this change has reduced repairs due to breakage to less than 2 per cent. Tempering on small parts is done in an electric furnace which can be set for the temperature desired and holds at that temperature.

The method employed in making knurled-head screws, referred to above as carried in stock, is interesting, in that it saves time and material. These knurled heads are turned out from the bar in screw machines. The screws are threaded into them and riveted over, thereby making an absolutely rigid unit of the two pieces and effecting a considerable saving.

The practice of carrying parts in stock has shown that it not only is a time-saving feature in the making of fixtures, etc., but is also most valuable in the time that it saves in repairing jigs which are needed in production work. Twenty-three sizes of jig feet,



Many of the Parts Machined in Fixtures of Various Kinds Are Tested for Accuracy at Frequent Intervals During the Run of a Lot. For this purpose dial indicators are used. These are mounted on bases made for the purpose to be used in conjunction with testing fixtures

hardened and ground taper pins, etc., assist materially in saving time on such repairs.

This department carries about $750,000 worth of master or reference plates for drill jigs, etc., in order that a constant check may be maintained on work of this nature. One unusual thing noted is the fact that Johannson gage blocks are found on various work benches, the policy of the company being that where accuracy is required it is more economical to permit men to use accurate gages rather than to keep them locked in a vault and give the men substitutes. The beneficial results of this practice are shown particularly in the accuracy with which the shaving dies are made. These must check absolutely in a location gage. Some shaving dies are used on rack work and the rack portion of the die is not ground, depending entirely upon the accuracy of the work assisted by accurate gages. This section also manufactures die casting dies, which are used by the company for such die castings as are required in the product. One unusual operation noted here was the making of a die for a class of upset punching of a sheet steel blank, thereby widening one edge in which a rack is later machined.

All dies and tools made here are carefully checked and inspected, the inspection being under the supervision of the main inspection department. To assist in this work the company made a surface plate which is larger than any on the market, having a surface of 48 x 64 in. It is mounted with a three-point bearing in a frame which rolls on swiveling type ball bearing casters. This surface plate, before being put into use, was subjected to an intensive seasoning process, thereby assuring maintenance of accuracy. After inspection



It Was Found Impossible to Purchase a Surface Plate Large Enough for the Needs of the Tool Making Department, so One was Made. It has three point suspension on a pipe frame mounted on ball bearing casters

of tools, dies, etc., they are all tried out before being forwarded to the production division for actual use.

Some of the duties of the stock order department, to which reference has been made several times, might properly be inserted at this point. The duties of this department require it to order and maintain a supply of raw materials through orders given to the purchasing department. A perpetual inventory is maintained, using a system of replacement with a maximum and minimum figure based on the period of delivery. They do not order the season's requirements at any one time. An established limit is set and orders are placed throughout the year, depending on sales. About 7900 items are carried on the records of this department, covering over 37,000 parts made in the plant.

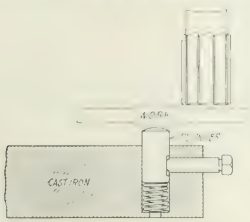
This department issues production orders for stock on the factory, according to routing by the inspection department, all of which has been mentioned in the description of the various tool making processes. A record is kept by travel or stock card covering every box or receptacle in the plant. A tracer record is maintained in which are posted labor tickets, showing work done and a complete record of a job is posted within four hours after work is performed. This covers every box, item, name of part, number of part, etc. Another

important duty of this department is to send each day to each department of the production division a list of items that are required by the assembly division.

Before proceeding to a description of the departments devoted to the making of special cutters and tools designed in the tool design division, a brief explanation of the duties of the general machine shop job until he reports in as starting on another order. In other words the waste of time for reporting that a job is completed is eliminated, the clerk automatically checking a completed operation on one order when the man reports he is starting on another.

Various classes of work, due to the arrangement of machines, can be routed around the shop starting at the right. In other words, at the right of the shop are screw machines, lathes, etc., for turning or preparing the blanks, before they go to succeeding operations of fluting, threading, etc. After each operation the box with the lot of tools is turned in for inspection before the next operation.

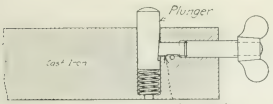
In this department are several special types of machines. One is a relieving machine designed and



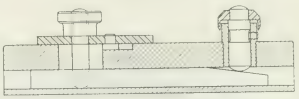
No. 1—Slipped and Clogged with Dirt



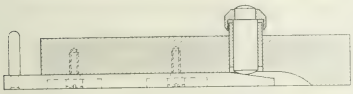
No. 5—Anti-Slipper Added but Would Spring Due to Unevenness of Platen



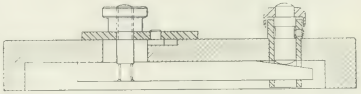
No. 2—Shifted in Tightening and Clogged with Dirt



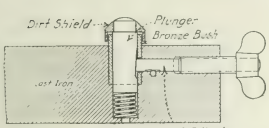
No. 6—Too Much Friction, Hence Not Sensitive



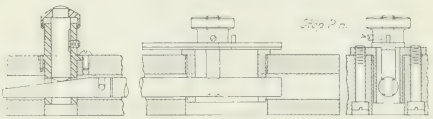
No. 4—Wedge Slipped Back



No. 7—More Sensitive Than No. 6



No. 3—Somewhat Dirt-Proof But Shifted in Tightening



No. 8—Present Model in Use

Evolution of the Adjustable Wedge Stop or Jack Largely Used to Support Thin Castings While Being Profiled, but Also Useful in Other Machining Operations. Objections in the various designs shown in this development are given under each sketch

might be in order, as it is located adjacent to the cutter or small tool department. This section employs 95 men in maintenance of machines throughout the plant and also in building special machines designed by the efficiency engineering department.

It is hard to form a conception of the number and variety of small tools made in a plant essentially devoted to the production of some other article. However, in the small tool division of the N. C. R. there are some 106,000 tools made annually from 20,000 drawings. These tools cover cutters, reamers, drills, arbors, broaches, counterbores, form cutters, milling cutters, knurls, laps, screw machine tools, taps, dies and wrenches used in all departments of the factory. The department employs 63 men.

The method of handling the work is of interest. Each job is handled in an individual metal box which is numbered; this number is carried on the card showing the shop order number so that each job can be traced by its container. A telephone system, which by the way is a part of the company's product, is used for keeping time on each job. As the tool maker receives a job at the material bench, he telephones to the shop office that he is starting on such and such an order number. His time is carried against that built by the company years ago. This machine in general appearance resembles a relieving lathe, except that the relieving mechanism is different from the more common form producing a steadier motion which does not deliver the blow or shock of the ordinary machine.

A special machine designed and built by the company is used for making the steel knurling dies for knurling figures on counter wheels. The cutter is set with a dial mechanism. Master characters for engraving machines described in another section are also made here. Special machines designed and built by the National Cash Register Co. are used for grinding screw machine tools, holding work within 0.0002 in.

This department also on occasion must grind rubber. The machine on which this is done is provided with a hood practically surrounding the wheel and work from which the dust is exhausted.

To show the care exercised in this tool shop mention is made of the fact that the clearance on reamers is honed with an oilstone. Also every form cutter is honed to shut out light between itself and the master form. All tools are tried before delivery to the production shop.

(To be continued)

Sheet Sales and Production Analyzed*

Comparable Trend Charts as an Aid in Determining the Relations of Inventories, Production and Shipments

BY W. HERMAN GREUL†

THE way in which sheet steel manufacturers have handled inventories and production schedules furnishes an interesting contrast to the control of these factors by the merchant pig iron producers described in a previous article. (Aug. 2, p. 255). Statistics collected by the National Association of Sheet and Tin Plate Manufacturers and published in the Department of Commerce in its *Survey*, afford the data

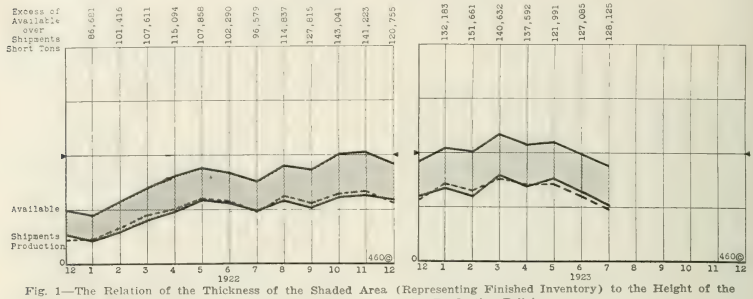


Fig. 1—The Relation of the Thickness of the Shaded Area (Representing Finished Inventory) to the Height of the Shipment Line Shows Conservative Production Policies

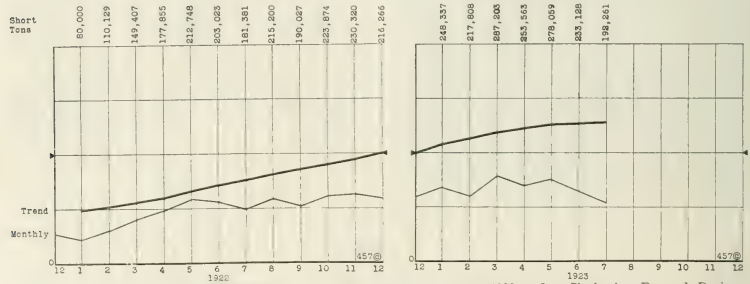


Fig. 2—The Trend of Shipments Shows Steady Upward Tendencies During 1922 and a Slackening Demand During Recent Months

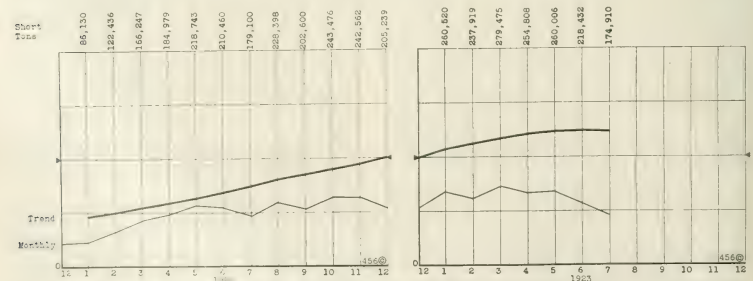


Fig. 3—The Trend of Production is Strikingly Similar to That of Shipments, Indicating Close Control of Schedules

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†Consultant in analysis of business operations, New York

for making the comparisons. These comparisons are facilitated by use of the standardized trend charts similar to those previously described.

Fig. 1 gives the relation between production, shipments and total stocks of association members, covering approximately 70 per cent of the country's output of sheets and fairly representative of the industry. The shaded area in this chart indicates by its varying thickness the tonnage of stocks in excess of shipping

It will also be noted that the fluctuation of production from month to month (thin line) is much less than in the case of the pig iron.

Fig. 4, picturing the fluctuation and trend of sales, shows the influence of advance bookings by the peaks of March, June and December, 1922, and March, 1923, in the monthly curve (thin line) and this is also reflected in the irregularity of the trend line. While these peaks synchronize with those of merchant pig

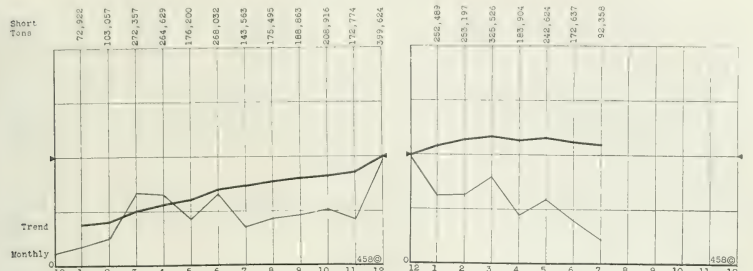


Fig. 4—The Trend of Sales Shows the Annual Volume of Business Falling Slightly in April, June and July, 1922

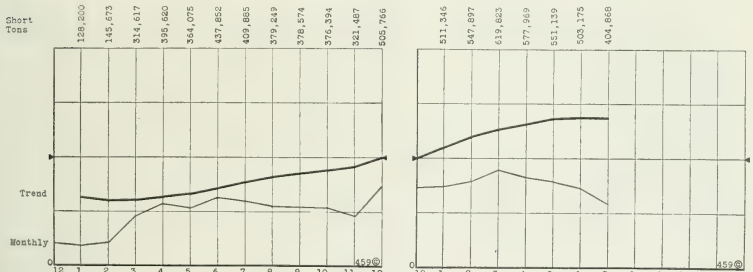


Fig. 5—The Trend of Unfilled Orders May Be Compared With Shipments, Production and Sales, Figs. 2, 3 and 4

demands. Comparison of this thickness with the height of the first horizontal ruling above the zero base line (representing average monthly shipments in 1922) shows that during the 20 months covered by the chart, this inventory is always less than one month's average requirements. Comparison of this thickness with the height of the shipments line shows that only in one month, January, 1922, is it equal to the current month's demand, that during 1923 this excess stock ranged around a half of the current monthly requirements up to June, and at the end of July the fall in shipments increased this ratio to about eight-tenths. It will be noted also that monthly production has followed very close to monthly shipments throughout the entire period. The first horizontal ruling of the chart above zero is made to be equal to the monthly average of shipments for the calendar year 1922.

Figs. 2 and 3, showing the trends, respectively, of shipments and production, emphasize by the similarity of the slopes of the lines, the close coordination of these two factors. The trend of shipments of sheets during the current year is very similar to the trend of merchant pig iron shipments but there is a striking contrast between the trends of production in the two fields of manufacture. Sheet manufacturers have held their production trend practically parallel to shipping demand while pig iron producers kept pushing up production when there was a flattening out of demand. iron sales, they are relatively much smaller in magnitude.

A useful characteristic of the trend lines of these charts is their quick reflection of the relation of the current month to the corresponding month of the preceding year. When the trend line moves upward for any month it indicates that the value of the subject pictured is greater than it was in the corresponding month of the previous year and vice versa. Notice in Fig. 4 that the trend line dips in April, June and July of this year indicating lower volume of sales than for corresponding months in 1922. All other months show increases. Confirmation of this is found by comparison of the heights of the monthly line for like periods or by comparison of the figures at the top of the diagram which give the actual values in tons.

The trend of unfilled orders, Fig. 5, was steadily upward from February, 1922, with an increase in the rate of its growth from last November to February of this year, when the rate gradually decreases until in July it is practically stationary and may be expected to decrease in succeeding months in view of the downward tendency of sales and the continued though slight upward trend of shipments.

The series of charts taken together indicate a steady, conservative progress in the industry with inventories well under control in keeping with the general business situation.

Japan Deliberate in Reconstruction

Little Steel Buying and Lull After Flash of Tentative Inquiries —Broad Price Control Likely if Speculation Is Attempted

NEW YORK, Sept. 11.—While any predictions as to the immediate future effect of the earthquake on trade with Japan are almost entirely speculative, the opinion of many exporters in close touch with Japanese affairs seems to be that the results will not be as depressing as might have been concluded from early reports. As was pointed out in THE IRON AGE last week, the greater part of industrial Japan is to the north and northeast and west of the devastated area. Tokio and Yokohama were distributing centers and the business headquarters of many companies engaged in importing the materials for manufacturers in other districts. At the same time there were numerous smaller Japanese factories and a few large plants near Tokio and Yokohama. Not minimizing the undoubtedly serious damage suffered, it must be realized that the greater part of industrial Japan is still unharmed and its activity will probably be given fresh impetus by the not far distant demands for reconstruction materials in the affected zone.

Difficulty in Securing Light Galvanized Sheets

What are probably forerunners of the first reconstruction needs of Japan have appeared in the past week in the form of inquiries for light gage galvanized sheets and considerable quantities of wire nails. While exporters experienced no difficulty in obtaining quotations from mills on the nails, the galvanized sheets, popular with Japanese consumers, are produced under normal conditions in Japan from American and British black sheets of Nos. 30, 30½ or 31 gage. Considerable difficulty seems to have been encountered thus far by exporters in obtaining quotations on such thin gages. In addition there has been a fair volume of inquiry for the usual specifications of No. 30 gage and lighter, one pass, cold-rolled black sheets.

Despite the destruction of Yokohama, exporters do not anticipate any unsurmountable difficulties in future shipments. The port of Yokosuka was destroyed, according to report, but this was largely a naval base and, therefore, not a direct factor in trade. The temporary loss of Yokohama, equipped with excellent dock facilities and numerous "go-downs" (warehouses) and the location of branch offices and a few main offices of importers and exporters, will prove unfortunate for a short time. In point of size and activity, Kobe, the port of Osaka, is probably second only to Yokohama, but there are other, although smaller ports, that will undoubtedly be taken into consideration until Yokohama again functions. One of these ports, which has been the destination of many export shipments, although of less importance and not as widely known, is Shimadzu, southwest of Nagoya. Another, not so well known, but equipped to handle much of the former Yokohama business is Yokkaichi to the south of Nagoya.

Little or No Damage to Large Buildings

Latest reports on the destruction in the two cities of Tokio and Yokohama, although not greatly modifying earlier estimates on the latter city, seem to show that many of the buildings originally believed totally destroyed in Tokio are still standing, but in many instances gutted by fire. Among these, largely in the Tokio business district, near the Central Station and Post Office, reported standing are the Marunouchi building, the Nippon Yusen Kaisha Building and the Nippon Oil Co. Building, all constructed by the George A. Fuller Co., New York; the head office building of the Mitsubishi Shoji Kaisha, exporters and importers, the Mitsubishi Bank, the Mitsui Co. office building and the Mitsui Bank, the Takata & Co. head office, which is understood to be of solid masonry with steel mesh floors and ceilings, built in 1910 by a German company; the Bank of Taiwan, the Bank of Chosen branch, the Yokohama Specie Bank, the Sumitomo Bank and several other buildings. Reports, however, on some of these buildings imply that they have been so twisted and racked by the earthquake that they are practically useless for reconstruction. One such report has specifically mentioned the great Marunouchi Building, but no confirmation of such serious damage has been received by the owners, the Mitsubishi Shoji Kaisha.

Possibility of Broad Price Control

The large export houses with branches in New York are now conducting most of their business from Osaka and Kobe branches. In most instances a request has been made for temporary suspension of shipment on tonnages consigned to Yokohama, but orders destined for Kobe and other ports exporters are permitting to go forward. Most exporters to Japan are looking forward to an increased demand for black sheets and possibly some galvanized sheets until the galvanizing plants in Japan can meet the demand, these sheets to be used in constructing temporary dwellings, warehouses, etc., with native lumber from northern Japan, supplemented by imports of American lumber. Some purchasing of structural steel is expected to follow, although temporarily the lighter sections that may be needed could doubtless be supplied by the Imperial Steel Works at Moji in the west. In view of the drastic measures of food price control instituted by the Government, exporters are under the impression that a similar effort at price control on other commodities will be instituted and steel prices may be under Government supervision for a time to prevent speculation.

A report circulated soon after the earthquake, claimed that the Foundation Co. had certain interests in Japan, which might have been seriously affected by the catastrophe. It is pointed out by that company that no work of any kind has been done by the Foundation Co. in Japan. At the time, however, J. W. Doty, president of the Foundation Co., was in Yokohama, accompanied by engineers of the company, following consultation with officials in Tokio on the proposed subways for that city. The George A. Fuller Co., New York, also was free of all construction work in Japan proper, having withdrawn following the completion of contracts on the Marunouchi Building, Nippon Oil Building and Nippon Yusen Kaisha Building. The only work being executed by this company in the Orient is at Dairen, Manchuria, where a general hospital is being built for the South Manchuria Railway Co.

Reports received by the Weber Chimney Co., Chicago, which has built nine concrete chimneys in Japan at various times, state that the five chimneys in the zone of the earthquake are still standing. These five were at the Hodogaya Soda Factory, Hodogaya, which is near Yokosuka, a town reported to have been virtually destroyed. Two were 125 ft. high with an inside diameter of 5 ft. and three were 75 ft. high with an inside diameter of 3 ft. The largest chimney, that of the Saganiseki Copper Smelter, Saganiseki, not in the affected zone. It was erected in 1906 and is 570 ft. high with an inside diameter of 26 ft. 3 in. at the top and 42-ft. 8 in. at the base, built on the top of a mountain 300 ft. above the sea level.

Exhibits by the Bureau of Standards which were shown at the Brazilian Centennial Exposition in Rio de Janeiro early this year are to be on view at the Chemical Exposition at the Grand Central Palace, New York, week of Sept. 17.

Special Stiffening of Tokio Buildings

Much More Bracing Steel Used Than in American Buildings of Same Type—All Parts Tied Together to Resist Distortion

MANY studies have been made by Japanese engineers to permit them to design steel frame buildings which would be proof against earthquake shock. In general, the tendency has been to make a building which would be sufficiently rigid in itself to move as a single unit without distortion among the several parts. This differs from American practice, where the design permits a certain amount of flexibility but is stiffened against too much movement in a high wind. It is reported now that all of the steel frame buildings in Japan went through the earthquake structurally undamaged, and it is believed also that most of the important ones were saved from the conflagration by the wide open space of the station plaza which faced the Marunouchi Building.

H. V. Spurr, of Purdy & Henderson, engineers, 45 East Seventeenth Street, New York, who designed the steel work for the Marunouchi, the Japan Oil, and the Nippon Yusen Kaisha buildings in Tokio, pointed out to a representative of THE IRON AGE the essential difference in construction details between the Japanese and the American designs. "The main difference," said Mr. Spurr, "lies in the columns, the connections of the beams to the columns, and particularly in these elements as they occur in the outside walls of the buildings. The spandrels, in particular, are unusually heavy and are fitted with diagonal bracing, tieing them to the columns in a way calculated to prevent any relative movement between the two. The column splices, which occur, as in American practice, at every second floor, are exceptionally heavy and in some cases are as long as a story height. In these exceptional cases as many as four splice plates, with close to 200 rivets through them in four rows, are fitted on each side of the column.

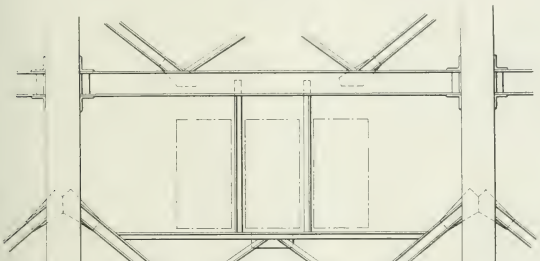
"All of these buildings are erected on the sand underlying Tokio. They are all carried on piles of 40 to 60 ft. in length and in some cases the piles under individual columns occupy so much area that the piling becomes almost continuous under portions of the building. The footings of stone concrete, with a large amount of steel reinforcing, are poured around the heads of the piles and the individual column footings tied together by reinforced concrete beams, forming in effect an enormous mesh with space between members equal to the column spacing. The reinforcing rods in these intercolumn members, which are designed to act as both ties and struts, are carefully anchored around the column bases before the concrete is poured around them.

"All three of the buildings mentioned are similar in general structural design, but the Marunouchi Building, covering a far larger ground area than either of the others, and having in consequence much greater inherent stability, was less heavily braced than the others.

"Construction consisted in each case of short span slabs of reinforced concrete, usually 4½ in. thick and with a maximum span not exceeding 8 ft. These are carried between steel beams, which themselves are designed about as in the United States, although some of them carry heavier live floor loads than are customary here for purely office buildings. In many cases the girders between columns are made of heavy double channels, back to back, where these will carry the load adequately; I-beams of 18 and 20 in. depth, however, form the usual girders of these buildings. All three buildings have built up plate and angle columns of H-section and of unusual weight.

"In stiffening the spandrels and their connection with the columns, the device adopted consisted of two diagonal members or knee braces above the spandrels and running at about 45 deg. from the quarter length of each spandrel to the adjacent column. These members themselves are then tied together by angles running horizontally just below the mullioned windows. This horizontal is again connected at its center point to the spandrel by two light channel diagonals reaching the spandrel at about the points of attachment of the knee braces. In each of these cases, the gusset plates are of sufficient area and weight to form a thoroughly rigid connection. In some cases a further tie is arranged by carrying vertical angles in the mullions from the horizontal already mentioned up between windows to the spandrel of the floor above.

"Much of the terra-cotta finish on these buildings may be expected to have shaken off as a result of the severe motion of the earthquake. In some cases, particularly with projecting cornices and other decorative



Diagonal Knee Braces Consisting of Channels Connecting the Spandrels with the Columns Form the Principal Stiffening Elements in Each Wall Panel. These braces, in turn, are tied together by angles running horizontally beneath the mullioned windows and further diagonals cover the center of the span. The angles running up between the windows to the spandrel above are often in pairs, back to back

elements, tie rods similar to concrete bars were passed through the terra-cotta members and many pieces may thus have been held in place. Obviously, however, it was impossible to do this for all of the surface finish. Another device to hold the terra-cotta in place consisted in making the spandrel of two angles and one channel back to back and separated by a small space, with washers on the rivets to maintain the space. The terra-cotta was then fitted so that this space was available for an anchorage to hold it in place. The same arrangement, somewhat differing in detail, was made in some cases in connection with the horizontal angles passing immediately beneath the windows.

"While some of the earthquake studies have shown a definite amplitude of movement of the earth's crust, it has not been the practice to design the buildings to meet any such pre-determined condition. The buildings were designed, however, on the assumption that they were to resist a certain intensity of movement, that is, a definite acceleration in any direction."

The Marunouchi Building measures 331 ft. by about 300 ft., and is eight stories high. Above the third floor there are two large courts running up through the remaining distance. The Nippon Yusen Kaisha Building measures 152 by 286 ft. The building of the Japan Oil Co., also of seven stories, is nearly square, being 153 by 159 ft. In accordance with Japanese law, all of these buildings at points where streets intersect are curved around the corner with a radius of 12 or 15 ft. This greatly eases corner congestion of pedestrians and, as the sidewalks are similarly curved, it helps traffic in turning the corner.

As all of the work on these buildings had to be done in conjunction with Japanese engineers' specifications and to conform with the building laws of the city of Tokio, there was much detail which had be gone into and a period of a year or more was consumed in getting plans ready. The Japanese dimensions given on the plans, furnished by the Japanese engineers, were in their local measurements—not the metric system nor the American system—and all had to be translated before much progress was made.

Photographs in the office of the George A. Fuller Co., which erected all three of these buildings, show the entire "skyscraper" district of Tokio as it existed during the construction of these buildings, the latest of which has been completed within the past year. Outside these three, only one seven-story building appeared, though there were half a dozen of five and six stories. For the most part, however, the buildings did not exceed three stories even in cases where steel framing was used, and it is understood that no building in Yokohama exceeded three stories.

In an article which appeared in the September *Scribner's* (and was written many weeks ago) William A. Starrett, president Starrett Brothers, contractors, and formerly manager in Japan for the George A. Fuller Co., said:

"No matter how severe an earthquake they may prepare for, an even more severe one will surely upset calculations; and there is no controlling or determining what may be the most severe possible. But for a given problem the light skeleton structure so familiar to Americans is undoubtedly far superior to anything heretofore attempted in Japan. Every element that an earthquake of moderate severity has been known to produce can be met through the standard formulæ of strains and wind-bracing, now the common knowledge of the American engineer.

"It might be said that only in the past few years did the more progressive of the Japanese appreciate that perhaps they had missed something in undertaking the rebuilding of their cities and industries—the task that fate has set for Japan. From a hermit kingdom she sweeps on so swiftly that history will hardly be able to record the transition. And with the change comes the necessity to rebuild the structures of the whole empire. Not only are modern office buildings, hotels, apartments, factories and residences required, but the even more pressing questions of paved roads, sewers, water mains, fire protection, sanitation and transportation on a larger and heavier scale are demanding attention.

"All this means construction—vast programs of construction, vitally essential to the Japanese as they emerge into the maelstrom of modern commercial and intellectual life—a tremendous price to be paid for the heritage of world power.

The Problem of Tokio

"Tokio, like most cities of Japan, stands on an alluvial plain—a river delta formed by the erosion from the mountains which everywhere abound in Japan; a soft, muddy bottom, with an evil reputation for allowing buildings to settle, and with Mother Nature pitching in earthquakes of greater or less severity. But under that silty alluvial there is excellent sand, and under the sand hardpan, a splendid foundation soil, an American engineer would say; and, with the water level only a few feet below the surface, a splendid place for a pile foundation."

STEEL COMPANIES GIVE

Japanese Relief Fund Exceeds $5,000,000 Still Growing

NEW YORK, Sept. 11.—Receipts for the Japanese relief fund effort are believed to have exceeded the $5,000,000 mark, taking account of untabulated contributions from remote parts of the country, according to reports from Washington. More than half of the total was subscribed in the Washington district of the American Red Cross, in which Judge Elbert H. Gary is chairman of the fund committee. The quota for this district, which includes New York, was exceeded by about a half million dollars. Conspicuous among the early contributions were $150,000 from the United States Steel Corporation and $10,000 from the American Locomotive Co. The American Car & Foundry Co. donated $10,000, and the American Radiator Co., Ingersoll-Rand Co. and the Railway Steel Supply Co. each gave $5,000. Later contributions include $25,000 from the Bethlehem Steel Corporation, $5,000 from the Railway Steel Spring Co. and $1,000 from the U. T. Hungerford Brass & Copper Co., New York.

In Chicago war-time Liberty Loan committees were called together again to collect for the relief fund. Frank Wetmore, president First National Bank of Chicago, who had charge of the Liberty Loan drives, was placed at the head of the organization formed to collect contributions. The total which the city expects to raise has been fixed at $500,000. Of this amount, a quota of $22,500 was assigned to the machinery division, of which E. P. Welles, president C. H. Besly & Co., was given the chairmanship, a position which he had previously held during the loan drives. Other members of the committee are Edward H. Wachs, Stocker-Rumely-Wachs Co.; Charles Piez, president Link Belt Co.; George A. Ranney, International Harvester Co.; Edward N. Hurley, Hurley Machine Co.

Industrial Machinery for Italy

Figures of the Department of Commerce show that in 1922 more than half the value of all machinery imported into Italy was from Germany. The United States stood in fourth position with 7.4 per cent of the total. These figures included non-industrial machinery and parts. Eliminating these, the estimated value of industrial machinery received by Italy was 280,408,345 lire, of which the United States furnished 12,965,612 lire or only 4.6 per cent. Germany furnished more than ten times as much as the United States, having 46.8 per cent. Switzerland, Great Britain and France stood in second, third and fourth positions.

The Dempsey Furnace Co., 15 Park Row, New York, has acquired factory premises at 61-63 Cornelison Avenue, Jersey City, N. J., where it will manufacture industrial oil burning equipment, as well as the furnaces associated with its name.

BELGIAN MARKET FAIRLY STABLE

Export Trade Fair but Domestic Business Quiet Luxemburg Again Complains of Coke Shortage

ANTWERP, BELGIUM, Aug. 22.—For the present prices are fairly well stabilized. Quotations on iron and steel are still very high and the market is firm, but the upward tendency is not as strong as during the past five or six weeks. Some products are higher, especially finished materials, and several works are fully booked for some time to come in the face of an active demand. Bars are quoted at about 775 fr. and beams at 750 fr., an advance of 25 fr. per ton. Rails for export are not obtainable at less than 750 fr. per metric ton. Purchases of rods have not been as large as expected, so that prices, even for export, are unchanged at about 925 fr.

Prices to American and British importers and merchants of other high exchange countries are actually lower than formerly on some products. The franc, however, has somewhat recovered in value.

On the basis of today's rate of exchange some of the following domestic prices are lower than those of a fortnight ago, with which they are compared:

	Aug. 22		Aug. 8	
	Fr. per Metric Ton		Fr. per Metric Ton	
Commercial iron No. 2	750	$32.20	750	$33.80
Commercial iron No. 3	800	35.10	775	35.00
Commercial iron No. 4	875	38.80	875	39.10
Heavy sheets	800	35.40	700	32.80
Light sheets	1,150	51.00	1,125	50.50
Iron bars	775	34.50	750	33.80
Rails	750	32.20	750	33.80
Heavy beams	725	32.00	725	32.60
Rods	950	42.00	900	40.50
Open hearth				
Ordinary	775	34.30	725	32.60
Special	1,075	47.50	1,050	47.50
Rounds	1,450	64.20	1,450	65.35
Spring steel	1,400	62.00	1,400	62.00
Basic Bessemer ingots	560	24.80	550	24.80
Blooms	600	26.60	590	26.80
Billets	640	28.30	630	28.40
Largets	670	27.65	660	29.80

Not much domestic business has been done, a large number of consumers and merchants being on vacations this month.

Luxemburg makers are quoting semi-finished products in Belgium at slightly higher prices.

	Fr. per Metric Ton	
Bessemer ingots	560	$24.80
Blooms	600	26.60
Billets	655	29.00
Largets	675	29.80

Makers of Luxemburg complain of the low value of the Belgian franc. Industry had somewhat revived with more coke available and prices higher. But coke is now becoming scarce again, while prices are no longer favorable, as the greater part of the raw materials is supplied by France and the ratio between French and Belgian francs is about 100 French to 126 Belgian. Stocks of coke in Luxemburg are decreasing rapidly and it is feared that some blast furnaces will be forced to blow out before long. During August 26 furnaces have been operating out of a total of 47. This represents an increase of nine over June.

The numbers of furnaces operating in Belgium during July was 39, 5 units more than in June. These furnaces produced during this period 187,000 tons of pig iron and 176,000 tons of rough steel.

Nominal prices for No. 3 Belgian foundry iron are 480 fr. (exchange rate, 22.30 fr. to the $1), $21.20 per metric ton delivered consumer's work, or f.o.b. Antwerp. This price also is quoted by Luxemburg furnaces for September-October delivery. Lorrain works are still refraining from quoting on long deliveries. These works lately advanced their price to 400 fr. (French). Business at this price is improbable, as some merchants, having stocks at the furnaces which were to be shipped before the end of this month have offered tonnages at prices much under the market. Such prices are only occasional and it is expected that before long the higher prices will be obtained. Some British importers have taken these special lots and a few good orders have been placed by Scotch merchants. The prices paid were about 92s. per ton, f.o.b. Antwerp, or $20.80.

There are large English and Scotch inquiries in the Belgian market for Bessemer iron. Quantities available, however, are small and prices about 520 fr.—$23 per metric ton.

Offerings of British hematite are small. Notwithstanding the firmer tone of the British market, Belgian consumers still are hesitating, relying on a better rate of exchange in the near future. The actual price of 106s., c.i.f. Antwerp, or 540 fr., is higher than Belgian or French makers are quoting.

The coal market maintains an upward tendency. Prices are higher even for domestic qualities. The arrivals of coal from the Ruhr have not been as large as expected. To date somewhat more than 4000 tons have been received by the furnaces, while it was expected that receipts would be more than 12,500 tons this month.

Allied Machinery's Japanese Representatives Are Safe

The Allied Machinery Co. of America has received information by cable from T. G. Nee, president Horne Co., Ltd., of Japan, that the entire head office staff of the latter in Tokio is safe. The exact status of the merchandise stocks and of the records of the business in Tokio has not yet been determined. Less than one-third of the company's stock is, however, carried in Tokio. None of the 13 branches of the company in Japanese territory was affected by the recent disaster. The Horne Co., Ltd., is, therefore, fully prepared to continue its business as distributer in Japan for American manufacturers of machine tools, industrial and construction machinery, building materials and allied lines. The Allied Machinery Co. of America, with which the Horne Co., Ltd., is closely affiliated, will continue to handle the affairs of the latter in this country.

The Basset Direct Steel Process in Belgium

Interesting information relating to the Basset process of producing iron directly from the ore comes from Belgium, says the London *Ironmonger*. It will be recalled that in this process a rotating furnace with a very high temperature of reduction is employed, the fuel being pulverized coal. The process was taken up by the Société d'Ougrée-Marihaye, the large Belgian steel firm, and at the recent general meeting of this company the president, Gustave Trasenster, a well-known figure in Belgian iron and steel circles, gave some details of the experimental work carried out in collaboration with Mr. Basset. Mr. Trasenster declared that the tests made by his company substantiated Mr. Basset's claims as to the process itself; but, as so often happens when successful laboratory methods are applied, difficulty was encountered when the process was tried in practice, because the furnace lining could not stand the high temperature necessary for the completion of the reduction.

The Ougrée-Marihaye company came to the conclusion that the next step was experimental work to find a lining which would not fail under working conditions. Mr. Basset apparently was not of the same opinion, and commenced experiments with a new furnace of the fixed Martin type. Mr. Trasenster thinks that even if these were to prove entirely successful they would be unsound economically; a deadlock has followed, and, for the time being, the Ougrée-Marihaye company has stopped further experimental work. It will be recalled that, when pulverized fuels were first introduced, a great deal of difficulty was experienced with disintegrated linings, but this was gradually overcome by careful study of the conditions, and application of the results of recent researches on refractories.

What the outcome of the Ougrée-Basset controversy will be is not apparent. If the experimental work is resumed and brought to a successful issue, it will behoove our smelters to look to their laurels, as with the Basset process lower grade ore and fuel can be used than is possible at present and, with cheap labor, the manufacturing price of iron would be lower than ever.

German Founders' Zeal for Their Art

Triple Convention at Hamburg Shows the Progressive Spirit of the Industry—Special Attention to the Training of Apprentices—Molding Sand Research

(Special Correspondence)

HAMBURG, GERMANY, Aug. 25.—The annual meeting of the Verein Deutsch r Eisengiessereien, which was held in Hamburg this year, beginning Aug. 19, was noteworthy for an exhibition of foundry appliances and aids which was planned on quite different lines from those of the American Foundrymen's Association, in that it was wonderfully educational and had as the fundamental thought the application of science in the foundry. The substantial showing of molding machines, electric furnaces, crucible furnaces, general appliances and accessories—of remarkably fine finish in execution and of designs that differ considerably from those in the United States—was really but an annex to a display of educational matter for apprentice as well as seasoned foundrymen that has been unequaled in the history of the art.

A Triple Convention

The value of the meeting and exhibition was further enhanced by the fact that the second great foundrymen's association of Germany, the Verein Deutscher Giesserei Fachleute, and the Executive Commission of Germany on Foundry Research had arranged their annual conventions for the same time and place. In explanation of the status of these three organizations it may be stated that the first named body of foundrymen would correspond to the National Founders' Association of the United States, but with the added function of regulating prices and contracts, in close contact with the German Government. The second mentioned body corresponds to the American Foundrymen's Association, the members being technically trained men. The third group consists of representatives from the great industries having foundries, and the object is educational and research, embracing the training of apprentices and developing progressive courses which will aid foundrymen in training their young men, thus starting foundry education where it belongs and working from the very bottom up. A further object is the study of foundry raw materials, melting methods, testing, specifications, etc. The joint meeting of these bodies enabled the carrying out of the plan of making the exhibition a real school of instruction for foundrymen, as a series of lectures, repeated frequently during the two weeks, was given by competent authorities to the continually changing groups of visiting foundrymen. As an attempt at educating the entire foundry industry of a country to think and work along scientifically correct lines, and thus enhance the economic value of that industry, the undertaking is certainly unique, valuable and worthy of emulation by the rest of the foundry world.

Three large rooms were filled with educational exhibits. These were contributed by the apprentice instruction divisions of some of the very large German works, such as the Augsburg-Nuremberg Machine Works, Ludwig Loewe & Co., and others of equal note, and arranged under the auspices of third group above mentioned, called the German General Committee on Trade Schools—Deutscher Auschuss fuer Technisches Schulwesen (abbreviated to "Datsch"). The walls were covered with plates from the publications of the trade school committee and almost numberless colored drawings of the apprentices selected from many works giving their young men this so necessary instruction.

Patternmaking Exhibit.

The display began with the essentials of patternmaking, the incorrect and correct selection of wood, methods of gluing together, application of screws, location and sizes of prints, proper and improper arrangements of loose pieces, and so on along the range of pattern work. With the bad and the good patterns there were actual castings from each, with gates attached, showing the results thus obtained. Similarly a whole range of bad and good gate arrangements, with castings full of shrinks and good castings respectively. Further series of castings with defects corrected by burning on iron and the several welding methods. The patterns were splendidly executed and the castings showed the care that must have been taken in the molding operations. In connection with this display was one showing the progress that has been made in standardization of patterns—all colors being now standardized and this work going on, apparently ahead of the American attempts along this line.

It was interesting to note the classes of apprentices from the Hamburg trade schools and foundries brought by their teachers and shown about by the energetic secretary of the "Datsch" organization, Dr. Harm. These boys were eager to have the drawings, patterns and castings explained to them and appreciated being presented to the American visitors who addressed words of encouragement to them and praised the performance of their mates in actual work at the foundries.

Cast Iron Testing

In addition to this educational exhibit there was one on the testing of cast iron, with a large number of fractured pieces, sections and tables of results. This exhibit was arranged by the famous head of the German Testing Bureau, Professor Rudeloff, who will be well remembered in America. The general supervision of the exhibition was under the care of Prof. U. Lohse, of the University of Hamburg, ably seconded by the well-known foundry engineer J. Mehrtens. The occasion was somewhat marred by the imprisonment of the president, Dr. Werner, in the Ruhr at the moment of his departure, he being held in confinement as a hostage, and the further retention of much of the exhibit material in that unhappy region.

There were many interesting features of the exhibits proper, and a few deserve special mention. Older foundrymen will remember the little instrument exhibited at the Cincinnati convention of the A. F. A. by the late Thomas D. West, by which he was enabled to gage the hardness of the rammed sand of a mold. A beautiful adaptation of this idea was exhibited in an instrument by Treuheit, in which a large steel ball can be pressed into the mold and the depth of indentation measured very delicately. The Government railroads had a fine display of broken locomotive castings which had been repaired by the electric welding process, among them some locomotive compound cylinders.

All along the walls of the exhibits were displayed plain and color drawings of air furnaces, cupolas, conveying machinery, cupola charging apparatus, sand preparation installations, etc. These were all working drawings, with full dimensions, and were intended for the instruction of those interested. In fact, contrary to all previous experience with German industrials, here was a case of no secrets whatever. It was interesting to note the gradual change from cupola charging constructions on the very wrong inclined dumping method to the correct straight drop. Unfortunately, however, the buckets in the designs are still too small in diameter and the layers of metal and coke will not drop level as they should when the buckets are almost the full cupola diameter.

Noteworthy Exhibits

An exhibit sign which would draw a smile from any American visitor read "Fluorspar Trust," when

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* Printed in U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.*, Charles G. Phillips *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Ending the Coal Strike

THERE was reason to expect that Governor Pinchot, acting as mediator, would end the anthracite strike, and substantially as happened. When two parties in a business controversy are quarrelling over terms, one of them demanding a higher price and the other naturally resisting, it is the common expedient for the mediators to say: "You are both good fellows and would best split the difference." Neither of them can well refuse such advice, especially when one has probably been asking more than he expected to get and the cost to the other is not going to be so much as appears prima facie. The absence of public excitement respecting the coal strike reflected an appreciation that something like this was going to happen. Also, that the prolonged palavers were to get people accustomed to the idea that they were destined to pay a higher price for anthracite coal.

Once more it has happened that the public has lost a strike. The miners get substantially what they wanted. The operators do not care particularly; the public pays. Governor Pinchot, who is regarded as the Sir Galahad of the Progressives, might at least refrain from shedding crocodile tears and from talking about how the advance ought to be absorbed by the operators and carriers, although, of course, it will not be.

All that the settlement of the anthracite strike means is that the politicians have washed their hands of a troublesome problem. There has been no step taken toward economic solution. The two-year contract gives us only a breathing space, at the end of which the United Mine Workers may make new demands and get them unless something important happens in the meanwhile.

We are, in short, at the mercy of the United Mine Workers, as President Harding said, and as President Coolidge and Governor Pinchot have in effect agreed. There has been no official suggestion on the simple line of undoing the economic restrictions that fetter the coal mining industry and prevent it from functioning freely like other producing industries. The talk about cost of living, cost of production, profiteering and all of that is simply a smoke screen to divert attention from the basic evils with which nobody political likes to grapple.

The facts are that we have a large and convenient supply of a desirable fuel, whereof the production is reserved for about 150,000 men, closely banded together, who will not even work a full year's time owing to the numerous holidays that they like to enjoy; while another branch of the coal mining industry has a surplus of about 200,000 men whom the public has to support in idleness. Manifestly such a condition can exist only by virtue of economic restrictions, in which the United Mine Workers is a great factor.

Until the American public shows more spirit it will be condemned to submit to the exactions of the anthracite miners. In being constrained to pay more for anthracite coal, it will have less with which to buy other things. No matter how high the barriers that are erected, however, economic forces tend naturally to flow over them. The higher the price for anthracite, the greater will be the incentive toward substitutes. It will require no stretch of the imagination to foresee that the powerful oil producers, who are just now afflicted by a grave over-production, will leave no stone unturned to substitute their fuel for anthracite wherever that can be done, and their technical staffs will probably devise new means for doing some things that now look impossible. The greatest concern of the anthracite operators throughout the recent controversies has been the preservation of their industry and their capital.

LESS than seven days ago a leading New York daily in an editorial article headed "Dies Irae," noted a portentous accumulation of disasters —the return of the annual holdup of the public by the coal miners; the warlike attack of Italy on Greece; and then the news from Japan of the greatest natural cataclysm in recorded time, which might mean the crippling of a great power for a generation. All this, with the continuance of the Ruhr malignancy, filled the air with depression like that of the last year of the great war. But how changed the picture at the beginning of a new

week. The coal strike settlement has removed the threat of heatless homes. In the Greco-Italian dispute the way to peace has been found. The Japanese catastrophe, with all its horrors, proves to be far less than was feared, relief is pouring in on a scale that will fully meet the need and set reconstruction well on its way. And after months of war, passive and open, in the Ruhr, the world hears of Germany's purpose to end her resistance to France and to open direct negotiations. A single week has worked marvels in the clearing of the world's troubled atmosphere, and again the economic prophets are venturing to say that fundamentally business conditions are sound.

Art and the Industrial Problem

A STRONG plea for the use of art in solving industrial problems by bringing men to face each other as brothers is made in *Scribner's Magazine* for September by Gerrit A. Beneker, artist and illustrator of Provincetown, Mass., who, by visiting machine shops and steel plants and painting portraits of the workers as he found them, came into such close and friendly relations with them that he had large influence, and in the case of a Cleveland steel company was put on the industrial relations advisory board. He often helped workers and officials to understand each other better. His constant aim was to show men that they were important as individuals in the organization and not merely cogs in a machine.

As one reads Mr. Beneker's account of his experiences with the workers, he is convinced that the curiosity of the men was aroused and that there was a direct appeal to their better natures. The artist tells the story of how he found Steve Rigo galvanizing rims for automobile wheels, painted his portrait and called him a "Galvanized American," protected by his American citizenship. This was a patriotic thought and had the desired effect on Steve Rigo. Mr. Beneker asks: "Is there not in every human being a divine spark which can be breathed upon with art through a picture, a statue, a play, a song or a poem, and kindled into a glowing ember, a flame, a consuming conflagration which will spell achievement?"

Idealism? Dreaming? Perhaps it is. However that may be, Mr. Beneker has what the industrial world sorely needs today, the ability to sympathize with men and influence them to act reasonably.

HOW will the Japanese catastrophe affect the American copper market? So much depends on foreign buying of that metal that any new demand stirs producing interests. Japan has been a heavy buyer of American copper for some years, although a new tariff law last year slowed down the movement. In the four calendar years since the war—1919 to 1922—our exports to Japan of refined copper as ingots, bars, etc., were 110,060 gross tons, or about 11 per cent of the total exports in those four years. While the amount is small compared with purchases of Germany, France and Great Britain, it is by no means insignificant. How much of this copper will have to be re-purchased can only be conjectured, for much of it was used outside the devastated areas. That substantial quantities will be needed in the coming months is a reasonable expectation, the history of rehabilitation following catastrophe being like that of reconstruction after war, in the larger use of materials insuring longer life or better protection from the elements.

Pig Iron and Steel Production

A RHYTHM can be seen in the ascending and descending production of pig iron and steel in the past eight or nine months. The rates of ascent and descent have been approximately the same, but the pig iron peak came after the steel ingot peak.

The high rate in steel ingot production came in April, with a daily rate of 157,776 tons, as reported by the American Iron and Steel Institute. This corresponded to an annual rate, 311 working days, of a shade more than 49,000,000 tons. August, the fourth month after April, brought a daily rate of 136,276 tons, or 14 per cent decrease. Four months before April was last December, with a daily rate of 132,017 tons. The intermediate months also matched up fairly well, January agreeing closely with July and February with June.

In pig iron the high rate was in May, our report showing a daily rate in that month of 124,764 tons. August, the third month afterward, showed 110,816 tons, or 11 per cent decline, while February, the third month previous, had shown 106,935 tons a day. The descent has been somewhat more gradual than the ascent.

There is no plainly apparent reason why pig iron production, in its rise and fall, should trail steel production. Steel production would naturally trail pig iron production, but not by such an interval as could be noticed. Possibly the steel works were using more scrap in the early months of the year and lately have been disposed to liquidate ore. Coke is cheaper in the market, but that would hardly influence the interests that make the coke themselves.

That the rate of steel ingot production decreased 14 per cent in four months and that pig iron production fell 11 per cent in three months are two facts that need to be considered in appraising the condition and prospects of the steel market. The decreases have been due to lessened insistence upon deliveries for the major part, though weather conditions may have exercised some influence.

Relative to peak rates production is lighter now, but relative to previous years it is heavy. Even assuming that steel ingot production is lighter now than it averaged during August, the rate is probably above 40,000,000 tons a year, whereas the average rate in the four post-war years was only 32,000,000 tons a year. Thus we have had a great bulge in production and after the rate has declined we are still doing 25 per cent better than the post-war rate prior to this year.

The actual consumption of steel is undoubtedly very heavy. It may be thought that steel has

accumulated in the hands of buyers. It is often remarked that such accumulations are found, after a period of activity, but the suggestion that mistakes must have been made is not altogether fair. Stocks are required for the proper conduct of building, manufacturing or jobber-distributing operations, and what is a normal stock at one time may look large at another time and vice versa.

Canada's New Patent Act

CANADA'S new patent act which became effective Sept. 1, while not departing in any way from the principle of compulsory working, removes some of the more severe restrictions as they applied to inventions of Americans and other foreigners. The principal changes have to do with conditions which the applicant must fulfill in order to obtain a patent and those with which he must comply in order to maintain the patent in force.

The authorities of the Dominion remain convinced that the manufacturing industries of the country and the good of the public are best served by eliminating the idle patent, which the laws of the United States still permit. Here a foreigner is given a patent that will prevent the manufacture of his invention in this country. He himself need not produce it here, nor can he be compelled to issue a license to another to produce it. He may confine his manufacturing to his own country and import his product into America, under full protection of our laws. Canada, as well as Great Britain and most other nations, hold that this is not a wise law.

The new Canadian act abrogates two conditions that have worked against American inventors. One was that if goods manufactured under an invention were shipped into the Dominion after one year from the time the patent was issued in another country, the inventor forfeited all right to a Canadian patent. The other condition was that under a Canadian patent the invention must be manufactured in Canada within two years, else protection automatically ceased.

Manufacturing and licensing provisions are now established which follow closely the British act. The patentee must satisfy the reasonable requirements of the public and adequately manufacture the patented article or carry on the patented process in Canada. Any person may apply for a compulsory license within three years of the date of the patent, and not less than one year after the passing of the act, and may obtain such license if he can show that the reasonable requirements of the public have not been satisfied, by failure of the patentees adequately to manufacture or to grant licenses upon reasonable terms, or if unfair conditions have been attached by the patentee to the use of the invention.

The patent may be revoked at any time not less than three years after its date, and not less than one year after the passing of the act, if the patented article or process is manufactured or carried on exclusively or mainly outside of Canada to supply the Canadian market with the invention covered by the patent. Upon such an application to revoke, the patent may be revoked "unless the patentee proves that the patented article or process is manufactured or carried on to an adequate extent in Canada, or gives satisfactory reasons why the article or process is not so manufactured or carried on." The patent may be revoked forthwith or after a reasonable interval. Application in Canada must be made within one year of filing in any foreign country, or within one year of the date of the passing of the act.

Japan and American Steel

NATURALLY in the discussion of the calamity that has overwhelmed Japan not a little has been said as to the large amount of new material that will be needed to rebuild the devastated areas or to found new cities. Those who recall the exaggerated estimate of requirements in steel and other materials of construction that followed the San Francisco earthquake have been chary of prediction. However, new emphasis has been given to the fact that Japan, since the war particularly, has been one of the largest buyers of American iron and steel. Without the trade of that country and Canada, our steel exports would fall to pitiful figures.

The magnitude of Japan's purchases of American steel in the last four years affords some basis for estimating her new needs. Official statistics give the destination of only a part of the domestic products sent to foreign countries. An analysis of these for 1919, 1920, 1921 and 1922 makes the following showing on seven leading products:

	To Japan, Gross Tons	Per Cent of Total for Each Product
Steel plates	506,850	24.5
Rails	464,000	25.0
Steel sheets	378,560	50.0
Tin plate	153,139	25.0
Wire (except barbed)	99,680	17.5
Wire nails	66,430	25.0
Galvanized sheets	32,600	8.5

In four years Japan has taken over 1,700,000 tons, or about 26 per cent, of the exports of the above materials, which aggregated nearly 6,500,000 tons. Outstanding has been her consumption of black sheets, of which Japan has absorbed over 50 per cent of our exports, besides buying heavily from England; in 1922 she took 74 per cent of what we shipped abroad. If structural steel, rods, bars, pig iron and some other items were included, the total would expand considerably. To this estimate, copper, zinc, machinery and automobiles are to be added.

Ten years ago, or in 1913, Japan's purchases from American mills were insignificant compared with those for any year since the war. The industrial advance yonder during the war and since has been phenomenal. While no measure can now be taken of the portion of these heavy purchases which must be re-bought, since much of them entered consumption in unharmed areas, there is no question that much of the financing of reconstruction will be done here and that Japan will continue to be a heavy buyer of American rolled steel, metals and machinery.

NO TAX REDUCTION

Little Prospect of Relief from Congress Bonus an Important Factor

WASHINGTON, Sept. 11.—Difference of opinion prevails among Republican leaders of Congress regarding possible legislation at the next session of Congress for reduction of taxes. Meanwhile business interests of the country will have to await the report of a board appointed by Secretary of the Treasury Mellon, which is making a comprehensive study of the entire tax problem before any clear indication may be had as to whether they will get relief or not. The oustanding obstacle is the apparent probability that a soldier bonus law will be enacted, involving billions of dollars. Senator Smoot, of Utah, who probably will be chairman of the Committee on Finance, has said that bonus legislation will be passed and that tax reduction consequently is not to be expected. Representative William R. Green of Iowa, who probably will be chairman of the House Committee on Ways and Means, has said that if a soldier bonus law is enacted no tax reduction may be expected. Chairman Madden of Illinois, of the House Committee on Appropriations, has prepared a preliminary plan for a so-called automatic reduction in income taxes, which he says will be worked out in detail and introduced at the next session of Congress and will give relief to business in the way of taxes. All three of these prominent leaders of Congress have recently held conferences with President Coolidge. The position of the President on the subject of a tax program has not been revealed.

At this time it is the general view that Senator Smoot is correct in saying there will be no tax reduction. His insistence upon soldier bonus legislation has created this opinion. While he proposes to raise the enormous amounts necessary to pay all soldiers who served during the world war, whether at home or abroad, by levying so-called luxuries taxes on a greater scale, it is also claimed that it will be necessary to maintain present taxes of other kinds in order to obtain the necessary money for the soldiers.

Rigid Economies

The underlying principle of the Madden plan is for a reduction in Government expenditures through more rigid economies. It is his idea to cut down taxes in any calendar year following any fiscal year in which a surplus expenditures is shown. Under this scheme, the taxpayer would be given a pro rata cut in his taxes, based on the surplus of income over expenditures of the Federal Treasury. There now exists a surplus of more than $300,000,000, although this would not be returned. At the same time, figures of probable income tax yields, collected over several years, it is proposed, would be so applied to expenditures authorized for the fiscal year 1925 that no further surplus would accrue in 1925. In other words, it is the plan of Mr. Madden to have contributions by business and other taxpayers based on the actual needs of the Government. But with this plan in effect there is to be carried the responsibility of taxpayers to make up any deficit that may accrue from one cause or another.

Mr. Madden, sharing the attitude of Secretary Mellon, is in favor of a reduction in surtaxes to a maximum figure of 25 per cent on a graduated scale, which, with the 8 per cent levied on incomes in the higher brackets, would make a total possible tax of 33 per cent.

Soon after a second conference between President Coolidge and Representative Madden, the Chief Executive conferred with Representative Green, whose views were not so cheerful as to possible tax reduction as were those of Mr. Madden. Mr. Green declared that any revision in taxes will depend principally upon the attitude of Congress toward soldier bonus legislation, which Senator Smoot has said will be enacted. Mr. Green declared that if such legislation is passed, some means of raising the money will have to be devised and he is understood to be opposed to the Madden plan to authorize the Secretary of the Treasury to reduce taxes in proportion to the surplus of the Government income over expenditures. Mr. Green said he hoped that the report of the Mellon board which is studying the tax problem will be ready for the Ways and Means Committee when Congress convenes in December.

Mr. Green said that he proposes to reintroduce his bill for a constitutional amendment to prohibit the issuing of tax exempt securities. He also said that it is probable that changes will be made in the tax laws for the purpose of simplifying them and eliminating questionable features. A board is at work on this matter also.

Wage Adjustment for Ten-Hour Men Had Been Expected in Pittsburgh

PITTSBURGH, Sept. 10.—Announcement last week by Judge Gary of an adjustment in the wages of workmen employed in the non-continuous departments whereby these men will receive 11 hours' pay for 10 hours' work occasioned little surprise here. Indeed, such an adjustment was looked upon as necessary to keep the men working the 10-hr. day satisfied, since the elimination of the 12-hr. day in the continuous process departments brought a 25 per cent increase in wages and made it possible for men in these divisions to earn as much in eight hours as the day wage men in the non-continuous departments earned in 10 hours. It is believed in well informed quarters here that this adjustment in the wages of the 10-hr. men is but the first step in the direction of setting up an 8-hr. day for these men.

Meanwhile, elimination of the long working day in independent steel plants in this district is progressing, Pittsburgh Crucible Steel Co., Pittsburgh plant at Midland, Pa., is the latest to inaugurate the change. The Jones & Laughlin Steel Corporation will soon start the shorter day at its blast furnaces, steel works and coke plants.

Tin Plate and Sheets to India

American exports to British India over a period of years show the following shipments of tin plate and of black steel sheets, according to the records of the Department of Commerce:

Calendar Year	Tin Plate (Gross Tons)	Steel Sheets (Gross Tons)
1913	58	*234
1914	1,210	*493
1915	8,330	*3,060
1919	10,545	2,109
1920	3,322	1,602
1921	2,089	2,231
1922	3,581	55
1923†	2,931	....

*Fiscal year, ended June 30.
†First seven months.

The Iron Age and Its Japanese Readers

The circulation department of THE IRON AGE has taken steps to reach all our subscribers in the stricken districts of Japan to give them a word of sympathy and to offer such special help as we may. Our sincere wish is that none of them may be found to have suffered severely, but with a company of readers in Nippon numbering several hundred, it is realized that this may prove a vain hope.

There is satisfaction in knowing that the disaster did not reach the leading manufacturing sections, which extend in both directions from the district taking in Tokio and Yokohama—a fact which was emphasized in these columns last week and elaborated on a few days later by Secretary of Commerce Hoover. Reconstruction will not have to wait primarily on the manufacturing resources of other nations, but the re-establishment of the commercial structures of the devastated area will be in the hands of the energetic, purposeful, persevering Japanese themselves.

Iron and Steel Markets

FALL BUYING WAITS

Steel Works Operations Adjusted to Lessened Demand

Wire Nails Bought for Japan. With Sheet Inquiries Still Pending—More Rail and Car Orders

The first ten business days of September have passed without improvement in new buying of steel products to the extent that had been expected. While some of the reduction in output in July and August was called seasonal, it now appears to have been in part also an adjustment of operations to a lessening scale of demand.

Whereas August bookings of finished steel by important producers were about up to the rate of July, and in some cases exceeded it, the general experience is that September has not maintained the August rate.

The Steel Corporation's falling off of 496,000 tons in August in its unfilled orders was accompanied by a reduction to 85 per cent in its rate of output. It had on its books Aug. 31 about 1,565,000 tons less than on June 1, when it was running at 95 per cent of capacity. Independent companies are today operating on a 70 to 75 per cent basis.

Thus the industry as a whole is producing ingots at a yearly rate slightly over 40,000,000 tons, as against upward of 49,000,000 tons as the rate of April, the peak month.

Apart from the buying of 30,000 to 40,000 kegs of nails for early shipment, little of the inquiry for Japan has resulted in business as yet. Thus far about 6000 tons of sheets have been asked for to sheath temporary structures, and much more sheet inquiry is looked for in the next 30 days. The total of shapes, plates and bars asked for on Japanese account is about 20,000 tons.

It is believed that several months will elapse before the real reconstruction needs of the stricken districts can be definitely known.

Labor supply has been such that leading producers in the Pittsburgh and nearby districts have been able nearly to complete the abolition of the 12-hour shift at blast furnaces, coke ovens and steel plants. In the Chicago district about half the 12-hour men have gone to the shorter day. Generally the change has been more rapid than was expected, many workers who have been on outdoor jobs having applied already at Central Western steel works.

Less is heard of the shorter day as a definite factor in finished steel prices, though the week has brought a 10 per cent advance in the hourly wage rate of the 10-hour men. It is recognized, however, that with higher costs producers will be more disposed to adjust output to demand than to try to fill up their mills by cutting prices.

The latest rail order is 26,000 tons placed with the Illinois Steel Co. by the Canadian National Railways for its lines in the United States. The rail mills now have a comfortable backlog and further good-sized orders are expected. The Pennsylvania Railroad, which has not been a buyer of rails this year, is soon to be in the market. Its plans for buying 12,000 to 15,000 cars have just become known also. Car works will need more business within 30 to 60 days.

The Norfolk & Western's total rail purchases are close to 60,000 tons, and it is now in the market for 10,000 tons of tie plates.

The policy of manufacturing consumers is still one of keeping close step with the mills, stocks being well drawn down all along the line. Jobbers are having less to do, seeing that so many mills can deliver promptly.

In finished steel the price structure holds, as for many weeks, sheets still being the most notable exception. The automobile industry is specifying more liberally in body sheets and there is the beginning of fourth quarter buying.

Products in which concessions are appearing are bolts and nuts, hot rolled flats, track fastenings, light rails, hard bars and wire fence.

Some deliveries on bars have been held up and in the Chicago district two mills that roll bars from old rails have shut down due to the falling off in demand for reinforcing bars.

Chicago finds more signs that high labor cost has caused the putting aside of building plans. At Cleveland two buildings in prospect will each take 5000 tons of steel. For the new Union passenger station there 50,000 tons will be needed, but none of it this year.

Hopes of an advance in the pig iron market based on an anthracite strike are now in abeyance. Following the settlement of the strike, the price of furnace coke has declined 50c. and in most centers the pig iron market again shows a sagging tendency, although at Pittsburgh and Cleveland there is more activity and foundry iron at Pittsburgh is held 50c. higher. Lake blast furnaces are pursuing an aggressive policy at distant points and another shipment of iron has been made from Buffalo to Chicago. In the South some furnaces have quoted as low as $23.

More activity has appeared in ferromanganese, but resales dominate the market. The usual price is $112.50, seaboard, although as low as $110 has been quoted.

Pittsburgh

Buying Movement in Steel Not Developed—Japan's Needs Undetermined

PITTSBURGH, Sept. 11.—Improvement in the demand for steel confidently looked for over the past few months to develop in September has not yet materialized and the tendency to reduce production to the proportions of current demand is becoming more pronounced. The experience of the Steel Corporation with its loss of 500,000 tons in its unfilled obligations in August is fairly typical of the industry as a whole, save that independent companies have been able to take on more early delivery business than the Steel Corporation, and much of the recent buying has been of that character. It is a reasonably safe estimate that new business of independent companies lately has been

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Sept.11 1923	Sept.4 1923	Aug.14 1923	Sept.12 1922
No. 2X, Philadelphia	$26.26	$26.76	$25.76	$24.84
No. 2 Valley furnace*	25.00	24.50	24.00	25.00
No. 2, Southern, Cin'ti	27.53	27.53	27.53	29.65
No. 2 Birmingham, Ala.	22.00	22.00	21.00	25.00
No. 2 foundry, Chicago*	27.00	27.00	27.00	32.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	32.00
Basic, Valley furnace	25.00	25.00	24.50	32.50
Valley Bessemer, del. Pgh	28.26	28.26	28.26	34.77
Malleable, Chicago*	27.00	27.00	27.00	32.00
Malleable, Valley	24.50	24.50	24.50	33.00
Gray forge, Pittsburgh	25.76	25.76	25.76	36.77
L. S. charcoal, Chicago	32.15	32.15	32.15	36.15
Ferromanganese, furnace	112.50	112.50	117.50	67.50
Rails, Billets, Etc., Per Gross Ton				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. sheet bars, Pgh	42.50	42.50	42.50	40.00
Forging billets, base, Pgh	47.50	47.50	47.50	45.00
O.-h. billets, Phila.	47.67	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	47.50
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.15	2.15	2.25	2.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.575
Iron bars, Chicago	2.40	2.40	2.40	2.25
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.60	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.60	2.60	2.80	2.30
Tank plates, New York	2.84	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.70	2.20
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

Sheets, Nails and Wire,	Sept.11 1923	Sept.4 1923	Aug.14 1923	Sept.12 1922
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh	5.00	5.00	5.00	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.80	3.80	3.80	2.60
Plain wire, Pittsburgh	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.15
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.00	$20.00	$19.50	$23.50
Carwheels, Philadelphia	21.00	21.00	20.00	21.00
Heavy steel scrap, P'gh	18.00	18.00	18.00	19.50
Heavy steel scrap, Phila.	17.00	17.00	16.00	16.00
Heavy steel scrap, Ch'go	16.50	16.50	16.00	18.50
No. 1 cast, Pittsburgh	22.00	22.00	21.50	21.50
No. 1 cast, Philadelphia	21.50	21.50	20.00	21.00
No. 1 cast, Ch'go (net ton)	20.00	19.50	17.50	22.00
No. 1 RR. wrot, Phila.	19.00	18.00	18.00	21.00
No. 1 RR. wrot, Ch'go (net)	16.00	16.00	14.00	18.00

Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$5.50	$5.00	$4.50	$11.00
Foundry coke, prompt	5.75	6.00	5.25	12.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.00	14.50	14.12½
Electrolytic copper, refinery	13.62½	13.50	13.87½	13.75
Zinc, St. Louis	6.55	6.50	6.25	6.37½
Zinc, New York	6.90	6.85	6.60	6.72½
Lead, St. Louis	6.72½	6.70	6.35	5.60
Lead, New York	7.00	7.00	6.70	5.95
Tin (Straight), New York	42.12½	41.50	38.50	32.12½
Antimony (Asiatic), N. Y.	7.50	7.50	7.87½	6.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Sept. 11, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	These products constitute 88 per cent of the United States output of finished steel	Sept. 4, 1923,	2.775c.
		Aug. 14, 1923,	2.775c.
		Sept. 12, 1922,	2.412c.
		10-year pre-war average,	1.689c.

Composite Price Sept. 11, 1923, Pig Iron, $25.29 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.		Sept. 4, 1923,	$25.38
		Aug. 14, 1923,	25.04
		Sept. 12, 1922,	31.52
		10-year pre-war average,	15.72

running between 50 and 60 per cent of the shipments against their orders.

For still another week there has been no important change in prices of the products making up the major portion of the production. The market is unsettled and rather weak on bolts, nuts and rivets, and shows some irregularity in hot-rolled flats of the sizes going to the automotive industry, while in cold-finished steel bars makers holding at 3.25c. have encountered lower prices in the Middle West. The general firmness of prices is traceable to the adjustment of production to current demands and a belief that the lower rate of plant operations and the elimination of the long work-day will be reflected in substantially higher costs.

Settlement of the anthracite coal miners' strike has been followed by a reaction of coke prices, which has virtually wiped out the recent advance, largely built up on expectations of an extra demand for coke to replace hard coal. A contributing factor in the decline in furnace coke, which is a matter of 50c. a ton, is the blowing out of more blast furnaces in this and nearby districts, where 103 out of a total of 138 will be making iron by the end of this week, as compared with 126 in active production in June.

While there has been some increase in the demand for foundry iron, it has not been sufficient to bring about materially higher prices and the disappearance of a quotation of $24.50, Valley furnace, for No. 2 is due partly to the fact that a furnace interest which took much business at that figure has gone out of production in the past week. The general supply of pig iron still is ample for all requirements, and other furnaces are likely to go out in the adjustment of supply to demand.

It is reported that a good many sheet orders are in the market for Japan, but as a general proposition the effect of the Japanese catastrophe has not been very much felt in this district. It is believed that the flood of inquiries that poured forth a week ago, coming as it did from exporters and brokers, was in anticipation of probable requirements. Local advices are to the effect that cables from Japan up to yesterday were not open for the transmission of commercial messages, and that no accurate idea of even the emergency requirements of the country can now be formed. It is believed that several months will elapse before the real reconstruction needs of the stricken sections will be definitely known.

Pig Iron.—This market has shown a fair degree of activity in foundry iron this past week, although the transactions are large only by comparison with the recent dullness. A sanitary ware manufacturer has bought 1500 tons of No. 2 iron at $25, Valley furnace, and there were several other sales, ranging from a carload to 500 tons, on which in practically all cases the base was $25, Valley furnace. In all, probably 5000 tons of foundry iron has been moved in the past week and in all cases it was for early delivery. Some producers are asking up to $26 for No. 2 foundry, but as far as actual sales are concerned $25 is the top of the market and, seemingly, is the bottom also, with the passing out of production of a Valley furnace interest that has been taking business at less. The promise is of continued improvement in sales of foundry iron, since a large sanitary ware interest whose ordinary requirements are about 5000 tons a month is expected to be in the market for last quarter iron at an early date, while the Westinghouse Electric & Mfg. Co. has put out an inquiry for approximately 7000 tons for its Trafford, Pa., and Cleveland foundries. The Cleveland plant inquiry involves 1200 tons of No. 1, 1150 tons of No. 2 and 1100 tons of No. 2X for fourth quarter shipment, while the inquiry for Trafford calls for 1000 tons each of Nos. 1, 2 and 3 grades, one carload of standard Bessemer iron and a carload of 8 per cent silvery iron. The tonnage for Trafford is for delivery over five months beginning Oct. 1. These inquiries should determine how firm the market is at $25, furnace. There has been only limited trading in the steel making grades. The West Penn Steel Co. recently bought 1000 tons of basic iron at $25, Valley furnace, but important sales of Bessemer iron have been absent. The Union Steel Casting Co. is in the market for 500 tons of Bessemer. Low phosphorus iron has been sold slightly above $32, delivered, Latrobe, Pa., or about $29 f.o.b. Riddlesburg, Pa. It is reported that Valley iron of this grade has been sold as low as $30, furnace. The Carnegie Steel Co. has blown out one Edgar Thomson, and one Newcastle stack since a week ago, and now has 45 of 59 furnaces making iron. It is expected that the Jones & Laughlin Steel Corporation soon will have to suspend the operation of two furnaces for relining. The A. M. Byers Co., Gerard, Ohio, put down its furnace last Saturday. The Top Mill furnace, Wheeling Steel Corporation, was blown out. Claire furnaces, Reliance Coke & Furnace Co., Sharpsville, Pa., will be blown out as soon as present ore supplies are used.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.00 to 24.50
No. 2 foundry	25.00
No. 3 foundry	24.00 to 24.50
Malleable	24.50 to 25.50
Low phosphorus, copper free	31.00 to 31.50

Ferroalloys.—Interest in the market again is low following the recent sales of about 1500 tons of ferromanganese at a recession of $5 per ton in the price. This material still is quoted at $112.50, seaboard, for either domestic or imported 80 per cent alloy, but sales are lacking in this district and the common impression is that the next important transactions will be at not over $110. Indeed, that price has been named here without inducing purchases. Outlook still is for reduced steel works operations over the last quarter of the year, with the consequent curtailment of the use of ferroalloys and purchases, which a short time ago appeared to be sufficient only to carry consumers into the quarter now promise to supply all requirements over the remainder of the year. On 20 per cent spiegeleisen, $45, furnace, now is maximum even for small lots. Prices are given on page 709.

Semi-Finished Steel.—The common quotation on billets, sheet bars and slabs here still is $42.50 and the tendency to hold to this price has been somewhat strengthened by the recent sale by a Cleveland producer to a Pittsburgh district strip maker of approximately 30,000 tons of billets and slabs for delivery over the remainder of this year at that figure. Buyers, however, have not abandoned expectations of being able to buy billets for less and on small tonnages for early delivery there have been sales at our minimum quotation. Demand for black sheets is not improving sufficiently to reduce the available supply of sheet bars materially and there is more profit in sheet bars at $41.50 than there is in black sheets at 3.75c., base. Demand for forging billets has not yet reflected the increased activity of the automobile and parts manufacturers and wire rods and skelp still are selling slowly. There is some excess supply of rods, due partly to the unsettled rivet market, which is keeping down specifications from that industry. It is doubtful if the present price of $51, base, could be obtained if makers had to sell a tonnage, the demand is so limited. Prices are given on page 709.

Wire Products.—The trade here is encouraged by a somewhat better inquiry, particularly as the renewed interest of buyers shows fairly strongly in woven fence and barbed wire, which have been extremely dull for several months. Orders do not show a corresponding gain, but manufacturers are hopeful that a turn is near. Order books in most products are low with most mills and early deliveries now are being made on practically all products. Locally, there is close observance of quoted prices, but in the Middle West it is reported that concessions are appearing in fence prices and that the full prices for processed wire have not in all cases been insisted upon. It is expected a good many nail orders will come from Japan for emergency building. Prices are given on page 708.

Steel Rails.—Reports as to the price of light rails rolled from new steel are conflicting, some claiming that 2.25c., base, has not been shaded, while equally convincing testimony is heard that not only has business been done at 2.15c., but also that it has been lost at that price. On attractive orders the market appears to have settled to the latter figure and on these sections rolled from old rails, 1.90c. to 2c., base, is the prevailing range.

We quote light rails rolled from new steel at 2.15c. to 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Hot-Rolled Flats.—The market appears to be holding fairly well on hoops and bands, but leans in buyers' favor on other products under this classification. No considerable trouble is experienced by consumers in securing wide strips at 3c., base, as against 3.15c., the regular quotation, and 2.90c., base, still is being done by some mills on rim stock, on which the regular quotation is 3c. There is a fair run of orders, but buyers generally still are "keeping close to the shore." Prices are given on page 708.

Iron and Steel Bars.—All makers of steel bars are holding firmly to 2.40c., base, although strictly new business is confined very largely to small tonnages for early delivery. Specifications against old orders still are reported good. A light demand does not appear to be having any effect upon iron bar prices.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $5 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—Most of the structural jobs coming to local fabricating shops involve small tonnage, and demands upon the mills are correspondingly small. Relatively low bids being made upon structural projects of size indicate that the fabricating companies either have fairly liberal stocks of plain material or have considerable tonnage due them from the mills at less than today's prices. On current business, however, there is no padding of the regular market price. Prices are given on page 708.

Plates.—The situation does not change much except for the fact that shipments against old orders still are running ahead of incoming business, and an increasing number of mills are in a position to take on business for delivery. The regular price of 2.50c., base, Pittsburgh, is well observed. Prices are give on page 708.

Cold-Rolled Strips.—While the general tendency of consumers still is to keep purchasers close to actual requirements and all makers could handle more business than they are booking, competition for orders is not keen enough to produce important recessions from the regular quotations on the regular base of 5c., Pittsburgh.

Bolts, Nuts and Rivets.—The market is very irregu-

lar and rather unsettled on these lines, due largely to the fact that there is more capacity than current demands require. Smaller units, anxious to keep going, are taking business at well below the quotations of the larger producers. Some of the former are naming 60, 10 and 10 per cent off list for large machine bolts, and on nuts as much as 4.25c. off list on hot pressed and 4c. off on cold pressed is being named. Rivet makers are trying to establish a 3c. base for large structural rivets, but it cannot be said that it is a firm price, since buyers were able to secure goodly supplies at that price or less on the old card of extras. The new card is not popular with buyers, the railroads being particularly active in protest. A size of rivets commonly used by the railroads is ⅝ x 2 in., which formerly commanded an extra of 15c. per 100 lb. over base. In the new list there is an extra of 35c. per 100 lb. for diameter and 25c. per 100 lb. for length, an increase of $9 per ton. Prices and discounts are given on page 708.

Track Fastenings.—The need of new business by some makers of spikes is beginning to tell on prices of small sizes, hitherto held at 3.50c., base, but which lately have been offered in the anthracite coal region at the same base as large spikes, or 3.15c. Inquiries for spikes are more numerous than they have been, but there has not been a corresponding gain in orders and old obligations are pretty well filled. For prices, see page 708.

Tubular Goods.—There continues to be heavy pressure upon the mills for shipments on old orders, particularly for standard pipe. Consumption apparently still is heavy, because a considerable portion of the shipments, notably of oil country goods, is going direct to users instead of to jobbers' warehouses. New business is fairly good, but not of a volume to encourage expectations that the present rate of production can be maintained during the remainder of the year. Even now some mills can make shipments so promptly as to suggest exhaustion of order books. Competition for business is keener on the basis of deliveries than on prices. Several inquiries for line pipe and oil well goods for shipment to Mexico and South America are current and call for early delivery. Boiler tube specifications are good, but new demands are light. There are intimations of price cutting in seamless tubes and a vague hint of a general revision of boiler tube prices about the middle of this month. Discounts are on page 708.

Sheets.—Orders show a slow, but pretty steady increase, and there has been a notable increase in specifications from the automotive industry, which also is beginning to place fourth quarter contracts. That industry is getting into smoother operation on the 1924 models. Only by a considerable stretch of imagination, however, could the general market be called active. While manufacturers, who have to buy their steel insist that 3.75c., base, for black sheets means no more than a new dollar for an old one at $42.50 for sheet bars and that even 3.85c. nets less than 5 per cent gross profit, the lower figure has not entirely disappeared. Buyers do not appear seriously impressed with the possibility of an early advance in prices and are governing purchases accordingly. The leading interest, which opened its books for fourth quarter business last Thursday, has not yet filled up for that period; when it opened its books for the present quarter it filled them in about 24 hours. The attitude of consumers has changed considerably since last April and prices will be governed more by the law of supply and demand than by producing costs. Cables from Japan not yet being open for business use no very clear line on the requirements of that country in its emergency reconstruction can be had. Prices are given on page 708.

Tin Plate.—The leading interest is sold out for the last quarter of the year and the independent makers largely so. Specifications for November shipments are due next Saturday and should disclose whether the consumers have requirements for all the tin plate contracted for. Few makers have any considerable tonnage available for shipment during the last quarter, and only small and broken lots of stock items for prompt delivery. The effect of the Japanese disaster in the tin plate market will probably be greatest in extra demands for material for meat and milk containers, these foods being the most urgent need of the stricken people.

Cold-Finished Steel Bars and Shafting. Locally, there is firm adherence to the quoted base of 3.25c., Pittsburgh, for carload lots, but makers are reported to be encountering rather sharp competition in the Chicago district, where makers are understood to have gone as low as 3c., Pittsburgh, in an effort to secure desirable accounts. Business is better with local makers, due chiefly to larger specifications and orders from the automotive industry. Other consuming industries still are buying sparingly. Ground shafting holds at 3.65c., base, f.o.b. mill, for carload lots.

Coke and Coal.—Settlement of the anthracite coal miners' strike has been followed by a considerable modification of producers' price ideas on coke. Furnace grade, not available a week ago below $5 per net ton at oven, now is freely offered at $4.75, and actually has been sold as low as $4.50, the latter price prevailing on 75 carloads to a local steel company. There has also been a drop of from 25c. to 50c. a ton in foundry coke, which for prompt delivery now is quotable from $5.75 to $6.50, as against $6 to $7 a week ago. Contracts for fourth quarter furnace coke aggregating somewhat above 100,000 tons a month are reported to have been concluded at $5 per net ton at ovens. Some of the tonnage, however, has been contracted for as a measure of protection. The coal market has also weakened slightly with the termination of the anthracite strike. Prices are not materially lower except on slack grade, which is down to $1.20 at mines for steam and $1.40 for gas grade. Mine run steam coal still is quoted at $2.15 to $2.40, and mine run gas and coking coal from $2.25 to $2.35.

Old Materials.—There is no occasion to materially alter the prices of a week ago. Steel makers still show no interest in fresh supplies; the foundries are buying only moderately and, as for the past few weeks, trading has been largely between dealers. Relatively high prices ruled on this month's offerings of scrap by the Pennsylvania Railroad, which brought $19.30 per gross ton for heavy melting steel, $23 to $23.50 for the specialties, $20.15 for No. 1 rails and $16 for borings. Dealers secured all of the offerings and were prompted to go high in their bids by the fact that a Youngstown district steel plant recently began accepting shipments on old and high-priced contracts. It is believed that most of the high-priced orders have been filled or that the material is available in dealers' yards to fill them. With dwindling steel mill order books brought about by the fact that shipments for some time have been exceeding new business, the outlook is for a lower rate of steel works operations and a smaller consumption of scrap. Furthermore, most of the steel companies have unusually big stocks of pig iron, which would be drawn upon in the event that scrap advances much. Such strength as the market shows, therefore, is merely a surface and not a fundamental condition. There is real weakness in compressed sheets. Norfolk & Western Railway will receive bids until noon Sept. 12 on 22,862 gross tons of scrap, and the Baltimore & Ohio Railroad list, which embraces 21 cars and 10,460 gross tons, closes at noon Sept. 17.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$18.00 to $18.50
No. 1 cast, cupola size	22.00 to 22.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 20.00
Compressed sheet steel	16.00 to 16.50
Bundles, sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	22.50 to 23.00
Railroad coil and leaf springs	22.50 to 23.00
Low phosphorus bloom and billet ends	24.50 to 25.00
Low phosphorus plate and other material	23.50 to 24.00
Railroad malleable	19.00 to 19.50
Steel car axles	21.50 to 22.00
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	22.50 to 23.00
Machine shop turnings	13.00 to 13.50
Sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	19.00 to 19.50
Stove plate	15.50 to 16.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	18.00 to 18.50

Chicago

Most Consumers Buying From Hand to Mouth—More Rail Orders

CHICAGO, Sept. 11.—Outside of additional rail orders amounting to 30,000 tons, purchases of finished steel during the week have been restricted. Heavy shipments continue to reduce the backlogs of the mills and now that satisfactory deliveries are available, consumers appear to be disposed to buy from hand to mouth. It is notable, however, that stocks in hands of consumers are thoroughly deflated and it is therefore expected that current purchases for short periods ahead will form an imposing aggregate tonnage. This view is based on the fact that consumption of steel is fairly well maintained, although some users are less insistent on deliveries than heretofore and a few of them have asked for the holding up of shipments.

The gradual decline in building activity is not surprising in view of high labor costs; the surprising feature is that it has slackened so gradually. Oil storage tank buying, on the other hand, has stopped abruptly, but past experience would indicate that it may be resumed just as unexpectedly. Railroad car buying is still at a low ebb. Other factors in the industrial situation are practically unchanged. Automobile production is still ahead of previous records for the same period of the year and general manufacturing operations are holding up well. The notable exception is the implement industry, which has been operating at a restricted rate for some time. On the whole, no radical changes in the market situation are expected this fall, although some observers believe that the advantage will be increasingly in favor of the buyer as winter approaches. Thus far there has been no pronounced increase in inquiries such as would forecast a heavy fall buying movement. The most important source of new demand has been Japan, which has entered the market for large quantities of sheets, nails and wire for the restoration of the area devastated by the earthquake.

Two hard steel bar mills have temporarily suspended production, but otherwise mill and blast furnace operations in this district are substantially unchanged.

Pig Iron.—A second cargo of Susquehanna iron from Buffalo, consisting of 1700 tons of foundry ranging from 2.75 to 3.25 per cent silicon, is expected to arrive at Milwaukee Friday, Sept. 14. Still another shipment will probably be made. On the whole, current buying is of a hand-to-mouth character and with the coal strike settled, buyers have recovered confidence in their ability to dominate the market. Some of the larger users, however, are placing substantial orders. A Wisconsin melter is inquiring for 3000 to 4000 tons of foundry for 30 to 60-day delivery. A local plant wants 2000 tons for September and October shipment and a railroad is in the market for 800 tons of foundry for delivery over the remainder of the year. A western Michigan melter has closed for 2000 tons of malleable both for shipment over the remainder of the year. It is understood that both of these orders went to Lake Erie furnaces. Both Detroit and Toledo producers are quoting $25 base, furnace, which enables them to penetrate far into what is normally Chicago territory. Local prices are fairly steady, but a sale at $26.50 base is reported to have been made at Milwaukee. On the other hand, one of the Milwaukee stacks which had been quoting $27 base, furnace, has announced an advance to $28. This figure is equal to the delivered price at Milwaukee from Chicago furnaces, but puts the Milwaukee stack at a disadvantage to the extent of the local switching charge from furnace to user. Outside of a few small sales of Southern iron for shipment by barge and rail, little Southern product is being disposed of in this section. Stocks in Southern furnace yards are said to be large, according to some estimates amounting to close to 100,000 tons. With so much iron piled some producers are changing their views of prices. At least two Southern stacks are now quoting $23 base, Birmingham. A local inquiry calls for 50 to 100 tons of low phosphorus. A sale of 250 tons of silvery has been made in Wisconsin at the Jackson County schedule and several carlot orders are also reported. Charcoal is quiet.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00
Malleable, not over 2.25 sil.	27.00
Basic	27.00
High phosphorus	27.00
Southern No. 2	28.65 to 30.01
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 35.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—There has been increasing interest in ferromanganese and a sale of 150 tons has been made at $112.50, seaboard, which is now the ruling market. A number of inquiries for ferromanganese are pending. A Michigan melter is inquiring for 100 tons of spiegeleisen.

We quote 80 per cent ferromanganese, $120.06 to $120.88, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $50.80, delivered.

Plates.—With buying of railroad cars and oil storage tanks at a low ebb, the two heaviest sources of plate business are contributing little to current mill bookings. New car inquiries which have reached Western car builders during the week do not involve more than 4500 tons of steel, and no orders or inquiries for tanks are reported. Mill shipments continue to exceed new business.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—Saginaw, Mich., has placed 125 tons with the National Cast Iron Pipe Co., and Chicago has awarded 860 tons to the United States Cast Iron Pipe & Foundry Co. Lincoln Park, Mich., took bids from general contractors yesterday on 700 tons, while Lake County, Ohio, received tenders on 1200 tons of 4- to 12- in. inclusive on the same date. St. Paul takes bids today on 425 tons of 6- to 16-in. Prices show little change, although slightly easier on the larger sizes.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Sheets.—Inquiries thus far received from Japan involve 6000 tons, about equally divided between galvanized and black sheets, and it is expected that this total will be increased to 20,000 or 30,000 tons within the next 30 days. The first efforts of the Japanese will be directed toward the building of light temporary structures which will require large quantities of sheets. The use of sheets for sheathing these buildings is dictated both by fire restrictions in large cities and by fear of cholera. The dread disease is transmitted by rats, and as a protection against them the Japanese drive sheet foundations into the wet subsoil under which the rodents will not burrow. An important feature of the current Japanese demand is the inquiry for galvanized sheets. Under normal conditions the tonnage of galvanized sheets imported into the islands is small, owing to the high protective duty, which will probably be suspended in view of the present urgent demand. The tremendous destruction of buildings would naturally cause a large increase in demand for sheets and spelter, and it is doubtless true that stocks of spelter and galvanizing plants were destroyed in the earthquake zone in which about 25 per cent of the very large galvanizing capacity of the country is located. The action of the leading sheet producer in opening its books for fourth quarter at unchanged prices caused no surprise. Other mills are generally holding to the same quotations, although black sheets are more freely available from smaller producers at 3.75c., base Pittsburgh. Domestic demand is not active, but consumption appears to be well maintained. Refrigerator manufacturers are operating at 100 per cent of capacity and expect to continue at that rate through the fall and winter in prepa-

ration for next year's trade. Hot air furnace makers are also very busy.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.15c. for blue annealed, 4.20c. for black and 4.55c. for galvanized.

Bolts and Nuts.—The announcement of the advanced list prices has had the effect of bringing in heavier specifications against third quarter contracts on which the old list prices prevail. Little fourth quarter contracting has been done thus far.

Bars.—Mill shipments of soft steel bars are still heavy, although some buyers are not so insistent on deliveries as earlier in the year, and in a few instances requests for the suspension of shipments have been received. New business is not heavy, but mills find encouragement in the receipt of a number of inquiries for first quarter. Bar iron continues weak with the ruling market at 2.40c., Chicago, although some orders are moving at both below and above that figure. Rail steel bars remain firm at 2.30c., mill, but the dearth of new business has had an adverse effect on operations. The Moline mill of the Republic company has shut down until the end of the month, and the Calumet plant at Chicago Heights has been idle for a week and will not resume again until next Monday. A decline in reinforcing bar business is responsible, in part, for the condition of the rail steel market. While good-sized reinforcing projects continue to be undertaken, the large number of small jobs which make up the volume of tonnage earlier in the year are lacking. The farm implement industry, another large user of hard steel, is taking little tonnage at present.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.25c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Rails and Track Supplies.—Two rail orders placed by Western roads during the week aggregated 30,000 tons. The Chesapeake & Ohio and Hocking Valley inquiries for standard section rails are still pending. There is little activity in light rails. The Great Northern Railway is inquiring for 1000 tons of 90-lb. and 1000 tons of 130-lb. rails for delivery in the first quarter of 1924, and also asks for prices on 2675 tons of tie plates, with the stipulation that delivery must be guaranteed one-half in the first quarter and the balance in the second quarter of 1924. The Canadian National Railways has placed 2300 tons of rails with the Illinois Steel Co. for its American lines.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material—Locally there is approximately 20,000 tons of fabricated steel work pending and elsewhere in this territory there is also a round tonnage undisposed of, but on the whole the demand for structural steel appears to be on the wane. There is no doubt that high labor costs are having a discouraging effect on new buildings and that some contemplated work is being delayed or postponed. Ore docks for the Great Northern at Duluth, involving 2300 tons, have been indefinitely posted. On the other hand, a new local project, the Sheridan Trust & Savings Bank Building, will require 3500 tons. Demand for heavy steel from Japan is not expected to be fully felt for some time, as initial efforts no doubt will be concentrated on the erection of temporary structures. Nevertheless, Japanese inquiries thus far received involve 20,000 tons of structural shapes, bars and plates.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Demand for nails from Japan is heavy, and it is estimated by the trade that fully 20,000 tons or the equivalent of 400,000 kegs, will be bought for use in putting up temporary structures in the earthquake zone. Substantial inquiries for galvanized wire as well as wire rods have also been received from Japan. Domestic demand is also improving, both inquiries and specifications being heavier. Greater interest is shown in fencing and barbed wire. Spring terms on fencing have been announced and some orders have been placed. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 708.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Reinforcing Bars.—The volume of prospective business is increasing, as is generally the case at this season of the year, and a number of large new projects are being figured on. The week also brought out a number of good-sized lettings, some of which were closed only after keen competition. Although some of the work let earlier in the year has been held up at the instance of investment bankers, prospects for building activity during the fall months are regarded as generally favorable. Lettings include:

John Marshall High School building, Minneapolis, Minn., 600 tons to Fleischer Construction Co.

Elks club-house, Milwaukee, 700 tons to Corrugated Bar Co.

Franklin Street School, Milwaukee, 200 tons to Corrugated Bar Co.

Fair Store basement, Chicago, 400 tons to Joseph T. Ryerson & Son.

Addition to Hotel Retlaw, Fond du Lac, Wis., 100 tons to Corrugated Bar Co.

Hoffman Building, Chicago, 125 tons to Barton Spiderweb System Co.

Illinois road work, 100 tons to Concrete Steel Co.

Pending business includes:

Perry Creek Conduit, Sioux City, Iowa, 700 tons.

United States Reclamation Service, Denver, Colo., 300 tons.

High school, Mishawaka, Ind., 175 tons.

Midwest Utilities Co. power house, Tulsa, Okla., 100 tons.

Old Material.—There is practically no consumer demand except for cast and malleable grades, which are notably stronger, and brokers' ideas are decidedly less bullish than a week ago. While dealers are still paying from $16.50 to $17 for heavy melting to cover their short sales, they are doing no speculative buying. Prices of the various grades listed below show little change, but if sentiment is any gage of the future, the next general turn will be downward. Railroad lists include the Illinois Central, 10,000 tons; the Baltimore & Ohio, 11,000 tons; the Northern Pacific, 3600 tons, and the Chicago & Eastern Illinois, 800 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$21.50 to $22.00
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	22.00 to 22.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	20.50 to 21.00
Heavy melting steel	16.50 to 17.00
Frogs, switches and guards cut apart	17.00 to 17.50
Shoveling steel	16.25 to 16.75
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheets	13.00 to 13.50
Axle turnings	13.50 to 14.00
Steel angle bars	18.50 to 19.00
Per Net Ton	
Iron angle and splice bars	22.50 to 23.00
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	25.50 to 26.00
Steel car axles	18.00 to 18.50
No. 1 busheling	13.50 to 14.00
No. 2 busheling	10.00 to 10.50
Cut forge	15.00 to 15.50
Pipes and flues	10.00 to 10.50
No. 1 railroad wrought	16.00 to 16.50
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	19.50 to 20.00
Coil springs	20.50 to 21.00
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	18.50 to 19.00
No. 1 agricultural cast	18.50 to 19.00
Low phos. punchings	17.50 to 18.00
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	9.00 to 9.50
Cast borings	11.00 to 11.50
Short shoveling turnings	11.00 to 11.50
Stove plate	16.50 to 17.00
Grate bars	14.50 to 15.50
Brake shoes	15.00 to 15.50
Railroad malleable	19.50 to 20.00
Agricultural malleable	17.50 to 18.00

New York

Structural Steel Continues Strong—Pig Iron Very Dull

NEW YORK, Sept. 11.—The only inquiry of importance which has been pending in this market for the past two weeks was from the American Tube & Stamping Co., Bridgeport, Conn., for from 4000 to 5000 tons of basic for last quarter delivery, and it was withdrawn last week, but the company afterward placed an order for 3000 tons and may buy 2000 more. Aside from this transaction, the market has been almost lifeless. The settlement of the anthracite strike has caused buyers to look for lower prices and to stay out of the market. The result is that quotations are nominal, but it seems very probable that on a tonnage of fair size about $24.50, eastern Pennsylvania, could be done on No. 2 foundry and that Buffalo iron would be sold on the same basis. The indifference of buyers as to prices is shown in the case of a small tonnage of Southern iron which has been offered for resale on a basis of about $20, Birmingham, and has gone begging. Virginia iron at the nominal quotation of $26, furnace, which has prevailed for some time, cannot be sold, and the few Virginia furnaces in operation are piling their iron with the prospect of going out of blast at an early date.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$28.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.27
East. Pa. No. 2, sil. 1.75 to 2.25	27.27
Buffalo, sil. 1.75 to 2.25	29.41
No. 2X Virginia, sil. 2.25 to 2.75	31.94
No. 2 Virginia, sil. 1.75 to 2.25	31.44

Ferroalloys.—The British official price of ferromanganese is still $117.50, and some carload lots have been sold at that figure, but $112.50 prevails on resale lots of both domestic and foreign production, and even lower prices have been named. In the spiegeleisen market, there have also been sales of carload lots for which the quotation is $47.50, furnace, with $45, furnace, asked for large lots. No changes are noted in the ferrosilicon or ferrochromium markets, which continue quiet with demand light.

Cast Iron Pipe.—Inquiries are in good volume, though few are for large tonnages. Firmness continues and makers of pressure pipe are booked for several months. One dealer is turning away orders on large sizes. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. New life appears in the soil pipe market as prospects loom up for needs in construction work. Prices are unchanged and demand is good. It is believed in some quarters that if the winter is mild the seasonal falling off in demand will be slight. One maker is declining orders for deferred shipment. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, for prompt shipment, as follows: 6-in. standard, 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Warehouse Business.—Thus far September is generally reported by warehouses in this district as a quiet month. Good deliveries from the mills are noted and in some products dealers claim that the mills are apparently anxious for business. Black and galvanized sheets continue firm with the volume of business transacted at about the same level as in July and August. Probably the majority of sales today are made on a basis of 4.75c. per lb. for No. 28-gage black and 5.75c. per lb. for galvanized sheets. A fair demand for bars is evident and sellers of spring steel report a fairly active market. Wrought iron and steel pipe are quiet, but prices are still firm. No change is reported in prices on brass and copper products. We quote prices on page 732.

Finished Iron and Steel.—Fair activity in structural steel is the only outstanding feature of the local steel situation. A good deal of the projected work is for commencement in the fall, so that the closing of contracts is expected to proceed without undue delay. The work is largely in public schools, loft buildings and apartments, a greater number of the latter being figured on since the prospect of any early lowering of rentals has practically disappeared. Aside from structural activity there is very little large steel tonnage up for consideration. Orders being put on mill books are mostly carload lots for early shipment, with a sprinkling of fourth quarter contracts of moderate size, mostly from jobbers. Large steel consumers who depend primarily upon Steel Corporation companies for their steel are getting deliveries on old contracts at such a full rate that their current requirements are made up of small fill-in lots. Some of the independent mills are in need of tonnage, particularly in plates, shapes and bars. Specifications in hand and orders coming in are better in the lighter forms of steel. Prices are firm on practically every item. Buyers have apparently given up thought of any reductions to come this year, yet there is no anxiety to cover for fourth quarter. The Norfolk & Western Railroad, which recently closed for 50,000 tons of rails for 1924, is now inquiring for 10,000 tons of tie plates. The New York, Ontario & Western is out for its 1924 rail requirements, probably 3000 to 5000 tons. The recent inquiry of the Standard Oil Co. of New Jersey for 10,000 tons of steel for oil tanks temporarily has been withdrawn. The largest active structural job is a bridge over the Raritan River at Perth Amboy, N. J., requiring 6000 tons, on which bids close today (Tuesday).

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The coke market has declined in price and is less active following the agreement of anthracite miners and operators. While foundry coke had reached a range of from $6 to $6.50 for prompt carloads, just prior to the expected strike, and standard furnace coke was at $5 to $5.50 per ton, the present market for prompt shipment is $5.75 to $6.25 for standard foundry coke and $4.25 to $4.50 for standard furnace. Consumers are evidently holding off further purchases as long as possible, expecting a further recession. By-product is quoted $11.41, Newark and Jersey City.

Old Material.—The market continues to show a stronger tendency on most grades, although demand is not reported particularly heavy. No. 1 heavy melting steel is now bringing $16.50 per ton, delivered to eastern Pennsylvania consumers, and in one instance, shipments to Pottsville, brokers are reported paying $17 per ton on strictly No. 1 heavy melting steel. Cast borings and machine shop turnings are strong, with the former bringing up to $15.50 per ton delivered eastern Pennsylvania consumers and the latter about $14.50 per ton. Specification pipe is unchanged at $16 per ton delivered Lebanon. Stove plate is firm and in the case of New Jersey foundries, although generally bringing $18 per ton delivered, is said to be sometimes up to $18.50 per ton. This grade is quotable in New York at $15.50 to $16 per ton, based on the prices offered for the nearby deliveries. A lower price is offered by brokers shipping to Harrisburg, Pa., as a result of the higher freight rate.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.50 to $13.00
Steel rails, short lengths, or equivalent	13.25 to 13.75
Rails for rolling	15.00 to 17.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	11.00 to 12.00
Machine-shop turnings	10.25 to 10.75
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.75 to 12.25
Stove plate	15.50 to 16.00
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Cincinnati

Low Prices Attributed to Lake Furnaces—Moderate Buying of Pig Iron

CINCINNATI, Sept. 11.—Pig iron sales generally run from carloads to lots of 200 tons, and the market is still dull. There were, however, a number of round-lot sales during the past week. A nearby melter bought 1000 tons of Southern iron, not strictly of foundry grade, at a price reported to be less than $23, Birmingham, but the circumstances of the sale and the fact that no more of this iron is available would leave this deal out of all calculations as affecting the market price. The Southern market can still be quoted at $23.50, but a small tonnage of resale iron is available at $23. Birmingham furnaces have not yet receded from the $24 price, but a test of the market has not been made recently and it is difficult to say just what could be done on a round tonnage. In the North, $25 continues minimum in the southern Ohio district, but lake furnaces are reported to be offering iron in this district on a basis of $24.50. In fact, an Indiana melter is reported to have placed an order with a Cleveland furnace for 1000 to 2000 tons for fourth quarter on the basis of $24.25, furnace, or the equivalent of $24.50, Ironton. Another Indiana melter bought 500 tons of foundry at $25, base Ironton. On an inquiry for first half of next year, a southern Ohio furnace has, it is understood, quoted $25, base. Inquiries are scarce, though the Westinghouse Electric & Mfg. Co. is in the market for 6500 tons, and a Bucyrus melter for 1500 tons for last quarter of this year and first quarter of next. There is no inquiry for basic and very little for silvery.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.05
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	27.27
Basic Northern	27.27
Malleable	27.27

Sheets.—Naming of fourth quarter prices by the American Sheet & Tin Plate Co. has had the effect of reassuring buyers of sheets and tin plate, some of whom had the idea that higher prices would be named on account of the inauguration of the 8-hr. day at the mills. Some good-sized orders have already been placed for fourth quarter delivery. Concessions of $2 per ton on blue annealed and galvanized sheets, as well as black, are reported to have been made by some of the smaller mills needing business.

Structural Material.—A little more activity is noted. Highway bridges in Indiana requiring 800 tons will probably be awarded today. Bids have been taken on a factory building for the Fibre Conduit Co., Richmond, Ind., involving 300 tons, and it is said that the work will be awarded to an Indianapolis fabricator. The Rowland office building, Columbus, Ohio, will probably be awarded this week. C. A. Koerner & Co., Louisville, Ky., have been awarded the general contract for the Kosair Temple, Louisville, involving 450 tons.

Warehouse Business.—Local jobbers report a slight improvement in the demand, though orders continue to be for very small tonnages. Stocks generally are in good shape. Prices are unchanged.

Finished Materials.—Orders continue small, and for immediate delivery. Indications point to a fair demand for plates arising in the near future, as tank builders are figuring on a number of projects that involve considerable tonnages. Specialties continue in fair demand, and some carload sales of track accessories, car wheels, boiler tubes and such items are reported. There is little activity in wire products, and mills report that jobbers and manufacturers are not specifying very heavily against contracts. New business is light. Some jobbers are apparently endeavoring to develop lower prices on plain wire and wire nails, but there is no indication of their being successful. Concessions can still be had in bolts and nuts, but despite these inducements orders are light. A report is current that considerably less than the published price of 3.15c. has been quoted by a northern Ohio mill on hoops and bands. Prices on all products are holding fairly well, but there is a disposition on the part of buyers to wait as long as possible before contracting for fourth quarter, they apparently feeling that it will be to their advantage to do so. Very prompt deliveries can be made by mills on practically all products.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—An upturn in coke prices is noted, the advances being made by operators who had been quoting lower figures to bring them in line with the general market. Some sizes of domestic fuels have been advanced 50c. to $1, but on the whole the market is about the same as last week. Foundry and furnace cokes are in fair demand, with domestic sizes moving better than for some time.

Old Material.—The scrap market remains about the same as last week, practically all the activity being traced to dealer trading. A steel company in the district is buying some sheet clippings, on which it has advanced its price about 50c., but this is the only activity of note. Cast grades are quiet. Offerings are large, the Norfolk & Western alone offering 35,000 tons, on which bids will close this week. Prices generally are unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$13.50 to	$14.00
Iron rails	16.00 to	16.50
Relaying rails, 50 lb. and up	29.00 to	29.50
Rails for rolling	17.00 to	17.50
Heavy melting steel	15.50 to	16.00
Steel rails for melting	15.50 to	16.00
Car wheels	15.50 to	16.00
	Per Net Ton	
No. 1 railroad wrought	13.50 to	14.00
Cast borings	10.00 to	10.50
Steel turnings	9.50 to	10.00
Railroad cast	17.00 to	17.50
No. 1 machinery cast	19.50 to	20.00
Burnt scrap	12.50 to	13.00
Iron axles	22.50 to	23.00
Locomotive tires (smooth inside)	14.50 to	15.00
Pipes and flues	9.50 to	10.00

Boston

Disregard of Pig Iron Differentials Noted—More Scrap Inquiries

BOSTON, Sept. 11.—More eastern Pennsylvania interests have advanced from $25 furnace to $25.50, with No. 2X now $26 and No. 1X $27, and claim to have closed business at the new prices. On the other hand, a Meriden, Conn., builders' hardware manufacturer, in the market for 500 tons fourth quarter No. 1X, bought eastern Pennsylvania at $26, furnace, while another Connecticut foundry bought 500 tons, silicon 3.25 to 3.75, fourth quarter, at $26. Small sales of No. 2X, prompt shipment, are reported at $26, and iron is offered in western Massachusetts at $24.50 base. On western Pennsylvania $24 furnace base has been done. Buffalo No. 1X sold the past week in Connecticut at $25 furnace, and a Vermont foundry took part of 900 tons on the same basis. A New York furnace is reported to have taken the rest of the Vermont business at a delivered price under Buffalo. As previously reported, Alabama furnaces have dropped from $27 to $24 furnace base, with limited sales at the new price. Virginia iron is not a factor, being considerably out of line with others. Business is better in New England, but by no means active, most of it for fourth quarter delivery.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$29.15 to $29.65
East. Penn., sil. 1.75 to 2.25	28.65 to 29.15
Buffalo, sil. 2.25 to 2.75	29.01 to 29.81
Buffalo, sil. 1.75 to 2.25	29.01 to 29.91
Virginia, sil. 2.25 to 2.75	32.42 to 32.92
Virginia, sil. 1.75 to 2.25	32.92 to 32.42
Alabama, sil. 2.25 to 2.75	33.60 to 34.10
Alabama, sil. 1.75 to 2.25	33.10 to 33.60

Structural Steel.—Steel mills are actively seeking business, but most fabricators are well covered and not disposed to make further commitments due to the drop in construction. One mill continues to quote structural steel at 2.40c., Pittsburgh base, but 2.50c. is the general asking price. No large tonnages were booked by fabricators the past week, and no important business is in immediate prospect. The movement of plain material out of warehouse stocks is moderately large, but individual orders in most instances do not exceed five tons.

Coke.—New England producers of by-product foundry coke are still quoting on a basis of $13.50 delivered. Deliveries against contract specifications have fallen still further behind, and with demands for domestic fuel very pressing, producers find themselves in about the same position experienced a year ago. Connellsville 72-hr. foundry coke is offered on a delivered basis of about $1 under local fuel, and foundries, especially in Connecticut, are showing more interest. Iron melters are taking increasing quantities of crushed coke not only from New England, but outside makers as well. Liberal sales of 48-hr. Connellsville coke at approximately $12 delivered were made to New England gas companies the past ten days or so, but such buying has quieted down somewhat.

Old Material.—Sentiment in old material circles is more optimistic, and more inquiries have come into the market the past few days. Now that the coal strike question has been settled, the trade expects an increase in actual bookings. During the past week, however, business was mostly between dealers, the largest endeavoring to accumulate supplies. Prices remain unchanged. A small amount of nonferrous material will be sold at public auction, together with much other material, by the government, at Squantum, Quincy, Mass., Tuesday, Sept. 18.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	16.00 to 17.00
Railroad malleable	21.00 to 21.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 rail wrought	13.50 to 14.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam. over 2 ft. long)	11.00 to 11.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

St. Louis

Light Buying of Pig Iron—Railroad Scrap Lists Are Heavy

ST. LOUIS, Sept. 11.—Buying of pig iron by melters in this district was less this week than for several weeks past. Melters for the most part seem wary of the market, and are generally buying only hand to mouth. The biggest sale of the week was of 1000 tons of basic made by the St. Louis Coke & Iron Co. to a melter in the district for prompt shipment. The same company sold 100 tons of foundry iron and about 200 tons in carload lots. The biggest inquiry before the market is from an Illinois melter for 200 to 500 tons of foundry iron for last quarter; other inquiries are mostly for carloads. Northern iron is still being sold on the basis of $27, Chicago. Quotations have been made as low as $23.50, Birmingham, for Southern iron, with the price ranging up to $24. A carload of spiegeleisen was sold in this market, and there is an inquiry for 100 tons of Bessemer ferrosilicon.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	$28.67 to 29.17

Finished Iron and Steel.—The market for all finished material is very quiet. No new work has been placed with fabricators here for several weeks, and trade in structural steel is dull. Jobbers are buying very little. A Texas jobber bought a carload of washers, and another jobber in that State bought a carload of nails. Railroad inquiries are very light.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.46c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—Before the reaching of an agreement at Harrisburg, the anthracite situation strengthened the position of coke, and Connellsville grades advanced 25c. within the last week, sales being made at $6.75 to $7.75 at the ovens. Domestic coke is in better demand, the St. Louis Coke & Iron Co. selling 1000 tons for early shipment.

Old Material.—Dealers continue to buy at good prices all railroad lists offered, and these lists continue to be heavy. However, dealers are delaying shipments as much as possible and are taking only such purchases as it is absolutely necessary to move. The result is that stocks in hands of dealers generally are low. Consumers still are out of the market except for a few specialties. Prices are unchanged. New railroad lists include: Norfolk & Western, 30,000 tons; Illinois Central, 9000 tons; Mobile & Ohio, 2200 tons; Missouri Pacific, 2300 tons; Union Pacific, 1000 tons; Kansas City Southern, 350 tons, and Pullman Co., 300 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Rails for rolling	18.00 to 18.50
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Progs, switches and guards cut apart	17.50 to 18.00
Per Net Ton	
Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	15.25 to 15.75
Iron car axles	25.00 to 26.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.50 to 20.00
Cast iron borings	12.00 to 12.50
No. 1 busheling	16.75 to 17.25
No. 1 railroad cast	19.00 to 19.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	17.50 to 18.00
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	8.00 to 8.50

Birmingham

Reduction in Price of Pig Iron Does Not Result in Much Buying

BIRMINGHAM, ALA., Sept. 11.—Inquiries for pig iron are a little more numerous and sales are aggregating better in the Birmingham district, though furnace interests cannot say that the make is being sold. With the lower quotation, $24 per ton, No. 2 foundry, there was some inducement offered for more buying. Some melters, however, are seeking even further concessions, but furnace interests assert that cost of production does not permit much lower prices. Some off-grade irons were sold recently and a report was current that lower prices for pig iron were made. One of the smaller companies is out of the market entirely through the remainder of the year. Another company is seeking no business but meeting demands of regular customers at prevailing quotations. The other makers, with the exception of the Tennessee Coal, Iron & Railroad Co., are taking on business as it is offered at prevailing prices. One of these interests the past week announced sales for the day aggregating 1000 tons, which is more than half of its production. Alabama surplus stocks on Sept. 1 amounted to 99,961 tons, of which 76,426 tons were sand cast, 8109 machine cast, 250 tons warrant

and 10,176 basic. The stocks on Aug. 1 in this district amounted to 83,934 tons, of which 57,985 tons were sand cast, 12,185 machine cast, 500 warrant and 13,264 basic. Two companies announced that during the next 30 to 40 days their entire surplus stock will be removed.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, 1 fdy., 1.75 to 2.25 sil.	$23.00 to $24.00
Basic	21.00
Charcoal, warm blast	33.00 to 34.00

Cast Iron Pipe.—Lettings are being received by the three pressure pipe companies of this district every week. The American Cast Iron Pipe Co. for the week announced 194 tons for Birmingham, Ala., and 121 tons for Los Angeles, Cal. The United States Cast Iron Pipe & Foundry Co. has 525 tons for Santa Barbara, Cal., and the National Cast Iron Pipe Co. has a few small tonnage lettings. Specifications are being bid on which hold out promise for several thousand tons.

Coke.—The coke market in the Birmingham district is steadying, though quotations are a little weak, around $8 per ton for foundry coke. Production has not been disturbed. The Alabama By-Products Corporation has made a contract with the Industrial Gas Corporation for by-product gas to be piped to North Birmingham and East Birmingham for manufacturing purposes. The American Cast Iron Pipe Co. has contracted for use of this gas.

Old Material.—No improvement is noted in the scrap iron and steel market in this section and all prices are uncertain, as well as weak. Melters of scrap have informed scrap dealers that some iron is being purchased at almost the prices asked by the old material dealers.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$16.00 to $18.00
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

Buffalo

Pig Iron Dull—More Activity in Scrap—Pipe Active

BUFFALO, Sept. 11.—The pig iron market is very dull, with no great interest being shown by consumers. The inquiries are for small quantities, producers being rarely asked to figure on more than a couple of carloads at a time. The price has shown no weakening from the $25 base, but, on the contrary, seems to be a bit firmer. Total sales for the week have been under 5000 tons. Some success has been experienced by some makers in obtaining the 50c. differential for No. 2X iron.

We quote f.o.b. gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$25.50
No. 2 foundry, 2.25 to 2.75 sil.	25.00
No. 2 plain, 1.75 to 2.25 sil.	25.00
Basic	24.00
Malleable	25.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—All classes of material are quiet. Prices stand up very well in the face of the dullness. The one material which continues very active and in which allocation of tonnage is being made steadily is pipe. Car-building activities in local shops show that business is keeping up well in this industry. The Buffalo Steel Car Co. recently purchased a tonnage of bars, shapes and plates, mostly the latter. The Buffalo Structural Steel Co. is low on 1000 tons of steel for the new Buffalo Consistory.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Dealers have been active enough to furnish almost a lively market during the past week. Acting on the assumption that the mills must soon buy at dealers' prices, the latter have been buying steadily in preparation for that time. Three local mills are willing to buy heavy melting steel now, but they seek to buy it at about $17. Dealers want to get $18 to $19. There has been some activity in compressed sheets, also in turnings and borings. Some sheets have been bought at $15.50 to $16, and turnings and borings for use in blast furnaces have been sold. The price for the latter grade is $15 to $16.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car axles	18.00 to 19.00
Machine shop turnings	9.00 to 10.00
Cast iron borings	15.00 to 16.00
No. 1 bushelings	15.00 to 16.00
Steel rails	17.00 to 18.00
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Heavy cast scrap	18.00 to 19.00
Railroad malleable	20.00 to 21.00

Cleveland

Pig Iron Buyers Begin to Show Interest in First Quarter Requirements

CLEVELAND, Sept. 11.—On Sept. 1 there was 5,907,272 gross tons of Lake Superior ore on Lake Erie docks, as compared with 4,956,705 tons on Aug. 1, and with 8,064,101 tons on Sept. 1, last year. Receipts at Lake Erie ports during August were 7,681,661 tons, as compared with 6,721,735 tons during August last year. Receipts at Lake Erie ports for the season up to Sept. 1 were 26,801,418 tons, as compared with 18,671,619 tons during the corresponding period a year ago. Shipments from the same docks up to Sept. 1 were 22,334,127 tons, as compared with 13,129,570 tons for the corresponding period of 1922.

Pig Iron.—Inquiry for foundry and malleable iron shows improvement and some consumers are beginning to take an interest in covering for their first quarter requirements, several inquiries having come out for that delivery. Quotations for the first quarter are being made on about the basis of ruling prices and it is expected that some of this business will be closed this week. Furnaces are uncertain regarding their costs and are not actively seeking first quarter contracts. Inquiries have come from foundries having casting contracts for that delivery, but are all outside the automobile field. The Westinghouse Electric & Mfg. Co., which recently purchased some early shipment iron, has sent out an inquiry for 3500 tons of foundry iron for Cleveland for the fourth quarter, and 3150 tons for Trafford City for deliveries extending through February. The price situation shows little, if any, change. While foundry and malleable iron are more commonly quoted at $25 by Valley and other Ohio district furnaces, this price is being shaded in some cases on desirable inquiries. We note the sale of 2000 tons of foundry iron to a radiator interest for the last quarter and another lot of 2000 tons for September shipment, both at $25, the latter iron to come from a Valley furnace. A Muncie, Ind., consumer is in the market for 2000 tons of malleable iron on which a quotation of $24.50 is understood to have been made. A sale of 500 tons of malleable iron was made to a Michigan consumer at $26. For Cleveland delivery furnaces continue to quote foundry and malleable iron at $25.50 at furnace. One interest that has been holding to $26 for Valley iron has reduced its quotation to $25.50. New inquiries include several for from 1000 to 2000 tons and one lake furnace now has inquiries pending aggregating 12,000 tons or more. The same producer booked 5000 tons during the week. Southern iron is inactive and not firm at $24 for Alabama iron. Consumers feel that the price is too high as compared with Northern iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$25.50 to 26.00
Southern fdy., sil. 1.75 to 2.25	29.50
Malleable	25.50 to 26.00
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00 to 32.00

Bolts, Nuts and Rivets.—New bolt and nut orders are light, but manufacturers report an increased volume of specifications on contracts. Leading manufacturers appear to be holding rather firmly to regular discounts and are not disturbed by some lower prices that are appearing. One manufacturer is quoting small machine bolts, rolled thread, at 60, 10 and 10 per cent, and larger and longer at 60 and 10 per cent off list and carriage bolts, rolled thread, at 60 and 10, and larger and longer at 60 per cent off list. The new price lists will have little effect before Oct. 1, as they do not apply to contracts that expire on that date. Some inquiry is coming out for fourth quarter contracts. Rivet specifications are good, but demand is light. The new rivet extras will become generally effective Oct. 1, as most consumers are under third quarter contracts. Small rivets are being shaded to 60, 10 and 5 per cent off list, but this discount is not general.

Alloy Steel.—Demand is light and and there is evidence that on an attractive inquiry regular quotations would be shaded.

Semi-Finished Steel.—Considerable additional business in sheet bars, slabs and billets has been booked by the leading local producer for the last quarter. About all this company's regular customers have been placed under cover, taking nearly all the mills' output of over 50,000 tons per month. Part of this business was taken at $42.50 and the remainder subject to trade paper prices.

Reinforcing Bars.—These are weak for both soft and rail steel as a result of keen competition for the small volume of business that is pending. Prices as low as 2.15c. are reported on rail steel bars, although the common range is 2.20c. to 2.30c. The only large inquiry pending is for 200 tons for the Western Reserve Hospital buildings of Cleveland.

Sheets.—Mills report an increase in orders from the automotive industry for blue annealed and automobile body sheets, but general buying is rather slow and a number of independent mills are anxious for business. Black sheets are still being shaded $2 to 3.75c., and some mills are offering their surplus stocks of all grades at less than the regular prices.

Finished Iron and Steel.—Orders and inquiries show a gain over last month, but this does not apply to all items. While the demand for steel bars has increased, the call for plates both in the heavier and light gages has fallen off materially. This is particularly noticeable by mills that cater to small lot business for early shipment. Generally consumers are buying rather small lots. Some demand is developing from the implement manufacturers for agricultural shapes for fall shipment and the demand for light rails from the coal mining companies has become fairly active. Prices are firm at the regular quotations on steel bars, plates and structural material. In the building field the outlook shows an improvement. Plans were sent out today for the 20-story bank and office building for the Brotherhood of Locomotive Engineers of Cleveland, which will require 56,000 tons of steel. Plans for the building of a county and municipal court and jail building of the office building type in Cleveland have reached a point where it is believed the project is assured. This will require 5000 tons of steel, but plans will not be out until after a vote on a bond issue in November. While excavating work has been started for the new union passenger station in Cleveland, an announcement has just been made that none of the steel will be purchased this year. This station will require 50,000 tons or more. An inquiry has come out for 500 underframes for gondola cars for the Elgin, Joliet & Eastern Railroad, requiring 700 tons of plates and structural material.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—Quotations on standard Connellsville foundry coke are unchanged at $6.75 to $7.50 but because of the probable settlement of the anthracite coal strike a decline of 50c. a ton is looked for. A leading sanitary interest has closed for its foundry coke requirements for the last quarter at $7 for Wise County coke.

Warehouse Business.—The demand for steel out of warehouse shows some gain over last month. Prices are firm, except on sheets, on which considerable irregularity exists. Jobbers are making concessions to cut down large stocks on certain items.

Old Material.—The upward price movement appears to have been checked, as with few exceptions quotations were not changed during the week. There has been some buying by mills in small lots at ruling prices, but the advances have not caused any rush to buy on the part of consumers. Sales of turnings to a local mill were made during the week at $14 delivered. A Cleveland mill has purchased 1000 tons of turnings from a Detroit producer at $10.50 and 1000 tons at $11.50, Detroit, the freight rate being $3. In the Valley district dealers are reported to be paying $19.25 for heavy melting steel.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$17.75 to $18.00
Rails for rolling	20.00 to 20.50
Rails under 3-ft.	19.50 to 20.00
Low phosphorus melting	20.50 to 21.00
Cast borings	13.50 to 14.00
Machine shop turnings	13.00 to 13.25
Mixed borings and short turnings	13.25 to 13.50
Compressed sheet steel	15.50 to 16.00
Railroad wrought	16.00 to 16.50
Railroad malleable	23.00 to 23.50
Light bundle sheet stampings	12.00 to 12.50
Steel axle turnings	16.00 to 16.75
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.00 to 13.25
Drop forge flashings	13.25 to 13.75
Railroad grate bars	17.00 to 17.50
Stove plate	16.00 to 17.00
Pipes and flues	13.50 to 14.00

Detroit Scrap Trend Upward

DETROIT, Sept. 11.—The recent lettings by one of the largest producers in the district of approximately 2800 tons of miscellaneous scrap for September delivery developed a dealer's market with mills and furnaces showing little interest in the offering. Regular hydraulic compressed and short turnings seem to be most in demand and have registered an increase of several dollars per ton in the past two weeks. Automobile cast is also active, some small sales recording as high as $27 per short ton. All grades are showing strength and the market generally has an upward tendency.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$15.50 to $17.00
Shoveling steel	15.50 to 17.00
No. 1 machinery cast	19.00 to 20.00
Cast borings	11.50 to 13.00
Automobile cast scrap	25.00 to 27.00
Stove plate	16.00 to 17.00
Hydraulic compressed	13.00 to 14.00
Short turnings	12.50 to 13.00
Long turnings	10.00 to 11.00
Flashings	10.00 to 11.00

The Chicago Foundrymen's Club will hold its first fall meeting at the City Club, Chicago, Saturday evening, Sept. 15. H. P. Kreulen, pig iron and foundry department, Bethlehem Steel Co., will discuss Mayari pig iron and its use in the cupola with particular reference to the effect of its nickel and chromium content on gray iron and semi-steel castings. His remarks will be illustrated by stereopticon slides. Several reels of motion pictures will also be shown, presenting the mining and transportation of ores in both open pit and shaft mining, and the loading and handling of ore. George A. Richardson, publicity department, Bethlehem Steel Co., will explain the pictures.

Philadelphia

No Signs as Yet of Fall Buying Activity—Market Extremely Quiet

PHILADELPHIA, Sept. 11.—The steel trade had looked for fall buying activity to develop shortly after Labor Day, but the past week brought no change in the dullness which has prevailed for weeks. The mill situation is very satisfactory on some of the lighter products, particularly sheets and tin plate, but among the heavier products pipe is the only item which is strongly in demand. Plates, shapes and bars are not active and there is an almost complete absence of large inquiries and orders.

The pig iron market has not held the moderate degree of strength it showed early last week before the settlement of the anthracite coal strike was announced and foundry iron has settled to a basis of $25, furnace, for No. 2 plain. Scrap shows a good deal of strength considering the very light demand.

Pig Iron.—Early last week, most of the Eastern furnaces, in expectation of a long-continued strike in the anthracite coal fields, put up their quotations on foundry iron to a minimum of $25.50 for No. 2 plain and $26 for No. 2X. With the announcement of a settlement of the strike, the market lost most of this slight show of strength and prices now quoted by several eastern Pennsylvania interests are on the basis of $25, furnace, for No. 2 plain and $25.50 for No. 2X. Some furnaces that are not badly in need of tonnage adhere to quotations 50c. a ton higher and quite a little carload business has been done at the higher figures, but it is apparent that a purchaser of a fairly large tonnage would not be obliged to pay above $25, base. Nearly all furnaces are equalizing freight rates so that the net to sellers is sometimes slightly under $25. A Pennsylvania cast iron pipe company has bought about 7500 tons of foundry iron for delivery over the remainder of the year. This and a sale of 3000 tons of basic to a New England consumer are the largest transactions of the week. Other sales were mostly of small lots. A noteworthy development is the willingness of some consumers to cover for their fourth quarter requirements.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.76 to	$26.63
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.26 to	27.13
East. Pa. No. 1X	26.76 to	27.63
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.67 to	31.17
Virginia No. 2X, 2.25 to 2.75 sil.	31.17 to	31.67
Basic delivered eastern Pa.		25.00
Gray forge	25.50 to	26.00
Malleable	26.26 to	26.84
Standard low phos. (f.o.b. furnace)	29.00 to	30.00
Copper bearing low phos. (f.o.b. furnace)		28.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.00
Low phos. copper free, guar. not over 0.035 per cent phos.	29.00
Continental, phos. 1.50; sil. 2 to 3	25.50

Ore.—Last week's receipts of foreign ore totaled 43,106 tons, of which 27,386 tons came from Sweden, 7300 tons from Greece and 8420 tons from Newfoundland.

Ferroalloys.—There has been no formal notice by British ferromanganese producers of a reduction in price, but resale ferromanganese, both foreign and domestic, is being freely offered at $112.50, seaboard, which is $5 a ton below the nominal price of British producers. Domestic furnaces are meeting the current quotations on resale material.

Semi-Finished Steel.—Eastern mills show no disposition to go lower than $42.50, Pittsburgh, for open-hearth rerolling billets and $47.50 for forging billets, but there has been no large inquiry to test these prices.

Plates.—Some of the Eastern plate mills are now running from hand to mouth, having specifications ahead for only a week or two. Prompt deliveries are being offered. In view of the lightness of the demand and the keen need of tonnage by some mills, even sellers express surprise at the strength in price, there having been no deviation, so far as reported, from 2.50c., Pittsburgh, by any mill.

Structural Material.—A large independent was offered a good-size tonnage of plain material a few days ago at 2.40c., Pittsburgh, but declined the business at less than 2.50c. An Eastern mill, which is freely quoting 2.40c., has brought about a situation where many consumers are demanding this price of their regular sources of supply, but so far as known all other mills are adhering strictly to 2.50c.

Bars.—One large interest is now offering steel bars for almost immediate shipment, but there is very little business in sight, orders being mostly of carload-lot size. There has been no indication of any price weakness. Demand for bar iron is also light, with prices unchanged.

Sheets.—An Eastern maker of blue annealed sheets has specifications in hand for six weeks' operation and the ordinary demands of regular customers will easily take up the production of the last two months. The sheet market is fairly strong, with prices holding firm. Less is heard of 3.75c. quotations on black sheets, which for a time were quite common.

Warehouse Business.—The demand for steel out of stock showed some falling off in the past week, but this week started out at a slightly better rate. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅛ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅛-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—The scrap market is in a peculiar position in that buyers do not want to buy and sellers do not wish to sell. Brokers are loath to take orders for more than a few carloads at a time at current prices for fear that the small dealers will stiffen their ideas on prices before they have had a chance to cover on their orders. The small dealers seem to believe that a fairly substantial advance in scrap prices is due, but there is nothing in the present attitude of the mills to give strength to such a view, and the mills will need considerable new finished steel tonnage on their books before there is an inclination to increase scrap purchases. A few grades are higher this week, but generally the market is about at the levels of a week ago.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.00 to $17.50
Scrap rails	16.50 to 17.00
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast-iron car wheels	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
No. 1 yard wrought	18.00 to 18.50
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	18.00 to 20.00
No. 1 cast	21.50 to 22.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.50 to 18.00
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 17.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Canadian Scrap Market

TORONTO, Sept. 10.—The Canadian iron and steel scrap market is very quiet, and sales reported by dealers during the past week or ten days were at a very low ebb. The present stagnation in buying by consumers has been reflected in dealers almost entirely withdrawing from the market and for some time past the latter have been showing practically no interest in adding to their yard holdings. While Toronto dealers have made no change in their buying prices for the week, Montreal dealers report a softening tendency and reductions have been announced in some lines. Canadian scrap prices are as follows:

Dealers' Buying Prices—Gross Tons

	Toronto	Montreal
Steel turnings	$10.00	$9.00
Machine shop turnings	10.00	9.00
Wrought pipe	8.00	8.00
Rails	14.00	13.50
No. 1 wrought scrap	14.00	15.00
Heavy melting steel	14.00	13.00
Steel axles	16.00	18.00
Axles, wrought iron	18.00	22.00
	Net Tons	
Standard car wheels	15.00	16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	19.00	21.00

Proposed Increases of Short Haul Freight Rates

Increases in the short haul freight rates on iron and steel products, in the Pittsburgh district, which will become effective Oct. 7, unless the Interstate Commerce Commission heeds protests by affected interests, not only produce higher rates with the Pittsburgh area, but mean the elimination of the combination rates to Cleveland and Erie, which are somewhat lower than the through rate to those points from Pittsburgh. The present rate on iron and steel products from Pittsburgh to Youngstown and nearby points is 9½c. per 100 lb. while from the Youngstown district to Cleveland the rate also is 9½c., making a combination rate from Pittsburgh to Cleveland of 19c. The new rate to Youngstown from Pittsburgh is 11c., and from Youngstown to Cleveland also 11c., which would produce a combination rate of 22c., as only the new tariffs of the Baltimore & Ohio Railroad and the Pittsburgh & Lake Erie Railroad have been issued, but it is expected that the Pennsylvania tariff will be in line with those of those roads. Points outside of Pittsburgh, which formerly had a 9½c. rate go to 11c. in the new schedules.

Another interesting iron and steel freight rate development is the announcement that the reduced through tariffs to the Pacific Coast and intermediate points in the far western tier of States will become effective Oct. 10. The new through rate to Pacific Coast points from Pittsburgh will be $1.15 per 100 lb. against $1.50, the present through rate, and $1.34, the combination Pittsburgh-Chicago and Chicago-Pacific Coast rate.

Dismantling Lawrence Furnace

Lawrence furnace of the Marting Iron & Steel Co., Ironton, Ohio, located at Culbertson, Ohio, is being dismantled, having been sold for junk. The furnace, which had a capacity of 70,000 tons of pig iron per year, was built in 1889-90, and was first operated in March, 1891. It was rebuilt in 1905-06. The furnace had not been operating since 1920.

Figures of the National Automobile Chamber of Commerce place August production of cars and trucks at 348,733, an increase of 6.5 per cent over July's 327,102. For the eight months the total of 2,701,771 exceeds by 42,707 the largest previous entire year's production—that of 1922, with 2,659,064 vehicles.

The American Institute of Mining and Metallurgical Engineers will have an exhibit at the Chemical Exposition, which opens at the Grand Central Palace, New York, on Sept. 17.

Ashtabula Steel Co. Reorganized

The Ashtabula Steel Co., Ashtabula, Ohio, control of which recently passed to W. H. Davey and several brothers associated with the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, has been reorganized as the Ashtabula Steel Sheet Co. W. H. Davey, president of the Mansfield company, is president; Samuel Davey, vice-president; Evan M. Jones, second vice-president and manager, and A. I. Davey, secretary and treasurer. Control will pass to the new organization Sept. 15. Mr. Jones, the new manager, has been superintendent of the Parkersburg Iron & Steel Co., Parkersburg, W. Va. Members of the old organization who will retire include Robert Lock, president and manager, and W. J. Kunkle, treasurer. S. P. Ker, Jr., general sales manager of the old company, remains with the new organization, being one of the board of directors. The company plans the installation of the jobbing mills in addition to the six sheet mills which now comprise the plant.

"Puff" at Pulaski Furnace Kills Four

An unusual accident at the blast furnace of the Pulaski Iron Co. at Pulaski, Va., on the night of Sept. 2 caused the death of four workmen and injured several others. The furnace was operating under 7-lb. wind pressure, when suddenly this pressure jumped up to 15 lb., causing a "puff" in the stack which caused the lining to slip. The furnace was blowing out for repairs when the accident occurred. Repairs will be made immediately and the furnace will be in blast again in about 60 days.

Low Dust Content with Dry Cleaning of Blast Furnace Gas

At the blast furnaces of the Pittsburgh Steel Co., Monessen, Pa., experiments conducted by George B. Cramp have resulted in the development of a dry process for cleaning blast furnace gas, in which dusty gas from the furnace is caused to drop its usual dust burden into a hopper and the latter in turn fills a vertical grid with dust. The dusty gas must then go through this dust curtain in its passage through the apparatus and in so doing is filtered to a uniform cleanness of 0.083 grain of dust per cu. ft. of cleaned gas. Average wet washed gas at Monessen runs 0.12 grain per cu. ft. of cleaned gas and best previous results with dry cleaners have shown considerably higher dust content per cu. ft. than wet washed gas.

Wages of Sheet and Tin Mill Workers Advanced

YOUNGSTOWN, Sept. 11.—Tonnage rates of sheet and tin mill workers in Midwestern plants operating under the sliding wage scale of the Amalgamated Association of Iron, Steel and Tin Workers will be advanced 3 per cent for September-October as a result of the bimonthly examination of Sept. 11.

The average price of Nos. 26, 27 and 28 gage black sheets shipped during the 60-day period ending Aug. 31, was disclosed at 3.70c. per lb., as compared with 3.60c. two months before. Under the new rate, such workers will be paid 46½ per cent above base.

Tin mill employees, previously paid according to the selling price of tin plate, are now paid on the black sheet average selling price basis, the same as sheet mill workers.

The settlement was conducted between the Western Sheet and Tin Plate Manufacturers' Association and the Amalgamated Association.

The New England Iron League on Monday, Sept. 10, played golf at the Woodland Golf Club during the afternoon. In the evening the members gathered at the Boston Yacht Club, Atlantic Avenue, Boston, for dinner.

FABRICATED STEEL BUSINESS

About 10,500 Tons in Orders and 14,000 in Fresh Inquiries

The continued run of activity in fabricated steel work is shown in orders for upward of 10,000 tons and in fresh inquiries for some 14,000 tons. The awards include:

Apartment hotel for Allerton House Co. at Cleveland, 1500 tons, to Bethlehem Steel Co.

Western Electric Co., Kearney, N. J., power plant, 1600 tons, to American Bridge Co.

Rome Brass & Copper Co., Rome, N. Y., plant addition, 250 tons, to American Bridge Co.

Iroquois Gas Co., Buffalo, N. Y., 900 tons, to Bethlehem Steel Co.

United States Metals Refining Co., Chrome, N. J., 350 tons, to Phoenix Bridge Co.

Matz office building, Los Angeles, 1000 tons, to Llewellyn Iron Works.

Euclid Avenue Bridge, Detroit, 500 tons, to Wisconsin Bridge & Iron Works.

United States Gypsum Co., buildings at Sweetwater, Tex., 218 tons, to Kansas City Structural Steel Co.

Contanda Carbonifera De Sabinas, crane runway at Rosita, Mex., 160 tons, to Ingalls Iron Works.

Steel building, West Allis, Wis., 100 tons, to Hackendahl & Schmidt, Milwaukee.

Municipal Bridge, South Bend, Ind., 500 tons, to Forest City Steel & Iron Co.

Kosair Temple, Louisville, Ky., 150 tons, general contract to C. A. Koerner & Co.

Fiber Conduit Co., Richmond, Ind., factory, 300 tons, bids taken and unnamed Indianapolis fabricator low bidder.

Niagara Falls Hotel, Niagara Falls, N. Y., 700 tons, to Buffalo Structural Steel Co.

Nickel Plate Railroad, shop buildings at Conneaut, Ohio, 100 tons, to Fort Pitt Bridge Works.

County Home for Erie County, Buffalo, 900 tons, general contract awarded to Henry Shenk Co.

Masonic Temple, Fort Wayne, Ind., 700 tons, to Forest City Steel & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Grain elevator at Oswego, N. Y., 850 tons.

High school building at Clifton, N. J., 400 tons.

Ashley River bridge in North Carolina, 2200 tons; bids rejected.

Bridge over Raritan River at Perth Amboy, N. J., 6000 tons, bids closing today; previously reported.

Barge canal terminal at Oswego, N. Y., 1500 tons; bids closed Tuesday, Sept. 11.

Jersey City Evening Journal, publishing building, Jersey City, N. J., 1100 tons.

Sheridan Trust & Savings Bank Building, Chicago, 3500 tons.

Middle West Utilities Co., power house addition, Tulsa, Okla., 250 tons, bids being taken by Sargent & Lundy, Chicago.

Missouri Pacific, 100-ft. turntable, 115 tons.

Wabash Railway, 100-ft. turntable, 115 tons.

State of Indiana, highway bridge, about 800 tons, bids closed Sept. 10.

Brotherhood of Locomotive Engineers bank and office building, Cleveland, 5000 tons.

The Jay L. Harman Sales & Engineering Co., El Paso, Tex., has been organized to deal in industrial equipment and supplies for mines, smelters, railroads and manufacturing plants. Offices have been opened in the Mills Building, and a branch office will be established in Mexico City in charge of Juan F. Gonzales. Jay L. Harman, president of the company, was formerly manager of the Mine & Smelter Supply Co., at El Paso, and, previous to that connection, was with the Phelps-Dodge Corporation for several years.

RAILROAD EQUIPMENT BUYING

Orders Placed for 1000 Freight Cars and for Car Repairs

Orders for 1000 cars and a number of sizable car repair contracts were the contribution of the early days of September to the railroad equipment field. Among the items of chief interest are the following:

The Chesapeake & Ohio has ordered repairs to 500 coal cars, the work being divided between the Newport News Shipbuilding & Dry Dock Co. and the American Car & Foundry Co.

The Atchison, Topeka & Santa Fe Railroad has ordered 300 50-ton drop-end gondolas and 200 flat cars from the Pullman Co.

The Chesapeake & Ohio is asking for prices on 6 mail and express cars.

The Erie Railroad has placed an order with the Pressed Steel Car Co. for 15 suburban coaches.

The Elgin, Joliet & Eastern is inquiring for 500 underframes.

The Toledo, Peoria & Western is in the market for 275 box car repairs.

Mitsui & Co. are inquiring for 60 new box cars.

The Gulf Coast Lines are inquiring for 9 passenger cars.

The Mexican National Railways placed 5 coaches with the Pullman Co.

The Santa Fe ordered 300 mill end gondola cars and 200 flat cars from the Pullman Co.

The Texas Co. is inquiring for 10 tank cars.

The Burlington placed car repairs with the Pullman Co. requiring 2000 tons of steel.

Trade Changes

The Standard Steel & Bearings, Inc., Philadelphia, has moved its Philadelphia plant to Plainville, Conn., occupying a spacious one-floor building.

The Pawling & Harnischfeger Co., Milwaukee, builder of traveling cranes, hoists and excavating machinery, has opened an office at 1124 Book Building, Detroit, with James Van Buskirk in charge.

The Logemann Brothers Co., Milwaukee, has purchased the business and assets of the Chicago Baling Press Mfg. Co., Chicago, and is continuing the manufacturing of the Logemann mechanical press for baling. The business is now entirely conducted from the main office and works of the Logemann Brothers Co.

The Wm. Inglis Wire & Iron Works, Detroit, manufacturer of steel wire factory partitions, window guards, machinery guards, etc., has moved into a new plant at 960 Harper Avenue, Detroit.

The Scranton office of the Dorr Co., engineers, New York, has been moved to 536 Miners Bank Building, Wilkes-Barre, Pa. John Griffen remains in charge.

Herbert W. Hayes, 40 Court Street, room 1003, Boston, formerly manager of sales for the Midvale-Cambria Co., has been appointed New England agent for the Surplus Steel Exchange, 7 Dey Street, New York.

J. W. Dickson, Commonwealth Building, Pittsburgh, who has been doing a brokerage business in pig iron, ferroalloys, coal and coke, and Geter C. Shidle, formerly with the Thomas R. Heyward Co., Pittsburgh, have become associated under the firm name of J. W. Dickson & Co. The firm plans to do a warehouse business, as well as to act as agents of producers. Mr. Shidle, for several years before the formation of the Wheeling Steel Corporation, was Pittsburgh district sales agent of the LaBelle Iron Works, and before that was identified with E. W. Midge & Co. He is secretary of the Cutler Steel Co., Pittsburgh, plant of which is at New Cumberland, W. Va.

The David Joseph Co., waste material dealer, has opened a downtown office at Youngstown, Ohio, in suite 608-9-10, Wick Building. Phil Frieder will continue in charge of the office. The company has also opened a New York office in the Cortlandt Building, 30 Church Street, with W. J. Doherty as Eastern representative.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base .....2.40c.
Refined iron bars, base .....2.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb.....3.15c.
Bands, base, per lb.....3.15c.
Strips, base, per lb.....3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.62

Cold-Finished Steels

Bars and shafting, base, per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (f.o.b. Johnstown).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 to 60, 10 and 5 per cent off list
Machine bolts, small, cut threads,
60 and 10 to 60 and 5 per cent off list
Machine bolts, larger and longer,
60 and 10 to 60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
60 and 10 to 60 and 5 per cent off list
Cut threads.....80 to 50, 10 and 5 per cent off list
Larger and longer.....60 to 50, 10 and 5 per cent off list
Lag bolts .....65 and 10 to 65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 5 per cent off list
Larger and longer sizes.....50 and 5 per cent off list
Hot pressed square or hex. nuts, blank.....4.00c. off list
Hot pressed nuts, tapped.....4.00c. off list
C.p.c. and t. square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, tapped.....3.75c. off list
Semi-finished hex. nuts:
⅜ in. and smaller, U. S. S.....80 per cent off list
⅞ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅞ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.$3.00 to $3.10
Small rivets .....65, 10 and 5 to 65 and 5 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$3.15
Spikes, ½ in., ⅝ in. and ⅝ in., per 100 lb.....$3.15 to 3.50
Spikes, ⅜ in. .....3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, ¾ in. and larger, per 100 lb..$4.00 to 4.25
Track bolts, 1 in. and ⅞ in. base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb ..... 2.55 to 2.60
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel		*Iron*	
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜ ....+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3.....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½ to 3	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	½ to ⅞ .....+19	+54
½	53	42½	1	21	7
¾	58	47½	¼	28	12
1 to 1½.....	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10.....	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1¼ in	+18
2½ to 2¾ in.....	37	1⅜ to 1⅞ in....	+ 8
3 in.	40	2 to 2¼ in.....	— 2
3½ to 3¾ in.....	42½	2½ to 3 in.....	— 7
4 to 13 in.....	46	3½ to 4½ in.....	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		

Hot Rolled

3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $3 per net ton for more than standard gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base .....$3 per cent off list
Carbon 0.30 to 0.40, base .....$1 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	3½-in. O.D. 9 gage..	45
2¼-in. O.D. 12 gage..	17	5⅜-in. O.D. 9 gage..	55
2¼ in. O.D. 11 gage..	18	5½-in. O.D. 9 gage..	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C....$14.90	
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic..$0.32	Buffalo	$0.265	St. Louis.....	$0.43	Pacific Coast	$1.34
Philadelphia, export... 0.235	Cleveland	0.215	Kansas City	0.735	Pac. Coast, ship plates	1.20
Baltimore, domestic... 0.31	Steubenville, Youngstown		Kansas City (pipe)..	0.765	Birmingham	0.58
Baltimore, export 0.225	Comb.	0.19	St. Paul	0.60	Memphis	0.56
New York, domestic... 0.34	Detroit	0.29	Omaha	0.735	Jacksonville, all rail..	0.70
New York, export 0.27	Cincinnati	0.29	Omaha (pipe)	0.765	Jacksonville, rail and water	0.415
Boston, domestic..... 0.365	Indianapolis	0.31	Denver	1.27	New Orleans	0.67
Boston, export..... 0.255	Chicago	0.34	Denver (pipe)	1.215		

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron.....$6.45
Old range non-Bessemer, 51½ per cent iron.....5.70
Mesabi Bessemer, 55 per cent iron.....6.20
Mesabi non-Bessemer, 51½ per cent iron.....5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian.....11½c.
Iron ore, Swedish, average 66 per cent iron...10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal.....43c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....41c.
Manganese ore, Brazilian or Indian, nominal 42c.
Tungsten ore, per unit, in 60 per cent concentrates.....$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard.....$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....$112.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid.....112.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace.....45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton.....44.00
Ferrosilicon, 50 per cent, delivered, per gross ton.....82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace.....43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace.....46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace.....50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace.....54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace.....59.10
Silvery iron, 6 per cent, per ton, furnace....32.00
Silvery iron, 7 per cent, per ton, furnace....33.00
Silvery iron, 8 per cent, per ton, furnace....34.50
Silvery iron, 9 per cent, per ton, furnace....36.50
Silvery iron, 10 per cent, per ton, furnace....38.50
Silvery iron, 11 per cent, per ton, furnace....41.80
Silvery iron, 12 per cent, per ton, furnace....45.10
Ferrotungsten, per lb. contained metal.....88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered.....12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.....11.50c.
Ferrovanadium, per lb. contained vanadium..$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton.....200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$46.00 to $48.00	$40.00 to $45.00
Maryland	50.00	45.00
Ohio	45.00 to 46.00	40.00 to 42.00
Kentucky	45.00 to 46.00	40.00 to 42.00
Illinois	48.00	45.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 9.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	53.00	
Ground silica clay, per net ton	10.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....$42.50
Rolling billets, 2-in. and under.....42.50
Forging billets, ordinary carbons.....47.50
Sheet bars, Bessemer.....42.50
Sheet bars, open-hearth.....42.50
Slabs.....$42.50
Wire rods, common soft, base, No. 5 to ¼-in.....51.00
Wire rods, common soft, coarser than ¼-in...$2.50 over base
Wire rods, screw stock.....$5 per ton over base
Wire rods, carbon 0.20 to 0.40.....$3 per ton over base
Wire rods, carbon 0.41 to 0.55.....$5 per ton over base
Wire rods, carbon 0.56 to 0.75.....$7.50 per ton over base
Wire rods, carbon over 0.75.....$10 per ton over base
Wire rods, acid.....$15 per ton over base
Skelp, grooved, per lb.....2.40
Skelp, sheared, per lb.....2.40
Skelp, universal, per lb.....2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton.....$43.00
Rails, light, new steel, base, per lb.....2.25c.
Rails, light, rerolled base, per lb.....1.90c. to 2.00c.
Spikes, ⅜-in. and larger, base, per 100 lb.....$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb. $3.15 to 3.50
Spikes, ⅞-in. base, per 100 lb.....3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.....3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb. 4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.. 4.75 to 5.50
Tie plates, per 100 lb.....2.55 to 2.60
Angle bars, per 100 lb.....2.75
Bars, common iron, base, per lb., Chicago mill. 2.50c.
Bars, common iron, Pittsburgh mill.....2.40c.
Bars, rails, steel reinforcing, base, per lb.....2.15c. to 2.25c.
Ground shafting, base, per lb.....3.65c.
Cut nails, base, per keg.....$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5100* (Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

British Iron and Steel Market

Pig Iron Drops Another 2½s.—Sheets and Tin Plate Firm—Continental Markets Improving

(By Cable)

LONDON, ENGLAND, Sept. 11.

Pig iron, both foundry and forge, is weak, and demand is poor. Hematite is steady.

One additional furnace has been blown out. Of the total of 39 Cleveland furnaces now blowing, 10 are on foundry iron, 12 hematite and 17 basic and specials.

Foreign ore is stagnant on further curtailment of the pig iron output. Bilbao Rubio is nominally 22½s. to 22¾s. ($5.13 to $5.18) ex-ship Tees.

Finished steel is unchanged. The works generally are wanting orders on heavy specifications. Australia has placed 8000 tons of plates and sections. Germany is inquiring for fair lines. The Indian Government is inquiring for large tonnages of railroad stores.

Continental markets are firm on a well-sold condition. On the Belgian order books, November-December is generally the earliest shipment available for most material. Japan has bought fair lines of bars and angles, but there is no large demand from that quarter.

In France 107 furnaces were in blast Aug. 1. In Germany the French have occupied part of the plant of the Phoenix Aktien Gesellschaft at Hoerde, Westphalia.

Tin plate shows a firmer tendency on the recent rise in tin and merchant orders against specifications. The stabilization committee meeting today is to discuss the future of the scheme and prices. Indications are that no alteration is probable.

Galvanized sheets are firm on some demand from the Far East, but the works are not keen sellers at the moment, when the Indian demand is expected to materialize, and it is realized that Japanese requirements in the future necessarily will be heavy.

Black sheets to Japanese specifications are nominal, with few works selling.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£2	1s.	to £2	1½s.	$9.35 to	$9.46
Bilbao Rubio ore†	1	4			5.47	
Cleveland No. 1 foundry	5	2½			23.37	
Cleveland No. 3 foundry	4	17½			22.23	
Cleveland No. 4 foundry	4	12½			21.09	
Cleveland No. 4 forge..	4	10			20.52	
Cleveland basic	5	0			22.80	
East Coast mixed	4	18½	to 5	0	22.39 to	22.80
Ferromanganese	18	0			82.08	
Ferromanganese*	18	10			84.36	
Rails, 60 lb. and up	8	0	to 9	0	36.48 to	41.04
Billets	7	10	to 8	5	34.20 to	37.62
Sheet and tin plate bars.						
Welsh	9	2½			41.61	
Tin plates, base box	1	3¼	to 1	3¼	5.37 to	5.30
					C. per Lb.	
Ship plates	9	5	to 9	15	1.88 to	1.98
Boiler plates	12	10	to 13	0	2.54 to	2.64
Tees	9	15	to 10	5	1.98 to	2.08
Channels	9	0	to 9	10	1.83 to	1.93
Beams	8	15	to 9	5	1.78 to	1.88
Round bars, ¾ to 3 in.	10	15	to 11	5	2.19 to	2.29
Galvanized sheets, 24 g.	18	10	to 18	15	3.76 to	3.82
Black sheets, 24 gage..	13	15			2.80	
Black sheets, Japanese specifications	15	5			3.10	
Steel hoops	12	0	& 12	10*	2.44 &	2.54*
Cold rolled steel strip, 20 gage	17	5			3.51	
Cotton ties, Indian specifications	15	0			3.05	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices. All F. O. B. Channel Ports. Delivery as Specified

Foundry pig iron:						
Belgium	£5	5s			$23.94	
France	5	5			23.94	
Luxemburg	5	5			23.94	
Billets:						
Belgium	7	0			31.92	
France	7	0			31.92	
Merchant bars:					C. per Lb.	
Belgium	8	0	to £8	5s.	1.63 to	1.68
Luxemburg	7	17½	to 8	5	1.60 to	1.68
France	7	10			1.52	
Joists (beams):						
Belgium	7	12½			1.55	
Luxemburg	7	12½			1.55	
France	7	10	to 7	12½	1.53 to	1.55
Angles:						
Belgium	8	0	to 8	5	1.63 to	1.68
⅛-in. plates:						
Belgium	8	15	to 9	0	1.78 to	1.83
Germany	8	10			1.73	
¼-in. plates:						
Luxemburg	7	15			1.58	
Belgium	7	10			1.53	

Machinery Trade of Japan

Great Britain and the United States are the only countries which have participated extensively in supplying Japan with machinery. In some particulars, Great Britain has had almost a monopoly of the field, while in others the United States occupies a similar position, according to figures prepared by the industrial machinery division of the United States Department of Commerce. In 1913, Great Britain furnished 48.4 per cent of the total machinery imports into Japan, compared with only 8.7 per cent from the United States. In 1920, however, the British percentage had dropped to 20.6, while the United States, with 51.4 per cent, had more than half of the total, and about 2½ times as much as the British share. In the meantime the proportion furnished by the rest of the world fell from 42.9 per cent in 1913 (five times the United States' share) to 28 per cent in 1920 (little more than one-half what the United States furnished.)

In 1921 Great Britain led in steam engines and boilers, water wheels, cranes, paper-making machinery, spinning and weaving machinery, which were the largest items of all, tissue-finishing machinery, and fuel economizers. In that same year, the United States led in steam turbines, internal combustion engines, pumping machinery, metal and wood-working machinery, knitting machinery, capstans, gas compressors, blowing machines, hydraulic presses, pneumatic tools, and in the general group of "all other."

Of the various types of machines listed, aggregating $82,762,000, the United States furnished $39,666,000, and Great Britain furnished $34,287,000, leaving $8,809,000 for all other countries of origin. The largest items are shown in the table.

Machinery Trade of Japan
(Thousands of Dollars)

	Furnished in 1921 by United States	Great Britain	1921 Total	1922 Total
Spinning machinery	$10,479	$15,857	$29,180	$30,596
Metal and woodworking machinery	7,211	3,375	10,976	6,521
Steam boilers	2,226	5,117	7,605	6,403
Weaving machinery	151	1,676	2,973	1,333
Steam turbines	1,870	....	2,292	1,052
Tissue-finishing machinery	448	1,042	2,122	1,467
Pumping machinery	1,135	574	1,991	1,391
Water turbines and wheels	102	374	1,600	2,979
Fuel economizers	165	1,294	1,510	932
Gas compressors	1,198	60	1,335	1,769
Internal combustion engines	747	199	1,111	2,371
Cranes	340	595	1,034	771
Totals*	$39,666	$34,287	$82,762	$75,756

*Include many items not listed.

Germany's exports of iron and steel in May were 135,605 metric tons, according to *Stahl und Eisen*. This brings the total to June 1, this year, to 869,231 tons as compared with 1,021,112 tons for the same four months in 1922. Imports of iron and steel in May were 134,947 tons or 785,613 tons to June 1. They were 695,776 tons to June 1, 1922. Scrap imports were only 4149 tons in May or 129,993 tons to June 1 compared with 163,532 tons to June 1, 1922.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept	Lake	Electro lytic*	New York	New York	St. Louis	New York	St. Louis
5	14.00	13.50	41.87½	7.00	6.70	6.87½	6.52½
6	14.00	13.50	41.87½	7.00	6.70	6.90	6.55
7	14.00	13.50	42.12½	7.00	6.70	6.87½	6.52½
8	14.00	13.50	.....	7.00	6.70	6.87½	6.52½
10	14.00	13.50	42.12½	7.00	6.72½	6.87½	6.52½
11.....	14.12½	13.62½	42.12½	7.00	6.72½	6.90	6.55

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Sept. 11.

The tone of all the markets is considerably improved and the prospects of a better feeling in the Ruhr situation has helped matters here. The copper market, while firm, is quiet and slightly higher. Fairly heavy sales have been made in the tin market at advancing prices. Consumptive demand for lead is good at unchanged prices. The zinc market is quiet and very steady.

Copper.—An unusually good business is reported for August, total sales aggregating close to 200,000,000 lb., or one of the best months in the year. Sales for export are put as equal to or better than any month this year. Most of the business, particularly in the last week or two, was done at 13.50c. to 13.75c., delivered. Thus far this month demand has been light, and while a little copper is available at 13.75c., delivered, most producers are now asking 13.87½c. to 14c., delivered, with some refusing to sell at less than 14c. The prospects of a settlement of the Ruhr problem is a bullish factor and the general opinion is that the market has for some time experienced its lowest prices. Thus far Japan has not been active enough to be a factor in bidding for the metal. Because of the heavy sales last month and the favorable statistical position of the industry as a whole, the market is regarded as strong and steady. Lake copper is quoted at 14c. to 14.25c., delivered.

Tin.—At least 1500 tons of Straits tin has been sold since Sept. 4, and the market has been quite lively on certain days. There was an active market on Sept. 5 when 500 tons changed hands. Early on that day dealers were sellers at 41.25c., but by mid-afternoon they became buyers at 41.25c. to 41.37½c., and very late in the day one parcel changed hands at 41.62½c. On the next day, Sept. 6, from 200 to 300 tons of tin, ex-steamer afloat, for September-October delivery, changed hands at 41.75c. to 41.95c. Fair sales were recorded on Friday up to 200 tons with about 100 tons sold on Saturday. Yesterday, Sept. 10, large sales were recorded with every offering from London taken, indicating liquidation of tin on long account. The sales are reported to have been between 500 to 700 tons. Consumers were active buyers with the bulk of demand for nearby position. Sentiment has been better each day, due partly to the improved Ruhr situation. Quotations for spot Straits tin was 42.12½c. New York today, with the market moderately dull. London prices today were £198 10s. for spot standard, £199 17s. 6d. for future standard and £202 5s. for spot Straits, all about £1 per ton higher than a week ago. Arrivals thus far this month have been 1155 tons, with 6280 tons reported afloat.

Lead.—The market is strong with buying for consumption very good. Sales have been made in round lots in the outside market up to 7c., New York, with the price of the leading interest unchanged at 6.75c., New York, at which it is booking limited amounts. The market is quotable at 6.70c. to 6.75c., St. Louis, or 7c., New York.

Zinc.—While domestic and foreign buying is largely at a standstill, the high price of ore and the disinclination of producers to force the market have caused a firm and steady tone, with prices changed but little in the past week. The prospect of a clearing up of the European situation is having some effect and a waiting attitude in this market is a feature. Prime Western for early delivery is quoted at 6.55c., St. Louis, or 6.90c., New York, with future delivery at a premium of five to ten points per month.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for both shot and ingot nickel are 29c. to 32c.

Antimony.—Chinese metal in wholesale lots for early delivery is quoted at 7.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26.50c., New York, duty paid, in such cases where they can obtain it from foreign producers. The leading domestic producer makes public no quotations.

Old Metals.—The market is firm and business more active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.50
Copper, light and bottoms	10.75
Heavy machine composition	10.75
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.25
Lead, heavy	6.25
Lead, tea	5.25
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

SEPT. 11.—The metals are generally stronger and tin and lead have advanced, but no real buying movement has yet developed. Among the old metals, grades of lead, tin, and zinc have advanced. We quote in carload lots, Lake copper, 14.50c.; tin, 43c.; lead, 6.80c.; spelter, 6.55c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5.25c.; zinc, 4.25c.; pewter, No. 1, 21c.; tin foil, 26c.; block tin, 32c.; all buying prices for less than carload lots.

Steel Corporation's Orders Decrease

Unfilled business on the books of the United States Steel Corporation as of Aug. 31 amounted to 5,414,663 tons, or 496,100 tons less than reported for July 31. During July unfilled orders decreased 475,498 tons, in June 595,090 tons, in May 307,158 tons and in April 114,823 tons, while increases of 119,343 tons, 373,213 tons and 165,073 tons were shown respectively in March, February and January. A year ago the unfilled tonnage was 5,950,105 tons, or 535,442 tons more than on Aug. 31, last year. Following is the unfilled tonnage as reported by months since January, 1920:

	1923	1922	1921	1920
Jan. 31.....	6,910,776	4,241,678	7,573,164	9,285,441
Feb. 28.....	7,283,989	4,141,069	6,933,867	9,502,081
March 31.....	7,467,332	4,494,148	6,281,765	9,892,975
April 30.....	7,288,509	5,096,913	5,815,274	10,359,747
May 31.....	6,981,351	5,254,228	5,482,487	10,940,465
June 30.....	6,386,261	5,635,531	5,117,868	10,978,817
July 31.....	5,910,763	5,776,161	4,830,324	11,118,468
Aug. 31.....	5,414,663	5,950,105	4,531,926	10,805,038
Sept. 30.....	.....	6,491,607	4,560,670	10,374,804
Oct. 31.....	.....	6,902,287	4,286,829	9,836,852
Nov. 30.....	.....	6,840,242	4,250,542	9,021,481
Dec. 31.....	.....	6,745,703	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, at 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Power Developed by Horses

At the Iowa State Fair early in September tests were made on the tractive pull and horsepower developed by teams of farm and city horses. A new form of dynamometer made possible exact determinations of both of these quantities and will, it is believed, make it easy hereafter to grade work horses definitely by performance. The highest power developed was 21.2 horsepower for a team weighing 3630 lb. The maximum pull recorded by this team, or by any other team, was 2300 lb., this maximum being maintained for 25 ft.

PERSONAL

Announcement of the appointment of B. T. Bechtel as Chicago district sales manager, F. A. Lathrop as assistant district sales manager at Chicago, and Glenn W. Christopher as Pittsburgh district sales agent of the Youngstown Sheet & Tube Co. was made in THE IRON AGE of Sept. 6. Mr. Bechtel has been identified with the Steel & Tube Co. of America and its predecessor, the Mark Mfg. Co., since the inception of the latter 21 years ago. From 1901 to 1904 he was a sales repre-



F. A. LATHROP



G. W. CHRISTOPHER

sentative in the Western States and when the Zanesville, Ohio, plant was purchased in 1904, he was transferred to the Eastern States. In 1906 he was appointed district sales manager at Pittsburgh, remaining there until 1917, when he was transferred to Chicago as assistant manager of sales. From 1922 to the time of the absorption of the Steel & Tube Co. by the Youngstown company, he was general manager of sales. Mr. Bechtel is a native of York, Neb. Mr. Lathrop has been identified with the sales department of the Youngstown company at Chicago for 17 years, having been district sales agent since 1915. Prior to going with the Youngstown company he was for two years with the Mark Mfg. Co. at Chicago, and before that time for five years with the Western Tube Co. at Kewanee, Ill. Before going to Kewanee he was for ten years identified with the National Tube Works Co. at Chicago. Mr. Christopher has been in the sales service of the Youngstown company for 11 years. During the past five years he has been sales representative working out of Chicago and, prior to that, he was for two years at St. Louis, one year at Atlanta, and during the remainder of the period at Youngstown. He was born at Wessington, S. D., Oct. 13, 1886.

S. G. Eastman, district sales manager Niles-Bement-Pond Co. at San Francisco, has been transferred to Chicago in the same capacity to succeed George F. Mills, who has retired, after 35 years as Chicago sales manager. Mr. Eastman was located in San Francisco for eight years, prior to which time he was for eight years at Chicago as district sales manager for the Pratt & Whitney Co. His affiliation with the Pratt & Whitney Co. and the Niles-Bement-Pond Co. covers 21 years. Prior to going to Chicago the first time he was located in New York for about a year and a half, and for three years, between 1904 and 1907, was situated at Birmingham, having opened the Birmingham office of the organization.

A. B. Neumann, consulting engineer, Chicago, has been elected a member of the board of directors of the Consolidated Steel & Iron Corporation, Terre Haute, Ind.

Russell R. Shepherd, who has been identified with the Steel & Tube Co. of America, Chicago, since 1916, formerly as electrical superintendent and more recently an electrical supervisor, has severed his connection since the merger with the Youngstown Sheet & Tube Co. His future plans have not been announced.

Nelson Littell, assistant examiner in charge of metal founding in the United States Patent Office since August, 1919, has resigned to engage in practice of patent law.

Wilson K. Ray of Pittsburgh, formerly connected with the Industrial Machinery Division, Department of Commerce, has been appointed Assistant Trade Commissioner and will be assigned to France, with headquarters at the American Embassy.

Francis Wagner, Martin Building, El Paso, Tex., has been appointed sales agent in the Southwest for the Trumbull Steel Co., Warren, Ohio. His territory will also include northern Mexico.

William J. Priestley, formerly steel works superintendent naval ordnance plant, Charleston, W. Va., and later works manager Pittsburgh Crucible Steel Co., Midland, Pa., is now metallurgical engineer with the Electro-Metallurgical Sales Corporation, New York, with offices at 817 Oliver Building, Pittsburgh. Mr. Priestley is to act in a consulting metallurgical capacity for the benefit of customers of the company.

Heber G. Stout, export manager Chain Belt Co., Milwaukee, who arrived in Japan on Aug. 26 to place in operation new distribution centers, has not been located since the earthquake. He was to have sailed for America on Sept. 6.

Oliver A. Lanchantin has resigned as manager of the Pittsburgh office, Oliver Brothers, Inc., New York, effective Oct. 1, to become general manager of sales, Eastern Steel Products Corporation, maker of cold-finished steel bars with a plant at Spring City, Pa., and executive office in the Widener Building, Philadelphia. Mr. Lanchantin was born in Brooklyn and attended the University of Pittsburgh and Duquesne University, Pittsburgh. He entered the employ of the Pacific Hardware & Steel Co., San Francisco, in its New York offices as assistant buyer in 1910. Three years later he resigned to join the Oliver Brothers, Inc., with which he since has been affiliated except for the period of American participation in the World War, when he was in the Quartermasters' Department. From 1915 to 1918 he was in the Pittsburgh office of the company. After his discharge from the army he rejoined the company as manager of its New York office and also manager of its export department. Since 1921 he has been manager of the company's Pittsburgh office, in which capacity he had charge of purchases of all iron and steel and heavy hardware items for the company.

Henry D. Hibbard, Plainfield, N. J., will return next week from a professional trip to Great Britain.

A. A. Corey has been elected president of the Vanadium Corporation of America to succeed J. Leonard Replogle. Mr. Corey, W. E. Corey, Payne Whitney, Samuel Pryor and F. W. Allen were elected directors, succeeding Joseph De Wyckoff, Charles M. Walton, Jr., E. R. Tinker and E. F. Nickerson, resigned, and the late Charles McNeil. L. F. Diffenderfer, treasurer of the company, was elected secretary-treasurer, succeeding Mr. Nickerson, who resigned as secretary.

Charles L. Close, head of the Steel Corporation's bureau of safety, sanitation and welfare, has made a good recovery after a major operation in a New York hospital.

John A. Topping, chairman Republic Iron & Steel Co., is spending a few weeks in Canada.

George B. Mitchell, for many years identified with the Jones & Laughlin Steel Corporation, Pittsburgh, latterly as assistant manager of sales, cold-rolled department, has joined the Union Drawn Steel Co., Beaver Falls, Pa., as general manager of sales. He succeeds the late Frederick N. Beegle, who besides his other duties had supervised sales.

Baron Kjell Akerhielm is in the United States as the representative of Jernkontoret, the Swedish iron masters' association, to investigate the various me-

chanical puddling processes. His address is in care of Einar Brundin, Dannemora Steels, Inc., 249 Pearl Street, New York.

George Morrisey, formerly general superintendent St. Louis Coke & Iron Co., St. Louis, at Granite City, has been made consulting engineer. M. D. Curran has been promoted from assistant superintendent to general superintendent to succeed Mr. Morrisey, and J. D. Shaw of the St. Louis sales office becomes district manager at Davenport, Iowa.

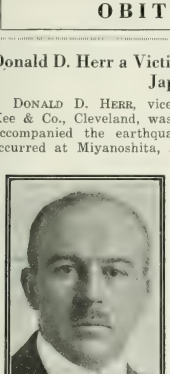
Thomas F. Kelly, Buffalo, N. Y., has been appointed manager of the Smelters' General Briquette Corporation, specializing in the manufacture of briquettes for smelting purposes, notably from iron flue dust. The new corporation has been organized to succeed the metallurgical department of the General Briquetting Co. Ellsworth B. A. Zwoyer, Perth Amboy, N. J., has been appointed manager of the General Fuel Briquette Corporation organized to succeed the fuel department of the General Briquetting Co.

F. B. Foley, metallurgist of the Department of the Interior, attached to the Mississippi Valley experiment station of the Bureau of Mines, is making a study of the special adaptability of the steels being used in the manufacture of oil well drilling equipment.

OBITUARY

Donald D. Herr a Victim of the Earthquake in Japan

DONALD D. HERR, vice-president Arthur G. McKee & Co., Cleveland, was killed in a landslide that accompanied the earthquake in Japan. His death occurred at Miyanoshita, a Japanese summer resort, where the first severe quake caused a part of the mountain to slide into a gorge, carrying with it a Japanese shop in which Mr. Herr was buying curios to send to Cleveland friends. With him at the time was Joseph S. Ruble, vice-president W. S. Ferguson Co., a college classmate who recently went to Japan to supervise some steel plant construction work for his company. Mr. Ruble was pinned to the ground by a telephone pole that was dislodged by the slide, but was only slightly injured. Mr. Herr was about 45 years of age and had been connected with Arthur G. McKee & Co. since his graduation from the Pennsylvania State College, 22 years ago. His first employment was as a consulting engineer, and in 1911, when the firm was reorganized, he was made vice-president. Several weeks ago he started on a trip to the Orient, largely for pleasure, and had planned before his return to inspect the blast furnaces erected by Arthur G. McKee & Co. at Asansol, near Calcutta, India. Mr. Herr was unmarried. He was a member of the Union and Mayfield Country Clubs of Cleveland. His pleasing personality had won him a host of friends in the steel industry.



DONALD D. HERR

E. CLAYTON GOODWIN, vice-president Fafnir Bearing Co., New Britain, Conn., died at the New Britain General Hospital on Sept. 5, aged 57, following an operation. Mr. Goodwin had been in poor health for about a year. He was a native of Terryville, Conn.

WILLIAM STEVENS, president and treasurer of the Stevens Iron Works Co., Cleveland, died suddenly, Sept. 9, age 57 years.

Gilbert H. Johnson Guest of Honor

Gilbert H. Johnson, treasurer Isaac G. Johnson & Co., Spuyten Duyvil, New York, at the time that company passed out of existence June 30 last, as the result of the condemnation of its plant site for the widening of Harlem River, and who retired as president of the Steel Founders' Society of America on July 1 last, was the guest of honor at a reception and dinner given by the Steel Founders' Society on Friday, Sept. 7, at the Westchester Biltmore Country Club, Rye, N. Y. A handsome testimonial was presented Mr. Johnson and a number of addresses were made expressing appreciation of his untiring energy and devotion in the interests of the society during his presidency from Jan. 1, 1911, to July 1, 1923. J. P. Allen, Union Steel Casting Co., Pittsburgh, was toastmaster, and the presentation of the testimonial to Mr. Johnson was by Arthur H. Jameson, Bayonne Steel Casting Co., Bayonne, N. J. The cover of the program contained a reproduction of the picture of the old Johnson plant at Spuyten Duyvil, New York, which appeared in THE IRON AGE, June 21 last, in connection with the story of the passing of Isaac G. Johnson & Co.

COMING MEETINGS

September

Chemical Industries. Sept. 17 to 22. National exposition, Grand Central Palace, New York.

Machine Tool Exhibition. Sept. 18 to 21. Mason Laboratory, Yale University, New Haven. New Haven Branch, American Society of Mechanical Engineers, 400 Temple Street, New Haven, Conn., in charge.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

October

National Safety Council. Oct. 1 to 5. Twelfth annual meeting, New Statler Hotel, Buffalo. W. H. Cameron, 168 North Michigan Avenue, secretary.

American Society for Steel Treating. Oct. 8 to 12. Annual convention, Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

West Virginia and Kentucky Association of Mining Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention, Hotel Frederick, Huntington, W. Va.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Gear Manufacturers Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

NEW TRADE PUBLICATIONS

Exhaust Steam Valves.—Atwood & Morrill Co., Salem, Mass. Catalog D of 24 pages covers low-pressure valves in considerable variety, running from 2 to 42 in. in size. These are illustrated both by diagram and half tone, sections being given and dimensions for design, showing clearances, etc. The list includes relief valves, flow valves, reverse current and back pressure valves of various types.

Steam Appliances.—Atwood & Morrill Co., Salem, Mass. Catalog E of 44 pages features a general line of steam specialties, including reducing valves, steam traps, automatic receiver and pump governors, back pressure valves, cast iron exhaust heads, balanced lever valves, damper regulators, tank valves, strainers, etc. Illustrations are numerous, prices are given and some of the principal dimensions of most of the types of apparatus covered.

Lubricating Oil Concentrate.—Henry Wells Oil Co., 11 Haymarket Street, London, S.W.1. England. Represented in the United States by Marland Refining Co., Ponca City, Okla. A 20-page pamphlet covering "Tonikol," made on the germ process. The pamphlet is devoted largely to a discussion of why oil lubricates and to friction tests of various types of oil. This particular product is recommended for railroad, steamship and engine uses generally.

Germ Process Oils.—Henry Wells Oil Co., 11 Haymarket Street, London, S.W.1. England. Represented in the United States by Marland Refining Co., Ponca City, Okla. A 20-page pamphlet devoted to a patented method of producing lubricating oil and giving results of tests made under varying conditions. Particular attention is paid to metal rolling where the metals are of such a character that they have a tendency to stick to the rolls, and where the use of this type of lubricant is recommended to avoid sticking.

Pulverized Coal Burning.—Ground Coal Engineering Corporation, Worcester, Mass. An 8-page pamphlet on the "Multi-Mix" method of using pulverized coal for power purposes. The device is designed to accomplish complete mixing of air and pulverized fuel before they enter the furnace, this being done in concentric passages through which the air and coal proceed to the burner. It is claimed that this form of device is far easier on the brick work of the furnace than in the high velocity type with jet formation.

Water Filters.—Graver Corporation, East Chicago, Indiana. Bulletin 501 of 12 pages features the horizontal pressure type of mechanical or rapid sand filtration. It is said to be especially adaptable to small municipalities, to large outdoor swimming pools and to industrial and manufacturing establishments using daily more than 250,000 gal. Descriptions of the various types and details are amplified by tables of capacities, dimensions and weights covering single and multiple units. Specifications are given for the entire equipment.

Sprue Cutter.—Hanna Engineering Works, 1765 Elston Avenue, Chicago. A circular of one page illustrating and describing the Milwaukee sprue cutter for steel foundry service. The weight is about 10,000 lb.; the throat has 9¾ in. reach and 20 in. gap. The motor, running at about 1100 r.p.m., is of 5 hp. d.c. or 7½ hp. a.c.

Foundry Molding Machines.—Hanna Engineering Works, 1765 Elston Avenue, Chicago. Calendar No. 11 of 56 pages covers Mumford molding machines for foundry use, including air squeeze machines, jolt squeeze machines, split pattern machines, and details of all of these. The illustrations show both the different types of machines and installations indicating their use. There are numerous drawings giving the shape and names of different parts, while the tabular matter covers the main features of specifications.

World's Wealth and Public Investment

In a 28-page pamphlet issued by Moody's Inventors Service, 35 Nassau Street, New York, a digest is given of figures covered in a 1200-page book of government and municipal investments. Included in this digest are estimates of the wealth of the principal nations of the world, together with the relation between wealth and population. Among the figures of largest interest to us are naturally those for the six leading manufacturing countries, which are listed in a separate group as follows:

Country	Population	Wealth (Millions of Dollars)	Wealth Per Capita
United States...	108,226,000	286,390	$2,648
United Kingdom	47,767,000	109,107	2,333
Germany	61,654,000	84,158	1,365
France	39,403,000	74,038	1,879
Belgium	7,684,000	10,343	1,346
Switzerland	3,880,000	4,567	1,177

None of the commercial, agricultural or unclassified countries has a wealth estimated as high as that of France in the table above, and only Russia reaches half France's figure. For Russia (1915 figures) the estimate is $73,083,000,000, amounting to $407 per capita. India and Japan are given 35 and 32 billions respectively, with Italy just under 30 billions. All others are below 20 billions. Canada is the only one not in the six listed which has a per capita wealth of over $2,000, the figure being $2,035. On this score Australia is given $1,847, Argentina $1,515, and the others all less than $1,200, China being at the bottom of the list with $60.

A course of 30 lectures on labor and employment management, to begin Sept. 27 and to continue every Thursday evening from 6 to 7.45 p. m., has been announced by the Department of Business Management, New York University, to which application should be made, for further information, at 32 Waverly Place, New York. The lectures will be given by James Dominick Hackett, labor consultant. A separate course of 30 group discussions for Tuesday evenings has also been arranged to cover principles and methods of training employees. The lecturer is John Dietz of the Western Electric Co.

New Books Received

Engineering Non-Ferrous Metals and Alloys. By Leslie Aitchison and William R. Barclay. Pages 300, 5¼ x 8¼ in.; 82 illustrations and 167 tables. Published by Oxford University Press, American Branch, 35 West Thirty-second Street, New York. Price, $7.

Transactions from the American Society of Mechanical Engineers. Volume 44, 1922. Pages 1421, 6 x 9 in.; illustrated. Published by the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York.

Heating and Ventilating Engineers' Guide, 1923. Pages 408, 6 x 9 in., illustrated. Published by American Society of Heating and Ventilating Engineers, 29 West Thirty-ninth Street, New York. Price, $3.

Metals and Metallic Compounds. By Ulick R. Evans. Published by Longmans, Green & Co., 55 Fifth Avenue, New York. Volume 3, The Transition Elements: pages 270, 5¼ x 8½ in.; illustrations 42; price, $4.75. Volume 4, Metals of the "B" Groups: pages 350, 5¼ x 8½ in.; illustrations 32; price, $6.

The Metal & Thermit Corporation, New York, has issued a new thermit rail welding pamphlet, which brings up to date the whole subject of thermit rail welding to cover the many recent improvements in economy and efficiency. It includes detailed instructions, accompanied by illustrations and drawings, showing steps in making the improved thermit rail weld which has greatly reduced the cost per joint. Improved apparatus used in connection with thermit rail welding, such as the self-luting mold box and the new lightweight double-burner preheater, which have accelerated the speed of operation, is described in detail for the first time, as well as illustrations showing results of a ten years' service test of the thermit rail weld, also rail bending and drop tests. Instructions for using thermit for welding compromise joints, constructing frogs and crossings and repairing loose arms of mates and switches, have also been included in complete form. At the end of the pamphlet is a discussion of the theory of rail joints.

Growing Use of Manganiferous Ores

Developments on the Cuyuna Range—Effect of Manganese in Blast Furnace and Open-Hearth Practice

BY L. E. IVES*

As the subject of this paper is restricted to the development of the use of the manganiferous ores of the Cuyuna range, it will not be necessary to go into the history of the Cuyuna range. Shipments of iron ore from the Cuyuna range were begun in 1911 from the Kennedy mine after several years of exploration and development.

It was not, however, until several years later that it was realized that the range contained not only so-called "straight iron ores" but also iron ores carrying varying percentages of manganese.

Manganese in iron ores was not new for the Lake Superior range, as several grades of such ores had been shipped for some years from the Gogebic and Menominee ranges in Michigan, and in a few instances with considerably less manganese from certain properties on the Mesabi range in Minnesota. The character and the quantity of the manganese ores present on the Cuyuna, however, seemed to indicate a new condition in regard to both the production and the sale of such ores.

The first shipment of manganiferous ore from the Cuyuna range was made from the Cuyuna Mille Lacs mine of the American Manganese Mfg. Co. in 1913, and amounted to 25,000 tons. This was followed by 51,000 tons from the same property in 1914, in which year the Iroquois Iron Co. also shipped about 2000 tons of a 10 per cent manganese ore which had been stockpiled during the previous winter at its Armour No. 2 mine, later operated by the Inland Steel Co. In the same year, also, the Iron Mountain Mining Co. shipped about 600 tons for experimental purposes. Up to the year 1915 the manganiferous ores from these properties were shipped to a number of furnaces, including the Standard Iron Co. in Ontario, Illinois Steel Co. at Chicago, the Dunbar Furnace, Bethlehem Steel Co., Pittsburgh Steel Co., Cambria Steel Co. in Pennsylvania and also some of the charcoal furnaces in northern Michigan and Wisconsin.

The Phosphorus Content

The bulk of these ores, however, was low in phosphorus and high in silica, thus constituting one of the two so-called groups of manganiferous ores which were developed on the range. The second group, developed later, carries considerably lower silica and somewhat higher phosphorus, and it is this class of ore which has been more extensively developed and which appears to be in greater abundance on the Cuyuna range. The ores of this group will range from 3 to 20 per cent in manganese and will not exceed 7 or 8 per cent in silica, with a natural combined metallic content ranging from 43 to 48 per cent in the raw ore. These figures, as well as the moisture content, vary considerably in different properties, but the figures above give a good indication of the range.

During the period of the World War the requirements of the steel industry in this country and the restrictions of imports were such that these low phosphorus high manganese ores found an extensive use in the making of spiegeleisen, which is an alloy of iron and manganese with a low percentage of manganese as compared to that in ferromanganese. The restrictions of the war also caused the United States Government to reduce the specifications of manganese in spiegel with the result that the Cuyuna ores of this class were better adapted for this purpose and this, of course, materially stimulated the production of these ores, as it afforded a much wider and more certain market for them. Considerable tonnages of this class of manganiferous ores from the Cuyuna range were mined and disposed of during the war period, but with the signing of the armistice this business practically dropped off over night and has never been regained in any appreciable amount. It is true that since then some tonnage of ore has been disposed of for this purpose but the production has been very small and intermittent, and it has mostly resulted in disposing of the stockpiles of such ore which had accumulated during the last year of the war.

With the inauguration of the present high tariff on manganese ore and ferromanganese, it had been expected by many in the Lake Superior region that the production of such ores would be stimulated and placed on a satisfactory basis. However, this tariff has been in effect for nearly a year and to date there have been no developments to indicate that such is going to be the result.

Increasing Manganese Content

The use of manganiferous ores in the blast furnace to increase the manganese content of basic pig iron dates back a good many years, but prior to the development of such ores on the Cuyuna range the furnace companies had to depend upon such tonnages as were available from the Gogebic and Menominee ranges in Michigan. The reserves of such ores were not in proportion to the reserves of the ordinary iron ores in the Lake Superior region; and while the furnace companies recognized the advantage to be gained by maintaining a high manganese content in the blast furnace burden, they were never certain of the future supply.

Another factor which has undoubtedly had a bearing in this matter is that such ores from the other ranges were produced mostly in underground operations, with consequent limited production and higher costs as compared to open pit operations.

The Cuyuna ores of the class under consideration are lower in phosphorus than some of the other manganiferous ores produced on the older ranges in Michigan, and as the Cuyuna ores are also very much lower in sulphur than the older range ores, they are more attractive to the furnace man.

The problem that seemed to develop, therefore, in regard to the sale of Cuyuna range ores suitable for use in a basic furnace mixture was one of assuring the furnace man first of an adequate future supply of these ores, secondly, their equal or greater desirability as compared to the old range ores, and further to extend by means of education the use of such ores to furnaces that had not heretofore employed them.

This effort has been quite successful, judging from the record of shipments of manganiferous ores from the Cuyuna range from the year 1916 to 1922. In 1916 the shipments of such ores amounted to 427,370 tons and in 1917 to 365,222 tons; whereas the shipments in 1920 were 604,706 tons and in 1922, 656,105 tons. The indications for the current season are that the shipment of manganiferous ores from the Cuyuna range will amount at least to the 1922 figures if it does not considerably exceed them. The average manganese in these shipments ranges from 6.99 to 12.21 per cent, with an average probably of about 9 per cent. The phosphorus will average close to 0.22 per cent and the silica ranges from a low of 5.59 to a high of 11.10,

*Clement K. Quinn & Co., Cleveland. This is an abstract of a paper read before the Lake Superior Mining Institute, at Duluth, Minn., Aug. 30.

with an average silica content of about 7 or 8 per cent.

There is evidence of the steadily increasing use of manganiferous iron ores in blast furnace practice, at both steel works and merchant furnaces making foundry and other grades of iron. This has been brought about through the wider appreciation of the advantages to be gained by the use of such ores.

Steel Works Practice

Some steel works furnaces have for many years made it their standard practice to use mixtures containing more than an ordinary amount of manganese. Among these the demand is steady and in general for an ore containing from 5 to 10 per cent manganese. It has been demonstrated through actual practice and experiments conducted for the purpose that there are numerous advantages in this and it is now generally accepted that manganiferous ore in the blast furnace has a beneficial effect upon the general operation of the furnace. More recently, however, the use of a high manganese pig iron has been demonstrated to be of advantage in the open-hearth furnace.

These late developments have a direct bearing upon the increasing use of manganiferous ores. While some works prefer to use a large tonnage of ore running comparatively low in manganese, say about 5 per cent, others for various reasons find it of advantage to use a small tonnage of an ore running much higher in manganese. There is no question, however, that present practice involves the use of a mixture carrying a much higher percentage of manganese than would have been used ten years ago. At that time it was only in exceptional cases that an ore containing over 1 per cent manganese was used, while today with most of the important plants in the country carrying over 1½ per cent manganese in their metal, it has become necessary to include in the burden an ore containing at least 5 per cent manganese.

There are a number of definite and valuable facts known concerning the effect of manganese in both the blast and open-hearth furnaces.

1. A high manganese charge is a help rather than a hindrance in blast furnace practice.

2. High-manganese iron improves the quality of open-hearth steel without reduction of tonnage or other injurious effects.

3. High-manganese iron is of very great assistance in meeting the demands for the better grades of steels.

4. Due to better surface conditions steel made from high-manganese iron shows increased yields with ordinary rolling mill practice.

5. Open-hearth production is materially increased by keeping manganese in proper amount in basic iron.

6. Maintaining manganese between certain limits in the iron saves the adding of appreciable quantities of ferromanganese in the ladle.

Increasingly high sulphur fuels are making it more difficult for steel manufacturers to meet sulphur requirements and specifications without additional cost. Manganese is the answer. The efficient way to add the manganese is through manganiferous ore in the blast furnace burden.

Some Possibilities

If manganese in the hot metal is maintained at about 2 per cent, it is possible to run the blast furnace with higher sulphur, leaner slags, increased tonnage and reduced fuel ratio and to deliver to the open-hearth iron as low in sulphur as could be obtained with a low manganese ore charge much lower in sulphur.

The use of manganiferous ore will secure leaner slags and maintain tonnage. With sulphur up to 0.10 per cent at the furnace, it is still possible to deliver iron to the open-hearth through the mixer with 50 per cent of the sulphur eliminated.

The time of open-hearth heats can be materially reduced by using high-manganese iron. Slag can be worked into shape more quickly in this way than with low-manganese iron.

In manufacturing ordinary steel under normal conditions, between 1 and 2 per cent manganese in the iron gives residual manganese in the bath and also saves adding manganese in the ladle at the rate of about 0.7 lb. of pure manganese for each 25 points of manganese in the iron over 1 and up to 2 per cent.

Manganese above 1 and up to 2 per cent in the basic iron will increase open-hearth production 1 per cent for each 25 points of manganese in the iron. This is because basic iron with relatively high manganese is more refined when delivered to the open-hearth, and also because the influence of the manganese on the sulphur reduces delay in finishing the open-hearth heat.

Experiments and experience have demonstrated, if anything, that high-manganese iron is less detrimental to open-hearth furnace bottoms than low-manganese iron. The same is true of ladle linings.

Oxygen red-shortness cannot be offset by carbon, phosphorus or silicon. Manganese will reduce it and is the best preventative agent. This is best accomplished through high-manganese iron and this can best be made by manganiferous ore in the blast furnace.

With a higher manganese content in the furnace mixture, the cost of production is reduced, tonnage increased, and a smaller amount of flue dust is made, on account of a smoother working furnace due to a more acid slag.

Can one assume that thorough deoxidation results from adding a little deoxidizer to a ladle of steel low in manganese and covered with basic slag containing oxides—and pouring almost immediately?

Needs of Blast Furnace

As the production and use of such ores has increased, it has become more and more apparent that the blast furnace man is as much interested in the regularity of the ore, its uniform structure and distribution of the manganese throughout the ore as he is in the total amount of the iron and manganese contained. It has therefore been necessary, as these ores find wider use, to give the blast furnace superintendent more nearly what he wants. Today the furnace superintendent has a number of well-established grades from which he can make any selection in manganese that he desires, and in doing so can be assured of receiving ore that is of excellent structure as well as being uniform in analysis. These grades are established and recognized and fortunately for the operator as well as for the furnace man, the Cuyuna manganiferous ores in their natural state have a splendid structure and this no doubt has helped materially in advancing their use and sale in a market that was not any too favorably inclined when such ores first appeared, and which required the overcoming of considerable opposition and much educating on the part of the producer to convince the furnace man and the steel works man that the ores were available in sufficient tonnages for a future period of years to warrant their adoption as standard practice. The Cuyuna manganiferous ores have now come into their own so far as a market is concerned for the grades suitable for use in making basic pig iron. There is every reason to believe that their use will continue to grow in proportion to the growth of the iron and steel industry in this country and will probably only be limited by the availability of such ore in the future.

Advancement of Sciences Predicted

Great advances in science and human welfare during the next half century were predicted by Secretary Hoover of the Department of Commerce in a message to the 1500 members of the American Chemical Society assembled at Milwaukee Sept. 10, for their fall meeting. "Our future advancement," said Mr. Hoover, "is indissolubly dependent upon our advance in the twin sciences of chemistry and physics and their application.

"Discovery and invention are no longer the function of the garret genius. They are the result of deliberate organized exploration by our men of pure science. New discoveries and their application will come faster and more securely than ever before; and I believe the next half century will be greater in its triumphs of science and in their contribution to human welfare than even the last 50 years, for we are better trained, better organized, better equipped for discovery than ever before."

OXYGEN IN BLAST FURNACES*

Lower Cost and Larger Output Predicted From the Use of Oxygenated Air

The trend of development in smelting and refining is in the elimination of inert matter—that is, material, solid or gaseous, that does not enter into the reactions in the furnace, and which simply passes through, absorbing and carrying away heat and reduced metals therefrom, a heat that otherwise would be utilized in the process. For instance, in making iron in the blast furnace, a process is still employed in which the inert material greatly outweighs the active material, as can be illustrated by the fact that, in the production of one ton of pig iron, three tons of nitrogen is passed through the furnace.

The same is more or less true of all furnace operations which derive heat from the combustion of fuel by atmospheric air. It would seem, therefore, that metallurgical technique, as well as the conservation of our natural resources, would be greatly advanced if the nitrogen passing through the furnace could be diminished. This might be done by substituting oxygen, or a mixture of oxygen and air, for the air now used, and the following discussion shows the possibilities of the application and efficiency of oxygen to some phases of ferrous metallurgy as it exists today.

Availability of Oxygen

In view of the many recent developments in oxygen manufacture, and considering the increasing cost and decreasing quality of our raw materials, the Bureau of Mines has taken the matter of the application of oxygen or oxygenated air to the metallurgical centers for consideration, and has appointed an advisory committee to study the problem.

This committee has made a thorough survey of the existing processes for the manufacture of 99 per cent oxygen. The conclusions reached are that the comparatively small demand for the product has prevented the installation of large units suitable for metallurgical processes, with corresponding economies, and by far the greater proportion of the present cost of oxygen represents the cost of transportation, storage and service. Large oxygen manufacturing plants can be built to serve metallurgical purposes directly which, by virtue of their large production and correspondingly increased efficiency, together with the fact that no compression in cylinders, storage, transportation or service will be required, will be capable of delivering oxygen for the processes at a cost not to exceed $3 per gross ton. In other words, the committee finds that the oxygen industry is now able to make plants for supplying large quantities of oxygen to metallurgical industries at low cost.

Applicability of Oxygen to Metallurgy

The committee has made studies of the possible application of oxygen to ferrous metallurgy in general, to the metallurgy of zinc, to the manufacture of fuel gas, and for some miscellaneous industrial uses. The findings on these theoretical studies are of such a revolutionary character that the members feel the strong advisability of conducting experimental work to verify the truth thereof, as well as to make changes in furnace design and processes in order to take full advantage of the probable benefits to be gained.

The committee has developed plans for experimentally determining the effects of oxygen enriched air upon the operation of the blast furnace, and it recommended that these plans be put into effect as the first step of an extended research upon the general applicability of oxygen to metallurgy.

The matter of increasing the oxygen content of the air blown into the iron blast furnace has probably received more discussion than any other proposed metallurgical application of oxygen. The fact, however, that oxygen has always been an expensive commodity has done much to prevent any real analysis being made of the effect of this practice, so that published opinions, being opinions only, differ greatly from one another as to the ultimate result predicted. However, by a careful analysis of both the metallurgical and thermodynamic principles involved, we may predict with some accuracy the effect on furnace operation of any change of this character.

For a comprehensive study we must first consider the furnace itself, and the principal chemical reactions which take place therein. In every blast furnace there are two main sections, namely, the hearth and bosh sections, and the shaft section, each of which has a separate and distinct function to perform. The burden or charge as it passes down the shaft section is heated by the ascending hot gases; the limestone is calcined, and the iron oxides are reduced to a large extent to metallic iron by the action of the hot carbon monoxide. All of the chemical reactions of the shaft section are performed at a comparatively low temperature. In the hearth and bosh section, the slag-forming materials are melted, the silicon is reduced, and the remaining iron oxide is reduced; in other words, the actual smelting is performed in this hearth and bosh section, and all of the work must be done at a very high temperature. Therefore, these two sections of the furnace must be considered as two individual units, the shaft as the preparatory zone, and the hearth and bosh as the actual smelting zone.

Thermodynamic Principles in Smelting

With this idea of the division of work performed in the furnace, it is well to consider the thermodynamic principles involved. The first and second laws of thermodynamics apply to the blast furnace just as much as they do to the steam engine, and for our purpose they may be stated as follows:

1. The quantity of work produced by transformation of heat bears a definite and unchanging ratio to the quantity of heat transformed.
2. The proportion of any given quantity of heat which can be utilized for conversion into work depends upon the temperatures at which the heat is applied and discharged.

Significance of Increased Smelting Heat

In order to comprehend fully the value of this increased smelting heat to the industry, one must realize that conditions up to the present are:

1. The efficiency and rate of operation is governed by the smelting ability of the furnace.
2. The smelting ability is dependent finally upon the amount of available high-temperature heat in the hearth and bosh.
3. This high temperature heat, being generated in the most inaccessible part of the furnace, is absolutely beyond any direct control.
4. Any material changes in hearth heat can be accomplished only by charging fuel in the top of the furnace, and will not be effective until the additional material reaches the hearth, a period of from 10 to 15 hours.
5. No changes in heat application or efficiency in the shaft will be effective on the operation as a whole, inasmuch as they can not change the smelting rate.

With more oxygen available in the blast, the smelting ability of the furnace will be increased beyond the speed of the preparing zone in the shaft, transferring the limiting conditions from the inaccessible hearth section to the shaft section, where any change may be accomplished with comparative ease. This fact will make it profitable to conserve the heat in the shaft section. Up to the present time this shaft heat has usually been in excess of requirements, so much so in many cases as to necessitate the charging of water in the top in order to dissipate the excess heat and protect the top of the furnace. With the hearth heat increased by the addition of oxygen, and the smelting rate accelerated, we will treat more ore in the shaft, which will absorb the additional heat; and as we reach fairly high concentrations of oxygen we will actually find a defi-

*Extract from an extensive report by a special committee of the Bureau of Mines, organized to investigate the use of oxygen or oxygenated air in metallurgical and allied processes. It includes the blast furnaces, Bessemer and open-hearth, ferromanganese and artificial gas. The chairman of the committee is M. H. Roberts, consulting mechanical engineer, Bureau of Mines. The author of the report is P. W. Davis, metallurgist, Bureau of Mines, Minneapolis, Minn.

ciency of shaft heat. Then we can begin to introduce shaft economies to increase production.

For instance, in present practice, no attempt is made to charge dry ore, the moisture content running from 8 to 15 per cent; also we are making the furnace calcine the limestone, both of which operations could be accomplished outside of the furnace, and the result would be a saving of about 10 per cent of the shaft heat. Another item to be considered in this connection is that when calcining the limestone in the furnace we are increasing the carbon dioxide content of the gas, thereby decreasing its power for reduction of iron. There are doubtless many other economies which may be effected in the shaft section, all depending on increasing the smelting capacity of the furnace sufficiently to make them worth while.

Doubtless the application of oxygen will revolutionize the art of smelting and it will probably change the whole operation and equipment. However, in order to demonstrate the value to the industry of a development of this character, it seems advisable first to adapt the process to present-day equipment. The first thought was to supply a furnace with blast of 40 per cent oxygen, but in this practice there would be insufficient reducing gas, and it would be necessary to recirculate a portion of the top gas. It is estimated this would increase the tonnage by 41 per cent and decrease the coke consumption by 30 per cent. However, in view of the fact that, due to the deficiency of carbon monoxide in the top gas, circulation of this gas would be necessary, the conclusion was reached that for the first demonstration it would be well not to make any changes that would prevent the burden being reduced completely by one passage of the furnace gas. We can, however, decrease the shaft requirements to the extent of charging calcined limestone, which will, of course, increase the limit to which we may go regarding the reducing power of the gas. We can also eliminate hot-blast stoves, supplying wind at atmospheric temperature.

After carefully considering the matter, it was concluded that, in this particular practice, 31 per cent of the oxygen in the blast will be as high as it will be practical to go, and that this mixture, when charged to the furnace cold, will increase the production of the furnace by 18.0 per cent and decrease costs 6.7 per cent.

Results Expected from Oxygenated Air

On the whole, our study of this problem has firmly convinced us that with the application of oxygen to the present blast furnace we will accomplish the following results:

1. Decrease of production costs:
   a. By increasing the high temperature or smelting heat available per unit of fuel.
   b. By removing the necessity for charging more coke than is theoretically necessary.
   c. By rendering hot blast unnecessary, and reducing the initial investment by the cost of hot-blast stoves, at the same time releasing for other use the gas consumed for this purpose.
2. Increase in the present output per furnace.
3. Increase of flexibility of the process, by giving the operator a remedy for any irregularity or trouble occurring in the hearth and bosh section.
4. Increase in uniformity of product, by admitting of much closer chemical control.
5. A change in the limiting factor of the process from the inaccessible hearth and bosh section to the shaft section. This will mean that, in the new process, any economy accomplished in the shaft section will be effective in increasing production and efficiency.
6. Make possible the use of cheaper materials, ore of a lower iron content, and coke higher in ash.
7. In addition to the above, it is believed that the sulphur content of the iron would be reduced by this practice, or, in other words, that we might use a coke higher in sulphur than is today possible.

Welding Manganese Steel to Ordinary Rails

The repair of manganese steel crossings and switches in street railroad work by welding with manganese steel rods led Mr. Roux to experiment with new crossings of ordinary steel, the parts of which exposed to wear and shock are covered with manganese steel deposited in suitable grooves. The effort was made to deposit a steel containing 11.0 to 13.5 per cent manganese and 1.0 to 1.5 per cent carbon, and an account of the work done, illustrated with photomicrographs, is given in the *Revue de Metallurgie* for July.

The current used was 42 cycle alternating with 80 volts pressure and 150 amperes. The rods were 5 mm. (slightly over 3/16 in.) diameter. Their analysis was 13.8 per cent manganese, 1.23 per cent carbon, and the deposit contained 11.0 per cent manganese and 1 per cent carbon. The rod was covered with a thin coating of wound asbestos and underneath the asbestos was a thin wire of aluminum. The original metal, as deposited without any treatment, showed a good austenitic structure. Between the ordinary steel and the alloy steel is a thin transition layer, not more than about eight ten thousandths of an inch thick, which appears martensitic in structure.

The total layer of metal, about ⅜ in. thick, is obtained by depositing three layers each about ⅛ in. thick. Examination after the first layer shows considerable martensite in the original steel due to surface hardening, similar to the effect produced by the slipping of wheels on rails. The next two layers cause the steel to be annealed by the reheating. In the case of switches the smaller amount of metal may show an overheated structure, and to avoid brittleness annealing should be carried out by heating with a blowpipe.

The experiments show that it is easy to obtain by electric welding a deposit of manganese steel of the composition and structure desired. The rod used should be high enough in manganese and carbon to allow of the losses that take place. The brittleness of the original steel is increased only if the cross section is too small, for example, with switch points.

The thin layer of martensite cannot be avoided. It is transitional in composition between ordinary and manganese steel, and its normal structure is martensitic, and its brittleness is accentuated by its thinness. This explains why the deposited metal does not adhere better to the rail. A good solution of this problem would be to make dovetailed openings on the surface to be covered or cylindrical holes with axes inclined to the surface. These would be filled by metal during the operation and increase adherence, which was proved by subjecting a rail so covered to a shock test.

G. B. W.

Oil Exposition at Tulsa

The International Petroleum Exposition and Congress will be held at Tulsa, Okla., Oct. 8 to 14. Included among the exhibitors will be the following:

American Cast Iron Pipe Co., American Metal Hose Co., Bessemer Engine Co., Blaisdell Machinery Co., S. F. Bowser Co., Bradford Motor Works, Bridgeport Machine Co., Blackman, Hill, McKee Machinery Co., Burns Tool Co., Calorizing Co., Columbian Steel Tank Co., C. & G. Cooper Co., Crane Co., DeLaval Separator Co., Graver Corporation, Hill Clutch Co., Hinderliter Tool Co., Hudson Wire & Iron Co., Harrisburg Pipe & Pipe Bending Co., Interstate Pipe Co., Jarecki Mfg. Co., Key Boiler Equipment Co., Landis Machine Co., Leader Iron Works, Link Belt Co., Lohmann Machine Co., A. Y. McDonald Mfg. Co., National Tube Co., Oil Well Supply Co., Oxweld Acetylene Co., P. H. & F. M. Roots Co., Joseph T. Ryerson & Son, Inc., Standard Machine & Tool Co., Schaffer & Budenburg Mfg. Co., Sullivan Machinery Co., C. J. Tagliabue Mfg. Co., Trimont Mfg. Co., Truscon Steel Co., Henry Vogt Machine Co., Westinghouse Electric & Mfg. Co., Wheeling Steel Corporation, Wilson Welder & Metals Co., Walworth Mfg. Co., Williamsport Wire Rope Distributing Co.

Edward F. McIntyre, Tulsa, is general manager of the exposition.

The National Fire Prevention Exposition will be held in New York Oct. 8 to 13 at the Seventy-first Regiment Armory, New York, in connection with an International Fire Prevention Congress. Headquarters of the exposition are at 25 East Twenty-sixth Street, New York.

German Founders' Zeal for Their Art

(*Continued from page 688*)

translated. A little "joshing" of the gentleman in charge revealed the fact that this trust got along very nicely with the Government, which bothered it very little so long as the German foundries were not overcharged. The foreigner might be charged all the traffic would stand.

A full line of designs of foundries was available. A small laboratory was exhibited as the "Normal Laboratorium" or standard foundry laboratory. Among the beautiful scientific displays was that of E. Leitz, of microscopes with photographic apparatus. The most complete outfit of this kind enabled the observer to place the polished specimen on a metal table and at once to see the enlarged structure in most delicate presentation on a light green glass screen, and, if desired, to proceed and photograph it. The perfection of workmanship of the entire apparatus can only be appreciated when actually seen. The price, around 800,000,000 marks—or $200 at the time—seemed remarkably low.

A number of photographs in series illustrated step operations in the production of special lines of castings, so that the interested foundryman could study the production routine without going to the particular shop. A number of soil pipe castings were exhibited which had been cast in horizontal position. Some of them were sawn in two longitudinally, showing the perfection of the metal within the casting. It is a pleasure to see that foundries can make soil pipe in green sand, the thickness of metal perhaps 3/16 in. and the length 10 ft. They are cast with four gates along the side and come out perfect. It is understood that sufficient phosphorus is added in shape of the E-K briquettes of commerce to bring up the fluidity of the molten iron to the necessary point.

Welded Radiator Sections

Economy is practised at every point in Europe, and hence it was not surprising to see radiator sections which had been welded up electrically. On the other hand the fact that an entire room was devoted to displaying books on foundry practice would show that this is a subject on which the German mind and purse are open. No German foundry exhibit is without art castings in profusion. Further, a large number of core oven designs were shown. Castings made in multiple molds, some 14 high, looked very fine. Several testing machines of entirely different design from those seen in America were on exhibition, and some of the American make of molding machines were under operation in addition to the German ones.

The question of molding sand preparation came in for considerable attention, and an unfamiliar sight to American eyes was the new cupola lining material that is rammed up in place instead of using fire brick, mica schist and heavy daubing.

The new development in cast iron, called "pearlitic cast iron" by the inventor, was shown and pieces put under the microscope actually do show an entire structure of pearlite and graphite, as against the ordinary cast iron of ferrite and graphite.

All entertainments previously arranged for had been cancelled in view of the gravity of the political and industrial situation. Holding the exhibition at all can be considered heroic in the face of the universal despair seen everywhere outside of the hotels and places of amusement. Delegations of foundrymen came from Norway, Sweden and Denmark. Three Americans were present, namely Jesse L. Jones, of the Westinghouse Electric & Mfg. Co., and Dr. and Mrs. Richard Moldenke, Watchung, N. J.

Technical Sessions

The technical sessions were opened on Wednesday, Aug. 22, in the educational building, attached to the university, which was founded by a public spirited citizen of Hamburg over a hundred years ago to lay the foundation for industrial education by which future generations might benefit. It is called the Curio House, from the name of the founder. Special lectures were given partly in the exhibition building and in the University of Hamburg.

The first paper of the Wednesday session was by Dr. Schimpke, who discussed the education of foundry engineers. As the great majority of foundry superintendents and managers of Germany are technical men who have entered the foundry by way of a mechanical engineering training, and the foundry metallurgist as apart from the ordinary foundry laboratory is a rarity, the information given and much of the discussion that followed is not of special interest to American foundrymen. However, Dr. Osann brought out the point that it is as essential to train foundry teachers as to provide for the students.

Dr. Kuehnel read a paper on segregation phenomena in castings. He illustrated the subject by many screen pictures and showed by analysis how the elements moved about from surface to interior and the reverse. He built up a theory of the formation of primary and then secondary groups of crystals from the surface inward, with still liquid metal between them, and held that most of the phenomena observed in the way of segregation were not connected with pressure conditions within the castings but from partial vacuum. This was objected to in the discussion, particularly as the idea was applied by the author to annealed malleable castings and the so-called inverted chill in gray castings—that is, a white core or portion within a gray surounding surface.

Contraction and Shrinkage

The third paper of the first session was by Dr. O. Bauer, on an investigation to determine whether there is a relation between the contraction of a casting and the interior shrinkages therein. This very elaborate work is in effect a continuation of the investigations by Professor Wuest, who used a very pure low carbon steel as the basis of his tests, and obtained his curves by addition of silicon, manganese sulphur and phosphorus respectively in progressive quantities and observing the contractings. Dr. Bauer took a carbon-iron of great purity—charcoal iron—melting his mixtures in the crucible. A special bar with enlargement near one end gave the interior shrinkages. This paper —as well as all the others presented—was not to be had at the time, but will be duly published, when more extended notice can be given the matter. The author claimed to have found satisfactory evidence of a relation between the two phenomena, which, however, was doubted by others present, as dissolved oxide of iron and its effect of increasing the interior shrinkages had not been considered in the tests made—in fact, could not very well be.

The acting chairman, Dr. Wedemeyer, in opening the meeting spoke feelingly of the absent Dr. Werner, welcomed the delegates from the several societies, greeting Dr. Moldenke as representing the foundrymen of America on the occasion, and called attention to the several investigations under way by the association. Among these was one on the strength of cast iron, in charge of Prof. Rudeloff of the Government Bureau of Standards. There were also an investigation by a committee on electrical welding, one on difficulties in contractual relations between foundrymen and their customers; an investigation on the lining up of cupolas and finally, one by a committee on molding sands. The chairman further called attention to the gravity of the times and asked the foundrymen to look out for the impending crisis facing the foundry industry of Germany just ahead, with all that this meant to every individual concerned.

In addition to the three lectures on the program, a supplementary one was given by Director Sipp of Mannheim, who discussed "pearlitic cast iron," though little was brought out not already published in America. Much interest was shown in the departure, which remains to be judged as it is tried out in different lines of work. In spite of the cancellation of all entertainments, the foundrymen of Hamburg insisted on a social evening, where they and their ladies entertained the foundrymen of the convention.

The rest of the program of the Verein Deutscher Eisengiessereien, lasting through the week, was of a

business character, the internal affairs of the association, as well as matters of trade, price adjustments, labor and general economics coming in for attention. Thursday, Aug. 23, was given over to the sessions of the Foundry Engineers' Society. The first paper was by Hubert Hermanns of Berlin, who spoke on the heat balance of the bloomery processes. Then came P. Laval, of Magdeburg with a very valuable paper on the acid Bessemer process, in which he indicated the possible economic advantage of going back to bottom blow where the tonnage came to five or more per blow. The discussion brought out several ideas in regard to preventing or removing the skulls forming at the mouth of the converter; the efficacy of these, however, was doubted.

Molding Sand Tests

The important paper of the day was a report by Dr. J. Behr, geologist of Prussia, who as chairman of the committee on molding sands, had done some splendid work on this subject, notably from the geological standpoint. The general and sectional maps shown as covering the molding sand deposits of Germany were certainly fine and useful, and would be of great interest to the molding sand research committee working in America. The methods of test followed parallel lines with those of the A. F. A. Committee, but were not so elaborate. One new point is to be noticed, and that was in connection with the valuation of the clay content of a sand. The German method differentiates between the colloidal portion of the clay of a molding sand and the clay that is not in this form. Hence the dye test is not used, but the method of Misterlich for determining the hydroscopic capacity of the clay portion in percentage. This point should be well worth studying, as a sand may have a high clay content and still be of poor bonding value unless the colloidal portion is sufficiently high. During the discussion Dr. Moldenke described the work of the American Committee shortly and suggested reciprocal cooperation between the respective committees of the two countries, which suggestion was enthusiastically received. As an interesting side light, Dr. Behr showed a molding sand preparation machine built under orders of Frederick the Great and still in operation, though now destined for a museum. It consists of a trip-hammer run by a water wheel, the hammer striking the floor and crushing any lumps of sand placed between. The excuse for still running such a primitive apparatus was that the man operating it was well trained for the work.

Psychological Tests of Workers

A further paper by Dr. Sterner-Rainer on modern melting furnaces concluded the morning session. In the afternoon, a series of moving pictures of foundry operations was first shown, after which came an interesting talk on "Adaptability Testing of Operatives." This was a psychological discussion on the theory and methods of sizing up men by actual test in various ways, to learn whether they would prove of value for the work picked out for them. It was but the beginning of more extended studies and should prove of highest interest in the line of efficiency work. The address was by Professor Rupp of Berlin. A final lecture by Professor Biehle of Bautzen on the casting of bells completed the program.

Summarizing the meeting in a general way, it may be said that the exhibit attracted the crowds of foundrymen, as is usual, but there were many parties of students coming from the schools of the city and towns near by, led by their teachers. There were no visitors present for mere curiosity. The papers were all good, but too much on theoretical lines. Discussions were limited as the papers had not been preprinted. The contrast, as a consequence, between the meetings of the German and the American societies is quite marked. Further, the papers were read in full, which meant some of them an hour long and one appreciates the American present custom of limiting the presentation of any paper to ten minutes, and having the discussion unlimited. Unquestionably the German society will undertake these improvements in practice the moment funds will allow it.

American Foundrymen in England

LONDON, ENGLAND, Aug. 28.—After a smooth passage across the Atlantic, the steamship Leviathan landed the American party of foundrymen, some 25 in number, at Southampton, whence they entrained to London, arriving at the Hotel Cecil Aug. 24, at 5.30 p. m. Saturday morning the party was welcomed by the British reception committee, which was augmented later in the day by F. J. Cooke, past-president of the Institute of British Foundrymen and of happy memory of the Rochester convention of the American Foundrymen's Association. Several American foundrymen had arrived simultaneously by way of the Continent, and the morning was given over to greeting friends and getting settled.

On the afternoon of Aug. 25, the party was taken to Windsor Castle by auto-bus and shown this beautiful and extensive historic pile. Particularly the state apartments of the famous regal residence were enjoyed by those who had not been across before. Tea was served at the White Hart Hotel, at Windsor, and on the return trip Hampton Court was passed. Sunday was given over as a day of rest and the visitors could be seen at Westminster Abbey and the National Galleries.

On Monday morning, the party was motored out to the large foundry of J. Stone & Co., Ltd., where one of the finest foundry plants of England was inspected. These works are at Charlton and make more and larger propellers for marine purposes than any other foundry in the world. The inspection was a treat for more than the non-ferrous men, for the huge castings for the big liner propellers are made here, and an opportunity was given to see the molding methods in detail. It was only at the banquet of the evening that the American visitors found out that theirs was the first party of visitors ever allowed into these works since it was built. After the visit luncheon was given at the Ship Hotel at Greenwich and the party motored through places of interest back to London.

A formal highly enjoyable dinner was given the American visitors, by the London branch of the Institute of British Foundrymen and the Iron and Steel Institute, in the evening at Hotel Cecil. President Lambert of the British foundrymen presided and the principal addresses of welcome were made by Sir Robert Hadfield, as past-president of the Iron and Steel Institute, substituting for Francis Samuelson, who could not attend; and Sir George Goodwin, vice admiral of the Navy and president of the Institute of Marine Engineers.

President G. H. Clamer of the A. F. A. responded in a happy vein, and expressed the thanks for the visiting delegates. Short addresses by Mr. Lambert, Past President Stubbs of the British foundrymen and Mr. Minich followed and the speeches of the evening were concluded by a toast to the ladies by Colonel Cheesewright and responded to by Britain's foundry lady, Miss J. M. V. Aynesley. Musical selections and recitations were delivered during the evening, and the party adjourned at midnight.

Tuesday, Aug. 28, in the afternoon the American party entrained for Sheffield.

The list of Americans registered at London and planning to attend the Paris convention is as follows:

Mr. and Mrs. G. H. Clamer and daughter (Ajax Metal Co.), Philadelphia; Dr. and Mrs. Richard Moldenke, Watchung, N. J.; Walter Wood, R. D. Wood & Co., Philadelphia; Mr. and Mrs. Verne E. Minich (American Foundry Equipment Co.), New York; Mr. and Mrs. Ralph West (West Steel Casting Co.), Cleveland; Mr. and Mrs. P. Krentz (Buffalo Foundry & Machine Co.), Buffalo; Mr. and Mrs. G. W. Knotts (United Engineering & Foundry Co.), Youngstown; Mr. and Mrs. John Hill (Hill & Griffith Co.), Cincinnati; Mr. and Mrs. J. S. McCormick and children (J. S. McCormick Co.), Pittsburgh; Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh; C. H. Gale, Cleveland; W. E. Dunn, Jr., Southern Metal Trades Association, Atlanta, Ga.;



Americans En Route to the International Foundry Congress Which Opened in Paris, Sept. 12, Were Entertained in London by the Iron and Steel Institute and the Institute of British Foundrymen. On Aug. 27, the delegation visited the works of J. Stone & Co., Ltd., at Charlton. Photograph from Wide World Photos.

George H. Kramer, Kramer Brothers Foundry Co., Dayton, Ohio; George Wadsworth, Wadsworth Cores Machine Co., Akron, Ohio; Q. S. Snyder, Phoenix Roll Works, Pittsburgh; Mr. and Mrs. C. S. Gilbert (Canada Iron Foundries, Ltd.), St. Thomas, Ont.; C. Barnhill, Fay & Scott, Dexter, Me.; Mr. and Mrs. R. E. Turnbull (Arcade Mfg. Co.), Chicago; E. W. Campion, Buckeye Steel Casting Co., Columbus, Ohio; L. S. Lehman, Baltimore; C. S. Bell, C. S. Bell Co., Hillsboro, Ohio; W. S. White, J. S. White Co., Pawtucket, R. I.; William H. Nichols, W. H. Nichols Co., Brooklyn; James Linkplate, Michigan Malleable Co., Detroit.

In addition to those listed, Stanley G. Flagg, Jr., of Stanley G. Flagg & Co., Philadelphia, will meet the party at Paris.

Making Open-Hearth Bottom

(*Concluded from page* 674)

it is required to perform the work of one ton of calcined stone. This is because of the shrinkage which occurs when CO_2 is driven off by the heat of the furnace. For this reason, some open hearth superintendents have eliminated raw stone altogether.

It is difficult to place refractory material exactly where it is wanted by the shoveling process. This not only increases the consumption of lining materials, but tends to build up bottoms of furnaces. Operators of the mechanical device at Warren find they can repair the furnaces without wasting refractories. In addition, the syndolagger has enabled the Trumbull management to dispense with carrying refractories on the charging floor, which always resulted in some loss.

According to A. G. Smith, steel works superintendent, and John Blair, senior melter, at the Trumbull plant, most satisfaction is derived from the fact that since the machine makes work easier for the men they are more contented and that makes the plant a desirable one in which to work. Today only English speaking men are working either on the floor or around the pits.

Iron and Steel Exports

In both May and June Canada was the principal customer for iron and steel products shipped from the United States, according to figures of the Department of Commerce. Japan occupied second position in May and third in June, while Cuba was in second position in June after having been third in May. The principal tonnages are covered in the table, which shows the first 10 of our June customers and includes all cases where as much as 5000 tons was shipped in either month:

	May	June
Canada	78,012	68,774
Cuba	18,128	20,712
Japan	44,806	18,127
Argentina	7,045	7,420
Mexico	9,012	6,386
United Kingdom	5,971	6,173
Kwangtung*	2,975	6,172
Brazil	3,089	4,579
Philippine Islands	1,507	3,795
China	5,234	3,629

*Leased territory.

Exports of Coal and Coke Increase

WASHINGTON, Sept. 10.—Coal and coke have advanced to second place among America's export commodities, moving from fourteenth position, as shown in the quarterly analysis of foreign trade issued by the Foreign Commerce Department of the Chamber of Commerce of the United States. This movement is disclosed in a comparison of coal exports during the first six months of the year with the corresponding period in 1922. It gives coal the highest place it has ever had.

Automobiles and their parts have taken third place in exports, also their highest position, and agricultural machinery, copper rods, electric motors, zinc, spelter, have made decided gains. Cotton remains secure as the country's most important export commodity.

The report speaks of references which have been made to a depressed condition of foreign trade and gives some figures on individual commodities. It says:

"As compared with the average exports for the five years just preceding the war (1908-1913) refined copper was off 20 per cent; steel rails were off 41 per cent; iron pipes and fittings were off 11 per cent; iron wire was down 7 per cent; nails had dropped 28 per cent."

Average Automobile Lasts 6.7 Years

In an analysis made by *Automotive Industries* and based on automobile registrations in all of the States, and the annual production and exports and imports of cars, it has been found that the average life of the cars retired during the past year or two has been about 6¾ years. This replaces the figure of 5 1/3 years established as the result of a similar analysis two years ago.

Total United States registration at the end of 1922 is given as 12,239,114 cars. Production during the year was 2,659,064, of which 78,234 or nearly 3 per cent were exported. Only 456 cars were imported. Those placed in service in the United States amounted, therefore, to 2,581,276. Those retired during the year figured out at 806,167, this being the excess of the number placed in service in 1922 over the increase (1,775,109) during the year in the total number of registrations.

June sales of the Greenfield Tap & Die Corporation, Greenfield, Mass., were 26 per cent larger than those for the corresponding month last year, while July sales increased 20 per cent and August 14 per cent.

Machinery Markets and News of the Works

A FEW BRIGHT SPOTS

Some Attractive Orders but Business on the Whole Is Quiet

Gray & Davis, Inc., Boston, Purchase a Large Number of Machine Tools—Axle Company Also Important Buyer

Despite the general quietness of machine-tool markets, some very attractive business has been placed. Conspicuous in recent buying has been that of Gray & Davis, Inc., Boston, whose purchases, it is estimated, will reach $100,000. This is the largest business placed in New England since early in the year.

The Eaton Axle & Spring Co., Cleveland, was another large buyer, having placed an order with a Cleveland dealer for 17 machines. The Ford Motor Co., Detroit, placed 12 turret lathes with a Cleveland manufacturer. The William Powell Co., Cincinnati, bought nine hand screw machines.

Automobile manufacturers are buying a few tools, single orders predominating. Most of this business is for preparation for next year's demand and for work on the new models which are being brought out for 1924. The safe companies at Hamilton, Ohio, have been consistent buyers in recent weeks.

There are scattered orders for single tools from the railroads, but no important railroad buying is in sight. The Chicago, Indianapolis & Louisville is asking for prices on several woodworking tools.

New York

NEW YORK, Sept. 11.

THE past week has brought no interesting developments in the local machine-tool market. Inquiries and sales are few. Used machines are more in demand than new tools. A few railroad orders are still being placed, but none of importance. The Pennsylvania Railroad has ordered a 90-in. wheel quartering machine, the Seaboard Air Line has bought two 100-ton bushing presses and the Bethlehem Steel Co. has bought a 6-ft. radial drill. The Davis Equipment Co., 50 Church Street, New York, is in the market for a car wheel press of 200 tons capacity and a portable crank pin press of 200 tons capacity. The Bertolette Machine Tool Co., 357 West Side Avenue, Jersey City, is inquiring for a Blanchard vertical grinder, a Pratt & Whitney vertical grinder and 42, 60 and 72-in. vertical boring mills. The machine-tool trade is confident that there will shortly be a better demand for tools, but the past week has brought no indications of a resumption of activity.

The Columbia Malleable Iron Works, Euclid and Atlantic Avenues, Brooklyn, has preliminary plans for a one-story foundry and machine shop to replace the plant recently destroyed by fire. Holmes & Winslow, 134 East Forty-fourth Street, New York, are architects.

The United Metal Hose Co., 532 West Twenty-second Street, New York, has inquiries out for a back-geared screw machine, 1½ to 2 in. capacity.

The Master Rule Mfg. Co., 841 East 136th Street, New York, will commence the erection of a new two-story plant, 75 x 100 ft., on 136th Street, near Willow Avenue, to cost $25,000. Carl M. Nicholson is president.

Officials of the Bridgman Smith Co., 487 Kent Avenue, Brooklyn, manufacturer of paper boxes and containers, have organized the Bridgman Smith Patents Co., to manufacture special paper box-making machinery and mechanisms. The company is headed by H. B. Smith and J. G. Meyers.

The Savage Arms Corporation, 50 Church Street, New York, with plant at Utica, N. Y., is perfecting plans for expansion in its electric washing machine department to increase the output from 1200 to 2000 machines a month. The company is also arranging for the manufacture of a new electrically-operated refrigerator.

The Superintendent of Light Houses, Staten Island, N. Y., will take bids until Sept. 19, for 4000 lb. of brass castings, for delivery from Oct. 1 to Dec. 31, proposal 15606, until Sept. 21 for 12,000 lb. of iron castings, same period, proposal 15620.

Eugene Seavey, 359 Pearl Street, New York, operating a general machine works, has organized the C-V Products Corporation, with capital of $25,000, for the manufacture of mechanical devices, developing the local plant for this purpose. E. A. Daly is also interested in the new company.

The Watson Elevator Co., 407 West Thirty-sixth Street, New York, is arranging for enlargements in its machine shop, service and repair departments, and will occupy the entire buildings at 407-9 West Thirty-sixth Street. The general manufacturing plant will be maintained at Hoboken, N. J., as heretofore.

A two-story automobile service and repair building, 155 x 200 ft., to cost about $200,000, for company motor trucks and cars, will be erected on White Plains Avenue, New York, by the New York Telephone Co., 15 Dey Street, under the name of the New York Telephone Realty Corporation. McKenzie, Voorhees & Gmelin, 432 Madison Avenue, are architects.

The Universal Pipe & Radiator Co., New York, has been organized by officials of the Iron Products Corporation, 41 East Forty-second Street, to take over and expand the different plants and subsidiary organizations.

The Fairchild Aerial Camera Corporation, 136 West Fifty-second Street, New York, plans for the construction of a one-story machine and repair shop at its proposed hangars and aeroplane terminal on Long Island, for which a site will soon be selected.

The M. W. Kellogg Co., 117 Westside Avenue, Jersey City, N. J., manufacturer of pipe, pipe bends, steam specialties, etc., has plans for a three-story addition on Hackensack Avenue estimated to cost $30,000. A crane runway will also be constructed.

The Passaic Valley Sewerage Commissioners, 900 Chamber of Commerce Building, Newark, will receive bids until Oct. 2 for pumping machinery and equipment for the Wallington pumping station, Wallington Borough, including three steam-engine driven centrifugal pumps, one of 25,000,000 gal. and two, 15,000,000 gal. per day, capacity; three vertical boilers; two 10-kw. generators, with auxiliary machinery. Bids will be taken at the same time on an alternate proposal for equipment for complete electric operation, eliminating all steam apparatus. Joseph H. Quigg is clerk of the commission.

The General Water Supply Co., Westmont, N. J., will install an electrically-operated pumping plant at Crystal Lake, with capacity of about 1,000,000 gal. per day.

The Montclair Ice Co., Pine Street, Montclair, N. J., will commence the construction of a one-story plant, 125 x 155 ft., to cost about $100,000 including machinery.

Power equipment, conveying and loading machinery, etc., will be installed in the new two-story plant to be erected on Duffield Avenue, Jersey City, N. J., by the Cinder Brick & Tile Co., care of J. W. Edwards, 1 Exchange Place, estimated to cost $30,000. C. H. Ziegler, 75 Montgomery Street, is architect.

Export Opportunities

J. W. Wallace & Co., 246 Wakefield Street, Wellington, New Zealand, desire to obtain exclusive sales agencies in that country for railroad and tram rails, tubular telegraph poles, copper and aluminum wire, shovels, undercarriage springs for vehicles and all rolling stock, horse shoes, reinforcing rods, steel conduit, insulators, picks.

H. L. Tyrer, Apartado No. 4, Cartagena, Colombia, South America, is contemplating the expansion of his plant,

The Crane Market

WHILE a few new inquiries for overhead and locomotive cranes have appeared since Labor Day, the volume of business closed is small and the crane market generally could not be considered particularly active. One of the outstanding inquiries from the standpoint of total cost is from the Government of the Philippines, 17 Battery Place, New York, and calls for two 15-ton and eight 2-ton, semi-portal, revolving jib cranes for installation on docks at Manila, P. I. These cranes are understood to be somewhat similar to those contracted for by the city of New York for the piers on Staten Island, which were leased to the Pan American Terminal & Dock Co. Bids will be opened Sept. 28. Another export inquiry comes from Hughes & Co., 40 Rector Street, New York, and is for a 30-ton gantry crane for Rio de Janeiro, Brazil. Viele, Blackwell & Buck, 49 Wall Street, New York are in the market for a 60-ton, 47-ft. 8 7/16-in. span overhead traveling crane for Kipawa, Canada. The New York Central & Hudson River Railroad is reported to have closed on a 25-ton stationary gantry crane. The Riverside Steel Casting Co., Lincoln Highway and Passaic River, Newark, N. J., is said to be receiving bids on a 10-ton 40-ft. span electric crane. The Power Machinery Exchange, 1 Montgomery Street, Jersey City, N. J., is prepared to purchase a 3½-ton and 10-ton overhead cranes, hand power or electric, and is also in search of a 25-ton and 50-ton electric cranes. The Edison Illuminating Co., Boston, Mass., has purchased a 20-ton, 20-ft. span, 3-motor overhead crane from an unnamed builder and the Consolidated Coke Co., Philadelphia, has closed on a 2½-ton, 62-ft. span, 3-motor overhead traveling crane.

Among recent purchasers are:

Manila Railroad Co., 17 Battery Place, New York, two 50-ton, overhead traveling cranes for Manila, P. I., from the Cleveland Crane & Engineering Co.

Vacuum Oil Co., New York, a 6-ton, 35-ft. span hand power crane from the Reading Chain & Block Corporation, through Arthur Appleton, New York.

Pittsburgh County Railroad Co., Busby, Okla., a 5-ton, 16-ft. 9-in. span hand power crane from the Reading Chain & Block Corporation, through Arthur Appleton, New York.

McIntosh & Seymour Corporation, Auburn, N. Y., a 20-ton trolley from an unnamed builder.

General Engineering & Management Corporation, 165 Broadway, New York, a 10-ton, 45-ft. span hand power crane for the Trenton Gas & Electric Co., Trenton, Mo., from the Reading Chain & Block Corporation, through Arthur Appleton, New York.

Pittsburgh Plate Glass Co., a 6-ton and four 7½-ton cranes for its Creighton, Pa., plant, from the Alliance Machine Co.

Henry L. Doherty & Co., 60 Wall Street, New York, a 100-ton overhead traveling crane reported purchased but formal order not yet awarded.

now making wire nails, to include the manufacture of bolts, nuts and rivets and is interested in receiving catalogs and other information about machines for this purpose.

Vignier Freres & Cie, 21 Boulevard des Lices, Castres, Tarn, France, desires to communicate with a maker of a device for holding the leaves of a loose leaf note book, the width of the leaves being about 3 in. (75 mm). A sketch with dimensions and price of the device is desired.

New England

BOSTON, Sept. 10.

GENERALLY speaking, August turned out better than most of the New England machine tool trade expected. Contrasted with the same period last year, the 1923 showing was very much better. September starts as though August's aggregate business in this territory would be at least doubled. Buying of shop and production equipment by Gray & Davis, Inc., Cambridge, Mass., automotive parts and accessories, will materially bolster up business this month. Estimates of purchases of both new and used tools made by this company are in the neighborhood of $100,000. Much of the machinery was bought direct from manufacturers, a majority being located in this territory. The purchase is the largest since that of the Saco-Lowell Shops, Boston, earlier in the year.

A list of some 27 shop tools will, according to report, be closed shortly by a cotton mill for a Southern subsidiary. The company already has placed its motor requirements, the General Electric Co. getting practically all of the business. Aside from the Gray & Davis business, individual sales of new machinery have been in lots of one or two, with a slight increase in the aggregate over the previous week. Used tool sales include two gear cutters, a Brown & Sharpe surface grinder, an upright drill, a 14-in. lathe, two turret lathes and two upright drills. The used machinery market, however, is quieter than it has been for weeks, due to the increase in the number of auction sales in this territory. With the market having hardly recovered from the Government sale at Squantum, Quincy, Mass., there is a sale today at Providence, of a large list of machines. Many of the tools sold at Squantum were taken by New York State, New Jersey and Philadelphia buyers.

The Brown & Sharpe Mfg. Co., Providence, R. I., has issued new price lists on small tools, which show some reductions on micrometer sets. Set No. 133 heretofore listed at $28, is now $22.50; No. 134, which was $63.75, is now $51.75; caliper set No. 137, formerly $109.50 is now $90, and set No. 138 is $145.25, formerly $163.75.

Bids are asked by John H. Wisbach, 1123 Commonwealth Avenue, Boston, automobile bodies, on a contemplated one-story, 80 x 89 ft. plant on North Beacon Street, Allston, Boston.

Papers have been placed on record showing the sale of considerable water front land in Salem by the Boston & Maine Railroad to the Salem Terminal Corporation, the latter controlled by Charles H. Tenny & Co., Boston. The corporation plans the erection of coal handling plant and superpower plant. Crane and machine shop equipment will be required.

The A. P. McCullough Mfg. Co., 216 High Street, Boston, has under consideration plans for enlarging its machine shop. Heavy duty machine tools will be required.

Machine shop and manual training equipment will be required for a three-story, 230 x 232 ft., $700,000 school to be erected by Chelsea, Mass., plans for which are being drawn. Bids will be asked about Sept. 15.

Permit has been granted the Union Mfg. Co., 221 Pleasant Street, Fall River, Mass., textiles, to build a one-story, 26 x 364 ft. unit. Motors and other equipment are required.

The Roy Mfg. Co, 192 Granite Street, Quincy, Mass., portable oil servers, has reorganized under the same firm name with Chester I. Campbell, president, and James E. Harcourt, general manager. The company has indefinite plans for expansion.

Foundations are being laid for a three-story and basement building, 90 x 100 ft., at the plant of the Judd Paper Co., 166 Race Street, Holyoke, Mass., estimated to cost $80,000, for which plans were prepared by George P. B. Alderman & Co., 316 High Street, Holyoke, architects.

The Connecticut Light & Power Co., Milford, Conn., will commence the construction of a new power plant on the Housatonic River, estimated to cost $675,000, including equipment.

The General Electric Co., Schenectady, N. Y., will increase production at its plant at Bridgeport, Conn., including the development of a new department for the manufacture of rubber-covered wire. Other departments will include the production of flexible steel conduit, armored cable, steel outlet boxes and covers, and kindred equipment heretofore produced at other works.

The Wilcox-Crittenden Co., Middletown, Conn., manufacturer of marine hardware, etc., has awarded contract to C. O. Stone & Sons, Inc., 111 South Main Street, for a three-story addition, 60 x 60 ft., estimated to cost $45,000.

The Oakville Pin Co., Oakville, Conn., has awarded contract to the J. W. Ferguson Co., Paterson, N. J., for a two-story addition, 70 x 120 ft., estimated to cost $43,000

In connection with the liquidation of the American & British Mfg. Co., Bridgeport, Conn., property of the company will be sold at auction Oct. 1-3, inclusive, including equipment.

Foundations will be laid for the construction of a one-story machine shop, 50 x 100 ft., at the plant of the Shawmut Engineering Co., Freeport Street, Dorchester, Mass.,

estimated to cost $25,000. Headquarters are at 24 Milk Street, Boston. E. F. Hathaway is general manager.

Bids are being asked on a general contract for a three-story addition to the plant of the Davol Rubber Co., Point and Eddy Streets, Providence, R. I., to cost $80,000. F. P. Sheldon & Sons, Hospital Trust Building, are architects.

Baltimore

BALTIMORE, Sept. 10.

AN expenditure of $6,500,000 will be made during the year by the Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, including work now in progress. Within the next twelve months, about $1,000,000 will be used for extensions at the Westport generating plant, to include the installation of two turbo-generators. Extensions will be made at the Penn Street power house to cost $100,000. A new gas purifier house will be erected at the Riverside plant, estimated to cost $200,000 including equipment, and waste heat boilers and other equipment will be installed at the Spring Garden station.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Sept. 25 for 8,600 lb. of iron or steel washers, schedule 1291, for the Norfolk Navy Yard; until Oct. 2 for bolts and nuts for the Boston and Mare Island Navy Yards, schedule 1290.

The Crown Coal Co., Salem, Va., M. J. Anderson, president, recently organized with a capital of $250,000, is planning for the installation of electric power and mechanical equipment on a tract of 60 acres, including hoisting, conveying and other machinery.

The D. M. Lea Co., Main and Twentieth Streets, Richmond, Va., will take bids on a two-story plant, 200 x 300 ft., for the manufacture of wood boxes, etc., to cost about $250,000 with machinery. Carneal & Johnston, Chamber of Commerce Building, are architects.

The Baptist & Goode Co., Boydton, Va., manufacturer of juvenile coasters and vehicles, is planning for the installation of forge shop equipment.

The Crisp County Lumber Co., Cordele, Ga., has tentative plans for rebuilding its plant and power house, partially destroyed by fire, Sept. 4, with loss estimated at $100,000, including machinery.

The Savannah Gas Co., Savannah, Ga., will install additional steam power and other machinery in connection with extensions to cost $500,000. The company has arranged for a stock issue of $1,850,000 and bond issue of $600,000.

A vocational department will be installed in the high school to be erected at Chesterfield, S. C., for which foundations will soon be laid. The Board of Education is in charge.

The Buchanan Locust Pin Co., Buchanan, Va., has awarded a contract to William R. West, Buchanan, for a new plant, 30x70 ft., with extension, 30x50 ft., for the manufacture of insulator pins, brackets, etc., estimated to cost about $35,000, with machinery. L. G. Vaughn is president and C. C. Crouch, general manager.

Bids will be received by the Chief of Air Service, United States Army, Washington, until Sept. 24 for two portable air compressors, circular C. A. S. 24-76; until Sept. 18 for 200 radiator assemblies, circular C. A. S. 24-23.

The Prudential Oil Co., Keyser Building, Baltimore, will build a new storage and distributing plant at Fourth Avenue and Seventh Street, estimated to cost $100,000, with equipment.

The Common Council, Sylvester, Ga., is considering the installation of electrically-operated pumping machinery at the municipal waterworks, to replace present steam-operated equipment.

J. E. McDonald, Cuthbert, Ga., has inquiries out for a stationary engine 50 to 60 hp., with auxiliary equipment, second-hand, in good condition.

The Board of Trustees, Cullowhee Normal and Industrial School, Cullowhee, N. C., is perfecting plans for extensions in the power house at the institution, including the installation of additional equipment, estimated to cost $45,000. H. A. Underwood, Commercial Bank Building, Raleigh, N. C., is engineer.

The Annapolis & Chesapeake Bay Power Co., Annapolis, Md., will issue bonds for $800,000, of which about $200,000 will be used for extensions in power plant and system and the installation of additional equipment.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a stationary steam engine, 125 to 150 hp., second-hand in good condition; also for a steel oil tank, about 20,000 gal. capacity; and for ten stevedore trucks, pony type.

The Morgart Coal Mining Corporation, Jennings, Md., will install electric power and mechanical equipment at its properties in the northern part of Garrett County, including machinery for the opening of a new mine and the electrification of existing mines. William A. Morgart is president.

Plans are under way for the installation of an ice and cold storage plant at the factory of the Planters Nut & Chocolate Co., Suffolk, Va., in connection with the erection of a five-story addition, estimated to cost $250,000, with machinery.

Electric and steam power equipment, conveying machinery, etc., will be installed in the new plant and power house to be erected by Archer's Laundry, Howard and Mulberry Streets, Baltimore, to cost $500,000, of which $200,000 will be used for equipment.

The Brady Mining Co., McLean, Va., recently organized, is planning for the installation of electric power and other equipment at its copper properties near Brady, Va. A power house will be erected. F. N. Hagman, Vienna, Va., heads the company.

The Tallapoosa River Power & Textile Corporation, Tallapoosa, Ga., recently organized with a capital of $500,000 has tentative plans for the construction of a hydro-electric power plant on the Tallapoosa River, to cost in excess of $150,000. W. W. Summerlin, Camp, Ala., heads the company.

The Tiger Tire & Rubber Corporation, 749 Equitable Building, Baltimore, recently organized, is contemplating the erection of a plant at Havre de Grace, Md., for the manufacture of automobile tires, estimated to cost $150,000 with equipment.

The Chicago Nipple Mfg. Co., First Avenue and Ninth Street, Baltimore, manufacturer of pipe nipples, pipe coils, etc., has acquired an adjoining building which will be remodeled for manufacturing purposes.

Philadelphia

PHILADELPHIA, Sept. 10.

CONTRACT has been awarded by the Edward G. Budd Mfg. Co., Hunting Park Avenue and Wissahickon Street, Philadelphia, manufacturer of steel automobile bodies, to the Wark Co., 1600 Walnut Street, for a six-story addition, 100x325 ft., with one-story extension, 75x325 ft., to cost about $800,000, including machinery.

The Ford Motor Co., Highland Park, Mich., has plans for the erection of its new assembling plant on Sixty-third Street, Philadelphia, for which bids will soon be asked on a general contract. It will be one-story, 400x925 ft., estimated to cost $500,000 with equipment. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Pennsylvania Sugar Co., Delaware Avenue, Philadelphia, has awarded a contract to the O'Meara Construction Co., 223 Warnock Street, for an addition to its refinery, to cost $300,000.

The R. W. Hartnett Co., 1010 Race Street, Philadelphia, manufacturer of printing equipment and supplies, has plans for a new three-story factory, 50x95 ft., to cost $70,000 with equipment.

The Steel Heddle Mfg. Co., Twenty-third Street and Allegheny Avenue, Philadelphia, is taking bids on a general contract for its branch plant at Greenville, S. C., estimated to cost $100,000 with equipment. J. E. Sirrine & Co., Greenville, are architects and engineers in charge.

The plant of the Wright Roller Bearing Co., 2929-55 North Twentieth Street, Philadelphia, on site 201x270 ft., has been acquired by C. B. Mertz, Philadelphia, for $100,000. The new owner is said to be planning to use the property for a similar line of production.

The Berko Brothers Co., Randolph and Wood Streets, Philadelphia, manufacturer of ornamental and other iron work, will commence the erection of a one-story addition, 75x90 ft., at 327 North Randolph Street, estimated to cost $25,000.

The Board of Education, Atlantic City, N. J., is taking bids on a general contract until Sept. 20 for a three-story addition, 42x125 ft., to the vocational and industrial school at Indiana and Baltic Avenues, to cost $160,000. Bertram Ireland, Guarantee Trust Building, is architect.

Manual training equipment will be installed in the two-story and basement junior high school to be erected on West Walnut Street, Shamokin, Pa., estimated to cost $130,000, for which an architect will soon be selected to prepare plans.

The Textile Machine Works, Wyomissing, Pa., has acquired the two foundries of Edwin A. Moore, Fort and Robeson Streets, Reading, Pa., for $85,000 and $35,000, respectively. The new owner plans for extensions.

The Falker Coal Co., Ashland, Pa., has plans for a new mechanical coal washery, to cost in excess of $45,000.

The Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, will install additional machinery at its coal breakers in the Pottsville, Pa., district, including repairs and parts replacements in present equipment.

The Reading Rubber Co., Carsonia Avenue, Reading Pa., is perfecting plans for an addition and improvements to its plant at Fleetwood, Pa., estimated to cost $80,000. Samuel H. Bell is president.

C. A. McClure and C. Schubert, Philadelphia, are organizing the Sandy Creek Township Power Co., Greenfield Township Power Co., and the French Creek Township Power Co., to construct power plants and systems in the respective territories. State charters will be granted on Sept. 24. James C. Jones, Bullitt Building, is representative.

Electric power equipment, conveying machinery, etc., will be installed in the two additions to be erected by the Lemoyne Block & Brick Co., Lemoyne, Pa., estimated to cost $25,000, for which plans have been completed.

Pittsburgh

PITTSBURGH, Sept. 10.

THE machine tool business has been dull the past week. Sales have been entirely of single tools and only in one or two cases have involved large expenditures. The crane market also has had a quiet week in sales and inquiries. Some activity has been observed in car equipment.

The Clarksburg Gas & Electric Co., Clarksburg, W. Va., has placed a 5000-kw. turbine with a 60-kw. motor generator set, for excitation purposes, with the General Electric Co., and a condenser with the C. H. Wheeler Mfg. Co. The Eastern Ohio Mfg. Co., which is equipping a plant at Warren, Ohio, to make cold-rolled strips, has placed the order for the electrical equipment with the General Electric Co., which includes one 750-kw. motor generator set, two 150-hp., four 100-hp., and four 50-hp. variable speed motors, together with the switchboard and control equipment.

Tentative plans are being considered by the Locomotive Stoker Co., 100 General Robinson Street, Pittsburgh, for a new one-story machine shop.

The Ohio River Edison Co., Sharon, Pa., and Toronto, Ohio, has made application for permission to construct an electric generating plant, coal-handling works, ice breakers and harbor terminal on the Ohio River at Toronto, about 55 miles distant, to cost $1,000,000 with machinery.

Manual training equipment will be installed in the proposed two-story high school to be erected at Beckley, W. Va., estimated to cost $250,000, for which an architect will soon be selected.

The Pennsylvania Railroad Co., Central Region, Conemaugh Division, Pittsburgh, George Nauman, 1155 Liberty Avenue, Division Engineer, has tentative plans for a new engine house and repair shops at Sharpsburg, Pa., estimated to cost $100,000. A. C. Shand, Broad Street Station, Philadelphia, is chief engineer.

The Logan Cut-Out Switch Mfg. Co., Logan, W. Va., recently organized with a capital of $100,000 to manufacture patented electric switches, has perfected arrangements with the West Virginia Grinding & Machine Shops, Huntington, to manufacture and assemble its equipment. The new company has tentative plans for the establishment of a plant at Logan at an early date. William Abraham is president.

Manual training equipment will be installed in the high school to be erected at Warren, Pa., for which it is expected to vote an appropriation of $350,000.

The Sterling Oil Products Co., Huntington, W. Va., is perfecting plans for the construction of a new storage and distributing plant on Thirty-first Street, estimated to cost $150,000. G. C. Barnes is general manager.

The Guyan Machine Shops, Logan, W. Va., machinery dealers, have inquiries out for a heavy duty milling machine, electric and steam-operated hoists, portable type, including belt-driven equipment, and for a number of transformers, 10, 15 and 20 kva. capacity, with hangers, fuses, lightning arresters, etc.

The A. C. Love Co., Huntington, W. Va., machinery dealer, has inquiries out for a hydraulic wheel press, about 200 tons capacity. Also, for a toggle press, Bliss type.

The Virginian Power Co., Charleston, W. Va., has acquired property adjoining its electric power plant at Cabin Creek Junction and plans for a new addition for considerable increase in capacity.

Manual training equipment will be installed in the new three-story high school to be erected at Charleston, W. Va., estimated to cost $500,000, for which bids will be asked on a general contract late in Oct. H. R. Warne, Masonic Temple Building, is architect.

Detroit

DETROIT, Sept. 10.

A FIVE-STORY power plant, 110 x 140 ft., to cost about $200,000, will be erected by the Ford Motor Co., Highland Park, Mich., at Iron Mountain, Mich. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Columbia Motor Co., 6501 Mack Avenue, Detroit, has acquired the plant of the Liberty Motor Car Co., Charlevoix Avenue, at a receiver's sale and will use it for expansion.

Work will commence on an addition to the municipal power plant at Detroit, for which bonds for $1,000,000 recently were voted, to include the installation of machinery. The Municipal Power Department is in charge.

Electrically-operated pumping machinery will be installed at the new waterworks plant to be built by the Board of Works, Jackson, Mich., estimated to cost $400,000, for which plans are being prepared by Howd, Decker, Shoecraft & Dryer, 303 South State Street, Ann Arbor, Mich., engineers.

The Castile Mining Co., Ramsay, Mich., will build a new power house, machine shop and other buildings at its new shaft, to cost $400,000 with equipment.

The Auto Specialties Mfg. Co., St. Joseph, Mich., has preliminary plans for additions, including a one-story foundry, core department, hard iron shop and power house. Foundations will be laid at once for the initial structure to be L-shaped, 300 x 300 ft., primarily for the production of malleable iron castings. The expansion, with equipment, is estimated to cost $200,000.

Ogleby, Norton & Co., Hanna Building, Cleveland, operating iron ore properties at Ramsay, Mich., and vicinity, have awarded a general contract to the Foundation Co., 120 Liberty Street, for a one-story machine shop and power house estimated to cost $500,000.

The Arcadian Consolidated Mining Co., Calumet, Mich., is planning the installation of new hoisting machinery, air compressor, two boilers and auxiliary power equipment at its New Baltic properties, replacing the works destroyed by fire last spring.

The Ashton Equipment Co., Watervliet, Mich, manufacturer of metal and wood equipment for postoffice service, which recently arranged for the removal of its plant from Chicago to a local building, is considering plans for a new factory, 50 x 100 ft. The local Chamber of Commerce is interested in the project.

Electrically-operated pumping machinery will be installed by the City Council, Winona, Mich., in connection with extensions in the municipal waterworks, for which plans are being prepared by Alvord, Burdick & Howson, 8 South Dearborn Street, Chicago, engineers.

Buffalo

BUFFALO, Sept. 10.

PLANS are being perfected by the Ontario Paper Co., Thorold, Ont., for a new paper mill and power plant on site acquired on Little Island, North Tonawanda, N. Y., estimated to cost $2,000,000 with equipment. Warren Curtis, general manager, is in charge.

A machine shop will be installed in the three-story automobile service building to be erected on Elmwood Avenue, Buffalo, by the Becker-Hoffman Service Co., 250 Franklin Street, to be 50 x 115 ft., estimated to cost $85,000.

The Martin Pulp & Paper Co., Norwood, N. Y., has commenced the erection of a new plant for the manufacture of tissue papers, to cost in excess of $150,000 with machinery.

Manual training equipment will be installed in the new two-story and basement high school at Sherburne, N. Y., estimated to cost $125,000, for which bids are being taken on a general contract. J. Mills Platt, Cutler Building, Rochester, N. Y., is architect.

L. Bergman, city engineer, Jamestown, N. Y., will purchase a boiler, pumping equipment and other machinery, for installation in the proposed addition to the Cassadaqua waterworks plant.

The New York Central Railroad Co., 466 Lexington Avenue, New York, has awarded a general contract to the Walsh Construction Co., Herald Building, Syracuse, N. Y., for a new engine terminal and repair shops at Selkirk, N. Y., estimated to cost $100,000.

Fire, Aug. 31, destroyed a portion of the plant of the Hoboken Paper Co., Gould, near Stottville, N. Y., with loss

estimated at $300,000, including machinery. Headquarters of the company are at 51 Newark Avenue, Hoboken, N. J.

C. W. Grinnell, Medina, N. Y., is planning the erection of a new ice and cold storage plant to cost about $60,000, to replace a similar works recently destroyed by fire.

The Garlock Packing Co., Palmyra, N. Y., manufacturer of steam packings, has announced plans of expansion to cost about $350,000. A new warehouse with 40,000 sq. ft. will form part of the additions.

Milwaukee

MILWAUKEE, Sept. 10.

DEFINITE improvement in the demand for agricultural machinery, largely from the cotton belt, has resulted in the material enlargement of working forces in farm equipment shops in this territory. The condition appears as the high light of the situation of foundries and machine shops at the moment. The past week's trade in general was confined largely to scattering purchases of one or a few tools by the automotive industries, with a few going to railroads and others to industrial machine shops. There was no marked increase of volume of sales, but inquiry was increasingly active and much is expected in the way of new business in September.

The J. I. Case Plow Works Co., Racine, Wis., increased its operating force by more than 300 the past week to handle a fair-sized accumulation of orders for planters, cultivators, plows and smaller tools, coming largely from the cotton belt. It was stated that it has been three years since the Case works have had as large bookings of manufacturing specifications as on Sept. 1. Nothing definite as to the trend of demand for machinery and tools in the wheat and corn belts has as yet appeared.

The Oneida Mfg. Co., Green Bay, Wis., incorporated recently with $500,000 capital stock, has completed the acquisition of the entire plant, assets and business of the Oneida Motor Truck Co., Green Bay, and will resume the operation on a moderate scale immediately. In addition to building motor trucks, the new concern will engage in the manufacture of gasoline railroad cars and coaches and miscellaneous power units, metal specialties, etc. L. W. Melcher, who assumed charge of the Oneida works as general manager last spring, is president and general manager of the new organization.

The Board of Education, New London, Wis., has selected Smith, Reynolds & Brandt, architects, Manitowoc, Wis., to design the proposed new $240,000 high and vocational training school. Foundations will be laid this fall.

The Thurner Heat Treating Co., 126 Ferry Street, Milwaukee, which is enlarging its plant, has changed from a partnership to a corporation, retaining the original title. The capital stock is $50,000. Rudolph J. Thurner has been elected president and general manager, and William B. Schroer, works manager.

E. W. Ihrig, of the Pine-Ihrig Mfg. Co., Oshkosh, Wis., has purchased the business and property of the defunct Washkosh Mfg. Co., which manufactured washing machines with manual and power drive, and will consolidate the factory with that of the Pine-Ihrig company, which is a manufacturer of wire spring machines, woodworking equipment and other special machinery. The new owner will need only a few items of miscellaneous tools to supplement the Washkosh equipment.

The Mid-West Automobile Accessories Mfg. Co., Green Bay, Wis., has been organized with $50,000 capital by Ralph W. Davis, A. R. Klug and A. A. Brazeau to establish a plant for the production of a general line of metal parts and specialties. A building has been leased and equipment is being purchased.

Charles Kuehn, Ripon, Wis., sustained an estimated loss of $12,000 when fire on Sept. 1 destroyed his machine shop and ruined most of the equipment. It was a frame structure which will be replaced with a concrete and brick building at once.

The Board of Education, Black River Falls, Wis., is considering tentative sketches for a proposed $75,000 addition to the high school to provide facilities for instruction in manual training and domestic science. The work is to be done in the spring of 1924. A. P. Jones is secretary of the board.

The Riverside Fibre & Paper Co., Appelton, Wis., let the general contract for a $300,000 paper finishing mill, 89 x 250 x 65 ft., one to five stories, to C. R. Meyer & Sons Co., 50 State Street, Oshkosh, Wis. Special paper mill machinery, electric motors, etc., are being purchased. Stephen Murphy is general manager. The engineer is T. W. Orbison & Co., Appleton.

The Janesville Tool Mfg. Co., Janesville, Wis., is making some purchases of tool room equipment from time to time to meet demands for special tools and dies from the typewriter, accounting machine and fine metal goods industries.

Cincinnati

CINCINNATI, Sept. 10.

THE past week was quiet so far as orders were concerned, but inquiries continue regularly and while none is large the character of those received indicates that some business will eventually develop. The principal source of activity is the automobile industry, and some orders for single tools were received from the Detroit district last week. The safe companies at Hamilton, Ohio, also have been consistent buyers for some time. Scattered orders for single tools from railroads are also reported.

It is expected that a demand for machine tools will develop for shipment to Japan following the disastrous earthquake, but export orders at present are negligible. Used machinery is still moving fairly well.

The Baker Car Co., recently incorporated in Kentucky, is having plans prepared for a factory to be erected at Lexington, Ky., in which it is proposed to build mine cars and kindred equipment. J. M., W. G., and J. A. Baker, Harriman, Tenn., are the principal incorporators.

The Eugene Strauss Cabinet Co., Louisville, Ky., has awarded contract for a brick and concrete factory to cost approximately $250,000. It will also erect a number of cottages for housing its employees. The company will manufacture all kinds of cabinets and will install a number of woodworking machines.

The Louisville Petroleum Refining Co., Louisville, Ky., will shortly commence the construction of a refinery to cost $300,000. It will have a daily capacity of 2500 bbl., and will be completed in about six months. W. M. Mitchell is president.

Chicago

CHICAGO, Sept. 10.

DEMAND for machine tools shows little, if any, improvement, although here and there manufacturers of seasonal goods are adding to their equipment. A local company making winter fronts for automobile radiators purchased two punch presses. The Western Electric is placing considerable equipment for its new wire plant, but this is largely special machinery made according to the company's own specifications. Prospects for railroad business this fall are not particularly bright because some of the roads are finding it necessary to economize, owing to diminishing returns. The Chicago, Indianapolis & Louisville, however, has put out an inquiry for woodworking machinery, and the Chicago, Burlington & Quincy is in the market for a 10-ft. 14-gage hand cornice brake. The latter road is also expected to close against its list of long standing, although no definite word has been given out as to just when such action will be taken.

Following is the Chicago, Indianapolis & Louisville list of woodworking machinery:

One cut-off saw to cut material 10 in. square.
One rip-saw to handle material 8 in. thick x 16 in. wide.
One No. 3 hand saw.
One double cylinder planer to handle 12-in. material.
One combination automatic car gainer.
One vertical and horizontal chisel mortiser with vertical car borer attached, having traveling carriage 40 ft. long.

The D. O. James Mfg. Co., manufacturer of cut gears, 1120 West Monroe Street, Chicago, has placed contract for a three-story factory, 48 x 50 ft., to cost $50,000. This will constitute the third unit of the company's new plant.

The National Lock Co., Rockford, Ill., will erect a one-story factory, 100 x 151 ft., to cost $25,000.

William Gaertner & Co., manufacturers of scientific instruments, 5343-9 Lake Park Avenue, Chicago, have sold their plant and are constructing a new factory to cost

$150,000 on a 150 x 150-ft. site at Wentlewood and Racine Avenues.

The York Mfg. Co., manufacturer of ice-making and refrigerating machines, 1509 North Halsted Street, Chicago, has let contract for a one-story addition, 58 x 50 ft., to cost $20,000.

The Chicago Window & Door Screen Co., 5118 South State Street, Chicago, has let contract for a two-story factory, 57 x 112 ft., at 5322-26 South State Street, to cost $15,000.

The Chicago Motor Coach Co., 1124 Rosemont Avenue, Chicago, has awarded contract for a one-story garage, 259 x 260 ft., at 1333-55 Wilcox Street, to cost $200,000.

The Bankers Supply Co., 5950 South State Street, Chicago, has let contract for a two-story printing plant, 80 x 116 ft., at 38-44 West Sixtieth Street, to cost $45,000.

The Seng Co., manufacturer of hardware, 1440-46 Dayton Street, Chicago, has awarded contract for two additional stories, 87 x 183 ft., to its factory, to cost $50,000.

W. H. Hutchinson & Son, manufacturers of bottlers' supplies, 2101 Walnut Street, Chicago, are having plans prepared for a two-story factory, 50 x 125 ft., at the northwest corner Hoyne Avenue and Lake Street, to cost $45,000.

The Hays Brass & Aluminum Foundry Co., recently incorporated with $50,000 capital stock at Michigan City, Ind., will operate two plants, one at Michigan City and one at LaPorte.

The Electric Auto Lite Co., Adrian, Mich., is fitting up an additional floor in its factory which will double its capacity. The Adrian plant is used for winding armatures for starting and lighting systems of automobiles and it is planned to increase the daily production of 800 wound armatures to 1500 or 2000.

The Ross Machine Works, Lincoln, Neb., contemplates the purchase of a milling machine and an engine lathe.

Fairbanks-Morse & Co., Chicago, have purchased all except one-and-a half acres of the former County workhouse property at Indianapolis, Ind., and contemplate erecting new factory buildings to adjoin their present plant at Indianapolis, which covers four and one-half acres.

Manufacturing operations have been started at the plant of the Tri-City Malleable Casting Co., East Moline, Ill., a new organization.

The Woods-Everetz Stove Co., Springfield, Mo., has started construction of an addition for the manufacture of enameled ware on gas ranges and other stoves to cost $3,500. It is also repairing a building formerly belonging to the Springfield Machinery Co., purchased last year, which will be used for an enlarged nickel plating department.

J. L. Davis, Jr. and M. E. Peace have purchased the machine shop of Thomas Morton, Magnolia, Ark., which they plan to rebuild.

The Marks-Fiske-Zeiger Co., 2503 Twenty-fourth Street, Detroit, is in the market for 300 tons of 80-lb., No. 1 relaying rails, A.S.C.E. quality, and angle bars to match.

Plans are in progress for the construction of a new power house at the State Teachers' College, Macomb, Ill., to cost $125,000. The Department of Public Works and Buildings, Springfield, Ill., is in charge. E. A. Martin, 304 South Wabash Avenue, Chicago, is State architect.

Bids will be received by the Bureau of Reclamation, United States Government, Denver, Colo., until Oct. 3, for hoisting machinery, gates and miscellaneous metal work for the Boise project, Idaho, and the Riverton project, Wyoming.

The Metropolitan Utilities Co., Omaha, Neb., will build a one and one-half story and basement addition to its electrically-operated pumping plant at Twenty-eighth Avenue and Hunt Street, and will install additional equipment.

The Mulvey Iron Works, 1840 Carroll Avenue, Chicago, is having preliminary plans drawn for a new one-story steel fabricating plant. G. J. Helbach, 415 South Dearborn Street, is engineer.

A machine shop will be installed in the two-story and basement automobile service building, 50 x 125 ft., to be erected by the Belsky Motor Co., Iowa and Sixth Streets, Dubuque, Iowa, to cost $60,000. Koenigsberg & Weisfeld, 5 North La Salle Street, Chicago, are architects.

The Chicago Metal Mfg. Co., 3724 South Rockwell Street, Chicago, is planning for the installation of sheet-metal working machinery, including shears, punches, etc.

The Common Council, Washington, Iowa, is planning for the installation of electrically-operated pumping machinery, switchboard and auxiliary equipment in connection with extensions and improvements in the municipal waterworks, estimated to cost $80,000. A. L. Mullergren, Gates Building, Kansas City, Mo., is engineer.

The Domestic and Foreign Commerce Department, Chicago Association of Commerce, 10 South La Salle Street, has received an inquiry (No. 2358) from a company at Tehuacan, Pueblo, Mex., in the market for American machinery for the manufacture of fiber rope and kindred products.

The Republic Flow Meters Co., 2240 Diversey Parkway, Chicago, manufacturer of steam meters, etc., will take bids for a two-story and basement addition to cost $30,000. The L. G. Hallberg Co., 116 South Michigan Avenue, is architect.

The Arpinus Mfg. Co., 2601 Cottage Grove Avenue, Chicago, manufacturer of metal and tin specialties, is planning for the installation of a 36-in. shear.

The Central Power Co., Omaha, Neb., has construction in progress on a new steam-operated electric generating plant on the Platte River, near Grand Island, Neb., estimated to cost $750,000, with turbo-generators and auxiliary machinery.

Manual training equipment will be installed in the new high school to be erected at Williamsfield, Ill., estimated to cost $90,000, for which an architect will soon be selected.

Cleveland

CLEVELAND, Sept. 10.

ORDERS and inquiries for machine tools show improvement and indications are that September business will be considerably larger than that in August. While no lists of any size have come out, machine tool manufacturers are getting a good volume of inquiries for small lots and single machines. Bids were opened Sept. 4 for considerable equipment for the Roosevelt High School, Dayton, Ohio. The equipment of the Elyria Machine Co., Elyria, Ohio, will be sold at auction Sept. 13 and includes 65 machines of various types.

There is some speculation among machinery men as to the demand for machine tools which will come from Japan to replace equipment destroyed by the earthquake.

The largest order reported is for 17 machines placed by the Eaton Axle & Spring Co., all of which went to a Cleveland dealer. It included two presses, 13 polishing lathes and 2 grinders for the Cox automobile bumper plant, which was recently purchased by the Eaton company, and two automatic disk grinders for the spring plant. The Ford Motor Co. purchased 12 large turret lathes from a Cleveland manufacturer. Other orders include two large turret lathes and two or three screw machines for the Westinghouse Air Brake Co., two turret lathes for the Central Railroad of New Jersey, one turret lathe for the Elgin, Joliet & Eastern Railroad, and nine hand screw machines for the William Powell Co., Cincinnati. One foreign order for a turret lathe came from France, which is the first export order received by a Cleveland company for some time. This manufacturer reports that its August orders increased 100 per cent over July.

The Central South

ST. LOUIS, Sept. 10.

PLANS are being arranged by the St. Joseph Railway, Light & Power Co., St. Joseph, Mo., for a new electric generating plant to cost $1,000,000 with machinery.

The Acme Mfg. Co., Marion, Mich., has leased the Overland Building, Wall and Second Streets, Joplin, Mo., for the establishment of a branch plant to manufacture refrigerators, automatic vending machines, metal cans, etc.

The Michael & Ferguson Hardware Co., Paducah, Ky., has authorized plans for a four-story and basement factory, 115x150 ft., to cost $150,000 including equipment. D. Harry Jamieson, 438 South Second Street, is architect; M. Michael is president.

The National Convertible Body Co., 309 Union National Bank Building, Knoxville, Tenn., B. D. Hammond, president, is perfecting plans for the establishment of a new works for an initial output of about twenty bodies per day.

The Crystal Ice & Fuel Co., Wichita, Kan., will build a one-story addition to its power house, for which plans are being drawn by Ebefson & Weaver, 514 Orpheum Building, architects.

Bids will be received by the Board of Supervisors, Foley, Mo., until Sept. 15 for equipment for a local pumping plant, including one 10 hp. oil-operated engine, vertical or horizontal; one centrifugal pump, 7500 gal. per min. capacity; one oil storage tank, and auxiliary equipment. T. N. Jacobs, 1900 Railway Exchange Building, St. Louis, is in charge.

A machine shop will be installed in the four-story automobile service building to be erected at Twenty-seventh and Main Streets, Kansas City, Mo., by the Studebaker-Riley

Co., Twenty-first Street and Grand Avenue, estimated to cost $250,000. Nelson Riley is president.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, is in the market for a number of used industrial trucks, suitable for logging or lumber service; also, for ten sets of wheels and axles for lumber trucks, to be used on iron rails, 30 in. gauge.

The Kentucky-Tennessee Light & Power Co., Hopkinsville, Ky., will commence the construction of a new steam-operated electric power plant, with 3000 kw. turbo-generator, boilers, stokers and auxiliary equipment, estimated to cost $300,000.

The Paris Gas & Electric Co., Paris, Ky., is planning to rebuild the portion of its electric power plant recently destroyed by fire. Additional equipment will be installed.

The Common Council, Goff, Kan., plans for the installation of electrically-operated pumping machinery in connection with a new waterworks system. The Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., is engineer.

The R. M. Denhard Co., Bardstown Road and Eastview Lane, Louisville, is planning for the establishment of a new machine shop for automobile parts and repairs to replace the works recently destroyed by fire.

The Common Council, Winfield, Kan., will install electrically-operated pumping machinery and other equipment in connection with extensions and improvements in the municipal waterworks, estimated to cost $110,000. H. P. Haynes, Winfield, is engineer.

Chester Davis, Colcord Building, Oklahoma City, Okla., has plans for the erection of a one-story machine shop, 48x100 ft., at 1111 West Main Street.

Manual training equipment will be installed in the new three-story high school to be erected at Dexter, Mo., estimated to cost $95,000, for which bids will be received on a general contract until Sept. 29. H. H. Hohenschild, Odd Fellows Building, St. Louis, is architect.

The Natural Rock Asphalt Co., Brownsville, Ky., recently formed with a capital of $350,000, fully paid, has tentative plans for the construction of a power house in connection with a new plant in Edmonson County, estimated to cost $150,000. C. K. Kirkpatrick is president.

The Gulf States

JACKSONVILLE, Sept. 10.

WORK will commence on rebuilding the portion of the plants of the Dallas Brass Mfg. Co., and the Motor Products Corporation, 2810-12 Elm Street, Dallas, Tex., affiliated organizations, destroyed by fire, Aug. 27, with loss estimated at $30,000. J. Watt Davis is president of both companies.

The Whiting Railway Motor Car Co., Tampa, Fla., has tentative plans for the establishment of new works to manufacture railroad passenger cars, operated by gasoline motors, estimated to cost $90,000. F. W. Brown and J. A. Whiting, both of Tampa, head the company.

The Oldsmar Automotive Accessory Corporation, Oldsmar, Fla., recently organized, has acquired the machine shop and foundry of the Oldsmar Mfg. Co., and will remodel the works to manufacture a line of automobile equipment.

The Mack International Motor Truck Corporation, 25 Broadway, New York, has plans for the erection of a new factory branch at Hickory and Ervay Streets, Dallas, Tex., 110x150 ft. C. E. Craddock, State manager, will be in charge.

Manual training equipment will be installed in the new three-story high school to be erected at Nederland, Tex., estimated to cost $100,000, for which bids have been called on a general contract. E. O. Taylor, 1802 Orange Street, Beaumont, Tex., is architect.

The Common Council, Ennis, Tex., plans the installation of electrically-operated pumping machinery in connection with extensions and improvements in the municipal waterworks, estimated to cost $50,000.

The J. R. Littlepage Drilling Co., Monroe, La., is planning to purchase portable oil-well drilling machinery, steam and gas-operated. J. R. Littlepage is president.

Fire, Aug. 31, destroyed a portion of the plant of the Orient Oil Refining Co., Wichita Falls, Tex., with loss estimated at $125,000 including equipment. It will be rebuilt.

The Burns Construction Co., Sarasota, Fla., has preliminary plans for new works to manufacture cement blocks, tile and similar products, estimated to cost $50,000 including machinery. T. R. Martin, Sarasota, is architect. Owen Burns is president.

The Common Council, Mercedes, Tex., is arranging for a special election to vote bonds for $150,000, the proceeds to be used for the installation of a municipal electric power plant and electrically-operated waterworks system.

The Magnolia Petroleum Co., Dallas, Tex., has arranged for the construction of a new oil refinery in the Luling Field, near Beaumont, Tex., with an initial capacity of 6000 bbl. per day.

The Sinclair Refining Co., Houston, Tex., will make extensions and improvements in its local oil refinery and distributing plant on the Houston Ship Channel, to cost in excess of $5,000,000, including the installation of additional machinery.

The Vulcan Rivet Corporation, Box 302, Birmingham, is in the market for a bar shear, capacity, 2-in. round bar; one six-spindle power feed drill, capacity 5-8 in., each spindle operated separately.

Indiana

INDIANAPOLIS, Sept. 10.

PLANS are being drawn for a one-story addition, 120 x 210 ft., to the plant of the Super-Heater Co., Railroad Avenue and 151st Street, East Chicago, Ind., estimated to cost $75,000.

Bids will be received by the Board of Public Works, City Hall, South Bend, Ind., until Sept. 19 for equipment for the new waterworks plant, including two Corliss pumping engines, each with capacity of 5,000,000 gal. per day, and auxiliary pumping plant machinery; two 150 hp. watertube boilers, with superheaters, and miscellaneous boiler house equipment; coal and ash-handling machinery. J. W. Toyne, South Bend, is engineer in charge.

Manual training equipment will be installed in the proposed new junior high school to be erected at Todd Park, East Chicago, Ind., estimated to cost $400,000. K. D. Norris, Calumet Building, is architect.

The Aladdin Lamp Co., Muncie, Ind., is considering plans for rebuilding the portion of its factory destroyed by fire Sept. 5 with loss estimated at $20,000, of which the greater part represents machinery.

A two-story power plant, 50 x 60 ft., will be constructed by the Excelsior Laundry Co., 222 North Alabama Street, Indianapolis, at its new laundry works, to cost approximately $300,000 with machinery. Blaine H. Miller is president.

Plans are being arranged by the New York, Chicago & St. Louis Railroad Co., Cleveland, (Nickel Plate System), for extensions in its locomotive shops at Frankfort, Ind., including a new engine house, repair shop and other buildings, estimated to cost $300,000, with equipment.

The Pacific Coast

SAN FRANCISCO, Sept. 5.

ERECTION will commence on two one-story additions to the plant of the California Metal Enameling Co., East Fifty-first Street, Vernon, 50 x 120 ft., and 60 x 75 ft., respectively, for which plans have been prepared by Hamm & Grant, Inc., 607 Ferguson Building, Los Angeles, engineers.

The Pacific Motor Products Co., San Francisco, manufacturer of bearings and other automotive equipment, has negotiations in progress for the purchase of a site at San Leandro, Cal., for the erection of a new plant. The local Chamber of Commerce, U. S. Ackles, secretary, is interested in the project. Charles Helser heads the company.

The Southern Pacific Railroad Co., 65 Market Street, San Francisco, has arranged an appropriation for extensions in its car and locomotive shops. The work includes the construction of a new one-story freight car repair shop and wheel shop at Brooklyn, Ore.; addition to steel foundry at the Sacramento shops, to cost $30,000, with a new woodworking plant and planing mill to cost $210,000 with machinery, and acetylene generating plant, $50,000; additional equipment at the Bayshore shops to cost $40,000; a new locomotive erecting shop and addition to machine shop at Los Angeles to cost $600,000 with machinery, and construction of a new power plant at the San Luis Obispo, Cal., shops to cost $50,000.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, will lay foundations for the construction of a new steam-operated electric power plant on Stevenson Street to cost approximately $250,000, including equipment.

The Southern Arizona Power Co., Nogales, Ariz., is disposing of a bond issue of $675,000, a portion of the proceeds to be used for extensions and improvements in electric power and ice-manufacturing plants.

Fire, Aug. 29, destroyed a portion of the plant of the Pacific Enamel & Mfg. Co., Oakland, Cal., with loss esti-

mated at $25,000 including equipment. It is planned to rebuild.

The Common Council, Tacoma, Wash., has authorized plans for extensions in the municipal power plant to cost $58,000.

The Columbia River Paper Mill Co., Vancouver, Wash., has arranged an appropriation of $1,500,000 for the construction of a new paper and pulp mill. F. W. Leadbetter is head.

The Wesco Blower & Pipe Co., Houston, Tex., C. L. Campbell, president, has leased property on East Fourteenth Street, Oakland, for the establishment of a new plant to manufacture exhaust fans, blowers, etc.

The Doble Steam Motors Corporation, San Francisco, has commenced super-structure work at its new plant at Emeryville, Cal., to manufacture steam-driven automobiles. It will cost in excess of $500,000 with equipment.

A manual training department will be installed in the new high school to be erected at Dallas, Ore., estimated to cost $90,000, for which plans are being prepared by Freeman & Struble, Salem, Ore., architects.

Canada

TORONTO, Sept. 10.

MACHINE-TOOL buying in small units continues to feature demand and dealers report a steady flow of orders for single machines. While large lists are absent, buyers are continually entering the market for tools and equipment for replacement purposes and inquiries are making their appearance more frequently than formerly. During the past two weeks Canadian railroads have been making substantial purchases of machinery and tools, and the automotive trades are also buying equipment in good volume. Demand for electrical equipment and mining machinery is also steadily increasing. While the call for new machinery and tools has been showing improvement, dealers state that rebuilt and second-hand equipment has shown even better strides and sales have been mounting.

The Red Star Refinery Co., Ltd., Montreal East, is in the market for oil filtering equipment.

Dick & Carew, Peterborough, Ont., are interested in equipment for a planing mill and box factory.

The Montreal Welding Co., 563 St. Timothee Street, Montreal, is in the market for equipment.

The Montreal Blue Print Co., 209 Beaver Hall Hill, Montreal, is asking for blue printing equipment.

The Canadian Westinghouse Co., Hamilton, Ont., is receiving bids for the erection of a foundry and will purchase equipment.

The Hydro Electric Commission, King Street East, Hamilton, Ont., is having plans prepared for the construction of sub-station and is in the market for transformers, switches, lightning arrestors, bus bars, insulators and wire. B. H. Prack, 1 Main Street, Hamilton, is engineer.

F. Barber, 45 Jarvis Street, Toronto, is preparing plans for the erection of an ice arena, 85 x 185 ft., for the Niagara Falls Arena Co., Ltd., Niagara Falls, Ont., to cost $150,000. The owners are in the market for an artificial ice plant.

Plans are being prepared for a waterworks plant to be built at Creemore, Ont., including mains, hydrants, valves, 3-stage electric pumps, etc. to cost about $40,000. James, Proctor & Redfern, 36 Toronto Street, Toronto, are architects.

The City Council, Three Rivers, Que., is contemplating the purchase of a steel foundry. It is the intention to make alterations in the plant and install machinery for the manufacture of electric steel products.

The Canada Axe & Harvest Tool Mfg. Co., Ltd., St. Patrick Street, Montreal, has let the general contract to James Shearer & Co., Ltd., for the erection of a factory.

The Brampton Tire & Rubber Co., Brampton, Ont., is in the market for equipment for a new $150,000 plant.

Work has been started on a $50,000 addition to the plant of the Pendrith Machinery Co., 970 Queen Street West, Toronto, manufacturer of bakers' and confectioners' equipment. The Dowling Construction Co., Yonge Street, Toronto, has the general contract.

The Canadian Roofing Co., Windsor, Ont., whose plant was recently destroyed by fire with a loss of about $60,000, is making arrangements for rebuilding and is interested in equipment.

STEEL AND INDUSTRIAL STOCKS

Slight Decline Occasioned by the First News from Japan Is Soon Recovered

In the face of the Japanese disaster steel and industrial stocks were but little disturbed. There was a slight drop at the opening, but this was soon recovered. Interests sponsoring independent steels still evince a hopefulness that higher levels can be brought about.

The range of active iron and industrial stocks from Monday of last week to Monday of this week was as follows:—

	High	Low		High	Low
Allis-Chalmers ..	43	44½	Int. Har. pf.....	106¼	107½
Allis-Chal. pf....	92	92	Lima Loco.	64⅞	67⅝
Am. B. S. & Fdy.	70	72	Midvale Steel ...	27⅝	28¾
Am. Can	95	100⅛	Nat. En. & Stm. ..	62½	64¾
Am. Can pf.....	106	107⅝	N. Y. Air Brake..	33⅝	34⅛
Am. Car & Fdy..	162½	164⅞	Otis Steel	8⅞	9¾
Am. Loco.	72⅛	73⅞	Pittsburgh Stl. pf.	94⅜	94¾
Am. Radiator ..	81¾	83¾	Pressed Stl. Car	55½	56½
Am. Roll. Mill pf.	98	98	Replogle Steel ..	12	14¼
Am. Stl. Fdries..	35⅞	37¼	Republic	46¼	51
Am. Stl. Fd. pf..	100	100	Republic pf. ...	92⅝	94⅜
Bald. Loco.	122	125⅝	Reynolds Spring.	19⅞	22¾
Beth. Steel	51¼	55¼	Sloss	48	49½
Beth. cum. pf...	94	94½	Steel of Canada	99¼	99¾
Chic. Pneu. Tool.	82	84½	Superior Steel ..	28¾	30
Colo. Fuel	29½	31	Un. Alloy Steel..	32	32
Crucible Steel ..	65	68⅝	U. S. Pipe.....	27½	31¼
Crucible Stl. pf.	89¾	90¼	U. S. Pipe pf....	73	74⅛
Deere pf.	61	61	U. S. Steel.....	91⅝	93¾
Gen. Electric ..	172	180	U. S. Steel pf...	116½	117
Gt. No. Ore Cert.	29¾	30⅞	Vanadium Steel.	31⅝	34½
Gulf States Steel	84	90⅜	Whouse Air Br.	81	82
Int. Har.	72⅜	77½	Y'gstown S. & T.	68	70½

Industrial Finances

The Arcade Malleable Iron Co., Worcester and Springfield, Mass., is to reincorporate under Massachusetts laws, with an authorized capitalization of $550,000 7 per cent first mortgage sinking fund bonds, $500,000 8 per cent cumulative preferred stock, and 10,000 shares of common stock having no par value. The company last week made a public offering of the preferred shares. H. P. Blumenauer, general manager of the old company, will be president as well as general manager of the new concern. He, together with the following, constitute the board of directors: John M. Collins, vice-president Moore Drop Forging Co., Springfield, Mass.; J. Verner Critchley, president Reed-Prentice Co., machine tools and president Walden-Worcester, Inc., wrenches, Worcester; Frank A. Drury, president Merchants National Bank, Worcester; Bowen Tufts, vice-president C. D. Parker & Co., Boston, bankers; Frank J. Weschler, president Hendee Mfg. Co., Springfield, motorcycles; and Arnold Whittaker, vice-president Massachusetts Trust Co., Boston. The backers of the original company have relinquished their active interest.

The Great Lakes Engineering Works, Detroit and River Rouge, Mich., and Ashtabula, Ohio, has sold to bankers, who in turn have resold to investors, $1,000,000 8 per cent cumulative preferred stock. Proceeds from the sale of these securities are to be used in retiring the present bonded indebtedness of $1,050,000, leaving all real estate and plants free and clear of liens.

John F. Lucey, president Lucey Mfg. Corporation, 233 Broadway, New York, manufacturer of oil well machinery, has made public an open letter addressed to holders of the corporation sinking fund notes and class A stocks, wherein he invites "a detailed investigation by representatives of the creditors, stockholders and noteholders as to the reason which made impossible an agreement with the banking firms." Disagreement arose over a plan of reorganization suggested by the banks, one of the firms holding out for conditions which Mr. Lucey deemed "unreasonable and improper."

The Hayes Wheel Co. reports gross sales for the first eight months of 1923 in excess of $13,100,000, and net earnings at $1,200,000. This compares with sales of $12,967,000 and profits of $1,346,000 for the full year 1922. Production schedules based on orders in hand indicate that this earning rate will obtain throughout the year.

Homestead Valve Mfg. Co. Absorbs Protected Seat Valve Co.

The Homestead Valve Mfg. Co., Homestead, Pa., manufacturer of the Homestead Quarter-turn Valve, announces that a consolidation has been effected with the Protected Seat Valve Co., Pittsburgh, which has been manufacturing the B & O Protected Seat Globe valve and the Protected Seat hydraulic operating valve; also a full line of check valves and angle valves with the protected seat feature. This line, which will carry the name of Homestead will now be made at the plant of the Homestead Valve Mfg. Co., and marketed along with the other products of the company.

Industrial News Item

By a plan of reorganization the Iron Products Corporation and subsidiaries will be merged into the Universal Pipe & Radiator Co., with capital of 90,000 shares of 7 per cent preferred stock of $100 par value and 100,000 shares of common stock, no par value. Iron Products Corporation subsidiaries include the Central Foundry Co., Central Iron & Coal Co., Central Radiator Co., Essex Foundry, Molby Boiler Co., Chattanooga Iron & Coal Co. and Central Foundry Co., of New Jersey.

Plans of New Companies

The Valley Rolling Mills, Inc., organized with capital stock of $750,000, has completed construction on a rolling mill situated at Elmira, N. Y. It is expected that operation will begin soon. The incorporators are V. A. Roberts, L. A. Anderson and M. K. Sessler. A detailed account will appear in a later issue.

The Clark Cement Brick & Block Co., New York, has been organized with capital stock of $150,000, and will engage in manufacturing cement bricks and blocks for construction purposes. It has an equipped plant at Jones' Point, N. Y., and will be operative shortly. J. M. Clark heads the company. Address care of L. E. Felix, 217 Broadway, N. Y.

Max Weiss & Sons, Inc., 18 Warren Street, New York, recently incorporated with capital stock of $65,000, has a plant in the Middle West engaged in manufacturing enamel ware and hospital accessories.

The Margach Mfg. Co., 213 Centre Street, New York, has been incorporated with capital stock of $100,000 to manufacture typesetting machines and parts. It has a completely equipped shop now turning out replacement parts for printing houses. H. Diamond, L. Krauss and L. Walsh are the incorporators.

The Helmerair Conditioning Corporation, 103 Park Avenue, New York, has been organized with capital stock of $50,000 to manufacture air cooling and conditioning systems for industrial use, succeeding the Lynn Air Conditioning Co. L. Helmer, F. Wells and A. J. Edwards are the incorporators. The company's plant is equipped and in operation.

The Johnson Equalizer Corporation, 505 Fifth Avenue, New York, has been incorporated with capital of $200,000 to manufacture the Johnson spring equalizer, a kind of shock absorber. Manufacturing will be done by contract, arrangements for immediate needs having already been made. L. W. Johnson is president; F. S. Cornell, vice-president, and T. G. Converse, secretary-treasurer.

The Atlas Steel Works, Inc., 623 Pearl Street, Camden, N. J., recently incorporated with capital stock of $125,000 to manufacture steel products, has taken over the business of the Atlas Erecting & Mfg. Co. It has a well-equipped plant and is ready to execute orders for structural steel, ornamental iron, and like products. The company intends to enlarge the plant in the near future. Paul R. Snader is managing director.

The Mava Engineering Corporation, New York, incorporated with capital stock of $20,000, proposes to manufacture airplanes and engines, but will not consider plans for operation for about four weeks. M. P. Paley and J. N. Kuh, are the incorporators. D. O. Kuh, 152 West Forty-second Street, New York, is representative.

The Essex Wire Cloth Co., New York, has been organized with $100,000 capital stock and will manufacture wire cloth and other metal products. The company is yet in the formative stage and will not take up manufacturing details for about six weeks. W. H. Bounce, A. Miller and H. B. Bunecke are the incorporators. C. D. Rogers, 36 West Forty-fourth Street, New York, is representative.

The Bowen-Dumars Power Corporation, New York, incorporated with 1000 shares of no par value stock, is developing power machinery of special design, having a shop and facilities for this stage of the work. Later on the company purposes to manufacture. W. S. Bowen and J. E. Dumars are the principals. Address care of R. S. Nichols, 141 Broadway.

The Non-Tenna Radio Co., New York, has been organized with capital stock of $25,000 to manufacture wireless instruments and equipment. It is likely that the company will manufacture after a time and when it does, work will be let by contract. J. H. and M. F. Weatherlow, and H. Brand are the incorporators. William Rasquin, Jr., 305 Broadway, is representative.

J. B. Hauer, Inc., 100 Bayard Street, Brooklyn, has been incorporated with capital of $100,000 to manufacture machinery and operate a general machine works, having purchased a plant on Bridge Street, 250 ft. x 200 ft. Equipment will be installed and the management, which has done work of this nature for 12 years, will follow established lines. J. M. and M. M. Hauer are the principals.

The C-V Products Corporation, New York, incorporated with capital stock of $25,000, has obtained a shop and equipment at 359 Pearl Street, where it will manufacture mechanical devices on a small scale. Eugene Seavy heads the company.

The Chausse Mfg. Co., 206 Lincoln Building, Detroit, has been organized as a subsidiary of the Chausse Oil Burner Co., to manufacture oil-burning and other equipment. The new company has a plant at Goshen, Ind., where it will manufacture asphalt machinery, industrial burners and street car and domestic furnace burners. W. P. White is secretary.

The Tallapoosa River Power & Textile Corporation, Tallapoosa, Ga., capitalized at $500,000, is being organized by W. W. Summerlin of Camp, Ala., and associates to develop hydroelectric power and operate textile mills at Camp. Considerable time will be consumed in organization.

The Modern-Bond Corporation, Wilmington, Del., successor to the Bond Machine Co. and the Modern Machinery Co., has been organized under Delaware laws with capital stock of $1,500,000, to manufacture collapsible tubing. A new plant will be built at Elsmere, Del., but no new equipment will be needed. Products include drill press and heavy machine vises; reloading tools, bullet molds and other ordnance machinery; bottlers' machinery, jigs and lathes. Richard W. Bond, S. C. Bond and J. P. Cann are the incorporators.

The Seaford Metal Products Co., Seaford, Del., recently organized, is ready to begin manufacturing ash separators and is in the market for ash cans to fit them. It is also in need of metal ceiling, metal lath and cornice, and desires to act as manufacturers' representative in these lines. Frederick J. Bauer is president-manager.

The Keystone Cement Block Co., Inc., New York, has been organized to manufacture building material. Part of the work will be done by contract and part in the plant of the company by the same name, whose properties were acquired. Louis F. Perl, 200 Fifth Avenue, is corporate representative.

The Industrial Cotton Oil Co., Waco, Tex., has been organized with capital stock of $150,000 to operate an oil mill plant, purchased from the American Cotton Oil Co., Waco. No additional equipment will be needed for a time. J. M. Ford is manager.

The Carloyd Electric & Radio Co., Newark, N. J., has been organized to manufacture radio receiving sets and transmitters. Upon completion of organization matters, which will take a few weeks, plans for manufacturing will be considered. Address care of L. E. Gehman, 390 South Eleventh Street, Newark.

The Geo. A. Hebb Spring Works, Murray and Austin Streets, Newark, N. J., has been incorporated with capital stock of $100,000 to manufacture springs for automatic machines, having acquired a private business in this line. Besides making springs the company expects to do general machine work in its plant at Newark. L. E. Hebb heads the company.

The Speeddee Specialty Co., care of H. Levin, 15 Park Row, New York, has been organized to acquire an established business in manufacturing radio parts.

Receiver for Harrisburg Foundry & Machine Co.

Christian W. Lynch, of Harrisburg, Pa., has been named by Dauphin County courts as receiver of the Harrisburg Foundry & Machine Co., Harrisburg, Pa., on petition of three creditors, who charge that the firm is insolvent and operating at loss because of mismanagement.

Just prior to the naming of the receiver, Alfred J. Sohland, of Harrisburg, resigned as president of the firm and of the Harrisburg Corporation, which controls a majority of the Harrisburg Foundry & Machine Co. stock. Creditors filing the receivership petition were Henry Gilbert & Son, of Harrisburg, and the Eugene Dietzgen Co. and the Pennsylvania Bronze Foundry Co., Philadelphia. The petition estimated the firm's assets at $700,000 and the liabilities at $943,000, including $500,000 in outstanding capital stock.

The Harrisburg Foundry & Machine Co. has been in continuous operation for 65 years. In 1920 the Harrisburg Corporation was organized for the purpose of taking over control of the company, which then had quick assets of $200,000 and only $5,000 indebtedness. According to the petition the company's surplus has since been dissipated and its indebtedness increased to $943,000.

The receivership has been made temporary for 30 days, during which time the plant will continue in operation under the direction of Mr. Lynch, a former general manager of the organization.

Steel Foundries and Cooperative Research

(*Concluded from page* 675)

probably be castings that actually cost $150 per ton to produce, and others that cost $1,000 per ton to produce.

The steel foundry industry is in a position not unlike that of other industries with regard to cost accounting and the use of cost data as means of control. There are perhaps at the present time a number of foundrymen who pay little or no attention to costs, but merely try to conduct their business by chance and by the figures shown on the general financial statement of profit or loss. Since this subject of costs is such a vital one in modern management and particularly in plants producing diversified articles such as ordinarily made in jobbing shops, it was one of the first to be given thorough consideration by the Electric Steel Founders' Research Group. This statement should not be construed to mean that the companies in the group did not have cost accounting systems previous to that time, but that they possessed the desire to improve existing methods.

The members of the group realized the need for a standard classification of accounts and definitions of accounts to be used at each plant, in order that manufacturing costs could be compared intelligently. When conducting research investigations which are primarily for the purpose of improving the quality of the product and of decreasing production costs, it is obvious that there must be suitable means for determining the effect of these on costs. Considerable time was devoted to formulating and adopting a uniform classification of cost accounts, and of course while doing this, due regard was given to cost accounting principles. This was a gradual development and at the present time it is at a point where exactly the same items of expense are charged to the same cost accounts at each plant.

At the present time, the group is making a thorough study of the problem of distribution of indirect expense or burden, so that it will be equitably applied when determining the cost of specific castings.

To derive the greatest benefits from cooperative work in the way of decreasing manufacturing costs and eliminating waste, it is desirable to compare costs of the various operations at each of the plants. Of course, comparisons of costs can be made intelligently only when the nature of the work done by such plants is similar and when the same cost accounting methods are used. This happens to be the condition at the plants in the research group, where similar organizations, equipment, manufacturing processes, and cost accounting methods, are used. Manufacturing cost comparisons among the five companies have created a great deal of interest in the subject of costs at each of the plants.

The benefits obtained from comparing the costs of the various operations in one plant with those in other plants, are hardly susceptable to accurate meaurement. However, it is reasonable to suppose that such benefits do occur. For example, if a plant perceives that a certain operation at that plant has a greater cost than the some operation at another plant, it has a definite goal to aim at. When such conditions occur, there is a free and unbiased exchange of practice and opinions among the members of the group, thereby enabling one plant to ascertain precisely the conditions at the other plants. Without this kind of cooperation, a company would have no knowledge concerning the possibility of changing its methods to reduce costs of operations.

Cooperation in Merchandising

Beneficial results are being obtained from cooperation among the foundries in the research group, along merchandising lines. By this is meant, an exchange of ideas and methods concerning such features as production control systems, statistical records, development of uses for the product, and education of salesmen.

A comprehensive survey was made at each plant to determine the methods of handling customers' orders and making production schedules. The data thus obtained served as the basis for establishing the fundamental principles of a standard production control system to be used at each plant. An efficient method of dealing with orders and schedules, is of course necessary in any foundry producing miscellaneous castings. In making this investigation, it was found that one company would excel in certain features in which another company was especially weak. Consequently, the result of the survey enabled all the companies to improve the parts of their production control system which were inferior to those of other companies.

The cooperation in merchandising methods has led to the intensive development of new uses for small thin-section steel castings. There has been a lack of real sales engineering and investigation of the potential market for castings in the steel foundry industry. The companies in the group are giving this thorough consideration and concerted efforts are being made to promote the use of steel castings in such parts of equipment where they give better service to the users of such equipment. At the present time there is undoubtedly a large volume of gray iron and malleable iron castings being used in parts of equipment where electric steel castings should be used to give the required strength, shock resisting properties and minimum weight. In addition to the substitution of electric steel castings for iron castings, it has been found there is a field for decreasing assembling operations when forgings are used, by combining several parts and casting them integral in one piece.

The cooperative work of the group is uncovering such cases and is developing the potential market for electric steel castings. Information concerning the production of castings having very thin sections and intricate designs, is being disseminated among users of metal products who had the opinion that steel castings can be made only with camparatively heavy metal sections and that an excessive allowance for machining must be made on steel castings.

Educational conventions of the merchandising forces of the five companies are held periodically. At these conventions, papers on steel foundry problems are presented and discussed, for the purpose of keeping the salesmen informed of the work being done in the production of castings. The conventions are part of the educational work being done by the research group to help the sales representatives understand their own products as well as competitive products, so that they become better equipped to serve the trade.

Another feature of the cooperative educational work being undertaken, is the preparation and issuance of regular bulletins to the members of the merchandising forces at all the companies. These bulletins contain information which a man in contact with consumers should know. They deal with such subjects as: Commercial specifications for steel castings as well as for other ferrous castings, significance of physical tests, characteristics of steel castings and other ferrous castings, business conditions in the steel foundry industry, research investigations and the results obtained, etc.

Conclusion

All the research investigations and cooperative work of the Electric Steel Founders' Research Group, have been of inestimable value both directly and indirectly. The employees of the different companies have taken a keen interest in the group and have been stimulated in their efforts by the spirit of competition that has arisen. Naturally, a desire has been created to know all the details of the work they are doing and the significance of these details. Such indirect results cannot be disregarded, as the success of a company depends largely on the calibre of its organization and its ability to make use of known facts having a bearing on the efficient conduct of its business.

A broad patent on the arc current welding transformers, patent No. 1,464,145, was granted Aug. 7 to Charles B. Peters, president Waters Arc Welding Corporation, 619 Tenth Avenue, New York. The company plans to add to its present line, which consists of alternating current arc welding machines and supplies, both of the grid and motor generator types, and also gas-driven welding machines.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel			*Wrought Iron*		
	Black	Galv.		Black	Galv.
½ in. Butt	—41	—24	½ in. Butt	— 4	—19
¾ in. Butt	—46	—32	¾ in. Butt	—11	— 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	— 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18½c. to 19½c.
High brass wire	19 c. to 20 c.
Brass rods	16¾c. to 17¾c.
Brass tube, brazed	26½c. to 27½c.
Brass tube, seamless	24 c. to 25 c.
Copper tube, seamless	25½c. to 26½c.

Copper Sheets

Sheet copper, hot rolled, 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55 $6.30
		90 lb.	6.65 6.40
		100 lb.	6.75 6.50
IC	$11.75 $10.50	IC	7.00 6.75
IX	13.00 11.75	IX	8.25 8.00
IXX	14.75 13.00	IXX	9.50 9.25
IXXX	16.50 14.75	IXXX	10.75 10.50
IXXXX	18.50 16.50	IXXXX	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	49c. to 56c.

Copper

Lake ingot	16¾c.
Electrolytic	16¼c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8½c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	32c. to 33c.

Old Metals

The market is firm and demand more active. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.25
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, September 20, 1923

ESTABLISHED 1855 VOL. 112, No. 12

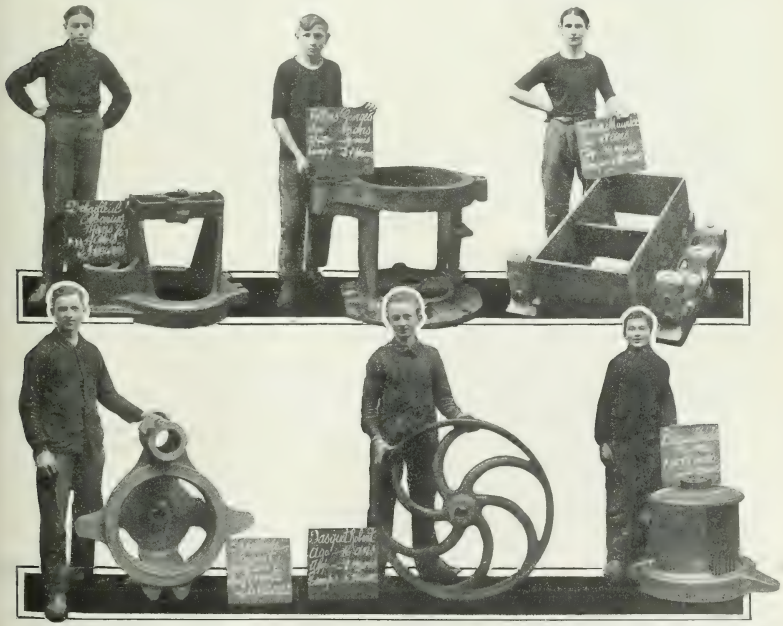
Training Foundry Apprentices in France

Making Directors of Molding Machine Operators and Foremen—Much of the Work Done in Green Sand Rather Dry

BY H. M. LANE

IN this country we frequently hear complaints and lamentations about the fact that nobody is making molders, but in France the old-fashioned apprentice system still exists in many shops. A good many apprentices are under instructions and will turn out to be fair molders. One plant is doing remarkable training work, and to a large extent with nothing but a desire to further the foundry cause. This is the plant of Ph. Bonvillain and E. Ronceray, of Paris, of which E. Ronceray is the head.

This firm maintains a foundry which has two or three interesting functions. In the first place, it serves to turn out all the heavy and special castings required for the manufacture of their extensive line of molding machinery and foundry appliances. In the second place, it serves as a demonstration plant for their molding machines, and in the third place, in order to keep a plant of this kind running as a demonstration plant, it has been necessary to take in certain kinds of work and run a portion of the foundry as a jobbing shop.



Besides Name and Age of Each Boy the Photographs Give Also the Period of Apprenticeship and the Time Taken for the Several Castings

There are twenty or thirty young men learning the molding trade. In France these boys go to work at about thirteen years of age, and some even a few months earlier. They generally serve about four years. In the Ronceray plant the boys are given careful instruction on molding, core making, operation and maintenance of molding machines and pattern making, or pattern and plate making as it is practiced in connection with the French molding machinery.

The accompanying illustrations show a portion of the sample castings turned out by the boys for a prize competition which is carried on at least twice a year. Each boy makes a casting for this competition, and the castings are then judged by a committee of outside foundrymen. In the final award of the prize, however, the boy's general foundry conduct and diligence are taken into consideration. All of the castings shown in these illustrations were made by hand and most of them in dry sand molds. On the board at the side of the casting is chalked the name of the boy, his age, and the number of months' apprenticeship he has served, and below this the number of hours which he spent in making the casting.

Whenever a boy is given a pattern the method of molding is discussed with him, and he is given such instruction as is necessary to assist him in turning out a good piece. He is also shown the cause of various failures, and whenever a casting goes wrong, the entire class of apprentices holds a port-mortem on it to determine the cause of the loss.

They are also constantly criticizing each other's work to try and improve the quality. The boys are generally allowed to pour their own work, and the entire crowd stands around until every mold is poured, and sometimes it is almost impossible to drive them out of the shop at any reasonable hour in the evening, particularly when some interesting piece has been poured and they wish to see it shaken out. Every one of the boys is a bright, active fellow, and the interest they are taking in their trade is very marked indeed. To Americans the fact that most of them wore wooden shoes would be quite a novel feature.

Another interesting thing in connection with the practice of this shop is the fact that the sand is worked much drier than it is in American shops, particularly for green sand work. As much of the work as possible is cast in green sand, and a good many difficult castings are made in this way. Several of the best of the castings shown in this competition were of green sand. As the boys complete their apprenticeship most of them find positions in other foundries where they become directors of molding machine work or foremen.

OXYGEN IN STEEL MAKING*

Advantages Claimed from Its Use in the Bessemer and Open-Hearth

Another field for the application of oxygen or oxygenated air is in the Bessemer process. We have available what might be termed intermediate ores, which, while they do not contain sufficient phosphorus to make the basic process possible, still have an amount of this element too high for use in the acid converter. If, however, the heat requirements for the process might be lowered below those of standard basic practice to correspond with the lower phosphorus in the pig iron available, we would have a process which would utilize these rather unsatisfactory products to our advantage, securing a steel better in quality than that obtained by the acid Bessemer process, and as a by-product a high-phosphorus slag valuable for fertilizer.

[Thermal requirements and heat balance are discussed here.]

We can use a mixture of 3788 lb. of nitrogen and 2353 lb. of oxygen, or a 38 per cent oxygen blast, and obtain the same thermal results in the bath as was the case when blowing a high phosphorus bath with atmospheric air.

To estimate the value of this process in dollars and cents will be difficult, for we have no standard basic practice against which to compare it. The best comparison we can make is against the open-hearth practice of making low-carbon steel. This comparison will cause criticism because Bessemer steel is recognized as inferior in quality to the open-hearth product. We will, however, risk still further criticism by making the assertion that by the use of oxygen-enriched blast we will be enabled to make Bessemer steel of almost as good quality as that of our average open-hearth steel.

In order to obtain some rough idea of cost comparison, the present low-carbon open-hearth steel requires as fuel 600 lb. of gas coal per ton, which at present costs $7.50 per net ton delivered, or a fuel cost of $2.25 per ton of steel. With the proposed basic Bessemer process along the lines shown in the heat balance we would require 0.0448 ton of oxygen per ton of steel, or with oxygen available at $3 per ton, a cost of 13.44 cents for oxygen per ton of steel.

Oxygen and the Open-Hearth Process

According to Clements (Trans. Iron and Steel Institute, May, 1922), the largest and most striking loss is that of heat lost by radiation from the bath and port ends or 44.20 per cent of total heat wasted. This figure impresses us as a most forceful argument that the open-hearth process stands in vital need of a "super-refractory." The silica brick used for the roof and port ends of the furnace is the purest obtainable and, while it is the most suitable material available, it is in our estimation far from being an ideal refractory for even the present requirements. The brick as used today has a fair life as a refractory, but is in no sense of the word a heat insulator nor is the endurance of this material in the service to which it is subjected great enough to allow us to supplement it by a heat insulator. What the industry needs is a brick so resistant to heat and metallic fumes, and one of such thermal expansion, that it will not only serve as the silica brick does today—as an uncovered arch and wall—but will stand the still more severe test of being covered with a heat-insulating material to prevent, in a large measure, the too great heat loss through these sections. As to the possibility of obtaining such a material, we see no reason to say it can not be done. Price should be of secondary consideration, for such a material once introduced would not only add materially to the life of the furnace, but would save millions of dollars in fuel cost.

In the matter of applying oxygen to metallurgical processes, our first thought is that of increasing temperatures. As our present refractories are now subjected to their maximum working temperatures, we will not consider the matter in that connection at present, but more with the idea of retaining a greater percentage of the total heat for a useful work than is the present practice. Clements gives the loss of heat by radiation from the regenerators as 15.50 per cent of the heat lost, and that from the chimney gases as 36.2 per cent of the heat lost. The chief function of the regenerating system in our present open-hearth process is that of increasing the temperature of combustion by adding sensible heat to the gases before they are burned. With oxygen available we will have another method of increasing the flame temperature,

*Extract from an extensive report by a special committee of the Bureau of Mines, organized to investigate the use of oxygen or oxygenated air in metallurgical and allied processes. It includes the blast furnace, Bessemer and open-hearth, ferromanganese and artificial gas. The chairman of the committee is M. H. Roberts, consulting mechanical engineer, Bureau of Mines. The author of the report is F. W. Davis, metallurgist, Bureau of Mines, Minneapolis, Minn. The portion on blast furnace was published in THE IRON AGE, Sept. 13, that on ferromanganese elsewhere in this issue.

which, instead of heating the gases, will simply decrease the amount of inert gases entering the furnace, and diluting the calorific intensity of the reaction. Suppose that we go even farther than the regenerators, and start by replacing with pure oxygen the air now used in operating the gas producers, increasing at the same time the steam used in order to dampen the higher producer temperature otherwise obtained. We will now secure a fuel gas of greater calorific power which may be burned from one end of the furnace only, using a mixture of oxygen and air, the oxygen content of which may be regulated as our temperature requirements dictate. From the exhaust end of the furnace, instead of passing through regenerators with their accompanying expense and heat loss, let us carry the reduced volume of gas through a waste-heat boiler, lower its temperature to 300 deg. C., and utilize the heat above this temperature in the generation of steam.

With a process of this nature we will not only eliminate the checkerwork, but will take a big stride in the way of efficient combustion and proper direction of the flame. In our present furnace, any mixing of air and fuel gas must be done in a crude manner, in that the only burner possible, in order to withstand the action of the intensely hot gases and flame during half of the operation, must be of a highly refractory material, and even this is always losing efficiency as a gas mixer due to its "slagging" away. If it were not necessary to reverse the flow of gases to the furnace, it would become possible to construct an efficient burner which would not only effect a perfect mixture of the gases, but which might be used effectively to direct the flow of gas in any manner desired. It is just possible that, with a device of this kind, we would be able to direct the flame to follow the bath more closely than is possible today, and relieve the roof to some extent of its high-temperature condition.

Available Fuel in Open-Hearth Process

Another phase of the question of the use of oxygen in the open-hearth is found in the matter of available fuel. The ordinary process requires for success large volumes of gas made from the most expensive grade of industrial coal, but we feel assured that suitable gas can be manufactured from much cheaper material by the aid of oxygen, and in this line it is well to consider blast furnace gas. This fuel is unsuitable for open-hearth work because it is a low-calorific, slow-burning gas, practically devoid of illuminants. Burning blast-furnace gas with oxygen will not improve this lack of illuminants, but it will increase the speed of combustion and increase the calorific intensity of the flame beyond that of current open-hearth practice. This is only one of the many cheap fuels which should be tried in this respect.

Chemical Problems of the Open-Hearth

The open-hearth process is essentially one of oxidation. Pig iron and scrap steel are charged in a furnace, melted down, and the impurities are oxidized out, leaving as a product a material which has lost a great part of its phosphorus, sulphur, silicon, manganese and carbon, the chief oxidizing agent being iron ore. In introducing iron ore we are also introducing further impurities, mainly phosphorus and silica, which have a tendency to lower the quality of the product. If we could accomplish our oxidation by means of oxygen we would avoid these additional impurities.

Our next consideration is the time element. To oxidize a bath to the desired quality, using iron ore, requires from 3 to 5 hr., but if we would use oxygen for this purpose it may be accomplished in less than 30 min. Oxidation by iron ore is an endothermic reaction, as it requires the reduction to iron of the ore charged, and therefore absorbs heat in the furnace. Oxidation by oxygen is highly exothermic and will add greatly to the available heat in the bath, another factor which will tend to shorten the process.

As to cost, we pay from $4 to $6 per ton of iron ore for this purpose. This ore contains about 90 per cent Fe_2O_3 or 27 per cent available oxygen. We are of course utilizing the iron content of the ore as well, but that is incidental to the fact that the ore is used for its oxidizing power; 98 per cent oxygen for this purpose at $3 per ton will compare favorably in the cost balances to 27 per cent oxygen introduced as ore at a cost of from $4 to $6 per ton even when crediting the latter practice with the iron retained in the bath. Also, inasmuch as this process will decrease the time requirements by about 3 hr., our capacities will be greatly increased and our fuel and overhead charges reduced accordingly.

In speaking of chemical possibilities connected with the use of oxygen in the open-hearth furnace, it is well to consider the higher quality steels. Steel made properly in the electric furnace is recognized as being of superior grade and purity to open-hearth steel, and commands a much higher price. One of the main factors which makes the difference in the two products is the almost total absence of oxides in electric steel, which is accomplished by finishing the steel under very reducing conditions. The current open-hearth process is incapable of duplicating these reducing conditions, inasmuch as the products of combustion are always of an oxidizing nature, and for that reason a highly reducing slag, such as is necessary in the electric process for the final purification, can not be maintained. However, if we have oxygen available in the open-hearth, we will be enabled to maintain sufficient flame temperature by partial combustion of the gas, and in this manner make possible a highly reducing atmosphere in the furnace. Under these conditions a reducing slag may be made, and the bath cleaned of its oxides, producing a steel which will be equal in every respect to that made in the electric furnace.

General Conclusions

The foregoing study of the open-hearth process has convinced us of the following:

1. While the application of oxygen for combustion in the open-hearth will effect some saving in fuel energy, with our present refractories the saving will be in the form of a by-product and not of practical value. However, if we can prepare refractories which will withstand much higher temperatures, the application of oxygen to the process will be of great value, both in saving fuel and increasing materially the speed of the process.
2. That the application of oxygen for combustion with an idea of substituting cheaper fuel for the very expensive fuel used today is a field of particular promise.
3. Taken from the standpoint of quality of product, the substitution of oxygen for air in the last part of the process will enable us to make, in the open-hearth furnace, steel of electric furnace quality.
4. That the substitution of oxygen for the iron ore now used as an oxidizing agent will not only give a higher grade product, but it will decrease the time required for the process by about 3 hours.

United States Exports

Among the 50 largest items of American exports in the first half of 1923, grouped according to value, there were five items of iron and steel products, seven of machinery, two of nonferrous metals, while coal and coke, considered together, occupy second position of the entire group, being exceeded only by raw cotton.

Figured by quantity rather than by dollar value, the largest item of all of our exports, both in 1922 and 1923, consisted of coal and coke, which show more than double the quantity this year than was shipped last year.

Exports not expressed in pounds included automobiles, to the extent of 69,941 passenger cars and 11,578 trucks and buses in 1923, both being more than double last year's figures. Locomotives fell off from 212 to 112, but agricultural tractors jumped from 3926 to 10,223, while freight cars at 7481 in 1923 were almost four times the 1957 of the previous year.

During the first half of 1923 our best customer was Great Britain, with Canada, Germany, France, Japan, Cuba, Italy, Mexico, Argentina, Australia, Netherlands and China following in the order named. Each of these 12 countries took upward of $50,000,000 of goods. Our sources of imports in the six months, again carrying the figure to the $50,000,000 mark, were, in order: Cuba, Great Britain, Canada, Japan, Straits Settlements, China, Argentina, Germany, France, India, Mexico, Brazil and Chile.

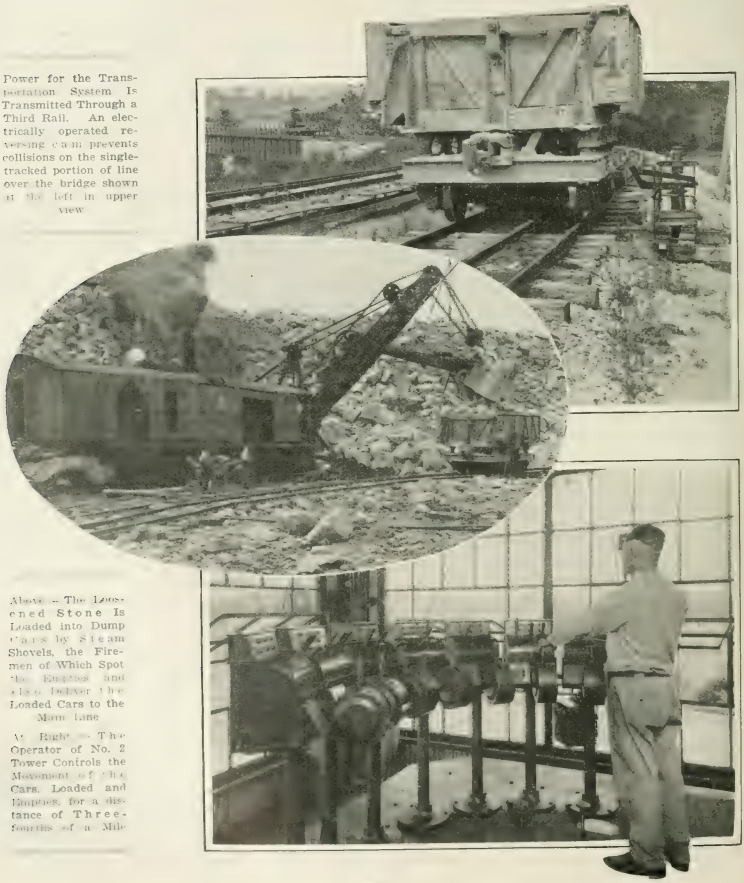
Washing Limestone for Blast Furnace Use

Plant Electrically Driven from Quarry to Storage Bins and Almost Automatic—Effort to Get a Flux Free from Dirt

IN response to complaints of dirty limestone from blast furnace operators, particularly those represented in the Southern Ohio Pig Iron and Coke Association, an installation of a washing equipment for cleaning the stone has been made at plant X of the Marble Cliff Quarries Co., Columbus, Ohio.

The stone deposits of the company are, generally speaking, about 50 ft. in depth, and the fluxing stone ledges lie usually about 20 ft. below the surface. All stone above this depth is used as ballast and in road work. The stone is quarried by steam shovels, after being blasted, and loaded into 15-ton dump cars for transportation to the crushers and washing apparatus. The system of transportation used is an indication of the economical processes evident throughout the plant, as only four men are required to operate the system from the stone ledge to the primary crusher.

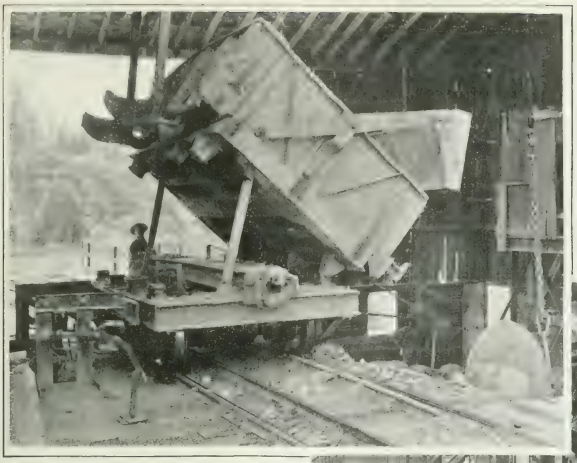
The transportation system used is the Woodford remote control system, electrically operated through a third rail. The line is double tracked with the excep-



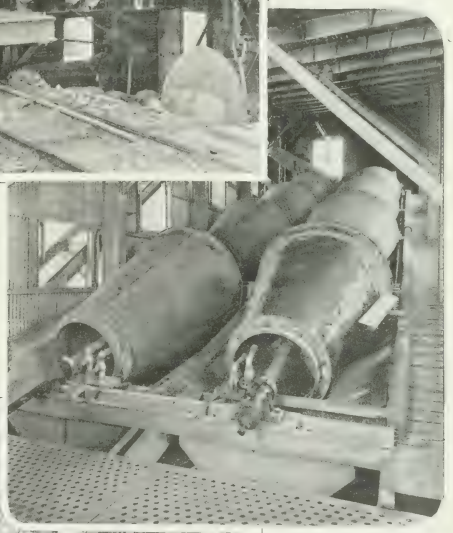
Power for the Transportation System Is Transmitted Through a Third Rail. An electrically operated reversing cam prevents collisions on the single-tracked portion of line over the bridge shown at the left in upper view

Above—The Unscreened Stone Is Loaded into Dump Cars by Steam Shovels, the Firemen of Which Spot the Empties and Also Deliver the Loaded Cars to the Main Line

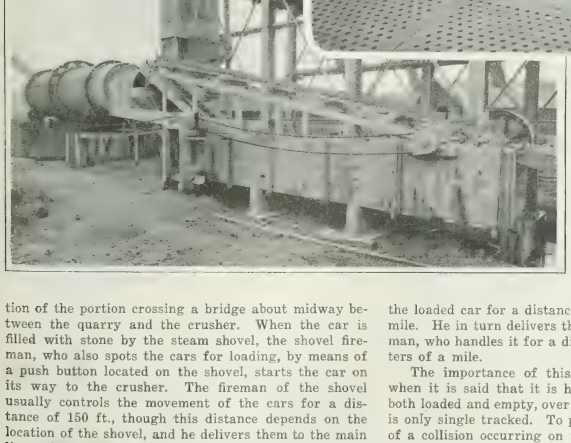
At Right—The Operator of No. 2 Tower Controls the Movement of the Cars, Loaded and Empties, for a distance of Three-fourths of a Mile



Car Dumper at the Primary Crusher. The car reversing cam is shown at the left



After Being Scrubbed the Stone Passes Through Rinsing Screens, Which Remove the Last Particles of Dirt from the Flux. Storage bins are located beneath this series of screens, from which the stone is loaded into railroad cars for shipment to the blast furnace



The Scrubber Operates Similarly to a Tumbling Barrel. The bucket elevator carries the stone to the rinsing screens

tion of the portion crossing a bridge about midway between the quarry and the crusher. When the car is filled with stone by the steam shovel, the shovel fireman, who also spots the cars for loading, by means of a push button located on the shovel, starts the car on its way to the crusher. The fireman of the shovel usually controls the movement of the cars for a distance of 150 ft., though this distance depends on the location of the shovel, and he delivers them to the main line, where an operator in a tower, located where he can secure a view of the entire quarry, takes charge of the loaded car for a distance of about one-quarter of a mile. He in turn delivers the cars to the second towerman, who handles it for a distance of about three-quarters of a mile.

The importance of this man's position is evident when it is said that it is his duty to handle the cars, both loaded and empty, over a bridge 350 ft. long, which is only single tracked. To prevent any possible chance of a collision occurring on this bridge, reversing cams have been installed at each end. This prevents cars from either direction going upon the bridge unless re-

leased by the tower operator. Thus it is impossible for a collision to occur through lack of observation from the tower.

A third tower operator handles the cars a distance of about 1000 ft., and as he is located directly opposite the primary crusher, he also operates the car dumper. When the loaded cars reach the dumper a cam arrangement automatically reverses them for the trip back to the quarry. An elaborate system of electrically controlled switches gives great flexibility to the movement of the cars, enabling the operators to keep four steam shovels, operating at distant parts of the quarry, continuously supplied with empties.

The first step in actually preparing the flux for blast furnace use is when the stone is dumped into the primary crusher, operated by a 200-hp. motor. Some pieces of stone weigh as much as 5 tons. The crushed stone drops upon a 60-in. rubber belt conveyor driven by a 75-hp. motor and is dumped into the main hopper in the screen house. From this hopper it is fed to two main screens, and the sizes between 8 in. and 4½ in. drop into the bins built beneath. The larger pieces of stone pass over the screen to conveyors, and then through chutes to three smaller sized crushers to be further broken up. From these crushers the stone is picked up by bucket elevators and taken to a series of what are called re-screens, and the different sizes soon find their way to the proper bins for loading.

The stone destined for blast furnace use is conveyed over a 30-in. belt conveyor to the washing plant. This conveyor is elevated about 30 ft. from the ground, and the stone enters a chute for the descent into the scrubber. The water for washing purposes is pumped into the chute at the same time as the stone.

The stone and water enter the scrubber, a revolving cylinder 30 ft. long and 5 ft. in diameter, driven by a 100-hp. motor, at one end. On the inside of the scrubber is a series of fins riveted to the casing for the purpose of forcing the stone forward to the discharge end of the scrubber; and the revolving action of the cylinder, throwing stone against stone, tumbling over and over, and being forced forward, puts all particles of dirt into suspension in the water. The water from this scrubber is wasted away at the discharge end.

The washed stone is discharged from the scrubber to a continuous bucket elevator, and is conveyed to a series of revolving, cone-shaped rinsing screens ranging from 1½ in. down to "sand." Flux stone sizes pass over the 1½-in. screens. All stone passing through 1½ in. is separated into smaller sizes and prepared for uses other than flux. Clean, fresh water is continually played on these screens, both inside and outside, and as a result, when the stone passes through and over the screens to the storage bins, it is free from dirt of any kind. The flux is then ready for loading into railroad cars for shipment to the blast furnaces. The sand accumulated in the washing operation is conveyed into settling tanks, and from there by a bucket conveyor to storage bins.

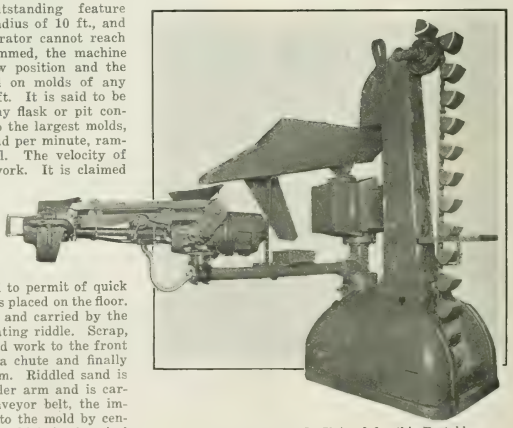
The entire plant, operated electrically and almost automatically, requires a minimum of workmen. From the primary crusher to the storage bins, the plant requires only fifteen men to operate it, and in this number are included electricians, oilers, millwrights and crusher attendants. The plant has a rated capacity of 3000 tons of flux per 10-hr. day, but as high as 4200 tons of all sizes have been produced and shipped during this period.

Portable Sandslinger Molding Machine

A portable type Sandslinger molding machine of particular interest to general jobbing shops has been added to the line of the Beardsley-Piper Co., 312 Union Park Court, Chicago.

Unusual flexibility is an outstanding feature claimed. The jointed arm has a radius of 10 ft., and if a mold is too large and the operator cannot reach or cover the entire flask being rammed, the machine may be lifted and placed in a new position and the ramming finished. It can be used on molds of any size and will ram to a depth of 10 ft. It is said to be used economically on pit jobs or any flask or pit containing from 5 cu. ft. of sand up to the largest molds, and ram 10 cu. ft. or 1000 lb. of sand per minute, ramming all that three men can shovel. The velocity of the sand varies with the class of work. It is claimed that the machine will not wear or damage the pattern, as the first sand out of the ramming head covers and protects it.

The machine is electrically driven and compressed air is not required. A hydraulic leveling device incorporated in the base is said to permit of quick leveling-up as soon as the machine is placed on the floor. The sand is shoveled into a hopper and carried by the vertical bucket elevator to an oscillating riddle. Scrap, gaggers and other refuse in the sand work to the front of the riddle and are delivered to a chute and finally into a scrap box mounted on the arm. Riddled sand is deposited on a hopper on the impeller arm and is carried to the impeller head by a conveyor belt, the impeller head discharging the sand into the mold by centrifugal force. The impeller head, which is the vital part of the machine, not only throws sand at high velocity but forms it into wads or compressed handfuls preparatory to projecting it into the flask. Three separate motors are used, one for the impeller head and belt conveyor, one for the riddle, and one for the bucket elevator.



Unusual Flexibility Is Claimed for this Portable Type of Molding Machine, Which Has a Jointed Arm with 10-Ft. Radius and May Be Moved from Place to Place During the Ramming of a Large Mold. It will ram to a depth of 10 ft.

On Aug. 9 the Ford Motor Co. produced 7225 cars and trucks; on Aug. 11, 7236; on Aug. 13, 7270. Each, in turn, was a new high record.

Assigned Car Order Case Postponed

WASHINGTON, Sept. 18.—The Interstate Commerce Commission has again postponed the effective date of its assigned car order, delaying it this time from Oct. 1 to Nov. 1. It is understood that the reason for this action was to permit the commission an opportunity to give further study to applications for reopening of the case. Among those who have sought a rehearing are iron and steel producers who own private railroad cars.

President Coolidge's Tariff Policy

White House Will Follow the Limited Inquiry Plan of President Harding—Commission Expected to Begin Work Abroad at Early Date

BY L. W. MOFFETT

WASHINGTON, Sept. 18.—Having resumed hearings under the flexible provisions of the Fordney-McCumber act, following its summer recess, interest is being manifested as to when the Tariff Commission may authorize investigations abroad under these provisions. It had been expected that such authority would be granted before the commission began its recess, but, for some reason as yet unexplained, such authority has not been given.

Disturbed economic conditions of Europe have been mentioned as one cause for the delay, but this has not been accepted as an entirely adequate reason. It has been pointed out that conditions in Europe have been far from normal ever since the armistice, but despite that fact it had been originally intended to begin investigations abroad under the flexible provisions. Another reason for the delay, which is given a great deal of credence, is the change in the Administration brought about by the death of President Harding. The commission is said to have been about ready to authorize investigations abroad, but was compelled to abandon the plan because of the unexpected death of Mr. Harding. The result was that the commission faced an entirely new situation. After a rather heated dispute between two groups in the commission, although statements of the commission have sought to deny there was any serious difference of opinion, the late President Harding had mapped out a program upon which the commission should proceed.

President Harding's Position

Mr. Harding took the view of the group headed by Chairman Marvin of the commission that the latter was not empowered to open wide without limitation any or all schedules of the tariff act with a purpose to making investigations upon its own initiative and recommending any changes that it might feel were justified. It was the Culbertson group which had conceived the idea that the commission did have such a blanket authority and this variance of view in the commission became so pointed, according to reports that apparently are well founded, that it was taken before Mr. Harding, and was settled by him.

With the commission given to understand its limitations, it had proceeded to follow out the program and in doing so to authorize investigation abroad. But upon the advent of Mr. Coolidge as President, the commission is said to have been uncertain as to what his attitude might be.

The President recently made it known that he was opposed to tariff tinkering and desired that business be not disturbed unnecessarily and made it plain that he would not authorize changes in rates under the flexible provisions unless investigations of the commission made it clear that revisions were thoroughly justified.

President Coolidge's Policy

Not until last Friday, however, did it become known at the White House that President Coolidge proposes in effect to follow the program of Mr. Harding with respect to limitations of the commission. It was clearly indicated that President Coolidge shares the view which was held by Mr. Harding that the commission has no authority to make wholesale investigations on its own initiative which would be equivalent to actual and complete tariff revision. At the same time, it was made known that President Coolidge is of the opinion that the commission does have authority to initiate certain investigations without waiting for the filing of formal complaints by those who are seeking changes in rates under the flexible provisions. It is believed, however, that President Coolidge will look askance upon and will discountenance any efforts to initiate widespread investigations, but will insist that they be restricted entirely to studies and hearings that are shown by outstanding facts to have been well taken. It was made plain also that before initiating investigations the commission will be required to get the approval of the President.

With this view of President Coolidge becoming known, it is believed that the commission in the near future will announce plans to begin investigations abroad. Among those which it is expected will be scheduled first are those relating to pig iron and Swiss files. It had been expected that these investigations would be under way by the first or middle of August. The domestic inquiry as to these two subjects has been completed. It is assumed that the investigation as to magnesite in which the applicant is seeking a reduction of rates, as contrasted with application in the pig iron and Swiss file cases, in which increased rates are sought, will not be undertaken abroad until after the domestic inquiry has been completed.

For Higher Duty on Swiss Files

Application for a higher duty on Swiss files was made to the commission by the American Swiss File & Tool Co., Elizabeth, N. J., through its president, P. F. Reichhelm. The Swiss File & Tool Co. particularly is desirous of better protection on the smaller size files, up to 6 in., according to the application. It is pointed out by Mr. Reichhelm that in 1920 total sales of agents of the company were $262,968.38. The entire product of the company was sold to E. P. Reichhelm & Co., Inc., thus relieving the producing company of the selling and administration overhead. At that time, the total overhead of the company, according to the application, was about 82 per cent.

The president of the company stated that it was the belief of the company that it would be greatly to its advantage to sell direct to jobbers and therefore in 1921 the company became its own distributor. This involved the building up of the sales organization and executive expense, which it is declared, would have been out of proportion even if the sales remained at the 1920 figure, but the application says the sales in 1921 dropped to $107,521. The overhead with labor at part time is placed at 134 per cent. With the sales decreasing, the application points out, it became necessary to work on part time, which increased the burden.

The petition adds:

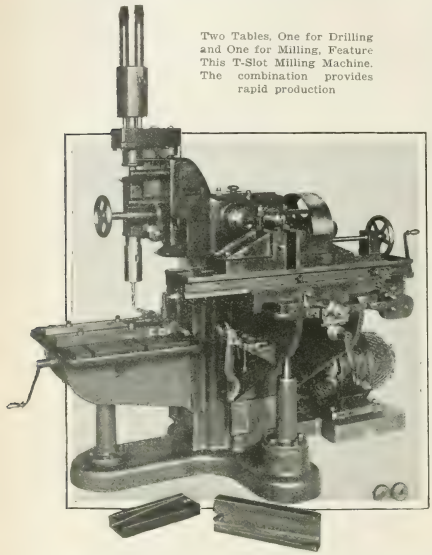
"All of this was suddenly imposed upon this organization when the business depression reached its peak, but we feel we will be better off in the long run to sell direct to distributors even though we must temporarily suffer the penalty of carrying the added selling expense, because the signs already have indicated a healthy increase in our business."

Passing upon a complaint of the National Supply Co. of Pennsylvania versus the Baltimore & Ohio, et al., against a rate of 27c. on wrought iron pipe from Pittsburgh to Mannington, W. Va., the Interstate Commerce Commission has ordered the carriers to reduce the rate to 19c. not later than Nov. 26. Reparation also was awarded.

T-Slot Milling Machine

Designed especially for the rapid production of T-slots in locomotive driving box adjusting wedges, the combination milling and drilling machine shown has recently been built by the Harrington Co., Philadelphia.

One side of the machine is equipped with a drill spindle provided with hand and power feed with automatic trip. Two holes on close centers are drilled in each wedge block, thus removing most of the metal for the subsequent milling operation. The vertically adjustable table under the drill spindle has adjustable guides and variable stops to facilitate rapid drilling. The two strips on the table are adjustable sideways to the width of any wedge block. The block to be drilled is placed between the guide strips and pushed



Two Tables, One for Drilling and One for Milling, Feature This T-Slot Milling Machine. The combination provides rapid production

back against the first adjustable end stop. This stop is adjusted so as to locate properly the first hole. Then the wedge block is pushed back against the second stop and the second hole drilled. These two holes can be seen at the right end of the wedge block on the floor at the left.

The milling side of the machine has two parallel spindles, running at different speeds and driven by spiral gearing flooded with oil. The milling table has vertical adjustment and carries a compound table with movement, in and out, parallel to the axis of the spindles and also transverse movement at right angles to that axis. The transverse movement has power feed and automatic trip for stopping the feed at any predetermined depth.

A specially designed vise mounted on the table, holds the wedge blocks with a narrow edge uppermost. The sliding jaw is quickly clamped by a hand wheel and screw, an adjustable stop determines the depth of the T-slot and a clamp over the top of the jaws prevents the work from raising.

The left hand spindle, rotating rapidly, drives a straight end mill and the right hand spindle, rotating slowly, drives a T-slot cutter, so that both cut at about the same surface speed. The table is fed from left to right, the end mill first removing the metal left by the drilling operation and then the T-slot is cut in as the work is fed toward the right-hand spindle.

A base extension carries the belt-connected motor. This should preferably be of the adjustable speed type, to give a range of spindle speeds for cutting different materials. Four different feeds can be obtained by means of constant center change gears. It is claimed that the use of this machine materially reduces cost of production as well as increases the output per manhour. The machine is so compact that comparatively little floor space is required.

Industrial Works, Builder of Locomotive Cranes, Celebrates Fiftieth Anniversary

The Industrial Works, Bay City, Mich., celebrated its fiftieth anniversary with a convention and dinner at Bay City, Sept. 6, 7 and 8. Twenty-one members of the branch offices and agencies of the company were present at the convention. The dinner, which included the force at the plant, numbered more than 300. Each guest was presented a small booklet containing the history of the Industrial Works from 1873 when the company was formed to take over the shop of the MacDowell Foundry Co. at Bay City, through the period of repair work on saw-mills and the galvanizing of salt well piping, the period of building engines, boilers, gang saws and circular saws, the development into marine engineers and later into builders of steam shovels for use on standard gage railroads, which was only a short step into the company's present line of wrecking cranes and locomotive cranes. The booklet is amply illustrated with drawings of the company's executives, the plant at various stages of its development and its cranes from the type of 1882 to that of 1923.

At the dinner on the evening of Sept. 7, Everett C. Wood, the plant engineer, was toastmaster. Among the speakers were William L. Clements, president, who spoke on "Our Golden Anniversary"; Charles R. Wells, secretary and treasurer, whose address was "Fifty Years a Treasurer"; Steven Martell, blacksmith of the Industrial Works for the past 43 years, who spoke on "Our Plant 43 Years Ago"; Fred L. Wild, whose subject was "Our Plant 24 Years Ago"; Walter B. Perry, superintendent, who described "Our Plant Today"; and Ernest B. Perry, general manager, whose address was "Fifty Years of Progress."

Building Koppers Ovens

Of the 711 new type ovens, for which the Koppers Co., Pittsburgh, took contracts since last fall, 37 already are completed and in operation, these composing the plant of the Weirton Steel Co., Weirton, W. Va., and most of the remainder will be built and in operation by next summer. The first of six units of 61 ovens each of the addition to the Clairton, Pa., plant of the Carnegie Steel Co. will be completed soon after the turn of 1924. The Koppers Co. expects to complete the 11 ovens it is building for the Battle Creek Gas Co., Battle Creek, Mich., around the first of November; the battery of 33 ovens for the Columbia Steel Co., Salt Lake City, by next spring; the 61 ovens for the Republic Iron & Steel Co., Youngstown, in November; 19 ovens for the Consumers Power Co., Zilwaukee, Mich., in December; the addition to the plant at Lackawanna Works, Bethlehem Steel Co., 114 ovens, next spring; the 47 ovens for the Trumbull-Cliffs Furnace Co., Warren, Ohio, next summer; and the 23 ovens for the Diamond Alkali Co., Alkali, Ohio, next spring.

After a shutdown of four weeks, during which extensive improvements had been made to the plant, the blooming and bar mills of the Andrews Steel Co., Newport, Ky., resumed operations Saturday last. The plant of the Newport Rolling Mill Co. resumed on Sunday night.

International Work in Testing Cast Iron

Foundrymen's Congress at Paris Takes Important Action —Chemical Specification for Pig Iron Favored —A European Malleable Association

(By Cable)

PARIS, FRANCE, Sept. 15.—The four days' technical sessions of the International Foundrymen's Congress, which was held under Government sanction, ended today. The attendance was large and the meeting, with its accompanying exhibition, was a pronounced success. Visitors were in attendance from eight different countries, the American delegation numbering 30 persons.

At the opening session on Wednesday Director L. Abbe of the Government Ministry of Technical Instruction, presided. On the platform were presidents of four national associations: E. Ramas of the Association Technique Fonderie de France; G. H. Clamer of the American Foundrymen's Association; Oliver Stubbs of the Institution of British Foundrymen, and M. Leonard of the Belgian association.

There were the usual greetings and responses, President Ramas making the opening address. The principal paper of the morning was on molding sand and the latter part of the session was given up to a discussion on the testing of cast iron. A resolution advocating the beginning of international work on specifications was seconded on behalf of the eight nations represented and adopted unanimously.

Thursday's technical session was in English, papers on testing and on molding sand being presented by members of the American Foundrymen's Association and the Institution of British Foundrymen. There was also a discussion of the desirability of adopting chemical specifications for pig iron. A resolution advocating the use of such specifications was carried unanimously.

The technical session of Friday, Sept. 14, was given up to papers and discussions on malleable castings. One outcome of this session was the formation of a European malleable association, which will deal with technical but not commercial questions.

The closing session this morning had before it the apprenticeship question and the proposal for the preparation of an international dictionary of foundry terms. The Minister of Technical Education presented medals to the association presidents in attendance, also prizes to exhibitors and to apprentices in the foundry schools.

The exhibition, which was located in the Government trade school building, was on a large scale and was highly creditable. There were educational exhibits of patterns and castings, and in the equipment section molding machines and sand treating machinery were shown in operation. The registration of exhibitors reached 450 and there were 1500 visitors. Visiting ladies were entertained by a committee which took them to many points of interest in Paris. The closing banquet was a memorable occasion. The American party scattered soon after the convention, the greater part taking the tour of Belgian battlefields.

The organization of international testing work, the resolution favoring the adoption of chemical pig iron specifications, and the organization of the European Malleable Association have been commented on as the outstanding features of the congress.

What American Foundrymen Saw in Great Britain

(Special Correspondence)

LONDON, ENGLAND, Sept. 5.—On the afternoon of Aug. 28 the American foundrymen's party entrained to Sheffield, where they were met by a reception committee of the Sheffield foundrymen and brought to the Royal Victoria Hotel. The evening was spent in getting acquainted as also in meeting friends gained by correspondence.

At the Hadfield Plant

On Wednesday morning, Aug. 29, the party was motored out to the Hecla works of Hadfields, Ltd. Sir Robert Hadfield had come down from London especially for the visit and with P. B. Brown, the managing director, received the visitors and showed them about the great plant. The principal products are manganese steel castings up to 35 tons in weight, entering into all kinds of industries, high grade steels for drilling and cutting purposes, crushing machinery parts, shells, guns, etc. The works, covering a great acreage, are peculiarly well laid out, with large buildings admirably lighted and with equipment driven electrically and of advanced types. The word quality is written all over the establishment in its best sense, for the record of good work produced, even during the war stress, is unsurpassed.

After seeing the electric furnaces at work, observing the action of the great shell piercing press, the railroad crossing and frog shop, the rolling mills for fine steels, etc., the party was entertained at lunch, with Sir Robert presiding, and giving an address of welcome and an explanation of the principles involved in the plant development. The usual toasts were drunk, responses being by President Clamer of the A. F. A., and Mr. Brown of Hadfields, Ltd. On adjournment motion pictures were shown in the dining room of the works, illustrating many phases of the work done at the plant, particularly during the busy war days.

The party was photographed and then taken across the dividing line into the great works of Edgar Allen & Co., whose specialty is in railroad crossings and track work, with large steel casting facilities for all classes of work. One of the special features was a sand storage with conveying systems for proper mixing and final milling arrangements for producing a molding sand suitable for the high grade work made. Steel from converters was poured at extremely high temperatures over the lip of the ladles, and this was made possible by the attainment of the highest degree of refractoriness in the sand in the first place. The resulting castings were notably smooth and clean as a consequence.

Another luncheon was served, through the courtesy of the Allen company, during which Mr. Clamer, as president of the American Foundrymen's Association, conveyed the thanks of the delegation to the officers of the Allen works. There was a brief response by the manager. In the meantime the ladies of the party had been entertained at tea by Mrs. T. H. Firth, at Prior Bank, one of the splendid homes of England. The rain, unfortunately, prevented taking full advantage of a motor run to the Derwent Valley Water Works.

A formal dinner was given in the evening by the Sheffield and district branch of the Institute of British

Foundrymen. John Shaw, president of the district branch of the institute, served as chairman, and there were present as additional guests the Lord Mayors of Sheffield and Rotherham, as also Sir Robert Hadfield. After the usual toasts to the King and the President, V. E. Minich, New York, toasted the City and Commerce of Sheffield, to which Lord Mayor W. C. Fenton responded. Sir Robert Hadfield then toasted the American Foundrymen's Association, President G. H. Clamer responding; and lastly Dr. Richard Moldenke toasted the Institution of British Foundrymen, to which Past President T. H. Firth of the institute responded.

British vs. American Test Bar Practice

Thursday, Aug. 30, was given over to a motor ride in the environments of Sheffield, visiting many points of interest. The American party left for Manchester Friday, Aug. 31, in the afternoon. In the evening Dr. Richard Moldenke addressed a meeting of the Sheffield branch of the institute, remaining behind the party for the purpose. He spoke on "American Foundry Practice," taking up present tendencies and methods of operation. The discussion that followed, in which Doctors Hatfield and Longmuir took part, among others, brought out several interesting facts. One was that English foundry iron blast furnaces were run very easy, seldom making more than 75 to 100 tons a day—often tapping out but twice in 24 hours and hence yielding high carbon and high quality metal. The analyses, day by day, were widely varying, however, and hence careful checking up of pig iron purchases was essential. Again, on the subject of specifications—particularly on the matter of test bars—the consulting engineers who were called in by the purchaser of castings had their own ideas on the subject and dominated the foundrymen to an extent that would not always be tolerated in the United States. Hence the direct statement that test bars should represent castings, and consequently one bar is insufficient. This is entirely contrary to the American conception, which holds that the test bar simply gives the quality of the iron going into the castings and in no way represents the castings themselves.

This controversy will probably be the bone of contention at the Paris meeting of the foundrymen, as without some modification of the viewpoint of either side an agreement on an international basis will be impossible.

Address by Doctor Moldenke

Doctor Moldenke repeated his address before the Manchester branch of the Institute of British Foundrymen at the College of Technology, Saturday afternoon, Sept. 1, where another large audience of foundrymen and metallurgists met him. The discussion was just as animated as at Sheffield, and among other things brought out the fact that some of the foundrymen present agreed with the American viewpoint on the subject of test bars. There was a long discussion on rational cupola practice, desulphurization of cast iron, the abuse of shot in the cupola, fluxing, and many other topics such as are of equal interest in the United States.

One interesting item came to light incidentally. The late Thos. D. West was born in Manchester, England, and the American party came to this city on an anniversary day of his birth. His son, Ralph West, of the West Steel Casting Co., Cleveland, a member of the party, was able to obtain a certificate of birth of his father, and located the old home. All the foundrymen of Manchester united in paying a tribute to the memory of this great American foundryman.

Visitors Dined at Manchester

On the arrival of the party in Manchester, Friday evening, they were given a splendid dinner in honor of the occasion. The Manchester foundrymen outdid themselves in hospitality to their guests, and adjournment was had at a very late hour. The dinner was given by the National Ironfounding Employers' Federation, Oliver Stubbs, president; and at the Midland Hotel. After the usual toasts to the King and the President by the chair, "Manchester" was proposed in a toast by Walter Wood of Philadelphia, and responded to by the Rt. Hon. the Lord Mayor of Manchester, Councillor W. Cundiff. The toast for "The American Foundrymen's Association," proposed by Mr. Stubbs, and supported by F. J. Taylor, was responded to by President Clamer of the A. F. A. There was abundant good music during the evening.

Saturday, Sept. 1, had the morning spent in an excursion about Manchester, visiting among other places of interest the large Ford assembling plant—the Ford foundry being in Cork, Ireland. The afternoon was occupied by the meeting of Manchester foundrymen, at which Doctor Moldenke gave his address on "American Foundry Practice." On Sunday an excursion was given the visiting party to the old Roman town of Chester. This is one of England's famous cathedral cities and the wonderful structure was duly appreciated. The Roman remains of the wall about the town were seen and a long walk taken along the parapets. In the afternoon a most enjoyable trip by boat up the River Dee—the restful river—was had, and after entertainment at dinner at the Grosvenor Hotel the party returned to Manchester late in the evening.

Monday, Sept. 3, the party was taken through the Metropolitan-Vickers Electrical Co., Ltd., plant, where the Westinghouse products are made. The enormous foundry, where not only the great variety of smaller castings required in the production of electrical machinery were produced in finely finished form, but huge turbine castings and generator frames were produced, came in for a full share of admiration by the American foundrymen. In the evening high tea was given the visiting party at the Victoria Hotel by the Lancashire branch of the Institute of British Foundrymen, after which the party was taken to the performance at the Manchester Hippodrome. After the many strenuous manifestations of the wonderful courtesy given the American party by the British foundrymen, the Tuesday morning period of rest was really needed. In the afternoon the visitors entrained for Birmingham.

(From Another Correspondent)

MANCHESTER, ENGLAND, Sept. 3.—Dr. Richard Moldenke, the well known American foundry metallurgist, delivered a lecture before the Institution of British Foundrymen at Manchester College of Technology on Saturday, Sept. 1. He reviewed modern American practice and discoursed at considerable length on the operation of the cupola. Rule of thumb cupola practice, he said, means a high coke bill. It is possible to melt 10 **cwt. of iron to 1 cwt. of coke, but** in many foundries only half this is obtained.

The adoption of uniform cost systems for each class of work has been a great step in advance for American foundrymen, it was stated, though it was not uncommon at one time to get quotations for castings from different firms varying from 2½c. to 6c. per pound. Yet it should be clearly understood that the American foundries are aiming at high quality castings even more than quantity. Strength and machinability are considered all important.

After saying that the high sulphur content of American pig iron is causing concern, the speaker described a method in use in some American foundries for desulphurizing iron by means of soda cakes. The slag is first skimmed off the ladle and a very small quantity of soda in the form of cake is then thrown into the molten metal. In 2½ minutes 40 per cent of the sulphur is removed and if the metal is still sufficiently hot the operation can be repeated and 90 per cent of the sulphur altogether removed. In one foundry the percentage of sulphur was 0.18 and it was reduced by the process to 0.045. Krupps at Essen are using this desulphurizing method and American foundrymen are looking to it to solve some difficult problems especially as much of the scrap has a percentage of 0.26 sulphur, and when the wartime castings came to be broken up this will probably be increased to 0.32. It is quite necessary, however, that the slag be all removed first and cupola design is being modified in the United States with this end in view.

An interesting statement was that American en-

ployers were being forced more and more to install machinery because of the shortage of labor, which Doctor Moldenke attributed to the faulty United States immigration law. He believed in developing machine work, and considered it profitable to put the highest skilled labor on molding machines. Employers should not lose sight of the human side and machinery should be to relieve labor of drudgery.

The gating of molds was referred to as one of the most difficult parts of foundry work. Top gates are now preferred in America, even cylinders being poured with several gates at the top. Bottom gates mean that the metal has to travel a long way through the sand before it reaches the mold, the result being that it becomes sluggish. Then as to cupola charging, the great drawback of side charging is that metal and coke are not level; thus the metal becomes oxidized because of the blast striking it. He emphasized the fact, in answer to questions, that the cupola is an exceedingly simple piece of apparatus. There should be 4 in. of coke between the charges and if correctly charged the metal should run from the tap hole 10 minutes after the blast is put on. The blast pressure, Dr. Moldenke said, in answer to another question, should not fall below 4 oz.; a pressure of 7 oz. is satisfactory. It is most important that the pressure be kept uniform.

A large party of American foundrymen and members of the Institute of British Foundrymen visited the works of the Metropolitan-Vickers Co. at Trafford Park, Manchester, on Monday afternoon, Sept. 3. Every facility was given to the visitors to get an insight into the methods and organization of the company, which at the present time employs about 7000 to 8000 men. Tea was served in the staff canteen and Mr. Bailey, the works manager, expressed the pleasure of the firm at having such a representative company as guests. He said that in the Metropolitan-Vickers foundry they had expended £80,000 during the last three years. He considered the foundry the basis of the engineering industry. During a visit to America he had been greatly impressed with the methods of handling materials in the foundries. Mr. Bailey stated that until five years ago the Metropolitan-Vickers works belonged to the Westinghouse company and that they had a working agreement for the exchange of designs and manufacturing methods. He considered, therefore, that the two companies had an interest in research work in both countries.

Thermal Treatment of Molded Pieces*

Imperfections in Tempering Semi-Steel—Density of Metal Affected by Heat Treatment, Which May Produce Porousness

IN a recent memorandum, Jean Durand pointed out the results he had obtained by the thermal treatment of test bars resulting from cast metals. The improvement noticed, in the course of tension and shock tests, shows what we can hope to obtain from these thermal treatments, especially on semi-steel shells. Aside from this, Messrs. Botchvar and Kalinnikoff presented at the Congress of Russian Metallurgists, held in November, 1920, the results of their experience on thermal treatments of semi-steel. They found more especially, by heating at 800 deg. C. (1472 deg. Fahr.), followed by re-heating at 500 to 600 deg. C. (932 to 1112 deg. Fahr.)—on castings at 3 per cent total carbon, 2.2 per cent graphite, 0.85 per cent Mn., 1.1 per cent Si.—an increase of 21 per cent for the transverse strength, 10 per cent for hardness and of 10 to 12 per cent for shock resistance.

During the war the question of thermal treatment of semi-steel occupied considerable time in the laboratory experiments, as well as that of manufacturers. Large lots of shells were submitted to acceptance tests at the shops and to firing tests. Without entering into all the details as to the data established and results obtained, which were fully reported to the permanent Bureau for Artillery Products in 1917 and 1918, we wish to call attention to the following points, which we believe essential in connection with the application to practice:

1.—So-called semi-steel, which consists schematically of laminas of graphite which are inclosed in pearlite, often runs rather high (0.8 to 1 per cent) in manganese, and is therefore critically affected by tempering. Samples of 20 mm. (0.8 in.) thickness (the average thickness of the walls of a shell of 155 mm. or 6⅛ in. diameter) show a lively action in tempering. At 850 deg. C. (1562 deg. Fahr.) in the water, a strong penetration of tempering reaches to the center. By reheating at 500 deg. C. it is possible to preserve for the bar a considerable hardness in its entire thickness, say from No. 250 to 270 Brinell units.

But this large tempering power increases considerably the chances of imperfections in the tempering, so much more because the laminas of graphite play the part of internal sharp grooves and because cast iron has far from the homogeneity of constitution which is found in wrought steel. To avoid such occurrences we are thus forced to adopt medium speeds of cooling, which are relatively weak (oil temper, temper with limited duration, etc.).

2.—Owing to the non-uniformity of mechanical properties in a series of iron castings, even when these castings come from the same run, it seems necessary to have recourse to a preliminary and final individual grading, for instance by bar tests, and to obtain reheating temperatures, if definite and fairly constant mechanical qualities are desired.

At the same time it is known that there is no chance to recognize the mechanical properties of iron castings if we base ourselves on the results of tests taken with test bars that are run separately from the castings. This is because the condition and properties of the metal are a function of the mass of the product. The phenomena of penetration of the temper hardness due to sections will be greater, in the case of thermal treatment, than usually exists between castings and test bars.

3.—Finally, the most important thing to call attention to seems to be, that the thermal treatments determine the density of the metal. This density is established by means of the hydraulic test. Under a water pressure of 390 kg. per sq. cm. (5550 lb. per sq. in.), *all* shells of 155 mm. (6⅛ in.) which had undergone a double heating (tempering followed by reheating, or double temper in case of failure of the first operation) and a large number of those which had undergone only one heating, have shown a density which revealed itself in a slow drop of pressure and even by a trickling out of water on the outer surface, if the duration of the test was prolonged.

This density is connected with the well-known phenomenon of the expansion of iron castings when heated. These phenomena have been especially investigated by Outerbridge, Rugan and Carpenter. This expansion shows itself only in gray castings which contain free carbon or graphite. It grows with the percentage of silicon and the number of heatings. Hence, it is noted that this apparent increase in volume, at constant weight, can entail as a consequence a porosity of the

*Memorandum of Albert Portevin, presented to the Academy of Sciences by H. Le Chatelier. Translated by E. J. Lowry. Hickman, Williams & Co., Pittsburgh.

(*Concluded on page* 794)

COLD STRIP ROLLING

Interesting Points Regarding the Process Furnished by Mill Designer

BY W. H. CLEAVER*

A NUMBER of large manufacturing consumers of cold rolled strip steel have recently been installing their own strip mills to make this product for their own plants. When the wide variety of products for which cold rolled strip steel is adaptable is considered, it is not surprising that this should be so. Large users of cold rolled strips now include manufacturers of typewriters, telephone instruments, metal moldings, adding machines, sewing machines, metal furniture, door knobs, hardware, welded tubing, shoe shanks, clothes line pulleys, electro-plated ware, razor blades, pencil sharpeners, ash trays, automobile parts, springs, etc. Many others could be named but this is enough to illustrate the great growth in the use of cold rolled strips.

A reason for the fact that many consumers are now rolling their own strips is the savings that may be effected. For example, when hot rolled strip fell from 5.50c. per lb. in November, 1920, to 3.30c. per lb. in March, 1921, cold rolled strip fell during the same period only from 8.50c. per lb. to 6.25c., base. It will be noted that the difference in base price between hot and cold rolled strip fell only from 3c. to 2.95c. per lb. When it is considered that these prices are for base gages, and that thin gages, narrow widths, specification carbon, etc., all carry an extra, it will readily be seen that the possible profit to the manufacturer of cold rolled strip steel for his own consumption is considerable.

In view of the widespread use of cold rolled strips we are getting more and more requests for information regarding processes of rolling and various other matters connected with its production. Our information is of course not new to those already in the business, but we believe it to be both interesting and valuable to those who contemplate making their own cold rolled strips.

Before going into the rolling process it is necessary to say a word about the material that is to be cold rolled. Much of the success of cold rolling depends on the quality of the hot rolled strip steel. Should there be any inaccuracy in the thickness of one edge of the hot rolled strip, this same inaccuracy will appear in corresponding proportion after cold rolling. This is due to the fact that there is very little spreading of the strip in rolling and since the width of the strip is much greater than its thickness the metal will not flow across the strip. On this account it is very important to have accurately rolled stock.

There are many mills throughout the country that make a specialty of hot rolled strip steel for cold rolling purposes, and by obtaining the stock from them better success will be assured.

The purpose of cold rolling strip steel is mainly to obtain a thinner strip than can be economically hot rolled, also an accurate thickness, a finely polished surface, and a definite degree of hardness.

Different degrees of hardness and polish may be obtained from the same stock. For example, a very hard steel is obtained by giving the strip four cold passes, but by annealing this same steel is changed to one very soft. The definite degree of hardness is then obtained by further cold rolling.

We find there is no standard classification for degrees of hardness and finish. We have found, however, the following the most useful:

Hardness Classification

No. 1. Hard Sclerescopic hardness approx.....40
No. 2. Half hard Sclerescopic hardness approx....35
No. 3. Quarter hard Sclerescopic hardness approx 30
No. 4. 8-oz. Sclerescopic hardness approx.....25
No. 5 Dead soft Sclerescopic hardness approx....20

In flat work on which no bends are required, grade No. 1 should be used. For deep drawing work and work on which the strip is bent double No. 5 grade should be used. The intermediate grades are used for work requiring more or less bending.

The better degrees of finish are obtained by giving the strip a greater number of light passes for a given reduction and by the use of highly polished rolls. The finish classification is as follows:

A—Extra bright—extremely smooth finish.
B—Standard bright—very smooth finish.
C—Smooth bright—smooth finish.

The hot rolled strip is usually received at the cold mills in coils. These coils are placed on drums and unwind as the strip is fed into the mill.

The cold mills may be operated individually or in tandem. Individual operation consists in passing the strip through one set of rolls and rewinding on a reel. The rolls are then adjusted and the strip passed through again. This operation is kept up until the required gage and finish are obtained.

Tandem operation consists in passing the strip continuously through several sets of rolls, usually four, placed in tandem. The strips are wound on a reel after leaving the last stand. Four passes are generally sufficient to finish the ordinary grade of steel, so it will be seen that much time and labor may be saved in the use of the tandem arrangement.

It is obvious in the tandem-operated mills that each succeeding mill must run at a speed faster than the previous mill, so that the quantity of steel delivered per unit of time will be the same for all mills. It is therefore necessary to equip these mills with adjustable speed motors with special controls. These controls are so arranged that one operator, from one point, may control the speed of each mill.

During the rolling operation it is necessary to anneal the strip periodically in order that further reduction may be made. In low carbon steel the strip is generally annealed after every fourth pass, whereas in high carbon steel it must be annealed after every two passes or so.

A 50 per cent reduction may usually be obtained in four passes, so it will readily be seen that to reduce a No. 14 gage low carbon strip to No. 34 gage sixteen passes and three annealings will be necessary.

All cold rolled strip steel must be pickled to remove scale and surface impurities. This is generally done before the last finishing passes, but for dead soft steel the strip is annealed and pickled after the last pass.

After the rolling process is completed the strip is then slit to the desired width, the edges finished if necessary, straightened and cut to length. The steel is then oiled, boxed and is ready for shipment.

Cold rolled strip steels are usually manufactured in widths ranging from 6 to 20 in.

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The Penn Steel Castings Co., with capital stock of $500,000 in cumulative preferred and 10,000 shares of common stock, no par value, has been organized by the directors of the Penn Seaboard Steel Corporation, Philadelphia, and will purchase from the latter corporation the Chester, Pa., plant, together with $500,000 of net quick assets, and in payment will issue to the corporation all capital stock and bonds. A closed first mortgage on all fixed assets of the new company will secure the bonds, assets being valued at $2,200,000, or twice the principal amount of the issue. During the first six months of 1923 the Penn Seaboard Steel Corporation showed net profits after expenses and deductions but before interest of $221,908, against a deficit before fixed charges of $225,000 during the same period last year.

A cablegram has been received by the Truscon Steel Co., Youngstown, that all of the American officials and employees at its plant in Japan, between Tokio and Yokohama, are safe, following the earthquake. R. F. Moss, formerly of Detroit, is vice-president and managing director of the property, while F. W. Shackleton, formerly at the Youngstown plant, is works manager. Some damage was done to the Japanese plant, the extent of which has not been fully determined. It is the intention to make the necessary rehabilitation without delay.

Blowing in French Blast Furnaces

Method Generally in Use Before the War Described in Detail—Modifications Necessary Since the War Have Resulted in Large Economies

THE blowing in of a blast furnace is one of the most important matters connected with its operation, and may have an effect on the entire run of the furnace. Very little has been published recently on this detail of practice, and an account of the French method of starting a furnace will be of interest, particularly as it includes a discussion of principles which are applicable to furnaces everywhere. The article is by Maurice Derclaye in the *Revue de Metallurgie*, April, 1923, and a special feature is an account of how their pre-war practice has had to be changed because of after-war conditions.

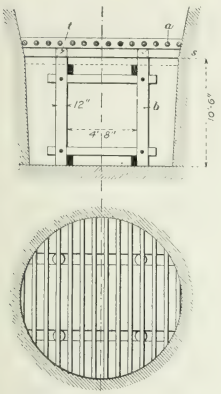


Fig. 1. (Left). — Construction of the Grate for Holding the Wood, Charcoal and Coke at the Beginning of the Bosh

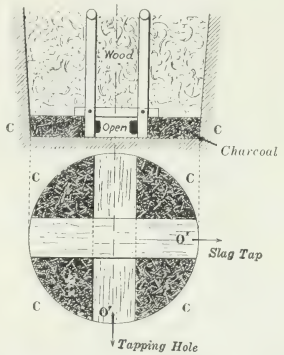


Fig. 2. (Right).— Method Used for Filling the Hearth Under the Grating

Pre-War Method

The method first described is that in general use in France before the war, and is taken up under separate headings.

Drying.—The volume of the refractory material of a modern blast furnace is considerable; for instance a French furnace of 11,720 cu. ft. capacity has 9040 cu. ft. of brickwork, which corresponds to 77 per cent. Such a mass of brickwork freshly erected requires careful drying to drive off its moisture and to heat it. Otherwise the moist brickwork may harmfully affect the development of the interior of the furnace; it may cause improperly heated materials to descend to the hearth and, above all, too sudden heating of the brickwork may cause bursting and scaling of the bricks, which means a short run. Even in the preliminary drying too much speed is harmful, and at least eight days are recommended.

Two small brick walls are built in the hearth of the furnace, about 2 ft. 6 in. high, and 5 ft. apart. On these are laid old rails to form a grate, and cut to fit the hearth. On this grate a fire of coke about 20 in. deep is kept burning day and night, and the ashes cleaned twice a day through the open tapping hole. The tuyeres and slag spouts are closed with walls made of half bricks, and the charging bell closed, only a small opening being left at the throat to give a light draft. When possible this method of drying is completed by introducing for one or two days a small amount of hot blast from an adjoining stove.

Wood, Charcoal, Coke and Wood Grate at the Beginning of the Bosh.—A wood grate at the beginning of the bosh is considered the best method for preparing to fill the furnace. It allows the complete charging of the furnace and prevents the charge pressing down on the materials for ignition, which are necessarily small in volume, and would be changed into a compact mass through which fire would have trouble in penetrating with the required regularity. Further the preparation of the hearth can be retarded until the last moment, which prevents premature firing. The disposition of the wood forms a kind of grating favorable to the uniform distribution of the air for combustion. The wood of the grating also furnishes a very inflammable material serving as a torch to fire the coke and to heat the walls of the hearth. The grating is constructed as shown in Fig. 1. Four round pillars of oak, about 12 in. diameter, are placed about 4 ft. 8 in. apart. They are tied together about 20 in. from top and bottom by two series of square supports. On top are placed two strong beams about 12 in. square, the ends shaped to fit the angle of the bosh. These beams are supported by two cross-pieces, "t." On these beams are placed rounds about 8 in. in diameter, and spaced about 8 in. apart, cut the proper length to form the circle.

On this grating is placed the wood for ignition, being well dried oak, cut in pieces about 4 ft. long and 3¼ in. square. The thickness of this bed of wood is to be about 4 ft. 4 in., and each successive layer should be laid cross-wise. The quantity of wood varies; 670 cu. ft. is sufficient for a furnace of 14,850 cu. ft. capacity. The quantity depends rather on the size of the hearth than on the internal capacity of the furnace. It is destined to fill the hearth with a combustible easily inflammable and of high calorific power so as rapidly to prepare the hearth for the first fused materials. A great deal of wood would be needed to meet this condition. A hearth of 350 cu. ft. capacity requires three or four tons of charcoal produced by 430 to 530 cu. ft. of hard

wood. This wood requires a large space in the furnace which can be used to better purpose. Therefore, part of the wood should be replaced with charcoal and, for large furnaces with hearths about 500 cu. ft. in capacity, in addition to the 670 cu. ft. of wood mentioned above about 2 tons of charcoal is placed on the wood, the thickness of the layer of charcoal being about 3 ft. 4 in. The total depth of wood and charcoal is then about 7 ft. 8 in.

In regard to coke for ignition Ledebur recommends 4 tons for each 3530 cu. ft. (100 cu. meters) of the interior volume of the furnace. Certain blast furnace men recommend 6 tons. Too much coke should not be used, and 5 tons per 100 cu. m. (3530 cu. ft.) has always been found a proper amount. In order to slag the ash of the coke, suitable additions must be made to give a slag fusible at relatively low temperatures. The importance of this first slag is considerable. It serves to heat the hearth and form a protective coating against the action of the iron. Also it is well to produce it during the first few hours of the run. Broken up blast furnace slag, made when the furnace was running with plenty of temperature, is a good base material. Considerable excess can be added without danger, as it

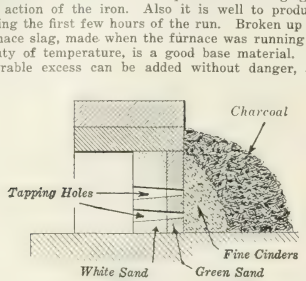


Fig. 3.—How the Preparation of the Tap Holes Is Provided for

melts slowly and dissolves the ash by filtering through the coke. It naturally contains a large excess of base ready to unite with the SiO_2 and Al_2O_3 forming the major part of the ash.

Limestone itself is not suitable for a flux at this time. A mixture of limestone and of good basic Bessemer slag can be used with success. M. Derclaye uses a flux equal to 8 to 10 per cent of the weight of coke and composed of two-thirds limestone and one-third crushed slag. This gives a very fusible slag with 32 to 33 per cent SiO_2, 41 to 42 per cent CaO and 20 to 21 per cent of Al_2O_3, with a lime over silica of 1.26 to 1.27. Slags richer in silica should not be used, notwithstanding the belief of many. Slags with 37 to 39 per cent SiO_2 are much too corrosive and easily attack the walls of the hearth.

Progressive Charges.—When making Bessemer iron the ratio between ore and flux on one side and coke on the other hardly ever exceeds 2.5. For basic Bessemer iron this ratio is usually about 3.0. The first charge generally has only 25 per cent of the normal ore and flux and gradually rises to 60 per cent in the upper layers. The change should not be too abrupt nor too slow. In regard to composition the slags produced should be fluid and non-corrosive. They should be capable of taking up silica or bases without too soon becoming infusible, and should remain fusible even if 10 per cent or more of the brickwork is dissolved. This result has been obtained by progressively increasing the basicity of the charges, starting with lime divided by silica = 1.35 for the first charges for Bessemer iron and attaining 1.45 in the upper layers.

In Bessemer iron slags this ratio is a maximum of 1.60, so this ratio must not be approached too closely. In the case of basic Bessemer iron where the maximum ratio is 1.40 the ratio to start with is 1.20, ending with 1.30 for the upper charges. These ratios apply to a furnace blown in with hot blast from neighboring stoves. When cold blast is used the ratios should be 1.20 to 1.35 for Bessemer iron, and 1.10 to 1.27 for basic Bessemer.

Many blast furnace men do not like to start a furnace with cold blast. Their fear is not justified, for there is no special difficulty in using cold blast. It is perfectly useless to install provisional gas producers to give gas to heat the stoves. The table shows the silica, lime and alumina found necessary to obtain fusible slags. By comparing the calculated slags with the table it is readily seen whether they will be fusible or not. When the slags are properly proportioned, one of the main factors for success has been obtained.

Table of Proportions of Silica, Lime and Alumina for Fusible Slags

Proportions of Al_2O_3	Cold Iron Min. Per Cent	Cold Iron Max. Per Cent	Hot Iron Min. Per Cent	Hot Iron Max. Per Cent
$Al_2O_3 = 0.60\ SiO_2$				
SiO_2	38.75	35.58	32.41	29.24
Al_2O_3	23.25	21.35	19.45	17.54
CaO	28.00	34.74	41.48	48.22
Other materials	10.00	8.33	6.66	5.00
$Al_2O_3 = 0.55\ SiO_2$				
SiO_2	39.91	36.67	33.44	30.20
Al_2O_3	21.84	20.01	18.28	16.50
CaO	28.00	34.77	41.53	48.30
Other materials	10.25	8.55	6.75	5.00
$Al_2O_3 = 0.50\ SiO_2$				
SiO_2	41.07	37.77	34.66	31.16
Al_2O_3	20.43	18.77	17.12	15.46
CaO	28.00	34.79	41.39	48.38
Other materials	10.50	8.67	6.83	5.00
$Al_2O_3 = 0.45\ SiO_2$				
SiO_2	42.23	38.86	35.49	32.12
Al_2O_3	19.02	17.49	15.95	14.42
CaO	28.00	34.82	41.64	48.46
Other materials	10.75	8.83	6.92	5.00
$Al_2O_3 = 0.40\ SiO_2$				
SiO_2	43.39	39.85	36.51	33.07
Al_2O_3	17.61	16.20	14.80	13.39
CaO	28.00	34.85	41.69	48.54
Other materials	11.00	9.00	7.00	5.00
$Al_2O_3 = 0.36\ SiO_2$				
SiO_2	44.55	41.04	37.53	34.02
Al_2O_3	16.22	14.94	13.64	12.35
CaO	28.06	34.87	41.75	48.62
Other materials	11.16	9.15	7.08	5.01
$Al_2O_3 = 0.32\ SiO_2$				
SiO_2	45.68	42.11	38.57	35.94
Al_2O_3	14.82	13.65	11.32	10.27
CaO	28.00	31.90	41.85	48.78
Other materials	11.50	9.34	7.26	5.01
$Al_2O_3 = 0.25\ SiO_2$				
SiO_2	48.00	44.30	40.60	36.90
Al_2O_3	12.00	11.08	10.15	9.23
CaO	28.00	34.96	41.91	48.78
Other materials	12.00	9.66	7.34	5.09

Labor of Charging.—The charging of the furnace should be done in dry weather as far as possible. The coke, ore, etc., should be dry. If possible they should be discharged and kept under cover. The coke should be chosen from the best available, lowest in ash, hardest and most regular in size. The unloading should be done carefully and the fines rigorously thrown away. Coke breeze stops the passage of gas, prevents regular descent of the charge, and any sudden drop due to hanging may cause insufficiently prepared material to drop into zones not yet properly heated.

Ore fines should also be carefully removed. All handling should be done with forks, and the ore, stone and fluxes should be broken to about fist size and fines rigorously rejected. The materials thus prepared should be carefully analyzed. The charges are raised to the throat and lowered into the furnace by means of a steam or electric hoist, discharged onto a steel plate and from this are shoveled by careful workmen into homogeneous horizontal layers.

A great deal of the success of blowing in depends on the charging. Direct charging as in normal operation should be avoided. The shock of the ore falling on the coke pulverizes it, and the effect is to give a column the whole height of the furnace. Derangements from this cause are corrected only slowly and with great difficulty in the early operation of the furnace. In order to have homogeneity and ore in good contact with fuel the charges are never so heavy as in regular

operation. The coke charges should never be more than two tons.

Preparation of the Hearth.—The filling of the hearth under the wooden grating is not done until the last minute. The slag hole and the tuyeres are put in place, but the latter are not connected with the bustle-pipe. Their openings are closed so as to avoid any accident, and the filling is carried out as shown in Fig. 2. On the hearth itself is built a box in the form of a cross, 20 in. high, one opening "O" in front of the tapping hole, the other or others in front of the slag holes. All over the bottom of the hearth is placed a thin layer, 2 in. to 2½ in. thick, of fine limestone screenings, so as to protect the hearth against the corrosive attack of the first slags. For the same reason a lining of fire bricks is built up around the hearth to the level of the tuyeres. The four corners "C" of Fig. 2 are filled with charcoal and the arms of the cross are stuffed with shavings. In order to form a roof and prevent the shavings being crushed tight, large planks are laid over the box.

The hearth is then filled with dry wood about 4 ft. 4 in. long and 2 in. thick, up to the grating, a space being saved in front of each tuyere which is filled with charcoal and shavings. The workman doing all this leaves by the opening always found above the tap hole. This hole is filled properly and everything is ready for starting.

Starting.—Lighting should be done at as many places around the circumference as possible. After having opened the tuyeres and connected them, gasoline is squirted through each one, through the tapping hole and the slag hole. Then fire is started in all the openings at once. It often happens that the fire seems to smolder in front of certain tuyeres. The best way to overcome this is to apply a gentle blast for two or three minutes. The effect is immediate and a clear flame soon shows at the throat. Natural draft is then used again.

Several hours after lighting little slips to right and left show that the oak columns are giving way. This takes place usually without noise, and frequent inspection at the tuyeres is necessary to observe it. Very soon after, coke is seen at the tuyeres, white hot, indicating that it is time to give a little blast, but before this the tapping hole must be closed and rings placed in the tuyeres to reduce the section.

Preparation of the Tap Hole.—Usually about 10 hr. after lighting, during which the tap hole is always open, the blast is applied with about 6 oz. pressure. Soon a flame appears at the tap hole like a blow pipe, heating it rapidly. After an hour of low blast pressure, the blast is raised for a half hour to about 30 oz., which cleans out all the dirt and prepares the hole for closing. The blast is then shut off. By means of a large rabble the hearth is cleaned about 20 in. back of the hole. A large basket of charcoal is then thrown in, then fine coke cinders, then green sand followed by white refractory sand rammed strongly into place (Fig. 3). Two triangular holes are then made with a special tool shown as in the sketch, one 2½ in. above the bottom and the other 6 in. above the first one. Fire clay rings are placed in the tuyeres, slightly over 3 in. internal diameter, to give more penetration to the blast. These rings can be readily broken and pushed into the furnace when not needed. All these preparations completed, the valves tested for the last time, assurance made that water is circulating properly in the tuyeres, etc., the blast is definitely put on.

Gas and Slags.—An apparently regular heating indicates that everything is going well. The stock descends in the furnace, and new charges are given with 60 to 65 per cent of the normal amount of ore. Twenty to twenty-four hours after putting on the blast the first slag is ready to tap, followed by another slag-tap one hour after. Many superintendents boast of tapping slag or iron within a short time after putting on blast. It is better to wait until the slag rises in the crucible, which is thereby heated and prepared for the first iron. When the second slag has been tapped, gas may be taken for the stoves. These should be taken care of before gas is taken for boilers or gas engines, but before doing anything the gas should burn at the throat with a clear, lively flame. This is usually the case after tapping slag twice.

This first gas contains a great deal of CO and care must be taken against explosions and gas-poisoning. The gas is taken slowly and methodically, the piping being swept out by sections. Finally full connection is made with the stove, and 10 to 15 min. are given to clean out the brickwork of the stove. There should be no hurry and it is better to give an extra five minutes rather than run the risk of an explosion.

The men should be kept away from the furnace top and the stoves. At the proper moment the blower together with a foreman lights the gas with burning tow or waste at the end of a bar, after having been sure there is draft through the stove. The first stove lighted, several minutes are given before the second is lit. It is rare that there is gas enough for a third stove.

The First Cast.—If it is best not to tap slag too soon it is still better to take time before tapping the iron. The first charges are low in metal and it takes at least 30 hr. before enough iron is concentrated in the hearth. Before tapping the spout and troughs are well dried with wood fires. Then half an hour before tapping a 1⅜-in. bar is driven through the lower of the two holes shown in Fig. 3, during this time it is allowed to heat in the iron. It is pulled out and the metal follows. Many times, however, there is a pasty mass on the bottom composed of fine ore, ash, stone, etc., and metal must be tapped from the upper hole.

This concludes the general remarks in the paper, and next comes a description in complete detail of the starting of six blast furnaces. The first three were with hot blast for making Bessemer iron. The next three were with cold blast for basic Bessemer iron and this is followed by the description furnished by another observer of another furnace which was not successful. Too little coke was used and too much limestone in the first slags, also no broken-up slag was used, and the gas was not used exclusively for the stoves. The furnace almost froze up, and made white iron and very limy dry slags. The author believes it is preferable to make first a white iron in ordinary practice for a short time, as the brickwork thereby is less attacked, and takes on more rapidly its usual protective coating.

After-War Modifications

The paper concludes with a description of the methods found necessary to meet the after-war conditions of shortage and expense of labor, and also the desire to shorten the preliminary time when no iron is produced. The preparation of the wood-grating, which characterizes the old method, is expensive, and more expensive still is the cost of hand filling, because it requires 20 men each shift of 12 hr. for eight to ten days. This is four times the labor needed for ordinary running. In addition the old method takes about 10 hr. from lighting before the blast is put on, putting gas to the stoves in 24 hr., and the first cast in 29 hr. About 11 days elapse from the first preparations until the first cast. Efforts have been made to reduce this time, and do away with hand filling.

The hearth is filled with large faggots well dried, to a level about three feet above the tuyeres, introducing the faggots from below. Then, the tuyere openings and tapping hole being carefully bricked up, the lighting coke and filling charges are charged in the usual way with the ordinary labor. No charging is done at night, so as to have the operation under good control, and the night men used on the other preparatory work necessary. Two days are enough to charge the furnace.

The principles outlined before are all carefully respected, such as the amount of lighting coke, gradation of iron in the charges, importance of the first slags, etc. Blast is given immediately after lighting, which is necessary because the wood burns quickly. Also to help in its combusion a tuyere is placed in the tapping hole, and left there for two or three hours.

Four furnaces put in blast since the armistice were handled in this way with complete success. Three hours after being lit the tap hole was closed, and seven hours

after gas was lit in the stoves. Twenty to twenty-four hours after, slag was tapped, and 22 to 24 hr. after lighting, iron was tapped. The elapsed time from the first preparations to tapping was three days instead of eleven. The fifth day 100 tons was made and in 10 to 12 days the furnace was in normal production, without the upper brickwork or the top having been in any danger. G. B. W.

Time Study in a Malleable Foundry

Factors Taken into Consideration Summarized—How It Is Applied in Actual Practice

BY MARTIN A. HARDER*

THE main object of time study is to determine the time for a task. There are, however, other advantages, such as the determination of possible improvements in the equipment, and elimination of all unnecessary operations, which means in itself less fatigue to a molder and therefore greater production.

Time study procedure entails certain basic investigations which are essential before the data collected can be made use of in rate selling. There should be made: first, a careful survey of the work and all influencing conditions; second, an analytical division of the task into simple elements; third, an observation and record of the time taken in performing each of the element operations; fourth, a study of the recorded unit times. To make use of the data collected for rate setting all abnormal readings should be discarded and a fair standard time determined for each one of the simple operations. To illustrate this, there are 25 different operations in molding a job on a squeezer, in sequence as follows: place match on machine, set drag on match, parting sand, riddle, shovel, pein, set board, squeeze, remove match, place cope, parting sand, riddle, shovel, pein, set board, squeeze, remove board, cut sprue, remove cope, rap pattern, remove pattern, place cores, place cope, remove flask, place mold on floor.

Now to take an observation in the ordinary way it would be necessary to time the actual making of at least three molds, analyzed as above, and the minimum time taken for each operation would then be totaled up, plus the usual allowance for fatigue, pouring, and whatever else would enter into it, and this then would be the basis for figuring the piece rate. The question might arise, what type of man would be used for a study? This is where the standard time on each operation enters into it, for if this were not the case the piece rates would be as much out of line as there are differences in the abilities of molders.

Of the 25 various operations there are only four which may be classified as being variables, namely, setting chills, rapping pattern, removing pattern and placing cores, that is, for flasks from 9 x 13 x 8 in. to 14 x 14 x 8 in., inclusive; the other operations within these limits are all standardized, which means that, in the majority of cases, it would only be necessary to time the four variables. However, it is advisable to take a study upon a complete mold, in order to see if anything interferes with the standard time.

Standards for each operation were arrived at in the following manner by one who has spent several years at this class of work, and made a special study to determine constants that could be used as standards. A good many observations were taken during the course of several months on men of average ability on flasks ranging in size as stated. The observations were next taken and analyzed for every operation, and an average taken which was afterward used as a standard, and has since proved to work out very satisfactorily.

A comparison of standards was made with other plants in Chicago and it was found that there was only 3 seconds difference in the total time allowed for making a mold on the squeezer.

The pouring time is figured somewhat differently; usually an hour is allowed for each heat and this time is figured in with the molding price. The weight of the castings or the number of ladles of iron carried is taken care of by the percentage of fatigue allowed.

Example: Total time taken to make mold is 3.55 min. Add 25 per cent to total time taken to make a mold, for fatigue, which equals 0.89 min., making 4.44 min., the total time allowed for making mold.

Ten hours are allowed for one full working day, of which 8 hr. are allowed for molding and 2 hr. for pouring. Reduce the molding hours to minutes, which equals 480 min. Divide the molding hours, or 480 min., by the total time allowed per mold, or 4.44 min., which is 108, or the production of molds per 10-hr. day, which includes the pouring time. The molder's base rate is 55c. per hour. To this add 33⅓ per cent, making 73c., or the high rate; in other words, the amount the molder is expected to earn per hour.

At the rate of 73c. per hr. the molder will be expected to earn $7.30 per 10-hr. work, including pouring. Divide $7.30 by the production per day, or 108 molds; this gives $6.75, which is the molding price per 100 molds.

Twenty-five per cent fatigue is allowed on all jobs where four or more molds are poured with one ladle, 30 per cent fatigue on jobs where three and four molds are poured with a ladle, and 35 per cent fatigue on all jobs when only one or two molds are poured with one ladle.

*Wisconsin Malleable Iron Co., Milwaukee. Paper presented at convention of Wisconsin Foundrymen's Association.

Officials of the Pacific Steel Corporation, San Francisco, have formed the Pacific Coke & Coal Co., under Delaware laws, with capital of $7,500,000, to carry out its proposed project at Long Beach, Cal., where a site has been selected between the Long Beach and Los Angeles harbors. It is purposed to construct a blast furnace with initial capacity of 600 tons of pig iron per day, with a battery of 50 by-product coke ovens. Later a steel works may be built on an adjoining site.

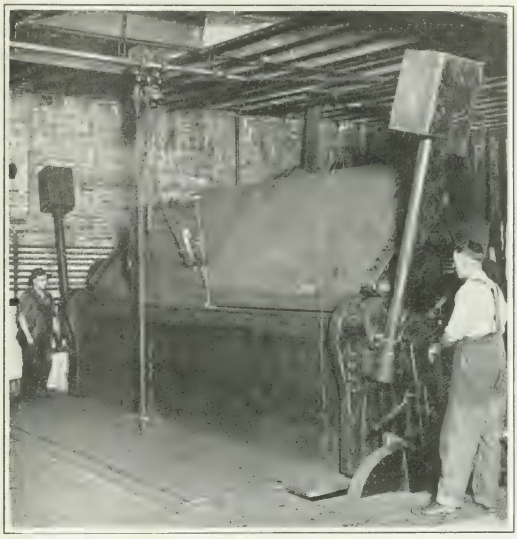
The Interstate Commerce Commission has suspended a tariff of the Illinois Central Railroad which provided an allowance of $1.25 per car to be paid to the St. Louis Coke & Iron Co., Granite City, Ill., on all carload line haul shipments going to or coming from the plant of the company where the industry performs a specific switching service between points of interchange with carriers and locations within the plant. The tariff had been filed to become effective Sept. 12.

The Acme Steel Goods Co., Chicago, is completing a new cold-rolled strip mill at Riverdale, a Chicago suburb, which will increase its cold rolling capacity to 56 mills, with an annual output of 50,000 tons. The mill is expected to come into production on or before Nov. 1. The mill adjoins the hot-rolling mill which the company built at Riverdale in 1919.

The Carnegie Steel Co. has prepared plans for a coke handling plant at its Mingo, Ohio, works. The company proposes, with the completion of the addition to its Clairton, Pa., by-product coke plant, to supply the coke requirements of the Mingo furnaces from Clairton and to convey the shipments by water.

Large Steel Bending Brake

What is believed to be the largest steel bending brake in this country was recently installed at the plant of the O. H. Hill Co., Chicago, manufacturer of metal doors and windows and heavy boiler plate work. The brake, which was built by the Dreis & Krump Mfg. Co., Chicago, has a capacity to bend ¾-in. steel plate 16 ft. long. It is built from 2-in. steel plates 60 in. wide and rests on a concrete foundation extending 2 ft. below the floor level. It is operated by a 35-hp. motor and weighs 30 tons. The massive character of the machine is indicated by the fact that the two balance weights shown in the photograph weigh 1700 lb. each. There are a number of other large brakes in use but none of them is believed to be as large as this one. The Newport News Shipbuilding & Drydock Co. has a 12-ft. power brake for ¾-in. plate. The Ford Motor Co., Detroit, has a 12-ft. brake for ⅝-in. plate, and the Boyle Mfg. Co., Los Angeles, a 14-ft. brake for ⅜-in. material.



Steel Bending Brake in the Plant of the O. H. Hill Co., Chicago, Capable of Bending ¾-In. Steel Plates 16 Ft. Long

Oxygenated Air in Metallurgy of Ferromanganese*

The field of ferroalloys is one of particular promise in the application of oxygen to combustion. So far, only a few of the ferroalloys respond to blast furnace reduction because of the inability to supply the high temperature heat required in this type of furnace. For this reason, electric furnace processes have been necessary for the industrial production of all but three of the common alloys, and as is true with all electric furnace processes, the cost of production is very high. Inasmuch as ferromanganese is one of the most common alloys made in the blast furnace, we have made a study of this process as it exists, and further investigations as to the results to be expected with the application of a blast enriched with oxygen.

[The original report contains here a discussion of general conditions with data on heat distribution and material balance.]

One of the most favorable studies developed calls for a blast of 26.3 per cent of oxygen (by weight) heated in stoves to 1135 deg. as in the regular practice shown, and an increase in burden of 75 per cent. In this practice, in order to conserve shaft heat, calcined limestone must be charged.

To form a comparison of manufacturing costs of the proposed process with that in use today we have prepared the following cost estimates based for the greater part on actual operating costs, charging oxygen at a rate of $3.00 per ton, for we have been assured that for large commercial production the cost of oxygen will hardly exceed this figure:

Table of Comparison of Making Ferromanganese with Air and Oxygenated Air

	Blast Used — Air			— 26.3% O_2 Blast		
	Per Ton Fe-Mn	Cost Per Ton Material	Cost per Ton, Fe-Mn	Per Ton Fe-Mn	Cost, per Ton, Material	Cost per Ton Fe-Mn
Manganese ore	6,169	$18.00	$49.572	6,165	$16.70	$45.962
Coke	6,707	10.00	33.535	3,829	10.00	19.145
Limestone	2,548	1.25	1.421	1,259 (calcined)	4.00	2.249
Labor:						
Superintendent, fireman, etc.			0.142			0.081
Stocking			0.029			0.029
Charging			0.317			0.317
Casting			0.758			0.432
Other producing labor			0.027			0.015
Repairs and supplies			1.378			0.785
Steam			0.012			0.007
Blowing			1.169			0.475
Water			0.269			0.154
Hydraulic and pneumatic power			0.027			0.015
Electric light and power			0.046			0.026
Yard switching			0.291			0.291
Handling material (raw)			0.593			0.593
Chemical laboratory			0.069			0.069
General works			0.132			0.075
Safety welfare			0.019			0.011
Contingent fund			0.030			0.017
Relining fund			3.000			1.714
Oxygen				203	3.00	0.272
Gross total cost			$92.826			$72.734
Credit for surplus gas, 345,000 cu. ft. @ $0.032 per 1000			11.04	164,000 cu. ft. @ $0.038 per 1000		6.23
			$81.796			$66.504
					Saving per ton,	15.292
						18.7%
Daily production 60 tons ferromanganese.				105.5 tons ferromanganese, 75.8 per cent increase.		

Ferromanganese is one of a large group of ferroalloys, and this study is shown not only as one on ferromanganese itself, but as an example of probable processes for coke furnace manufacture of other and more difficultly reducible alloys.

*Extract from an extensive report by a special committee of the Bureau of Mines, organized to investigate the use of oxygen or oxygenated air in metallurgical and allied processes. It includes the blast furnace, Bessemer and open-hearth, ferromanganese and artificial gas. The chairman of the committee is M. H. Roberts, consulting mechanical engineer, Bureau of Mines. The author of the report is F. W. Davis, metallurgist, Bureau of Mines, Minneapolis, Minn. The portion on blast furnace was published in THE IRON AGE Sept. 13; that on the open-hearth and Bessemer elsewhere in this issue.

One Month's Progress in Reducing Hours

Introduction of the Shorter Day Attended by Many Difficulties, Which Are Slowly Being Overcome —The Case of the Ten-Hour Workmen

PITTSBURGH, Sept. 17.—A few days after the announcement of the adjustment in the wages of the 10-hr. workmen, whereby such men receive 11 hr. pay for 10 hr. work, the labor boss at one of the Pittsburgh district plants was approached by one of the dark-skinned men, who was still among those working 10 hr. a day. Incidentally this adjustment means that such labor now gets 44c. per hr., or $4.40 per day of 10 hr. As an example of the reaction of the men of this class to the change the conversation between the colored man and the labor boss is interesting.

"Boss," said the workman, "you do not expect us to work for 20c. an hour?"

The boss, having in mind the new rate of 44c. an hour, did not instantly catch the drift of the negro's query and asked just what the latter meant.

"Well," said the dusky worker, "the fellows working 8 hr. get $4 and we get $4.40 for 10 hr., 40c. for two hours, or 20c. an hour."

If this was an exceptional case, its citation would be uncalled for, but it is a fact that in the Pittsburgh district steel plants and in those in adjacent districts, one of the most troublesome problems connected with the abolishment of the 12-hr. day has been to keep the men working longer than 8 hr. entirely satisfied.

It has been difficult even at blast furnace plants where the three 8-hr. shift system has been inaugurated to put all of the men on an 8-hr. day, chiefly because there have not been enough men. This statement calls for some amplification. Men in large numbers have been attracted to the steel plants by the promise of 50c. an hour and an 8-hr. day, but it is the experience of the plant managers in this and nearby districts that the quality of the labor applying for work has averaged pretty low and the percentage of acceptances has been all out of proportion to the number of applicants.

Chance for Garden Work Needed

The 8-hr. day has long been the common working period in iron and steel plants in Europe, and those conversant with conditions across the water say that a longer day would be difficult to establish since the shorter day permits the workmen ample time for the cultivation of small truck gardens, located near their homes and not far away from the plants. Less difficulty as to wage adjustments would be experienced, it is asserted, in putting in the shorter workday in American plants if the workmen, not a few of whom are from the agrarian districts of Europe and would welcome a chance to work a small patch of ground in spare time, were given an opportunity to do so.

It is somewhat difficult to arrive at a definite estimate as to the extent of the application of the shorter day since it was inaugurated about a month ago in this and adjacent steel-making centers. With the Steel Corporation subsidiaries it was a case of going right ahead with the idea and a determined effort to surmount all obstacles in the path. With the independent companies it has been a case of experimenting first and applying the change afterward. Steel Corporation plants, consequently, are further along in the application of the change than are the independent companies. Independent companies in the Youngstown district made the move practically coincident with the Steel Corporation, but, locally, only the Pittsburgh Crucible Steel Co. and the Pittsburgh Steel Co. have made formal announcement of the adoption of the shorter day and, starting later than did the Steel Corporation subsidiaries, they are not yet very far along with the plan. The Wheeling Steel Corporation started the change of working schedules a week or so after the Steel Corporation, but has been moving cautiously, giving due attention to the course of other companies having plants in the same localities in which it has plants.

In the Pittsburgh-Wheeling-Youngstown district a careful casting up of estimates made by the different companies would indicate that about half of the total number of men formerly engaged on the longer turn now are working 8-hr. turns. The change worked much faster at its inception than it has during the past two weeks. This is explained by the fact that large numbers of men who previously found employment in other walks were attracted to the mills by the comparatively high rate of wages and the short workday. But it was soon found that the average ability of the men seeking the jobs created by the change was very low, and in the past two weeks progress in extending the shorter day in the continuous process departments has been largely arrested while the inefficient men are being culled out. It has been the experience of several plant managers here that the negroes, who have been coming to the North from Southern plantations in large numbers, have not included many efficient workmen. The Mexicans and some Spaniards who have come in through Mexico have proved much more satisfactory in filling up the gaps created by the setting up of the extra turn.

The Plan for Three Shifts

The most common plan followed in setting up the three-shift system has been to start the first turn at 7 a. m., the second at 3 p. m. and the third at 11 p. m. This has been the scheme in blast furnaces, coke plant and open-hearth furnace plants, and was designed primarily to overcome the ending and starting periods at inconvenient hours. With the night turn starting at 11 p. m., men finishing a turn at that hour could reach their homes and beds without long waits for street cars or disturbing their families who might be asleep, and it worked no hardship for the men reporting for work at that hour. In the sheet and tin plate mills the plan has called for the first turn men to start at 8 a. m., while the plan as devised by the National Tube Co. called for the working of seven 8-hr. turns and 24 hr. layoff every seven days. The latter plan, designed to preserve the 6-day week, of course meant that at least a portion of the men appeared twice on one day of each week, and had merely an 8-hr. layoff on that day.

Progressing More Slowly

While the plan of establishing the shorter day in the industry has worked out much more rapidly than many expected, it must not be supposed that it is yet anywhere near 100 per cent in this and nearby districts. And as has been previously stated, it has been a slower process in the past fortnight than it was in the first two weeks of the effort. It has been necessary to promote men and to find men to fill the vacancies thus created. The men in new jobs have had to be coached by older men and the new men taken on have had to be instructed and at the same time tried out as to their capabilities. As an official of one of the Steel Corporation plants expresses it, "the change thus far has meant very hard work for the older men, who have been doing the work, while the new men have been looking on."

As to the actual number of men required in the

creation of the extra turn, the experience of different plants has varied. In some instances it has involved the employment of a full extra crew, or a 33 1/3 per cent increase, but on the other hand, there have been cases where only a few extra men were necessary since the duties of each man were increased and the crew numbers correspondingly reduced. On an average, however, it is estimated that about 20 per cent more men are necessary under the new than under the old arrangement.

Many Plants in Central Pennsylvania Changed

MARYSVILLE, PA., Sept. 17.—All iron and steel plants of any size in Harrisburg, Pa., and immediate territory, are now operating on the 8-hr. day basis. The Steelton, Pa., plant of the Bethlehem Steel Co., the largest of these, will require a total of 500 men to make the change satisfactorily, while the Central Iron & Steel Co. is operating on 8-hr. days without additional help.

The change of the last workmen at Steelton to the 8-hr. day was accomplished at Steelton during the past week, the change having required about three weeks for completion. Not all of the 500 men needed have been secured, but enough have been added to make the change from the long day satisfactorily without sending out employment agents for negroes and Mexicans, although some men of these classes, usually relatives or friends of men already employed, have been added. Most of the new workmen, according to plant officials, have been Americans, men coming from mines and other mills.

The Steelton plant maintains a labor camp, composed of concrete huts, for these men. This was established during the war, and was abandoned during the subsequent slump, but there are now about 700 negroes, Mexicans and Portuguese living there.

The change to the 8-hr. day has involved the transfer of efficient workers from one department to another in some cases in the extra shift where skilled men were needed. Few skilled workers have been found among the new men, most being laborers. Few of the men living in the labor camps, the negroes, Mexicans and Portuguese, get beyond the labor class, although in isolated instances some become mechanics' helpers. The foreigners from Central Europe who have been added are showing encouraging progress, while most of the Americans added to the forces adapt themselves easily to their new work.

Workmen generally have been entirely satisfied where they receive as much money under the new scheme as under the longer tricks. In cases where they receive less there has been some slight dissatisfaction, although not of alarming proportions.

Pleased with the Change in Southern Ohio and Northern Kentucky

CINCINNATI, Sept. 17.—Much progress has already been made in the installation of the 8-hr. day at steel plants and blast furnaces in the southern Ohio and northern Kentucky district. One month after the time when this movement was really started, Aug. 16, by the larger producers of iron and steel, finds six merchant furnaces in this district on three shifts, with the remaining furnaces preparing to put the new order into effect in the shortest possible time.

The steel plants of the district have been working on three shifts for some time past; in fact, two of these, the Andrews Steel Co. at Newport, Ky., and the Middletown works of the American Rolling Mill Co., were the pioneers in this movement. Other plants have followed the lead until today, in the steel industry in this district, there are only a few spots where longer shifts than 8 hr. are worked, and it is almost a certainty that by the first of the year, at the very outside, all plants will be organized on an 8-hr. basis.

The change from the 12-hr. day to the shorter shift has been accomplished without any complications. The experience of the Jackson County silvery furnaces may be taken as typical of the new order. These three furnaces, Globe, Star and Milton, each put the 8-hr. day into effect on Aug. 23. The change has been working exceptionally well, according to the executives of the companies. The shifts worked are from six to two, two to ten, and ten to six. Very few extra men were required to operate the furnaces under the new arrangement, and no material change in the output was noticed. The question of wages was naturally of some moment, but this was solved satisfactorily both to the men and management. The 12-hr. men, when put on the 8-hr. turn, gracefully accepted a 10 per cent reduction in their total earnings, but what this really means is a 35 per cent advance in their hourly rate. Practically all of the men employed at these furnaces are native-born Americans, and welcome the change from the long shift to the short one, as giving them much extra time to themselves to be used in improving their properties—as many of them own their own homes—or in other ways that may suit their individual cases. Speaking of the change, the executive of one of the furnaces said that it was working out beautifully, and he expressed the conviction that never again would the blast furnaces of the Jackson County district be operated by men working longer than 8 hr. at a time.

The furnace of the Milton Iron Co. at Wellston has been operating on the 8-hr. plan for some months, and conditions there are entirely satisfactory to the men and management. Where necessary, of course, some overtime is worked, but all efforts of the management and employees are bent to adhere strictly to the three-shift plan.

In the Ironton district the Marting Iron & Steel Co. and the Hanging Rock Iron Co. have changed over to the 8-hr. shift, and the change is working out very satisfactorily. Only a few extra men were needed, and these were available without the necessity of importing workmen from outside points. Other furnaces in the district are working out plans for the substitution of the shorter day, and when these plants start it will be on a three-shift basis.

At Ashland the rolling mills of the American Rolling Mill Co. are operating on the 8-hr. turn, and the change from the longer shift to the shorter one will be made in the blast furnace department about Oct. 1, according to present plans. This also applies to the blast furnaces of the company at Columbus. At Portsmouth the same condition exists, and it is probable that Oct. 1 will see the 8-hr. day installed at the blast furnace department.

The coke oven plants in the district are also working out plans to put the three-shift plan into operation at the earliest possible moment. The consummation of these plans, it is said, has been handicapped by a shortage of labor, but it is expected that this condition will be overcome very shortly, as more men become available from the ranks of those now employed at seasonable activities.

Reviewing the situation, it may be said that the 8-hr. turn is firmly established at those merchant furnaces now in operation, and will be shortly established at the steel works furnaces. All the rolling mills in the district are now on the three-shift basis. Those furnaces which are now out of blast will, when they resume operations, be put on an 8-hr. basis, so that it is confidently expected that by the first of the year the long shift in the steel and allied industries will have become but a memory. General satisfaction is ex-

(*Continued on page 772*)

BUSY ALONG THE OHIO

Conditions in Southern Ohio and Northern Kentucky—Furnace Activity May Increase

IRONTON, OHIO, Sept. 17.—The summer season has been a busy one in Ironton and vicinity, and no pessimism is apparent, judging from reports of the operators of the various blast furnaces, steel plants and wire and nail mills located in the southern Ohio and northern Kentucky district.

While only two blast furnaces are operating at Ironton, the Etna stack of the Marting Iron & Steel Co., at Ironton, and the Hamilton furnace of the Hanging Rock Iron Co., at Hanging Rock, it is expected that two more will be in blast shortly after Oct. 1. The Belfont Iron Works Co. is now installing a pig machine at its Belfont furnace, and it is likely that the furnace will blow in for a run on Bessemer iron about Oct. 15, when the installation will be completed. It is also expected that Sarah furnace of the Kelly Nail & Iron Co. will go in about the same time. This furnace has been extensively altered during the summer, and with the changes made, it will be able to considerably increase its output of iron.

Blast Furnace Resumes

At Ashland, No. 2 Ashland furnace of the American Rolling Mill Co. has resumed operations after having been shut down for repairs. This furnace is making basic iron. The steel plant is operating at about 65 per cent of capacity. Construction work on the new rolling mills is well advanced, and machinery is now being installed. It is expected that operations will be commenced in this plant some time in November. Norton furnace at Ashland is out of blast, but it is not at all an impossibility that it will blow shortly. The plant of the Norton Iron Works Co. is running well on nails and wire products.

Globe furnace at Jackson is the only silvery furnace at present in operation, Star having blown out some time ago, and Jisco furnace is down for relining. It is expected that Jisco furnace will be put back in operation within the next three or four weeks. At Wellston the Milton furnace has been out of blast for some time, and Wellston No. 1 is scheduled to go out this week.

At Portsmouth the furnace of the Whitaker-Glessner Co. is operating on basic, while at Columbus, one furnace of the American Rolling Mill Co. is still in blast. The furnace of the Hamilton Iron Co. has been out of blast for several weeks.

Production and Shipments

While some of the furnaces now operating have iron piled on the yards, they are now about balancing production with shipments, so that a substantial buying movement, which it is hoped will develop, would clear up the larger part of the yard stocks.

Coke plants in the district continue to operate full time, but no effort is being made to push production.

At Newport, Ky., the plants of the Andrews Steel Co. and the Newport Rolling Mill Co. are both operating at practically full capacity. Extensive improvements have been completed at the blooming and bar mills of the Andrews Steel Co., which enables the company to better take care of its customers for sheet bars and billets, as well as keeping the sheet mills well supplied with materials.

Merchant blast furnaces in the Ironton district are now using the Ohio River in shipping their products to their customers. While most of this iron is being shipped to up-the-river points in Ohio and West Virginia, several barge loads have been sent down the river as far as Louisville. With the installation of the unloading facilities planned at Cincinnati, it is expected that shipments of pig iron from the Ironton district by river barges will soon catch up with the shipments handled by the railroads, as a considerable saving in freight charges can be made by using the river method of transportation.

EMPLOYMENT INCREASES

Slight Improvement in August as Compared with Conditions in July

WASHINGTON, Sept. 18.—Employment in iron and steel and their products showed the slight increase of 0.7 per cent in August when compared with July, according to the Department of Labor through its Employment Service. An increase of 0.68 per cent was shown in railroad repair shops. A decline of 1.4 per cent was made in metal and metal products other than iron and steel. Of the 14 basic industries reporting, the greatest increase, which amounted to 8.6 per cent, was made in stone, clay and glass products.

In the 1428 establishments involved in the analysis, a decrease in employment was revealed in August amounting to 9366 or 0.5 per cent. This decline was anticipated in employment circles, as July and August are regarded as the months in which a slackening in industry may be expected. The report adds:

"One of the features of this month's report is the continuation of the tremendous building programs in nearly all of the larger centers throughout the country. In very few sections is any abatement noticeable, and vast numbers of building tradesmen and common labor are at work on projects of sufficient magnitude to insure permanent employment for some time to come.

"Activity continues with no signs of a let-up on the construction of State and county highways. Large numbers of both skilled and unskilled labor are employed on this work, and in some sections there is a demand for this class of laborer which is not being met. The shortage of men which had been confronting the farmers for the past few months shows some signs of easing up. There is still a persistent demand, however, and in some sections the call for farm help far exceeds the available supply.

"Generally speaking, industrial employment in this country today is on a satisfactory and sound basis, and the outlook for the future is one of the brightest in recent years."

Coke Production Reduced

WASHINGTON, Sept. 18.—The production of by-product coke declined slightly during August, says the Geological Survey. The total output is estimated at 3,239,000 net tons, a decrease of 28,000 tons from the revised figure for July. Reports from all plants now in existence show that 65 were active and five were idle. The output from active plants in August was 86.5 per cent of the total capacity of all plants. The production of beehive coke continued on the decline during August and the output was 1,494,000 tons against 1,582,000 tons in July. The rate of production, although in excess of the monthly average of 1921 and 1922, was less than during the more normal years 1917 to 1920. Production of soft coal during the week of Sept. 10-15, is estimated at between 11,000,000 and 11,300,000 tons.

A wall chart for the tool room is being prepared by the Independent Pneumatic Tube Co., Chicago, to cover the various interchangeable repair parts of the Thor electric drill. In the form of a wall-hanger, it is expected that this chart will prove of considerable convenience to users of the drill.

F. E. Schuchman, general manager Homestead Valve Mfg. Co., Homestead, Pa., will address members of the Pittsburgh Foundrymen's Association on, "Industrial Management—Some Points of Application to Daily Problems," at the monthly meeting to be held Monday evening, Sept. 24, at the General Forbes Hotel.

Nickel Steel Direct From the Ore

Use of Canadian and Cuban Ores—The Waste Involved—Presence of Copper—Use of the Electric Furnace

BY F. H. MASON*

IN the year 1914 approximately 300,000 tons of sulphur was ejected into the air, poisoning the atmosphere and rendering waste a large area of arable land, and 400,000 tons of iron was sloughed off and wasted as slag in the recovery of 22,700 tons of nickel and 14,400 tons of copper from the nickel-copper ores of Sudbury, Ontario. The foregoing estimate was contained in a report by Alfred Stansfield, professor of metallurgy at McGill University, to the Royal Ontario Nickel Commission. The waste is the more appalling when it is remembered that at that time 70 per cent of the nickel recovered was subsequently alloyed with steel produced from iron ores from other parts of the world.

The Canadian Ores

Palpably, then, if nickel and iron could be recovered together from the Sudbury ores, an enormous saving would be made and if at the same time the sulphur could be utilized the natural resources of Canada would be that much to the good. Nor would the economy end there. The roasting operation, though done by natural combustion in heaps, entails a good deal of labor and the slagging of the iron necessitates, besides a large amount of labor in disposing of the slag, the addition of a quantity of silica to flux the iron oxide.

Sudbury nickel-copper ore is a massive pyrrhotite together with varying quantities of greenstone and quartzose gangue through which is disseminated several nickel minerals, principally pentlandite and chalcopyrite. Typical ores will run from 2 to 4 per cent nickel, 1 to 2 per cent copper, 20 to 30 per cent sulphur, 25 to 40 per cent iron, and 5 to 15 per cent gangue, the ore varying markedly with the mine from which it is obtained. The ore contains also small amounts of gold and silver and a number of the metals of the platinum group. These precious metals are distributed very unevenly.

The Waste Involved in Some Methods

A brief outline of the preliminary method used for the recovery of the nickel and copper is necessary to illustrate the appalling waste in the operation. The ore is piled in heaps of about 60 by 100 ft. by 8 ft. high, several cords of wood forming the bottom layer of the center of each heap; the lump ore is placed at the bottom and the fine on the top; a channel, to provide draught, connects the center of the heap with the outside. The fire is started, and the wood burns for about two and a half days, by which time the combustion of the sulphur in the ore has been thoroughly started. The combustion continues for three or four months, by the end of which time the sulphur content has been reduced to 9 or 10 per cent and the ore has become so agglomerated that it requires to be blasted to break it up.

The roasted ore is charged into rectangular blast furnaces, ranging from 50 by 204 ft. to 50 by 306 ft. in section and 19 ft. high, with 12 per cent of coke and varying proportions of quartzose ore, or quartz, to flux the oxide of iron. The matter from this operation, containing about 30 per cent of mixed nickel and copper, is conveyed by ladles to Bessemer converters where, with frequent additions of quartz, it is blown to a matte containing about 80 per cent of mixed nickel and copper and 3 to 4 per cent iron. The separation of the nickel and copper in this matte is carried out by different processes at the several refineries, processes with which this article has no concern, the foregoing outline being given purely to show the enormous waste of iron and sulphur in the operations.

Use of the Electric Furnace

This waste was recognized by Eugene Haanel, at that time director of the mines branch of the Canadian Department of Mines, toward the end of last and the beginning of this century, and a series of experiments were made with a view to producing a nickeliferous pig iron directly from the Sudbury ore. These experiments gave so much promise that the Lake Superior Power Co. purchased the Gertrude mine and, in 1902, erected a small electric furnace at Sault Ste. Marie.

The ore from the Gertrude mine was thought to be particularly suited for the purpose, as it had a high nickel and low copper content, the latter metal at that time being considered to be particularly injurious in steel. Sault Ste. Marie was chosen as a site for the operations, because it was convenient to Sudbury and the sulphurous vapors evolved during the roasting of the ore could be used in the manufacture of sulphite wood pulp. The work was carried out under the direction of the late E. J. Sjostedt, Doctor Haanel acting in an advisory capacity.

The ore used was specially selected, with a view to keeping the copper content as low as possible. It was crushed and roasted, and the roasted product had the following average analysis: Iron, 45.8; nickel, 2.23; copper, 0.41; and sulphur, 1.56 per cent. The furnace charge consisted of roasted ore, 2000 lb.; limestone, 1500 lb.; charcoal, 1200 lb.; electrodes, 40 lb., and electrical horse-power-years 0.46. The resulting pig had the following average analysis: Nickel, 4.0; copper, 0.8; sulphur, 0.01; and phosphorus, 0.03 per cent.

With the furnace operating at the rate of about one and one-third tons per day, Sjostedt turned out 168 tons of nickeliferous pig. This metal was sent to different parts of the world for experimental purposes; some was converted into steel in the United States and some in Europe. The resulting steel was found, it is said, to be fully equal to nickel steel, manufactured by alloying nickel with steel in the usual way, but engineers had such a deeply rooted objection to the presence of copper in steel that it was practically impossible to induce them to specify the metal for structural work.

For many years G. M. Calvocoresses carried out experiments along similar lines in the laboratory at Columbia University and in other places, and in 1918 he endeavored to form a company for the purpose of making what he called "nicu" steel from Sudbury ores by nodulizing the roasted ore and smelting it in blast furnaces and converting the resulting pig into steel in open-hearth furnaces—a perfectly feasible plan, as subsequent events have demonstrated. Calvocoresses, however, ran against the same obstacle that had halted Sjostedt—copper.

The Presence of Copper

Of recent years engineers have moderated their views on this point to some extent but, despite numerous tests clearly proving that a moderate proportion of copper is not injurious to nickel steel, a number of steel manufacturers still retain the prejudice against copper in steel while many engineers bar such metal in their specifications. It is the old tale of giving a dog a bad name ever repeating itself.

It might be well to point out here that the main

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objection to copper in steel is that the copper does not alloy readily with iron and, consequently, tends to separate on cooling, rendering the metal "cold short." Nickel, on the other hand, alloys in nearly all proportions with both iron and copper; consequently, when nickel and copper are both added to iron, the nickel holds the copper in solution and prevents segregation.

Still, until this fact becomes recognized by the engineering profession, it is useless to try to force a nickel steel with a high copper content on the market. If, then, a nickel steel acceptable to engineers is to be made from Sudbury ores it is evident that most of the copper must be removed before the ore is melted. How is this to be done?

A hint, it is suggested, may be obtained from experiments that have been made on the gold-copper ores found at Rossland, in British Columbia. These ores bear a strong resemblance to the Sudbury ores, but contain only a trace of nickel. The ore is a massive pyrrhotite through which is disseminated a small proportion of chalcopyrite, the gold being associated with the latter mineral. The Consolidated Mining & Smelting Co. of Canada and the Le Roi No. 2 Mining Co., which own most of the important mines in the Rossland district, have spent years of research and a large sum of money in an endeavor to separate the gold and chalcopyrite from the pyrrhotite by wet concentration, but the two minerals have so nearly the same density that all efforts at separation by gravity failed.

Within the last few years great strides have been made in the perfecting of a combination gravity and differential flotation process and it now is possible to separate most of the gold and chalcopyrite from the great bulk of the pyrrhotite and earthy gangue. It also has been found possible to first remove the gangue by gravity concentration and then remove the pyrrhotite from the chalcopyrite by wet magnetic concentration but, to make this process effective, it is necessary first to subject the ore to a heat treatment to improve the magnetic properties of the pyrrhotite.

Either of these processes, it would seem, might be applied effectively to the Sudbury ores. It is likely, too, that the precious metals would follow the chalcopyrite, as they do at Rossland, and in this way a marked saving would be made, for, otherwise, in the manufacture of steel directly from the Sudbury ores, as is the case in the manufacture of monel metal, the precious metals would go into the pig. Exactly what would happen to the pentlandite nothing but experiment can tell, but the physical properties of the mineral are so closely allied to pyrrhotite that there is reason to expect the two minerals would stay together.

Should either of these processes of concentration prove adaptable to the Sudbury ores, it would be possible to get a concentrate containing between 50 and 55 per cent of iron, 35 and 40 per cent of sulphur, and 4 to 6 per cent of nickel. The resulting pig from such a concentrate would contain too much nickel for the manufacture of structural steel, but it easily could be diluted with scrap iron or non-nickeliferous pig to the desired proportion before it was converted into steel.

Nickel Steel from Cuban Ores

In the meantime, nickel steel is being produced directly from a nickeliferous iron ore that is found in Cuba. The ore is a bog ore, and appears to have been obtained from the basic rocks on which it now rests. The deposit covers a large area at Mayari, at the eastern end of the island and, so far as exploration has gone, has a thickness of 15 to 20 ft. The deposit has three distinct layers, readily distinguished by their respective colors. The bottom layer is a light yellow-brown, the middle layer a darker yellow-brown, and the top layer a crimson-brown.

Besides oxide of iron and a high proportion of water, characteristic of all bog ores, the deposit contains a considerable proportion of alumina and small quantities of oxides of nickel and chromium. These oxides are not evenly distributed throughout the mass but are fairly evenly distributed in the respective layers. According to J. F. Kemp, the bottom layer contains 1.49 per cent of NiO and 3.66 per cent of Cr_2O_3, while the top layer contains 0.77 per cent of NiO and 1.89 per cent of Cr_2O_3. The center layer averages about a mean of the layers between which it rests. Professor Kemp has estimated that the field contains 605,000,000 tons of ore, while a similar deposit nearby, at Moa, is estimated to contain 702,000,000 tons.

The Mayari deposit is owned and is being exploited by the Steelton plant of the Bethlehem Steel Corporation. By selecting ores from the different layers it is possible to produce steel with a nickel content ranging from 1 to 1.5 per cent, and by a slight modification of the open-hearth process the chromium content can be controlled within the desired limits. The ore, which besides containing a high percentage of combined water contains a large percentage of moisture, is nodulized in a rotary kiln at the mine. This deprives it of moisture and combined water and agglomerates it into a convenient form for shipping and one that is able to withstand the necessary burden in the furnace.

The nodulized ore, which averages 57 per cent iron, is reduced to pig iron in a blast furnace and the product is treated in a special form of open-hearth furnace. The product is a natural nickel-chromium steel, the only addition it receives being ferromanganese, to regulate the carbon and manganese contents. The finished product varies according to the purpose for which it is to be used, and ranges from 1 to 1.5 per cent of nickel, 0.20 to 0.75 per cent of chromium, 0.03 to 1.5 per cent of carbon, less than 0.04 per cent sulphur and 0.03 per cent of phosphorus, and manganese to meet any desired specification. Mayari steel, as the product is called, is in considerable demand for bridges and fabricating purposes, the bridge over the Mississippi at Memphis being constructed of this material.

A similar deposit of nickeliferous iron ore occurs at San Filipo, in Cuba, and a deposit containing less nickel but some cobalt occurs on the island of Seboekoe, Borneo. Chrome-nickel iron ores are found also in the States of Lokris and Boitis, in Greece, and in some of the islands of the Grecian Archipelago. These ores, however, differ from those found in Cuba and Borneo in that they occur as brown hematite in fissures and replacement veins. The nickel content is lower and the chromium content higher than the Cuban ores. The ore has been shipped to European iron-making centers but, so far as is known, has been used only in the manufacture of high-grade foundry pig, not in the manufacture of nickel steel.

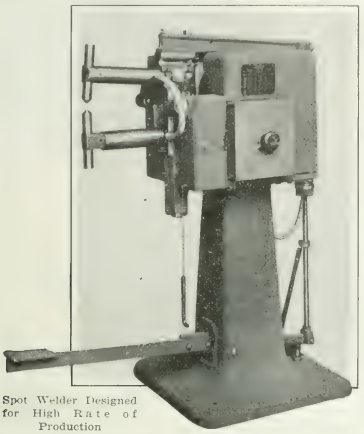
The Jones & Laughlin Steel Corporation, Pittsburgh, has been looking over sites at Memphis, Tenn., with an idea of establishing there unloading and storage facilities in connection with its river transportation service. No definte plans have been worked out, nor has the company made any land purchases. An investigation trip to Memphis recently by officials of the company was primarily for the purpose of finding out whether the company could handle its shipments at a privately owned wharf as against the municipally-owned terminal at Memphis, and to look into the possibilities of the storage of steel at Memphis for rail shipment into the interior. During at least half of the year river shipments are rendered impossible by low water and the company is figuring on getting enough steel shipped during the period of easy navigation to be able to distribute steel from Memphis the year round.

Figures compiled by *Automotive Industries* covering the relation between Ford cars and all others show a steady gain for the Ford in proportion to the total. In 1914 there were 405,000 Fords registered, this being 29.4 per cent of the total of 1,376,000 cars. Successive years since then have shown the Ford proportion steadily increasing until the 1922 figures give 5,156,000 Fords out of 10,913,000 total, or 47.2 per cent Fords. It may be noted that the other cars taken as a group exceeded the Fords in 1922 by a total of 601,000, compared with an excess of 852,000 in 1921. Thus the Ford gain over the others, in one year, was 251,000 cars. Ford registration in 1922 was 1173 per cent higher than in 1914; "all other" was 493 per cent higher.

New Spot Welder

With a range of welding capacity up to 20 kw., a machine has been placed on the market by the Thomson Spot Welder Co., Lynn, Mass. The machine, which is ruggedly built, may be equipped either with water-cooled dies and solid copper die points or with water-cooled horns and die shanks, with solid copper die inserts.

Among the improved features are listed a new design of fireproof primary coil arranged for very slow temperature rise; a new type of split transformer core, permitting quick disassembling for changing primary



Spot Welder Designed for High Rate of Production

coils; an improved secondary lead connection which has been found under long test to give high conductivity at the joint, thus eliminating heating at this point; an improved design of pressure spring with adjusting features to give longer life; an adjustable foot treadle of machinery steel in place of the previous cast steel.

Normal operation may be considerably exceeded for short periods, as the machine will stand overload and make welds quickly under these conditions. The maximum welding capacity is given as two pieces of steel or iron each 5/32 in. thick or two pieces of brass or aluminum each 1/16 in. thick.

Based on current at 1c. per kwhr., the cost of 1000 welds between two sheets of steel each ⅛ in. thick is given as 8.3c. and the time for each weld is stated to be 1½ sec. With greater thickness of steel, both time and cost increase, and vice versa. Thus, for sheets 0.03 in. thick, the time is given as ⅛ sec. and the cost per 1000 welds as ½c.

With a height of 50 in., the machine takes a floor space 20 x 48 in. Its net weight is 1000 lb.; crated weight, 1175 lb.; boxed for export, 1400 lb.

The members of the Electric Hoist Manufacturers' Association report a decrease of 22.32 per cent in the number of hoists ordered during August as compared with the previous month and a decrease of 15.12 per cent in the value of orders received. Shipments of hoists increased 23.823 per cent as compared with shipments during July.

The plant of the Magna Metal Corporation, Doremus Avenue, Newark, N. J., which was organized several years ago to manufacture magnesium metal and alloys, will be sold at public auction by the receivers, B. E. F. Rhodin and Arthur T. Vanderbilt, Oct. 5.

Progress in Making Repairs to Rolling Stock

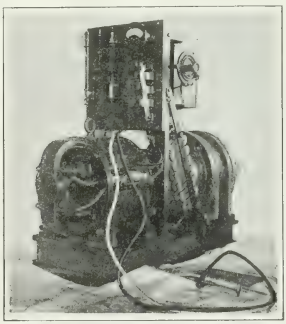
WASHINGTON, Sept. 17.—Fewer freight cars were in need of repair on Sept. 1 this year than on any date since November, 1920, according to the Car Service Division, American Railway Association. The total on Sept. 1 was 175,327 or 7.7 per cent of the number on line. This was a decrease of 13,308 freight cars since Aug. 15, at which time there were 188,635 or 8.2 per cent. Of the total number on Sept. 1, 137,229, or 6 per cent, were in need of heavy repair, a decrease of 7546 since Aug. 15, while 38,098 or 1.7 per cent, were in need of light repair, a decrease of 5762 during the same period.

The number of locomotives in need of heavy repair on Sept. 1 totaled 9392 or 14.7 per cent. This is the smallest number in need of heavy repair since Aug. 1, 1920, when the Car Service Division began compiling these reports.

A new high record was also established from Aug. 15 to Sept. 1, in the number of locomotives repaired and turned out of the shops, the number for that period being 23,056. This was an increase of 856 locomotives over the best previous record which was made during the last half of July, and was also an increase of 2976 locomotives over the number repaired and turned out of the shops from Aug. 1 to Aug. 15, this year. The railroads on Sept. 1 had 53,438 serviceable locomotives, an increase of 1100 over the number on Aug. 15, while they also had 2714 locomotives in good repair but stored for future use, which was an increase of 47 since the middle of August.

New Wilson Plastic-Arc Welder

The Wilson Welder & Metals Co., Inc., New York, has developed a new type of electric arc welding machine, one-arc capacity and rated at 200 amperes



Plastic-Arc Welder Designed for Close Control of Current

continuous welding. The principal feature of this unit is what is known as the type J control panel to secure close control of the welding current at the arc. Its chief function is to provide constant temperature in the weld and the entire unit is small, compact and ready for immediate operation.

The Drop Forge Association, 300 Chestnut Street, Philadelphia, H. N. Taylor, president, has issued an invitation to all members of the drop forging trade, visiting the Steel Treaters' Convention in Pittsburgh next month to attend a dinner to be held on Wednesday, Oct. 10 at 6.30 p. m. at the William Penn Hotel. At that time, plans will be considered for a similar joint meeting of drop forgers and supply men in 1924. All companies engaged in the manufacture of drop forgings are cordially invited to send representatives to this meeting.

ELECTRICITY IN METALLURGY

Electric Blast Furnaces—Properties, Composition and Uses of French Electrolytic Iron

The French Society of Civil Engineers devoted three sessions last April and May to the use of electricity in metallurgy. These sessions were addressed by specialists in the various branches of the subject and there was a final discussion. A long review of the important points brought out is given in the *Revue de Metallurgie* for July.

Electric Blast Furnaces

First comes an interesting section on progress in the making of steel in the electric furnace, but with nothing particularly new to the workers in this art in the United States. It is followed by one on the making of pig iron in the electric furnace. There are now 30 electric blast furnaces in the world, distributed as follows: 18 in Sweden, 1 in Japan, 3 in Norway, 6 in Italy and 2 in Brazil. With the exception of those in Japan and Italy they all use charcoal as the reducing agent. In addition a number of open top furnaces with hanging electrodes have been used intermittently for making pig iron in France, Sweden and Italy.

In these furnaces charcoal is to be preferred as a reducing agent for small units, a mixture of charcoal and coke in average size furnaces, and coke in the large units. For short runs these furnaces are worthy of consideration; they can use spare or peak load current, also a change to the making of various ferroalloys can be quickly carried out, and ore or scrap can be used as raw material.

Electric vs. Open-Hearth in France

Next comes an interesting discussion on electric furnace practice by M. Suhr. He finds that the slow growth of electric steel making in France is because of the excellent open-hearth steel made, which he says cannot be exceeded in quality by any steel. He believes the electric furnace should be reserved exclusively for refining and for operations under reducing conditions. By carrying out preliminary work in the basic Bessemer or open-hearth the oxide slags can be excluded, and deoxidation and desulphurization are rapid and simple if carried out with a short arc, that is, with a low voltage between 35 and 40 volts.

To obtain satisfactory costs he suggests for French conditions a combination of the basic Bessemer and electric furnaces of 30 to 35 tons capacity. The power required would be 2500 to 3000 kwhr. with a practically stable power factor between 85 and 90 per cent. For these furnaces he believes the Soederberg electrodes would be necessary, and also believes the power consumption per ton of finished steel would be between 150 and 200 kwhr. The total cost should not be more than that of ordinary open-hearth steel.

A brief reference to direct steel is made by M. Chaplet, who mentions some experimental work carried out at Giffre, where 0.20 per cent carbon steel was made direct from ore in a 150-kwhr. furnace. This steel made out of contact with air had remarkable properties. It was as soft and malleable as an ordinary steel with 0.08 per cent carbon. Also a direct steel was made with 2 per cent carbon that could be forged cold, notwithstanding its hardness. These properties are attributed to the fact that the material was at no time in contact with oxygen or nitrogen.

Next come interesting sections on aluminum and magnesium and ultra-light alloys, followed by one on electrolytic iron by M. A. Bouchayer.

Electrolytic Iron

This section deals with the "Bévé" electrolytic iron made by Bouchayer and Viallet at Grenoble, and its applications. Reference may be made to an article on this same subject in THE IRON AGE, March 11, 1920, page 732. Since the beginning of 1922 this plant has been functioning normally and can turn out 2 tons per day. The metal is obtained in cylindrical tubes, length 4 meters (13 ft. 1½ in.), diameter 80 to 200 mm. (3 5/32 in. to 7⅞ in.), thickness 1/10 mm. to 7 mm. (0.04 in. to 9/32 in.). The regularity of thickness is perfect and the properties of the metal are very uniform.

When first produced it contains about 5½ times its volume of various gases, chiefly hydrogen, but with nitrogen, carbon-monoxide and carbonic acid gas. It is silver white, satiny and iridescent, the iridescence diminishing with perfection of deposit. The surface is smooth, regular and soft to the touch. The structure is exceedingly fine and close. Annealing eliminates the occluded gases, the maximum temperature being 950 deg. C., although annealing in a vacuum or even melting is necessary for theoretical complete removal of the gases. As is well known, this is accompanied by considerable softening of the metal.

Properties and Analysis

Some properties of the annealed iron are given below. Chemical analysis compared to that of Swedish iron is as follows:

	Electrolytic Iron, Per Cent	Swedish Iron, Per Cent
Carbon	0.029	0.160
Manganese	0.00	0.013
Phosphorus	0.0037	0.034
Sulphur	0.0048	0.0069
Silicon	0.004	0.05

In addition the special iron contains a little lead and copper coming from the anodes. The lead is generally from 0.02 to 0.2 per cent, and the copper from 0.02 to 0.1 per cent. A characteristic is the complete absence of manganese.

A test carried out at the Usines d'Allevard in melting electrolytic iron scrap for making bars and wire gave an ingot with the following composition: Carbon 0.09, man. 0.072, phos. 0.07, sul. 0.01 and sil. 0.089 per cent. [The phosphorus is so given in the article.] The fracture of the annealed iron is analagous to that of Swedish iron.

The physical properties of the iron as deposited are: Elas. limit 108,090 lb. per sq. in., ult. stress 113,780 lb. per sq. in., and elongation in 3.94 in. 3 per cent. After annealing the results are:

	Longitudinal	Transverse
Elas. limit, lb. per sq. in.	25,170	26,740
Ult. stress, lb. per sq. in.	42,380	42,100
Elon. in 3.94", per cent.	42.7	37.3

Experiments regarding porosity show that it is not permeable to dissolved acetylene at 60 atmospheres pressure, nor acetone, the internal pressure after two months not having diminished. A diagram is given from some of Yensen's work in this country showing the very low hysteresis of this material.

Some of the Uses

The uses of the iron are very interesting. It is used for melting as a source of pure iron. The methods of production allow tubes to be made of the exact thickness required to meet various pressures and conditions. An unexpected use is for radiators for heating rooms and houses. The heat efficiency is 10 to 15 per cent better than that of the usual cast iron. In the previous article reference is made to its use for the oil cooling system of transformers. For stamped ornamental work it is easily applied because of its great ductility. It is of use for tanks for compressed gases, and all the welding at the Bouchayer and Viallet plant is done with this metal.

The main article then takes up the use of electricity in the electrolysis of metals, electric furnaces for brasses and other alloys where American furnaces are prominently mentioned, and electric heat treatment furnaces. There is a very good and complete final section on the making of electrodes, both of amorphous carbon and of graphite.

G. B. W.

The New England Foundrymen's Association held its first fall meeting Wednesday, Sept. 12, at the Exchange Club, Boston, some 80 attending. George A. Ray, Hartford, Conn., president, presided. No business was transacted. George A. Richardson, Bethlehem Steel Co., Bethlehem, was the guest of the evening. He gave an illustrated talk on Mayari pig iron, a product of the Bethlehem Steel Co. Robert MacDonald, also of the Bethlehem Steel Co., led the discussion which followed Mr. Richardson's talk.



J. LEONARD REPLOGLE

What Industrial America Wrought in the World War

Grosvenor B. Clarkson, Formerly Director of the United States Council of National Defense, Tells the Story of the Great Service Rendered by Steel Manufacturers and Other Business Men in Bringing Victory to the Allies

"HERE is a good and useful book," says Clemenceau in his introduction to "Industrial America in the World War—The Strategy Behind the Line, 1917-1918,"* by Grosvenor B. Clarkson, formerly director of the United States Council of National Defense.

The book is all that Clemenceau says, and more, for it is a wonderful story of what industry did to win the war. After having heard so much criticism, just and unjust, of public officials and business men during and since the great conflict, it is highly satisfactory to read Mr. Clarkson's well written account of what was done. He does not, of course, claim that the carrying on of the war was free from errors, nor does he conceal the fact that some men were unpatriotic, or at least not so patriotic as others, but emphasis is placed on achievement rather than on carping criticism, and the story as a whole is one which will stir the pride of every American.

"Mr. Clarkson is right": says Clemenceau, "the men who won the war behind the lines—on which victory at the front depended—are entitled to the gratitude of the nations, and the nations do not even know their names. It is time that justice should be done these men, and this book hastens that day. We Frenchmen, who are eternally thankful, despite the troublous times through which we have lately passed, to our good comrades in arms from beyond the seas, remember with gratitude the organizers of the industrial victory, who made military victory possible. They have modestly gone back to their offices and factories, with the sole reward of duty well done. Let them receive our cordial thanks; they have deserved well of the Allied and Associated Nations."

Early in the book, the author, who happens to be a Republican, makes a positive statement with regard to Secretary of War Baker and his five Democratic Cabinet associates forming the Council of National Defense. Mr. Clarkson says that, looking back on the three years during which he served the council, he is unable to recall a single instance in which Mr. Baker or the council requested him to make an appointment or take an administrative action on a partisan or political basis. He says that to Secretary of War Baker should undoubtedly go the credit for making possible the non-partisan state of affairs which did honor to the Government and the country alike. This attitude, he adds, reflected the policy of the President with respect to enlisting the best industrial and scientific brains of the country, regardless of party affiliations.

In his chapter entitled "The War Industries Board Emerges," Mr. Clarkson says that "so quiet and unobtrusive were the extensions and projections of this central control that to this day there is little general understanding that through the War Industries Board the United States had in the end a system of concentration of commerce, industry and all the powers of Government that was without compare among all the other nations, friend or enemy, involved in the World War." Mr. Clarkson adds—"Never before was there such a focusing of knowledge of the vast field of American industry, commerce and transportation. Never was there such an approach to omniscience in the business affairs of a continent."

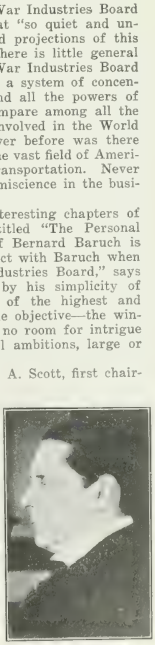
One of the most intensely interesting chapters of the entire book is the one entitled "The Personal Element." A striking picture of Bernard Baruch is painted. "All who came in contact with Baruch when he was chairman of the War Industries Board," says Mr. Clarkson, "were impressed by his simplicity of motive. Inspired by patriotism of the highest and intensest order, he had one single objective—the winning of the war. His mind had no room for intrigue and the advancement of personal ambitions, large or small."

Mr. Clarkson refers to Frank A. Scott, first chair-

*"Industrial America in the War," by Grosvenor B. Clarkson; 556 pp., 6 x 9; price $6. Houghton Mifflin Co

GROSVENOR B. CLARKSON, when appointed secretary of the United States Council of National Defense and Advisory Commission in March, 1917, had been well prepared for the position by a varied background of experience. He had been a reporter, director of the criminal investigation work of the Department of the Interior in southern New Mexico, advertising man, and assistant chairman of the committee on industrial preparedness, United States Naval Consulting Board. In the last named office, he directed the first organized educational campaign in this country for industrial preparedness.

Mr. Clarkson became acting director of the council in July, 1918, and, becoming director in December of the same year, held the office until March, 1920. Besides directing personally the council's field division, he initiated and directed the council's post-bellum reconstruction work. In this connection, he started the movement to make permanent the community councils throughout the country. He initiated the work of the interdepartmental defense board under the council, to study and classify in peace-time America's economic resources for defense.



G. B. CLARKSON

man of the War Industries Board, and one of the pioneers in building the American war machine, as "one of the sacrifices to its grinding labors." Mr. Clarkson tells how Mr. Scott, a student of military affairs from boyhood, became deeply interested in the industrial implications of war. On three different trips to Europe before 1914, he carefully studied the production of military *materiel* in England, Russia, Germany, France, and in a minor way, in Italy. As early as 1909 he came to the conclusion that Germany was preparing for a war of conquest "and that she would so overtop her immediate enemies, owing to her industrial preparedness, that the United States would be forced to join the league against her in order to prevent Germany from becoming the world's dictator.

"The extraordinary development of by-product coke ovens in Germany, and even in England by German capital, indicated that Germany was planning far ahead for a great supply of the ingredients of high explosives. Scott found like signs in the development of the dye industry and the building of plants for the fixation of nitrate. The discovery in the winter of 1914 that Germany had placed orders for a certain type of turret lathe, used in the production of fuses, on such a scale that it would have absorbed the entire annual capacity of the United States, absolutely confirmed in his mind the opinion arrived at in 1913 that the war would begin in 1914—an opinion that was even then so near a judgment that Mr. Scott caused his own company's turret lathe plant to be made ready for the orders that he was sure would soon be coming from Germany's enemies."

Mr. Replogle's Characteristics

Of J. Leonard Replogle, director of steel supply, Mr. Clarkson speaks in words of well deserved praise, saying in part:

"J. Leonard Replogle had a hard place to fill. A young man of high renown in the world of iron and steel, he was called upon to take a position that necessarily brought him into opposition with the chief men and interests of his calling. In serving the Government he stood to block his own career. In such a position a man might err on either side: he might drive too hard bargains for the Government or he might be too considerate of the industry. From beginning to end, Replogle made the public interest first, but he was fair to business. When he entered the Government he had only one minor interest that could be directly affected by his position as director of steel; that interest lost money throughout the war. As the conserver as well as the producer of steel, Replogle gave a rare exhibition of courage when he resolutely directed the whole steel output of the country to direct or indirect war purposes. Often he had to defend his policy against the great steel corporations as well as against the great users of steel. His complete knowledge of every angle of the business qualified him for this important position. Specious arguments and manipulated cost-sheets meant nothing to him. His position duly taken and fortified with the facts, he stood like a rock against both assaults and importunities. He forced down prices and increased production; things that the steel men had said could not go together."

Referring to the correspondence between the "industrial dictator" and President Wilson, Mr. Clarkson says: "There is revealed an unfailing promptness on the part of the President to concur in every undertaking of the former and an unexpected closeness of the President to all the supply problems." Mr. Clarkson adds:

"In passing, the writer is prompted to say that, in the course of the preparation of this book, he has interviewed some two-score of the executives of the War Industries Board and the Council of National Defense, and all of them, regardless of party affiliation, who had any personal contact with President Wilson, united in expressing appreciation of his quick grasp of the fundamentals of the most abstruse and technical problems that were laid before him. It is possibly true that the President did too long defer a determination of the problem of industrial centralization for war purposes; but on the other hand, once he had decided his course and mapped it in the lucid and comprehensive letter of authority to Mr. Baruch, the supporting decisions thereafter were always prompt and clear-cut."

Showing how great was the response to the demands of the Allies, Mr. Clarkson recalls that when Marshal Joffre came to the United States in June, 1917, he talked about one division of troops at once as a convincing symbol of alliance, and perhaps 400,000 or 500,000 soldiers in France at the most. "One year later," says Mr. Clarkson, "the most unmilitary of the great nations had 2,000,000 soldiers in France and more than 3,600,000 under arms; was preparing to put and maintain 5,000,000 men in France and conduct the war single-handed against Germany, 3600 miles distant, if both France and England should be prostrated."

Priority Policy

Considerable space is devoted to the priority policy of the Government. "Priority," says Mr. Clarkson—"with experience and study, became the most efficacious implement of Government ordinance of industry. It was the sturdy shovel with which the War Industries Board cleared up the blockade and kept the tracks open. It was nothing less than a great system of industrial and transport precedence, automatic in the main, manipulated in the exception, whereby production was ordered, restrained, or stimulated to meet current and projected war demands and prevent the civil population from suffering destitution in the midst of prosperity. In effecting these immediate ends, it automatically checked profiteering and repressed prices."

Mr. Clarkson says that the wisdom of Solomon could not have infallibly decided all the questions that were presented in the administration of priority regulations. For example, such questions as these were constantly presented:

"Should steel go to destroyers whose mission was to sink submarines or to the merchant ships the submarines had thinned to the point of breaking down the food supplies of the Allies? Should brass go to binoculars without which cargo ships could not leave port or to shells without which they need not go at all? Should nitrate go to munitions without which guns were useless or should they go to fertilizers without which the artillerymen would be foodless? Should acetone, indispensable for British explosives, go to the powder mills or to airplanes which needed it for their wings? Should chrome steel go to indispensable army trucks or indispensable army munitions? Should women be condemned to steelless corsets or tinless preserved vegetables? Should cranes go to American wharves for loading ships for France or to French wharves for unloading the same ships? Should ships from Brazil bring coffee to bolster civilian morale or manganese for fighting steel?"

Probably few men in the steel industry except those who were receiving confidential orders from the Government knew how closely the making of steel was connected with the efforts of the soldiers in the field. Showing the prompt response of the steel manufacturers, Mr. Clarkson cites this example:

Prompt Response of Steel Works

"In August, 1918, the French reported that the draft of the combined French and American armies on French 75 mm. shells was unexpectedly greater than production and that the reserves were being perilously depleted. They had fallen from 30,000,000 to 13,000,000. The Germans were on the run and then was the time to hammer them without stint. No shells were coming from America, and yet the French munitions plants were working only half-time for lack of steel. Within five days of the time that the French reported the situation to the Foreign Mission of the War Industries Board, the mission had satisfied itself of the correctness of the French representation and cabled the board for immediate assistance. On the sixth day, by direction of the War Industries Board, the Lackawanna Steel Co. and the Carnegie Steel Co. were diverted to the production of 75 mm. steel and the first shipments arrived in France within three weeks. The steel was actually arriving in France before the French Ministry of Munitions had formally placed orders for it. It came rolling into the French shell plants in such unfailing quantities that, with the 10,000 guns of the

American and French batteries blazing away as never before, the French reserves went up to 19,000,000 shells. That is priority in action."

"The Control of Prices" forms an important chapter of the book, telling the story of how some manufacturers came slowly and others rather quicker to a realization of the fact that prices must be reasonable and the same for all the enemies of Germany. When the President laid down the rule that prices must be the same as for the public, he declared: "Prices mean the same everywhere now; they mean the efficiency of the nation, whether it is the Government that pays them or not; they mean victory or defeat." Price-fixing by the War Industries Board was not, however, an arbitrarily proclaimed or abruptly determined process. It always took the form of negotiation, and the results were, strictly speaking, agreed rather than decreed prices. Mr. Clarkson recalls this interesting incident:

An Historic Occasion

"On the historic occasion when the 65 delegates of the steel industry met the board in full session to determine steel prices, Judge Elbert H. Gary, speaking for his associates, solemnly inquired of Judge Lovett, of the board, as a lawyer:

"'May I ask by what authority the War Industries Board has undertaken to fix these prices?'

"'A gentleman of your eminent qualifications in law,' was Judge Lovett's answer, after a moment of profound silence, 'requires no information from me on that point.'

"And with a grim smile all around, the board and the delegation proceeded to fight it out. It was no parlor debate, either. The board was armed with facts and figures about steel and iron production and costs, not only from the exhaustive investigations of the Federal Trade Commission, but from the inside information of Replogle and other steel men who were playing the Government's game."

In direct opposition to the contention of many during the war that the neglect of Allied industrial integration was a profound error, Mr. Clarkson remarks that "there was always a menacing possibility that France might have been inundated by the Germans, and her industrial potency annihilated, leaving America, had Allied economic unity been effected, without facilities at home or abroad with which to continue the contest."

The chapters headed "The Control of Labor," "In the Seat of Power," "The Backbone of the Board," "The Commodity Sections," abound in interesting discussion and important historical facts. Then comes the chapter "Steel: An Epic of the World War," a chapter whose reading will make every man connected with the steel business feel proud that he has such a connection. Only a mere outline can be given here.

"The World War was moved and fought on steel," says Mr. Clarkson. "In its last days it was as much a Vulcanic struggle between the Mesabi and Lorraine, between the Ruhr and Pittsburgh, as it was a final grapple of men in Flanders, Champagne and the Argonne."

Mr. Clarkson says that at first Judge Gary advocated excessive prices in the face of refuting figures by his own accountants, but the steel men soon adapted themselves to the view that the national need was above the question of profits. Price McKinney was among the first to take a conspicuously patriotic stand, as is shown by this story related by Mr. Clarkson:

Price McKinney's Patriotic Position

"Even at the height of this saturnalia of high prices, J. Leonard Replogle, who had been called to Washington by Mr. Baruch to advise the War Industries Board as to steel, expressed the confidence that when the situation clarified, just prices could be obtained from the steel industry without resort to compulsion. In fact, on the very day he voiced this opinion, he was able to put it to the test. The Italian Government was in the market for 40,000 tons of steel billets, which were then bringing around $140 a ton in the open market. Price McKinney, of the McKinney Steel Co., of Cleveland, happened to be in Mr. Replogle's office. They discussed the general steel situation and the Italian requirement. Mr. Replogle said it was obvious that steel could not bring such prices much longer, and asked Mr. McKinney to determine a fair price for the Italian order.

"Write the ticket yourself, Replogle," was Mr. McKinney's answer. "Any price you name, profit or no profit, will be satisfactory to me."

Replogle figured and said he guessed $45 a ton would be about right. That was $3,000,000 swept away, but McKinney stood pat.

On another occasion, Mr. McKinney said: "We are making more money out of this war than the average human being ought to," and once when Judge Gary was informing the board that the steel interests would not ask for an increase of prices at the expiration of the ninety-day period for which prices were established, he dwelt on the fact that the level price plan accrued greatly to the profit of the Steel Corporation, "but," he added, "the tax collector comes along and takes about 50 per cent of it—and I wish it was more."

Only One Purpose—Winning the War

Later Judge Gary declared that the steel industry under Government control had become such a unit that no member of it had any right to conduct his business with a view to individual profit when it was simply an integration that must be treated as having only the one purpose of winning the war.

On one occasion Mr. Baruch casually remarked to Judge Gary that the country was deficient in forging plants and orders were issued the next morning for an eight million dollar extension of the Steel Corporation's forging capacity.

Mr. Clarkson speaks at some length of the attitude of automobile manufacturers in opposing regulatory measures of the Government. He says that the early and unwise designation of the automobile industry as a non-essential was undoubtedly the chief cause of the stubborn resistance it offered to curtailment and conversion. In spite of this attitude, the industry rendered great service. In concluding this chapter, Mr. Clarkson says:

"The relation of the Government to the steel industry, when fully realized, was perhaps the best example the war afforded of the masterly conception of industrial mobilization and functioning by the simple process of establishing effectual contact between a pooled and compactly united industry manned by its own captains and a governmental organism, expert, initiative, resourceful and energetic. It was a model of that highest and best form of efficiency which President Wilson declared to be 'the spontaneous cooperation of a free people.'"

Mr. Clarkson next takes up other industries, such as copper, platinum, ferroalloys, nitrates, lumber, leather, textiles, showing how each did its part.

In the concluding chapter Mr. Clarkson says that "we are still too near the close of the war to appreciate what has been done by supremely able men who came to great tasks. When the war was over, they did not march up Fifth Avenue to the cheers of their admiring countrymen. They modestly went back to their desks, and sometimes they were followed by investigators, who sought to advertise themselves rather than serve any patriotic purpose."

"The men of the War Industries Board," says Mr. Clarkson, "and those who preceded them in too loosely joined committees and boards, deserved well of their country, and, though their deserts are not symbolized in triumph, they will eventually come into them."

While there is ground for some difference of opinion in regard to both men and methods, the reader of Mr. Clarkson's book is impressed by the thoroughness of his work, and his amazing ability in collecting facts and in presenting them in an attractive manner. He has made a highly important contribution to the history of the World War, a book which should be widely read, especially by business men. G. S.

FOR GRAY IRON CASTINGS

Tentative Specifications Adopted by the Test Bar Committee of British Foundrymen

Publication has just been made in Great Britain of the tentative specifications for gray iron castings prepared by the Test Bar Committee of the Institute of British Foundrymen and submitted for the consideration of the British Engineering Standards Association.

The chemical composition to which castings should conform has not been included in the tentative specifications, the committee explains, because of the absence of reliable data as to the cumulative effect of the constituent elements on cast iron. The committee states that it was practically unanimous in deciding to recommend three sizes of bars, each of which would be related in thickness and therefore in structure to the castings it represented. On this point, the British Cast Iron Research Association, acting independently, reached a similar conclusion.

The tensile loads proposed in the specifications are all in present use and are embodied in various British Engineering Standards Association specifications, excepting in the case of the largest bar. The committee comments on the fact that its bar M, having a diameter of 1.2 in., is the size of bar suggested by the Cast Iron Committee of the American Society for Testing Materials for use as the international arbitration bar. The proposed specifications are as follows:

Process of Manufacture

1. Gray iron for castings may be made from metal melted in any metallurgical plant except an iron ore smelting furnace, in which case permission in writing must be received from the engineer or purchaser.

Molding

2. The castings shall be accurately molded in accordance with the pattern or working drawing supplied by the engineer or purchaser with the addition of such lettering as may be presented.

Classification

3. Iron castings shall be one of two grades in accordance with the purpose for which they are to be used, as specified by the purchaser and as approved by the inspecting body. The grades of casting, whether grade A or grade B as given below, shall be specified on the drawing, inquiry or tender from and all other documents having reference to contract or order by the purchaser.

Designation of Classes

4. Grade A is to include important castings.

Grade B is to include all other castings which require to conform to mechanical standards.

Mechanical Tests and Selection of Test Pieces

5. Gray cast iron castings must comply with the following mechanical tests, if such are required. All test pieces shall be selected by the inspector and tested in his presence and he shall satisfy himself that the conditions herein prescribed are fulfilled.

Dimensions of Test Bars

6. The average sectional thicknesses of any casting shall determine the size of the test bar to be utilized. Thus (a) for all castings where no main cross section of the metal exceeds ¾ in. in thickness, a bar of 0.875 in. diameter cast 15 in. long, and hereinafter referred to as bar S, shall be used; (b) for all castings where no main cross section of the metal exceeds 2 in. in thickness or is less than ¾ in. in thickness, a bar of 1.2 in. diameter, cast 21 in. long, hereinafter referred to as bar M, shall be used; and (c) for all castings, where no main cross section of metal is less than 2 in. in thickness, a bar 2.2 in. diameter, cast 21 in. long, hereinafter known as bar L, shall be used.

Method of Preparing Test Pieces

7. The test-pieces for grade A shall be cast on wherever possible; that is to say, the mould for the casting and the mold for the test piece shall be joined together in such a manner that the liquid metal fills both simultaneously. When practical conditions do not permit of this, or when the consent of the purchaser or engineer is obtained, the procedure outlined for grade B shall be followed. Test pieces for grade B may be cast separately at the option of the supplier, and shall preferably be cast in duplicate sets of two bars, each of the dimensions specified in clause 6.

Two test pieces shall be cast in a molding box, and the mold shall consist of dry sand, green sand or loam, depending on whether the casting to which it refers is molded in dry sand, green sand or loam. The test pieces shall be cast from the same ladle as the casting or castings they represent, and as nearly as possible at the same pouring temperature. The test pieces shall possess the same thermal history as the casting or castings they represent, and shall be left in the mold until nearly cold. The test pieces may be tested transversely as cast or skin-machined at the option of the purchaser or engineer.

Transverse Tests

8. The transverse test pieces, specified in clause 5, shall be tested in the manner shown in Appendix I and shall conform to the following minimum requirements:—

Grade	Bar		
A	S	1,185 lb. associated with in. deflection.	0.12
	M	1,950 lb.	0.15
	L	10,000 lb.	0.12
B	S	1,050 lb.	0.10
	M	1,715 lb.	0.12
	L	9,000 lb.	0.10

Tests Required from Modified Dimensions

9. If the diameter of a transverse test bar be found to be 0.125 in. greater than standard it shall be turned down to the dimensions specified in clause 6. If, however, the diameter of a transverse test bar, as cast, is not greater or less than one-tenth of an inch of the standard dimensions, and the test piece is a true cylinder, then the following tests shall be met:—

Grade	Bar	Diameter in In.	Breaking Load in Lb.
A	S	0.975	1,639
		0.925	1,400
		0.825	993
		0.775	823
B	S	0.975	1,453
		0.925	1,240
		0.825	880
		0.775	729
Grade	Bar	Diameter in In.	Breaking Load in Lb.
A	M	1.30	2,479
		1.25	2,204
		1.15	1,715
		1.10	1,562
B	M	1.30	2,180
		1.25	1,938
		1.15	1,508
		1.10	1,321
A	L	2.30	11,426
		2.25	10,697
		2.15	9,330
		2.10	8,696
B	L	2.30	10,284
		2.25	9,628
		2.15	8,400
		2.10	7,828

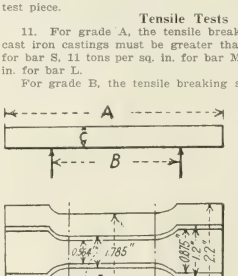
Tensile Test Pieces

10. The tensile strength shall be determined from test pieces of standard dimensions (see standard tensile test piece S, M, or L, Appendix). These standard test pieces shall be prepared from one portion of the broken transverse test piece.

Tensile Tests

11. For grade A, the tensile breaking strength of gray cast iron castings must be greater than 12 tons per sq. in. for bar S, 11 tons per sq. in. for bar M, and 10 tons per sq. in. for bar L.

For grade B, the tensile breaking strength of gray cast iron castings must be 10 tons per sq. in. for bar S and 9 tons for bars M and L.



Section of Standard Tensile Test Piece, Indicating Varying Dimensions of the Three Sizes Recommended. Details are given in the Appendix on the following page

Additional Tests before Rejection

12. Should the first test fail, the inspector shall break a second set, or if the bars represent a number of castings made from the same raw materials, then additional bars

may be taken from any selected casting at the option of the supplier. If these test pieces do not reach the minimum tests specified in clauses 8, 9, and 11, then the casting or castings shall be rejected by the engineer or purchaser.

Chemical Analysis

13. Where physical tests are specified, the percentage of any chemical element other than phosphorus shall not be specified and then only its maximum percentage.

Inspection

14. The representative of the engineer or purchaser shall have free access to the works of the supplier at all reasonable times during the course of the manufacture of the castings, he shall have power to inspect the manufacture of the castings at any stage and to reject any casting or material that is unsound or does not otherwise conform to the terms of this specification.

Testing Facilities

15. The supplier shall furnish, prepare and test all test pieces at his own cost, either in his own works or elsewhere.

Appendix

Transverse Test Pieces.—A for Bar S = 15 in.; for Bar M = 21 in.; for Bar L = 21 in.

B for Bar S = 12 in.; for Bar M = 18 in.; for Bar L = 18 in.

C for Bar S = 0.875 in.; for Bar M = 1.20 in.; for Bar L = 2.2 in.

P = the parallel length to be not less than 2 in.

Tensile Dia. in Center.—Bar S = 0.564 in.; Bar M = 0.798 in.; Bar L = 1.785 in.

Slow Delivery of Cast Iron Pipe Delays Gas Company Projects

MILWAUKEE, Sept. 17.—Inability of cast iron pipe foundries to make prompt deliveries of gas mains is holding in suspense a number of important projects of Wisconsin gas companies, according to a statement made by the Wisconsin Public Utilities Bureau, Milwaukee. The shortage of pipe, the statement says, is attributed to the unprecedented demand created by extensive building operations throughout the country, which have crowded pipe founders to the limit and make it necessary for them to take orders subject to six months' delivery. "In addition to the shortage, prices are higher than last year," the statement says. "Present quotations made on gas pipe are $69.90 per ton; the highest in 1922 was $62 per ton, and in 1921, $56 per ton." The situation of the Milwaukee Gas Light Co. is cited as an example of the acute condition. This utility has laid 67,548 ft. of gas main this year and its 1923 project includes 90,453 ft. additional, which probably will have to be deferred until 1924 because founders have notified the company that they cannot deliver pipe contracted for early in August until after Dec. 15.

Newark Wire Cloth Co.'s New Plant

The Newark Wire Cloth Co.'s new plant at Verona Avenue and North Second Street, Newark, N. J., was formally dedicated Saturday afternoon, Sept. 15. Employees, through Louis Beyer, foreman of the fine wire weaving department, presented President John C. Campbell a desk chair and framed photograph of the building. Those who had part in the building's construction presented a flag pole and large American flag which was raised by James V. Taylor, father of Congressman Herbert W. Taylor of Newark. The plans for the building were drawn by Alvin A. Campbell, son of President Campbell, and one of the officers of the company. The new buildings, 100 by 300 ft., is of reinforced concrete, truss construction having made possible the elimination of all pillars from the 31,000 sq. ft. of floor space. The Norse & Whyte Co., Boston, was taken over by the Newark Wire Cloth Co. some time ago, as was also part of the equipment of the Rogers Wire Works, Belleville, N. J. The new building represents an investment of $95,000. Newark's business and manufacturing interests had been invited by President Campbell to inspect the building, and responded in large numbers.

Western Electric Places Large Contracts

Contracts aggregating about $1,000,000 have been placed for manufacturing machinery and equipment to be used in the cable and telephone switchboard works the Western Electric Co. is erecting at Kearny, N. J., according to a statement issued by the publicity department of this company. The statement says further:

"Some of the individual orders for machinery in this group of contracts are the largest single orders of the kind ever placed. Other contracts that entail an expenditure of about $250,000 additional for machinery and equipment in the company's power house also have been placed. Besides these several contracts another involving an expenditure of approximately $180,000 for structural steel to be used in the cable plant buildings has been executed with the American Bridge Co.

"Work on the cable and telephone switchboard works is progressing rapidly. Ten pile drivers are at work on the construction of the new 1600-ft. bulkhead and the piling and foundations for the buildings are well under way.

"Grading and filling is proceeding steadily on the 60-acre tract where next fall 600 employees, the first contingent on the ultimate 30,000, will be at work in the first group of buildings in the Western Electric Kearny works which, when completed, will cost more than $20,000,000."

Inefficiency of Union Labor in Coal Mines

WASHINGTON, D. C., Sept. 18.—Figures as to comparative efficiency and earnings of bituminous coal miners in union and non-union fields have been presented to the United States Coal Commission, coupled with the charge that hampering of output by the United Mine Workers of America is a deliberate policy, despite its injury to the individual miner as well as to the operator.

In 14 mines in the Kanawha district of West Virginia, which worked first under union regulations and later as non-union mines, the increase in output per man per day in all classes of labor combined, after the exit of the union, is given as 99 per cent by Col. Henry L. Stimson and Goldthwaite H. Dorr, counsel for the Bituminous Operators' Special Committee, who filed the brief. These same mines, the brief declares, show an increase of 102 per cent in the daily earnings of the men since the union lost its hold on the operations.

In spite of the normal tendency of men to increase their efficiency from year to year, the brief says, the mines which have changed from non-union to union management have shown a let-down in individual efficiency, in marked contrast to those which, like the Kanawha group, have been freed of union domination and have rocketed to higher efficiency and greater earnings for the miners.

Record Production of Portland Cement

August showed a new record in the output of Portland cement, with 12,967,000 bbl., replacing the previous record of 12,910,000 bbl. produced in May. This makes four successive months with more than 12,300,000 bbl., the smallest of the four being larger than the figure for October, 1922, which was the highest month's output previous to this year. For the eight months of the year to date the production has been 87,907,000 bbl., compared with 70,139,000 bbl. for the corresponding eight months of last year, which in itself was a record up to that time.

Shipments in August aggregated 14,971,000 bbl., which again is a high record, displacing the figure of 14,361,000 bbl. in August, 1922. The highest previous figure in 1923 was in May, with 14,257,000 bbl. For the eight months of the year to date shipments in 1923 have aggregated 90,909,000 bbl., compared with 76,240,000 bbl. for the eight months last year, itself a record up to that time.

Manufacturers of coal-breaking machines are requested to send their catalogs and prices to Scientia, 26 rue Troyon, Sèvres, France.

Steel Buying at Youngstown—Blast Furnace at South Chicago to Be Rebuilt

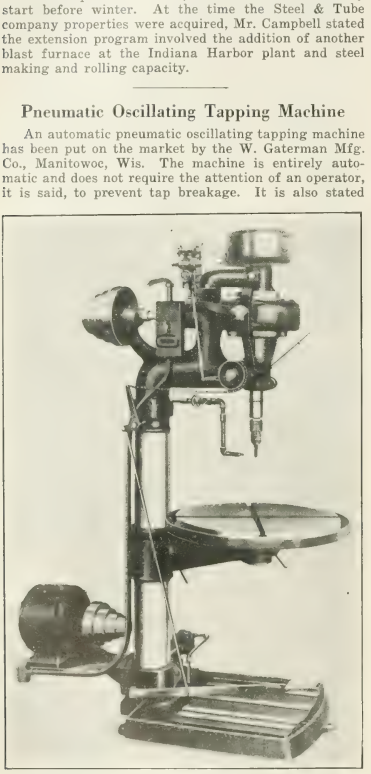
YOUNGSTOWN, OHIO, Sept. 18.—Buying of steel products is not equal to the tonnage shipped, states President James A. Campbell, referring to conditions with the Youngstown Sheet & Tube Co. Operations are being maintained at a high rate, however, by reason of the large unfilled tonnage on the company's books.

The Sheet & Tube company has awarded a contract to the William B. Pollock Co., Youngstown, for the rebuilding and enlarging of a blast furnace at the South Chicago plant of the Steel & Tube Co. of America. The stack's capacity will be increased to 500 tons.

Mr. Campbell has just returned from an inspection of the company's properties in the Chicago district. Other improvements are contemplated and an early decision is expected on them, so that construction may start before winter. At the time the Steel & Tube company properties were acquired, Mr. Campbell stated the extension program involved the addition of another blast furnace at the Indiana Harbor plant and steel making and rolling capacity.

Pneumatic Oscillating Tapping Machine

An automatic pneumatic oscillating tapping machine has been put on the market by the W. Gaterman Mfg. Co., Manitowoc, Wis. The machine is entirely automatic and does not require the attention of an operator, it is said, to prevent tap breakage. It is also stated



Oscillating Tapping Machine Run by Air and Designed to Avoid Tap Breakage and Stripping of Threads

that it prevents the stripping of threads, making it possible to cut perfect threads in the most delicate tapping jobs. In its automatic operations it imitates hand tapping, although it is said to be far more sensitive, as the working strain upon the tap is weighed to a fraction of an ounce at all times by an adjustable spring scale balance drive on the tap. No dependence is placed on slippage to prevent tap breakage. On the contrary, the machine has a positive pneumatic action which automatically oscillates the tap spindle just as would be done in hand tapping when the strain on the tap is too great. The backing up, or oscillation, works like a flash, and only when it is necessary to prevent tap breakage. The load on the tap is carried by a cushion coil spring which deadens shocks on the tap, as well as on the entire machine.

The machine has been used to tap No. 29 wire drill holes in steel with 10-30 bottoming tap running at 800 r.p.m. It is unnecessary with this machine to use tapered taps to overcome tap breakage. This is advantageous because a tapered tap must be driven full length through the work, while a plug tap need be driven only two or three threads. When desired, an automatic indexing attachment for chucking and ejecting work is provided with the machine. The machines are arranged for both motor and belt drive, although the former is recommended. Among extras which are furnished are oil pump and piping, and air compressor for plants not equipped with air. Specifications are as follows:

	No. 4	No. 8
Capacity in steel, in.	⅛–⅝	¼–¾
Height over all, in.	60	70
Distance center of spindle to column, in.	9½	13
Diameter table inside oil channel, in.	15	22¼
Vertical adjustment of table, in.	20	21
Spindle speeds, r.p.m.	340	195
Spindle speeds, r.p.m.	520	275
Spindle speeds, r.p.m.	800	390
Spindle speeds, r.p.m.	...	670
Spindle travel, in.	2¾	3
Highest position of table from floor, in.	36	41
Lowest position of table from floor, in.	16	20
Motor, hp.	½	1½
Weight, lb.	375	850

British Pig Iron and Steel in August

LONDON, ENGLAND, Sept. 18.—(*By Cable.*)—The pig iron and steel production in August showed a decline from July and a further decline from the heavy output in May, the peak of the year. In August 599,800 gross tons of pig iron was made, which compared with 655,100 tons in July. The steel ingot and castings output in August was 582,700 tons, a decrease of 41,600 tons from July.

Comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	639,000
1920, per month	669,500	755,800
1921, per month	217,600	302,100
1922, per month	408,300	486,000
January, 1923	567,900	634,300
February	543,400	707,100
March	633,600	802,500
April	652,200	749,400
May	714,200	821,000
June	692,800	767,700
July	655,100	624,300
August	599,800	582,700

Plant Operations at Birmingham

BIRMINGHAM, ALA., Sept. 17.—Repairs in the blooming mill of the big Ensley plant of the Tennessee Coal, Iron & Railroad Co. are about completed and the entire plant will shortly be going at the pace that has been found necessary for some time. With the blooming mill out, practically all departments have been running slow.

The Gulf States Steel Co. now has four out of six open-hearth furnaces in operation and has all finishing mills going. Expectations are for strong demand for various shapes in steel. No Japanese business has been placed here lately. The Tennessee company is receiving its steel barges to be used in the Warrior River service between the Birmingham district and the port of Mobile. The last of the nine barges will have a hauling capacity of 1300 tons and will be able to carry a good sized cargo of steel products from this district to Mobile.

Vanderbilt blast furnace of the Woodward Iron Co. has been blown out because of lagging iron market, leaving three furnaces still in blast. Alabama now has only 23 furnaces making iron.

CORRESPONDENCE

Continuous Wire-Drawing of Steel*

To the Editor: Perhaps there is no industry about which so little is known by the general public as the production of steel wire, which enters so largely into every day use. It is a cold process when being drawn. The art of wire drawing is very old and the drawing is still accomplished in about the same manner and by such machines as were used hundreds of years ago.

A wire drawer who has been brought up in a wire mill, asked why he does this or that operation as he does, would probably answer: "Father and grandfather did it this way, and this is the way we always do it." If one should suggest some newer method designed by a mechanical engineer who did not happen to be brought up in a wire mill, the reply would likely be: "He knows nothing about wire drawing; he was not brought up in a wire mill. He was in one only a short time, while I have been all my lifetime in the mill and know all about wire."

These people seem to think there is some unseen or subtle cause of various troubles encountered which can be learned only by a lifetime spent in the presence of the old-fashioned machinery, and that nothing but a long series of years can convey to men's minds sufficient knowledge to enable them to draw wire without spoiling the product.

About twenty years ago I took up the study of this subject and, through the courtesies of several mill owners, was given an opportunity to study wire drawing very closely. In conversation with various operators in different mills, I found there were many things that gave trouble that were hard for them to explain—some would attribute them to weather conditions and others to various other causes.

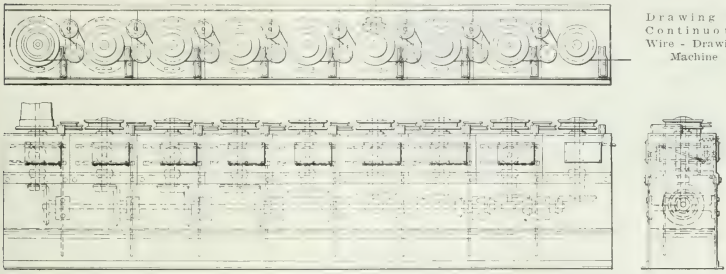
Up to this time I had been traveling selling machinery and, as some of my sales were wire-drawing machinery, I had become a student of wire-drawing. I also had opportunity to study the continuous drawing of brass and copper wire and had many discussions as to why steel wire could not be drawn successfully on machines adapted and extensively used for brass and copper. Always came the same reply: "It simply will not draw successfully on steel wire."

This caused me to study why and, after considerable time, I concluded it was because brass and copper were in themselves a source of lubrication and, as dies are usually steel or cast iron, copper and brass would pass through with a very small amount of lubrication, while steel would be scratched or roughed up with the same lubrication and be commercially spoiled.

Steel wire to be drawn is generally coated with a material which will adhere and remain on the wire during its passage through the die and remain on and intact for passage through several other dies. This coating is a mixture of hydroxide of iron, lime and soap or tallow, for "dry drawing," and coated with copper or copper and tin for wet or "liquor drawing."

These coatings will go through the die and remain on the wire through several dies, with the single draft system, but when the wire is put on a continuous machine, where the drums act as capstans to draw the wire through the die, and for reasons inherent in the process the wire has to slip on the drums, a portion of the coating is removed from that side of the wire next the drum and this will cause scratching or "sloping up" in the next and succeeding dies.

I found by experiments on a No. 5 rod drawn to No. 8 in one draft that, for ordinary steel, about 1200 lb. pull was required to pull the wire through the die. A machine which I patented, and which is in commercial use in Europe, has shoes in a groove as a wire forwarding seat. The shoes are formed in a ring just to fit the portion of the drum provided for them, said ring being cut into eight sections and lacking the saw kerfs of making a complete circle. They are retained in position but not attached to the drum and are driven by friction on the flat seat against which they are forced with the pressure produced by the winding on of the drawing wire at 1200 lb. strain in three wraps.



Drawing of Continuous Wire-Drawing Machine

These shoes, properly made in the right thickness, will travel only as fast as the wire that is on them and the slip will take place between the shoes and the drum. These machines were described in THE IRON AGE, Jan. 3, 1907, page 18, under the title "Wire Drawing: the Second Step in a Useful Art," by W. W. Gibbs.

In drawing steel wire by the continuous process the rods must be thoroughly cleaned to remove all the black oxide of iron that is the product of hot rolling, carefully coated with hydroxide of iron (brown coating), then with lime coating, then baked to remove the hydrogen gas and to dry on the lime coating.

This coating, when combined with the soap by the heat generated in the die, will pass through four or more dies unless removed by scraping through guides or drawn over the hard surfaces in its passage from one drum to the next succeeding drum. In liquor drawn wire, and most fine wires, the wire is coated with copper and tin and, from the nature of the process, must be kept in liquor after coating until drawn or it will rust.

The necessity for a non-slip machine of the continuous type was recognized by the writer, hence the shoes described. But the control of the speed of the various drums to suit the tension of the wire has to be accomplished by the excess strength of the wire being drawn, over the amount of pull necessary to draw it

*Patent No. 1,460,379, dated July 3, 1923, has been issued to James A. Horton, Worcester, Mass., on a continuous wire-drawing machine of the non-slip variety. An illustration herewith is adapted to draw the finer sizes of wire, but the patent applies also to coarser sizes of steel wire. The claims in this patent are very broad and some are basic in effect. For instance, Claim 3—"In a wire-drawing machine, a source of power, a die, a drum around which wire passing through said die is wrapped, a yielding transmission means between the source of power and the drum, adapted to permit lagging of the drum with increase in tension of the wire, means controlled by such lagging for altering the speed of the drum, and provisions for adjusting the tension of said yielding transmission means."

through the die. In the four wires this ozone is only a few pounds and in the machine illustrated it is only a matter of seconds to go the rounds.

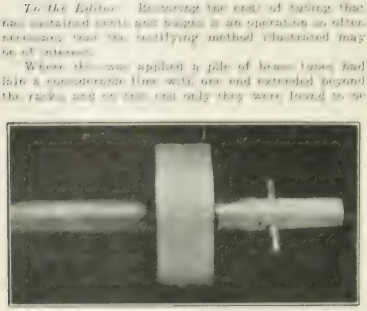
It will be seen from the foregoing that I produced a rod-up machine for drawing rods over twenty years ago and, in experimenting, I drew coils of rods (mass spread) weighing 610 to 615 lb. each from No. 5 rod to No. 11 wire through five dies in one continuous pass at 42 miles, dies and drums being water cooled.

JAMES A. HOGENS,
Mechanical Engineer
St. Louis Rod & Wire Co.

Taking Bulges Out of Tube Ends

To the Editor: Reviving the end of tubing that has cracked ends and bulges is an operation so often necessary that the rectifying method I have used may be of interest.

Where the wire applied a pile of brass tubes had little a considerable time with one end extended beyond the racks, and on the end only they were found to be



Device for Taking Bulges and Bruises at the Ends of Brass Tubes

all more or less bruised. With both internal and external diameters a standard size it was not difficult to procure a brass collar to fit the outside and a short piece of bar stock for the inside of the tube. The only work required was to grind a short taper on the end of the bar, drill a hole through it sideways and drive a pin through. The method of operating the device was first to drive the solid bar into the tube end in order to straighten out the inner bulges, and then to slip the collar over the other end and drive it over the end with the bar inside.

In this way the end of the tube was drawn out as straight as it was originally without showing marks of the operation. It may be seen that the object in having the cross pin in the solid bar piece is to permit its easy removal from the tube. As the collar piece is driven over the end it comes against the pin and carries the bar piece out with it. HARRY WOOD

Brassworker, Hamilton, Ontario

The Ohio State Foundrymen's Association, Cleveland announces the addition of the following members to its roster: Baker Brothers, Bonding Brass & Bronze Co., Donovan Wire & Iron Co., Ensign Foundry Co., Etna Machine Co., Merrell Mfg. Co., National Supply Co., Toledo Machine Tool Co., Toledo Ship Building Co., Toledo Steel Casting Co., Toledo Steel Products Co., all of Toledo, and American Rolling Mill Co., Ashland, Ky., division.

Lumber cut in the states of the United States has practically doubled within the past 20 years, and in the west has in some districts increased even more than that, according to the survey of the timber supply just completed by the Department of Agriculture through the Bureau of Markets. In consequence the supply in some regions been used that the cost of lumber to the user equals the cost of the timber at the place of operation.

The Standardization of Stove Bolts and of Taps and Dies

A meeting of the National Screw Thread Commission, of which the Director of the Bureau of Standards is chairman, was held in Swampscott, Mass., on Aug. 7 and 8. In connection with this meeting, conferences were held with representative manufacturers of stove bolts and of taps and dies. There is at present a lack of uniformity in specifications for stove bolts as manufactured in the central West, notably Cleveland, Ohio, and as manufactured in New England. The commission desires to assist manufacturers and users of stove bolts to arrive at a single standard, so that the product of various manufacturers will be completely interchangeable. It is hoped that this may be accomplished through the interest of users of these bolts who are now put to unnecessary expense and inconvenience through lack of interchangeability.

The conference with manufacturers of taps and dies was arranged with a view to bringing into harmony the commission's report and the manufacturers' standards for threaded products. The conference resulted in satisfactory progress toward the settlement of minor differences between the commission's recommendations and the standards of the manufacturers.

Gases in Malleable Cast Iron

Analyses for oxygen, hydrogen and nitrogen have been completed on samples of hard white iron and annealed iron from two plants making malleable in electric furnaces and from those plants melting in air furnaces. In all cases it was found that the annealing of the hard iron increased the oxygen content of the metal and decreased the nitride nitrogen content. No distinction between air furnace and electric furnace iron was found on the basis of the oxygen content or on the basis of the changes in oxygen or nitrogen. There was apparently in some instances a tendency for electric furnace iron to contain more nitrogen than air furnace iron in both hard and annealed conditions, but this difference was not true throughout the series of samples analyzed. The ranges of gas contents were as follows: Oxygen in hard iron 0.0014 to 0.0043; oxygen in malleable iron 0.0060 to 0.0190; nitrogen in hard iron 0.0080 to 0.0104; nitrogen in malleable iron 0.0011 to 0.0036 per cent.

Fatigue Properties of Steel

The Bureau of Standards is carrying out an investigation on the fatigue properties of various woods and metals and in connection with this work 26 specimens of 3.50 per cent nickel steel have been tested in the rotating beam fatigue machine by the load deflection method. The results are consistent for the different heat treatments to which the metal had been subjected. Fatigue values of from 50 to 55 per cent of the ultimate strength were obtained when the proportional limit was above that of the fatigue limit. When the proportional limit of the material was less than 50 per cent of the ultimate strength, the fatigue limit was less than the proportional limit. Fatigue tests by the load deflection method have also been made in a rotary beam fatigue machine on three specimens cut from a Thermit-welded rail joint. The fatigue limit averaged 31 500 lb. per sq. in. with an average ultimate strength of 57 445 lb. per sq. in., the average percentage of the fatigue limit to the ultimate strength was 54.9.

"Reactivity of Coke in Relation to Blast Furnace Operation," was the subject of a joint paper by George St. J. Perrott, assistant physical chemist, and Ralph S. Sherman, assistant physicist, U. S. Bureau of Mines, Pittsburgh, presented at the bi-monthly meeting Steel Works Section, Engineers' Society of Western Pennsylvania at the William Penn Hotel, Pittsburgh, Tuesday evening, Sept. 18.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY — WILLIAM W. MACON — GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* — PRINTED IN U. S. A. — George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Mind of Business

IT is well nigh a platitude to say that reactions in business are psychological. It would be as much a platitude to say that business revivals are psychological, but that is something we do not say, for we regard business activity as something very "substantial" and we do not so think of mental attitudes. Yet it is not what is, but how men appraise what is, that determines business conduct. Hence there is a psychology factor in all business equations.

Observation of the mental factor may be made by scrutinizing the causes of the various panics and industrial depressions we have had. There is an accepted list of causes, and for each panic or depression the authorities have picked out those that were present. In but one case were all the causes so found, one of the foremost writers on this subject stating that the panic of 1873 was unique in that respect. We should find some of the causes present when there is no depression, but we are careful to avoid such inquiries.

The psychological side can be observed also in the recurrent presentations by financial writers of the "favorable" and "unfavorable" factors in the existing situation. It is good form in financial journalism, by the way, to arrange the points in such a way that there shall be one more favorable than unfavorable factor. It is easy to state the facts correctly, but sometimes business grows better and sometimes it grows worse, depending simply on which group of factors is given the greater weight in men's appraisals, and that is mental.

Continuously during the present period of activity men have been asking themselves what would occur to destroy the activity. The usual causes have been conspicuous by their absence, if we throw out of the reckoning, as we certainly should, those alleged causes that were in existence when the present activity was succeeding to inactivity.

This inquiry is itself more or less unique. In the past it has been the common thing to ignore the existence of unsound conditions until too late. The obvious explanation of the present search for unsound conditions is that of late "the business cycle" has received such extensive advertising that many think the time has arrived for something to go wrong.

The complicated machinery of business can be easily disturbed. It can be disturbed by men concluding that poorer times are coming, when the conclusion does not rest upon physical facts, just as well as when the conclusion is based upon material conditions. The great danger to American business today is not so much unfavorable conditions as a disposition to expect unfavorable conditions.

"Economic" Brayings

"THE 'economic war' will not end until business abandons the present predatory methods and unites with producers and consumers of the country in sharing with them their just rewards," Senator Brookhart declared in a recent address, wherein he proceeded to say: "Capital is taking a vast toll of labor, and this, with the decreased earnings of the farmers, renders laboring men and farmers natural allies. Out of the dollar labor pays for the products of the farm, the farmer gets 37 cents, as officially reported by the joint committee of Congress. Out of the dollar the farmer pays for the products of labor, the laboring man gets even less. The last fact is disputed, but I think it substantially correct."

There is one admittedly impartial fact-finding body in the United States—the National Bureau of Economic Research. Its findings are passed upon by a board of directors who are selected as exponents of all kinds of interests and thought. That bureau has reported that out of the produce of mining, manufacturing and transportation industry, labor gets about 70 per cent and capital together with management (which means the executives, the engineers and other professional men, and their staffs who run things and without whom there would not be much produce at all, as the Russian Soviets learned to their sorrow) get only 30 per cent.

This finding was studied and expressly approved by the entire board of directors of the bureau, including Gray Silver, representing the American Farm Federation Bureau, and Hugh

Frayne, representing the American Federation of Labor.

When, therefore, Senator Brookhart makes a statement to the contrary he is setting himself above science and above the most intelligent and most impartial thought of America. In fatuously admitting that what he alleges to be fact (which it is not) is disputed, he ought to explain that among those who dispute it are Mr. Silver and Mr. Frayne, who sit specifically as representatives of organized farmers and organized laborers.

If Senator Brookhart is going to pose as an economist he might go further, without making any great draft upon intelligence. He might compare the amount of the national income as reported by the authority we have cited—again with the assent of Messrs. Silver and Frayne—and the aggregate sums paid to railroad labor, as reported by the Interstate Commerce Commission, and see how railroad labor has been taking an increasing share, of course at the expense of other people and largely of the farmers.

What shall we think of the intellectuality that lets Senator Brookhart and others of his ilk say such things? It would be hard to say which it should more provoke—pity or contempt.

Oxygen in Steel Metallurgy

IN most major chemical reactions satisfactory results are assured when the various reagents are in concentrated form. In steel metallurgy, oxygen, one of the most active factors in the manufacture of pig iron and steel, necessarily has been employed greatly diluted with nitrogen. Tons of an inert useless gas are daily blown through modern blast furnaces or pass through steel melting furnaces. It has been recognized for a long time that if oxygen were available at a reasonable cost, radical and beneficial changes might result from the use of a more concentrated blast or one higher in oxygen. Interest in this subject was aroused by Dr. F. G. Cottrell and the late J. E. Johnsen, Jr.

The Bureau of Mines created a few months ago a committee of well-known metallurgists and scientists to investigate further the possibilities of oxygen or oxygenated air in metallurgy. The first report has been made public, abstracts appearing in THE IRON AGE last week and this week. While the conclusions are largely theoretical, they are such as to indicate that further investigation on a commercial basis is fully justified.

The high cost of oxygen has been one important deterrent to progress. The committee has been definitely assured, however, that cheap oxygen can be depended upon. The fact that members of the National Helium Board are part of the advisory committee practically assures the same success as to oxygen which marked the extraordinary results on helium.

With oxygen at less than $3 per ton well nigh a certainty, the investigators indicate, as among the possibilities, a decrease in the production costs of pig iron and the possible elimination of the hot blast stove, a better steel from the open-hearth and a more efficient production of ferromanganese, as a result of the use of more oxygen. It is probable that large scale experiments will confirm some or all of these probabilities and that important changes in steel and iron metallurgy will follow.

Still at the Mercy of the Union

AT the time of the settlement by union miners and operators in the bituminous field a year ago at Cleveland, THE IRON AGE spoke of it as "an ignominious surrender." The recent anthracite settlement at Harrisburg is a similar proceeding—of course, not so bad as the Cleveland surrender, by which the obnoxious check-off was continued, but in all other particulars quite as unsatisfactory. Nothing has been done to prevent another industrial struggle in two years and there is no assurance that the entire increase in cost of production will not be collected, as usual, from the consumers. Governor Pinchot has not forgotten his original proposition that the increased cost be divided among the operating companies, the railroads and the distributers; but there is little ground for hoping that the suggestions he has made to President Coolidge will have important results.

The United States Coal Commission has issued a document of about 7500 words, understood to have been prepared by former Vice-President Thomas R. Marshall, which sounds, in some of its paragraphs, more like a stump speech than the statement of conclusions based on thorough investigation. Familiar platitudes are given much space, and the report concludes by stating that "the legislative, judicial and executive branches of this Government must not permit a union of operators, a union of miners, nor a union of both, to become greater than the Union of the States."

The commission does not, however, propose any plan of preventing the continuation of the domination of the labor union. It does not recognize the plain fact stated in an editorial in THE IRON AGE of Aug. 30, that the United Mine Workers is an organization directed against the public welfare. It has not a word to say about the obnoxious license system under which the union prevents men from taking the place of union miners and thus completely controls the situation. The nearest it comes to recognizing the true character of the union is in expressing the opinion that Congress should compel full publicity from both operators and United Mine Workers to the end that the people of the United States may determine whether they will longer permit the existence of these organizations.

The report declares that if other methods fail "it is the solemn duty of the Congress of the United States to assume jurisdiction over American rights, bringing the full power of the Union to their preservation by the prosecution and conviction of all persons, whether high or low, who shall dare to violate them." But Congress can hardly be expected to stand up for American rights when employers and employees in joint session with the Governor of a great State fail to

do so. Recalling again the words of the late President, we are still "at the mercy of the United Mine Workers."

Coke in 1922

OF the coke produced in 1922, the proportion of by-product coke was remarkably high through a combination of three influences: 1. In general, by-product coking is increasing while the beehive process is decadent. 2. Demand was relatively light early in the year, affecting beehive more than by-product coke. 3. The coal strike, April to August, affected beehive more than by-product coke production, as shipped coal from mines not closed by the strike went to by-product rather than beehive ovens.

Final figures of coke production in 1922 were recently stated by the Geological Survey, at 8,573,467 net tons of beehive and 28,550,545 net tons of by-product, making a total of 37,124,012 tons. The proportions were thus 23.1 per cent beehive and 76.9 per cent by-product. The percentage of beehive coke was larger in 1922 than in 1921, for in 1921 total demand had been very light and the beehive ovens suffered correspondingly. They contributed only 21.8 per cent to a total which was but 69 per cent of the 1922 production.

Beehive coke is largely a merchant production, while by-product coke is made chiefly for owner consumption. There is, however, a trend toward the building of by-product ovens for making merchant coke. Further growth of by-product coking must be largely in this direction, for the greatest consumer, the blast furnace industry, has already gone far in building by-product ovens. In 1922 coke consumed by the producers was 1,071,886 tons of beehive, or 12.5 per cent of the total beehive, and 21,106,823 tons of by-product, or 74 per cent of the total by-product.

The influence of last year's coal strike in curtailing production of beehive coke cannot be gaged, since the demand for blast furnace operation so increased during the strike that it cannot be conjectured what the beehive production would have been had there been no strike. Beehive coke production was 781,000 tons in March, the month before the strike, dropping to 465,000 tons in May, on account of the strike, and reaching 935,000 tons in October, when the influence of the strike had been lost, so that the post-strike output was much beyond that preceding the strike.

Unfortunately the reports do not give the value of the by-products, chiefly gas, used by the coke producers. The total value of all by-products sold is given at $83,387,763 for 1922, including gas sold to steel and other affiliated plants, or $2.92 per ton of coke produced. This is a tidy sum, but must not be regarded as profit since expense was involved. It does represent, however, a recovery of material that would have been lost had the beehive process been used. A further saving was involved in that the yield of coke from coal was 69.5 per cent in the by-product process, against 64.5 per cent in the beehive process. The value of the coal used being reported, it can be computed that extra coal to the value of 53 cents per ton of coke produced would have been required had the yield been 64.5 instead of 69.5 per cent. This added to the $2.92 just mentioned makes $3.45. The by-product coke itself was valued at $6.60 per ton.

Using Manganese Ore Stocks

TO Aug. 1, American blast furnaces had produced in 1923 over 170,000 gross tons of ferromanganese, according to returns to THE IRON AGE. Theoretically this would require the consumption of about 425,000 tons of high-grade manganese ore. To meet this, however, only a little over 101,000 tons of ore had been imported to Aug. 1, according to official data, or an apparent deficiency of over 300,000 tons. Returns for 1920, 1921 and 1922 show that the ore imported in those three years, approximately 1,380,000 tons, was just sufficient, on the same theoretical basis, for the production of about 553,000 tons of ferromanganese. In the same three years the output of ferromanganese was 532,120 tons, or practically enough to consume the equivalent of the ore imported between Jan. 1, 1920, and Dec. 31, 1922. While these calculations are not exact, they would indicate on their face that the 1923 production of ferromanganese has eaten into stocks of manganese ore on hand at the opening of the year to the extent of 325,000 tons. This figure should be reduced by the amount of domestic manganese ore that has been charged this year into the furnaces producing ferromanganese. This latter factor is not known, but it is quite improbable that it is large enough to account for the marked decline in ore importations as compared with the rate of the three preceding years.

"Off Grade" Basic Iron

A RECENT sale of basic iron in the Pittsburgh area at a relatively low price on the ground that it was off in grade, since the silicon content ranged from 1.01 to 1.25 per cent, brings up the question what analysis constitutes standard iron. Published specifications long have recognized 1 per cent as the maximum silicon content in standard Northern basic iron; and as a matter of fact Southern and Eastern iron practice has set up the same limitation on this element. It is assumed that consumers had a voice in fixing the silicon in basic iron as well as in the other grades, and steel making practice of other years dictated a maximum of 1 per cent, probably because of the injurious effect of silicon upon furnace walls and bottoms. But steel works practice does not stand still and it is a fact that in the Pittsburgh area and farther west steel makers are showing a preference for basic iron containing more than 1 per cent of silicon, not a few asking for 1.25 per cent.

One reason for this development is that iron of the higher silicon content will carry a greater burden of scrap, and it is well known that beginning with the war period the ratio of scrap in the mix has been steadily increasing. There are several plants in which the charge of pig iron today is as low as 20 per cent and as against the old half pig iron and half scrap mix, the average in

important districts, according to competent observers, is about 65 per cent scrap and 35 per cent pig iron. Regardless of the reasons for the preference of steel makers for basic iron of higher silicon content, is it within the province of any producer to decide that iron running above 1 per cent silicon is off grade?"

This question is more apt to come to the surface in periods of dullness. It is argued, of course, that buyers cannot be so exacting as to analysis when the need for iron is pressing as they can be, and usually are, when producers want orders; but it is splitting hairs to say that an iron of a given analysis is "standard" when demand is good and "off grade" when the buying is slack. And with an increasing preference for iron above 1 per cent in silicon, is it not time for the formal revision of a specification that makes 1 per cent silicon the maximum for basic pig? Particularly so when an important Middlesbrough, England, furnace group produces a grade with a silicon range of 0.75 to 1.50 per cent.

Progress Toward Shorter Hours

THE report of one month's progress in abolishing the twelve-hour day, as made by correspondents of THE IRON AGE in this issue, clearly shows that those reformers who expected the change to be made quickly and easily were indeed in error, while iron and steel company operators who foresaw many difficulties did not exaggerate the size of the undertaking.

Some of the difficulties have indeed been greater than any of the operators had expected, but after a month it is certainly well within the truth to say that much has been accomplished by the Steel Corporation subsidiaries which have naturally been leaders, and that many of the independent companies are not far behind the Steel Corporation, while others are progressing very slowly and some have not made any move toward changing the hours of labor.

One effect of the change is seen in the hint that many of the iron and steel workers would be better satisfied if they had an opportunity to work in gardens or in other outdoor employment during their spare time. The desire of workers in various lines to get away from cities may result, in the case of the steel industry, in more plants being located in what are now strictly rural districts, following the example of companies located on the outskirts of various smaller cities in Ohio, as Warren, Massillon, and Ashtabula. Such a change is greatly to be desired.

An important feature of the movement away from the long hours is that the short shift is becoming popular among the better classes of workmen—the men who prize their home life, know how to enjoy healthful recreation and are willing to sacrifice a little in wages in order to obtain the better living conditions.

While it is noteworthy that the readjustment to ten and eight hours is being made more slowly now than it was a month ago, it does not follow that the change will be further retarded in the next few months. Much depends upon the state of employment. Naturally, at this time of the year, workmen are attracted from various outdoor employments to the mills, and if mill activity should decrease even to a moderate degree in the next three months there would be plenty of labor available and the readjustment to shorter hours would be easily made. If, however, mill activity continues on the present basis and negroes in considerable numbers return this winter to the milder climate of the South, the transition to the shorter day will not be so easy.

ALTHOUGH imports into the United States in the first half of 1923 were 47 per cent greater than in the first half of 1922, the increase in manufactured goods ready for consumption was slight, most of the gain being either in foodstuffs or in materials for manufacturing. Under the latter heading the $731,000,000 of 1922 gave place to $1,210,000,000, a gain of 65.5 per cent, while all imports except those destined to be processed in our factories show an increase of only 27.6 per cent, advancing from $688,000,000 to $878,000,000. Thus the goods entered as raw materials or partly finished for further use in manufacturing represented this year 57.9 per cent of the total value of all imports, compared with 51.5 per cent last year.

The Iron Age and Its Readers

AS new uses of steel are developed or promising avenues seem to open up for the enlargement of a present use, THE IRON AGE has been prompt to give the facts to its readers.

Some months ago we pointed out how in providing new or repaired freight cars with a form of corrugated steel door, the consumption of sheets could be increased easily by 350,000 tons a year.

A little later we gave an estimate of the tonnage of steel bars now going in increasing quantities into concrete road construction.

And in last week's issue was described at length the making of a variety of bedroom furniture in steel which is being so well received that an enlarged plant now building will take steel at the rate of 225,000 lb. a day, or, in a year's time, upward of 20,000 tons of sheets and 13,500 tons of strip steel.

THE IRON AGE analysis at the opening of the year of the steel production of 1922 was useful to the same end in giving both the amounts of the different forms of steel rolled by the mills and the quantities taken to be worked up by different industries. Numerous were the ways in which these exhibits were studied for their bearing on sales policies in 1923 or in initiating new programs for disposing of steel.

FRENCH MARKET RISES RAPIDLY

Receipts of Ruhr Coke Small—Export Demand Good—Pig Iron Production Small

PARIS, FRANCE, Sept. 6.—Prices are still moving upward and the increase is progressing so rapidly that there is some anxiety as to the future standing of the market, it being feared that an exaggeration of prices at this time would affect business badly. A rise in the price of coke is expected on Oct. 1. Although no official information is available, it is said that this advance might be as much as 30 fr. per ton. As a consequence, revisable contracts based on coke prices are again in use.

In addition to the anticipated increase in coke prices, fear is felt that there will be a shortage of the fuel needed to meet the demands of increased output and the fluctuations of exchange may also prove serious. On the other hand, the increase of exports has produced a domestic shortage which enables producers to advance prices.

Coke.—The latest statement issued by the Office des Houilleres Sinistrées, in charge of the distribution of indemnity fuels in both France and Luxemburg, advances the price for German coke to 388 fr. per metric ton. It is noteworthy that this coke was still quoted at the beginning of July at 72.67 fr. per metric ton. Week by week this price has successively been 98.50 fr., 124.84 fr., 203.32 fr., 264 fr. and now 388 fr. In the last four days of August, 18,870 metric tons of Ruhr coke was received, making a total for the month of 120,000 tons. There has been an improvement in arrivals but the daily average was only 4000 tons during the month. For the first four days of September the daily average was 4600 tons.

Pig Iron.—Sales are limited and production is small with prices moving upward. No. 3 P. L. is quoted at 420 fr. at works and No. 3 P. R., 1.80 to 2.25 per cent sil., at 410 to 415 fr. No. 3 G.m.b. pig iron, with the pound sterling at 80 fr., is not yet a dangerous competitor in the domestic market, but there is but little opportunity at present of selling into British markets. Hematite pig iron is firmer and very few lots are available for prompt shipment because of the numerous orders booked ahead. These orders have generally been at about 500 to 525 fr. per metric ton, delivered, with a clause in the contract permitting a revision of price based on the variations in the cost of coke. This situation is evidently favorable to British transactions in hematite, which is quoted in the Paris market at 510 to 515 fr. per metric ton. For export, the following prices per metric ton, f.o.b. Antwerp are quoted: Casting iron, No. 3, 465 to 475 fr. (Belgian currency); ordinary basic Bessemer, 455 to 465 fr. (Belgian currency).

Ferroalloys.—The tendency of the ferroalloy market is decidedly upward. Ferromanganese, 70 to 80 per cent, is quoted at 1600 fr. per metric ton. Ferrosilicon shows increases for various percentages of from 25 to 100 fr. per metric ton, 25 per cent being quoted at 775 fr. Spiegeleisen, 18 to 20 per cent, is quoted at 750 fr., an advance of 50 fr. per metric ton.

Semi-Finished Material.—Prices are advancing and deliveries offered are being extended. Export demand is reported active, which has resulted in some scarcity in the domestic market and fluctuations in prices. In basic material, ingots are quoted at 48 to 50 fr. per 100 kg., blooms at 52 to 54 fr. per 100 kg., and billets at 56 to 58 fr. per 100 kg. Open-hearth material is from 2.50 to 3 fr. higher.

Rolled Products.—Much the same situation prevails in this market as in the market for semi-finished materials. The lowest base price is now 62 fr. per 100 kg., but quotations generally average 63 to 65 fr., at works. Beams (light) are quoted at 60 to 63 fr. per 100 kg., according to size. For export, f.o.b. Antwerp, the following prices are quoted in Belgian currency: Bars, 775 fr., small shapes, 785 fr., and light beams, 725 fr. per metric ton.

Sheets.—The market shows an increase in price of from 2 to 3 fr. per 100 kg. Prices in the domestic market are as follows for basic steel: Heavy plates, 66 to 68 fr. per 100 kg.; heavy sheets, 67.50 to 70 fr.; medium sheets, 80 to 90 fr. and light sheets, 95 to 100 fr. per 100 kg. Lorraine works are quoting sheets for export, f.o.b. Antwerp in Belgian currency, at 780 fr. per metric ton, for 5 mm. and heavier and 850 fr. per metric ton for 3 mm.

JAPAN NOT YET ACTIVE

Inquiries for Sheets and Wire Nails and Some Business Placed—Light-Gage Galvanized Sheets Too High

NEW YORK, Sept. 18.—In contrast to the numerous rumors of heavy purchasing by Japan of temporary reconstruction materials, the export market with the Far East is extremely quiet thus far. Some fair activity in wire nails and light gage black sheets is noted, but most of the export houses which conduct business with both Japan and China complain of delay in cables, believed to be a result of the reported congestion of messages because of the earthquake in Japan. Exporters to Chinese markets also mention a considerable interruption of cable service with Shanghai. Chinese merchants are inactive with the exception of light buying of wire shorts and a few orders for cut nails. One exporter to the Far East reports an order for 1000 tons of cut nails from China. One large Japanese export house has booked in the past week orders for 1000 tons of light gage black sheets and several thousand kegs of wire nails.

Whether prices of American mills on the materials needed by Japan for this reconstruction will prove too high to compete with other foreign sellers remains to be seen. And the possibility of extended payment is a factor. In addition to the difficulty encountered by exporters in obtaining quotations on the Nos. 30 and 31-gage galvanized sheets recently asked for by Japanese merchants, the prices that were received were regarded as rather high. One exporter found that the best c.i.f. quotation he could make on these light-gage sheets was $143 per ton for four to five weeks' delivery.

While the Tokio office of the Imperial Government Railways was so completely destroyed as to necessitate removal of the company's headquarters to Osaka, it is now believed that damage to the company's lines was probably not nearly as great as originally estimated. Furthermore, with the company's reserve supplies in Japan and additional tonnage under order, not yet delivered, buying for replacement of damaged sections may be somewhat delayed. It is felt that purchasing of structural steel is still somewhat in the future and, although on important projects American sections would undoubtedly receive preference, it is pointed out that with the present low value of the Belgian franc, Belgian makers are quoting below the American delivered price on structural steel, in some instances $45 to $46 per ton, c.i.f. Japan.

A report has been issued by the Department of Commerce, Washington, that the American built steel and reinforced concrete buildings in Tokio and the Yokohama district withstood the earthquake shock and are in good condition. It is pointed out that the fact that this construction has proved resistent to earthquakes is likely to influence favorably the adoption of this type of construction in the future.

President Julius Kahn of the Truscon Steel Co., Youngstown, states that his company has received information from Japan that the damage to its plant between Tokio and Yokohama as a result of the earthquake will approximate $100,000. The property was operated by a separate company, with many Japanese stockholders. It will be rebuilt as soon as possible.

Business Begins to Slacken in Germany

Introduction of Gold Mark Reckoning Brings Price Muddle and Lifts Quotations Above World Levels— Works Going on Short Time

BERLIN, GERMANY, Sept. 5 (*By Air Post to Bremen*). —The German industry is nearing a crisis. As all prices are fixed in gold marks the continual depreciation of the currency, which used to bring new orders every time the mark went down, has lost its power to act as a stimulus to business. Railroad rates have been heavily advanced recently and prices of raw material have in many cases reached foreign levels. Inquiries and orders in the metal and engineering industry are decreasing considerably and many smaller firms are already in difficulties. Wages and other expenses have gone up tremendously and many firms have trouble in finding sufficient ready capital to carry on. The home business is declining and export orders are also dwindling. Inland customers are in many cases trying to cancel their orders. Short time work and dismissal of employees are extending, though legal restrictions are allowing the dismissal of workmen only after the firm has worked short hours for some time.

The rapid changes that are taking place in the value of the mark are making the stipulations in regard to payment in trade and industry very complicated. The great number of different modes introduced is confusing and adds considerably to the difficulties in the home business in Germany at the present time. They are all introduced with the view to safeguard the seller against loss. In some lines quotations are in paper marks for a certain date and the amount varies with the exchange of the dollar. In others prices are given in gold marks or in foreign exchange, generally in dollars. Some firms take the dollar as 4 marks; others, as 4.2 marks.

Sharp Advances in Iron Prices

The Association of Iron Foundry Masters has increased prices considerably, and to such an extent that the new prices are, in gold, three to four times above pre-war quotations. The advances in prices have already led to a considerable decline in orders in almost all lines, and many firms are working short time. The larger firms, which have contracts extending over a longer period, have so far succeeded in keeping their men employed.

Demand for Siegen iron ore is diminishing and the mines are decreasing production. The Siegerland mills are fairly well employed in sheets and bar iron. Orders at the foundries, the sheet iron and construction works are declining. Some home orders were cancelled and very few foreign orders are booked. Conditions in the Solingen, Altenaer and Lüdenscheid iron industry are not improving. The electrical industry is meeting with a stronger foreign competition. Employment at the dock yards is also slackening. Some firms have dismissed up to 20 per cent of their employees as home and foreign contracts have fallen off considerably. The textile machinery factories are suffering at present under the quietness in the textile industry at home, and are mainly working for export. The automobile industry is expecting a decrease in sales owing to the heavy taxes recently imposed on motor cars and motor cycles.

The Pig Iron Association is now fixing prices in pounds sterling instead of marks, payable in paper marks at the exchange rate on the day of payment. Hematite, steel making iron low in copper, and foundry iron No. 1 and No. 3 are quoted at 122s. 6d. now, Siegerland steel making iron at 135s. and spiegeleisen at 190s. per ton.

Repeated Wage Adjustments

In order to reduce the differences in the industry about wages and salaries, the employers' associations and the trade unions have agreed to a system which is to take into consideration the full depreciation of the purchasing power that is taking place from week to week. The remunerations are to consist of a base wage which is fixed for a period of 4 to 8 weeks and a multiplier which is determined every week by a special committee in each district. The multiplier is determined from the cost of living index and any probable fluctuation is to be judged beforehand in order to compensate for a probable advance during the time till the next pay day. The wholesale price index and the exchange rate of the dollar are to be taken into consideration.

Owing to the catastrophal decline in the exchange the Federal Commissioner for Exports and Imports has given instructions that sales in paper marks to foreign countries require a special export permission now, which is to be granted in exceptional cases only.

As the Reichsbank has lately utterly been unable to provide sufficient paper currency, the scarcity of paper mark notes has become so acute that a large number of firms have printed their own notes in order to be able to pay their workmen. These notes are only valid locally, but as even small firms issued them, they are adding to the currency confusion existing, and the printing of some of them has now been prohibited.

Workmen have succeeded in enforcing the demand for a gold wage. The wage is differently calculated in different industries and districts; but in general is about equal to the pre-war wage. Last week with the dollar at around 4,500,000 marks, Berlin metal workers were drawing 750,000 marks an hour, or 6,000,000 marks a day, whereas until lately wages have seldom exceeded 50 cents a day. The price-rise of the past few weeks has been unprecedented. A fall in mark prices is considered impossible, and a fall in gold prices is highly improbable, because upon any further mark exchange decline wages, freight rates and other factors in costing will be automatically and immediately increased according to the new system of calculating in "gold marks," the real basis of which is the day's dollar quotation.

Convention of Iron and Steel Electrical Engineers

Papers to be read at the convention in Buffalo, next week, of the Association of Iron and Steel Electrical Engineers were listed on page 402 of THE IRON AGE for Aug. 16.

Sessions will be held from Sept. 24 to 28 in the Broadway Auditorium, Buffalo, with the show continuing for the five days, from 9 a. m. to 6 p. m. The grand opening will take place in the Auditorium at 2 p. m., Sept. 24, after the preliminary business session of the morning at 9:30 in the Hotel Statler.

Chicago Iron, Steel and Machinery Men Active in Relief Work

CHICAGO, Sept. 18.—The machinery and the iron and steel divisions of the Chicago Japanese Relief Committee went over the top in Liberty Loan style. The iron and steel division, of which Silas J. Llewellyn, president Interstate Iron & Steel Co., was chairman, collected approximately $25,000. The contributions to the machinery division exceeded that division's quota of $22,500 by 20 per cent. E. P. Welles, president C. H. Besly & Co., Chicago, was chairman of the machinery committee.

One Month's Progress in Reducing Hours

(*Continued from page 751*)

pressed by both the employer and the employees over the passing of the old order.

The district is very fortunate in the make-up of its workmen, as very few foreigners are employed, the men in nearly all of the mills being for the most part long residents of this section of the country, and good, solid, substantial property-owning citizens.

Fair Progress Made at Cleveland Plants

CLEVELAND, Sept. 17.—Fair progress has been made in the establishment of the 8-hr. day in the local steel plants since the inauguration of a shorter day a month ago, but not many merchant blast furnaces have as yet adopted the shorter day. Within the next month the shorter hours will probably be placed in effect by a number of Central Western merchant furnaces. In some of these the men are beginning to show uneasiness because of the delay in reducing their working hours.

The 8-hr. shift has now been adopted in all continuous operation departments of the American Steel & Wire Co., in which the men had been employed 12 hr. Following this change the company reduced from 12 to 10-hr. day men in the wire mills and other departments where men not engaged in continuous operation have been on the 12-hr. basis and advanced their pay, so that, based on the 40c. per hr. rate, they will receive 11 hr. pay, or $4.40 for a 10-hr. day. The McKinney Steel Co. has practically completed changing over from a 12-hr. to an 8-hr. day for continuous operations in its steel plant and River furnaces in Cleveland, but has made no changes as yet in the hours in its blast furnaces at Josephine and Scottdale, Pa., and Charlotte, N. Y. Men who have been working on the 10-hr. schedule in the McKinney plants in Cleveland have been granted a 10 per cent increase in wages.

Pickands, Mather & Co. have placed their Toledo, Ohio, furnaces and Perry furnace at Erie, Pa., on an 8-hr. day for continuous operations. The Stewart Iron Co., Ltd., has placed its Sharon, Pa., stack on an 8-hr. day. After the inauguration of the shorter day for continuous operations, the 10-hr. men at this furnace were dissatisfied because of the increased wage rate of the 8-hr. men and they were also placed on the 8-hr. day and given a 25 per cent increase in their hourly rate.

Several blast furnaces that have not yet adopted the shorter day have had under consideration the wage scale for their 10-hr. men. The late announcement of the Steel Corporation that its 10-hr. men will be paid for 11 hr. at the old rate, or an increase of 10 per cent, helps to clear up this situation, and it is probable that merchant furnaces, when they adopt the 8-hr. day will grant their 10-hr. men the 10 per cent increase.

Opinion among the workmen in the steel plants over the 8-hr. day seems to be somewhat divided. Some look with favor on the change and others would rather work the longer hours because of the increased earnings. Little difficulty has been experienced in securing additional labor necessitated by the shortening of the hours. This is largely due to the increased supply of labor that has resulted from a falling off in outside work with approach of winter and from the labor made available by shutting down of a number of blast furnaces. The announcement of the shorter hours has also attracted to the steel industry common labor that has been employed in other channels.

Workingmen Help in the Youngstown District

YOUNGSTOWN, Sept. 17—Another step in the elimination of the 12-hr. day in the iron and steel industry in this district was taken on Monday when several thousand men, unaffected by previous changes, were put on the shorter shift. With this last change but a small percentage of the 45,000 workmen employed by the industry in the Mahoning Valley are still working 12 hours. These will be changed gradually as more men become available.

The reduction of working hours and adjustment of wage rates as well as tonnage rates has met with the cooperation of the majority of workingmen. It can be stated with authority that what iron and steel property employees in this district now desire most of all is steady employment at satisfactory wages, which will enable them to maintain the American standard of living. They will not be susceptible to the influences of imported labor agitators, and any attempt to further organize the industry at this time would make little headway in his section. Workers have learned from bitter experience that the promises of the professional labor agitator are often more or less unreliable, and that the results to be gained from labor disturbances are sometimes questionable.

There appears for the time being to be an ample supply of men for nearly all needs of the industry. The somewhat extensive suspension af blast furnaces has created an additional supply of workmen for the active departments, and has also proportionately reduced the number of additional men otherwise required for introduction of the shorter work-day. Only in a few scattered cases is the supply of workers inadequate, and this involves mostly specialized skilled workmen.

Therefore, from the standpoint of labor, the situation in this district is very satisfactory. There are no evidences of labor unrest or agitation. Within the past five years, there has been inculcated in the minds of many workers in the industry a different attitude toward the employer. Old suspicions have been dissipated in many cases and the men appear to be more tractable and more disposed to listen to reason. It is felt that the employees' representation plan, as in effect at the plants of the Youngstown Sheet & Tube Co., has been in no small measure responsible for this changed attitude.

While it is true this attitude on the part of many workmen may be due to the fear that conditions are somewhat unsettled and employment may be more or less intermittent, there are those who contend that workers have been educated to the fact that cooperation with the employer will produce the best and most beneficial effects. This changed viewpoint on the part of many intelligent workmen is to be considered as a most significant step forward, and as a means of settling disputes which arise from time to time by conciliation rather than by strikes and walkouts.

On Aug. 16 the men who were affected by reduction in working hours were largely those employed in continuous operations, such as in blast furnaces, open-hearth and byproduct coke departments. Those affected this week are chiefly workers employed in pipe furnaces, tube mills and auxiliary departments and in bar mills.

In some cases, 12-hr. men are being reduced to 8-hr., while in others they are being cut to 10-hr. It is difficult to establish the three-shift plan with the present type of pipe furnace, explains a steel maker, and in consequence it was deemed advisable to establish the 10-hr. workday. Between shifts, it is necessary to make repairs to the bottoms of the furnaces, and to make other adjustments, which always cut into

the actual rolling time. In establishing the 10-hr. day, though, there is an increase in the idle time of the furnaces, with a possible decrease in production.

The Sheet & Tube company has established a 10-hr. day in its tube mills, with six day and five night shifts. This plan has worked to the satisfaction of the management as well as the employees. It is being adopted in similar respects by the Republic Iron & Steel Co. in the same departments.

The Carnegie Steel Co. has been gradually changing its 12-hr. workmen to a shorter day, until there are comparatively few in the Youngstown district who are still working 12 hours.

All men reduced from 12 hours receive an adjustment in wages or tonnage rates. Those who are reduced from 12 hours to 8 hours are paid a rate based on a common labor rate of 50c. per hr., while those changed from 12 hours to 10 hours receive wages on the basis of 44c. per hr. common labor rate. The 10-hr. workmen who had previously worked 10 hr. are paid for 11 hr. Thus where the hours are changed the management and the men divide the cost.

Easier Labor Conditions Help at Chicago

CHICAGO, Sept. 17.—An easier labor situation has made it possible for Chicago district steel producers to eliminate the 12-hr. shift much more rapidly than was anticipated. Some of the independent companies could probably complete the change to the new plan of operations before the close of the current month without difficulty, but they are purposely avoiding hasty measures, believing that safety considerations alone demand that a deliberate course be pursued. There are certain important tasks such as the operation of electric cranes that cannot be safely performed by green men without sufficient training. Notwithstanding the cautious policy of the industry in this district, considerable progress has been made towards the abandonment of the 12-hr. day and it would not be surprising if the change to the new regime is completed in the steel plants some time in October or November. The Inland Steel Co., for example, is now operating its blast furnace, coke oven and open-hearth departments on a three-shift basis and is organizing a third shift for its blooming mill department. Merchant blast furnaces in this territory, however, have not yet proceeded very far with the change in operations. Employees in the plants where the long day has been abandoned seem well satisfied, although there is no doubt that foreign white labor would prefer to work additional hours to obtain a larger day's wage. As a matter of fact, however, the organization of extra shifts has resulted in numerous promotions so that many men are earning as much and, in some instances, more per day than under the old scheme.

One of the difficulties of the present labor situation is the fact that mills must still depend to a large extent on negroes and Mexicans for common labor. According to operating officials, it takes at least three negroes to do the work of two white men. This is not due to the physical weakness of the negro, but the fact that he cannot be depended upon to work steadily. In the words of one mill officer, the negro will not work unless he is "broke." The Mexicans are absent from their work less frequently, but this is because they are always in debt. Their bent for gambling is even more pronounced than that of the negro and the result is that they are continuously without funds. The Mexican is apparently less able to stand hard physical exertion than the negro, however, and will not stay on a job unless he is permitted to rest periodically. While the mills make no attempt to conceal their preference for white labor, it is unlikely that they will be able to replace the Mexicans and negroes this winter. Although the labor situation in this district is easier, the first effect has been the sifting out of the less desirable men from the higher paid occupations. Foundries, for example, are finding it possible to discharge their negro help and replace it with white labor. The negro who finds that he cannot hold a semi-skilled job naturally seeks employment as a common laborer.

Moving Slowly at Buffalo

BUFFALO, Sept. 17.—Elimination of the 12-hr day in blast furnace and steel mill operation in this district is progressing slowly. Only one mill expects to have the new plan in full operation before Oct. 15. With reference to other furnaces and mills it will likely be Jan. 1 before schedules are worked out to the point that the 12-hr. shift can be abandoned.

Rogers, Brown & Co. have accomplished satisfactory steps to date and state that progress has been made without the addition of employees. To what extent the new schedule will require a larger force is yet to be determined.

The Lackawanna mills of the Bethlehem Steel Co. are working out new schedules and in conference with committees of plant representatives. Under the plan now under consideration, a maximum of 10 hours will be adopted. Both Mexican and negro forces are now employed in considerable number and are giving fairly satisfactory service.

Reduced blast furnace operation due to a slackening of demand, has reduced to a large extent the need of additional labor. The fact that little actual work is required of blast furnace laborers between blasts, and that elimination of the long day will reduce earnings, causes a question with the men as to whether or not they want any change in working schedules that would tend to reduce daily earnings.

Production Maintained in the Youngstown District

YOUNGSTOWN, Sept. 18.—Steel ingot production in the Mahoning Valley is being maintained at 85 per cent and there appears to be a more hopeful outlook in the pig iron market. The Struthers Furnace Co., operating a merchant stack in this district, is preparing to start the unit some time between Oct. 1 and 15. It was suspended owing to the stagnation in the iron market.

Operations in finishing iron and steel departments are holding up well. This week the Youngstown Sheet & Tube Co. is operating 21 sheet mills, and is planning resumption of its Empire plant at Niles. The Trumbull Steel Co. is operating its plant at Warren at a normal rate, with exception of four idle tin mills.

Of the 66 open-hearth furnaces in the Mahoning Valley, 56 are melting, while all Bessemer departments are in commission. The lowest steel-making rate at any plant is 80 per cent.

Of the 117 sheet and jobbing mills in the Valley, 80 were scheduled at the beginning of the week, a gain of two as compared with the previous week. Pipe mill departments are running close to normal.

The passenger steamer Greater Detroit, which is being built at the Lorain, Ohio, yards of the American Ship Building Co. for the Detroit & Cleveland Navigation Co., was launched Sept. 15. This boat is 550 ft. long, being about 50 ft. longer than the Seeandbee, at present the largest passenger boat on the Great Lakes. A sister ship, the Greater Buffalo, will be launched in October. Both vessels will be used on the Buffalo-Detroit route.

By the use of oil fuel in place of coal the steamship Mauretania has replaced 400 stokers by a fire room crew of 60. In the British Navy the change in the past nine years has been from 45 per cent oil burning to 90 per cent.

Iron and Steel Markets

CONSUMER WELL COVERED

Large Buying in Spring Months Reached Well Forward

Production Shows Further Contraction, With Price Trend in Buyers' Favor

The week has been a quiet one in all departments of the steel market. Consumers are getting such good service from both railroads and mills that deliveries of material bought in the first and second quarters of the year are sufficient for the needs of most of them. Meanwhile production both of pig iron and steel shows a further slight reduction. While prices of the major finished products are generally unchanged, the evident tendency is in the buyer's favor.

The extent to which many consumers provided for their wants in the strong buying movement of last spring appears from a canvass just made in Eastern territory by an independent steel company. About half the buyers who replied were covered for the remainder of the year. The other half expected to place further orders, but not immediately.

Among blast furnaces just blown out are one each in southern Ohio, Alabama and the Chicago district. Three at Cleveland, one at Erie, Pa., and two in the Shenango Valley will stop in the near future.

In the early inquiries for steel for Japan from New York export houses there were duplications. The Japanese Government is now moving to prevent speculation, and meanwhile warehouse stocks of nails, wire, sheets and pipe in China, Dutch East Indies, the Philippines and on the Pacific Coast are being taken up. Considerable orders are expected for replacing these stocks, and later a good demand for steel for the work of rebuilding.

London reports strong demand from Japan for thin galvanized sheets and British works are well sold out at advancing prices. Far Eastern buying of British black sheets continues also, and the works are booked until February-March.

Chicago mills, which until recent weeks were much congested, are now giving such service that Ohio and Pittsburgh mills are less able to get orders in that market on the score of better delivery.

Eastern plate mills show more marked effects of the shrinkage in new business. With one exception they have come to a 50 per cent operation and Eastern plates can be had at 2.40c., Pittsburgh, a concession of $2 per ton.

The semi-finished steel market has weakened, as indicated by a $40 price on a round lot of sheet bars at Youngstown, against $42.50 recently. A sale of several thousand tons of slabs was made at less than $42.50, Youngstown.

At Buffalo 2.40c., Pittsburgh, has been done on structural shapes, or $2 a ton below the common market. An Eastern mill which has sold at 2.40c. has gone to 2.35c.

With some 29,000 tons of fabricated steel and over 19,000 tons of new inquiries, the past week's business equalled that for the previous fortnight. So far September buying is practically up to the scale of August, which was 10 per cent better than July. New schools in New York were a large part of the week's awards.

Southern pig iron has shown marked weakness and some good sized sales have been made as low as $21, Birmingham, on which basis sales could be made as far north as Chicago. Furnaces making the lowest quotations later advanced, but iron is still obtainable at $22, Birmingham. In some centers in the North inquiry has been fair, with increased interest in deliveries for the first quarter of next year, but sales have not been large and prices are for the most part untested. Pipe works have bought a round tonnage of Southern iron, and at Philadelphia last week 4200 tons of British iron came in, most of it going to a pipe foundry.

It is evident that in New England, as elsewhere, some large buyers have pig iron stocks that will carry them through the year.

Blast furnace shutdowns, with attendant stopping of coke shipments, have been in such numbers as to cause heavy offerings of coke. Standard furnace grade has sold at $4.25, a reduction of 25 cents, bringing the market back where it was prior to the anthracite strike. The prospect of lighter industrial demand later in the year is seen also in lower prices for soft coal.

For the ninth consecutive week THE IRON AGE composite price for finished steel stands at 2.775c. per lb. It has not differed by more than 2 per cent from that figure in the past six months.

At $25.04, THE IRON AGE pig iron composite price is at the level of Aug. 7 and 14—the lowest for more than a year. One year ago it was $32.54, the highest since 1920.

Pittsburgh

Prompt Deliveries an Important Factor—Blast Furnaces Blowing Out

PITTSBURGH, Sept. 18.—Consumers of steel still are letting the railroads and the steel mills act in a warehouse capacity. The railroads are functioning so well and the mills are operating so smoothly that there is nothing to interfere with very prompt deliveries and consumers feel perfectly safe in going along with much smaller inventories than they would if there were any serious doubt about future supplies. That is one reason why there continues to be a marked absence of forward buying. Another is the belief that if prices are not going down in the near future, the possibility of an advance is even more remote. This sort of a demand means that mill backlogs are being steadily reduced

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 18, 1923	Sept. 11, 1923	Aug. 21, 1923	Sept. 19, 1922
No. 2X, Philadelphia‡	$26.26	$26.26	$25.76	$34.26
No. 2, Valley furnace†	25.00	25.00	25.00	36.50
No. 2, Southern, Cin'ti†	*26.65*	27.55	27.55	31.05
No. 2, Birmingham, Ala.†	*22.00*	23.50	24.00	25.00
No. 2 foundry, Chicago*‡	27.00	27.00	27.00	32.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	31.00
Basic, Valley furnace	25.00	25.00	25.00	34.00
Valley Bessemer, del P'gh	28.26	28.26	28.26	35.77
Malleable, Chicago*	27.00	27.00	27.00	32.00
Malleable, Valley	24.50	24.50	24.50	34.00
Gray forge, Pittsburgh	25.76	25.76	25.76	37.77
L. S. charcoal, Chicago	32.15	32.15	32.15	36.15
Ferromanganese, furnace	*110.00*	112.15	117.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	40.00
Forging billets, base, P'gh	47.50	47.50	47.50	45.00
O.-h. billets, Phila	47.67	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	47.50
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.15	2.15	2.25	2.25

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.575
Iron bars, Chicago	2.40	2.40	2.40	2.25
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.60	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.25
Tank plates, Chicago	2.60	2.60	2.80	2.30
Tank plates, New York	2.84	2.84	2.84	2.49
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.70	2.20
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Sept. 18, 1923 Cents	Sept. 11, 1923 Cents	Aug. 21, 1923 Cents	Sept. 19, 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.35
Sheets blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.60
Plain wire, Pittsburgh	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.15
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.00	$20.00	$19.50	$24.50
Carwheels, Philadelphia	21.00	21.00	20.00	23.00
Heavy steel scrap, P'gh	18.00	18.00	18.00	21.00
Heavy steel scrap, Phila.	*16.50*	17.00	16.00	18.00
Heavy steel scrap, Ch'go.	*16.25*	16.50	16.00	18.00
No. 1 cast, Pittsburgh	22.00	22.00	21.50	24.00
No. 1 cast, Philadelphia	21.50	21.50	20.00	23.00
No. 1 cast, Ch'go (net ton)	20.00	20.00	17.50	21.00
No. 1 RR. wrot. Phila.	**20.00**	19.00	18.00	22.00
No. 1 RR. wrot. Ch'go(net)	*15.50*	16.00	14.00	17.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$4.25*	$4.50	$4.50	$11.50
Foundry coke, prompt	*5.25*	5.76	5.50	12.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*14.00*	14.12½	14.25	14.12½
Electrolytic copper, refinery	*13.37½*	13.62½	13.75	13.75
Zinc, St. Louis	*6.45*	6.55	6.45	6.65
Zinc, New York	*6.80*	6.90	6.80	7.00
Lead, St. Louis	**6.80**	6.72½	6.45	5.90
Lead, New York	**7.12½**	7.00	6.70	6.25
Tin (Straits), New York	*41.50*	42.12½	39.37½	32.12½
Antimony (Asiatic), N. Y.	7.50	7.50	7.62½	6.75

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Sept. 18, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Sept. 11, 1923,	2.775c.
Aug. 21, 1923,	2.775c.
Sept. 19, 1922,	2.419c.
10-year pre-war average,	1.689c.

Composite Price, Sept. 18, 1923, Pig Iron, $25.04 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 11, 1923,	$25.29
Aug. 21, 1923,	25.29
Sept. 19, 1922,	32.54
10-year pre-war average,	15.72

and, while that does not necessarily portend an early scramble for new business with attendant cutting of prices, it undoubtedly shows a further curtailment of production.

There has not yet been a very heavy loss of ingot production, but as an indication of how the future is viewed in the industry the continued suspension of blast furnaces is significant. October, on account of atmospheric conditions, usually is a favorable month for production and, if market conditions are right, the effort is made to keep the furnaces going. In the near future the Perry furnace, Erie, Pa., one furnace of the Otis Steel Co., Cleveland, and two furnaces of the McKinney Steel Co., Cleveland, are to be blown out while blowing out of the Claire furnace, Sharpsville, Pa., and the banking of one of the Shenango Furnace Co. stacks at Sharpsville, Pa., are early probabilities. The heavy tonnage products—bars, plates and shapes—show very little life in respect to new orders. The sheet market reflects mixed conditions, with some users specifying well and others able to get along on the tonnage still due on old orders. Tin plate and standard pipe show up well in the specifications and orders. Wire products are slow; indeed, the big drop last month in the unfilled orders of the Steel Corporation is said to have been in part ascribable to the reduced rate of new orders of the wire making subsidiary. No real weakness in prices yet has cropped out, but the market is rather in buyers' favor on black sheets, light rails, hot-rolled flats and most of the bar products.

In semi-finished steel $42.50 is now regarded by some buyers in the light of a premium price for prompt deliveries. A slightly better inquiry for pig iron is not productive of firmer prices, because stocks are heavy and buyers are doing little forward buying. The coke market is affected by blast furnace suspensions. Dealers with scrap to sell are experiencing much trouble in uncovering an outlet.

Pig Iron.—In the matter of sales the past week has been a very quiet one in this market. The largest individual sales reported were two lots of 500 tons of Bessemer iron; one to the Union Steel Casting Co., Pittsburgh, was at $26, Johnstown. The freight from Johnstown being the same as that from the Valley, this business was 50c. a ton below the Valley base.

The Sterling Steel Foundry Co., Braddock, Pa., also was a buyer of 500 tons of Bessemer iron, paying $26.50, Valley furnace, and this sale preserved that figure as the Valley quotation. The Central Steel Co., Massillon, Ohio, is reported to have closed for 10,000 tons of basic iron with a Cleveland furnace interest with which it is allied, at $25, Valley furnace basis. No sales of consequence of basic grade have been made to Pittsburgh district melters in the past week, although there have been unconfirmed reports that the Allegheny Steel Co. has been buying small tonnages. Sales of foundry iron have been small again the past week, but considerable tonnage is pending and likely to be closed before the end of the week. The Standard Sanitary Mfg. Co., contrary to its usual practice of buying its requirements for three months at one time, is in the market for merely its October supplies for its local plant, which amount to about 2000 tons. The Westinghouse Electric & Mfg. Co. has not yet closed for approximately 7000 tons of foundry iron for its local and Cleveland foundries. The Conemaugh Iron Works, Blairsville, Pa., is in the market for 250 tons of foundry iron for the last quarter shipment. We make no change in quotations of the several grades this week, but it would be some exaggeration to describe the market as more than steady. Estimates are current that, including the steel company surpluses, stocks of iron on furnace yards in this and nearby districts are between 400,000 and 500,000 tons. This probably explains the inclination on the part of most buyers to confine their purchases close to actual requirements, presumably in the hope that the need of funds may force price concessions.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.00 to 24.50
No. 2 foundry	25.00
No. 3 foundry	24.00 to 24.50
Malleable	24.50 to 25.50
Low phosphorus, copper free	31.00 to 31.50

Ferroalloys.—Producers and importers of ferromanganese are making pretty strong efforts to interest consumers in supplies without much success. As low as $110, Atlantic seaboard, is being quoted, but even that price, which represents a further recession of $2.50 a ton, does not appeal to buyers, most of whom are well covered against their nearby requirements and are not yet satisfied that prices are as low as they are going to be. There is a quotation of $112.50 for small tonnages for prompt delivery, but we note no sales at that figure. The only recent sale of spiegeleisen involved 300 tons at $45 furnace for 19 to 21 per cent material for delivery over the remainder of the year. Prices are given on page 789.

Semi-Finished Steel.—If prices have a definite tendency, it is downward. While such business as has been done in billets, slabs and sheet bars has been at $42.50, the sales in most cases have been for very prompt delivery and, representing a pressing requirement, the advantage has been with the seller. The United Alloy Steel Co., Canton, Ohio, recently bought 1000 tons of sheet bars for delivery in one week at that price, and a Youngstown district steel company in the past week bought from a Pittsburgh maker between 4000 and 5000 tons of tin bar at $42.50, Youngstown. The only fourth quarter business which has been done here involves 25,000 to 30,000 tons of billets and slabs, also at $42.50, but with business in finished products on a moderate scale, interest in tonnages of semi-finished steel for the last quarter is limited and there is a feeling that lower prices are ahead, notwithstanding increased costs incident to the elimination of the 12-hr. day and the increases in wages. The market does not show much activity in forging billets or skelp and the only activity in rods seems to be in the shape of inquiries from exporters having Japanese connections. Prices are given on page 789.

Wire Products.—Recent improvement in orders for woven wire fence, it now develops, was a result of the fact that manufacturers recently inaugurated spring datings on business in this product. Business in wire products generally shows no appreciable increase and while new orders are fair in number, they fall far short of making good completed business. Jobbers are believed to have fairly generous stocks and there being no indication of higher prices in the near future, they are showing little inclination to anticipate their requirements. All makers in this district claim to be holding firmly at the quoted prices, but it is admitted that some business has been lost in nails on a quotation of $3 base per keg, and reports from the Middle West indicate some deviation from quotations. Very prompt delivery now is promised on all products except possibly manufacturers' wire and bale ties. Prices are given on page 788.

Steel Rails.—The local rail making subsidiary of the Steel Corporation now is busy lining up specifications for 1924 tonnages of standard rails and already has booked practically full rollings for the first half of the year. The market still is irregular on light rails. The two larger producers insist that the price is 2.25c. base and that orders are being taken at that figure. But there have also been sales at 2.15c. base for billet rails and on orders of a desirable character it is doubtful whether more now is obtainable. Rerolled rails still are quoted at around 2c. base. General demand for light sections is moderate.

We quote light rails rolled from new steel at 2.15c. to 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Hot-Rolled Flats.—Demand upon the mills are not gaining much either in number or volume. Buyers not only do not expect higher price but actually seem to believe they will buy cheaper by waiting and their current purchases are governed accordingly. The prevailing quotation is 3.15c., base, for hoops, bands and strips, but on the latter product there are fairly frequent concessions, particularly in the wide sizes and on rim stock, which is generally quoted at 3c., base, and there still are some mills which want business badly enough to go as low as 2.90c. The full range of prices is given on page 788.

Iron and Steel Bars.—New business in steel bars is very light, but on such orders as are being placed there is no deviation from the regular base of 2.40c., Pittsburgh. Contract buyers are specifying fairly freely, particularly on old ore orders carrying prices well below today's level. It is said that invoice prices on current shipments do not average above 2.25c. Iron bars are dull, but prices are well maintained.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Alloy Steel Bars.—The report that prices of these bars recently had been reduced $5 to $10 per ton appears to be a belated chronicling of an old event. Prices reached their present levels about two months ago as shown by IRON AGE quotations and there has since been no change.

Structural Material.—Mills in this territory are holding firmly to 2.50c. for large structural shapes, although new business falls considerably short of making good completed orders. A building permit has been granted the Smithfield Methodist Episcopal Church for a church and office building at Smithfield Street and Seventh Avenue, Pittsburgh. Bids for this building will be asked for in November. Other important structural projects in this district still are dormant. Plain material prices are given on page 788.

Plates.—New business is on a dwindling scale, and it is probable that several of the independent makers soon will have to have additional orders to maintain mill schedules. About 2300 tons of steel, mostly plates, will be wanted for 19 steel barges for the U. S. Engineers, Louisville, Ky., district on which the American Bridge Co. is low bidder. Prices are given on page 788.

Sheets.—General business is somewhat heavier than it was last month, but the market is far from active, this being notably true on black sheets, orders for which are needed by a number of independent mills.

A number of inquiries have been current for tonnages of No. 30 gage black sheets for shipments to Japan, but actual orders are few. Domestic business is somewhat spotty, some consumers having enough tonnage due them on old contracts to meet their probable requirements over the remainder of the year, while others, notably those serving the automotive industry, find it necessary to make fresh purchases. The leading interest is believed to have enough business to run at its present rate of operation, about 80 percent, for the remainder of the year. Independent companies generally are not as well off. Prices show no particular change except that public quotations of less than 3.85c. base for black sheets have pretty well disappeared and a price of 3.75c. base now is developed only by definite offers. Prices are given on page 788.

Tin Plate.—Open market activity is lacking, but consumers are specifying freely on contract and little or no tonnage is becoming available for spot delivery. The price of $5.50 per base box, Pittsburgh, is a fixture.

Bolts, Nuts and Rivets.—Buyers still are working on the old price lists and extras and the changes recently made can hardly become effective before Oct. 1. Bolts still are obtainable at 60 and 10 per cent off list for large machine bolts on the old price lists, and buyers do not appear to be very anxious to contract for rivets at $3 base, plus the new extras. Buyers seem to be looking for further increases in the bolt and nut discounts and for lower base prices on rivets. Prices and discounts are given on page 788.

Cold-Finished Steel Bars and Shafting.—There is a fair run of new orders, which occasionally involve good-sized tonnages, but all makers could handle more business than they are getting. Old orders are melting away pretty rapidly because of the excess of shipments over incoming orders, but as yet the need of business has not become urgent enough to lead to important price concessions. Higher prices are not expected by buyers and they are accordingly keeping purchases closely in line with known requirements. Based on the current price of hot-rolled bars, cold-finished bars should be higher in the preservation of the usual differential; that they are not is probably explained by the fact that little of the tonnage coming in and in process carries either today's quotation, or the extra for cold-finishing quality, having been ordered before the extra became effective. Local mills are quoting 3.25c., base, and disclaim any disposition to meet lower prices reported in the Middle West. Ground shafting still is quoted at 3.65c., base, f.o.b. mill, for carload lots.

Cold-Rolled Strips.—Business could be better with most makers, but a belief that orders will come out quite as well at firm prices as they would at concessions prompts a firm stand at 5c., base, Pittsburgh.

Track Fastenings.—Leading local makers deny having gone as low as 3.15c., base, for small spikes, at which most of the recent business in the anthracite coal mining district is reported to have gone. It is believed here that this price was made by Eastern makers. The local experience is that both large and small spikes are in better demand than they were recently. Prices are given on page 788.

Tubular Goods.—Makers of steel pipe in this district note no let-up in the pressure of buyers for shipments against old orders for standard pipe and also observe that in the face of practically full production of this class of goods, they are unable to keep their customers satisfied. Shipments of lap-welded pipe are still heavy. New business reflects the unsettled conditions of the oil market due to overproduction. Pipe men say that until there is some curtailment of production of oil in California, the outlook for the industry and incidentally the demand for oil country pipe cannot improve much. So many of the California wells are of the gusher type and oil is produced so cheaply there that the temptation to drill new wells will be strong until operators begin to bring in wells which have to be pumped. Shipments on old orders for boiler tubes still are running well in excess of new business. Discounts are given on page 788.

Coke and Coal.—Blast furnace suspensions, with the attendant stopping of coke shipments, are so frequent that coke production cannot be curtailed rapidly enough and the result is that offerings are very heavy and prices have declined further. Today's range on standard furnace grade for prompt shipment was $4.25 to $4.50 per net ton at oven, a decline of 25c. a ton from last week's level, and putting the market back where it was just prior to the advance brought on by the strike of the anthracite coal miners. Fourth quarter contract prices also have eased off about 25c. a ton, the most recent business of this sort having been at $4.75. The market also was weaker on foundry coke, which now is priced at from $5.25 to $5.50 as against $5.75 to $6.50 a week ago. The coal market reflects the fact that there will be no unusual demand for soft coal as a substitute for hard coal and the prospect of lighter industrial demands over the remainder of the year. Mine run steam coal now is quotable at from $1.85 to $2.25 per net ton at mines, gas coal $2.40 to $2.50, and coking grade $2 to $2.50. Slack coal takes a range of from $1.25 to $1.50, and lump coal $2.50 to $3.

Old Material.—Bethlehem Steel Co. was a recent buyer of a round tonnage of heavy melting steel at $18.50, Johnstown. This business is all there is to sustain the recent range on this grade, as there is no interest on the part of local melters in this or any other grade and it is believed that lower prices are immediately ahead, since besides the lack of demand, some of the dealers who took the bullish side of the market recently in expectation of better business, now find themselves "long" of the market and are having much trouble in locating an outlet. There have been no sales of heavy melting grade to the mills at above $18.50 in the past three or four weeks, except one lot of strictly railroad heavy melting steel to one of the Steel Corporation subsidiaries, which brought $19. Dealers a few weeks ago paid $19 or more and now are wondering where to sell their purchases. The market is fairly well sustained on foundry grades, but as a whole is very quiet and gives signs of going lower, especially if some of the dealers long of the market get panicky.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$18.00 to $18.50
No. 1 cast, cupola size	22.00 to 22.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 20.00
Compressed sheet steel	16.00 to 16.50
Bundles, sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	22.50 to 23.00
Railroad coil and leaf springs	22.50 to 23.00
Low phosphorus bloom and billet ends	24.50 to 25.00
Low phosphorus plate and other material	23.50 to 24.00
Railroad malleable	21.00 to 21.50
Steel car axles	21.50 to 22.00
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	22.50 to 23.00
Machine shop turnings	13.00 to 13.50
Sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	19.00 to 19.50
Stove plate	15.50 to 16.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	18.00 to 18.50

Crane Orders at Chicago

CHICAGO, Sept. 18.—The Milwaukee Electric Crane & Mfg. Co. has booked the following orders: Eight 40-ft., 6-ton electric traveling cranes for the Elgin, Joliet & Eastern Railroad; one 25-ton, 60-ft. span gantry crane for A. Finkl & Sons Co., Chicago; one 10-ton, 5-motor, 89-ft. crane and one 10-ton, 5-motor, 50-ft. crane for Joseph T. Ryerson & Son, Chicago.

A competitive examination for associate mechanical engineer and assistant optical engineer to fill vacancies in the ordnance department at Frankford Arsenal, Philadelphia, have been announced by the United States Civil Service Commission, Washington, to which application should be made prior to Oct. 23.

Chicago

Decided Drop in Southern Pig Iron—New Steel Orders Limited

CHICAGO, Sept. 18.—The market is quiet in all departments and new business in finished steel booked during the week is the smallest taken for a considerable period. Deliveries from local mills are steadily improving and producers east of here are finding it increasingly difficult to obtain orders on the score of better service. Chicago prices, however, are still firm, indicating that mills are not alarmed by the current lull in buying.

Operations in this district have again been slightly reduced, a blast furnace of the Illinois Steel Co. at South Chicago having been blown out for repairs. That company now has 23 active stacks out of 27 steel works furnaces and its ingot production is approximately 90 per cent of capacity. The Inland Steel Co. remains on a 75 to 80 per cent basis.

Pig Iron.—The chief development in the market has been increasing competition from outside furnaces, particularly Southern producers. At least two Southern furnaces have taken business at from $21 to $21.50, base, Birmingham, thereby meeting delivered prices from Northern stacks. One of these producers is said to have withdrawn from the market after booking considerable tonnage. Lake Erie furnaces also continue to be factors at nearby points. An order for 2000 tons of malleable for a plant on the west coast of Michigan was lost to a Lake Erie stack notwithstanding a marked freight advantage in favor of Chicago producers. A Wisconsin melter has closed for 3500 tons of foundry for October delivery, having divided the order between a nearby furnace and a Southern producer. A local user has closed for 800 tons of Northern foundry and another Chicago melter has placed an order for 1000 tons of Southern. A South Bend melter is inquiring for 1000 tons of No. 1 foundry for October shipment. A Wisconsin buyer has closed for 200 tons of foundry for delivery in 30 days. Two 100-ton sales of 7 per cent silvery have been negotiated at the full market. Charcoal and low phosphorus are inactive. On the whole, melters still hesitate to cover their needs for any distance ahead and most purchases are for 30 to 60 days shipment. Northern prices continue steady at $27, base, Chicago furnace, although Wisconsin users are still able to buy from stacks in their own State at $27, base, furnace, instead of f.o.b., Chicago.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00
Malleable, not over 2.25 sil.	27.00
Basic	27.00
High phosphorus	27.00
Southern No. 2	27.01 to 28.01
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 35.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—Following sales of a considerable tonnage of ferromanganese at $112.50, seaboard, the market has suffered another decline and a number of small orders have been taken at $110, seaboard.

We quote 80 per cent ferromanganese, $117.56 to $118.38, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $50.89, delivered.

Plates.—With demand light and prices unchanged, the market is without features. Shipments from local mills are heavy and producers East of here are finding it increasingly difficult to obtain business in this district on the strength of deliveries. No oil storage tank awards are reported, but two prospective projects in the Southwest involve a total of 2000 tons of plates. Railroad car buying is at a low ebb.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—Portsmouth, Ohio, has placed 900 tons with the National Cast Iron Pipe Co. St. Paul has divided 425 tons between the National Cast Iron Pipe Co. and the Glamorgan Pipe & Foundry Co. The American Cast Iron Pipe Co. will furnish 700 tons for Lincoln Park, Mich. Lake County, Ohio, rejected bids on 1200 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Sheets.—Independent mills in this district have not yet taken any business for Japan, being unable to make the prompt deliveries asked for. They expect to be called upon, however, for tonnage for later shipment. The first effect of the earthquake was the absorption of warehouse stocks in China, the Dutch East Indies, the Philippines and the Pacific Coast. Inquiries for the replacement of these supplies are already making their appearance. The feverish haste with which Japanese importers entered the market following the disaster undoubtedly resulted in considerable duplication of inquiries, and it is therefore difficult to estimate the tonnage which will actually be bought for rehabilitation purposes. In the meantime, domestic inquiry for sheets continues to lag, with black sheets weak and galvanized and blue annealed fairly steady.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Bolts and Nuts.—Manufacturing users and jobbers continue to specify liberally to get the benefit of the old list prices. At the same time, a considerable number of fourth quarter contracts are now being closed on the basis of the new lists. Even the farm implement makers, whose operations have been sharply curtailed, are showing interest in their fourth quarter requirements. Discounts remain unchanged and are shown on page 788. In this district the discounts are on a f.o.b. Chicago basis.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—The Great Northern has placed 3000 tons of rails with Chicago mills and 2000 tons with the Bethlehem Steel Co. It also ordered 3000 tons of tie plates from the Bethlehem company and 2000 tons from a Chicago producer. The Minneapolis & St. Louis, which, because of its financial situation, had held up shipments of rails, has been ordered by its receiver to specify the remaining 2000 tons still undelivered against its contract. Current inquiries for angle bars aggregate 2000 tons.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—New structural business is in reduced volume, but fabricators are still well booked and are not yet much concerned about getting additional orders. Mills are booking comparatively little new tonnage in plain material.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Pacific Coast stocks of nails have been absorbed by Japanese importers and inquiries for replacements are now current. No estimates of Japanese purchases up to date are available here, but the tonnage bought undoubtedly bulks large. So far as domestic demand for wire products is concerned, there is no scramble to get orders on the books such as obtained earlier in the year. Inquiries are improving,

however, and specifications are fair. Fall demand for barbed wire is commencing to be felt and new business in fencing is in encouraging volume. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 788.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Reinforcing Bars.—The aggregate volume of new business is declining, although a considerable number of projects involving more than 100 tons have been let or are active. Competition for tonnage is growing keener and some price concessions are reported, although they are still of an exceptional character. Lettings include:

Buena Vista apartment building, Chicago, 400 tons to Joseph T. Ryerson & Son.

John Marshall High School building, Minneapolis, Minn., 600 tons to Concrete Steel Co.

Gimbel Bros. store addition, Milwaukee, 300 tons to Concrete Steel Co.

Dock for Illinois Central Railroad, New Orleans, 300 tons to Kalman Steel Co.

Kentucky highway work, 200 tons to Corrugated Bar Co.

Illinois highway work, 150 tons to Concrete Steel Co.

Reis Furniture Co. building, South Bend, Ind., 100 tons to Kalman Steel Co.

Lincoln School building, St. Louis, 100 tons to Concrete Steel Co.

Foundations for Milwaukee Journal building, Milwaukee, 100 tons to Corrugated Bar Co.

Alvernia High School building, Chicago, 325 tons to Kalman Steel Co.

School building, Winfield, Iowa, 110 tons to Concrete Steel Co.

Illinois highway work, 100 tons to Kalman Steel Co.

Kelvinator Corporation plant, Detroit, 100 tons to McRae Steel Co.

Pending business includes:

Wharf, Houston, Tex., 2000 tons, general contract awarded to Doullut & Williams, New Orleans.

Chicago, Burlington & Quincy freight house, Chicago, 900 tons, general contract awarded to Blome-Sinek Co., Chicago.

Club house for Olympia Fields Golf Club near Chicago, 200 tons, general contract awarded to Dahl-Stedman Co., Chicago.

Commonwealth Edison Co., Crawford Avenue station, 450 tons, general contract to George A. Fuller Co., Chicago.

State Teachers College building, Winona, Minn., 300 tons.

Warehouse Prices.—Local jobbers have advanced cone head steel boiler rivets $2 a ton to $4.20 per 100 lb.

Bars.—The bar market is quiet, but the price situation is unchanged. Soft steel bars remain firm at 2.50c. Chicago. Hard steel bar makers continue to hold to 2.30c. mill, although two important plants were forced to shut down because of lack of business. Bar iron prices show greater variation, ranging from 2.35c. Chicago, to 2.50c. The ruling market, however, is 2.40c.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Hard cold-rolled strip steel 1/10 in. thick and heavier has been advanced 10 cents per 100 lb. to $7.90 for orders of 2000 lb. and over. Cold-rolled flat wire, 1 in. and wider by 1/10 in. and heavier has been advanced 20c. to $8.25 per 100 lb. for lots of 2000 lb. and over.

Old Material.—The trend of the market is mixed with foundry grades higher and other classes of scrap unchanged or lower. Consumer buying of cast grades has been liberal recently, but the largest individual user has now withdrawn from the market. A rolling mill has placed liberal orders for wrought, but at lower prices. Otherwise the situation has been quiet among both users and dealers. Brokers are no longer buying long in anticipation of rising prices. Railroad lists include the Rock Island, 3800 tons; the Chesapeake & Ohio, 5000 tons, and the Soo line, 500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$21.50 to $22.00
Cast iron car wheels	20.00 to 20.50
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	21.00 to 21.50
Rails for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	20.50 to 21.00
Heavy melting steel	16.25 to 16.75
Frogs, switches and guards cut apart	16.75 to 17.25
Shoveling steel	16.00 to 16.50
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheets	13.00 to 13.50
Axle turnings	13.50 to 14.00
Steel angle bars	18.50 to 19.00
Per Net Ton	
Iron angle and splice bars	22.50 to 23.00
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	25.50 to 26.00
Steel car axles	18.50 to 19.00
No. 1 busheling	13.50 to 14.00
No. 2 busheling	10.00 to 10.50
Cut forge	15.00 to 15.50
Pipes and flues	10.50 to 11.00
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	15.00 to 15.50
Steel knuckles and couplers	19.00 to 19.50
Coil springs	20.00 to 20.50
No. 1 machinery cast	20.00 to 20.50
No. 1 railroad cast	19.50 to 20.00
No. 1 agricultural cast	19.50 to 20.00
Low phos. punchings	17.50 to 18.00
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	9.00 to 9.50
Cast borings	11.00 to 11.50
Short shoveling turnings	11.00 to 11.50
Stove plate	17.00 to 17.50
Grate bars	15.00 to 16.00
Brake shoes	15.50 to 16.00
Railroad malleable	19.50 to 20.00
Agricultural malleable	17.50 to 18.00

October Meeting of American Iron and Steel Institute

The next meeting of the American Iron and Steel Institute will be held Thursday, Oct. 25, a day earlier than usual, in order to permit members to leave on a midnight train after the banquet to visit the Aberdeen Proving Grounds. A special train of Pullman sleeping cars will leave the Pennsylvania station, New York, at midnight Oct. 25, and will run direct to the Aberdeen Proving Grounds, arriving in time for breakfast. This train will leave the Aberdeen Proving Grounds about 8 p. m., Oct. 26, and will arrive at the Pennsylvania Station, New York, about midnight. Further details as to the trip will be announced later.

Operations of Newton Steel Co.

YOUNGSTOWN, Sept. 18.—Three new sheet mills which are being built by the Newton Steel Co. at its plant in Newton Falls, Trumbull County, will be completed and placed in operation by Oct. 1, states President E. F. Clarke. This will give the company a total complement of 20.

"Business is not so good as last spring," said Mr. Clarke, "but enough tonnage is coming through to enable us to operate all 20 of our mills."

The company is a substantial producer of full finished sheets for the automobile trade.

Directors have declared a common dividend of 60c. and preferred dividend of $1.75 for the third quarter, both payable Oct. 1 to holders of record Sept. 20. The common payment is unchanged from the previous quarter.

The decline in construction volume which began in June continued through August, according to F. W. Dodge Corporation. The August drop from July was 5 per cent.

New York

Southern Iron Sells at Low Prices—Fair Inquiry for Northern Iron

NEW YORK, Sept. 18.—A number of reports in regard to large transactions in Southern pig iron have been current the past few days. One, which seems to be well founded, is that Southern iron has sold at $21.50, the tonnage being between 5000 and 10,000, and it is understood that the company selling the iron has advanced to $24. Another report is that an important cast iron pipe company has purchased a large tonnage. This has not been confirmed. The Southern market seems to be very weak with $23 as the present prevailing quotation. In the New York district the pending inquiries amount to about 12,000 tons, including 5000 tons for the Richardson & Boynton Co., of which 1000 is for delivery this year and the remainder for the first quarter of next year; 2500 tons for the Crane Co., Bridgeport, for delivery the next two months; 700 tons of various grades for the New York Central; 2000 tons for the New York Air Brake Co., for the first quarter of next year and 1000 tons for another company for the remainder of this year. Few sales have been made and the market is still untested, while $25 as the usual basis in eastern Pennsylvania, while $24.50 can probably be shaded at Buffalo.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$28.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.27
East. Pa. No. 2, sil. 1.75 to 2.25	27.27
Buffalo, sil. 1.75 to 2.25	29.41
No. 2X Virginia, sil. 2.25 to 2.75	31.94
No. 2 Virginia, sil. 1.75 to 2.25	31.44

Ferroalloys.—Because practically all of the present light demand for ferromanganese is being met by what may be termed resale lots of both British and domestic origin, it would not be a surprise if British producers would soon reduce their present price of $117.50, seaboard. The sales referred to have been made anywhere from $110 to $112.50, seaboard or furnace basis, and almost no business is being taken at any higher price. In view of the lessened steel output of the country, demand for spiegeleisen is light at unchanged quotations. There is a moderate demand for 50 per cent ferrosilicon, but the ferrochromium market is dull.

Cast Iron Pipe.—The market is firm with prices unchanged. The period of municipal tenders is coming to an end now and only the smaller tonnages needed to complete work well under way are needed. Makers are well booked ahead. The earthquake in Japan has resulted in a few feelers for pressure pipe of various sizes for use in reconstruction of water supply plants in the devastated area. Prompt delivery, which is now an impossibility, was desired. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. The soil pipe market is enjoying a considerable demand, considering the lateness of the season. Present activity, however, is evidently largely confined to the East. Makers are well booked for the next month or two. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in. standard, 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Warehouse Business.—Practically all warehouse products are quiet and, unless the second half of September proves more active than the first half, the month will probably not measure up to either July or August. Part of the present dullness, it is believed, develops as a result of the much better deliveries now being made by the mills, so that many of the large consumers who were temporarily forced to purchase out of stock are now returning to buying from the mills. Some warehouses look forward to an improvement toward the end of this month. Shading on bars is no longer prevalent and prices generally seem to be holding firm. This is also true of black and galvanized sheets, very little inclination to shade the base of 1.75c. on black and 5.75c. on galvanized being evident. As a result of a change in the differentials on tin plate sizes by the leading interest, warehouses have corrected quotations on charcoal tin plate accordingly. The change involves an average increase in prices from 75c. to 90c. per box. We quote prices on page 804.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The coke market is still showing weakness. Standard furnace coke is quotable at from $4.50 to $5 per ton, with medium sulphur available at about $4.25 per ton and higher. Standard foundry coke ranges from $5.75 to $6.25, with some brands bringing up to $6.50 and $7 per ton. An inquiry is current from the New York Air Brake Co. for 1500 tons of foundry coke, delivered Watertown, N. Y., at the rate of five cars a week until contract is completed. By-product coke is quoted at $11.41, Newark and Jersey City.

Old Material.—On practically all grades the market seems to be holding its own with slight increases on stove plate, specification pipe and heavy melting steel. No. 1 yard steel is fairly firm at $16.50 and $17 per ton, delivered eastern Pennsylvania, with $17.50 reported paid for delivery to Pottsville, Pa. It is believed that some of the present upward movement is a result of dealers covering low-priced contracts. Heavy melting steel, railroad quality, is now quoted at $16.50 delivered eastern Pennsylvania. Stove plate is going forward to Harrisburg consumers and to New Jersey foundries. Shipped to the latter, $18 and $18.50 is being paid for strictly high-grade stove plate, of which dealers and brokers report something of a shortage. Specification pipe is fairly active and is now being bought delivered Lebanon, Pa., at $16.50 per ton, an advance of 50c. Borings and turnings are firm and unchanged. Cast borings and machine shop turnings are being shipped to Harrisburg and machine shop turnings to Phoenixville.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$13.00 to $13.50
Steel rails, short lengths, or equivalent	13.50 to 14.00
Rails for rolling	15.00 to 17.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.50 to 15.00
Wrought iron track	13.50 to 14.00
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	11.00 to 12.00
Machine-shop turnings	10.25 to 10.75
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25 to 12.75
Stove plate	15.50 to 16.00
Locomotive grate bars	13.50 to 14.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.50 to 18.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Finished Iron and Steel.—Including an apartment building taking 9000 tons of steel and five New York City school buildings totaling close to 9000 tons the structural steel awards of the past week, as reported to THE IRON AGE, total almost 21,000 tons, nearly all of the work being in the metropolitan district. New projects reported total nearly 17,000 tons. Structural steel work presents by far the most active feature of the steel market, and while the volume of work being let and pending does not approach the peak of last spring, it is showing a gain over recent weeks. Although mills and fabricators are competing more strenuously for business because of the decline of orders on their books, there does not appear to have been much in the way of price concessions on fabricated steel. In some instances, in fact, premiums have been paid by builders for early delivery so that buildings may be housed in before cold weather. In new structural work a considerable part is for buildings in the

rapidly growing garment manufacturing center on Seventh Avenue between Times Square and the Pennsylvania Station. In other steel lines there is scarcely enough business of importance to be recorded. The Standard Oil Co. of New Jersey is in the market for 300 tons of plates and this is today a fairly large inquiry as compared with the carload lots that make up the bulk of current inquiries and orders. This, the third week of September, has brought no indications of fall buying in general steel lines and there is more questioning as to the prospects of sufficient buying to keep mills in operation at anywhere near the present rate during fourth quarter. There has been no change in prices.

Cincinnati

Southern Iron Weak and Prices Lower—Ironton Quotation Declines

CINCINNATI, Sept. 18.—The only inquiry of consequence comes from a Springfield melter for 1200 tons each of malleable and foundry grades for the quarter. This deal, which will probably be closed on Wednesday, is expected to develop lower prices than now prevail, as it is said $24.75, Ironton, has been freely quoted on the inquiry. On a sale of 3000 tons of malleable to Muncie last week, it is said that the delivered price paid was less than $27, the order netting the Lake interest which booked the order around $23.60, or the equivalent of $24, Ironton. The Southern market is weaker at $23, and it is said that an attractive order could be placed at less than this figure. In fact as low as $21.50 is reported to have been quoted, but this price cannot be confirmed. Current orders, which generally are one and two carloads, are taken at $23 base. There is little inquiry or interest being shown in basic or silvery irons. The Wellston furnace blew out on Friday last, leaving three merchant and three steel works furnaces operating in the district.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.77
Basic Northern	26.77
Malleable	26.77

Tool Steel.—Returns for the month of August indicate a great improvement over July in the volume of business. The present month is holding up very well in regard to orders. Prices are unchanged, 18 per cent tungsten high speed steel being quoted at 75c. to 95c. per lb., according to brand.

Sheets.—The demand is getting better, particularly for auto body sheets, and some fair orders have been placed by body makers in the territory at the full price of 5.35c. Black and galvanized sheets are also in a slightly improved demand, some of the larger users having covered for their fourth quarter requirements. Prices generally are unchanged from last week, though less is now heard of concessions on black and galvanized sheets from the price named by the leading interest.

Structural Material.—More activity was evident in the market last week, and some fair-sized lettings were reported. The largest of these was for 19 steel barges for the U. S. Engineers' Office, Louisville, Ky., involving 1900 tons, which went to the American Bridge Co. The Vincennes Bridge Co. is low bidder on bridge work for the State of Indiana, involving approximately 800 tons. Other awards are published elsewhere in this issue.

Reinforcing Bars.—A noticeable pickup in the demand is reported. The largest letting reported is for 300 tons for the Kosair Temple, Louisville, Ky., to the Consolidated Reinforced Steel Co. Road work for the State of Ohio near Dayton will require 420 tons on which bids have been asked. An apartment hotel at Cincinnati will require approximately 800 tons, while an infirmary at Louisville is expected to require about 400 tons. The Breslin office building, Louisville, on which bids will shortly be taken, will include 350 tons of bars, and a school for crippled children at Dayton, Ohio, on which bids are being taken, will require about 100 tons. There is nothing new in the price situation, although it is said that the price of 2.40c. quoted by some mills includes engineering services.

Warehouse Business.—Local jobbers report orders more numerous, but tonnages still light. Improvement, however, is steady, and optimism prevails regarding the situation. Prices have not changed within the past few months, and present conditions do not seem to indicate that any changes will be made in the immediate future.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Finished Materials.—Demand for finished materials continues light. Orders generally are being placed for immediate shipment, and for work in early prospect, there being little inclination on the part of consumers to place orders for stock. There was, however, a slight improvement in the number of orders placed for steel bars, and structural inquiries for work in hand were a little better. Prices show no evidence of changing, and 2.40c. is still regarded as the market on bars, and 2.50c. on shapes and plates. There is some talk of lower prices on hoops and bands, it being stated that at least one mill has gone below 3c. on bands for a small order. Some price cutting in wire products is also reported, but this has not yet reached common wire nails, which are still quoted at $3 per keg, base. Orders for cold-finished materials are in better volume, while on cold-rolled strips it is reported that some consumers in the Detroit district have been able to place orders for very fair tonnages at 4.75c., one order for 1500 tons being reported booked at this figure. There is little activity locally in bolts and nuts, and prices are weak. Track accessories are not in demand, largely on account of the fact that the only large buyer in the territory is not expected to enter the market before next month.

Coke.—There is little activity in furnace or foundry fuels, though domestic sizes are moving fairly well. Prices are inclined to be weaker, but are practically unchanged from last week.

Old Material.—The only activity in the scrap market is trading between dealers. Consumers are buying only small lots. The price situation generally is weaker than last week, and bundled sheet, borings, machinery, cast and tires have been reduced 50c. On the other hand an inquiry for iron axles raised the offered price $1. Other prices are as reported last week.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to $13.50
Iron rails	16.00 to 16.50
Relaying rails, 50 lb. and up	29.00 to 29.50
Rails for rolling	17.00 to 17.50
Heavy melting steel	15.50 to 16.00
Steel rails for melting	15.50 to 16.00
Car wheels	15.50 to 16.00
Per Net Ton	
No. 1 railroad wrought	13.50 to 14.00
Cast borings	9.50 to 10.00
Steel turnings	9.50 to 10.00
Railroad cast	17.00 to 17.50
No. 1 machinery cast	19.00 to 19.50
Burnt scrap	12.50 to 13.00
Iron axles	23.50 to 24.00
Locomotive tires (smooth inside)	14.00 to 14.50
Pipes and flues	9.50 to 10.00

Good Demand for Detroit Scrap

DETROIT, Sept. 18.—While there has been a slight decrease in melt in this district due to the fact that the automotive industry has reduced production somewhat, there is a very healthy demand for waste material. Radiator plants are running at approximate capacity and stove furnace and other manufacturing on an 80 to 90 per cent basis. Prices are unchanged.

St. Louis

Buying of Pig Iron More Active, Including Two 500-Ton Lots

ST. LOUIS, Sept. 18.—Buying of pig iron during the last week was on a more extensive scale than for several weeks past. The principal sales were of 5000 tons of basic by the St. Louis Coke & Iron Co. to an East Side melter and 5000 tons to a St. Louis melter, a part of the latter sale being Southern iron. A local stove foundry bought 300 tons for prompt shipment and other sales of the local maker amounted to 200 tons for prompt shipment. An Illinois melter has inquired for 500 tons of foundry iron, another inquiry is for 500 tons of malleable and other inquiries before the market amount to about 2000 tons. The melt in the district is increasing. All of the stove foundries are operating, and the job foundries are doing more business. Some melters are well covered on their requirements for some time, while others are content to pursue a hand-to-mouth buying policy because of a lack of confidence in the market. The market for Northern iron is still firm at $27, Chicago, while quotations on Southern make range from $23 to $24, Birmingham. Two sales of 100 tons each of 11 to 12 per cent Bessemer ferrosilicon were made in the district during the week.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $2.23 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	$28.67 to 29.17

Finished Iron and Steel.—Extreme dullness prevails in the market for finished iron and steel. Fabricators have sufficient structural steel on hand to take care of orders already booked, and few big orders are in sight. One concern reports the sale of about 300 tons of structural steel monthly in small lots. The railroads are sending out only a few inquiries for small lots. Manufacturers and jobbers are buying very little.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ½-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Old Material.—Steel mills in the district bought a few lots of specialties. Outside of this buying was confined to dealers. It is believed that consumers will enter the market about the first of the month. In the meantime, they are only buying occasional "distress" cars—cars that dealers prefer to sacrifice rather than lay down in their yards. Railroad lists continue heavy. New lists include: Baltimore & Ohio, 9000 tons; Rock Island, 2000 tons; Wabash, 3500 tons and Missouri-Kansas-Texas, 1600 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Rails for rolling	17.50 to 18.00
Steel rails less than 3 ft.	19.50 to 20.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	25.50 to 26.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00
Per Net Ton	
Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	16.00 to 16.50
Iron car axles	25.00 to 26.00
Steel car axles	18.50 to 19.00
Wrought iron bars and transoms	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.25 to 19.75
Cast iron borings	12.00 to 12.50
No. 1 busheling	15.75 to 16.25
No. 1 railroad cast	19.50 to 20.00
No. 1 machinery cast	20.00 to 20.50
Railroad malleable	17.50 to 18.00
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	8.00 to 8.50

Coke.—A much better demand for coke from foundries in the district is reported, although sales are still confined to small lots, not more than their requirements for 30 to 60 days. Sales of Connellsville 72-hr. coke were made at prices ranging from $6.50 to $7.50, an advance of 50c. from the bottom price. Cooler weather has caused a better demand for domestic coke.

Buffalo

Improvement in Pig Iron Inquiry, But Prices Do Not Show Strength

BUFFALO, Sept. 18.—Marked improvement in inquiry for pig iron has developed and considerable tonnage has been placed. New business is mainly for fourth quarter delivery and there is a dearth of spot shipment tonnage. There is no question that $25 base price has been shaded on several transactions where the tonnage was greater than 1000, but $25 remains firm for the ordinary run of business. One furnace quoting $25 on 1500 tons for Eastern delivery lost the business in competition. Action on another inquiry for 1500 tons of furnace iron was postponed after prices were received. Foundry activity is brisk and stock piles are exceedingly low. Several 2000-ton lots are being inquired for in this district. About 12,000 tons has been sold and as a general proposition most of it went at less than $25. There is no further curtailment in furnace operation.

We quote f.o.b. gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$25.00 to $25.50
No. 2 foundry, 2.25 to 2.75 sil.	24.50 to 25.00
No. 2 plain, 1.75 to 2.25 sil.	24.50 to 25.00
Basic	26.00
Malleable	25.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—New business in semi-finished material has not brightened in proportion to expectations with the close of the vacation period. In bars, shapes and plate, demand is not very urgent and reports are current that shape prices have been shaded in several instances, and that tonnages have been closed on the price of 2.40c. Plate demand in this territory comes mainly from car builders and at this time they are seemingly not interested in the market. Pipe demand is especially brisk and another inquiry for 2500 tons of line pipe has been put up by a Canadian company, interested in shipping the material to South America. Bar and plate prices hold, as do sheet prices. Demand for fourth quarter tin plate is brisk.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Coke.—Demand for furnace coke is weaker, but foundry grades are still sought in big measure. Prices on foundry coke range from $6 to $6.50.

Old Material.—The fact that most consumers are in urgent need of heavy melting steel and indications are that some buying will be done this week; dealers are not anxious to sell at less than $19. One mill is understood to have paid better than $19.25 for heavy melting steel in a direct purchase from a railroad. There is more confidence all around, but it has not reached the stage that business has been placed.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 bushelings	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

Birmingham

Pig Iron Selling Not Equal to Production—Prices Uncertain

BIRMINGHAM, ALA., Sept. 18.—Pig iron selling in the Birmingham district is not equal to the make, though numerous orders are being booked, and as a consequence there is a little uneasiness that the present pace of production cannot be continued. By the end of the month, if not before, conclusion will have been arrived at as to the curtailment of make, by blowing out two or more blast furnaces. Some of the melters are asking for concessions, and the price situation is unsettled. Southern territory demands have been in small lots for spot delivery. The situation is summed up as follows: the Sloss-Sheffield Steel & Iron Co. with five blast furnaces in operation is still piling some iron; the Republic Iron & Steel Co. with two furnaces making iron is not selling make; the Alabama Co. with two furnaces in blast is moving its iron steadily and also taking some iron from its surplus stocks; the Woodward Iron Co. has three furnaces in blast and piling some iron; the Tennessee Coal, Iron & Railroad Co. has seven furnaces on basic and three on foundry, needs all the basic being produced and is out of the open market on foundry; the Central Coal & Iron Co. has sold the probable make of its single furnace for the remainder of the year. The Gulf States Steel Co. is moving off its basic iron on yards while the blast furnace is undergoing repairs and will not be ready to resume operations for a month. The Shelby Iron Co. is repairing the charcoal furnace at Shelby and will not put it back in commission until November. In the meantime stock is being moved off the yards. Local melters are buying as immediate needs are met with, confidence being held that when iron is needed it can be gotten and at the lowest price. Pressure pipe, radiator and stove makers are operating to capacity.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$22.00 to $23.00
Basic	24.00
Charcoal, warm blast	$33.00 to 34.00

Cast Iron Pipe.—Every week the pressure pipe plants of the Birmingham district are receiving more or less lettings. The American Cast Iron Pipe Co. announces 495 tons taken from San Francisco the past week and 159 from Glendale, Cal. The United States Cast Iron Pipe & Foundry Co. and the National Cast Iron Pipe Co. also participated in the lettings of the past week. The two last named companies are pushing the work on additions of DeLavaud machines for the manufacture of pressure pipe.

Coal and Coke.—Coal production in Alabama shows a little improvement, though not as much as was anticipated. The coke demand is lagging and unless there is an early recuperation in the market, curtailment will be necessary. Four of the by-product coke oven plants of the district by reason of gas contracts with municipal and other consumers will have to continue in steady operation whether there is any coke demand or not. Coke prices are around $8 as maximum, foundry coke.

Boston

Less Activity Among Foundries Reflected in Pig Iron Sales

BOSTON, Sept. 18.—Less activity among New England jobbing foundries, which constitute a large percentage of the melters in this territory, is reflected in pig iron sales. Foundries maintained by industries generally are operating almost full, but they are well covered on pig iron requirements for the next two months or longer. Sales reported the past week in very nearly all cases concerned car lots, and in the aggregate were the smallest noted in several weeks. Eastern Pennsylvania iron, which previous to the ending of the anthracite labor troubles advanced to $25.50 furnace base, with regular differentials, is now offered at $25 for No. 2 plain, No. 2X and No. IX. It is intimated that less than $25 base could be done on desirable business, but the lack of such tonnages fails to substantiate this report. Buffalo No. 2 plain, No. 2X and No. 1X are obtainable at $25, with few takers, and buyers still maintain central and western Pennsylvania furnaces will accept less even on car lots. Not enough is being done in Virginia and Alabama iron to really establish a market and quotations therefore are largely nominal.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$28.65
East. Penn., sil. 1.75 to 2.25	28.65
Buffalo, sil. 2.25 to 2.75	29.91
Buffalo, sil. 1.75 to 2.25	29.91
Virginia, sil. 2.25 to 2.75	32.42
Virginia, sil. 1.75 to 2.25	31.92
Alabama, sil. 2.25 to 2.75	33.60
Alabama, sil. 1.75 to 2.25	33.10

Coke.—According to local by-product foundry coke producers, the settlement of the coal strike has failed to check the demand for such fuel. Specifications against contracts are running fully as strong as a week ago, and new business is increasing. Both the New England Coal & Coke Co. and the Providence Gas Co., however, have speeded up shipments. They continue to quote on a basis of $13.50 delivered in New England. Prompt shipment Connellsville foundry coke is offered more freely, usually at or about $6 on cars or $11.55 delivered, but aside from those in Connecticut, foundries show little interest.

Old Material.—The recent celebration of the Jewish New Year put a decided quietus on the old material market, from which it has not recovered. Sentiment among the trade, however, is optimistic, it being commonly predicted mill buying will increase this month. Dealers are still endeavoring to accumulate material, yet holders are less inclined to sell at going prices. One house, by marking up its bid of $12.50 to $13 for chemical borings, secured 250 tons for New England consumption, but for points outside $12.50 appears the limit buyers will pay. New York inquiries for round tonnages of horse shoes at $17 to $17.25 on cars shipping point have disclosed a shortage. A Norwood, Mass., brake shoe manufacturer continues to offer $17.50 delivered for stove plate, but is reported as securing only occasional truckloads. No. 1 textile machinery cast also is not coming out, but a moderate amount of No. 1 machinery sold the past week to nearby consumers at $22.50 delivered. The Watertown Arsenal, Watertown, Mass., has disposed of additional scrap tonnages.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	16.00 to 17.00
Railroad malleable	21.00 to 21.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 rail wrought	13.50 to 14.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam. over 2 ft. long)	11.00 to 11.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

The properties of the American Coke Corporation which is in receivers' hands will be sold at public auction on Thursday, Sept. 27, at the Fayette County Courthouse, Uniontown, Pa. The properties listed for sale are the Orient Plant, American No. 1 and No. 2 Plants, and Struthers Plant, together with mine supplies at these plants. Receivers are George S. Baton, Frank W. Byrne and R. H. Jamison.

The Technical Photographic and Microscopical Society will hold its fall meeting at the Grand Central Palace, New York, in conjunction with the 1923 Chemical Exposition. The meeting will be held Sept. 21.

Cleveland

Low Price for Sheet Bars—Lull in Pig Iron Market

CLEVELAND, Sept. 18.—While ore shipments are fairly heavy, they will show some falling off this month. The movement for the first half of September was at the rate of about 9,000,000 tons for the month. One large Eastern consumer has just made a 10 per cent reduction in its shipping schedule for the season. With an ample supply of cars, shippers are about a month ahead on some of their shipping orders. Present indications are that the movement after November will be light and that there will be an early closing of the ore shipping season.

Pig Iron.—The market has again become very quiet. The decline in activity was unexpected, as a week ago there were indications of an increased volume of business. Several foundries that inquired for first quarter iron have decided to postpone purchases and other buying is light, being limited for the most part to small lots for immediate requirements. One producer during the week sold from 5000 to 6000 tons, all in small lots. Little inquiry is pending. Some attribute the recent spurt to an expectation by consumers that if the anthracite coal strike had not been settled promptly, pig iron prices might have advanced. A Muncie, Ind., melter who recently inquired for 2000 tons of malleable iron, has placed this business but it did not go to a Cleveland producer. The Westinghouse Electric & Mfg. Co. has not yet purchased the 6600 tons of foundry iron wanted for its Cleveland and Trafford City plants, but is expected to place the former lot in a day or two. An inquiry for 1500 tons of foundry iron from a Bucyrus consumer is still pending and it is understood that a Valley producer has quoted $24.50 on this inquiry and that the same quotation has come from the Valley district on two or three inquiries, although a Valley producer continues to make sales at $25. The Cleveland market is firm for local delivery, producers holding to $25.50 at furnace for foundry and malleable grades. Low phosphorus iron is weak and is no longer quoted above $30 by a Valley producer. Southern iron shows signs of weakness and while no actual quotations are reported in this territory, producers have indicated to consumers that they will take business at $23 for Alabama iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	26.00
Southern fdy., sil. 1.75 to 2.25	28.00
Malleable	26.00
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00

Bolts, Nuts and Rivets.—Local bolt and nut manufacturers are holding to 60 and 5 per cent off list for large machine bolts and for small carriage bolts, rolled thread, and to other prices on their regular schedule, although at least one small manufacturer is quoting an additional 5 per cent discount. Some fourth quarter business is being taken at higher prices. Rivets are firm. While the common quotation is 3c. for large structural rivets, concessions to 2.90c. are being made. One local manufacturer has revised prices of small rivets to 65 and 10 per cent off list.

Semi-Finished Steel.—The market has softened, in spite of the efforts of some mills to keep prices at $42.50. One consumer has been able to buy a round lot of sheet bars at $40, Youngstown, for the fourth quarter, and another has purchased several thousand tons of slabs at considerably under $42.50, but above $40, Youngstown. A local mill made a few small lot sales during the week at the regular price. On forging billets the price of $47.50 has been shaded on a 50-ton order.

Sheets.—The volume of sheet business is light. Most consumers are carrying fair stocks or have material coming on contract. Very little business is being booked for the fourth quarter, as consumers seem disposed to buy in small lots as needed. On black sheets 3.75c. is being quoted by several mills, but other grades are firm at regular prices.

Reinforcing Bars.—The market on rail steel bars is weak. While the common quotations range from 2.20c. to 2.30c., the lower price is being shaded. There is a fair demand for small lots for specific work, but jobbers are not buying for stock. Orders include one for 300 tons for a viaduct in Akron, Ohio.

Finished Iron and Steel.—New demand for steel is light. Mills are getting a fair volume of orders, but they are nearly all for small miscellaneous lots for early requirements and shipments generally are in excess of bookings. Prices on steel bars, plates and structural material are firm and there seems to be little effort on the part of buyers to secure concessions. Plates are moving fairly well in small lots, the demand for them being better than for steel bars and structural shapes. Small mills are quoting plates at 2.50c., Pittsburgh, for prompt shipment and Eastern mills continue to get some orders at the same price at mill. Light plates are quoted at 3c. for No. 10 gage. Reports from Detroit indicate that some of the leading automobile companies that have brought out new models as well as parts manufacturers who supply them with parts are increasing production schedules, but some of the smaller automobile manufacturers are curtailing production. Most automobile manufacturers are buying steel only in small lots for early needs. In the building field considerable new work is in prospect, but inquiry is light. Bids for the bank and office building for the Brotherhood of Locomotive Engineers of Cleveland, requiring 5000 tons, which is the only project of any size out for figures, will be taken Oct. 15. The inquiry for 2400 tons of steel for bridge work for the Great Northern Railroad, on which an Ohio fabricator has been figuring, has been withdrawn. Prices on bands are not firm. On these 3c. instead of 3.15c. has become a more common quotation.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.

Coke.—Prices on standard Connellsville foundry coke have declined sharply and quotations range now from $5.50 to $7. These prices are being named both for prompt shipment and contract. The market is inactive.

Old Material.—The market for the first time in weeks shows a downward tendency. Apparently the only reason the dealers had for forcing prices upward was the release of a number of shipping orders by the mills and the expectations of some new demand. However, little buying developed during the advancing prices and, without a buying movement to support the market, the softening of prices was not surprising. Heavy melting steel has declined $1 a ton and turnings are slightly lower. Quotations on most other grades are unchanged, but these in the absence of transactions are largely nominal. A Cleveland consumer, during the week, purchased 8000 to 10,000 tons of heavy melting steel at $18 to $18.50 and about 8000 tons of compressed steel at $16 to $16.50, but these sales were made before the weakness developed.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.50 to $17.00
Rails for rolling	20.00 to 20.50
Rails under 3-ft.	19.50 to 20.00
Low phosphorus melting	20.00 to 20.50
Cast borings	13.50 to 14.00
Machine shop turnings	12.50 to 13.00
Mixed borings and short turnings	12.50 to 13.00
Compressed sheet steel	15.50 to 16.00
Railroad wrought	16.00 to 16.50
Railroad malleable	23.00 to 23.50
Light bundle sheet stampings	12.00 to 12.50
Steel axle turnings	16.00 to 16.75
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.00 to 13.25
Drop forge flashings	13.25 to 13.75
Railroad grate bars	17.00 to 17.50
Stove plate	16.00 to 17.00
Pipes and flues	13.50 to 14.00

Philadelphia

No Signs as Yet of Resumption of Steel and Pig Iron Buying

PHILADELPHIA, Sept. 18.—Expectations of a fall revival in steel and pig iron buying of sufficient volume to give mills and furnaces substantial backlogs for fourth quarter have been toned down to a considerable degree and the trade begins to view the outlook for the remainder of the year with less optimism. The situation is particularly acute for Eastern plate mills, which with possibly one exception are down to 50 per cent operation and new business is not coming to them in the volume necessary to maintain that rate for very long. Some of the plate mills have fairly good orders on their books for the Pennsylvania Railroad at Altoona, but these were held up some weeks ago because of congestion of material at that road's car shops and there has not been enough tonnage from other sources to take their place.

Price weakness in plates has not actually developed, but this appears to be due mostly to lack of opportunity to quote on desirable tonnage, as there are indications that some mills would go to 2.40c., Pittsburgh, if such a reduction would produce any business. For the first time since prices reached their present level, there seems to be concern among steel mill representatives as to their ability to hold prices on plates and shapes for the rest of the year. A further concession of $1 a ton on structural shapes is reported to have been made by one Eastern mill, bringing its price down to 2.35c., Pittsburgh, on such business as it finds desirable, this being $3 a ton under the quotations of other producers.

A large independent steel company, in making a canvass of its trade in this territory, found that about half of the large buyers are fully covered on their steel requirements for the remainder of the year, taking into account steel on hand and yet to be shipped on old orders, while the other half of the principal consumers report they will need some steel to finish out the year, but say that they are not yet ready to buy. With manufacturing consumers virtually out of the market and with little specific tonnage coming up, apart from structural steel, the mills begin to take a less hopeful view of the next few months than was in evidence a few weeks ago. Yet there are some people who still look for a fair amount of fall buying next month.

In pig iron there is no change in conditions and the scrap market likewise reflects the general lack of buying interest. Pig iron shows some further signs of softening, but, as in steel, there is little inquiry of importance in the market.

Pig Iron.—The pig iron market is again in that state of questioning as to the future that develops when production and stocks are in excess of the tonnage being sought by consumers. Buying of iron, which is confined mostly to foundry grades, is so light that in the past week some companies have booked orders equal only to about one day's output. The orders are small, ranging from a carload to 100 tons, and on these quantities there is less disposition on the part of sellers to shade prices. Most of the current orders are being taken at $25, furnace, for No. 2 plain and at $25.50 for No. 2X, but that sellers are willing to go lower on attractive business is indicated by orders placed a week ago by a Trenton, N. J., melter for 2500 tons. Three furnaces participated in this business at $24.50, furnace, for No. 2 plain and at $25, furnace, for No. 2X. The minimum freight rate was $1.13 per ton, making a delivered price of $26.13 on No. 2X. Furnace representatives say that their present minimum on No. 2X is $25.50, furnace, but it will require further inquiry of importance to develop the strength or weakness of this price. The only business in basic was a sale of 2000 tons to a New England consumer at $24, furnace. Copper free low phosphorus iron is now offered by a New York State furnace at $28, furnace, with a freight rate to Philadelphia of $4.79, and close to 1500 tons was sold last week at this level. Copper-bearing iron is quoted by eastern Pennsylvania furnaces at $28, furnace. The Robesonia furnace, out for repairs, will be relighted Oct. 7. Although the importation of foreign pig iron was thought to have ceased, 4200 tons came in last week at this port from England.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.76 to $26.63
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.26 to 27.13
East. Pa. No. 1X	26.76 to 27.63
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.17 to 30.67
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.17
Basic delivered eastern Pa.	25.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ore.—Last week's receipts of iron ore were 19,900 tons from Cuba and 6814 tons from Sweden; 1500 tons of chrome ore was received from British India.

Ferroalloys.—The Bethlehem Steel Co., which for some time has made ferromanganese only for its own use, has become a merchant seller and is offering it at $112.50, furnace. Some resale ferromanganese is to be had at slightly under this price. British producers have not changed their prices, still quoting $117.50, seaboard, but naturally are taking no business at this figure.

Semi-Finished Steel.—Open hearth rerolling billets are quoted at $42.50 and forging billets at $47.50, Pittsburgh, but in view of the declining orders for finished steel, there is some likelihood that lower prices might be quoted if attractive inquiry were presented. No such inquiry is at hand, however.

Bars.—One large maker of steel bars reports that its total tonnage for last week was about double that of the week previous, but this really means little in relation to the company's capacity. Most of the orders are for one or two carloads and for immediate specification. Aside from a few contracts with jobbers there has been very little fourth quarter contracting. Consumers generally seem to be well supplied, and are still getting shipments on old orders. Bar iron is quoted at from 2.35c. to 2.40c., Pittsburgh. The larger makers of shafting and screw stock still quote 3.25c., Pittsburgh, but slight concessions have been offered by smaller producers.

Warehouse Business.—Orders received by local warehouses are in fair volume, though less than they were getting a month or so ago. Prices for local delivery are unchanged as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Sheets and Tin Plate.—Inquiries for sheets from Japan have come to this market, these calling mostly for No. 30 and No. 30½ gages. Sheet mills are fairly well supplied with orders and see a continuation of good business to the end of the year, and the same holds true of tin plate—a situation quite different from that existing in the heavier products. Prices are unchanged.

Coke.—A decided easing in the coke supply has brought lower prices on furnace coke, now available at $4.50 to $4.75, Connellsville.

Old Material.—The failure of steel mills to show a gain in new bookings of finished steel has been reflected in the scrap trade, as obviously there will be no gain in buying of steel melting scrap unless the mills maintain a good rate of operation. As the Eastern scrap trade depends to a considerable extent on the consumption by plate mills, and as plate business has declined more than any other, the scrap trade takes a less hopeful view than a few weeks ago, when a revival of steel buying had been expected to develop this month. Heavy melting steel presents a variation in prices. The largest consumer is offering only $16.50, while sales have been made within the week to other consumers at $17. Dealers who recently took orders at a Pottsville mill at $17.50 have not fully covered on these orders, so that this latter price also remains as a market factor. Other grades of scrap show more strength than melting steel. Sales of No. 1 railroad wrought by the Pennsylvania Railroad brought out fairly good offers. Sales to consumers have been negotiated at $20 to $21, delivered. The Bethlehem Steel Co. has reduced its price on blast furnace borings and turnings to $10, delivered, which is $2.50 or $3 a ton below the prices at which dealers would be willing to sell. The explanation of the scrap trade is that the Bethlehem company is well provided with turnings and that its reduction is equivalent to a withdrawal from the market.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.50
Scrap rails	16.50 to 17.00
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast-iron car wheels	21.00 to 22.00
No. 1 railroad wrought	20.00 to 21.00
No. 1 yard wrought	18.00 to 18.50
No. 1 forge fire	14.50 to 15.00
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	18.00 to 20.00
No. 1 cast	21.50 to 22.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.50 to 18.00
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Plates.—A declining volume of new steel tonnage invariably affects Eastern plate mills among the first, and the present is no exception. While in other steel products many mills still have fairly good specifications yet to be filled, the plate mills of this district are on the ragged edge. One mill has sufficient specifications to run practically full until the end of this month, but its production is small. Other mills have from one to three or four weeks' work ahead at a reduced rate of operations. With the exception of the one mentioned, all of the Eastern plate mills are now operating at about 50 per cent, and it is agreed that this rate will not be maintained for long unless there is an increase in business. Up to this time there has been no sign of any willingness to break away from the 2.50c. price, but some mills would not hesitate to go to 2.40c., Pittsburgh, though it is recognized that such a concession would not bring out the desired tonnage. The Southern Pacific Railroad is asking bids on a boat that will require 3500 tons of plates and shapes, and one or two shipbuilders have inquired for steel prices.

Structural Material.—It has been surprising to some buyers of structural shapes that the quotations of 2.40c., Pittsburgh, by an Eastern mill have not up to date affected the determination of other mills to adhere to 2.50c. on plain material. Buyers have made the effort to place shapes with other mills at 2.40c. but apparently without success. It is now reported that 2.35c., Pittsburgh, has been quoted by this Eastern mill on certain tonnage. Whether this difference of $3 a ton between the lowest quotation and the figure named by all other producers will eventually have its effect on the price situation is yet to be developed.

San Francisco

Pig Iron Very Dull and Conditions in General Are Quiet

SAN FRANCISCO, Sept. 6.—A noticeable undercurrent of quiet pervades the iron and steel markets in this city, and in a general way nearly all the Pacific Coast seems to be similarly affected. While it is true that some mills and foundries are still busy finishing up the remnants of early placed orders, it is equally true that others are gradually slowing down because the booking of new business is materially diminished as compared with the corresponding period of last year. Some of the leading importers and jobbers are not backward in saying that business is dull, while others are disinclined to appear pessimistic while speaking of the trade outlook in connection with the admitted quiet of the present. Several foundries report a fair volume of business in the line of small castings and some of the mills say the demand for steel for reinforcement purposes still maintains a good volume of activity with prices steady. Reports are current, however, that fractional shading of figures has occasionally occurred. Complaints about lack of new orders is now more general than at any time since the trade quietness was first noticed several weeks ago. Trade sentiment is inclined toward the belief that the depression, while conforming to conditions prevailing in the leading Eastern markets, is intensified on this coast by high labor costs, coupled with new demands in several trades for still further wage advances.

Pig Iron.—Both importers and jobbers report the market very dull, with inquiries confined to small lots, and the outlook for the near future not very favorable for an increased demand. Prices, too, are showing some weakness with the prospect of further reductions. Current rates are now $33 to $35 per ton ex-ship, and one dealer is said to have offered to shade the minimum figure without effecting a sale. Total imports by sea during August were only 726 tons, and while the receipts by rail are not known, it is believed the total is less than twice the tonnage received by sea. There is a little more activity in Los Angeles than in this city for the present, and sales there during the past ten days are reported as in excess of 3200 tons, with the probability of another sale within a day or two of another 1000 or possibly 1500 tons. The demand for future delivery is practically at a standstill, both mills and foundries having sufficient supplies on hand to meet requirements for the present, and, in fact, for the next two months, unless there should be a very material increase in new business.

Old Material.—Sales of the last two weeks have been unusually light, and although prices are not quotably different from the figures of two weeks ago, the indications are for a decline in the near future. Some of the mills are decidedly backward about paying the maximum figure, and it is considered doubtful whether an offering at slightly shaded figures would be regarded as any inducement to buy. The mills are reported as well supplied for at least a couple of months, and the foundries are nearly as well provided for. That prices will be lower seems to be generally recognized as almost a certainty.

The Fabricated Production Department of the Chamber of Commerce of the United States has issued a pamphlet relating to the acceptance and installation of uniform methods of cost accounting by members of a trade association. It is the purpose of the pamphlet to aid officers and members of trade associations which have undertaken to obtain advantages of uniform methods of cost accounting.

British Iron and Steel Market

Strong Japanese Demand for Thin Galvanized Sheets—Finished Steel Firmer—Continental Markets Irregular

(By Cable)

LONDON, ENGLAND, Sept. 18.

There is an improved general demand for pig iron but there have been few important sales yet recorded. Consumers apparently are more inclined to purchase and forward inquiries are spreading over the end of the year.

Foreign ore is quiet. Best Bilbao Rubio is quoted nominally at 22½s. to 22¾s. ($5.11 to $5.17) ex-ship Tees.

Finished steel has a firmer tendency on high costs. Demand is improving, though it is still disappointing except on specialties for the Far East. Workington has secured 18,000 tons of rails and accessories for the Gold Coast.

August exports of pig iron, excluding ferroalloys, amount to 55,107 tons. The total of iron and steel exports was 323,877 tons.

Continental markets are irregular owing to the well-sold condition of most Belgian works. Japan has bought fair quantities of angles, sections, bars, wire and wire nails.

Billets are being sold at £7 ($31.78) delivered to North East Coast and £6 12s. ($29.96) f.o.b. is also quoted.

In Belgium the threat of liquidation of the Ruhr stocks is causing anxiety. Forty-one furnaces out of 56 were blowing Sept. 1.

Tin plate minimum remains unchanged. Large sales made to many parts have resulted in works being sold out until the second half of October, while the demand is mainly for early October, though some inquiries extend to the end of the year. The Tin Plate Bar Association price remains unaltered.

There is strong demand from Japan for thin galvanized sheets. The works are well sold out at advancing prices. Japanese specifications 6 x 3, 60's, are being sold at £28 (5.675c. per lb.) f.o.b.

Far Eastern demand for black sheets is maintained. The works are sold out until February-March. Sales of 6 x 3, 13's, 107 lb., are being made up to £20 10s. (4.15c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.54 per £1, as follows:

Durham coke, delivered	£2	1s.	to £2	1½s.	$9.31	to	$9.42
Bilbao Rubio ore†		1 4			5.45		
Cleveland No. 1 foundry		5 2½			23.27		
Cleveland No. 3 foundry		4 17			22.02		
Cleveland No. 4 foundry		4 12			20.88		
Cleveland No. 4 forge		4 10			20.43		
Cleveland basic		5 0			22.70		
East Coast mixed		4 18½	to 5	0	22.36	to	22.70
Ferromanganese		18 0			81.72		
Ferromanganese*		18 10			83.99		
Rails, 60 lb. and up		8 0	to 9	0	36.32	to	40.86
Billets		7 10	to 8	5	34.05	to	37.46
Sheet and tin plate bars, Welsh		9 2½			41.43		
Tin plates, base box		1 3⅛	to 1	3¼	5.25	to	5.28
					C. per Lb.		
Ship plates		9 5	to 9	15	1.87	to	1.98
Boiler plates		12 10	to 13	0	2.53	to	2.63
Tees		9 15	to 10	5	1.98	to	2.08
Channels		9 0	to 9	10	1.82	to	1.93
Beams		8 15	to 9	5	1.77	to	1.87
Round bars, ¾ to 3 in.		10 15	to 11	5	2.18	to	2.28
Galvanized sheets, 24 g.		18 10	to 18	15	3.75	to	3.80
Black sheets, 24 gage		13 15			2.79		
Black sheets, Japanese specifications		15 5			3.09		
Steel hoops		12 0	& 12	10*	2.43	&	2.53*
Cold rolled steel strip, 20 gage		17 5			3.50		
Cotton ties, Indian specifications		15 0			3.04		

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron:							
Belgium	£5	2½s.	to £5	5s.	$23.27	to	$23.84
France	5	2½	to 5	5	23.27	to	23.84
Luxemburg	5	2½	to 5	5	23.27	to	23.84
Billets:							
Belgium	6	12½	to 7	0	30.08	to	31.78
France	6	12½	to 7	0	30.08	to	31.78
Merchant bars:					C. per Lb.		
Belgium	7	15	to 8	0	1.57	to	1.62
Luxemburg	7	15	to 8	0	1.57	to	1.62
France	7	10			1.52		
Joists (beams):							
Belgium	7	12½			1.55		
Luxemburg	7	12½			1.55		
France	7	10	to 7	12½	1.52	to	1.55
Angles:							
Belgium	8	0	to 8	5	1.62	to	1.67
⅛-in. plates:							
Belgium	8	5			1.67		
Germany	8	10			1.72		
¼-in. plates:							
Luxemburg	7	15			1.57		
Belgium	7	10			1.52		

Pig Iron and Finished Materials in Poor Demand—Sheets for Japan Active

LONDON, ENGLAND, Sept. 6.—Though the holidays are over, there is yet no sign of improvement in demand for iron and steel. The pig iron trade especially is in a poor state and, though makers endeavor to meet the position by continually reducing prices, consumers on the whole are still holding off. No. 3 Cleveland has fallen to 97½s., but, even at this comparatively low price buyers are not keen, and stocks are still being accumulated at makers' works. In the hematite trade the damping down of furnaces has prevented prices running away, and East Coast mixed numbers are fairly steady at from 98½s. to £5. In the Northeastern district, since the end of June, eight furnaces have been put out of blast, leaving 12 running on hematite, and making the total Cleveland furnaces producing all grades of pig iron no more than 40.

Demand for finished iron and steel is generally poor, purchasers considering prices too high and looking for considerably lower figures, but makers on the other hand assert that, even at today's figures there is little or no margin of profit owing to the continued high costs of production. In certain specialties, such as contracts for railroad material both at home and abroad, and in sheets for construction purposes, there is a good deal of trade passing, but the shipbuilding trade, which is the backbone of the steel industry, is almost dead. There were no new contracts placed on the Clyde last month, and the total launchings were only nine small vessels.

Japanese Situation

It is early yet to predict what benefit, if any, British iron and steel manufacturers will obtain from the disaster in Japan, but at the present time, at any rate, there is a run on thin steel sheets, both plain and galvanized, for temporary dwellings and warehouses, and many thousands of tons have been booked, some for shipment as far ahead as March. Of course, for a long time there is bound to be a strong demand from that quarter, and it is thought likely that, when other main overseas markets, such as India, realize this, they, too, will come in and place their requirements.

The Continental position seems rather obscure. Practically the only material offering is Belgian and Luxemburg, and even these deliveries are ahead, works having booked pretty considerable orders. These, however, have not been passing through hands in this country, and it is assumed have been done by Continental shippers direct. The fact is that probably plants are working at very low capacity owing to fuel shortage, and so have easily filled their books.

Among recent railroad contracts placed was one by the Great Indian Peninsular Railway for 77 motor and trailer coaches for the electrification of the Bombay lines, which has been awarded to Cammell, Laird & Co.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. . . . . 2.50c.

Structural Material

Beams, channels, etc., base, per lb. . . . . 2.50c.
Sheet piling . . . . . 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. . . . . 2.40c.
Soft steel bars for cold finishing . . . . . .3 per ton over base
Reinforcing steel bars, base . . . . . 2.40c.
Refined iron bars, base, per lb. . . . . 3.25c.
Double refined iron bars, base, per lb. . . . . 4.85c. to 5.00c.
Stay bolt iron bars, base, per lb. . . . . 8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. . . . . 3.15c.
Bands, base, per lb. . . . . 3.15c.
Strips, base, per lb. . . . . 3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb. $1.62

Cold-Finished Steels

Bars and shafting base, per lb. . . . . 3.25c.
Bars, S. A. E. Series, No. 2100. . . . . 4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300. . . . . 6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100. . . . . 5.50c. to 5.75c.
Strips, base, per lb. . . . . 5.00c.

Wire Products

Nails, base, per keg. $3.00
Galvanized nails, 1 in. and over. . . . . $2.25 over base
Galvanized nails, less than 1 in. . . . . 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. 2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg. 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg. 3.00
Cement coated nails, base, per count keg. 2.70
Woven fence, carloads (to jobbers). . . . 67½ per cent off list
Woven fence, carloads (to retailers). . . . . 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 to 60, 10 and 5 per cent off list
Machine bolts, small, cut threads,
60 and 10 to 60 and 5 per cent off list
Machine bolts, larger and longer,
60 and 10 to 60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
60 and 10 to 60 and 5 per cent off list
Cut threads. . . . . 60 to 50, 10 and 5 per cent off list
Larger and longer. . . . . 60 to 50, 10 and 5 per cent off list
Lag bolts . . . . . 65 and 10 to 65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads. . . . . 50 and 10 per cent off list
Other style heads. . . . . 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 5 per cent off list
Larger and longer sizes. . . . . 50 and 5 per cent off list
Hot pressed square or hex. nuts, blank. . . . . 4.00c. off list
Hot pressed nuts, tapped. . . . . 4.00c. off list
C.p.c. and t. square or hex. nuts, blank. . . . . 3.75c. off list
C.p.c. and t. square or hex. nuts, tapped. . . . . 3.75c. off list
Semi-finished hex. nuts:
⅛ in. and smaller, U. S. S. . . . . 80 per cent off list
⅜ in. and larger, U. S. S. . . . . 75 per cent off list
Small sizes, S. A. E. . . . . 80 and 5 per cent off list
S. A. E., ⅜ in. and larger. . . . . 75 and 5 per cent off list
Stove bolts in packages. . . . . 75, 10 and 5 per cent off list
Stove bolts in bulk. . . . . 75, 10, 5 and 2½ per cent off list
Tire bolts . . . . . 60 and 10 per cent off list
Bolt ends with hot pressed nuts. . . . . 60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers . . . . . 5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws. . . . 70 per cent off list
Milled set screws. . . . . 70 per cent off list
Upset cap screws. . . . . 75 and 10 per cent off list
Upset set screws. . . . . 75 and 10 per cent off list
Milled studs . . . . . 50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $2.90 to $3.00
Small rivets . . . . . 65, 10 and 5 to 65 and 5 off list

Track Equipment

Spikes, ½ in. and larger, base, per 100 lb. $3.15
Spikes, ½ in., ⅜ in. and ⅝ in., per 100 lb. . . . . $3.15 to 3.50
Spikes, ¼ in. . . . . 3.15 to 3.50
Spikes, boat and barge, base, per 100 lb. 3.50
Track bolts, ¾ in. and larger, base, per 100 lb. . $4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb. . . . 5.00 to 5.50
Tie plates, per 100 lb. . . . . 2.55 to 2.60
Angle bars, base, per 100 lb. 2.75

Welded Pipe

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	26½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3.	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	2 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12 . . .	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12 . . .	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1¼ in.	+18
2½ to 2¾ in.	37	1⅜ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in. . . .	47	3½ and 3¾ in. . . .	37
1⅝ in.	31	4 in.	41
2 and 2¼ in. . . .	22	4½ in. and 5 in. . . .	33
2½ and 2¾ in. . . .	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in. . .	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base. . . . . 83 per cent off list
Carbon 0.30 to 0.40, base. . . . . 81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage. . . .	15	2¼-in. O.D. 10 gage. . .	20
2-in. O.D. 11 gage. . . .	16	3-in. O.D. 7 gage. . . .	35
2-in. O.D. 10 gage. . . .	17	1½-in. O.D. 9 gage. . .	15
2¼-in. O.D. 12 gage. .	17	5⅝-in. O.D. 9 gage. .	55
2¼ in. O.D. 11 gage. .	18	5½-in. O.D. 9 gage. .	57

Tin Plate

Standard cokes, per base box. $5.50

Terne Plate

(Per Package, 20 x 28 In.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C. . . .	$14.90
8-lb. coating I. C. . . .	11.30	25-lb. coating I. C. . . .	16.20
12-lb. coating I. C. . . .	12.70	30-lb. coating I. C. . . .	17.35
15-lb. coating I. C. . . .	13.95	35-lb. coating I. C. . . .	18.35
		40-lb. coating I. C. . . .	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. . . . . 3.00c.
Box Annealed, One Pass Cold Rolled
No. 28 (base), per lb. . . . . 3.75c. to 3.85c.
Automobile Sheets
Regular auto body sheets, base (23 gage), per lb. . . . . 5.35c.
Galvanized
No. 28 (base), per lb. . . . . 5.00c.
Long Ternes
No. 28 gage (base), 8-lb. coating, per lb. . . . . 5.30c.
Tin-Mill Black Plate
No. 28 (base), per lb. . . . . 3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.225	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.765
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.69
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.765
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.34	Birmingham	0.58
Pac. Coast, ship plates	1.20	Memphis	0.56
Birmingham	0.58	Jacksonville, all rail	0.70
Memphis	0.56	Jacksonville, rail and water	0.415
Jacksonville, all rail	0.70	New Orleans	0.67

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 40c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per lb. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	43c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	41c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00 to $112.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00 to 112.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$46.00 to $48.00	$40.00 to $45.00
Maryland	50.00	45.00
Ohio	45.00 to 46.00	40.00 to 42.00
Kentucky	45.00 to 46.00	40.00 to 42.00
Illinois	48.00	45.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 9.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	53.00	
Ground silica clay, per net ton	10.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	$40.00 to 42.50
Sheet bars, open-hearth	40.00 to 42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill.	2.50c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (1½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200* (Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.60 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Week's Orders and Inquiries Half Again Greater Than August Averages

With some 29,000 tons of fabricated steel orders and over 19,000 tons of fresh inquiries, the past week's showing is as good as that of the two preceding combined. Awards were swelled by public school work in New York and loft building projects in New York account for most of the new pending jobs. Some railroad bridge work figured. Awards include:

Two school buildings, New York, totaling 2600 tons, to Easton Structural Steel Co.

School building, New York, 1500 tons, to Hinkle Iron Construction Co.

School building, New York, 1500 tons, to A. E. Norton, Inc.

Apartment building on Seventy-first Street, New York, 450 tons, to A. E. Norton, Inc.

Parochial school building, Fourth Avenue and Forty-third Street, Brooklyn, 325 tons, to George A. Just Co.

Garage on Jerome Avenue, New York, 300 tons, to George A. Just Co.

Apartment building at Madison Avenue and Fifty-eighth Street, New York, 1300 tons, to Paterson Bridge Co.

Apartment building at 277 Park Avenue, New York, Thompson-Starrett Co., general contractor, 9000 tons, to American Bridge Co.

Elks' building, Long Island City, N. Y., 450 tons, to American Bridge Co.

Glens Falls Portland Cement Co., Glens Falls, N. Y., plant addition, 200 tons, to Bethlehem Construction Co.

Girls' Commercial High School, Brooklyn, N. Y., 3000 tons, George A. Fuller Co., general contractor; steel awarded to New York Shipbuilding Corporation.

Cherry Street bridge over Fox River, Appleton, Wis., 768 tons, sublet by Wausau Iron Works to American Bridge Co.

Ford Motor Co., hydro-electric station, St. Paul, Minn., 246 tons, to Pittsburgh Bridge & Iron Works.

Goss Printing Press Co., building, Chicago, 552 tons, to Continental Bridge Co.

Capitol Theater Building, Chicago, 393 tons, to Duffin Iron Works.

Great Northern Railway, bridges near Minot and Des Lacs, N. D., 920 tons, to Milwaukee Bridge Co.

State of Minnesota, bridges, 326 tons, divided between Illinois Steel Bridge Co. and Minneapolis Steel & Machinery Co.

Certainteed Products Co., cement plaster mill, near Grand Rapids, Mich., 478 tons, to Mississippi Valley Structural Steel Co.

U. S. Gypsum Co., plant at Sweetwater, Tex., 218 tons, to Kansas City Structural Steel Co.

State of Indiana, highway bridges, approximately 800 tons, Vincennes Bridge Co., low bidder.

Fiber Conduit Co., Richmond, Ind., 300 tons, to Hetherington & Berner.

State of Indiana, reformatory at Pendelton, 200 tons, to Hetherington & Berner.

Kosair Temple, Louisville, Ky., 450 tons, to Louisville Bridge & Iron Co.

U. S. Engineers' Office, Louisville, Ky., 19 steel barges, approximately 1900 tons, to American Bridge Co.

Meredith Building, Huntington, W. Va., 250 tons, to Cincinnati fabricator.

Rowland Building, Columbus, Ohio, 250 tons, to Columbus Structural Steel Co.

School on Long Island, 250 tons, to Kellogg Structural Steel Co.

High school, Ambridge, Pa., 500 tons, to American Bridge Co.

Duquesne Light Co., Pittsburgh, substation, 175 tons, to Jones & Laughlin Steel Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Two loft buildings on Thirty-seventh Street, New York, for the Bricken Realty Co., totaling 2000 tons.

Loft building on Seventh Avenue, New York, in new garment manufacturing zone, 6000 tons.

Crystal loft building, in new garment manufacturing zone, New York, 1000 tons.

Greenberg loft building, Seventh Avenue and Thirty-seventh Street, New York, 2000 tons.

President James Monroe High School, Bronx, New York, 3000 tons.

School building No. 108, New York, 1500 tons.

Bridge over Raritan River, Perth Amboy, N. J., Frederick Snare Corporation low bidder. Low bid was $1,000,000 above engineers' cost estimates, hence letting of contract is in doubt.

New York Central Railroad, bridges, 400 tons.

Chesapeake & Ohio Railroad, bridges, 500 tons.

George W. Smith & Co., Philadelphia, addition to woodworking plant, 400 tons.

Union Trust & Savings Bank Building, Davenport, Iowa, 750 tons; bids closed Monday, Sept. 17.

American Sintering Co., plant, Hubbard, Ohio, 600 tons, general contract awarded to H. K. Ferguson Co., Cleveland.

Union Pacific, girder spans, 179 tons.

Illinois Central, two 40-ft. deck plate girder spans and Springfield Avenue subway, Champaign, Ill., 100 tons.

Knights of Columbus club building, Madison Street near Cicero Avenue, Chicago, 600 tons.

Quick Meal Stove Co., St. Louis, factory, 150 tons.

RAILROAD EQUIPMENT BUYING

Minimum Amount of Repair Work Pending in Both Cars and Locomotives

According to the car service division of the American Railway Association, fewer freight cars were in need of repair on Sept. 1 than on any date since November, 1920. The total was 175,327 or 7.7 per cent of the number on line. The number of locomotives in need of heavy repair on Sept. 1 was 9392 or 14.7 per cent, the smallest number since Aug. 1, 1920.

Of the new freight cars on order on Sept. 1, box cars numbered 31,807, coal cars 29,203, refrigerator cars, 6989 and stock cars 3079.

According to the Department of Commerce, unfilled orders for locomotives at the end of August called for 1497, of which 91 were for foreign buyers.

The main items of the week are:

The Elgin, Joliet & Eastern has placed 500 steel underframes with James G. Heggie & Sons.

The Universal Portland Cement Co. is inquiring for 50 hopper cars of 70-tons capacity.

The Minnesota Steel Co. has placed 44 hopper cars with the Pressed Steel Car Co.

The New York, Chicago & St. Louis is inquiring for 200 underframes for box cars and 10 underframes for caboose cars.

The Engineers & Contractors' Supply Co., Milwaukee, is in the market for one 6-ton 24-in. gage steel ore car.

The Chicago & North Western Railroad has ordered 8 locomotives from the American Locomotive Co.

To Sue Bethlehem Shipbuilding Corporation

WASHINGTON, Sept. 18.—The United States Shipping Board has instructed its legal department to prepare suit against the Bethlehem Shipbuilding Corporation for $2,500,000 alleged to have been overpaid on that company's war contracts. The matter has been under negotiation for some time, but no settlement has been reached. If the position of the Shipping Board in this suit is maintained it may open up a long series of litigation involving many other war contracts.

The question at issue is whether the Bethlehem Shipbuilding Corporation is entitled to profits made under a so-called "economic clause," by which it was to share with the Government in savings effected in the building of ships. The Shipping Board now contends that this clause carries no weight and that the contractor was morally bound to conduct the work as economically as possible. The Department of Justice has concurred in this view.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
12.....	14.12½	13.50	42.25	7.00	6.75	6.90	6.55
13.....	14.00	13.50	41.50	7.12½	6.80	6.90	6.55
14.....	14.00	13.50	41.00	7.12½	6.80	6.85	6.50
15.....	14.00	13.50	....	7.12½	6.80	6.85	6.50
17.....	14.00	13.37½	41.00	7.12½	6.80	6.82½	6.47½
18.....	14.00	13.37½	41.50	7.12½	6.80	6.80	6.45

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Sept. 18.

The markets are all exceedingly quiet with lower prices in most of them. Demand for copper has fallen off and quotations are ½c. lower than a week ago. The heavy buying of tin has ceased and quotations have considerably declined. Lead is the only market which has advanced. Buying of zinc is extremely light and prices have fallen about 10 points in the week.

Copper.—The optimism prevalent a week ago in the electrolytic copper market has been displaced by a considerably easier tone. The slowness in the settlement of the Ruhr problem is one factor as well as a decline in the London market. Domestic consumers in the face of easier conditions here are slow to enter the market and demand from that source is exceedingly light. There has also been a falling off in export sales. As a consequence of these conditions prices have declined until today electrolytic copper is available in quantity from several sources at 13.62½c., delivered, or 13.37½c., refinery. Lake copper is quoted at 14c., delivered.

Tin.—Only a fair business in Straits tin has been recorded in the past week. On Thursday and Friday, Sept. 13 and 14, about 300 tons changed hands on each day, with most of the buying done by consumers. Yesterday was an exceedingly quiet day and business today was also light. The latter part of last week the London market declined despite fairly good transactions on this side with the result that further buying here was halted. The London decline referred to is attributed to large selling of tin in the Far East, which was very heavy last week. This was supposed to consist of some of the Government stocks known to exist there. The fact that yesterday and today sales from that quarter were small tends to confirm the foregoing assumption. Today there was a sharp advance of nearly £4 per ton in London prices, with spot standard quoted at £197 5s., future standard at £197 15s. and spot Straits at £201 5s., all, however, about £1 per ton less than a week ago. The quotation today was 41.50c., New York, for spot Straits. Arrivals thus far this month have been 2090 tons, with 5505 tons reported afloat.

Lead.—On Thursday, Sept. 13, the leading interest advanced its quotation 10 points to 6.85c., New York, the outside market having already been at least 15 points higher than that for some days. The independent market has continued to advance with good sales at St. Louis on a basis of 6.80c., and with sales for delivery in the East at 7.12½c., New York. Apparently the leading interest is not a free seller at its new quotation.

Zinc.—Domestic buying is still light and unsatisfactory and the market is quiet and considerably easier. There has also been a sharp decline in export sales. Prime Western for early delivery is quoted at 6.45c., St. Louis, or 6.80c., New York.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for both shot and ingot nickel are 29c. to 32c.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 7.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26.50c., New York, duty paid, in such cases where they can obtain it from foreign producers. No quotations are made public by the leading domestic producer.

Old Metals.—Business is quiet and the market is sluggish. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	13.50
Copper, light and bottoms	10.75
Heavy machine composition	10.75
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.25
Lead, heavy	6.25
Lead, tea	5.25
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

SEPT. 18.—In a listless market tin and zinc have declined. The old metals are unchanged except for a decline in copper wire, shapes and clips. We quote in carload lots, Lake copper, 14.50c.; tin, 42.50c.; lead, 6.80c.; spelter, 6.50c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5.25c.; zinc, 4.25c.; pewter, No. 1, 21c.; tin foil, 26c.; block tin, 32c.; all buying prices for less than carload lots.

Crystalline Structure of Ferrite

Ferrite is the metallographic constituent, iron, which forms the basis of all steels. Hence, any advance in our knowledge of its characteristics is of interest and also of some possible technical importance. The crystal grains of ferrite often show a peculiar network within the individual grains after various types of etching for revealing the microstructure. This gives the material the appearance of being of a very fine grained structure which, if true, would greatly affect the properties of the material.

During the past month the Bureau of Standards has devoted some time to the study of the phenomenon which has been noted by other observers, although no explanation of its nature has ever been suggested. The work has not yet been completed, but the results so far obtained indicate that this peculiar feature in the structure of ferrite is not related to the ordinary crystalline structure as it exists at room temperatures. When ferrite is heated sufficiently, it undergoes an allotropic change. Some evidence has been obtained indicating that when the iron is cooled from a high temperature all evidence of the structural condition existing at that temperature is not entirely erased, but persists as a pattern superimposed upon the ordinary structural arrangement. When the iron is reheated to a sufficiently high temperature although considerably below the temperature at which the allotropic change takes place, the characteristic network previously mentioned results, but upon continued heating this is wiped out as equilibrium is obtained. Further work is in progress to show more clearly in what these changes consist, but it is evident from what has already been accomplished, that they are quite different from the usual processes of recrystallization and grain growth.

As one indicator of the industrial trend, figures may be taken of the sales of mechanical stokers, the statistics of which are collected by the Department of Commerce. In August sales were made for a rated capacity of 71,693 hp. for the 15 establishments making the reports. This compares with 52,518 hp. in July. The monthly average for the first quarter was 72,950, that for the second quarter, 81,850 hp. and the eight months average this year is 73,580 hp.

PERSONAL

J. W. Troupe, formerly superintendent open-hearth department, Upson works, Bourne-Fuller Co., Cleveland, now is a member of the sales force of the McFeely Brick Co., First National Bank Building, Pittsburgh.

R. T. Harris, formerly superintendent No. 1 open-hearth department, Lackawanna Steel Co., Buffalo, has joined the Vulcan Furnace & Equipment Co., Westinghouse Building, Pittsburgh, as efficiency man in the installation of the Loftus improved open-hearth furnace.

William W. Peacock, for the past nine years attached to the Pittsburgh office of the Motch & Merryweather Machinery Co., Cleveland, has severed that connection to become associated with J. L. McCartney in the Pittsburgh office of the Niles-Bement-Pond Co.

Thomas Scott, formerly assistant superintendent of the open-hearth department, Brier Hill Steel Co., Youngstown, Ohio, has been appointed superintendent of the open-hearth department of the Toronto, Ohio, plant of Follansbee Bros. Co., Pittsburgh, succeeding Winsor Evans, resigned.

George Haglund, metallurgical engineer Ljusne Iron & Steel Works, Sweden, who recently spent several days inspecting Worcester, Mass., plants, will shortly sail from New York for his home.

Judge E. S. Hall has been elected president of the Chase Turbine Mfg. Co., Orange, Mass., to succeed George E. Dexter, who served as president and treasurer. Albert M. Dexter is treasurer and general manager.

H. H. Meehan of Milwaukee, who went to Yokohama, Japan, some time ago to supervise the construction of three large hydroelectric generating plants for the Allis-Chalmers Mfg. Co., Milwaukee, reported, in a cablegram to the home office, that he and his family are safe. John A. Roberts, representative of the Allis-Chalmers company at Tokio, has also reported that he and his family are alive and well.

Bert L. Hendershot, district sales manager National Cast Iron Pipe Co., at Dallas, Tex., has been appointed Pacific Coast sales manager, in charge of a newly opened office at Los Angeles, Cal.

E. J. Lowry, metallurgist, Hickman, Williams & Co., will address the Detroit Foundrymen's Association at Detroit, Sept. 20, on the "Blast Furnace in Relation to the Foundry."

M. S. Palmer has been appointed representative in the New England district of the brass goods companies of Manning, Maxwell & Moore, Inc. His headquarters are at 5 Watson Street, Boston.

Edward C. Smith has been appointed manager of pig iron sales, effective Sept. 24, by the Belfont Iron Works Co., Ironton, Ohio. He has been connected with the iron and steel business for the past 25 years. His first experience was with the Dayton Coal & Iron Co., with which he was connected from 1899 to 1903, when he became sales agent at St. Louis of the Sloss-Sheffield Steel & Iron Co. In 1912 he resigned to become manager of sales and purchases of the Howe Scale Co., San Francisco. He returned to the East in 1918 and joined the sales force of the Matthew Addy Co., with headquarters in Cincinnati, with which company he has been connected since. He will make his headquarters at Ironton.

N. B. Norris has been appointed manager of the New Orleans office, 938 Whitney-Central Building, of the Pawling & Harnischfeger Co., Milwaukee.

John R. Poyser, for 12 years secretary in charge of sales for the Canton Foundry & Machine Co., is now sales manager of Doelger & Kirsten, Milwaukee.

C. D. Hollins, formerly sales manager of the Black Products Co., has been appointed manager of the sales department for the National Engineering Co., holding the title of second vice-president.

Walter A. Deems, for the past 10 years master mechanic of the Baltimore & Ohio Railroad Co.'s New York terminals and the Staten Island Rapid Transit Co., Tompkinsville, S. I., has resigned to join the machine tool sales organization of Manning, Maxwell & Moore, Inc., New York.

E. C. Morse, previously in the Boston and Washington offices of the Westinghouse Electric & Mfg. Co., has joined the Triumph Electric & Ice Machine Co. as vice-president in charge of sales.

E. D. Spicer has resigned as works manager of the Kerr Turbine Co., Wellsville, N. Y., to become general manager of the Standard Turbine Corporation, Wellsville. H. R. Geiger has been appointed New York manager of the latter company.

Marcus A. Follansbee, formerly of the Follansbee Brothers Co., Pittsburgh, has been appointed vice-president of C. S. Davis & Co., Inc., Chicago, to have charge of the newly established sheet steel, tin and terne plate department.

James F. Lyon, representative of the Brown & Sharpe Mfg. Co., now has offices in Los Angeles, Cal.

Harold P. Childs, formerly special representative of the executive offices of the General Electric Co., New York, has become associated with the Heine Boiler Co. as manager of the New York office.

M. W. Moss, representative of the American Rolling Mill Co., Middletown, Ohio, in Japan and his wife, are among the survivors of the Japanese earthquake. A cablegram to the company from Mr. Moss stated that he was then at Nikko, 40 miles from Tokio.

OBITUARY

GENERAL CHARLES L. FITZHUGH, for a period of 30 years active in the steel industry in Pittsburgh as president of Shoenberger & Co., later the Shoenberger Steel Co., died at his summer home in Coburg, Ontario, Sept. 16. Before becoming identified with the steel industry, General Fitzhugh had been in the United States Army, having been a graduate of West Point. He won an enviable record in the Civil War, out of which he came with the rank of brevet brigadier general. He retired from the Army a few years after the conclusion of the Civil War and became associated with Shoenberger & Co. in 1869. This connection he retained until the company was absorbed in 1899 by the American Steel & Wire Co. He was a native of New York and in his eighty-sixth year. In recent years he had made his home in Washington. He is survived by Mrs. Fitzhugh, who was the daughter of George Shoenberger and a granddaughter of Peter Shoenberger, founder of Shoenberger & Co.; also by two sons, Henry and Carroll Fitzhugh.

JAMES A. BECKETT, assistant engineer American Malleable Castings Association and acting field representative for that organization, died on Aug. 22. He was born in the North of Ireland in 1855 and came to this country at an early age, securing employment as molder with the W. A. Wood Mowing & Reaping Machine Co., Hoosick Falls, N. Y. He was made foreman in 1895 and later was appointed general manager of the plant, from which position he resigned in 1910. During the World War, he resumed active duties as production engineer with the Rochester, N. Y., division of the ordnance department. Afterwards he became associated with the American Malleable Castings Association. Mr. Beckett was a member of the American Society for Testing Materials.

WILLIAM J. HASKINS, aged 50 years, tool steel salesman of the Midvale Co., was killed in an automobile accident near Troy, Ohio, Sept. 17, while making a trip from Springfield to Troy. Mr. Haskins' connection

with the steel business covers 35 years, all of which were spent with the Midvale Steel & Ordnance Co. and the Midvale Co. He began in the machine shop as apprentice and worked up to superintendent. About 10 years ago, he took the position of demonstrator and salesman of tool steel for the company and worked out of the Cincinnati office. Upon the purchase by the Bethlehem Steel Corporation of the Midvale Steel & Ordnance Co., he went with the Midvale Co., and since that time has been working from the Cleveland office with local headquarters in Dayton. Mr. Haskins was a native of Philadelphia, to which city his body was sent for interment.

DANIEL BEST, founder of the Best Mfg. Co., San Leandro, Cal., died recently at his home in that city, aged 85 years. He crossed the plains to Oregon in 1859 and settled in San Leandro in 1886, commencing the manufacture of combined harvesters and heavy threshing machines. About 12 years ago the company name was changed to the Best Tractor Co., and since has specialized in the manufacture of motor-driven caterpillar tractors for farm service, an invention of L. C. Best, son of the founder, and now head of the organization.

JULIUS E. ROTTHAUS, who was assistant to the president of the Thomas Iron Co. prior to the absorption of that company by the Reading Iron Co., died Sunday, Sept. 9, at Whitehaven, Pa., at the age of 39. Shortly after the sale of the Thomas Iron Co., Mr. Rotthaus formed a partnership with W. A. Barrows, Jr., who was president of the Thomas Iron Co., the firm being known as Barrows & Rotthaus. Offices were opened in the Widener Building, Philadelphia, for the sale of pig iron, coal, coke, etc., but soon after Mr. Rotthaus contracted the illness which resulted in his death.

GUSTAVUS L. STEUBNER, aged 69, president of two Long Island City iron foundries, died on Sept. 12 at his home, 14 Botanic Place, Flushing, L. I. He was a native of Reading, Pa., but went to Long Island City at an early age and formed the partnership, Steubner & Woods, iron founders. This firm was succeeded by the G. L. Steubner Iron Works of which Mr. Steubner was head. He was also president of the Long Island City Foundries Co.

CARL A. SCHNEIDER, production manager Cincinnati Screw Co., Loveland, Ohio, died at Mercy Hospital, Hamilton, Ohio, after an illness of three weeks. He was born in Hamilton and was 42 years old.

LANGDON GIBSON, noted explorer, who until two years ago was production manager of the General Electric Co.'s Schenectady works, died Sept. 5, at Criehaven, Me., where he was spending the summer. Death was due to cerebral hemorrhage. He was a native of Boston and was 58 years of age. Mr. Gibson had been associated with the company 31 years.

ORAMEL M. CURRIE, for 30 years superintendent of the Stewart Boiler Works, Worcester, Mass., died at his home in that city on Sept. 10, aged 53 years.

GEORGE MACLAGAN, president and treasurer Garvin Machine Co., New York, died of apoplexy at his home in Mountain Lakes, N. J., on Sept. 15. He was born in 1858 and prior to his association with the Garvin company in November, 1901, had been connected with a chemical firm. Mr. Maclagan was a member of the Machinery Club. He is survived by three daughters.

CYRUS REIMER, sales manager of the American Hoe & Fork Co., Cleveland, died Sept. 14, age 69 years.

Active work of standardization by the American Marine Standards Committee is reported by the Department of Commerce to be imminent. The committee is to look into details of both hulls and engines of ships, as well as care and operation of various types of equipment, including the ship as a whole.

Sales of Sheets in August Show Moderate Gain Over July—Shipments Also Large

PITTSBURGH, Sept. 18.—Sales of sheets in August by independent manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers showed a moderate gain over those for July, but there was an even greater increase in shipment last month. Again in August as in July the excess of shipments over new orders was a matter of more than 100,000 tons. Unfilled orders on Aug. 31 were 316,972 tons, a decrease of approximately 88,000 tons in a month. Net obligations arrived at by deducting unshipped and unsold stocks were 182,366, against 263,738 tons on July 31.

August figures in net tons compare with those for July and June as follows:

	August	July	June
Capacity (tons)	420,000	385,000	392,000
Per cent reporting	69.5	69.6	70
Sales (tons)	116,659	92,358	172,637
Production (tons)	234,112	174,910	218,432
Shipments (tons)	234,486	192,261	233,128
Unfilled tonnage	316,972	404,868	503,175
Unshipped stocks (tons)	102,354	109,068	115,649
Unsold stocks (tons)	32,252	32,062	29,827

COMING MEETINGS

September

Machine Tool Exhibition. Sept. 18 to 21. Mason Laboratory, Yale University, New Haven. New Haven Branch, American Society of Mechanical Engineers, 400 Temple Street, New Haven, Conn., in charge.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

October

National Safety Council. Oct. 1 to 5. Twelfth annual meeting, New Statler Hotel, Buffalo. W. H. Cameron, 168 North Michigan Avenue, secretary.

American Society for Steel Treating. Oct. 8 to 12. Annual convention, Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

West Virginia and Kentucky Association of Mining, Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention, Hotel Frederick, Huntington, W. Va.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Iron and Steel Institute. Oct. 25, fall meeting in New York; Oct. 26, visit to Aberdeen Proving Ground, Md. E. A. S. Clarke, 40 Rector Street, New York, secretary.

American Gear Manufacturers Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

Thermal Treatment of Molded Pieces

(*Continued from page 743*)

material. As this porosity appears to be connected with the heating, it is compelled to manifest itself, whatever the thermal treatment chosen.

Moreover, all shells treated were in their cast condition. After all investigations which have been made on the sonorousness of semi-steel shells, during the war, this is an indication of very poor mechanical qualities. Moreover the intensity of the sound is connected with the modulus of elasticity, and the latter, for castings, decreases with the elastic limit. These results of hydraulic tests and of sonorousness have been the reason for discarding thermal treatment of semi-steel, together with the fact that these treatments are delicate and very troublesome to carry out.

STEEL AND INDUSTRIAL STOCKS

Early Strength Turns Into Downward Reaction Despite Favorable World News

After ready response to news of Franco-German accord, steel and industrial stocks sustained an abrupt downward reaction. Under the stimulus of favorable world conditions, Steel common and Republic displayed certain strength. Cast Iron Pipe issues made new highs on the movement. Independent steels gathered strength and have done better than the Steel Corporation in recent weeks. Reversals set in at midweek, when selling was general and most issues grew heavy. Steel again dipped below 90.

The range in active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High
Allis-Chalmers ..	41	44½
Allis-Chalm. pf..	92	93
Am. B. S. & F'dy.	69½	71
Am. Can	91	99⅞
Am. Can pf.....	108	108⅞
Am. Car & F'dy.	157¼	166½
Am. Car & F. pf.	118¼	118¾
Am. Loco.	69	75⅛
Am. Loco. pf....	114½	117½
Am. Radiator ..	81⅞	82
Am. Steel Fdries.	35⅜	37⅛
Am. Steel Fd. pf.	98¼	99½
Bald. Loco.	115¾	125½
Bald. Loco. pf..	113	113
Beth. Steel	48½	54½
Beth. cum. pf...	94	94¾
Beth. Stl., 8% pf.	105	105
Br. Em. Stl., 1 pf.	59¾	59¾
Br. Em. Stl., 2 pf.	16½	18
Chic. Pneu. Tool.	79⅞	85
Colo. Fuel	26½	30½
Crucible Steel ..	60	67¾
Crucible Stl. pf..	89	89
Deere pf.	62	62
Gen. Electric	172	176
Gt. No. Ore Cert.	29	30
Gulf States Steel	76½	88⅝
Inland Steel	34	34
Int. Har.	75	78¼
Int. Har. pf....	107½	109
Lima Loco.	62½	67⅜
Midvale Steel ...	26	28⅜
Nat.-Acme	10¾	10⅞
Nat. En. & Stm..	58	63⅝
N. Y. Air Brake	32½	36⅝
Nova Scotia Stl.	16	16
Otis Steel	8⅛	9¼
Otis Steel pf....	50	50
Pressed Steel Car	54	56½
Pressed Steel pf.	89	89
Ry. Steel Spring.	103	107
Replogle Steel ..	11½	13¼
Republic	43¼	50½
Republic pf. ...	88½	94
Sloss	45	49
Steel of Canada.	67½	69
Superior Steel ..	28	28
Un. Alloy Steel..	31	32½
U. S. Pipe.....	29¼	32⅛
U. S. Pipe pf...	75	79
U. S. Steel.....	87⅞	93⅝
U. S. Steel pf...	116⅞	117¼
Vanadium Steel.	28⅜	34⅛
Va. I. C. & Coke	80	80
Whouse Air Br.	81	81⅛
Ygstown S. & T.	69¾	69¾

Industrial Finances

William J. Breen, William J. Breen & Co., 148 State Street, Boston, pig iron and coke, and New England representative of the Sloss Sheffield interests, has filed a petition in bankruptcy showing liabilities of $223,747.17, and assets of $34,-352.89. Of the liabilities, $136,899 is unsecured to about 70 creditors. Secured claims amount to $14,729. The petitioner also is liable as indorser of $45,000 notes, accommodating the Palmer Foundry & Machine Co., Palmer, Mass., which recently filed a petition in bankruptcy. The assets consist chiefly of debts due on open accounts.

New Steel Casting Company to Succeed Penn Seaboard

President Warren, Penn Seaboard Steel Corporation, in a letter addressed to holders of the 7 per cent serial notes maturing Feb. 1, 1924, says in part: "A new corporation will be formed under the laws of Pennsylvania or such other State as counsel may advise, to be known as 'Penn Steel Castings Co.' or having such other name as may be approved by the directors, having an authorized capital of $500,000 par value of 8 per cent cumulative preferred and 10,000 shares of common without par value. The new company also will authorize the issuance of $1,100,000 first mortgage 7 per cent sinking fund 15-year gold notes. Subject to obtaining the approval of the stockholders, the new company will purchase from the corporation the steel casting plant at Chester, Pa., with approximately $500,000 net quick assets, and in payment the new company will issue to the corporation all its stock, both preferred and common, and all bonds herein before referred to.

"Subject to the deposit of sufficient 7 per cent serial gold notes and to the consummation of the plan, the corporation submits the following proposition:

"On or before Dec. 1, 1923, the corporation, in exchange for each 7 per cent serial gold note series B of principal amount of $960, will pay the holder thereof $200 in cash on account of principal, with accrued interest to date from which interest accrues on bonds of the new company, and in addition will deliver to holders of each of said notes $700 principal of bonds of the new company."

The International Chain & Mfg. Co., 1207 Vine Street, Philadelphia, has moved to larger quarters at 1015-1019 Chestnut Street. The company's York, Pa., and Philadelphia plants are in operation.

To hold and operate the mines in Mexico purchased by the American Smelting & Refining Co. from Compania Metalurgica Mexicana, Towne Mines, Inc., has been formed with F. H. Brownell as president and W. E. Merriss as secretary. Both are officers of the American Smelting Company. Capital stock consists of 40,000 shares of preferred stock, $100 par, and 40,000 shares of common stock no par value. These mines, particularly those at Somberete, have been important producers in the past and have considerable potential value.

NEW TRADE PUBLICATIONS

Electric Resistance Materials.—Henry Wiggin & Co., Ltd., Birmingham, England, (Branford Electric Co., 39 Cortlandt Street, New York). A 48-page catalog descriptive of various trade marked resistance wires, including nickel-chromium alloys of varying compositions, as well as nickel-steel, copper and nickel, nickel-silver, nickel with a small percentage of manganese, etc. The catalog is informative in that it contains a large amount of tabular matter covering not only these specific products, but also the electric and heat resistance tables of various materials, tables of square and circular mils, gage tables, etc.

Lathes.—Cisco Machine Tool Co., Cincinnati. 20-page loose-leaf catalog illustrating and describing engine and rapid production lathes, including those driven by geared heads. Special parts are shown in detail, including quick change gear boxes, attachments of various sorts, a square carriage turret with four holes, a taper attachment and a full swing rest being among the features. Metric lathe gear boxes are also shown. Specifications are given, as well as details of construction of the various types of lathes described.

Pulverized Fuel Systems.—Combustion Engineering Corporation, Broad Street, New York. A 12-page pamphlet dealing with Sopulco fuel equipment, with a number of illustrations, both photographic and diagrammatic, and giving evaporative tests of boilers equipped with this apparatus. General advantages include ability to burn practically any fuel, decreased labor cost, increased capacity, ease of ash removal and of operation, etc.

Electric Power Transmission.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Catalog covering line material and porcelain insulators, supplementary to its large supply catalog. It is a 200-page publication of convenient size, fully illustrated.

Truck Springs.—Saving Spring Co., Ashland, Mass. A very attractive 12-page pamphlet describing the plant where these springs are made and touching particularly upon the personal element in both shop and office. The plant is thoroughly modern and has equipment designed for the specific purpose of turning out its definite product.

Machinery Markets and News of the Works

WESTERN ELECTRIC BUYS

Large Orders for Special Equipment for Kearny, N. J., Plant Total $1,000,000

Some Railroad Orders Still Being Placed, But Machine-Tool Business Generally Is Dull

The Western Electric Co. announces the purchase of special machinery and equipment for its cable and telephone switchboard plant, now being built at Kearny, N. J., involving a total expenditure of $1,000,000, with $250,000 additional for power plant equipment.

Railroad buying has tapered off but some orders are being placed. The Southern Pacific has bought an axle lathe, a large engine lathe and a 6-ft. radial drill, and the Central of Vermont has bought a large engine lathe and a 5-ft. radial drill. The New York Central has bought a large engine lathe. The Nickel Plate has ordered several tools. The American Locomotive Co. has taken a large planer and some other tools. There has been other miscellaneous buying by railroads and equipment companies, but none of importance. The Pennsylvania Railroad, Central Region, has taken no action on a list of 34 tools issued some time ago, but the Pittsburgh trade is expecting that orders will come soon.

According to reports of machine-tool salesmen, many manufacturing plants are very busy, but mostly on old orders, and buying by these companies is at low ebb. It will require a resumption of general business activity to bring them again into the market for new shop equipment.

Although the General Electric Co. has ceased buying tools for its present plants, it will soon issue a list of equipment required for its new switchboard plant in Philadelphia, for which building contracts were recently let. Another prospective list is for equipment needed by the Department of Plants and Structures, New York, for a motor bus repair station, but this may not come out for some time.

The Petroleum Iron Works, Sharon, Pa., has bought several plate fabricating machines for a new shop at Beaumont, Tex. The Cleveland Stone Co., Cleveland, is inquiring for eight machines. Six hand-screw machines were bought by the Remy Electric Co., Cleveland.

Some fairly good business from automobile companies is pending. A Detroit automobile manufacturer last week ordered about a dozen machines.

New York

NEW YORK, Sept. 18.

LARGE purchases of special machinery and other equipment have been made by the Western Electric Co. for its new cable and telephone switchboard plant now being erected at Kearney, N. J., but dullness still prevails in the machine-tool trade. The purchases of the Western Electric Co., according to an official announcement by this company, have totaled $1,000,000. Negotiations for these machines have been under way for some weeks.

Machine-tool salesmen who have visited manufacturing works throughout the Eastern territory within the past week or two have found many plants working at capacity, but they are working on old orders with little new business in sight and consequently are not interested in buying more shop equipment until the future trend becomes more clearly indicated. Industrial companies have almost entirely dropped out of the market as buyers of tools. For example, the General Electric Co., Schenectady, N. Y., which has been a consistent buyer of tools since the first of the year, is now making few, if any, purchases for its existing plants, but will soon issue a fairly large list of machines which will be required for its new switchboard plant in Philadelphia, now in course of construction. Another list expected to come into the market soon will cover the machine-tool equipment needed for the motor repair station of the Department of Plants and Structures, city of New York, the building now being under construction. Tool purchases of importance in the past week have been almost entirely by railroads or companies doing railroad work.

The American Locomotive Co. has bought a large planer and other tools. The Southern Pacific Railroad has ordered an axle lathe, an engine lathe, 36 in. x 18 ft., and a 6-ft. radial drill for its shops at Bayshore, Cal., the Central Railroad of Vermont has bought an engine lathe, 36 in. x 17 ft., and a 5-ft. radial drill, and the New York Central has bought an engine lathe, 36 in. x 14 ft. The Ingersoll-Rand Co. of New York has bought a 48-in. x 26-ft. crank shaft lathe and the Ferracute Machine Co., Bridgeton, N. J., has bought a 6-ft. horizontal boring and drilling machine.

The Forsberg Electric Mfg. Co., 100 West Houston Street, New York, has inquiries out for a milling machine.

The United States Navy Purchasing Office, South and Whitehall Streets, New York, will take bids at once for 8748 ft. of steel tubing, N. S. A. F. requisition 84.

The International Lead Co., a subsidiary of the Anaconda Copper Mining Co., 25 Broadway, New York, is completing plans for the construction of a new unit at North Akron, Ohio, estimated to cost $500,000, with machinery. Additional furnaces will be installed.

The Davis Equipment Co., 50 Church Street, New York, has inquiries out for a car wheel press, capacity about 200 tons; portable crank pin press, and other equipment. W. E. Davis is head.

Bennett & Son, Albany Street and Troy Road, Albany, N. Y., operating an automobile equipment and accessory works, have plans for a one-story addition to cost $25,000. A. L. Delahanty, 17 Steuben Street, is architect. J. Bennett is head.

In connection with rebuilding its plant, on which work has commenced, the Tottenville Copper Co., Tottenville, S. I., has plans for additional buildings, including blast furnace, refining plant and mechanical washing shop, to cost $200,000 with machinery.

The John E. Biggins Co., Inc., 59-65 Ingraham Street, Brooklyn, has plans for a one-story addition to its foundry.

The Library Bureau, 380 Broadway, New York, manufacturer of steel filing cabinets, etc., with main plant at Ilion, N. Y., is arranging for the establishment of a branch plant in a six-story and basement building, 75 x 128 ft., on Flatbush Avenue Extension, Brooklyn, now being completed. It will approximate 65,000 sq. ft. of floor area.

The Taft Motors Corporation, 110 First Avenue, Long Island City, has plans for a new two-story service and repair building, 75 x 92 ft., at Jackson and Twentieth Avenues, Woodside, L. I., to cost $60,000. Louis Sheinart, 194 Bowery, New York, is architect.

The Willys-Overland Co., Inc., 1631 Broadway, New York, with main plant at Toledo, Ohio, is disposing of a bond issue of $10,000,000, a portion of the proceeds to be used for extensions and improvements. John N. Willys is president.

The Jackwill Mfg. Co., 615 East 134th Street, New York, manufacturer of pipe nipples and kindred engineering products, has purchased property on 140th Street, near the Southern Boulevard, 75 x 120 ft., as a site for a new plant.

The Campbell Refining Corporation, 250 West Fifty-seventh Street, New York, refined oils, has acquired property at New Hartford, N. Y., heretofore held by the New Hartford Canning Co., for a new plant.

Manual training equipment will be installed in the new two and three-story Washington Irving high school to be erected at Tarrytown, N. Y., to cost $200,000, for which bids are being asked on a general contract until Oct. 1. Guilbert & Betelle, Chamber of Commerce Building, Newark, N. J., are architects.

Joseph A. McCarthy, 14716 Jamaica Avenue, Jamaica, L. I., manufacturer of heating apparatus, etc., is planning for the installation of equipment for plating copper, nickel, etc.

The Transit Commission, 49 Lafayette Street, New York, is arranging for an award of contract to the McHarg-Barton Co., 1328 Broadway, low bidder for construction of car building and repair shops at Lenox Avenue and 118th Street, for the Interborough Rapid Transit system, at a price of $960,000.

The Baker Mfg. Corporation, Saratoga Springs, N. Y., manufacturer of gray iron castings, etc., plans for the installation of a 10-ton traveling crane, at its one-story foundry addition on Ballston Street, 50 x 90 ft., estimated to cost $45,000 with equipment. A list of other machinery will soon be arranged.

Manual training equipment will be installed in the new three-story high school to be erected at Scotia, N. Y., estimated to cost $250,000, for which ground will be broken at once. J. M. Ryder, Parker Building, Schenectady, N. Y., is architect.

J. E. Egert, engineer for the Atlantic Industrial Alcohol Co., New York, care of Floyd S. Corbin, 300 Madison Avenue, will take bids for the construction of the new plant on the Arthur Kill Road, Tottenville, S. I., estimated to cost $200,000 with machinery.

The Little Falls Fibre Co., Cohoes, N. Y., is planning for the installation of a condenser and other equipment at its plant in the Northside section.

The Dempsey Furnace Co., 15 Park Row, New York, manufacturer of industrial furnaces, is arranging for the establishment of a new plant at Jersey City, N. J.

Manual training equipment will be installed in the two-story high school to be erected at Central Avenue and Lincoln Street, Orange, N. J., estimated to cost $850,000, for which bids will be called in October. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

Fire, Sept. 8, destroyed a portion of the plant of the General Woodcraft Co., Thirty-ninth Street and Second Avenue, North Bergen, N. J., with loss estimated at $100,000 including machinery. Plans for rebuilding are under consideration.

The Utility Lock Washer Co., 140-44 Pennington Street, Newark, N. J., has plans for the erection of a new one-story factory. A one-story power house will also be built. Monks & Johnson, 99 Chauncy Street, Boston, are architects.

The Yellow Cab Co., 11 Centre Street, Newark, has plans for a one-story service and repair building at Sussex Avenue and Summit Street, 170 x 220 ft., to cost about $55,000. E. H. Miller is president.

New England

BOSTON, Sept. 17.

THE machine tool business in this territory, so far as it relates to purchases by New England users, has suffered a relapse. Reported sales were very largely of single machines, with used equipment somewhat more in demand. Fundamental conditions in New England have not changed since last reports, although considerable pessimism has developed in banking circles, which naturally is reflected among manufacturers. New England machine tool dealers are of the opinion that the lull in buying is temporary, and some sizable active prospects give promise of closing before the end of September.

Prices for machinery are steady and unchanged. List prices on the Armstrong line of lathes have been just about doubled, but a liberal discount is now allowed, so the net difference represents an advance of not more than 5 per cent.

The Crane Market

The market on both overhead and locomotive cranes is extremely quiet, with few new inquiries reported and little or no business placed this week. Among the recent inquiries was one from the Erie Railroad, 30 Church Street, New York, for a 5-ton hand power crane for the Pennsylvania Coal Co. The Northern States Power Co. has closed on a 100-ton, 59-ft. span overhead traveling crane and the Edward G. Budd Mfg. Co., Philadelphia, which recently purchased a list of several overhead cranes, has closed on a 10-ton 20-ft. span, 3-motor overhead crane.

Among recent purchases are:

United Shoe Machinery Co., Beverly, Mass., a 5-ton, 28-ft. span electric crane from the Shepard Electric Crane & Hoist Co.

Phoenix Utility Co., 71 Broadway, New York, a 4-ton, single I-beam, hand power crane with electric chain hoist from the American Engineering Co.

New York Central & Hudson River Railroad, New York, a 25-ton gantry crane from an unnamed builder.

Lee C. Moore & Co., Pittsburgh, a 5-ton, 38-ft. 7½-in. span crane from the Case Crane & Engineering Works.

Chicago, Burlington & Quincy Railroad, one 20-ton overhead electric traveling crane for the West Burlington, Iowa, shop to Shaw Crane Co.

John J. Grothe Co., Inc., Everett Street, Woburn, Mass., truck manufacturer, has completed plans for a one-story and basement factory, 100 x 200 ft. A. B. McKay is general manager.

The New Bedford Welding & Machine Co., 1 Rodman Street, New Bedford, Mass., contemplates alterations to its plant and the addition of equipment.

Cranes of 3-ton capacity will be installed in Building 26-F being erected by the General Electric Co., Pittsfield, Mass. The plant will be used for the vacuum treatment of small transformers.

Holyoke, Mass., has indefinitely postponed the erection of a vocational school, plans for which have been submitted for bids.

The resumption of work toward the completion of the Southern New England Railway from Palmer, Mass., to Rhode Island Tidewater has revived plans for the establishment of a machine shop at some point along the road. The company is a subsidiary of the Grand Trunk Railway.

The P. & F. Corbin Co., New Britain, Conn., a subsidiary of the American Hardware Co., will make alterations and repairs to its plant at an estimated cost of $60,000. The American Hardware Corporation will erect a cooling plant on Park Street to cost approximately $15,000.

Bids will shortly be asked on a new school to be erected on the Hawley grammer school grounds, Northampton, Mass., plans for which call for manual training departments.

The New York, New Haven & Hartford Railroad Co., Union Station, Providence, R. I., will build a new engine house and repair shop at Oriental and Charles Streets.

The Cumberland County Power & Light Co., Congress Street, Portland, Me., is planning the construction of a new power house estimated to cost $50,000.

Manual training equipment will be installed in the new two-story high school to be erected at Gorham, N. H., estimated to cost $100,000, for which a general contract will soon be let. Wilson Potter, 22 East Seventeenth Street, New York, is architect.

Manual training equipment will be installed in the proposed two-story high school to be erected at Newmarket, N. H., estimated to cost $100,000. The J. H. Bickford Co., 6 Beacon Street, Boston, is architect, and will soon call for bids on a general contract.

The Eastern Machine Works, 24 Marshall Wharf, Lynn, Mass., has inquiries out for a high pressure oil pump with capacity of about 3000 lb. per sq. in., and one hydraulic accumulator, about 3000 lb. capacity, used, in good condition.

The Quality Grinding Co., Springfield, Mass., has taken over a branch of the business of the Charter Oak Machine Co., Hartford, Conn., covering cylinder grinding and motor parts and specialties, and will concentrate and expand operations at its Chestnut Street plant. Clifford Loud is head.

The Connecticut Co., 22 Church Street, New Haven, Conn., operating a motor bus line, has awarded contract to C. A. Sibley & Co., New Haven, for a one-story machine and repair shop, 68 x 208 ft., at Grant Avenue and Haven Street, to cost $60,000. It will also be used for parts manufacture.

The Katahdin Electric Co., Patten, Me., recently organized, plans the construction of a power plant and system in a portion of Penobscot County. Raymond D. Gardner is president.

The Weir Stove Co., Taunton, Mass., is considering the erection of a one-story building, 52 x 102 ft.

Bids will be received by the Metropolitan District Commission, Commonwealth of Massachusetts, 1 Ashburton Place, Boston, until Oct. 4 for a cross-compound, crank and flywheel condensing pumping engine, with daily capacity of 20,000,000 gal. for installation at Spot Pond.

Baltimore

BALTIMORE, Sept. 17.

THE Chestertown Development Co., Chestertown, Md., has inquiries out for a boiler, locomotive type, with auxiliary equipment.

The Navy Supply Officer, Washington Navy Yard, will take bids at once for three motors, three automatic starting compensators, three flexible couplings and four electric transformers, N. S. A. F. requisition 83; also for 3750 ft. phosphor bronze cable and 10 lengths of galvanized chain, N. S. A. F. requisition 80.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until Sept. 24, for a quantity of tools and equipment, including 144 machinists' hammers, 24 pairs tinners' shears, 24 breast drills, 24 hand drills, 80 blacksmiths' punches, 20,000 ft. galvanized steel conduit and 25,000 ft. of copper wire, circular 2332.

The North Beach Electric Light & Power Co., North Beach (Calvert County), Md., recently organized, contemplates the installation of a plant and system for service in this section. The company is headed by William J. Duncan and Augustus C. Breitenstein, both of North Beach.

The Chesapeake & Ohio Railroad Co., 823 East Main Street, Richmond, Va., is planning to purchase a 20-ton locomotive crane. H. C. Pearce is director of purchases and stores.

The Bristol Ice & Coal Co., Bristol, Va., recently organized, is contemplating the construction of a new ice-manufacturing plant, 60 x 100 ft., at Commonwealth and Euclid Avenues. R. F. Wagner is president.

Fire, Sept. 8, destroyed a portion of the plant of the Henderson Veneering & Mfg. Co., Henderson, N. C., manufacturer of coat hangers, etc., with loss estimated at $35,000. It is planned to rebuild.

The Nottaway Shook Co., Blackstone, Va., is planning to rebuild the portion of its plant recently destroyed by fire and is inquiring for box-manufacturing machinery and other equipment.

The Bureau of Yards and Docks, Navy Department, Washington, is preparing plans for a new pumping plant at the naval property, Dahlgren, Va., and will soon take bids, specification 4904.

A machine shop will be installed in the new automobile service and repair building to be erected at Washington by M. Cafritz, 913 Fifteenth Street, N. W., estimated to cost $200,000, for which plans have been prepared by H. H. Warnick, 1108 Sixteenth Street, N. W., architect.

The Western Paper Makers' Chemical Co., Kalamazoo, Mich., will remodel the plant of the Grecian-American Turpentine Co., Savannah, Ga., recently acquired, and install machinery for rosin-sizing and other operations. The company operates plants at Jacksonville and Pensacola, Fla. O. E. Scott will act as manager at Savannah.

The Board of District Commissioners, Washington, will take bids until Sept. 25 for woodworking machinery and other manual training equipment for the Eastern junior high school; until Sept. 27 for one truck loader, one power grader and other road machinery.

The Pigeon River Power Co., Waynesville, N. C., has preliminary plans for a hydroelectric power house on the Pigeon River, near Waterville, N. C., with initial capacity of 50,000 hp. A steel tower transmission system will be built for service at Asheville, N. C., and vicinity. Francis R. Weller, Mills Building, Washington, D. C., is consulting engineer.

J. W. Evans, East Morgan Street, Raleigh, N. C., is planning the erection of a two-story machine and repair shop at Blount and Morgan Streets, 100 x 100 ft., estimated to cost $50,000.

A company is being formed to take over the plant of the Hess Steel Corporation, Biddle Street and Loney's Lane, Baltimore, for the manufacture of a new line of steel products. It has been practically idle since July, 1920, when a receiver was appointed for the Hess company.

The Common Council, Gastonia, N. C., is planning for a bond issue of $200,000 for the construction of a municipal electric power plant and electrically-operated waterworks. B. H. Parker is mayor.

The Blue Ridge Mica Co., Winston-Salem, N. C., is perfecting plans for the construction of a local plant, with power house, estimated to cost $250,000 including machinery.

The Consolidated Ice & Fuel Co., Union, S. C., is planning for the installation of electrically-operated machinery at its plant, to replace present steam-driven apparatus. R. L. McNally is treasurer.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 2 for one apron loader and motor, for the Annapolis Navy Yard, schedule 1301; until Sept. 25 for 500 7-in. scythe cutting pliers, for the Hampton Roads Navy Yard, schedule 1299, and until Oct. 9 for 1660 lb. of magnet wire, for the Mare Island Navy Yard, schedule 1303.

W. L. Duncan, 347 Arcade Building, Norfolk, Va., is making inquiries for drag and belt-driven types of portable conveyors and desires to get in touch with manufacturers of such equipment.

The Tom Houston Mfg. Co., Columbus, Ga., has inquiries out for a number of chain hoists, 1 and ½-ton capacities.

The Clinch River Coal Corporation, Coeburn, Va., has acquired the local properties of the Odle Coal Co. and plans for the installation of electric power and other equipment. William J. Jegen, Edge Hill, Pa., is president of the purchasing company.

The Paul Rubber Co., Salisbury, N. C., is planning for the establishment of new works for the manufacture of automobile tires.

Philadelphia

PHILADELPHIA, Sept. 17.

INQUIRIES are being made by C. M. Roswell, 1162 Marlyn Road, Philadelphia, machinery dealer, for one air compressor, 250 to 500 cu. ft. capacity, direct-connected to electric motor, or belted type.

Bids will be received by the Quartermaster Department, Intermediate Depot, Twenty-first Street and Oregon Avenue, Philadelphia, until Sept. 26 for the installation of oil burning equipment at the central heating plant, United States Army depot.

The Philadelphia & Reading Railway Co., Reading Terminal, Philadelphia, has plans for the construction of a machine and mechanical shop on Huntingdon Street estimated to cost $75,000, including equipment. It will soon commence the construction of its new elevator at Port Richmond, estimated to cost $1,500,000 with loading, conveying and other equipment.

Bids will be received by the Department of Public Works, City Hall, Philadelphia, until Sept. 25 for a new electrically-operated pumping plant on Germantown Avenue for auxiliary waterworks service.

The Metalweld Service Corporation, 1435 North Thirty-first Street, Philadelphia, operating a welding and general metal works, has acquired property at Hunting Park Avenue and Fox Street for $60,000 as a site for a new factory, for which plans will soon be prepared.

Officials of the Penn Seaboard Steel Corporation, Franklin Bank Building, Philadelphia, are perfecting plans for a reorganization of the company under the name of the Penn Steel Castings Co., with capital of $500,000. It will take over and expand the plant of the Penn Seaboard company at Chester, Pa., and purposes to develop large capacity for steel castings.

A list of electric power equipment, transmission and other equipment will soon be arranged for installation in the nine-story addition now in course of erection by Stephen F. Whitman & Son, Inc., Philadelphia, manufacturer of chocolate and confectionery products, estimated to cost $750,000 with equipment. Walter S. Sharp is president.

The Wood Brothers Ice Mfg. Co., Tamaqua, Pa., has preliminary plans for rebuilding the portion of its plant recently destroyed by fire with loss estimated at $40,000, including equipment.

The Hardinge Conical Mill Co., 120 Broadway, New York, manufacturer of grinding mills, etc., has perfected plans for the concentration of operations at its plant at York, Pa., including the removal of headquarters to this location. All branches of manufacture, including parts and assembling, will be carried out at this works.

Manual training equipment will be installed in the new junior high school to be erected at New Philadelphia, Blythe Township, Pa., estimated to cost $200,000. The Board of Education is in charge.

The Metropolitan Power Co., Reading, Pa., a subsidiary of the Metropolitan Edison Co., will install a 37,500 kva. turbo-generator, five 1500-hp. boilers, with steel tube econo-

mizers, pumping machinery and other equipment at its new generating plant on the Susquehanna River, at Middletown, Pa., for which superstructure work is now under way. The initial plant is expected to be completed next summer, and shortly thereafter another 37,500 kva. generator will be installed, and additional units later until the ultimate capacity of 200,000 kw. is available. It will cost $500,000, including transmission lines.

The Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, is perfecting plans for the construction of a new coal washery at its properties near Shamokin, Pa.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa., is planning for extensions in its electric plant and system to cost $125,000 with equipment.

Following the purchase of the two foundries of the late Edwin A. Moore at Fort and Robeson Streets, Reading, Pa., and at Spring City, Pa., by the Textile Machine Works, Wyomissing, Pa., the last noted plant has been disposed of to a new company now being organized by M. M. Marcus. Early possession will be taken, improvements made and the foundry placed in operation by the new organization. The Textile Machine company will operate the Reading foundry.

Manual training equipment will be installed in the new high school to be erected at Hyde Park, Muhlenberg Township, Pa., estimated to cost $100,000, for which Richter & Eller, Philadelphia, are architects.

The Penn Central Light & Power Co., Altoona, Pa., is contemplating extensions in its plant and system in the vicinity of Lewistown, Pa.

Buffalo

BUFFALO, Sept. 17.

BIDS will be received by the Superintendent of Light Houses, United States Light House Service, Buffalo, until Sept. 24 for one oil engine-driven electric generator and one electric motor-driven air compressor unit, as per specifications on file.

The Buick Motor Corporation, 1100 Main Street, Buffalo, has awarded a general contract to Cooker & Carpenter, Crosby Building, for a two-story service and repair building estimated to cost $75,000.

The Cutler Ice Co., Front Street, Binghamton, N. Y., has tentative plans for an addition estimated to cost $50,000.

The Jewett Refrigerator Co., 27 Chandler Street, Buffalo, will build an addition, 40 x 60 ft., to its plant at Lackawanna, N. Y., to provide for additions in its line of products.

Arthur W. Kreinheder, commissioner of public works, Buffalo, will receive bids until Oct. 23 for electrically operated centrifugal pumping machinery for the local waterworks, including two units, each with capacity of 75,000,000 gal. per day; and others with a capacity of 45,000,000 gal., 30,000,000 gal., 15,000,000 gal., 8,500,000 gal., and one unit of 3,500,000 gal., with 10 switchboard panels and auxiliary electrical apparatus. Fuller & McClintock, 170 Broadway, New York, are consulting engineers.

The Art Work Shop, 828 East Ferry Street, Buffalo, manufacturer of metal products, is planning the erection of an addition, 20 x 80 ft., with installation of a drop hammer, cutting machines and other equipment, all electrically operated. H. B. MacFarland is president.

The Buffalo Creek Railroad Co., Lehigh Valley Railroad Terminal, Buffalo, is planning for a new engine house and repair shop, 80 x 85 ft., on Buffalo Creek.

The new plant of the Ontario Paper Co., Thorold, Ont., on Little Island, North Tonawanda, N. Y., will consist of a main building, 150 x 400 ft.; machine department, 93 x 380 ft.; beater department, 130 x 145 ft., and power house. Excavations will begin at once. The plant will cost $2,000,000 with machinery, and will be operated in the name of the Daily Newsprint Corporation, a subsidiary. Warren Curtis is general manager.

John C. Breker, Buffalo, is planning for the establishment of a metal-manufacturing and plating works in the two-story building, 20 x 55 ft., at 132 Spruce Street, and will soon commence the installation of equipment.

The Paige Sales Co., Cortland Street, Rochester, N. Y., local representative for the Paige automobile, will install a machine shop in its two-story service and repair building, 60 x 100 ft. H. R. Stewart is president.

The Northern Oil & Fuel Corporation, 337 State Street, Watertown, N. Y., is contemplating the erection of a branch plant at Lowville, N. Y., estimated to cost $75,000. G. W. Lane is president.

The Board of Trustees, Orchard Park, N. Y., has tentative plans for the installation of electrically operated pumping machinery, steel water tank and tower and other equipment, in connection with a proposed municipal waterworks to cost about $215,000.

The Walker Repair Shop, Ferguson and Muir Streets, Niagara Falls, N. Y., T. H. Routh in charge, is planning for the installation of small tools and other machine shop equipment.

The Harrison Radiator Corporation, Lockport, N. Y., manufacturer of automobile radiators, has filed plans for a new unit, duplicating its present works and designed to double the capacity, estimated to cost $300,000 including machinery.

The Symington gun manufacturing plant, University Avenue, Rochester, N. Y., inactive since the war, owned by the Gleason Works, Inc., and the Todd Protectograph Co., has been sold to the Monroe Warehouse Co. for $300,000, of which about $100,000 represents buildings and equipment. The new owner purposes to use the plant for automobile service.

W. J. Kinekenberg, 279 Niagara Street, Buffalo, has inquiries out for two hoisting engines, each with two drums.

A machine shop will be installed in the two-story automobile service and repair building to be erected on Main Street, Lockport, N. Y., 54 x 100 ft., by Cole Brothers, Lockport, for which plans have been prepared by Nichols & Gardinier, 46 North Pearl Street, Albany, N. Y.

The Spencer Lens Co., 442 Niagara Street, Buffalo, is arranging for extensions to manufacture a new motion picture machine to be known as the Automatic Delineascope. The fifth floor of the present plant, heretofore leased to outside interests, will be taken over and equipment installed for the new department.

Pittsburgh

PITTSBURGH, Sept. 17.

LOCALLY, the machine tool market lacks activity and new features. There is a fair number of single tool orders, but action is still deferred on lists which have been out for several weeks. Most interest centers around the list of the Pennsylvania Railroad, Central Region, embracing 34 tools for shops in and around Pittsburgh. This road recently closed for a journal truing machine for its Pitcairn shop, which was not included in the list issued about six weeks ago. The Lorain Steel Co., Johnstown, Pa., has not yet closed on two heavy frog and switch planers. The Petroleum Iron Works, Sharon, Pa., which is constructing a fabricating shop at Beaumont, Tex., is reported to have closed for a multiple-type beam punch and a spacing table with the Thomas Spacing Machine Co., Pittsburgh, and for several punches and shears with the Cleveland Punch & Shear Co., Wickliffe, Ohio.

The week has been dull in cranes and other heavy equipment, and there have been no new orders for power equipment of any consequence.

Tentative plans are being considered by the Consolidated Motors Corporation, 117 Flavel Street, Pittsburgh, W. O. Dayton, vice-president, for a new assembling plant at New Castle, Pa., where a site will be selected.

A machine shop will be installed in the two-story service and repair building, 85 x 125 ft., to be erected by the McGraw Co., 10-12 South Broadway, Wheeling, W. Va., local representative for the Ford automobile, estimated to cost $75,000. F. F. Harris, Wheeling Steel Corporation Building, is architect. Robert W. McGraw is general manager.

The Jeffrey-Dewitt Insulator Corporation, Kenova, W. Va., has leased the former plant of the Ferguson Shipbuilding Co., Abbott Road and the Buffalo River, Buffalo, for the establishment of a new plant. The buildings will be remodeled and production will be devoted to the manufacture of electric switches. It is purposed to make this the main plant of the company for such line. Jesse E. Sinclair will be general manager.

The French Sand Dryer Co., Keystone, W. Va., recently organized, has tentative plans for a local foundry to manufacture special iron castings. C. S. French and S. A. Christie, Keystone, head the company.

The Western Electric Co., 910 River Avenue, Northside, Pittsburgh, has leased a five-story building, 65 x 158 ft., to be erected on West Street, totaling about 50,000 sq. ft., for new works. It will be ready for occupancy about Dec. 1.

The Guyan Machine Shops., Logan, W. Va., machinery dealers, have inquiries out for several portable boilers, 35 to 40-hp., mounted on wheel trucks, with auxiliary equipment.

The Northern Cambria Co., Spangler, Pa., care of Tannett, Seelye & Fleming, Caplan Building, Harrisburg, Pa., engineers, has plans for the installation of an electrically-operated pumping plant to cost about $50,000, with pipe line, etc.

Milwaukee

MILWAUKEE, Sept. 17.

MACHINE-TOOL business is making some progress toward volume, although the process is slow and the course of business continues uneven. Orders come from scattering sources, although inquiry is improving and shows a tendency to broaden. A few large concerns are carrying forward extensive shop and power plant projects, while the large majority of all sizes are marking time in this respect, the main idea being to await a reduction in construction costs. There are few if any large lot inquiries before builders or dealers, and current trade is dependent mainly upon replacement needs. The automotive industries remain the principal source of demand.

The American Skein & Foundry Co., Racine, Wis., is erecting a two-story brick and concrete addition, 40 x 140 ft., to be used largely for the piano plate division which recently was separately incorporated, although remaining in the sole control and ownership of the original company. The general contractors are Nelson & Co., Racine.

The Four Wheel Drive Auto Co., Clintonville, Wis., is buying a few miscellaneous items of equipment, having secured the exclusive right to manufacture and mount on F W D motor trucks the earth-boring machine formerly built by the defunct Winther Motors, Inc., Kenosha, Wis., and sold in liquidation to the International Earth Boring Machine Co., Chicago. The device is used for boring post holes and setting poles and posts for transmission lines, etc.

The Algoma Wood Products Co., Algoma, Wis., will replace its frame and brick factory group with fireproof buildings and contemplates the purchase of considerable new wood and metal-working equipment and additional power plant machinery. Contracts will be let Oct. 1 for the first unit, 60 x 120 ft., two stories and basement. Next spring work will be started on a similar unit and a battery of dry kilns. The capital stock has been increased from $50,000 to $100,000 to finance the work. Charles Schmitt is secretary and general manager.

The Triangle Mfg. Co., Oshkosh, Wis., will buy a few items of additional equipment for a new department which will manufacture a patented hospital bed designed by George C. Hume and Peter Enders, Chilton, Wis. No plant enlargement is contemplated for the present. F. J. Sullivan is president and general manager.

The Cedarburg Dairy Co., 1028 Central Avenue, Milwaukee, has purchased several buildings of the Cream City Brewing Co. group at Thirteenth and Cherry Streets. It will do extensive remodeling and will require complete new pasteurizing equipment, tanks, conveyors, refrigerating machinery, etc. The total investment will be in excess of $150,000. Henry Berns is president.

The Lakeside Malleable Casting Co., Racine, Wis., has started work on a foundry addition, 40 x 140 ft., and will also remodel the present works at an estimated cost of $75,000. The work is in charge of Edmund B. Funston & Co., local architects and engineers.

The Board of Education, River Falls, Wis., has selected Jacobson & Jacobson, architects, 127 Auditorium Building, Minneapolis, Minn., to design the proposed new $225,000 high school to be erected early in 1924. The building will accommodate manual training and other vocational shops. George T. Smith is chairman of the board.

The Gold Medal Camp Furniture Co., Racine, Wis., manufacturer of metal and wood camping equipment, will build a power plant addition, 24 x 42 ft., and is in the market for some supplementary equipment. A factory addition probably will be erected next spring.

The Glancy Malleable Corporation, incorporated recently at Waukesha, Wis., with a capital of 1000 shares of common stock without par value, has taken over the business of the Waukesha Malleable Iron Co., which has been operated under a five-year lease by the General Motors Corporation. Originally the plant furnished castings to the Samson Tractor Co., Janesville, Wis., which has been liquidated and the works turned over to the Chevrolet and Fisher Body divisions. A. R. Glancy, who was general manager of the Waukesha foundry for the General Motors interests, becomes president and general manager of the new concern. L. A. Williams is vice-president; E. F. Carsob, treasurer, and L. D. Harkider, secretary.

The Kickapoo River Power Co., LaFarge, Wis., has been organized with an initial capitalization of $25,000 to develop a water power near LaFarge and build a hydroelectric generating plant on the Kickapoo River. Plans are being prepared by Mead & Seastone, consulting engineers, Madison, Wis. The principals are E. E. Woodard of LaFarge, and L. C. Fleck and E. E. Dillon, Madison.

The Board of Industrial Education, Appleton, Wis., expects to take bids after Oct. 1 for the construction of two junior high and vocational training schools, estimated to cost in the aggregate about $550,000. Plans are being completed by Perkins, Fellows & Hamilton, architects, 814 Tower Court, Chicago. Henry Reuter is president of the board.

The Prime Mfg. Co., Milwaukee, is contemplating the erection of a brass foundry of approximately 15,000 to 18,000 sq. ft. No definite plans have as yet been made.

Chicago

CHICAGO, Sept. 17.

THE market remains quiet except for occasional purchases of one or two machines. Industrial companies continue busy and apparently could use additional equipment, but are hesitant about making purchases at this time. There is still considerable second-hand equipment in the market, which is frequently bought instead of new tools. There has been no further railroad buying, and some lines which were counted on to place orders have inaugurated a policy of retrenchment in all departments. The Sinclair Refining Co. is in the market for a list of miscellaneous equipment, including a steam hammer, a bulldozer, a 24-in. upright drill and a hack saw. Frank D. Chase, engineer, Chicago, is inquiring for an open-side planer for one of his clients.

The Chicago Steel & Wire Co., 106th Street and Torrence Avenue, Chicago, is adding a wire-weaving unit, 60 x 239 ft., to its plant.

The New York, Chicago & St. Louis Railroad is building a one-story extension to its shop, 99 x 157 ft., at Ninety-third and Stony Island Avenue, Chicago.

The National Steel Door Co., 26 West Austin Avenue, Chicago, has leased a one-story plant containing 20,000 sq. feet at 4241 Ogden Avenue.

J. D. Wallace & Co., machinery manufacturer, 1401 West Jackson Boulevard, Chicago, will receive bids through C. W. Lampe, 155 North Clark Street, on a one-story factory, 112 x 150 ft., at the northwest corner of Adams Street and California Avenue, to cost $50,000.

The Protecto Mfg. Co., 5206 West Kinzie Street, Chicago, is having plans prepared for a one-story factory, 25 x 125 ft., on West Lake Street, near Long Avenue, to cost $15,000.

The George F. Marchant Co., machinist, Fourteenth and Rockwell Streets, Chicago, has let contract for a one-story factory, 73 x 124 ft., on the northwest corner of Fourteenth Place and Rockwell Street, to cost $15,000.

The Reliance Stove Co. has awarded a contract to Weslo, Wagstad & Carlson, 1743 North Crawford Avenue, Chicago, for a one-story factory, 80 x 125 ft., at 1917-25 Bloomingdale Avenue, to cost $25,000.

The Common Council, Le Sueur, Minn., has tentative plans for the construction of a municipal electric power plant.

Manual training equipment will be installed in the new two-story junior and senior high school to be erected at Fairbury, Neb., estimated to cost $200,000, for which excavations will begin at once. Fiske & Meginnis, Bankers' Life Building, Lincoln, Neb., are architects.

Cohn Brothers, 911 Commercial Street, Waterloo, Iowa, are having plans drawn for a one-story machine shop, 60 x 70 ft. Bartley & Pediford, 218 L. & J. Building, are architects.

Manual training equipment will be installed in the new two-story high school to be erected at Waseca, Minn., estimated to cost $450,000, for which bids will be asked on a general contract in October. William B. Ittner, Board of Education Building, St. Louis, is architect.

The Western Cartridge Co., East Alton, Ill., has inquiries out for a steam boiler and auxiliary equipment, about 165 hp., Scotch marine or similar type.

The Common Council, Washington, Iowa, is planning for the installation of electrically-operated pumping equipment in connection with extensions and improvements in the municipal water works, estimated to cost $80,000. Arthur L. Mullergren, 555 Gates Building, Kansas City, Mo., is consulting engineer.

The Great Northern Railway Co., St. Paul, Minn., is considering the construction of a new one-story machine and repair shop at Minot, N. D., estimated to cost $85,000. R. A. McCandless, superintendent of the Minot Division, is in charge.

The Holland Furnace Co., Holland, Mich., manufacturer of furnaces, stoves, etc., will commence the erection of an addition to its plant at Cedar Rapids, Iowa, to double the present output, estimated to cost $100,000.

Cleveland

CLEVELAND, Sept. 17.

THE improvement shown in the machinery market at the beginning of the month has not kept up, and the past week was generally quiet. There were few sales outside of single tools and not much in the way of new inquiry. The Cleveland Stone Co. has sent out a list of eight machines for a shop at Amherst, Ohio, which is the largest new inquiry. It includes a 14 and 16-in. lathe, a 4-ft. radial drill, a small drilling machine, milling machine, shaper and slotting machine. The Nickel Plate Railroad placed one machine, a turret lathe, with a Cleveland manufacturer and still has a number of machines to purchase on its recently issued list. The Humphrey Mfg. Co., Mansfield, Ohio, is planning the erection of a foundry and machine shop for use in the manufacture of cast iron bathtubs and other sanitary ware and will probably purchase several machine tools.

A Detroit automobile company purchased close to a dozen machines the past week, and some fair sized lots are pending in that city. Other purchases include six used hand screw machines by the Remy Electric Co., Anderson, Ind., the order being taken by a Cleveland dealer.

The equipment of the Erie Specialty Co., Erie, Pa., will be offered for sale at auction Sept. 18.

The Pioneer High Speed Knife Co., Cleveland, has been organized by C. G. Willis and J. J. Zoffer and others to manufacture machine knives. The company has leased a factory on West Street, providing approximately 25,000 sq. ft. of floor space. It was formerly occupied by the Great Lakes Welding Co.

The Gripstick Co., Canton, Ohio, has been incorporated with a capital stock of $50,000 to manufacture a combination wrench and plier. H. N. Bigler, Dover, Ohio, is president and Fred P. Potchner, secretary. The company plans to have its product made under contract.

The William Campbell Co., Detroit, Mich., will move to Alliance, Ohio, where it will erect a plant for the manufacture of automatic fireless cookers.

The Cleveland Cap Screw Co., 2921 East Seventy-ninth Street, has awarded contract for the erection of the two-story addition, 66 x 95 ft.

The Union Chain & Mfg. Co., Sandusky, Ohio, is in the market for a 77½ or 78½ Bliss punch press or equivalent, 5-in. to 6-in. stroke.

The Interstate Foundry Co., 3161 East Sixty-first Street, Cleveland, is inquiring for a second-hand, 250-hp. unity power factor, 3-phase, 60-cycle, 440-volt synchronous motor.

Vickery & Vickery, Cleveland Discount Building, Cleveland, attorneys for the stockholders' protective committee of the Whitney Tractor Co., Port Huron, Mich., have placed on sale the entire machine tool equipment of that plant, which is valued slightly in excess of $25,000. The plant will be open for inspection of the machinery until Sept. 22, and bids for all or part of the equipment will be received by Vickery & Vickery until September 29, at which time the machinery will be disposed of to the highest bidders.

Henry Prentiss & Co., 149 Broadway, New York, have been appointed selling agents in the New York territory for the Cincinnati centerless grinder, manufactured by the Cincinnati Milling Machine Co. Prentiss & Co. have represented this company on milling machines for some time.

Cincinnati

CINCINNATI, Sept. 17.

ALTHOUGH the past week has been quiet in the machine tool market, a number of orders, mostly for single machines, has been booked. Several large deals, at least one of which is for export, are said to be nearly completed, but little information is being given out regarding them. Another transaction involving a large number of tools is reported to be about ready to close, but it depends largely on the proper financing. Automobile companies continue to buy for replacement, and it is said that one large manufacturer, which recently brought out its 1924 model, is so booked with orders that it is negotiating for the purchase of a number of plants in various sections of the country, to be used for body-building and for the manufacture of motors and other parts.

That the machine tool industry as a whole showed improvement in August over July is attested by the figures on order books for the two months. July showed an index number of 32.4, while August was 37.6. September, to date, has been dull, but orders now pending are expected to bring the total bookings up to last month's figures.

The property of the Kilbourne & Jacobs Mfg. Co., Columbus, Ohio, which went into receiver's hands early in the year, was sold at public auction for $900,000 to F. R. Huntington, of the Huntington National Bank, Columbus. No statement has been made as to the syndicate for which he acted as agent, but it is understood that the plant will be continued in operation.

The city of Hamilton, Ohio, will spend approximately $700,000 for the erection and equipment of an electric lighting plant. The Froelich & Emery Co., Toledo, are engineers. Plans have been completed and bids for erection will probably be asked within the next few weeks.

Colgate & Co., New York, who recently purchased the building of the Indiana Reformatory at Jeffersonville, Ind., will remodel it for the manufacture of soaps and perfumes. A power house is being erected and numerous tanks for storage purposes will be installed.

Detroit

DETROIT, Sept. 17.

PLANS are being completed for a new works at Pontiac, Mich., by the Fisher Body Co., General Motors Building, Detroit, adjoining a plant recently completed for the manufacture of bodies for the Oakland Motor Co. The new building will be equipped for metal body construction and metal-finishing and is estimated to cost $500,000 with machinery.

The American Plywood Wheel Co., care of the Chamber of Commerce, Howell, Mich., has acquired the Hadden tract of property, near the Pere Marquette Railroad as a site for a new plant to manufacture automobile wheels.

The Kelvinator Corporation, 2051 Fort Street, Detroit, manufacturer of electric refrigerators, has awarded a general contract to Malow Barry, 2631 Woodward Avenue, for a three-story addition, 45 x 96 ft., estimated to cost $85,000. Smith, Hinchman & Grylls, 800 Marquette Building, are architects. H. W. Bailey is secretary.

J. W. Brown, formerly connected with the Couple Gear Co., and P. Honn, previously with the Perkins Machine Co., both of Grand Rapids, have formed the Honn-Brown Co., Inc., to manufacture equipment for automobiles, including wheel removers, etc. Property has been acquired at 416 Scribner Avenue for the new plant.

The C. B. Shepard Co., 89 Moss Avenue, Highland Park, Detroit, has inquiries out for a used hydraulic press, 700 to 1000 tons' capacity.

The Mack International Motor Truck Co., 628 Forest Avenue, Detroit, has leased a one-story building, 195 x 385 ft., to be erected on the Grand River Boulevard, for a new service and repair work. It will cost about $150,000.

The Trail-Ford Corporation, Ann Arbor, Mich., formerly known as the Automotive Utilities Corporation, has secured a plant, with site of about seven acres, for the manufacture of special wheel equipment, axles and other specialties for the Fordson tractor. Tentative plans are under advisement for an addition, for which ground will be broken early in the coming year, to provide about 45,000 sq. ft. of additional space. A. R. Thomas is vice-president.

Electrically-operated machinery will be installed in the new pumping plant, to be erected by the Wayne County Road Commission, Real Estate Exchange Building, Detroit, at Lincoln Park, Mich., estimated to cost $45,000. H. A. Shuptrime is engineer for the commission.

The National Steel Products Co., 2270 Franklin Street, Detroit, has purchased the plant of the Ground Hog Tractor Co., Holly, Mich., a defunct organization, for the establishment of new works. Machinery will be installed at once for the manufacture of a line of steel products for automobiles.

Indiana

INDIANAPOLIS, Sept. 17.

PLANS are being perfected by the All-Rite Co., Virginia Avenue, Indianapolis, manufacturer of electrical products, for the removal of its works to 418 South Pennsylvania Street, where additional equipment will be installed for larger output.

The Kolograph Co., Indianapolis, will establish a machine shop at 216 East Maryland Street, for the manufacture of motion picture machines and parts.

A machine shop will be installed in the new two-story service and repair building at 530-32 South Meridian Street, Indianapolis, now in course of construction, by Smith & Moore, Inc., 259 South Meridian Street, local representative for the Ford automobile. It will cost about $100,000.

The Spacke Machine & Tool Co., Indianapolis, David Spacke, head, has disposed of its two-story building at Madison Avenue and Merrill Street, for $100,000, and it will be remodeled for another line of business. The Spacke company has been operating under the direction of Charles O. Roemler, receiver, who is liquidating the property.

Michael Seyfried, Indianapolis, has arranged for the establishment of a new plant at 3320 East New York Street, for the manufacture of sheet metal products.

The Common Council, Jasonville, Ind., is planning for the installation of electrically-operated pumping machinery in connection with a new waterworks plant estimated to cost $150,000. A. Simms is consulting engineer for the city.

Hedderich Brothers, Bond Street, Evansville, Ind., operating a brass and bronze foundry, are said to be arranging a list of equipment for installation in their proposed one-story addition.

The Indiana Electric Corporation, Indianapolis, has disposed of a bond issue of $27,000,000, a portion of the proceeds to be used for electric power plant construction, extensions, etc.

L. P. Hartzell, Hoagland, Ind., has tentative plans for rebuilding his tile manufacturing plant and power house, partially destroyed by fire with loss of about $25,000, including equipment.

The Central South

ST. LOUIS, Sept. 17.

WORK will commence on the new cement manufacturing plant to be erected at Bonner Springs, Kan., by the Kansas Portland Cement Co., 1608 Federal Reserve Bank Building, Kansas City, Kan., estimated to cost $1,000,000 with machinery. The installation will include a power plant. The McDonald Engineering Co., 533 West Jackson Boulevard, Chicago, will be in charge of the work. The company is operated by the International Cement Co.

The American Aluminum Co., 305-7 South Seventh Street, St. Louis, has tentative plans for rebuilding the portion of its works recently destroyed by fire with loss estimated at $135,000, including equipment.

The Atlantic Ice & Coal Co., Chattanooga, Tenn., will commence the construction of a four-story addition to its ice-manufacturing plant, 80 x 80 ft. Other units will be built later.

Fire, Sept. 8, destroyed the power house and plant of the Union Sash & Door Co., Cape Girardeau, Mo., and adjoining property of the Forrest Lumber Co., an affiliated organization, with loss estimated at $250,000, including equipment. It is planned to rebuild.

Ovens, power equipment, conveying and other machinery will be installed in the new three-story and basement plant, 75 x 100 ft., to be erected by the Jordan Baking Co., Topeka, Kan., estimated to cost $100,000, for which bids will soon be asked. W. E. Glover, Stormont Building, is architect.

A machine shop will be installed in the three-story service and repair building, 135 x 166 ft., to be erected on Washington Street, St. Louis, by the Tate Motor Co., 3111 Locust Street, estimated to cost $200,000. The Widmer Engineering Co., Laclede Gas Building, is engineer. F. R. Tate is president.

The Common Council, Lawrenceburg, Tenn., is perfecting plans for a municipal electric power house on Shoal Creek, estimated to cost $80,000. Bids will soon be asked by Freeland-Roberts, Inc., Nashville, Tenn., engineer.

The Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, has plans for the first of its proposed group of three branch buildings on Vandeventer Street, St. Louis, to be two and three stories, estimated to cost $225,000 with machinery. Kleipstein & Rathmann, Chemical Building, St. Louis, are architects.

The Kelleys Ferry Coal Co., 322 First National Bank Building, Chattanooga, Tenn., is planning for the installation of electric power and general mining machinery at its coal properties. W. J. Nixon is president and treasurer.

C. E. Carroll, Newport, Ark., has inquiries out for automatic oiling equipment for electric machinery and automatic governor controls, and desires to get in touch with manufacturers of such products.

The Eagle River Coal Mining Co., Oliver Spring, Tenn., recently organized with a capital of $250,000, is planning for the installation of electric power equipment, hoisting and other mining machinery at its properties. W. A. Montgomery and J. E. Wood head the company.

The Board of Directors, Deaner Institute, 3520 Broadway, Kansas City, Mo., is planning for the installation of a universal woodworking machine. P. M. Orlopp is in charge.

The Henrici-Lowry Engineering Co., 1222 Commerce Building, Kansas City, Mo., is preparing plans for the installation of a quarry and crushing plant at Murfreesboro, Ark., for a company whose name will be announced later. The installation will include a steam-operated power plant, pumping machinery, hydraulic mining equipment, loading and crushing machinery, and auxiliary equipment.

The Clinchfield Portland Cement Co., Kingsport, Tenn., has acquired the cement and lime plant and machinery of W. E. Culbert, near Perry, Ga., and will use the equipment in connection with its new plant on property recently acquired in this section. Considerable additional equipment will be installed at the projected plant, designed to develop an output of 4000 bbl. per day. It is estimated to cost $2,500,000.

The Warren Steel Casting Co., Fairview Avenue and the Kingshighway, St. Louis, has completed plans for a new two-story foundry, 93 x 256 ft., estimated to cost $55,000, including equipment. O. J. Popp, Odd Fellows Building, is architect.

The Western Electric Co., Hawthorne, Chicago, has acquired 15 acres at East Nashville, Tenn., and has tentative plans for the erection of new branch works.

The Gulf States

BIRMINGHAM, Sept. 17.

ERECTION will commence on a new one-story ice-manufacturing plant on South Twelfth Street, Corsicana, Tex., 90 x 150 ft., by the Navarro Ice Co., Corsicana, estimated to cost $100,000 including machinery.

The Electric Appliance Co., Dallas, Tex., has been organized to take over and consolidate the local company of the same name and the Electric Specialty Co., to specialize in the production of automotive electrical equipment and supplies. The new company will operate with a capital of $90,000. Charles L. Martin is secretary and general manager.

The Riftclimber Boat Co., Mount Alto, Pa., manufacturer of motor boats, etc., is concluding negotiations for a lease of property on Lake Harris, Leesburg, Fla., for the establishment of a branch plant.

The Western Service Corporation has acquired the municipal electric power plant at Franklin, Tex. Extensions will be made, including the installation of additional transmission lines. Headquarters of the purchasing company are at Calvert, Tex.

The Board of Supervisors, Noxubee County, Macon, Miss., John A. Tyson, clerk, will receive bids until Oct. 1 for one pile driver hammer, capacity 1500 hp.

The Lubbock Cotton Compress Co., Lubbock, Tex., is planning the erection of a new one-story compress plant, estimated to cost $80,000 including machinery.

G. H. Brummell & Co., East Twelfth Street, Anniston, Ala., manufacturers of automobile bodies, are planning to rebuild the portion of their two-story plant recently destroyed by fire with loss reported at $40,000 including equipment.

The Leesburg Fibre Pulp & Paper Co., Leesburg, Fla., has authorized plans for a new paper mill at Jacksonville, Fla., where negotiations have been closed for the purchase of 1½ acres adjoining the shipyard of the Merrill-Stevens Co. The main mill will be 50 x 300 ft., with smaller adjoining structures for other departments. A one-story machine shop will be built and a steam-electric power plant. The initial works will cost $500,000 with machinery. Raw mate-

rial will be furnished from the company's plant at Leesburg. Gilbert D. Leach is secretary and treasurer.

The Texas Farm Labor Union, Bonham, Tex., R. R. Claridge, in charge, has preliminary plans for a new cold storage plant at Dallas, Tex., estimated to cost $45,000.

The Gulf States Chemical & Refining Co., 608 American Trust Building, Birmingham, has plans for new works at Montgomery, Ala., estimated to cost $200,000 with machinery. The installation will include pumping machinery, pulverizers, agitators, tanks, mechanical drying equipment and auxiliary machinery. John M. Gallalee is in charge.

Manual training equipment will be installed in the new two-story high school to be erected at Georgetown, Tex., estimated to cost $100,000, for which ground will be broken at once. The Board of Education is in charge.

Manual training equipment will be installed in the new high school to be erected at Eufaula, Ala., estimated to cost $100,000, for which bids are being taken on a general contract. Frank Lockwood, Montgomery, Ala., is architect.

The Humble Oil & Refining Co., Dallas, Tex., is planning for the construction of a new gasoline refinery at Corsicana, Tex., estimated to cost $200,000 with machinery.

W. M. Smith & Co., P. O. Box 1709, Birmingham, Ala., machinery dealers, have inquiries out for a locomotive crane, one wheel press and one standard gage locomotive.

A machine shop will be installed in the two-story automobile and service building, 75 x 120 ft., to be erected by Freeman & Sons, Inc., 3644 North Second Avenue, Buena Vista, Fla. The company was organized recently with a capital of $100,000. H. J. Freeman is head.

The Uvalde Co., 607 City National Bank Building, San Antonio, Tex., has inquiries out for a steam shovel, 1 to 2 yd. capacity, crawler type.

The Madison Oil & Coal Co., Houston, Tex., Hall Etter, president, has acquired lignite property in the vicinity of Calvert, Tex., and contemplates the installation of a complete mining plant, including electric power, hoisting and conveying machinery, etc.

The Common Council, Wylie, Tex., is considering plans for the installation of electrically-operated pumping machinery in connection with its proposed new waterworks estimated to cost $50,000. The Municipal Engineering Co., Praetorian Building, Dallas, Tex., is engineer.

A machine shop will be installed in the new automobile service and repair building to be erected by the Watson Corporation, 213 Congress Building, Miami, Fla., estimated to cost $120,000. C. M. Watson is construction engineer, in charge.

The Steel Products Co., Box 194, Savannah, Ga., is in the market for a medium sized belt-driven bull-dozer for bending structural sections.

The Pacific Coast

SAN FRANCISCO, Sept. 11.

FIRE, Sept. 8, destroyed the mill and power house of the Fir Tree Lumber Co., Olympia, Wash., with loss estimated at $250,000. It is planned to rebuild.

The Grand Rapids Show Case Co., Grand Rapids, Mich., has awarded a general contract to Dougan & Chrisman, Hinckley Building, Seattle, for the first unit of its new plant at Portland, Ore., to be three-stories, estimated to cost $110,000 with equipment. Plans are in progress for other units, to represent a total investment of about $1,000,000, including machinery. Sutton & Whitney, Lewis Building, Portland, are architects.

The Golden Seal Refining Corporation, Riverside, Cal., has preliminary plans for a new gasoline refinery, estimated to cost $150,000. Temporary offices have been established in the Glenwood Mission Garage Building, West Seventh Street.

The Chevrolet Motor Co. of California, Foothill Boulevard and Sixty-ninth Avenue, Oakland, Cal., is having plans drawn for a one-story and basement addition to its local plant, to cost $125,000. The company engineering department is in charge.

Fire, Sept. 8, destroyed a portion of the plant of the Harrington Harvester Co., Harrington, Wash., manufacturer of harvesting machinery, etc., with loss estimated at $200,000, including equipment. It is planned to rebuild.

The Jackson-Bischoff Auto Battery & Accessory Co., Portland, Ore., has plans nearing completion for a new factory estimated to cost $100,000. Schacht & Bergen, Yeon Building, are architects.

The Perfo Piston Ring Co., Los Angeles, has awarded a general contract to F. L. Froley, 942 South Normandie Avenue, for a one-story factory on West Twelfth Street. Stromwell & Halperin, 300 Ferguson Building, are architects.

The Shell Oil Co. of California, 343 Sansome Street, San Francisco, has specifications work under way on a new refinery at Wilmington, Los Angeles, and plans to install machinery for a daily capacity of about 20,000 bbl.

The California Wire Cloth Co., 1001 Twenty-second Avenue, Oakland, Cal., has awarded contracts to McDonald & Kahn, 130 Montgomery Street, San Francisco, for a one-story addition, to cost $50,000.

The Puget Sound Light & Power Co., Seattle, is planning the construction of a new power house at Union and Western Avenues, estimated to cost $50,000.

The Coast Oilfields Supply Co., Los Angeles, manufacturer of oil-drilling and oil well machinery, has awarded contract to the Lavery Construction Co., 543 Bradbury Building, for a two-story plant on Long Beach Avenue, estimated to cost $35,000.

The Board of Education, Monrovia, Cal., has plans for a one-story addition to the manual arts building at the high school, to be used as an automobile mechanic workshop and machine shop.

The Western Fruit Express Co., 1505 Pioneer Building, St. Paul, Minn., is planning the erection of a new one-story railroad car repair shop at Hillyard, Wash., estimated to cost $55,000. F. G. Luth is mechanical superintendent in charge.

The Coast Valley Gas & Electric Co., Monterey, Cal., is disposing of a bond issue of $250,000, a portion of the proceeds to be used for extensions in generating plants and system.

The Board of Public Works, Spokane, Wash., is planning for the installation of electrically-operated pumping machinery in connection with improvements in the municipal waterworks, for which an appropriation of $139,600 has been arranged.

The Carlisle-Pannell Lumber Co., Okalaska, Wash., is planning the construction of a new mill and power house at Carlisle, Wash., to replace its plant recently destroyed by fire.

The C. F. Bulotti Machinery Co., San Francisco, is in the market for a 200-ton standard sectional flanging press, 1500-lb. working pressure, a 300-ton, 72-in. hydraulic wheel press; rolling machine for handling 8-in. channels and angles; angle roller for handling maximum 8-in. channels and angles; No. 3 Cincinnati Acme universal turret lathe.

The Byron Jackson Pump Mfg. Co., Berkeley, Cal., is inquiring for a 400- or 600-hp., three-phase, 60-cycle, 2200-volt horizontal motor.

Trade Changes

C. M. Decker, Philadelphia sales representative of the Geo. T. Ladd Co., manufacturer of Ladd water tube boilers, has moved his office from the Land Title Building to 504 Franklin Bank Building.

Hereafter the Arnold Electric Drill Co., Inc., West Haven, Conn., will be known as the National Electric Mfg. Co.

The Continental Can Co. has purchased the can and tube department of the National Can Co., Detroit. The latter company will retain the buildings and will manufacture automobile radiators exclusively.

William J. Doherty, formerly of the Continental Iron & Steel Co., New York, has opened a branch office at 30 Church Street for the David J. Joseph Co., Cincinnati, dealer in iron and steel scrap, relaying rails, pig iron, bars, plates and sheets.

The Watson Engineering Co., New York and Cleveland, has changed its name to the Watson Co., architect and engineer. The New York office under the management of Charles Watson, is located at 15 Park Row.

The Standard Turbine Corporation, Wellsville, N. Y., has appointed the Percy E. Wright Engineering Co. as agent in the Seattle, Wash., territory, with offices at 2012 L. C. Smith Building.

Industrial Finances

The St. Louis Coke & Iron Co. reports net earnings of $1,389,498 for the year ended Aug. 31, 1923. After preferred dividends there was a remainder equal to 8¾ per cent on the 89,400 shares of common stock outstanding.

Action has been deferred until this week on a petition for authority to issue $50,000 in receiver's certificates to pay current expenses of the Harrisburg Foundry & Machine Co. of Harrisburg, Pa., for which a receiver was named several weeks ago. B. E. Taylor, treasurer of the company, testified that the money is needed to pay operating expenses. The payroll is $5,000 weekly and the firm now has orders amounting to $170,000. It is believed by the receiver, Christian W. Lynch, a former official of the company, that profits on the orders will be sufficient to redeem the receiver's certificates and to place the company on a firm financial basis.

Plans of New Companies

The Farmelectric Corporation, New York, organized in May, is now manufacturing power plants for farm use, through the Poole Engineering & Machine Co., Woodberry, Baltimore, at the rate of 75 per week, and it is likely that this number will have to be increased to meet orders. All replacement parts for these plants are Ford parts. Address care of the Takamine Mfg. Corporation, 342 Madison Avenue.

The Mercury Steam Car Corporation, 523 Monadnock Building, San Francisco, has been incorporated with $10,000,000 capital stock, and will engage in manufacturing steam-driven automobiles. Part of the equipment will be built by the company and part will be let by contract. Operations are expected to begin in the near future. W. T. Dickson is president and F. N. Sessions is secretary-treasurer.

The United States Cutlery Co., Belleville, N. J., has been incorporated with capital stock of $300,000 and has purchased the plant, machinery and raw stocks of the Knickerbocker Mfg. Co., that city. Manufacture will be continued in the same line with the addition of stainless steel cutlery. Machinery has been contracted for. W. A. Magee is one of the principals.

The Morse Mfg. Co., 325 West Fayette Street, Syracuse, N. Y., has been incorporated with $50,000 capital stock to manufacture automotive equipment, taking over a business established for four years. J. M. Morse heads the company and G. L. Clook is sales manager.

The Steelcraft Parts Co., 3160 West 106th Street, Cleveland, organized to take over the plant and equipment of the Structural Tool Co., Cleveland, now has a factory, fully equipped, and is manufacturing a line of rivet sets, chisel blanks, bushings, punches and dies. C. L. Wasmer is president; C. E. Kramer, vice-president, and J. C. Wasmer, secretary.

The Scranton Supply & Machinery Co., has been organized by William H. Taylor to handle machinery, tools and supplies for mines, railroads and machine shops. T. M. Voyle is president; E. R. Holgate, vice-president, and D. C. Voyle, secretary-treasurer. It is located at 634-48 Wyoming Avenue, Scranton.

The Sundh Mfg. Corporation, 342 Madison Avenue, New York, has been organized to manufacture flexible metal couplings. Mr. Sundh of the Sundh Electric Co., Newark, N. J., and the Sundh Engineering & Machine Co., Philadelphia, has withdrawn from these companies to become affiliated with the new organization, whose plant at Hastings, N. Y., will be put on an operating basis at an early date. Other products will likely be added to the line later. Address M. F. Mason.

J. B. Hauer, Inc., 100 Bayard Street, Brooklyn, recently incorporated with $100,000 capital stock and operating a general machine works, is in the market for equipment which will be installed in a building 160 x 200 ft., recently purchased and located at Fifth Avenue and North Driggs Street. J. B. Hauer heads the company.

The Portable Electric Cabinet Co., New York, has been incorporated with capital stock of $50,000 to manufacture electric equipment. Its chief product will be a collapsible metal cabinet. The incorporators are: S. Rosenthal and H. Hymowitz. Address care of Benjamin Koenigsberg, 93 Nassau Street, New York.

Delway Heaters, Inc., New York, has been incorporated with capital stock of $250,000 to manufacture heating equipment and kindred engineering products. Its principal product is an oil-burning heater for domestic and industrial purposes. The incorporators are: J. A. Barrett, A. H. Haaren and A. Wallander. The company plans to install equipment in a factory somewhere in New York and to begin manufacturing at an early date. Address care of Mr. Weyers, 165 Broadway.

E. Blout, Inc., New York, organized with $500,000 capital stock, will manufacture talking machines. Plans are unknown, but it is expected that temporary offices will be located at 2756 Broadway. E. R. Rye and E. Blout are incorporators. Address care of S. M. Kronheimer, 49 Chambers Street.

Plans of the Pacific Coast Fibre Co., Seattle, Wash., organized in July to manufacture mechanical products, are entirely indefinite. Should the project be resumed, notice will be given in these columns. Battle, Hulbert, Gates & Helsell, Alaska Building, Seattle, represent the company.

The Cutaway Harrow Co., Higganum, Conn., incorporated with $75,000 capital stock, will continue a business long established in the manufacture of disk harrows and plows. E. S. Hubbard is president; E. R. Austin, vice-president, and A. H. Hubbard, secretary-treasurer.

The Rapid Heater Co., Grand Rapids, Mich., has been organized with $50,000 capital stock to manufacture various types of gas water heaters. It will take over a business established since 1904, but further details are lacking. E. M. Newman, 1130½ Sigsbee Street, Grand Rapids, is manager.

The Art Products Co., Inc., Zeeland, Mich., has been incorporated for the purpose of manufacturing novelties, having purchased the assets and business of a firm in this line. Manufacturing is done on a small scale through contract. F. J. Osborne is manager.

The National Wheel & Axle Co., Inc., Victory Building, 1011 Chestnut Street, Philadelphia, recently incorporated with capital stock of $750,000, will erect a plant for the manufacture of automobile axles and wheels. Decision has not been reached as to the location of the plant, but it will be either in Ohio or northern Indiana. Equipment will be purchased. Edwin J. Weston heads the company.

The Irvington Machine Co., Badger Avenue and Runyon Street, Newark, N. J., incorporated with capital of 2500 shares of no par value stock, will manufacture Trubloc cylinder grinders. R. H. Stone is secretary.

The Steel Materials Co., 5639 Roby Place, Detroit, and 506 Society of Savings Building, Cleveland, recently incorporated, has completed steel and concrete buildings for manufacturing building stanchions and toy automobiles. The company will also carry a full line of new and second hand pipe, couplings, flats, rounds, bars and surplus and salvage material, including rails and bar steel. It will also have the exclusive agency for the Canton Foundry & Machine Co. for alligator shears in Michigan. Charles Marienthal is president and general manager and H. A. Velick, who is also conected with the Velick Scrap Iron & Machinery Co., is secretary-treasurer.

The Logan Cut-Out Switch Mfg. Co., Logan, W. Va., has been formed with capital stock of $100,000 to manufacture patented switches. Immediate manufacturing will be done by contract, the work already having been placed. It is expected that plans will soon be drawn for the construction of a plant. William Abraham heads the company.

The Oneida Mfg. Co., Green Bay, Wis., recently formed with capital stock of $500,000, has acquired the assets and business of the Oneida Motor Truck Co., at Green Bay, and will continue operation along the same line. The company also expects to maufacture gasoline railroad cars and power equipment. L. W. Melcher is president and general manager.

The Michigan Body Corporation, St. John, Mich., has been incorporated with capital stock of $65,000 and will manufacture commercial and other automobile bodies. It has a plant fully equipped to conduct its business for present needs. The incorporators are B. F. Wright, H. D. Minich and W. L. Beitler, Jr., secretary-treasurer Triangle Motor Truck Co., St. John. All the incorporators are officers of the Triangle Motor Truck Co.

The Hays Brass & Aluminum Foundry Co., Michigan City, Ind., has been incorporated with capital of $50,000 and will manufacture brass and aluminum products. The company will operate a plant at Michigan City and one at La Porte, Ind.

The Flanders Co., 53 Pennsylvania Avenue, Newark, N. J., recently organized to manufacture and deal in fabricated steel products has discontinued business.

The Oldsmar Automotive Accessory Corporation, Oldsmar, Fla., recently formed to manufacture accessories, has taken over the foundry and machine shop of the Oldsmar Mfg. Co., and will reconstruct the plant to suit this line of manufacture.

The Midwest Air Filters Pacific, Inc., care of H. B. M. Miller, Royal Insurance Building, San Francisco, recently incorporated with $75,000 capital stock, contemplates no manufacturing, but will act as distributor for the Midwest Steel & Supply Co., 28 West Forty-fourth Street, New York, in the Pacific territory. Stocks will be carried in warehouses at various points throughout the territory. Its line includes steel sections, box rails, steel stringers, filters and gas washing machines. W. B. Lomak is general manager.

The American Car Door Co., Michigan City, Ind., has been incorporated with $25,000 capital stock to manufacture door and other hardware products. Plans are undeveloped. H. E. Osborn is secretary-treasurer.

The Roberts-Ward Corporation, Castle Hall Building, Indianapolis, recently organized to manufacture machinery and parts, will have all its work done by contract, one letting already having been made. W. A. Cohen is president.

The Highway Appliance Co., 115 Pine Street, Providence, R. I., organized with capital stock of $50,000, will manufacture machines for traffic marking. These are now being built by the General Machinery Co., Providence. R. G. McMeehan, 14 Pearl Avenue, is representative of the new company.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—41	—24	⅛ in. Butt...	— 4	+19
¼ in. Butt...	—46	—32	¾ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap...	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap.	—34	— 6	7-12 in. Lap..	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18½c. to 19½c.
High brass wire	19 c. to 20 c.
Brass rods	16¾c. to 17¾c.
Brass tube, brazed	26½c. to 27½c.
Brass tube, seamless	24 c. to 25 c.
Copper tube, seamless	25½c. to 26½c.

Copper Sheets

Sheet copper, hot rolled, 21¼c. to 22¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.. $6.55	$6.30
		90 lb.. 6.65	6.40
		100 lb.. 6.75	6.50
IC.. $12.55	$10.70	IC.. 7.00	6.75
IX.. 13.95	12.55	IX.. 8.25	8.00
IXX.. 15.55	13.75	IXX.. 9.50	9.25
IXXX.. 17.10	15.30	IXXX..10.75	10.50
IXXXX.. 18.85	16.80	IXXXX..12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	49c. to 56c.

Copper

Lake ingot	16¾c.
Electrolytic	16¼c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8½c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	32c. to 33c.

Old Metals

Business has slowed down again and the market is quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.25
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, September 27, 1923

ESTABLISHED 1855 VOL. 112, No. 13

Cause of Red Hardness of High-Speed Steel

New Facts and Theories—Changes Due to Heat Treatment X-Ray Crystal Analysis—Slip Interference

BY EDGAR C. BAIN AND DR. ZAY JEFFRIES

THE high-speed steels considered in this article are essentially iron, tungsten, chromium and carbon alloys containing approximately:

	Per Cent
Tungsten	18.0
Chromium	4.0
Carbon	0.7

They are called high-speed steels because they can be used as cutting tools at a speed which produces a temperature corresponding to a dull red heat. The amount of metal which can be removed from the work by these high-speed steels in a given time is, therefore, much greater than that which could be removed by carbon steel tools which soften at a temperature far below that admissible for high-speed steel.

An average of 50 crucible high-speed steels shows the following composition:

	Per Cent
Carbon	0.67
Manganese	0.24
Silicon	0.28
Sulphur, less than	0.03
Phosphorus, less than	0.03
Chromium	3.99
Tungsten	18.36
Vanadium	0.96
Cobalt, practically nil.	
Nickel, practically nil.	

At the outset we may place manganese, silicon, vanadium, cobalt and nickel in a class of elements of secondary importance. Sulphur and phosphorus seem to be somewhat less harmful than in carbon steels, but nevertheless, in good practice they are kept quite low. Nickel is conceded to be detrimental to high-speed steel, and it is, therefore, somewhat surprising that extraordinary results are often cited in the special high-speed steels containing 3 to 4 per cent of cobalt. Vanadium, aside from its cleansing action seems to impart a certain additional hardness to high-speed steel and in recent years has been generally used in amounts of about 1 per cent. Although iron, tungsten and carbon might seem to be the chief elements of a steel possessing high temperature hardness, no high-speed steel is on the market which does not contain a substantial amount of chromium. Chromium is, therefore, to be classed as one of the more important elements of high-speed steels.

Steels exhibit good high-speed properties with the tungsten as low as 14 per cent. In European practice a tungsten content of over 22 per cent has been used. Perhaps over nine-tenths of the total tonnage of high-speed steel has a tungsten content between 16 and 20 per cent. These figures merely tend to emphasize the

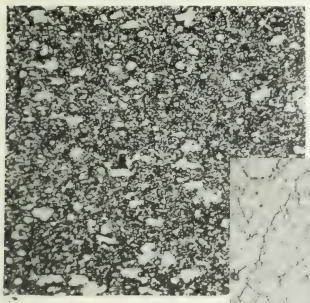


Fig. 1—High-Speed Steel, Thoroughly Annealed, x 500

Fig. 2—(Below)—High-Speed Steel, Quenched From 2400 Deg. Fahr. (1300° C) in Oil, x 500

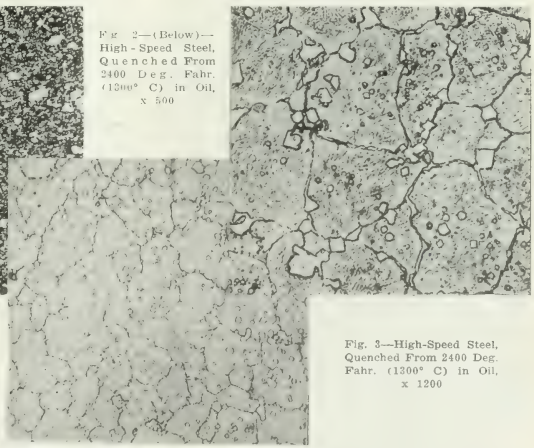


Fig. 3—High-Speed Steel, Quenched From 2400 Deg. Fahr. (1300° C) in Oil, x 1200

fact that the thermal and mechanical history of a bar of steel is so much more significant than its composition (within certain limits) that the effect of small variations in composition is relatively unimportant.

Molybdenum can be substituted for tungsten, but so far it does not seem to have complied with all of the necessary factors for commercial success.

The same general procedure in melting, casting, cogging and rolling which produces a fine grained, clean and homogeneous steel of any other class must be applied in the production of high-speed steel. The ingot shows the usual columnar structure with carbide envelopes about the grains, so there must be sufficient mechanical working to refine the cast structure. After mechanical working and annealing, the microscope reveals a matrix of a sort of finely spheroidized pearlite made up of ferrite and globular particles of carbide. The carbide particles seem to vary greatly in size. A small percentage of the particles are large and give evidence of being primary carbide particles, whereas the smaller particles are apparently of secondary origin. That is, the large fragments have never been entirely in solid solution in the matrix at any stage of the previous working and heat treatment, whereas the smaller particles at some previous stage have been in solution in the matrix and have been precipitated during the anneal. This structure is shown in Fig. 1. There is no difficulty in differentiating, at least in extreme cases, between the primary and secondary carbides. This annealed high-speed steel is relatively soft and malleable. Most high-speed steel is delivered from the mills in this condition.

Changes Caused by Heat Treatment

In order to form a comprehensive idea of the changes taking place in high-speed steels during the various steps in heat treatment, the authors have considered the published work on microstructure, hardness, expansion and shrinkage, magnetic measurements, chemical behavior with reagents used as electrolytes, etching characteristics, and the spontaneous generation of heat at room temperature after quenching. The authors have supplemented the above information by the study of the crystal structure of the constituents of high-speed steel as revealed by X-ray crystallograms. The results of the X-ray examinations of high-speed steel are published here for the first time, although one of the authors has previously given a resumé of the information in lectures.

It is the purpose of the authors to set forth briefly the outstanding facts derived from the various methods of experimentation and to offer an interpretation of the cause of the high temperature hardness of high-speed steel. The authors have approached the problem from the standpoint of the basic and fundamental cause of hardness—slip interference[1]. In other words, high-speed steel is hard at a red heat because the slip interference is effective at a red heat. To discover possible sources of slip interference which persist at elevated temperature, let us consider the various properties as modified by heat treatment.

Microstructure

When high-speed steel of the average composition considered above is quenched from a temperature near that of incipient fusion, we obtain the structure as shown in Fig. 2. At low magnifications the polyhedral grains are almost structureless. Some undissolved carbide particles are seen to be present. Most of the carbide shown in Fig. 1 would be dissolved at a temperature near incipient fusion. The carbide particles shown in Fig. 2 are, therefore, residual particles. After re-annealing, these particles would be designated as primary in contradistinction to the smaller secondary particles. At higher magnifications there is visible a discernible structure within the polyhedral grains. We now know these grains to consist of a mixture of martensite and austenite. As the quenching temperature is lowered these grains etch more readily and the structure more nearly resembles that of carbon steel martensite. Upon quenching below 1800 deg. Fahr. (980 deg. C.) there is no microscopic evidence of the retention of austenite. The matrix etches so rapidly as to suggest the presence of troostite or sorbite.

In terms of the metallography of ordinary steel, high-speed steel at a temperature just above the A_{r-r_1} transformation is markedly hyper-eutectoid, that is, it contains a large excess of carbide. This carbide is more soluble in the matrix, the higher the temperature. All of the carbide does not go into solution in the matrix at any temperature at which the steel is completely solid. The higher quenching temperatures are, therefore, conducive to the solution of the maximum amount of carbide and hence to the retention of a minimum amount of residual carbide. The matrix contains more carbon and tungsten and chromium, the higher the quenching temperature. The quenched matrix, therefore, has different properties in accordance with its composition at the time of quenching. Apparently a high carbon-tungsten-chromium content of the matrix is conducive to the retention of austenite by quenching. Fig. 3, magnified 1200 diameters, shows the microstructure of the high-speed steel quenched from near incipient fusion. This steel is known to contain both martensite and austenite. Photomicrographs of high-speed steel are unsatisfactory for even qualitatively determining austenite.

Sauver[2] states that high-speed steel becomes much more resistant to etching the higher the quenching temperature. In one case an annealed steel was sufficiently etched in two minutes, whereas, after a high temperature heat treatment, an immersion of 14 min. in the etching solution was required. It is stated that the rate of etching in certain reagents can be used as an indication of the previous heat treatment. The carbides of either annealed or quenched high-speed steel are darkened by immersion in a solution of hydrogen peroxide and sodium hydrate. Fe_3C (ordinary cementite) is not darkened by this solution. This offers chemical evidence that the visible carbide in high-speed steel is not cementite. The development of a structure in high-speed steel, corresponding to globular pearlite in ordinary carbon steel, requires a temperature of about 1450 deg. Fahr. (790 deg. C.). In other words, it requires a higher annealing temperature to produce carbide particles of a given size in high-speed steel than in carbon steel.

Hardness

Measurements of hardness showing the effect of reheating temperature on specimens quenched at various temperatures have been made by a number of investigators. Fig. 4, taken from Scotts[3] work, gives the general information on these points. The increase in hardness observed after tempering at 1100 deg. Fahr. (595 deg. C.) on specimens quenched from 2100 deg. Fahr. (1150 deg. C.) and 2280 deg. Fahr. (1250 deg C.) is known as *secondary hardness*. It appears that very little secondary hardness is obtainable with a quench below about 1900 deg. Fahr. (1040 deg. C.). The potentiality for the development of secondary hardness increases with the quenching temperature above about 1900 deg. Fahr. (1040 deg. C.). It will be noted that there is a decrease in hardness on tempering at temperatures up to 950 deg. Fahr. (540 deg. C.). Recent and careful hardness measurements indicate that the hardness of quenched high-speed steel is reduced by tempering temperatures up to about 840 deg. Fahr. (450 deg. C.). If the quenching temperature is below about 1900 deg. Fahr. (1040 deg. C.) the hardness may be still lower

on tempering at 1100 deg. Fahr. (595 deg. C.) but it will probably not show a smooth curve through the tempering range 840 deg. Fahr. (450 deg. C.) to above 1100 deg. Fahr. (595 deg. C.). In other words, there will either be a halt in the rate of hardness reduction at a tempering temperature near 1100 deg Fahr. (595 deg. C.) or an increase in hardness depending upon the previous heat treatment.

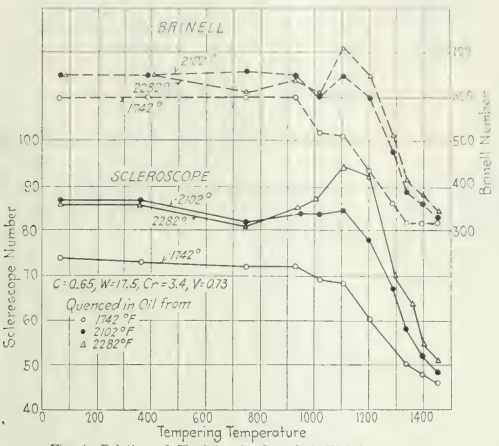


Fig. 4—Relation of Hardness in Quenched High-Speed Steel to Drawing Temperature.—Scott

If the quenching temperature is slightly below about 1900 deg. Fahr. (1150 deg. C) there will be a local rise in the hardness-tempering curve corresponding to the secondary hardness, but the value obtained by tempering at 1100 deg. Fahr. (595 deg. C.) may not be so high as that obtained before tempering. With quenching temperatures above about 1900 deg. Fahr. (1150 deg. C.) the hardness after secondary hardening may be greater than the hardness before tempering. The secondary hardening effect reaches a maximum with short time of tempering at about 1100 deg. Fahr. (595 deg. C.).

It should be mentioned that the decrease in hardness occasioned by tempering up to 840 deg. Fahr. (450 deg. C.) is not always gradual, and often a small hump in the curve toward a maximum has been observed at about 575 deg. Fahr. (300 deg. C.). This hump is strongly marked in the special high-speed steels containing cobalt and is encountered in high chromium steels containing no tungsten, there being, of course, no maximum at the higher temperature in this latter type of steel. This slight discontinuity in the hardness-tempering relations is somewhat more pronounced after quenching from relatively lower temperatures.

Expansion and Shrinkage

Throughout this discussion, the authors have deliberately avoided the mention of time in any of the heat-treating schedules; this has been done in the interests of simplicity, and because of the variations in individual practices, but it is safe to assume that 30 min. at drawing temperature would duplicate the results of the averages recorded by the authors.

Interesting results on the linear change of dimensions of high-speed steel under various conditions have been reported by Grossmann[4]. The results are in qualitative accord with those published by Edwards[5], and by Gill and Bowman[6]. If the linear dimensions are plotted directly, or density inversely, with drawing temperature the curves very much resemble the hardness tempering curves, as may be seen in Fig. 5. The steel expands on quenching, the expansion being greater the higher the quenching temperature up to 2300 deg. Fahr. (1250 deg. C.). With successively higher tempering temperatures the steels contract and the density increases up to about 800 deg. Fahr. (425 deg. C.). Beyond this temperature expansion sets in, the volume reaching a sharp local maximum at about 1100 deg. Fahr. (595 deg. C.). Above 1100 deg. Fahr. (595 deg. C.) the density again increases. A final draw at about 1500 deg. Fahr. (815 deg. C.) restores the approximate original density of the annealed bar.

Magnetic Measurements

Honda[7] has made preliminary studies on the magnetism-temperature relations of high-speed steel. He has determined the presence of cementite in high-speed steel by means of the reversible magnetic transformation which occurs in cementite at about 430 deg. Fahr. (215 deg. C.). He has also noted an additional reversible transformation at about 750 deg. Fahr. (400 deg. C.) which he attributes to the double carbide of iron and tungsten. This latter transformation is weaker than the cementite transformation and practically disappears with certain heat treatments.

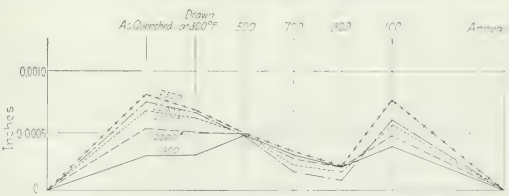


Fig. 5—Change in Dimensions of High-Speed Steel with Drawing Temperatures.—Grossmann

With reference to experiments on the magnetization of high-speed steel it has been observed[8] that in steels quenched from a high temperature the maximum induction drops below 4000 gausses. Reheating increases the value slowly until a temperature of 930 deg. Fahr. (500 deg. C.) is reached. Tempering above this point rapidly restores the magnetization to the value found for thoroughly annealed steel.

Electrolytic Corrosion

When a completely annealed specimen of high-speed steel is made annode in a dilute acid solution nearly all of the ferrite can be removed without dissolving the carbide particles. One of the specimens treated by one of the authors retained the original shape of the

specimen until nearly three-quarters of its weight had been removed. The residual carbide falls to powder when thoroughly dried. Great care is necessary to wash the carbide completely and then dry it without atmospheric attack. This powdered carbide was first prepared to obtain a sample for the X-ray examination. A sample of this carbide was analyzed and gave results shown in the first column of the following table:

	Analysis of carbide Residue by Smith [9]	Analysis of carbide Residue by Arnold
Carbon	2.5	2.33
Iron	28.1	23.96
Chromium	6.5	3.13
Tungsten	60.1	64.24
Vanadium	2.8	4.81

An analysis of a similar residue has been reported by Arnold and is given in the second column. Both of the above samples were obtained from annealed high-speed steels.

In the course of the decomposition of the steel in the dilute hydrochloride acid the tungsten, if in a condition to be attacked, is converted to insoluble tungstic acid. Sometimes the precipitation does not seem to take place at once, but instead, a colloidal solution of the tungsten results. However, this is not persistent, and the final filtrate is free from tungsten. This yellow precipitate is, of course, mingled with carbides and can

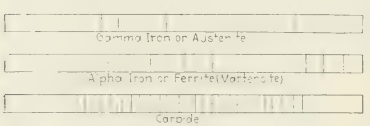


Fig. 6—The Crystallogram Lines of the Three Principal Constituents of High-Speed Steel

be separated by solution in ammonia. It is very interesting to note that the carbides from thoroughly annealed high-speed steel show only a very slight (about 2 per cent) loss by this ammonia treatment. On the other hand, carbide residue from freshly quenched high-speed steel, shows a different result. In this case as much as 33 per cent of the carbide residue mixture is soluble in ammonia, indicating that about 26 per cent of all the tungsten in the steel had been converted to tungstic acid by the electrolytic decomposition.

Tests show that the carbides are at most only very slightly attacked by dilute hydrochloric acid, hence we may be reasonably sure that nearly all of the tungsten is located in the carbide phase after annealing and that much of the tungsten is in another form in the freshly quenched or slightly drawn condition. The inference is very strong that the tungsten must be atomically dispersed, or at least in an extremely fine state of aggregation, in order to form the tungstic acid in the hydrochloric acid solution.

Spontaneous Generation of Heat in Quenched Condition

C. F. Brush[10] has water-quenched high-speed steel from a temperature not far below fusion and within an hour after the quenching has observed a temperature change in the steel when placed in a sensitive calorimeter. He performed many similar experiments with high carbon tool steels and found a generation of heat which persists to a measurable extent after several weeks. There was a contraction accompanying the heat generation in the tool steel. It is assumed that a contraction would take place also in the high-speed steel at room temperature. Dr. Brush remarks: "It is seen that heat generation in the tungsten steel is the same in character as in the carbon steel . . . although much less in amount and somewhat more persistent." The authors would infer that the spontaneous shrinkage would be less than in the carbon steel also.

X-ray Crystal Analysis of High-Speed Steel

By means of crystal analysis[11] carried out along the lines of the Hull method, it has been shown that iron having the body-centered cubic arrangement of atoms at low temperature undergoes an atomic rearrangement at the critical range and changes to the face-centered cubic crystal lattice. The patterns of the diffraction lines recorded on a photographic film are very distinctive for these two crystal types. The changes from austenite (face-centered cubic atomic arrangement) to ferrite (body-centered cubic atomic arrangement) may be very easily followed. In the case of carbon steel, the cementite present does not yield a pattern strong enough to reveal its presence or disappearance with either gamma iron or alpha iron as a matrix. However, the carbide of high-speed steel contains a high percentage of the heavy tungsten atoms and is, therefore, capable of producing X-ray patterns at least when present in considerable amounts, and in particles of a size corresponding to about 50 or 75 atomic layers (0.0000015 cm.).

Annealed high-speed steel as shown in Fig. 1 shows a strong ferrite pattern and slightly weaker carbide pattern. The carbide pattern is the same, however, as that obtained by the use of isolated carbide particles obtained from electrolytic decomposition. When the steel is quenched from successively higher temperatures, beginning at about 1470 deg. Fahr. (800 deg. C.) the intensity of the carbide pattern gradually decreases. At about 2350 deg. Fahr. (1290 deg. C.) the carbide pattern becomes so faint that it is scarcely discernible. When the steel is quenched from 1900 deg. Fahr. (1040 deg. C.) a faint face-centered cubic crystal lattice is revealed proving the retention of austenite. The intensity of the austenite lines in the crystallogram increases and the intensity of the ferrite lines decreases as the quenching temperature is raised above 1900 deg. Fahr. (1040 deg. C.). High-speed steel quenched from about 2350 deg. Fahr. (1290 deg. C.) shows both ferrite and austenite patterns (as suspected by Scott) well developed with the ferrite pattern being only slightly more intense.

The austenite retained on the quench is very resistant toward martensitic transformation. A specimen was repeatedly immersed in liquid air without causing the austenite to transform to martensite. Twenty cycles of temperature change from room temperature to —310 deg. Fahr (—190 deg. C.) failed to have any observable effect on the austenite content of the steel.

A sample quenched from 2350 deg. Fahr. (1290 deg. C.) shows such a faint carbide pattern that it may be regarded as essentially a ferrite-austenite combination, the ferrite in this case being, of course, of martensitic nature. Furthermore, when quenched steel is reheated about 16 hr. at 950 deg. Fahr. (515 deg. C.) the austenite changes to martensite and the carbide particles have not yet reached a sufficient combination of size and number to produce an effective X-ray pattern. A steel so treated shows essentially a ferrite pattern. Heating for a moderate time at 1200 deg. Fahr. (650 deg. C.) increases the intensity of the carbide pattern. The pattern lines as recorded on the crystallogram for the three principal constituents are shown in Fig. 6.

In spite of the fact that the literature is full of reports indicating the existence of several carbides, the authors have found only one carbide pattern in annealed high-speed steel. This pattern is too complicated to decipher at the moment in order to construct the space lattice, but it is distinctive and unlike Fe_3C, W_2C or FeW. The X-ray results indicate that the stable carbide is the iron-tungsten carbide which no doubt is capable of retaining varying amounts of chro-

mium and vanadium without changing the type of crystalline lattice.

General Considerations and Conclusions

From all of the above facts, the authors have arrived at certain conclusions regarding the changes taking place in high-speed steel with various heat treatments and offer an interpretation as to the cause of the red hardness of high-speed steel. Many of the statements enumerated below are well known and corroborated by many investigators, while others are believed to be new:

1. Ordinary high-speed steel contains sufficient carbon, tungsten, and chromium to be classed as a markedly hypereutectoid steel. There is a considerable amount of excess carbide at a temperature just above the A_{cm} transformation. This fact is demonstrated clearly by microscopic examination and is typically shown in Fig. 1. While contemplating the behavior of high-speed steel, it may be well to bear in mind that the metallic atoms of the elements are present in the ratio of about 140 iron, 10 tungsten, 10 chromium and vanadium together and 6 carbon. That is to say, in an entirely representative cube of 10 atoms on the cube edge, we would have about 840 iron atoms, 60 tungsten atoms, 60 chromium and vanadium atoms and 36 carbon atoms.

2. The excess carbide is more soluble in the austenitic matrix, the higher the temperature. The greatly reduced quantity of carbide shown in Fig. 2 gives sufficient evidence of this point.

3. The amount of alloying elements in ordinary high-speed steel is sufficient to form more carbide than is soluble even at incipient fusion of the steel. This fact is demonstrated by microscopic examination after quenching high-speed steel from incipient fusion.

4. At temperatures appreciably above the lower critical point only one crystal structure in the carbide is present. This carbide is essentially an iron-tungsten carbide, but no doubt contains varying amounts of vanadium and chromium with the retention of the same type of crystal structure. This ability to retain crystalline structure intact with change in composition is an outstanding property of intermetallic compounds. It is, of course, conceivable that with certain chemical composition the carbon and tungsten would be present in such proportions that either of them might be substantially used up in the formation of the iron-tungsten carbide and leave an excess of the other element. In such a case an additional compound would be expected to form when conditions permitted. It is also submitted that the iron-tungsten carbide is the most stable carbide in high-speed steels above about 1100 deg. Fahr. (595 deg. C.).

5 As the iron-tungsten carbide dissolves in austenite at high temperatures, the constituents of the carbide, no doubt, are dissolved in the austenite as individual atoms. The evidence against the existence of the intermetallic compound as such in solution in a space lattice has been considered at length in the literature cited. Before the quench the high-speed steel consists of some residual, undissolved iron-tungsten carbide embedded in a matrix of austenite which contains a considerable proportion of the tungsten, carbon, chromium and vanadium in solid solution.

6. The quenching of the high-speed steel leaves the residual carbide particles unchanged and produces varying amounts of martensite in accordance with the quenching temperature and the remainder persists as austenite. Freshly quenched high-speed steel, therefore, consists of a small amount of iron-tungsten carbide and the remainder is composed of martensite and austenite in both of which the atoms other than iron are atomically dispersed. Grain growth in the austenitic matrix of high-speed steel at the quenching temperature is profoundly discouraged by the presence of the residual carbide particles.

7. Some of the austenite which exists at the high temperature changes during the quench to martensite. The amount of austenite which remains unchanged varies with the temperature of the quench, the higher the quench the greater the proportion of austenite. This is probably due in part to the greater solubility of carbon, tungsten and chromium in gamma iron at higher temperatures—these elements acting to restrain the conversion.

8. In the martensite portion of the freshly quenched material, the only atoms which can migrate easily at room temperature or a little higher are the carbon atoms. In all probability the tungsten atoms are held in fixed positions in the iron lattice, and likely this is true also of chromium and vanadium. Iron atoms are available on every hand for combination with these carbon atoms; hence, even at room temperature Fe_3C begins to form. The heat of formation of Fe_3C is probably the heat evolution observed by Brush.

9. At progressively higher temperatures the chromium and vanadium will be capable of diffusion in the ferrite space lattice and carbides will form. The crystalline structure of the ferrite becomes more perfect and the carbide particles grow by coalescence to a super-critical size so as to soften the martensite at 850 deg. Fahr. (450 deg. C.). The carbide precipitation in the order of availability of atoms accounts in a large measure for the softening, heat evolution, shrinkage and magnetic point. The order of atomic volumes from smallest to largest of the principal elements involved is—C, Fe, Cr, Va, W.

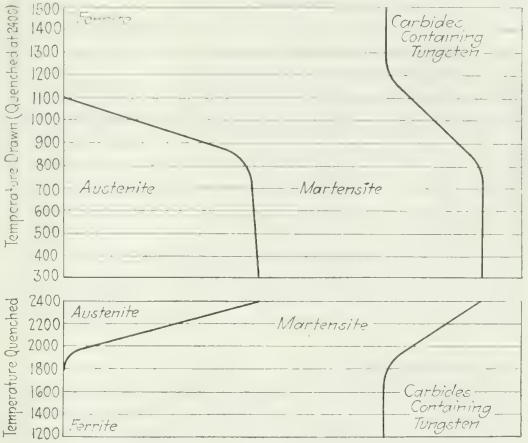


Fig. 7—The Relative Proportions of the Principal Constituents (Abcissae) of High-Speed Steel After Various Treatments (Ordinates)

10. At about 850 deg. Fahr. (450 deg. C.) the larger tungsten atoms are capable of slight diffusion and at this temperature the formation of carbides will follow the order of carbide stability in preference to the sequence of atom availability. Iron-tungsten carbide is the most stable one and forms to the elimination of the earlier formed carbides.

11. The iron-tungsten carbide particles reach approximately the size for critical dispersion after a short reheat at 1100 deg. Fahr. (595 deg. C.). Within the grain growth temperature range carbide particles are present to obstruct the growth and hence the grains of the matrix are not permitted to grow excessively. It is the combination of retention of small grains and precipitation of the tungsten-iron carbide particles in critical size at 1100 deg. Fahr. (595 deg. C.) which accounts for the red hardness in high-speed steel.

12. The austenite present after the quench may not undergo any change important to the physical properties of the steel up to the temperature of martensite transformation at from 850 deg. Fahr. to 1100 deg. Fahr. (450 deg. C. to 595 deg. C.). Some excess cementite (Fe_3C) may precipitate from austenite below this temperature, but if so, we would regard it as only an incidental feature.

13. Between 850 deg. Fahr. and 1100 deg. Fahr. (450 deg. C. and 595 deg. C.) the austenite transforms into martensite with expansion and increase in hardness. At

this temperature the iron-tungsten carbide can form, and does form, in critical dispersion. Its presence helps to keep the grain size of the new martensite small and to key the slip-planes of the ferrite grains.

14. As the temperature is raised above 1100 deg. Fahr. (595 deg. C.) grain growth of ferrite and particle growth of the iron-tungsten carbide produce rapid softening similar to the corresponding process in carbon steel at lower temperatures. Fig. 7 is a chart which is intended to show the change in relative proportion (abcissae) of the constituents of high speed steel with heat treatment (ordinates). It should be noted that the cementite, Fe_3C, is included in the martensite (ferrite) area and that only the change in amount of the characteristic stable iron-tungsten carbide is indicated.

15. The double carbide contains its atoms in a relatively dense state. When double carbide dissolves in austenite the density of the steel is lowered and when double carbide precipitates, the density increases. There is also the usual decrease in density when austenite changes to martensite. This is largely due to the lower density of alpha iron as compared to gamma.

Cause of Red Hardness Briefly Stated

The cause of the red hardness of high-speed steel might be briefly stated as follows: The changes which cause martensite of carbon steel to soften are grain growth of the ferrite and growth of the carbide particles above critical size. Similar changes in high-speed steel take place only at a red heat. The outstanding reasons for the retention at red heat of fine grains in the ferrite of high-speed steel are the increased resistance to growth due to the elements in atomic dispersion in the ferrite and the copious presence of obstructing carbide particles. The reason for retention at red heat of carbide particles of critical size is the great stability of the iron-tungsten carbide and the large size of the tungsten atom. The great stability of this double carbide forces its formation to the exclusion or elimination of other carbides when the necessary atoms are available. The large size of the tungsten atom prevents its diffusion in the ferrite space lattice until a temperature corresponding to a red heat is reached. The double-carbide is an intermetallic compound which owes its existence entirely to crystallization. The formation of a particle of this carbide, therefore, requires a number of tungsten atoms which must be supplied by diffusion through the ferrite lattice. The precipitation and growth of the double carbide in quenched high-speed steel at a dull red heat is, therefore, somewhat comparable to the precipitation and growth of cementite in quenched carbon steel below 300 deg. C.

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Heat-Treated Steel Parts in Service

Effect of Long-Time Drawing Conditions or Further Heat Treatment Under Use—Stability of a Steel

BY GEORGE K. ELLIOTT*

As commonly understood, heat treating consists of passing a metal or alloy through one or more changes of temperature for the purpose of imparting to it definite physical properties. Applied to steel it generally involves raising the temperature of the steel to some point above its critical temperature and cooling in some way so as to reach eventually a room temperature. If the cooling be conducted slowly, the process is known as annealing; if rapidly, it is called hardening, the degree of hardening being determined largely by the amount of carbon in the steel and the speed of cooling. All this is a matter of elementary knowledge to heat treaters.

Hardening usually is paralleled by an increase in strength, elastic limit and brittleness, which last property customarily calls for a supplementary treatment in the form of tempering or heating to a relatively low temperature and cooling, for the purpose of decreasing it to a safe degree.

Hardened Steel Is Unstable

The writer wishes to dwell upon the fact that steel in the hardened condition is often unstable and readily slips back to some form of greater stability whenever its existing temporary equilibrium is disturbed by an increase in temperature. Especially is this true of carbon steels and of alloy steels of a relatively mild nature which may be classed as "near" carbon steels.

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Rudimentary as this fact is to the metallurgist, it has been found to lie beyond the pale of knowledge of not a few engineers who design mechanical devices and specify materials for them. They overlook the fact that under certain working conditions a treated steel may automatically undergo further heat treatment in service with possible harmful results.

Here reference is made to modern industries which are adopting a number of processes and practices which demand higher temperatures than formerly could sanely be even hinted at; frequently these in addition involve rather severe working stresses. In order to meet these stresses we occasionally find engineers specifying steels and strengths in the steel that are attainable only through a hardening heat treatment. Attention should be called to the fact that such treatment is liable to leave the steel in a more or less unstable condition. If a steel thus treated be exposed for long periods of time to temperatures of 600, 800 or 1000 deg. Fahr., there is a dangerous possibility that it may take advantage of the circumstance and recede to a more stable state with a corresponding decrease in physical properties. Therefore it would seem safer for the engineer to figure on using his steel for high temperature, in its most stable form, the form least susceptible to thermal influences.

In order to accomplish this at least two roads lie before him—either he can stick to the carbon steel with which he is best acquainted, have it in a thoroughly annealed or normalized condition, and design

the steel parts accordingly heavier; or if he desires to reduce to a minimum the weight of his structure, he must look for some alloy steel which, in its most stable state, will have the needed physical properties.

A piece of steel that has been heated above its critical point, quenched and drawn at perhaps 800 deg. Fahr. may seem to the casual inquirer to be permanent enough for service under stress and at 800 deg. temperature, but if it be considered that the service perhaps will extend through months and even years there arises a grave doubt that the cumulative effect of time and temperature will not sooner or later effect a "drawing" of the steel which will be much more drastic than would be deduced from the temperature alone.

Demand for Steel Used at High Temperatures

The petroleum industry, ultra-modern high pressure and temperature power plants, and several chemical processes are creating a demand, limited as yet but growing, for steel parts which will withstand high pressures at temperatures of 600, 800, 1000 deg. Fahr. and perhaps higher, and the metallurgical engineer must heed very carefully the material that is supplied to these wants. Especially does it seem important that the steel used be of such composition and in such state as to be of maximum stability under the thermal conditions of the service.

It seems highly desirable that extensive investigations be made concerning the true effect of long-time drawing at moderate temperatures of carbon and alloy steels which have first been submitted to a variety of heat treatments. These tests would involve exposing the test samples for many months at various industrially important temperatures and noting the effect upon the physical properties; for example, one series of tests might be conducted at 400 deg. Fahr., and others at 600, 800 and 1000 deg. At higher than 1000 deg. the drawing completes itself much more rapidly so that the results either are already known or are more readily predicted.

It is now known that drawing a steel at 350 deg. for a long time will give approximately if not exactly the same results as drawing at 450 deg. for a much shorter time, but metallurgical literature does not yield much information as to whether drawing at 350 deg. can be prolonged sufficiently to attain results equal to drawing at 800 or 1000 deg. for a short time. In other words there is need of knowledge as to how far various commercial steels and others can proceed toward greater stability when exposed to any of the moderate temperatures just mentioned and how the physical properties are affected by the stabilizing.

The question of stability at these temperatures also embraces a study of alloy steels. In fact there seems to lie the greatest promise of a solution because it is well known that many of the alloying elements such as nickel, chromium, manganese, etc., have an effect upon the thermal properties of steel which serves toward greater stability.

Some Causes for File Steel Failures

Suggested Means for Prevention—Conditions Prevailing in the Rolling, Forging and Heat Treatment of the Steel

BY ARTHUR W. F. GREEN*

FILE steels are made in the crucible, electric and open-hearth furnaces. The relative merits of the products of these three steel-making processes are not to be discussed. The purpose of this paper is to describe briefly and illustrate some of the causes for failure in files made from carbon steel, and to suggest possible means for their prevention.

File steels made from carbon steel have a carbon content ranging from 1.10 to 1.40 per cent, the average being about 1.35 per cent. File steel as cast has a structure as shown in photomicrograph Fig. 1, which shows plainly the free cementite both as the network around the grains and as needles within the grains. (All photomicrographs are X150 and etched in 10 per cent nitric acid.) Steel containing so high a percentage of carbon is not a particularly hard material to make in no matter what kind of furnace employed, but, because of that fact, it sometimes happens that usual care is not exercised. A wild heat or one that is not correctly handled may cause material to be made that will not be uniform, in that there will be areas of carbon segregation with the result that files made from the steel will not be uniformly hard.

Some idea of the way in which carbon segregates can be seen in photomicrograph, Fig. 2. This shows the carbon segregation around a blow hole in a large ingot of crucible steel. The heavy white network being free cementite. Photomicrographs, Figs. 3 and 4, show two sections taken from the same file, which failed to pass inspection because of lack of uniform hardness. In Fig. 3 a hard spot is shown in the tooth, while in Fig. 4 the tooth was soft as shown by the troostitic structure, and the lack of free cementitic globules. It will also be noted that the top of the tooth shown in Fig. 4 is burred over. This occurred when the file was tested. The failure was due primarily to carbon segregation.

Another cause for failure of files due to improper melting conditions is slag inclusions. Defects of that kind may cause soft spots, and very often cracking during quenching for hardening. Photomicrograph, Fig. 5, shows a slag inclusion in a file which broke in harden-

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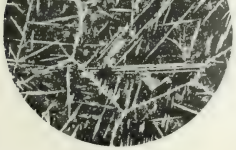


Fig. 1

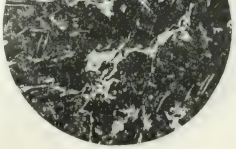


Fig. 2

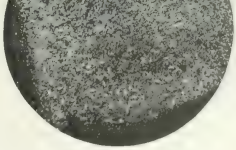


Fig. 3

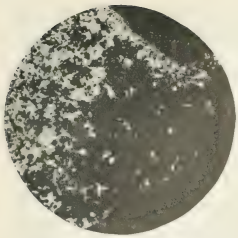


Fig. 4

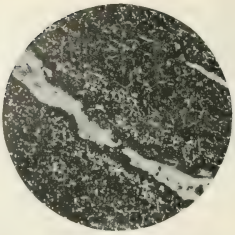


Fig. 5

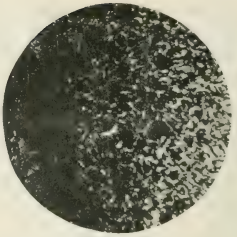


Fig. 6

ing. Carbon segregation around the inclusion may be easily seen.

The rolling of file steel into the various commercial shapes does not give rise to any unusual conditions, and with proper care in heating, coupled with correct roll design it is possible to produce rolled flats or tapers that will meet the most exacting needs. However, there is one problem that faces all file steel manufacturers, and that is decarburization of the steel. Because of the high carbon of the material, this is an easy condition to produce, especially where little attention is given to furnace atmospheres, etc.

Photomicrographs, Figs. 6, 7 and 8, show some phases of decarburization of file steel. Figs. 6 and 7 were made from the same piece of steel. In Fig. 6 is shown the surface of the piece. Practically no carbon remains on the surface. Going in from that point the carbon content gradually increases until a wide area is reached containing 0.8 per cent to 0.9 per cent carbon. This eutectoid area is several thousandths of an inch wide, and is distinguished by the lack of either free iron or cementite.

The true condition of the steel is shown in Fig 7. File steel decarburized as deeply as that just described is useless, since it would be necessary to grind so great an amount from the surface to render the file usable that the cost of grinding alone would be prohibitive, as well as making the piece too small. Photomicrograph, Fig. 8, shows the decarburized edge of a rolled file steel, which is not as bad as that shown previously. However, because of the width of the eutectoid area it would be difficult to produce good files without doing a great deal more grinding than usual. Photomicrograph, Fig. 9, was made from a bar of file steel showing normal decarburization from rolling. Since all file manufacturers count on grinding several thousandths of an inch from all file blanks before cutting and hardening, such decarburization is not serious.

Mill decarburization can best be regulated by keeping as nearly as possible a reducing atmosphere in the furnace used for heating, and also by designing the rolls so as to give as great a number of scaling passes as is possible. The mill in which the writer is employed has been quite successful in combating decarburization by installing oil-burning furnaces using low-sulphur oil, and by using specially designed rolls.

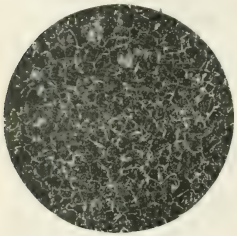


Fig. 7

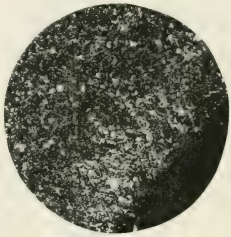


Fig. 8

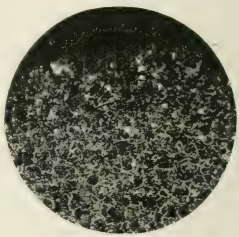


Fig. 9

It is not to be assumed from the foregoing that all the failures of file steel are to be laid at the door of the mill producing steel. Very often the cause or causes for failure of files occur in the file manufacturers' shops.

Many files are doomed for failure and the manufacturer's scrap heap because of lack of control of the temperatures used for forging the tang and shaping

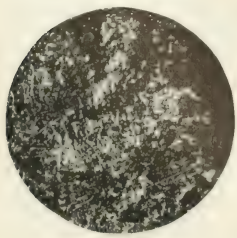


Fig. 10

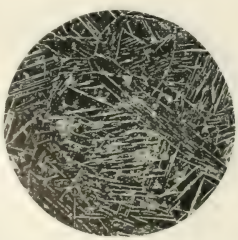


Fig. 11

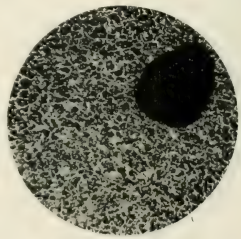


Fig. 12

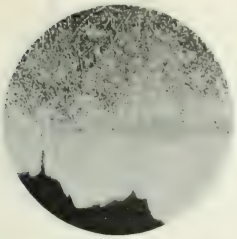


Fig. 13

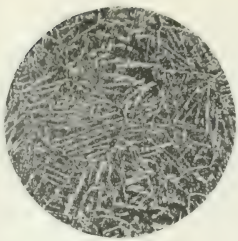


Fig. 14

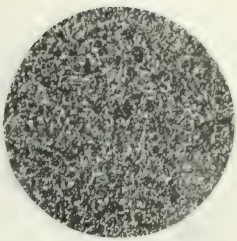


Fig. 15

the file. Most of that work is done on a piece work basis. Consequently, the workers very often feel that by using high temperatures they can produce more work, because it has been heated quickly. The results of too quick and too high heating may be seen by referring to photomicrographs, Figs. 10 and 11, Fig. 10 showing the edge of the sample severely decarburized, and Fig. 11 the structure of the steel near the center of the piece. This is in contrast with the structure shown in photomicrograph, Fig. 12, taken from a section of the unforged end of the same piece of steel. Material so mistreated and then made up into files will result in the files being brittle and very often cracking during quenching. The structure of the forged end poorly worked and then hardened is shown in photomicrographs, Figs. 13 and 14.

The use of correct forging temperatures usually improves the structure of the part of the file worked. This is shown in photomicrographs, Figs. 15 and 16. It will be noted that the grain is smaller and more refined in the forged section shown in Fig 15 than in the unforged section shown in Fig. 16.

The annealing of the file blanks after the tang has been forged and the pieces properly shaped by forging or rolling is a process which, in the writer's experience, is carried on in a different way in each shop. Some manufacturers anneal by packing the blanks in suitable boxes that can be readily sealed to keep out air and furnace gases. Charcoal or other carbonaceous material is sometimes added to the charge in the box to guard against decarburization. Some anneal successfully by tying a number of blanks into bundles and placing a number of bundles in the furnace at the same time. Others merely pack the furnace with loose blanks. It has been found that wood, coke, oil, coal, gas and electricity are used for fuel for the annealing furnaces.

One shop using a method of packing the blanks in the furnace without protection, experienced great difficulty in producing good files, and examination disclosed that those files which had formed the upper layer and sides of the bundle had been severely decarburized. A section from one of the blanks is shown in photomicrograph, Fig. 17. A great deal of grinding was done, but even then the files would come from the hardening with soft spots. This can be readily understood by noting the way in which the free cementite had segregated to the grain boundaries while the amount of spheroidized cementite within the grains gradually decreased and only normal pearlite remained.

Photomicrograph, Fig. 18, shows the decarburized edge on a file blank after having been ground in the usual way. This blank had been annealed in an old

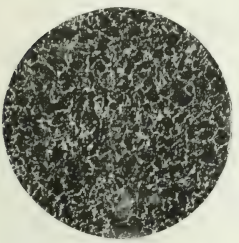


Fig. 16

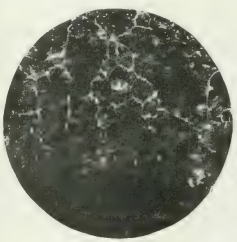


Fig. 17

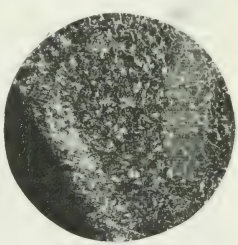


Fig. 18

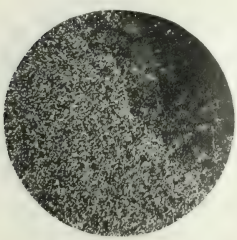


Fig. 19

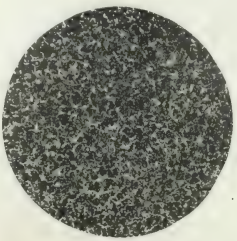


Fig. 20

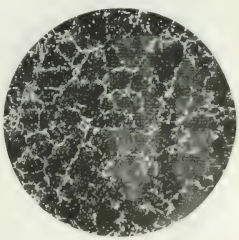


Fig. 21

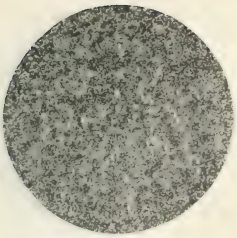


Fig. 22

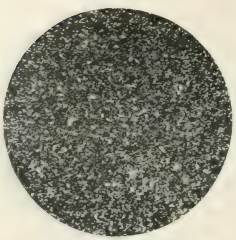


Fig. 23—Quenched From 1400 Deg. Fahr.

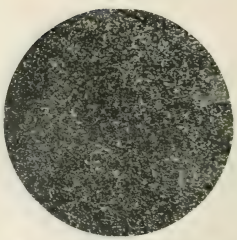


Fig. 24—Quenched From 1420 Deg. Fahr.

wood-burning furnace with little care being taken to protect the material from excessive oxidation.

It has been found that the most uniform results in annealing have been obtained in those shops using boxes or other suitable containers, which had been carefully sealed, and in which charcoal or other carbonaceous material had been used to pack around the blanks in the box. Even with these precautions slight decarburization may occur as shown in photomicrograph, Fig. 19, showing a section taken from a blank which had been carefully ground before having been annealed. This small amount is, however, not a serious matter.

The fact that file steel blanks have been packed in boxes and carefully sealed, and a pyrometer has been employed to indicate the temperature of the furnace used, is not a criterion that the steel will be properly annealed as is shown in photomicrographs, Figs. 20 and 21. These were taken from two separate pieces of steel, taken from different boxes which had been in the same furnace at the same time. The furnace employed was a side-fired oil-burning type. The sample from which the photomicrograph was made was taken from a box which rested on the floor of the furnace. The other sample was in a box that protruded several inches above the bridge-wall of the furnace where it had been exposed to a very hot flame. The pyrometer used showed that a temperature of 1440 deg., Fahr. had been used. However, the method of packing the furnace and the position of the thermocouple in the furnace with relation to the charge, as shown in Fig. 30, discloses the reason for the lack of uniformity. The shaded areas in the drawing show the approximate position of cold areas.

To secure the best results in annealing, care should be used in charging the furnace so that the boxes or bundles do not rest directly on the floor and a slight distance away from the door. They should be raised at least 2 in. from the floor regardless of whether the furnace is under-fired, over-fired or side-fired. By raising the charge the circulation of hot gases is expedited and the causes for cold spots lessened. If boxes are piled one on top of the other, they too should be separated about 2 in., and attention should be paid to the position of the top boxes so that they do not protrude above the bridge-wall in side-fired furnaces, or too near the arch in any furnace. The thermocouples should be so placed so as to indicate the temperature of the furnace at points nearest the charge rather than the temperature of the hot gases in the roof or arch of the furnace. Care should be taken so that at no time the indicated temperature exceed that desired for annealing, a condition very often resorted to to hasten the operation.

The best structure for file steel that has been annealed is one in which all of the cementite has been spheroidized. Such a structure is shown in photomicrograph, Fig. 22. It is possible to produce this condition by annealing at 1440 to 1460 deg. Fahr., followed by slow-cooling to at least 800 deg. Fahr. in the furnace.

Improper grinding of the annealed blanks can also cause trouble for the manufacturer. An excellent plan to determine whether the grinding has been uniform or whether the steel has been more deeply decarburized on one side than on the other is to take several representative blanks from each annealing and grind as usual. Then harden, and fracture each piece several times, noting the structure at each fracture. Any decarburization is easily seen and proper precautions for working the steel may be taken.

Soft spots from excessive decarburization, carbon segregation, etc., are easily detected in the cutting of the files, especially where the modern cutting machines are in use. The cuts produced in the soft places are deeper and broader than in the rest of the file.

The hardening of files is generally carried on by coating them with a suitable paste, usually made from some carbonaceous material, the fohmula for which is different in most every shop, and heating to the desired temperature in a lead pot, followed by quenching in a salt bath. The paste acts chiefly as a protection against lead adhering to the teeth of the file. It is easily knocked off the file after it is taken from the lead pot and before being plunged into the quenching bath.

The chief causes for failure in the hardening of files, provided they have been made from good material, and proper care has been exercised in previous processes, is overheating. The effects of various tempera-

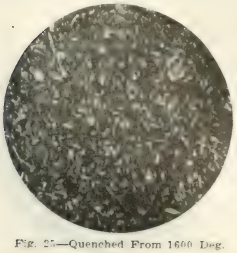


Fig. 25—Quenched From 1600 Deg. Fahr.

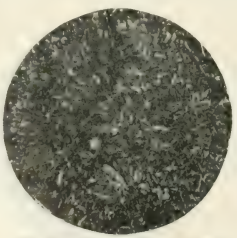


Fig. 26—Quenched From 1700 Deg. Fahr.

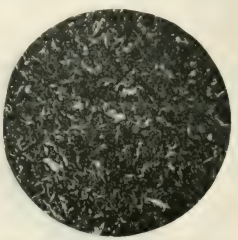


Fig. 27—Quenched From 1800 Deg. Fahr.

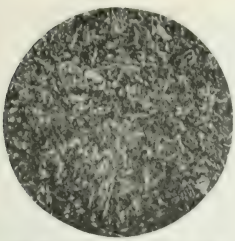


Fig. 28—Quenched From 1900 Deg. Fahr.

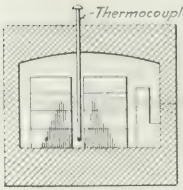


Fig. 30

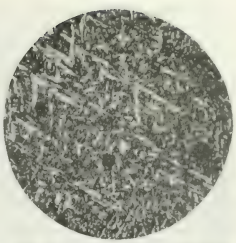


Fig. 29—Quenched From 2100 Deg. Fahr.

tures for hardening file steels may be judged by referring to photomicrographs, Figs. 23, 24, 25, 26, 27, 28 and 29, the best structure being produced in the steel when quenched from 1420 deg. Fahr. When file steels are quenched from too high a temperature, the teeth become very brittle and are easily knocked off, or else the files break in quenching.

It has been shown by text and illustration what some of the more common causes for file steel failure are. The suggested means for their correction are by no means arbitrary. Care in making the steel, care in rolling the steel, which includes the heating for rolling, and care especially in forging and annealing the steel has been shown to eliminate most of the troubles. The attention directed to the production of spheroidized cementitic structure in the annealed files will generally assure blanks being produced that can be cut easily and harden splendidly.

Ingot Structure and Heat Treatment

Importance of Controlling the Former as an Aid to the Latter—Possible Effect of Electro-Magnetic Treatment During Solidification

BY B. D. SAKLATWALLA*

THE most remarkable property of steel, increasing its technical usefulness and differentiating it from other alloys, is its wonderful susceptibility of structural changes below its solidifying temperature, in other words its amenability to heat-treatment. The purpose of this treatment is to bring about physical conditions superior to those existing in the original solidified condition. We may, therefore, consider the heat-treating process as a continuation of the changes starting from liquid steel and going through the intermediate state at the point of solidification. If we assume this continuity, we find that through development in the art of heat-treatment we have been able to wonderfully control the changes occurring in the period after solidification, but that we have scarcely made any efforts to control the structural changes occurring prior to or during solidification, which changes undoubtedly are of primary importance and their effect persists through the later stage after solidification.

Factors at Play During Melting and Cooling

Liquid steel prepared in the furnace can probably be finished in a more or less perfect condition. From this desirable condition, during the subsequent operations of tapping, pouring, etc., it is unfortunately subjected to deteriorating influences. When the molten metal is tapped the stream comes in contact with the atmospheric gases which can be absorbed physically and chemically, and also the molten metal is stirred up with non-metallic material, such as ladle lining, slag, etc. Consequently, the liquid steel as poured in the molds is always more or less subject to the evil influences of non-metallic inclosures, dissolved oxides, nitrides, blow holes, shrinkage cavities, etc. These innate deficiencies in the ingot are not going to be offset by any later heat-treatment processes in the solid state. It is therefore important to study and if possible control the changes taking place during solidification in the mold.

For the purpose of improving mold setting conditions several expedients are resorted to, such as different ways of casting, either bottom or top pour, changing design and size of molds, keeping the top hot, applying increased or decreased pressure during solidification, and resorting to chemical agents such as aluminum to remove gases. All these practical expedients aim, however, at removing the mechanical apparent defects and impurities without trying to influence the primary crystallization and molecular structure of the ingot.

The physical forces at play during the process of cooling of a body from the gaseous to the liquid and the solid state have been more recently investigated from the modern standpoint of atomic structure. If, for instance, we follow the cooling process of a gas, through the liquid, to the solid state we can picture the following phenomena: The atoms forming the gas, taking it to be monatomic for the sake of simplicity, are, according to the kinetic theory, in a state of constant motion depending on the temperature. Within the confines of the gas volume, these atoms would meet other atoms in similar motion. In the case of such an impact the atoms would rebound from one another. These atoms would be under the influence of two forces, the one a cohesive force between the atoms and the other the force of rebound. In the gaseous state the latter force is by far more the preponderating. As the temperature of the gas and consequently the kinetic energy of the atoms is diminished, the rebound force becomes less, the cohesive force comes more into play, and the body assumes a liquid form. On still further decrease of temperature the cohesive force becomes the more preponderating, the rebound force is absent and the body solidifies. If under the influence of the cohesive forces the atoms on solidification arrange themselves into definite

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geometrical configurations we have crystalline bodies such as the metals.

Cohesive Force and Solidification

In this solidification procedure we have described the attractive force between atoms as a cohesive force. The idea seems to be fairly well established that this cohesive force is of an electro-magnetic nature. According to the modern concept, the atoms consist of a positively charged nucleus with a number of negatively charged electrons. Without going into a discussion of the various theories of atomic structure, it might be said that it is easy to conceive that positive and negative charges, under certain arrangement in the atom and with certain relations of these charges to those of other atoms, can bring about forces of an electro-magnetic nature. If, therefore, the aggregate condition of matter is dependent on these bonds of cohesion, electro-magnetic in nature, the presence of other electro-magnetic forces, extraneously applied, will undoubtedly influence the physical properties depending on these atomic bonds. Hence we can see the possibility of controlling the bonds of cohesion on which crystallization of metals depends by extraneous means.

Electro-Magnetic Force and Crystal Growth

If a liquid metal is subjected to the influence of an electric or magnetic field, its different constituents will be differently affected depending on their characteristics of conductivity, permeability, etc. Also the setting up of an alternating electric current through the molten steel may cause molecular vibratory disturbances, depending on the frequency of the current, which may help towards elimination of occluded gases, non-metallic impurities, and the like.

The most novel effect, however, from the presence of an electric or magnetic field can be expected from the influence exerted on the electro-magnetic bonds of cohesion determining crystal growth. Hence the rate of primary crystallization, the distribution of primary crystals, the grain size, etc., would be affected. It would therefore probably be feasible, by controlling the intensity of the extraneous electro-magnetic field, to bring about refinement of crystal structure in the solidifying ingot.

The practical means of producing such a field in which a steel ingot or casting could solidify would be a comparatively simple matter. It would be possible to pass a current, direct or alternating, of low or high frequency, through the body of the solidifying ingot, or such currents could be induced in the contents of the mold by extraneous conductors. Each method of procedure will undoubtedly show different results.

The application of the electric current in the production and refinement of steel has shown within the last decade very far-reaching results. Let us hope that the application of electrical energy towards the refinement of ingot structure may show equally remarkable results in the future and partly accomplish the result achieved today by heat treatment of the finished material, thus helping to alleviate in some measure some of the present trials and tribulations of the heat treater.

Steel Structural Parts for Aircraft

Control in Their Heat Treatment—Alloy Steels Which Have Been Adopted—Use of Metal in Aircraft Increasing

BY HORACE C. KNERR*

ABSOLUTE dependability combined with minimum weight is the difficult ideal to be attained in the construction of aircraft, perhaps more than in any other industry. Materials must be selected for their uniformity and reliability as well as for superior physical properties. Processes and inspection must be such as to insure that each individual part fully meets its designated requirements. A single defective member in an airplane, consisting of many thousands of different parts, most of which are highly stressed, may cause disaster. In the classic words of one dusky philosopher—"when a' automobile breaks down, dar you is, but when a' ary-plane breaks down, *whar* is you?" The most rigorous inspection of raw material and fabricated parts is therefore essential.

Economy Through Standardization and Technical Supervision

Simplification of practice, standardization of processes and material, careful workmanship, rigid inspection and close technical control and supervision, have resulted in reducing rejections of structural parts after heat treatment at the Naval Aircraft Factory from an originally high figure to an almost negligible quantity. Besides contributing to the safety essential to aircraft work and eliminating the delays incident to replacing unsatisfactory material, this has afforded substantial economies in production, which more than compensate for the cost involved.

During the year of 1922 a total of over 88,000 structural parts of aircraft were heat-treated at the Naval Aircraft Factory with only a single rejection, this one being for incorrect material. All heat-treated parts are subjected to a close inspection for cracks, warping, scale, etc., and are required to come within specified hardness limits. Most of the parts treated are not of a difficult nature, and production is on a moderate scale, but it is believed that the results clearly demonstrate the value of the methods employed, and that these methods are applicable to other industries engaged in the manufacture of high grade metal products.

Use of Metal in Aircraft Increasing

There is little doubt that aircraft of the future will be of all-metal construction. The hazards of fire, decay, deterioration by the absorption of moisture, limitations and uncertainty of supply, and other drawbacks connected with the use of wood are too serious to permit survival for long. The growing tendency toward the increased use of metal in aircraft is retarded by the difficulty of obtaining suitable high grade structural metals of dependable quality on the market, especially sheet and seamless tubing. Duralumin and other light alloys are formidable rivals of steel in this field and are making rapid strides, but the growth of the aircraft industry is destined to offer an ever-widening market for ferrous as well as non-ferrous alloys of superior quality.

At present, the majority of airplanes and flying boats have their larger structural members made of wood. But even in these there is a very important class of parts, subject to high stresses, such as bolts, eyebolts, wing hinges, wire terminals, braces, struts and strut ends, engine mountings, landing gear braces, axles, and miscellaneous parts of more or less compli-

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The Office (Below) and Part of the Microscopic Equipment of the Metallurgical Laboratory

Some of the Heat-Treating and Other Testing Apparatus of the Metallurgical Laboratory of the Naval Aircraft Factory

cated design known as "fittings," which are made of steel and which must be thoroughly dependable.

Chemical and Physical Requirements Specified

All steel is purchased under detailed specifications, covering both chemical composition and physical properties. Formerly, physical properties were the determining factor, the contractor being permitted to furnish any one of a number of different steels which, when suitably heat-treated, would have the specified tensile strength, yield point, elongation, reduction of area, etc. For example, a certain specification called for alloy steel bar stock having the following physical properties after heat treatment as recommended by the manufacturer:

Tensile strength (min.), lb. per sq. in.....	125,000
Yield point (min.), lb. per sq. in.....	95,000
Elongation (min.) in 2 in., per cent.....	17.0
Reduction of area (min.), per cent.....	50.0

This specification permitted the use of any one of 18 steels of different composition, including five nickel steels, 12 chrome-nickel steels and one chrome-vanadium steel. Such a wide choice of compositions under a given specification was permitted on the supposition that since physical properties were the ultimate aim, any steel which would meet physical tests would be satisfactory.

However, a different heat treatment would be required for nearly every one of the different steels mentioned to give it the desired properties. As heat treatment is done after fabrication it would be necessary to identify each different composition through stores and production, in order to apply the correct heat treatment. This would result in great complication of records, marking and storage, and numerous mistakes would be almost inevitable.

In order to simplify design, inspection, stockkeeping, manufacture and repair, a minimum number of steels have been adopted as standard at the Naval Aircraft Factory for use in structural parts, and physical requirements reduced to the least variety which will meet the needs of design. One standard S. A. E. steel under each set of physical requirements has been selected, the choice being based upon its availability on the market, its working qualities and the readiness with which it would meet the specified physical properties. This simplification has brought the total number of steels used for structural parts down to six, and a still further reduction may ultimately be accomplished.



Heat-Treating Equipment in the Naval Aircraft Factory, Philadelphia

The present list of standard steels is as follows:

Grade	Steel No.	Form	Physical Properties: Tensile Strength, Lb. per Sq. In.	Yield Point, Lb. per Sq. In.	Elong. in 2 In., Per Cent
Mild carbon steel	1025	Sheet, bar and tubing	55,000	36,000	22
Medium carbon steel	1035	Bar, forgings only	80,000	60,000	22
High carbon steel [a]	1095	Sheet, rod and wire	.....	.....	..
Nickel steel, 3.50 per cent	2330	Bar and seamless tubing	125,000	95,000	17
Chrome-vanadium steel	6130	Sheet	125,000	100,000	10
Chrome-nickel steel [b]	3135	Bar	150,000	115,000	14

[a] Steel No. 1095 is used only to a small extent, chiefly for light springs.
[b] Steel No. 3135 is used moderately for parts subject to specially high stresses and wear.

Chrome-vanadium steel was adopted as standard for sheet after a careful comparison of three leading types of alloy sheet steel—3.50 per cent nickel, No. 2330; chrome-nickel, No. 3130, and chrome-vanadium, No. 6130. The latter was found to have distinctly the best properties in cold bending. ("Three Types of Alloy Sheet Steel" H. C. Knerr, THE IRON AGE, Sept. 8, 15 and 22, 1921.) Unfortunately this steel is not available in the form of seamless tubing in the sizes and gages required. It has therefore been necessary to include two steels, Nos. 230 and 6130 under the 125,000-lb. class.

Steels are indicated on drawings and material requisitions by their S. A. E. steel number, the N. A. F. heat treatment symbol being appended thereto on drawings.

Inspection Tests of Raw Material

All stock intended for structural parts is first given a thorough inspection for dimensions, surface condition and mechanical defects. Test coupons are then taken, tensile specimens being heat-treated before testing. Bend tests are also made on sheet, and crush tests are applied to tubing, in the condition in which furnished by the manufacturers (annealed). These latter tests are for the purpose of detecting defects in the material, and to insure that it has been properly annealed for working. They have been found very effective. Sheet steel is required to withstand bending cold through 180 deg., the worst way of the grain, over a diameter equal to its own thickness, without cracking. The crush test for tubing consists in crushing endwise a section whose length is 1½ times the diameter of the tube until one complete fold is formed, or its outside diameter is increased 25 per cent in one zone, or its length is reduced to one diameter, without cracking. The same tests are applied to both alloy and mild carbon steel sheet and tube.

Chemical analysis is made from samples representing the full thickness of the material. Upon acceptance, all steel is painted with a distinguishing color (stripe), corresponding to the analysis or steel number, before being placed in stock.

Heat Treating Equipment

Heat treatment is done in oil-fired, semi-muffle furnaces, a lead pot being used for tempering small parts such as bolts, eye-bolts, forgings, clevis pins, etc.

Before being put in service, and from time to time, furnaces are checked for uniformity of temperature within the hearth. The temperature is held constant by means of the furnace couple located at the center, and the hearth is explored for hot or cold spots by means of one or more auxiliary couples placed at various points. The temperature within the hearth is required to be uniform within plus or minus 5 deg. C. The furnaces are underfired, so that the charge is heated from all directions. A slightly reducing atmosphere is maintained, judged by the vent flame. Flames do not come in contact with the charge.

Quenching tanks are located close under the furnace door, so that parts may be withdrawn and quenched with hardly more than a single motion of the arm and no loss of time. Oil is used almost exclusively as a quenching medium. Oil tanks are water-jacketed for cooling, and the oil is rapidly agitated by means of compressed air discharged from a perforated pipe at the bottom of the tank. Small parts are placed in metal trays in the furnace and dumped into the oil with a spreading motion. They are caught in a wire basket suspended in the oil tank.

Large parts are tempered in the furnace. Small parts are dusted with powdered charcoal while oily, and submerged in the lead tempering bath by means of a wire grid held down with a lever. The charcoal effectually prevents sticking of lead to the work.

A cast iron pot is used to contain the lead. Firing is by oil, but hot gases making a complete circuit of the pot. The lead is never heated above about 600 deg. C. (1100 deg. F.). The same pot, furnace and thermocouple have been in use for more than four years at date of writing, without replacement, and are still in good condition.

Temperature Regulation

Temperatures are regulated by means of a Leeds & Northrup multiple-point recording pyrometer, mounted in a cabinet near the furnaces, so as to be protected, but readily accessible to the heat treater. The continuous record is of great assistance to the operator in regulating temperatures, and the fact that it is available for inspection has an excellent influence in preventing carelessness. Connections are provided in the cabinet for substituting a portable indicating pyrometer for the recorder without delay should the latter get out of order.

Automatic control has not been attempted because of the variety of temperatures at which furnaces and lead pot are required to operate. Manual control has been found quite satisfactory. Temperatures can be adjusted and held constant within plus or minus 5 deg. C. without difficulty.

Iron-constantan thermocouples are used. The furnace couples are sheathed with 1¼-in. black iron pipe with a plug welded into the end (galvanized pipe cannot be used as the zinc attacks the couple). The head of the couple is inclosed in a larger piece of pipe so that the connections between couple wires and lead wires are at uniform temperature, avoiding parasite electromotive forces which would be set up were the brass connections hotter at one end than the other. Duplex iron-constantan lead wires are run without joints from the head of the couple to the pyrometer terminals through metal conduits. The pyrometers have automatic cold junction compensators. The couples extend into the center of the hearth a distance of about 2 ft., so that there is no danger of error by conduction of heat along the couple. The couple in the lead pot can be immersed to a depth of only about 8 in., and is therefore provided with a light sheath made of 1-in. seamless steel tubing, about 1/16 in. thick, to avoid conduction errors. (The present sheath has been in service more than 4 yr.).

Calibration of Thermocouples

The thermocouples are welded in the metallurgical laboratory from certified wire. This wire is checked for accuracy and uniformity by the manufacturer and runs very true but, as an additional precaution, every new lot of wire is checked against a standard platinum-platinum-rhodium thermocouple in the metallurgical laboratory. Three noble metal couples are kept as primary standards, having been calibrated by the U. S. Bureau of Standards. Only one of them is used for checking base metal couples, the other two being used at intervals to check that one, thereby insuring the detection of any variation.

Checking is done in an electric muffle furnace, which, after heating up on the shop power line, is held at the required temperature on a separate storage battery circuit to avoid temperature fluctuations due to variations in line voltage. Preliminary readings are taken until all the couples show constant readings for a reasonable time, before taking the final readings. The hot junctions are bound together and inserted in a heavy cylinder of cast iron placed in the center of the furnace in order to insure their being at the same temperature. This cylinder is about 8 in. long,

3¼ in. in diameter, with a center hole 1¾ in. in diameter and 7 in. deep. Couples are checked at at least three different temperatures. The noble metal couple has a sheath to prevent contamination; the base metal couples are bare.

An iron-constantan couple checked in this way against the noble metal standard is used as a secondary standard for checking the couples in the shop. This secondary standard is encased in a sheath made of a piece of 1-in. diameter seamless steel tubing of 1/16 in. wall thickness, the end being closed by welding. It is inserted directly alongside the couple to be checked in the furnace. Readings are taken on an indicating pyrometer of the potentiometer type, and must agree with the readings of the recording prometer to which the furnace couple is connected, within plus or minus 5 deg. C. This constitutes a check of the whole temperature measuring system. The furnace is held at constant temperature, and simultaneous readings of the standard couple and furnace couple are taken until both have remained constant for about ten minutes, before the final reading.

All factory couples are checked in this way by a representative of the metallurgical laboratory at intervals of from one to eight weeks, according to the severity of their service. Check readings are reported to the metallurgist on the form shown below:

Calibration of Thermocouples

Location..... Date.....

Standard Couple No..... Furnace Couple No.....

Time of Day	Standard Couple, Degrees	Furnace Couple, Degrees	Correction, Degrees	Remarks
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

Approved ..... Data by.....
Metallurgist.

When a furnace couple is in error more than 5 deg. C., it is removed. Every couple is given a serial number when made, and its service recorded.

Technical Supervision of Shop Processes

All heat-treating processes are under the technical supervision of the metallurgical division of the engineering department. The metallurgist keeps in close, personal touch with these operations in the factory. Under the chief engineer, the metallurgist prepares specifications for the purchase of metals and their heat treatment. In consultation with the mechanical superintendent of the works department, he assists in the preparation of plans and specifications for heat-treating equipment. All pyrometric equipment is under the direct care and supervision of the metallurgical laboratory.

Heat-treatment specifications cover the process in considerable detail, as is illustrated by the following specification for chrome-vanadium steel. It will be noted that the quenching temperature is held within comparatively close limits.

Heat Treatment Specification for Chrome-Vanadium Sheet Steel No. 6130

1. When the work is inserted, the temperature of the furnace shall not exceed 650 deg. C. (1200 deg. Fahr.). Raise the temperature gradually to between 870 and 885 deg. C. (1600 to 1625 deg. Fahr.). Hold this temperature for 20 min.
2. Remove the parts from the furnace and instantly quench in oil with vigorous agitation, until cold.
3. After quenching, the Brinell hardness should be from 300 to 475, according to the thickness of the sheet, thin sheets being the harder.
4. Insert the work in a furnace or lead pot whose temperature is not above that to be used in tempering, and hold for at least 20 min. at the temperature indicated by the Brinell hardness after quenching, as follows:

Brinell Hardness After Quenching	Tempering Temperature
300 to 350	425 deg. C. (800 deg. Fahr.)
350 to 400	455 deg. C. (850 deg. Fahr.)
400 to 475	485 deg. C. (900 deg. Fahr.)

5. Remove the parts and allow them to cool in still air.
6. A Brinell hardness of from 250 to 325 should result.
7. Physical properties required:
   Ultimate tensile strength..125,000 lb. per sq. in.
   Elongation in 2 in.....10 per cent

After quenching, Brinell hardness tests are made on a number of samples from the batch by the metal shop inspector. He reports the hardness to the heat treater, who uses the corresponding tempering temperature. After tempering, a large proportion, or all, of the parts are tested for hardness by the metal shop inspector, and are required to come within the specified hardness limits. These hardness limits are such as to insure the required tensile strength and ductility, and are determined by experiment on test coupons of the material.

Variations in chemical composition of the material even within the approved S. A. L. tolerances (plus or minus 0.05 per cent carbon, 0.15 per cent manganese, 0.25 per cent nickel, etc.) cause considerable variations in the hardness after heat treatment. Any parts failing to come within the specified hardness limits are returned for re-treatment, when the temperatures may be slightly modified. If they again fail, they are rejected. Cracks, deformation or excessive scale are also cause for rejection.

Rejections after heat treatment are immediately reported to the metallurgist by the metal shop inspector on the form below:

Date.....

To: Metallurgist

The following material has failed to pass inspection after heat treatment:

Name or Description.....
Part No.....
Job No.....
Quantity Rejected.....
Quantity Passed.....
Steel Specification No.....
Heat Treatment Specf.....
Hardness, Quenched.....
Hardness, Drawn.....
Hardness Required Quenched.....
Hardness Required Drawn.....
Remarks.....
.....
.....

(Signed) .....
Inspector, Metal Shop.

Recommendations .....
.....
.....

Date.....

.....
Metallurgist.

A prompt investigation is made and the cause of failure determined. Steps are taken, if possible, to prevent recurrence of the failure. This practice has been one of the principal factors in reducing rejections to a minimum. It prevents blame being placed on the heat treater for failures which are due to causes beyond his control, and on the other hand makes it possible to correct any error which he may be committing, before the matter has gone very far. The metal shop inspector keeps a record of all parts heat-treated, stating the part or drawing number, the quantity of parts in each lot, the maximum and minimum hardness, and the number and cause of rejections, if any. In this way it is possible to compare the efficiency of the work for any periods desired.

The work of inspection is under the engineering department, which is concerned primarily with quality of output. The inspection of heat-treated parts has been exceedingly careful and conscientious and no parts are allowed to pass which are not fully up to requirements.

A summary of the heat-treating record for the past five years taken from the log of the metal shop inspector is given below. The period from August to December, 1918, when rejections reached nearly 9 per cent, was before the present system of supervision was put into operation. The subsequent annual periods show a substantial and progressive decrease. These results appear to be adequate proof of the economical value of accurate control, and close technical supervision of heat-treating processes.

RECAPITULATION
Heat Treatment Log, Naval Aircraft Factory
Structural Parts

Period	Total Parts Treated	Parts Rejected After Heat Treatment	Per Cent Rejection
August to December, 1918, inclusive	75,431	6,669	8.85
Year of 1919	72,287	173	0.24
1920	103,921	44	0.042
1921	249,376	35	0.014
1922	88,312	1	0.0011

Summary

Rejections of heat-treated structural parts, even when subject to rigid inspection and close hardness

limits after treatment, may be reduced to a comparatively negligible quantity by proper precautions, including the following:

1. Purchase of steel under suitable specifications, including chemical analysis and physical properties.
2. Restriction of each grade of steel to a standard S.A.E. steel number, or within similar or closer chemical tolerance limits.
3. Inspection and test of raw material to insure that specifications are met.
4. Standardization upon a minimum variety of steels and treatments.
5. Accurate specifications for the heat treatment of each grade of steel.
6. Correctly identified stock.
7. Reliable pyrometers, frequently checked.
8. Properly designed and operated furnaces, quench tanks, etc.
9. Hardness tests of parts, after quenching, to designate correct tempering temperature, as indicated by heat treatment specification.
10. Intelligence, care and conscientious attention to instructions on the part of the heat treater. (Technical knowledge not necessary.)
11. Active technical supervision of heat-treating operations, by an experienced metallurgist, and immediate investigation of all failures to determine their cause and prevent their recurrence.

X-Rays in the Steel Industry

Origin and Properties—Hidden Defects and How to Find Them—Some of the Work Already Done

BY DR. ANCEL ST. JOHN*

WHAT use are X-rays in the steel industry? Ten years ago the answer would have been, "No use at all!" Today, however, owing to the activities of several earnest investigators in this country and abroad the answer is vastly different. X-rays are being used to find the extent and nature

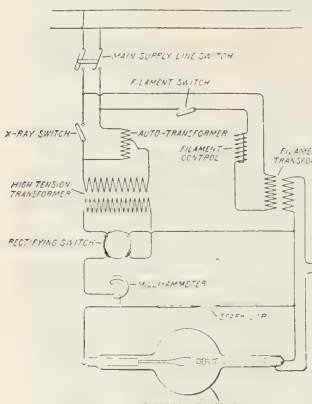


Fig. 1—Diagram of X-Ray Apparatus

of hidden defects in castings and forgings and to go beyond the realm of the metallurgical microscope in studying the reasons for the special properties of treated steels.

It is, therefore, pertinent to call attention to a few outstanding features of the work already done and to indicate some of the more important articles describing the methods used. The examples and references given by no means represent all the work that has been done; they are instances of noteworthy achievements selected to arouse the interest of steel makers, steel treaters and steel users in the possibilities of X-rays in the steel industry.

Origin and Properties of X-Rays

It is well at this time to recall certain facts concerning X-rays and their behavior. X-rays arise when rapidly moving electrons are abruptly stopped by matter. The general mechanism of their production is the same as for the production of visible light and the X-rays themselves differ from light waves only in having much shorter wave-lengths, less than one ten-thousandth those of light. According to accepted theory an atom consists of a positively charged center or nucleus surrounded by a number of negatively charged particles or electrons, the whole forming a sort of miniature solar system. The mass and charge of the nucleus and the number of surrounding electrons are characteristic of each element and are nearly proportional to the atomic weight, but the electrons themselves are the same for all elements.

Ordinary light is produced when agitation of the atoms, due to combustion, excessive heating by an electric current, or some other cause displaces the electrons forming the center portion of the atom from their normal positions or paths. X-rays are produced only when the inner electrons are displaced. This is accomplished by the impact of a free electron moving with sufficient speed to penetrate to the interior of the atom. In either case the displaced electrons vibrate with definite frequencies, depending upon the structure of the atom and the original position of the electron, until they dissipate the energy acquired during the displacement as radiation of wave-lengths corresponding to the frequencies. The X-rays given off in this manner thus have wave-lengths peculiar to the atom and are called the characteristic X-rays of that element. In addition the stoppage of the free

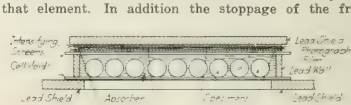


Fig. 2—Diagram of Radiographic Set-up

electrons sets up a series of waves, known as the general or independent X-rays, of wave-lengths exceeding a minimum determined by the speed of the electron.

The necessary speed is imparted to the free electrons by impressing a suitable voltage between electrodes in a vacuum. Since the electrons in the interior of atoms of high atomic weight vibrate more rapidly and so give off shorter waves than those in atoms of lower atomic weight, since a greater speed is required for a free electron to penetrate to the

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interior of such an atom, and since finally, the speed of the free electron increases with the impressed voltage, the voltage necessary to produce X-rays of a given wave-length is inversely proportional to the wave-length, and the voltage required to produce the characteristic X-rays of an element increases rapidly with the atomic weight. Thus three volts suffice for hydrogen X-rays, whereas about 20,000 volts are required for molybdenum and about 90,000 volts for tungsten. A typical apparatus for generating X-rays is shown diagrammatically in Fig. 1. The supply of free electrons is produced by heating a tungsten filament to incandescence. The voltage is applied between the filament and a block of metal, usually tungsten, often called the target. The X-rays arise when the electrons hit the target.

When X-rays fall upon a substance, part of the energy is absorbed, part scattered without change of wave length and the balance passes through. Much



Fig. 3—Lester: 400-lb. Casting Ready to be Radiographed

of the absorbed energy is reradiated as longer waves, known as secondary X-rays, characteristic of the absorbing substance, but in some cases a part may cause chemical and physical transformations, such as ionizing a gas, activating a photographic emulsion, or causing a fluorescent glow, which may be used to detect and record the presence of the rays. The amount of this absorption and scattering depends on the wave-length of the rays, the number and arrangement of the electrons in the absorbing atoms and the number of atoms traversed. Expressed in another way, it depends somewhat upon the atomic weight of the target but principally upon the voltage across the tube and the atomic weight, density and thickness of the absorber. For a given voltage the absorption increases rapidly with the atomic weight of the absorber, for a given absorber it decreases rapidly as the voltage increases.

X-rays are only slightly visible to the human eye and produce such serious physiological consequences, when they fall on any part of the body frequently or for a long time, that other means, such as those already mentioned, must be used for observing them.

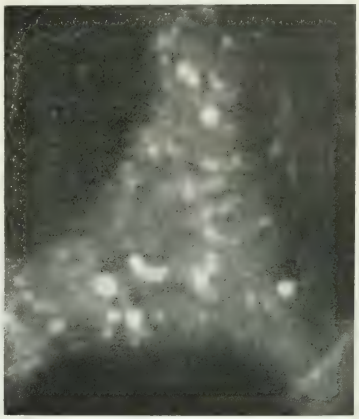


Fig. 4—Radiograph through Head of Casting

For general purposes the photographic effect is the most convenient.

Finding Hidden Defects in Steel

The method used for finding hidden defects in steel with the X-rays is similar to that used by the surgeon in examining the human body, except that since the materials examined are much less transparent to the rays a much greater penetrating power is required. The general arrangement of the apparatus is shown in Fig. 2. The object to be examined is interposed between the X-ray tube and a photographic film and exposed for the proper length of time to



Fig. 5—Section through Head of Casting

X-rays of the appropriate character. In the resulting shadow picture cavities, thin spots and foreign matter of atomic weight lower than the material as a whole are recorded as regions of increased illumination, while foreign matter of higher atomic weight appears as a region of decreased illumination.

A great deal of valuable information concerning X-ray examination of steel castings has been given by Dr. Lester of the Watertown Arsenal.[1] Dr. Lester

shows that more than 3 in. of steel can be radiographed satisfactorily in a 30-minute exposure at 195,000 volts with commercial equipment at present available. Cavities as small as 2 per cent of the thickness of the part examined can be detected with certainty. Some idea of the objects examined can be gained from the accompanying Figs. 3, 4 and 5 taken from Dr. Lester's article. Fig. 3 shows a 400-lb. casting for an air bomb, ready to be radiographed. The risers have not yet been removed. Fig. 4 is a radiograph with the rays passing along the vertical axis of the casting where they traverse slightly more than two inches of metal. The dark shadows are the risers and the mottled regions show that the risers were not feeding properly. Fig. 5 is a section through the defective head showing some of the holes responsible for the spots in Fig. 4. On the information furnished by the radiograph the design of the risers was changed and the difficulty remedied. The article contains data on the correct voltages and exposures for various thicknesses of steel, notes on the proper positioning of tube, casting and film, suggestions on the interpretation of results and contributions to the theory of radiography.

(To be concluded)

Steel Castings for Sugar Mills



Developing an Alloy Steel to Withstand High Pressure—Its Manufacture, Heat Treatment and Properties

BY HARRY J. BARTON*

ONE of the largest and most important industries of today is that of sugar making, yet it is one line of endeavor with which very few foundries come into contact. With a great proportion of the world's sugar coming from Cuba, Porto Rico, and Louisiana it is natural that southern foundries should specialize on this class of work. During the past few years the competition in sugar mill castings has become very keen, and practically all machinery is sold on a guarantee. Each shop is striving to make superior products, and a great deal of experimentation is being done along the lines of new metals, heat treatment, etc.

Important Castings Employed

One of the most important castings used in sugar mills is the cap which holds the crushing rolls in position. The duty of this cap is about as follows: As the cane comes from the fields it is placed on a conveyor belt which carries it to the first set of rolls. These rolls are usually of steel, and are cast with deep, interlocking corrugations in order to properly grip the cane. This set of rolls is two-high, and so arranged that the cane is well pulped on this pass. From here the crushed mass travels through several other sets of rolls each with a smaller clearance as the train progresses. Frequently hot water is sprayed on this pulp to increase the yield of juice, which tends to swell the mass making the rolling more difficult. Often, due to carelessness on the part of a laborer, a fork, or crowbar falls into the moving cane, further increasing the strain on the rolls.

Naturally there must be some sort of an arrangement to compensate for slight movements in the rolls, keeping them at the desired clearance but allowing for an upward movement when some foreign element is introduced. This is the duty of the cap of which there are two kinds. There is the "top cap" which holds the upper roll in position, and the "side caps" which work on the two lower rolls, the three rolls being on an equilateral triangle, base down. The upper roll is the one which does all of the heavy crushing and consequently it is the "top cap" upon which the brunt of the heavy duty falls. The roll shaft fits into a heavy side frame casting which is slotted to receive the shaft bearing. This bearing is made in two parts, the lower, which is stationary, and the upper, which is movable. Upon this upper bearing is placed a heavy, close fitting steel plate casting, slightly recessed on the top side. Into this recess fits a short piston rod the upper end fitting into the top cap. The upper end of the top cap is connected to a hydraulic arrangement, set at whatever pressure is desired.

*Diebert, Bancroft & Ross Co., New Orleans, La.

High Manganese Steel Adopted

We will assume a batch of cane going through the rolls. The hydraulic cylinders are set at 6000 lb., keeping the roll clearance at ½ inch. Due to some irregularity the cane clogs and is bunched under one set of rolls. Immediately the pressure rises above the safety mark, the roll is forced up, the piston rising in the top cap and allowing the needed upward movement. As soon as the lump passes the hydraulic pressure forces the piston down, and the roll drops to its customary position.

It becomes clear why the cap is a very important part of the mill, and why such care must be used in its manufacture. To briefly summarize what must be obtained for a high grade cap:

1. The metal must have a maximum toughness to withstand the constant strain, both from the pressure, and the constant vibration of the crushers.
2. There must be sufficient strength of metal to withstand any tendency to elongate under this constant pressure.
3. The metal must be of absolute solidity, and denseness to hold the hydraulic pressure, and must be free of any defects such as slag or sand spots, shrinks, draws or blow holes.
4. The metal must be free cutting in order that machining costs may not be excessive.

Formerly it was the practice to use heavy bronze bushings in the caps to withstand the hydraulic pressure but, as this was so expensive, steps were taken to see if a metal could not be cast which would stand up without bushing. In addition to the above qualifications there was therefore another to be added which was that the metal poured into caps would also be satisfactory for miscellaneous machinery castings. As our work is varied and a cap would only take about 3000 lb. of metal from each heat it became necessary to pour the rest of our melt into jobbing work, and naturally we could not use such an analysis as would tend to make castings either hard or brittle.

Considerable thought was given to this subject, and many different classes of steel were considered and finally rejected for one reason or another. What we wanted was a metal which would fill the qualifications in a satisfactory manner, which was as cheap as possible to make, and which would require only a simple heat treatment to bring out its best properties. Finally two classes were selected as offering proper features: One a nickel steel, and the other a high manganese product. Comparative tests of these metals and a plain carbon steel are given in Table 1. These figures showed us that the steel with high manganese was very comparable to the nickel alloy, and this metal was accepted for trial. Our results from the first were fairly good and, after many minor difficulties, we were finally able to thoroughly standardize our process to the point where the product was eminently suitable from all angles.

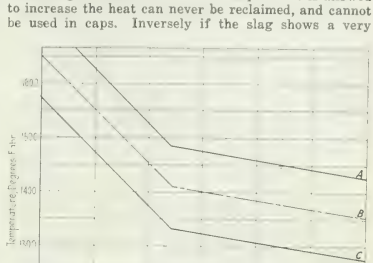
Our adopted analysis is carbon 0.25 to 0.30, silicon 0.25 to 0.30, phosphorus and sulphur under 0.05, and manganese 1.25 to 1.50 per cent. We later found that the analysis was the least of the troubles, and that the making of proper steel was something entirely different from that of producing ordinary castings. It was found that the presence of this high manganese content, while making an unusually good metal, caused the steel to become extremely sensitive and considerable trouble was encountered until its peculiarities had been mastered. It was found that the temperature of pouring was of extreme importance; the presence of any non-metallic inclusions in the steel caused trouble from cracks, and segregated spots; the steel did not need a harsh treatment to exhibit its best properties; and finally that the utmost care must be used in its manufacture from the raw scrap to the heat treating. The metal as produced today is indeed wonderful steel. There is absolute freedom from any cracking or segregation, the metal machines as well as a soft carbon steel, the hydraulic test has been raised to 8000 lb. and, best of all, the work on the job has proven satisfactory.

Furnace Practice for the Steel

The class of scrap used must be very carefully picked if results are to be good. In our first heats the scrap was taken as it came and caused endless trouble. If too clean, the heat would melt down high in carbon, manganese, and silicon, and would require heavy amounts of ore to cut these elements down. If the scrap was dirty it would melt down heavily oxidized. Either way it was found that the excess of oxide, even though supposedly eliminated in the furnace, would cause trouble later on, mainly coming to light as the cause of a cracked casting, or oftentimes as a porous spot in the metal. Experience showed that the most satisfactory charge was one containing about half returned shop scrap, and half clean boiler plate. This was charged with the shop metal on the hearth, the holes being filled with the plate, always attempting to obtain as compact a mass as possible. Two or three scoops of old molding sand were thrown in with the charge to furnish enough of a slag blanket to cover the bath, and prevent surface oxidation. Electrodes were carefully watched so that there was little likelihood of a stub breaking and raising the carbon during the melt down. Contrary to general practice we do not lute our doors during melting as this has a tendency to cause "snowing" with its attendant undue reduction and high results. The small slag body is sufficient to avoid any air reaching the metal.

The furnace being charged the current is thrown on the high tap and melting proceeds. As soon as a fair sized pool of metal is formed the furnace is carefully watched, especially the flame coming from around the electrodes. If melting under too much reducing atmosphere this flame will be very soft and luminous, accompanied by heavy clouds of white smoke. If this condition persists after five or ten minutes, small quantities of fine ore are added to thin the slag until the flame becomes sharper, accompanied by a yellowish brown smoke. If the heat is melting under heavy oxidizing conditions, the arc will be very irregular, the flame very sharp and bluish-brown and there will be either no smoke at all or very dense dark brown fumes. This is overcome by adding a little more slag. As soon as the heat is about three quarters melted a spoon is inserted and a test for slag taken.

From this point on is the crucial test of what the metal will be. If this slag is heavy and greenish, reduction has been too heavy and ore must be added, and the temperature of the metal kept down until conditions right themselves. If the temperature is allowed to increase the heat can never be reclaimed, and cannot be used in caps. Inversely if the slag shows a very



Heat Treatment Chart; Average Manganese Contents 1.25 to 1.50 Per Cent. *B* represents critical ranges for a plain carbon steel; *C* represents the theoretical critical ranges of a "cap steel" and *A* is the maximum allowable temperatures to which such a steel may be heated for treatment

The area between *A* and *B* is that which experience has shown to offer maximum results upon treatment

dull black, oxidizing conditions have been paramount and it will be necessary to carefully add small amounts of pig iron. The main point at this stage of the heat is to adjust the metal and slag under low temperatures. The correct slag on the melt down should be a very dark grey, in fact nearly a black, and should be very thin and opaque resembling lava in texture. As soon as these conditions exist the melt can proceed. When entirely melted all loose pieces should be raked from the walls, and a metal test taken and broken either for fracture, or to send to the chemist. If the heat has melted under the right conditions this test should show fairly sound, and contain approximately 0.12 to 0.15 per cent carbon, 0.03 to 0.05 per cent silicon, and 0.08 to 0.12 per cent manganese. While the test will not in any manner of means show finished metal it will not boil violently in the chill mold, and will show clear metal, free of blow holes around the rim of the test piece.

At this period the temperature of the metal will be low enough to still allow minor changes which may necessitate small amounts of either ore or pig. If the slag is very heavy it may even become necessary to rake most of it off and build anew. When the analysis is to the desired point six or eight large scoops of old dry molding sand are thrown in to make the finishing slag. I have found that this old refuse sand makes a better slag than any other class of material as it seems to fuse quickly and cleanly. The current is still kept on the high sides for about five minutes in order that the long arc may thoroughly mix up the slag. As soon as the temperature begins to increase this slag will begin to work on the metal, and the flame coming from the roof rings will gradually turn into a soft, luminous one showing that reduction is commencing.

The current is now thrown on to the low tap, and the final stages of the heat begins. Slag tests are now taken every three or four minutes, and it will gradually change from a dark brownish black to a very dark green. The slag will puff up and bright flames will be given off. This is the first good indication of deoxidation, and will be followed by the slag turning to a yellowish green, and stringing from the test spoon in long fingers. If the slag still remains thin and black

it needs more sand; if too thick and heavy small amounts of lime should be added. The slag in its proper condition will seem to be boiling when the door is opened. Metal tests taken now will show fairly clear around the rim, and with absolute freedom from gas holes, although the metal will rise slightly in the mold.

The heat is now in its correct chemical condition, and great care must be taken as regards temperature.

Table 1.—Comparative Results of Plain Carbon, Nickel and High Manganese Steels

Treatment: Oil quenched from critical point and drawn at deg. Fahr.:	Composition Carbon 0.30% Mn 1.50%	Carbon 0.30% Nickel 3.00%	Carbon 0.30% Mn. 0.60%
	Tensile Strength, Lb. per Sq. In.		
1,300	80,000 to 95,000	75,000 to 90,000	70,000 to 85,000
1,100	95,000 to 115,000	90,000 to 110,000	85,000 to 95,000
900	115,000 to 135,000	110,000 to 135,000	95,000 to 100,000
	Elongation, Per Cent		
1,300	27.5-30.0	28.0-30.0	30.0-32.0
1,100	20.0-23.0	22.0-26.0	23.0-28.0
900	15.0-20.0	18.0-22.0	20.0-23.0
	Reduction of Area, Per Cent		
1,300	55.0-60.0	64.0-68.0	60.0-65.0
1,100	50.0-55.0	60.0-64.0	55.0-60.0
900	40.0-50.0	55.0-60.0	50.0-55.0

Our only temperature test is taken by noticing the manner in which the steel pours over the side of the test spoon, and the amount of scull left. As soon as the steel pours clean from the spoon it is nearly ready to tap. Our practice on this metal is to hold for exactly five minutes and then take the final test. If all is right the ladle is called for.

Other melters have various methods of ascertaining temperature, but it must be remembered that this metal should be poured as "cold" as is possible. About three or four minutes before the heat is tapped the manganese is added to the furnace. This is calculated to 1.35 per cent and is in lumps about the size of the fist, in which condition it is thoroughly molten when the steel is poured. The pouring further tends to completely mix it with the metal eliminating any segregation. No carbon is added as that contained in the ferro-manganese is sufficient to raise at least 0.11 points or within the specification. Silicon at 0.15 per cent is added in wheat size to the ladle being placed in a paper bag, and thrown directly under the molten stream. This should be added when the ladle is about half full. If thrown in too early it will scull the bottom; if too late it will not have a chance to thoroughly mix.

Should it ever become necessary to recarbonize this is always done by means of pig iron added as long before the pour as is possible in order not to disturb the temperature. If the heat has been carefully watched and properly melted there is very seldom any need for this. I am not at all in favor of lowering the electrodes immediately before the pour and allowing the molten metal to absorb carbon. This is very careless practice as there are so many variables which will change results, such as temperature of metal, depth of slag, depth of insertion, area of electrodes, etc. Furthermore, with electrodes at about 6 to 7c per lb., this is expensive carbonizing.

To briefly summarize the salient points in melting:

1. Scrap must be carefully picked and charged.
2. Small amount of slag making material must be charged on the furnace hearth.
3. Melting must proceed carefully, always tending to keep the temperature as low as possible until conditions are ready for finishing the heat.
4. Take plenty of slag and metal tests in order to closely follow the progress of the heat.
5. Should it be necessary to add either ore or pig do so in small amounts until melt is of correct composition.
6. Use pig of low phosphorus content for all recarbonizing.
7. Add all manganese to furnace at least three or four minutes before tapping.
8. Use no aluminum in the ladle or mold whatsoever.

Bottom pour ladles are used exclusively for pouring, and the metal is held in the ladle for at least five minutes before the nozzle is opened. Upon first opening up the stream the metal is allowed to run in the mold rather fast until 200 or 300 lb. has passed, when the flow is choked and the mold filled as slow as is consistent with the proper running of the casting. In this manner absolute freedom from slag is obtained; there is very little danger from cold shutting or seams; the metal sets rapidly, eliminating cracks, tears or shrinks; and the surface of the work cleans readily.

In the preparation of the mold the greatest care is used. The sand used is carefully examined, and after being molded the cope and drag are both thoroughly dried in an oil-fired drying oven. Contrary to general practice no nailing is used except in the vicinity of the gate. The mold is gated down through the large center core, and so arranged that the downcoming metallic stream impinges on a boiler steel plate. This has been found to be very important, as the metal dropping over 4 ft. is very apt to seriously scab the runner, allowing sand inclusions to arise in the casting.

Table 2.—Results of Various Treatments on a Steel Averaging Carbon 0.25 to 0.30 Per Cent, and Manganese 1.25 to 1.30 Per Cent

Treatment, Deg. Fahr. Water	Drawn	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent	Bend, Deg.
1,700	1,300	103,200	4.7	...
	1,100	106,700	3.0	...
	900	121,000	2.7	...
1,600	1,300	97,500	10.2	90
	1,100	102,000	8.0	30
	900	115,000	7.5	30
1,550	1,300	94,000	12.1	120
	1,100	98,500	6.3	40
	900	107,400	6.1	30
1,500	1,300	93,000	11.1	120
	1,100	96,300	7.9	60
	900	98,900	6.8	60
1,450	1,300	98,000	12.0	100
	1,100	102,400	9.1	75
	900	109,600	5.3	30
1,400	1,300	86,000	7.2	45
	1,100	89,300	5.1	...
	900	91,100	4.0	...
1,300	1,300	88,100	8.3	...
	1,100	90,500	8.0	...
	900	93,200	7.7	...
Annealed from:				
	1,700	92,000	11.0	120
	1,600	90,000	17.5	130
	1,500	88,500	18.5	150
	1,400	82,000	13.2	90
Oil	Drawn			
1,700	1,300	101,100	8.5	60
	1,100	103,650	8.1	50
	900	109,300	6.8	30
1,600	1,300	90,000	19.7	180
	1,100	93,500	18.9	180
	900	100,250	16.3	120
1,500	1,300	94,400	21.2	180
	1,100	94,900	20.0	180
	900	99,750	17.5	150
1,450	1,300	92,200	21.4	180
	1,100	91,700	20.2	180
	900	96,400	18.7	160
1,400	1,300	84,000	13.3	90
	1,100	86,500	12.7	80
	900	83,750	9.5	60
Air				
1,700	1,300	92,000	9.5	80
	1,100	94,400	9.3	90
	900	97,350	8.9	60
1,600	1,300	91,750	22.5	180
	1,100	94,000	21.7	180
	900	96,250	20.3	180
1,500	1,300	89,600	24.0	180
	1,100	91,500	22.7	180
	900	92,000	19.6	180
1,400	1,300	82,700	14.1	120
	1,100	84,000	12.2	120
	900	84,500	11.9	90

There are two heads of sufficient size to avoid any possible chance of shrinkage, and a little fresh metal is poured in each head before leaving the job. If the piece has been poured correctly and the temperature of the metal is right the steel should be set in the

pouring cup not over two or three seconds after the ladle is shut off.

The casting is allowed to cool in the mold over night, is shaken out and passes to the acetylene station where the heads and runner gate are cut off. The sand blast is the next step where all adhering sand is removed. The casting is then ready for the heat treatment.

Heat Treating the Castings

These castings are handled three at a time in the treating process. They are placed on the car, run into the oven, the door carefully closed, and the heat started. The oven is oil-burning and so arranged that the flame enters at the bottom, and passes up both sides and around the steel. The flame at no time impinges on the metal. Manganese has the property of lowering the critical range of steel approximately 5 deg. Fahr. for each 0.10 per cent. With a steel of 1.50 per cent manganese this would amount to 75 deg. We have found, however, that heating to slightly higher temperatures tends to improve the metal, and consequently the work is treated with the same temperatures as would be used for a plain steel of the corresponding carbon content.

On determining the proper temperatures of heating, different experiments were conducted under perfect conditions. Sets of test bars of standard size were cast, as were bars for bend tests. These were treated in a small electric annealing furnace under varying conditions and temperatures, all work being closely checked with a pyrometer. There were four main tests made:

1. Quenching in water from 1600, 1550, 1500, and 1450 deg. Fahr., and drawing at 1300, 1100, and 900 deg.
2. Quenching in oil at same temperatures.
3. Quenching in an air blast as above.
4. Plain annealing.

Our results from these tests were quite varied as might well be expected. The first result of importance was that results of practically equal worth were obtained from all of the quenching temperatures. This at first seemed strange and rechecks were made not only at the above temperatures, but also at 1400, 1300, and 1700 deg. It was found that below 1450 deg., results were very low on tensile strength, while at 1700 deg. the elongation was seriously impaired. Quenching temperatures of from 1450 to 1600 deg. gave the same closeness of results. This was encouraging, as it meant that soaking temperatures could be more easily controlled without overheating the metal.

The next development was the comparison between the different quenching mediums. Water proved too harsh, the tendency being for low elongations regardless of the drawing temperature. Oil and air proved about equal, with the balance in favor of the air. Plain annealing did not seem to bring out any of the beneficial properties of the manganese at all, and was quickly discarded.

From these results it was decided to try different drawing temperatures after an air quench with the result that from 1200 to 1300 deg. proved to give maximum results. Upon practical trial this system proved acceptable. Strengths were as high as necessary, the toughness of the metal on the bend test was apparent, and the steel machined quite readily.

The castings are very slowly brought up to a point where the furnace pyrometer shows 1550 deg. Fahr., and are allowed to soak as close to this figure as possible until the heat is thoroughly diffused. The heating will take approximately 4 hr. and the soaking from two to three. The car is rapidly withdrawn and a stream of air played on the castings until nearly black. They are then again placed under the heat and brought to 1250 deg., allowed to soak for about an hour and allowed to cool down in the oven.

After machining the castings are tested under hydraulic pressure at 8000 lb., and are again placed in the treating furnace and heated up to about 600 deg. to help relieve any machining strains, when they are ready for the job.

From our results on this metal we have obtained a very interesting insight into its qualifications, and believe there are many other types of casting for which it is eminently suited. For any work requiring a steel of great toughness, combined with good strength, it seems extremely suitable, and at the same time is cheap to make. The greatest care, however, must be observed to avoid difficulties.

Pearlitic Cast Iron

The interest in Germany in so-called pearlitic cast iron continues as shown by a recent article in *Die Giesserei*, and by mention of this material at the recent convention of foundrymen in Germany. Dr. Bauer's paper on this subject was abstracted in THE IRON AGE, Aug. 16, 1923, the method being to cast metal of carefully determined composition in heated molds.

The article in *Die Giesserei* is by Dr. H. Frei of Zurich, and gives the methods followed at Brown, Boveri & Co. in Baden, Switzerland. Special molds are not used but great care is paid to the composition of the metal, produced in an electric furnace mainly from steel scrap, and also to the pouring temperature. Photomicrographs are given in the original article showing a matrix of well laminated pearlite in which is a well developed network of graphite.

At the Brown, Boveri plant, through exact regulation of these conditions, the following tests of good workable iron were guaranteed:

Tensile strength	45,500 lb. per sq. in.
Bending strength	71,100 lb. per sq. in.
Compressive strength	142,300 lb. per sq. in.

These guaranteed strengths have already been exceeded, giving regularly 51,200, 78,200, and 159,300 lb. per sq. in. respectively. From 40 to 60 tons per month of such special iron is being made in the form of castings. To obtain such excellent test results the foundry superintendent at Brown, Boveri believes the total carbon should be from 3.0 to 3.1 per cent, the silicon about 1.5 per cent, and the manganese 0.70 to 0.80 per cent. Because of the high temperatures available with the electric furnace a thin liquid iron can be obtained with phosphorus not over 0.10 per cent and the harmful effect of the phosphide eutectic is avoided. In regard to sulphur it is believed that a certain amount is desirable, and the lower limit may be placed provisionally at 0.035 per cent, which is easily obtained with the basic lined electric furnace.

An iron with total carbon 3.08 per cent, graphite 2.08, silicon 1.62, manganese 0.79, phosphorus 0.096, and sulphur 0.037 per cent gave 49,900 lb. per sq. in.; and another with total carbon 3.03, silicon 1.65, manganese 0.77, phosphorus 0.128, and sulphur 0.033 per cent, gave 51,050 lb. per sq. in.

The furnace used is briefly described as being 3 to 5 tons and similar to a Heroult three-phase type with three electrodes. A distinctive electrode regulator is used on a hydraulic principle. The charges are made up of steel scrap, cast iron turnings, etc., with ferrosilicon used to regulate the silicon. The time is 8 to 10 hr., and the current consumption per ton of finished castings is 800 to 900 kw. G. B. W.

Story of Aluminum Industry

The importance of aluminum in the present stage of civilization and the development of this industry since the discovery of the metal in a chemical laboratory in 1827, are graphically told in the current issue of *Lehigh Leaflets*, one of the publications of Lehigh University, Bethlehem, Pa.

Any account of the aluminum industry must necessarily record the part played in its commercial development by Dr. Joseph W. Richards, for over 30 years associated with all phases of aluminum production and who at the time of his death in December, 1921, had been professor of metallurgy at Lehigh University for 18 years.



Steel Treaters' Week at Pittsburgh

Fifth Annual Convention and International Exposition of the American Society for Steel Treating, Oct. 8 to 12

FOUR years ago in Chicago the first convention and steel exposition of the newly formed society —since named the American Society for Steel Treating—was held. This took place in September, 1919. The growth of this society has been the outstanding development in the history of American technical organizations.

The fifth annual gathering is to be held this year in Pittsburgh under the auspices of the Pittsburgh chapter during Oct. 8 to 12, and there seems to be no doubt that it will surpass the eminently successful one held in Detroit last year.

A new arrangement has been made this year regarding the time of holding the technical sessions. For the first time the exposition will not be open during the morning technical sessions, which are to be held at the William Penn Hotel, six miles from the exposition, which is housed at Motor Square Garden. At the latter place in the afternoons special programs for round table discussions and symposiums have been scheduled. The successful symposiums of last year—on hardness testing and on metallurgical education—are to be continued.

The issue of THE IRON AGE for Sept. 27 published seven specially contributed articles dealing with heat treatment subjects. General details follow.

List of Exhibitors and Products Exhibited

A

AIR REDUCTION SALES CO., New York. General line of welding and cutting equipment; also demonstrations of straight line and circular cutting and combinations of both with the Radiagraph; angular cuts by means of a circular cutting device known as the Hologragh, adapted for use with the Radiagraph; also demonstrations of work done by the Oxygraph, such as production cutting of crank shafts from steel slabs; demonstrations of the Camograph roughing out steel gears of fairly coarse pitch as well as any other repetitional production work, where the removal of large quantities of steel at low cost is required. Represented by G. Van Alstyne, F. E. Rogers, Harold Grow, W. A. Warfel and Alexander Blaser.

AMERICAN CAR & FOUNDRY CO., New York. One No. 3 three-electrode Berwick electric rivet heater; one No. 4 two-electrode end-rod heaters, and one 4-ft. rod heater. Represented by John S. Helt, W. C. Helt and F. C. Cheston.

AMERICAN STAINLESS STEEL CO., Pittsburgh. Articles made from stainless steel, including automobile parts, castings, cutlery, dies, golf clubs, harness fittings, springs, surgical instruments, turbine blades, wire, etc. Represented by John C. Neale, president, and C. S. Bunting, secretary.

AMERICAN TOOL WORKS CO., Cincinnati. One 14 in. x 6 ft. American high-duty tool room lathe with three-step cone, double back geared head, taper attachment, oil pan, universal relieving attachment, draw-in attachment with set of collets, shear wipers on carriage and carriage micrometer stop; one 3-ft. American triple-purpose plain radial drill, with plain box table and six change speed box arranged for belt drive; one 24 in. x 12 ft. American heavy pattern, high-duty lathe, with patented 12-speed geared head arranged for motor drive, shear wipers on carriage and high-duty tool box, to be driven by 15 hp., 1160 r.p.m., 220 volt, 3 phase, 60 cycle, type CS, frame 460 C, Westinghouse motor, with type AF auto starter and start and stop push buttons; also 6 ft. radial drill. Represented by H. W. Schatz and F. L. Stubenroth.

ARMSTRONG-BLUM MFG. CO., Chicago. Marvel hack saw machines, automatic high-speed band saw, punching, shearing and bending machine; all machines in operation. Represented by Harry J. Blum, secretary.

ARMSTRONG CORK & INSULATION CO., Pittsburgh. Nonpareil insulating brick for the insulation of furnaces and ovens; Nonpareil high-pressure covering, blocks and cement for high temperature insulation; Nonpareil cork covering for refrigerated lines and tanks; Nonpareil cork board for cold storage rooms, and Linotile and Armstrong's cork tile floors. Represented by R. S. Findley, L. W. Bertelsen and F. C. Young.

E. C. ATKINS & CO., Indianapolis. Silver steel saws, saw tools and saw specialties, including metal-cutting circular saws for every purpose; AAA non-breakable hack saw blades, AAA power blades, hack saw frames, hack saw machines, metal band saw cut-off machines, band saws, planer knives, belt wax, dado heads, special groovers and cutters as used by the foundry and steel treating trade. Represented by E. S. Norvell, W. H. Albaugh and W. L. Sturtevant.

ATLAS STEEL CORPORATION, Dunkirk, N. Y. Showing applications of tool steels and special steels, articles made from the company's steels and exhibits of fractures of steels in various conditions. Represented by Howard Reese, district manager of sales of Pittsburgh district.

AVEY DRILLING MACHINE CO., Cincinnati. Three drilling machines—a No. ½ machine with speeds up to 12,000 rpm.; three-spindle No. 2 machine with one-spindle hand feed and tapping attachment, one-spindle semi-automatic feed and one-spindle full automatic feed; single-spindle No. 3 machine with power feed. Represented by J. G. Hey, vice-president, and J. F. Mirrieless, general superintendent.



B

BAKER BROTHERS, Toledo, Ohio. No. 121 heavy-duty drilling and boring machine in booth of Motch & Merryweather Co., Cleveland, which is Baker Brothers' selling agent. Represented by W. W. Elliott and H. L. Tigges.

BAUSCH & LOMB OPTICAL CO., Rochester, N. Y. Metallurgical microscopes and metallographic equipment, featuring several new models of the latter ranging from simple equipment to the larger equipment used for research work.

BELLEVUE INDUSTRIAL FURNACE CO., Detroit. A vertical muffle-type, high-speed hardening furnace equipped with a carborundum muffle and working in connection with a Geissinger fuel control and Brown recording instruments; also a tilting-type aluminum melting furnace, both in operation. Represented by Walter E. Hinz and Louis J. Raymo, sales manager.

BELLIS HEAT TREATING CO., New Haven, Conn. Operating demonstration of the triple-unit Lavite furnace for high-speed hardening of steel tools. Represented by A. E. Bellis, president, and J. W. Black.

BETHLEHEM STEEL CO., Bethlehem, Pa. Exhibit showing quantities of the various materials which enter the coke ovens, blast furnaces and open-hearth, together with the quantities of the different materials obtained from each. Represented by R. M. Bird, A. P. Spooner, R. H. Christ, A. D. Shankland, W. L. Trumbauer, Henry Wysor, C. E. Chamberlain and G. A. Richardson.

THE BRISTOL CO., Waterbury, Conn. Standard line of recording instruments for pressure, vacuum, temperature, electricity, time, motion, etc.; also the new Bristol-Fuller controller valve for use in connection with temperature control. Represented by Roy M. Walker, Pittsburgh district manager.

BROWN INSTRUMENT CO., Philadelphia. Standard line of Brown indicating and recording pyrometers, thermometers, pressure gages and tachometers, and the following new instruments: Brown hydrogen ion recorders for recording alkalinity and acidity; oxygen content recorders; indicating and recording temperature control, signaling and alarm instruments; also the new Brown electric CO-2 recorder, which, it is claimed, does away with the limitations of CO-2 recorders operated on other principles. Represented by George W. Keller, sales manager; G. L. Clapper, Pittsburgh district manager; F. Q. Thorp, Cleveland district manager; D. C. Mayne, Columbus, Ohio, district manager; A. C. Hanson, Pittsburgh district representative; P. E. Hemmerle, pyrometer engineer; C. L. Simon, technical director of advertising; M. M. Watkins, special representative.

BUREAU OF STANDARDS, U. S. Department of Commerce, Washington. Showing equipment available at the Bureau of Standards for research work and testing, illustrating the fields of cooperation with various industries; also standard chemical samples, a set of the bureau's precision gage blocks, a relatively large number of samples to illustrate metal spraying; photographs, transparencies and a projection lantern in continuous operation to show as completely as possible the field of activities at the bureau. Represented by Dr. G. K. Burgess, director; H. J. French, T. G. Diggs and O. Z. Klopsch.

C

CALORIZING CO., Pittsburgh. Calco recuperators; also specimens of powder calorizing and dip calorizing; also a few samples of Calite, the company's high heat-resisting alloy. Represented by B. L. Jarrett, G. D. Mantle, J. S. Stairs, Harry Miller, B. J. Sayles, E. L. Malone, A. V. Farr and G. L. Davis.

CASE HARDENING SERVICE CO., Cleveland. Exhibiting Bohnite, a case hardening compound, and Caseite, a cyanide hardening compound; also a new product known as Non-Case, which is a paint for protecting steel from carbonizing gases during the case hardening process. Represented by W. C. Bell, E. J. Gossett and J. S. Ayling.

CELITE PRODUCTS CO., Chicago. Sil-O-Cel heat insulation, brick, block, concrete, powder and cements; a blow torch showing a flame playing continuously on a Sil-O-Cel brick to illustrate its impenetrability to heat; also a small heat treating furnace showing the application of Sil-O-Cel insulation to various forms of equipment. Represented by W. T. Kennedy of company's Pittsburgh office.

CENTRAL STEEL CO., Massillon, Ohio. Enlarged photographs showing plant operations; also a completely assembled transmission together with a display of various finished parts made from Agathon alloy steels. Represented by Earl C. Smith, chief metallurgical engineer; F. J. Griffiths, president and general manager; J. M. Schlendorf, vice-president in charge of sales; B. F. Fairless, vice-president in charge of operations; C. P. Richter and W. W. Leffler, metallurgists.

CHICAGO FLEXIBLE SHAFT CO., Chicago. An oven furnace and also a new type furnace for use with liquid heating media in connection with the hardening of high-speed steel. Represented by Peter Blackwood, sales manager, assisted by O. C. Bernhard, Pittsburgh representative, and J. W. Lazear, district manager, New York.

CINCINNATI GRINDER CO., Cincinnati. One 12 x 36-in. Cincinnati universal grinder; one Cincinnati centerless grinder; separate units of Cincinnati universal grinder, comprising one heavy-duty headstock, one automatic reverse plate and one speed change gear box; exhibit in conjunction with that of Cincinnati Milling Machine Co. in booth of the Motch & Merryweather Machinery Co. Represented by Arthur C. Hoefinghoff, Walter W. Tangeman, John Caster, Walter F. Stegner and Learn Johnson.

CINCINNATI MILLING MACHINE CO., Cincinnati. No. 4 vertical milling machine of new type, a No. 2 universal milling machine with the new rectangular overarm, a cutter grinder, a newly designed centerless grinder and a new universal grinder of the 12 x 36-in. size. Represented by J. E. Caster, Middle West representative; W. W. Tangeman and L. V. Johnson.

CLIMAX MOLYBDENUM CO., New York. Literature on molybdenum steels covering products used by automobile companies, railroads, the forging industry and for tool steels, steel rolls and castings and other purposes; also products of molybdenum steel by the following companies: A. Finkl & Sons Co., Wood Shovel & Tool Co., Cox Bumper Co. and King Pneumatic Co. Represented by B. F. Phillipson, president; J. D. Cutter, vice-president and metallurgist; W. N. Bratton, sales metallurgist; C. F. Blue, G. O. Loeffler and R. C. Purkhiser, Pittsburgh representatives of the Climax Molybdenum Co.

COLONIAL STEEL CO., Pittsburgh. Samples of crucible and high-grade open-hearth steel illustrating mill practice, heat treating methods, etc. Represented by Lawrence Wood, Pittsburgh district sales manager.

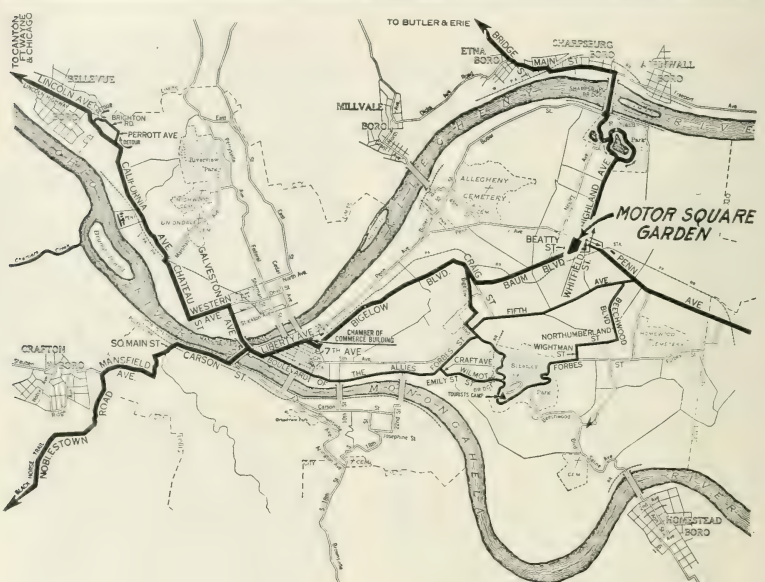
COMBUSTION UTILITIES CORPORATION, New York. Recuperative heat treating and forging furnaces. Represented by W. B. Kopfer, H. M. Henry and F. W. Manker.

CRUCIBLE STEEL CO. OF AMERICA, New York. Crucible and alloy electric steels in various tool forms, with several illustrations to show the evolution of well known tools

(*Continued on page* 830)

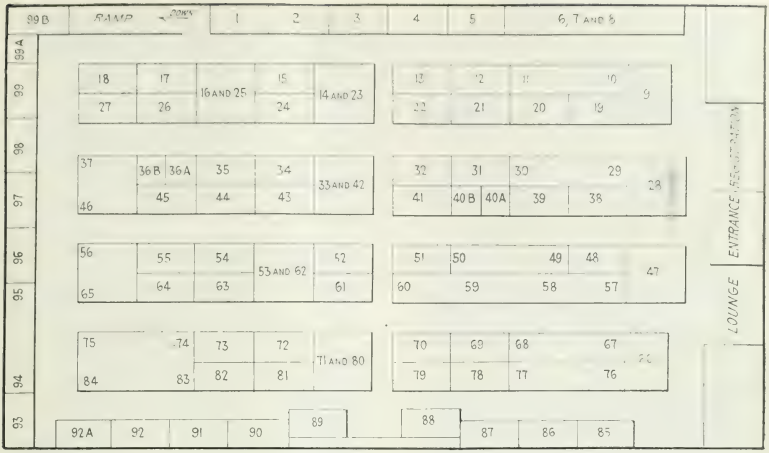
List of Exhibitors and Their Location

	Space No.
Air Reduction Sales Co.	S137
American Car & Foundry Co.	89
American Gas Furnace Co.	S105
American Stainless Steel Co.	S116
American Tool Works Co.	92
Andresen & Associates, Inc.	S142
Armstrong-Blum Mfg. Co.	78
Armstrong Cork & Insulation Co.	52
Atkins & Co., E. C.	S123
Atlas Steel Corporation	19
Avey Drilling Machine Co.	59
Babcock & Wilcox Tube Co.	S107
Bacharach Industrial Instrument Co.	99B
Baker Bros.	89
Bausch & Lomb Optical Co.	5
Disston & Sons Co., Henry	S115
Driver-Harris Co.	4
Electrical Refractories Co.	S101A
Engelhard, Inc., Chas.	32
Equitable Gas Co.	S130
Federal Machine & Welder Co.	S119
Finkl & Sons, A.	62
Firth-Sterling Steel Co.	3
Ford Co., J. B.	31
Forging, Stamping and Heat Treating	43
General Alloys Co.	28
General Electric Co.	76-77
Giddings & Lewis Machine Tool Co.	86
Goddard & Goddard Co.	79
Gould & Eberhardt	8a
Ludlum Steel Co.	56 & 65
Machinery	40A
Mahr Manufacturing Co.	54
Matthews & Co., Jas. H.	2
McCoy-Brandt Machinery Co.	S121 & S122
Midvale Co.	81
Molybdenum Corporation of America	27
Motch & Merryweather Machinery Co.	82
Included in this are booths 85 to 92	
National Automatic Tool Co.	91
National Machinery Co.	12
National Twist Drill & Tool Co.	S136
Nuttall Co., R. D.	S113
Obermayer Co., S.	63



Location of the Exposition—Motor Square Garden—with reference to the Center of Pittsburgh

Bellevue Industrial Furnace Co.	96
Bellis Heat Treating Co.	36A
Bethlehem Steel Co.	14 & 23
Blanchard Machine Co.	85
Bristol Co.	99
Brown Instrument Co.	9
Bullard Machine Co.	87
Bureau of Standards	S104
Calorizing Co.	47
Carnegie Institute	S149
Case Hardening Service Co.	38
Celite Products Co.	1
Central Steel Co.	35
Champion Sales Co.	S112
Chicago Flexible Shaft Co.	93
Cincinnati Grinders Inc.	90
Cincinnati Milling Machine Co.	90
Cleveland Steel Tool Co.	36B
Climax Molybdenum Co.	80
Colonial Steel Co.	33 & 42
Combustion Utilities Corporation	94-95
Crescent Washing Machine Co.	93
Crucible Steel Co. of America	15
Cutler Steel Co.	S111
Davison Gas Burner & Welder Co.	
N. C.	99A
Dearborn Chemical Co.	41
Dempsey Furnace Co.	97
Hagan Co., George J.	66
Halcomb Steel Co.	22
Hamilton & Associates	S102
Haskins Co., R. G.	S141
Hauck Mfg. Co.	58
Haynes Stellite Co.	51
Heppenstall Forge & Knife Co.	6-7-8
High-Speed Hammer Co.	S109
Hoicroft & Co.	S143
Homestead Valve Co.	S101
Hoover Steel Ball Co.	S100
Hoskins Mfg. Co.	74
Houghton & Co., E. F.	45
Hunter Saw & Machine Co.	S125
International Nickel Co.	37 & 46
Interstate Iron & Steel Co.	50
Iron Age	21
Iron Trade Review	73
Jones & Laughlin Steel Corp.	26
Keller Mechanical Engraving Co.	89
King Refractories Co.	44
Kinite Co.	S114
Kleist & Co., Chas.	40B
Laughlin & Barney Machinery Co.	57-58-59
Leeds & Northrup	71 & 80
Lentz, Inc., E.	S110
Linde Air Products Co.	S117
Ohio Machine Tool Co.	60
Ohio Steel Foundry Co.	15
Oilgear Co.	58
Oliver Instrument Co.	59
Olsen Tinning Machine Co., Tinius	72
Pangborn Corporation	74-75 & 83-84
Pannier Bros. Stamp Co.	S126
Park Chemical Co.	S108
Peerless Machine Co.	S135
Pennsylvania Pump & Compressor Co.	92A
Pittsburgh Crucible Steel Co.	S120
Pittsburgh Instrument & Machine Co.	S124
Quigley Furnace Specialties Co.	61
Racine Tool & Machine Co.	S140
Rockwell Co., W. S.	24
Rodman Chemical Co.	20
Roessler & Hasslacher Chemical Co.	S131
Ryan Co., F. J.	S132
Scientific Materials Co.	S128
Shore Instrument & Mfg. Co.	S133
Spencer Turbine Co.	64
Steel City Testing Laboratory	S150
Surface Combustion Co.	17
Swindell & Bros., William	S103
Tacony Steel Co.	48
Tate-Jones & Co., Inc.	S129

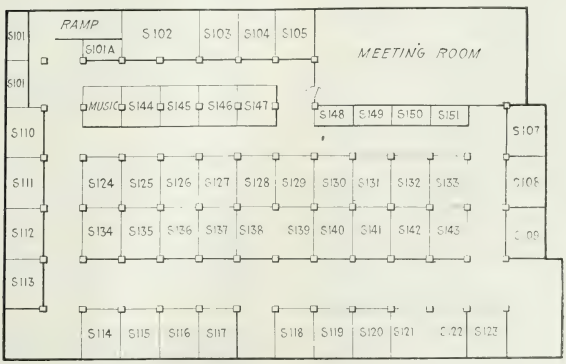


Location of Exhibitors' Booths on the Main Floor of Motor Square Garden

	Space No.
Taylor Instrument Cos.	34
United Alloy Steel Co.	10-11
Union Electric Steel Co.	55
U. S. Chain & Forging Co.	S134
V & O Press Co.	86
Vanadium-Alloys Steel Co.	29-30
Vanadium Corporation of America	16 & 25
Vulcan Crucible Steel Co.	S127
Warner & Swasey Co.	S118
Westinghouse Electric & Mfg. Co.	67-68
Wilson-Maeulen Co.	S138-S139
Witherow Steel Co.	39



Motor Square Garden Where the International Steel Exposition Is to Be Held



Location of Exhibitors' Booths in the Basement of Motor Square Garden

(*Continued from page 827*)

made from these grades of steel. Represented by R. A. McDonald, Dr. C. N. Johnson, A. E. Van Cleve, M. S. Dravo, C. E. Hill and J. W. Taylor.

CUTLER STEEL Co., Pittsburgh. Complete line of the company's heat-resisting alloy, Duraloy, in the various forms in which it is manufactured, namely, castings, sheets, bars and wire. Represented by W. H. Waddington, A. S. Lambie, W. F. Furman, F. B. Foster and T. R. Heyward, Jr.

D

DEARBORN CHEMICAL Co., Chicago. No-Ox-Id rust preventative compound; Klean-Kleen, a powdered cleaner, and Dearboline, a liquid cleaner. Represented by E. M. Converse, Chicago, director of specialties department; J. A. Crenner, E. K. Thomas and C. C. Brown of Pittsburgh office and C. I. Loudenback of Detroit office.

HENRY DISSTON & SONS, Philadelphia. Disston metal-cutting saws, tools and files, with metal-cutting saws in operation. Represented by Messrs. Dorrington, Ludy and Newman.

DRIVER-HARRIS Co., Harrison, N. J. Cast Nichrome carbonizing containers, furnace muffles, furnace parts, conveyor chains, retorts, pyrometer protection tubes, Nichrome sheets and Nichrome in various other forms for high temperature work. Represented by H. D. McKinney.

E

CHARLES ENGELHARD, INC., New York. Indicating and recording thermo-electric pyrometer instruments in operation for both rare-metal and base-metal types of thermocouples; electric resistance thermometers, both indicating and recording types; automatic temperature regulators in connection with thermo-electric pyrometers, electric resistance thermometers and thermostats, these including electric circuit breaker panels, solenoid operated valves, motor operated valves and a new type mercury circuit breaker; indicating and recording instruments for gas analysis, operated on the principle of thermal conductivity; autographic instrument for measurement of temperature coefficient of expansion; a complete line of Impervite refractory porcelain in the form of crucibles, boats, combustion tubes, pyrometer tubes, etc. Represented by J. H. Allison, E. J. Deckman and E. S. Newcomb.

EQUITABLE GAS Co., Pittsburgh. Photographic reproductions of various furnace installations; a corps of engineers to give advice regarding the use of gas for heat treating and other purposes. Represented by R. E. Folk, C. H. Whitwell, E. F. Koch and C. J. Long.

F

FIRTH-STERLING STEEL Co., McKeesport, Pa. Samples of Blue Chip high-speed steel, Firth-Sterling special tool and die steel and Firth-Sterling stainless steel. Represented by Edwin T. Jackman, in charge; D. G. Clark, A. C. Leete, Robert Kimber, A. E. Barker, H. I. Moore, Charles Von Schlutter, Harry Jarvis, Frederic Jarvis, D. E. Jackman, Jr., G. J. Bauer, H. S. Norman, W. A. Nungester, W. C. Royce, L. E. Tegardine, J. A. Wotan, T. A. Larecy, R. H. Hallagan and M. E. Burkemer.

J. B. FORD Co., Wyandotte, Mich. Wyandotte cleaning specialties and a specimen air agitation tank. Represented by B. N. Goodell, Wyandotte; C. S. Tompkins, Detroit, and J. H. Smith, Pittsburgh.

G

GENERAL ALLOYS Co., Boston. Full line of carbonizing boxes, lead and cyanide pots, pyrometer tubes and castings for heat resisting purposes. Represented by H. H. Harris, president; E. P. Van Stone, vice-president, and W. K. Leach, assistant to the president.

GENERAL ELECTRIC Co., Schenectady, N. Y. Three electric heat treating furnaces. Represented by A. N. Otis, E. F. Collins, Walker Anderson, C. L. Scott, R. A. Tophan and C. T. McLoughlin.

GIDDINGS & LEWIS MACHINE TOOL Co., Fond du Lac, Wis. No. 32 horizontal boring mill in the space of the Motch & Merryweather Co. Represented by George Cole, the company's Cleveland representative, and E. V. Wenzell, sales manager.

GODDARD & GODDARD Co., Detroit. "Go & Go" type of milling cutters. Represented by A. N. Goddard, president; C. H. Wallace, railroad demonstrator; R. T. Rice, Ohio and Pittsburgh representative; J. W. Seelequist, New York representative; E. E. Guntert, Rochester, N. Y.; Dix Proctor, New York; Joseph Sample, Philadephia, and C. S. Goddard, general sales manager.

GOULD & EBERHARDT, Newark, N. J. A 32-in. Invincible shaper in operation, roughing off steel die blocks. It is possible to operate this machine from 9 to 115 strokes per min., according to the manufacturers. Represented by Albert Miller, demonstrator.

H

GEORGE J. HAGAN Co., Pittsburgh. Standard electric heat-treating furnace; also a supply of literature describing various installations of electric furnace equipment that have been made within the past few years. Represented by R. E. Talley, C. F. Cone and A. D. Dauch.

HALCOMB STEEL Co., Syracuse, N. Y. A complete line of tool, alloy and special steels; also dies and tools shows uses to which company's tool steel may be put, and products from company's alloy steels, including automobile and airplane crank shafts, cam shafts, gears, connecting rods, springs, etc.; also products of the company's wire mill in cold drawn wire, drill rod and special shapes both in tool and alloy steels. Represented by Messrs. Stagg, Galbraith, Kirwan, Talmage, Schroeder, Atkinson, Schnibbe, Boland and Spalding.

R. G. HASKINS Co., Chicago. Flexible shaft equipments and portable tools used for die sinking and drop forging work, as well as in other branches of the steel industry; also a working model of the Spurgin belt shifter. Represented by R. G. Haskins and Ralph Sloan.

HAUCK MFG. Co., Brooklyn. Venturi high and low pressure furnace burners for open-hearth furnaces, annealing furnaces, case hardening furnaces, forging furnaces, crucible melting furnaces, muffle and retort furnaces, plate, angle and rod heating furnaces, core ovens, etc.; also portable burners for cupola lighting, mold drying, ladle heating, straightening, bending, pre-heating for welding, thawing, etc.; hand torches for drying and patching cores, tool dressing, tempering small tools, etc. Represented by Jules Escheman, Herbert Vogelsang, A. F. Schuman, F. A. Thomas, F. J. Schwenk and W. C. Elze.

HAYNES STELLITE Co., New York. Haynes Stellite tool bits and welded tools for turning, boring and planing; blades for milling cutters, boring bars and reamers; solid milling cutters, die casting machine parts, hot billet scrapers and various other products. Represented by A. B. Leonard and W. J. Lindner.

HEPPENSTALL FORGE & KNIFE Co., Pittsburgh. Forgings, shear knives, an impact testing machine and moving pictures. Represented by G. I. Allen, Cleveland; F. C. Moyer, Detroit; A. L. Wurster, Philadelphia; R. C. Rose, Milwaukee, Wis., and C. J. Sauer, Bridgeport, Conn.

HOLCROFT & Co., Detroit. Two electric melting furnaces, small size. Represented by H. L. Ritts, sales manager; R. T. Cadwell, secretary and treasurer; C. E. Chaney, electrical sales engineer; A. Ruckstahl, engineer; H. M. Gregory and F. E. Gardener, Canadian representatives.

HOSKINS MFG. Co., Detroit. An electric heat treating furnace, equipped with five alloy tubes, through which the material to be heat treated is shoved by an automatic pusher. This furnace is declared to be particularly adapted to the heat treatment of such parts as knuckle bolts, spring bolts, piston pins and similar small pieces. The principal feature of the outfit is that it allows individual quenching of each piece. Represented by J. D. Sterling, R. P. Ellis, W. D. Little, W. A. Gatward and C. S. Kinnison.

E. F. HOUGHTON & Co., Philadelphia. Cutting oils, carburizers, tempering and drawing oils, quenching oils, Houghton's absorbed oils and Vim leather belts and packings. Represented by H. G. Lloyd, G. W. Pressell, W. A. Buechner, D. J. Richards and C. H. Schultz.

HUNTER SAW & MACHINE Co., Pittsburgh. Inserted tooth and solid tooth circular milling saw blades; also hot saws, tube saws, inserted tooth saw grinders, sharpening and beveling machine for sharpening and beveling teeth of milling saw blades; also a line of hardened steel specialties such as circular shear knives, clutch disks, valve plates, core plates, brick mold liners, pneumatic hammer rivets, sets and chisel blanks. Represented by the entire staff of the company's heat treating department and officials of the sales department.

I

INTERNATIONAL NICKEL Co., New York. Various finished products made of nickel steel. Represented by P. D. Merica, C. McKnight, Jr., and L. Muller-Thym.

INTERSTATE IRON & STEEL Co., Chicago. Finished parts made from the company's steel as produced by the leading spring manufacturers of the United States; also assemblies and units of other motor car parts such as transmissions, in connection with a mill display of sections and samples indicating the scope and character of the company's alloy steel production; also a three reel film known as "The Story of Alloy Steel." Represented by Paul Llewellyn, vice-president; W. J. MacKenzie, metallurgist, and Elmer Larned, assistant.

J

JONES & LAUGHLIN STEEL CORPORATION, Pittsburgh. Specimens illustrating the different products this company manufactures. Booth fitted up as a reception room. Represented by Jesse J. Shuman, H. W. Graham and A. Milne.

K

KELLER MECHANICAL ENGRAVING Co., Brooklyn, N. Y. Keller heavy-duty automatic die-cutting machine, motor driven, with centrally located push-button controls, of a type designed to handle the largest dies for which hammers are built; shown cutting a 48-in. die for one of the leading manufacturers of the United States, on a Hardtem steel block, from a cement master; also a new device for finishing dies. Represented by Jules Dierckx, vice-president and sales manager; S. A. Keller, treasurer; Charles Bitter and A. J. Benson.

KING REFRACTORIES Co., Buffalo, N. Y. Flame brand cements for laying up, veneering and patching fire brick linings, monolithic walls and baffles, together with bulletin machines with slides of different installations of the company's materials. Represented by S. C. Smith, president; E. J. Eddy, treasurer, and H. J. Parthesius, Pittsburgh sales agent.

KINITE Co., Milwaukee, Wis. Kinite and Kompite castings and patterns from which these castings are made; also stamping made on Kinite and Kompite dies. Represented by T. A. Moorman, superintendent; H. F. Kluender, Detroit representative; William C. Eakin, Pittsburgh representative, and E. J. Mohr, sales manager.

CHARLES KLEIST & SON, Jamestown, N. Y. Built-up and standard type hammer boards and hammer pins. Represented by H. E. Kleist.

L

LAUGHLIN-BARNEY MACHINERY Co., Pittsburgh. Various machine tools, including a 32-in. Dreadnaught shaper made by the Ohio Machine Tool Co.; Nos. 2 and 4 Oliver drill pointers and by the Oliver Instrument Co.; drilling machines made by the Avey Drilling Machine Co.; gooseneck type broaching and assembling presses made by the Oilgear Co., and high-duty drilling machines made by the Foote-Burt Co. The Ohio Machine Tool Co. represented by C. C. Swift, secretary and treasurer; Oliver Instrument Co., represented by E. C. Oliver, president, and W. G. Shutt; Avey Drilling Machine Co., represented by J. G. Hey, vice-president and general manager; Oilgear Co., represented by W. D. Creider, sales manager; Laughlin-Barney Machinery Co., represented by Harry E. Barney, J. K. Henry, William Kanzenmeyer, R. C. Neimeier, C. W. Pompey and J. M. Hill.

LEEDS & NORTHRUP Co., Philadelphia. Potentiometer pyrometers of the indicating, recording, signalling and controlling types, and equipment for heat treatment by the Hump method, this equipment in operation hardening carbon and alloy steel tools. Represented by G. W. Tall, Jr., A. E. Tarr, O. Brewer, H. Brewer and E. B. Estabrook.

E. LEITZ, INC., New York. Leitz micro-metallograph, a large metal microscope with camera; medium type microscope, model MO, workshop microscope, model MT, Brinell microscope, assortment of grinding and polishing machines, several models of mineralogical microscopes and assortment of accessories of interest to steel manufacturers. Represented by G. Spindler, in charge of company's technical department, and H. E. Bader, Middle West representative.

LUDLUM STEEL Co., Watervliet, N. Y. Special tools made from Ludlum steels, such as chisels, dies, punches, reamers, twist drills, etc.; also valves made from the company's Silcrome valve steel; also specimens of non-corrosive steels and high-speed tools. Represented by V. S. Yarnall, assistant to the president; W. H. Vrooman, assistant manager of sales; Charles B. Templeton, Jr.; also in attendance: T. C. Sherman, Cleveland manager; P. R. Thurston, Pittsburgh representative; J. E. Polhemus, Detroit manager; Harry I. Askew, Herman W. Spiegel and John J. Cruice, Detroit representatives; W. A. Edwards, Chicago manager; P. E. Floyd, Chicago representative.

M

MAHR MFG. Co., Minneapolis, Minn. Mahrvel standard heat treaters and tool furnaces. Mahrvel direct-connected blowers and kindred equipment. Represented by W. M. Horner, president; H. A. Anderson, chief engineer; B. G. Harmon, manager Chicago branch; E. F. Piea, Philadelphia representative; A. D. Fihsel, Cleveland representative; James A. Murrian, Knoxville, Tenn., representative, and H. R. Rosendahl, field engineer.

JAMES H. MATTHEWS & Co., Pittsburgh. Marking devices for the marking of metals, including steel stamping and embossing dies, steel letters and figures, brass and rubber dies for box printing, marking inks, identification checks and badges, metal shipping tags, bronze signs. Represented by Harry Ehrlen, J. L. McConaghy and H. R. Wade.

THE MIDVALE Co., Nicetown, Philadelphia. Hardened and ground rolls for cold rolling all sorts of metals; stainless steel exemplified by pieces of finished cutlery; also exhibits showing eight stages in the manufacture of revolver chambers; also models or patterns used in the Midvale shops for all sorts of rough and finished machining. Represented by Stuart Hazlewood, vice-president; H. E. Rowe and J. E. De Cray, Philadelphia; W. B. Smyth and J. C. Glass, Cleveland.

MOLYBDENUM CORPORATION OF AMERICA, Pittsburgh. Samples of tungsten ore and ferro-tungsten, samples of molybdenite ore, molybdic acid, ferro-molybdenum, molybdenum metallic powder, molybdenum wire and sheet; also many products made from molybdenum steels, such as springs, chisels, shovels, rolling mill rolls, lock washers, bearings, etc. Represented by J. M. Fuller, in charge of exhibit, with attendance also by J. W. Weitzenkorn, vice-president and general manager; Clifton Taylor, general sales agent; E. A. Lucas, works manager.

MOTCH & MERRYWEATHER Co., Cleveland. Various machine tools sold by this company in the Ohio territory. Represented by salesmen of the company and special representatives of machine tool builders.

N

NATIONAL MACHINERY Co., Tiffin, Ohio. Display of samples of products produced on forging machines and bolt, nut, rivet and wire nail machinery made by this company. Represented by Charles Harmon, K. L. Ernst and F. J. Mawby.

H. D. NUTTALL Co., Pittsburgh. A display of miscellaneous small gears which have been hardened by the company's special process; also flexible couplings and the assembly power unit through courtesy of the Denver Rock Drill Co. Represented by W. H. Phillips, chief engineer; R. W. Young, sales engineer; L. H. Keim, engineer; W. H. Smith, sales engineer, with the following officials of the company also in attendance: Milton Rupert vice-president; Q. W. Hershey, sales manager; C. H. Doolin, sales engineer; L. F. Burnham, engineer; J. A. Bouslough, assistant works manager; E. C. Wilson, railway sales department; C. H. Parker, industrial sales department; Miss H. Gatens, mining sales department.

O

S. OBERMAYER Co., Pittsburgh. Various high temperature furnace cements and the company's special prepared charcoal for loose-pack rolling. Represented by E. D. Frohman, J. L. Cummings, F. A. Eggert, W. C. Samuels and F. P. Bullion

OHIO MACHINE TOOL Co. An Ohio 32-in. Dreadnaught shaper, with four-speed selective-type gear box, all gears of heat-treated alloy steel. Represented by John Leibold and C. C. Swift.

OLIVER INSTRUMENT Co., Adrian, Mich. Two sizes of the company's automatic drill grinders and one of its filing machines. Represented by E. C. Oliver and W. G. Schutt.

TINIUS OLSEN TESTING MACHINE Co., Philadelphia. Completely equipped laboratory, comprising some of the newest testing machines and instruments, such as universal testing machines for tension, compression and transverse testing of wire and other material, also fitted with special attachments for Brinell hardness tests, ductility tests for sheet metal, also for testing welds and welding material by the Owens method, also for testing valves, fitting and gages hydro-statistically; various types of Olsen hydraulic Brinell hardness testers, the Olsen hardness testers for sheet metal, Olsen ductility testers for sheet metal; also repeated impact testing machines of the Matsumura type, special spring testing machines, the Olsen-Boyd cement tester, the latest machine of its type, and elasicity testing machines for wire. The Olsen-Williams dynamic ductility testing machine, which is the recording type, and the Herbert pendulum hardness tester are special features, the latter being shown in this country for the first time.

P

PANGBORN CORPORATION, Hagerstown, Md. Barrel sand-blast, cabinet sand-blast and rotary table sand-blast equipment, all in operation demonstrating the sand-blasting of heat treated parts, forgings, etc.; also a display of photographs showing sand-blast equipment installations in heat treating plants, interesting specimens of the heat-treating art and a complete display of metallic abrasives. Represented by John C. Pangborn, vice-president; F. E. Wolf, district sales engineer, and H. D. Gates, sales manager.

PANNIER BROTHERS STAMP Co., Pittsburgh. Devices employed for marking of steel, employing steel stamps and dies; also a duplicate of the first mechanical device employed for making a mark, which is said to date back to the Runic period, the original of which is in the Husaby Museum in Sweden. Represented by O. M. Pannier, president; W. J. Pannier, Jr., vice-president; F. Speicher, Jr., W. W. Hague and C. C. Gray.

PARK CHEMICAL Co., Detroit. Case hardening compounds, Cyanides, cyanide mixtures, reheating materials, lead pot carbon, quenching and drawing oils and furnace cements. Represented by Messrs. Schermer and Bourg.

PEERLESS MACHINE CO., Racine, Wis. One 6 x 6-in. universal shaping saw, one 13 x 13-in. universal shaping saw and one 9 x 9-in. high-speed hack saw, all in operation. Represented by H. J. Swanson, general sales manager; A. H. Goetz, Pittsburgh representative, and R. W. Hansen, Cleveland representative.

PENNSYLVANIA PUMP & COMPRESSOR CO., Easton, Pa. Pennsylvania air compressor in operation, furnishing air for the use of other exhibitors, and therefore working under normal conditions. Represented by George C. Towle, Pittsburgh representative, and R. H. Mellick and Charles A. Benckert, from the company's shop.

PITTSBURGH INSTRUMENT & MACHINE CO., Pittsburgh. Brinell testing machine, impact testing machine, sheet metal tester and metallographic grinding machine. Represented by Paul Kammerer and Charles Trueg.

Q

QUIGLEY FURNACE SPECIALTIES CO., New York. High temperature insulation in brick block, powder and cement form for retarding heat flow through furnace walls and other heated equipment; Hytempite, a high temperature cement for bonding fire brick and other refractories, its bonding qualities being demonstrated by electric furnace tests under severe temperature changes. Represented by W. S. Quigley, president; W. H. Gaylord, Jr., traveling sales manger, and D. F. McMahon.

R

RACINE TOOL & MACHINE CO., Racine, Wis. Racine high-speed metal cutting machines, including the No. 5 machine of 6-in. capacity, motor driven through silent chain drive; also a Racine duplex band saw, the latest addition to the company's line; also Racine Junior 4-in. machine, which is a portable metal-cutting machine for the average small shop.

RODMAN CHEMICAL CO., Verona, Pa. Case hardening or carburizing compounds, luting or sealing compounds, quenching oils and tempering oils. Represented by Hugh Rodman, general manager, and Gordon A. Webb, Detroit district manager.

ROESSLER & HASSLACHER CHEMICAL CO., New York. Chemicals for case hardening such as sodium cyanide, copper cyanide, sodium prussiate, potassium prussiate, etc., and case-hardened metal parts, including gears and pinions. Represented by Charles H. Proctor, William M. Gager and a representative from the company's Pittsburgh office.

F. J. RYAN & CO., Philadelphia. Different types of burners, including new automatic combination gas and oil burner; also working models of firm's new automatic temperature control for gas and oil burners; a small working model of new type of resistor hanger block for electric furnace construction. Represented by F. J. Ryan, president; G. F. Beach, chief engineer; F. A. Hall, sales department; J. L. Edwards, Pittsburgh manager, and Harry M. Austin.

S

SCIENTIFIC MATERIALS CO., Pittsburgh. Various machines used in heat treating operations, such as the Brinell hardness testing machine; the F. & F. optical pyrometer, a direct reading pyrometer for measuring pouring, heat treating and other temperatures; the S. M. Co. optical bench for the examination and photography of microstructure of metals; grinding and polishing machines for preparing specimens for micro-examination; levigated alumina, a special prepared solution for metallographic polishing. Represented by E. H. Fisher, E. C. Mateja and E. P. Dillinger.

SHORE INSTRUMENT & MFG. CO., Jamaica, N. Y. Testing devices, including recording scleroscope, model D, and improved vertical scale scleroscope, model C-1, both of which are used for measuring the hardness of metals; Pyroscope, for measuring high temperatures; Durometer, for measuring hardness of rubber; Elastometer, for measuring elasticity of rubber; Localcase, for selective case hardening; Localhard, for selective tool steel hardening. Represented by F. G. Kendall.

SPENCER TURBINE CO., Hartford, Conn. Turbo compressors for supplying air in connection with oil and gas-burning industrial furnaces, foundry cupolas, etc. Represented by H. M. Grossman, sales engineer, and O. J. Dingee, engineer.

STEEL CITY TESTING LABORATORY, Pittsburgh. Hand and power operated Brinell machines for various loads. Represented by H. A. Weaver, general manager.

SURFACE COMBUSTION CO., New York. A combination gas and oil burner equipped with automatic proportioning devices; also a valve control common to all products of this company; also exhibits of the fundamental features of Surface combustion, such as inspirators, commonly called "gas carburetors," and the several types of gas burners which are used. Represented by F. J. Winder, manager of Pittsburgh office; M. Goodman and A. M. Ammann.

T

TACONY STEEL CO., Philadelphia. Bar steel, billets, forgings, die blocks and piston rods. Represented by H. A. Baxter, general manager of sales, and C. W. Forcier, Pittsburgh district manager.

TATE-JONES & CO., INC., Pittsburgh. Automatic control units for oil and gas, various types of burners; literature and information relating to electric furnace operation. Represented by Edward Busch, Detroit; W. H. Busch, Dayton, Ohio; R. L. Mann, Buffalo, N. Y.; W. M. Smith, New York; P. J. Myall, and J. L. Stroman, Chicago.

TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y. Full line of indicating and recording pyrometers; portable and wall type switchboard protection cases; also full line of heavy-duty thermo-couples; temperature regulators, central recorders and thermometers for brine, lead and oil tempering baths. Represented by G. A. Howell, Rochester, N. Y.; E. C. Taylor and Avery Taylor, Pittsburgh.

U

UNITED ALLOY STEEL CORPORATION, Canton, Ohio. Exhibition of charts and other data giving physical properties which may be received from various heat-treated alloy steels; also sections of forgings to show the proper grain flow. Represented by H. H. Pleasance, vice-president; M. F. McOmber, district sales agent, and F. W. Krebs, sales engineer.

UNION ELECTRIC STEEL CORPORATION, Carnegie, Pa. Die blocks, trimmer steels, piston rods and shoes. Represented by W. L. Goodrich, sales manager; R. J. Emery, I. J. Johnson, D. Stuart and W. H. Reeger.

U. S. CHAIN & FORGE CO., Pittsburgh. Specimens of various kinds of heat-treated chain; also moving pictures of the comparative wearing qualities of heat-treated and untreated chain. Represented by Frank L. Campbell, Frank A. Bond and William H. Reids.

V

V & O PRESS CO., Hudson, N. Y. A V & O double-length slide press, a model clutch, samples of recent developments in pressed metal working, miscellaneous dies, a dis-assembled V & O press and various photographs. Represented by Edward Cairns and R. O. Brunst.

VANADIUM-ALLOYS STEEL CO., Latrobe, Pa. Tools made from various grades of steels made by the company; fractures showing the result of different kinds of heat treatment of each grade of steel, and fractures showing the effect of different methods of manufacturing different grades of tool steel. Represented by J. P. Gill and L. D. Bowman, metallurgists; E. L. Moberg, vice-president in charge of operations, and the following sales representatives: A. F. Chilcott, Buffalo; W. R. Mau, A. G. Henry, R. F. Noonan, W. L. Coller, Chicago; F. W. Potts, Cincinnati; J. H. Caler, R. L. Daull, T. J. Van de Motter, Cleveland; J. S. Cole, Dayton, Ohio; A. F. MacFarland and D. D. Dodd, Detroit; D. A. Black, E. B. Kitfield, L. G. Murray, New England division; J. A. McKay, New York; A. W. Stephenson and F. C. Comas, Philadelphia; H. P. Edison, R. R. Artz, D. L. Bardes, Pittsburgh.

VANADIUM CORPORATION OF AMERICA, New York. Specimens of vanadium ore and ferrovanadium; Attractoscope exhibition of lantern slides of Peruvian scenes, mining and shipping vanadium ore and applications of vanadium steel. Represented by George L. Norris, in charge; Col. Merrill G. Baker, vice-president; B. D. Saklatwalla, Charles F. Fritz, J. A. Miller, Jr., H. T. Chandler and W. R. Flannery.

VULCAN CRUCIBLE STEEL CO., Aliquippa, Pa. Tool steels (high speed, alloy and carbon) and special steels, materials used in their manufacture and tools and parts made therefrom. Represented by G. L. Kronfeld and A. D. Beeken, Jr.

W

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh. A number of electric furnaces of the muffle and wire-wound type, round and rectangular crucible furnaces, tube furnaces and combustion furnaces, also oven heaters, air heaters and space heaters; a furnace and an oven in operation heat treating steel and an electrically heated oil bath. Represented by W. S. Scott, manager of industrial heating section of the industrial sales department, and members of the sales and engineering departments.

WILSON-MAEDEN CO., New York. Indicating and autographic thermoelectric pyrometers and electrical resistance thermometers; also three sizes of Rockwell direct-reading hardness tester. Represented by S. C. Horn, Pittsburgh; C. E. Heilenberg, Detroit, and Harvey Lee, Cincinnati.

WITHEROW STEEL CO., Pittsburgh. Continuous die-rolled products such as ring gear blanks, front axle blanks and rear axle shafts. Represented by W. P. Witherow, president; J. S. Langston, general sales manager, and Lee Leibinger, sales engineer.

WARNER & SWASEY CO., Cleveland. No. 3-A universal hollow hexagon turret lathe in operation, doing both bar and chucking work. Represented by C. J. Stilwell, domestic sales manager; A. H. Keetch, manager Buffalo office; J. E. Figner, Pittsburgh representative, and Frank Castle, demonstrator.

Technical Program for the Convention

The program of technical papers, round table discussions and symposiums for the fifth annual convention of the American Society for Steel Treating at Pittsburgh, Oct. 8 to 12, is as follows:

Note: Registration begins at 1 p.m. at Registration Desk, Motor Square Garden.

MONDAY, OCT. 8

10:a.m.—Meeting in Ball Room, William Penn Hotel.
Chairman ..... W. J. Merten
Address of Welcome ..... J. Trautman, Jr.
Welcome to Pittsburgh ..... Mayor Wm. Magee
Response ..... Pres. T. D. Lynch

"The Manufacture of Automobile Leaf Springs," by C. G. Shontz, metallurgist, Perfection Spring Co., Cleveland.

"Metallography and Testing of Oxyacetylene Welds," by J. R. Dawson, research metallurgist, Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y.

"Some Observations on Furnaces and Fuels, Including the Electric Furnace for Heat Treating," by E. F. Collins, consulting engineer, General Electric Co., Schenectady, N. Y.

"The Tempering of Tool Steels," by J. P. Gill and L. D. Bowman, metallurgist, Vanadium Alloys Steel Co., Latrobe, Pa.

"Abnormal Grain Growth in Cold Rolled Low Carbon Steel," by V. E. Hiliman and F. L. Coonan, metallurgist and assistant metallurgist, Crompton & Knowles Loom Works, Worcester, Mass. (To be presented by title.)

1:00 p.m.—Exposition opens.

3:30 p.m.—Technical Session—Motor Square Garden.

"The Annealing of Sheet Steel," by Francis G. White, Metallurgical engineer, National Enameling & Stamping Co., Granite City, Ill.

"Sheet Steel for Automotive Purpose," by Harry Martin, metallurgical department, Dodge Bros., Detroit.

"The Manufacture of Sheet Steel," by J. H. Nead, research metallurgist, American Rolling Mills Co., Middletown, Ohio.

"Automobile Sheet Steel Specifications," by H. M. Williams, metallurgist, General Motors Research Corporation, Dayton, Ohio.

7:00 p.m.—Moving Pictures—Exposition open until 10 p.m.

TUESDAY, OCT. 9

9:30 a.m.—Meeting in Ball Room, William Penn Hotel.

"Measurement of Carbon Penetration in Carburized Steels," by S. P. Rockwell, consulting metallurgist, Hartford, Conn., and Frederick Downs, chemist, New Britain Machine Co., New Britain, Conn.

"Case Hardening and Other Heat Treatments as Applied to Gray Cast Iron," by H. B. Knowlton, inspector, Central Continuation School, Milwaukee, Wis.

"The Influence of Barium Carbonate upon Wood Charcoal used for Cementation," by B. F. Shepherd, metallurgical department, Ingersoll-Rand Co., Phillipsburg, N. J.

"Protective Coatings for Selective Carburization," by J. S. Vanick and H. K. Herschman, metallurgist and assistant physicist, Bureau of Standards, Washington.

Investigation of the Treatment of Steel for Permanent Magnets," by R. L. Dowdell, instructor in metallography, University of Minnesota, Minneapolis, Minn.

"The Thermal Treatment of the Light Alloys of Aluminum and Copper," by A. M. Portevin and Francois Le-Chatelier, Paris, France. (To be presented by title).

12:10 p.m.—Plant Vistation, Westinghouse Electric & Mfg. Co.

1:00 p.m.—Exposition opens.

3:30 p.m.—Round Table Discussion under Direction of Standards Committee, Motor Square Garden; Chairman, R. M. Bird.

Exposition open until 10 p.m.

7:00 p.m.—Moving pictures.

9:30 p.m.—Annual Smoker and Entertainment, Ball Room, William Penn Hotel.

WEDNESDAY, OCT. 10.

9:30 a.m.—Annual Meeting of the Society, Ball Room, William Penn Hotel; Chairman, T. D. Lynch.
Report of Tellers of Election ..... C. G. Shontz
President's Address ..... T. D. Lynch
Report of Treasurer ..... J. V. Emmons
Report of Secretary ..... W. H. Eisenman
Report of National Committees
Standards ..... R. M. Bird
Constitutions and By-Laws ..... S. M. Havens
Report of Chapter Delegates.

1:00 p.m.—Exposition opens.

2:00 p.m.—Plant Visitation, Homestead Works, Carnegie Steel Company.

3:30 p.m.—Round Table Discussion and Technical Session on Forgings, Motor Square Garden.

"The Manufacture of Heavy Forgings," by W. R. Klinkict, foreman, Heat Treating Department, Pollak Steel Co., Cincinnati.

"Determining Heat Treating Costs," by H. F. Wood, metallurgist, Wyman-Gordon Co., Ingalls-Shepard Division, Harvey, Ill.

"Spark Testing of Steel," by Don Stacks, consulting metallurgical engineer, Hartford, Conn.

"Some Fundamental Defects of Hardened Steel," by Dr. Leslie Aitchison, Birmingham, England. (To be presented by title).

7:00 p.m.—Moving pictures.

9:30 p.m.—Informal Dance, Ball Room, William Penn Hotel. Exposition open until 10:00 p.m.

THURSDAY, OCT. 11

Exposition opens at 10:00 a.m.

9:30 a.m.—Technical Session, Ball Room, William Penn Hotel; Chairman, H. M. Boylston.

"Effect of Heat Treatment on Lathe Tool Performance and Some Other Properties of High-Speed Steels," by H. J. French, physicist, Bureau of Standards, Washington; Jerome Strauss, materials engineer, U. S. Naval Gun Factory, Washington, and T. G. Digges, assistant physicist, Bureau of Standards, Washington.

"Secondary Hardness in Austenitized High Chromium Steels," by E. C. Bain, research metallurgist, Atlas Steel Corporation, Dunkirk, N. Y.

"The Hardening of Steel," by Zay Jeffries and R. S. Archer, research bureau, Aluminum Co. of America, Cleveland.

"Crystallization of Iron and Its Alloys," by Albert Sauveur, professor of metallurgy, Harvard University, Cambridge, Mass.

"X-Ray Examinations of Steel Castings," by F. C. Langenberg, metallurgist, Watertown Arsenal, Watertown, Mass.

2:30 p.m.—Technical Session, Motor Square Garden, Hardness Testing Symposium, National Research Council, Maj. A. E. Bellis, Chairman.

"The Hardness of Common High Sheet Brass," by A. L. Davis, metallurgist, Scovill Mfg. Co., Waterbury, Conn.

"Magnetic Indications of Hardness and Brittleness," by A. V. deForest, research department, American Chain Co., Bridgeport, Conn.

"Testing of Steel for Hardness," by H. M. German, Metallurgist, Henry Disston & Sons, Inc., Philadelphia.

5:30 p.m.—Exposition closes.

6:30 p.m.—Annual Banquet of the American Society for Steel Treating, English Room, Fort Pitt Hotel. Tickets at Registration Desk.

FRIDAY, OCT. 12

Exposition opens at 10:00 a.m.

9:30 a.m.—Technical Session, Ball Room, William Penn Hotel; Chairman, Paul D. Mercia.

"Salt Baths and Containers," by Sam Tour, Metallurgist, Doehler Die Castings Company, Brooklyn, N. Y.

"The Physical Properties of Metals at Elevated Temperatures," by Vincent T. Malcolm, metallurgist, Chapman Valve Mfg. Co., Indian Orchard, Mass.

"The Ageing of Steel," by W. P. Wood, department of metallurgy, University of Michigan, Ann Arbor, Mich.

"Conical Illumination in Metallography," by H. S. George, Union Carbide & Carbon Research Laboratories, Inc., Long Island, City, N. Y.

"Carbon and Carbon—Vanadium Steel Castings—A Comparison," by J. M. Lessells, metallurgist engineer, Westinghouse Electric & Manufacturing Co., East Pittsburgh.

"The Theory of Quenching in Steels," by Kotaro Honda, Tohoku Imperial University, Sendai, Japan. (To be presented by title).

12:00 m.—Plant Visitation, National Tube Works, McKeesport, Pa.

2:30 p.m.—Motor Square Garden.
Symposium on Metallurgical Education; Chairman, Prof. S. L. Goodale.

7:00 p.m.—Band Concert.

10:00 p.m.—Exposition Officially Closes.

Methods of Testing Iron Castings*

Developments in American Practice—What an International Arbitration Bar Should Be in Respect to Shape, Length and Diameter

BY DR. RICHARD MOLDENKE

[In the early part of the paper the author tells why the testing of castings themselves is generally impracticable and refers to the experience with test coupons, passing to the evolution of the separately cast test bar. Stress is put upon the fundamental idea which always must be kept in mind—that test bars do not represent the castings made of the same iron, but only the quality of the iron going into these castings. The hope is expressed that eventually foundrymen will be spared the molding up of coupon test bars, which in addition to being highly troublesome are made under technically unreliable conditions.—EDITOR.]

As the separately cast test bars, representing the quality of the iron poured into the castings of the same cupola or furnace melt, began to come into general use—eventually for the foundryman as much as for his customers—the cumbersome lengths [originally as much as 5 ft.] were reduced to test at 3 ft., then 2 ft., as still used today in the standard cast iron pipe test bars; and finally down to the present American bar which is placed upon supports 1 ft. apart and broken transversely. Tensile test pieces were always made short and saw an evolution from square, flat or round pieces of about 1 ft. in length and gripped by the flat wedges of the testing machine, to the present day carefully turned test pieces made from the broken halves of the arbitration bar and provided with finely threaded ends, so that alignment in the testing machine may be as nearly perfect as possible before and during test.

In the early test bar days a variety of shapes were used. The square bar predominated, usually 1 in. square in section, though for years the ½-in. square section held its vogue in the light castings shops. The round bar of today for transverse testing was practically unknown at first, and came into use after many series of tests had been made by early investigators.

The American Tests of 1898-1900

This change and simplification of the test bar situation was concomitant with the advance in knowledge of the physical and chemical properties of cast iron, and as this information grew in extent more or less elaborate investigations into the subject were instituted by foundry and engineering bodies the world over. These led to the publication of the results of many testing programs. The most complete of these ever made, and the last conducted in the United States (in 1898-1900), was that of the American Foundrymen's Association, the writer of this report being chairman of the committee having the matter in charge. The tests involved the pouring of tons of bars of many kinds of iron under the very best of foundry conditions. The results were studied by committees of the American Foundrymen's Associations and the American Society for Testing Materials jointly, and formed the basis of the specifications now in use. The leading foundrymen and metallurgists of the United States were members of these committees, and they disregarded customs where these conflicted and evolved definite lines of procedure which are still standard today, and are used where buyer and seller clash in specification contracts.

Use of the Arbitration Bar

Be it understood that the American standard arbitration test bar never has replaced and never will replace the test bars used by individual foundries that are loath to change their old ways. But for universal comparison of results it is essential that a standard be adopted with which all other bars can be correlated by suitable factors. A national standard may even consist of several bars of different cross-sections to care for an extended silicon range and thus cover a wider field in lines of castings than a single bar. But when it comes to an international standard, it would seem essential that but one bar be selected which would cover the metal going into castings used for machinery and pieces of construction rather than to include such special work as chilled rolls, crusher parts, or the very lightest and thinnest castings in which strength is not essential.

The American arbitration test bar, as well as the method of preparing and testing it, as first advanced by the two societies above mentioned in 1905, has proved satisfactory to the present day in every respect but its length. When first advanced, the method was ahead of the times. The foundry industry, however, has slowly worked up to it, and the arbitration bar is specified for general as well as specific lines of castings to judge the quality of the metal going into the product.

Americans Receptive to a New Bar

The American foundrymen and engineers are now ready to consider the lengthening of the bar and possibly increasing the diameter somewhat at the same time. They will be glad, however, to await international action on this point, so that when an international arbitration test bar is adopted this may possibly be as acceptable as the American national bar.

That the reasoning by which the present American test bar was worked out may be fully understood, a summary of the arguments used is given in what follows:

First, the section of the bar. The cast iron pipe industry announced at the outset that it would retain its standard test bar. It is the same bar as used in Great Britain, namely, 2 in. x 1 in. in section and 26 in. long. It is tested on supports 24 in. apart. The bar is placed flat in American, and on edge in British testing. This bar has the advantage of approaching the general distribution of metal in cast iron pipe. It is long and exhibits elasticity under test. The disadvantage of the bar is the fact that it has four hard edges, as in square bars, so that when put under transverse center loading with maximum strain on the outer fiber of the metal, this is soft in the middle and hard at the ends. Such a bar sliced longitudinally into three sections of equal width will show widely different metal in middle and end pieces. It is to be hoped that when an international standard bar is agreed upon, this will be long and flexible enough to replace the antiquated flat cast iron pipe bar which does not effectively register serious differences in chemical composition or different pig-scrap relations for equal compositions.

Square Bars and Round Bars

The disadvantages with the flat section are those of the square section. On comparison of test results of square bars with round ones of equal sectional area, the former will always be found stronger. This because of the greater proportion of combined carbon, the four edges cooling more rapidly than the balance of the metal. The metal in a square bar is, therefore, not under as natural a condition of setting and cooling as in a round one, and consequently the round section was determined upon as a matter of basic principle in the American standard. In fact, it might be stated

*From a paper read at the International Foundrymen's Convention, Paris, France, Sept. 15, 1923.

that about the only advantage a square bar has is that it rests better upon the test supports, and the outer fiber of the metal tears along a line rather than at a point.

The disadvantages of the round bar are the concentration of the maximum fiber stress on the lower point of the fracture circle, and the inconvenience of the test piece for transverse testing. The decisive advantage of the round section bar, however, is the uniform change in the character of the metal from the center of the bar to every point on the periphery of the fracture circle.

At the time of the adoption of the American standard arbitration bar practically every one in America who made bars at all—outside of the cast iron pipe interests—used a length which allowed a tranverse breaking test on supports 12 in. apart. The bars, therefore, varied from 13 in. to 15 in. in length. The question of studying the deflections had not then assumed any particular importance, as the stronger irons made with steel additions to the mixtures had only made their appearance sporadically. With the general use of steel scrap in mixtures, giving a line of castings going under the misnomer "semi-steel," however, the measure of the resilience of cast iron became of interest, and there is a desire manifest for a longer bar which would exhibit deflections that can be differentiated and would mean something.

The length of an international bar will probably be a matter of compromise, as nations using short bars will yield on some increase, just as nations using very long bars will agree to a shortening. The International Association for Testing Materials had proposed an international test bar with dimensions which would be readily convertible in English and Metric measurements. It was to be tested on supports 18 in. or 45 cm. apart. The bar itself was to be at least 20 in. or 50 cm. long, to be safe in case of short pouring the mold. From the reports of testing bodies of the more interested nations, this bar length seems generally acceptable, and it is suggested as a basis for discussion when this matter of an international test bar is taken up seriously for settlement.

The question of the test bar diameter is a matter that may require some further study on the part of the interested foundrymen and engineers of the world. The bar originally proposed was to be 1.2 in. or 30 mm. in diameter. Many of us have made numerous tests with a bar of this diameter, broken on supports 18 in. apart. The curves obtained from these transverse tests on irons of a variety of compositions are not altogether satisfactory and indicate that the bar is too flexible for its length. Might it not be well to agree first upon the shape of the cross-section and the length of the bar as broken upon supports for test, and then make a study of the desirable diameter of such a bar, so that a proper degree of sensitiveness may be attained for deflection as well as for load. This thought is advanced for the reason that all the other points involved in the selection of an international bar should lend themselves to a ready adjustment, whereas the most advantageous diameter or section for a bar to be broken on supports 18 in. apart has not yet been evolved by systematic study.

Non-Ferrous Metals in Engineering

Arsenic in Firebox Copper—Copper-Tin and Copper-Zinc Alloys—Bearing Metals—Future of Aluminum

LONDON, ENGLAND, Sept. 10.—The autumn meeting of the Institute of Metals, which is being held in Manchester during the present week, exemplifies the great difficulty experienced by the Council in obtaining papers on practical subjects to lay before its members. Partly for this reason, the announcement that Sir Henry Fowler had consented to deliver the "tumn" lecture, and that his subject would be "Non-Ferrous Metals in Engineering," aroused considerable interest. Sir Henry is one of the best-known locomotive engineers in this country, and, as a very large purchaser of metals, his observations were listened to with close attention by a large body of metallurgists. He touched only upon certain phases of the subject and he confined himself principally to copper and its alloys, white metals, aluminum and its light alloys and one or two non-ferrous alloys which are of especial interest to engineers.

Sir Henry reiterated his faith in copper for locomotive fire boxes—a matter about which there is practical unanimity of opinion among British locomotive engineers. He challenged the view expressed by E. F. Law in his "Alloys and Their Industrial Uses," that "it is no uncommon thing to see the surface of the copper plate showing drops of copper where the metal has been actually melted," and a personal examination of hundreds of locomotive fire boxes failed to prove this, although the metal is on the surface subjected to a great heat.

Value of Arsenic in Firebox Copper

The troubles which lead to the removal of the plates of a locomotive fire box are, according to Sir Henry Fowler, the wear at the sides and the cracking where bending has taken place, and in certain cases round the stud holes. The wear is probably due to combined effects of erosion and oxidation, and has been diminished by adding from 0.35 to 0.50 per cent of arsenic to the copper. If the oxygen in a copper containing this amount of arsenic exceeds 0.15 per cent, the metal is liable to give trouble in the bending essential in manufacture. The copper stay which joins the inner copper to the outer steel plate of the fire box is regarded as a greater source of trouble than the copper plate, and Sir Henry deplored the gradual disappearance of the riveted head on the fire side. The "wear" of the head, however, like that of the plate, seems to be the joint effects of erosion of the particles of fuel and oxidation. When, however, the end of a stay which has been worn down is examined no sign of oxidation is found.

Behavior of Copper-Tin Alloys

Turning to the heat treatment of copper-tin alloys the lecturer said there is only a slight effect at quenching after raising to less than 500 deg. C. At a temperature above this, however, although a higher tenacity and elongation may be obtained, the softer homogeneous structure which results may be unable to resist wear. The following instances, although widely different, will illustrate this point.

Some years ago, at Derby, a careful investigation was carried out on the subject of the composition of the slide valves used in the Midland Railway Co.'s locomotives. The alloy was copper 85, tin 14, lead 1 per cent, and it was found that these valves when subjected to a tensile test broke easily. When, however, the valves were raised above 500 deg. C. and quenched they were found to be extremely tough. As a result arrangements were made to deal with all the valves in this way, but before they could be completed it was found that the homogeneous metal that resulted wore so badly that the old method of using a sand cast was reverted to, with satisfactory results.

The second case runs on different lines. When the war broke out there was at once a great demand for certain vehicles in which the steel axles ran in a phosphor-bronze pipe box, the composition of which was copper 88, tin 11 and phosphorus 1 per cent. The metal satisfied the mechanical tests, but was so hard that it was impossible to fulfill the promises of machining. A method of heat-treatment was devised that not only

gave a metal which satisfied the mechanical tests, but was machined in just one-third of the time that the original metal took.

Copper-Zinc Alloys

Sir Henry Fowler next passed on to the question of brasses, or copper-zinc alloys, the use of which in engineering may be divided into castings, stampings (hot-pressed) and pressings and spinnings (worked cold). In the majority of cases what is required by engineers from a brass casting is not strength, but to act as a vessel—such as an oil cup—certain portions lending themselves to easy machining. A brass with up to 2 per cent of lead does this perfectly.

For the so-called manganese-bronze (the name is not a correct one, for it is in reality a brass with copper from 55-60, zinc from 35-40 per cent; under 1 per cent manganese, and with small percentages of tin, lead, iron and aluminum) Sir Henry Fowler predicts an even greater future. It was used extensively for ordnance parts, although care has to be taken in casting, as a large head and runners are essential. It has been found most useful for axle-boxes which are liable to be hammered, as its properties are such as to resist breaking from this cause. It is, however, soft, and must not be subjected to abrasion.

Phosphorus and Solid Castings

Discussing the influence of phosphorus, Sir Henry pointed to the great advantage of introducing it easily into an alloy either as phosphor-copper or phosphor-tin. Its reputation for giving sound solid castings is well and truly earned, for it frees the alloy from the oxides which cause trouble, and carries them with itself as phosphates into the slag. If a still further amount than that necessary to do this is added it forms a phosphide of copper, which forms hard wear-resisting particles in a soft matrix. The wearing properties will be proportional to the amount of this phosphide present, but it will be appreciated that the alloy hardens also as the percentage rises. This gives one a choice depending on the purpose for which the alloy is required.

Bearing Metals

Dealing with bearing metals, usually consisting of tin-antimony-copper-lead alloys, Sir Henry Fowler asked why we required more than one bearing metal. The answer is because, if the matrix or fixing is lead, it will be too soft to prevent, with heavy loads and repetition stresses, the crystals of tin-antimony being hammered into the matrix and the bearing-metal spreading. In such cases a harder matrix is required, and this may be supplied by using a higher percentage of tin and some copper, which, in its turn, forms tin crystals. For railroad bearings, the following three white metals have been adopted as temporary standards.

	Tin, Per Cent	Antimony, Per Cent	Copper, Per Cent	Lead, Per Cent	Brinell Hardness (500 Kilos)
No. 1	85	10	5	..	32
No. 2	80	10	2	28	26
No. 3	12	13	..	75	19

The first two will deal with all cases of bearings subjected to hammering or repetition stresses, while the lead base will deal with more lightly loaded bearings in which the journal or shaft only rotates.

Casting under conditions which lead to slow cooling encourages the growth of the tin-antimony crystals, while too rapid cooling will prevent their regular formation. With the 85 tin, 10 antimony, 5 per cent copper alloy good temperatures vary between 375 deg. C. as a minimum and 400 deg. C. as a maximum, taken at the time of casting, the bearing in which the metal is run being about 200 deg. C. The difficulty of impurities is a purely practical one, and one which is likely to occur in shops which, like locomotive shops, are largely engaged on repairs. From 1.5 to 2 per cent lead causes trouble in a tin-antimony-copper alloy, due to its tending to drag and break when the lubrication is not absolutely perfect. The Midland Railway Co. uses a mixture of 83 copper, 9 tin and 8 per cent lead with every satisfaction for locomotive axle bearings where the pressure and speed are not great. In these cases the lead does not alloy with the copper-tin, but remains as globules or threads. Some railroad companies are using high zinc bearing metals with success.

Sir Henry Fowler considered that engineers should keep in touch with research into the problems of non-ferrous metals, the results of which are extremely useful in practical application. This is notably so in regard to aluminum, which, itself is not a sound engineering proposition. Too much was expected of it in the early days, and we are now suffering the results of that disappointment. But, said Sir Henry, aluminum alloys are undoubtedly going to be used by engineers more and more as time goes on.

Bookings of Steel Castings

WASHINGTON, Sept. 22.—The Department of Commerce announces that August bookings of steel castings, based on reports from principal manufacturers, representing over two-thirds of the commercial-castings capacity of the United States amounted to 50,515 tons, as against 52,066 tons in July. The following table shows the bookings of commercial steel castings for the past eight months by 65 identical companies, with a monthly capacity of 96,900 tons, of which 38,300 tons are usually devoted to railroad specialties and 58,600 tons to miscellaneous castings.

	Total		Railway Specialties		Miscellaneous Castings	
Month	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January, 1923.	100,605	103.8	47,879	125.0	52,726	90.0
February	90,152	93.0	39,845	104.0	50,307	85.8
March	143,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,738	101.3	50,705	86.5
June	84,878	87.6	42,773	111.7	42,105	71.9
July*	52,066	53.7	16,741	43.7	35,325	60.3
August	50,515	52.1	18,432	47.9	32,183	54.9

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

Valley Rolling Mills, Inc., Takes Over Merchant Bar Mill

The Valley Rolling Mills, Inc., Elmira, N. Y., recently incorporated under New York laws with $750,000 capital to take over a complete merchant bar and light structural shape mill, originally built by the Quirke interests, will begin rolling at once on bars and bands, particularly in the small sizes. Marcel K. Sessler of New York has joined the organization as vice-president and treasurer, and will be actively associated in executive matters with E. F. Quirke and J. S. Quirke, both experienced, practical mill men, and will be in charge of the production end of the business. The company expects to stress its ability to make light weights, which are often difficult to obtain, and to give service both as regards quick delivery and in meeting special requirements. The general negotiations and this consolidation were effected through the Engineering Business Exchange, 30 Church Street, New York, of which Charles Whiting Baker, formerly editor of the *Engineering-News Record*, is the director.

Lackawanna Plate Mill to Have Electric Drive

The Bethlehem Steel Co. has ordered from the Westinghouse Electric & Mfg. Co. electrical equipment to replace a steam drive for a 30 x 48-in. universal plate mill in its Lackawanna plant, Buffalo. The order includes one direct-current reversing mill motor operating at 75 to 150 r.p.m. in either direction; one flywheel motor generator set consisting of one 4000-hp. wound rotor induction motor, two 2100-kw., 700-volt D.-C. generators, and one 100,000-lb. cast steel flywheel, and the auxiliary equipment consisting of a three-unit exciter set for the reversing mill motor and the generator of the flywheel set, apparatus for ventilating the main equipment, the switchboard and complete automatic control equipment.

To Buy Foundry Pig Iron by Analysis

Endorsement of the Proposal at Paris Congress—An International Committee on Cast Iron Testing—Papers on Handling and Testing of Sand

(Special Correspondence)

PARIS, FRANCE, Sept. 14.—The First International Congress of Foundrymen opened on Wednesday, Sept. 12, in the halls of the École Nationale d'Arts et Metiers de Paris. In connection with it there is a very large and interesting exhibit of foundry machinery and supplies. In cooperation with the Association Technique de Fonderie de France, which organized the congress, there were the Association Technique de Liége (Belgium), the Institute of British Foundrymen, the American Foundrymen's Association, the Association de Fonderie Tchéco-Slovaque, and independent foundrymen of Spain, Italy and other countries.

The exhibition had been opened on Sept. 2 by M. Dufour, president of the Syndicat général des Fondeurs de France, or the association of foundry owners, continued in active operation through the congress. The first congress session, Wednesday, Sept. 12, was opened by M. l'Abbé, Directeur de l'Enseignement Technique, as representative for the assistant secretary of state for technical instruction, who made a short address of welcome and introduced M. Emile Ramas, as president of the congress. With Director l'Abbé and President Ramas of the French Foundrymen's Association there were seated on the platform Messrs. Clamer, Stubbs and Leonard, respectively presidents of the American, British and the Belgian foundrymen.

M. E. Ronceray served as secretary of the congress and through his knowledge of the English language and indefatigableness in translating and abstracting papers and discussions gave value to the meetings for the English-speaking members, most of whom were not familiar with the French language. Probably 500 foundrymen attended the opening session.

Sand Handling and Testing

President Ramas read his opening address, which was followed by a greeting from American foundrymen, delivered by President Clamer of the A. F. A. The chair then called for the paper of Henry M. Lane, Detroit, on the "Mechanical Handling and Preparation of Sands." This was discussed briefly. Mr. Lane described the essentials of a molding sand bin, in that it must have a straight front, can slope inward back and sides, so that the conveyor underneath can empty the bin effectively. Also that it must be wide enough not to have the sand bridge.

Mr. Stubbs, president of the British foundrymen, addressed the meeting and urged close cooperation in the investigations before it—particularly in regard to the testing of cast iron and the purchase of pig iron by analysis. Next came the paper on "The Foundry and the Foundry Superintendent" by M. Léon Thomas, which was not discussed.

The paper by H. Holmes of Newcastle, on the "Necessity of Standardizing the Testing of Molding Sands," was not in print. It goes into the testing of molding sands by water current separation instead of by the American methods. The working of the method was shown later on by Mr. Holmes in one of the laboratories of the institution at which the congress was held. The paper of Mr. Hanley on the "Bonding Substance of Molding Sands" was read by title.

Joint Work on Testing

The paper by Dr. R. Moldenke on "Testing Cast Iron" was briefly outlined by him, with translation by M. Ronceray. This paper started the discussion of the day, and it was participated in by M. Portevain and others, with a written discussion by Mr. MacPherran of Milwaukee. Previous to the meeting, a dinner given by Walter Wood of Philadelphia gave opportunity to get the viewpoint of prominent French investigators on testing cast iron. Similarly, in England, at the several dinners given by the British foundrymen, the English viewpoint had been ascertained. Hence it became possible to reconcile these views in a resolution which was presented to the Congress by Secretary Ronceray, as follows:

Resolved: That the International Congress of Foundrymen, assembled in Paris, recommends that the testing of cast iron be differentiated into testing of the quality of the iron entering the castings, from the testing of the quality of the castings themselves.

That immediate steps be taken to study both subjects side by side, in the expectation that the first subject will be solved earlier than the second.

That it is recognized that in no case will the testing of the quality of the iron give reliable information as to the quality of the castings made with it.

That a joint committee be appointed from the nations here represented, to make suitable recommendations carrying this proposal into effect.

The above resolution was given in both French and English, and was seconded by Mr. Clamer for the United States, by Mr. Stubbs for England, with the understanding that the existing national commissions be intrusted with the actual work; by M. Leonard for Belgium, by M. Portevain for France, and then by representatives from Tchéco-Slovakia, Spain and Italy. After some further inquiries and discussion, the resolution was passed without a dissenting vote. Ways and means of carrying out the undertaking and the laying out of the problems involved will be taken up before the congress closes.

The last paper of the session was by M. Ledésert on "Methods of Testing Cast Iron." The afternoon was spent in visiting the exhibition, the exhibits of an educational character, the demonstration of the scientific apparatus for testing shown and the testing of molding sands.

Buying Pig Iron on Analysis

On Thursday, Sept. 13, the work of the congress was divided into two simultaneously held sessions, one for the French-speaking delegates and the other for those who could only speak English. Unfortunately, while the English papers had all been translated into French, the reverse was not the case, and hence the English visitors lost an advantage in not getting the presentation in a language they could understand. The discussions were also very meager on that account.

At the French session C. Adamson of Sheffield gave a brief summary of his paper on "Graphitization of Cast Iron," which was translated by M. Ronceray. In the discussion that followed, the president of the Tchéco-Slovak Foundrymen's Association desired the congress to take a stand on the subject of chemical specifications. This gave an opportunity for President Ramas to present the draft prepared by Walter Wood and Doctor Moldenke, embodying the tentative specifications of the A. S. T. M. for the purchase of pig iron by analysis. It is now before the blast furnace organizations of Great Britain and France. This draft of the American specifications was presented only as a statement of what was being done in the United States. It proved so interesting to the foundrymen assembled that a motion was made and carried indorsing the principle of buying and selling of pig iron by analysis, with proper tolerances and methods of sampling and analy-

(*Continued on page 868*)

Eight Hour Shifts at Blast Furnaces

Southern Ohio Pig Iron and Coke Associations Receive Encouraging Report of Progress in Reducing Hours of Labor—Other Important Matters Considered

THE annual meeting of the Southern Ohio Pig Iron and Coke Association was held at Columbus, Ohio, Sept. 18, the members of the association, as well as the members of the Ohio section of the American Institute of Mining and Metallurgical Engineers being the guests of the Marble Cliff Quarries Co. for the day. The members were driven on arrival to the Scioto Country Club, where luncheon was served at 12.30, and after addresses of welcome to the visitors by W. H. Hoagland, president of the Marble Cliff Quarries Co., and R. H. Sweetser, president of the Southern Ohio Pig Iron and Coke Association, with responses by E. P. Mathewson, president of the American Institute of Mining and Metallurgical Engineers, and B. D. Quarrie, chairman of the Ohio section, the guests, 80 in number, were driven to the quarries for the tour of inspection. The company had fitted up a flat car with seats, and a fine opportunity was presented to see the latest methods in quarrying and preparation of stone for the market. The fact that it rained steadily during the inspection trip detracted not one whit from the interest displayed by the visitors, who made the entire trip as scheduled. The principal interest was, of course, shown in the preparation of blast furnace flux, a description of the method of quarrying, transportation, handling and washing of which appeared in THE IRON AGE of Sept. 20.

Following the inspection of the quarries the visitors were driven to the Columbus Athletic Club, where the guests were treated to an elaborate dinner, after which the meeting of the association took place.

This being the annual meeting, President R. H. Sweetser in an address reviewed the work of the association during the past year, and made some suggestions as to what should be taken up in the coming year. The most important of these was, in his opinion, the question of coal supply. On this question, Mr. Sweetser dwelt at some length.

Changing to the Eight-Hour Day

One of the most interesting reports, in the light of recent events, was that submitted by the committee on wages and hours of work. This report showed that a number of merchant furnaces in the district had already instituted the 8-hr. shift on continuous operations at furnaces. The plan was reported to be working very successfully from the standpoint of both employer and employee. At least two of the furnaces installing the three-shift turn reported that they had been able, by a better division of the work, to reduce the number of employees required to efficiently operate the furnace as compared with the number required while working two shifts. One furnace reported that it was able, with the same number of men, to operate as efficiently as under the old system. Reports to date indicate that the men are working more steadily and more efficiently under the new plan. The committee reported that it was a practical certainty that the 8-hr. turn will be installed throughout the entire district before the first of the year.

Transportation Facts

Some interesting figures on the transportation situation were given by Mr. Roney, of the traffic committee. For the week ending Sept. 1 the railroads of the country moved 73,000 more loaded cars than for any similar period in history. And at that time there was a surplus of 66,000 cars. The number of new cars put into service, as well as locomotives, and the decrease in bad order equipment, had been to some extent responsible for this showing. The average movement of cars had, however, been increased over 3½ miles per day, and the tonnage per car had also shown new high records, averaging now over 28 tons per car. The committee also compared the loadings of the different commodities during this week with the same period last year, showing that coal had made the greatest percentage of increase. The traffic committee also reported that it was now arguing a case before the Interstate Commerce Commission regarding the splitting of rates in the Ashland-Ironton district, which would give the manufacturers bordering on the south side of the Ohio River lower rates to the South and Southeast than those enjoyed by manufacturers bordering on the north side. These rates have already been put into effect on manufactured iron and steel products, and should the contemplated class rates be upheld will be put into effect on semi-finished products as well as on pig iron.

The committee also reported that coal mines, with the exception of those in West Virginia, had enjoyed an excellent car service to date, but that since Sept. 1 some mines had been handicapped by a shortage of coal cars. In this connection, Mr. Sweetser pointed out that a reduction of 1 per cent in the amount of ash in coal means an annual saving in cars alone of 120,000.

President Sweetser's Address

In his address, Mr. Sweetser stated that at previous meetings he had suggested that it would be well if the coal trade would adopt the customs of the iron ore industry and do business on the same high plane that iron and steel men conduct their affairs. He referred particularly to customs of the Lake Superior iron ore industry in buying and selling ore by analysis, transporting according to schedules and contracts made before the opening of each season and employing independent chemists who sample and analyze cargoes of ore in transit according to accepted scientific methods. In conclusion Mr. Sweetser said:

"These three sensible customs of the iron ore business, to wit: valuation by analysis, transportation by contract, and establishment of an independent group of coal samplers and chemists would help to place the coal trade on a higher plane as far as the iron and steel industry is concerned. And it is probable that in all their relations, the coal trade would be nearer right than under the present condition with all its artificial irregularities. The production and consumption of bituminous coal in connection with our own membership is of sufficient volume to be of importance and influence in the mining, transportation, and marketing of coal in the great coal producing States of West Virginia, Kentucky, Ohio and Pennsylvania. If the above proposition meets with the approval of the association, we can then proceed as we have done in the past in attacking the several practical problems of blast furnace and coke oven practice."

Coal Problems Discussed

A general discussion followed the delivery of the address, in which the members of the Institute of Mining and Metallurgical Engineers joined by invitation of the president. Some doubt was expressed by traffic experts as to the possibility of coal being shipped according to schedules worked out in advance, it being pointed out that there were over 17,000 coal mines shipping coal, whereas there were only a few ore shippers. On the question of selling coal by analysis, however, the members felt that some plan could be worked out. Approval was also given to the plan suggested of giving support to the establishment of a system by which independent chemists would sample and analyze coal the same as is now done on iron ore at the lake ports.

The association went on record, and will work to that end, in favor of selling coal by analysis, and also establishing a system by which coal shipment can be inspected and analyzed by independent chemists.

One of the objections to the selling of coal by analysis was that coal mines could hardly afford to sell coal by analysis. This objection was met by the statement that users of coal were able and willing to pay higher prices for coal of guaranteed analysis. Another objection to the plan was that there were too many coal mines in operation to make the plan feasible. It was stated, however, that there were practically as many mines and deposits of ore in this country as there were coal, but under the strict method of sampling and analysis enforced, it was found not practicable to mine the low-grade iron ores while those of higher iron content were more easily available. President Sweetser said that in his opinion it would be more profitable to the country if more of the coal now mined was left in the ground, the same as low grade iron ore, until such time as it was found necessary to mine it. There was plenty of good coal available to supply the needs of the country for the present, and with a plan of selling the coal by analysis the industries requiring a certain grade of coal would be able to get that coal with the least possible trouble.

The committee on blast furnace rating reported that the rule adopted by the association to rate the capacity of blast furnaces is being followed in many centers. The committee is anxious to receive any criticisms of the rule, and will welcome any suggestions.

The committee on membership reported 10 applicants for membership since the last meeting. These were elected by unanimous vote.

Election of Officers

The nominating committee handed in the following slate of officers for the coming year: President, R. H. Sweetser, re-elected for the fifth consecutive year; vice-president, Ashland district, George Hansen; vice-president, Ironton and Hanging Rock district, H. A. Berg; vice-president, Jackson-Wellston district, Walter Brown; vice-president, Portsmouth district, Peter Wielander; vice-president, Hamilton district, Jos. F. Savage; secretary-treasurer, Don H. Putnam.

Following the installation of officers, congratulatory addresses were made by a number of those present on the selection of Mr. Sweetser as president, and many tributes were paid him for assuring the success of the organization.

E. P. Mathewson gave a very interesting account of the trip of the members of the American Institute of Mining and Metallurgical Engineers to Canada last month. He was followed by a number of others, who discussed the business situation from different angles.

The meeting closed with a rising vote of thanks to Mr. Hoagland and his associates of the Marble Cliff Quarries Co. for the entertainment provided, and also for the opportunity afforded for an inspection of the quarries of the company. The next meeting of the association will be held later in the fall, at the call of the president.

Quad City Foundrymen's Meeting

Foundry coke was discussed from a metallurgical and practical viewpoint at a meeting of the Quad City Foundrymen's Association, Monday evening, Sept. 17. President Hageboeck of the association gave a short talk on the objects of the association, and explained briefly the program outlined for the current association year.

The following standing committees were appointed:

Cost committee: Davenport, H. A. Soverhill, chairman, Davenport Locomotive Works; Rock Island, Dave Kennedy, Tractor Works; Bettendorf, A. Reading, Zimmerman Steel Co.; East Moline, Elmer Gullberg, Union Malleable Iron Works; Moline, Louis Stone, Frank Foundries Corporation.

Industrial education: East Moline, Fred Kirby, chairman, Marseilles Works; Elmer Gullberg, Union Malleable Iron Works; Moline, Martin Carlson, Barnard & Leas.

Membership committee: Moline, E. H. Heartlein, chairman, Moline Sales Co.; Rock Island, William Seiffert, Tractor Works; Bettendorf, A. Reading, Zimmerman Steel Co.

Fellowship committee: Davenport, John Ploehn, chairman, French & Hecht; Rock Island, Leon Mitchell, Rock Island Stove Co.; Herman Alex, Rock Island Arsenal; William Seiffert, Tractor Works.

Sand research and international test bar: Moline, Henry Bornstein, chairman, Deere & Co.; Davenport, John Ploehn, French & Hecht; Bettendorf, F. V. Frew, Bettendorf Co.; Richard Hecschen, Zimmerman Steel Co.

Molding sand: East Moline, P. T. Bancroft, chairman, John Deere Harvester Works; Moline, Martin Carlson, Barnard & Leas; Lester Starner, Frank Foundries Corporation; Herbert Miller, Deere & Mansur; Charles Suhl, Tractor Plant; Roy Schoffer, Rock Island Plow Co.; Bettendorf, Fred Zimmerman, Zimmerman Steel Co.; R. L. Eichman, Bettendorf Co.

Green sand core: Rock Island, P. J. Schmitz, chairman, Blake Specialty Co.; East Moline, George P. Pearce, Union Malleable Iron Works; Rock Island, Charles Suhl, Tractor Plant.

The membership committee has put for its goal 100 active members and 100 plant representations in the form of sustaining members from all foundries in the Quad Cities.

The paper of the meeting was presented by Owen Pritchard, assistant general superintendent Milwaukee Coke & Gas Co., who explained the mechanical construction of the various departments in a coke-producing plant by using lantern slides which were furnished by the Pickands, Brown & Co., at Chicago. George A. T. Long, in charge of the service department of the Pickands, Brown company, spoke of the various elements in foundry coke that either tend to help or bother the foundryman. The discussion following lasted over one hour. The meeting was closed by an address by J. C. Mears, R. B. Co., St. Louis, who also has been in the pig iron and coke business for many years. He said he did not believe the local foundrymen appreciated the value and the benefit of an association such as that of the Quad Cities.

Brass Manufacturers Meet

The National Association of Brass Manufacturers held a well-attended fall meeting in the Old Colony Club, Hotel Cleveland, Cleveland, on Sept. 11, 12 and 13.

The newly established credit department, on report of Commissioner W. M. Webster, showed some splendid results. The standardization committee tendered a report, also the committee on standard gages for uniform sizes of tapers and threads of all basin and bath faucets.

The die committee has rechecked the models made by the Greenfield Tap & Die Corporation and substantially all members of the association promptly placed their order for a set of these gages, which will not only provide a uniform and interchangeable system of threads for plumbing fixtures so that the goods made by a member in the Far East will interchange with those made by a member in any other section of the country, but the saving was marked in what these gages might be provided for. This will be another advantage, it is emphasized, that the jobbers will have in procuring their goods from members of the association.

Work is progressing on the new official catalog, which will be issued on Jan. 1, 1925.

The association indorsed the action of the Middle West Foreign Trade Committee in regard to its merchant marine program, and recommended that each member of this association write to his United States Senator and Congressman, asking that they support a

proper bill calling for private ownership and operation of American ships, to be fostered and encouraged by the United States Government.

A committee of three was appointed to cooperate with the National Trade Extension Bureau on the question of standardization of catalogs, more particularly to assist this committee than anything else, as this association has adopted a standard uniform size of 7½ x 10⅝ in. The committee was instructed to encourage no change, which is so near to that suggested by the National Trade Extension Bureau, unless some very marked and practical reasons can be offered for making the change, in which case the committee was instructed to report back.

State of Business

The report made at the conclusion of the final session on general business conditions showed that a number of members were making goods for stock. On an average the members had sufficient business on their books to operate their plants for over a month. The majority reported that they were operating their plants full force and full time, some stating they were working overtime. The wage and labor question seems to be more or less of a tranquil nature.

The convention adjourned to meet in New York City on Wednesday and Thursday, Dec. 12 and 13.

Engineers' Society of Western Pennsylvania Addressed by A. E. Crockett

A. E. Crockett, manager bureau of instruction, Jones & Laughlin Steel Corporation, Pittsburgh, gave an interesting talk to members of the Engineers' Society of Western Pennsylvania on river transportation Tuesday evening, Sept. 25. Mr. Crockett has given the subject of inland waterways considerable study, and has been heard in various parts of the country in advocacy of greater use of the rivers to supplement the transportation service of the railroads. In his talk, which was illustrated by lantern slides, Mr. Crockett outlined the development of the inland waterways as transportation arteries, giving a particularly graphic story of the development of the Ohio River and a glimpse into the future of that river when the locks and dams along its more southerly reaches, for which the Government has already appropriated funds, are completed. William McConway, president of the McConway & Torley Co., Pittsburgh, also was a speaker at this meeting, explaining motion pictures and lantern slides detailing the McConway method of centrifugal casting of steel ingots. This method was described in an article in THE IRON AGE of Feb. 1, 1923, page 337.

Expanding Activities of the Steel Construction Institute

The American Institute of Steel Construction up to the present time has been conducted with a view of establishing a broad and sound foundation for future development. Much of this work has been of a technical character and centers around the adoption of a standard specification, publication of which was noted some time ago in these columns. The board of directors at the beginning of the year decided that when this work had reached a proper stage there would be need for additional talent to conduct the affairs of the institute to assist L. H. Miller, who was then engaged as the managing director.

At a meeting of the board of directors held in New York on Sept. 13, Charles F. Abbott was engaged for this purpose. Mr. Abbott is experienced in practical business as well as industrial organization effort along the lines contemplated in the organization. He will direct the work of the organization from an office in New York, and Mr. Miller will continue his work with the organization at his present location in the Leader News Building, Cleveland, as its chief engineer in the promotion of the technical phases of the institute.

Drop Forgers at Steel Treaters' Convention

The executive committee of the Drop Forgers' Supply Association held a meeting in Philadelphia recently, and it was decided to make a concerted effort to invite as many drop forgers as possible to attend the convention and exposition of the American Society for Steel Treating to be held in Pittsburgh, Oct. 8 to 12.

Inasmuch as the drop forge industry is so closely allied to the aims and purposes of the A. S. S. T., all of the members by attending have been able to obtain great benefit from the many papers that are to be presented on that subject, and also by visiting the exhibitors.

On Wednesday afternoon at 3:30 there will be a round table discussion on the subject of "Large Forgings." At this session papers will be presented on forging subjects as well as forging costs.

The drop forgers visiting the convention are requested to make that fact known at the registration desk so that they may attend the informal drop forge dinner to be held on Wednesday evening, Oct. 10, at 6:30, previous to the annual dance of the society.

The Hudson Sheet & Tin Plate Co., Marietta, Ohio, in liquidation, has been purchased by W. F. Robertson, of the W. F. Robertson Steel & Iron Co., Cincinnati, for $84,000. Whether the mill will be put into operation has not been definitely determined by Mr. Robertson, but an official announcement as to his intentions is expected to be made this week.

COMING MEETINGS

September

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

October

National Safety Council. Oct. 1 to 5. Twelfth annual meeting, New Statler Hotel, Buffalo. W. H. Cameron, 168 North Michigan Avenue, secretary.

American Society for Steel Treating. Oct. 8 to 12. Annual convention, Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

West Virginia and Kentucky Association of Mining, Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention, Hotel Frederick, Huntington, W. Va.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Iron and Steel Institute. Oct. 25, fall meeting in New York; Oct. 26, visit to Aberdeen Proving Ground, Md. E. A. S. Clarke, 40 Rector Street, New York, secretary.

Society of Automotive Engineers. Oct. 25 and 26. Production meeting at Cleveland. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

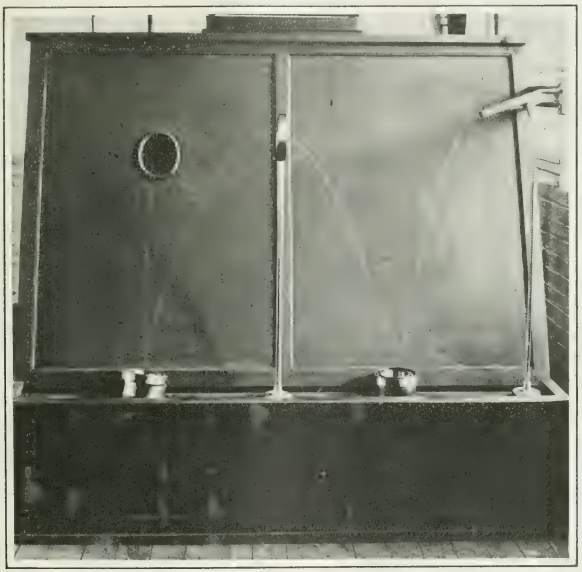
American Gear Manufacturers Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

Machine Tool Exhibit at Yale University

Some of the Unusual Features—Caliber of Visitors Apparently of Higher Order Than Heretofore—Resolutions of Appreciation to Yale University

THE four-day session of the third annual machine tool exhibition held under the joint auspices of Yale University, the New Haven section of the American Society of Mechanical Engineering and the New Haven Chamber of Commerce closed in Mason Laboratory of mechanical engineering, New Haven, Conn., Sept. 21. This year there seemed to be fewer of the curious class among the visitors and more of the potential buying power and they came from a wide area, visitors being reported from as far away as Baltimore, Cincinnati, Pittsburgh and Buffalo. Many master mechanics, production managers, plant engineers and superintendents were among the number. Marked interest was shown in the demonstrations and some of the evening meetings were poorly attended, visitors preferring to see machines in operation rather than to hear the addresses.



Sphericity and Uniform Hardness of Balls Used in the Modern Ball Bearing Are Shown by the Test Staged by the New Departure Mfg. Co. This illustration was made from a time exposure. Due to this fact the track developed by the balls following each other in a parabolic curve registered clearly on the negative. Had there been any non-uniformity in the track or the balls the impression would not have been sufficiently heavy to register on the plate, or it would have been wavy or broken

Among the papers prepared to follow the opening address and the address of welcome were one on "Yale and the Machine Tool Industry," by Charles H. Warren, dean of Sheffield Scientific School, and one on the "Broader Aspects of Machine Tool Applications" by Prof. Herbert L. Seward, also of the Sheffield Scientific School. On the second evening meeting were presented papers on "The Origin of Machine Tool Building" by Joseph W. Roe, professor of Industrial Engineering, New York University, and "An Industrial Birthplace of Pioneer Machine Builders," by E. Guy Hubbard, engineer at the Gridley plant at Windsor, Vt., of the National Acme Co.

A rather novel procedure featured the third evening meeting. Some of the new machine tools were removed from the exhibition floor to the auditorium where they were demonstrated in operation, with opportunity for discussion and explanation. It is planned to make this an annual feature to acquaint visitors with the newest devices on the market.

At a meeting of exhibitors held on the last day, resolutions of appreciation were drawn up for presentation to William Smith Mason and George Grant Mason, Yale 1888, donors of the Mason Laboratory and to Yale University for the opportunity given the machine tool industry through these exhibitions to advance that branch of the science of mechanical engineering. These resolutions were signed by the individual in charge of each exhibit.

List of Exhibitors

Abrasive Machine Tool Co.; Alexander Brothers; American Blower Co.; B. C. Ames Co.; Anderson Die & Machine Co.; Atlas Ball Co.; The Atlas Steel Corporation.

The Baird Machine Co.; Billings & Spencer Co.; Bentley Holmgren Equipment Co.; The Bilton Machine Tool Co.; Bolwinick Bros.; Brown & Sharpe Mfg. Co.; The Bullard Machine Tool Co.

A. C. Campbell, Inc.; Carborundum Co.; S. W. Card Mfg. Co.; The Cushman Chuck Co.

Detroit Belt Lacer Co.; Detroit Twist Drill Co.; Diamond Machine Co.; R. & J. Dick Co., Inc.

Eastern Machine Screw Corporation; Eggleston Supply Co.

The Fafnir Bearing Co.

Garvin Machine Co.; General Electric Co.; The Geometric Tool Co.; Grant Mfg. & Machine Co.

The Hanson-Whitney Machine Co.; The Hanson Tap & Gage Co.; Haynes Stellite Co.; The Hendey Machine Co.; The Henry & Wright Mfg. Co.; The Heppenstall Forge Co.; Hergi Mfg. Co.; The High Speed Hammer Co., Inc.; The Hoggson & Pettis Mfg. Co.

Ideal Machinery Co.

Jacobs Mfg. Co.; Jones & Lamson Machine Co.

Keller Mechanical Engineering Corporation; Kingsbury Mfg. Co.

Leland-Gifford Co.; J. L. Lucas & Son, Inc.

Machinery Dealers Incorporated: R. H. Madden Co., Inc.; Manning Abrasive Co.; C. S. Mersick & Co.; Monarch Machine Tool Co.

The National Acme Co.; Friedrich Neumann's Successors, Inc.; The New Departure Mfg. Co.; The J. M. Ney Co.; Nicholson File Co.; The Noble & Westbrook Mfg. Co.; The Norma Company of America.

Ohio Machine Tool Co.; Ohio Valley Pulley Works; The Oven Equipment & Mfg. Co.

The Page, Steele & Flagg Co.; Peerless Machine Co.; Peerless Surfacing Machine Co.; Potter & Johnston Machine Co.; Pratt & Whitney Co.; Purinton & Smith.

Racine Tool & Machine Co.; Reading Automatic Machine Co.; Ready Tool Co.; Reed-Prentice Co.; Rhodes Mfg. Co.; Richards & Co.; Rivett Lathe and Grinder Corporation.

Sellew Machine Tool Co.; Seneca Falls Mfg. Co.; Sidney Machine Tool Co.; Simonds Saw and Steel Co.; Sipp Machine Co.; S. K. F. Industries; The Skinner Chuck Co.; J. T. Slocomb Co.; The Springfield Machine Tool Co.; Standard Safety Mfg. Co.; Standard Steel & Bearings, Inc.; Stark Tool Co.; J. S. & J. F. String.

The Taft-Peirce Mfg. Co.; The Taylor & Fenn Co.; Torchweld Equipment Co.; The Torrington Co.; Triplex Machine Tool Co.

Union Twist Drill Co.

Van Norman Machine Tool Co.

O. S. Walker Co.; J. D. Wallace & Co.; The Warner & Swasey Co.; Waterbury-Farrel Fdy. & Mach. Co.; A. F. Way Co., Inc.; Westinghouse Electric and Mfg. Co.; Whitney Mfg. Co.; Wickes Bros.; Wisconsin Electric Co.; Wright Mfg. Co.; The Yale & Towne Mfg. Co.

Many of the manufacturers exhibited in space reserved by their representatives in the New England district. Thus the demonstrations of several builders were grouped and appeared as the exhibition of one of Connecticut's machinery dealers. Most of these displays were of more or less well known lines and included items which have been on the market for some time. Other manufacturers presented entirely new products together with those which had been shown before. Many accessories not properly classified as machine tools were seen.

Probably the most spectacular exhibit and one which savored of a real scientific demonstration was that of the New Departure Mfg. Co., ball bearing manufacturer of Bristol, Conn. In this exhibit the uniform quality of the modern ball bearing was demonstrated. Uniformity of material, heat treatment and dimension of ball races was shown by a xylophone arrangement of races of varying sizes which would vibrate to different wave lengths when struck with a mallet or beater. That part of their exhibit which attracted most attention was one in which the balls to the lay mind would appear to be bewitched. Balls were fed up through a standpipe to a trough, down which they rolled to drop upon a hardened steel disk. A motor driven device inclosed in the platform forced the balls up the standpipe. Balls dropping one after the other from the trough would rebound from the disk, describe a parabolic curve, pass through a bearing mounted on a stand, and, dropping, would rebound from a second disk into a hole in the inclined wall behind the apparatus. Not one ball but seemingly thousands in a continuous performance followed the same course. Occasionally one ball out of several thousands would miss the hole. It was found when this happened that the ball had picked up a speck of dust which was sufficient to deflect it on striking. The demonstration depicts uniform quality of chrome alloy, forged, heat treated steel balls, alike in hardness, size and sphericity.

The Pratt & Whitney Co., Hartford, Conn., among other machines, gages and small tools, showed the new model geared-head lathe in which the back gear shaft is hung directly below the spindle and the motor mounted in the cabinet leg. This machine was recently described in THE IRON AGE.

The Skinner Chuck Co., New Britain, Conn., showed its new S line of independent chucks in which the chuck plate recess is set more deeply into the body of the chuck thereby reducing overhang when mounted on the lathe spindle. It is claimed that at the same time weight has been somewhat increased. This chuck also has what are called self-alining thrust bearings for the jaw screws. Another line shown by this company is a quick acting milling machine vise, formerly known as the Ketcham vise before taken over by the Skinner company, in which the width of jaw opening is governed by an adjustable spanner nut, while the opening and closing in operation of the movable jaw is actuated by an eccentric handle.

The Bullard Machine Tool Co., Bridgeport, Conn., showed a "mult-au-matic" turning, boring, reaming and facing a cam shaft gear blank as used in the Jewett motor car. This blank was 7½ in. in diameter with a face of 1⅜ in. and machining was completed at the rate of one every 57 sec. with dimensions accurate within 0.001 in.

The Yale & Towne Mfg. Co., Stamford, Conn., among products displayed, showed the new tier lift industrial electric truck which was described in THE IRON AGE several weeks ago.

The Cushman Chuck Co., Hartford, Conn., exhibited for the first time its line of lathe and boring mill face plate jaws and the new combination tri-plex chuck, which is claimed to be self-centering, independent, or eccentric. It has a scroll plate for the universal action. When the jaws have been used in independent motion, they may, it is claimed, be more readily set for concerted or self-centered action than in previous types of combination chucks.

Andrew C. Campbell, Inc., Bridgeport, Conn., displayed two new sizes of the Campbell nibbling machine in addition to the size displayed at the show last year. These two new sizes provide for a cutting capacity up to ⅜ in. and a throat depth of 24 in.

One exhibit of particular interest to core makers and japan bakers was that of J. S. & J. F. String, New Haven, Conn. This was a core baking or japanning oven equipped with automatically controlled oil firing. A thermostat controls the switch governing the blower motor. Beside the oil burner is a gas pilot light. When the operator starts, it is simply necessary for him to throw in the line switch to start the blower and light the pilot. Oil is brought to the burner and atomized as the air pressure is built up by the blower. As soon as oil starts to feed, it is ignited. When the furnace reaches the pre-determined temperature, the thermostat acts to open the electric switch, closing it again when the temperature has reached a pre-determined low point. It is claimed that the device is accurate to within 4 deg. The thermostat is adjustable. After starting, with the pilot burning, the oil may be turned on or off like gas.

The Jones & Lamson Machine Co., Springfield, Vt., in addition to displaying the Jones & Lamson turret lathe in operation, the comparator, and the Hartness die head, also exhibited a line of ground thread taps which it is marketing under the name of the Flanders ground tap.

The Haynes Stellite Co., New York, had on display a number of solid milling cutters developed since the last exhibition, to supplement its line of inserted blade cutters.

President Werner to Speak on the Schuermann Cupola in Chicago

Siegfried G. Werner, president of the German Foundrymen's Association and holder of the patents for the Schuermann cupola, is expected to arrive in this country the latter part of October, when he will visit the plant of the Griffin Wheel Co. at 445 Sacramento Boulevard, Chicago, where a cupola of this type is now being installed. Tentative arrangements have been made to have Mr. Werner address the Chicago Foundrymen's Club on the Schuermann cupola Saturday evening, Nov. 10. On the same day, from 9 a. m. to 2 p. m. the Griffin company will open its plant to visitors desiring to see the cupola in operation. Mr. Werner was employed in this country by the American Steel & Wire Co. for a period of three years and speaks English fluently. The Schuermann process of preheating the blast for the cupola in stoves to shorten the time of melting was described in THE IRON AGE of Oct. 19, 1922.

The Prime Mfg. Co., Milwaukee, plans the erection of a brass foundry with a floor space of about 15,000 to 16,000 sq. ft.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 416 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Right Price for Steel

MUCH of the comment of the past two months on the course of the steel market has ignored a factor that has contributed largely to the present situation. We have read frequently of the "seasonal" influences that held back new buying of steel products in the summer months and that were expected to give way in the early fall to a revival of demand on a broad scale. It is quite well recognized now that to a large extent this "seasonal" factor was a talking point for commentators who felt called on to come to the help of a situation that was working itself out in an old-fashioned way.

Naturally, much that has been said in recent months about the steel market has been true of other commodity markets. All have been operated upon by a variety of forces—some of these growing out of the war and affecting the world, while others represent a complicated economic and political situation at home. All shared to a greater or less extent in the rapid expansion of demand in the first four months of the year and now have somewhat moderated their pace. Thus the present condition was described in one of the last week's commercial reviews as due to the fact that "requirements were largely covered ahead during the noteworthy commercial revival of earlier months this year."

But the steel market has had in some respects a situation of its own. It was particularly hard hit in output by the coal and railroad shop strikes last year. The very low prices for steel in the early months of 1922 started a general restocking movement in compensation for the beggarly buying of 1921. The double strike interrupted the restocking, but it was resumed late in 1922 and carried over into the early months of this year. When there was added to it the building expansion of last spring and the heavy buying of the railroads, it seemed to many consumers of steel that they would not be able to get deliveries of material as needed. That fear proved groundless. Deliveries of steel in the first eight months of 1923 were on a scale never equaled.

It became evident early in the summer, however, that consumption, great as it was, would not require such a full operation of plant as had made April and May peak months in all our history. Curtailment has been so gradual that four months of it have left production within 15 to 20 per cent of the high rate. Prices, which at the opening of the year were 2 cents for plates, shapes and bars, advanced steadily under the heavy buying of the first quarter, until for early delivery they were well above 2.50 cents, and on contracts were easily established at the latter figure for plates and shapes and at 2.40 cents for bars. But shipments are still being made, and have been for months, of material bought well below 2.40 and 2.50 cents, so that consumers have not had to figure the prices of their own products on any such basis for steel as today's. Car builders, for example, have put much 1.70 cent and 1.80 cent steel into the cars they have been delivering to the railroads this year. They have yet to find out whether they can sell cars at the prices they must get if they pay 2.50 cents for steel.

Coming back, then, to the statement with which we began, the price factor, which has figured but little in reviews of the steel situation, is the one to which the whole trade presently will be giving a great deal of attention. Buyers whose 1923 product has been based on steel costing from $10 to $15 less than is asked today must decide how much business they can do if they must advance their prices to the basis of today's level for steel, and then buy accordingly. It is a situation in which both sides of the market will soon be engaged in one of the familiar efforts that have followed every considerable market advance, to answer the question what is the right price for steel—the price at which there will be the largest possible consumption, under existing business conditions, of the secondary products into which steel so largely enters.

A PREDICTION at the close of the war that five years later the iron and steel buying by the nations from one another would be less than it was before the war would not have been accepted. The combined exports of the six leading exporting nations—United States, Great Britain, France, Germany, Belgium and Luxemburg—has

risen to only 1,017,400 gross tons per month this year against 1,350,000 tons per month in 1913. The monthly total in 1920 averaged 965,000 tons and in 1922, 982,350 tons. Yet prodigious figures have been offered repeatedly as estimates of the steel shortage caused by the war's absorption. Presumably what the world has struggled along without, it is not now concerned about; indeed, it could be said that it has allowed the shortage to increase.

Passing of the Coal Commission

LAST week the U. S. Coal Commission came to the end of its statutory life and passed out of existence, having previously addressed a series of reports to the President. These have been verbose and inconclusive. The commission has told to economists and engineers and the persons engaged in the coal mining industry nothing very material that they did not already know. It was never expected that it would. The most that was hoped was that it would inform the general public respecting coal mining conditions in a lucid and convincing way. Indeed, that was the primary function of the commission, for as a public body it could speak to the people, through the President, with a voice of authority and widespread circulation and instructiveness. In that primary function the commission has signally failed.

In its concluding report the commission recommends the use of the powers of the Federal Government over interstate commerce, through a specially created division of the Interstate Commerce Commission, "to regulate the coal mining industry, recognizing that under our constitutional system a substantial part of the responsibility rests on the State and local governments and should remain there, and an even larger part on the industry itself and the public which it serves."

There is a good deal of hedging in that declaration and in the more specific ones that follow. The commission intimates that the industry itself and the consuming public ought to take care of themselves, but it does not venture to say that both would be in a better position to do so if they should be unhampered. On the contrary, the commission proposes further restrictions and supervisions. This is clearly opposed to the evidence that what the coal mining industry needs is liberation from existing economic and political restrictions, not the imposition of more of them.

The commission said among other things "the main remedy against extortionate prices lies in the consumer himself. There are substitutes for hard coal, and a readiness to resort to them is the ultimate and effective defense against an unreasonable price." This rubs it in to the consumers of domestic sizes of anthracite who have already heard of advances of 50 cents to $1 per ton in the prices f.o.b. mine and who are thinking of Governor Pinchot not merely as the man who settled the strike but also as the one who put up the price for coal. However, the U. S. Coal Commission again is only partially right. The coal consumer himself is helpless. He can not use substitutes unless they be offered to him.

The real immediate solvers of the predicament of the consumers will be the entrepreneurs and engineers who offer substitutes to them. We are glad, therefore, that the powerful petroleum producers are right on the job, as, of course, they would be. At the convention of the National Petroleum Association last week, Henry L. Doherty expressed the belief that from now on one seller of petroleum products after another will be establishing tank wagon routes to deliver oil for house heating and small industrial uses, it being his opinion that probably the biggest potential market of the petroleum industry is the domestic use of oil for heating. We may be sure that inventors and manufacturers of oil burning apparatus will be encouraged, and although the simple oil burner for the house heater may not yet have been devised, it will come and will afford much more hope for the consumer than anything that the U. S. Coal Commission has recommended.

Stocking Coal Against a Strike

THE very unsatisfactory character of the United States Coal Commission's 7500-word report was commented upon briefly but emphatically in THE IRON AGE last week. There is general disappointment over the report, and it is impossible to see that the commission has done much to pave the way for a proper settlement of bituminous coal mining wages for the period beginning April 1, 1924. In the interest of the public, a mining suspension should be avoided and wages should be brought down to a reasonable level.

Hope of the coal commission's settling this matter being abandoned, the question is, what next? There is unlikely to be any great public movement, and Congressional action, in advance of trouble at least, cannot be expected.

A question remaining is, what will consumers do in the matter of stocking? If a consumer stocks and there is no strike, he loses the cost of stocking and probably part of the purchase price, nce prices would probably be lower while he was liquidating the stock. If he does not stock and there is a strike, he loses, as he will have to pay high prices.

These alternatives are taken on the basis of the matter of strike or no strike being predetermined, but there is also the question what influence stocks would have upon the matter. Many men have readily embraced the idea that the way to prevent a strike is to stock heavily, then the miners will see that they cannot hold out long enough to win, but what prospect of work on April 2 does the miner have if there are large stocks, or where would the operator be? There have been many cases in the past quarter century of operators and miners disagreeing for a few weeks and then suddenly coming to terms, when it appeared rather plain they were simply waiting for stocks to be liquidated.

On the basis, however, of stocking being a strike preventive and an expense to the consumer, the individual consumer may be disposed to let some one else do the stocking. Altogether, there is no clear view as to what consumers are

going to do, or what effect any particular action would have.

Enormous stocks can easily be accumulated by April 1, for there are large stocks already. In anthracite a full twelvemonths' production is commonly taken at 90,000,000 net tons, and it requires only a little production this month, since the recent resumption, to make the total for the six months, April 1 to Oct. 1, one-half of this, or 45,000,000 tons. Anthracite is therefore well able to take care of itself.

As to bituminous coal, production in the first eight months of the year is reported at 367,260,000 tons, this being the second best total on record for the period, the record period being in 1918. The last Geological Survey report showed 51,000,000 tons of commercial stocks Aug. 1, while the record high stock was 63,000,000 tons, both on Armistice Day and on April 1, 1923. An increase of 5,000,000 tons was reported for July, and similar increases in August and September would bring stocks practically up to the high record by Oct. 1, with six months still to go. Thus, if consumers are convinced that large stocks will kill the strike prospects and are willing to cooperate, full physical facilities are available.

A Problem for Steel Makers

IT is worthy of note that the microscope—powerful investigative weapon though it is—has had little use in the every-day routine of steel production or heat treatment. Workmen still rely almost exclusively upon the ancient method of examining the fracture of a test piece made by empirical methods. Minute differences in appearance, as viewed by the skilled eye, mean large differences in the quality of the parent metal. Only when a quite unusual structure is revealed is the sample referred to the laboratory for attention, and the research men then bring the microscope into play.

Is it not true that the reason for so few microscopes getting into the mill is not the delicacy of the instrument or manipulation, for chemical analysis has surmounted this objection, but the fact that no one has yet been able to correlate what the bare eye sees with what the microscope reveals? Whatever it is that produces "flaky" fractures in nickel steels, an immense amount of microscopic study has failed to find it. And no one knows what is the nature of that peculiar fibrous fracture desired in test pieces from armor plate and heavy forgings. (It is not entirely due to solid impurities in the steel, for it is possessed by heat-treated plates made at Charleston from superfine electric steel.)

Or, referring to everyday affairs, "black fracture" in carbon tool steel has been shown by the microscope to be due to graphitized cementite. Yet, if that same steel be hardened, it would pass inspection under any microscope, but would be instantly discarded by the skilled inspector because of its "dry" fracture.

We venture to suggest that the reason for this mismatch of works and laboratory is that in general macrostructure is due to primary crystallization, microstructure to secondary. The fracture of a specimen is primarily influenced by idiosyncrasies developed during solidification; while the metal is passing from the liquid to the solid state in the mold. Microscopic investigation, on the other hand, has to do almost exclusively with the much finer crystalline units formed during the time the steel is cooling through the critical ranges when the solid solution austenite transforms into pearlite and other intermediate substances.

These latter transformations are of first importance to the phenomena of hardening, and the industrial world owes a great debt to the scientists and laboratory investigators who have evolved a rational theory to guide the practice of heat treatment. But more laurels await studies in the almost neglected field of structure visible to the naked eye, or at a few diameters magnification. In that field we must look for information if we are to make progress in improving the structure of castings. Such studies will help clear up many doubtful questions about the refining stages during steel making, and develop a rational explanation of the process. Also they will answer such questions as: How little reduction by forging is a necessary preliminary for refining the grain by heat treatment; how much is necessary to cause the development of "flow lines?" For that matter, is the banded structure of "flow lines" necessary, preventable or desirable even if preventable?

Heat treaters have done yeoman service in showing the practical utility of the microscope. Recognizing its adequacy they are turning to the method of deep etching or pickling to develop the coarser structure of their metal. Professor Sauveur recently has written a scholarly paper for the American Society for Steel Treating appraising the entire situation and asking pertinent questions about dendritic segregation. But it would seem really to lie in the province of steel makers, rollers and smiths to explain the riddle of "fracture."

AN international exchange of commercial students is urged by the Chamber of Commerce of the United States. Just as there are now abroad American students of art, literature and the sciences, while students from foreign countries are similarly occupied in this country, so there is promise in some organized arrangement which will send the commercially inclined American overseas to learn trade customs, institutions and language. At the same time the young foreign business student desirous of gaining familiarity with practices in the United States will be studying here. It remains for the American chambers of commerce abroad to secure berths for Americans in their local industrial establishments and for business organizations here to do likewise for the foreigners nominated, say, by the American associations abroad. The chief need in establishing the exchange idea is the setting up of the central bureau to bring both ends together.

British Machines Long Lived Yet Efficient

American Foundrymen See Interesting Processes and Equipment in Birmingham and Manchester

(Special Correspondence)

LONDON, ENGLAND, Sept. 11.—On arrival at Birmingham Tuesday evening, Sept. 4, the party of American foundrymen was received by the local committee and cared for at the Queen's Hotel. Wednesday, Sept. 5, was devoted to plant visitation. The first stop was at the famous plant of W. & T. Avery, Ltd., manufacturers of precision scales and a variety of other metal products of high grade. The old firm name was Boulton & Watt, and the first engine in England was built and operated here. The date is from 1776 to 1898, when this engine was placed in a museum for exhibition. The American visitors were much astonished to see some very ancient but none the less efficient machinery in operation. A huge lathe in daily operation has been running for over 125 years constantly, and a duplicate screw for feed, which had been placed on the wall to serve for replacement, has been there over 40 years without prospect of being brought into requisition for a long time to come yet. A radial drill has been in operation over 100 years and is still as efficient as any modern tool. The man running it has done so for over 57 years. The original works clock, put there in 1802, is still serving well. All of which shows the degree of skill in designing the machinery in the first place, and the excellence of the materials used.

Some of the processes and equipment the American visitors are seeing on this trip are of highest interest. While in Manchester, some of the party ran out to Stanton, to the blast furnace and large pipe plant of the Stanton Iron Co., where pig iron is made with raw coal instead of coke, and where, in the pipe plant, the DeLavaud process of making centrifugally cast iron pipe has been brought to a high degree of perfection.

The second plant visited in Birmingham was that of the Birmingham Aluminum Casting Co., where much of the work was done in iron molds, some of very intricate form. This is not the die casting but real permanent mold work. A visit to the Midland Motor Cylinder Co. plant completed the afternoon. Here aeroplane and auto-cylinder castings are made in great variety, as well as complete engines. Birmingham is peculiarly the cradle of the larger iron development of England, for here Dud Dudley succeeded in making the first coke and replacing charcoal in furnace practice.

The dinner of the evening was a splendid affair. Prof. Thos. Turner acted as chairman. A formal reception preceded and gave opportunity for renewal of friendship and the forming of new ties. President Clamer of the A. F. A. proposed the formal toast to the King, while Professor Turner did the honors for the President of the United States. "Our Guests" were then toasted by Gilbert C. Vyle, the managing director of W. & T. Avery, Ltd., with a happy response by Jesse L. Jones, of the American party. V. E. Minich then lauded the city of Birmingham and the foundry industry in an interesting address and gave the toast to the gathering. This was responded to by the Lord Mayor of Birmingham, Alderman Sir David Davis, J. P., who had brought Lady Davis with him.

The last toast, "The Ladies," was given by Sir Herbert Austin, M. P., in a speech which gave the Americans an idea of how woman's suffrage is regarded in parliamentary circles. The response to this toast was the event of the evening, and was given by Mrs. G. H. Clamer in a most happy and humorous vein, and was thoroughly enjoyed by every one present. Music finished up the evening.

The following day, Thursday, Sept. 6, was devoted to plant visitation in the Coventry District, to which the party was taken by train. The shops of the Daimler company were visited first, and the several divisions inspected with much interest. After lunch in the Masonic Hall, the party went to the plant of the British Piston Ring Co., and the special production was examined with much interest. The Sterling Metals plant with its variety of interest then claimed the attention of the visitors, after which the party entrained at Coventry station for Birmingham again.

Friday, Sept. 7, was given up to a sightseeing trip by motor car to the ruins of Kenilworth, to Warwick Castle, and to Shakespeare's country with all its mementoes, arriving at London in the evening. Saturday and Sunday were set aside as days of rest, in view of the strenuous nature of the trip ahead. Monday, Sept. 10, was filled by an official visit to the Shipping, Engineering and Machinery Exhibition at Olympia, London, where the party was also entertained at lunch.

Tuesday afternoon, Sept. 11, the party left for Paris, via Dover-Calais, thus closing up a most eventful, enjoyable and important visit of American foundrymen to the foundrymen of Britain. Much will come of this close association in the future, and it is hoped that American foundrymen may welcome a British delegation in 1926, at the Philadelphia Exposition, if not before that time.

R. M.

To Standardize Stove Bolts

An effort is being made through the cooperation of makers of stove bolts with the Government departments and scientific societies, to establish a national standard for stove bolts. The present practice of makers differs in head, thread and actual diameter and some modifications are necessary to obtain uniformity. To determine the requirements and preferences of consumers, a questionnaire has been sent out by the American Screw Co., Providence, R. I.

It is hoped that answers will be received promptly and information obtained which can be used in the promotion of uniformity.

The Iron Age and the Steel Treaters

IN this issue—designated as a Steel Treaters' number, published ten days before the annual convention of the American Society for Steel Treating—are seven articles specially prepared for THE IRON AGE, dealing with problems and developments in the heat treatment of steel. High-speed steel and the cause of its red-hardness; X-rays in the steel industry and what may be expected of them; why steel files fail in service; steel structural parts for aircraft; a new suggestion to overcome the effect of ingotism in heat treatment; how long time drawing conditions may affect heat-treated steel parts in service, and an electric alloy steel for special machinery castings—all are discussed with an authority which makes the array of contributions a notable tribute to THE IRON AGE as the medium for the dissemination of the most advanced evolutions, both in the art and the science.

In consonance with the expanding importance of the heat treatment of steel and other metals, it is not surprising that THE IRON AGE steadily has been increasing this service, so that every issue has something to add to the progress made by the individual or by the American Society for Steel Treating.

JAPAN WAIVES STEEL DUTY

Many Products Exempted for Six Months—Some Inquiry for Galvanized Sheets, Wire and Nails

NEW YORK, Sept. 25.—The expected trade activity with Japan as a result of the earthquake is evidently still in process of development. While there are reports of some structural business having been awarded to European mills, probably Belgian, said to be quoting about $46 per ton, delivered, very little specific inquiry in this line has thus far appeared in the American market. Certain mills, however, are reported to have increased export prices on bars and shapes to $69 per ton, c.i.f. Japan, an advance of several dollars since the earthquake and a slight advance is also said by exporters to have been made on other products.

Inquiry for gas pipe is expected to develop before long but at present demand is almost entirely confined to requests for prices on galvanized sheets, 3 ft. x 6 ft., 13 sheets to the bundle (No. 30 gage) plain and corrugated (eight 3-in. corrugations to the sheet), of which there are probably total inquiries for 8000 to 9000 tons. Exporters also report requests for prices on a few hundred tons of No. 8 gage galvanized wire, wire nails and Nos. 30 and 31 gage black sheets. A few inquiries for copper have appeared and one Japanese export house reports an order for about 250 tons of electrolytic copper wire bars. Inquiries for bars and structural material are expected to take shape in about two weeks.

In view of the quotations now being made by American mills on the light gage galvanized sheets that are in demand for immediate use, it is considered doubtful by many exporters that much business will be placed in the United States. British sellers are said to be offering No. 30 gage galvanized sheets, plain, at $134.25 per ton, c.i.f. Japan, with corrugated (eight 3-in. corrugations, total width 2-ft. 2-in.) at $127.75 per ton, c.i.f. Japan, October delivery.

Practically all quotations are now being requested c.i.f. Kobe. The present active inquiry for galvanized sheets, it is pointed out, is at best only a temporary expedient to tide over the need, until the galvanizing plants, a large percentage of which are in the Osaka and Kobe districts, can absorb the unusual demand.

For the present, under an Imperial ordinance, notification of which was received by the Consul General of Japan, Sept. 20, galvanized sheets and a number of other iron and steel products are exempt from import duty, effective until March 31, 1924. In addition to a number of food products, medical supplies, slate, cement, bricks and clay tiles for building construction, the ordinance exempts from import duty iron bars or rods, including T's, angles, etc.; wire rods in coils; plates and sheets not coated with metals, nor exceeding 0.7 mm. thick or not otherwise mentioned in the tariff law; plates or sheets, tinned or galvanized; wire; pipes and tubes, not otherwise provided for in the tariff; iron nails, screws, bolts, nuts, washers and rivets; railroad construction material; posts and other materials for suspending electric lines; materials for construction of buildings, bridges, docks, etc., (shipbuilding materials excepted); cocks and valves, excluding those made of, or combined with precious metals; hinges, hathooks, and metal fittings for doors, windows, furniture, etc.; locks and keys; mechanics' tools, agricultural implements and parts thereof, not otherwise provided for; stoves and parts thereof; radiators; gas meters; water meters; ampere meters, voltmeters and wattmeters; telegraphic and telephone instruments and parts therefor; motor trucks and parts therefor; machinery of motor trucks; cranes; sewing machines, parts and accessories, excluding needles. The ordinance also exempts by one-half the import duty on automobiles other than motor trucks, but including automobile parts and motive machinery.

Japanese Tin Plate Order Increased

It is stated that the latest inquiry of the Nippon Oil Co., for 19,000 boxes of tin plate, which closed just prior to the earthquake was increased to 47,000 boxes and awarded to a New York branch of a Japanese export house, which placed it with a large independent export interest. Bids on the 120 sets of frogs asked for by the South Manchuria Railway Co., were opened at Dairen, Sept. 13 and award of 70 was made to Mitsui & Co., New York. Another opening of bids for 10 frogs will be made about Oct. 8 by this railroad.

In the rebuilding of the residential sections of the cities, which were visited by the disaster, says a report from Japan to the Department of Commerce, every economy will be practiced and the use of wood will be limited in every possible way. The city of Tokio, continues the report, for some time has contemplated the widening and straightening of its narrow, crooked streets, and many have already been designated for this improvement. This plan will no doubt be carried out in the reconstruction program and the widening of the streets will require quantities of paving blocks. It is reported, says the communication, that plans are being made to rebuild Tokio and Yokohama along modern lines, conforming with the construction of the Western World as closely as practicable. The possibilities along this line are somewhat limited, however, owing to the necessity of always keeping in mind the probability of a recurrence of earthquakes and designing the building accordingly, and the necessity of keeping the cost within certain limits, especially in the case of homes.

To Study Future of American Shipbuilding

Charged with the investigation of general conditions as affecting shipyards and ship repair plants over the entire country, a committee headed by J. Harry Mull, president and general manager of the Wm. Cramp & Sons Ship & Engine Building Co., last week established headquarters in the offices of the Atlantic Coast Shipbuilders' Association, 1600 Walnut Street, Philadelphia, and began a study of the varied problems of the industry with the view of formulating recommendations that will insure a permanent future for American shipbuilding.

The findings of the committee will be acted upon at the forthcoming American Marine Congress to be held in New York, Nov. 5-10, when representatives of all groups interested in water transportation will meet to consider the maritime problems in all of their various phases. The aim of the conference is to evolve a shipping program which will bring about a unity of purpose and coordination of effort throughout all industry, from the manufacturer who supplies the materials used in the construction of ships to the industrial groups whose products furnish the cargoes.

The cooperation of more than 200 American plants engaged in all branches of shipbuildings and marine repair work is sought in a communication which goes forward today from the shipyards committee pointing out the need for coordinated action and inviting the views of all shipyard executives as to subjects to be considered upon which definite recommendations can be formulated and placed before the American Marine Congress.

Associated with Mr. Mull on the shipyards committee are John G. Pew, president Sun Shipbuilding & Dry Dock Co., Chester, Pa.; H. G. Smith, vice-president Bethlehem Shipbuilding Corporation, Bethlehem, Pa.; E. P. Morse, president Morse Dry Dock & Repair Co., Brooklyn, N. Y.; and J. J. Tynan, general manager, Union Plant, Bethlehem Shipbuilding Corporation, San Francisco. The secretary of the committee is Clarence Samuel King, who is also secretary of the Atlantic Coast Shipbuilders' Association.

The Aetna Foundry & Machine Co., Warren, Ohio, has leased for a five-year period the plant in Sharon, Pa., of the Shenango Machine Co. The lease becomes effective Sept. 24. The plant will be used to produce blast furnace and steel mill castings. The foundry capacity of the plants in Sharon and Warren of the Aetna company is now equal to 800 tons per month.

ELECTRICAL ENGINEERS MEET

Steel Plant Problems Discussed at Buffalo Electrified Foundry a Feature

BUFFALO, Sept. 25.—With an enrollment of about 400 at the close of the first day, the annual convention of the Association of Iron and Steel Electrical Engineers was put well under way today. Following a brief business session in the morning, in the Fillmore Room of the Hotel Statler, the exposition was formally opened shortly after 2 p. m. in the Broadway Auditorium. The afternoon technical session was devoted to standardization of equipment and reports of committees.

In the absence of R. B. Gerhardt, president of the association, the chair was filled in the morning and at the beginning of the afternoon sessions by W. S. Hall, chairman of the finance committee. At the first technical session, when announcement was made of the new officers, Mr. Hall introduced the new president, R. S. Shoemaker, as presiding officer for the remainder of the day.

At the close of the morning session, in a talk full of deep feeling, A. H. Swartz, special representative Westinghouse Electric & Mfg. Co., who has been continuously chairman of the convention committee since the association was founded in 1907, voiced his valedictory. He promised all the cooperation he could give to those who might succeed him but felt that he could carry the major responsibility no longer. Mr. Swartz, in company with the present treasurer, James Farrington, then of the La Belle Iron Works, E. Friedlander, W. T. Snyder and L. A. Palmer, the latter with Jones & Laughlin Steel Co., were founders of the association. It has now reached 1600 members and has representatives in every steel plant in the world.

New Officers

New officers were announced when the afternoon session began, as follows:

President, R. S. Shoemaker, superintendent of maintenance American Rolling Mill Co., Middletown, Ohio.

First vice-president, A. C. Cummins, electrical engineer Carnegie Steel Co., Duquesne, Pa.

Second vice-president, George Shaeffer, electrical engineer Carpenter Steel Co., Reading, Pa.

Treasurer, James Farrington, electrical engineer Steubenville plant, Wheeling Steel Corporation.

Secretary, J. F. Kelly.

Directors: A. F. Jones, electrical engineer Champion Machine & Forging Co., Cleveland; Walter Kennedy, operating engineer Worth Steel Co., Claymont, Del.; E. F. Elliott, electrical engineer Sloss-Sheffield Steel & Iron Co., Birmingham; Henry Davis, electrical engineer Interstate Steel Co., Chicago, and F. W. Cramer, assistant to the electrical superintendent, Cambria plant of the Bethlehem Steel Corporation, Johnstown, Pa.

At the technical session reports were read from the electrical development committee of the safety committee, with special reference to automatic engine stops, and of the standardization committee. F. W. Cramer, who read this last report, made a strong plea for cooperation with the American Engineering Standards Committee, on the theory that electrical interests were largely ignored or sidetracked by that committee. He asked for the appointment by the steel companies of a strong, representative committee with power to carry the matter on. Another speaker told of listing 510 parts for one 5-hp. series-wound motor and emphasized the large investment tied up in some spare parts when many motors of many types and sizes were used. Another member suggested that, as contactors wear fastest, the first serious effort at standardization be centered there. Bolt hole spacing for motor bases is another item needing immediate action.

The Exposition

Nearly every booth on the main floor of the Auditorium was filled when the exposition opened and many of the exhibits were running. The one which, naturally, attracted most attention was the operating electrified foundry, which was organized by the Pittsburgh Electric Furnace Corporation and is being operated by the American Radiator Co., Buffalo. The Pittsburgh company furnished the Moore Rapid Lectromelt furnace, operating at 128 to 80 volts at full load and using 600 to 800 amperes of current. It is set on a brick floor with concrete pouring pit.

Commanding the pouring and casting floor is a 5-ton Shepard crane. There are 40 or more Truscon pressed steel flasks, two Osborn molding machines, a Worthington air compressor and a Hagan electric annealing oven in the group. The electrodes for the melting unit were supplied by the Acheson Graphite Co., Niagara Falls, N. Y.

To Cooperate with Electric Power Club

Tuesday's sessions covered bearings and centrifugal pumps in the morning and skip hoist and ore bridge control in the afternoon. The association plans to cooperate with the Electric Power Club in standardizing anti-friction bearings. The club has 16 standard motor ratings below 100 hp., with 13 shaft sizes and various pulley sizes. The association has 15 sizes of bearings to cover these. The difficulty lies with the motor builders in redesigning to fit standards, but their sacrifice is in name only, as they charge the customer for it anyway.

Production of Pig Iron, Steel Ingots and Castings in Canada

A heavy production of pig iron in Canada as well as of steel ingots and castings during August is reported by the Dominion Bureau of Statistics. Pig iron produced in August amounted to 92,587 long tons as compared with 81,647 tons in July. It is pointed out, however, that the increase was wholly in the quantity of basic pig iron produced by reporting firms for their own use, this representing 69 per cent of the gross output. The production of foundry iron was maintained while the output of malleable iron showed a decline of 70 per cent from July. For the eight months ending with August, the total production of all grades of pig iron amounted to 609,380 long tons, compared with 251,015 tons for the corresponding period last year and 413,448 tons for the first eight months of 1921. Ferroalloys produced during August were 2258 tons, while in July the output reached 2342 tons. During the month one furnace at Sault Ste. Marie, Ont., was banked and one additional furnace was blown in at Sydney, N. S., leaving the same number of furnaces in blast at the end of the month as during July. The following companies had furnaces in blast: The Algoma Steel Corporation, Sault Ste. Marie, Ont., three; the Steel Co. of Canada, Hamilton, Ont., two; the Canadian Furnace Co., Port Colborne, Ont., one, and the British Empire Steel Corporation, Sydney, N. S., three.

The August production of steel ingots and castings amounted to 105,056 long tons, an increase of 43 per cent over July when 73,532 tons were reported. Practically the whole of the increase was in basic open hearth steel ingots, which accounted for 100,817 tons. Steel castings accounted for 4239 tons, compared with 3810 tons in July.

Pennsylvania Railroad Issues New Tariff on Steel

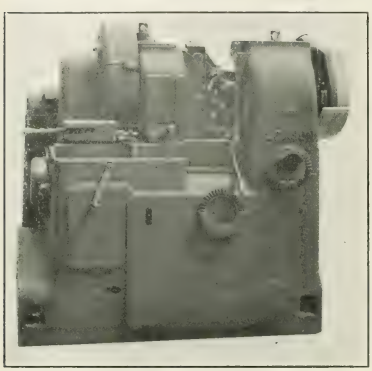
The Pennsylvania Railroad has issued a new tariff, advancing the Pittsburgh-Youngstown and Youngstown-Cleveland rates on steel products from 9½c. to 11c. and reestablishing the published through Pittsburgh-Cleveland rate of 21½c. For several years steel buyers have had the benefit of the combination of below local rates making the through rate to Cleveland 19c. The new rate becomes effective Oct. 7 and will affect a number of cities in the northern Ohio territory west of Youngstown.

NEW BEVEL-GEAR GENERATOR

Compact Machine for Mass Production, Either Singly or in Battery

Designed as single purpose equipment, a new bevel gear generator capable of producing high-grade bevel gears on a mass production basis faster than this has been done before has been put on the market by the Gleason Works, Rochester, N. Y. In appearance it is a radical departure in design from the Gleason bevel gear generators of the universal type, but the same basic principle of generating the tooth is used. The tooth contour is developed by relatively rolling the work and the tools together at a uniform pitch line velocity. The tools represent the adjacent teeth of a crown gear and, as they reciprocate, cut away the stock on the work and so develop correct tooth profiles.

Generating motion is obtained by means of a crown gear and segment, the generating roll being entirely



The New Gleason Bevel Gear Generator, Claimed to Turn Out Twice the Work Previously Obtained

on the work holding member. This arrangement has been developed into a simple and rigid form of design, which is very accurate, due to the few parts and fits involved. The index is of the notched plate type and is operated by the generating roll. The index plates are hardened and ground.

The tool carrying unit is mounted on an upright which, instead of swinging about a center, is given a lateral movement by a cam to feed the tools to the work. This permits the whole unit to be securely gibbed, with simple adjustments for taking up the wear.

The steel clapper box is integral with the slide and the steel tool holder is hardened and ground. The relief movement for the tools during the return stroke is mechanically operated and is positive in its action. The amount of movement necessary for the relief of the tools is exceedingly small because the swivel pins on which the clapper blocks swing are behind the cutting edges of the tools and almost in line with their travel. This small movement makes the machine quiet and steady in operation and, as the tool drive is arranged to have the effect of a draw cut, the connections being well ahead of the tools, high tool speeds can be maintained practically without vibration or noise, giving the work a smooth finish.

The tool carrying slides overrun the arms at both ends, so that a long run on any one job will not wear a depression in the bearing surfaces of either part. One large gib on each slide takes up the wear for all directions. The tools are the same as those used on the 11-in. and 18-in. Gleason generators.

Every point on the machine requiring lubrication is flood lubricated by a pump circulating system. There are two points for inspecting the oil flow, within easy sight of the operator. This is said to be the first time that every point requiring lubrication has been reached by one system. On this machine, besides all rotating bearings, the tool slides and all hand adjustments are reached by the central oiling system and even such points as the notches in the index plates and the friction surfaces on ratchet pawls are thoroughly oiled.

Considering the number of oil holes found on some machine tools, the advantage of having only one place to oil is readily apparent. On some modern tools it is not unusual to find from 70 to 130 points which require the operator's attention for lubrication and, of these, some are difficult to get at. Besides the loss of time shutting down the machine for oiling, considerable unnecessary upkeep costs have to be borne on account of an operator's failure to lubricate some vital point.

Chips are removed and both lubricating oil and cutting compound are replenished without stopping the machine or causing the operator any delay. The chips drop into a basket swivelled on trunnions. When full, this basket is tipped and the chips fall into a second basket at a lower level and remain until the service man removes them, which is done by lifting out the basket complete and dumping.

The machine is started by means of a lever and the control is sensitive. If necessary, the tools can be "inched" along very small distances. When the machine reaches the correct position for reloading, an automatic stop operates to shut down the machine by throwing off the disk friction clutch.

To permit two or more of the machines to be set up in battery, the surfaces where they come together are planed parallel, so that the joints are always true and tight. Repair work or replacement of parts on any portion of these machines, when set up in battery, can be made without moving the machine.

As arranged for motor drive, the 3-hp. motor is located on the back of the machine and belt-connected to the main drive pulley. This pulley has a very heavy rim and, running continuously, is in effect a flywheel. Power is transmitted to the main shaft of the machine by a disk friction clutch. When the automatic stop releases this friction clutch, the pulley runs free and, as there is but slight momentum in the machine, it stops without appreciable coast. In starting, too, there is no lost time in getting under way, as the momentum in the constantly revolving pulley brings the machine up to full speed as soon as the clutch is engaged.

The work head, designed for differential gears and pinions, can be arranged to handle any of these parts having a pitch angle between 61 deg. and 29 deg. minimum. Each gear or pinion will require a crown gear and segment corresponding to its pitch angle and an index plate for the correct number of teeth. For greater pitch angles than these, a separate complete work head is needed and the same is true for pinions of a lesser angle. In both these cases, a variety of gears or pinions can be cut if proper segments, crown gears or index plates are provided.

The machine is very compact, the floor space of the belt driven equipment being 4 ft. 6 in. x 3 ft. 8 in. The 3 ft. 8 in. dimension is slightly increased when the machine is motor driven, the exact amount depending on the motor used. When arranged in battery formation, a spacer is used to join the machines together if the pitch angle of the gear to be cut is greater than 35 deg.

The machine can be arranged to cut gears falling within the following specifications:

Cone distance: greatest, 4½ in.; least, 2 in.
Pitch angle: greatest, 75 deg. 58 min.; least, 14 deg. 2 min.
Extreme ratio for right angle bevels, 4 to 1.
Largest gear of 4 to 1 ratio, 8¾ in.
Largest gear of 2 to 1 ratio, 8 in.
Largest gear of 1 to 1 ratio, 6¾ in.
Largest diametral pitch, 4 D.P.
Longest face, 1¼ in.
Time for generating one tooth, 4 to 30 sec.

One cutter speed is supplied and this can be any speed between 300 and 500 strokes per minute.

One of these machines has been operating continuously 24 hr. per day for several months on production work and the quantity turned out has been twice what had been previously accomplished on the universal type bevel-gear generator. This output was obtained without any sacrifice in the quality of the work.

GERMAN PRICES

Quotations of Major Products on the Basis of the Past Six Weeks

(By Radiogram)

BERLIN, GERMANY, Sept. 25.—Foundry pig iron is quotable at 122s. 6d. per ton, the figure at which it stood in early September. With one pound sterling equivalent to $4.56, this price corresponds to about $27.90. Prior to Aug. 13, when iron was quoted in paper marks, price advances did not keep pace with the fall in exchange, and since prices have varied automatically, according to the exchange rates between the mark and the pound sterling. The last quotation on the paper mark basis was an equivalent to about $12 per gross ton.

Steel ingots are quoted at 165.90 gold marks per gross ton, which on a gold parity basis would put ingots much higher than the former basis of quotation, the last such being an equivalent of $14.60. The quotation for steel bars is 240 gold marks and for thin sheets 400.10 gold marks.

BELGIAN MARKET QUIET

Exchange Fluctuation Affects Business—Prices Fairly Steady Despite Keen Competition From Lorraine

BRUSSELS, BELGIUM, Sept. 13.—Activity is moderate because of the hesitation on the part of buyers as a result of the fluctuations of the pound sterling. When the pound is decreasing buyers refuse to pay the prices asked and no concession is made by the sellers, who await a rise in the exchange.

Business has been very quiet and it is beginning to be realized that the fluctuations of exchange have a direct effect upon the industrial and commercial life of the country. The price tendency is firm, for some of the larger companies, well booked ahead, refuse to make any reduction. Those with smaller tonnages on their books, however, are concluding orders at about 750 fr. for bars (Lorraine and Luxemburg prices), while others will not accept less than 775 to 800 fr., or £8 2s. 6d. Buyers have been offering about 725 fr., or £7 15s. to £7 17s. 6d. Like the French market, the Belgian market is influenced by the new turn taken in the Ruhr discussion.

Coke.—The price for metallurgical coke is about the same as in July and August, which were 203.60 fr. and 203.50 fr. per metric ton, respectively.

Pig Iron.—The market is unchanged, apart from some weakness as a result of offerings by Lorraine and Luxemburg, which in some cases are as low as 435 Belgian francs. There are very few transactions in basic Bessemer, most of the furnaces utilizing their production in their own steel works. The following are quoted either delivered or f.o.b. Antwerp: Casting No. 3, 455 to 465 fr.; ordinary basic, 450 to 455 fr. Luxemburg prices are: Casting No. 3, f.o.b. Antwerp, 450 to 455 fr., and Lorraine, 445 to 455 fr.

Semi-Finished Steel.—Prices are easier as a result of Lorraine and Luxemburg competition, and the improvement in exchange. Few transactions are noted. Basic material is quoted per metric ton as follows:

	Belgian, at Works, Fr.	Lorraine, f.o.b. Antwerp, Fr.	Luxemburg, f.o.b. Antwerp, Fr.
Ingots	550 to 560	.....	.....
Blooms	590 to 600	610 to 615	600 to 605
Billets	610 to 620	625 to 635	610 to 615
Largets	630 to 640	640 to 645	625 to 630

Finished Material.—The influence of exchange is felt keenly in this market, demand being heavy when the pound sterling is rising and vanishing when a decline is noted. Works are so well supplied with orders, however, that in spite of Lorraine and Luxemburg competition prices are firmly maintained. Transactions are still on a base of 750 fr. and higher, while the pound sterling was at 94.50 fr. on Sept. 12. Beams are quoted f.o.b. Antwerp, at £7 10s., rods at 925 to 950 fr. Lorraine makers quote 750 fr. minimum f.o.b. Antwerp, with 20 to 25 fr. increase for small shapes. Beams are quoted at £7 10s. Luxemburg makers have the same quotations. Three Belgian plants, Ougrée, Cockeril and La Providence, are furnishing a total of 5000 tons of rails to Japan.

Sheets.—The market is firm, despite Lorraine competition, and the reserve shown by buyers who evidently expect lower prices. Heavy sheets are now 775 fr. and medium sheets on a £10 base. Light, polished and galvanized sheets are firmer. Lorraine mills quote f.o.b. Antwerp: 5 mm. and heavier, 780 fr.; 3 mm., 850 fr. Offers have also been made of 5 mm. sheets at £8 5s. Open-hearth grade is worth 5s. more. Bessemer sheets, 5 mm. thick, are quoted at 775 to 800 fr.; 3 mm., 850 fr.; 2 mm., 900 to 925 fr. Galvanized sheets are quoted at: 1 mm., 2000 to 2025 fr.; 8/10 mm., 2150 to 2175 fr.; galvanized; 5/10 mm., 2450 to 2475 fr., and boiler sheets, 850 to 875 fr.

Old Material.—The market is completely disorganized as a result of arrivals of German reparation scrap sold at low prices by the Government. Consequently, the tendency is very weak, with prices uncertain and nominal.

Carburization of Steel

At the suggestion of a group of metallurgists of the automobile industry, the Bureau of Standards has taken up the investigation of the carburization of steel, a problem of great importance in this industry. The specific purpose of the investgiation will be to determine whether or not the initial quality of a steel influences to any marked extent the results obtained in carburizing practice as has been claimed by some commercial metallurgists. Specimens of "normal" steels, that is, steels which in the hands of these metallurgists prove to be entirely satisfactory, and of "abnormal" steels, those which gave results of a decidedly different character when subjected to the same carburizing process, have been secured; and the preliminary work of cutting the samples, making examinations of the structure, etc., is now under way.

Alabama Furnaces Blown Out

BIRMINGHAM, ALA., Sept. 25.—The Sloss-Sheffield Steel & Iron Co. tonight blows out No. 2 City and Florence blast furnaces, leaving two North Birmingham and one Sheffield in operation. The policy of the furnace interests in the Birmingham district is to cut down production of high cost iron until the demand improves.

Writing on the perpetual inventory of raw and finished stock William R. Basset, president Miller, Franklin, Basset & Co., Inc., New York, says that an excellent perpetual appraisal record consists of one card, or loose leaf sheet for each machine. These can be grouped into departments. On the card is recorded the first cost, the freight, the cost of installing, the cost of major repairs, the depreciation rate and amount, and the present value. If the machine is moved to another department, that fact is noted on the card, and the card is transferred in the file to the new department.

This week the Newton Steel Co., Youngstown, operating a sheet mill plant at Newton Falls, in Trumbull County, Ohio, expected to place in commission three new mills which have been under construction for several months, giving it a total complement of 20. Working at capacity, these mills have a monthly output of 11,000 tons of sheets, or 130,000 tons yearly. Of its production, fully 90 per cent is devoted to full finished stock for the metal furniture and automobile body industries.

Iron and Steel Markets

AN ENDURANCE CONTEST

Necessity Buying Being Held Back for Price Advantage

Curtailment in Sheet and Bar Mills—Sustained Structural Demand

Market developments in steel throw in relief an endurance contest between consumer and producer. The one finds needs growing but views a waiting policy as wholly to his advantage, having an eye to price concession and no fear of securing quantity or delivery when he orders. The other sees no buying volume awaiting release on a price reduction, but with nearly five months of substantially unchanged prices, and advancing costs meanwhile, looks for necessity purchases in the next few weeks sufficient to maintain today's price levels. A factor is that large consumers long out of the market for regular requirements do not find it easy to adjust themselves to steel at prices as much as $10 a ton higher than they are paying on present shipments.

With the Steel Corporation and with some of the independents, bookings in the last week have improved, but the general experience is that September so far is no better than August. Production activity has been curtailed to the extent that some sheet and bar mills have shut down.

In pig iron weakness has become more pronounced. In the South the price has declined $1, with $21, Birmingham, as the new ruling quotation. Three blast furnaces in Alabama have been blown out this week on account of unsatisfactory market conditions. Prices have been marked down $1 at Chicago, with concessions of 50c. to $1 not uncommon in the East and Central West. A Nova Scotia producer was a factor in a transaction in Connecticut, taking an order in competition with eastern Pennsylvania furnaces.

In the face of a break in plate prices in the East from 2.50c. to 2.40c. per lb., Pittsburgh basis, plate business looms large in the West. For oil tanks, 14,000 tons was bought in Chicago; Portland, Ore., wants 13,000 tons for a pipe line and Eastern mills are quoting on 5000 tons of tank work on the Pacific Coast. With a so-called conference rate of 40c. per 100 lb., Eastern mills are expected to give a Pacific port price of 3c., equivalent to 2.60c., Philadelphia.

Including tank work, fabricated steel bookings total 23,000 tons. These and new inquiries calling for 17,000 tons show no falling off in the structural field.

Railroad equipment inquiries are chiefly for passenger cars. China is in the market for 50 flat cars.

The Baltimore & Ohio distributed 30,000 tons of rails to the Bethlehem, Inland and United States Steel Corporation mills.

Container manufacturers are considering tin plate requirements for the first quarter and first half of next year. For the remainder of this year the mill problem is almost solely a matter of deliveries. The United States is expected to be a large factor in the world's markets next year.

Increased specifications have been received from the farm implement manufacturers. Though not large, they are significant as being the first change for the better in months. Agricultural machinery makers are operating at not more than 40 to 50 per cent of capacity.

Lake shipyards are figuring on two car ferries for the Canadian National Railways, each requiring 2600 tons of plates and shapes.

Most wire mills have caught up sufficiently on their orders to offer prompt shipments.

The market is still a buyer's in bolts, nuts, rivets and also hot rolled flats. Black sheets remain unsteady with 3.75c., Pittsburgh basis, more commonly quoted.

The prospect of resumption of industrial operations in the Ruhr is viewed with much interest by iron and steel manufacturers in the United States, who expect that in time the products of Europe will compete with those of the United States on both the Atlantic and Pacific Coast.

Reductions in both foundry and steel making irons bring THE IRON AGE pig iron composite price to the lowest point in 14 months, or to $24.37, against $25.04 last week and $32.54 a year ago.

THE IRON AGE composite price for finished steel remains at 2.775c. per lb., the level reached by a slight reduction ten weeks ago.

Pittsburgh

September Proves Disappointing in Steel Buying—Pig Iron Prices Lower

PITTSBURGH, Sept. 25.—September has been a disappointment in new business in steel. While some companies say the month was as good and some that it even slightly bettered the August record, the most common experience has been that the total bookings were below those of last month. While the suggestion is frequently made that fundamental conditions are sound and conducive to good business, consumers appear to be guided by the psychology of the situation rather than by rates for money, buying power of a country or by the fact that there is no apparent diminution in consumption. American industry is essentially speculative to some degree and the fact that there is nothing in sight to suggest higher prices in the near future and that there is a possibility of recessions tends to keep down purchases to known requirements.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in *Italics*
At date, one week, one month and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Sept. 25, 1923	Sept. 18, 1923	Aug. 28, 1923	Sept. 26, 1922
No. 2X, Philadelphia†	$25.76	$26.26	$27.26	$21.26
No. 2, Valley furnace†	*24.50*	25.00	26.00	20.00
No. 2 Southern, Cin'ti†	*25.05*	26.05	27.05	21.05
No. 2, Birmingham, Ala†	*21.00*	22.00	24.00	17.00
No. 2 foundry, Chicago*	*26.00*	27.00	27.00	22.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	20.00
Basic, Valley furnace	*24.50*	25.00	25.00	24.00
Valley Bessemer, del P'gh	28.26	28.26	28.26	25.77
Malleable, Chicago*	*26.00*	27.00	27.00	22.00
Malleable, Valley	24.50	24.50	24.50	24.00
Gray forge, Pittsburgh	25.76	25.76	25.76	24.27
L. S. charcoal, Chicago	32.15	32.15	32.15	36.15
Ferromanganese, furnace	110.00	110.00	117.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	*40.00*	42.50	42.50	40.00
O.-h. billets, Pittsburgh	*40.00*	42.50	42.50	40.00
O.-h. sheet bars, P'gh	*40.00*	42.50	42.50	40.00
Forging billets, base, P'gh	47.50	47.50	47.50	45.00
O.-h. billets, Phila	47.67	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.15	2.15	2.25	2.25

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.475
Iron bars, Chicago	*2.35*	2.40	2.40	2.25
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.60	2.10
Steel bars, New York	2.74	2.74	2.74	2.44
Tank plates, Pittsburgh	2.50	2.50	2.50	2.25
Tank plates, Chicago	2.60	2.60	2.80	2.30
Tank plates, New York	2.84	2.84	2.84	2.49
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.70	2.20
Beams, New York	2.84	2.84	2.84	2.44
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Sept. 25, 1923 Cents	Sept. 18, 1923 Cents	Aug. 28, 1923 Cents	Sept. 26, 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.35
Sheets, blue an'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$19.50*	$20.00	$19.50	$24.50
Carwheels, Philadelphia	21.00	21.00	21.00	23.00
Heavy steel scrap, P'gh	*17.50*	18.00	18.00	21.50
Heavy steel scrap, Phila	16.50	16.50	16.50	18.00
Heavy steel scrap, Ch'go	*16.00*	16.25	16.00	18.50
No. 1 cast, Pittsburgh	*21.00*	22.00	21.50	24.00
No. 1 cast, Philadelphia	*21.00*	21.50	21.50	23.00
No. 1 cast, Ch'go (net ton)	*19.50*	20.00	18.50	21.00
No. 1 RR. wrot. Phila	*19.00*	20.00	18.00	22.00
No. 1 RR. wrot. Ch'go (net)	*15.00*	15.50	15.00	17.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.25	$4.25	$4.75	$12.00
Foundry coke, prompt	*5.00*	5.25	5.50	13.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*13.87½*	14.00	14.25	14.25
Electrolytic copper, refinery	*13.25*	13.37½	13.75	13.75
Zinc, St. Louis	*6.42½*	6.45	6.42½	6.87½
Zinc, New York	*6.77½*	6.80	6.77½	7.22½
Lead, St. Louis	*6.75*	6.80	6.65	6.25
Lead, New York	*7.10*	7.12½	6.75	6.50
Tin (Straits), New York	*42.25*	41.50	40.75	32.50
Antimony (Asiatic), N. Y.	7.50	7.50	7.50	6.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon 1.75 to 2.25. ‡Silicon 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Sept. 25, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Sept. 18, 1923,	2.775c.
	Aug. 28, 1923,	2.775c.
	Sept. 26, 1922,	2.433c.
These products constitute 88 per cent of the United States output of finished steel	10-year pre-war average,	1.689c.

Composite Price Sept. 25, 1923, Pig Iron, $24.37 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Sept. 18, 1923,	$25.04
	Aug. 28, 1923,	25.38
	Sept. 26, 1922,	32.54
	10-year pre-war average,	15.72

This tendency is emphasized by the fact that the railroads are functioning with unusual efficiency and steel production is at a rate that is suggestive of ample supplies.

News that sheet bars have declined in prices has tended to make sheet buyers even more cautious than they were recently, and a price of 3.75c. base on black sheets is somewhat more common than it was recently, notwithstanding that some of the smaller producers find the margin between semi-finished and finished steel prices so slim that they are planning to shut down.

The market still is favorable to buyers on bolts, nuts and rivets, and also on hot-rolled flats. There are also intimations that the Chicago price of 3c., Pittsburgh, on cold-finished steel bars is being met by Eastern producers, notably in the Detroit district. It is impossible to detect any easing of local mill prices on the other products, although reports of concessions are fairly frequent.

Fresh weakness has developed in foundry pig iron on comparatively limited sales. A sanitary ware manufacturer was able to develop a price of $24.50, Valley furnace, for No. 2, and it is understood that an even lower price was named against the Westinghouse business.

There has been a general recession of 50c. a ton in the steel works grade of scrap and the market is dull even at the new levels. The coal and coke market is even weaker than it was a week ago. Furnace coke is freely offered at $4.25, and good foundry coke as low as $5. The supply of coal so far exceeds demand that prices are largely of buyers' making.

Pig Iron.—The fact that production of pig iron still is running ahead of consumption and that producers are adding to their stocks is again telling on prices. The largest individual transaction of the week involved about 2000 tons of foundry grade to the Standard Sanitary Mfg. Co. at $24.50, Valley furnace, or Valley furnace basis for the base grade. This sale represents a drop of 50c. a ton from last week's quotation, but apparently does not represent the bottom of the market, as a lower price is said to have been quoted on the Westinghouse inquiry amounting close to 7000 tons for its local and Cleveland foundry. It has been an ex-

tremely quiet week in the steel-making grades. We hear of only small lot sales of Bessemer and there has been an utter dearth of sales of basic grade. The common asking price on the latter is $25, Valley furnace, but this price was not interesting to a Sharon, Pa., melter who recently inquired for 1000 tons, presumably because there have been quotations as low as $24.50. In the absence of sales, but based on offerings, the market is now quotable at $24.50 to $25. A Pittsburgh melter recently bought 100 tons low phosphorus iron at $30, Valley furnace.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$24.50 to $25.00
Bessemer	26.50
Gray forge	24.00
No. 2 foundry	24.50
No. 3 foundry	24.00
Malleable	24.50
Low phosphorus, copper free	30.00

Ferroalloys.—The present market on ferromanganese is being made by resale offerings of British material. Importers bought some of this alloy for their own accounts and failed to move all of it before the demand slumped. Now they are pressing it for sale and recently moved about 300 tons at between $108 and $109, seaboard. It is said that about 1000 tons still is hanging over the market and with the demand limited, efforts of producers to obtain more are unavailing. Recent sales into the Chicago district now are said to have figured back to $108, Eastern Atlantic seaboard. Interest on the part of consumers is low in the other ferroalloys and prices are merely nominal. Prices are given on page 863.

Semi-Finished Steel.—Local mills disclaim having gone below $42.50, Pittsburgh or Youngstown, on billets, slabs and sheet bars, but such sales as have been made at that figure lately for the most part either have been of tonnages which were required very promptly or in an adjustment of third quarter contracts at higher prices against which buyers did not specify fully. A recent contract for 6000 tons of billets and slabs for fourth quarter to be shipped in equal monthly quantities at $42.50, Pittsburgh, is believed to have been possible because the buyer had not taken much of the tonnage bought for delivery in the second and third quarters. A Pittsburgh district sheet maker recently closed for a round tonnage of sheet bars at $41.50, Pittsburgh. Forging billets still are quoted at $47.50, base, but only small sales are being made. Skelp is very dull and rods continue in light demand, except for some export inquiry, chiefly from Japan. It is claimed that base price on rods is well maintained, but it is admitted also, that the extra for coarse rods is not always obtained. Prices are given on page 863.

Wire Products.—There is a fair run of orders in the commoner products like nails and manufacturers' wire, but they are almost entirely for nearby delivery, as buyers are impressed by the favorable transportation and production conditions and are not yet showing much interest in their fourth quarter requirements. A few contracts for nails and wire for that period have been entered, but as a general rule buyers are inclined to pursue a conservative policy. We note no shading of regular prices by mills in this territory. It is asserted that present prices are so close to costs that there is nothing to give away and there is considerable doubt that price concessions would stimulate buying. On an average, mills in this district have about a month's business on their books. Prices are given on page 862.

Steel Rails.—While the larger producers of light rails, rolling them from billets, still claim to be holding firmly to the 2.25c. base, there are some makers who have recently taken business at 2.15c. base. General demand is slightly more active than it was recently, but there are few sizable inquiries and competition from rerolled rails still is fairly sharp.

We quote light rails rolled from new steel at 2.15c. to 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Pressure for shipments of standard pipe in both wrought iron and steel still is heavy, and makers of steel pipe of this classification still report their inability to fully satisfy their customers. Pressure for shipments of oil country goods is relatively light and the new demand fully reflects the unsettled crude oil market. Pennsylvania crude oil was cut 25c. per barrel late last week to $2.50 per barrel, as against $4 last spring. Oversupply of crude oil is due chiefly to the heavy production in California and while late reports from the southern portion of that State indicate a falling off in production, the more general belief is that some time will elapse before the general oil supply situation is corrected to a point where fresh drilling and development work will be sufficiently active to increase the demand for tubular goods. Several inquiries for small tonnages of line pipe are current. There is one inquiry for 25 miles of 10-in. pipe for South America. New business in boiler tubes is very light and it is reported that an extra 5 per cent is being given by some makers of charcoal iron tubes. Most makers of seamless tubes still have a fair backlog of business. Discounts are given on page 862.

Cold-Finished Steel Bars and Shafting.—Consumers are buying against only their known requirements and with forward buying very largely lacking, the market is best described as quiet. Makers in this district all are holding firmly to the 3.25c. base and deny that they are meeting lower prices out of Chicago even in competitive territory. Ground shafting still is quoted at 2.65c. base, f.o.b. mill, for carload lots.

Hot-Rolled Flats.—Few of the independent makers of these products are at all heavily committed and while such fourth quarter business as has been booked carries the price of 3.15c., base, there is some doubt whether all makers are rigidly adhering to that figure. Wider sizes of strips still can be bought at 3c., base, and competition for rim stock business keeps the market in buyers' favor. Cooperage demands suffer to some extent by the unsettled market in oil, which is cutting down the demand for wooden oil barrels. Prices are given on page 862.

Cold-Rolled Strips.—Real activity is lacking, but so far there has not been any tendency to seek orders at the expense of prices and this product still is quotable at 5c., base, Pittsburgh.

Bolts, Nuts and Rivets.—Larger producers of bolts and nuts do not appear to be meeting the lower prices, which are being named by the smaller makers, whose need of business apparently is pretty urgent. This also is true in rivets, the producers of which, representing the larger part of the country's output, claim that they are not going below 65 and 10 per cent off list on small rivets nor below $3, base, per 100 lb. on heavy rivets. There is some shading of these prices, but it is chiefly for early delivery orders and is not being done on fourth quarter contracts. Prices and discounts are given on page 862.

Track Fastenings.—Railroads are expected to follow up recent rail purchases with orders for the fastenings and already a good many sizable inquiries are current for large spikes. There are no intimations of lower prices than have been quoted for some time on large spikes. There is some irregularity in small spikes, however, as demand is not particularly brisk and some makers, especially in the East, want orders badly enough to cut prices. Prices are given on page 862.

Structural Material.—Demands upon local mills run chiefly to small tonnages for early delivery and fall far short of making good shipment against old orders. There seems to be no important deviation from the regular market price of 2.50c. base for large structural shapes. Prices are given on page 862.

Plates.—Mills in this territory are holding firmly to 2.50c. base, although new business is considerably smaller than shipments and several of the independent producers need orders to maintain present operating schedules. Prices are given on page 862.

Sheets.—This market was slow and not overly steady. Buyers are encouraged to defer purchases by the fact that a good many of the smaller producers need business and that some of the larger units lack backlogs, particularly in black sheets. Development of

lower prices for sheet bars does not suggest advances in the near future in the finished product, and the tendency of most consumers is to let their inventories run down. Shading of quoted prices is more common in black sheets than in the other finishes. It is estimated that Japanese requirements will run between 20,000 and 30,000 tons, but the Japanese want No. 30½ and No. 31 gage tin mill gages and American producers are trying to get them to take No. 30 gage material, which is the limit of sheet mill economical practice. Prices are given on page 862.

Tin Plate.—Already there is interest on the part of large container manufacturers in requirements for the first quarter and first half of next year. Business for the remainder of this year has been largely placed and now is merely a matter of deliveries. This year has been a very heavy one in the matter of tin plate consumption, although export business has been much smaller than it was last year. The can companies are figuring on a very heavy pack of perishable foods next year and tin plate manufacturers also expect to be larger factors in the world's markets than they have been this year. All makers still are quoting $5.50 per base box, Pittsburgh.

Iron and Steel Bars.—All makers of steel bars in this and nearby districts are holding firmly to 2.40c., base, although current orders are moderate and specifications on contracts show some decrease in keeping with a slower market in bar products. Makers of iron bars also are maintaining recent prices.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Old Material.—Steel works grades generally have declined about 50c. a ton since a week ago and we now carry heavy melting grade at $17.50 to $18. The lower price was all that a local mill would allow on shipments made without an order and provides the best guide as to where the local market is on this grade, since if more could have been obtained elsewhere, the material would have been reconsigned. As a general rule, mills in this district not only are out of the market, but those which are not closed to shipments by embargoes are watching that there are no overshipments on orders. The market is a disappointment to many dealers, who shared the fairly common idea of a few weeks ago that September would be productive of increased steel orders, well maintained steel works operations and a buying movement in scrap. Some went "long" of the market on that belief and now have much trouble in finding an outlet for purchases except at a loss. The market is slightly stronger on turnings, which have sold up to $14 and on cast iron borings, price of which has advanced 50c. a ton since last week. Demand for foundry grades has not been sufficient to hold the market up to its recent levels.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$17.50 to	$18.00
No. 1 cast, cupola size	21.50 to	22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.50 to	19.50
Compressed sheet steel	15.50 to	16.00
Bundles, sheets, sides and ends	14.50 to	15.00
Railroad knuckles and couplers	22.00 to	22.50
Railroad coil and leaf springs	22.00 to	22.50
Low phosphorus bloom and billet ends	24.00 to	24.50
Low phosphorus plate and other material	23.00 to	23.50
Railroad malleable	21.00 to	21.50
Steel car axles	20.50 to	21.00
Cast iron wheels	18.50 to	19.00
Rolled steel wheels	22.00 to	22.50
Machine shop turnings	13.00 to	14.00
Sheet bar crops	20.00 to	20.50
Heavy steel axle turnings	15.00 to	15.50
Short shoveling turnings	14.50 to	15.00
Heavy breakable cast	19.00 to	19.50
Stove plate	15.50 to	16.00
Cast iron borings	16.00 to	16.50
No. 1 railroad wrought	14.50 to	15.00
No. 2 railroad wrought	17.50 to	18.00

Coke and Coal.—This week a price of $4.25 per net ton at oven is the top of the market and as offerings are heavy at that figure, it is possible that before another week goes by the price may be $4 flat, thus setting up a new low market for the year. Demand is very limited for both spot and future shipments because of the continued uncertain outlook for pig iron. Only a small portion of the Connellsville production is yet under contract for the fourth quarter because blast furnace operators are so doubtful about keeping their furnaces in blast. On such recent fourth quarter business as was done, $4.75 was the price, but that is now merely an asking price and it is believed that $4.50 could be done. Spot foundry coke is quotable from $5 to $5.50 and offerings are large in relation to demand. Practically no market exists for coal and very low prices prevail, particularly on slack, which is being pressed for sale and is selling as low as $1 per ton for steam and $1.50 for gas. Mine run steam coal is quotable from $1.85 to $2 and mine run gas and coking coal from $2 to $2.25. These prices, however, are not very firm.

Krupp Interests Said to Be Negotiating for Mexican Company

WASHINGTON, Sept. 25.—While denials have been made by officials of the Monterey Iron & Steel Co., reports from other sources persist that the Krupp works in Germany is negotiating for the purchase of the Mexican company's plant particularly for the purpose of obtaining control of its mountain, Cerro de Hierro (hill of iron), in the State of Durango, located several hundred miles from the company's steel works. It is claimed that the negotiations are being conducted by a Mr. Hehny, representing the Krupp works, who is now in Mexico. The fact that Germany is greatly in need of raw resources, especially ore, and the problem she faces because of this by reason both of a shortage of ore and the low value of the mark which makes purchase of foreign ore a difficult financial matter, has given credence to the report of the negotiations.

It is claimed that Mr. Hehny has been visiting all of the stockholders of the Monterey Iron & Steel Co. in an effort to buy the stock at par. The corporation has not been paying dividends. The iron mountain is said to contain tremendous quantities of ore. With improved transportation facilities together with modern mining and other equipment, it is claimed that the ore deposits would be of great value to the Krupp people, who, it is claimed, would either convert the ore into pig iron or ingots and ship the manufactured product to their plant in Germany for finishing into rolled steel.

The coal problem will be the major topic of the meeting at Rochester, N. Y., Oct. 12 and 13, of the executive board of the American Engineering Council of the Federated American Engineering Societies. The federation's committee on coal storage has been conducting a study in cooperation with 107 local committees of engineers all over the country. Its report is expected to view the storage of coal as a practice which should be adopted on no basis other than that of a sound economic one. The final report, it is stated, will deal with many other aspects of the storage problem, including the technique of coal storage considered from the chemical standpoint and from the materials handling standpoint.

The Sullivan Machinery Co., Michigan City, Ind., maker of mine machinery, has opened its new plant in that city and has moved all machinery from the old Chicago plant at 2824 West Lake Street to the new location. The company was organized at Claremont, N. H., in 1869 and 23 years later was merged with the Diamond Prospecting Co., an Illinois corporation. In 1902 the M. C. Bullock Co., Chicago, was purchased and became the Western manufacturing unit. The principal manufacturing plant is at Claremont, where about 1500 men are employed. Among the Sullivan company's products are air compressors, undercutting machines, rock drills and prospecting machinery. The management remains unchanged with Frederick K. Copeland, Chicago, president.

Chicago

Round Tonnage for Tanks—Pig Iron Prices Decline One Dollar

CHICAGO, Sept. 25—The placing of 14,000 tons of tank work marks the first buying by oil interests in this market for several weeks. Further large additions to storage capacity would seem to be imperative unless the present overproduction of crude oil is curtailed through a suspension of drilling and pumping. At the moment, however, there are few tank inquiries actually active.

Railroad car buying, one of the chief sources of heavy tonnage business for Western mills, remains quiescent. While there are rumors of a possible revival in equipment purchases this fall, it would appear that the wish is the father of the thought, as no definite prospects have been uncovered. So far as railroad carbuilders can discover, there is not even any active engineering work in car design such as customarily precedes the issuance of inquiries. A certain amount of car repair work is being undertaken, but probably no more than has been carried on throughout the summer. In fact, inquiries for repairs received by car builders have been notably few.

Generally speaking, the steel market shows no material change. Shipments from mills continue to exceed new business and consumers still follow a hand to mouth buying policy. Prices of plates, shapes and soft steel bars remain unchanged and firm. Bar iron is still weak and has declined to 2.35c., mill. Black sheets also remain unsteady.

The chief change in the production situation lies in the further reduction of merchant iron output. The No. 4 Iroquois furnace has been blown out for rebuilding. Its daily capacity will be increased from 400 to 500 tons. The two leading steel producers continue to report excellent operations. The Illinois Steel Co., notwithstanding recent losses in active blast furnace capacity, is producing steel at the rate of 93 per cent of ingot capacity. The Inland Steel Co. operations average 80 per cent and have been helped in the sheet department by cooler weather. Of its 18 hot mills, 16 are now active.

Pig Iron.—A decline of $1 a ton in Northern prices and a further reduction of merchant iron production were the two leading developments of the week. The No. 4 Iroquois stack has been blown out for rebuilding. This leaves seven active merchant furnaces out of a total of 13 in this territory. The stacks still producing include two Iroquois, two Federal, one Mayville, and the Thomas and Zenith furnaces. In addition, a local steel works continues to offer part of its blast furnace output for general sale. Prices have receded from $27, base, furnace, to $26, this price being f.o.b. producing point, whether it be in Chicago or Wisconsin. Competition for business is keen and there are already reports of shading under the new price, as low as $25.76, delivered, Milwaukee, having been reported. The maximum going price on Southern iron appears to be $21, base, Birmingham, and while some furnaces are holding for more, they are not getting any business. In northern Indiana and western Michigan, the competition of Lake Erie furnaces continues to be felt. As high as 3 per cent silicon foundry has been sold by these producers at base prices, silicon differentials having been waived. Current sales are largely of small tonnages for early shipment, melters being indisposed to contract for any time ahead. Inquiries are probably somewhat more numerous than heretofore, indicating that price reductions have developed more widespread interest in the market. In view of the fact that prices have receded $6 a ton since the decline began, some buyers are frank to state that if the bottom has not been reached, it must be close at hand. A local melter has closed for 350 tons of foundry at $26, base, furnace for 30 days' delivery. A southern Michigan user is inquiring for 500 tons of Southern foundry for fourth quarter. A Wisconsin melter wants 300 tons of foundry for 30 days' shipment. A Milwaukee plant has closed for 500 tons of low phosphorus. A Chicago buyer is in the market for 200 tons of 15 per cent Bessemer ferrosilicon.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	26.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	26.00
Malleable, not over 2.25 sil.	26.00
Basic	26.00
High phosphorus	26.00
Southern No. 2	27.01
Low phos., sil. 1 to 2 per cent, copper free	34.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—Ferromanganese is weak and recent sales have been made at $109, seaboard. Spiegeleisen has also declined and can now be bought at from $48 to $49, delivered.

We quote 80 per cent ferromanganese, $116.56 to $117.38, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $48 to $49, delivered.

Plates.—Orders for oil storage tanks placed with local fabricators involve a total of 14,000 tons of plates. Considerable additional tank business is said to be in prospect although inquiries actually active at this time are few. Railroad car buying continues to be light, but the carriers are showing renewed interest in the repair of their old equipment as cars ordered earlier in the year are delivered to them by builders. Mills are pressed for deliveries of plates against old orders, but their new business does not equal the current rate of production.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—Lake County, Ohio, which recently rejected bids on 1200 tons, will receive revised figures Sept. 28. Orrville, Ohio, took bids yesterday on 500 tons, and Algoma, Wis., received tenders on 125 tons on the same day. Late last week, Port Huron, Mich., took bids on 250 tons and Berne, Ind., took figures on 300 tons. Prices are slightly easier. Sizes above 12-in. are not bringing over $49, Birmingham, and sometimes less than that, while 6- to 12-in. can be bought at $51, Birmingham, and in mixed lots with larger pipe at a lower figure.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $63.20 to $64.20; 6-in. to 12-in., $59.20 to $60.20; above 12-in., $57.20; class A and gas pipe, $5 extra.

Sheets.—Indirectly Chicago mills have felt the effect of the Japanese earthquake to the extent of taking several orders for material to replenish stocks of Pacific Coast jobbers. These sales have consisted largely of galvanized sheets and up to date have not involved any great amount of tonnage. Generally speaking, demand for sheets shows no change. Consumers are not buying ahead, preferring to place small orders for their immediate needs. Local mills are still comfortably booked, but outside producers are in a position to make quick shipments.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Bolts and Nuts.—Specifications continue to improve somewhat as the end of the quarter approaches, but they are not coming in with the rush which was expected in some quarters when the new list prices were announced. Contracting for fourth quarter is proceeding slowly, indicating that buyers have not forsaken their policy of extreme caution. Discounts are shown on page 862, being on an f.o.b. Chicago basis in this district.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅝ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅝ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—No new rail orders are reported, but a fair amount of track supply business is being placed. The Great Northern placed 500 tons of bolts and spikes and 1000 tons of tie plates with a local mill, these orders being in addition to those mentioned a week ago.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—Fabricated lettings for the week total 2160 tons, but heavier inquiry has developed, raising the hopes of the trade for an active fall. A power plant in Indiana will involve 4000 tons while six other active prospects account for 2900 tons more. Buyers of plain material continue to follow a cautious policy and while orders are being placed, they involve small tonnages. Mills continue to ship freely against old commitments, but are not booking new tonnage as fast as they are delivering old.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Although the business now coming in is characterized as fair, it falls short of shipments. Most mills are now sufficiently caught up on deliveries to offer prompt shipments on practically all forms of wire products. Prices are unchanged and steady. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 862.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Reinforcing Bars.—Competition for available business has grown keener and prices are soft. Although there is considerable variation in quotations on different current projects, the market appears to have settled at about 2.75c., Chicago warehouse. Lettings include:

Fish Furniture Co. warehouse, Chicago, 400 tons to Olney J. Dean.

Commodore Hotel building, Chicago, 400 tons to American System of Reinforcing.

Perry Creek conduit, Sioux City, Iowa, 700 tons to Fort Dodge Rolling Mill Co.

U. S. Reclamation Service, Denver, 300 tons to Colorado Fuel & Iron Co.

Commonwealth Edison Co., Crawford Avenue station, Chicago, 450 tons to Concrete Steel Co.

Madison Square Bank building, Chicago, 100 tons to Joseph T. Ryerson & Son.

Addition to Banner Laundry, Detroit, 100 tons to McRae Steel Co.

Buena Vista Apartment building, Chicago, 400 tons to American System of Reinforcing instead of to another fabricator as reported last week.

Pending business includes:

Knights of Columbus clubhouse, Madison Street and Cicero Avenue, Chicago, 325 tons.

Goss Printing Press Co. plant addition, Chicago, 100 tons.

Bars.—Current orders for soft steel bars are largely for small tonnages. Buyers apparently do not see any possibility for an early advance in prices and finding available deliveries satisfactory, see no advantage in buying ahead. While current business is not equal to shipments, mills find encouragement in the pressure for delivery of old tonnage. Consumption is well sustained in most directions and shows slight improvement where it has been subnormal. Forge shops are unusually busy, and automobile manufacturers, while not so active as earlier in the year, are nevertheless exceeding all production records for this season. The most promising development, however, has been the receipt of heavier specifications from the farm implement industry. The tonnage involved is not yet particularly large when compared with the normal consumption by agricultural machinery makers and is chiefly significant because it marks the first change for the better in months. Present operations of the implement manufacturers probably do not average more than 40 or 50 per cent. Bar iron has shown further weakness because of slack demand and now ranges from 2.35c. to 2.40c., Chicago, with a considerable proportion of current orders going at the lower figure. One important bar iron mill is idle because of lack of business. Hard steel bars are still firm at 2.30c., mill. Mills apparently prefer to curtail or suspend operations entirely rather than reduce their prices to an unprofitable level.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.35c. to 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. per rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Coke.—The market is exceedingly quiet. Local by-product foundry is unchanged at $13.50, delivered, Chicago switching district. Beehive foundry is quoted at $5.25 to $5.50, f.o.b. Connellsville.

Old Material.—Users have withdrawn from the market almost entirely and prices have declined generally from 50c. to $1 a ton. Mills refuse to pay more than $16, delivered, for heavy melting, although dealers are still taking it at $16.50 to apply on old orders. Consumer demand for cast and malleable grades, which was the only feature a week ago, has subsided. Railroad offerings include the Santa Fe, 6000 tons; Chicago surface lines, 1000 tons; and the Big Four, a blind list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$21.00 to $21.50
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.50 to 21.00
Rails for rolling	17.00 to 17.50
Steel rails, less than 3 ft.	20.00 to 21.50
Heavy melting steel	16.00 to 16.50
Frogs, switches and guards cut apart	16.25 to 16.75
Shoveling steel	15.75 to 16.25
Drop forge flashings	11.00 to 11.50
Hydraulic compressed sheets	12.50 to 13.00
Axle turnings	13.00 to 13.50
Steel angle bars	18.00 to 18.50
	Per Net Ton
Iron angle and splice bars	21.50 to 22.00
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	25.00 to 25.50
Steel car axles	18.50 to 19.00
No. 1 busheling	13.00 to 13.50
No. 2 busheling	9.50 to 10.00
Cut forge	14.50 to 15.00
Pipes and flues	9.50 to 10.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	14.50 to 15.00
Steel knuckles and couplers	19.00 to 19.50
Coil springs	19.50 to 20.00
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	19.00 to 19.50
No. 1 agricultural cast	19.50 to 20.00
Low phos. punchings	16.50 to 17.00
Locomotive tires, smooth	15.50 to 16.00
Machine shop turnings	8.90 to 9.00
Cast borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Stove plate	16.50 to 17.00
Grate bars	14.50 to 15.50
Brake shoes	15.50 to 16.00
Railroad malleable	19.00 to 19.50
Agricultural malleable	17.50 to 18.00

Detroit Scrap Market

DETROIT, Sept. 25.—One of the largest producers is offering 3500 tons of turnings, borings, flashings and regular hydraulic compressed for October delivery. Melters in this district are buying for current needs only.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$15.50 to $17.00
Shoveling steel	15.50 to 17.00
No. 1 machinery cast	19.00 to 20.00
Cast borings	11.50 to 13.00
Automobile cast scrap	25.00 to 27.00
Stove plate	16.00 to 17.00
Hydraulic compressed	13.00 to 14.00
Short turnings	12.50 to 13.00
Long turnings	10.00 to 11.00
Flashings	10.00 to 11.00

New York

Plates Now 2.40c—Limited Buying of Pig Iron at Low Prices

NEW YORK, Sept. 25.—The pig iron market is weak and competition active on the limited tonnage which has been pending. On a sale of 2000 tons of foundry iron to a Bridgeport melter for delivery within 60 days, it is understood that 1000 tons went to a Nova Scotia company at about $26, delivered, and that an Eastern steel company went to nearly as low a price but failed to get any of the business, while a second 1000 tons went to a northern New York company. The Richardson & Boynton Co., Dover, N. J., which had been in the market for 5000 tons, of which 1000 tons was for delivery this year and the remainder next year, has placed an order for 1000 tons and held the remainder in abeyance awaiting market developments. The New York Central & Hudson River Railroad, which inquired for 700 tons of various grades, is reported to have placed its tonnage with different furnaces. The New York Air Brake Co. has not yet closed on 1000 tons for which it has been in the market. The Gould Coupler Co., Depew, N. Y., is again in the market for 2000 tons of malleable and the General Electric Co. is inquiring for 800 tons of iron, 3.25 to 3.75 per cent silicon, for delivery at Pittsfield, Mass. The trend of prices is downward. While eastern Pennsylvania is still quoted at $25 for No. 2 plain, it is weak at that price and reports indicate that $24.50 could easily be done. Probably iron could be had at $24, Buffalo.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$27.77 to $28.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	26.77 to 27.27
East. Pa. No. 2, sil. 1.75 to 2.25	26.77 to 27.27
Buffalo, sil. 1.75 to 2.25	29.41
No. 2X Virginia, sil. 2.25 to 2.75	31.94
No. 2 Virginia, sil. 1.75 to 2.25	31.44

Ferroalloys.—In view of the fact that ferromanganese is being sold anywhere from about $109 to $112, seaboard basis, it would not be surprising if British producers should lower their asking price from $117.50, seaboard, at which level they are not taking any business. With a clearing up of the Ruhr situation, there is the possibility of more demand for the British alloy on the Continent and this might affect any decision to lower prices. Such demand as there is is confined to carload lots. Demand for spiegeleisen is also made up of small lots, prices for which are unchanged. There is no particular activity in the 50 per cent ferrosilicon market and quotations are the same as they have been for some months.

Cast-Iron Pipe.—Makers continue sold up until well toward the end of the year. No award has yet been made of the 4000 tons of 6-in. to 20-in. water pipe by the Department of Water Supply, Gas and Electricity, New York, bids on which were opened Sept. 7. No early disposal of the 20,500 tons of water pipe for the city of Manila, P. I., pending for some time and under litigation in the Philippine courts, is expected by the bidders. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. Business in soil pipe is still fairly heavy, with fully 90 per cent of the present purchasing for as prompt delivery as possible. Makers are booked for about two months in advance and discounts are unchanged. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in. standard, 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Warehouse Business.—Although the market continues quiet, warehouses as a rule estimate that business for September will probably compare favorably with August, as a result of the slight improvement during the second half of the month. Prices are slightly firmer than was the case several weeks ago, very little inclination to shade being evident, even on black and galvanized sheets, which are usually weaker than the rest of the market. The base price on black sheets seems fairly strong at a minimum of 4.75c. per lb. up to 5c. per lb., with galvanized sheets on a basis of 5.75c. and 6c. per lb. Since the settlement of the strike that has been in effect in Sweden for many months, the price of Swedish charcoal iron bars out of stock in New York has declined 25c. per 100 lb. to 7.25c. per lb. When the heavy demand following the strike settlement has somewhat subsided, importers look for another slight reduction. Prices of brass and copper products out of stock have been reduced ½c. to 1c. per lb. in most instances. We quote prices on page 880.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The market continues weaker and buyers have apparently adopted an attitude of waiting for low prices. A recent inquiry from a northern New York company for 1500 tons of foundry coke is reported to have been temporarily postponed. Standard furnace coke is quotable at from $4.50 to $5 per ton and standard foundry coke ranges from $5.50 per ton up, with lots available, it is claimed, as low as $5.25 per ton. By-product coke is quoted at $11.41, Newark and Jersey City.

Old Material.—Although activity is diminishing somewhat, prices on most grades of scrap are reported to be holding fairly firm. So few transactions are reported that quotations are largely nominal. Heavy melting steel continues unchanged at $16.50 and $17 per ton, delivered to consumer in eastern Pennsylvania, but it is reported that the $17.50 price paid for delivery to Pottsville, Pa., has disappeared. Railroad quality is holding at $16.50 per ton, delivered eastern Pennsylvania. Borings and turnings are quiet, shipments to plants of the leading independent having been suspended. Stove plate is unchanged in price and shipments are still going forward to New Jersey foundries at about $18 per ton, delivered. Some tonnage has also gone to a Bridgeport, Conn., consumer at $18.50, delivered. Shipment of stove plate to Harrisburg by dealers has resulted, it is said, in a surplus of a number of carloads still in the hands of the sellers. Machine shop turnings are no longer reported going forward to Phoenixville, but borings and turnings are being shipped to consumers at Johnstown, Riddlesburg and Swedeland. Both rails for rolling and relaying rails are inactive in this district and prices quoted are largely nominal.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$13.00 to $13.50
Steel rails, short lengths, or equivalent	13.50 to 14.00
Rails for rolling	15.00 to 17.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.50 to 15.00
Wrought iron track	13.50 to 14.00
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	11.00 to 12.00
Machine-shop turnings	10.25 to 10.75
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.00 to 12.50
Stove plate	15.50 to 16.00
Locomotive grate bars	13.50 to 14.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.50 to 18.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), coupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Finished Iron and Steel.—Keen competition among Eastern plate mills for the little tonnage that is to be had has resulted in a break in the 2.50c. price, which had held firmly for months. Some mills have quoted 2.40c., Pittsburgh, and on 300 tons bought by the Standard Oil Co. of New Jersey it is believed in the trade that less than 2.40c., Pittsburgh, was quoted by at least one mill. Most of the Eastern plate mills are now down to about a 50 per cent operation, and their backlogs are light. Structural steel mills adhere to 2.50c., Pittsburgh, on plain material despite quotations of $2 and $3 a ton under this price by one small Eastern mill. There is fair activity in structural steel, but the pace of lettings of week before last was not maintained last week. However, inquiries are fairly nu-

merous for this time of year, though some that were considered active have been withdrawn. In general steel business there has been no improvement in the volume of inquiry and orders. Jobbers are buying sparingly for fourth quarter shipment, while manufacturing consumers are buying even more sparingly. Tin plate and pipe are the most active of all steel products. Prompt deliveries of plates, shapes and bars are available from nearly all mills. There is no revival of inquiry for railroad equipment, but a few roads are in the market for passenger and baggage cars.

Cincinnati

Southern Iron Recedes to $21, But Some Furnaces Are Quoting Higher

CINCINNATI, Sept. 25.—The pig iron market is dull and prices weak, particularly on Southern irons which have declined $2 during the past 10 days. Southern iron can now be bought at $21, Birmingham, base, from at least one furnace, and while one or two others are reported to be asking $23 to $24, it is generally felt that an attractive order could be easily placed at $21 if not slightly lower. The drop to lower levels was probably the result of a reported purchase by a large pipe company of 25,000 tons at $21.50. While the details of this sale cannot be learned, it is known that at least one of the larger pipe companies paid $22 base for a small tonnage. The largest sale of Northern iron reported was to a central Ohio melter, 2400 tons of foundry and malleable grades at around $24.50, Ironton. This price probably could be duplicated on a round tonnage; but carload sales are generally made at $25, base. There is little inquiry, the L. & N. Railroad being in the market for 500 tons and a Michigan melter for a similar amount, both of Southern iron.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.77
Basic Northern	26.77
Malleable	26.77

Sheets.—There is more inquiry for fourth quarter tonnages, but on the whole consumers are simply covering for their needs as they develop. Less is heard of shading of prices, and it is difficult to find a buyer who has placed any orders at less than the regular schedule. Automobile body sheets continue in good demand at the established price of 5.35c.

Reinforcing Bars.—A hotel at Memphis, Tenn., requiring about 800 tons of bars, will be up for bids in the next week or two. Highway construction in Ohio will require about 600 tons, the contracts having been let this week. A number of other projects are ready for bids, including the foundation work for the new Neil House at Columbus, and the foundation for the Masonic Temple at Springfield, Ohio. Prices generally quoted range from 2.25c. for rerolled bars, to 2.40c for new billet stock.

Structural Material.—No new inquiries appeared during the week, and the lettings generally were for less than 100 tons. A hotel at Portsmouth, Ohio, on which bids were taken, and involving 300 tons, will not go ahead now. A school building at Columbus, Ohio, will be up shortly, and will require from 300 to 350 tons.

Finished Materials.—Orders are made up mostly of specialties. Railroad spikes, bolts and nuts, boiler tubes, car wheels and forgings have been moving in good shape, but there is little activity in bars and plates. Structural shapes have been fairly active during the past few weeks, but a lull was noticed in the demand the past few days. Plates are not being bought in any sizable tonnages, and reports indicate that boiler and tank manufacturers have materially slowed up in operations. Prices, however, continue firm, and on several carload orders of light rails placed during the past week, 2.25c. was done. While there is some talk of lower plate prices in the East, apparently Pittsburgh district mills are holding firmly to the 2.50c. price, as a consumer in this territory was unable to develope a lower price on an inquiry for over 1000 tons.

Warehouse Business.—Local jobbers reported a heavy demand for hoops and bands during the past week. Other materials are moving in fair volume, but the tonnages generally are light, as mills are in good position to make delivery on practically all products. There has been no change in prices.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—The coke market is showing a little more activity; but prices continue to sag. Connellsville foundry coke is now quoted at $5 to $6 and Wise County foundry $6 to $7. A by-product producer in the district is expected to reduce the price on October contracts $1 per ton. New River foundry is unchanged at $12 for prompt shipment.

Old Material.—Outside of a purchase of cast by a large interest with a plant in the district, the scrap market is quiet. A small sale of couplers and knuckles was also reported. Offerings are heavier, particularly from the railroads and prices are inclined to lower levels. In fact, the whole list is affected and dealers have been able to buy for yard stocks at 50c. to $1 per ton under last week's prices.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$12.50 to $13.00
Iron rails	15.50 to 16.00
Relaying rails, 50 lb. and up	28.50 to 29.00
Rails for rolling	16.50 to 17.00
Heavy melting steel	15.00 to 15.50
Steel rails for melting	15.00 to 15.50
Car wheels	15.00 to 15.50
Per Net Ton	
No. 1 railroad wrought	13.00 to 13.50
Cast borings	9.00 to 9.50
Steel turnings	9.00 to 9.50
Railroad cast	16.50 to 17.00
No. 1 machinery cast	18.50 to 19.00
Burnt scrap	12.00 to 12.50
Iron axles	23.00 to 23.50
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	9.00 to 10.50

Canadian Scrap Market

TORONTO, ONT., Sept. 24.—Trading in iron and steel scrap in the Canadian market is beginning to show renewed life. While the demand for scrap is slowly picking up, business is still far from normal, and what orders dealers are receiving are almost entirely confined to small tonnage for the immediate use of consumers. Neither steel plants nor foundries are interested in scrap for last quarter and up to the present no contracts for this period have been made. While Toronto dealers have made no further change in their buying prices, a few slight changes have been announced by Montreal dealers.

Prices Canadian dealers are offering for iron and steel scrap are as follows:

	Toronto	Montreal
Dealers' Buying Prices—Gross Tons		
Steel turnings	$10.00	$7.00
Machine shop turnings	10.00	7.00
Wrought pipe	8.00	8.00
Rails	14.00	13.50
No. 1 wrought scrap	14.00	14.00
Heavy melting steel	14.00	11.50
Steel axles	16.00	18.00
Axles, wrought iron	18.00	20.00
Net Tons		
Standard car wheels	15.00	16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	19.00	20.00

St. Louis

Buying of Pig Iron Not So Active—Stove Plants Are Busy

ST. LOUIS, Sept. 25.—Buying of pig iron was much less this week than the previous seven days. The St. Louis Coke & Iron Co. sold a few carload lots and up to 200 tons, this maker being well booked with orders. There is an inquiry before the market for 5000 tons of basic iron from an East Side melter and an Illinois melter wants 200 tons for first quarter delivery. Melters who are not well supplied with pig iron are buying only from hand to mouth. However, business is improving, the stove factories in the district operating at high capacity, and the job foundries report taking on more orders. The market for Northern iron is easier, with quotations being made at $26, Chicago. Southern iron is selling as low as $22, Birmingham, the low price being made by a Tennessee maker. However, with a freight rate to St. Louis of $4.45, as compared with $5.17, the all-rail rate from Birmingham, the Tennessee makers have an advantage of 72c. Two lots of 100 tons each of Bessemer ferrosilicon were sold.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$28.16
Northern malleable, sil. 1.75 to 2.25	28.16
Basic	28.17
Southern fdy., sil. 1.75 to 2.25	27.17

Coke.—The market for foundry coke is rather quiet. Sales of Connellsville grades were made during the week at $5.75 to $7.25 for spot shipment and $6.50 to $7.75 for future shipment. Cooler weather has stimulated a consumer demand for coke, and dealers are buying more liberally.

Old Material.—Consumers of old material in the district are still buying only such specialties as they may actually need, and this is a small factor, or "distress" cars, which they pick up at almost their own price. Only a few of such cars are to be had. Dealers continue to absorb all railroad offerings, which were smaller than for several months. The only new lists were: Kansas City, Mexico & Orient, 300 tons, and Kansas City Terminal Railway, 600 tons. The quotation on steel car axles in our issue of Sept. 6 should have been $18.50 to $19 per net ton.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$16.00 to	$16.50
Rails for rolling	17.50 to	18.00
Steel rails less than 3 ft.	19.50 to	20.00
Relaying rails, 60 lb. and under	26.00 to	27.00
Relaying rails, 70 lb. and over	33.50 to	34.50
Cast iron car wheels	18.50 to	19.00
Heavy melting steel	16.50 to	17.00
Heavy shoveling steel	16.50 to	17.00
Frogs, switches and guards cut apart	16.50 to	17.00
	Per Net Ton	
Heavy axles and tire turnings	12.50 to	13.00
Steel angle bars	16.00 to	16.50
Iron car axles	25.00 to	26.00
Steel car axles	18.50 to	19.00
Wrought iron bars and scrap	20.00 to	21.00
No. 1 railroad wrought	15.00 to	15.50
No. 2 railroad wrought	15.00 to	15.50
Railroad springs	18.00 to	18.50
Cast iron borings	11.50 to	12.00
No. 1 busheling	15.75 to	16.25
No. 1 railroad cast	19.50 to	20.00
No. 1 machinery cast	20.00 to	20.50
Railroad malleable	17.00 to	17.50
Machine shop turnings	11.50 to	12.00
Champion bundled sheets	8.00 to	8.50

Finished Iron and Steel.—The market for finished iron and steel products is very quiet. The only railroad inquiry has been issued by the Missouri-Kansas-Texas and is for 150 tons of miscellaneous steel castings for locomotives and cars and 87 tons of locomotive and car bolsters and side frames, being fourth quarter requirements. The contract for 1700 tons of reinforcing bars for the first of three units of the municipal docks at Houston, Tex., went to the Knoxville Iron Co. A few railroads have requested prices on machine bolts and nuts for fourth quarter delivery. Jobbers are showing only an interest in a few special items.

For stock out of warehouse we quote: Soft steel bars, 3.25c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ¾-in. and smaller, 50-5 per cent. off list; machine bolts, 45-5 per cent.; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Birmingham

Sale to Leading Pipe Interest with Concession of $2 for "Off Grade" Iron

BIRMINGHAM, Sept. 25—Practically the only item of interest which has occurred during the week in pig iron circles to cause undue comment is the reported sale of 25,000 tons of Birmingham iron to the large pipe interest at $23 base price, with a concession of $2 per ton for "off grade" iron which may be produced during the interim of manufacture of this tonnage on one furnace. Sale prices of $21 per ton for silicon 1.75 to 2.25 per cent have been reported in Northern markets, though Birmingham producers stoutly maintain that quotations are on the basis of $24. Sales have been made to Southern and Southwestern consumers on the $24 price, with liberal allowances in silicon content. However, the fact remains that there has been no great volume of business booked, with the exception of the 25,000 ton order, since the slump in price from $27 to $23 per ton, and a fair percentage of current make at the present time is finding its way on the yards. Within the past three weeks, a total of three furnaces on foundry iron has been blown out; and unless there is created a much greater incentive on the part of buyers to take on new business and "speed up" current movements of iron on old orders, from two to three additional furnaces will likely be found on the idle list by the end of October. Outside of the large pipe interest, there have been no forward bookings of consequence made by Southern pipe manufacturers; and this class of business is really the "backbone" of Southern iron consumption. Charcoal iron production is practically nil at the present time, there being produced only about 60 tons per day, and the market is quite inactive.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$22.00 to $23.00
Basic	24.00
Charcoal, warm blast	$33.00 to 34.00

Cast-Iron Pipe.—The high pressure pipe plants of the district are reported to be in very comfortable shape—each week finding some new business placed. Manufacturers state that the orders on hand are quite sufficient to insure uninterrupted operations for the remainder of this year. The soil pipe interests continue to operate at about 50 per cent.

Coal and Coke.—Notwithstanding the near approach of winter months, the coal trade has not responded to the demands anticipated by dealers, and some of the mines are experiencing difficulty operating three days per week. Foundry coke is firmly quoted at $8 per ton at the ovens and domestic coke $6.50. Operations of the one commercial by-product plant continue 100 per cent, but certain beehive ovens which have had a reputation for years on foundry coke are experiencing a relatively slack business. With the advent of by-product coke in the district, there has been created a substantial domestic coke market which has not existed heretofore.

E. L. Ford of Youngstown, leading stockholder in the American Puddled Iron Co., which is completing a plant in Warren, Ohio, for the mechanical production of puddled iron, stated this week that actual production would not begin before Nov. 1. It was the original intention to start operations about Oct. 1, but delays have caused the postponement.

Buffalo

Improvement in Inquiry and Sales of Pig Iron But Not in Prices

BUFFALO, Sept. 25.—Decided improvement in inquiry and sales is found by all but one producer. About 15,000 tons of various grades of foundry and malleable has been taken on as new business and while the smaller lots were sold at $25 base, the larger tonnages brought price concessions. A farm implement maker near Buffalo bought 2000 tons of foundry and malleable and it is reported that a flat price of $23.50 was made. This lacks confirmation. A number of other large inquiries engaged Buffalo sellers, but the fact that the majority are from Eastern points discouraged local producers in quoting. As a general proposition, local sellers are satisfied that present price schedules are the highest that can be made at this time. The furnaces have not sufficient backlogs to enable them to maintain higher schedules. The Bethlehem Steel Corporation is again quoting on pig iron and is booking tonnages for fourth quarter delivery of Lackawanna iron. Buffalo sellers quoted on the 2000-ton inquiry put out by the northern New York railroad equipment maker, but the delivery point is outside the area where Buffalo furnaces can compete. Furnace operation is maintained without change.

We quote f.o.b gross ton Buffalo as follows:

No 1 foundry, 2.75 to 3.25 sil...	$25.00 to $25.50
No. 2 foundry, 2.25 to 2.75 sil...	24.50 to 25.00
No. 2 plain, 1.75 to 2.25 sil.....	24.50 to 25.00
Basic	26.00
Malleable	25.00
Lake Superior charcoal.....	32.28

Finished Iron and Steel.—New business in semi-finished material is being placed in satisfactory volume, but practically all buying is for immediate use and there is very little tendency to place any tonnages ahead. Prices are not disturbed; the only recent departure from the schedules that have been in effect for several months, was the quotation on structural shapes reported last week in THE IRON AGE. It is since learned that this concession came from a mill ordinarily not active in this district. Slight concessions in the price of cold-rolled material are reported; the prevailing figure has been 3.25c., but isolated quotations of 3.15c. have been heard of. Plate demand is quiet, but on tubular products and wire demand is strong and pressure for delivery insistent. The 2500-ton inquiry for pipe for shipment to South America is still open. A large portion of bar and shape buying is for fill-in purposes. The Bethlehem Steel Corporation will supply the shapes for the Niagara Hotel, Niagara Falls, N. Y., 800 tons, and 1800 tons for the new Knights of Columbus home at Rochester.

We quote warehouse prices Buffalo as follows: Structural shapes 3.65c.; plates 3.65c.; soft steel bars 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—One mill has bought a considerable tonnage of heavy melting steel and the consideration is understood to be $18. The other buyers are not anxious to place orders at this time notwithstanding they have little on hand. With the good-sized purchase by a mill interest plus lesser tonnages, about 10,000 tons has been sold.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel.....	$18.00 to $19.00
Low phos., 0.04 and under.....	23.50 to 24.50
No. 1 railroad wrought.....	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 bushelings	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings.....	10.00 to 11.00
No. 1 machinery cast.....	19.50 to 20.50
Hydraulic compressed	16.50 to 17.00
Railroad malleable	20.00 to 21.00

San Francisco

Principal Demand for Pig Iron Comes from Southern California Points

SAN FRANCISCO, Sept. 19.—There is little activity in iron and steel and both mills and foundries are taking very small lots. The fact is the dearth of buying orders is due directly to a lack of new business and at the moment there is little in the way of encouragement for the remaining months of the year and possibly longer. Prices on materials are easier than two weeks ago, and while there is a disposition to shade asking figures, such action would not stimulate trade under present conditions. The small establishments are fairly well supplied because of accumulations of the earlier months of the year, which by reason of slack business have lasted longer than expected, but some of the large concerns are making inquiries which may develop into business in the near future. Judging by the inquiries, however, the buying will be of very moderate proportions. The building industry, which has maintained a satisfactory volume through the summer, is slacking off and it is doubtful if any substantial recovery can be expected before spring. Other elements in the industrial situation are not materially changed, although it seems to be conceded that the trend toward increased dullness is unchecked.

Pig Iron.—There have been no transactions worthy of note for some time past and the demand is confined to small lots. Consumers are making more inquiries than two weeks ago, and this is taken as an indication that their supplies are at a low ebb, notwithstanding their assertions that they have all they need for some weeks. Prices are a trifle lower, the current quotations being from $34 to $35 per ton duty paid ex-ship. It is also noted that there is some disposition to shade asking figures to certain buyers, but this has had scarcely any effect as an inducement. The chief demand in this market at present is from Los Angeles and other southern California points. Considerable quantities of both domestic and imported iron have gone forward and new orders are still coming to hand from that quarter. Importers say there is practically no tonnage en route to this port by sea, but it is known that several moderate shipments of Scotch iron will start for this coast in the near future, to arrive probably in the latter part of December or early in January.

Coke.—Several sales of coke for both the San Francisco and Los Angeles districts have been made lately after a long period of inactivity. The price at present is about $20 per ton, ex-ship, with a small range of probably 50c. either way. Business has been light for so long that consumers are beginning to make inquiries, although orders are for the time being unimportant. An improved demand in sanitary lines is reported and these interests are in the field to fill their foundry coke requirements.

Old Material.—The trade is not backward in pronouncing business dull with every prospect that prices will be lower. Every effort is being made to maintain an optimistic outlook, but the fact is that prices are slightly lower than two weeks ago. Strictly first-class material is held at $15, but this is a maximum rate and in some quarters there is shading of this figure, occasionally as much as $1 per ton. During the last few days a cargo of 2600 tons of old material arrived from Chile, so this augmentation of supplies will serve to meet requirements for several weeks and possibly longer unless business should develop unexpected activity. Like pig iron, there has been considerable inquiry for desirable grades of old material from southern California, following increased orders for iron and steel parts in oil field equipment.

The Phillips Customs Body Co., Cleveland, has acquired by purchase the real estate and factory buildings in Warren, Ohio, of the Trumbull Mazda Lamp Co. Equipment will be installed for the manufacture of automobile bodies.

Philadelphia

Further Weakness in Pig Iron and Scrap—Steel Sales Gain Slightly

PHILADELPHIA, Sept. 25:—Some of the larger steel companies report that their total tonnage for September shows an increase over July and August, but the fact remains that new business is still far below the volume of shipments and the mills are eating into back orders at a rapid rate. Present indications are that there will be a declining rate of operation through the fourth quarter. This statement should be qualified by saying that this situation will affect plates, shapes and bars more than other products. The mills rolling pipe, wire products, sheets and tin plate are still in a fairly comfortable position as compared with that which exists in the three major products. Eastern plate mills are particularly hard hit by the lack of tonnage, and on the part of one or two mills there has been a disposition to break through the 2.50c. price on attractive lots. There is no question that 2.40c., Pittsburgh, has been done in a number of instances.

Raw materials also continue to show weakness. Foundry pig iron is quoted at $24.50, furnace, for No. 2 plain and at $25 for No. 2X and 50c. a ton under these prices has been quoted on a few desirable tonnages. Scrap is weak and some grades are lower in price. Coke and ferromanganese also show weakness.

Pig Iron.—The excess of production over consumption and the present very light demand for iron are factors which are seriously disturbing to the Eastern pig iron trade. The recent let-down in operations at Eastern steel mills increases the quantity of iron that is available for foundry use, and foundries are not buying, except in very small lots. This weak situation has brought a reduction of at least 50c. a ton in foundry iron prices, and it is conceded that on attractive business prices might go 50c. a ton lower, or to $24, base, furnace, and this latter price is said to have been quoted on a few lots. On the small lots, which make up the bulk of current business, most of the furnaces are getting $25 for No. 2 plain and $25.50 for No. 2X, but it is possible to get quotations of $24.50 and $25 on these grades. In other grades of iron there is no change. Last week 531 tons of pig iron from British India arrived here. The Bethlehem Steel Co. has banked three or four furnaces and has put one out at Johnstown and one at Sparrows Point for relining.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.26 to $26.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.76 to 26.63
East. Pa. No. 1X	26.26 to 27.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.17 to 30.67
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.17
Basic delivered eastern Pa.	25.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Resale lots of ferromanganese are selling at from $108 to $110, seaboard or furnace, which is slightly lower than domestic furnaces are quoting. Spiegeleisen is being sold in carload lots at $44 to $45, furnace.

Plates.—Some of the Eastern plate mills are no longer adhering strictly to the 2.50c. plate price, which has been in effect for some months. In a few instances they have quoted 2.40c., Pittsburgh. On the small-lot business which makes up the bulk of the present light volume of buying they still quote 2.50c., but appear willing to go lower on any desirable orders. This break in price has been ignored by some of the larger mills, which, however, are watching the situation closely. Bids will be closed next week at Portland, Ore., on 13,000 tons of plates for pipe, and it is expected that Eastern mills will quote about 3c. per lb., delivered at Pacific Coast port, equivalent to 2.60c., Philadelphia, the present conference freight rate being 40c. per 100 lb. Two or three Pacific Coast tank builders have inquired for 5000 tons each, but the inquiries apparently are for the same job. There is no other plate business of importance in prospect. One of the Eastern plate mills has gone on a five-day week and if business does not increase soon will go to a single turn, while most of the others are operating this week at about 50 per cent.

Structural Steel.—Some buyers say they have received quotations of 2.35c., Pittsburgh, on structural shapes. However, one company which was believed to have made such quotations states that it has not gone below 2.40c., Pittsburgh. The latter price is apparently being freely quoted, though the larger mills still give 2.50c., Pittsburgh, as their only price. Bids have been taken at Detroit on a Philadelphia assembly plant for the Ford Motor Co., which will require about 5000 tons.

Bars.—Steel bar tonnage is light, being very much below the present volume of shipments, but there has been an improvement in demand this month over the two preceding months. Most of the orders are small, a carload to 100 tons, but they are more numerous.

Rails.—The Baltimore & Ohio Railroad has placed orders for 30,000 tons of rails with the Bethlehem Steel Co., Steel Corporation mills and the Inland Steel Co.

Warehouse Prices.—Following are the prices quoted by the local warehouses for steel out of stock:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Ore.—Last week's receipts of iron ore at this port included 15,380 tons from French Africa and 14,097 tons from Sweden, while 4000 tons of manganese ore from Brazil and 5047 tons from Turkey also arrived.

Coke.—There is an easier situation in blast furnace coke, with $4.50, Connellsville, now freely quoted, and it seemed likely today that even lower quotations could be obtained on prompt delivery fuel.

Old Material.—Scrap is in somewhat larger supply, due principally to the releasing of lots which scrap dealers have been holding in their yards. This, with the fact that there has been no increase in buying by consumers, has contributed to a weaker market and lower prices on some grades. There is difference of opinion among brokers as to what are the actual market prices today, the very limited volume of buying making it difficult to determine prices. Most of the prices below represent quotations which brokers would be willing to make, though it is doubtful whether these would hold on large tonnages. Most of the current business is in carload lots.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap rails	16.00 to 16.50
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	23.00 to 24.00
Cast-iron car wheels	21.00 to 22.00
No. 1 railroad wrought	17.00 to 18.00
No. 1 yard wrought	18.00 to 18.50
No. 1 forge fire	14.00 to 15.00
Bundled sheets (for steel works)	14.00 to 15.00
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.00 to 12.50
Machine shop turnings (for steel works use)	14.00 to 15.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	21.00 to 21.50
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.50 to 18.00
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	20.00 to 21.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	24.00 to 25.00
Steel axles	22.00 to 23.00

Cleveland

Consumption of Ore Falls Off—Pig Iron Buying Mostly in Small Lots

CLEVELAND, Sept. 25.—With the curtailment of blast furnace operations, the consumption of Lake Superior ore fell off 394,209 gross tons during August, being 5,353,147 tons as compared with 5,747,356 tons in July, according to the monthly report of the Lake Superior Iron Ore Association. The peak was reached in May with the consumption of 6,118,540 tons. During August, 1922, the amount consumed was 2,589,251 tons. Consumption by lake front furnaces including Canadian furnaces during August was 2,161,167 tons, a falling off of 62,127 tons. Interior furnaces in the central district consumed 2,763,533 tons during the month, a decline of 307,789 tons, or 10 per cent, and Eastern furnaces consumed 288,438 tons, a falling off of 15,770 tons. On Sept. 1 there was 32,831,227 tons of ore on hand at furnaces and Lake Erie docks as compared with 27,503,482 tons on Aug. 1 and with 37,630,036 tons on Sept. 1, 1922. Stocks at furnaces Sept. 1 were 26,923,953 tons, as compared with 22,546,777 tons on Aug. 1.

Pig Iron.—The volume of business continues rather light and most sales are in small lots. Some consumers are buying only for immediate requirements and others for the remainder of the year. The Westinghouse Electric & Mfg. Co., which inquired for 7000 tons of foundry iron for its Cleveland and Trafford City plants, today purchased 200 tons for its Cleveland plant. This iron is understood to have gone to a Cleveland furnace at $26, delivered and apparently for deferred additional purchases. For out-of-town shipment, foundry and malleable iron are quoted at $25, which is also the more common price in the Valley and southern Ohio district, but quotations of $24.50 are still being made. The International Harvester Co. is credited with the purchase of 2400 tons of iron for its Springfield, Ohio, plant, 1200 tons of malleable iron from a Cleveland producer and 1200 tons of foundry iron from a southern Ohio furnace. One lake furnace, during the week, sold 4000 tons of foundry and malleable iron, all in small lots. Recent inquiries for iron for the first quarter resulted in three or four sales, aggregating 1200 tons, but new inquiry for that delivery has died out. Steel making iron is inactive. Some of the buyers of merchant basic iron are not consuming as much iron as they are receiving under their third quarter contracts. Low phosphorus iron has become more active. We note the sale of 1000 tons in several lots including one 500-ton lot in the Pittsburgh district, and another inquiry for 500 tons is pending. While standard low phosphorus iron is quoted at $30, some small lot sales have brought from $1 to $2 more. Southern foundry iron is weak. This is being offered at $21 for Tennessee iron, but Alabama furnaces seem to be holding to $23. The Otis Steel Co. will blow out one of its Cleveland stacks about Nov. 1 for relining.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	26.00
Southern fdy., sil. 1.75 to 2.25	28.00
Malleable	26.00
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00

Semi-Finished Steel.—Several leading producers are holding firmly to $42.50 for sheet bars and a northern Ohio consumer placed 500 tons for the fourth quarter with a Youngstown district mill at that price during the week, although a recent sale was reported at $40, Youngstown. Billets and slabs are weak and several quotations below the regular price have appeared, $40 Youngstown being the reported minimum. A Cleveland consumer has purchased 1200 tons of billets at a concession, the delivered price being reported to be close to $42.50.

Sheets.—New demand continues light and some of the independent mills have curtailed operations. A fair volume of business is coming from the automobile companies, but these are buying mostly in small lots. Prices are firm except on black sheets, which are being quoted freely at 3.75c. Automobile body sheets are moving fairly well.

Alloy Steel.—The demand shows an improvement as a result of orders that are coming from the automobile manufacturers. Prices are unchanged at the quotations that have prevailed for two months.

Reinforcing Bars.—Low prices continue on rail steel bars on which 2.25c. now appears to be the maximum quotation. The Truscon Steel Co. has taken 300 tons for the State Street viaduct, Akron.

Bolts, Nuts and Rivets.—The demand for bolts and nuts shows an improvement. Some of the large automobile companies have placed fourth quarter contracts and several inquiries are pending from railroads for that delivery. Specifications from automobile companies have increased. Local manufacturers are adhering to 60 and 5 per cent off list for large machine bolts and other regular prices, although some manufacturers are still quoting a 5 per cent additional discount. The new price lists become effective Oct. 1. Rivet orders show an improvement, but prices are not very firm. Quotations range from 2.90 to 3c. for structural rivets.

Finished Iron and Steel.—The volume of business shows little change. Sales are mostly in small lots for early requirements and mills continue to catch up on their order books. September business in this territory will be about the same in volume as that booked for August. Prices are firm at 2.40c. for steel bars and 2.50c. for plates and structural material. The only apparent weakness is on hot-rolled strip steel, which is quoted down to 2.75c. for wider sizes and around 3c. for the narrow material. In some cases, mills are quoting net prices on hot strips. Equipping motor cars with four wheel brakes is expected to increase considerably the demand for bands. The demand from manufacturers for plain wire is fairly heavy and many consumers have covered with fourth quarter contracts during the past week or two. The demand for steel pipe continues heavy. Automobile and parts manufacturers are buying steel a little more freely than they had been. The Willys-Overland Co. is placing 5000 to 6000 tons in bars and other products for the fourth quarter. While no rail inquiries have appeared, railroads in this territory expect to come in the market shortly for their 1924 requirements. Inquiries for two car ferries have come to lake shipyards from the Canadian National Railways. These will each require 2600 tons of plates and structural material.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 250 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—Prices are unchanged at recent quotations and sales are limited to small lots for prompt shipment.

Old Material.—The downward movement of prices noted last week has continued and quotations on many grades have been reduced from 50c. to $1 per ton. The buying movement that dealers have been looking for has failed to materialize. While most consumers are taking scrap on contracts, one Youngstown mill has held up shipments and an embargo on scrap has been declared against a West Virginia steel plant.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.00 to $16.50
Rails for rolling	19.50 to 20.00
Rails under 3-ft	19.00 to 19.25
Low phosphorus melting	19.50 to 20.00
Cast borings	13.00 to 13.25
Machine shop turnings	12.50 to 13.00
Mixed borings and short turnings	12.50 to 13.00
Compressed sheet steel	15.00 to 15.50
Railroad wrought	15.00 to 15.25
Railroad malleable	22.75 to 23.00
Light bundled sheet stampings	12.00 to 12.50
Steel axle turnings	15.50 to 16.00
No. 1 cast	21.00 to 22.00
No. 1 busheling	12.00 to 12.50
Drop forge flashings	12.00 to 12.50
Railroad grate bars	17.00 to 17.50
Stove plate	16.00 to 17.00
Pipes and flues	12.50 to 13.00

British Iron and Steel Market

Japanese Still Buying Wire, Sheets and Plates—Pig Iron Easier—Tin Plate Booking Heavy

(By Cable)

LONDON, ENGLAND, Sept. 25.

Demand for pig iron has improved, but makers are still prepared to reduce quotations for foundry iron if it will attract buyers. Dorman, Long & Co. and Bolckow, Vaughan & Co. have each blown out one furnace. No. 3 G. M. B. has sold in Scotland below 96s. ($21.66), f.o.b. Hematite iron is steady at present, but doubts are entertained as to whether the price can be maintained in the near future.

The foreign ore market is dull, with sellers of rubio at 22s. 6d. to 22s. 9d., ex-ship Tees.

The finished steel market is generally quiet, with little inclination on the part of mills to grant concessions. In some cases higher values are anticipated before long. The continental markets are firm, with an upward tendency, but sales are small except for wire, sheets and plates for Japan. India has also bought plates. The semi-finished steel market is irregular, with billets sold at little over £7 ($31.92), c.i.f. Wire rods are nominally £10 ($45.60), f.o.b.

In Belgium Soc. Anon. des Forges de Clabecq is erecting a third furnace and Soc. Anon. D'Athus Grivegne has relit a fourth furnace. Tin plates are firm, with a large business done in all sizes and most works fully booked to the end of October, with some already sold up for part of November and December. At a minimum price there are renewals for a further three months, and the question of a central selling agency has been referred to a committee. Galvanized sheets are steady, with a moderate demand for thick gages, but there is a large inquiry for thin specifications, especially for the Far East, with some makers sold out to the end of January. Demand for black sheets for the Far East continues, with works quoting Japan 6 x 3, 13s., 107 lb., up to £20 10s. ($91.20), f.o.b. May shipment.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£2	0s.	to £2	1s.	$9.12 to $9.21
Bilbao Rubio ore†	1	4			5.70
Cleveland No. 1 foundry	5	2½			22.80
Cleveland No. 3 foundry	4	16½	to 4	17	21.66 to 21.72
Cleveland No. 4 foundry	4	12			21.40
Cleveland No. 4 forge	4	10			20.52
Cleveland basic	5	0			22.80
East Coast mixed	4	18½	to 5	0	21.79 to 22.80
Ferromanganese	18	0			82.08
Ferromanganese*	18	10			84.96
Rails, 60 lb. and up	8	0	to 9	0	36.48 to 41.04
Billets	7	10	to 8	5	34.20 to 36.62
Sheet and tin plate bars, Welsh	9	2½			41.60
Tin plates, base box	1	3½	to 1	3¼	5.70 to 5.72
					C. per Lb.
Ship plates	9	5	to 9	15	1.88 to 1.98
Boiler plates	12	10	to 13	0	2.54 to 2.64
Tees	9	15	to 10	5	1.98 to 2.08
Channels	8	0	to 9	10	1.83 to 1.93
Beams	8	15	to 9	5	1.78 to 1.88
Round bars, ⅜ to 3 in.	10	15	to 11	5	2.18 to 2.29
Galvanized sheets, 24 g.	18	10	to 18	15	3.76 to 3.81
Black sheets, 24 gage	13	15			2.79
Black sheets, Japanese specifications	15	5			3.10
Steel hoops	12	0	& 12	10*	2.44 & 2.54*
Cold rolled steel strip, 20 gage	17	5			3.51
Cotton ties, Indian specifications	15	0			3.05

*Export price. †Ex-ship. Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron:					
Belgium	£5	2½s.			$23.30 to $23.90
France	5	2½			23.30 to 23.90
Luxemburg	5	2½			23.30 to 23.90
Billets:					
Belgium	6	12½	to 7	0	30.10 to 31.80
France	6	12½	to 7	0	30.10 to 31.80
Merchant bars:					C. per Lb.
Belgium	7	0½			1.65
Luxemburg	7	0½			1.65
France	7	10			1.53
Belgium	£7	15			$1.57
Belgium	7	15			1.59
Luxemburg	7	12½			1.53
France	7	10	to 7	12½	1.52 to 1.55
Angles:					
Belgium	8	0	to 8	5	1.63 to 1.68
½-in. plates:					
Belgium	8	5			1.68
Germany	8	10			1.73
⅜-in. plates:					
Luxemburg	7	15			1.57
Belgium	8	0			1.63

Conditions in the Malleable Iron Industry

The demand for malleable castings shows little change in volume as compared with the few previous weeks, according to reports made at meetings of the American Malleable Castings Association at monthly meetings held last week. The Western members of the association met in Chicago, Sept. 19 and the Eastern members in New York, Sept. 21. Reports indicated that conditions in the malleable iron industry look somewhat brighter in the Central West than in the East. This is due to the demand for automobile castings which shows quite an improvement. The demand from the railroads is light, as new car work has not been coming out. There is very little demand from the implement manufacturers and few orders are being placed for miscellaneous castings. While the improvement so far has been limited to the automotive field, most of the foundrymen attending the meetings expressed the belief that considerable fall buying of castings in other fields would develop during the coming month.

New Books Received

Foundry Work. By R. E. Wendt. Pages 206, 4¼ x 7½ in.; illustrations, 172. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $2.

Mechanics of Machinery; Mechanism. By Robert C. H. Heck. Pages 508, 5¾ x 9 in.; illustrations, 749. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, $5.

An Introduction to Mining Science. By J. B. Coppock and G. A. Lodge. Pages 252, 5 x 7¼ in.; illustrations, 102. Published by Longmans, Green & Co., 55 Fifth Avenue, New York. Price, $1.35.

The Chemical Resistance of Engineering Materials. By Marston Lovell Hamlin and Francis Mills Turner, Jr. Pages 267, 6 x 9 in.; illustrations, 21. Published by the Chemical Catalog Co., Inc., 19 East Twenty-fourth Street, New York. Price, $5.

Annual Report Chamber of Commerce of State of New York. Pages 465, 5¾ x 9 in.; illustrated. Published by Press of the Chamber of Commerce, 65 Liberty Street, New York.

J. B. Crane, sales manager of the George T. Ladd Co., Pittsburgh, addressed the M. E. Cooley Association No. 7, of the National Association of Stationary Engineers at Detroit, Sept. 6. His subject was "Large Water Tube Boilers." Mr. Crane is also scheduled for a talk on "Vertical vs. Horizontal Water Tube Boilers" at the next meeting of the Pittsburgh section No. 18 of the National Association of Stationary Engineers.

The M. A. Hanna Co., Cleveland, placed the 8-hr. day for continuous operations in effect at its Cherry Valley furnace, Leetonia, Ohio, and at its Detroit furnaces during the past week, increasing the hourly rate of the 8-hr. men 25 per cent. This company has not yet adopted the short hours for its Buffalo furnaces.

Automobile production in August, according to compilations of the Department of Commerce, amounted to 334,261 passenger cars and trucks against 327,508, the revised figure for July. The number of passenger cars made in August was 304,010 and in July 297,257.

THE SHORTER WORKDAY

Change Being Made in Finishing Mills of the Carnegie Steel Co.

PITTSBURGH, Sept. 24.—Application of the shorter workday in the steel industry steadily is being extended in the plants in this and nearby districts and no longer is being confined, as was the primary purpose of the plan, to the continuous process departments. Several finishing units of the Carnegie Steel Co. recently were put on the 8-hr. turn and it is probable that when the supply of workmen, particularly of the higher types of intelligence, is more ample than at present, not only will the 12-hr. day disappear from the blast furnaces, coke plants and steel works, but the 10-hr. day from the finishing mills. Getting sufficient men to fill the gaps created by the setting up of the third shift in the continuous process departments is one problem that has arisen to bother the plant managers and, as the change involved the promotion to responsible places of men before they were really qualified by experience for the new jobs, another problem will be bothersome until these men get "their feet on the ground."

The effort to fully eliminate the long workday is an earnest one on the part of plant officials, as is evident from recent efforts toward making the negro workmen useful employees. Some plant officials have found that the lack of ready money is one reason why there is such a heavy turnover among that class of men, and it also has been found that if these men can draw against their earnings at fairly frequent intervals they are more disposed to stay on the job than if paid only twice a month. Coming from Southern plantations without funds, they find it hard to get along for more than a few days, and the tendency among them is to leave the jobs they came to take and seek those where they can get paid promptly. It is believed that weekly paydays might solve the problem, and, while this would mean increasing the paymaster's force and the expense of this department, some argue that the higher cost would be counterbalanced by the smaller turnover among the colored men and less tendency among them to quit entirely upon receiving their semi-monthly pay.

At Merchant Stacks

Merchant pig iron producers are slow to move in eliminating the long workday. The Stewart Furnace Co., with a furnace at Sharon, Pa., near the plant of the Carnegie Steel Co., inaugurated the 8-hr. day along with the Carnegie company on Aug. 16, and the Sharpsville Furnace Co. recently posted notice that the 8-hr. day became effective on Sept. 16. These are the only merchant stacks in this and nearby districts which have adopted the new working schedule.

MORE COAL BURNED

National Association of Purchasing Agents Sees Increased Activity

The National Association of Purchasing Agents in its latest report on anthracite and bituminous coal takes an optimistic view of business conditions. It says in part:

"The most recent statistics covering the industrial consumption of hard and soft coal in the United States and Canada show that the volume of business, taken as a whole, recorded an increase during the month of August of 9.87 per cent, as compared with July.

"Business is looking up, and is well out of its backward and dormant state of the past few months. The month of August recorded considerable improvement, and the indications are that the upward swing which got its momentum during the month of August will continue.

"Of the total number of industrial coal consumers reporting for the month of August, 49 per cent recorded increases in business, 22 per cent remained stationary, and only 29 per cent showed further decreases, as compared with the preceding month. These percentages reflect a rather healthy condition, and are indicative of further progress and continued revival of business."

Statistics of the association include both bituminous and anthracite coal, and cover the total stocks in the hands of commercial consumers, the total tonnage consumed and the total production by months. (Coal consumed by the householder and his stocks are not included.)

Stocks on Hand	Net Tons
May 1, 1923	49,022,000
June 1, 1923	53,669,000
July 1, 1923	59,723,000
Aug. 1, 1923	66,937,000
Sept. 1, 1923	76,480,000
Consumption	
Month of April	42,659,000
Month of May	41,532,000
Month of June	39,729,000
Month of July	38,937,000
Month of August	42,750,000
Production	
Month of April	50,209,000
Month of May	54,723,000
Month of June	54,308,000
Month of July	53,062,000
Month of August	57,547,000

(Of the August production 48,864,000 tons were soft coal and 8,683,000 tons were hard coal.)

The figures shown for stocks and consumption are estimates, based on reports supplied by consumers.

The stocks of hard and soft coal in commercial consumers bins on Sept. 1 were 9,543,000 tons greater than on Aug. 1. Based on the rate of consumption in August the stocks on Sept. 1 were sufficient to meet the industrial requirements of the United States and Canada for a period of 55½ days on the average. Some consumers are exceptionally well supplied, while others have practically no reserves.

The association desires reports on stocks and consumption of coal from all industrial consumers, and is not confining its efforts to its membership, but asks that all who are willing to cooperate send the name of their purchasing agents.

Cost of Living Almost Stationary

From figures compiled by the National Industrial Conference Board it appears that the cost of living, based on the budget of the average workman, is practically stabilized at approximately 60 per cent above the pre-war level. Monthly figures, since May, 1921, have varied between 64.8 per cent excess as a maximum, and 54.5 per cent excess as a minimum, with an average for 27 months of 59.2 per cent above 1914. The figure for August at 61.6 per cent above 1914 is a slight recession from the 61.9 per cent of July. Both figures are higher than any other since the 62.7 per cent of December, 1921—that is, higher than anything in more than 18 months.

The change in the current month results from a decrease in food costs, partly counterbalanced by an increase in clothing costs; the other items were unchanged. Of all the items making up the present figures, food is by far the lowest, being listed at 46 per cent above the pre-war average. Clothing, sundries, shelter, and fuel and light are all above 70 per cent over pre-war, ranging in the order named from 71 to 76 per cent excess.

Domestic sales of oak leather belting in August, as reported by the Leather Belting Exchange, amounted to 446,258 lb., valued at $881,228, or an average of $1.97 per lb. This compares with 460,850 lb., $876,537 and $1.90 per lb. in the preceding month and with 590,618 lb., $967,433 and $1.64 per lb. in August, 1922. The increase in average price, since last year, has been 20 per cent. The returns are compiled from the reports of manufacturers representing about 60 per cent of the total product.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. ..... 2.50c.

Structural Materials

Beams, channels, etc., base, per lb. ..... 2.50c.
Sheet piling ..... 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 2.40c.
Soft steel bars for cold finishing ..... $3 per ton over base
Reinforcing steel bars, base ..... 2.40c.
Refined iron bars, base, per lb. ..... 3.25c.
Double refined iron bars, base, per lb. ..... 4.85c. to 5.00c.
Stay bolt iron bars, base, per lb. ..... 8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. ..... 3.15c.
Bands, base, per lb. ..... 3.15c.
Strips, base, per lb. ..... 3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb. $1.62

Cold-Finished Steels

Bars and shafting, base, per lb. ..... 3.25c.
Bars, S. A. E. Series, No. 2100 ..... 4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300 ..... 8.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100 ..... 5.50c. to 5.75c.
Strips, base, per lb. ..... 5.00c.

Wire Products

Nails, base, per keg $3.00
Galvanized nails, 1 in. and base ..... $2.25 over base
Galvanized nails, less than 1 in. ..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. 2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg 3.45
Cement coated nails, base, per count keg 2.75
Woven fence, carloads (to jobbers) ..... 67½ per cent off list
Woven fence, carloads (to retailers) ..... 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 to 60, 10 and 5 per cent off list
Machine bolts, small, cut threads, 60 and 10 to 60 and 5 per cent off list
Machine bolts, larger and longer, 60 and 10 to 60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.: Smaller and shorter, rolled threads, 60 and 10 to 60 and 5 per cent off list
Cut threads ..... 60 to 50, 10 and 5 per cent off list
Larger and longer ..... 60 to 50, 10 and 5 per cent off list
Lag bolts ..... 60 to 50 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads ..... 50 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in., 50 and 5 per cent off list
Larger and longer sizes ..... 50 and 5 per cent off list
Hot pressed square or hex. nuts, blank ..... 4.00c. off list
Hot pressed nuts, tapped ..... 4.00c. off list
C.p.c. and t. square or hex. nuts, blank ..... 3.75c. off list
C.p.c. and t. square or hex. nuts, tapped ..... 3.75c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S. ..... 80 per cent off list
⅞ in. and larger, U. S. S. ..... 75 per cent off list
Small sizes, S. A. E. ..... 80 and 5 per cent off list
S. A. E., ⅝ in. and larger ..... 75 and 5 per cent off list
Stove bolts in packages ..... 75, 10 and 5 per cent off list
Stove bolts in bulk ..... 75, 10, 5 and 2½ per cent off list
Tire bolts ..... 60 and 10 per cent off list
Bolt ends with hot pressed nuts ..... 60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller, 55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller, 70 and 10 to 65 and 5 per cent off list
Washers ..... 5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws ..... 70 per cent off list
Milled set screws ..... 70 per cent off list
Upset cap screws ..... 75 and 10 per cent off list
Upset set screws ..... 75 and 10 per cent off list
Milled studs ..... 50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $2.90 to $3.00
Small rivets ..... 65 and 10 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.	$3.15
Spikes, ½ in., ⅝ in. x ⅝ in., per 100 lb.	$3.15 to 3.50
Spikes, ⅜ in.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝ in., base, per 100 lb., $4.00 to	4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.,	5.00 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, base, per 100 lb.	2.75

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	32	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	⅛	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 6	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	34	1¾ and 2 in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	37	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base ..... 83 per cent off list
Carbon 0.30 to 0.40, base ..... 81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	17	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box $5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. ..... 3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. ..... 3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. ..... 5.35c.

Galvanized

No. 28 (base), per lb. ..... 5.00c.

Automobile Sheets

No. 28 gage (base), 8-lb. coating, per lb. ..... 5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. ..... 3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.32	Cleveland, Youngstown		Kansas City (pipe)	0.765
Baltimore, export	0.225	Combs	0.19	St. Paul	0.67
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.27	Cincinnati	0.29	Omaha (pipe)	0.765
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.17
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.34		
Pac. Coast, ship plates	1.20		
Birmingham	0.58		
Memphis	0.56		
Jacksonville, all rail	0.70		
Jacksonville, rail and water	0.415		
New Orleans	0.67		

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 45c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	113c.
Iron ore, Swedish, average 66 per cent iron	140.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	43c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	41c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	$108.00 to 110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$45.00 to $48.00	$40.00 to $45.00
Maryland	50.00	45.00
Ohio	45.00 to 46.00	40.00 to 42.00
Kentucky	45.00 to 46.00	40.00 to 42.00
Illinois	——	40.00 to 45.00
Missouri	45.00 to 48.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 7.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	53.00	
Ground silica clay, per net ton	9.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00 to $42.50
Rolling billets, 2-in. and under	40.00 to 42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	$40.00 to 42.50
Sheet bars, open-hearth	40.00 to 42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	3 per ton over base
Wire rods, carbon 0.41 to 0.55	5 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10 per ton over base
Wire rods, acid	15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅞-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill.	2.50c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$ 4.75	$ 4.80
⅜-in.	5.50	6.00
⅝-in.	6.50	7.00
⅞-in.	9.00	9.50
½-in.	11.00	11.50
⅝-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1-in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (1½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2200 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Orders for Tanks Feature the Week's Awards—Inquiries Nearly Equal Last Week's

The largest awards for tanks in many weeks, amounting to 14,000 tons, is the feature of structural lettings. Private and public building awards have fallen off and total less than 10,000 tons. New inquiries have dropped to about 17,000 tons, against 19,000 tons a week ago.

Jamaica Bay Boulevard viaduct, 200 tons, to American Bridge Co.

Henry L. Doherty & Co., New York, 400 tons, to Kansas City Structural Co.

Apartment building at 15 Park Avenue, New York, 650 tons, to Taylor-Fichter Steel Construction Co.

Apartment building at Fifth Avenue and Tenth Street, New York, 525 tons, to Taylor-Fichter Steel Construction Co.

Garage for John D. Rockefeller, Jr., 150 tons, to Hedden Iron Construction Co.

Gedding apartment building, New York, 400 tons, to Hinkle Iron Co.

The Pan-American Petroleum Co., 13 100,000-bbl. tanks and 2 80,000-bbl. tanks, 6000 tons, to Chicago Bridge & Iron Works.

The Graver Corporation, Chicago, has taken the following orders for oil storage tanks: 1200 tons for the Invincible Oil Co., 600 tons for the Utah Oil Co., 3200 tons for the Independent Oil & Gas Co., the Delmar Oil Co., the Simpson Fell Co. and the Burt-Franklin Co., all four of which are controlled by the same interests, and 3000 tons for miscellaneous orders from California.

Alverna High School building, Chicago, 538 tons, to Duffin Iron Works.

State Teachers College building, Winona, Minn., 160 tons, to St. Paul Structural Steel Co.

Hermitage Portland Cement Co., plant, Nashville, Tenn., 112 tons, to Nashville Bridge Co.

Michigan State Highway Commission, bridge at Grand Haven, 650 tons, to Wisconsin Bridge & Iron Co.

Milwaukee Coke & Gas Co., reconstruction of benzol plant, 250 tons, to Wisconsin Bridge & Iron Co.

Nash Motors Co., shipping building at Milwaukee works, 250 tons, to Worden-Allen Co.

Wisconsin State Highway bridge at Peshtigo, Wis., 178 tons; general contractor, Stein Construction Co., Milwaukee, to sublet steel.

Gas holder, San Diego, Cal., 1200 tons, to Stacey Mfg. Co.

Knights of Columbus Club, Rochester, N. Y., 1800 tons, to Genesee Bridge Co.

Diamond Alkali Co., extension, Painesville, Ohio, 700 tons, to McClintic-Marshall Co.

American Sintering Co., Hubbard, Ohio, 600 tons, reported placed with Penn Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Virginian Railway, bridges, 200 tons.

Transit Commission, New York, subway work in Fourth Avenue, Brooklyn, 3000 tons.

Central Railroad of New Jersey, bridges, 200 tons.

Philadelphia & Reading Railroad, bridges, 200 tons.

Central Steel & Wire Co., Chicago, addition, 400 tons.

Knights of Columbus club house, Madison Street and Cicero Avenue, Chicago, 1450 tons instead of 600 tons as reported last week.

Compania Carbonifera de Sabinas, Rosita, Mexico, washer building and conveyor frames, 450 tons, Allen & Garcia, Chicago, engineers.

John B. Murphy Memorial Auditorium, Chicago, 300 tons.

Illinois Central, an 85-ft. and two 50-ft. deck plate girder spans for Madisonville, Ky., 135 tons.

Elks Club building, Gary, Ind., 350 tons.

School, Columbus, Ohio, 350 tons, bids to be taken about Oct. 1.

Portsmouth, Ohio, hotel, 300 tons, postponed.

Twin Branches power plant, Mishawaka, Ind., 4000 tons.

Ford Motor Co., assembling plant at Philadelphia, 5000 tons.

Bell Telephone Co., Philadelphia, exchange, 400 tons.

Crosswick bridge, Bordentown, N. J., 160 tons; Phoenix Iron Co., low bidder.

Babes and Children's Hospital, Cleveland, 1000 tons.

RAILROAD EQUIPMENT BUYING

Inquiries for Over 100 Passenger Cars—No Orders Placed for Cars or Locomotives

With no orders for cars or locomotives reported, this week's business is confined to moderate inquiries, the largest of which is 60 passenger cars for the Long Iland Railroad and 50 for the Central of New Jersey. A Chinese inquiry involves 50 flat cars. Repair work is also limited.

The Long Island Railroad is in the market for 60 motor passenger cars.

The Central Railroad of New Jersey is inquiring for 15 steel passenger cars, 5 steel combination cars and 10 steel baggage cars.

The Philadelphia & Reading is in the market for 10 steel combination cars.

The American Window Glass Co. has let contract for the repair of 30 hopper cars to the Pressed Steel Car Co.

The Northern Pacific is inquiring for 10 center sills.

An inquiry from China calls for 50 flat cars.

The Philadelphia & Reading is in the market for 40 suburban coaches and 10 combination suburban coaches and baggage cars.

The Central Railroad of New Jersey is inquiring for 50 coaches, 5 combination passenger and baggage and 10 baggage cars.

More Men Than Jobs in Philadelphia—Demand in Pittsburgh Active

HARRISBURG, PA., Sept. 24.—For the first time this year, according to the semi-monthly report of the Philadelphia employment office to Dr. Royal Meeker, State Secretary of Labor and Industry, there is a surplus of first-class iron and steel plant machinists in the district. This was indicated recently by the arrival of an employment agent to secure tool and die makers and general machinists. Almost 75 per cent of the men paid their own carfare. Molders and pattern makers are still scarce.

The Pittsburgh office reports openings for practically all kinds of workmen, and no early change in the conditions in general is expected. The demand for all class of workmen continues relatively good.

Iron and steel plants in the Erie district are operating at 94 per cent of capacity, according to a survey just completed. The supply and demand for virtually all class of skilled mechanics are reported equal.

Marked improvement is reported to have been shown in all departments and branches of the iron and steel trades in the Harrisburg district. Skilled, semi-skilled and unskilled mill workers are widely sought. Johnstown mills are reported to be producing a satisfactory output.

Moderate Improvement in Youngstown but Buyers Are Very Cautious

YOUNGSTOWN, Sept. 25.—Orders do not measure up to shipments, is a fair summarization of the iron and steel market situation in this district. The declining rate of finishing mill operations is also indicative of the situation. Steel makers are not pessimistic in making such statements, but are simply reporting current buying conditions as they actually exist.

The hopeful aspect of the situation is that steel stocks in hands of jobbers and consumers appear to be much below the usual inventory and current buying largely confined to actual requirements.

"Stocks of iron and steel in the hands of jobbers and users are low," states President James A. Campbell of the Youngstown Sheet & Tube Co. "Nobody is buying ahead and this is one of the principal reasons why the industry is not up to the mark of the usual fall buying. Everybody seems to be waiting."

Mr. Campbell states that while business is still quiet, new orders are more numerous and involve larger tonnages than ruled during July and August. Production is being fairly well sustained, though curtailment in finishing mill schedules is already in effect.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
19.....	13.75	13.25	41.37½	7.10	6.75	6.75	6.40
20.....	13.75	13.12½	41.25	7.10	6.75	6.75	6.40
21.....	13.75	13.00	41.00	7.10	6.75	6.75	6.40
22.....	13.75	13.00	....	7.10	6.75	6.75	6.40
24.....	13.75	13.12½	42.00	7.10	6.75	6.75	6.40
25.....	13.87½	13.25	42.25	7.10	6.75	6.77½	6.42½

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Sept. 25.

None of the markets is particularly active. After lower prices there has been a fair demand for copper. The lead market is moderately active and steady. There has been no improvement in the demand for zinc, with the market practically stationary.

Copper.—The electrolytic copper market fell until the middle of last week, when moderately large sales were made at 13.25c. to 13.37½c., delivered. Today it is believed that nearly all metal below 13.50c., delivered, has been absorbed and the minimum of the market is regarded as 13.25c., refinery, or 13.50c., delivered. Some sellers are out of the market at anything less than 13.62½c., delivered. There is a fair amount of inquiry before sellers, but consumers do not report any marked improvement in demand for finished products. Lake copper is quoted at 13.75c. to 14c., delivered.

Tin.—Buyers and sellers have assumed a waiting attitude and the market had been very dull up to yesterday, when 200 to 250 tons of Straits tin changed hands. It was made up of both nearby delivery and far-off shipment, with most of the sales made at 42c., although one parcel brought 42.10c. The only feature of interest during the week was the eagerness of one large importer for orders. The market here today has been very dull, with spot Straits tin quoted at 42.25c., New York. In the London market quotations today were £3 to £5 per ton higher than a week ago, with spot standard quoted at £203 5s., future standard at £202 17s. 6d., and spot Straits at £206 15s. Arrivals thus far this month have been 3230 tons, with 5035 tons reported afloat.

Lead.—This market is quieter, with a slight easing in prices. There is less of a scarcity of prompt lead, which is slightly easier at 6.75c., St. Louis, or 7.10c., New York. A week ago there were bids for prompt lead at 6.75c., St. Louis. While the market is not exactly firm it may be regarded as steady and good business is looked for in the immediate future, with practically little shrinkage in prices.

Zinc.—Demand from galvanizers or brass melters is inconsequential, but there have been fair sales for export to England and there is still some foreign inquiry before the market. Prices have been slightly lower than a week ago, with early or October delivery quoted at 6.42½c., St. Louis, or 6.77½c., New York, for prime Western.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with the electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for both shot and ingot nickel are 29c. to 32c. per lb.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 7.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26.50c., New York, duty paid, in such cases where they can obtain it from foreign producers. There have been some fair-sized inquiries for fourth quarter and first quarter delivery. No quotations are made public by the leading domestic producer.

Old Metals.—Business continues quiet and the market shows little change. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.50
Copper, light and bottoms	10.75
Heavy machine composition	10.75
Brass, heavy	7.50
Brass, light	6.25
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.00
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

SEPT. 25.—Tin has advanced as a result of a shortage in London, while lead and zinc have declined, there being larger offerings of those metals than purchases. Copper shows a slightly better tone, with price unchanged. Among the old metals, tin grades have advanced. We quote in carload lots, Lake copper, 14.50c.; tin, 43c.; lead, 6.75c.; spelter, 6.45c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5.25c.; zinc, 4.25c.; pewter, No. 1, 22c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

Operating Schedules Reduced in the Mahoning Valley

YOUNGSTOWN, Sept. 25.—Reductions this week in operating schedules of Mahoning Valley plants are but the forerunners of other curtailments, unless new business comes forward in larger volume, say steel makers. Because of the general slackness in the black sheet market, the Falcon Steel Co. was obliged to suspend its 8-mill plant at Niles. The Falcon Tin Plate Co., an allied interest, is operating seven of nine tin plate mills at Canton.

The Mahoning Valley Steel Co. is operating six mills this week, at its sheet mill plant in Niles, a reduction of one unit. Of the 117 sheet and jobbing mills in the Mahoning Valley, 75 were scheduled for operation on Monday.

The Republic Iron & Steel Co. has likewise suspended two merchant bar mills, leaving two active mills of the five at the Brown-Bonnell works in Youngstown.

Of the 17 tube mills in the Valley, 16 are operating, the Youngstown Sheet & Tube Co. having 10 of its 11 units active, and the Republic company all six of its pipe mills.

The steel department at New Castle, Pa., of the Carnegie Steel Co. has been put on a five-day basis, instead of six days as heretofore.

Forty-four independent open-hearth furnaces are melting in the Mahoning Valley, with little change in this branch of steel-making.

The Trumbull Steel Co., Warren, has added one jobbing mill to its inactive list, which includes in addition four tin plate units.

At the combined meeting of the Engineers' Club of Cincinnati and the Cincinnati Section of the A. S. M. E., held at the Chamber of Commerce, Sept. 20, Col. C. W. Kutz, division engineer, Central Division Corps of Engineers, U. S. A., and C. I. Grimm, assistant engineer, described the progress being made on the survey for the proposed deep water barge canal to connect the Ohio River and Lake Erie. These preliminary surveys of proposed routes will probably be completed by Jan. 1. Colonel Kutz gave some figures which would indicate the quantity of steel required. For Route No. 4, Cincinnati to Toledo, 194 bridges would be required; Route 1, Pittsburgh to Ashtabula, 89 bridges, and Route 3, Sandusky to Portsmouth, 86 bridges. The cost of the canal from Sandusky to Portsmouth has been estimated at $150,000,000.

PERSONAL

Harry J. Bailey, who on Aug. 25 was elected president of the Consolidated Machine Tool Corporation, succeeding the late W. H. Marshall, has been engaged in the machine-tool business since 1899, when he started his career as messenger boy for the former Hilles & Jones Co., Wilmington, Del. He worked his way through the plant as salesman, purchasing agent, secretary, and finally president of the company. He was elected secretary in 1900 and in 1918 succeeded to the presidency. When the Hilles & Jones works became a part of the Consolidated Machine Tool Corporation, Mr. Bailey became vice-president of the latter corporation in charge of operations at the Hilles & Jones plant. He has been actively connected with the machine-tool business for 24 years, his present age being 48. He will reside in Rochester, N. Y., where the general offices of the Consolidated corporation are now located.



HARRY J. BAILEY

M. F. Day, Jr., who for the past few months has represented Rogers, Brown & Co. at Chicago, is no longer associated with that firm.

United States Marshal McGregor of Pittsburgh has been ordered by the United States District Court to sell on Oct. 23 the plant of the Sharon Pressed Steel Co., Sharon, Pa., which was involved in the Cleveland Discount Co. failure. It is said that the Discount company had advanced around $2,000,000 on payroll requirements.

George R. Woods, manager in New York of Stockvis & Zonen, 17 Battery Place, who deal in machine tools, has returned from a sojourn in Quebec.

H. E. Baldwin has resigned as chief engineer of the Variety Iron Works Co., Cleveland, to take a similar position with the Brown Hoisting Machinery Co., that city. He was associated with the engineering department of the latter company about 15 years ago.

Richard M. Haskins, erecting engineer, Bucyrus Co., South Milwaukee, Wis., and Mrs. Haskins arrived in Milwaukee on Sept. 21, the first survivors of the Japanese disaster to reach that city. Mr. Haskins was seriously injured and is confined in Columbia Hospital, having also found it necessary to have hospital treatment at Vancouver, B. C., upon arrival there Sept. 16. Mr. and Mrs. Haskins were in the Oriental Palace Hotel, Yokohama, at the time of the catastrophe. Mrs. Haskins escaped with slight injuries.

M. J. Sylvester, superintendent of forge and projectile machine shops, Bethlehem Steel Co., Bethlehem, Pa., has been appointed superintendent of the general machine shops and founders at the plant, in addition to his present duties, succeeding in the latter capacity John M. Lund, resigned.

W. A. Carrell, vice president and general manager Erd Motors Corporation, Saginaw, Mich., has been elected president to succeed the late F. Erd. He was connected previously with the Wisconsin Motors Co. for several years, acting as general manager.

Newman M. Marsilius, general manager Woodstock Typewriter Co., Woodstock, Ill., has resigned, effective Oct. 1, to go with another company.

Lewis D. McClaren, sales manager United Coke & Coal Co., Fisher Building, Chicago, has been promoted to vice-president.

William A. Rogers, Rogers, Brown & Co., Buffalo, will sail on Oct. 2 to spend several months in India, Ceylon and Siam.

Robert D. Black, branch manager for the Black & Decker Mfg. Co., in charge of the Philadelphia territory, will return to headquarters about the middle of November to take up duties as advertising manager for the company. H. G. Smith, present resident salesman for Pittsburgh and Western Pennsylvania, will succeed Mr. Black. E. D. Allmendinger, formerly working in the Detroit territory, has returned to headquarters at Towson, Baltimore, where he will take charge of the Black & Decker export business.

George W. Tyrol, formerly with J. H. Williams & Co., has joined the sales force of the Bonney Forge & Tool Works, Allentown, Pa., and will cover Pennsylvania, Southern New York, New Jersey and Delaware.

James W. Hook, who for the past six years has been president of the Allied Machinery Co. of America, has resigned that position to enter the manufacturing field. After graduating from Iowa State College, Ames, Iowa, Mr. Hook was with the Globe Machinery & Supply Co., Des Moines, Iowa, as engineer for two years, leaving there in 1908 when appointed sales manager of C. A. Dunham Co., Marshalltown, Iowa, later becoming general manager of that company. In 1916 he left to become associated with the Allied Machinery Co. of America, and was elected president the following year. On Oct. 1 Mr. Hook will take up his duties as vice-president and general manager of the Geometric Tool Co., New Haven, Conn., manufacturer of die heads and other threading devices.



JAMES W. HOOK

Lloyd Booth, president Falcon Steel Co., Niles, Ohio, back from a trip to Europe, declares conditions there are growing worse each week.

Philip Wick of Youngstown, Ohio, a director and vice-president of the Trumbull Steel Co., Warren, Ohio, who has returned from Europe, declares that according to reports abroad Russia is making definite progress, both in a commercial and social way.

Church A. Williams, formerly general superintendent Verona Steel Castings Co., Verona, Pa., has accepted a position as superintendent of open-hearth furnaces, Park works, Crescent Steel Co. of America, Pittsburgh. Before joining the Verona Steel Castings Co. he was with the Keystone Steel & Wire Co., Peoria, Ill.

Traveling cranes, conveying and other machinery will be installed on the new coke handling plant to be constructed by the Carnegie Steel Co., Carnegie Building, Pittsburgh, at its Mingo Junction, Ohio, plant, to cost $500,000. The company plans to supply the coke requirements of the Mingo furnaces by river shipments from Clairton, Pa., with the completion of an addition to the Clairton by-product coke plant.

The British Empire Steel Corporation plans to put into operation its battery of coke ovens erected in 1921 at its Sydney, N. S., plant. These ovens have been idle since their erection, the company securing a sufficient supply of coke from the other two batteries constructed early in the war years.

OBITUARY

General Charles Lane Fitzhugh

GENERAL CHARLES LANE FITZHUGH, former president of the Shoenberger Steel Co., Pittsburgh, who died at his summer home in Coburg, Ontario, Sept. 16, as fully recorded in THE IRON AGE last week, was born in Oswego, N. Y., Aug. 22, 1838. He was of distinguished ancestry, being a descendent on his paternal side from William Fitzhugh of Bedfordshire, England, who settled in Stafford County, Va., in 1670, and on his maternal side from Charles Carroll of Litereuna, Ireland, who settled in Maryland in 1671, and among whose descendents were Charles Carroll of Carrollton, one of the signers of the Declaration of Independence. General Fitzhugh was educated in the Oswego schools and at the Canandaigua Academy, Canandaigua, N. Y. After a year at Yale University, he entered West Point in June, 1859. At the outbreak of the Civil War, he was commissioned first lieutenant in the Fourth United States Artillery and served with distinction throughout the conflict, being brevetted captain in April, 1862, for gallant and meritorious service at the battle of Shiloh, major, Aug. 28, 1864, and colonel and brigadier-general March 13, 1865. From May, 1865, he was on the staff of General Sheridan on duty in Louisiana and Texas until November, 1868, when as captain of the Seventh United States Cavalry, he resigned his commission. From 1868 to 1869 he was a member of the firm of Shoenberger & Co. and was president of the company, which had been reorganized as the Shoenberger Steel Co., from 1896 to 1899, when it was taken over by the American Steel & Wire Co. General Fitzhugh then retired from active business. Since 1902 he had made his home in Washington. Mrs. Fitzhugh, who was Emma Shoenberger, a granddaughter of Peter Shoenberger, founder of the business, and two sons, Henry and Carroll Hamilton Fitzhugh, survive.

William L. Hirsch, formerly secretary of the Shoenberger Steel Co. and later sales manager of the American Steel & Wire Co., Pittsburgh district, writes THE IRON AGE: "With much sorrow I learned of the death of Gen. Charles L. Fitzhugh some days ago, and I cannot add anything in tribute to his brilliant and splendid record except to testify that it was my great privilege to spend 20 years in close business association with him, when with the Shoenberger Steel Co. The firm was composed of Gen. C. L. Fitzhugh, John Z. Speer and G. A. Steiner. General Fitzhugh was for many years president of the company. During all the years I was with the company it was a pleasure to be in daily contact with him. Sweet memories of this splendid and handsome man recall that he was kind, polite, gentle, helpful and courteous to all his associates and employees. The world is better that he lived and the memory of him everlasting."

GORDON BATTELLE, an active figure in the iron and steel business in the Middle West, died suddenly at his home in Columbus, Ohio, on Sept. 21, aged 40 years. He was a director of the American Rolling Mill Co. and the Inland Steel Co. Mr. Battelle was also president and treasurer of the International Steel Products Co. and the International Derrick & Equipment Co., Columbus, as well as a director of the Republic Fuming & Refining Co. and the Ohio Mining Co.

JOHN J. DALY, a dealer in iron and steel scrap, died at his home, 71 Remsen Street, Astoria, Long Island, Sept. 22. Mr. Daly, who was 51 years of age, had been in the scrap business for about 35 years and had maintained a large yard in Long Island City for the past 31 years. For several years past his son, John J. Daly, Jr., has been associated with him in the business. Mr. Daly was at one time excise commissioner of Long Island City.

Pig Iron Prices Reduced $2 in Toronto and Montreal Markets

TORONTO, ONT., Sept. 24.—Canadian blast furnace operators have again reduced the price of pig iron. This reduction, which became effective Sept. 22, amounts to $2 per ton in both Toronto and Montreal markets. While no definite reason has been given for this lowering of price it might safely be stated that the chief cause is the present state of the Buffalo market, together with the small demand that has existed for pig iron in the Canadian market during the past three months.

Importation of pig iron into Canada from the United States and Great Britain has been very limited for some time past, and practically the entire iron consumed here is produced by Canadian furnaces. Some special grades have, however, recently reached the Canadian market from United States furnaces. British iron has not been coming in for some time, and while dealers in the Montreal district are quoting Summerlee at $40 and Carron at $39 per ton in lots of 5 tons and up in the Montreal district, the demand for this commodity as well as the supply on hand is small. The prevailing price on Canadian iron is as follows: No. 1 (2.25 to 2.75 silicon), $31; malleable, $31; No. 2 (1.75 to 2.25 silicon), $30, Toronto. Montreal prices are No. 1 and malleable, $33.50; No. 2, $32.50.

Ohio Foundries Not So Active

The Ohio State Foundrymen's Association reports that operations for August were on the basis of 79.56 per cent of normal or capacity, which is a tapering off as compared with July, 1923. July operations were on the basis of 85.32 per cent of normal. The August decline was expected.

The normal melt figure or the capacity of all of the foundries reporting is equal to 22,683 tons. Against this possible production there was produced 18,048 tons, which is equal to 79.56 per cent.

The stocks of scrap and pig iron received were 14,899 tons. This, compared with the normal melt or 100 per cent figure, equals a percentage of 65 compared with 37 per cent in July.

Total stocks on hand show an increase over July. The total stocks on hand are 23,033 tons, which compared with the normal melt figure of 22,683 equals 101 per cent. July stood at 96 per cent and August, 1922, at 90 per cent.

Non-ferrous operations have increased over July, which figure stood at 77.22 per cent of normal or capacity. August shows a figure of 80.7 per cent.

Protests Against Freight Rates

WASHINGTON, Sept. 25.—Protests against and requests for the suspension of tariffs, scheduled to become effective Oct. 7, advancing freight rates on iron and steel products from the Pittsburgh district to New Castle, Pa., and Cleveland, Akron, Canton, Massillon and Youngstown, have been filed with the Interstate Commerce Commission by the Jones & Laughlin Steel Corporation, the American Bridge Co., the American Sheet & Tin Plate Co., the American Steel & Wire Co., the Carnegie Steel Co., the Lorain Steel Co., and the National Tube Co. The proposed increases are based on the decision of the commission in the American Shipbuilding Co. case which involved the so-called short-haul rates on iron and steel products. The protestants claim the rate increases would range from 31.2 to 60 per cent.

Total exports of iron and steel from Germany for the first six months of this year, incomplete because of the Ruhr occupation, were 976,392 metric tons as compared with 1,234,332 tons for the first six months of 1922. Imports to July 1 were 927,056 tons as against 910,798 tons in the first half of 1922.

To Buy Foundry Pig Iron by Analysis

(*Concluded from page 837*)

sis. The congress expects the furnacemen and foundrymen jointly to reach some agreement on the subject in the very near future.

The passage of the resolution was strongly applauded. M. Ramas also called attention to the fact that the Department of Commerce at Washington was interested in this action and was assisting Messrs. Wood and Moldenke in the negotiations. A French furnaceman present approved of the American specifications and held that it was the best method of giving the foundryman what he wants. The subject will be worked up further before the close of the congress.

Next came a paper by Prof. Pisek, president of the Association of Foundrymen of Tchéco-Slovakia, on "Use of Alloys for Machine Castings." This was a very elaborate paper of great scientific interest. It was not discussed. Next a representative of Lieut. Col. Jaime Coll of Spain read his two papers on the fatigue of cast iron and cupola reactions.

The paper by M. Masson had not yet come from the press, but with the paper by M. Varlet, both men of Belgium, a summary of the war loss situation was given so far as foundries were concerned. The discussion brought out a lot of hard facts in connection with the capture of trade by the Germans, aside from the actual money loss.

American Papers

In the meantime, at the English-speaking session, there were interesting proceedings. It was learned that many foundrymen were present from Tchéco-Slovakia and even from India, while the previous evening there had been a dinner for the Spanish foundrymen, at which 146 participated.

President Clamer of the A. F. A. opened the meeting for the reading of the papers by Americans. The first subject, which proved the one most discussed, was on "Test Bars," on the basis of the paper of Doctor Moldenke. He outlined his paper again, as on the previous day for the French meeting, and explained in addition that the American party had in the meantime come in contact with many problems that confront both the British foundrymen as well as those of France. Hence the Americans were certainly inclined to keep their minds open on the subject of international action in this direction. This contact had shown that the whole subject was shaping itself into testing for the quality of the metal used and testing for the quality of the castings. Doctor Moldenke read again the resolution passed on the day previous regarding this matter, and the long discussion which followed only emphasized the correctness of this viewpoint, even if it was held difficult to carry through practically.

The discussion itself was participated in by Mr. Shaw and Mr. Ronceray in a brisk clash on the value of the Frémont test method of boring out small test pieces from the castings themselves. Mr. Wood explained the American way of using any shop test bar, but getting comparison with the standard arbitration bar for adjustment in case of dispute. He held that unquestionably the several methods brought out would find special application which was quite satisfactory, even if not specified for general or international use. Mr. Lane also gave instances of testing castings, and Doctor Moldenke finally reviewed and closed the discussion.

H. M. Lane followed with his paper on the handling and preparation of foundry sands, showing how oftentimes sand has to be handled nine times in the course of making a casting; that it took about 1900 lb. of sand to make a bathtub, and that the sand problem is usually more costly than the iron involved. He explained the casting losses when tempered sand is put on a long open belt and urged transportation of sand in closed containers or conveyors and off the foundry floor.

Cast Iron and Mass Effect

Mr. Clamer now turned the chair over to Mr. Stubbs, president of the Institution of British Foundrymen, who called for the English papers, beginning with that of Mr. Smalley, on "Cast Iron and Mass Effect." In the discussion that followed, inquiry was made whether quickly and slowly setting metal had been considered, to which Mr. Smalley replied that particular care had been taken with their cupola melting practice to avoid all chances of oxidation. Mr. Holmes called attention to the possibility of a very heavy mold yielding, thus increasing the volume unduly at the time when no more molten metal could feed in. Mr. Smalley thought that the metal would set fast enough in such a mold to prevent the action indicated. Mr. Lambert called attention to the difficulty in getting practical papers on mass effect in cast iron.

Mr. Fletcher emphasized the importance of the latent heat phenomena observed, and that his experience was that manganese was an important factor in the matter. The study of mass effect would have an important bearing on the design of castings; finally, the speed of pouring was a vital point to be considered. An interesting point brought out by Mr. Smalley was his making cores of steel shot, to get a chilling effect inside a casting. The shot were held together by a good core binder.

At this point Mr. Stubbs introduced Stanley G. Flagg, Jr., Philadelphia, and assured him of the sympathy of the congress with his misfortune in accidentally breaking his shoulder by slipping on the channel steamer deck. Mr. Flagg responded happily and wished the congress every success.

Magnesium in the Foundry

Mr. Mabrey now presented his paper on the use of magnesium in foundry operations. In the discussion, Mr. Lambert pointed out the necessity of using a pure metal for castings, as much magnesium was on the market with less than 95 per cent metallic Gg. With poor metal there would be subsequent efflorescent effects which were highly troublesome. He had used such metal in his cabinet for steel specimens, which were kept bright by the absorption of the injurious properties of the air within by the bad magnesium placed there. A Swedish foundryman present volunteered the information that in pouring magnesium into molds the latter were made of sand mixed with sulphur, and that the gases formed thus would prevent the burning of the magnesium.

Mr. Adamson gave his paper on the graphitization of cast iron, the summary of the points being that he considered it necessary to grade both by fracture and analysis in the case of English irons. Mr. Holmes followed with his paper on testing molding sands. This paper will appear shortly in the technical press. The author's methods differ somewhat from those worked out by the American committee, as he shakes the sample with water for an hour and differentiates the grain sizes that way. The Eugene Smith method is held to be subject to errors. Mr. Holmes pleads for uniformity in standards, not mixing pounds and feet with millimeters and cubic centimeters. The presentation of the paper had to be cut short on account of the lateness of the hour, the Parisian dinner hour being sacred. After a paper by Lieutenant Coll on cupola reactions the English-speaking section adjourned.

In the meantime the ladies were conducted to Montmartre, the Isle of Paris, also Notre Dame and Palais de Justice; then after lunch to the Luxemburg and the Pantheon, etc. The foundrymen took a trip to the surrounding foundries, visiting three of them during the afternoon. R. M.

The desirability of storing coal has been seized on, owing partly to the timeliness of the topic, by the McMyler-Interstate Co., Cleveland, as an opportunity to issue a sales letter of an unusual kind. It amounts to a printed type-written missive of several pages illustrated with half-tone engravings of the forms of cranes which the company builds adaptable to handling coal to and from storage. Similar letters have been used in the past but it is not always that they have been tied to a topic of national economic interest.

A new line of glass oilers has been placed on the market by the Penberthy Injector Co., Detroit.

REFRACTORIES ARE IRREGULAR

Business in the West Better Than in the East - Some Prices Lower

PITTSBURGH, Sept. 24.—Much irregularity is observed in the refractories market, both as regards prices and business. In the West, manufacturers appear to be still enjoying a reasonably good business, but here and to the East, matters are pretty quiet, as regards purchases and specifications against old orders. In all territories, some makers are better off than others in the matter of bookings and this condition promotes deviations from what are supposed to be the regular quotations on the part of those who have the lightest order books. The market on clay fire brick now is quotable in practically all districts at $45 for large lots of high duty brick, this representing a drop of $1 per 1000 and even that price is not religiously observed when an attractive inquiry develops. Small makers of silica brick in the Eastern district continue to take business at $42 and that price is said to have been made by some of the larger producers on contracts. As a sales basis, $45 is no longer a representative quotation. Ground clay and silica are lower. There is no change in magnesite and chrome brick. Prices are given on page 863.

Monthly report of the Refractories Manufacturers' Association, F. W. Donahoe, Oliver Building, Pittsburgh, secretary, notes a slight gain in clay fire brick shipments in August as compared with July, and a gain in net new business for the month, but production also gained and stocks at the end of the month showed an increase of 3 per cent as compared with that at the beginning of the month and unfilled orders sustained a decline for the month of about 8,500,000 brick. Shipments and production of silica brick in August were almost equal, but new business declined and unfilled business did also.

Figures in 9-in. equivalents, figures in parenthesis, being the percentages to economical monthly producing capacity, follow:

Clay Fire Brick

	August	July
Capacity reporting	74,341,977	74,591,977
Stock, first of month	157,432,125 (211)	155,573,382 (208)
Production	58,839,866 (79)	56,976,888 (76)
Shipments	56,219,590 (75)	54,667,581 (73)
Stock, end of month	160,052,401 (214)	157,942,669 (212)
New orders	48,505,008 (65)	45,773,431 (61)
Cancellations	645,660 (1)	605,177 (1)
Net new business	47,859,346 (64)	45,168,254 (107)
Unfilled orders	71,400,345 (96)	79,826,439 (107)

Silica Brick

Capacity reporting	22,565,500	22,565,500
Stock, first of month	34,243,812 (152)	34,310,226 (152)
Production	10,245,769 (45)	11,980,588 (53)
Shipments	10,132,789 (45)	12,047,202 (53)
Stock, end of month	34,356,792 (152)	34,243,812 (152)
New orders	6,695,726 (30)	8,351,087 (37)
Cancellations	135,512 (1)	556,712 (2)
Net new business	6,560,214 (29)	7,794,357 (35)
Unfilled orders	27,202,475 (121)	30,775,050 (136)

There seems to have been some misunderstanding or misrepresentation of some of the items in these tables. It has been figured, for instance, that the difference in tonnage, or in percentage of monthly capacity, between that shown as stock on hand at end of month and unfilled orders at end of month indicates free stock. It is a misconception that any great part of this tonnage is available for shipment on new orders, unless those new orders call for just such shapes as happen to be in stock, which would be unusual. It is not uncommon for large producers to carry one or more blast furnace linings in stock. Much of the stock also is odds and ends—the excess production of times when a full run on certain shapes is more economical practice than limiting production to the exact number required by the order in hand.

Time Studies of Grinding and Polishing

An efficiency demonstration conducted in the presence of 35 representatives of 21 companies likely to be interested in the machine was made on Aug. 29 of a redesigned type of the No. 27 automatic grinding and polishing machine built by the Excelsior Tool & Machine Co., East St. Louis, Ill. The test was made at the Excelsior plant to establish a fair cost of polishing stove tops and manifold gas pipes.

No special preparations were made for this occasion. A stock polishing machine and regular stove tops and common rough gas pipe were used. The stove top cast iron was size 25 x 37 in. to 40 in. long, or 7 sq. ft., consisting of six 8-in. covers and loose sectional anchor plates and shelving, not sand blasted or pickled. The threaded rough gas pipe was ¾ in. in 2-ft. lengths. The stove top was ground and polished with four different wheels to a high commercial finish in 19 min. 38 sec., which is equal to 24 stove tops or 168 sq. ft. in 8 hr. The gas pipe or manifolds were ground and polished with 4 different wheels ready for nickeling at the rate of 10 pipe in 17 min. 28 sec., which is equal to 34 2-ft. lengths of pipe in 1 hr. or 544 lin. ft. in 8 hr. Buffing nickel plated pipe was done at the rate of 400 lin. ft. per hr.

The changing of wheels and tops was included in the time, but not time for glueing up, balancing or truing up the wheels or the changing of machine.

Among those present were Lawrence D. Bridge, superintendent Bridge & Beach Mfg. Co.; E. R. Funck, purchasing agent and J. Krauss, superintendent Bucks Stove & Range Co.; A. G. Haferkorn, vice-president C. Heinz Stove Co.; F. E. Terrio, treasurer and manager, La Salco, Inc.; George Lamkemeyer, foreman Majestic Mfg. Co.; George P. Hamman, superintendent Quick Meal Stove & Range Co.; L. H. Winter, purchasing agent and treasurer Wrought Iron Range Co., all of St. Louis; E. S. Simpson, production engineer American Stove & Range Foundry Co., East St. Louis, Ill.; Louis M. Hofmeister, Auto Stove Works, New Athens, Ill.; W. C. Audel, Belleville Stove & Range Co., Belleville, Ill.; George E. Baker, president Baker Stove Co., Belleville, Ill.; Charles J. Corty, Belleville, Ill.; N. Willard, Eureka Stove Mfg. Co., O'Fallon, Ill.; Adam Karr, Karr Range Co., Belleville, Ill.; G. Marsh, manager plating and polishing department Orbon Stove Range Co., Belleville, Ill.; A. E. Krebs, manager Perfect Stove Co., Belleville, Ill.; H. Lange, secretary and treasurer Quincy Stove Mfg. Co., Quincy, Ill.; Joseph P. Roesch, president Roesch Enamel Range Co., Belleville, Ill.; Charles L. Gohmann, president Gohmann Brothers & Kahler Co., New Albany, Ind., and Charles Emory, foreman Great Western Stove Works, Leavenworth, Kan.

Steel Furniture Stock Business

WASHINGTON, Sept. 22.—The Department of Commerce announces that August shipments of steel-furniture stock goods, based on reports received from 22 manufacturers, amounted to $1,345,147 in August, as against $1,247,605 in July, and $943,087 in August, 1922. The following table gives comparative figures for the first eight months of 1923 and 1922:

	1923	1922
January	$1,362,470	$983,834
February	1,307,173	967,125
March	1,709,206	1,087,228
April	1,520,286	1,068,382
May	1,506,072	1,056,735
June	1,401,950	1,015,463
July	1,247,605	945,768
August	1,345,147	943,087

British Steel Output by Grades in 1922

The production of steel ingots and castings of Great Britain for 1922, according to revised returns was as follows in gross tons:

Ingots	
Acid open-hearth	1,680,000
Basic open-hearth	3,624,300
Acid Bessemer	272,500
Basic Bessemer	196,000
Electric	21,300
Castings	
Electric	18,100
Open-hearth, Bessemer, etc.	68,000
Total	5,880,600

A feature is the heavy output of basic open-hearth steel. The total electric steel production was 39,400 tons which compares with 27,100 tons in 1921 and 89,100 tons in 1920.

Machinery Markets and News of the Works

JAPAN IS INQUIRING

Machinery for Rebuilding Arsenals May Be Bought in United States

Some Railroad Business Still Being Placed, But Orders Generally Are Very Light

A development of interest is the receipt of inquiries from Japan for machine tools to replace those destroyed in arsenals there in the recent earthquake. So far these inquiries, though cabled to this country have been in rather indefinite form. Automatic screw machinery is one of the items at present in demand. Punching and shearing machinery, it is indicated, will also be an early requirement.

Railroad business is not conspicuous in volume, but in comparison with the small number of orders coming from industrial plants it is still the outstanding feature of the domestic market, both as regards present and future buying. The Pennsylvania Railroad has begun placing orders for its eastern shops. A list of tools for its shops in the central region, issued some time ago, has not been acted upon, but it is expected that orders may go out this week.

At Chicago there is a revival of prospects of railroad buying. The Chicago, Burlington & Quincy is about to place orders within a week or 10 days, according to trade reports, on a list issued some time ago. The Illinois Central has asked for prices on four machines. The Chicago & North Western and the Chicago, Rock Island & Pacific are getting figures for 1924 budget purposes. The Louisville & Nashville, Chesapeake & Ohio and Southern roads are reported to be considering the purchase of equipment for various shops.

There is some miscellanous business, but it is very light in volume.

New York

NEW YORK, Sept. 25.

SEPTEMBER has brought no increase in machine-tool business in the Eastern district, and the situation is about as dull as it has been in the past two months. Inquiries are few and orders are just as scarce. There is a little buying of single tools, but the aggregate of such orders is nowhere near what is considered a "normal" business. The Southern Pacific Railroad has added two axle lathes to the orders placed a couple of weeks ago, but this is the only railroad buying of importance in the past week.

The Multi Metal Co., 251 West Nineteenth Street, New York, manufacturer of wire cloth, etc., has engaged H. Tanenbaum, 530 Main Street, New Rochelle, N. Y., architect, to prepare plans for its proposed one-story factory, 75 x 100 ft., on 139th Street, near the Southern Boulevard.

The State Department, Wellington, New Zealand, is arranging a fund of $4,500,000 for the installation and operation of a hydroelectric generating plant at Lake Waikaremoana, North Island, to be expended during the next 12 months. The initial capacity will approximate 24,000 hp., which will be increased to 50,000 hp., with transmission system to Auckland and vicinity.

The Stucky International Mining & Milling Co., Lampazos, N. L., Mexico, is planning to purchase mining, concentrating and electric power equipment for the production of lead, zinc and other metals.

The Universal Can Co., an interest of the Nestlé Food Co., 130 William Street, New York, J. F. Montgomery, in charge, is planning for the installation of equipment in a factory at Hiresdale.

Officials of the American Smelting & Refining Co., 120 Broadway, New York, have organized the Towne Mines, Inc., with capital of $4,000,000 and 40,000 shares of common stock, no par value. The new company will acquire the property of the Compania Metalurgica Mexicana in Mexico, and plans extensions and the installation of additional machinery. F. H. Brownell is president, and William Loeb and D. C. Brown, vice-presidents.

The Great Eastern Sugar Co., New York, Willard N. Bayliss and George Copeland, 141 Broadway, New York, representatives, recently organized under State laws, is perfecting plans for a beet sugar mill on Long Island, to include power house and machine shop, estimated to cost $1,500,000 with machinery. Kurt Grunwald heads the company.

The Long Island Railroad Co., Pennsylvania Terminal, New York, is planning the purchase of additional equipment to cost about $2,860,000, including electric power apparatus.

The New York Radio Co., Brooklyn, has leased the building at 81 Flatbush Avenue, for a new works, and will install equipment as soon as alterations and improvements are made. Saul Modell is one of the heads of the company.

Bids are being asked on a general contract for a one-story foundry and machine shop at the plant of the Columbia Malleable Iron Works, Atlantic and Euclid Avenues, Brooklyn, to replace the structure recently destroyed by fire. Holmes & Winslow, 134 East Forty-fourth Street, New York, are architects; Ward & Bender, 120 Broadway, New York, are engineers.

The Reo Motor Car Co. of New York, Inc., 1709 Broadway, New York, has acquired property, 100 x 170 ft., at 625 West Fifty-fifth Street, as a site for a six-story factory branch, with service and repair departments. Parker & Shaffer, 469 Fifth Avenue, are architects and engineers.

The Anaconda Copper Mining Co., 25 Broadway, New York, is planning the erection of an addition to its wire plant at Butte, Mont., 50 x 125 ft., estimated to cost $75,000.

Thomas A. Digan, Inc., 656 Third Avenue, Brooklyn, has engaged David M. Ach, 1 Madison Avenue, New York, architect, to prepare plans for a two-story and basement cold storage plant on Thirty-ninth Street, Brooklyn, to cost $65,000, with machinery.

The Department of Public Works, J. A. Lynch, Borough Hall, New Brighton, S. I., has awarded a general contract to the Anderson Construction Co., Port Richmond, S. I., for a new one-story machine and repair shop, 50 x 95 ft., on the Clove Road, West New Brighton, for municipal motor trucks and cars, estimated to cost $42,000. W. F. McCulloch, 350 Madison Avenue, New York, is architect.

The American Hoist & Derrick Co., 50 Church Street, New York, with plant at St. Paul, Minn., has secured a portion of the works of the Terry Mfg. Co., 15 Exchange Place, Jersey City, N. J., manufacturer of derricks, cranes, etc., at Kearny, N. J., for $156,000 and will use the property for a new Eastern branch. The Terry company has been in receivership since September, 1922, and the receivers have divided the plant into two parcels; the remaining section will be sold for $118,000, which amount, it is stated, has been offered by the Holland Co., for derrick and hoist manufacture.

The Bessemer-American Motors Corporation, Plainfield, N. J., will expand and concentrate production at its local plant in October, for the manufacture of motor trucks and American automobiles and parts. The Philadelphia works of the company were sold recently and operations previously conducted there will be transferred to Plainfield.

The Royal Motor Coach Co., Inc., 285 Bloomfield Avenue, Caldwell, N. J., William B. Brandley, representative, has acquired the plant and adjoining site of the Lincoln Body Co., St. Georges Avenue, Rahway, N. J., for its new works to manufacture motor buses. It is purposed to equip the plant to include all features of production. The company was

organized recently with a capital of $100,000. Ralph De Camp, Livingston, N. J., is head, Mark A. Smith is vice-president and general manager.

The Common Council, Park Ridge, N. J., is planning the installation of electrically-operated pumping machinery in connection with a new waterworks plant estimated to cost $200,000. H. J. Harder, 129 Market Street, Paterson, N. J., is engineer.

The Alexander Hamilton Garage, Inc., 777 Madison Avenue, Paterson, N. J., will take bids in October for a four-story automobile service and repair building, 100 x 175 ft., on Clark Street, to cost approximately $100,000. F. W. Wentworth, 140 Market Street, is architect. J. J. Fitzgerald is head.

The Intercoastal Lumber Terminals, Inc., George Quayle, Grand Central Terminal, New York, head, has leased for a term of years about 40 acres fronting on Newark Bay, Port Newark, Newark, N. J., for the establishment of a lumber terminal and distributing plant. Buildings will be erected to cost close to $2,000,000 with machinery, the latter to include electrically-operated portable cranes, overhead traveling cranes, locomotive crane, yard and dock hoisting and operating machinery, etc.

William F. Smith, Newark, is closing negotiations with Stuart A. Young and George H. Weber, equity receivers for the Sloan & Chase Mfg. Co., manufacturer of machinery and tools, for the purchase of the plant at 351 Sixth Avenue. The new owner proposes to improve the works for a kindred line of production.

The General Electric Co., Harrison, N. J., has disposed of property at Seventeenth Avenue, Boyd and Lillie Streets, Newark, to Joseph Segal, Newark, who will divide it into a number of factory units for the manufacture of mechanical products.

The Power Machinery Exchange, 1 Montgomery Street, Jersey City, N. J., is in the market for 3½ to 10-ton cranes, either hand or electrically driven.

Baltimore

BALTIMORE, Sept. 24.

THE Paper Products Co., 2405-11 West Franklin Street, Baltimore, whose plant was destroyed by fire recently with damage estimated at $350,000, including machinery, will be rebuilt at once. Joseph M. Smith is manager.

The Hatfield Resilient Wheel Co., Munsey Building, Baltimore, is having plans prepared for a factory to manufacture a patent automobile wheel, the invention of Schuyler C. Hatfield, president.

Plans for a power house to be constructed at John Hopkins Hospital, Baltimore, at a total cost of $1,000,000, have been prepared by Joseph Evans Sperry, architect, Calvert Building.

The Board of Fire Commissioners, Baltimore, are planning the erection of a repair plant and the construction of new equipment if there are ample facilities. It will be built on the waterfront, where the plant will be handy also for the repair of the harbor fire boats. Charles A. Jording is president of the board.

The Purchasing Agent, Post Office Department, Washington, D. C., will take bids until Oct. 1 for 300 drop forged wrenches, and until Oct. 3 for 8000 ft. of rubber-covered cable.

The Electric Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, has received details regarding the recent partial destruction by fire of a hydroelectric generating plant in the vicinity of Madrid, Spain, with loss estimated at $130,000, and will furnish company name and information to American manufacturers desiring to furnish machinery for rebuilding.

Fred C. Dreyer, 23½ North Mechanic Street, Cumberland, Md., manufacturer's agent, is making inquiries for an engine lathe, complete with tools, chucks and countershaft, 18 in. swing, 9 ft. 6 in. between centers, used, in good condition.

A. J. Homer, Fort Valley, Ga., is in the market for used equipment for installation in a machine shop, including lathe, drill press, emery stand and other tools.

The Southern Brake Shoe Works, Inc., Portsmouth, Va., now carrying out production at the local plant of the Southern Brass Works, is having plans prepared for a new plant to cost $50,000 including equipment.

The Gennett Lumber Co., Asheville, N. C., plans the construction of a power house in connection with a new band-saw mill on a 6000-acre tract in Madison County, recently purchased. Andrew Gennett is head.

The Common Council, Andrews, N. C., is having plans completed for extensions in the municipal electric light and power plant and system, for which bonds for $350,000 have been voted. The Ludlow Engineers, Inc., Winston-Salem, N. C., is engineer.

The Laurel Run Lumber Co, Frostburg, Md., has tentative plans for a power house in connection with a new plant in the Laurel Run section. The company was formed recently with a capital of $250,000. Joseph T. Blake is head.

The Atlantic Sign Corporation, Fifth and Maxwell Avenues, Baltimore, has inquiries out for a steel shears, 52 in. wide, capable of cutting 14 gage metal and heavier stock.

The Atlantic Coast Line Railway Co., Wilmington, N. C., will commence the installation of a new electrically-operated air plant for train-testing service at its yards at Florence, S. C., estimated to cost $25,000. Other extensions will be made, including the installation of new coaling equipment.

The Smith Cutlery Co., Danville, Va., recently organized with a capital of $100,000, is perfecting plans for the establishment of a plant to manufacture cutlery. The company is in the market for equipment, including machinery for the production of shears, snips, pruning knives, etc. G. W. Gammon is president, and H. A. W. Smith, secretary.

Bids will be received by the Board of Water Commissioners, Macon, Ga., until Oct. 16, for the installation of a new pumping plant, with machinery, for a capacity of 10,000,000 gal. per day.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until Oct. 12 for mechanical equipment, including manganese steel pinions, electric motors, fans, grindstones, wire and cable, crucibles, etc., as set forth in circular 1558.

The Clinchfield Motor Co., Coeburn, Va., recently organized, is planning for the construction of a new two-story service building with machine shop, at West Coeburn, estimated to cost $50,000. Fayette Stallard heads the company.

The Board of Education, Columbia, S. C., has authorized plans for a two-story industrial school, with complete manual training department, on Lady Street, to be used for negro pupils. Bids will be asked at an early date. J. H. Sams, Columbia, is architect.

G. H. Rowan, Egypt, Ga., has inquiries out for a boiler, steam engine and auxiliary equipment for a power house.

The Thornhill Wagon Co., Lynchburg, Va., is planning for the installation of additional equipment, and has inquiries out for a hub lathe, block-cut saw, borer and reamer, and other apparatus.

Manual training equipment will be installed in the new junior high school to be erected at Durham, N. C., estimated to cost $100,000. The Milburn-Heister Co., Durham, is architect.

George H. Martin & Co., 940 Linden Avenue, Baltimore, are having plans drawn for the erection of a one and two-story automobile service and repair building, with machine

The Crane Market

The crane market is extremely quiet with a fair volume of pending business but few new inquiries for either electric overhead, hand power or locomotive cranes. Although the Western Electric Co., is reported to be purchasing some equipment for the new plant being erected in New Jersey, no inquiry for cranes has as yet appeared. The inquiry for six small capacity electric cranes with an alternate price on hand power cranes issued a few weeks ago by the Long Island Railroad, for estimating purposes only, is still inactive. Clement A. Hardy, engineer, Chicago, is asking for prices on a 15-ton electric traveling crane. The Illinois Steel Co., Chicago, is inquiring for a 3½-cu. yd. bucket crane for coal handling. The Griffin Wheel Co., Chicago, is inquiring for two 1-ton pit cranes for its Detroit plant.

Among recent purchases are:

Monahan Stone Co., Newark, N. J., a 10-ton, 44-ft. span electric traveling crane from the Shaw Electric Crane Co.

Southern Pacific Co., 165 Broadway, New York, a 10-ton, 33-ft. span electric traveling crane from the Shaw Electric Crane Co.

Whitehead Construction Co., Flint, Mich., a 25-ton, used Browning locomotive crane from Philip T. King, 30 Church Street, N. Y.

Lorain Steel Co., Johnstown, Pa., a 3-ton, 3-motor overhead traveling crane from the Northern Engineering Works.

Packard Electric Co., Warren, Ohio, a 25-ton, 28-ft. 3-in. span, 4-motor overhead crane with 5-ton auxiliary from the Cleveland Crane & Engineering Co.

Carnegie Steel Co., Pittsburgh, 14 electric jib cranes for the Duquesne works open-hearth department, from the Whiting Corporation.

shop, at Elgin Avenue and Payson Street, to cost about $50,000. Stanislaus Russell, 11 East Lexington Street, is architect.

The Common Council, Salisbury, N. C., plans the installation of electrically-operated pumping machinery in connection with extensions and improvements in the waterworks plant, estimated to cost $35,000.

Frank Talbott, superintendent water department, Danville, Va., will receive bids until Oct. 11 for electrically-operated high and low lift centrifugal pumping machinery for the municipal waterworks. Hazen & Whipple, 25 West Forty-third Street, New York, are engineers.

New England

BOSTON, Sept. 24.

SUPERSTRUCTURE work is under way on a new foundry, 135 x 240 ft., for the Hunt-Spiller Mfg. Co., 383 Dorchester Avenue, Boston, estimated to cost $150,000 with equipment, for which a general contract was awarded recently to the C. A. Dodge Co., Erie Street, Cambridge, Mass. The company specializes in the manufacture of gun and other steel castings.

Manual training equipment will be installed in the new three-story junior high school to be erected at North Park Street and President Avenue, Fall River, Mass., estimated to cost $700,000, for which bids will soon be asked on a general contract. Nathaniel C. Chase, 47 Borden Building, is architect.

The Hope Machine Co., 13 Hope Avenue, Worcester, Mass., has awarded a general contract to the E. J. Cross Co., 82 Foster Street, for a two-story addition, 75 x 100 ft.

Fire, Sept. 15, destroyed a number of buildings at the Maine State Prison, Thomaston, Me., including a new forge and blacksmithing shop, recently completed at a cost of $100,000, and several other shops, with loss placed at $500,000 with equipment. It is planned to rebuild.

The Board of Works, Springfield, Mass., has tentative plans for a one-story municipal machine and repair shop for the fire department, estimated to cost $23,000.

Contract will soon be let for two additions at the plant of the Textile Finishing Machinery Co., 171 Westminster Street, Providence R. I., comprising a two-story structure, 60 x 100 ft., to be equipped as a roll shop, and a building, 75 x 120 ft., one-story, to be used as a press works. The cost is estimated at $185,000, including equipment. Lockwood, Green & Co., 24 Federal Street, Boston, are engineers.

The New England Power Co., 50 Congress Street, Boston, will dispose of a new bond issue of $2,800,000, the proceeds to be used in connection with the installation of a hydro-electric generating plant at Davis Bridge on the Deerfield River, with capacity of 60,000 hp.

The Connecticut Foundry Co., Rocky Hill, Conn., has acquired a controlling interest in the Valley Foundry Co., East Hampton, Conn., and has reorganized the latter company. Plans are under consideration for expansion. A. O. Knudson is president.

The Taylor-Hall Welding Corporation, Worcester, Mass., recently organized, has acquired the local branch plant and business of the Thomson Electric Welding Co., with main works at Lynn, Mass. The new owner plans extensions and considerable increase in production. Preston M. Hall is president, and Louis S. Taylor, treasurer.

Philadelphia

PHILADELPHIA, Sept. 24.

CONTRACT has been let by the Remington & Sherman Co., 636 Richmond Street, Philadelphia, manufacturer of safes, vaults, etc., to the Austin Co., for extensions in its plant to cost about $23,000.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Oct. 2, for 1800 ft. of steel wire rope, schedule 1341, until Oct. 9, for 100 airplane wheels, schedule 1345.

The R. A. Erwin Motor Co., 9533 Rustleton Avenue, Philadelphia, R. A. Erwin, head, has plans for a one-story and basement service and repair building, 80 x 190 ft., with machine shop, estimated to cost $55,000. Charles Fries, 8237 D Street, is architect.

Electric power equipment, transmission, conveying and other machinery will be installed in the five-story addition to be erected at the confectionery manufacturing plant of the J. Frank Shellenberger Co., Front and Race Streets, Philadelphia, to cost $200,000 with equipment. Clarence E. Wunder, 1415 Locust Street, is architect.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, has authorized a fund of $250,000, for improvements at the terminal yards at Rutherford, Pa., including a new coaling plant, water column equipment, engine pits and repair equipment, etc.

The Ford Motor Co., Highland Park, Mich., has authorized the construction of a power plant at its new assembling works at Sixty-third Street and Schuylkill River, Philadelphia, and plans will be drawn by Albert Kahn, 1000 Marquette Building, Detroit, architect. Bids are being asked for structural steel for the first unit of the assembling plant, estimated to cost $500,000. The same architect is in charge.

The American Ice. Co., 121 North Broad Street, Philadelphia, is taking bids for the erection of a three-story addition to its plant at Washington and Seventeenth Streets, 58 x 150 ft., estimated to cost $85,000. C. L. Weir, 41 East Forty-second Street, New York, is architect.

The MacAndrews & Forbes Co., Jefferson and Third Streets, Camden, N. J., manufacturer of wallboard, boxboard and kindred products, has awarded contract to Barclay White & Co., 1713 Sansom Street, Philadelphia, for a one-story and basement addition, 70 x 179 ft., estimated to cost $100,000, including equipment.

The Wilkes-Barre Buick Co., South Main and South Streets, Wilkes-Barre, Pa., representative for the Buick automobile, is having plans drawn for a two-story service and repair building, 75 x 120 ft., at Kingston, Pa., to cost $75,000. Knapp & Bosworth, 15 South Franklin Street, Wilkes-Barre, architects, will soon take bids.

The Miller Lock Co., 4530 Tacony Street, Philadelphia, has inquiries out for an embossing press, toggle joint, about 200 tons capacity, used, in good condition.

The Erie Railroad Co., Jersey City, N. J., is arranging to close its locomotive repair shops at Dunmore, Pa., within 90 days and proposes to abandon operations entirely at this point. Work will be concentrated at Hornell, N. Y., where construction is in progress on a number of shop buildings for heavy repair service.

The Bryden Horseshoe Co., Catasauqua, Pa., is pushing construction on new buildings at its plant and purposes to install equipment at an early date. The works have been placed on a 24-hr. operating basis.

Fire, Sept. 14, destroyed a portion of the plant of the Phoenix Portland Cement Co., Nazareth, Pa., including finishing mill with machinery, and adjoining structures, 60 x 80 ft., 50 x 80 ft., and 50 x 60 ft., respectively, with loss estimated at $500,000, including equipment. The machine shop and power house were saved. It is planned to rebuild. J. W. Walker is vice-president, and E. P. Haubert, secretary and assistant treasurer.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Mount Carmel, Pa., estimated to cost $150,000, for which plans are being prepared by J. A. McGlynn, Simon Long Building, Wilkes-Barre, Pa., architect.

Work will commence on a new power house at the vocational shops of the William Penn high school, Harrisburg, Pa., to cost about $60,000. The Board of Education is in charge.

The Grantville Electric Co., Cold Spring Electric Co., and the East Hanover Electric Co. have been organized under State laws to operate power plants and systems for commercial service. The companies are headed by H. G. Stambaugh, Rehrersburg, Pa.; S. S. Seyfert, Bethlehem, Pa., and J. G. Rich, Bethel, Pa.

Fire, Sept. 13, destroyed a portion of the plant of the Quarryville Body Building Co., Quarryville, Pa., manufacturer of automobile bodies, etc., with loss estimated at $22,000, including equipment. It is planned to rebuild. Aldus Eshelman is head.

The Orion Corporation, Scranton, Pa., care of the local Board of Trade, has arranged for a lease of the building formerly used by the Victor Typewriter Co., for the establishment of new works to manufacture phonographs and parts.

Herr & Co., 7 East King Street, Lancaster, Pa., will install a machine and repair shop in their proposed three-story and basement automobile service works, 65 x 150 ft., at Chestnut and Prince Streets, estimated to cost $100,000, with equipment. M. R. Evans, 10½ East Orange Street, is architect.

The H. J. Homan Co., 1713 Sansom Street, Philadelphia, contractor, has inquiries out for pumping equipment, boilers and oil-burning apparatus, refrigerating machinery and other equipment. C. Fleming is in charge.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Mechanicsburg, Pa., estimated to cost $100,000, for which bids are being asked on a general contract. Clayton J. Lappley, Ebner Building, Harrisburg, is architect.

The Mill Creek Electric Co. and the New Vernon Electric Co., Greenville, Pa., recently organized as affiliated companies, plan the installation of power house and system for general light and power service. F. A. Conner, Greenville, is treasurer of both organizations.

F. J. Ryan & Co., Wesley Building, Philadelphia, report contracts in part as follows: Standard Steel & Bearings Co., Plainville, Conn., three double chamber car type annealing furnaces; Rickenbacker Motor Car Co., Detroit, tempering, annealing and carbonizing furnaces; Pusey & Jones Co., Wilmington, Del., equipment for oil firing of boilers; U. S. Cast Iron Pipe & Foundry Co., Birmingham, automatic control for pipe annealing furnace; Wilmington Furniture Co., Wilmington, Del., equipment for oil firing of boiler; Hupp Motor Car Corporation, Detroit, automatic pyrometer control for heat treating plant at Jackson, Mich.; Penn Seaboard Steel Co., Tacony, Pa., burner equipment for core ovens; Reading Hardware Co., Reading, Pa., 10 brass melting furnaces.

The Standard Steel & Bearings, Inc., has discontinued its Philadelphia plant, concentrating its manufacturing activities at Plainville, Conn.

Plans are being prepared for a manual training high school to be erected at Twenty-third and Federal Streets, Philadelphia, at an estimated cost of $1,000,000. Machine-tool equipment will be required, but the list will not be ready for some time. I. T. Catherine, architect for the Board of Education, is drawing the plans.

The Industrial Plants Corporation, New York, has been retained to liquidate the machinery and equipment of the Tindel-Morris Co.'s plant at Eddystone, Pa.

The Hendrick Mfg. Co., 39-75 Dundaff Street, Carbondale, Pa., is in the market for a geared press. Bliss No. 74½-B or similar, a 300-ton hydraulic press, also a pump and accumulator for these.

The Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., is inquiring for a 4-column hydraulic press of 1000 x 1500 tons capacity 1800 lb. working pressure, approximately 4-ft. stroke and suitable for piercing billets.

The Gruen Electric Construction Co., 1721 Vine Street, Philadelphia, is in the market for a 500- to 750-hp. motor 200 volts d. c., variable speed.

Pittsburgh

PITTSBURGH, Sept. 24.

OUTSIDE of a fair number of single tools for replacement, little activity has been observed in the local machine tool trade. Purchases are solely for necessity, new projects involving a number of tools are not moving ahead with much speed and action on pending lists likewise is very slow. Activity also is lacking in cranes and other heavy equipment.

The East Ohio Mfg. Co., Warren, Ohio, for which Barton R. Shover, Oliver Building, Pittsburgh, is consulting engineer, has revised its original plans and will build on a larger scale than at first contemplated. The electrical equipment for this plant, a cold-rolled strip mill, has been purchased, but the contract for the mills is held up pending the working out of the revised plans.

Merger plans have been perfected by the Standard Plate Glass Co., Butler, Pa., and the Heidenkamp Plate Glass Corporation, Springdale, Pa., under the name of the Standard Plate Glass Corporation. Both companies specialize in the production of polished plate glass. The new company has arranged for a bond issue of $1,250,000, the proceeds to be used to carry out the merger and for proposed extensions. Frank E. Troutman is president.

The Standard Seamless Tube Co., Ambridge, Pa., is taking bids for a one-story addition to its plant, 80 x 500 ft., with extension, 23 x 80 ft., to cost $90,000.

The Midland Electric Service Co., West Union, W. Va., recently organized, has acquired property on Middle Island Creek for the erection of a new electric power plant. J. Lambert McCormick and Benjamin E. Hamrick head the company.

The West Virginia Match Co., Wheeling, W. Va., recently organized with a captial of $300,000, has acquired a local building, which will be remodeled for a new plant. Fred F. Fairs, Wheeling, is architect, in charge. Louis F. Haller and E. L. Yeager head the company.

The Monongah Glass Co., Fairmont, W. Va., has arranged for a bond issue of $1,000,000, of which about $500,000 will be used for additional units and new machinery. The company will also expand its coal properties, located about four miles from the plant, and will install electric power and other equipment. H. L. Heintzelman is president.

The West Virginia Hardware Supply Co., Huntington, W. Va., will commence the erection of a one-story building, 240 x 300 ft., estimated to cost $60,000. Meaner & Handloser, Professional Building, are architects.

Plans are being perfected for the construction of a new pumping plant at the works of the Libbey-Owens Sheet Glass Co., Kanawha City, W. Va. The DeVoe Co., Toledo, Ohio, is engineer.

Reimann & Co., 5 East Front Street, Oil City, Pa., have plans for a two-story automobile service building, with machine shop, 136 x 200 ft., estimated to cost $70,000.

The Imler Supply Co., Pittsburgh, manufacturer of dairy machinery and supplies, has acquired the property of the Lutz Brewery, 150 x 240 ft., consisting of a main seven-story building and three adjoining structures, and will remodel and improve the property for a new plant.

The Savage Fire Brick Co., Johnstown, Pa., F. W. Minch, secretary and treasurer, has plans for new works in the vicinity of Meyersdale, Pa., with main building one-story, 75 x 300 ft., estimated to cost $50,000.

The Board of Allegheny County Commissioners, Court House, Pittsburgh, has plans for a new two-story and basement shop, 70 x 330 ft., at the County Workhouse, Parkview, near Pittsburgh, estimated to cost $200,000 with equipment.

Chicago

CHICAGO, Sept. 24.

AFTER several weeks of extreme quiet, machine tool business shows some signs of revival. Inquiries are more numerous and additional railroad business is in prospect. The Chicago, Burlington & Quincy is expected finally to close against its pending list within the next ten days. In addition it has put out an inquiry for a motor-driven universal grinding machine, 60 in. between centers. The Illinois Central has asked for prices on four machines. The Chicago & North Western and the Chicago, Rock Island & Pacific are taking figures for 1924 budget purposes. The American Steel & Wire Co. is inquiring for a turret lathe and a radial drill for its Illinois plants. The Pullman Co. is in the market for a hack saw in addition to the list which it issued some weeks ago. The All-Steel Equip Co., Aurora, Ill., inquiring for a hand-operated screw press similar to a Walsh No. 2. The Leonard Tractor Co., Gary, Ind., contemplates the purchase of a planer.

A number of fair-sized orders have been booked by local machine tool houses recently. The Rockford Lathe & Drill Co., Rockford, Ill., has purchased three No. 2½ milling machines, a 2½-ft. and a 4-ft. radial drill and a horizontal boring mill. The American Maize Products Co., Chicago, has purchased a used vertical 60-in. boring mill and a used 6-ft. radial drill for its plant at Roby, Ind.

Illinois Central List

One motor-driven 2½-in. double bolt cutter complete with standard equipment.

One 20-in. motor-driven upright high-speed drill with power feed.

One 300-lb. helve-type power hammer suitable for general, medium and light blacksmith work.

One 20-in. x 10-ft. heavy duty engine lathe with taper attachment and with 16-in. 4 jaw independent steel chuck fitted, and with motor drive, including motor arranged for 440-volts, 50-cycle, three-phase, alternating current.

The Yellow Cab Mfg. Co., Austin and Dickens Avenues, Chicago, has let a contract for a one-story power house, 53 x 63 ft., at 2009-13 Austin Avenue, to cost $60,000.

William H. Vallas, Jr., manufacturer of sheet metal work, 4811 West Lake Street, Chicago, will build a one-story addition, 25 x 100 ft., at 4825 West Lake Street, to cost $6,000.

The Goss Printing Press Co., 1538 South Paulina Street, Chicago, has awarded contract for a four-story addition, 92 x 100 ft., at the southeast corner of Wood Street and Fifteenth Place, to cost $250,000.

The Chicago Concrete Post Co., 9 West Illinois Street, Chicago, has purchased the former plant of the Continental Chemical Works, at 4701-23 North Lamon Avenue, 125 x 347 ft.

Ground has been broken for an addition to the plant of the Standard Body Co., Angola, Ind.

The Bortner Mfg. Co., manufacturer of plumbing supplies, 3504 West Lake Street, Chicago, has leased manufacturing space in the building formerly occupied by the Anhydrous Food Products Co., at the corner of Stanley Street and Lakeside Avenue, North Chicago, Ill.

The Danly Machine Specialties, Inc., 4911 Lincoln Avenue, Chicago, formerly a division of Ludwig & Ludwig, was recently organized as a separate corporation. It will continue to operate at its old location and is not in the market for additional equipment at present. Officers are R. C. Danly, president; P. H. Danly, vice-president; G. I. Danly, secretary and treasurer.

The West Douglas Welding & Boiler Works, under the management of C. Regez, has been opened for business in Freeport, Ill. Equipment has been installed for welding and boiler repair work.

The Illinois Electric Power Co. is constructing an electric power plant at Peoria, Ill., to cost $3,500,000.

The National Plate Glass Co., a subsidiary of the General Motors Corporation, which is erecting a plant at Ottawa, Ill., recently took bids on the super-structure of a pot house and a machine shop unit.

The Waller Mfg. Co. has added a brass and aluminum foundry to its plant at East Dubuque, Ill.

The Woodmanse Mfg. Co., machinist and founder, Freeport, Ill., is adding another story to its west building at the cost of $10,000. The general offices and display room are to be located on the second floor and the machine shops in that building will be extended into the space now occupied by the offices.

The Lindell Drop Forge Co., Lansing, Mich., has awarded contract for a forging plant, 60 x 300 ft. The company will confine its production to forgings of light and medium weight, which can be handled by board hammers exclusively.

The Reo Motor Co., Lansing, Mich., has started the construction of an addition which will double the size of its power plant.

The International Lamp Corporation, 736 West Monroe Street, Chicago, contemplates the erection of a new plant on four acres recently acquired in Cicero, Ill.

The Burr Co., Champaign, Ill., manufacturer of castings and fabricated steel specialties, has been purchased by G. S. Burtis, H. B. Morrow and Robert Beaird. Mr. Burtis is president of William Garrigue & Co., chemical engineers, Chicago, Mr. Beaird is president of the Robert Beaird Corporation, industrial engineer, Chicago, and Mr. Morrow was formerly superintendent of the tractor works of the International Harvester Co.

The Citizens Gas & Electric Co., Waterloo, Iowa, has arranged an expansion program calling for an expenditure of $1,000,000, including work now in progress. Additional electric equipment to be installed will cost $300,000; hydroelectric power station at Cedar Falls, $200,000; Waterloo River power plant, $125,000; with remainder of the fund for power dam construction and miscellaneous work.

The Minnesota-Edison Co., St. Cloud, Minn., has been organized by Frank H. Hughes, St. Cloud, and associates, with capital of $11,000,000. It will take over existing power properties in this section, including the electric generating plant and system at St. Cloud, and contemplates the construction of additional power plants and transmission lines.

The Consumers Power Co., Osage, Iowa, will install additional equipment at its local steam-operated electric generating plant to double approximately the present capacity.

The Colonial Steel Co., 211 West Lake Street, Chicago, has awarded a contract to the Austin Co., 208 South La Salle Street, for a new one-story building at 1440-42 Bryan Place, 50 x 120 ft., estimated to cost $25,000.

The Common Council, Shelbyville, Ill., is planning for the installation of electrically-operated pumping machinery in connection with improvements in the waterworks system. The W. A. Fuller Co., 1917 Railway Exchange Building, St. Louis, is engineer.

The Minnesota Sugar Co., Metropolitan Bank Building, Minneapolis, Minn., is considering plans for the construction of a new beet sugar mill in the vicinity of East Grand Forks, Minn., with power plant, estimated to cost $1,200,000, with machinery. H. A. Douglas is president.

Manual training equipment will be installed in the two-story and basement high school to be erected at Mandan, N. D., estimated to cost $150,000, for which bids have been asked on a general contract. G. R. Horton, Jamestown, N. D., is architect.

The Western Public Service Co., Chadron, Neb., will make extensions and improvements in its local power plant to cost $25,000, including equipment.

Buffalo

BUFFALO, Sept. 24.

PLANS are being arranged by the International Paper Co., Buffalo Avenue, Niagara Falls, N. Y., for a steam-operated power house, estimated to cost $200,000 with equipment.

J. K. Fisher, 1095 Sycamore Street, Buffalo, is planning to purchase sheet-metal working machinery.

The Morrison & Risman Co., Bailey Avenue and Broadway, Buffalo, operating a general iron and steel works, is planning for the installation of a friction saw, Ryerson type; roller table, 120 ft. long, and other apparatus.

The American Kardex Co., North Tonawanda, N. Y., manufacturer of filing equipment, has acquired about two acres adjoining its plant for the erection of an addition, to utilize a portion of the site.

Cole Brothers, Lockport, N. Y., will install a machine shop in their two-story automobile service building, 55 x 90 ft., for which bids are being asked on a general contract. It will cost about $35,000. Nichols & Gardinier, 46 North Pearl Street, Albany, N. Y., are architects.

The Kroehler Mfg. Co., Ely Street, Binghamton, N. Y., manufacturer of furniture, is planning the erection of an addition to cost close to $100,000, including machinery. Headquarters of the company are at Naperville, Ill.

The Standard Thermometer Co., Ithaca, N. Y., has acquired the Dunn-Salmon Building, Syracuse, N. Y., for a new plant and will remove to the new location and install additional equipment.

The Union Carbide Co., Union Street, Niagara Falls, N. Y., has plans for a one-story addition, 75 x 160 ft., to cost $50,000, including equipment.

Fire, Sept. 16, destroyed a portion of the power house and machinery at the plant of the Fredonia Laundry Co., Water Street, Fredonia, N. Y., with loss estimated at $40,000. It is planned to rebuild.

Arthur W. Kreinheder, commissioner of public works, Buffalo, will receive bids until Oct. 23 for equipment for a filter plant at the municipal waterworks, including gages, rate controllers, feed devices, meters, etc. Fuller & McClintock, 170 Broadway, New York, are consulting engineers.

The General Abrasive Co., College Avenue, Niagara Falls, N. Y., has commenced the erection of an addition to cost $20,000.

The Batavia Iron Works, Inc., Batavia, N. Y., organized by James F. Fergsuon and Frederick W. Allen, Buffalo, operating a local iron and steel works, has acquired the plant of the Batavia Car Works, Inc. The new owner will make improvements for the resumption of production, including car wheel manufacture, etc. Mr. Ferguson is president of the company and Mr. Allen secretary and treasurer.

A machine shop will be installed in the two-story automobile building, 60 x 200 ft., to be erected at Oneonta, N. Y., estimated to cost $75,000, for which plans are being prepared by G. L. Tupper, 204-5 Lane Building. The owner's name is temporarily withheld.

Electric power equipment, transmission, conveying and other machinery will be installed in the new plant of the duPont Cellephane Co., a subsidiary of the E. I. du Pont de Nemours & Co., Buffalo, N. Y., for which foundations are under way on the River Road. The plant will be devoted to the production of transparent cellulose products and is estimated to cost $2,000,000 with machinery. L. A. Yerkes is president, and B. M. May, vice-president and treasurer.

Detroit

DETROIT, Sept. 24.

TENTATIVE plans are being considered by the McLean Motor Co., 1103 Military Street, Port Huron, Mich., for new works for the manufacture of automobiles and parts. Harvey Dixon is president.

The Detroit Auto Body Corporation, Detroit, recently organized to take over the automobile body manufacturing plant of the Andrew C. Sisman Co., Beaufait Street and St. Paul Avenue, has tentative plans for the purchase or erection of additional property for increase in output. A stock issue of $900,000 is being sold, a portion of the proceeds to be used for expansion.

Following the sale of its can and tube manufacturing departments to the Continental Can Co., 61 Broadway, New York, the National Can Co., 2566 East Grand Boulevard, Detroit, is arranging facilities at its local plant for the manufacture of automobile radiators exclusively. Present buildings will be retained and additional equipment provided in the vacated departments for increase in output. The Continental company is arranging for expansion to accommodate the necessary increased manufacture of cans and tubes.

Thomas G. Cranwell is president of the last noted organization.

The Ford Motor Co., Highland Park, Mich., is planning the construction of three new units at its body manufacturing works at Iron Mountain, Mich., to cost in excess of $700,000 with machinery. It has acquired property on the Western Parkway, Louisville, and plans the construction of a new assembling plant estimated to cost $600,000 with equipment.

New interests, headed by O. O. Schulz and Charles Hueman, have acquired the plant and business of the Jackson Motor Shaft Co., Jackson, Mich., heretofore operated as a unit of the Earl Motors Corporation, for $500,000. The company will be reorganized and has plans for development in the manufacture of crankshafts, camshafts and kindred products. Mr. Schulz will be president of the new company and Mr. Hueman, secretary; Frank Stiente will be plant superintendent.

Manual training equipment will be installed in the two-story and basement high school addition to be erected at Birmingham, Mich., estimated to cost $125,000. Van Leyen, Schilling, Keough & Reynolds, 3440 Cass Avenue, Detroit, are architects.

The Wills Sainte Claire Motor Co., Marysville, Mich., is perfecting plants for the establishment of a new factory branch at Detroit, and has leased a portion of the Sievers & Erdman Building, Beaubien and East Jefferson Streets. A service and machine repair works will be located in the building at Larned and Rivard Streets.

The Common Council, Marquette, Mich., is arranging a special election to vote bonds for $100,000, for a municipal electric generating plant on the Dead River. Orbison & Orbison, 812 College Avenue, Appleton, Wis., engineers, will prepare plans.

The Olds Motor Works, Inc., Lansing, Mich., is making extensions at its local plant for large increase in production. It is expected to install facilities for about 1000 additional workers. John Scott is plant manager.

The Wilson Foundry & Machine Co., South Saginaw Street, Pontiac, Mich., has awarded a contract to the Bryale Construction Co., Crofoot Building for a two-story and basement addition, including improvements in the present works, to cost approximately $400,000, with machinery. C. B. Wilson is vice-president. Mills, Rhines, Bellman & Nordhoff, Ohio Building, Toledo, are architects.

Manual training equipment will be installed in the new two-story senior and junior high school to be erected at Owosso, Mich., estimated to cost $500,000, for which bids will be called at an early date on a general erection contract. Lane, Davenport & Peterson, Charlevoix Building, Detroit, are architects.

Milwaukee

MILWAUKEE, Sept. 24.

LITTLE change is noted in the character or volume of the demand for machine-tools. Scattering sales are being made from day to day, but in general the market remains quiet. Automotive industries continue the best buyers and still their immediate needs are of rather scant proportions. Used machinery is in perhaps better demand than new, and the supply is fairly large, being augmented from time to time by lots growing out of liquidation of plants. A notable example is the Mitchell Motors Co. of Racine, the trustee of which in the past week or two has sold a relatively enormous quantity of miscellaneous machinery.

The Glancy Malleable Corporation of Waukesha, Wis., has taken over a part of the former Samson Tractor Co. works at Janesville, Wis., and is buying considerable new and used equipment. An order for seven presses and four drophammers has been placed with the Rockford Iron Works, Rockford, Ill. The Janesville unit will serve as the finishing plant for the malleable foundry conducted by the Glancy company at Waukesha, which is occupied with orders for parts for various automobile plants.

Carl Otto, Watertown, Wis., has engaged R. A. Phillips, architect, Beaver Reserve Building, Madison, Wis., to design a public garage, with machine and service shop, 60 x 150 ft., two stories and part basement, estimated to cost $35,000. Foundations will be laid this fall.

The Milwaukee Coke & Gas Co., 187 Greenfield Avenue, Milwaukee, is awarding contracts for buildings and equipment for a new benzol distillery and refinery in connection with its main works, which will replace a unit destroyed by explosion and fire on Aug. 1. The cost is estimated at $250,000. J. W. Schaeffer is president and general manager.

The Nash Motors Co., Kenosha, Wis., will build another addition to its four-cylinder passenger car works on Clement Avenue, Milwaukee. It will be 200 x 600 ft., 26 ft. high of brick and steel, and will be known as a loading building. The general contract has been let to Theodore Stark & Co., 130 Muskego Avenue, Milwaukee.

The Palmolive Co., 42-60 Fourth Street, Milwaukee, will build a branch soap, toilet goods and chemical works at Newark, N. J., the investment to be upward of $1,000,000. Plans will be completed at once and purchases of machinery and equipment made shortly. A complete machine and service shop will be provided. Caleb E. Johnson is president.

The general contract for a new machine shop and automotive service station for Jim's Repair Shop at Fifteenth and Galena Streets, Milwaukee, has been let to the Byrne Brothers Co., 3112 Burleigh Street, by Frank Howend, architect, 65 Wisconsin Street. With equipment now being contracted for, the cost will be about $25,000.

The Cedar Grove Shoe Mfg. Co., Cedar Grove, Wis., is buying shoe machinery, motors, etc., for a two-story addition, 38 x 144 ft., designed by Dick & Bauer, architects, 811 State Street, Milwaukee. Bids for the construction work closed Sept. 22.

The L. F. Schoelkopf Co., Ford distributor, 210 East Washington Avenue, Madison, Wis., is taking bids this week through Small & Flad, architects, for a four-story addition, 43 x 83 ft. The upper floors will be added to the service department and machine shop, for which additional equipment will be purchased.

The Lakeside Bridge & Steel Co., North Milwaukee, is in the market for a rotary planer, 36 to 48-in. head, with or without turntable.

Cleveland

CLEVELAND, Sept. 24.

LOCALLY, the market is quiet and sales confined for the most part to single machines. The Humphrey Mfg. Co., Mansfield, Ohio, which will build a new foundry and machine shop, as reported last week, has sent out an inquiry for about ten standard machine tools and for a 5-ton and 7½-ton electric traveling crane. Manufacturers of automatic screw machinery report an improvement in orders for from one to three machines, but business with machine tool builders in some other lines is lighter than a few weeks ago. Some business is pending in the Detroit automotive field, including machinery requirements for the Rickenbacker Motor Co., which is planning to double its output.

The Japanese Government is inquiring for machinery for rebuilding arsenals destroyed in the earthquake. Inquiries for automatic screw machines have reached agents of American machinery houses in Japan and have been cabled to this country. So far, they have been rather indefinite. Manufacturers may await actual orders from the Japanese Government or may decide to consign machinery to their Japanese agents with the expectation that they will receive orders later. In addition, inquiry has also come from Japanese houses in New York for punching and shearing machinery with a view of finding what manufacturers have in stock and lining up equipment to fill any orders that they may secure from Japan.

The Templar Motor Car Co., Cleveland, has been organized to take over the Templar plant which for some time has been in receivership. T. L. Hausmann, receiver, is president of the new company. None of the members of the former Templar organization is affiliated with the new organization, which will have a capital stock of $2,500,000 in preferred stock and 100,000 shares of no par common stock.

Baker Brothers, Toledo, Ohio, have placed contract for the erection of a two-story machine shop.

The Elyria Foundry Co., Elyria, Ohio, a subsidiary of the Brown Hoisting Machinery Co., has purchased the adjoining plant of the Elyria Machine Co. and will use it for enlarging its foundry capacity. It includes a machine shop, about 150 x 160 ft., which will be used for a foundry and a shell shop, 60 x 300 ft., which will be converted into a pattern storage department. The plant of the Elyria Machine Co. has not been operated for a long time and its machinery equipment was recently sold at auction.

The Pioneer High Speed Machine Knife & Tool Co., which will establish a plant in Cleveland for the manufacture of machine knives, has been incorporated with a capital stock of $10,000 by C. G. Willis and others.

The Citizens Necessity Co., 614 Virginia Street, Toledo, Ohio, is contemplating the erection of a new cold storage plant to cost approximately $350,000, with machinery. Plans will be prepared early next year. J. Murphy is president.

The Vannette Sons Co., Tiffin, Ohio, recently organized, has acquired property for the establishment of a new plant to manufacture lawn mowers and kindred hardware products.

Indiana

INDIANAPOLIS, Sept. 24.

ABOUT 130 acres at Gary, Ind., has been taken over by the American Steel & Wire Co., 208 South La Salle Street, Chicago, as a site for a new plant. It is stated that the project will involve more than $400,000 and that plans will be prepared for building early next year.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Connersville, Ind., estimated to cost $250,000, for which excavations will be made at once. E. E. Dunlap & Co., State Life Building, Indianapolis, are architects.

The Craft Co., Wulsin Building, Indianapolis, manufacturing jeweler, has leased space in the Jackson Building, and will remove to this location. Additional precision machinery will be installed.

Thomas L. Green & Co., 202 Miley Avenue, Indianapolis, manufacturers of bakers' machinery, have plans for a one-story addition estimated to cost $37,000. Charles E. Bacon, 605 I. O. O. F. Building, is architect.

The Public School Board, Indianapolis, will break ground for a new technical high school with vocational department, estimated to cost $100.000.

The Board of Commissioners, Crown Point, Ind., will take bids for a plant for electric light and power service at its proposed sanitarium estimated to cost $350,000. Karl D. Morris, Calumet Building, East Chicago, Ind., is architect.

The C. & G. Pattern Works, 233½ East Maryland Street, Indianapolis, has acquired the plant and business of the Modern Brass Foundry Co., 1026 Kentucky Avenue, consisting of a two-story building, 145 x 145 ft. The new owner will remove the pattern works to the latter location and will merge the plants. Plans are under way for expansion in both departments, with foundry to specialize in the manufacture of automotive products. Charles J. Gisler is president and general manager and Fred D. Crider, secretary.

The Toledo, St Louis & Western Railroad has let contract to Bierd, Lydon & Grandpre, Inc., 340 West Harrison Street, Chicago, for the construction of a 27-stall roundhouse at Frankfort, Ind., to cost about $300,000.

Cincinnati

CINCINNATI, Sept. 24.

ORDERS were more numerous in the machine tool industry last week. A St. Louis manufacturer is reported to have booked a number of machines, some of which were for Cincinnati manufacturers. The Pennsylvania Railroad is placing orders for its Eastern shops, and equipment is being bought for the Harrisburg shops. The list of tools for the Central and Western regions, over 30 in number, has not been placed as yet, but orders will probably go out this week. Some buying by automobile manufacturers is also reported, but the volume is light. Inquiries are increasing for one and two machines.

Railroad buying is expected to develop this fall. The Big Four has issued an inquiry for two large machines and is expected to have another out shortly. The Louisville & Nashville Railroad, the Chesapeake & Ohio and the Southern Railroad are also reported to be considering the purchase of equipment for various shops. Local dealers report a slightly improved demand from machine shops in this district, although the inquiries generally run to small tools. A Philadelphia manufacturer placed an order for four engine lathes this week, two of which were booked by a Cincinnati builder. Used tools are in improved demand.

A tractor manufacturer in this district reports the receipt of an order for a number of machines for shipment to South America and Australia. Japanese interests also have been buyers during the past two weeks.

The Ohio Edison Co., Springfield, Ohio, is contemplating the erection of a 12,500-kw. power plant along the Mad River, work on which is expected to start next spring.

The Standard Sanitary Mfg. Co., Louisville, Ky., is having plans drawn for an addition to its pattern shop to cost $40,000. D. X. Murphy & Bros. are the architects.

The Hamilton Press & Machinery Co., Hamilton, Ohio, has been organized with a capitalization of $100,000 to manufacture power presses and machine tools. The incorporators are Gordon S. Rentschler, Thomas A. Dorsey, Henry A. Rentschler, John H. Black and W. C. Shepherd. Manufacturing operations will be carried on in the plant of the Hoover, Owens & Rentschler Co., and no new works are contemplated in the immediate future.

Manual training equipment will be installed in the new high school to be erected at Sylvania, Ohio, estimated to cost $150,000, for which plans are being prepared by T. McLaughlin and associates, Citizens Building, Lima, Ohio.

The William Powell Co., 2525 Spring Grove Avenue, Cincinnati, manufacturer of valves and steam specialties, has awarded contract to the Ferro Concrete Construction Co., Third and Elm Streets, for a three-story and basement addition, 45 x 160 ft., and improvements in present plant, estimated to cost $150,000.

The Central South

ST. LOUIS, Sept. 24.

CONTRACT has been let by the Heine Boiler Co., 5319 Marcus Street, St. Louis, to the Fruin-Colnon Construction Co., Merchants Laclede Building, for a one-story addition, 80 x 140 ft., to be equipped as a machine and boiler shop, estimated to cost $55,000. Lichter & Jens, St. Louis, are architects.

The Common Council, New London, Mo., plans the installation of electrically-operated pumping machinery in connection with a new municipal waterworks, estimated to cost $35,000. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are engineers.

A power house will be installed by the Jefferson Cotton Mills Co., Pine Bluff, Ark., recently organized in connection with its proposed mill. The complete machinery installation is estimated to cost $250,000.

The Arkansas Bauxite Products Co., P. O. Box 381, Little Rock, Ark., recently organized, is planning the construction of a new factory to manufacture alum and kindred products, estimated to cost $75,000, of which about $40,000 will be expended for machinery and electric power equipment. G. W. Goodman is secretary.

Manual training equipment will be installed in the new high school to be erected at Burlingame, Kan., estimated to cost $95,000, for which bids will soon be asked on a general contract. W. E. Glover, Stormont Building, Topeka, Kan., is architect.

The St. Louis Coffin Co., 1821 Choteau Avenue, St. Louis, will commence the erection of an addition, 125 x 160 ft., estimated to cost $55,000. E. J. Hass, 3228 Magnolia Avenue, is architect.

The Border City Ice & Cold Storage Co., Fort Smith, Ark., has inquiries out for a steam boiler, about 500 hp., and auxiliary equipment.

The Common Council, Owensboro, Ky., plans the installation of electrically-operated pumping machinery in connection with proposed extensions at the waterworks plant, for which a bond issue of $100,000 is being arranged.

The Fred Medart Mfg. Co., Second and Potomac Streets, St. Louis, manufacturer of steel lockers, shelving and kindred equipment, has awarded a general contract to the Woermann Construction Co., Syndicate Trust Building, for a one-story addition, 130 x 260 ft., estimated to cost $100,000, including equipment.

A power house will be constructed at the proposed textile mill of the Tulsa Cotton Mills Co., Tulsa, Okla., recently organized, estimated to cost $200,000. The Southwest Engineering Co., Tulsa, architect and Daniel Hunt president.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for a double-cylinder, single drum hoisting engine with auxiliary equipment; also for a hoisting engine for mining service, single drum, to handle about 1900 ft. of ¾ in. cable.

Carl Willms, Jr., Erwin, Tenn., is in the market for a box car loader, about 10 ft. long, electrically operated.

The Louisville Petroleum Refining Co., Louisville, has selected a site on the Ohio River for a new oil refinery with initial output of about 2500 bbl. per day, estimated to cost $300,000, including machinery. W. M. Mitchell is president.

A cold storage and refrigerating plant, with steel ovens, conveying and other machinery will be installed in a five-story and basement addition to be erected by the Gould Cracker & Candy Co., Kansas City, Mo., to cost about $125,000, including equipment. Shepard & Wiser, 1202 R. A. Long Building, are architects.

The Trenton Cotton Oil Co., Trenton, Tenn., has been organized with a capital of $100,000 to take over the cotton oil mill of the American Cotton Oil Co., recently acquired by R. H. Baker and L. P. Brown, both of Memphis, Tenn., who will head the new company. The same owners have purchased the American Cotton Oil Co. refinery at Memphis for $75,000, and will convert this property for an oil mill machinery works, including repair and used equipment de-

partment. R. H. Patterson, Trenton, Tenn., is also interested in the new organization.

Manual training equipment will be installed in the new senior and junior high school to be erected at Warrensburg, Mo., estimated to cost $185,000, for which excavations will be made at once. J. H. Feit & Co., Kansas City, Mo., are architects.

The Empire Companies, Inc., Bartlesville, Okla., has commenced the construction of a new gas compressing plant at Cambridge, Kan., with capacity of 40,000,000 cu. ft. per day, estimated to cost $90,000. Four gas engines, compressors and auxiliary equipment will be installed.

The Kansas City Light & Power Co., Grand Avenue, Kansas City, Mo., has plans for a one-story automobile service and repair building, 160 x 180 ft., at Ninth and Charlotte Streets, for company motor trucks and cars, estimated to cost $85,000, with equipment.

The Gulf States

BIRMINGHAM, Sept. 24.

BIDS will be received by the supervising architect, Treasury Department, Washington, until Oct. 16, for a power plant with complete equipment, and refrigerating equipment, for the National Home for Lepers, Carville, La.; also for one engine-generator.

W. M. Smith & Co., P. O. Box 1709, Birmingham, have inquiries out for an air compressor, 80-hp. boiler, and auxiliary equipment.

The Gadsden Ice & Fuel Co., Gadsden, Ala., recently organized with a capital of $150,000, will take over and expand ice-manufacturing plants on local site and at Attala, Ala. Otto Agricola is secretary.

The Dallas Power & Light Co., Dallas, Tex., has arranged for an increase in capital from $3,500,000 to $4,500,000, a portion of the proceeds to be used in connection with a new local electric generating plant.

Manual training equipment will be installed in the new senior high school to be erected at Denton, Tex., estimated to cost $150,000, for which excavations will soon be made. The Board of Education is in charge.

Work is in progress on the erection of a new cotton oil mill at Lubbock, Tex., and equipment to provide for an output of 110 tons a day will be installed. The plant will be owned and operated by the Lubbock Cotton Oil Co., and is estimated to cost $275,000, including equipment.

The Common Council, Bayou la Batre, La., is interested in a project to build a municipal ice-manufacturing plant, to cost about $50,000 with equipment.

Plans are under way for the installation of electrically-operated pumping machinery in connection with a waterworks plant at White Springs, Fla., estimated to cost $30,000. The Common Council is in charge.

V. K. Bessonette, P. O. Box 191, Waco, Tex., has plans under way for the establishment of a plant to manufacture electric storage batteries.

The Desdemond Electric Co., Desdemona, Tex., is planning for the installation of additional equipment, including oil-operated engine, electric generator, switchboard and auxiliary machinery.

Edward Tucker, Ocala, Fla., is planning the construction of a one-story automobile service building, 110 x 200 ft., with machine shop, estimated to cost $50,000 with equipment. A. C. Price, Bradentown, Fla., is architect.

The J. Decker & Sons Sales Co., Dallas, Tex., meat packer, has commenced the construction of a new cold storage plant at Griffin and Laws Streets, estimated to cost $60,000, including equipment.

The Florida Food Products, Inc., P. O. Box 96, Stuart, Fla., is planning the construction of an electric power house, and will make inquiries for equipment at once. A refrigerating plant will also be installed. The company was organized recently with a capital of $500,000.

The Weekers Auto Parts Co., New Orleans, is planning to rebuild the portion of its works at Carondelet and Erato Streets, recently destroyed by fire with loss estimated at $50,000.

The Magnolia Carbon Co., Monroe, La., recently organized with a capital of $500,000, is planning the construction of a gasoline refinery in connection with its proposed carbon plant. The entire works will cost $400,000, including machinery. W. L. Ethridge, secretary, will be in charge of all equipment purchases. W. H. Price, Swartz, La., is construction engineer.

The Indiana Truck Corporation, Miami, Fla., is planning to rebuild the portion of its service and repair building at 316 South Miami Avenue, recently destroyed by fire with loss estimated at $55,000.

The Valley Ice & Electric Co., McAllen, Tex., will install electrically-operated pumping machinery at the local waterworks.

The Dyer Mfg. Co., Bell, Cal., is inquiring for an 8-ft., 10 gage power brake, similar to Keenes.

Canada

TORONTO, Sept. 24.

INQUIRY for machine tools continues a strong feature in this market. Buying, however, is chiefly confined to small lots and preference is shown for labor and time saving equipment. Second hand and rebuilt machine tools are in good demand.

The Marvel Equipment Co. of Canada, a subsidiary of the Marvel Equipment Co., Cleveland, Ohio, manufacturer of portable outfits, oil and grease pumps, etc., will establish a fatcory at Belleville, Ont.

The General Motors Corporation of Canada, Oshawa, Ont., is building an assembling plant on Division Street to cost $300,000.

The Town Council, Cochrane, Ont., will install a sewage disposal plant to cost $25,000. Work will be done under the supervision of the town engineer, who will purchase all equipment.

The Alberta Granite & Marble Works, Edmonton, Alberta, is having plants prepared for a factory on 101st and 107th Streets, to cost $10,000.

Plans are being revised for the erection of a new foundry for the Canadian Westinghouse Co., Aberdeen Street, West, Hamilton, Ont.

The B. C. B. Berry Growers' Union, New Westminster, B. C., will build a cold storage plant to cost $75,000.

D. Bell, Collingwood, Ont., has the general contract for the erection of a plant for the Canadian Postal Lock-Nut & Bolt Co.

The Harbor Commission, Montreal, is erecting a machine shop to cost $40,000.

Plans are being prepared for a paper mill at St. Catherines, Ont., for the Garden City Paper Co., Merriton, Ont., to cost $400,000. W. J. Trible, 54 University Avenue, Toronto, is engineer and general contractor.

An addition to the power plant at Yorkton, Sask., to cost $63,000 is contemplated. It will include the purchase of two 300 hp., Mirrless Bickerton and Day Diesel engines, two generators, and other equipment.

The Municipal Electric Light & Power plant at Melville, Sask., was destroyed by fire with a loss of $100,000.

The plant of the International Fibre Board Co., Ltd., Penetanguishene, Ont., was destroyed by fire with a loss of $150,000.

The Canadian Roofing Co., Winsdor, Ont., is making arrangements for the erection of a new manufacturing plant to replace that recently destroyed by fire and is interested in equipment.

Construction work is under way on the erection of an addition to the plant of the Pendrith Machinery Co., 970 Queen Street, West, Toronto. The Dowling Construction Co., Yonge Street, Toronto, has the general contract. Some equipment has yet to be purchased.

The W. & C. Window Regulator Co., Chesley, Ont., is contemplating the erection of a manufacturing plant to cost $100,000 for the manufacture of a patent window regulator. R. J. Ranney, manager, is inquiring for equipment.

The Ottawa River Power Co., Ltd., 145 St. James Street, Montreal, is in the market for power and transmission equipment and machinery.

The Universal Wheel Co., Ltd., Windsor, Ont., has leased the building formerly occupied by the Universal Button Co., and will commence the manufacture of disk automobile wheels.

Construction will start at an early date on a gas plant for the Winnipeg Electric Railway, Winnipeg, Man. It will cost approximately $1,000,000 and will be equipped with the latest machinery.

Dustless Sifters, Ltd., Brantford, Ont., is in the market for equipment to manufacture ash sifters, fuel saving devices, etc. I. Lunenfeld is the purchasing agent.

The E. B. Myers Co., Ltd., Montreal, will make purchases for the manufacture of radio equipment, etc. F. Callaghan, 222 St. James Street, Montreal, is receiving quotations.

Firstbrook Brothers, Ltd., Toronto, has purchased a site on

Caledonia Road, and will erect a factory for the manufacture of builders' supplies, etc.

The De Laval Co., Peterborough, Ont., will build addition to its plant for the manufacture of cream separators.

The Pacific Coast

SAN FRANCISCO, Sept. 19.

NEGOTIATIONS are under way between the Paramount Motors Co., Azusa, Cal., and city officials for a site for the construction of a new plant to manufacture automobiles. The company agrees to expend at least $100,000 for the works, including equipment.

The United States Steel Products Co., Los Angeles, has awarded a contract to Gutleben Brothers, 609 I. W. Hellman Building, for the erection of a one-story distributing plant and works, 300 x 400 ft., at Vernon, Cal., with one-story office, 50 x 100 ft. Hoisting, conveying and other equipment will be installed.

The Washington Water Power Co., Spokane, Wash., has acquired the plant and property of the Okanogan Valley Power Co., and plans the erection of an addition to the hydro-electric generating station at Similkameen Falls, to increase the capacity about 2500 hp.

The Board of Public Works, Portland, Ore., is arranging an appropriation of $17,400 for the purchase of tools and equipment for installation in the new four-story municipal shop and warehouse to be erected at Fourth and Market Streets, to cost $35,900 exclusive of machinery.

The Pacific Portland Cement Co., Pacific Building, San Francisco, has tentative plans for a new cement mill in the vicinity of Redwood City, Cal., with power plant, to cost $700,000 with machinery.

S. G. Beach & Son, Placerville, Cal., are planning for extensions in their box factory, including the installation of electric power and other machinery, to cost $30,000. A new company is being organized to take over and expand the company, in which Seth G. Beach, head of the present company, will be interested.

The Oakland Foundry & Furnace Co., Oakland, Cal., is arranging for the removal of its plant to a new site acquired on Third Street, West Berkeley, Cal., where operations will be considerably extended to cover the manufacture of a patented furnace, and operation of a general commercial foundry. Officers of the company are interested in the Newman Pattern Works, Oakland, and this plant will be removed also to the new location and operated jointly with the foundry. John Newman heads both organizations; John E. Hyatt, mechanical engineer, is secretary and treasurer.

The Pacific Power & Light Co., Portland, Ore., is planning the construction of a new power house at Pendleton, Ore., to cost $140,000 including equipment.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, operating hydroelectric and other power plants in northern California, will issue bonds for $10,000,000, a portion of the proceeds to be used for extensions. Work will soon commence on a new steam-operated power plant on Stevenson Street, estimated, to cost $250,000 with machinery.

The Santa Fe Railway Co., Kerchkoff Building, Los Angeles, has awarded a contract to Robert E. McKee, El Paso, Tex., for a new pipe and tin-working shop at San Bernardino, Cal., to cost $55,000.

The Common Council, Seattle, Wash., has approved an appropriation of $50,000 for extensions in the municipal steam-operated electric power plant, used for auxiliary service, to include the installation of superheaters, oil-burning system and other equipment.

STEEL AND INDUSTRIAL STOCKS

Market Remains Sluggish and Unsettled—Prevailing Tone Is Bearish

Industry has staged no autumn quickening to buoy stocks above the sluggish condition into which they have lapsed and from which the course of limited trading has made little departure. Steels revived at midweek, but the new strength waned later in the week. The conciliatory foreign mood could not prevail against domestic uncertainty. United States Cast Iron Pipe & Foundry displayed exceptional strength, obviously reflecting favorable earnings.

The range of active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers...	39¾	42	Int. Har. new...	75½	76¾
Allis-Chalm. pf..	92½	93	Lima Loco.	62	63¾
American Can...	90⅝	93⅝	Midvale Steel...	25¼	26⅛
American Can pf.	107½	107⅝	Nat.-Acme	10¼	10½
Am. Car & Fdry.	155¼	158	Nat. En. & Stm.	55⅝	59
Am. Car & F. pf.	117	117	Nat. En. & S. pf.	97	97
Am. Locomotive.	68	70½	N. Y. Air Brake.	35½	37½
Am. Radiator...	80	80	Otis Steel	7¾	8¼
Am. Steel Fdries.	35	36	Otis Steel pf....	49	49
Baldwin Loco...	112¾	117¾	Pressed Stl. Car	48	52
Bald. Loco. pf...	113	113	Ry. Steel Spring.	99½	102
Bethlehem Steel.	47	49¾	Replogle Steel..	10¾	11½
Beth. pf. new...	91¼	92¼	Republic	42¼	44⅝
Beth. Stl. 8% pf.	105	106	Republic pf.....	87	87½
Br. Em. Steel...	6	6	Sloss	43	44
Br. Em. Stl. 2 pf.	16½	16⅝	Transue-Williams	31	31
Chic. Pneu. Tool	80	80¾	U. S. Pipe.....	29¾	34½
Colo. Fuel	25	27	U. S. Pipe pf....	74	78⅞
Crucible Steel...	58¼	62⅛	U. S. Steel.....	86⅝	89⅛
Gen. Electric....	167⅝	169½	U. S. Steel pf..	116⅝	117¼
Gt. No. Ore Cert.	26½	29¼	Vanadium Steel.	29	30
Gulf States Steel	74¾	79⅝	Wh'ouse Air Br.	80½	81
Inland Steel.....	32	33	Y'gstown S. & T.	65	67

Annual Meeting of Canadian Locomotive Co., Ltd.

The Canadian Locomotive Co., Ltd., Kingston, Ont., has unfilled orders to the extent of $2,300,000 and it was announced after the annual meeting that the plant had enough work on hand to keep it running well into next spring. F. G. Wallace of Pittsburgh, resigned the presidency, and Aemilius Jarvis was appointed to succeed him, also retaining the chairmanship of the board, William Casey, vice-president and general manager, and William Harty, Jr., secretary, were reelected, as were the directors.

The usual quarterly dividend of 1¾ per cent on preferred stock and 1 per cent on common stock was declared. In his statement to the shareholders, Mr. Jarvis, chairman of the board, pointed out that there had been a shut down of the plant for over 20 months and that very little profits from the new business had entered into the current year. Despite this the operating profits, together with the income from the investments, has enabled the company to show an operating profit for the year of $7,401 over the charges for the shut down period, leaving the surplus after payment of interest at $1,007,317. There were Victory bonds at cost to the amount of $1,040,760. The amount of the accounts payable including a bank loan of $750,000 was $1,273,920, whereas the current assets, cash, and investments amounted to $2,487,667. Since 1917 there has been an average net earning of $432,706 per annum.

Plans of New Companies

The C. G. Spring Co., 1819 Broadway, New York, has been incorporated with capital stock of $50,000 to manufacture automobile springs and bumpers. Plants are maintained at Kalamazoo, Mich., Detroit and Cleveland. Later the company expects to install facilities for manufacturing fittings. Christian Girl is president and A. C. Bergmann is New York manager.

The American Batteries, Inc., care of H. C. Curran, 111 Broadway, New York, has been organized with $1,500,000 capital stock to manufacture batteries. Its plant is located at Waco, Tex., and is now in operation.

The Eden Washer Corporation, Paterson, N. J., incorporated with capital stock of $325,000, will manufacture washing machines. The Robbins & Myers Co., Springfield, Ohio, will build the machines by contract. All jigs, tools and machinery of the new company are now being moved and production should begin about Nov. 1. Paul V. D. Brokaw is president.

The du Pont Cellophane Co. has been organized as a subsidiary of E. I. du Pont de Nemours & Co. and will build a $2,000,000 plant on the Niagara River at Buffalo. Cellophane, the chief product, is a cellulose substance. L. A. Yerkes is president; B. M. May, vice-president and treasurer; M. du Pont Lee, secretary.

Construction has begun on the new copper smelter at San Luis Potosi, Mexico, of the Towne Mines, Inc., recently organized by the American Smelting & Refining Co. to take over mines formerly owned by the Compania Metalurgica Mexicana. The smelter will have a capacity of 30,000 to 50,000 tons of charge per month and will cost approximately $1,500,000. The work of rehabilitating the Towne properties at Santa Barbara has begun, large pumping equipment now being installed. It is expected that the company will be ready for operation in the fall of 1924.

The Wright Machine Co., Worcester, Mass. has been incorporated with $250,000 preferred stock and 2500 shares, no par value, and will manufacture machine tool products.

It has purchased property formerly owned by the R. F. Phillips Mfg. Co., Worcester, and the American Steam Gauge & Mfg. Co., Boston.

The Florida Steel & Wire Co., Jacksonville, Fla., has been incorporated with $225,000 capital and will establish a plant for the manufacture of wire nails. It is understood the company may manufacture barbed wire and other fencing later on.

The United Metal Products Co., Canton, Ohio, has been organized to purchase the property formerly owned by the Central Metal Products Corporation. It will manufacture hollow metal doors and drawn steel and bronze moldings.

The Heateconomy Corporation, New York, has been incorporated with capital stock of $10,000 and will manufacture apparatus for oil burners. Manufacturing will be done by contract, a few hundred of the devices to be ordered immediately. Further details of operation are indefinite. Incorporators are E. T. Crepeau and J. A. Mallon. Address care of O. P. Carpenter, 154 Nassau Street, New York.

A. M. Kennedy & Co., Inc., New York, has been organized to manufacture printing presses and parts, but no manufacturing is contemplated at the present time. The company will act as distributor in these and kindred lines. Temporary offices will be located at 396 Broadway. Bernard Berger, 305 Broadway, is representative.

The Leff Electrical Co., Brooklyn, has been incorporated with capital stock of $20,000, to manufacture electrical specialties. Temporary headquarters are at Canarsie, Brooklyn. Manufacturing will not be undertaken at present. The company will confine its activities to electrical contracting. J. H. Leff, 499 Hart Street, Brooklyn, represents the company.

The Wallace-Lispenard Cotton Harvester Co., care of H. M. Wise, 7 Dey Street, New York, organized some time ago to manufacture cotton harvesting machinery has postponed manufacturing plans for the present. A few machines will be built for demonstration purposes and when quantity production is undertaken the work will be done by contract. Incorporators are L. H. Cohn and George Lispenard, Lispenard & Park, 250 Canal Street.

The Sar Vant-Weatherdon Co., 331 Madison Avenue, New York, has been organized to manufacture machinery. Plans for operation have not been perfected. The incorporators are W. N. Sar Vant, F. J. E. Weatherdon and C. D. Landry.

The New Matic Machine Corporation, New York, recently incorporated with capital stock of $50,000 to manufacture machinery, will establish its plant in New York. Equipment will be installed and operations will be under way as soon as possible. Address care of Levisohn, Niner & Levisohn, 13 Astor Place.

The King Partition Block Corporation, New York, has been incorporated with $15,000 capital stock, and will manufacture cement blocks. Plans are not definite. Frederick L. Keppler, formerly of the Keppler Blair Construction Co., who now is located at 1799 First Avenue, heads the company.

The Commerce Motor Truck Co. has been organized to continue the business of the Motor Car Co., Detroit. The new organization is headed by Walter Parker, who planned and directed the formation of the Commerce company.

The Great Eastern Sugar Co., incorporated to engage in an extensive sugar beet business on Long Island, has planned to erect a large factory. Kurt Grunwald, consulting agriculture engineer of Denver and Medford, L. I., is the principal organizer. The company is ready to spend $7,000,000 in this development. In connection with a colonizing plan the company has purchased 40,000 acres of land which will be equipped with necessary buildings and machinery.

The Goodwin Antipilferage Automatic Lock Corporation, Woolworth Building, New York, has been incorporated with $50,000 capital to manufacture locks. Negotiations are being made to have the work done by contract and the company wishes to communicate with firms equipped for this line. J. D. Jolkovski heads the company.

The Empire Block Corporation, Utica, N. Y., has been organized with $50,000 capital stock to manufacture cement blocks. It is a subsidiary of the Empire Wall Plaster Co., Utica. L. W. Kunkel, G. Hopp and J. Ferguson are the principals.

The Maximum Motors Corporation., 2 Rector Street, New York, incorporated several months ago to manufacture machinery, has built six motors with a new valve design and will continue testing operations for a few weeks. Manufacturing will be done eventually but plans are not yet being considered. C. Mackay, Room 1624, heads the company.

The Oil-O-Matic Heating Corporation, 439 Boush Street, Norfolk, Va., has been organized to handle automatic oil burners, oil burning equipment and oil. C. C. Carper is general manager.

The Tice Tinsley Steel Co., Terminal Building, Youngstown, Ohio, has been organized with $50,000 capital stock to succeed the Tice Steel Co., that city. The new company will deal in sheets, plates, strip and terne plate seconds, as well as surplus mill supplies. Charles A. Tice was formerly assistant general manager of sales of the Brier Hill Steel Co. George C. Tinsley was vice-president of the Commercial Shearing & Stamping Co., general manager of the sheet and tin plate department, David J. Joseph Co., Youngstown, and was for several years with the Sharon Steel Hoop Co., Sharon, Pa.

The Hoops-Wood Shipyard, Inc., Eightieth Street and Jamaica Bay, Rockaway Beach, N. Y., organized to operate a shipbuilding plant, will do repair work and overhauling. H. P. Woods and William Hoops are the principals.

The Electric Lumber & Mfg. Co., care of A. M. Crawford, Yeon Building, Portland, Ore., incorporated with capital stock of $40,000, will operate a plant making carbuilding material. The mill will be operated by 500-hp. motors. W. H. Richardson is president and A. M. Crawford, secretary.

The Royal Motor Coach Co., Inc., 285 Bloomfield Avenue, Caldwell, N. J., recently organized with $500,000 capital stock, will purchase equipment to provide for an initial capacity of production of automobiles.

The Baker Car Co., Lexington, Ky., recently organized with $50,000 capital stock, will build a factory and install machinery for the manufacture of mine cars and foundry products. W. G. Baker is president; Henry P. Fening, Jr., vice-president; M. E. Brown, secretary; J. N. Baker, treasurer.

The Burke Steel Co., Rochester, N. Y., has been organized as a consolidation of the Rochester Forge Co., Inc., and the Burke Steel Co., Inc., equipment recently installed will more than double the output of the two units. W. H. Kline is president.

The Public Service Co. of Colorado has been organized to acquire the Denver Gas & Electric Co. and the Western Light & Power Co., Boulder, Colo. Plans are under way for the construction of new steel tower transmission lines and generating plants. The new company will have capital stock of $15,000,000 and is an interest of Henry L. Doherty & Co., New York.

The New York Air Brake Co. reports net operating income after interest for the first eight months of 1923 of $2,007,595. President Starbuck reported unfilled orders as of Sept. 1 of approximately $2,225,000, and declared that the outlook was very good. The regular quarterly dividend of $1 per share was declared on common stock.

NEW TRADE PUBLICATIONS

Controller Valve.—Bristol Co., Waterbury, Conn. Bulletin No. 319 of 16 pages is devoted to the Bristol-Fuller controller valve for air and oil, in connection with oil-burning installations and governed by temperature control. Both the fuel and air valves are operated by electric motor and are carefully timed. Automatic recording instruments place their records upon a chart. A variant is a controller valve for air and gas, while still another type handles air, gas, water and steam. A safety-stop valve is used in connection with the equipment.

Filtration for Flue Gas.—Uehling Instrument Co., Paterson, N. J. Bulletin No. 116-A of 8 pages is devoted to the "pyro-porus" filter, and to its use in flue gas analysis. Drying and desulphurizing the gas are given adequate attention, with a final section on gas line tubing. The bulletin tells how ordinary difficulties met in gas analysis may be avoided.

Contractors' Pump.—American Well Works, Aurora, Ill. Bulletin No. 169 describes a centrifugal pump operated by a gas engine through flexible coupling, the unit being mounted on a rigid base about 3 ft. x 17 in. overall. The entire unit measures about 4 ft. 6 in. in length, and 23 in. in width. The pump is recommended for heads up to 57 ft. and delivery from 70 to 250 gal. per min.

Oilstone Tool Grinder.—Oliver Machinery Co., Grand Rapids, Mich. Four-page folder describing No. 585 motor-driven grinder. The machine includes an emery cone, a leather stropping wheel, two oilstone wheels and the tool holder, and stands upon a cast iron pedestal. It is portable, deriving power from any electric light socket. Ball bearings and automatic lubrication make it easy running. The pan measures 25 x 28 in.

Temperature Control Apparatus.—The Bristol Co., Waterbury, Conn. Bulletin No. 319, on its new Bristol-Fuller controller valve for use in connection with temperature control, particularly of interest to those engaged in heat-treating of metals.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:
- Refined iron bars, base price ..... 3.54c.
- Swedish charcoal iron bars, base ..... 7.25c.
- Soft steel bars, base price ..... 3.54c.

Hoops, base price ..... 5.19c.
Bands, base price ..... 4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base ..... 3.64c.
Channels, angles and tees under 3 in. x ¼ in. base ..... 3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier ..... 3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt..	—41	—24	⅛ in. Butt..	— 4	+19
¼ in. Butt..	—46	—32	¾ in. Butt..	—11	+ 9
1-3 in. Butt .	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap....	— 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap.	—34	— 6	7-12 in. Lap.	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High brass sheet	18 c. to 19 c.
High brass wire	18½c. to 19½c.
Brass rods	15¾c. to 16¾c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	23 c. to 24 c.
Copper tube, seamless	24½c. to 25½c.

Copper Sheets

Sheet copper, hot rolled, 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb..	$6.55 $6.30
		90 lb..	6.65 6.40
		100 lb..	6.75 6.50
IC..	$12.55 $10.70	IC..	7.00 6.75
IX..	13.95 12.55	IX..	8.25 8.00
IXX..	15.55 13.75	IXX..	9.50 9.25
IXXX..	17.10 15.30	IXXX..	10.75 10.50
IXXXX..	18.85 16.80	IXXXX..	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	49c. to 56c.

Copper

Lake ingot	16¾c.
Electrolytic	16¼c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	11c. to 12c.
Solder ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 34c. to 35c.

Old Metals

Business continues quiet although values are a little firmer. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.25
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, October 4, 1923

ESTABLISHED 1855 VOL. 112, No. 14

Distribution of Wealth in the United States

Thorough-Going Analysis Shows the Fallacy of the Claim That "the Rich" Two Per Cent Own 65 Per Cent of the Country's Resources

BY DR. WALTER RENTON INGALLS*

THE spreading of the farmer-labor movement in the West and the ascendancy of Senator LaFollette and Senator Brookhart and others like them foreshadow attacks upon the corporations and wealthy persons of the United States in the next session of Congress. James A. Frear, a member of Congress from Wisconsin, stated the underlying idea in a recent newspaper interview, wherein he was represented as saying the following:

"Undistributed and unlimited profiteering has brought about an unhealthy economic condition when 2 per cent of the people in this country are found to own 65 per cent of all the wealth. . . . Millions of people who are scraping out a bare existence and fighting against a vicious sales tax urged by big business will approve any effort to curb these unconscionable profits."

Genesis of the Error

I do not criticize Mr. Frear, or any of the so-called radical Senators, for entertaining the belief that 65 per cent of the wealth of the United States is owned by 2 per cent of the people, for their belief is founded upon what appears to be good authority and is entertained by more scholarly persons than they. Prof. Homer Hoyt, in the quarterly of the American Statistical Association for March, 1923, discussed this subject, drawing attention to the discrepancy between the bulk of the wealth being owned by the few and the bulk of the national income being shared by the many, the latter having been proved by the National Bureau of Economic Research in a way that has received common assent.

Professor Hoyt remarks that no one has reconciled these apparently conflicting statements and adds that as a matter of fact both of them are correct; following which he proceeds to try to prove that what seems to be a paradox really is not so. A simpler mind would not jump so quickly to the conclusion that both of these conflicting statements are correct, but rather would deduce that one of them is probably wrong, and knowing the nature of the work of the National Bureau of Economic Research on the national income would conjecture that the error is in the statement respecting the distribution of wealth.

The genesis of the latter statement is as follows: It appears in the "Final Report of the Commission on Industrial Relations" (Frank P. Walsh, chairman), published in 1915, wherein it is stated that "the 'rich,' 2 per cent of the people own 60 per cent ' of the wealth."[1]

*Director of the American Bureau of Metal Statistics; formerly editor of *Engineering and Mining Journal*.

[1] The agrarian Senators refer to 65 per cent of the national wealth being owned by "the rich." The Walsh committee says 60 per cent. Dr. King's original statement was that "more than half, in fact, almost three fifths of the property is possessed by this fiftieth part of the people." His statement, therefore, has been magnified in repetition, but we need not waste any space on this.

IS it true that 2 per cent of the people of the United States own 65 per cent of the country's wealth?

Dr. Ingalls shows in this article, which is the most thorough-going study of the subject that has yet been made, that statements that have been given wide currency, as to the concentration of property ownership, are not true. In his book of two years ago, "Wealth and Income of the American People," Dr. Ingalls made a careful analysis of the physical property in the United States. In this article the study is carried farther, with a view to disposing definitely of the fallacy which radical politicians have used so widely in stirring up discontent.

In the next twelve months the changes will be rung on the issue of unequal distribution of wealth, in the effort to array the house of "have not" against the house of "have." Dr. Ingalls' contribution to THE IRON AGE *is thus a most valuable and timely document, and its conclusions should be widely disseminated.*

Mr. Frear, Senator LaFollette and the rest of them therefore find their authority in the report of a Government commission duly transmitted to Congress. That commission was not, however, the original authority for the statement, but adopted it from the book on "The Wealth and Income of the People of the United States," by Dr. Willford I. King, whom the Walsh Commission correctly characterizes as a "statistician of conservative view."

Reference to the work of Dr. King will show that he did not make the statement in quite so positive a way as represented. However, it is unnecessary to split any fine hairs, for the same reference to the work of Dr. King will disclose also that he made his statements upon the strength of very inadequate data, which will not withstand critical analysis. I know that Dr. King himself agrees to this, for he informs me that he is "now in doubt as to whether the amount of wealth escaping probate is not so large as to cause a curve showing the distribution of estates probated to give a very erroneous impression concerning the distribution of wealth among decedents."[2]

We have here an instance of a great misconception that may lead to grievous political consequences. It is founded upon the unsupported statement of a single economist, made eight years ago when the data available were far less than what exist at present; a statement that, moreover, is based upon a method of computation whose very validity is challenged. It has been worth while to go into this explanation, even at the risk of being tedious, for if we are going to try to ascertain the truth it is desirable first to expose previous errors and misconceptions. This is, moreover, an excellent example of how unsupported statements are perpetuated, are incorporated and indorsed in Government reports, and become accepted as facts without anybody stopping to consider whether they really are so or not.

Inventory of the National Wealth

A study of the distribution of wealth in the United States will surely be complicated and probably more or less uncertain in its results. A method that immediately suggests itself is an analysis of the inventory of the national wealth. In my book on the "Wealth and Income of the American People" I offered such an inventory, expressed in terms of the dollar of 1913. My totals were higher than would be indicated from Census estimates for previous years, and I made it clear why the previous Census estimates are to be viewed as untrustworthy and should not be used in comparison with other estimates. I made my own estimates in great detail and was quite frank in explaining how I arrived at them. I am unaware of any serious criticisms of them. I feel justified, therefore, in assuming that my figures are nearly enough correct.

I estimated that the wealth of the United States at the end of 1920 was as follows:

Physical property in the United States	272.8 billion dollars
Foreign credit balances	17.8
Total	290.6

I expressed the opinion that the foreign credits are a doubtful asset. In so far as they are owed to the nation this will not enter extensively into a discussion of the distribution of wealth, for the loss, if there be any, will be spread over all classes of people. Any loss on commercial credits and foreign investments will fall, however, mainly upon the banks, corporations and investors. It may be remarked here that a considerable loss has already been sustained due to the extensive speculation in foreign currencies.

Wealth Classified

I divided my estimate of the physical wealth at the end of 1920 according to heads. A condensation thereof is as follows, in billions of dollars:

Owned by the people in common	17.125
Farms, live stock, etc.	75.035
Houses in cities and towns	55.244
Other urban real estate	23.676
Factories, railroads, mines, etc.	57.320
Furniture, clothing, jewelry, etc.	15.900
Gold and silver bullion and coin	3.823
Automobiles	4.594
Ships, yachts, wharves, drydocks	1.063
Stocks of goods	19.000
Total	272.780

An itemization of the industrial property, including public utilities, as of the ends of 1916 and 1920, is as follows. It will be observed that in these estimates the value of the railroads of the United States is put at a much higher figure than was tentatively allowed by the Interstate Commerce Commission:

	1916	1920
Mines	$3,880,000,000	$3,269,000,000
Railroads, steam	24,500,000,000	25,500,000,000
Railroads, electric	5,361,734,000	4,000,000,000
Express companies	38,597,253	34,691,199
Manufacturing machinery and tools	14,500,000,000	15,500,000,000
Meat packing plants	250,000,000	350,000,000
Telephones and telegraphs	1,475,000,000	1,800,000,000
Pullman cars	130,000,000	150,000,000
Tank cars	63,000,000	180,000,000
Petroleum pipe lines	400,000,000	608,000,000
Petroleum tankage	50,000,000	60,000,000
Light and power plants	2,900,000,000	4,058,000,000
Gas lighting plants	1,250,000,000	1,500,000,000
Water works, privately owned	300,000,000	310,000,000
Totals	$55,098,331,253	$57,319,691,199

Of the above enumerated wealth a good deal may be allocated as being of general ownership besides what has been so specified. Thus some of the gold and silver bullion is owned by every person who possesses gold and silver certificates, which he uses as currency. The wharves and dry docks are largely municipally owned. The estimate for the value of ships represents mainly the national fleet. There is certainly a wide distribution in the ownership of the automobiles, about one-third of which is ascribed to the farmers of the country. Also in the ownership of furniture, carriages, clothing and jewelry. Although the well-to-do possess a great deal more of those things per person their number is too small to enable their aggregate of such possessions to loom very big. The stocks of goods are owned partly by the producers of raw materials, including the farmers, partly by the manufacturers who fabricate them, and partly by the merchants, wholesale and retail, who distribute the finished products.

Ownership of Real Estate

The urban real estate, valued at $78,920,000,000, represents about 20,000,000 houses and apartments, outside of the farms. It is well known that to a large extent the American people own their own homes. According to the last census 55 per cent of the families in the United States rented the houses in which they lived, while 45 per cent held title to them. Of the latter about five-eighths of them held their property free from encumbrance, while three-eighths held it subject to mortgage. These percentages are calculated upon all of the dwellings, including those on the farms; but we may apply them to the 20,000,000 urban dwellings without going far astray.

In my "Wealth and Income of the American People" I estimated the 20,000,000 houses and apartments available for use by people other than farmers in 1916 as being of an average value of $2,880, including the land on which they stood, giving a grand total of 57.6 billion. My estimate for the value of other urban real estate was 24.7 billion. With the aid of the

[2] Dr. King's original deductions were drawn from an examination of probate records of Massachusetts and Wisconsin.

Census figures we may proceed further with the analysis. Of the 57.6 billions in houses, about 31.6 was owned by landlords. Of the 26 billion remaining about three-eighths, or roughly 10 billion, was mortgaged. Inasmuch as mortgagees are generally indisposed to lend more than two-thirds the value of real estate, we may conjecture reasonably that the total of mortgages on the homes occupied by owners in the United States was about 6 2/3 billion dollars.

Farm Capital

Dr. L. C. Gray of the U. S. Department of Agriculture, at a meeting of the American Economic Association in December, 1922, presented a compilation and analysis of the wealth and indebtedness of the farmers of the United States. He estimated the total farm capital at about 95 billion dollars, of which he reckoned about 73 billion dollars as belonging to farmers who owed about 11 billion, making the net worth of the farmers proper about 62 billion. Dr. Gray estimated that nearly half of the total farm property not owned by farmers was held by retired farmers. It may be conjectured that the remaining ownership of farms is largely by local merchants and bankers. These data are not seriously out of tune with my own estimates.

It will be seen that Dr. Gray's estimate of the net worth of farmers is about 21 per cent of my estimate of the total national wealth, while his estimate of the farm capital is about one-third. This in itself is an important thing upon which to fix attention, for it is well known that the "rich" class that is especially the target for invective and taxation, is not in the habit of either investing in farms or lending money upon them. If 33 per cent of the wealth of the United States be in farm capital the "rich 2 per cent" of the people could not own 65 per cent of the wealth and leave anything for the millions of people other than themselves and the farmers, which result would be a *prima facie* absurdity.

Mortgages on Real Estate

Obviously this brings us right up to the consideration that the titular holders of the wealth of the United States may not actually own it free of claim by the money lenders. The farmers of the country do not own their farms in full. The townspeople who have title to their houses to a certain extent have only an equity in them. I have already estimated the mortgages on the latter class of property as amounting to about 6 2/3 billion dollars. According to the last census there were mortgages on about 40 per cent of the farms, aggregating about 8 billion dollars. It does not follow from this, however, that such claims appertain to "the rich." The greatest lenders of money to the farmers are the life insurance companies, whose assets are the combined property of many millions of policy holders. So it is with the mortgages on urban real estate, the money for which comes largely from the life insurance companies and the savings banks, wherefore the claim upon these forms of property rests among many millions of people.

Government, State and Other Bonds

Besides mortgages on real estate, claims on the physical wealth of the United States by others than the titular holders of the property are represented by Government bonds and notes, State, county and municipal bonds, corporate bonds, and notes for bank loans. The obligations of the Federal Government are, of course, collectible out of everything through the medium of taxation. The State, county and municipal bonds are in the same way first liens on all the property within the respective political subdivisions.

The public debt of the United States, June 30, 1922, was about 23 billion dollars, represented chiefly by Liberty and Victory bonds. It was estimated by Treasury experts at that time that there were at least 10 million holders of these bonds. There were some concentrated holdings. Thus, at the end of 1922 the national banks owned 2 2/3 billions of United States securities. It is obvious, however, that upward of 10 million bond owners implies a wide distribution of this national claim upon the wealth of the country.

The total of State, county and municipal indebtedness in 1922 was about 8 billion dollars. These bonds are probably owned largely by the more wealthy class of investors.

Bank Loans and Investments

The total of loans and discounts by the national banks at the end of 1922 was 11,600 million dollars. These advances were to a large extent attributable to carrying the country's necessary stock of goods, both through the process of manufacture and through the period of sale. To a smaller extent they were loans to brokers and other persons on stocks and bonds. But here again it was not only the bankers' own money that was loaned. Rather was it, in the main, the aggregate of the deposits of a great many people.

It does not follow from the fact that certain interests are money lenders that the source of supply is a relatively few wealthy people. The greatest money lenders of all are the savings banks and the life insurance companies. At the middle of 1922 there were in American savings banks 26,637,831 accounts, aggregating $18,087,493,000. At the end of 1920 the life insurance companies had assets of $7,319,997,019, which was contingently the property of over 40,000,000 policy holders. Of this great fund 32.29 per cent was invested in mortgages, divided about half and half between farm mortgages and the other kind made up of city, building, home and industrial loans. About 26 per cent was invested in railroad bonds and stocks. Loans on policies amounted to $820,000,000 and investments in Government bonds to $772,000,000. The other investments were mainly in State, county and municipal bonds.

Indebtedness Among Ourselves

In all of these forms of investment—savings bank deposits, life insurance and Government bonds—there have been important increases since 1916. This does not reflect increase in the physical wealth, which, as I have shown in my book, did not occur in the period 1916-20 and to but relatively small extent in 1921-22. What it does show is a transfer of the claims upon the national wealth from one group of people to another, probably from a relatively small group to one that is very much larger. The last is indicated by the great increase in the number of savings bank accounts, Government bondholders, etc. The depletion of the smaller class is much greater than the transfer to the larger class, the difference being measured more or less by the decline in the national rate of saving from 15 per cent of the national income prewar to perhaps 7 or 8 per cent in 1920-22.

The main features of internal indebtedness, which represents claims upon the physical wealth of the country by others than the titular holders, may now be summarized as follows:

	Billions of Dollars
The national debt	23.0
State, county and municipal debts	8.0
Loans by national banks	11.6
Savings bank deposits	18.0
Life insurance assets	7.3
Total	67.9

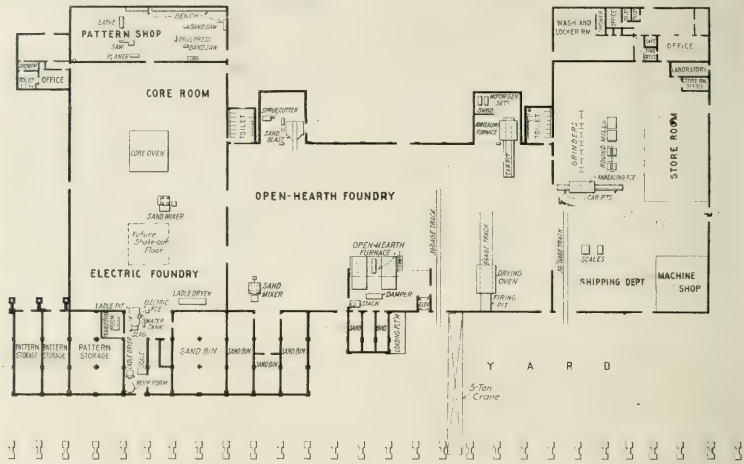
The above summary omits obviously the claims of State banks and private persons. Conjecturally these

(*Continued on page* 915)

New Steel Jobbing Foundry

Plant of Eastern Steel Castings at Newark Uses Both Acid Open-Hearth and Electric Furnaces—Exceptional Light Conditions and Rugged Construction Feature the Building

HAVING completed its removal from the old plant at Bayonne, N. J., the Eastern Steel Castings now occupies a plant built in the closing days of the war for the National Brake Shoe & Foundry Co. at Avenue L and Edward Street, Newark, N. J., which was designed and constructed for the purpose of turning out automotive cylinder castings and similar work and built on a "cost plus" basis by James Stewart & Co., New York. The construction is exceptionally heavy and is of a character far superior to that customary in foundries, the walls being of heavily reinforced concrete with brick trim, while the roof of concrete tile is



Layout of the Plant of Eastern Steel Castings at Newark, N. J., Showing Arrangement of the Various Units. The three pattern storage rooms at left were converted from sand bins. The yard crane, with 95-ft. span, passes over the roof of the bins with enough headroom to deliver sand from a clamshell bucket through the roof scuttles

carried on steel frame construction. An unusual amount of light is available through both side windows and monitors.

Broadly speaking, there is a main building 120 x 472 ft., with extensions at right angles to the length at both ends on the one side and storage bins outside the main dimensions on the other side. The entire plant, except for the power house, is within the one building, which has an extreme length of 520 ft. with an extreme width of 266 ft. The center of the main structure houses the open-hearth foundry, with the electric foundry at one end and the shipping department at the other end. The pattern shop occupies the end of one of the wings at the electric foundry end of the plant, while the office and the men's locker room are located in the corresponding end of the other principal wing. Pattern storage and sand bins are in the wing back of the electric furnace, both being placed in the position designated for sand storage in the original layout of the plant.

Among the unusual features are the character of the pattern storage, the commodious sand bins, method of charging the electric furnace, command of the yard crane over both the stockyard and its siding and the bins, and the arrangement of a small annealing furnace operated with two cars.

Three heavily constructed reinforced concrete bins intended originally for sand, because of the large requirements of sand for core making in automotive cylinder practice, have been converted into a pattern storage through the simple expedient of closing permanently the openings in the roof through which sand was to have been delivered by the overhead crane from railroad cars, and erecting a heavy timber second floor about 8 ft. above the concrete base. An automatic sprinkler system for protection of these patterns from possible danger of fire is to be installed. The space devoted to pattern storage occupies an area of 60 x 80 ft. on each of the two floors, with a corner cut out for the transformer room for the electric furnace.

One of the sand bins remaining, and still used for that purpose, will, it is estimated, hold the contents of 37 cars of 50 tons each. The smaller bins have an aggregate capacity greater than this, so that the present sand storage capacity of all the bins approaches 5000 tons, for a plant with a present maximum capacity of 750 tons of castings per month. Sand is taken by clamshell bucket on the yard crane from railroad cars and dumped through scuttles in the roof of the sand bins, this roof being about 18 ft. above the ground.

The present battery of core ovens includes eight ovens in two rows of four, back to back, and using coke for fuel. Originally the equipment included another unit of this same size, the larger capacity for cores being required for the type of casting for which the plant was designed. Only half of the present equipment, however, is in steady use, and it is felt that these eight ovens will fill the needs of the plant for a long time. The pit where the other ovens were originally located is to be arranged eventually for sand reclama-

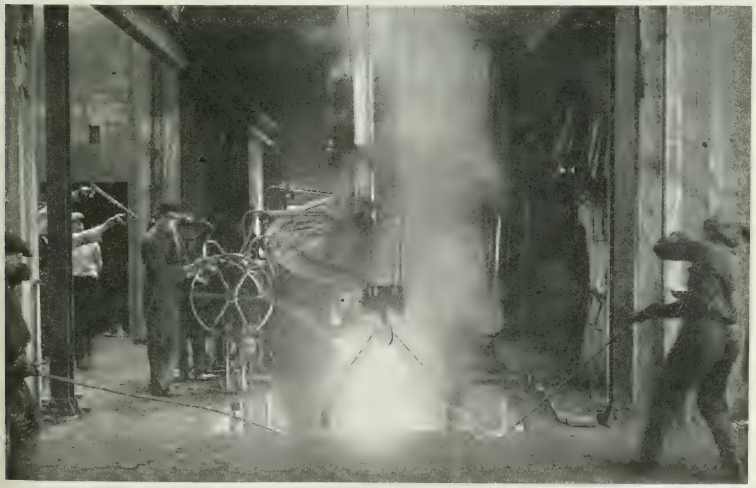


Car-Type Oil-Fired Annealing Furnace, Fired on One Side and Operated on the Semi-Muffle Principle. Easy operation of the door by hand wheel is shown. At right is a battery of bench grinders for cleaning castings

tion, the grating which is to cover it being utilized as a shake-out floor. As the plan shows, the core ovens and the future shake-out floor are located in front of the electric furnace. Reclaimed sand is mixed with new sand in the ratio of about 80 per cent of the former to 20 per cent of the latter.

There is one car type mold drying oven, measuring 12 x 16 ft.

Melting is accomplished in a 1½-ton Moore electric furnace furnished by the Pittsburgh Electric Furnace Corporation, which is capable of turning out a heat per hour melting from cold stock, and an 8-ton open-hearth furnace with acid bottom, capable of turning out six heats per day, or one every 4 hr. It is possible to charge the electric furnace up to a maximum of 4 tons, or considerably more than double its normal capacity, while the open-hearth furnace also can be super-charged. No pig iron is used in the electric furnace charges, steel scrap only constituting the charge, with such ferro-alloy additions as may be necessary to complete the heat. For the open-hearth furnace not more than 10 per cent of pig iron is used, this being of low phosphorus grade. The usual charge carries between 8 and 10 per cent of pig iron. Much of the scrap used is of



Tapping the 1½-Ton Moore Electric Furnace. Scrap bins are at the rear (left), while the weighing scale and "sugar scoop" charging trough are directly behind the furnace (not visible here). The transformer room is behind the wall corner at right

high carbon; in particular a considerable quantity of shell steel still remaining from war operations is being melted here. Oil is used as open-hearth fuel.

Charging the electric furnace is done by means of a so-called sugar scoop about 10 ft. long and mounted on wheels. This is filled with scrap and weighed during the time the furnace is melting the preceding charge. It then is run into the charging door of the furnace and dumped by the simple expedient of lifting the rear end by means of an air hoist, or electric hoist, both being available at that part of the plant. Charging of the open-hearth furnace is by hand, there being two charging doors capable of taking pieces about 42 in. wide.

Product of the company consists wholly of castings ordered by outside customers. It includes particularly electric motor housings, headers for the tubes of water-tube boilers, parts for oil stills and other pieces of similar character, some of which have to withstand heavy pressures, while others such as the motor housings do not. The output includes castings varying all the way from ½ lb. to 5 tons, though the great bulk of the sales consists in castings of less than 200 lb. each. All castings are annealed before shipment and, as many of them are made with large sink heads weighing frequently considerably more than the casting itself, a certain amount of work has to be done on each one, not only in cutting off the sprues and sink heads, but also in grinding off the burrs left by the sprue cutter. Some of the large risers are burned off, while swing-frame grinders are used to take off the burrs. Many of the castings are sand-blasted, while the smaller ones are run through tumblers after annealing, there being six of these tumblers located alongside the shipping department at the office end of the plant.

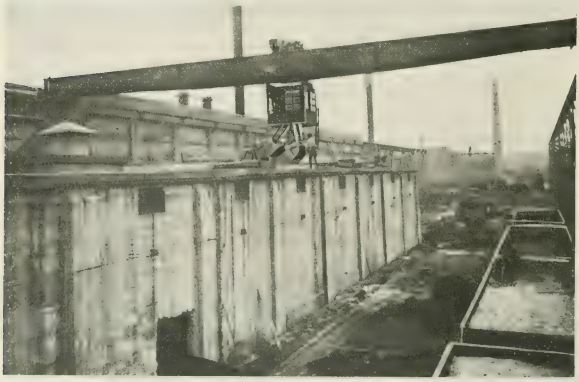
Two annealing furnaces take care of this special process, both having car pits. One furnace measures about 7 x 11 ft. inside, while the smaller one is 3½ x 15 ft. This latter has two cars in a pit, which are run in and then sealed by clay after the doors at the two ends of the furnace are lowered upon the ends of the cars. A grating placed upon the cars, under the castings to be annealed, facilitates circulation by the heated gases, and causes the furnace to operate on the semi-muffled principle. Oil is used as fuel, with firing on one side.

Power for the electric furnace, the yard crane and all the inside cranes, as well as for light and other purposes and for running air compressors, is furnished by a 450-kw. a. c. General Electric unit operated by a Unaflow engine of one cylinder built by the Skinner Engine Co. Arrangements are being made to install a second unit of 160 kw. for use at night, when much of the power required during the day will not be needed. It is believed that the added investment will be fully justified by the greater efficiency of operation thus provided. The two boilers of 450-hp. are fired with oil from six storage tanks in the yard, which have an aggregate capacity of about 8 cars. Each boiler has four oil burners; two furnish ample heat to maintain a steam pressure of 135 lb. under normal conditions; one is sufficient under light load.

Two air compressors made by the Chicago Pneumatic Tool Co. and operated by synchronous motors furnish an air pressure which is maintained at 90 lb. per sq. in. The two units are duplicates, with cylinders 17 and 10 x 12 in.

Water which is employed to cool the frame and doors of the open-hearth furnace is passed from that point to a Cochrane feed-water heater in the power house and given further heat from the steam engine exhaust before being fed to the boilers. Water which has been used for cooling purposes on the electric furnace goes to a sump, from which it is pumped to a riffle arrangement on the roof for cooling, whence it drains into a tank and then is circulated back around the furnace.

About 225 men are now employed, although for heavier production the plant might use 50 per cent more. They have a locker room unusually commodious and well provided with both light and ventilation. There are several showers and other accommodations for the men. *Esprit de corps* is helped by a production chart over the door leading from the foundry floor to the men's locker room. This shows, day by day, the output "this" month, compared with "last" month.

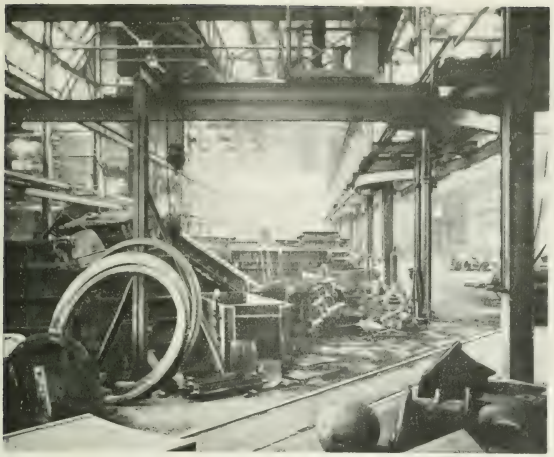


With a 95-Ft. Span, the Yard Crane Extends Over Both the Spur Track and the Concrete Sand Bins. Sand, handled in a clam-shell bucket, is readily dumped through scuttles in the roof. Steel for the open-hearth furnace is handled by magnet, from this same crane, being dumped on a platform at the far end of the sand bin structure, whence it is moved by hand to the furnace charging floor on the same level with the platform

As the plant is a self-contained unit, it has the usual equipment of pattern-making machinery, sand mixers, overhead cranes, sand-blast equipment and a small machine shop, besides grinding benches and heavy grinding units at various locations through the foundry.

The 5-ton yard crane runs on trestle rails over the roof of the sand bins and along the edge of the main building, extending also over the spur tracks. The operator's cab is in the center of the 95 ft. span, giving him a view of all operations. In the foundry is a 10-ton overhead electric traveling crane, while an overhead hoist runway traverses the entire molding floor.

As originally designed, the plant had a cupola in the place now occupied by the open-hearth furnace. The charging platform for this cupola was at the level of the top of the sand bins and there was an elevator in one corner of the charging floor. This floor had to be lowered about 10 ft. to form a charging floor for the newly constructed open-hearth furnace, while a loading platform for scrap and other materials for the furnace



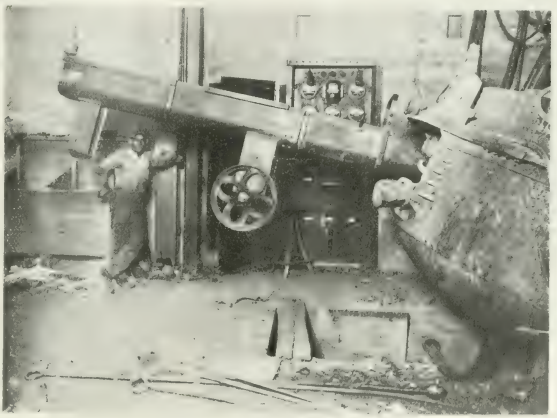
In Addition to the 10-Ton Crane Which Serves the Molding and Pouring Floor, a Monorail System With Hoists Extends Throughout This Section of the Plant. The roof structure with concrete tiling and good light may be noted from this illustration

was placed outside under the yard crane. Great difficulty was experienced in cutting through the concrete and steel members of the building in lowering the floor just mentioned, because of the very rugged construction adopted. This same difficulty was experienced also in cutting doorways through the reinforced concrete walls of the old sand bins in refitting these bins for storage of patterns.

Cleveland Steel Tube Co. Organized

The Cleveland Steel Tube Co. has been organized with a capital stock of $1,200,000 by former stockholders of the International Steel Tube Co. and has purchased the plant of that company, which had been in bankruptcy for some time, and which had never been placed in operation. The new company has also purchased 20 acres adjoining the site of the plant, on which the old company had an option. The value of this land is said to have materially increased since the option was taken. Members of the new organization state that all the claims against the old company have been paid, including claims for plant equipment which had not been installed when the former company got in financial difficulties. The new company expects to issue bonds to the amount of $400,000 to $500,000 to provide working capital and hopes to be able to place the plant in operation within a few months. The officers of the Cleveland Steel Tube Co. are: Jacob Kahler, president; H. E. Smythe and J. E. Jontzen, vice-presidents; M. E. Cunningham, secretary, and H. D. Marble, treasurer. These officers, with F. E. Baker and Don F. Wood, constitute the board of directors.

The railroads on Sept. 15 had 10,792 locomotives in need of repair, or 16.8 per cent of the total number on line, according to reports filed Oct. 1 by the carriers with the Car Service Division of the American Railway Association. This was an increase of 275 over the number of such locomotives on Sept. 1, at which time there were 10,517, or 16.3 per cent.



The Electric Furnace Is Charged by a Sort of Mammoth Sugar Scoop. This scoop is loaded at the bin, then wheeled into position for charging. With the nose of the scoop inserted into the charging door of the furnace, the rear end is raised by a hoist and the material thus dumped into the furnace for melting

Iron and Steel Exports Fall Once More

August Imports Smallest of Year—Pig Iron Imports Lowest in Months—Machinery Exports Increasing, with Machine Tools Leading

WASHINGTON, Oct. 2.—Exports of iron and steel in August totaled 161,426 gross tons, valued at $19,402,293, a slight decrease in volume from the exports of July, which amounted to 168,558 gross tons, valued at $21,582,626. Imports of iron and steel in August aggregated 45,439 tons, valued at $2,475,512, as against 53,464 tons, valued at $2,147,112, in July. Exports of machinery in August were valued at $28,240,760, compared with $26,469,980 in July, and with $20,262,870 in August, 1922. Imports of machinery in August were valued at $602,665, as against $796,596 in July. Machine tool exports in August, 1922, totaled 19,022 in number, with a value of $1 018,613, as against a total of 5176, with a value of $503,283, in July.

Exports of Iron and Steel
(In Gross Tons)

	August, 1922	August, 1923	Eight Months Ended August 1922	Eight Months Ended August 1923
Pig iron	1,791	3,117	17,564	20,928
Ferromanganese	76	.....	984	3,220
Ferrosilicon	28	84	277	837
Scrap	3,586	13,662	52,884	39,533
Ingots, blooms, billets, sheet bar, skelp	9,353	9,684	76,421	79,601
Iron bars	.....	765	.....	10,683
Steel bars	*13,488	12,625	*127,876	111,124
Alloy steel bars	246	117	3,027	1,666
Wire rods	929	1,548	35,115	19,675
Plates, iron and steel	6,231	5,586	71,687	83,852
Sheets, galvanized	9,690	6,942	83,002	83,891
Sheets, black steel	6,290	5,781	188,657	69,188
Sheets, black iron	1,026	1,341	8,589	10,217
Hoops, bands, strip steel	2,331	3,117	22,457	26,508
Tin plate, terne plate, etc.	4,092	5,995	53,545	71,330
Structural shapes, plain material	22,162	14,165	85,798	91,026
Structural material, fabricated	7,639	7,668	32,081	50,019
Steel rails	17,658	22,718	262,021	165,050
Rail fastenings, switches, frogs, etc.	2,266	3,067	24,260	26,053
Boiler tubes, welded pipe and fittings	11,843	18,490	117,851	127,099
Cast iron pipe and fittings	2,095	2,486	17,270	17,897
Plain wire	8,452	4,690	86,745	62,206
Barbed wire and woven wire fencing	7,043	5,009	49,228	54,887
Wire cloth and screening	166	302	942	1,166
Wire rope	383	467	2,889	4,504
Wire nails	2,355	3,245	44,516	26,115
All other nails and tacks	563	760	5,983	6,114
Horseshoes	113	49	588	596
Bolts, nuts, rivets and washers, except track	1,429	1,614	11,866	12,667
Car wheels and axles	1,051	1,838	11,504	13,302
Iron castings	895	767	6,877	6,800
Steel castings	183	474	1,540	3,503
Forgings	135	252	1,633	2,118
Machine screws	37	.....	135	.....
Total	145,640	161,426	1,445,944	1,302,995

*Includes both iron and steel bars.

Exports by Countries of Destination
(In Gross Tons)

	August, 1923	Eight Months Ended August, 1923
Plates:		
Canada	7,155	71,563
Philippine Islands	382	549
Japan	156	612
Cuba	120	740
South America	84	899
Mexico	43	507
Galvanized Sheets:		
Canada	1,578	25,616
Cuba	1,069	9,530
Philippine Islands	588	4,824
Mexico	496	4,333
Central America	399	2,700
Chile	358	1,842
Japan	249	2,870
Argentina	284	3,630
Colombia	9	3,561
Black Steel Sheets:		
Canada	3,026	38,998
Japan	1,089	19,907
Cuba	280	1,415
Argentina	51	1,690
Philippine Islands	.....	160
Tin Plate:		
Canada	2,314	19,412
Japan	1,891	18,034
Argentina	748	3,833
Uruguay	267	2,223
China	36	5,833
Cuba	91	3,288
Hong Kong	78	2,022
Mexico	153	1,413
Chile	74	1,264
Italy	.....	2,266
British India	.....	2,931
Galvanized Wire:		
Canada	993	10,292
Japan	741	14,208
Mexico	521	2,592
Brazil	484	6,073
Chile	370	3,894
United Kingdom	267	1,544
Cuba	253	1,862
Argentina	200	9,463
Australia	181	4,663
Barbed Wire:		
Cuba	863	7,344
Mexico	732	2,779
Brazil	722	7,025
British South Africa	511	4,541
Australia	363	1,497
Colombia	229	3,297
Central America	235	2,407
Canada	105	4,521
West Indies	.....	6,153
Argentina	.....	6,410
Steel Rails:		
Cuba	7,618	34,863
Japan	4,972	45,753
Canada	4,541	31,700
Brazil	1,929	2,733
Philippine Islands	721	3,346
Colombia	27	2,136
Mexico	113	2,684
Honduras	70	1,342
Chosen	250	9,004
Kwang Tung	.....	11,143
Argentina	.....	334
Chile	.....	2,116
New Zealand	.....	400

Machine Tool Exports

	August, 1923 Quantity	August, 1923 Value	July, 1923 Quantity	July, 1923 Value
Lathes	66	$89,913	70	$96,780
Boring and drilling machines	258	46,283	204	67,505
Planers, shapers and slotters	14	32,891	16	32,538
Boring and turning mills	6	77,701	14	19,030
Gear cutters	5	23,131	7	20,371
Milling machines	9	18,181	13	17,913
Thread-cutting and screw machines	109	114,557	27	27,913
Punching and shearing machines	6	22,115	28	16,666
Power hammers	1	2,500	14	*20,005
Rolling machines	1	1,100	13	6,010
Sharpening and grinding machines	852	93,670	1,452	87,102
Chucks, centering, lathe, drill and other metal-working tools	2,429	26,090	2,271	36,504
Pneumatic portable tools	1,027	11,070	957	54,946
Total	19,022	$1,018,613	5,176	$503,283

Exports, January 1922, to July, 1923, Inclusive
(Gross Tons)

	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,212,732	248,126	288,766
Calendar year 1920	4,961,851	212,958	216,873
Fiscal year 1921	4,168,619	129,541	82,549
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,633
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	185,840	1,791	9,353
September	129,475	5,203	6,810
October	132,924	1,553	8,364
November	127,732	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922	1,986,297	30,922	107,201
January, 1923	123,190	2,482	10,563
February	133,902	2,786	7,733
March	163,920	2,881	11,416
April	177,471	1,844	11,247
May	203,389	1,848	12,824
June	171,183	2,960	9,652
Fiscal year 1923	1,816,329	31,891	113,377
July	168,558	2,966	6,480
August	161,426	3,117	9,684
Eight months	1,302,995	20,928	79,601

*Calendar years.

Imports of iron ore in August amounted to 267,677 tons, while imports of manganese ore were 23,026 tons. For the eight months ended with August imports of iron ore reached the substantial volume of 2,035,535 tons, while imports of manganese ore for this period

Imports of Iron and Steel into the United States
(In Gross Tons)

	August, 1922	August, 1923	Eight Months Ended August 1922	Eight Months Ended August 1923
Pig iron	17,105	14,564	62,332	328,164
Ferromanganese	16,959	6,845	69,093	61,894
Ferrosilicon	2,083	489	9,159	8,941
Scrap	9,085	9,909	48,015	110,562
Steel ingots, blooms, billets, slabs and steel bars	3,904	3,579	14,936	12,623
Rails and splice bars	726	4,449	21,161	20,099
Structural shapes	355	1,389	1,598	7,463
Boiler and other plates*	.....	828	.....	1,312
Sheets and saw plates	51	710	382	1,672
Bar iron	619	1,208	3,909	6,271
Tubular products*	.....	285	.....	3,027
Castings and forgings*	.....	232	.....	2,028
Nails and screws*	.....	107	.....	885
Tinplate	66	160	2,185	9,621
Bolts, nuts, rivets and washers*	.....	22	.....	150
Wire rods	94	60	1,067	2,195
Round iron and steel wire*	.....	205	.....	2,75
Flat wire and strip steel*	.....	58	.....	813
Wire rope and insulated wire, all kinds*	.....	326	.....	780
Total	50,050	45,439	233,868	614,726
Manganese ore	62,121	23,026	280,668	127,238
Iron ore	171,142	267,677	545,549	2,035,535
Magnesite	12,978	945	76,765	60,689

*Not reported separately previous to Sept. 22, 1922.

were 127,238 tons. Pig iron imports were 14,564 tons in August and 328,464 tons in the eight months.

Steel rails constituted the largest item of iron and steel exports in August. Of the foreign shipments in

Imports of Machinery
(By Value)

	August, 1922	August, 1923	Eight Months Ended August 1922	Eight Months Ended August 1923
Metal-working machine tools and parts	$18,926	$14,486	$146,515	$265,069
Agricultural machinery and implements	54,967	84,486	424,515	660,045
Electrical machinery and apparatus*	.....	12,587	.....	363,748
Other power generating machinery	.....	52,438	.....	1,489,251
Other machinery	340,375	248,905	1,969,348	1,803,546
Vehicles, except agricultural	111,604	189,763	969,114	1,916,953
Total	$525,872	$602,665	$3,509,492	$6,528,612

*Not reported previous to Sept. 22, 1922.

this month, amounting to 22,718 tons, Cuba took the greatest tonnage, the quantity to that country amounting to 7618 tons, while Japan came second with 4972 tons and Canada third with 4541 tons. For the eight months Japan was the largest foreign buyer of American steel rails, taking 49,753 tons out of a total of 165,050 tons. Of the 5781 tons of black steel sheets exported in August, Canada took 3026 tons and Japan 1080 tons.

Imports of Iron and Steel in Gross Tons
(Monthly Average)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl.	26,595	‡14,132	.....	.....
1914 to 1918, incl.	23,351	4,845	3,281	‡17,155
1919 to 1921, incl.	23,901	5,708	3,710	37,115
1922	59,545	21,954	9,117	31,204
January, 1923	120,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,902	36,371	7,221	14,071
May	75,885	39,764	10,482	12,734
June	68,019	30,033	12,794	36,138
Six months' average	85,964	49,706	8,980	13,535
July	53,464	19,760	12,381	23,824
August	45,439	14,564	7,324	23,026

*Not included in "total imports."
†Includes ferroalloys.
‡Average for three years, 1916 to 1918 only.

Machinery Exports
By Value

	August, 1922	August, 1923	Eight Months Ended August, 1922	Eight Months Ended August, 1923
Locomotives	$1,528,478	$289,725	$7,000,192	$2,982,945
Other Steam Engines	42,243	10,790	364,282	422,999
Boilers	118,084	38,053	678,785	757,980
Accessories and Parts	58,004	197,639	606,676	809,734
Automobile Engines	237,043	280,862	4,010,099	3,845,880
Other Internal Combustion Engines	682,921	528,536	4,295,513	4,679,151
Accessories and Parts for	222,701	309,546	1,759,707	2,229,765
Electric Locomotives	10,462	321,057	189,821	2,860,287
Other Electric Machinery and Apparatus	428,550	676,021	5,907,647	5,506,509
Excavating Machinery	75,896	65,650	926,186	993,991
Concrete Mixers	51,686	36,739	389,932	362,085
Road Making Machinery	28,236	101,846	217,759	622,765
Elevator and Elevator Machinery	367,190	436,850	2,810,032	3,151,129
Mining and Quarrying Machinery	515,288	1,070,072	4,103,001	6,366,316
Oil Well Machinery	160,289	808,054	2,979,286	4,390,852
Pumps	554,748	573,999	3,825,423	4,728,724
Lathes	52,963	99,913	516,898	560,978
Boring and Drilling Machines	31,370	46,283	396,098	453,630
Planers, Shapers and Slotters	11,980	32,894	153,781	163,403
Bending and Power Presses	16,061	77,704	262,702	193,377
Gear Cutters	15,290	22,131	77,168	117,009
Milling Machines	27,631	48,484	213,873	289,061
Thread Cutting and Screw Machines	13,530	111,557	117,121	382,666
Punching and Shearing Machines	6,735	23,443	112,507	126,892
Power Hammers	10,534	22,280	75,213	105,001
Rolling Machinery	734	1,100	155,119	18,849
Sharpening and Grinding Machines	79,356	93,670	519,335	656,519
Other Metal Working Machinery and Parts of	527,438	481,850	3,689,856	3,126,092
Textile Machinery	643,619	995,188	10,927,720	6,321,614
Sewing Machines	914,405	961,916	4,083,045	5,755,283
Shoe Machinery	92,479	111,615	676,533	944,962
Flour-Mill and Gristmill Machinery	19,946	132,432	841,637	729,676
Sugar-Mill Machinery	347,725	919,993	1,891,615	2,442,960
Paper and Pulp Mill Machinery	62,652	135,172	1,283,205	1,531,638
Sawmill Machinery	30,816	165,249	372,568	478,142
Other Woodworking Machinery	186,734	65,797	923,786	691,048
Refrigerating and Ice Making Machinery	72,709	139,496	1,287,129	1,551,301
Air Compressors	286,000	200,956	1,466,899	1,572,815
Typewriters	729,727	981,553	7,537,428	9,322,192
Power Laundry Machinery	80,577	105,887	435,095	682,251
Typesetting Machines	253,882	387,709	2,509,704	2,346,949
Printing Presses	200,735	476,196	2,454,375	2,931,460
Agricultural Machinery and Implements	3,533,483	6,325,306	16,537,000	34,479,641
All Other Machinery and Parts	7,261,370	9,327,163	57,988,899	66,675,144
Total	$20,262,870	$28,340,760	$157,600,650	$189,241,550

It is expected that as a result of the recent Japanese disaster considerable impetus will be given to American mills in the way of demand from Japan for black and galvanized sheets, pipe, wire nails and certain types of machinery. While it is doubted that this demand will be reflected in the September export movement, it is believed that it will be shown in foreign shipments of October.

Imports of August reveal a further decline in in-

Sources of American Imports of Pig Iron
(In Gross Tons)

	August, 1923	Eight Months Ended August, 1923		August, 1923	Eight Months Ended August, 1923
England	6,036	164,464	Mexico	1	1
British India	5,062	13,980	Belgium	.....	12,817
Canada	2,375	40,858	Germany	.....	20,740
France	595	56,604	Austria	.....	299
China	275	1,225			
Sweden	120	705	Total	14,564	328,464
Scotland	100	16,771			

coming shipments of pig iron. The movement of this blast furnace product to the United States gradually has been tapering off since domestic furnaces have been meeting demands. Of the imports of pig iron in August, amounting to 14,564 tons, 6036 tons came from England and 5062 tons from Canada.

Sources of American Imports of Iron Ore
(In Gross Tons)

	August, 1922	August, 1923	Eight Months Ended August 1922	Eight Months Ended August 1923
Spain	7,328	.....	28,197	184,000
Sweden	61,304	52,523	185,952	589,082
Canada	87	369	1,408	23,579
Cuba	65,917	96,650	199,489	527,001
Other countries	36,506	118,135	130,503	702,073
Total	171,142	267,677	545,549	2,035,535

New Experiments with Repeated Shocks*

Influence of Cold Drawing Considerable, Especially on Ductility—Ultimate Strength and Elastic Limit Raised: Compression and Elongation Lowered

BY LEON GUILLET

IN a preceding article†, we drew attention to the importance which is attributed to resiliency, while not enough stress is laid upon the elastic limit. We have seen pieces of extra soft steel with 2 per cent nickel, which frequently broke, giving 30 to 35 kilogrammeters (217 to 253 foot-pounds) in the shock test on Mesnager bars. To avoid all variation in breakage, it was found necessary to temper them and thus make them exceed the elastic limit of 30 to 40, while the resiliency came down to 13 kilogrammeters (94 ft.-lb.).

Moreover, we clearly pointed out that this point of view was not new; that especially the experiments of Mr. Nusbaumer‡ had demonstrated it quite clearly. He added, however, that at all events it was necessary to insist on the steel makers and metallurgists realizing clearly these little known facts; moreover, to insist on the tests being made a good deal more popular, by continued efforts along these lines.

To put the matter still more tersely, we have made a series of tests that have seemed suggestive, notwithstanding the criticisms which might be made against them. In these tests, we took a bar of ordinary soft steel, of good quality, which was tempered at 850 deg C. (1562 deg. Fahr.); the bar was of round section, with a diameter of 18 mm. (0.71 m.). We cut it into five equal parts and, while one of these parts was left at its original diameter, the others were turned to 17, 16, 15.5 and 15 mm. (0.67, 0.63, 0.61 and 0.59 in.).

Then the first three were drawn out so as to reduce all three, as well as the piece of 18 mm. diameter, to 15 mm. Under these conditions we had five bars, all of 15 mm. diameter, which had undergone the following treatments:

1. A tempered bar.
2. A thin drawn bar, tapered 0.5 mm. on the diameter.
3. A thin drawn bar, tapered 1 mm. on the diameter.
4. A thin drawn bar, tapered 2 mm. on the diameter.
5. A thin drawn bar, tapered 3 mm. on the diameter.

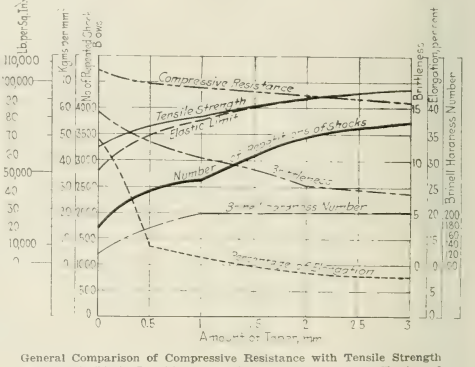
These bars were given the following four tests, which were twice repeated:

Tension Test

This was performed on a test bar of 100 mm. (3.937 in.) length and 13.8 mm. (0.543 in.) diameter, the metal being, as should be carefully noted, in its cold hammered or tempered condition.

Breaking Test

This was performed on Mesnager test bars of 10 x 10 x 55 mm. (0.39 x 0.39 x 2.16 in.), with groove of 2 x 2 mm. (0.08 x 0.08 in.) round bottom, which were broken with Charpy hanging drop hammer.



General Comparison of Compressive Resistance with Tensile Strength and Elastic Limit, Ductility and Brittleness, Resistance to Shock and Brinell Hardness Number

Hardness Tests

These were made under a pressure of 1000 kg. (2205 lb.), with 10 mm. (0.39 in. diameter) ball, the test being made on a shock test bar, with the direction of application perpendicular to the direction of drawing.

Repeated Shock Tests

These were taken with the Cambridge apparatus, the hammer weighing 2385 grams (5¼ lb.) the speed being 60 strokes a minute and the height of drop 33 mm. (1.3 in.).

It should be well noted that, as the test bars of the different determinations did not have the same dimensions, the results could not be obtained exactly on the same metal, owing to the possibility of heterogeneity in cold hammering. However, it was impossible to perform the tests in any other way. If it had been possible to draw the bars to the exact dimensions desired by the shock test, the cold hammering would not have

*Paper presented before the Franco-Belgian Association of Testing Methods. Translated by F. J. Lowry, Hickman, Williams & Co., Pittsburgh.

†See *Metallurgical Review of French Papers*, February, 1921, page 96, and verbatim report of the meeting of Nov. 20, 1920, of the Franco-Belgian Association of Testing Methods.

‡*Metallurgical Review*, 1914, page 1133.

Degree of cold hammering obtained by taper of drawing	Tension Test: Rupture*	Elastic Limit*	Elongation, Per Cent	Compression*	Brittleness Test: ρ	Angle	Hardness Δ	No. of shocks applied
0	44.4	35.1	24.5	73.9	14.7	Bent double	121	1,855
—	44.7	35.7	23.8	74.9	14.7	Bent double	—	1,519
0.5	52.4	19.0	13.9	68.0	11.6	Bent double	171	2,519
—	53.3	50.1	13.2	70.5	11.8	Bent double	—	2,330
1.0	56.8	55.7	11.0	68.0	9.6	Bent double	197	2,591
—	56.5	55.3	11.7	68.0	10.7	Bent double	—	2,675
2.0	63.4	63.4	8.0	64.1	7.5	Bent double	200	3,203
—	63.7	63.7	8.8	65.5	7.7	157 deg.	—	3,678
3.0	66.8	66.8	7.3	61.7	6.9	159 deg.	200	3,745
—	67.1	67.1	8.0	61.7	6.7	160 deg.	—	3,703

*In kg. per sq. mm. (Multiply by 1422 to obtain lb. per sq. in.)

been the same, if the drawing taper was constant on a bar of 10 x 10 mm. (0.39 x 0.39 in.) and on a round bar of 15 mm. (0.59 in.) diameter. Moreover, the groove itself would always have taken away the skin of the metal at the most vital point.

The table sums up the results obtained.

These results call forth numerous and important remarks. The quality of the metal used is truly exceptional, being an open-hearth steel with the following analysis:

C = 0.12 to 0.13
Mn = 0.61
Si = 0.13 to 0.14
S = 0.021 to 0.023
P = 0.041

The tension test is influenced considerably by the taper of drawing, even though extremely small (0.5 mm. or 0.02 in. on the diameter). It is therefore an error to believe, as the drawers do, that it is possible to draw a steel, roughly temper it, give it a small taper and obtain a steel possessing sensibly the qualities of well worked metal. It is noted that the elongations especially drop very quickly.

Cold hammering has a more pronounced influence on the elongations and elastic limit (which soon becomes confounded with the breaking load), than on the rupturing load, and especially on the compression, which here keeps very high values.

Hardness and strength have no constant relation to each other. This point was already treated in an essay by Mr. Portevin and ourselves. Below are given the coefficients ascertained:

Hardness No. Δ	Rupture kg. per sq. mm.	Coefficient
121	44.4	0.367
171	52.4	0.306
197	56.8	0.288
200	63.4	0.317
200	66.8	0.334

Little resiliency is obtained. The test bars will take a taper of 1 mm., which makes the elongation fall to 11 per cent. Breakage takes place only for products whose cold hammering is such that the elastic limit is sensibly equal to the breaking load applied.

Finally, the results given by repeated shocks show that the number of strokes necessary to cause breakage will quickly grow with cold hammering, at least under the conditions of our tests. Hence, if the results obtained on tempered metal and on the cold-hammered metal (taper 2.5 mm. or 0.1 in.) are considered, it is seen that:

The breaking strain increases 50 per cent.
The elastic limit increases 90 per cent.
The elongations decrease 76 per cent.
The compression decreases 16 per cent.
The resistance to repeated shocks increases 110 per cent.

Chevrolet Company Orders Ovens for Copenhagen Plant

The Chevrolet Motor Co. has recently placed its order, through the General Motors Export Corporation, for complete japanning equipment for the Chevrolet plant in Copenhagen, Denmark. Designed and built by Young Brothers in Detroit in cooperation with the Chevrolet engineering staff, the equipment will consist of two truck type compartment body ovens and two fender ovens which will also be used for the japanning of miscellaneous small parts. All of these ovens are to be furnished with indirect gas heaters. The equipment, which consists of three carloads, is now being shipped, and will soon be installed in Copenhagen.

W. W. Lewis and P. H. Schaff have been elected directors of the Falcon Steel Co., Niles, Ohio, due to enlargement of the board from five to seven members. Mr. Lewis, who has been general superintendent, was also named general manager. Directors have authorized the regular quarterly preferred dividend of 1¾ per cent, the regular common payment of 1 per cent, and an extra dividend of ½ of 1 per cent.

Inventor of Sykes Gear Generator to Come to America

W. E. Sykes of the Power Plant Co., Ltd., West Drayton, England, has severed his connections in the British Isles and will arrive in this country to join the staff of the Farrel Foundry & Machine Co., Inc., Buffalo, N. Y., as consulting engineer. He is recognized as one of the foremost authorities in Europe on the subject of gearing. He has designed installations for all types of duty and has made a specialty of heavy rolling mill work and stationary and marine turbine drives. He is the inventor and designer of the Sykes gear generator, which generates double helical gears with continuous teeth and sharp apices so that full bearing is secured across the entire face width. These machines were brought to this country about a year ago by the Farrel company and installed in the plant at Buffalo, N. Y. Since that time, the Farrel plant has made these gears for general industrial uses.

Mr. Sykes spent seven months last winter in this country, so he is, of course, well acquainted with American practice in engineering and business.

New England Iron and Hardware Outing

The annual fall outing of the New England Iron and Hardware Association was held at the Tedesco Country Club, Swampscott, Mass., Tuesday, Sept. 25, and sustained the reputation of its predecessors in being a thoroughly delightful event. Myron B. Damon, president, presided at a brief business session, at which appropriate resolutions on the death of the late Frederick H. Butts, presented by E. P. Sanderson, president E. P. Sanderson Co., were adopted

The golf tournament was the event of the day. Prizes were donated by the Trumbull Steel Co., Standard Horse Shoe Co., Youngstown Sheet & Tube Co., Bethlehem Steel Co. and President Damon. The winners were: First net, the Loomis cup and a steamer rug, F. M. Butts, Butts & Ordway Co.; best gross, Damon cup and a pipe, A. P. Chase, Chase, Parker Co.; second net, a set of golf balls, C. C. Butts, Butts & Ordway Co.; third net, Bethlehem Steel Co. cup, J. E. Kelley, Simonds Saw & Steel Co.; largest score, Damon prize, E. P. Williams, Corbin Screw Co.

Arrangements were in charge of George J. Mulhall, manager of the New England Iron and Hardware Association, and F. W. Brigham, Bethlehem Steel Co.

Simplification in Prepared Roofings

WASHINGTON, Oct. 2.—Simplification of prepared roofing was decided upon at a meeting here last Thursday held between representatives of the Division of Simplified Practice, Department of Commerce, the Chamber of Commerce of the United States, manufacturers, distributers and consumers. It was voted to eliminate all grades or kinds of slate-surfaced and also stone-surfaced prepared roofing that do not measure up to requirements of the "Class C" label of the Underwriters Laboratories and to reduce the varieties of smooth surface roofing to seven lines or grades, weights and qualities being considered. The recommendation is to become effective Jan. 1, 1924. According to William A. Durgin, chief of the division, the proposed eliminations were supported by the American Institute of Architects, the National Retail Hardware Association, the National Retail Lumber Dealers' Association, the Southeastern Builders' Supply Association and the Prepared Roofing Association.

The Warren Steel Castings Co., St. Louis, which been in the hands of receivers for several years, has been reorganized. New officers include Julius Seidel, president Julius Seidel Lumber Co., president, and Harry Benjamin, president Harry Benjamin Equipment Co., treasurer. The plant was destroyed by fire about six months ago. A settlement has been made with the insurance company, and a new plant will be erected. The company's capital stock is $150,000.

Careful Selection of Negroes Urged

Leader of Colored Men Gives His Views on Problems Resulting from Investigations from the South —Worth Not Yet Established

BY L. W. MOFFETT

WASHINGTON, Sept. 25.—The negro migrant industrial laborer in the North still must prove his worth. Not as yet has he passed beyond the classification of the emergency laborer. While he now has his day in court, the actual relative evaluation of the Southern negro in the iron and steel plants, foundries, machine shops, and other industries, will face the acid test whenever there is a slackening in operations and consequently dismissal of the more unfit employees. It will be then that the negro from the South, who is experiencing the profound change from a section largely agricultural to another that is predominantly industrial, meeting new conditions, different employers and new jobs, will come to grips in the competitive field of labor.

Students of sociology and industrial economics, as well as those who are directly interested in the movement, are watching with the deepest interest the performance of the Southern negro as an industrial producer, but, awaiting the passing of time and giving them a chance to gather more experience, are holding judgment in abeyance. There are those who believe that the negro is entering upon his second emancipation and is but slightly removed from the same environs that obtained when Lincoln proclaimed him free. Included among those sharing this view is Phil H. Brown, himself a colored man, who is a Commissioner of Conciliation of the United States Department of Labor.

Drafted in Industrial Crisis

"The negro migrant has embarked upon a pilgrimage to the goal of enlarged opportunity shadowed by the doubts of his friends and the venality of his foes," said Mr. Brown. "He is drafted in the great industrial crisis as he was drafted in the war. He is sought to fill the unskilled functions of alien labor. At best, and without thorough thought, he is classified as emergency labor, rather than preferred. To the industries the inclusion of his labor is an experiment; to him it is the realization of a century of dreams. The tolerance of one combined with the awakening of the other should render this labor permanent in the scheme of industry, but the failure of either to contribute its full share in essential cooperation will cause the great plan of absorbing one-tenth of the nation's population into its industrial life either to fail or be hopelessly deferred."

Mr. Brown is firmly convinced that negro labor has an opportunity to prove its industrial value to the country. He speaks of the situation as a crisis that is double-edged because in the same degree that it benefits those that migrate, it will help those who have remained at home. He has warned that this labor must never lose sight of the fact that it is on trial and its defense and liberty are left in its own hands. Naturally, a keen student of the subject, Mr. Brown is thoroughly aware of many differences between white and colored labor. One point he has brought out sharply is that white labor moves collectively and effectually, while negro labor works individually and by necessity. For this reason, he said, some opposition will logically accrue from organized labor, but this opposition in his opinion is not as persistent nor of the character that is generally believed. He called attention to the fact that there are 488 locals of colored workers in various industries affiliated with the American Federation of Labor, and that the United Mine Workers of America have thousands of colored members and officials.

It would be wrong to say that employers in the iron and steel and other industries have acclaimed the Southern negro as being an entirely proficient and satisfactory worker. In instances he has proved as much. Many employers not altogether satisfied with the Southern negro worker, have expressed confidence, that if properly selected, he has all of the potential requirements and only needs experience and training to develop into a competent employee, whether skilled or unskilled. Mr. Brown is thoroughly aware of this view, and referred to the many letters that he has received from employers in the North showing an enormous turnover in negro labor. It is the view of Mr. Brown that the iron and steel and other large employing interests should adopt a method of careful selection of negro laborers from the South. The plan he has in mind is that these large employers of labor establish their own employment stations at so-called "border" towns which constitute gateways to the North.

Propaganda of Employing Agents

Through this method it is confidently believed that the turnover would be greatly diminished and that it would also have the advantage of wiping out a lot of loose propaganda of professional employing agents, who hold up the North as the promised land and accept Southern negro workers for employment regardless of their qualifications. It also has been pointed out that in the absence of a process of selection many of the less desirable negroes purposely have been pushed through these gateways to the North. It has been estimated that not more than 20 per cent of the many negroes from the South have been selected for employment in industries of the North. In other words, they were accepted in masses upon the high wave of labor demand and in the face of restricted immigration. In general, no preparations for housing the negro migrants was made, although there are noticeable exceptions. If this new class of labor in industries of the North is to be kept permanently, it is held that the first fundamental duty of the employer is to see that the negroes are provided proper housing and thus given the outstanding inducement to remain steadily at work at a given point, instead of "rambling" as the roving habit of the Southern negro is colloquially expressed. The necessity of the Northern employer understanding the negro from the South, and vice versa, manifestly is obvious and it is felt that the Northern employer could take his greatest step forward in this direction by giving attention to the social welfare of his new class of workers. There will be many other characteristics of the negro that the Northern employer will have to become acquainted with. Mr. Brown has pointed out that the negro has always been and probably always will be a problem to civilization.

Change in Immigration Laws

The great industrial revival set in simultaneously with a sweeping change of the immigration laws. The need of labor became insistent, and industry turned to the massive multi-colored labor reserve, as it is characterized by Mr. Brown, and it was called out in the emergency. Immediately an upheaval of labor conditions ensued. Negro men and women in the number of 358,856 according to surveys of the Department of Labor, deserted the Southern industrial centers since Dec. 1, 1922. These supplementing 250,000 of the same class of workers, who were left in the North during the wartime migration from 1917 to 1919, making a conservative total of 608,856 negro units, added to industrial labor in the North within five years. When this large movement is considered, it will be readily recognized that Northern industries in taking this new class

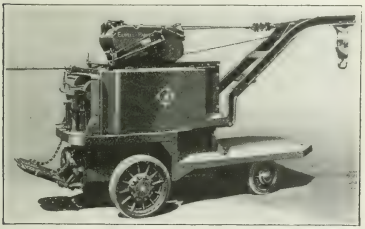
of labor have created a social problem and it may be said to the credit of more intelligent negroes that they are thoroughly aware of this fact and are aiding in trying to evolve a solution. The present-day results from the study of placement of negro labor passing from the South to industries in the North, are mixed and interesting. Some of them are anything but gratifying. On the other hand, others are pleasing. In connection with the latter, Mr. Brown pointed out that an unexpected phase is the inclusion of skilled workers migrating to the North. Returns from an analysis of payroll statistics of 273 employers of negro labor in California, Kentucky, Delaware, Illinois, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Missouri, New Jersey, New York, Ohio, Oklahoma, and Wisconsin, showed a heavy intake of negro labor. Difficulties were encountered in discriminating as to whether those employed were recent migrants or were from the class that were already located in the North. However, sufficient specific classification was given, Mr. Brown said, to suggest that the South is not only yielding up a great mass of unskilled workers, but a remarkable number of skilled hands are finding employment.

Mr. Brown said that he refused to confess that negro labor is inferior. He declared that it is striving to catch up with acknowledged standards and that when it does catch up, it will keep up. As a sound commercial proposition, he maintained, the industry should foster the improvement of the quality of this labor, not only for emergencies, but because one-tenth of our population must not trail behind the nine-tenths, nor tarry along the fringe of our industrial progress.

Electric Portable Crane for Industrial Service

The Elwell-Parker Electric Co., Cleveland, has brought out a new type of electrically operated portable crane for industrial handling. This has been designed especially for the general storekeeper of a railroad. It may be driven directly into a box car, down a store house aisle or out into the yard or shop where its runway may not be very smooth.

The lifting unit, power plant and battery counterbalance the boom. This is supported on a strong steel column set into a heavy base anchored to an all-steel frame fitted with wide axles. The hoisting mechanism consists of a single motor driving two separate drums



Portable Crane for Use by General Storekeeper of a Railroad. It may be driven directly into a box car

through worm gearing running in oil. Each drum is fitted with a ⅜-in. plow steel cable, one to raise and lower the boom and the other to handle the hook. Each is operated independently so that the load may be picked up at any point over the end or side of the crane, the boom swinging from left to right. For stacking stores the crane is provided with a boom of suitable length, although somewhat shorter than that furnished for use in the locomotive shop where it is necessary to reach up over the boiler.

The crane is propelled by an electric motor direct connected through worm gearing on the axle beneath the battery and back of the crane column. This motor as well as the hoist motor receives power from the same battery. The leads from this battery, which swings with the boom, pass down through the hollow crane column. A separate controller operates each motor. When the service demands, a motor to revolve or slew the crane is provided and this also receives power from the same battery. The forward axle or that nearest the hook is quite heavy and serves as a rolling outrigger. Its wheels are equipped with 15 x 3½-in. solid rubber tires. The drive wheels are provided with 22 x 4½-in. tires. All four wheels are used for steering.

This truck crane was exhibited last week at the Broadway Auditorium, Buffalo, in connection with the convention of the Association of Iron and Steel Electrical Engineers.

Shop Practice Division of Mechanical Engineers Adopts Wide Program

Reorganization of the machine shop practice division of the American Society of Mechanical Engineers is planned. Definite aims are the encouragement of original research in the machine shop field and of education in machine shop practice, and the advancement of standards of practice as well as its exact knowledge. Educational institutions will be asked to adopt wider programs of instruction in this sphere.

Ten years of organized effort have been mapped out. Cooperation is contemplated between the division and local sections of the society and branches in 62 industrial centers, thus enlisting the active support of the society's entire range of membership. In each of these centers the division will name one or more representatives who will act as liaison officers.

Research and standardization are among the problems to be dealt with, the preparation of papers for the annual and spring meetings of the society also being an important task. "These papers," says the report of the special committee on plan and scope, "should be of a fundamental or research nature. In general, they will concern machine shop processes applicable to machine shops everywhere rather than to those in a particular industry. By laying down plans under a 10-yr. schedule, it will be possible for a sub-committee on planning to keep in touch with research and experimental work of various kinds and arrange to have it presented before a meeting of the society when its development is sufficiently advanced."

Enlargement of the literature of machine shop practice and a wider common knowledge of its developing principles will be accomplished, it is expected, not only through discussions at the national meetings but also through the regional and local section meetings, where, it is felt, the machine shop practice papers should relate to the problems of specific industries of the several sections. It has been suggested that in localities where several plants produce similar products, and thus have similar production problems, groups be organized to work up and to present discussions bearing on their common activities.

Joint sessions with other professional divisions of the society are a part of the plan, and it is proposed also to establish contact with other professional societies, trade organizations, and other bodies.

The new organization of the division comprehends an executive committee, and sub-committees on meetings and papers, publicity, membership, and planning. The planning sub-committee will seek research problems of interest to the division, call them to the attention of the research committee of the society's council, and assist in furthering their progress. It will also call to the attention of the standardization committee of the council desirable standardization subjects. To assist the executive committee in organizing representative committees of the local sections, a group headed by K. H. Condit, New York, has been selected. Associated with Mr. Condit are: A. L. DeLeeuw, Erik Oberg and Frederick Franz, New York; J. J. Reynolds, Easton, Pa.; Earle Buckingham, Hartford, and Wilbur J. Peets, Elizabethport, N. J.

SAFETY CONGRESS MEETS

Dr. Royal B. Meeker Describes America as the Most Careless Nation in the World

BUFFALO, Oct. 1.—The twelfth annual Safety Congress opened here today with a registration of 3000 delegates. The congress includes meetings of the American Association of Industrial Physicians and Surgeons, and the annual safety conference of the New York State Department of Labor.

One of the first acts of the meeting was the acceptance of an invitation from the League of Nations to send a delegate to the meeting of the 55 nations at Geneva, Switzerland, Oct. 22, to tell what is being done in America in the interest of safety.

While the principal session was in progress at the Hotel Statler safety talks under the supervision of various groups were given in stores and shops.

In his opening address, President Dow gave a summary of the toll taken by carelessness in the United States. Accidents in the year 1922 cost 75,000 lives, he said.

"Every city contributes its quota of victims to the tragic and unnecessary evil that goes on day after day, week after week and that is increasing year after year in continental America largely through individual carelessness and lack of organized effort to eliminate accidents. It is bad enough that 75,000 persons of any age or station in life should be sacrified on the altar of carelessness in a single year, but when we stop to consider that out of that number 20,000 were children under fifteen years of age and of that number 10,000 were babies under five years, it is time to rise up and say 'this cannot go on. Let us get together and put a stop to it and wipe out this blot on the nation.'

"The consummation of 11 years of effort to develop safety measures has been the realization that each individual can save others from premature death and can prevent personal injury if he will conscientiously do the things we have together learned will bring about the maximum safety."

Bernard L. Shientag, Industrial Commissioner of New York, welcomed the delegates in behalf of the workers of New York State. In his address Mr. Shientag stated that the elimination of the 12-hour day in the steel industry would bring about a gradual decrease in the number of accidents as well as in the severity of these mishaps. There will be less lost time by employees and increased efficiency and production throughout the industry, he declared.

Dr. Royal B. Meeker, Commissioner of Labor and Industry of the State of Pennsylvania, delivered an address at the afternoon session Monday. Dr. Meeker spoke on "International Aspects of the Safety Problem."

Dr. Meeker declared that America today is the most careless nation in the world.

"We lead the world in accident prevention, but we also lead by leagues in accident occurrence and in the economic losses due to accidents," he said. "In no line do we outdistance Europe more emphatically than in the killing and maiming of men in industry and on the public streets. We kill and maim more men per thousand and destroy more per thousand tons of product than any other country."

Dr. Meeker attributed the appalling loss of life and injuries to workers to high speed production and the improper layout and construction of plants and to the heterogeneous mixture of nationalities and races in industry, but more than all these to our own native recklessness on the part of both employers and employees.

COMING MEETINGS

October

National Safety Council. Oct. 1 to 5. Twelfth annual meeting, New Statler Hotel, Buffalo. W. H. Cameron, 168 North Michigan Avenue, secretary.

American Society for Steel Treating. Oct. 8 to 12. Annual convention, Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

American Engineering Council of the Federated American Engineering Societies. Oct. 12 and 13. Meeting at Rochester, N. Y. L. W. Wallace, 26 Jackson Place, Washington, secretary.

West Virginia and Kentucky Association of Mining, Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention, Hotel Frederick, Huntington, W. Va.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Iron and Steel Institute. Oct. 25, fall meeting in New York; Oct. 26, visit to Aberdeen Proving Ground, Md. E. A. S. Clarke, 40 Rector Street, New York, secretary.

Society of Automotive Engineers. Oct. 25 and 26. Production meeting at Cleveland. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

American Gear Manufacturers' Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

Annual Report of American Iron and Steel Institute

The Annual Statistical Report of the American Iron and Steel Institute for 1922, the compilation of which has been in charge of William G. Gray, has been published. The statistics contained in this volume have been for the most part published in association bulletins and in THE IRON AGE. The table showing comparative production by the United States Steel Corporation and of all other companies indicates that in 1922 the Steel Corporation produced 44.2 per cent of the pig iron compared with 52 per cent in 1921 and 39.4 per cent in 1920; it produced 45.2 per cent of the steel ingots and castings as compared with 55.4 per cent in 1921 and 45.8 per cent in 1920, and it produced of all kinds of finished roll products 42.9 per cent in 1922 as compared with 50.5 per cent in 1921 and 41.6 per cent in 1920. The percentage of the United States Steel Corporation was largest in the production of spiegeleisen and ferromanganese, 63.51 per cent in 1922, and smallest in the case of coke, 35.66 per cent.

Curtailing Production of Ford Parts

The Ford Motor Co. has notified foundries throughout the country to curtail production of Ford parts beginning immediately. The order was issued, it is reported, as the first move in the company's plan to reduce its inventory. The stock of parts in the company's plants and in the warehouses of its dealers is said to be sufficient to take care of expected requirements for the remainder of the year. It is not the intention of the company at this time to reduce its production of passenger cars and trucks, and schedules for October call for a slight increase in the output over September. Some foundries in Ohio and Indiana which had been employed on Ford work have already reduced their operations, a number of men being laid off from each shop.



SIR ARTHUR BALFOUR

Hopeful for Britain's Industrial Future

Sheffield Steel Maker, Head of British Chambers of Commerce, Believes Financial Policy Will Bring Ultimate Advantage

BY DR. RICHARD MOLDENKE

LONDON, ENGLAND, Sept. 5.—The wonderful courtesy shown the party of American foundrymen visiting in England has afforded an excellent opportunity to obtain first-hand information on the present status of the British iron and steel industry from its leaders. To give special enlightenment to the readers of THE IRON AGE, the writer has extended this inquiry further by interviewing one of the foremost men of affairs in Great Britain, who is now president of the Association of British Chambers of Commerce—Sir Arthur Balfour—and by giving his thoughts on how the world's current events are affecting the present and are likely to affect the future development of Britain's iron industry.

Serious Unemployment

The first thing noted by a foreign visitor to England's foundries and steel mills is the extreme gravity of the unemployment problem, the situation being the reverse of that which for most of this year has prevailed in the United States. There are, for example, 50,000 idle men in Birmingham and 35,000 idle in Sheffield, out of populations of 900,000 and 800,000 respectively. With enormous tax rates, part of which go for "doles" to idle people; with acute crises existing on the Continent and the new disruption of business with Japan, it does indeed take a man of clear vision to look into the future without being unduly influenced by the black outlook of the present. That the majority of Englishmen are extremely pessimistic at the moment is amply borne out by the press and in conversations with leading industrial men, as well as members of Parliament. The cause does not lie altogether in the terrific slump of business, but in the moral bankruptcy of a great part of the working classes—any number of former good workers preferring a life of idleness with municipal charity, to getting busy and earning their living in the old accustomed manner.

Sir Arthur Balfour, head of Arthur Balfour & Co. of Sheffield, is well known in the United States, and has but recently returned from studying industrial conditions there. He is the author of an important report on reparations, which has served as the basis of the policy of the present British Cabinet in dealing with this complicated question.

Sir Arthur has visited America frequently, and recalled meeting the writer in Pittsburgh in the early days of his activity. Now in the prime of his life, and president of the most important commercial body of his country, his views on how Britain is affected by present world currents and how her basic position will serve her interests in the developments to come are the result of wide observation and clear thinking. Without quoting him directly I am giving the purport of Sir Arthur's comments.

Forces of Destruction

The world of today is facing the result of two great lines of destruction. There is first the vast destruction of material wealth by the war, the waste and inefficiency, in providing the means to conduct this war, and the incident industrial over-building that was and was not necessary in connection with so great an up-

SIR ARTHUR BALFOUR is head of the firm of Arthur Balfour & Co., steel manufacturers, Sheffield. He commenced his association with these works when he was 14 years of age, and within a quarter of a century they came entirely under his control. He has been master cutler of Sheffield, an honor which the city confers on those of its citizens connected with the steel trade who have rendered outstanding service.

Sir Arthur was born in London in 1873, and received his early education in London and Harrogate. Left an orphan, he was brought up by his godmother, who afterward married the then managing director, Robert Schott, of the Dannemora Steel Works, Sheffield. The firm, then known as Seebohm & Dieckstahl, had been founded in 1865 by Henry Seebohm, a native of Bradford. From small beginnings in Leadmill Street, Sheffield, it soon removed to Willey Street, Wicker, where it now stands with numerous extensions to its credit. A branch steel works was established in another part of the city in 1899, and a subsidiary company, the Eagle & Globe Steel Co., Ltd., was formed in 1902 to deal with the export business.

The firm's jubilee in 1915 was signalized by the change in its name to that of Arthur Balfour & Co., Ltd. By that time Mr. Balfour had been connected with the firm for 28 years. At the age of 19 he was sent to America to gain practical experience in engineering methods there at the works of the New York Car Wheel Co. of Buffalo. At 21 he became works manager, having the control of 200 workmen, most of them Poles. A year later he was promoted to the position of general manager. Soon, however, he left that position and returned to the Dannemora works.

During the war he organized Sheffield's hospitality to the Belgian refugees, being Belgian consul in Sheffield; filled the position of one of the industrial advisers to the Treasury; was a member of the royal commission on railroads; was on Mr. Lloyd George's advisory committee in regard to munitions, and also a member of the Sheffield munitions committee; a member of the Board of Trade departmental committee on engineering trades; president of the Sheffield Society of Engineers and Metallurgists. He is a magistrate for the city of Sheffield. This year he was elected president of the Associated Chambers of Commerce of Great Britain and was knighted by the King.

heaval involving terrific inflation. Then there is—and just as deplorable—a great wave of moral destruction reaching into every activity and thought of mankind the world over. The fiber of humanity has been seriously weakened, and selfish interests have come to dominate ruthlessly individual and national activities. The determination to obtain wealth and advantage of position without giving an equivalent in return is seen everywhere. Material wealth can be replaced in time, but the recovery of moral stamina is a longer and more serious problem for nations to face. England shows much of this in her idle workingmen. While every effort is being made to give employment to those who really want to work and thus bring costs to a better competitive basis in the production of manufactured product, the desired object is yet far from consummation. Meanwhile politicians and press are exploiting the situation from the individual viewpoint.

Factors in Britain's Strength

Sir Arthur looks beyond the immediate situation. He holds that not even excepting the United States, Great Britain of all countries has proceeded more completely along the lines of national deflation, and stands in the soundest financial position of any European nation today. By disregarding the phantom reparations return in her budget, taxing directly to the limit of the country's capacity, adjusting the American debt squarely, and properly caring for her home interests, Great Britain has a credit today that is solid and unassailable. Hence, when Germany, France and Belgium come to the final point of forcible deflation by the trend of events, with the financial agony this brings with it, the present period of serious depression in Great Britain will give way to one of unexampled prosperity, with full production from her industrial establishments to supply the world's needs.

Belgium's Competition

Again, Britain has always felt the competition of other countries and adjusted herself to it. It is always thought that Germany was the keenest commercial rival, and yet Belgium is really more so with its poor home markets and low production costs. Britain, therefore, sees little of new commercial terrors to be faced once the inevitable summary deflation of her business rivals begins. For the time being, the low mark, franc and lira work havoc with English exports and home industries, but this situation cannot remain indefinitely. Indeed, it is a moot question whether the import of necessary raw materials—with conservation of home resources—is not to be welcomed, so long as the finishing remains for domestic labor.

When the inevitable deflation comes to the Continental nations, the manner in which this is carried out will determine the future business development of the countries involved. Repudiation of huge entities of paper currency will bring with it destruction of future credit, and since the position of Britain is sound in that respect, she has nothing to fear for her commerce and manufacture.

Hopeful for the Long Look

Sir Arthur Balfour, therefore, feels optimistic in regard to the industrial future of Great Britain in spite of the dark clouds which now envelop her productive classes. Force of circumstances will compel a rational solution of the Ruhr occupation difficulty and the eventual financial deflation of the nations badly needing this, with the return to reasonably normal conditions of personal effort in the near future, will allow the world to devote itself more effectively to the restoration of the moral ruin wrought by the great war.

President Samuel M. Vauclain of the Baldwin Locomotive Works says that shipments this year will approximate $100,000,000. Orders for spare parts and repair work are heavier than any previous period this year. Plants are running at full capacity. Speaking of general conditions Mr. Vauclain said, "General business of the country is good. Basic conditions are very good."

French Automobile Manufacturer Installs American Equipment

Andre Citroen, France's well known production automobile manufacturer, has turned over the layout of his entire japanning plant and the designing of his complete equipment to the engineering staff of Young Brothers, Detroit.

When the three Citroen engineers who recently visited this country completed their tour and their study of American production methods, H. M. White of Young Brothers returned to France with them. As a result, the entire equipment of the japanning plant, with a capacity of 275 cars a day, will be designed by Young Brothers, according to the ideas worked out by Mr. White in consultation with the Citroen engineering and production staff, and will embody the best American experience adapted to local conditions in France. All parts requiring special equipment for their manufacture will be made at Young Brothers' plant and other parts will be made in France in accordance with blue prints furnished.

The only condition placed upon their work by M. Citroen was that he wished the plant to be the finest and most modern in France, and that the capacity must be 275 cars per day.

According to Mr. White, M. Citroen plans to open a plant in the United States. M. Citroen feels that there is a place in the American market for his car.

Committee on Russian Trade Formed

A committee on Russian trade with Henry T. Hunt, former member of the Railroad Labor Board, as chairman, has been formed. An effort will be made to enlist 2000 representative American manufacturers and export houses in the resumption of trade with Russia. The headquarters of the committee are at 120 Broadway, New York.

The committee, according to Mr. Hunt, is preparing an industrial report which will exhaustively describe Russian conditions. Among those conducting the investigation upon which the report is to be based are Valerian E. Greaves, former professor of law in the University of Petrograd, and Ellery A. Baker, formerly in charge of the industrial department of the National City Bank, New York. Cooperating with the committee are representatives of export bodies and trade associations including the American Manufacturers Foreign Credit Insurance Exchange and Lloyds of London. Monroe Curtis is aiding the work from Berlin. The committee, it is said, is studying the possibility of obtaining credit insurance on at least a portion of the shipments, and will make arrangements for financing. "The solution of this problem of Russian trade," says Mr. Hunt, "lies in proper organization. The committee, a non-profit body, will remain strictly impartial regarding all political conditions in Russia, and will take no sides with any of the existing Russian political factions."

President Crawford Heads Dock Commission

BIRMINGHAM, ALA., Oct. 1.—Governor W. W. Brandon, of Alabama, has appointed George Gordon Crawford, president of the Tennessee Coal, Iron & Railroad Co., chairman of the Dock Commission, to be in charge of the development of the port of Mobile. The voters of Alabama some time ago voted a constitutional amendment providing for $10,000,000 credit of the State for the development of the port of Mobile and inasmuch as this port is nearer to the sea than New Orleans, it is expected ultimately that this will be one of the most important ports of the country. The Dock Commission will be charged with the organization of the forces which will map out and carry on the first development work, including the purchase of the water front and other preliminary work.

The development of this port, it is expected, will bring about great development plans on the part of the United States Steel Corporation, the idea being that the corporation will make this section one of its great exporting subsidiary centers.

Last Days of Foundry Congress at Paris

Plans Renewed for International Exchange of Views on Testing Castings—Next Congress, Three Years Hence, Likely in United States

(Special Correspondence)

PARIS, FRANCE, Sept. 16.—The session on malleable castings of the Paris convention of foundrymen was opened Friday, Sept. 14, with M. Cury, vice-president of the French Foundrymen's Association, in the chair. The first paper was by M. Piedboeuf on "Tensile and Transverse Tests of Malleable Castings." The author advocated sections of test bars which were "I" and cross-shaped and, as indicated by the samples passed around, did give excellent metal in the extremities of the section but were complete "shrinks" in the junction points. The paper provoked much discussion. The general thought was against changing from the wedge and standard American test piece. This was brought out specially by M. Rémy, and accentuated by Mr. Portevain, who also opposed the tensile test for cast iron, even if malleablized, as unreliable.

The next paper, by Mr. Gailly, went exhaustively into American malleable practice as seen by him on his journeys to the United States. A long discussion by Mr. Rémy ensued, in which he pointed out differences in viewpoints and practice—the two manufacturers of malleable castings in Belgium disagreeing considerably —Mr. Gailly favoring the straight American "black-heart" malleable. Dr. Moldenke was asked a number of questions on his practical experience in connection with malleable melting processes, particularly on the air furnace.

M. Perrin presented a paper on the electric furnace for foundry use. This was discussed by Mr. Lamballe and J. Léonard, and some information was given on nickel-chromium alloys added to heats of steel. Ivan Lamoureux, Liege, Belgium, then discussed the need of a dictionary of technical foundry terms, holding that there is great need for accurate definitions in the industry, and advocated work along this direction—in effect doing the same work as the American Society for testing materials through its committee on definitions. The applause given the speaker indicated that he had the appreciation of the assemblage.

M. Rémy then took the floor to advocate the forming of a European malleable association—on the lines of the American to some extent, so far as research is concerned. At the close of the meeting those who were interested remained behind to consider the question of organization.

Buying of Pig Iron by Analysis Recommended

The following is the text of the resolution passed by the congress in regard to the purchase and sale of pig iron:

> *Resolved:* That the International Congress of Foundrymen, assembled in Paris, recommends that the purchase and sale of pig iron be conducted on the basis of its analysis.
>
> That this should be done under appropriate regulations that will protect the buyer and seller on matters relating to methods of sampling and analysis; as also allowable variations from such analyses in the delivery of the pig iron specified.

The ladies were entertained during the day by a visit to the Eiffel Tower, at which the foundrymen met them for lunch, and later interesting points were visited by motor-bus. The foundrymen continued their visits to foundries. The establishments visited during the congress were the following: the steel casting plant of Noisy-le-Sec; the converter-steel casting plant of the Ateliers Nord-Paris à La Courneuve, and the iron, bronze and aluminum foundries of Forges et Fonderies de l'Aviation à Gennevilliers. These were covered in the trip of Thursday, and the converter-steel foundry of the Usines de Vitry-sur-Seine, and the foundry and molding machine shop of Ph. Bonvillain and E. Ronceray at Choisy-le-Roi were left for the Friday trip.

Regarding the exhibition this much can be said: While naturally not comparing in size with that of the American Foundrymen's Association, it was nevertheless a creditable showing of the state of the art of both foundries and equipment manufacturers. The character of the machines and appliances shown was high, and everywhere were seen the care and finish that had been given the design as well as the execution of the work. The exhibition was replete with examples of art casting, sections of automobile castings showing the intricacy of design, and the various raw materials entering the foundry. Particularly the fact stood out that few equipment houses confined themselves to one line of machinery or operating equipment. Molding machines, ladles, sand mixing machinery and tumbling barrels would be seen in one exhibit. One exhibitor even had a liquid to give air-dried cores —that is, without baking—provided, however, that only silica sand was used, as the presence of clay rendered the fluid ineffective. Probably some chemical like magnesium chloride or other artificial stone-forming solution is involved.

The exhibition had the great advantage of being located in one of the four great trade schools operated by the French Government. Hence a visit through the extensive shops and class-rooms was illuminating. The young men receiving instruction have to take a four-year course. Pattern-making, molding, machining and blacksmithing are taught thoroughly, as the fine exhibits of the work done amply testify. It is no wonder that the United States foundry industry has to look to Europe for a large portion of its future molders, as the larger countries of Europe are turning out proportionally far more trained mechanics than we are able to do with all our schools and plant training classes.

On Saturday, Sept. 15, was the closing session. This was presided over by Minister Gaston-Vidal, Assistant Secretary of State for Industrial Education, who had first made an official tour through the exhibition. The first paper of the session was by J. Galibourg and A. Brizon on the casting of bronzes and aluminum, which was briefly discussed. Then H. J. Maybery gave a brief resumé of his paper on magnesium in the foundry, which was followed by an elaborate address by Prof. Chevenard of the School of Mines of St. Denis, who went deeply into the expansion of irons under heat and the graphitization of cast iron.

In taking the chair at the opening of the session Minister Gaston-Vidal had given an excellent address on the importance of the mechanic arts to France and the world, and in particular the foundry, as requiring more specific instruction. He held forth the promise of a special institution for this purpose to be inaugurated by the state. The speech was of a patriotic character and called forth many bursts of applause. After the papers, the Minister distributed the prizes and medals incident to the congress. The presidents of the visiting associations each received a medal, and then the prizes for the best exhibits were given out—checks and medals. Then came the unique distribution of medals, cash prizes and books to the students in the trade schools who had achieved distinction. The smaller the boy the greater the applause he got from the assemblage. The congress then adjourned officially.

European Malleable Association Formed

It was learned that on the previous day there had been formed the European Malleable Association on technical lines only.

On leaving the place of assemblage the entire dele-

gation took a special Seine steamer for a three-hour ride down the river to St. Germain, where the magnificent collection of French antiquities, from the stone age and the Roman occupation, were exhibited in the palace, dating back to Francis the First. Return was had by rail, and shortly thereafter everyone went to the great banquet held in the Palace d'Orsay.

It should be mentioned that, according to Continental custom, every function connected with the congress was by ticket duly paid for by the participant—in distinction to the English custom, under which the guests found it difficult to pay out anything except the hotel bills. This Continental custom made it easier for the hosts in their arrangements, but also difficult for the guests in getting about. A case in point was the getting to the boat of 150 congress members from the distant meeting place—in taxicabs, not previously arranged for. Hence, some who vainly hunted conveyances for nearly half an hour were left behind. Unquestionably, however, the newness of the occasion made it impossible to provide for everything in advance.

The banquet was a grand affair. The director of technical education of France, M. l'Abbé, presided, owing to the unavoidable absence of the Secretary of State. Eight nationalities were toasted, and Mr. Clamer, president of the A. F. A., responded for America. It was shortly before midnight that the chairman, in clearer French than any of the previous speakers, struck the keynote of the whole occasion in urging constant attention to the apprentice problem.

Plan for International Study of Testing Castings

During the excursion to St. Germain the representatives of the various bodies interested in testing cast iron met in the cabin and discussed ways and means of carrying out the object in view. A loose organization was perfected, with M. Portevain as chairman and M. Ronceray as secretary, these gentlemen to serve as means of communication between single members for each country, to receive and transmit information. It was asked that each country send in their views on the subject of testing iron—under the resolution passed by the congress—for information and criticism, these views to be accompanied by the reasons and arguments for their presentation. This will give the start to those nations having done no testing work as yet, as well as clarify divergent views of those nations which have. It is hoped to have made considerable headway before the next congress—expected to be held in three years, and in the United States.

The American party will now break up somewhat, several going to Italy to attend the meeting of the Iron and Steel Institute in Milan. Others go to Switzerland and Germany, and probably most of the party to Belgium and the devastated battlefields.

(From Another Correspondent)

PARIS, FRANCE, Sept. 18.—So great was the success of the first International Congress of Foundrymen, that the chairman of the American representatives announced at the concluding banquet, at the Palais d'Orsay, that it was hoped to hold another conference in America in 1926. There were representatives from eight different countries. There were about 150 members of the Institute of British Foundrymen present and substantially the same number from Spain, as well as an influential body from America. Sweden and Czecho-Slovakia were also represented.

Sessions were held in French and English, the same papers being discussed. Nearly all the papers were contributed by American and English representatives.

Cast Iron and Mass Effect

The papers that were of the greatest importance were those on "Magnesium in the Foundry," by H. J. Maybery; "Mechanical Handling of Sand," by H. M. Lane, Detroit; "Testing Cast Iron," by Dr. Richard Moldenke, and "Cast Iron and Mass Effect," by O. Smalley, Newcastle, England. In the last paper the author was exploring what is almost virgin ground. He stated that he was not cognizant of any attempt at systematic investigation of the mass problem. It assumes, he said, proportions of huge dimensions and presented a fertile field for research for which the contributed cooperative effort of many investigators was necessary to its scientific understanding.

The treatment of the subject was altogether comprehensive and the subsequent discussion chiefly centered on pouring problems. Mr. Smalley contended that the controlling influences in the manufacture of solid castings were (1). Time factor during solidification (2) Temperature of pouring. (3) Chemical Composition (4) Rate of cooling and (5) Rate of pouring. Dr. Moldenke explained the big influence on the solidity of castings of fluidity and Dr. Fletcher, late director of research of the British Cast Iron Research Association, stated that in his opinion thick or thin sections make or mar castings. In his opinion also the speed of running castings is of vital importance. The interesting statement was made by him that the British Cast Iron Research Association were giving special consideration to the question of mass effect. In replying to the discussion Mr. Smalley agreed that stability of the mold was important, but if the time taken to solidify was too long the metal should be dealt with and not the mold.

Magnesium is of great importance in engineering. It is often used as a deoxidizer for brass and steel. Mr. Maybery in his paper emphasized that it is as well when designing molds for magnesium alloys to remember the simple laws of hydrostatics. Magnesium alloys, he said, were more than four times as light as iron. Therefore it would require a column of molten magnesium four times as high to produce the same pressure as a similar column of molten iron. The point has to be borne in mind when designing runners and risers. Provided the metal supplied by the manufacturers is of suitable quality, there are no great difficulties with magnesium alloys in the foundry.

International Tests for Cast Iron

Dr. Moldenke's paper provided the basis of an interesting discussion, unfortunately as fruitless as similar discussions have been in the past, in consequence of which a resolution to form an international committee to divide research work on testing among the different countries in order to get testing on a recognized basis was not proceeded with. [The preceding report shows a later informal attempt at establishing a plan which promises some success.]

The French method, invented by Fremont, was severely criticized, especially by British representatives. Mr. Ronceray, a French engineer and foundryman of high repute, praised the French method, which had been proved since the war, he said, more satisfactory than casting separate bars or bars on castings, the small rods thus obtained being subsequently prepared for shearing tests.

The American arbitration bar dates from 1905 and, in Dr. Moldenke's opinion, it is in every respect satisfactory except as to length, which is one foot. American engineers and foundrymen are now ready to consider the lengthening of the bar and are anxious for international action.

A point that is much discussed is whether test bars should be cast flat or on end. Dr. Moldenke explained that the American arbitration bars were cast in the vertical position. Before he replied and explained that the arbitration bar was only used when there was a dispute and that in America no specifications were issued for light castings, a trenchant criticism of both French and American methods was made by J. Shaw, Sheffield. He said that the conditions differed in England from America. In England the engineers dominated the position.

Industrial units in the Mahoning Valley now nearing completion include the mechanical puddling plant of the American Puddled Iron Co., coke oven extension of the Republic Iron & Steel Co., new by-product coke plant of the Trumbull-Cliffs Furnace Co., and a new plant at Haselton for the Standard Slag Co., for the reduction of furnace slag. Operation of these plants will add several hundred men to the payroll of the district.

Electric Brass Foundry Practice

American Electrochemical Society Holds a Notable Session—All Phases of the Industry Represented—Power Rates and Refractories Discussed

An innovation, in the form of an unusual round-table discussion, was the feature of the forty-fourth general meeting of the American Electrochemical Society, held at Dayton, Ohio, Sept 27 to 29. It was one of the most profitable meetings of this kind. Its success was due to two causes: The complete plans prepared for insuring the attendance of interested parties and the understanding that each speaker would be free to speak his mind with the assurance that the proceedings would not appear in the society's *Transactions* nor taken down by stenographers or publication representatives. The technical press was requested to cover only generalities.

A New Kind of Meeting

The meeting was a group luncheon. The general discussion was held under the auspices of the electrothermic division of the society. The subject was "Electric Furnace Brass Foundry Practice," one which is of large importance and which is attracting wide interest among brass manufacturers, particularly the operation of different kinds of electric furnaces under varying conditions. It was expected by the organizers of a meeting of this character that viewpoints could be exchanged more openly, with the result of a better understanding among both producers and users of such furnaces. This was fully realized. There was also the added advantage that, for the first time at any such meeting, representatives of central power station companies were present to express their views or to answer questions.

The attendance at this round-table luncheon, held at the Engineers' Club, Thursday noon, Sept. 27, far exceeded the most optimistic expectations of the organizers. The most exaggerated prediction was an attendance of 50, but at least 80 to 85 actively interested participants were present. The diversity of interests in electric brass foundry practice represented almost every important district of the country. Users of electric brass furnaces from the Ansonia and Bridgeport, Conn., districts; the Rome, N. Y., territory; the Buffalo, Detroit, Cleveland and other important centers were represented. Companies interested in selling special types were also represented. Many of the large power companies in certain districts, such as Detroit, Dayton, Cincinnati, New York and other centers, sent men particularly acquainted with the furnace or power load phase of the problem. The result was an aggregation of men informed in all aspects of the subject, and ready and free to discuss almost any topic.

No small amount of the success of this notable meeting is due to the chairman, Dr. H. W. Gillett of the Bureau of Mines Station, Ithaca, N. Y. His management of the session, reinforced by his intimate knowledge of the industry, was a large factor.

Four general topics were discussed in about the following order: Power rates in various localities, including the question as to at what rates can an electric furnace show a saving; large furnaces versus small furnaces; types of furnaces best suited for different purposes; operation of furnaces more than one shift per day; and refractories.

Power Rates in Various Localities

From representatives of power companies and from users of electric furnaces, the actual rates in force in various parts of the country were made public, as well as the conditions surrounding the use of this power. It developed in general that there is not such a large variation in power rates as was expected by many and that there is an eagerness on the part of many power companies for just such a load as the electric brass furnace demands. It was also evident that not only is electricity very widely used for electric melting and refining furnaces, but also that in the brass industry it is not a prohibitive fuel even at some of the higher rates, because of certain accompanying advantages, such as better product, less metal loss, etc.

Refractories for electric brass furnaces was the next most important phase of the session. The inability to secure certain refractories for some kinds of brass melting furnaces is a problem needing early solution. Various experiences and suggestions were fully discussed, but it did not develop that this problem has been solved. It was the sense of the meeting that faster progress should be made and it was recommended that the society as an organization cooperate with the American Ceramic Society, the Bureau of Mines and other organizations in an effort to clarify the situation.

There was a most interesting exchange of opinions as to various types of furnaces, their advantages and limitations, as well as the kind of work they are particularly adapted to. Unusual frankness pervaded the exchange of views. An announcement of interest was that of Dr. E. F. Northrup, Ajax Electrothermic Corporation, Trenton, N. J., that his company has recently perfected a hydrogen gap which he reports greatly simplifies the operation of his high frequency, high temperature electric melting furnaces.

There were among those present some who are contemplating the introduction of brass melting equipment, fuel or electricity. The interest in the session was so intense that it lasted two or three hours longer than scheduled, over 75 per cent of those present electing to forego some of the entertainment features in order to prolong the discussion. So notable was the success of this new kind of gathering that it will be continued at one or both of the next two conventions, which are planned for the spring and fall of 1924.

Plant Visitations and Future Meetings

Besides the brass session there were other round-table luncheons devoted to special electrochemical subjects, as well as regular technical sessions, the most important of which was a symposium on "Electrochemistry of Gaseous Conduction," of which Dr. Duncan MacRae was chairman.

Among plant visitations were those to the General Motors Research Laboratories, the Duriron Castings Co. and the National Cash Register Co. At a smoker and entertainment at Triangle Park, Thursday evening, Sept. 27, Charles F. Kettering of the General Motors Research Corporation delivered a scholarly address on the general subject of research, its misconception, limitations and objects.

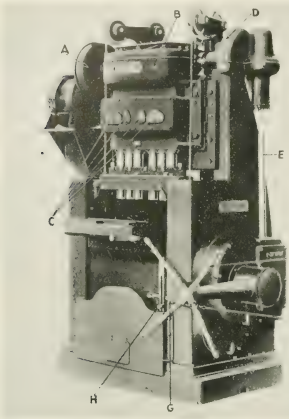
The 1924 spring meeting of the society was announced as arranged for Philadelphia in April and the fall meeting for Detroit, probably in September. The Dayton convention was remarkably well attended, having a registration of nearly 200, or practically equal to the New York meeting last May.

A two-semester course in Industrial Metals and Alloys will be added to the courses in evening studies at the University of Buffalo if a sufficient number of registrations are received. University authorities have approached district iron and steel executives and have asked them to ascertain sentiment on the proposed course. David A. Waite, consulting chemist and metallurgist will be in charge. The object of it is to familiarize men who are not metallurgists, but who are dealing with metals, with the physical and chemical properties of the important metals and alloys. The plan calls for registration of purchasing agents of steel, salesmen and automobile manufacturers.

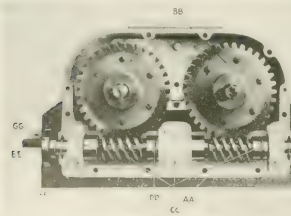
IMPROVED BORING MACHINE

Multiple Spindle Unit for Quantity Production—Interchangeability of Heads a Feature

The Foote-Burt Co., Cleveland, has placed on the market the multiple spindle boring machine illustrated, which is for use in boring and reaming automotive cylinders and for miscellaneous boring operations on a range of other work, the machine being an improvement over the company's previous equipment for the same duty.



The Spindles Are Set at Fixed Center Distances and the Feed and Speed Worked Out for the Particular Job. Interchangeability of heads and jig plates provides for using the same machine on different boring jobs. The drive to the spindle is shown in view below



Being intended for use where parts are to be machined in quantity, the spindles are set at fixed centers and the speed and feed worked out for the particular job. To adapt the machine for use where it is desired to run two or more boring operations on the same machine, the heads are made detachable and are bolted to the rail, which is provided with T-slots. To change the heads, it is merely necessary to loosen the bolts and dowel pins and disconnect the couplings which connect with the main drive of one side of the machine and with the feed mechanism at the opposite side. Another head is then placed on the machine and the drive arrangement coupled up again. The jig plate holding the bushings for guiding the spindles may also be easily interchanged.

The machine may be arranged for either belt or individual motor drive, the latter being mounted on a bracket on the column, as shown. The drive is from the motor through reduction gears at *A* to a main driving shaft in the head. There are two worms, shown at *AA* in the separate illustration, mounted on a main driving shaft, which transmits the motion to two worm wheels *BB*, located near the top of the gear case *B*.

The following description applies to a six-spindle head, but a similar arrangement is employed for other numbers of spindles. For the six-spindle machine each worm wheel is mounted at the top of the middle of a group of three spindles, and under the worm wheel is arranged a spur gear, which transmits power to spur gears mounted at the top of each of the other two spindles in the same group. These spur gears have their faces divided into two sections, the teeth on one of the sections being of a coarse pitch to carry the load, the other section of the same gear being provided with teeth of a finer pitch to divide up the points of contact, which is intended to assure a smooth running drive. The main driving shaft carrying the two worms *AA* is mounted on roller bearings, and is also provided with ball thrust bearings to carry the end thrust of the worms. Each spindle is carried by adjustable tapered bronze bearings, and the endwise load is taken by all thrust bearings. The spindle head is lubricated by a force feed system.

Feed Accomplished by Raising Work Table

In this design the head occupies a fixed position, and the feed is accomplished by raising the work table. Four feeds are provided by means of two sets of pick-off gears, mounted in a gear case *D*, in which all of the mechanism runs in oil. Power is taken from the main driving shaft in the head and carried through the spur and bevel gears to the vertical shaft *E*, at the lower end of which there is a knockout worm meshing with the worm wheel. On the worm wheel shaft there is a spur gear meshing with the worm wheel, on the shaft of which there is a spur gear meshing with a second gear carried on the shaft running transversely through the machine. This shaft carries pinions with racks at either side of the table, so that their rotation causes the table to be raised and carry the work up to the tools in the spindles. Raising the hand lever *F* throws the knockout worm into engagement with the wheel and makes the power feed operative. When lever *F* is raised, it is latched at the upper end of bell crank *G*, and when in that position holds the worm in engagement with the wheel, resisting the tension of a spring which tends to throw the worm out of engagement.

Attached to the work table there is a slotted bar, on which the feed trip *H* may be set in any desired position. When the table is fed upward to the end of its stroke, the trip *H* engages the lever *G*, and by rocking this lever causes the latch to release hand lever *F*. Then the spring throws the worm out of engagement with the worm wheel and stops the feed. Capstan wheel *I* provides for adjusting the position of the table by hand. The table is counterweighted, steel cables connected with the table serving to carry the counterweights, which slide on cylindrical guides mounted at the back of the machine.

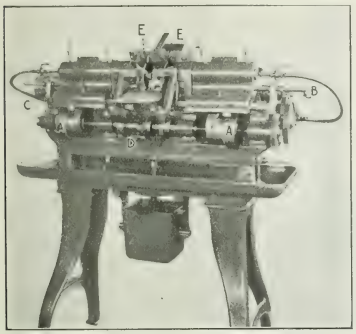
The growing tendency among retailers to increase their rate of turnover through buying in smaller quantities is likely to require more convenient wholesale sources of supply to facilitate prompt deliveries, declares a pamphlet issued by the Domestic Distribution Department of the United States Chamber of Commerce, Washington, and available now for distribution. This report urges more familiarity with scientific warehousing as a means for lowering the costs of distribution and recommends that merchants and manufacturers shall study their peculiar problems and their possible relation to public warehousing.

A competitive examination for assistant mechanical engineer to fill a vacancy in the Bureau of Aeronautics, Navy Department, has been announced by the United States Civil Service Commission, Washington, to which applications should be made prior to Nov. 6.

Double-End Machine for Production Threading of Studs and Rods

A machine for simultaneously threading both ends of studs and rods and which is entirely automatic in its operation, fitting it for work on a quantity production basis, has been brought out by the Grant Mfg. & Machine Co., Bridgeport. The production claimed in threading ⅝-in. rods on both ends to a length of ½ in. is 30 rods per min. The capacity of the machine illustrated is for work of ⅝-in. diameter and 10 in. long.

The threading is done by two opposing die heads mounted on the heads and moving longitudinally along the bed. The work is fed intermittently from a magazine at the rear to a position in line with the die heads



The Threading Is Done by Means of Two Opposing Die-heads. The machine is entirely automatic, work being fed from a hopper and discharged into chute when completed

and is clamped by means of levers. The movement of the levers, the traverse of the heads and the operation of the work carrier are by means of cams. Power is transmitted through a two-step cone pulley on the driving shaft, from which each head is driven by a train of spur gears. The die head spindles are hollow and lubricant is pumped through them to the ends of the work.

The cam-shaft extends along the front of the bed and is driven from the driving shaft by means of gears. The cylinder cams *A A*, mounted at each end of the cam-shaft, carry cam blocks for controlling the forward and return movements of the heads by engaging a roller on the bottom of the heads. The cam blocks are changed to suit threads of different pitch, but change gears may be used also to obtain the proper rate of forward movement of the heads relative to the rotation of the spindles.

In addition to controlling the rate of traverse of the heads, the cams also control the length of their movements. The positions of the cams are adjustable to suit the length of work by means of a thread and locknuts. Obviously the positions of the cams control the positions of the heads. Threads of different lengths may be cut by providing cam blocks to suit. The opening and closing of the die heads is accomplished by means of rods *B*, and two adjustable stops on each rod. The rods extend through the heads and are connected to the die heads by a fork. At the end of an operation the forward movement of a rod ends as the rear stop comes in contact with bracket *C*, which causes the die head to open. At the ends of the return movement of the head the second stop strikes the other end of the bracket and closes the die head.

Work is delivered from the magazine to the threading position by means of cam *D*, which actuates a roller attached to the front end of a link extending to the rear of the machine. At the rear end the link is connected to a bell-crank, which is in turn fastened to a vertical rod having a pawl at the upper end. The pawl engages a ratchet on a shaft which carries two disks, *E E*, and causes the shaft to rotate intermittently when motion is imparted to it from cam *D*. Each disk has six notches by means of which a piece is carried from the magazine each time the pawl rotates the ratchets.

When in the threading position the work is clamped by means of levers which are rocked forward by the movement of cams. As the rollers ride on the low portion of cams, the levers swing forward again and release the work, which rolls forward into a receptacle provided. Provision is made against the possibility of breakage due to improper clamping of oversize work.

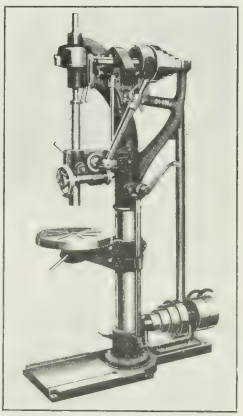
New 21-In. Upright Drilling Machine

A new model 21-in. upright drill with gear driven feed has been placed on the market by the Buffalo Forge Co., Buffalo. Departures from its previous machines are in the use of a positive gear feed instead of belt driven, and the placing of a brace between the lower pulley shaft and the upper part of the frame. The machine is available, however, without the brace attachment if desired.

The general construction of the machines may be noted from the illustration. The drill has eight speeds with use of back gears, three power feeds, hand wheel and ratchet lever feeds. A feature of the power gear arrangement emphasized is the type key spring installed, a spiral spring being used in place of the semi-elliptical type, which is said to provide uniform and maximum pressure to the key in all positions. The spiral spring employed in the new machines consists of fourteen coils of music wire, 0.023 in. thick.

All feeds are obtained without stopping the machine. Quick adjustment from plain to back-geared drive may be had by disengaging the knurled knob in the top gear and throwing in the back gears by means of a hand lever. A lock screw serves to hold this lever in place. An adjustable trip is provided by which the power feeds are thrown out when the piece has been drilled to the required depth. All gears are machine cut and are bronze bushed, and the main feed worm runs in an oil bath.

The spindle is of high carbon steel and is accurately ground. Spindle thrust is taken up by means of ball bearings, and plain spindle bearings are split. The head and column are cast as one unit, the column itself being machined and highly polished. The vertical travel of the spindle is 12½ in. and the maximum distance from the base to spindle is 39 in. The table of the drill, carried on the main column, is operated by a screw of the ball thrust type which is lathe turned. The table arm is bored by the machine itself, which is intended to assure close accuracy. The maximum distance from the spindle to table is 22 in. and the diameter of the round table is 16½ in. A tapping attachment of the double-jaw clutch type is available if desired.



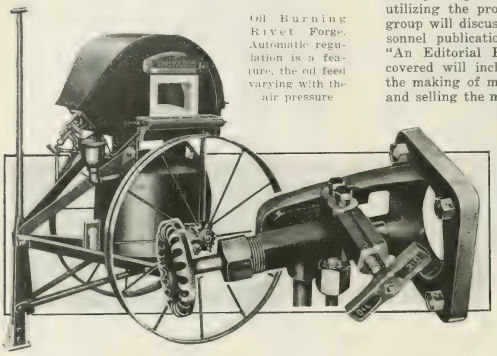
Positive Gear Feed Is Employed. Feeds are obtainable without stopping the machine

The capacity of the machine is for holes up to 1½ in. The weight is 970 lb. and the floor space required is 16 x 47 in.

New Line of Rivet Forges

A new line of oil-burning, wheel-portable rivet forges, designated as Nos. 1, 2 and 3, for use in car repair yards, structural and boiler shops, respectively, has been placed on the market by the Johnston Mfg. Co., Minneapolis.

The general construction may be noted from the accompanying illustration. The frame is built on the "triangle" principle to permit of maximum rigidity, and the tongue is pivoted and acts as a guard for the burner. A large foot is provided to prevent sinking in soft ground. The wheels are 34 in. in diameter and 3 in. wide and are mounted in roller bearings. The forge is designed to burn fuel oil or any lighter oil. The automatic oil regulation provided is emphasized as maintaining a constant character of flame, eliminating scaling and smoking due to variable air pressure, and



Oil Burning Rivet Forge. Automatic regulation is a feature, the oil feed varying with the air pressure

maintaining high combustion efficiency. The entire floor of the heating chamber is visible to the operator as he stands normally, without stooping.

The charging opening is 6 in. wide and 5 in. high and is said to maintain its shape and size for a long period, thereby saving oil and maintaining best operating conditions. An air curtain pipe is provided to deflect the hot gases upward. The forge is designed for relining with standard firebrick or special tile. The tank capacity is 20 gal. The floor space occupied is 2 ft. 9 in. by 3 ft. 10 in. and the shipping weight is 825 lb.

The burner employed, designated as the Johnston non-clogging vacuum oil burner, is shown in the insert illustration. In this burner the oil supply is regulated indirectly by an air valve, which, it is said, cannot clog or vary, it being claimed that the burner operates continually without clogging or varying on oil containing so much free carbon and dirt that the usual burner will not maintain a fire without constant attention.

The burner has only two working parts, two needle point air valves, one of which regulates the compressed air and the other regulates the oil feed indirectly. The oil regulating air valve is plainly marked as shown, and is operated in the same way as other valves. High vacuum and large oil connections are provided in order that the burner may handle thick heavy oils. The oil feed increases and decreases automatically with the air pressure, and uniform flame is said to be maintained regardless of large variations of pressure in the air lines. The elimination of the necessity for readjustment of the oil feed, thus leaving the operator free to assist in other work, is a feature emphasized.

B. J. Mockenhaupt & Co., 217 North Des Plaines Street, Chicago, have been appointed sales representatives in the Chicago district for the Reinforced Switch & Mfg. Co., Inc., Pittsburgh.

To Discuss Plant, Sales and Office Management Problems

A variety of subjects bearing on plant, sales and office problems, with employer-employee relationship outstanding, will be discussed at the second annual meeting of the American Management Association, which will be held at the Hotel Astor, New York, Oct. 29 to 31.

Committee reports will be presented and discussed at three simultaneous meetings held Oct. 29. The subjects taken up by one group will include selecting employees, economics for employees, job descriptions, and man specifications, bases of remuneration, and cooperation with engineering colleges. Another section will discuss tendencies in training methods, coordination and administration of benefits, the scope and management of medical departments, the relation of community to personnel problems and distributing and utilizing the product of the public schools. A third group will discuss the report of the committee on personnel publications, the topic of the meeting being "An Editorial Program and Policy." The subjects covered will include the fundamentals of journalism, the making of magazine layouts, interesting the home, and selling the magazine.

Three simultaneous sessions will be held the second day, under the auspices of the office executives division, the plant executives division and the sales executives divisions respectively. The program of the plant executives division will include a report on apprentice systems, and an address on the "Relation of the Employment Department to the Foreman," by S. R. Rectanus, assistant works manager, Ashland division, American Rolling Mills Co., Middletown, Ohio. "Labor Efficiency in Good and Bad Times" will be discussed by N. I. Stone, general manager Hickey Freeman Co., Rochester, and "Following Up Foreman Training," by A. H. Young, manager of industrial relations, International Harvester Co., Chicago. A committee report on the training of salesmen will be presented and discussed at a meeting of the sales executives division, the six topics planned including among others the starting of new salesmen, coaching the salesmen in the field and the preparation of sales manuals. At the annual dinner, to be held Oct. 30, there will be several addresses on "Stabilizing Prosperity in America."

A session devoted to personnel administration in companies with 1000 or less employees will include committee reports and addresses on training, employee service, safety, health, employee contracts and employment. Simultaneously another group will discuss committee reports on "Devices for Conferring with Employees" and "Selecting the Supervisory Forces." Special luncheon meetings will follow.

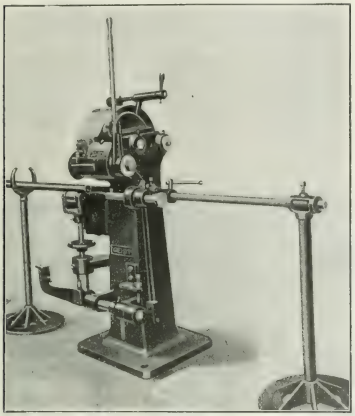
The closing sessions will include an address on "Supervision and Discipline, Their Nature and Importance," by Elisha Lee, vice-president Pennsylvania Railway System. "Using the Motion Picture in Personnel Work," another topic planned, will include a motion picture prepared under the auspices of the committee on visualized training. An address will also be made by Sam A. Lewisohn, vice-president Miami Copper Co., New York, on the subject of "Estimating Managerial Achievement in Terms of Human Organization."

The foundry department of the Christopher & Simpson Iron Co. on Park Avenue, Eighth to Ninth Streets, St. Louis, has been sold to a new company known as the City Foundry Co., of which U. S. Arnold is manager.

The American Sintering Co. has awarded contracts to double the capacity of its plant at Hubbard, Trumbull County. Improvements contemplated will involve expenditure of approximately $200,000.

Heavy-Duty Roller Pipe Cutter

A heavy-duty roller pipe cutter incorporating improved features and having a range from ⅛ to 2 in. inclusive, has been placed on the market by the Geist Mfg. Co., Waynesboro, Pa. In this machine the cutter is of tool steel, heat treated, and may be reground when dull. The cutter shaft bearing is provided with an adjustable cap on the cutter side, for taking up wear, which is emphasized as a distinctive feature adding greatly to the life of the machine.



Roller Pipe Cutter. The cutter is of tool steel and the cutter shaft bearing has an adjustable cap for taking up wear

The rollers are of tempered tool steel and are carried in roller bearings. The cage which supports the rollers is elevated to the cutter by a cam which is operated jointly by a pedal and a lever. A flexible guard is provided to protect the surfaces of the sliding cage from scale and dirt. The rollers are adjustable for the different sizes of pipe, the adjustments being obtained by means of the hand-wheel just below the rollers. The lever and pedal may be positioned to suit the convenience of the operator. Their movements are limited by an adjustable stop. A small cage of rollers for ⅛ to ⅜ in. pipe may be attached to the large cage without removing the regular rollers.

The length gage is adjustable for the different sizes and lengths of pipe, and may be used for lengths up to and including 4 ft. The parts coming in contact with the revolving pipe are hardened to resist wear, and the gage arm is a heavy casting to resist flexure. All spindles and shafts are ground and run in bronze bearings. Although fully inclosed the gears are conveniently accessible.

The machine is being sold by the Landis Machine Co., Waynesboro.

The Ford Motor Co. has placed orders for two lake boats which will be used in carrying iron ore from the Lake Superior district mines to the Ford plant at River Rouge. One of the boats will be built by the Great Lakes Engineering Works at its Ecorse yard, Detroit, and the other by the American Shipbuilding Co. at its Cleveland or Lorain yard. These boats will be 611 ft. over all, 62 ft. beam and 32 ft. deep. They are the first freight boats ordered from lake shipyards for 1924 delivery. The engines will be of the direct Diesel type and the boats will have twin screws. They will be equipped with electrically operated winches and steering gear and an electric device for shifting the hatches.

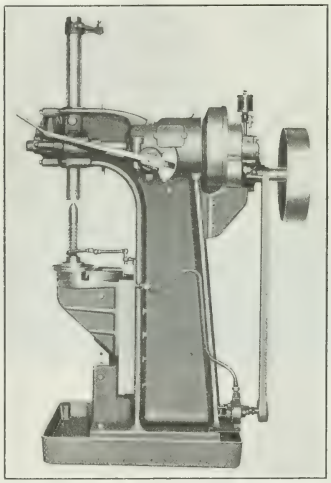
Combination Power and Broaching Press

A combination vertical broaching machine and three-speed power press incorporating improved features is being placed on the market by the Hercules Mfg. Co., 446 Woodbridge Street, East, Detroit.

The machine is rated at 15 tons capacity, and the ram is 36 in. long, 3 in. in diameter and has a travel of 24 in. The floor space occupied by the machine is 2½ x 4½ ft. The knee may be removed to permit the use of special fixtures. The trip arm is adjustable and may be set to stop the ram automatically at a predetermined point.

Power to the ram is through a series of steel gears and a double friction clutch by means of which pressure from zero to capacity may be obtained. The fast speed of the ram is 50 ft. per min. up and down, the pressure feed down being 84 in. per min. for heavy duty. All speeds are controlled by a single lever. The machine is self-contained and is equipped with reservoir in the base, pump and standard equipment. It is adaptable to either belt or motor-drive.

Broaches are made with 60 deg. ends to which adapters are fitted, and arrangement said to give proper alinement and to reduce breakage of tools. In



Combination Broaching Machine and Power Press. Fast speeds, heavy cuts and less tool breakage are emphasized

broaching, the greater production due to fast speeds of the machine, and heavier cuts and smoother work due to gravity lubrication are advantages.

New York City's first brass mail-box was installed Sept. 29 on lower Broadway, near Wall Street. The Post Office Department is placing boxes of this construction in seacoast cities. Protective green paint is not regarded as necessary and the boxes will retain their shape and lettering as a means of identification. The boxes are made at the Navy Yard at Washington.

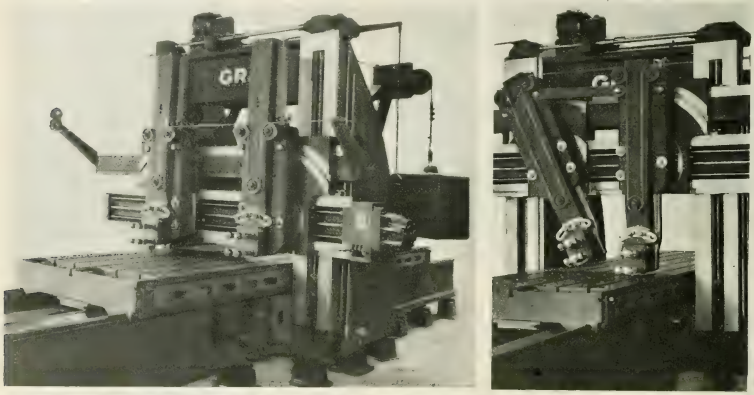
Increased industrial activity in Iowa was reflected in the August survey of employment conditions in that State recently issued by A. L. Urick, commissioner of labor. Reports from 352 companies showed an increase of 1.7 per cent in the number of employees over July, and a 16.4 per cent increase over August, 1922. The largest gain in employment over July, 119.1 per cent, was made in the refrigerator industry.

TWIN-RAIL LONG REACH PLANER

Machine Developed for Planing Inclined Sides of Steel Safe Doors—Heavy Cuts Taken

A new planer, designated as the "twin-rail, long reach, maximum service planer," and intended for work requiring longer reach than is available with the usual standard planer, combined with heavy cutting, has been placed on the market by the G. A. Gray Co., Cincinnati.

The machine illustrated, which was built for the Mosler Safe & Lock Co., Hamilton, Ohio, is 60 in. x 44 in. x 16 ft. in size and is used for planing the inclined sides of steel safe doors up to 30. in. thick. The planer was designed to take heavy, wide forming cuts in the steel without chatter, 30 in. below the bottom of the rail. The massive proportions of the machine may be noted from the weight of the various units, the bed weighing 14 tons, the table and rack 10 tons, the housing 6 tons, the rail 6 tons and the top brace 1 ton.



Planer with Twin Rails, Intended for Work Requiring Longer Reach Than Available with Regular Planer, Combined with Heavy Cutting. The method of swiveling a head is shown in right hand illustration

Operation is said to be as quick and easy as in the case of a smaller planer of the regular type.

The rail is built up of two members, as shown, bolted together and moving as one unit. The saddles have a solid bearing against the bottom of the lower member, an adjustable gibbed bearing on its top surface, and a supplemental bearing against its rear face. The saddles also have an adjustable gibbed bearing against the rear of the upper member of the rail. The top and bottom bearings of the saddle are thus localized on the lower member, an arrangement intended to provide the advantages of a narrow guide, while the bearing against the rear of the upper member gives the stiffness required for the machine.

Three ball bearing rollers are provided in the top of each saddle, so that most of the weight of the heads comes on the upper rail member. This obviates deflection of the lower member, which is said to remain straight and true, so that the head always moves exactly parallel to the table top. At the same time the effort of moving the head is reduced so that the operator can easily set the head with the ordinary crank from the end of the rail.

The ram carriers can be swivelled on the saddles, and as shown are bolted not only to the lower portion of the saddles, but also to a supplemental support near the top of the saddles. The steel tool boxes are mounted on the lower ends of the rams. The rams have rapid traverse as well as hand and power feed through the ram carriers. As the ram carriers can be swivelled, the rams have automatic feed in any direction.

To swivel the heads quickly, a simple but effective method is employed. As shown in the illustration, a bar is slipped over the collars provided on the heads. The left-hand ram carrier is then loosened and the right-hand head is moved by power traverse. This causes the left-hand ram carrier to swivel. Having secured an approximate setting with the traverse, the operator can get a very accurate setting by moving the right-hand head with his crank. He can then clamp the left-hand ram carrier, loosen the right-hand one, and swivel that to the desired angle by moving the left-hand head.

"Twin purpose" taper gibs add to the rigidity of the heads while cutting. One of these gibs is provided between the ram and ram carrier. A turn of the handle in one direction positively adjusts the gib to the operating position while a turn in the other direction securely locks the ram to the ram carrier throughout the entire length of the carrier. A similar "twin purpose" taper gib is provided between the saddle and the rail.

The rams and heads can be traversed by power by means of the single shift rapid traverse that characterizes the company's regular line of maximum service planers, and which has been previously described in THE IRON AGE. The new planer is also equipped with the company's "cantslip" feed and the balanced helical driving system running in oil. Both the lower and upper members of the rail are clamped to the inside of the housings by independent rail locks. The rams and rail are independently counterbalanced and move very easily. The table is provided with steel hold-down gibs running its entire length and automatically oiled from the constant pressure forced lubricating system that oils the Vs. The bed is double length, so that the table never overhangs.

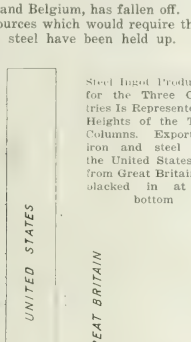
A competitive examination for valuation engineer and for associate valuation engineer to fill vacancies in the technical staff of the Income Tax Unit of the Bureau of Internal Revenue, Treasury Department, has been announced by the United States Civil Service Commission, Washington, to which applications should be addressed prior to Dec. 28.

Export Field for Iron and Steel

Great Britain Shipped Abroad Nearly Half Her Steel Output of First Six Months—United States, Less Than 4 Per Cent

BY M. H. BLETZ*

IN press and journal reports from principal producing and consuming countries of iron and steel it is generally acknowledged that there is a world shortage of steel products. Certainly it is conceded that the domestic demand, except in the United States and Germany and to a certain extent in the United Kingdom, France and Belgium, has fallen off. New developments of resources which would require the use of vast quantities of steel have been held up. Replacements



Steel Ingot Production for the Three Countries Is Represented by Heights of the Three Columns. Exports of iron and steel from the United States and from Great Britain are blacked in at the bottom

and repairs to existing equipment have been kept at a minimum.

The United States, as the greatest producing nation of iron and steel, is followed in order by the United Kingdom, Germany and France. It is not possible to say at this time which of the two—Germany or France—has the greater capacity but, if that of the Ruhr is added to the French, it is safe to say they are about equal. Belgium and Luxemburg fall into a secondary class as to volume of possible production, when compared with the main group.

From production figures reported for the first half of 1923, we can judge what three of the primary units have done. Accurate data for Germany are not available.

Iron and Steel Production (Gross Tons)

	First six months of 1923			
	Pig Iron—		Steel Ingots—	
	1st quarter	2nd quarter	1st quarter	2nd quarter
United States..	9,747,659	11,093,875	11,324,141	11,889,102
United Kingdom	1,744,900	2,059,300	2,243,700	2,338,100
France	1,090,440	1,156,560	995,370	1,152,550

July figures indicate that this rate of output is being maintained. The production of pig iron and steel ingots for July is reported as follows, figures in parentheses being for steel ingots: United States, 3,678,334 (3,515,966); United Kingdom, 655,100 (624,300), and France, 430,000 (393,200), all in gross tons.

Belgian production for the first quarter of 1923 was approximately 475,000 gross tons of pig iron and 485,000 tons of steel, while the corresponding figures for Luxemburg were 320,000 and 172,000 tons. These two units in the secondary group are mentioned in this discussion, due to the fact that, though their production is low in comparison with the first group, their exports take a stronger position.

Domestic demand in the United States has left little for export—less than 4 per cent—even at the record rate of output in this country. The figures for the first half of 1923 show that the United Kingdom has exported a tonnage equal to almost 50 per cent of its steel ingot production. French exports were in practically the same ratio for the first five months of the year, with nearly half the tonnage going into Belgium. The data reported for Germany show that, for the first five months, exports of iron and steel more or less balance imports. It is believed that a great deal of the iron and steel produced in Germany in 1922 and the first half of 1923 has gone into improvement and reconstruction of industrial works, including iron and steel plants. If this is the case, Germany will be better prepared to take her place in the steel export field when conditions adjust themselves.

That the iron and steel trade of the United Kingdom for the first half of 1923 was more widely distributed than that of the United States, and more evenly divided

DISTRIBUTION INTO COUNTRIES OF IRON AND STEEL EXPORTS

In Gross Tons—First Half of 1923

Countries	From United Kingdom 1st Quarter 1923	From United Kingdom 2nd Quarter 1923	From United States 1st Quarter 1923	From United States 2nd Quarter 1923
United Kingdom	.....	.....	15,711	17,234
United States	143,659	88,359	.....	.....
Canada	18,634	34,021	184,301	221,803
Belgium	36,356	43,686	1,846	2,561
Denmark	13,734	14,831	(1)	(1)
France	30,534	43,439	2,557	2,859
Germany	40,507	86,816	(1)	(1)
Italy	26,686	24,345	622	1,784
Netherlands	20,651	19,303	1,038	1,282
Norway	9,900	12,261	678	1,290
Portugal	5,295	10,438	(1)	(1)
Spain	8,891	9,773	2,711	1,875
Sweden	7,366	10,491	(1)	(1)
Switzerland	1,071	3,745	(1)	(1)
Australia	130,395	121,647	12,880	8,476
China	11,403	12,020	9,367	13,421
Hong Kong	4,550	3,863	3,198	3,975
India and Ceylon	177,976	153,041	9,193	1,753
Japan	46,683	81,628	50,088	91,648
Kwantung	.....	.....	1,281	10,785
New Zealand	32,007	23,701	1,399	1,170
Philippine Islands	.....	.....	6,815	7,935
Straits Settlements	10,333	10,246	(1)	(1)
British E. and W. Africa	7,989	24,966	(1)	(1)
British South Africa	36,022	40,316	2,280	5,165
Egypt and Palestine	9,181	22,126	(1)	(1)
Portuguese East Africa	5,182	5,004	(1)	(1)
Argentina	39,926	42,975	12,209	18,472
Brazil	8,955	6,243	9,552	10,439
Chile	4,475	6,584	8,346	8,273
Colombia	(2)	(2)	8,471	6,585
Cuba	(2)	(2)	27,302	52,855
Dominican Republic	(2)	(2)	1,455	2,812
Guatamala	(2)	(2)	1,187	1,762
Honduras	(2)	(2)	6,190	5,263
Mexico	(2)	(2)	18,949	23,268
Panama	(2)	(2)	1,522	2,467
Peru	(2)	(2)	6,141	6,538
Uruguay	(2)	(2)	1,704	2,396
Venezuela	(2)	(2)	2,412	2,628
Other S. A. Countries (2)	6,838	8,793	(1)	(1)
All other countries (1)	143,860	211,953	12,945	18,120
Total	1,039,029	1,176,614	424,250	556,804

(1) All other countries, including non-allocated.

*Iron and steel division, Department of Commerce, Washington.

among the hemispherical groups of countries of the world, is shown by the accompanying table. In this period practically five-eighths of the total American export tonnage of iron and steel products went into Canada, Cuba, Mexico and Japan.

It should be noted that the figures for "all other countries" under the United Kingdom include a large tonnage which has not as yet been allocated. That part not distributed in the first quarter amounts to approximately 114,200 tons and in the second quarter to 158,000 tons. Where detailed figures for various countries are not given under the exports from the United States, it may be understood that the total for the period would be less than one thousand tons.

RECOMMENDATIONS FOR BEARINGS

Report of Special Committee of Association of Iron and Steel Electrical Engineers

BY D. M. PETTY*

DURING the past year the Committee on Bearings has made a careful study of the problem of applying roller and ball bearings to motors. It has held one joint meeting with a committee representing the Power Club and appointed to study the same problem. Among the users of motors is a relatively small class who have used ball or roller bearings in motors. A vast majority of this class are enthusiastic over the results obtained. They have had some bearing failures, but have been able satisfactorily to explain these failures and have definitely fixed the cause. A few of these follow: Improper mounting; improper size of bearing; grounded armatures; improper lubrication. This item may be divided into improper lubricant and lack of sufficient quantity of the proper lubricant.

Among the motor builders are three classes:

1. Those who have used ball bearings extensively. These builders usually report good results and, where a standardized method of mounting has been worked out, do not quote excessively high prices for motors equipped with ball bearings when compared with their prices for sleeve bearing motors.

2. Those who believe that ball or roller bearings can be successfully applied, and are entirely willing to furnish motors equipped with these bearings, provided the motor user will pay the bill. The bill is high because no standardized method of mounting has been worked out.

3. Those who believe that motors are good enough with the present type sleeve bearing, and who furthermore believe that, if bearing improvements are necessary, they can be made in the sleeve bearing. Their arguments against ball bearings include excessive cost of changing existing designs and excessive cost and difficulty of doing the accurate machine work necessary in mounting the ball or roller bearings.

Builders of Bearings

With the builders of bearings the ball bearing has been standardized internationally. This standardization includes three general weights of bearings, light, medium and heavy. Each of these three general classifications includes many varieties. This standardization does not include the size of ball or shape of race, but the outside diameter of the outer race and the inside diameter of the inner race. In other words, the international standards make the mounting dimensions of ball bearings entirely interchangeable from one manufacturer to another. The ball bearing industry is to be congratulated for excellent work along this line.

Roller bearings of the large diameter, short length, solid type have been somewhat standardized along the same line. There is, however, still room for improvement in the standardization of roller bearings. Several lines of roller bearings on the market are interchangeable with the medium series of ball bearings.

Ball or roller bearings properly mounted are good or bad, depending upon the accuracy of the grinding. Great improvements have been made in the past five years along this line. Ball-bearing builders in general have made more progress than roller-bearing builders, but the latter are rapidly catching up, and even now no trouble results from this cause. As the use of ball and roller bearings is constantly increasing, the manufacturing facilities have been constantly increasing, so that the cost of the finished bearing has been gradually decreasing and this should continue.

Roller bearings of small diameter and great length do not line up with the ball bearings so well as the roller bearing of large diameter and short length. Therefore the standardization of this general type of roller bearing has not advanced to the same extent. Owing to the marked difference between this type of bearing and the ball bearing, it will likely be found necessary to make a separate standardization.

Recommendations of the Joint Meeting of the Bearing Committee and the Electric Power Club

1. It is desirable to standardize bearings as quickly as possible, so that motor users may install roller or ball bearings in existing motors and use sizes which will line up with standards to be used by motor builders in the future.

2. It is considered desirable and practical to standardize on ball-bearing sizes that will be interchangeable with roller-bearing sizes, so far as outside and inside diameters are concerned. Roller bearings in this discussion being limited to the solid roller type, it was pointed out that, while a roller bearing and ball bearing of the same inside and outside dimensions would be interchangeable from a mounting standpoint, the roller bearing would almost invariably be capable of carrying a somewhat heavier load.

3. After a general discussion it was considered advisable to adopt the standard ball-bearing sizes of the 300 series, and that the roller bearings be made to conform to these sizes so far as inside and outside dimensions are concerned.

4. That the number of sizes standardized upon for motors be limited to the smallest practical number, so as to reduce the number of spare bearings necessary to stock for protection against breakdowns.

5. That no attempt be made to standardize on any particular size of bearing for a given frame size of motor of any given horsepower rating or speed; that the selection of the sizes for any line of motor be left in the hands of the designing engineers.

In line with paragraphs 3 and 4, the association committee has set up the following as a tentative list of sizes:

Mounting Dimensions of Race in Inches

Series	Inside Diameter	Outside Diameter
304	0.7874	2.0473
305	0.9843	2.4410
307	1.3780	3.1493
309	1.7717	3.9370
311	2.1654	4.7244
314	2.7559	5.9055
317	3.3465	7.0866
320	3.9370	8.4646
323	4.5276	9.8426
329	5.7087	12.2047
336	7.0866	14.9606

This list of sizes will take care of motors up to approximately 150 hp. The committee desires a full discussion of this selection, not only from the builders of motors, but from the builders of bearings, as well as from the users of motors. It should be pointed out that, while it is desirable to have the number of sizes held down to the irreducible minimum, it would be unwise unduly to penalize certain sizes of motors by compelling the designing engineer to use a bearing much too large. On the other hand it should be pointed out that one of the pitfalls into which motor designers most frequently fall is that of using a bearing too light for the hardest service in which the motor eventually finds itself.

Discussion

Mr. Brown of the Electric Power Club emphasized the strong movement toward cooperation between the Association of Iron and Steel Electrical Engineers and the Electric Power Club in the establishment of stand-

*Electrical superintendent, Bethlehem Steel Co., South Bethlehem, Pa., chairman of the committee. The report was presented at the Buffalo meeting of the association.

ards. The Electric Power Club already has 16 standard horsepower ratings from 1 to 100 hp., involving 13 shaft sizes and various pulley sizes. To meet this stage of standardization the association has arrived at 15 sizes of ball bearings.

Mr. Hipple, in discussing the report, pointed out that the difficulty lies in getting motor manufacturers to redesign their equipment to fit the standards provided by these various standards committees. What the electrical engineers want as a final answer is a line of motors with ball or roller bearings already in them. Due to the variation in specific dimensions in the product of various motor manufacturers, it does not appear feasible to limit to 12 or 15 sizes of bearings the standards for both general purpose and mill type motors. As a matter of fact, the speaker pointed out, both ball and roller bearings are experimental as yet and it might be well to go slowly in establishing standards on something which is still feeling its way, especially as some of these standards so established might turn out to be something which is not wanted. Sleeve bearings of the oil ring type can now be had which require oiling not oftener than every three months.

H. E. Brunner, chief engineer S. K. F. Co., showed on slides the great diversity of present designs of motors made by different manufacturers. In some cases dimensions varied by more than 50 per cent for motors of the same power, and each size of motor had a wide variation in almost every particular concerned with the bearing question.

D. M. Petty, in his closure, stated that no standardization along this line is possible unless all of the motor manufacturers make some sacrifice on some of their sizes. This sacrifice, however, will be one in name only, because the manufacturer in any event will charge his customer with whatever it costs to make the change. There is no difficulty in this connection in new motors, because it is just as easy to adhere to the standards established in making new patterns from new drawings as to follow any other dimension and, as motors are being changed in particulars of design every few years, it ought to be only a short time before complete new lines are out. The standards could thus be put into effect within such period and with very little trouble.

Bearings for general purpose motors and for mill motors could just as well be the same thing, with the provision that for a mill motor the next larger size bearing would be used, because this motor is more rugged and a little heavier. The increase in cost of frictionless roller bearings would be compensated for by their increased life. Short and approximately square rollers are to be preferred to long rollers, principally because precision in the latter case is very difficult to obtain.

E. S. Jefferies pointed out that motors with anti-friction bearings require only a small fraction of the time of maintenance men called for by motors with the sleeve or other type bearings. As a case in point, he mentioned that babbitt bearings have a life usually, between repairs, of 500 to 600 hr. of running, whereas a roller anti-friction bearing, substituted for the babbitt bearing, has been running for more than a year without special attention and is still going strong. As regards bearings in general, 50 per cent of the trouble is reported as due to oil and grease getting out of the bearing and into the motor windings.

Another speaker pointed out that when grounds occur in d.c. motors, the flow of current seems to affect ball bearings badly, wearing spots at the points of contact and making it necessary to replace the bearings. In the case of a grounded armature, the cost of thus replacing the bearing is reported as greater than that of repairing the armature. Consequently, a short circuit brush has been developed for carrying the current past the bearing. From the standpoint of keeping oil and grease out of the motor, ball bearings were reported far superior to sleeve bearings.

SALE OF NAVAL VESSELS

Estimates of Tonnage of Metal to Be Scrapped Are Announced

WASHINGTON, Oct. 2.—Preliminary estimates have been announced by Capt. E. W. Bonnaffon, officer in charge in the sale of naval vessels, of the approximate tonnages of metal in ships that are to be scrapped under the four-party treaty for limitation of armaments. The estimates take into account the approximate tonnages in the vessels on the ways and the approximate averages of materials in vessels afloat. The figures were compiled at the request of prospective bidders. The latter are advised, however, to inspect the vessels and make their own estimates. As Captain Bonnaffon states, the figures given are merely approximate, are not guaranteed and may be changed by later surveys. The navy will withhold certain tonnages of armor and special treatment plates, as well as certain non-ferrous materials on ships and in yards and in the case of some vessels only a small fractional part of the tonnage they contain has been included in the estimates. The result is that the total indicated by these tentative figures is brought down greatly under an original estimate of 321,970 tons of ferrous and 11,000 tons of non-ferrous metal. The estimated total under the program as now devised includes 199,677 tons of steel and 5623 tons of non-ferrous metal.

The program calls for the scrapping of 21 vessels. They are to be sold by sealed proposals on Oct. 25, Nov. 1, Nov. 8 and Nov. 30. The battleships and battle cruisers on the ways at navy yards which are to be sold on Oct. 25 were made available for inspection yesterday. The battleships include the South Dakota at the New York Navy Yard; Montana at the Mare Island, Cal., Navy Yard, and the North Carolina at the Norfolk, Va., Navy Yard. The battle cruisers are the Constitution and the United States at the Philadelphia Navy Yard.

The ferrous metal on the South Dakota is estimated at 8656 tons, while the approximate tonnages not on the ways are 1652 tons, armor 511 tons and non-ferrous metals 23 tons; on the Indiana, 7665 tons of ferrous metal and 1833 tons not on the ways; armor 259 tons, non-ferrous 19 tons; Montana, ferrous metals, 5580 tons, structural material fabricated but not erected, 900 tons, non-ferrous 7.5 tons; North Carolina, ferrous metals 8580 tons, steel fabricated but not erected, 1348 tons; Constitution, steel erected in ship, 3340 tons, steel not erected, 3500 tons; United States, steel erected in ship, 2410 tons, steel not erected, 4000 tons.

The old capital ships involved in the scrapping total 11, with an average weight of 13,830 tons. The battleships afloat to be sold Nov. 1 include the New Hampshire and Louisiana at the Philadelphia Navy Yard, the Georgia and Rhode Island at Mare Island and the Connecticut at Puget Sound, Wash., Navy Yard. These will be available for inspection Oct. 15. Battleships afloat which are to be sold Nov. 30 will be open for inspection Nov. 19. These are the Michigan, Minnesota and Kansas at Philadelphia, Vermont and Nebraska at Mare Island and Delaware at Boston, Mass.

Ships under construction to be sold Nov. 8 include the battleship Iowa and battle cruisers Constellation and Ranger at the plants of the Newport News Shipbuilding & Drydock Co., Newport News, Va., and the battleship Massachusetts at the plant of the Bethlehem Shipbuilding Corporation at Fore River, Mass. These vessels will be open for inspection on Oct. 15. The approximate tonnages to be scrapped as given by preliminary estimates show that even allowing for the fact that these vessels are only partially completed, a great deal of tonnage is to be withheld. The total quantity estimated for the Constellation is 8211 tons, while for the Ranger it is only 25 tons.

For the Iowa the total is 10,962 tons, of which 1526 tons is fabricated and partly fabricated plates and shapes. This vessel is 29 per cent completed, so that the estimate is taken to include all of the steel in this ship. On the other hand, the estimate for the Massachusetts is only 2119 tons.

X-Rays in the Steel Industry—II

Advantages of the New Method Using an Absorbing Liquid —Studying the Properties of Special Steels— Future Outlook

BY DR. ANCEL ST. JOHN*

IN using X-rays in this way it is necessary to protect the operators from the rays and to prevent stray secondary radiation from fogging the films. This may be done by working in a lead walled room or by placing the X-ray tube in a lead covered box, allowing the rays to pass through convenient openings to the objects undergoing examination and screening them off with lead beyond the object. In either case if the object does not extend beyond the edges of the film, or if it is much thinner in some parts than in others it is necessary to provide auxiliary absorbers to make the illumination over the entire film of the same order of magnitude. Otherwise the effect will be much like trying to photograph a room with the camera facing a brightly lighted window.

To overcome this difficulty the author has developed a method[2] of immersing the object in a liquid of suitable absorbing power, in a container with parallel transparent faces. Figs. 6, 7, 8 and 9 illustrate the method. Fig. 6 is a photograph of a miscellaneous collection of articles to be examined simultaneously; Fig. 7 is a radiograph taken without any precautions against the "glare." In Fig. 8 the objects were immersed in a liquid of somewhat less absorbing power than steel and in Fig. 9 they were in a liquid of absorbing power greater than steel but less than brass. In this picture the steel objects appear as light areas, the brass as dark areas, in the background due to the absorbing liquid.

The illustrations have been reduced in size and much of the finer detail has been lost in reproduction but a sort of spongy structure in the cast fragments at the bottom of Fig. 9 and a light line lengthwise of the third bolt from the right are plainly visible. This line is due to a slag filament and the fact that it is not distorted in the head shows that the bolt was cut from bar and not cold-headed. This method has been used for objects as large as 4½ in. diameter and 1 inch thick with complete success. Where the object is too bulky for immersion it is necessary to use a plastic medium impregnated with an absorber. Dr. Lester, in an unpublished communication, reports using wax impregnated with lead salts and bismuth.

The advantages of X-ray examination are great. A few exposures, oftentimes a single exposure, will give more information than many sectionings. The nature, extent and location of all defects more than one-fiftieth of the thickness will be disclosed without harming the object in the least. If sections for macroscopic or microscopic study are desired, they can be made so as to be certain of displaying the particular defects to be investigated. Nor need X-ray examination be restricted to the research or development laboratory. In the shop, routine X-ray inspection of all material before beginning manufacture may in many cases be a profitable procedure. This will be particularly true if the subsequent labor costs are high

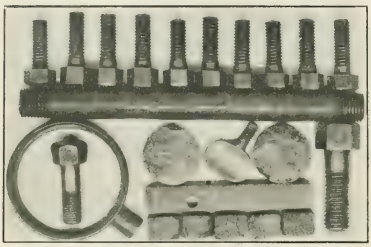


Fig. 6.—Group of Irregular Objects to Be Photographed

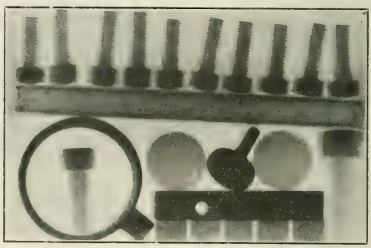


Fig. 7.—Radiograph Made by Author's Method



Fig. 8.—Radiograph When Transparency to X-Ray of All Parts Is Not of Same Order of Magnitude

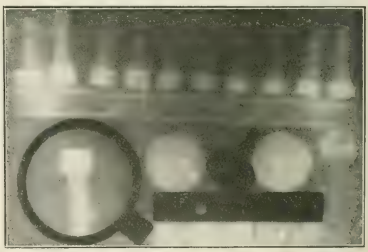


Fig. 9.—Radiograph When Absorbing Power of Medium Is Greater Than That of Specimen

*Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y. The first instalment was published in THE IRON AGE, Sept. 27.

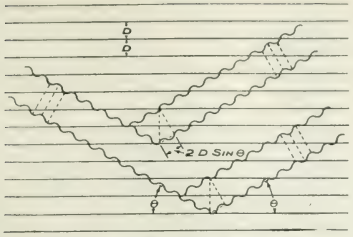


Fig. 10.—Reflection of X-Rays by a Crystal

and the losses by rejections due to disclosure of hidden defects in a late stage of manufacture, are at all great. For X-ray inspection spots the hidden defects before any work is done.

Studying the Properties of Special Steels.

The method used in studying the properties of steels depends upon the diffraction of X-rays by crystals. The theory of the method and examples of its use in determining the crystal structure of several elements have been given by Dr. A. W. Hull[3, 4], and a convenient apparatus has been described by Dr. Davey[5]. It is well to recall the principal features of the method. If the atoms in a substance are arranged at random the scattered X-rays referred to in a previous paragraph will be scattered at random. But if the atoms are arranged in an orderly manner, as they are in crystal grains, marked increase in the scattering, in fact, a definite reflection of the rays, may occur under suitable conditions. It is well known that two trains of light waves proceeding from a common source to a point of observation nullify each other if they arrive out of phase and reinforce each other if they arrive in phase. They will arrive in phase only if the two paths are equal or differ by a whole number of wave-lengths. Accordingly a train of X-rays having a wave-length l, incident Θ on a series of atom planes a distance d apart will be reflected provided they satisfy the equation

$$nl = 2d \sin \theta$$

where n is a whole number, known as the order of the reflection. This is illustrated in Fig. 10, taken from an article by Bain[6]. The value of l is known, being characteristic of the material composing the target. The angle Θ is half the angle between the undeviated and the reflected beams and can be measured, hence the value of d can be calculated. In practice a film is bent to form a part of a cylindrical surface with the specimen on the axis, as indicated in Fig. 11. Screens and slits are provided to prevent fogging of the film by rays scattered from other things than the specimen, and a filter is arranged to suppress all but one wave-length in the radiation from the tube as shown in Fig. 11, taken from the article by Dr. Davey[5]. Each set of parallel planes that exists in the the atomic arrangement characteristic of the crystal will be represented on the film by a line at the correct angle from the undeviated beam provided there are enough crystals placed at the proper angle. If the crystal grains are very small, i.e. less than 0.0001 in. in diameter the chances are that there will be many grains at every possible angle, so that every spacing will be represented. On account of the small size of the grains the lines on the film will be smooth and continuous. If the grains are exceedingly small, approaching molecular dimensions the lines will be broad, diffuse bands, while if the grains are at all large, i.e. exceeding 0.001 in. in diameter the lines begin to be speckled. As the grain size increases the speckles become larger and decrease in number until sometimes the lined appearance disappears. Some of these effects are illustrated in Fig. 12, which shows fine grained and coarse grained nickel, and medium grained tungsten. The difference between the face-centered cubic pattern of nickel and the body centered cubic pattern of tungsten is also shown.

The extension of the method to the field of alloys, including steel, has been discussed by Bain in a series of papers[6, 7, 8, 9]. A striking example of the ability of the method to go beyond the realm of the metallurgical microscope is given in the second of these papers[7]. A sample of apparently coarse grained austenitic steel prepared and photographed in the early summer of 1920, and thereafter kept at room temperature was placed in the X-ray crystallometer in the fall of 1921 and found to give a pattern identical with pure, fine grained ferrite, that is, body-centered cubic, instead of the coarse grained face-centered cubic structure of

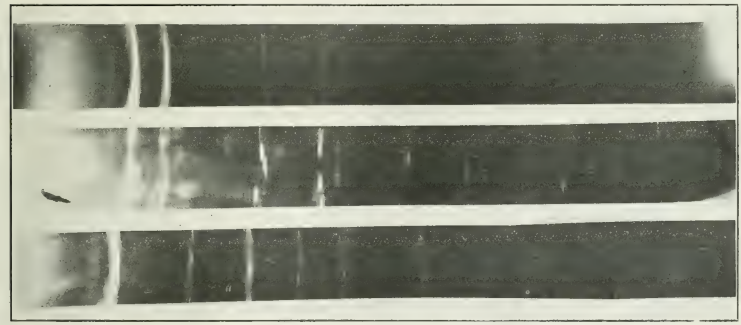


Fig. 12.—Crystallograms of Nickel and Tungsten

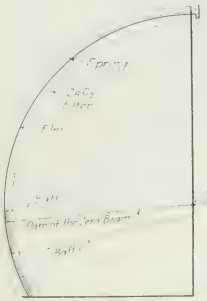


Fig. 11.—X-Ray Crystallometer

austenite which was expected. A new photograph of the surface showed no great difference in the visible structure of the grains. During the fifteen months at room temperature the austenite had spontaneously transformed into martensite, each of the original grains decomposing into a great many crystal fragments without altering the original grain boundaries.

A further illustration of the ability of the X-ray method to disclose information not otherwise obtainable is given by the investigations of Westgren and Phragmen on the crystal structure of iron at high temperatures". They used a crystallometer in which the sample was a fine wire which could be heated electrically, and showed that the body-centered cubic pattern of alpha iron persists through the region usually assigned to beta iron but disappears when the gamma iron region is reached and is replaced by a face-centered cubic structure. At a temperature slightly lower than the melting point the body-centered form again appears for delta iron.

The Future Outlook

The few cases here described and the many examples given in the references cited show how X-rays are already being used to help in making better steel products and to increase our understanding of the structure and properties of steel. These fields are broad; the new tools are already powerful and are constantly being improved; the ground has thus far only been scratched. X-ray inspection of moderate sized castings and forgings is now a commercial possibility: the day may not be far distant when it will be common practice. X-ray analysis of the crystal structure of steel is at present confined to the research laboratory: it is not unreasonable to believe that the day is coming when it will be found in the control laboratory, and specifications for steel will call for a particular X-ray pattern as well as a particular chemical composition. It is well for the makers, the treaters and the users of steel to be thinking of these things and to be preparing to use X-rays profitably in the steel industry.

The author desires to express his indebtedness to the Watertown Arsenal, to Mr. E. C. Bain and to Dr. W. P. Davey for the use of certain illustrations:

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ORDERS FROM JAPAN

Conditions in Canada Improved by Buying for Rebuilding—Rail Mill Idle

TORONTO, ONT., Oct. 2.—The Canadian iron and steel market, which has been without feature for the past couple of months, is beginning to show more life. While the demand for steel for home consumption is steadily improving, it is also pointed out that Canadian mills have recently closed large contracts for orders for steel for shipment abroad and at the same time inquiries have been received for still further large tonnages on export account. According to George Spence, sales manager Steel Co. of Canada, Hamilton, Ont., his company has received large orders for bars, rods and nails from Japan, the material to be used for reconstruction purposes. At the same time it is pointed out that inquiries have also reached Canadian firms for galvanized sheets and figuring on this business is under way. The British Empire Steel Corporation, Sydney, N. S., has also received extensive orders from Japan, this company having closed contracts for large bars of sufficient tonnage to keep its bar mill in operation for several weeks. At the present time both the Steel Co. of Canada and the British Empire Steel Corporation are busy on new business and the latter company is contemplating blowing in a fourth furnace in order to take care of its pig iron requirements which have considerably improved during the past few weeks. The company has three blast furnaces blowing. Curtailed production is reported by the Algoma Steel Corporation, Sault Ste. Marie, Ont. This company has closed down its rail mill, having completed large rail orders for the Canadian National and Canadian Pacific Railways, and while officials of the company are trying to secure new orders, there is nothing at present in sight.

Canadian steel plants are finding a stronger demand for practically all commodities and while material is available for almost spot delivery in most lines, orders are coming to hand in good volume and it is the opinion of officers of the various companies concerned that the demand for iron and steel will continue up to the end of the present year at least. Building activities have been exceptionally brisk for some months past and as a result the demand for structural steel has been heavy. During the past two or three weeks Canadian producers have been closing orders for large tonnages of shapes, beams, reinforcing bars, etc., for spot delivery, this material being required for building which will be rushed to completion before unfavorable building weather sets in. Shapes and beams are quoted at 2.70c., Toronto. The demand for iron and steel bars is showing some improvement, but consumers and dealers are showing a perference to buy only sufficient material to keep them going for a short time. Mills are quoting bars at 3.10c., Toronto. Some good business has recently been closed from companies with car and repair orders on their books for plates, and while a large volume of the orders for plates is going to United States producers, Canadian producers are also actively engaged. Plates are quoted at 2.60c., Toronto.

While the demand for sheets has been fairly quiet of late, mill representatives are expecting to close a good share of the demand for galvanized sheets for which inquiries have recently been received from Japan. Black and blue annealed sheets are moving slowly at present, but the general undercurrent in the market leaves the impression that a stronger demand is not far in the future. Galvanized sheets have been in good demand and builders and dealers have been buying in good volume, both for immediate use and for stock purposes. Mill prices on sheets are firm and as follows: No. 28 gage galvanized, 6c.; No. 28 gage, black, 4.60c.; No. 10 gage, blue annealed, 3.70c., Toronto.

The Hunter Crucible Steel Co., Cleveland, has installed a new 30-pot crucible furnace, the first heat from which was poured Sept. 27. This furnace will be used principally in the manufacture of high speed tool steel.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips Vice-Pres. A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Wealth of "the Rich"

THAT 2 per cent of the people of the United States own 65 per cent of the wealth has been commonly asserted as an argument for the so-called radical legislative program. At bottom the proposals of the various blocs that are expected to be active at Washington in the coming year represent a purpose to secure a redistribution of income or property or both. The situation gives particular timeliness to the article published elsewhere in this issue on "The Distribution of Wealth in the United States." It well may be described as an economic contribution of major importance. Dr. Walter Renton Ingalls, as an engineer and economist and the author of "Wealth and Income of the American People," is competent to speak respecting this phase of quantitive economics, to which he has devoted prolonged study.

Even if the Western agrarian program of "Soak the rich" be not consummated, even if there be nothing more than partial concessions to it, there will be important and far-reaching effects upon the welfare of our country.

Dr. Ingalls, avoiding all spirit of captiousness, finds no fault with the agrarian Senators for entertaining the belief they hold as to the concentration of the country's wealth, pointing out that they have authority for it in a heretofore uncontroverted statement in a report to Congress by a commission of its creation. He shows positively, however, that this assertion was not based upon direct studies of the commission or its staff, but was merely a citation from a single economist; an economist of excellent standing, to be sure, but one who was making merely a reconnaissance, so to speak, at a time when available data in this field were very scarce.

Dr. Ingalls then proceeds, with calm logic and the practicality of the engineering mind, to make a new reconnaissance in the light of the data that recently have become available. He is not dogmatic and makes no attempt to pronounce a specific figure as the answer to a problem that is inherently too complicated and uncertain so to be answered. He merely indicates limits between which the answer is probably to be found. His frankness in marking as conjectural his assumptions, as distinct from his facts, renders his deductions all the more impressive. They constitute a powerful refutation of the dangerous fallacy that is now influencing the minds of many of our people.

Improved Yield in Pig Iron

ANOTHER year has been added to the statistical record of increasing yield of pig iron from the ferrous material charged to blast furnaces. The annual statistical report of the American Iron and Steel Institute, just issued, shows that in 1922 for each ton of pig iron produced the ore, scale, scrap, etc., charged to blast furnaces was 1.920 gross tons, against 1.925 tons in 1921. A gain so small might be attributed to the fact that there was a decrease in the ore charged and an increase in the scrap, the latter being richer in iron. But, on the other hand, only the fittest furnaces were running in 1921, while less fit furnaces operated in 1922, the increase in production from 1921 to 1922 being 62 per cent.

Statistics of the consumption of ferrous materials in blast furnaces began with the year 1909. There was an increase in the amount per ton to 1911, that year showing 2.018 tons, made up of 1.859 tons of ore, briquettes, etc., and 0.159 ton of scrap, cinder, scale, etc. Since then there has been a continuous decrease, except for a slight backset in 1917 and 1918, when various things went amiss.

It is generally agreed that the average iron content of the ores shipped from the Lake Superior region decreases year by year. To an extent this may be offset by our importing more ore, generally rich ore, and perhaps using less native low grade ore from certain districts. At any rate we are not making more pig iron in proportion to ore consumed on account of the ores becoming richer. The gain is due to improvement in blast furnace practice.

There has been reference lately to furnace managers being able to retrieve more of the iron in scrap charged than used to be possible. It might be thought that as time passes we should use more scrap and less ore in making pig iron,

but the statistics do not bear out any such idea. In 1911, a year of light pig iron production, there was 0.159 ton of scrap, scale and cinder, while in 1912, a year of heavy production, there was 0.145 ton. Of the last two years, 1921 was one of light production, with 0.141 ton used, while 1922 was one of much heavier production, with 0.154 ton used. The figures do not show that large or small total outputs have anything to do with the material used. The proportion of ore has simply decreased somewhat.

Naturally the consumption of fuel has likewise decreased. The statistics of fuel consumption begin with 1912, when coke consumption per ton of pig iron was 2436.5 lb., the greatest shown. In 1921 it was 2200.6 lb. and in 1922 2176.3 lb. The limestone consumption in 1922 was also the lowest within the statistical period, being 969.3 lb.

Transportation being an important part of the cost of making a ton of pig iron, the iron industry of the United States is improving its economic position in an important respect. The improvement in practice suggested by the statistics is not general as yet, hence further progress is naturally to be counted upon.

Relative Values of the Dollar

FOR several months after the war there was much complaint about the low purchasing power of the dollar and there were heated arguments as to whether or not we were going to return to pre-war price levels. Nearly all the opinions expressed fell under one of two heads: (1) That all prices would have to get back to their old levels; (2) That the value of the dollar itself was greatly lowered, hence that one should expect all prices to remain correspondingly higher.

Nearly five years later it is well worth while to revert to these opinions and see what really has occurred. By such reviews a suggestion is frequently furnished as to what weight we should attach to new opinions on economic matters as they come out.

The composite value of the dollar is indicated by the Bureau of Labor's commodity index number, the weighting of which is according to volume of production in the different groups of commodities. The basis is the average of prices in 1913, taken as 100. For December, 1918, the month after the Armistice, the number stood at 202. The average or composite value of the 1913 dollar had been cut in half. By February, 1919, the number was down to 193, but there it turned, rising to 247 in May, 1920. Thus the dollar was not deflated; it was inflated more. The index number then declined to 138 in January, 1922, which is as far down as it has ever gone. For August of this year it stood at 150.

Thus the first great movement in prices was a rise instead of a decline, and nearly five years after the Armistice the dollar is worth on an average two-thirds as much as in 1913.

If the fault lay with the dollar, however, we should now expect prices of different commodities all to stand at about 50 per cent above their 1913 level. That is far from being the case. Why talk of the dollar as having some precise value, when its value varies greatly according to the commodity for which it is exchanged?

The claim that commodity prices must needs get back to pre-war levels is settled. The thing has not occurred. Next one may inquire whether it is the low value of the dollar that makes prices high. If it is, all prices should be equally high, within reasonable limits. Particular commodities that were out of line, at the end of the war, through being above or below the general average, should have trended toward that line. This also has not occurred. A simple comparison can be made by taking the report for February, 1919, at the bottom of the little dip that occurred after the Armistice, when the index number for all commodities stood at 193, and scaling each group of commodities down in the proportion of 193 to 150, the number for August. It is then seen that farm products would have been at 168, or well above the general level, while in August they stood at 139, or well below the average. Why did they not stop at the general level, if it is a matter of the value of the dollar? On the other side, building materials would have been at 135 February, 1919, while they are now at 186. They were relatively too low, now they are relatively too high. Almost precisely the same showing is made by housefurnishing goods. Another case entirely is that of cloths and clothing, which were above the general average just after the war, but are now much farther above.

These comparisons show that the various commodities have simply been making their markets according to circumstances. They ignore entirely the value of the dollar and are concerned only with their own values.

Workers' Thrift Increases

RECENT experience of the mutual savings banks, cooperative banks and other institutions where industrial employees place their savings indicates that the American workman is showing more intelligent and consistent thrift than at any time in recent years, according to the analysis of accounts by bank officials. The nation's total savings accounts have increased greatly since manufacturing activities again became normal, and, at any rate in the industrial centers, are larger than ever before. The greater part of this growth is attributed to regular deposits from the pay envelopes.

The hard times of 1920-21 taught a lesson in thrift. Coming suddenly, after a relatively long period of extravagantly high earnings, they caught countless families ill-prepared. Prodigally high incomes had brought with them an orgy of spending. Under the feverish influences of wartime and the period immediately following, men and women workers got the idea deep planted in their minds that the new era was a permanent condition. It is true many of them saved their money in one form or another, in proportion to their earnings, but a vast number did not. The rainy day seemed far away. And then came the deluge of unemployment.

Savings deposits had to be drawn upon. The banks found withdrawals large and constantly

increasing, and at the same time new deposits fell away, of course. Many workerr exhausted the last cent of their savings. It was a hard lesson, but one, however, which was taken to heart by the many who dropped the new standard of living and settled down to get on their feet again. The result is seen in the big totals of deposits on the books of the banks.

Another and a very important influence on the new thrift is the sympathetic activity of employers to encourage systematic saving, particularly to induce wage earners to lay aside something each week from their pay envelopes. Various plans have been adopted, and each has done something toward bringing about the desired result. And in this connection emphasis should be laid on the work done by owners in discouraging the placing of savings in speculative investments. The average industrial employee is easy prey for the professional salesman of the class which peddles spurious oil stocks and similar "securities," with their promise of quick riches.

Employers have found that the only really effective way to combat this influence is to go for the root of the evil, the stock salesman himself, or herself, as sometimes it is. Some of the chambers of commerce and other civic organizations have assisted in this protective work. They maintain investigating bureaus, to which the arrival of a new salesman or a new prospectus is reported as soon as known. Reputable brokers and the bank men lend every assistance. If there is evidence of fraud or of violation of "blue sky laws," where they exist, then the police are called in. In recent months many a stock salesman who has been soliciting workmen has flitted away in the night to some new scene of activities. Unfortunately there are still many communities where interest in this sort of welfare work has not been aroused.

However, the interest in encouraging thrift is without question responsible to a large extent for the showing of the savings banks. As a phase of management it is still in its infancy, but the promise is that the effects will be rapidly cumulative.

Inefficient Indexing

VIGOROUS protest is made by *Engineering*, London, because scientific and technical books are poorly indexed. It is complained that users of such works are often seriously handicapped in their research because the contents cannot easily be found; that due to inadequate indexing laborious search is necessary in order to get at desired information.

American publications have improved greatly in this respect in recent years, yet some of them still suffer from the old complaint. Authors may take too much for granted as to the intimacy of their readers' knowledge of the subject at hand. Or, as librarians point out, the work may be done in an amateurish manner, instead of by the clean-cut method of the professional, for indexing has come to be a vocation in itself. Or the selection of the indexer may not be carefully considered and he may lack the knowledge of the subject requisite to skilful work. The tendency is to under-index, which is always a mistake. Users of books rarely complain that the subject matter is over-indexed. As a rule American students and investigators are quite well looked out for, the Engineering Index, which classifies all articles published by the technical and engineering press, adequately meeting the needs in those fields.

Engineering, in pursuing the subject, says:

> For some reason, scientific and technical books have had to put up with indexes that do far less than justice to their contents. This may be no great hardship where the book is slender or is of little worth, but the better the book, and still more, the more complex and voluminous its information, the better its index must be if it is to enable the book to be used to proper advantage. To compendiums of practice good indexes have always been desirable, and it is not too much to say that the absence of such indexes to books of their present ponderous girth reduces their value to the reader to an extent that may offset the merit of the increased information that is buried within them. No one is likely to covet the labor and risk of producing yet another compendium unless some very strong inducement is offered, especially when regard is had to the excellent quality of much that is contained in the present works. But if users of such books had the choice of one that gave less information, but in a form conveniently and readily accessible, they would be likely to prefer it to the imperfectly dissected haggis into which compendiums seem to have grown.

Some of the editors of the handbooks issued by American manufacturers may find a hint in the following extract from the same editorial, for not all of the trade matter is indexed to the point of giving the greatest possible assistance to readers:

> There are a number of manufactured objects that are applied in several or many branches of engineering, and crop up in a variety of contexts in different parts of the book. Take such a subject as pipes. Even in an ascetic compendium which contains no mention of tobacco there may be easily over a hundred separate references in the index to the various kinds and properties of pipes, and even these are likely as not to omit something important for the reader's purpose which yet may be modestly concealed in some other part of the book. One page may give the thickness of hydraulic pipe, and another the thickness of iron, water and hydraulic pipes, two references may point to the speed of the water through pipes, half a dozen to its flow, and perhaps seven to its velocity; and what these references may be and whether they are the same or different can be discovered only by turning up the several pages quoted, perhaps hundreds or thousands of pages apart. No hint may perhaps be given under the heading of specifications to indicate that the book contains, as it may, several important standard specifications for pipes. If, in fact, you want to know what information is waiting and ready for you, you have to hunt through a mass of entries, sometimes superfluous, sometimes insufficient, and as often as not you may spend many times as much energy in the search as is required in extracting the information when once it is located.

Distribution of Wealth in the United States

(*Continued from page 883*)

would be relatively insignificant in the aggregate. On the other hand, it is positive that there are duplications in the above summary. For example, some of the assets of life insurance companies are invested in Government bonds and some of the loans of national banks are employed for carrying such securities. Moreover, a considerable proportion of the life insurance assets are invested in railroad bonds and stocks. Bearing these conditions in mind, and making due reservations respecting uncertainties, it appears probable that about 20 to 25 per cent of the wealth of the country is mortgaged internally, in one way or another.

One-Third Our Wealth in Farms

As has been previously shown, the mortgagees are in the last analysis great in number; wherefore there is implied a diffuse distribution of these claims. We may come positively to another conclusion. About one-third of the national wealth is in farm capital. Nearly one-half of the American urban homes are occupied by their owners. Combining these thoughts with the wide distribution of savings bank accounts, life insurance policies, Government bonds, and the stocks and bonds of corporations, it is indisputable that the American people are preponderatingly property owners.

Diffused Ownership of Industrial Property

Even the property of the railroads and industrial corporations is widely distributed through stock ownership. Thus, at the end of 1922 the Pennsylvania Railroad had 140,000 stockholders and 90,000 bondholders, whose combined number was almost equal to the employees of that company, who aggregated about 243,000. So it is with many of the great industrial companies, such as the United States Steel Corporation, the General Electric Co., the General Motors Co., the public service corporations like American Telephone & Telegraph Co., and so on. There is some evidence respecting the ownership of corporate securities in the aggregate, in that the dividends reported by income taxpayers fall short of the estimates of dividends paid by corporations. The latter statistics are not fully reliable. I should hesitate to characterize them as being any more than roughly indicative. With due allowance for these uncertainties we may be viewed as generous in assuming that about 75 per cent of the industrial property of the United States was owned by the income taxpayers of 1916.[3]

What "the Rich" Own

By making some bold assumptions we may now proceed to estimate the total holdings of the class that I have arbitrarily defined as "the rich." I shall assume that they owned 75 per cent of the industrial property, 75 per cent of the stocks of goods, rather more than that proportion of the gold and silver; that they owned all of the foreign credits other than national; that they owned automobiles, furniture, clothing, etc., to the average value of $5,000 each; that they owned all of the urban houses that are rented, all of the other urban real estate, all of the State, county and municipal bonds, all of the mortgages on houses and farms, and one-half of the Government bonds, less only what is attributable to the savings banks and life insurance companies. We may then summarize as follows:

Industrial property, 75 per cent thereof	43.0
Stocks of goods, 75 per cent thereof	14.5
Foreign investments and credits	6.8
Furniture, automobiles, etc.	2.2
Urban houses, 55 per cent thereof	31.7
Other urban real estate	24.7
Gold and silver	3.0
Mortgages on urban real estate	6.7
Mortgages on farms	8.0
Government bonds	11.5
State and municipal bonds	8.0
Gross total	159.9
Assets of savings banks and life insurance companies	25.3
Net total	134.6

134.6 ÷ 290.6 = 46 per cent.

Forty-Six Per Cent Is Maximum for "the Rich"

It is certain that the rich 2 per cent of the people do not own all of the stocks and bonds of industrial enterprises and it is highly improbable that they owned all of the rented urban real estate or all of the shops, hotels and other commercial buildings. But even if they did so, their ownership of the national wealth at the end of 1920 would be not more than 46 per cent. This analysis indicates that figure as the maximum limit of possibility without, however, giving us any positive evidence as to what the percentage really is.

Too much emphasis cannot be put upon this being the *maximum* limit of possibility. Instead of "the rich" owning *all* of certain classes of real estate, to the aggregate value of 56.4 billion dollars, it will subsequently appear that their receipts from rentals capitalize at only about 6½ billion. It will appear, moreover, that instead of 43 billion in industrial property the dividends received by them capitalize at only about 35½ billion dollars.

What Income Taxes Show

Fortunately we may approach this subject in quite a different way and one that is more positive. In 1916 there were 437,000 income taxpayers, among whom the number of farmers was negligible. The year 1916 was not one of extraordinary abnormality in the light of what we subsequently witnessed, the general index number of that year being only about 125. Assuming that the 437,000 income taxpayers were all heads of families and that their average family comprised four persons we shall account for 1,748,000 people out of a total population which is estimated at 101,722,000 for the middle of 1916. In other words the income taxpayers represented 1.7 per cent of the total population on the assumption that they were all heads of families, which of course is the maximum that can be assumed.

These taxpayers reported among other things their income from rents, interest and dividends. We may reckon that gross rentals averaged 10 per cent of the value of the property from which derived. We may reasonably conjecture that interest averaged 5 per cent on the principal and that dividends averaged 6 per cent. The interest average may have been a little lower than the assumption while the dividend average may have been a little higher, but although this is all conjectural the fact cannot be at any great variation and would not materially modify the broad result. We may then capitalize the reported incomes as follows:

Rents	$ 643,802,657	÷ 0.10 =	$ 6,438,026,570
Interest	1,080,879,405	÷ 0.05 =	21,617,588,100
Dividends	2,136,468,625	÷ 0.06 =	35,607,810,417
Total			$63,663,425,087

[3] In 1916 the dividends reported by the Bureau of Internal Revenue as having been received by income tax payers amounted to $2,136,469,000. The total of dividends paid by corporations was estimated at $3,733,900,000 by Dr. Friday and at $3,389,000,000 by Dr. Knauth. The dividends received by income tax payers were therefore 56.46 per cent of the total estimated by Dr. Friday and 63.04 per cent of the total estimated by Dr. Knauth. This would of course imply ownership of dividend paying stocks in like proportion. I have expressed the opinion elsewhere that Dr. Friday's estimate was too high, but in the light of later consideration I think that may not be so. The comparison in this paper between the amount of dividends received by income tax payers and the valuation of industrial property is rather indicative of the contrary. Anyway, these considerations lead me to think that my conjectural estimate of not more than 75 per cent of the industrial property of the United States being owned by the income tax payers of 1916 is reasonably conservative. Inasmuch as the ownership of the stocks of goods is of similar nature the same percentage is roughly assumed for that item. There is no foundation for the guess that this class owns only half of the Government bonds other than the data of the Treasury Department showing a wide distribution thereof.

The remainder of the personal income in 1916 was derived from salaries and business. Respecting salaries there is of course no question in interpretation. Business income, reported at $3,010,404,924, is a combination of the products of personal service and capital employed in the business. We have no means for making any separation between these two elements. There are included in this the earnings of professional men, of traders and of merchants conducting unincorporated business. No guess for the amount of capital in use in this way would be justifiable, and we can do nothing but disregard this matter, simply making a mental reservation respecting it. We must also make mental reservation respecting income that was not reported.

Two Per Cent May Have 30 Per Cent of Wealth

It appears from the foregoing that the 437,000 income tax payers of 1916, representing 1.7 per cent of the population at the maximum, derived income in the form of rents, interest and dividends from property valued at about 63.7 billion. It may be argued, and properly, that this class to a large extent occupied houses of its own, the rental value of which does not appear in the income tax returns. Assuming that each of these tax payers owned a $10,000 house, which is improbable, the total of such real estate would be $4,370,000,000. Overestimation here may offset in part the neglect of the capital used in private business. On the face of things, therefore, the property belonging to income tax payers aggregated about 68 billion dollars. Making comparison with the physical wealth of 1916, estimated at 268.4 billion dollars for the internal and 0.3 billion dollars for the external, it appears that 1.7 per cent of the population owned about 25 per cent of the total wealth. I am inclined to put this as the minimum limit and say that the class specified owned at least that proportion of the national wealth. By the first method of analysis there has been established the maximum limit of 46 per cent. The truth is probably somewhere between these extremes, but much nearer to the lower than to the higher. A fair guess might be something like 30 per cent.

The Matter of Intangible Wealth

Attention should be drawn here to the distinction between physical or tangible wealth and capitalized wealth, which includes also the intangible. A good illustration of the latter is the value of a newspaper, which may be rated at a high figure without there being much physical property associated with it. The difference between the market value of corporate securities and the physical property owned by the company is ascribable to intangible wealth, which may be a reflection of organization and experience, maybe of good will, maybe of patent rights. If the aggregate market value of a stock be less than the cost or reproduction value of the physical property the chances are that the usefulness of a portion of the latter has disappeared and consequently that some physical value has been extinguished. This may not be the case, however, with respect to public service corporations whose economic freedom is restricted by legislation.

There has never been any estimate of the national wealth that includes the intangible. The aggregate value of the securities of our industrial corporations must logically be in excess of estimates of their physical property. On the other hand, the aggregate market value of the railroad securities is at present inferior, and the same may be true of other kinds of public service corporations. Confusion involving these points may introduce errors in the computations in this paper, but they will not be of serious, certainly not invalidating, nature. If the intangible wealth, pertaining solely to the industrial enterprises, be guessed at 20 billion dollars on top of the 57 billion of physical, computation by the first method would give 48 per cent instead of 46 per cent; and by the second method, which is founded on capitalization, we should arrive at 23 per cent instead of 25 per cent.

With full recognition of the roughness of the work in this study, I hold it to be sufficient to dispel the idea that something like 65 per cent of the wealth of the United States is owned by less than 2 per cent of the people, and consider that it clears away the seeming paradox between that idea and the established fact that about 70 per cent of the national income, other than agricultural, goes to the wage earners, with only 30 per cent to property and management.[4] Of that 30 per cent a large part is ascribable to professional and personal earnings and less than half of it to capital, properly speaking.

Wide Diffusion of Wealth

My classification of "the rich" as those who possessed incomes of $3,000 and upward per annum in 1916 is decidedly a broad one. There were 375,000 income tax payers classed between $3,000 and $20,000 per annum in that year, and the aggregate of their income was 40 per cent of the total. I do not mean to fix $20,000 as the line of demarcation between those who are rich and those who are simply well-to-do, but merely to point out that this exhibition is in line with all the other evidence respecting the great diffusion of wealth in the United States. There is some concentration in great fortunes like those of Henry Ford and John D. Rockefeller, to be sure, but clearly it does not amount to anything like what is popularly supposed.

The two methods of examination that I have used in this paper may be described concisely as (1) analysis of inventory and (2) capitalization of income. These mere descriptions are in themselves convincing as to the soundness of the thought. Pursuance of the latter has not always been satisfactory, owing to the lack of much desirable data. I am therefore conscious of the deficiencies in my study; but I think it is the most helpful adventure into a complicated subject that has been made up to the present time. While there is a good deal in it that is conjectural, there is also a good deal that is positive, especially as to the great percentage to which the farms, livestock, etc., bulk in the total of the national wealth; also the great percentage of the urban real estate and the widespread ownership thereof. The net worth of the farmers of the country, who are not classed among the rich at all, is vast, as has been shown by Dr. Gray. Among the farmers there are inequalities, just as among other people; there are well-to-do farmers and there are tenant farmers who possess but little.

Such concentration of wealth as exists in the United States is nothing that either requires any apology or justifies any attack upon it. In general, the people in the United States who possess wealth have earned it and have saved it out of their thrift. There is an enormous difference in the intelligence and earning capacity of people. The biologists tell us that only about one person out of 6000 in the United States is in the "Who's Who" class. That would imply less than 20,000 of that class in the United States. The number of people who are capable of earning and saving money is much greater than that, but nevertheless it is small in comparison with the total population.

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[4] This division refers to pre-war conditions. In recent years the proportion to wage-earners has been increasing.

To replace rusted roofing, sheet metal work, plumbing pipe and hardware, home owners last year spent $626,500,000, according to Thomas A. Brophy, of the Anaconda Copper Mining Co., in a paper before the American Construction Council, New York, Sept. 21.

Italian Meeting of Iron and Steel Institute

Technical Discussions at Milan Cover Small Bessemer Practice, Manganese in Steel, Corrosion Effects and Internal Stresses

(*Special Correspondence*)

MILAN, ITALY, Sept. 20.—The party of members of the (British) Iron and Steel Institute attending the Milan meeting arrived Sunday afternoon, Sept. 16. The American members came on the 17th in time for the opening session. The attendance was about 180. The meetings were held in the hall of the Milan Chamber of Commerce, President Francis Samuelson in the chair. The address of welcome was given by Commander G. E. Falck, chairman of the executive committee, president of the Italian Association of Metallurgical Industries and president of the Lombardy Iron & Steel Works Co. The address in Italian was translated by an able interpreter. Commander C. Vanzetti welcomed the institute on behalf of the Chamber of Commerce and President Samuelson responded happily. The visiting party, he said, were to see this time the iron and steel industry of Italy and not the art, which would take years to see and study. It would be highly interesting, he added, to see the new Italy, that has worked hard to get to the front and has succeeded so remarkably. A little later the newly elected president of the institute for the year coming, Sir William H. Ellis, also expressed his appreciation of the welcome.

The first paper of the session was by Commander Falck, on "The Iron and Steel Industries of Italy." This was discussed by Sir Hugh Bell, who expressed his admiration for the new Italy of work. He said that England had not given Italy any ore, but was sending over coal. In any case, material resources of a country were always overstressed, for in reality it was what a country did with raw materials that counted. Skill was necessary in building up industries. Raw materials could be brought in. He had always found that a country that did much selling in the way of export could be counted upon to buy in return. Sir Hugh Bell then offered a resolution of thanks, which was carried by acclamation.

Manganese Additions to Steel

Prof. F. Giolitti gave a synopsis of his paper on "The Complex Action of Manganese and Other So-Called Deoxidizing Agents in the Manufacture of Steel." In discussing this paper, Dr. L. H. Hatfield stated that it was not enough to look upon the reactions with manganese of the liquid steel as chemical ones, but that many other factors are to be considered, such as the temperature. It was necessary, therefore, to study the situation more from the standpoint of physical chemistry than had been the case heretofore. With oxygen in the steel, manganese became an oxide and it was necessary to study the behavior of this oxide, as well as manganese silicate, when probably in colloidal form. He would like to advance for consideration the fact that when a mold was filled with liquid steel this froze, and the working out of the problems of segregation and liquidation depended much on the temperature at the time. For instance, suppose we had the elimination of all the oxygen and that the steel was very hot. Then freezing would proceed in a desirable way and the impurities would segregate out into the upper part of the ingot. With cold steel, however, what impurities would be segregated would be distributed throughout the ingot. Hence, the necessity of considering such matters in addition to those the author had put forward.

AMERICAN PRACTICE

Dr. John A. Mathews, New York, said that without question manganese has a beneficial effect. The matter is receiving practical consideration in the United States. Not only does the manganese addition count, but the residual manganese of the finished heat.

J. E. Lester said he had watched the matter for many years and found that it was not so much a question of figures in manganese additions, but rather a question of how the processes were actually carried out. Unless such processes were carried through with the required care, good results would not eventuate from the manganese additions. He considered the bringing up of the entire subject a good one, as it was only by such attention that good steel could be made. There were some new aspects brought out which doubtless had an important bearing upon the production of good steel, and it was not a question of the figures obtained but how they were obtained by a process. He heartily agreed with the author that enough ferromanganese should be added to the bath while it was being stirred, and that there be a final addition in making the refined product. However, he thought the best results were obtained by the addition of enough manganese at the time of working the charge.

E. L. Dupuy (France) said he had made the matter the subject of many researches. He had made oxygen determinations by hydrogen reduction on steel produced by the basic process with the presence of manganese during the whole operation, and when the steel gave good tests some water had been obtained showing the presence of an oxide, either of manganese or silicon. He would ask the author if he thought the good tests were due to a change in the chemical composition or only to its repartition.

EXPERIENCE WITH THE BASIC BESSEMER

C. H. Ridsdale, Middlesbrough, England, said that some years ago in connection with the basic Bessemer process there had been a good deal of oxidized steel, and he had occasion to study very closely the effect of manganese in making the process go right again. As the author had said, it was not altogether the reaction of manganese on the ultimate product, or a simple deoxidation, but the effect of manganese on the working of the process. Very early in his firm's history they had commenced to make what they called "electrical" steel, or "high conductivity" steel as it is now called. It was very low in carbon, about 0.03 per cent, and very low in manganese. When it was rolled, it contained about 0.25 to 0.30 Mn. It would be readily appreciated that starting with a highly oxygenated charge they would get very short material. This could be prevented by adding plenty of manganese at the beginning. They did not possess pig irons such as the minette ores yielded, iron with 1.75 manganese, and it had to be made artificially by the addition of manganese ores, and the iron makers did not always put the full amount in. As a result, all sorts of methods had to be resorted to in order to work up the quality of the iron to make good tough steel that was not dry. One of these methods was to add liquid spiegeleisen at the beginning of the charge, and after the silicon and carbon had been blown out, and a good deal more manganese was then obtained in the bath at the end. It was sometimes necessary to add two or three doses of spiegeleisen during the process to keep the manganese up to 0.20. If it went under 0.20 good "electrical" steel could not be obtained at the finish—not even if plenty of manganese was added at the end to deoxidize well. For years he had analyzed what was called "ooze"—a sort of liquid slag from the top of the ingot, and found that it contained 87 per cent manganese oxide and

about 7 per cent phosphoric acid, with much sulphur. In each case the manganese oxide with the impurities which had been in the steel had liquated out.

Doctor Giolitti in reply confirmed the observations of Doctor Hatfield in regard to liquation. It was quite generally known that in making a steel which would be subjected to transverse action the elimination of the flaky fracture was much easier to obtain when the ingot was poured very hot. This has been remarked by the workingmen in the course of their labors. He thanked M. Dupuy for his suggestions and would get at the problem and try to solve it.

Castings from the Small Converter

The paper by Com. C. Vanzetti on "The Manufacture of Heavy Steel Castings from Small Converters" was then read by the author. It was discussed by President-Elect Sir William Ellis, who said he had had a long association, some 25 years, with the small converter process and he regarded it as a convenient system for making castings up to three tons where a variety of castings was to be made and easy control was necessary. Here it was better than the open-hearth furnace, as small shanks could be poured over the lip and the fresh, hot metal could be obtained continually by tilting from the converter as required. Both the Tropenas and the Robert systems were working well in England and France and were deservedly popular.

Doctor Hatfield supported Sir William Ellis. He thought the small converter had advantages over the electric furnace. With regard to the details of the paper, he was of the opinion that the manganese contents of the castings ran a little lower than should be. If instead of 0.20 to 0.50, they had run 0.60 or 0.70, they would have been substantially improved. The material results obtained with castings were largely determined by their heat treatment, and it might be useful if the test made were compared with the annealing process that had been used. Personally, he thought that annealing at 900 deg. C. would eliminate all casting strains with great advantage to the mechanical properties of the castings.

The author, in replying, said he did not believe that the converter was the best means of making steel. In fact, he thought it the worst; but he was desirous of having a system of production by which good results could be obtained. He had treated the subject from the special point of view of a small converter for making, not small, but large castings.

At this point President Samuelson announced the report of the nominating committee, by which Sir William Ellis will be president for the coming year. Sir William expressed his thanks for the honor conferred and mentioned the fact that he would hold the office only one year, thinking it a wise plan that the two-year incumbency had just been changed. He was an engineer and not a metallurgist, but expected to be one by the time his term was up.

Corrosion Cracking and Internal Stresses

Secretary Lloyd read the paper of M. A. Portevain on "The Corrosion Cracking of Steel Under the Influence of Internal Stresses." Doctor Hatfield, in opening the discussion, said that the paper was really the logical working out of the internal stresses in metals generally. A great deal had been done in this direction in bronzes, but little in steel. Just before and during the war great emphasis had been laid upon the importance of the notched test bar. To obtain high values on impact on notched bars it had been found necessary to quench steel from the tempering temperature, and this left internal stresses within the steel of a magnitude far exceeding that which is generally appreciated. In fact, his own experimental work along these lines showed that the internal stresses might, under such conditions, be almost coincident with the yield obtained from the material. It seemed to him that the engineers would seriously have to consider whether the steel should be quenched from the tempering temperature and full of internal strains, or whether they would want the steel slow-cooled, and free from these stresses, though relatively low in impact value. He preferred the latter. He was glad to note by the paper that in some of the cases where stresses were present—sufficient to produce fracture—corrosion had set in. When corrosion took effect, a concentration of local stresses was involved, and fracture became the logical result.

Doctor Giolitti thought that the importance of the paper rested in the fact that it had been shown that small cracks in steel might have a very great effect on the mass, just as that from large inclusions.

E. L. Dupuy agreed with Doctor Hatfield on the value of the paper to engineers because of the indications it gave as to the value of steels for different purposes. It was impossible to put forward satisfactory results from the same kind of steel used for different purposes. At the present time engineers are adopting this principle, with bad results.

Electric Steel on a Large Scale

In the afternoon conveyances took the party to the new rolling mills and steel works of the Lombardy Iron & Steel Works Co., two of the eight plants being inspected. The outstanding feature was the operation of their very large electric furnaces, several heats of which were tapped and put into ingots at the time of the visit. The open-hearth plant and sheet and rod mills were duly admired. After the inspection the rather large party was entertained at tea by the company, with the usual speeches of felicitation following. In the evening a formal reception was given by the Chamber of Commerce and was greatly enjoyed. The ladies were specially cared for by a committee of ladies of the Milan members. They visited the steel plant and attended the evening reception.

Reports of the technical session on Tuesday morning, Sept. 18, and of the excursion in the afternoon, will appear in THE IRON AGE next week.

British Iron and Steel Market

Japan Has Bought Heavy Tonnages of Galvanized Sheets—Pig Iron Easier—Continental Prices Up

(By Cable)

LONDON, ENGLAND, Oct. 2.

Pig iron position is improving on broadening demand, but makers are prepared to grant concessions to clear their stocks. There is more inclination on the part of consumers to contract for forward delivery. The Continent, especially Germany, is purchasing hematite.

Foreign ore still is quiet, but increased activity is anticipated, as the Bilbao strike has ended. Sellers of Bilbao Rubio ask 22½s. to 22¾s. ($5.11 to $5.17) ex-ship Tees.

Finished iron and steel generally is quiet, with prices tending lower, owing to cheaper fuel. Far Eastern demand at present is limited to sheets but is expected to develop later. Foreign buyers generally are cautiously awaiting Ruhr developments.

Continental prices are dearer on improving exchange rates and moderate business with India and Japan. In Germany the Donnersmarckhütte works has blown out one blast furnace and reduced the operations of others, owing to prohibitive working costs.

In France and Belgium plans are being formed for the liquidation of the seized Ruhr stocks of iron and steel.

Tin plate market is firm, with good business moving on the basis of the minimum, chiefly for October delivery. But supplies are difficult, owing to the well-sold condition of the works. There is increased activity in most foreign markets and home consumers are covering to the end of the year.

India is buying galvanized sheets in small quantities. The demand, it is anticipated, will develop. Japan has bought heavily of thin gages, paying high prices. The makers are sold out until early next year.

Far Eastern specifications of black sheets have been sold up to £21 (4.26c. per lb.) f.o.b. Early

supplies are difficult to obtain. India is buying moderately.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.54 per £1, as follows:

Durham coke, delivered	£1	18s.	to £2	0s.	$8.85 to $9.08
Bilbao Rubio ore†	1	4			5.45
Cleveland No. 1 foundry	5	2			23.14
Cleveland No. 2 foundry	4	16½			21.91
Cleveland No. 4 foundry	4	11			20.66
Cleveland No. 4 forge	4	9	to 4	10	20.20 to 20.43
Cleveland basic	4	10	to 4	11	20.43 to 21.24
East Coast mixed	4	18½	to	5 0	22.36 to 22.70
Ferromanganese	17	10			79.45
Ferromanganese*	17	10			79.45
Rods, 3/8 in. and up	8	0	to 9	0	36.32 to 40.86
Billets	7	10	to 8	5	34.05 to 37.06
Sheet and tin plate bars, Welsh	9	2½			41.42
Tin plates, base box	1	3½	to 1	3¼	5.35 to 5.38 C. per Lb.
Ship plates	9	2½	to 9	12½	8.85 to 9.04
Boiler plates	12	10	to 13	0	2.39 to 2.62
Tees	9	12½	to 10	2½	1.95 to 2.04
Channels	8	17½	to 9	7½	1.80 to 1.90
Rounds	8	12½	to 9	2½	1.75 to 1.85
Round bars, ¾ to 3 in.	10	10	to 11	0	2.13 to 2.23
Galvanized sheets, 24 g.	18	10	to 18	15	3.75 to 3.80
Black sheets, 24 gage	13	15			2.79
Black sheets, Japanese specifications	15	5			3.05
Steel hoops	12	0	to 12	10*	2.39 to 2.52*
Cold rolled steel strip, 20 gage	17	5			3.50
Cotton ties, Indian specifications	16	0			3.04

*Export price. †Ex-ship. Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron:					
Belgium	£5	2s.	8d.		$23.18
France	5	2½			23.14
Luxemburg	5	2½			23.14
Billets:					C. per Lb.
Belgium	6	12½	to 6	17½	30.08 to 31.78
France	6	12½	to 7	0	30.08 to 31.78
Merchant bars:					
Belgium	8	7½	to 9	0	1.70 to 1.87
Luxemburg	8	7½	to 9	0	1.70 to 1.87
France	7	10			1.52
Belgium	7	15			1.57
Luxemburg	7	12½			1.55
France	7	10	to 7	12½	1.52 to 1.55
Angles:					
Belgium	8	0	to 8	5	1.62 to 1.67
¼-in. plates:					
Belgium	8	10			1.72
Germany	8	10			1.72
⅜-in. plates:					
Luxemburg	7	15			1.57
Belgium	8	0			1.62

FRENCH MARKET FIRM

Prices Move Upward with Mills Well Booked Ahead, but Consumers Refrain from Stocking, Anticipating Disposal of Ruhr Seizures

PARIS, FRANCE, Sept. 21.—There is a feeling among the larger consumers that even though a satisfactory arrangement is made with Germany coke will continue scarce and expensive for some time and exchange will continue high. In the domestic market, disposals in raw, semi-finished and finished products are limited, as a result of heavy exports and finishing mills are beginning to complain of this shortage which is leading to higher prices. A change may come, however, if the iron and steel products seized in the Ruhr are sold on the market at reasonable prices. There is no reason, under such conditions, for consumers to build up large stocks of supplies, since a shortage is not to be feared; on the contrary, any unconsidered hastiness on their part would mean another increase in the prices.

Pig Iron.—The production for August is about equal to that of July. But owing to the active demand, especially for export, prices continue firm with an upward tendency. Some transactions were made during the past week at 420 fr. for No. 3 P. L., September delivery. This price has since been advanced to 430 and 435 fr., f.o.b. East Works, although tonnage has been accepted at 420 and 425 fr, September-October delivery, by East and Lorraine Works. October orders are being booked at 450 fr. per metric ton, at works, for No. 3 P. L. The price for August for No. 3 P. L. phosphorus iron was established at 414.60 fr. per ton, to the cooperative of the French Foundrymen's Association. Hematite is quoted in the East at 500 fr. per ton, f.o.b. works. However, small tonnages can still be had both in the Center and North for 460 and 490 fr. per ton, at works. British hematite, East Coast mixed numbers, is sold on the Paris market for 510 to 515 fr. per ton, delivered.

Ferroalloys.—Sept. 19, the French Comptoir for ferrosilicon advanced the price of 45 per cent to 1050 fr., an increase of 25 fr. per metric ton.

IRON AND STEEL INSTITUTE

After Meeting in New York, Members Will Visit Aberdeen Proving Grounds

The twenty-fourth general meeting of the American Iron and Steel Institute will be held at the Hotel Commodore, New York, Thursday, Oct. 25. The papers to be read at the morning and afternoon sessions following the address by President Gary are:

X-Ray Examination of Metals, Col. T. C. Dickson, commanding officer, Watertown Arsenal, Watertown, Mass.

Investigation of the Influence of Temperature on Charpy Impact Value of a Group of Steels of Varying Composition, Dr. F. C. Langenberg, metallurgist, Watertown Arsenal, Watertown, Mass.

Open-Hearth Furnace Refractories, F. B. Quigley, superintendent, open-hearth department, Ohio Works, Carnegie Steel Co., Youngstown, Ohio.

Iron and Steel Industry in China, Chung Yu Wang, Hankow, China.

The Use of Blast Furnace Slag for Various Construction Purposes, C. L. McKenzie, president, Duquesne Slag Products Co., Pittsburgh.

Recent Developments in Steel Forging, John L. Cox, assistant to president, Midvale Co., Philadelphia.

Following the banquet, which will be held in the evening at the Hotel Commodore, a special train will be run to Aberdeen, Md., and on Friday, Oct. 26, the institute will hold a joint meeting with the Army Ordnance Association at the United States Army Proving Grounds at Aberdeen. The program for the joint meeting on Friday will be devoted to demonstrations of the use of ordnance material by the services which actually use it in battle: artillery, infantry, air service, etc. The program will include the firing of heavy railroad mortars and guns, dropping of bombs from bombing airplanes, firing of anti-aircraft guns against moving targets in the air, demonstration of machine gun firing from airplanes, and machine gun barrages on land, the attack of tanks against machine gun nests, etc. It is expected that a large number of the members of the institute will avail themselves of this opportunity to witness these very interesting demonstrations.

Malleable Castings in August

WASHINGTON, D. C., Sept. 29.—The Department of Commerce announces statistics on the production of malleable castings manufactured for sale, by months, which include only those castings manufactured for sale as such, and do not include those used in the plant or finished and sold as other products:

Figures are also shown comparatively for June, July and August, covering the operations of 103 identical establishments for which reports were received each month:

Production of Malleable Castings by Months

Month	Plants Reporting	Total Production, Tons	Total Shipments, Tons	Orders Booked, Tons	Monthly Capacity of Plants, Tons	Per Cent of Total Capacity Operated
May	95	64,726	62,806	52,898	91,174	71.0
June	105	65,168	64,608	42,067	96,240	67.7
July	108	57,881	60,102	41,733	98,241	58.9
Aug.	112	68,069	65,405	39,830	103,068	66.0

Comparative Summary for 103 Identical Establishments

Month	Plants Reporting	Total Production, Tons	Total Shipments, Tons	Orders Booked, Tons	Monthly Capacity of Plants, Tons	Per Cent of Total Capacity Operated
June	103	63,398	62,888	39,814	94,840	66.7
July	103	54,433	55,922	39,131	94,826	57.4
Aug.	103	63,038	60,207	36,753	94,858	66.5

Electrical Engineers Hold Convention

Buffalo Meeting and Exhibition Draw Many Visitors—Technical Sessions and Discussions Well Attended—Operating Electric Foundry a Great Drawing Card

WITH an attendance which reached 1076 members out of a total of between 1500 and 1600, and with 15 past-presidents present out of 17, the Buffalo convention, Sept. 24 to 28, of the Association of Iron and Steel Electrical Engineers made a new high record in the history of the association. Expanding activities were shown, particularly by the character and scope of the exhibition in the Broadway Auditorium, while increase in the breadth of the technical interest was indicated by the special fuel section, and the papers and discussions brought together under that heading. The chairman of this section is George R. McDermott, assistant chief engineer Illinois Steel Co., South Chicago, who was a recipient of the Hadfield medal for his paper before the American Iron and Steel Institute last year.

The program of the meeting was published on page 402, in our issue of Aug. 16, and the brief record of the first two days' sessions appeared on page 849 of our issue of Sept. 27. Lack of space prevents the publication in this issue of some of the outstanding papers before the convention. On page 906, however, will be found an abstract of the report of the committee on anti-friction bearings and some of the recommendations for standardization. This is followed by the discussion on the report and recommendations. Discussions of other papers read before the convention will follow the abstracts of those papers, as we publish them in the next few issues.

Exhibition a Great Success

Many more of the members of the association were to be found going over portions of the exhibition on the main floor of the Auditorium than were present at any of the technical meetings in the second story of that building. The entire floor, consisting of about 170 booths, was occupied, the total number of exhibitors being about 125. Several had two booths and the two large electrical supply companies—Westinghouse Electric & Mfg. Co. and General Electric Co.—occupied ten booths each.

The Electrified Foundry

Chief in interest and a never failing attraction for visitors was the electrified foundry, organized by the Pittsburgh Electric Furnace Corporation and operated by the American Radiator Co., Buffalo plant. From the delivery of scrap to the furnace, until the final grinding of burrs from the castings, this unit was electrically operated throughout.

More than a score of companies cooperated in this particular unit, including the Acheson Graphite Co., Niagara Falls, N. Y., furnace electrodes; Air Reduction Sales Co., New York, cutting-off torch; Automatic Transportation Co., Buffalo, storage battery industrial trucks; Bridgeport Safety Emery Wheel Co., Bridgeport, Conn., grinding wheels and stands; Buffalo Scale Co., platform scales; Cleveland Pneumatic Tool Co., air manifolds, valves, couplings and hose; Cutler-Hammer Mfg. Co., Milwaukee, lifting magnets; Electrometallurgical Corporation, New York, ferroalloys; George J. Hagan Co., Pittsburgh, electric annealing furnace; Harbison-Walker Refractories Co., Pittsburgh, furnace refractories; Mahr Mfg. Co., Minneapolis, ladle heater; National Engineering Co., Chicago, sand mill; Ohio Steel Foundries, Springville, Ohio, Fahrite annealing box; George Oldham & Son Co., Baltimore, chipping hammers and sand rammers; Osborn Mfg. Co., Cleveland, two molding machines; Pangborn Corporation, Hagerstown, Md., sand blast and dust-arrester, angular grit and Simpson steel shot; Pittsburgh Transformer Co., electric furnace transformer; Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., overhead traveling crane and runway; Truscon Steel Co., Youngstown, Ohio, pressed steel flasks and bottom boards; Venango Sand Co., Franklin, Pa., foundry sand; Westinghouse Electric & Mfg. Co., East Pittsburgh, electric furnace automatic control switches and motors; Whiting Corporation, Harvey, Ill., ladles; Worthington Pump & Machinery Corporation, Cincinnati, Laidlaw variable capacity compressor and Maxim silencer.

Melting was accomplished in a Moore "Rapid Lectromelt" furnace using a current at 128 volts high circuit and 80 volts during melt, the current flow being at about 600 amperes with high voltage and 800 amperes during melting. This current came in at 2200 volts and was handled through the Pittsburgh transformer. The Buffalo city authorities made arrangements, previous to the opening of the exposition, for getting in this high tension current for this purpose. Heats were poured at frequent intervals, the furnace furnishing ½ ton of metal at each heat. The entire operation of a foundry was carried through to the production of the finished castings, the whole unit being operated on a brick floor measuring about 35 x 65 ft., spanned by the overhead crane and broken only by the concrete ladle pit in front of the furnace.

Exhibits in Booths

While the exhibits were decidedly diversified, they naturally grouped themselves into a number of classes according to the character of the product exhibited. Space does not permit extended treatment but, in brief, the principal features covered are included in the following paragraphs:

Cranes and hoisting apparatus were shown by the Alliance Machine Co., Alliance, Ohio, which had models of two types of ingot strippers, two types of ladle cranes, a soaking pit crane and a two-car dumping machine for handling ore or coal. The Hayward Co., New York, showed in operation handling sand an electrically operated clam shell bucket suspended from a crane bridge. The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., had the 5-ton overhead crane operating in the foundry exhibit and, in addition, two types of 1-ton hoists and two types of 2-ton hoists. The Motorbloc Corporation, Philadelphia, showed motor-driven differential blocks, and the Otis Elevator Co., New York, elevating equipment.

Electrically driven trucks, tractors and portable cranes were shown by six exhibitors. The Automatic Transportation Co., Buffalo, had a 3-ton elevating platform truck and a fork platform tiering lifting truck of 2 tons capacity, capable of raising from 1 to 6 ft. These were in connection with the foundry show. Baker R & L Co., Cleveland, showed three machines—an industrial tractor, a truck and a crane truck. The Elwell-Parker Electric Co., Cleveland, had a 3000-lb. electric revolving crane and a 3-ton electric lift truck. The Lakewood Engineering Co., Cleveland, showed industrial trucks. The Mercury Mfg. Co., Chicago, showed a tractor and trailer. The Wright-Hibbard Industrial Electric Truck Co., Buffalo, was the sixth exhibitor.

Electric portable tools were shown by the Chicago Pneumatic Tool Co., New York; the Cleveland Pneumatic Tool Co., Cleveland, and the Van Dorn Electric Tool Co., Cleveland.

Boilers, furnaces and parts were shown by the American Heat Economy Bureau, Pittsburgh; the George J. Hagan Co., Pittsburgh; the Liptak Fire Brick Arch Co., Chicago, and the Superheater Co., New York. Other

companies, including the Wickes Boiler Co., Saginaw, Mich., were represented by drawings or catalogs.

Gears of various types were shown by the Farrel Foundry & Machine Co., Ansonia, Conn. (shown by Buffalo plant); by R. G. Nuttall Co., Pittsburgh; W. P. Taylor Co., Buffalo, and the Tool Steel Gear & Pinion Co., Cincinnati. The Sykes double helical gear with sharp apices, the whole tooth being generated right up into the corner and having no center gap, attracted much attention.

Flexible couplings were exhibited by the Thomas Flexible Coupling Co., Warren, Pa., and the Bartlett Hayward Co., New York.

Anti-friction bearings were shown by the Hyatt Roller Bearing Co., New York; Norma Co. of America, New York; the Rollway Bearing Co., Syracuse, N. Y.; and the S. K. F. Industries, Inc., Hartford, Conn.

Valves were shown by the Chapman Valve Mfg. Co., Indian Orchard, Mass., and the Homestead Valve Mfg. Co., Pittsburgh.

Metals as such were represented by the Park Metalware Co., Buffalo, by the metallic packing of the France Packing Co., Philadelphia, and by the bearing metals of the Lumen Bearing Co., Buffalo, and of the Sumet Corporation, Buffalo.

Oils, either lubricating or fuel or both, were shown, together with the action of lubricating oils, by the Keystone Lubricating Co., Philadelphia, the Standard Oil Co., New York, and the Tide Water Oil Sales Corporation, New York.

Other exhibits included the Aero Pulverizer Co., New York, coal pulverizer and blower; Allis-Chalmers Mfg. Co., Milwaukee, impulse steam turbine for auxiliary equipment; Hagan Corporation, Pittsburgh, boiler regulation system and gas controllers; Johns-Manville, Inc., New York, insulating materials; William Reed Engineering Co., Louisville, Ky., air filter; Spencer Turbine Co., Hartford, Conn., turbo compressors; M. H. Detrick Co., Chicago; Gas Combustion Co., Pittsburgh; MacLeod Co., Cincinnati; Mutual Foundry & Machine Co., Atlanta, Ga.; Stroh Steel Hardness Process Co., Pittsburgh.

Aside from the great variety of electrical instruments, shown by exhibitors whose business is devoted to electrical matters, there were other types of instruments shown by the Bacharach Industrial Instrument Co., Pittsburgh, the Northern Equipment Co., Erie, Pa., and the Republic Flow Meter Co., Chicago.

Electrical Apparatus

Among the important electrical applications may be mentioned the exhibits of the Crocker-Wheeler Co., Ampere, N. J., with mill type motors and induction motors for mill uses; Cutler-Hammer Mfg. Co., Milwaukee, with various control devices and heating elements, including heated plates on which chocolate creams were made and distributed to visitors; the Ohio Electric & Controller Co., Cleveland, magnetic switch controller and electric magnets; Rowan Controller Co., Baltimore, mill table controller with starter and switches; and United States Graphite Co., with a group of graphite products, particularly applicable to the iron and steel industry, including motor and generator brushes.

Electric equipment of all sorts, some of it specifically designed for steel mill use but most of it general in application, was exhibited by a large number of companies, including Allan Mfg. & Welding Co., Buffalo; Louis Allis Co., Milwaukee; Appleton Electric Co., Chicago; Automatic Reclosing Circuit Breaker Co., Columbus, Ohio; Benjamin Electric Mfg. Co., Chicago; Boxill-Bruel Carbon Brush Co., Indianapolis; Bussman Mfg. Co., St. Louis; Chicago Fuse Co., Chicago; Corliss Carbon Co., Bradford, Pa.; Crouse-Hinds Co., Syracuse; Cutter Electrical & Mfg. Co., Philadelphia; Delta-Star Electric Co., Chicago; Economy Fuse & Mfg. Co., Chicago; Edison Storage Battery Co., Philadelphia; Electric Controller & Mfg. Co., Cleveland; Electric Materials Co., North East, Pa.; Electrical Power Equipment Corporation, Philadelphia; Electric Service Supplies Co., Philadelphia; Electric Storage Battery Co., Philadelphia; Electro-Service Co., Marietta, Ga.; Johns-Pratt Co., Hartford, Conn.; Martindale Electric Co., Cleveland; William G. Merowit, Buffalo; Mutual Electric & Machine Co., Detroit; National Carbon Co., Cleveland; National Electrical Mfg. Co., New York; Nichols-Lintern Co., Cleveland; Packard Electric Co., Warren, Ohio; Pittsburgh Electric & Machine Works, Pittsburgh; Pyle National Co., Chicago; Reliance Electric & Engineering Co., Cleveland; Rockbestos Products Corporation, Buffalo; Schweitzer & Conrad, Inc., Chicago; Square D Co., Detroit; Standard Underground Cable Co., Pittsburgh; Thompson Electric Co., Cleveland; Trumbull Electric Mfg. Co., Plainville, Conn.; V. V. Fittings Co., Philadelphia; Western Electric Co., Chicago.

The Banquet

At the Hotel Statler, Thursday evening, the ballroom was thoroughly filled with members and guests at the annual banquet. The toastmaster, George Leahman, general manager Buffalo Chamber of Commerce, told the guests that Buffalo is in process of switching from a commercial center to a manufacturing center of the first importance. Formerly the city took toll of what commerce passed through between the Great Lakes district and the Atlantic seaboard. Already, however, the city stands eighth in the value of its manufactured products and the industrial plants centered around Niagara Falls, and deriving cheap electric power from that development, make that section the most rapidly growing in the United States.

Other speakers included R. B. Gerhardt, retiring president of the association and assistant general manager Sparrows Point plant, Bethlehem Steel Corporation; R. S. Shoemaker, the new president of the association, and superintendent of maintenance American Rolling Mill Co., Middletown, Ohio; Frank X. Schwab, Mayor of Buffalo; Frank A. Baird, a veteran blast furnace man of Buffalo; Hugh Kennedy, vice-president Rogers-Brown Iron Co., Buffalo; and Douglas Malloch, international humorist, Chicago.

Mr. Baird told the story of Buffalo's connection with the iron and steel industry. Forty years ago not a ton of iron or steel was made in Buffalo—this in spite of the fact that it had been made there in large quantities before that time. After the Civil War, Mr. Carnegie looked over Buffalo as a manufacturing site. There were being produced there the largest iron structural beams in America, 16 in. in depth, but the old-fashioned anthracite method was in use and the metal was being fashioned into beams and rails of iron. Long after iron rails had ceased to be produced elsewhere, Buffalo was making them. Eventually these firms failed. In contradistinction, the Carnegie Steel Co. set up the first steel mill chemical laboratory in America, while Buffalo was still running on rule of thumb methods. All of this helped in Buffalo's downfall and for 10 years there was no iron and steel produced with the city limits. Today there are 23 blast furnaces within five or six miles of the City Hall.

Mr. Kennedy expressed great impatience with the people who have criticized the steel industry on account of long hours and alleged inhuman working conditions. He pointed out that 40 years ago, when he entered the industry, and kept Mr. Schwab's time, such criticism would have been valid, but it was not made. The A furnace at Braddock had been transported from Michigan and was the first American furnace operated on ferromanganese. It was using Spanish ores; every bit of material was moved by hand in wheelbarrows and otherwise, and largely by the use of Irish labor. Physical human endurance alone limited production. That slavery of 40 years ago has all disappeared, because of the work of engineers and of the electricity which they have harnessed. Today not a pound of the materials going into the blast furnace is touched by the hand of man. All is handled by machinery, and yet today, with conditions like that, people harp on what a "hard job" men have who work in iron and steel plants.

SEPTEMBER IRON OUTPUT

Decline From August 7090 Tons Per Day —Rates Down to Lowest of the Year

Eighteen Furnaces Down or Banked and Three Blown In—Net Loss of 15

Still further decline in the pig iron output of this country was registered in September. According to blast furnace statistics, gathered almost entirely by telegraph, the daily rate fell practically to the lowest for the year, or only 3 tons more per day than the rate in January. With the net loss of 15 furnaces in blast on Oct. 1, the loss for the last three months amounts to 68 furnaces since July 1. The loss in output per day in September was 7090 tons, as compared with 7382 tons per day in August, and 3892 tons per day in July.

Production of coke and anthracite pig iron for the 30 days in September amounted to 3,125,512 gross tons, or 104,184 tons per day, as compared with 3,449,493 tons (revised figures) in August, a 31-day month, or 111 274 tons per day. The September decrease from August was 323,981 tons, or 7090 tons per day. There were 18 furnaces blown out, or banked and three blown in, a net loss of 15 furnaces.

The total number of furnaces in blast on Oct. 1, was 255, as compared with 270 on Sept. 1. The capacity of the 255 furnaces operating Oct. 1 is estimated at about 102,000 tons per day, as compared with 106,590 tons per day for the 270 furnaces operating on Sept. 1.

There was a large production of ferromanganese in September, at 23,206 tons, next to the largest for any month this year. The spiegeleisen output was low at 4478 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron months, from September, 1922, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
September, 1922	53,856	13,935	67,791
October	66,060	19,032	85,092
November	72,177	22,813	94,990
December	75,179	24,398	99,577
January, 1923	79,991	24,190	104,181
February	80,684	26,251	106,935
March	87,881	25,792	113,673
April	90,145	28,179	118,324
May	96,029	28,735	124,764
June	90,907	31,641	122,548
July	88,798	29,858	118,656
August	86,479	24,795	111,274
September	78,789	25,385	104,184

The figures for daily average production, beginning with January, 1917, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921	1922	1923
Jan.	101,643	77,799	106,525	97,264	77,917	53,063	104,181
Feb.	94,473	82,835	105,006	102,720	69,187	58,214	106,935
Mar.	104,852	103,648	99,685	103,900	51,448	78,675	113,673
Apr.	111,165	109,607	82,607	91,327	39,768	69,070	118,324
May	110,238	111,175	88,062	96,312	39,394	74,409	124,764
June	106,002	110,793	70,495	101,451	35,494	78,701	122,280
July	107,820	110,354	78,340	98,931	27,889	77,592	118,656
Aug.	104,772	109,341	88,496	101,529	30,780	58,586	111,274
Sept.	104,465	113,942	84,632	104,310	32,850	67,781	104,184
Oct.	106,550	112,482	60,115	106,212	10,215	85,092	.....
Nov.	108,859	111,482	29,745	97,859	47,182	94,990	.....
Dec.	92,997	110,762	84,944	87,222	53,196	99,577	.....
Year	104,619	105,496	83,789	89,492	45,325	73,645	.....

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production		Spiegeleisen and Ferromanganese			
			1922		1923	
	1922	1923	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	1,306,045	2,479,727	6,874	1,230	19,358	12,056
Feb.	1,311,170	2,259,154	3,610	4,930	21,282	3,657
Mar.	1,629,982	2,754,305	11,600	2,095	20,730	13,832
Apr.	1,707,902	2,704,360	14,998	4,211	20,808	7,440
May	1,879,180	2,976,892	15,432	4,902	19,568	9,533
June	1,876,033	2,727,208	18,273	4,817	19,717	13,289
6 mos.	9,710,312	15,871,646	70,787	22,185	121,564	64,807
July	1,931,138	2,752,738	18,873	7,176	26,493	12,856
Aug.	1,415,872	2,680,851	11,402	7,925	22,045	5,586
Sept.	1,615,696	2,363,967	10,681	4,235	23,206	4,478
Oct.	2,047,873	.....	9,193	12,283	.....	.....
Nov.	2,165,295	.....	12,222	4,182	.....	.....
Dec.	2,330,545	.....	17,007	10,591	.....	.....
Year	21,216,691		151,175	68,587		
9 mos.		23,669,202	.....	.....	193,308	87,747

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for September and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	Sept. (30 days)	Aug. (31 days)	July (31 days)	June (30 days)
New York	208,737	246,347	265,406	253,625
New Jersey	18,293	19,449	18,920	26,033
Lehigh Valley	73,945	79,529	90,231	91,078
Schuylkill Valley	88,699	108,448	116,428	117,779
Lower Susquehanna and Lebanon Valleys	56,531	56,884	74,645	64,374
Pittsburgh district	659,963	713,314	759,159	737,339
Shenango Valley	127,781	117,133	142,419	164,969
Western Pa.	157,960	193,611	205,059	201,026
Maryland, Virginia and Kentucky	55,581	81,826	91,443	89,164
Wheeling district	147,771	159,418	155,324	149,067
Mahoning Valley	286,558	338,466	366,681	378,170
Central and Northern Ohio	273,885	287,641	286,021	289,498
Southern Ohio	37,416	46,779	72,120	74,798
Illinois and Indiana	587,323	631,225	643,043	620,281
Mich., Minn., Mo., Wis. and Colo.	113,460	121,172	133,330	159,254
Alabama	213,683	230,468	236,049	239,589
Tennessee	18,526	17,753	16,056	19,901
Total	3,125,512	3,449,493	3,673,334	3,676,445

Among the furnaces blown in during September were the following; Buffalo C furnace in the Buffalo district; the Sharpsville furnace in the Shenango Valley, and one Ashland furnace of the American Rolling Mill Co. in Kentucky.

Among the furnaces blown out or banked during September were the following: F furnace of the Bethlehem Steel Co. and the Buffalo B furnace in the Buffalo district; C furnace of the Bethlehem Steel Co. at Coatesville in the Schuylkill Valley; the Edgar Thomson D furnace of the Carnegie Steel Co. in the Pittsburgh district; Nos. 1 and 2 Newcastle furnaces of the Carnegie Steel Co. in the Shenango Valley; J furnace of the Bethlehem Steel Co. at Johnstown in western Pennsylvania; the Pulaski furnace in Virginia; E furnace of the Bethlehem Steel Co. at Sparrows Point, Md.; the McKeefrey and Mattie furnaces in the Mahoning Valley; Dover furnace in northern Ohio; the second Wellston furnace in southern Ohio; No. 8 South Chicago furnace of the Illinois Steel Co. and No. 4 Iroquois furnace of the Youngstown Sheet & Tube Co. in the Chicago district; the Philadelphia and No. 1 City furnace of the Sloss-Sheffield Steel & Iron Co. and the second Vanderbilt furnace of the Woodward Iron Co. in Alabama.

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

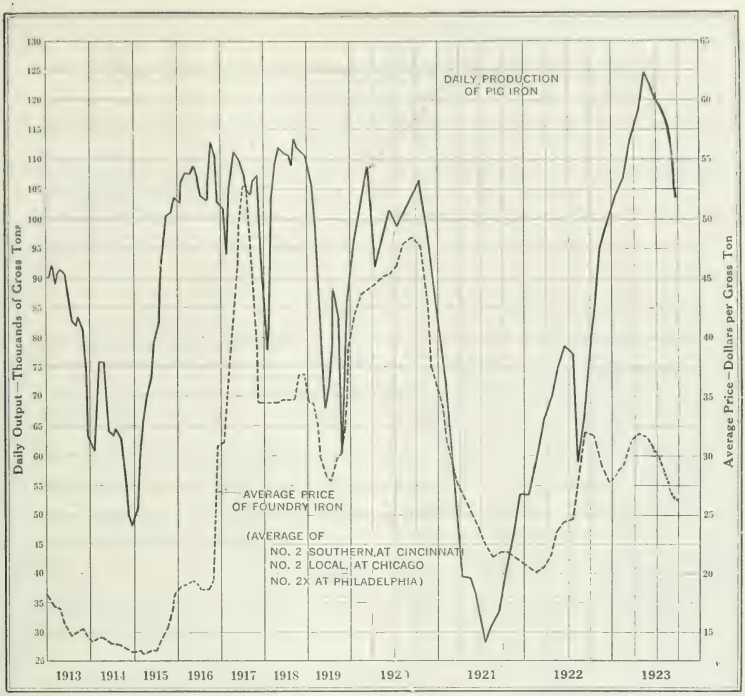


Diagram of Pig Iron Production and Price

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1919—Gross Tons

	1919	1920	1921	1922	1923
Jan.	3,302,260	3,015,181	2,416,292	1,844,564	3,529,604
Feb.	2,940,168	2,978,879	1,937,257	1,629,991	2,994,187
Mar.	3,090,243	3,375,907	1,595,522	2,035,920	3,523,868
Apr.	2,478,218	2,739,797	1,193,041	2,072,114	3,549,736
May	2,108,056	2,985,632	1,221,521	2,500,674	3,867,405
June	2,114,853	3,043,940	1,064,852	2,261,056	3,676,115
½ year.	16,033,808	18,138,986	9,428,166	12,050,683	20,841,534
July	2,428,541	3,067,043	864,555	2,405,365	3,678,334
Aug.	2,743,388	3,147,402	954,193	1,816,170	3,449,493
Sept.	2,487,965	3,129,323	985,529	2,033,720	3,125,512
Oct.	1,863,558	3,292,597	1,246,676	2,637,844	.....
Nov.	2,393,350	2,954,908	1,415,181	2,849,703	.....
Dec.	2,633,268	2,703,855	1,469,086	3,086,898	.....
Year*	30,582,878	36,414,114	16,543,686	26,880,383	.....

*These totals do not include charcoal pig iron. The 1922 production of this iron was 224,731 tons.

The Selflock Nut & Bolt Co., Inc., East Syracuse, N. Y., manufacturer of friction fit nuts and bolts, has entered into a contract with the Bethlehem Steel Co., Bethlehem, Pa., operative at once, for the manufacture and sale of carriage and machine bolts, track bolts, and heavy railroad nuts and bolts. The Selflock company will increase its facilities and will specialize on S. A. E. selflock products and cap screws with selflock threads.

John H. Bricker, Philadelphia, has changed address from 51 Estey Building to 816 Otis Building.

Slight Increase in Buying Reported at Youngstown

YOUNGSTOWN, Oct. 2.—A fair volume of steel business through the fall and winter months, with an appreciable improvement next spring, is the anticipation of President James A. Campbell of the Youngstown Sheet & Tube Co. He also says there is little or no price shading by the leading interests.

Some quickening in iron and steel demand is reported by other Valley executives. Somewhat better black sheet buying is reported by independent interests, which have heretofore complained of the apathy existing in this market.

Requirements for standard merchant pipe are holding fairly well, and business of this kind is reported in sufficient volume to maintain tube mill departments at a fair rate through the remainder of the year.

There is speculation as to the operating rate which the mills can be expected to maintain through the winter, leading steel makers being of the opinion this will average 70 to 75 per cent. in finishing departments.

While the pig iron market is still slack, there has been some reduction in accumulated stocks, especially by merchant interests in the past six weeks, owing to suspension of production. Orders meanwhile have been filled from stocks in the yards.

There is less evidence in this district that semi-finished steel is moving below $42.50, which makers seek to establish as the fourth quarter price, both nominally and actually.

Railroads are handling the large volume of traffic in and out of the Valley expeditiously, and no car shortages or inadequacies in motive equipment are reported.

Iron and Steel Markets

OUTPUT SLIGHTLY LESS

September Contraction in Pig Iron and Steel

Further Buying of Rails—Hoops and Bands Lower—Pig Iron Decline Continues

A further slight contraction in output of both pig iron and steel marks the coming in of the last quarter of the year. Consumption continues at a high rate, though in some lines there is a falling off from that of early summer, and neither sellers nor buyers are forcing the issue as to prices for forward delivery. It is recognized on both sides that September conditions may prevail for some weeks.

September pig iron output fell off about 6 per cent from that of August, which in turn was 6.5 per cent less than the July total. As showing that the contraction is more in steel products than in foundry work it is significant that practically all the loss of 324,000 tons in September pig iron output is contributed by blast furnaces operated by steel companies.

Complete returns compiled on Oct. 2 show a pig iron production of 3,125,512 tons in the 30 days of September, or 104,184 tons a day, against 3,449,493 tons in August, or 111,274 tons a day. After having reached a daily rate of 124,000 tons at the peak in May, pig iron output is now back to the 104,000-ton rate of January.

Eighteen furnaces were blown out in September and 3 were blown in. The 255 in blast Oct. 1 represent a daily capacity of about 101,000 tons, against 106,590 tons for the 270 furnaces in blast one month previous.

September operations of the Steel Corporation are estimated at about 87 per cent of its steel making capacity. If the 31,000-ton daily rate of new bookings which the corporation announced for the first three weeks of the month held up to the end, the net reduction in unfilled orders was considerably under the 495,000 tons reported for August.

Output of independent steel companies averaged not far from 70 per cent of capacity last month, and the improvement of that rate in October will call for an early picking up in the major tonnage products—plates, shapes and bars.

While railroad car buying and oil tank contracts are absent, Chicago district mills are still booking rails, the total already taken for the first half of 1924 being put at 250,000 tons. The C. & O. has just ordered 17,000 tons at Chicago and 13,000 tons in the East. The Missouri Pacific is expected to buy 30,000 tons, and other roads yet to contract are the Chicago & Northwestern, Nickel Plate, Santa Fe, Rock Island, Missouri, Kansas & Texas, Cotton Belt and Pennsylvania.

Pittsburgh reports still feature wrought pipe and tin plate as the most active lines. The report of the National Association of Sheet and Tin Plate Manufacturers is expected to show September orders were nearly double those of August. Recent orders for tin plate for China and Japan have been taken at full domestic prices, indicating a stronger market for the Welsh product.

The principal price change in the week is a decline of $3 per ton in hoops, bands and hot-rolled strips, these products being now at 3c. base, as against 3.15c. recently.

Early shipments of nuts, bolts and rivets can be had at prices substantially below those announced some time ago for fourth quarter.

For the two ore boats the Ford Motor Co. has ordered 10,000 tons of plates and shapes, which will probably be placed with the leading producer.

Some curtailment of production by foundries having Ford Motor Co. contracts has been ordered. The company has parts on hand nearly equal to its requirements in the next three months and is taking a first step in the reduction of inventory.

On primary materials the market still tends downward. Furnace coke has sold at $4 at oven, a decline of 25 cents in the week, and scrap prices are off 50c. to $1.

In the Central West weakness in semi-finished steel is still indicated, delivery prices of $42 on billets and sheet bars being quoted to Cleveland buyers.

Pig iron prices continue to decline. Lake Superior charcoal is $2 lower. The Southern market is very weak, and although $21 is still the ruling price, $20 has been quoted. In eastern Pennsylvania and Buffalo, foundry grades have declined $1, and furnaces have yielded at Pittsburgh, Chicago and Cleveland. The largest sales were of 5000 tons of basic at St. Louis and 7000 tons of foundry grades at Pittsburgh.

Finished steel remains at 2.775c. per lb. for the eleventh successive week, according to THE IRON AGE composite price. One year ago it was 2.474c. per lb.—the highest figure of 1922.

THE IRON AGE pig iron composite price has fallen to $23.96, compared with $24.38 last week. It is now lower than at any time since July of 1922.

Pittsburgh

Strong Demand for Pipe—Pig Iron Prices Lower—Export Orders for Tin Plate

PITTSBURGH, Oct. 2.—The final quarter of the year starts with no decided betterment in the steel business over that of the quarter just ended. With talk of price concessions becoming more distinct, buyers show no inclination to abandon a policy of committing themselves strictly in keeping with their known requirements, this tendency being heightened by a desire to keep inventories well in hand as the year draws to a close.

The bright spots in the situation as far as demand is concerned are standard pipe, for which there is no let up on the part of distributors in their pressure upon the mills and tin plate, which is being specified freely for delivery over the remainder of this year, and in which the large consumers are manifesting keen interest in regard to their early 1924 supplies. Some fair sized export orders for tin plate for China and Japan lately

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	1923 Oct. 2,	1923 Sept. 25,	1923 Sept. 4,	1922 Oct. 3,
No. 2X, Philadelphia‡	*$24.76*	$25.76	$26.76	$33.14
No. 2, Valley furnace†	24.50	24.50	24.50	33.00
No. 2, Southern, Cin'tif..	25.05	25.05	27.55	31.05
No. 2, Birmingham, Ala.†	21.00	21.00	23.50	27.00
No. 2 foundry, Chicago*	26.00	26.00	27.00	32.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	29.50
Basic, Valley furnace	*24.00*	24.50	25.00	33.50
Valley Bessemer, del. P'gh.	*27.86*	28.26	28.26	35.77
Malleable, Chicago*	26.00	26.00	27.00	32.00
Malleable, Valley	24.50	24.50	24.50	33.50
Gray forge, Pittsburgh	25.76	25.76	25.76	34.27
L. S. charcoal, Chicago	*30.04*	32.15	32.15	36.15
Ferromanganese, furnace	110.00	110.00	112.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	42.50	40.00
O.-h. billets, Pittsburgh	40.00	40.00	42.50	40.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	40.00
Forging billets, base, P'gh.	47.50	47.50	47.50	45.00
O.-h. billets, Phila.	*45.17*	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.15	2.15	2.15	2.25

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.475
Iron bars, Chicago	2.35	2.35	2.40	2.50
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.44
Tank plates, Pittsburgh	2.50	2.50	2.50	2.25
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.84	2.84	2.84	2.49
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.84	2.84	2.84	2.44
Steel hoops, Pittsburgh	*3.00*	3.15	3.15	2.90

Sheets, Nails and Wire,	1923 Oct. 2,	1923 Sept. 25,	1923 Sept. 4,	1922 Oct. 3,
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.50
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.50
Sheets, blue an'd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$19.00*	$19.50	$20.00	$24.50
Carwheels, Philadelphia	*20.50*	21.00	21.00	23.00
Heavy steel scrap, P'gh.	*16.50*	17.50	18.00	22.00
Heavy steel scrap, Phila.	*16.00*	16.50	17.00	18.50
Heavy steel scrap, Ch'go.	*15.00*	16.00	16.50	18.50
No. 1 cast, Pittsburgh	21.00	21.00	22.00	24.00
No. 1 cast, Philadelphia	*20.50*	21.00	21.50	23.00
No. 1 cast, Ch'go (net ton)	*19.00*	19.50	19.50	21.00
No. 1 RR. wrot. Phila.	19.00	19.00	18.00	23.00
No. 1 RR. wrot. Ch'go(net)	*14.50*	15.00	16.00	18.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$4.00*	$4.25	$5.00	$12.00
Foundry coke, prompt	5.00	5.00	6.00	13.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*13.75*	13.87½	14.00	14.25
Electrolytic copper, refinery	*13.00*	13.25	13.50	13.75
Zinc, St. Louis	*6.30*	6.42½	6.50	6.80
Zinc, New York	*6.65*	6.77½	6.85	7.15
Lead, St. Louis	*6.70*	6.75	6.70	6.30
Lead, New York	*7.00*	7.10	7.00	6.65
Tin (Straits), New York	*41.87½*	42.25	41.50	32.87½
Antimony (Asiatic), N. Y.	7.50	7.50	7.50	6.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Oct. 2, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Sept. 25, 1923,	2.775c.
Sept. 4, 1923,	2.775c.
Oct. 3, 1922,	2.474c.
10-year pre-war average,	1.689c.

Composite Price Oct. 2, 1923, Pig Iron, $23.96 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 25, 1923,	$24.38
Sept. 4, 1923,	25.38
Oct. 3, 1922,	32.11
10-year pre-war average,	15.72

have been taken at the full domestic price of $5.50 base box. That this business should come to this country at that price is taken to mean a stronger situation across the water and encourages hopes of increased export business.

The major products, plates, shapes and bars, are the slow movers. As to prices, the most important change of the week has been a drop of $3 a ton in hoops, bands and hot-rolled strips. These products now are at 3c. base, as against 3.15c. set up as the fourth quarter price. The weakness in this line finds its explanation in the fact that demand is below normal and a competitive condition has been created because some mills in their desire to maintain relatively full operation have gone pretty low to secure orders. On wide strips 3c. is a maximum rather than a minimum price. Early shipments of bolts, nuts and rivets can be had at substantially lower prices than manufacturers have announced as fourth quarter quotations. Recent quotations hold on all other products, on plates, shapes and bars because independent makers fear they would have to compete with the present invoice price of the Steel Corporation, which on these products is said to be $6 to $10 a ton below current quotations. Strict adherence to quotations by independent companies, however, is resulting in some intermittency in rolling mill operations.

The market still is headed downward on the primary materials. Furnace coke has sold down to $4 per net ton at ovens, a decline of 25c. a ton since a week ago. Basic iron has dropped 50c. a ton to $25 at Valley furnace and Bessemer $1 a ton to $25.50 after having stood at $26.50 since early July. Further declines of 50c. to $1 a ton have taken place in scrap iron and steel.

Pig Iron.—The Westinghouse Electric & Mfg. Co. since a week ago has closed on about 7000 tons of foundry iron for its local and Cleveland foundries and was able to purchase this iron at the lowest prices of the year to date. The bulk of the 3000 tons for Cleveland went to a Cleveland furnace at $25.50 delivered, and this price also was made by a Buffalo producer on a part of the tonnage. For its Trafford, Pa., works the bulk of the foundry iron was secured at a delivered price of $25.89 for No. 2, this from western Pennsylvania furnaces, while iron bought from Valley furnaces sold at $24 for No. 3 grade and a small lot of No. 2X brought $25.50. The National Malleable Casting Co. bought 1000 tons of basic at $24.50 delivered Sharon, Pa.; or $24 at Valley furnace. While small sales of Bessemer have been made at $26 Valley furnace since a week ago, there was one sale of 250 tons to a local melter at $25.50,

Valley furnace. These were the only important sales of the week. Buyers generally cling to the idea that large stocks, which are piled up on local furnace yards, will prevent any immediate stiffening of prices and they are governing their purchases accordingly. W. P. Snyder & Co. make the average price of basic iron from Valley furnaces for September $24.50, against $25 in August, and on Bessemer $26.50, the same price as in August.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$24.00
Bessemer	$25.50 to 26.00
Gray forge	24.00
No. 2 foundry	24.50
No. 3 foundry	24.00
Malleable	24.50
Low phosphorus, copper free	30.00

Ferroalloys.—Activity is lacking locally in all of the ferroalloys and prices are easy, although in the case of ferromanganese the claim is made that practically all of the resale British material has been cleaned up and that this development justifies a firmer stand as to prices. Agents of British producers have been advised that the price still is $117.50 c.i.f. Atlantic seaboard duty paid, but business at that figure is out of the question at the moment, since the resale tonnages filled up those short of supplies and American producers have not yet withdrawn their quotation of $110, furnace or seaboard. Spiegeleisen is dull and weak and available at $43, furnace, for average 20 per cent material. Hardly enough is going on in 50 per cent ferrosilicon to determine real prices, but the market is not quotable above $82.50 delivered, and it is believed that $80 can be done. Prices are given on page 937.

Semi-Finished Steel.—A Warren, Ohio, steel company is making frequent appearances in the market for tin bars and usually seeks delivery within a week. This interest has been paying $42.50, Youngstown, and locally the claim is made that $41 is as low as any recent business has been done in sheet bars. The market for billets and slabs is slow and weak, and while there have been a few sales of small tonnages recently as high as $42.50, a much greater amount of business has been done at or near $40. Demand for sheets is very light and the possibility of lower prices keeps down the demand and specifications for sheet bars. Considerable price cutting is going on in hoops, bands and strips and this is not without effect upon the billet and slab market. Forging billets still are quoted at $47.50, base, but no large tonnages are moving at that figure, and it is reported that those making forgings for the automotive industry are exerting considerable pressure for a downward revision of price. Skelp still holds at 2.40c., but that price is largely untested. Wire rods are slow of sale and prices are slightly easier to the extent that the extra for coarse rods is being waived by some makers. Prices are given on page 937.

Wire Products.—A good demand is observed for plain wire from manufacturers, but there is not much activity in other products. Jobbers are carrying fair sized stocks and, having an idea that prices will be lower before they are higher, they are disposed to make fresh commitments with considerable caution. A fair volume of orders is coming to local mills, but most of the business is for prompt delivery and does not help to create backlogs, since the mills are well caught up with old obligations and in a position to take care of current orders. There is close adherence to quoted prices by local mills. Prices are given on page 936.

Steel Rails.—The ordinary quotation on light rails rolled from billets is 2.25c., base, but the market is not firm at that level and would be shaded on attractive orders. On such business 2.15c., base, or less could be done and an absence of sales at less than 2.25c., base, in the past week is explained by the lack of inquiries of an attractive character. Light sections rolled from old standard rails still are to be had at from 1.90c. to 2c., base.

We quote light rails rolled from new steel at 2.15c. to 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Pressure for shipments of standard pipe still is heavy, as it has been throughout the year, but activity in oil country goods still is on a tapering scale, although reports of a decreased production of crude oil encourage expectations of an improved demand before the end of the year. New business in boiler tubes is slow and there is some irregularity in prices, notably in seamless tubes. Discounts

Cold-finished Steel Bars and Shafting.—Local mills still are holding to 3.25c., base, although the demand is comparatively light. Consumers are drawing upon their stocks of lower-priced material and are making fresh purchases with considerable caution in the belief that prices are not going to be any higher in the near future, and in view of persistent reports of a weaker market in hot-rolled bars that the price of cold-finished bars may actually decline. The extra for hot-rolled bars of cold-finishing analysis adopted by leading manufacturers as of July 1 has not yet become generally effective because the manufacturers had so much business upon their books before the change was announced. It is believed, however, that such tonnage as escaped the extra will have been largely shipped in the next few weeks. Ground shafting still is quoted at 3.65c., base, f.o.b. mill for carload lots.

Hot-Rolled Flats.—This line of products seems to have pretty generally settled to 3c., base, Pittsburgh, as a maximum, although the former quotation of 3.15c. has not entirely disappeared. Business at the latter figure has been difficult, however, as so many mills have considered the assurance of full mill operations of first importance and have not hesitated to cut prices to maintain schedules. On wide strips well below 3c., base, has been done, although makers here deny having gone as low as 2.75c., reported in other centers. Strip makers are having pretty stout competition from plates or skelp and from manufacturers who have jobbing mills, at present none too well supplied with orders for regular jobbing mill products. Prices are given on page 936.

Structural Material.—Weaker advices from other markets have found no response locally, although independent mills are exhausting their backlogs and curtailed mill operations are in prospect, since fresh inquiries run chiefly to small tonnages and are not especially numerous. Prices are given on page 936.

Plates.—The leading interest still has a comfortable backlog but is producing and shipping at a rate that suggests its early ability to take on new business. Independent mills are not as well off and are making very prompt delivery of the small tonnages now being sought. There has been a considerable falling off in the demand for oil storage tanks now that the production of crude oil has begun to show some decrease. There is no shading of the regular market price of 2.50c. base, but inquiries of a size that might induce concessions are lacking. Prices given on page 936.

Bolts, Nuts and Rivets.—There seem to be two distinct markets in these products. Makers generally appear to lack prompt shipment orders and are going pretty low to get them. The effort is being made to hold bolts at 60 and 5 per cent off list for large machine bolts for fourth quarter contracts, but for spot delivery the common price is 60 and 10 per cent off list. Lower prices also are obtainable on nuts for prompt shipment than on fourth quarter contracts, and in rivets at least one order recently was placed as low as $2.75 base, and $2.85 is a fairly common quotation on desirable orders, as against $3 named by large producers for fourth quarter. The quotable range on large rivets is from $2.75 to $3. The decline in rivet prices is much less than is indicated, however, owing to increases in the extras, which mean actual prices well up to those obtained on the higher base and lower extras. Prices are given on page 936.

Cold-Rolled Strips.—There is fairly close adherence to 5c., base, Pittsburgh, on this product, although demand is light by comparison with that of the fore part of the year. Buyers are placing orders rather than contracts as a general rule, a tendency which reflects some lack of confidence in the maintenance of the present price.

Iron and Steel Bars.—All makers of steel bars here still claim to be adhering firmly to 2.40c. base, and the tendency among independent mills is to curtail production rather than cut that price. We also note close adherence to quotations on iron bars.

We quote soft steel bars, rolled from billets, at 2.40c. base, basis for cold-finishing of screw-stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Sheets.—While business in sheets shows some improvement with most makers, it would be exaggeration to call the market active. It is intimated that the next report of the National Association of Sheet and Tinplate Manufacturers will show that September orders were practically double those of August. The American Sheet & Tinplate Co. has bookings which it is estimated will take it through November at the present rate of operation, about 80 per cent of capacity. Concessions from regular quotations have appeared in practically all finishes except possibly automobile body stock. Prices are given on page 936.

Track Fastenings.—Weakness of small spikes in the East seems to be spreading, as a delivered price of $3.25, base 100 lb., has appeared here. As high as $3.50 still is quoted and sales are claimed at that price, but apparently on rather small lots. Track bolts and tieplates are steady as to price, but show only moderate activity. Prices are given on page 936.

Tin Plate.—Large container manufacturers are already making known probable requirements for the first half of 1924 and the leading interest already considers that the bulk of its production for that period is engaged. Nothing yet has been said as to prices for the first and second quarters of the new year, but the common impression is that the present prices will be continued, this idea finding support in the fact that some fair sized export orders recently were taken at the full domestic quotation of $5.50.

Old Material.—Only an appraisal of prices is possible this week, since there is practically no demand from the steel manufacturers and the dullness is only slightly less intense as far as the foundries and consumers of specialties are concerned. The undertone of the market is decidely soft, because dealers are not anxious to take on material for which they see no outlet except their own yards and prices are not yet down to a level where purchases for yard are considered safe. Much material is pressed for sale and dealers report having bought heavy melting steel as low as $16. Steel mills, being out of the market, have declined offers of this grade at $17. It is claimed by dealers that they also have been able to buy compressed sheets as low as $14, delivered, but this is believed to be an exceptional case and is hardly representative of the market. Local mills which have been buying turnings and borings have covered their present requirements and have materially lowered their bids. Prices show further declines as compared with last week or from 50c. to $1 a ton and on a number of grades are the lowest of the year.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$16.50 to $17.00
No. 1 cast, cupola size	21.00 to 21.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 18.50
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Railroad knuckles and couplers	21.00 to 21.50
Railroad coil and leaf springs	21.00 to 21.50
Low phosphorus bloom and billet ends	24.00 to 24.50
Low phosphorus plate and other material	23.00 to 23.50
Railroad malleable	20.50 to 21.00
Steel car axles	20.00 to 20.50
Cast iron wheels	18.00 to 18.50
Rolled steel wheels	21.00 to 21.50
Machine shop turnings	13.00 to 13.50
Sheet bar crops	18.50 to 19.00
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	14.00 to 14.50
Heavy breakable cast	18.50 to 19.00
Stove plate	15.00 to 15.50
Cast iron borings	15.00 to 15.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.50 to 17.00

Coke and Coal.—The market continues dull and almost entirely in buyers' favor. This is particularly the case on coal, offerings of which still greatly exceed the demand. Spot furnace coke is down to $4 per net ton at ovens on sales and higher figures now are simply asking prices. There is no contract business whatever in furnace coke; the asking prices on such tonnages range from $4.50 to $4.75, but the best brands probably could be bought at the lower figure and less desirable ones at $4.25. Spot foundry coke still is quotable from $5 to $5.50. Slack steam coal has sold as low as 90c. a ton, mines, and gas slack is available at from $1.25 to $1.35. We quote mine run steam coal at $1.85 to $2.10, mine run coking coal at $2 and gas grade at $2.25.

BRITISH MARKET FIRM

Pig Iron Market Improved—Buying by Japan Heavy—Mass Production

LONDON, ENGLAND, Sept. 20.—There has been a slightly improved tone during the past week or so which is in part attributable to the sudden rush of orders from the Far East. Pig iron consumers at home and abroad are evidently beginning to feel that prices are about as low as they are likely to go as long as costs remain where they are and in consequence there has been more disposition to enter into forward commitments and demand has been spread over the end of the year requirements. Inquiry from the continent has also improved, but stocks of pig iron are still fairly substantial. No. 3 Cleveland is at about 97s., while for East Coast mixed numbers hematite makers ask from 99s. to 100s.

It was thought at one time that the Japanese requirements would be on a very heavy scale as a result of the earthquake, but so far there has been no extraordinary demand from that quarter except for galvanized sheets, galvanized wire, and wire nails of which large quantities have been bought for immediate reconstructional requirements, but there is as yet little sign of important structural material orders coming to hand, though it is reported that several lines have been placed with continental producers.

The weakest part of the iron and steel trades is undoubtedly the abstention from buying from India and until this market comes in to place its normal requirements little revival can be looked for. New shipbuilding is at a very low rate, but there is considerable activity at the railroad material plants.

It is interesting to note that mass production is being adopted by the London, Midland & Scottish Railway at their Derby car building works, and, whereas it used to take from six weeks to complete a car, one can now be assembled in six days. It is rather early to judge what effect the new processes will have upon the car building trades, but Mr. Nicholson, general secretary of the Vehicle Builders' Union, remarked that "there is no doubt that mass production in some form or other is now essential in railway carriage construction."

An interesting news item is the statement that a large iron and steel merchant company has recently purchased from the Admiralty a huge steel floating dock for testing submarines which was constructed for the German Navy and taken over by the British Admiralty at the end of the war. This dock weighs 5000 tons, and has a total length of 412 ft. and a breadth of 131 ft., and the main feature of its construction is a large cylinder for the reception of the submarine for testing purposes. It was designed by an engineer in Hamburg and the plans were rejected by the Russian Government, to whom they were first submitted, but in 1917 were accepted by the German Government. The construction, however, was delayed and was not completed before 1918. The merchant company has bought the dock for breaking up purposes and are taking it to their depot at Queenborough where they are now engaged in breaking up two dreadnoughts.

Chicago

Favorable Signs Not Entirely Absent in a Quiet Market

CHICAGO, Oct. 2.—The market is quiet in all departments with buyers still pursuing a waiting policy. Pig iron and scrap are notably weak, and while the heavier forms of finished steel products still are steady, consumers are placing orders cautiously. But signs of improvement are not entirely lacking. An important local independent reports that bookings are now equal to shipments, although this is not yet true of other producers. The Chicago district office of another important mill booked 100 per cent more business in September than in August. Much of the tonnage taken was rails, the remainder consisting largely of plates, shapes and bars. Nothing resembling a real buying movement, however, has developed, and in view of the satisfactory deliveries now available, it is probable that users will continue to limit their orders to early requirements. Mills are encouraged by sustained consumption among industrial plants, some of which are operating at close to 100 per cent. On the other hand, some industries are fast approaching the time when they will be forced to curtail, if they have not already done so. The operating schedules of a number of automobile manufacturers are now being reduced, and in view of the lack of new orders for railroad cars, carbuilders will soon reach the end of their present bookings. Fabricators in this district, however, have enough structural business to keep them occupied until well toward the end of the year.

Blast furnace and mill operations of the two leading local steel interests remain substantially unchanged.

Pig Iron.—The market is quiet and prices are soft. Charcoal has declined $2 to $27, base furnace. Southern foundry is notably weak with $21, Birmingham, the common quotation, and 50c. less than that reported in connection with recent sales in Michigan. In fact, as low as $20, Birmingham, has been quoted in a few instances, although no orders at that price have been reported in this district. The recent arrival of two boatloads of Buffalo iron, previously noted in this column, has further stimulated competition in the sale of Northern foundry. Local producers now contemplate the shipment of an equivalent tonnage into the Buffalo market. Sales of Northern iron in this territory during the week have been few and so far as can be ascertained have brought the full market of $26, base furnace. In sections intermediate between producing centers, that price has been shaded as much as $1 a ton to meet the competition of outside furnaces. Two Indiana melters are understood to have bought 500 tons of malleable and 200 tons of foundry at $25 base, Chicago. A melter in the St. Louis metropolitan district has purchased 5000 tons of basic from a Chicago seller. A Wisconsin plant is inquiring for 1000 tons of foundry for delivery over the current quarter. Another Wisconsin melter has closed for 200 tons each of Northern and Southern foundry. A local buyer is in the market for 300 tons of low phosphorus. A Michigan melter has purchased 100 tons of 8 per cent silvery at the Jackson County schedule. While melters' stocks are low, their failure to buy for other than immediate needs is not due entirely to a desire to drive prices down. On the contrary, the spirit of caution has extended to the melters' customers with the result that the forward commitments on the books of foundries are too small to justify an intelligent estimate of their iron requirements for any distance ahead. They purchase iron as they find it necessary to take care of new business as it comes in, and the surprising feature of the entire situation is that foundry operations are so well maintained. In some directions, notably in the automotive industry, there has been some curtailment, but this is regarded as seasonal, inasmuch as automobile output generally declines in the fall. September bookings of Northern furnaces were approximately equal to those of August. Stocks on furnace yards are still large and it is probable that another merchant furnace will be banked or blown out in the near future.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$30.04 to $30.15
Northern coke, No. 1, sil. 2.25 to 2.75	26.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	26.00
Malleable, not over 2.25 sil.	26.00
Basic	26.00
High phosphorus	26.00
Southern No. 2	27.01
Low phos., sil. 1 to 2 per cent. copper free	34.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—A local buyer has closed for 200 tons of 15 per cent ferrosilicon. Another Chicago melter has placed an order for 100 tons of 12 per cent electrolytic ferrosilicon. Recent sales of ferromanganese, largely resale lots, have been made at from $102 up to $110, seaboard. Producers' prices are said to have stiffened at $110 with the possibility of an advance to the former figure of $117.50, seaboard. Prospective orders here include one lot of 400 or 500 tons. Spiegeleisen has declined to $40, furnace, or $45.80, delivered.

We quote 80 per cent ferromanganese, $116.56 to $117.38, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $45.80, delivered.

Plates.—In the absence of railroad car buying and oil tank business, the plate market is quiet. Present efforts of oil producers to effect a general curtailment of pumping and drilling operations are expected to fail, in which case the purchase of much additional storage capacity will become imperative. Prices are firm at 2.60c. Chicago.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—In view of the steady decline of pig iron, lower pipe prices would not be surprising. Current quotations show on increasing trend toward softness, particularly on business for extended delivery, and general reductions are believed inevitable. It is improbable, however, that there will be any radical drop from the present market level, as the bookings of pipe makers are still fairly comfortable, notably in the smaller diameters. The United States Cast Iron Pipe & Foundry Co. has booked 3000 tons of 48-in. for Omaha, Neb.; 860 tons for Chicago, and 300 tons for Berne, Ind. James B. Clow & Sons have been awarded 500 tons by Orrville, Ohio, and 250 tons by Port Huron, Mich. Detroit took bids yesterday on 500 tons of 12-in. Whitecloud, Mich., takes figures Oct. 4 on approximately 100 tons of 4-, 6- and 8-in. Lake County, Ohio, which received revised figures on 1200 tons Sept. 28, is expected to place the business by next Monday.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $63.20; 6-in. to 12-in., $59.20; above 12-in., $57.20; class A and gas pipe, $5 extra.

Sheets.—Actual orders from Japan have failed to materialize as yet, but some manufacturers are confident that when business does come from that country it will employ from 20 to 30 per cent of American mill capacity for several months. In the meantime the market has a softer tendency. A number of the smaller mills continue to quote 3.75c. base, Pittsburgh, for black, and sporadic quotations on galvanized at as low as 4.90c. and 4.85c., base, Pittsburgh, are reported. Apparently a comparatively small amount of new tonnage is being booked at any price.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Bolts and Nuts.—With buying slow and competition for business keen, the market is soft. Generally speaking, the lower prices shown on page 936, figured on an f.o.b. Chicago basis, represent what is being done to

obtain particularly attractive orders, while the higher prices are the more common quotations. In extreme instances sellers have increased their discounts sufficiently to compensate for the higher list prices recently put into effect.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅝ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅜ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—The Chesapeake & Ohio has equally divided 17,000 tons of standard section rails between the two local mills and is understood to have placed 13,000 tons additional with mills east of here. The Hocking Valley has ordered 5400 tons of rails from Carnegie Steel Co. Chicago mill bookings for the first half of 1924 are now estimated at over 250,000 tons, and it is believed that a considerable quantity of rails for that delivery is still to be bought. The Missouri Pacific is expected to buy 30,000 tons and other roads which will probably also take action include the Chicago & Northwestern, the Santa Fé, the Rock Island, the Nickel Plate, the Missouri, Kansas & Texas, the Cotton Belt and the Pennsylvania. Demand for light rails is slightly better with local prices unchanged.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—Notwithstanding the recent decline in lettings, fabricators in this district have satisfactory bookings, some of the larger companies being committed until the end of the year. Buying of plain material shows some improvement, although most individual orders are small. Among new fabricating projects a bridge program authorized by the Legislature of South Dakota is of interest. This provides for five bridges across the Missouri River between the northern and southern boundaries of the State. For two of them, namely, one at Wheeler and one at Mobridge, involving a total of 2100 tons, appropriations have already been set aside. Plain material remains steady at 2.60c. Chicago.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—New business still falls short of mill shipments, reflecting the conservative attitude of both jobbers and retailers. Jobbers are buying enough to replenish their stocks as they are depleted, but not much beyond that. Actual consumption shows little recession, but mill bookings for the time being are affected by the hesitant attitude of buyers. For mill prices, which are steady and unchanged, see finished iron and steel, f.o.b. Pittsburgh, page 936.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Reinforcing Bars.—Prices have been rather erratic since the market broke from 3c., Chicago warehouse, but the ruling price level now appears to be settling at 2.75c. Competition is still keen, however, and it is possible that a large tonnage of desirable specifications might still be placed at a lower figure. Recent lettings include:

Freight house for Chicago, Burlington & Quincy Railroad, 900 tons to Kalman Steel Co.

Olympia Fields Country Club club house near Chicago, 200 tons to Kalman Steel Co.

High school, Mishawaka, Ind., 170 tons to Concrete Steel Co.

Illinois highway work, 150 tons to Concrete Steel Co.

Middle West Utilities Co. power house, Tulsa, Okla., 100 tons to Joseph T. Ryerson & Son.

Department store, Pullman, Ill., 100 tons to Concrete Steel Co.

Chicago, Rock Island & Pacific Railroad, 100 tons for work at Harrington, Kan., to Corrugated Bar Co.

Pending work includes:

Superstructure for Milwaukee Journal building, Milwaukee, 500 tons.

Illinois State Journal Building, Springfield, Ill., 210 tons, bids on general contract taken Oct. 1.

Bars.—Bookings in soft steel bars show some gain, although still unequal to mill shipments. Local mill prices remain steady at 2.50c. Chicago, but it is notable that a few sales of deformed bars from warehouse have recently been made at mill quotations. Bar iron prices remain unchanged, but soft, with new business light. The bar iron mill of the Interstate Iron & Steel Co. at East Chicago, which has been idle, will resume operations the middle of this week. Rail steel bars are steady at 2.30c., but demand is inactive. The Moline hard steel mill of the Republic Iron & Steel Co., which has been down for several weeks, is expected to resume the middle of this week or the beginning of next.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.35c. to 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Old Material.—The market is exceedingly weak and the only question in doubt is the extent to which prices have declined below last week's level. Consumers show little interest and even brokers are cautious about buying. The last mill purchase of heavy melting was at $16, but the best price offered by a user today is $15.50. A few moderate sales of stove plate to melters has been made. Railroad offerings are large. The Chicago & Northwestern has advertised 8000 tons; the Burlington, 5000 tons; the Pennsylvania, Southwestern Region, 7500 tons; the Pennsylvania, Northwestern Region, 2600 tons; and the Michigan Central and the New York Central, blind lists. Through typographical errors steel rails less than three feet and machine shop turnings were incorrectly quoted in the issue of Sept. 27. Short rails should have been quoted at $20 to $20.50 per gross ton and machine shop turnings at $8.50 to $9 per net ton.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$20.50 to $21.00
Cast iron car wheels	19.00 to 19.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.00 to 20.50
Rails for rolling	17.00 to 17.50
Steel rails, less than 3 ft.	19.00 to 19.50
Heavy melting steel	15.00 to 15.50
Frogs, switches and guards cut apart	15.25 to 15.75
Shoveling steel	14.75 to 15.25
Drop forge flashings	11.00 to 11.50
Hydraulic compressed sheets	12.50 to 13.00
Axle turnings	12.00 to 12.50
Steel angle bars	17.00 to 17.50

Per Net Ton

Iron angle and splice bars	20.50 to 21.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	25.00 to 25.50
Steel car axles	17.50 to 18.00
No. 1 busheling	12.00 to 12.50
No. 2 busheling	8.50 to 9.00
Cut forge	14.00 to 14.50
Pipes and flues	8.50 to 9.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	14.00 to 14.50
Steel knuckles and couplers	18.50 to 19.00
Coil springs	19.00 to 19.50
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	18.50 to 19.00
No. 1 agricultural cast	19.00 to 19.50
Low phos. punchings	16.00 to 16.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	8.00 to 8.50
Cast borings	10.00 to 10.50
Short shoveling turnings	10.00 to 10.50
Stove plate	16.50 to 17.00
Grate bars	14.00 to 15.00
Brake shoes	15.50 to 16.00
Railroad malleable	18.50 to 19.00
Agricultural malleable	17.50 to 18.00

New York

Pig Iron Prices Lower, with Limited Business Being Done

NEW YORK, Oct. 2.—Weakness continues in the pig iron market, prices having receded from 50c. to $1 on nearly all grades. The low prices have developed only a fair amount of business. One agency sold about 5000 tons and several thousand tons were disposed of by other agencies. Sales included one transaction of 2500 tons concerning which details were not announced; 500 tons bought by the Gould Coupler Co.; 2000 tons by the New York Air Brake Co., and 900 tons by the General Electric Co. The last named company still being in the market for 250 of No. 1X and 350 tons of higher silicon iron. Michigan charcoal is down $2 and is now quoted $27 base, furnace. Buffalo furnaces have been very aggressive and $23.50 is freely quoted on No. 2 plain and No. 2X, with usually 50c. more for No. 1. The eastern Pennsylvania market is unsettled with $23.50 as probably the minimum for No. 2.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.81 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$26.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	26.27
East. Pa. No. 2, sil. 1.75 to 2.25	26.27
Buffalo, sil. 1.75 to 2.25	28.41
No. 2X Virginia, sil. 2.25 to 2.75	30.94
No. 2 Virginia, sil. 1.75 to 2.25	30.44

Ferroalloys.—The ferromanganese market is slightly more active with inquiries totaling about 1000 tons. There has been no change in the price of the alloy from British producers and there are indications that most of the alloy which has recently been available around $110, seaboard basis, has been absorbed. Because of prices at which certain domestic producers are willing to take business the price situation has changed but little. Imports of the alloy during August were 6845 tons, bringing the total for the first eight months of this year to 64,894 tons, or over 8100 tons per month. Business in spiegeleisen is confined to carload and small lots at unchanged quotations. Manganese ore importations continue unprecedentedly low, the August receipts having been 23,026 tons, bringing the total for the first eight months to 127,238 tons, as compared with 280,668 tons for the same eight months last year. Unchanged quotations prevail in the 50 per cent ferrosilicon and the ferrochrome markets with demand very moderate.

Cast-Iron Pipe.—Demand for water pipe continues heavy, although the fact that on many sizes makers cannot offer delivery much before the end of the year is undoubtedly a deterrent to many purchasers. One foundry reports six to eight weeks delivery on medium specifications, but much longer shipment on the heavy and the small sizes. Prices continue firm and unchanged. No new municipal tenders are reported. We quote per net ton, f. o. b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. As the end of the season approaches, the soil pipe market is slightly less active, although makers are still fairly well booked ahead. Most of the present shipments are reported as going forward at prices prevailing previous to the increase that brought quotations to their present level. We quote discounts of both Southern and Northern makers, f. o. b. New York, in carload lots, as follows: 6-in., 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Finished Iron and Steel.—Most of the Eastern plate mills are now quoting 2.40c., Pittsburgh, on all inquiries except those for less than carloads. Pittsburgh and Youngstown makers of plates have not followed this reduction of $2 a ton. Demand for plates, as for most other lines of steel except pipe, is extremely light. No other price weakness has appeared, however, except that which has existed for some weeks in structural shapes, offered by two or three mills at 2.40c., Pittsburgh, and in black sheets, which some of the smaller mills quote at 3.75c., Pittsburgh. While steel bars remain firm at 2.40c., bar iron is more freely available at 2.35c., Pittsburgh. Structural steel work continues in fair volume in the metropolitan district, but many of the projects which were regarded a few weeks ago as likely to be closed promptly are being held up for one reason or another. Prospects for further important buying of oil tanks and freight cars this year do not appear bright, and it is these two lines that have sustained the plate mills to a large degree throughout the year. Car builders quite generally have enough work to carry them through the fourth quarter and are giving thought to the possibilities of 1924 buying of cars on an extensive scale. Four roads have been expected to come into the market with inquiries for a total of about 30,000 cars, but none of these inquiries has definitely developed and the buying may be deferred until later in the year.

Warehouse Business.—Warehouses with connections in other districts report that prices are generally firmer here than in some other cities. On the whole, September did not show up as well as the previous two months from the standopint of tonnage, although the number of orders was fairly large. Sellers of special steels in some instances report slightly heavier business for September than for August. The weakest spot in the market continues to be sheets, although 4.75c. to 5.00c. per lb. base still holds fairly firm on black and 5.75c. to 6.00c. per lb base on galvanized. We quote prices on page 952.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—Prices of both furnace and foundry show a further decline this week and many producers, particularly those on furnace coke, are reported curtailing operations. At the low quotations prevailing, sellers are not particularly interested in deliveries extending beyond two or three weeks. Standard furnace coke is quotable at from $4 to $4.25 per ton, with medium sulphur at $3.75 per ton and standard foundry ranges from $5.25 to $5.75, with certain brands up to $7 per ton. Many buyers believe that better than these prices could be obtained. By-product coke is quoted at $11.41, Newark and Jersey City.

Old Material.—The market is evidently slightly weaker on most grades, with so few transactions reported in many cases that it is difficult to determine the current price. Heavy melting steel is quotable at about $16 per ton, delivered eastern Pennsylvania consumers, with railroad quality or equivalent bringing $16 and $16.50, depending upon the shipment. As low as $15.50 per ton is reported to have been paid for railroad quality delivered to an eastern Pennsylvania consumer. Few shipments of borings and turnings are being made, but $14 per ton is said to have been paid for delivery to an eastern Pennsylvania mill and $13.75 to a mill with a slightly higher freight rate. Stove plate has brought $16.50 per ton, delivered to Harrisburgh, Pa., and $17.50 per ton delivered to a Connecticut consumer and to New Jersey foundries. Specification pipe is down to $15 per ton delivered to an eastern Pennsylvania consumer. Cast borings are from $14.50 to $15 per ton delivered.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.00 to $12.50
Steel rails, short lengths, or equivalent	13.00 to 13.50
Rails for rolling	15.00 to 17.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	18.50 to 19.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.50 to 15.00
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	11.00 to 11.50
Machine-shop turnings	10.00 to 10.50
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.00 to 11.50
Stove plate	13.00 to 14.00
Locomotive grate bars	13.50 to 14.50
Malleable cast (railroad)	17.00 to 18.00
Cast-iron car wheels	17.50 to 18.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Cincinnati

Low Prices on Southern Pig Iron Fail to Develop Much Business

CINCINNATI, Oct. 2.—The pig iron market is exceptionally dull, and total sales reported in this district during the past week were probably the smallest for a similar period this year. It was thought that the low prices being quoted on Southern iron would have a stimulating effect on buying, but the opposite seems to be the case, as melters are very hard to interest at any price. Buying still continues to be of the hand-to-mouth character, and foundrymen apparently are only covering for the orders on their books. It is generally admitted that stocks on foundry yards are the lightest for many years, but as transportation service is exceptionally good, and stocks on furnace yards are fairly heavy and well assorted, melters are apparently content to buy only as needed. When purchases are made, however, melters insist on immediate shipment, and furnaces are having many requests to trace shipments of cars which are one or two days late of delivery promises. The price situation remains unchanged from last week. Southern iron is still quoted at $21, Birmingham, although reports are heard of offers being solicited at less. Southern Ohio iron is still available at $24.50 for round tonnages, but carload orders are being put through at $25. The largest sale reported was for 500 tons of Northern to a melter in this district at an undisclosed price. Several sales of 100 tons each were also made. There is little inquiry, the largest being for 150 tons for the Baltimore & Ohio Railroad shops at Newark. Several inquiries from Michigan melters for Southern iron have been withdrawn.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.77
Basic Northern	26.77
Malleable	26.77

Finished Materials.—Some selling agencies report a slight improvement in orders during the past week, but generally speaking the market is quiet, orders being confined to one and two carloads for immediate shipment. Prices on bars, shapes and plates are holding very firmly, however, a good illustration of this being the prices quoted on an inquiry for plates and shapes, which failed to develop a better one than 2.50c., Pittsburgh. However, very attractive delivery promises were made by practically all mills, and this is taken as an indication of the need of tonnage. The order was placed, it is reported, with a mill which will commence shipments 10 days after receipt of order. The bar market is very quiet, and plates and structural steel are being booked at the same rate current for the past few weeks. Wire orders are also light, and prices are said to have been shaded on some lines, but nothing under $3 per keg has been heard on wire nails. Bolts and nuts, track spikes, boiler tubes and light rails continue to be placed in fair volume. Steel pipe is very active, particularly from jobbers, whose stocks are very low, and who are having difficulty in getting sufficient shipments from mills to take care of the business offering. The Big Four Railroad is inquiring for its fourth quarter requirements of steel, estimated at 2000 tons of miscellaneous items.

Sheets.—A steady demand for blue annealed and galvanized sheets is reported, although tonnages are not heavy. Black sheets are not in heavy demand, and the fact that a good many mills are needing business for this line accounts for the shading of prices. Some of the smaller mills are reported to have made concessions on galvanized sheets, but confirmation is lacking. Demand for tin plate is heavy, but as most mills are reported to have sufficient business now on their books to run well into the first quarter, there is little likelihood of the demand being satisfied. Automobile body sheets are still in fair demand, though most of the body manufacturers have already contracted for fourth quarter requirements. Prices of sheets and tin plate, with the exception of black sheets, are being maintained at the schedule.

Structural Material.—The week has been a quiet one in so far as inquiries and lettings are concerned. The Third National Bank, Dayton, will, within the next two weeks, call for bids on a banking building, estimated to require over 1200 tons of structural shapes. A local gas holder manufacturer reports receipt of orders for three holders during the week which will require approximately 3000 tons of plates and shapes.

Reinforcing Bars.—The only new inquiry of consequence is for 110 tons for the Tanners' Research Laboratories Building, University of Cincinnati. There have been no important lettings. Prices generally vary from 2.20c. for rerolled bars to 2.40c. for bars from new billets.

Warehouse Business.—Jobbers generally report business fair, the demand being general for all products. Prices are holding firmly, no disposition being apparent to cut prices to secure orders. It is not thought that jobbers are losing business to mills, which are able to make almost immediate delivery.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—Some sellers report a little more activity in the coke market, but sales generally are confined to single cars for prompt shipment. There is little contracting for fourth quarter. Prices generally rule about the same as last week. Connellsville furnace coke is quoted to the trade at $4.50, with foundry bringing $5 to $6. Wise County furnace is $5.50 to $5.75 and foundry $6.50 to $7. New River foundry is quoted at $12. There will be no change in by-product prices for October, the quotation of $9, Connellsville basis, standing.

Old Material.—Few sales of scrap are reported. Dealers, however, are still filling out old contracts. Prices have further receded, and some dealers do not think the bottom has yet been reached. Declines range from 50c. to $1 per ton. Railroad offerings are heavy.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$11.50 to $12.00
Iron rails	14.50 to 15.00
Relaying rails, 50 lb. and up	28.00 to 28.50
Rails for rolling	15.50 to 16.00
Heavy melting steel	14.00 to 14.50
Steel rails for melting	14.00 to 15.00
Car wheels	14.00 to 14.50
Per Net Ton	
No. 1 railroad wrought	12.50 to 13.00
Cast borings	8.50 to 9.00
Steel turnings	8.00 to 8.50
Railroad cast	15.50 to 16.00
No. 1 machinery cast	18.50 to 19.00
Burnt scrap	12.00 to 12.50
Iron axles	22.50 to 23.00
Locomotive tires (smooth inside)	13.50 to 14.00
Pipes and flues	8.00 to 9.50

Buffalo

Pig Iron Prices Decline and Business Shows Marked Increase

BUFFALO, Oct. 2.—Pronounced weakness has developed in the pig iron market and prices have sagged after several desirable tonnages were sold by Buffalo furnaces. It is now possible to state that the tonnage for the agricultural implement manufacturer near Buffalo has been placed at a Buffalo furnace at a price not greater than $23.50. The inquiry called for both foundry and malleable iron. The $23.50 price is probably the lowest that has been done on any tonnage, and several tonnages of fair size delivered in the Buffalo district have been bought at $24 base. It is understood, however, that the price of $23.50 was not confined to one sale, but that other transactions involving as high as 2000 tons have been closed at the same figure. One furnace has been especially active in closing new business with both large and small consumers. About 18,000 tons of new business has been closed, most of it

for extended delivery, with only a small part for spot shipment. Several desirable tonnages on which inquiries were put out recently are still open, including the 2000 tons requirement of the Northern New York Railroad equipment maker. One furnace is quoting $24.50 base on small lots, but it is not possible to get higher than $24 on business of this character. No 1924 inquiry has appeared to date nor are furnaces anxious to quote on the new year requirements.

We quote f.o.b. gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$24.50
No. 2 foundry, 2.25 to 2.75 sil.	24.00
No. 2 plain, 1.75 to 2.25 sil.	23.50
Basic	24.00
Malleable	24.00
Lake Superior charcoal	30.28

Finished Iron and Steel.—Except for a slight flurry in sheet demand, call for finished material is about on the same level. Some of the new sheet business has come from agricultural interests and isolated quotations of 3.75c. are encountered, but on the whole the 3.85c. price is firm. Bars are holding at 2.40c. and demand shows no particular change. As a comparative proposition, bar prices are generally accepted as satisfactory by consumers. Pipe specifications are heavier because heating appliances work is being speeded up as cold weather approaches.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Only small sales of heavy melting steel have been made and these to cover immediate needs. Sellers are not confident that any large orders will be placed for the rest of the year and are counting only on fill-in business. The larger mills have made their purchases and are not further interested. Deliveries have been exceptionally good and the railroad situation has been exceptionally satisfactory.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$18.00 to $18.50
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 busheling	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	16.50 to 17.00
Railroad malleable	20.00 to 21.00

Birmingham

Pig Iron Production Still Exceeds Sales—Wage Reductions Started

BIRMINGHAM, ALA., Oct 1.—Production of pig iron in the South, even with four blast furnaces closed down, continues greater than the aggregate sales. The Woodward Iron Co. is readjusting wages of labor at ore and coal mines. It had a little strike at coal mines Nos. 1 and 3 at Dolomite, but men are accepting a cut of 15 per cent in order to bring about cheaper pig iron costs. Other companies will follow. Labor is not manifesting feeling. This may prevent further curtailment of pig iron production. The ruling price is $21 per ton, No. 2 foundry. No large tonnage has been sold in the last few days here, some of the steady melters of iron buying for needs of a week or two. The employers assert that wages are around the peak of war times and there have been several reductions in prices at which iron is being sold, a decline of $7 per ton recently having been recorded. Northern competition is severe, when $25 is the Northern iron quotation and the freight rate on Birmingham iron into the Chicago territory is $6.01 per ton. The fourth quarter of the year is starting in with only a part of the probable make sold. The surplus stock, too, will show up beyond 115,000 tons. The Alabama Co., the Gulf States Steel Co. and some other smaller furnace interests have reduced their spiile steel bars the Sloss-Sheffield Steel & Iron are freely available Iron Co. and the Republic Iron & Steel Co. have added some iron to their piles on furnace yards.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$21.00
Basic	22.00
Charcoal, warm blast	$33.00 to 34.00

Cast Iron Pipe.—Additional awards have been made to the cast iron pipe plants, pressure pipe in particular. The American Cast Iron Pipe Co. has taken on 1024 tons from Ponce, Porto Rico, and 240 tons from Hollywood, Fla. The National Cast Iron Pipe Co. has three of its four DeLavaud machines in operation and the other one will be going by the middle of October. The United States Cast Iron Pipe & Foundry Co. will shortly have six additional DeLavaud machines operating.

Coke.—The coke market continues weak and sales are not numerous, though quotations are soft. Foundry coke, both beehive and by-product, is being quoted at $7.50 per ton, while furnace coke is from 50c. to $1 under that price.

Old Material.—There is no improvement in the scrap iron and steel market in the South. Prices are weak; in fact, dealers assert that figures which are given out are nominal and that melters of old material come near making their own prices. Some old contracts still exist and dealers have induced the melters to take the product as ordered some time ago. All scrap yards in the district are being kept well filled, for just as much old material as is moved out is being brought in.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Cast iron borings	8.00 to 9.00

Boston

Buffalo Furnaces Make Low Prices, but Develop Little Business

BOSTON, Oct. 2.—The pig iron market is extremely quiet, with abundant evidence of increased weakness. Reports indicate decreasing activity in nearly all foundries, including some connected with prominent manufacturing concerns. While, some time ago, there was a decided scarcity of molders, this condition has changed, and in most centers in New England there is a surplus of molders. Furnaces in Buffalo have become very aggressive. Although $24 had been regarded as the usual minimum at Buffalo furnaces, $23.50 is now freely done on No. 2 plain. On eastern Pennsylvania $24 is considered the minimum, but the market is unsettled. It is understood that even less than $21, Birmingham, has been quoted on Southern iron, but it would be necessary to make still lower prices to take business in this territory under present conditions. Virginia iron, at $25, furnace, is still having much difficulty in this territory in meeting competition. Various reports are current in regard to manufacturers of textile machinery and silk machinery receiving orders from Japan to replace machinery destroyed by the recent earthquake, and it is hoped that these orders will result in considerable increase in demand for pig iron, but nothing definite has developed along these lines. A trial lot of 100 tons of Indian pig iron has been sold in this city at about $24.50, delivered, for 2.75 to 3.25 silicon.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$28.15
East. Penn., sil. 1.75 to 2.25	27.65
Buffalo, sil. 2.25 to 2.75	28.91
Buffalo, sil. 1.75 to 2.25	28.41
Virginia, sil. 2.25 to 2.75	31.42
Virginia, sil. 1.75 to 2.25	30.92
Alabama, sil. 2.25 to 2.75	31.10
Alabama, sil. 1.75 to 2.25	30.60

Finished Material.—On structural material 2.40c., Pittsburgh, is rather freely quoted by the smaller independent companies, but 2.50c. is strongly adhered to by the Steel Corporation and larger independents. Leading fabricators are extremely busy, and will be at least till the end of the year, and are strongly opposed to shading of prices on the plain material, as they believe that such action has a demoralizing effect upon general conditions. Some companies do not yet admit making a quotation of less than 2.50c., Pittsburgh, on plates, and one company states that 90 per cent of its business taken this month was on the 2.50c. basis, but 2.40c. is being done on desirable business. The plate market is dull and depends largely upon boiler manufacturers, owing to the increasing use of Bethlehem shapes in building construction. Specifying for third quarter on bars has been fairly satisfactory and a few contracts have been made for the fourth quarter, but some undelivered third quarter tonnage hangs over into the fourth quarter.

Coke.—Although the foundry business is not so active as it was, the condition does not seem to be reflected in the coke business of the New England Coal & Coke Co. and the Providence Gas Co., which are enjoying excellent business. They are still quoting on a basis of $13.50, delivered in New England, with no prospect of an immediate change in the price. Prompt shipment Connellsville foundry coke is still selling at $6 on cars, or $11.55, delivered, but this price is sometimes shaded.

Old Material.—Dealers who had been holding material for some time, causing a decided stagnation in the market, are showing a disposition to let it go at such prices as can be obtained, and, in some cases, quotations are lower. Heavy melting steel has been reduced about 50c. and is now quoted at $11.50 to $12, and a similar decline is noted in wrought pipe, blast furnace borings and turnings and forged scrap. The Boston & Albany is offering a rather large list consisting principally of brake shoes and malleable.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	16.50 to 17.00
Railroad malleable	21.00 to 21.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 rail wrought	13.50 to 14.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.75 to 13.25
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap and bundled skeleton	8.50 to 9.00
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

St. Louis

Low Prices Made on Pig Iron Fail to Develop Business

ST. LOUIS, Oct. 2.—The pig iron market is weak. The deep cut to $21, Birmingham, made by Southern producers the early part of the week failed to produce any new business. In fact, it caused those melters who had been waiting to buy to further delay their purchases in the hope that prices would go still lower. On the present basis, the delivered price for Southern iron in the St. Louis industrial district is $26.17, as compared with $28.16, for Northern iron sold at the Chicago price of $26, plus the freight rate. Some melters are waiting for Northern iron prices to drop to this level. Sales of Southern iron were virtually nothing. As for Northern make, there was one sale of 5000 tons of basic to an East Side melter, but this was sold at Chicago at a price less than $26. The St. Louis Coke & Iron Co. reduced its price to $26.50 to $27.50, Granite City furnace. There is an inquiry for 2000 tons of foundry iron, and other inquiries total perhaps 500 tons. One of the Southern makers now offering iron at $21 was holding its make a few weeks ago at $27, while the market was $24. The Federal Reserve Bank of St. Louis reports that August sales of seven manufacturing stove interests in the eighth district were 5.3 per cent larger than in August, 1922, and 2.7 per cent over July, 1923.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$28.16
Northern malleable, sil. 1.75 to 2.25	28.16
Basic	28.17
Southern fdy., sil. 1.75 to 2.25	26.17

Finished Iron and Steel.—New rail inquiries are reported. The Kansas City Southern wants 6000 tons of 85-lb. rails; the Gulf Coast lines 4000 tons of 90-lb., and the Missouri Pacific is expected to buy this week.

Coke.—The market for furnace coke is quiet. Connellsville grades have been sold here the last week at prices ranging from $6 to $7.25. Warmer weather has caused a lessening demand for domestic grades.

Old Material.—There is no change in prices or in the general situation as regards old material. About the only buying there is comes from dealers, who are putting the material in stock in anticipation of the demand that most of them think will come eventually. One dealer estimates the normal consumption of old material in the St. Louis industrial district at 40,000 tons a month and he believes that stocks in hands of consumers will soon be used up when operations are normal. In the meantime, the mills are interested only in a few specialties, and cars that are in "distress." Railroad lists include: Pennsylvania, Northwestern Region, 3000 tons; Southwestern Region, 7000 tons, and Central Region, 11,000 tons; C., B. & Q., 4800 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$16.00 to	$16.50
Rails for rolling	17.50 to	18.00
Steel rails less than 3 ft.	19.50 to	20.00
Relaying rails, 60 lb. and under	26.00 to	27.00
Relaying rails, 70 lb. and over	33.50 to	34.50
Cast iron car wheels	18.50 to	19.00
Heavy melting steel	16.50 to	17.00
Heavy shoveling steel	16.50 to	17.00
Frogs, switches and guards cut apart	16.50 to	17.00
	Per Net Ton	
Heavy axles and tire turnings	12.50 to	13.00
Steel angle bars	16.00 to	16.50
Iron car axles	25.00 to	26.00
Steel car axles	18.50 to	19.00
Wrought iron bars and transoms	20.00 to	21.00
No. 1 railroad wrought	15.00 to	15.50
No. 2 railroad wrought	15.00 to	15.50
Railroad springs	18.00 to	18.50
Cast iron borings	11.50 to	12.00
No. 1 busheling	15.75 to	16.25
No. 1 railroad cast	19.50 to	20.00
No. 1 machinery cast	20.00 to	20.50
Railroad malleable	17.00 to	17.50
Machine shop turnings	11.50 to	12.00
Champion bundled sheets	8.00 to	8.50

Detroit Scrap Market

DETROIT, Oct. 2.—Prices on most scrap materials registered a slight decline over those quoted a week ago and the market is "spotty." Tonnages offered by producers on a competitive basis for October delivery confirm this condition. Automobile manufacturers have their production schedules pretty well set for the fourth quarter, the majority of them being on a reduced basis. Manufacturers of automotive castings are forced to quote on a close margin, due to the present intense competition in the automotive industry.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$14.00 to $14.50
Shoveling steel	15.00 to 16.00
No. 1 machinery cast	17.50 to 18.50
Cast borings	10.75 to 11.75
Automobile cast scrap	25.00 to 27.00
Stove plate	16.00 to 17.00
Hydraulic compressed	12.00 to 13.50
Short turnings	11.00 to 12.00
Long turnings	9.50 to 10.50
Flashings	10.00 to 11.00

Cleveland

Ore Shipments Decline—Pig Iron Weak—Finished Material Prices Hold

CLEVELAND, Oct. 2.—Iron ore shipments fell off 1,200,000 tons during September, being 9,095,981 tons for the month as compared with 10,296,133 tons during August. Shipments during September were 2,294,682 tons greater than during the corresponding month last year. Shipments by water up to Oct. 1 were 45,988,845 tons or an increase of 12,877,607 tons, or 39 per cent over the corresponding period last year.

Pig Iron.—Prices have declined and the market is weak. Basic iron is now quoted at $24 Valley furnace, and a sale of 1500 tons has been made at that price by a Cleveland interest for shipment from a western Pennsylvania furnace. In this case the seller had a freight rate advantage of over 30c., the rate from the shipping to the consuming point being $1.39. Locally the market on foundry and malleable iron has declined 50c. to $25 at furnace for Cleveland delivery. In the Valley district, $24.50 now appears to be the top price on foundry iron and $24 quotations have appeared. The Buffalo market is decidedly weak, with quotations reported at as low as $23 with extras waived. The market is unusually dull and consumers as a rule are buying only in small lots. Many consumers will need additional iron during the present quarter, but feel that prices will go no higher and possibly may go lower and consequently are deferring buying. On the other hand, a few sales during the week were for the first quarter or for deliveries extending into that quarter. A Cleveland interest has sold 500 tons to the Westinghouse Electric & Mfg. Co. for its Trafford City plant at $24.50 Valley furnace. Other sales include one 2000 ton lot and a 1000 ton lot of foundry and malleable iron.

A Sharon consumer has purchased 1000 tons of basic iron from a broker at $24.50, this to be shipped from a Valley furnace having a 50c. freight rate. A Cleveland consumer during the week purchased 500 tons of malleable iron from a local furnace. Some of the Westinghouse business is reported to have been placed at as low as $23.25, Valley furnace.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$24.00
Northern No. 2 fdy., sil. 1.75 to 2.25	25.50
Southern fdy., sil. 1.75 to 2.25	28.00
Malleable	25.50
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00

Finished Iron and Steel.—Mills are getting a fair volume of small orders for steel bars and structural material. Plates are quiet. Some buyers are making new efforts to break prices, evidently because of the weakness that has developed in plates in the East. However, while competition is unusually keen, prices appear to be holding to 2.40c. for steel bars and 2.50c. for plates and structural material. Local plate mills are feeling the competition of Chicago district mills selling at 2.60c., Chicago. Hot-rolled strip steel is weak with the 3c. quotation quite common. The two ore boats ordered by the Ford Motor Co. will require 10,000 tons of plates and structural material, which will probably be placed with the leading interest. The two car ferries inquired for by the Canadian National Railways have not yet been placed. The Willys-Overland Co. has purchased 6600 tons of steel bar products, about 4000 tons of this being for October shipment. The volume of inquiry in the building field shows an improvement. The Babes' and Children's and Maternity Hospital, Cleveland, reported last week as requiring 1000 tons of steel, will take under the revised plans 1500 tons. The first inquiry for steel growing out of the construction of the new Union Station, Cleveland, has come out, being for 500 tons of structural material and reinforcing bars for replacing a grade separation bridge. The Brotherhood of Locomotive Engineers Building, Cleveland, for which bids will be received shortly, will require 500 tons of steel piling. The Bethlehem Steel Co. has taken 1500 tons of rails for the Clover Leaf Railroad, this being the first rail purchase in this territory for 1924.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Sheets.—The demand for sheets continues rather light, although automobile body sheets are moving fairly well. Automobile companies as a rule are placing orders only for monthly requirements. On black sheets 3.75c. is commonly quoted. On galvanized sheets a 4.75c. price has appeared, but this price may have been named only on surplus stock. Blue annealed sheets are firm.

Reinforcing Bars.—New demand is fair, but prices are irregular. Some manufacturers of deformed bars who are using steel bars supplied on old contracts at much lower than present prices, are naming a very low price. On rail steel bars 2.25c. is a common price. New inquiries include 250 tons for the West Twenty-fifth Street bridge, Cleveland, and 400 tons for a warehouse for the Fisher Body Corporation, Cleveland.

Semi-Finished Steel.—The softening of the semi-finished steel market has resulted in the holding back of some prospective business until the price situation is more clearly defined. A Cleveland consumer this week was offered a round tonnage of sheet bars at $42 delivered. It has developed that on a recent inquiry for billets a $42 delivered price was named, this being quoted by more than one mill. A Valley district mill has taken 5000 tons of skelp for the fourth quarter at 2.35c., Pittsburgh.

Bolts, Nuts and Rivets.—Makers are booking a good volume of contracts for bolts and nuts, mostly from the railroads and automobile companies, but not much business is coming from jobbers, who have good stocks and shipments due on old contracts. Local manufacturers generally are holding to 60 and 5 per cent off list for large machine bolts, although some makers are allowing an additional discount of from 2½ to 5 per cent. The rivet market lacks firmness. While 2.90c. to 3c. are the more common prices, a 2.80c. price has appeared, and there is the possibility that some manufacturers will not attempt to hold to the 3c. price in making contracts for the fourth quarter.

Coke.—The foundry coke market is very weak, with standard Connellsville makes quoted at $5.25 to $6.75. The market is dull.

Old Material.—Prices have further declined 50c. a ton on heavy melting steel and several other grades and the market is still moderately weak. There is some demand from blast furnaces for borings and turnings, round lot sales of these grades being reported in Pittsburgh and Buffalo. Other grades are inactive. Mills are taking shipments on contracts in good volume and dealers are well covered on old orders, so there is little activity between dealers. The embargo against scrap to the Weirton Steel Co. has been lifted.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$15.50 to $16.00
Rails for rolling	19.00 to 19.50
Rails under 3 ft.	18.00 to 18.50
Low phosphorus melting	19.50 to 20.00
Cast borings	12.75 to 13.00
Machine shop turnings	12.50 to 12.75
Mixed borings and short turnings	12.50 to 12.75
Compressed sheet steel	15.00 to 15.50
Railroad wrought	15.00 to 15.25
Railroad malleable	21.00 to 21.50
Light bundled sheet stampings	12.00 to 12.50
Steel axle turnings	14.50 to 15.50
No. 1 cast	21.00 to 22.00
No. 1 busheling	11.50 to 12.00
Drop forge flashings	12.00 to 12.50
Railroad grate bars	17.00 to 17.50
Stove plate	16.00 to 17.00
Pipes and flues	12.50 to 13.00

Philadelphia

Prices of Pig Iron, Scrap and Coke Decline Still Further

PHILADELPHIA, Oct. 2.—Further declines in pig iron, scrap and coke, with spotty weakness in some steel products, have developed. Foundry pig iron is off fully $1 a ton from last week's published quotations, nearly all grades of scrap have declined 50c. or $1 a ton, while coke is 50c. a ton lower than a week ago. The chief weakness in steel products is on plates and shapes, due largely to the urgent need of Eastern mills for orders. Both plates and shapes are now quite generally quoted by the mills of this district at 2.40c., Pittsburgh, for the more desirable orders, though there are one or two plate mills which are slow to adopt this price in spite of competition. There is slight weakness in black sheets, quoted by one or two small mills at 3.75c., Pittsburgh, and in bolts, nuts and rivets, but other finished steel lines are firm. The larger Pittsburgh and Youngstown mills have, so far as is known, shown no deviation from the prices which have been in effect for some months. Nothing has developed in the way of new business to give cause for encouragement; on the contrary, the small volume now being booked, being so much less than shipments, points to a more rapid diminishing of the backlogs which some of the companies have enjoyed throughout the year.

Pig Iron.—The weakness which has been developing in the pig iron market for some time reached a more acute stage in the past week, when a decline of fully $1 a ton from last week's published prices resulted from keen competition over the meager tonnage available. On the base grade, No. 2 plain, $24, furnace, is being freely quoted on even the smallest tonnages, though some quotations are 50c. a ton higher, while on the few desirable lots that have been closed quotations have been at $23.50. A Dover, N. J., stove manufacturer closed for 2000 tons, and on at least a part of this tonnage $23.50, furnace, was shaded. The fact that the iron is to be shipped this month contributed to the willingness of one or two furnaces to go to this low figure. Early last week a cast iron pipe company bought 3000 tons of eastern Pennsylvania iron and this business developed prices somewhat in line with today's market. There is very little foundry iron business in the immediate Philadelphia territory. A good deal more competition has been in evidence in the New York and New England territories, where quotations of $23, furnace, on Buffalo iron have been encountered. The Virginia situation is weaker, sales having been made to a pipe interest in that State at $24, furnace. Production in Virginia is being cut down because of the small demand, and shortly there will be only a few furnaces operating.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.26 to $25.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.76 to 28.13
East. Pa. No. 1X	25.26 to 26.63
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	25.00
Gray forge	25.00 to 25.50
Malleable	25.00 to 26.00
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Resale ferromanganese still dominates the market, being available at $108 to $110, furnace or seaboard, which is lower than domestic furnaces or importers are willing to go. Spiegeleisen is to be had at $44 to $45, furnace.

Semi-Finished Steel.—Although there is little business to test the market, Eastern mills appear willing to meet competition of Pittsburgh mills on billets. While quotations nominally are $42.50 for rerolling and $47.50 for forging billets, these prices would undoubtedly be cut $2.50 a ton on desirable orders.

Plates.—The Eastern plate situation is acute. Not only is the price more definitely established at 2.40c., Pittsburgh, it being almost impossible to obtain more than this except on less than carload lots, but the current rollings are very light. One mill last week rolled only about 15 per cent of its normal capacity, but its specifications this week are better, permitting about a 33-1/3 per cent operation in the finishing department. The increase in rollings this week was due largely to specifications coming in at the end of the month on expiring contracts. Some mills report a slight increase in new orders, but the tonnages are small.

Structural Material.—Two Eastern mills are now freely quoting 2.40c., Pittsburgh, while one or two of the larger mills are said to have met this price when regular customers insisted. There is very little structural work in prospect in this territory. Orders being put on mills' books are less than the rate of shipments.

Bars.—Rerolled concrete bars are being offered at 2.30c., Pittsburgh, and even this price is said to have been shaded, but bars rolled from new steel by the larger mills are being firmly held at 2.40c. Bar iron is quite generally quoted at 2.35c., Pittsburgh, though there are still some quotations of 2.40c.

Sheets.—Galvanized and blue annealed sheets are firm at 5c. and 3c., Pittsburgh, respectively, but one or two of the smaller mills have quoted black sheets at 3.75c., $2 a ton under the quotation of the larger mills.

Bolts, Nuts and Rivets.—Weakness has developed in bolts, nuts and rivets. On large machine bolts 60 and 5 per cent off list is being freely shaded. Structural rivets have been quoted at 2.85c., Pittsburgh. Nuts are also weaker.

Rails.—Orders have not been distributed by the Pennsylvania Railroad on the 100,000 tons of rails it is expected to buy for 1924 delivery, nor by the Philadelphia & Reading on the 25,000 tons it will require.

Ore.—Iron ore receipts last week from abroad were as follows: Germany, 2000 tons; Newfoundland, 7750 tons; Sweden, 13,707 tons. Chrome ore, 1002 tons from British India; manganese ore, 575 tons from Chili.

Coke.—Some of the Connellsville coke ovens are offering spot furnace coke at prices 50c. below last week's quotations in the hope of getting enough orders to avoid going out. Furnace coke is now to be had for prompt shipment at $4 to $4.25, ovens, while some off-grade coke has been offered at $3.75. Foundry coke is about $1 a ton higher.

Old Material.—Scrap prices have fallen to lower levels, generally 50c. or $1 a ton below last week's quotations on nearly all grades. The market is extremely weak, and there isn't sufficient demand to promise any betterment within the near future. No. 1 heavy melting steel is available at $16 to $16.50, delivered at Eastern plants. Last week's quotations on No. 1 railroad wrought and No. 1 yard wrought were in juxtaposition. The correct quotations for that date were $18 to $18.50 on railroad wrought and $17 to $18 on yard wrought. The latter is lower this week. A shipment of 2283 tons of scrap from San Domingo reached this port last week.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap rails	16.00 to 16.50
Steel rails for rolling	18.50 to 19.00
No. 1 low phos. heavy 0.04 and under	22.00 to 23.00
Cast-iron car wheels	20.50 to 21.50
No. 1 railroad wrought	18.00 to 18.50
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Mixed borings and turnings (for blast furnace use)	12.00 to 12.50
Machine shop turnings (for steel works use)	14.00 to 14.50
Machine shop turnings (for rolling mill use)	14.00 to 14.50
Heavy axle turnings (for open hearth)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	14.50 to 15.00
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	20.50 to 21.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 18.00
Railroad malleable	20.00 to 20.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.50 to 16.00
Shafting	24.00 to 25.00
Steel axles	22.00 to 22.50

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, base, per lb.....3c. to 3.15c.
Bands, base, per lb.....3c. to 3.15c.
Strips, base, per lb.....3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.63

Cold-Finished Steels

Bars and shafting, base, per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.60 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.75
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (a jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 to 60, 10 and 5 per cent off list
Machine bolts, small, cut threads,
60 and 10 to 60 and 5 per cent off list
Machine bolts, larger and longer,
60 and 10 to 60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
60 and 10 to 60 and 5 per cent off list
Cut threads.....60 to 50, 10 and 5 per cent off list
Larger and longer.....60 to 50, 10 and 5 per cent off list
Lag bolts.....65 and 10 to 65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads.....50 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 5 per cent off list
Larger and longer sizes.....50 and 5 per cent off list
Hot pressed square or hex. nuts, blank.....4.00c. off list
Hot pressed nuts, tapped.....4.00c. off list
C.p.c. and t. square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, tapped.....3.75c. off list
Semi-finished hex. nuts:
⅜ in. and smaller, U. S. S.....80 per cent off list
⅜ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E. ⅜ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $2.75 to $3.00
Small rivets .....65 and 10 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb..... $3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb. $3.15 to 3.50
Spikes, ⅞ in. ..... 3.15 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.50
Track bolts, ¾ in. and larger, base, per 100 lb..$4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	⅛ to ¾	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12 ...	53	40½			

Butt Weld, extra strong, plain ends

¼	41	24½	2 to 3	61	50½
⅜ to ⅝	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12 ...	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1½ in.	+18
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....	+ 8
3 in.	50	2 to 2½ in.....	— 2
3¼ to 3¾ in.....	42½	2½ to 3 in.....	— 7
4 to 13 in.....	46	3¼ to 4½ in.....	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.	50	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		

Hot Rolled

3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in..	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage.....	35
2-in. O.D. 10 gage....	17	3½-in. O.D. 9 gage....	15
2¼ in. O.D. 12 gage..	17	5⅜-in. O.D. 9 gage....	55
2¼-in. O.D. 11 gage..	18	5½-in. O.D. 9 gage....	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.34	Memphis	0.58
Pac. Coast, ship plates	1.20	Jacksonville, all rail	0.70
Birmingham	0.58	Jacksonville, rail and water	0.415
		New Orleans	0.67

The minimum carload for most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 70,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 50c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	39c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	$108.00 to 110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	43.00 to 45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	42.00 to 44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	80.00 to 82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr, per lb. contained Cr, delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per ton	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$45.00 to $48.00	$40.00 to $45.00
Maryland	50.00	45.00
Ohio	45.00 to 46.00	40.00 to 42.00
Kentucky	45.00 to 46.00	40.00 to 42.00
Illinois	——	40.00 to 45.00
Missouri	45.00 to 48.00	38.00 to 43.00
Ground fire clay, per net ton	6.50 to 7.50	
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago	52.00	
Birmingham	53.00	
Ground silica clay, per net ton	9.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00	
Chrome Brick:		
Standard size, per net ton	50.00	

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00 to $42.50
Rolling billets, 2-in. and under	40.00 to 42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	$40.00 to 42.50
Sheet bars, open-hearth	40.00 to 42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	3 per ton over base
Wire rods, carbon 0.41 to 0.55	5 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	per ton over base
Wire rods, acid	.15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.15c. to 2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅞-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ⅜-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill.	2.50c.
Bars, common iron, Pittsburgh mill.	2.40c.
Bars, rail, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$ 4.80	$ 4.80
⅜-in.	5.50	6.00
⅜-in.	6.50	7.00
⅞-in.	9.00	9.50
½-in.	11.00	11.50
⅝-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1-in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Orders and Inquiries Are the Lowest in Several Weeks

Awards for the week total about 7600 tons, as compared with 24,000 tons a week ago. The largest award was only 1900 tons. New inquiries call for about 6500 tons, contrasting with approximately 17,000 tons last week.

New York, Westchester & Boston Railroad, station at 132nd Street, New York, 110 tons, to Jones-Smith Co.

Theater at Broadway and Fifty-third Street, New York, 300 tons, to American Bridge Co.

Chesapeake & Ohio Railroad, bridges, 125 tons, to an unnamed fabricator.

New York Central Railroad, bridges, 500 tons, divided among four fabricators.

Highway bridge at Bordentown, N. J., 200 tons, to Phoenix Iron Co.

New Jersey State College, building at New Brunswick, N. J., 300 tons, to American Bridge Co.

George W. Smith & Co., Philadelphia, woodworking plant, 400 tons, to McClintic-Marshall Co.

Union Trust & Savings Bank, Davenport, Iowa, 750 tons, to Mississippi Valley Structural Steel Co.

Sheridan Trust & Savings Bank, Chicago, 1900 tons, to Worden-Allen Co.

Washington State Highway Department, Hamilton, creek bridge, 104 tons, to Illinois Steel Bridge Co.

Okanogan County, Wash., Omak bridge, 217 tons, reinforced concrete construction substituted.

Chicago Gravel Co., Rockdale, Ill., plant, 100 tons, to Milwaukee Bridge Co.

Gas holder at Omaha, Neb., approximately 1100 tons; gas holder at Saratoga, N. Y., 500 tons, to Stacey Mfg. Co.

Packard Electric Co., Warren, Ohio, factory building, 240 tons, reported placed with the Morgan Engineering Co.

Akron Savings & Loan Co., Akron, Ohio, bank building, 750 tons, to the Burger Iron Co.

American Sintering Co., Hubbard, Ohio, 600 tons, to the Variety Iron Works Co. This was previously reported placed with the Penn Bridge Co.

Union Carbide Co., Niagara Falls, N. Y., 200 tons, to Lackawanna Structural Steel Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

American Car & Foundry Co., addition at Madison, Ill., 300 tons.

Parochial school, Fifty-seventh Street, Brooklyn, 300 tons.

American Gas & Electric Co., New York, power plant for construction in Central West, 2000 tons.

Columbia Machine Works, Brooklyn, 500 tons.

State of South Dakota, bridge at Mobridge, 1100 tons and bridge at Wheeler, 1000 tons.

Vicksburg, Shreveport & Pacific Railroad, New Orleans, bridges, Nos. 168-3 and 34-2, 300 tons.

Cuyahoga County, Cleveland, Hillside Road bridge, 200 tons. New bids asked.

Euclid Avenue Temple, Cleveland, addition, 250 tons, bids taken.

Methodist Church, Piqua, Ohio, 100 tons, bids taken.

Bascule bridge, California Avenue, Chicago, 1200 tons

Cleveland Union Terminal Co., West Twenty-fifth Street bridge, 250 tons.

Railroad Equipment Business

There is very little in the way of pending business in cars, except a number of inquiries for small lots of passenger cars, previously reported. No formal inquiries have been received by car builders from the Pennsylvania, Chesapeake & Ohio, Norfolk & Western and Nickel Plate roads, which have been expected to come into the market for a total of close to 30,000 freight cars, the reported plans of the Pennsylvania accounting for fully half of that number.

The American Short Line Railroad Association is inquiring for 500 automobile cars.

E. L. Dougherty & Co. has placed 200 tank cars with the General American Tank Car Corporation.

THIRTY-EIGHT IDLE FURNACES

Net Loss of Six in September in Pittsburgh and Adjoining Districts

PITTSBURGH, Oct. 1.—Today, 103 furnaces out of a total of 141 in the territory bounded by Johnstown and Erie, Pa., Dover, Ohio, and Wheeling, W. Va., are making iron, as compared with 109 a month ago, a net loss in September of six furnaces. In the past month the Carnegie Steel Co. put out one Edgar Thomson in the Pittsburgh district and two New Castle furnaces in the Shenango Valley, and the stacks of the Hanna Furnace Co. at Canal Dover, Ohio, the McKeefrey Iron Co. at Leetonia, Ohio, the Reliance Coke & Furnace Co. at Sharpsville, Pa., and A. M. Byers Co. at Girard, Ohio, have ceased production. Only one of the three furnaces of the Shenango Furnace Co., Sharpsville, Pa., is in production, but the furnace of the Sharpsville Furnace Co., Sharpsville, Pa., recently resumed after being idle for about a month because of an accident to the blowing engine. Furnaces carried on the active list number 105, but that total includes two banked furnaces, one Pittsburgh Crucible Steel Co. stack at Midland, Pa., and the furnace of the Struthers Furnace Co., Struthers, Ohio.

Furnaces in and out as of today and a month ago make the following comparison:

	Total	Sept. 30 In	Sept. 30 Out	Aug. 31 In	Aug. 31 Out
PITTSBURGH DISTRICT					
Steel Works Blast Furnaces					
American Steel & Wire Co.	4	4	0	4	0
Carnegie Steel Co.	34	28	6	29	5
Jones & Laughlin Steel Corporation	12	11	1	11	1
National Tube Co.	4	4	0	4	0
Pittsburgh Crucible Steel Co.	2	*2	0	*2	0
Pittsburgh Steel Co.	2	2	0	2	0
Merchant Furnace					
Clinton Iron & Steel Co.	1	0	1	0	1
Total	59	51	8	52	7
MAHONING AND SHENANGO VALLEYS					
Steel Works Furnaces					
Carnegie Steel Co.	15	11	4	13	2
Republic Iron & Steel	7	4	3	4	3
Sharon Steel Hoop Co.	1	1	0	1	0
Trumbull-Cliffs Furnace Co.	1	1	0	1	0
Youngstown Sheet & Tube Co.	9	6	3	6	3
Merchant Furnaces					
A. M. Byers	1	0	1	1	0
Hanna Furnace Co.	3	1	2	2	1
Reliance Coal & Coke	2	0	2	1	1
McKeefrey Iron Co.	1	0	1	1	0
Sharpsville Furnace Co.	1	1	0	*1	0
Shenango Furnace Co.	2	2	1	2	1
Struthers Furnace Co.	1	*1	0	*1	0
Stewart Furnace Co.	1	1	0	1	0
Valley Mould & Iron Corp.	1	0	1	0	1
Total	47	29	18	35	12
WESTERN PENNSYLVANIA					
Steel Works Furnaces					
Bethlehem Steel Co., Johnstown	11	7	4	7	4
Merchant Furnaces					
Adrian Furnace Co.	1	1	0	1	0
American Manganese Mfg. Co.	2	1	1	1	1
Kittaning Iron & Steel Mfg. Co.	1	0	1	0	1
McKinney Steel Co.	3	3	0	3	0
Perry Furnace Co.	1	1	0	1	0
Punxsutawney Furnace Co.	1	1	0	1	0
Total	20	14	6	14	6
WHEELING DISTRICT					
Steel Works Furnaces					
Carnegie Steel Co.	7	5	2	5	2
National Tube Co.	2	2	0	2	0
Wheeling Steel Corp.	3	3	0	3	0
Weirton Steel Co.	1	1	0	1	0
Total	13	11	4	11	4
Grand total	141	105	36	112	29

*One furnace banked.

The Pittsburgh File & Steel Co., 4017-31 Liberty Avenue, Pittsburgh, has been incorporated with capital stock of $60,000 as a consolidation of the Pittsburgh File & Saw Co., Pittsburgh, and the Akron File Co., Akron, Ohio. New equipment has been installed and the company is operating at full capacity. The new management expects to increase present output and new machinery for that purpose is now being built. An office is maintained also at 1006 Grant Street, Akron.

The Hayes Murphy Co., Hartford, Conn., has been incorporated with capital stock of $1,000,000 to manufacture textile machinery and parts. L. Hayes Murphy of the American Wiremold Co., Hartford, is president.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
26.....	13.87½	13.25	41.62½	7.05	6.70	6.75	6.40
27.....	13.87½	13.25	41.25	7.05	6.70	6.75	6.40
28.....	13.75	13.25	41.32½	7.05	6.70	6.70	6.35
29.....	13.75	13.25	....	7.05	6.70	6.65	6.30
Oct.							
1.....	13.75	13.12½	42.07½	7.00	6.70	6.65	6.30
2.....	13.75	13.00	41.87½	7.00	6.70	6.65	6.30

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Oct. 2.

The markets are exceedingly quiet and all of them weak except lead. Copper has again fallen to lower levels on light demand. The tin market is only moderately active, but fairly steady. A fair business is being done in lead with the market a shade easier. Lower quotations are recorded in zinc in a very dull market.

Copper.—The strength which was apparent in the electrolytic copper market last week has given way to marked weakness until today there are offerings at 13.25c. to 13.37½c., delivered, with consumers practically uninterested. Some producers are unwilling to sell at less than 13.37½c., delivered. In the recent moderate buying movement consumers have apparently covered their needs for the present and are awaiting developments. The export market is exceedingly flat, influenced no doubt by European political conditions. Lake copper is quoted at 13.75c., delivered.

Copper Averages.—The average price of Lake copper for the month of September, based on daily quotations in THE IRON AGE, was 13c. The average price of electrolytic copper was 13.36c., refinery, or 13.61c., delivered.

Tin.—The market has been in general quiet with dealers showing no initiative and consumers uninterested. Total sales of Straits tin during the week have amounted to about 700 tons, with about 500 tons of this sold from September 26 to 28, transactions on the latter day having ranged from 41.25c. to 41.37½c. Yesterday 200 tons was sold at a range of 42c. to 42.12c., but today the market has been inactive. Spot Straits tin was quoted today at 41.87½c., New York, with values in the London market reported as £202 for spot standard, £201 7s. 6d. for future standard and £205 for spot Straits, all about £1 per ton lower than a week ago. During the past week the London market declined over £3 per ton, most of which was recovered by yesterday. Deliveries of tin into consumption for the month of September were 4540 tons, with 2362 tons in stock and landing Sept. 30. Imports for September were 4015 tons, bringing the imports for the first nine months to 51,667 tons.

Lead.—While the market is quiet there is a fairly heavy consumption and moderate inquiry. Prices are only steady, with a tendency to shade slightly, as indicated by quotations this week which in the outside market are 6.70c., St. Louis, and 7c., New York, with some sellers asking as high as 7.10c. The quotation of the leading interest continues unchanged at 6.85c., New York.

Zinc.—Demand for prime Western has fallen to very small proportions and the market has declined in the last few days more than for some time. Quotations are about 10 points lower than a week ago with early delivery metal held at 6.30c., St. Louis, or 6.65c., New York, with no interest shown by either domestic or foreign buyers. There has also been a decline of about $1 per ton in ore prices in the West.

Nickel.—Quotations for shot and ingot nickel are still 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market both shot and ingot nickel are quoted at 29c. to 32c. per lb.

Antimony.—Chinese metal in wholesale lots for early delivery is quoted at 7.50c. to 7.60c., New York, duty paid, for October arrivals.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., New York, duty paid, in such cases where they can obtain it from foreign producers. No quotations are made public by the leading domestic producer.

Old Metals.—Prices are a little lower and the market is dull. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.25
Copper, heavy and wire	12.25
Copper, light and bottoms	10.75
Heavy machine composition	10.50
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	7.00
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

OCT. 2.—Copper and zinc have declined in an exceedingly quiet market. Old metal prices are unchanged. We quote in carload lots, Lake copper, 14.25c.; tin, 43c.; lead, 6.75c.; spelter, 6.35c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5.25c.; zinc, 4.25c.; pewter, No. 1, 22c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

Improvement in Operations in the Mahoning Valley

YOUNGSTOWN, Oct. 2.—Attitude of Valley iron and steel makers this week with respect to fall business is somewhat more optimistic. The leading independent interest reports an improvement in the volume of orders coming through the past two weeks, as compared with the average in August and the first two weeks in September. In this district active ingot capacity is being maintained at 85 per cent.

Operating schedules also show some improvement this week. The Falcon Steel Co. has resumed operations at its eight-mill sheet plant in Niles, recently suspended. The Youngstown Sheet & Tube Co. has placed in commission its 12-in. merchant bar mill, idle recently. The Trumbull Steel Co. is operating virtually all units except four tin plate mills. The Falcon Tin Plate Co. is operating its property at Canton at 75 per cent.

Of the 117 sheet mills in the Mahoning Valley, 83 were scheduled this week, which represents the high point in recent schedules. Of 17 tube mills, 16 are rolling.

The Carnegie Steel Co. continues to operate at a rate close to normal, which it has consistently maintained, except for interruptions due to mechanical difficulties.

Coal Gas Plant for Winnipeg

The Winnipeg Electric Railway Co. has placed a contract with the Koppers Co., Pittsburgh, covering the design and erection of a coal gas plant at Winnipeg, Canada. This plant will consist of 17 combination gas ovens of the Becker type having a capacity of 6.8 net tons of coal per charge, together with producer plant and coal and coke handling equipment.

This plant will embody the latest developments in coal gas manufacture, including provision for underfiring the ovens with producer gas, blue gas or oven gas, and steaming of ovens. The ovens are designed to operate on a normal coking time of 12 hr. which can be reduced to 10 hr. or increased as desired, permitting of the greatest flexibility in the production of gas and coke.

This is the third Koppers small oven coal gas plant to be contracted for during 1923. Construction work on the other two plants located at Battle Creek, Mich., and Zilwaukee, Mich., is progressing rapidly and both plants will be in operation before the end of the year.

PERSONAL

A. H. Chamberlain, who has been secretary-treasurer of the American Iron, Steel and Heavy Hardware Association for nearly eight years, has resigned and on Oct. 1 became general manager of sales of Edgar T. Ward's Sons Co. During Mr. Chamberlain's incumbency the association has increased in membership and strength and he has proved himself a highly capable executive. For a number of years he was connected in an editorial capacity with the hardware department of THE IRON AGE, before that department became a separate paper, *Hardware Age*. In 1908 he accepted an engagement with Wiebusch & Hilger, manufacturers' agents, New York, and continued with that company until January, 1916, when he took up his work with the jobbers in iron and steel and heavy hardware. Edgar T. Ward's Sons Co. specializes in shafting, and in cold-finished and special steels, having warehouses in Boston, Newark, Philadelphia, Detroit, Cleveland and Chicago, and Mr. Chamberlain's headquarters will be in Philadelphia. In succession to Mr. Chamberlain the American Iron, Steel and Heavy Hardware Association has elected George F. Greene as its secretary-treasurer. For a number of years Mr. Greene was assistant credit manager of the Midvale Steel & Ordnance Co., at its Philadelphia offices.



A. H. CHAMBERLAIN

Frank Billings, president Tod-Stambaugh Co., Cleveland, and prominent in the Superior iron ore industry, who was taken seriously ill in London a few days ago, has improved rapidly and plans to sail for home this week.

W. E. Colbert, for the past seven years identified with the Pittsburgh Crucible Steel Co. in the operating and sales departments, has severed that connection and joined the sales force of the Schley & Nash Co., Columbia Building, Pittsburgh.

Dr. John A. Mathews, president Crucible Steel Co. of America, New York, and Dr. Richard Moldenke, Watchung, N. J., were the American members of the Iron and Steel Institute in attendance at the Italian meeting, which began with technical sessions at Milan, on Sept. 17 and 18, and continued in a tour, taking in Florence, Rome, Leghorn, Pisa, Genoa, Turin and other centers.

President George G. Crawford of the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., has returned from a three months' stay in Europe.

A. H. Jameson, formerly with the Bayonne Steel Casting Co., Bayonne, N. J., has been appointed sales manager of the Deemer Steel Casting Co., New Castle, Del., recently taken over by Newlin T. Booth.

A. H. Cordery, one of the veterans of the American steel and iron industry, having been connected with it continuously for 54 years and six months, and all of that time with one company, the Phoenix Iron Co., Philadelphia, has retired from active participation in the company's affairs.

E. J. Schriever, secretary Pollak Steel Co., Cincinnati, for the past four years, has resigned and will engage in the real estate business.

Joel S. Coffin, chairman, and Samuel G. Allen, vice-chairman Lima Locomotive Works; Joseph B. Terbell, president American Brake Shoe & Foundry Co., and F. F. Fitzpatrick, president Railway Steel Spring Co., have been elected to the board of directors of the International Combustion Engineering Corporation. Mr. Coffin will be chairman and Mr. Allen vice-chairman of the executive committee.

Blake D. Hay, who has been with the Williams Tool Corporation at Erie, Pa., for some time, has been appointed Chicago district manager. He succeeds E. L. Mey, resigned.

Charles M. Brown was elected president of the Colonial Steel Co., Pittsburgh, at the annual meeting held Sept. 24. Herbert C. Poole, who has had charge of the New York office for the last 13 years, was appointed general works manager, and Jacob Trautman, Jr., formerly assistant sales manager, was appointed general sales manager.

Clement A. Hardy, consulting foundry engineer, Chicago, will deliver an address before the Chicago Foundrymen's Club on the evening of Oct. 13, on "Heating, Ventilation and Lighting of the Foundry."

OBITUARY

WILLIAM HENRY BALDWIN, widely known in the steel industry, died at his home in Washington last Wednesday, following a long illness. He was 72 years of age. He served as secretary of the Youngstown Iron & Steel Co. from 1890 to 1892. In the latter year the name of the company was changed to that of Union Iron & Steel Co., which he served with for two years. He then became secretary of the Ohio Steel Co., remaining with the latter from 1894 to 1899. Next he was secretary of the National Steel Co., with which he was identified for two years. Some years after the Steel Corporation was formed, he had a part in the inquiry of the Bureau of Corporations into the cost of making steel. Subsequently he was engaged in social and philanthropic work. Mr. Baldwin also at one time was cashier of the First National Bank of Youngstown. He held this position from 1877 to 1887 and was vice-president of that institution from 1889 to 1900. He received his early education in the public schools of Youngstown and entered Western Reserve College, from which he was graduated in 1871. From 1887 to 1889 he was also vice-president and manager of the Arms-Bell Co., in addition to being vice-president of the First National Bank at Youngstown. He was a member of the Cosmos Club and the Chevy Chase Club of Washington and the University Clubs of Washington and New York. He was also a member of the Phi Beta Kappa and the Alpha Delta Phi Societies. He is survived by a brother, Frank L. Baldwin, of Youngstown, and two sisters, Miss M. Helen Baldwin, Youngstown, and Mrs. Emily B. Osborne of Cleveland.



W. H. BALDWIN

RUTHERFORD B. BURGHER, president National Drawn Steel Co., East Liverpool, Ohio, died at Dover, Ohio, Sept. 30. He was one of the organizers of the Kidd Drawn Steel Co., Monaca, Pa.

FRANCIS FENWICK, for many years head of Fenwick Freres & Cie., Paris, machinery merchants, died last week of heart failure.

WILLIAM C. AGNEW, pioneer mining engineer in the Lake Superior district, died on Sept. 29 at Duluth, Minn., aged 74 years. He was general manager of the Mahoning Ore & Steel Co. and had been active up to the time of his death. Several years ago, Mr. Agnew was active in the Mahoning valley as railroad civil engineer.

Japan Buys Equipment in United States

Manufactured Products Apparently of Most Interest Now —Report on Effects of Earthquake—Chilean State Railways to Issue Rail Tender

NEW YORK, Oct. 2.—The Japanese movement of buying for reconstruction and other purposes has apparently begun in this country in highly manufactured products. An active demand for small electrical equipment and accessories is reported, the General Electric Co. having orders in excess of $1,000,000, and there is an active interest in motor trucks, of which one large Japanese export house is said to have purchased about 700 available on the Pacific Coast. The heaviest inquiries continue to be for light gage galvanized sheets, No. 8 gage wire and wire nails and a few small requests for prices have been issued on bars and shapes. It seems to be the opinion of some exporters that much of the galvanized sheet business will be placed with British sellers, as a result of the lower prices as well as fairly good delivery. Actual purchasing by the Imperial Government is not yet reported and exporters are awaiting the report of the committee which has been formed to investigate the advisability of forming a Department of Reconstruction through which all purchasing for the devastated areas could be routed. In the meantime there is a persistent rumor that a large Government inquiry for sheets, nails and wire will shortly appear in the American market.

Apparently the prices quoted Japanese buyers on structural material have either been too high or the latter are not yet in a position to place orders. Some of the bar quotations now being made by leading export sellers are reported as $63.70 per ton, $64.25 per ton and $68.75 per ton, all c.i.f. Japanese port. Most of the quotations are now being made c.i.f. Kobe. The only inquiry by any of the large companies in Japan is reported from the Imperial Government Railways for a small lot of axles, wheels and other car equipment.

A number of inquiries, chiefly for wire nails, believed by sellers to be of a highly speculative nature are reported. One of these was for 10,000 kegs and another called for 5000 kegs. On the other hand, an inquiry said to total about 7000 metric tons of wire nails is reported to have come through the Department of Commerce and is considered as authentic business. One exporting and importing company reports the sale of a small tonnage of No. 31 gage black sheets to Japan as well as 2300 tons of wire rods, which have been placed with a Canadian interest. This same exporter for the first time in a number of months has been able to meet British competition on spiegeleisen and booked an order for 1000 tons to a Belgian consumer.

While actual purchasing by Japanese consumers has thus far been small, the number of tentative inquiries for various kinds of material, particularly structural steel for buildings, is apparently large. The H. K. Ferguson Co., Cleveland, reports the receipt of a number of tentative inquiries for reinforcing steel, structural steel and other building equipment to be used in replacing buildings destroyed by the earthquake. This company reports that it was about to begin the erection of additions to the steel plant of the Shibaura Engineering Works at the time of the earthquake and has received word that a large part of this plant was destroyed. Instructions, however, have been given to rush work on the original contract for the additions and additional work for the Shibaura works and an allied company, the Tokio Electrical Works, totaling about 50 per cent of the original contract for the additions, will also be done.

Member of Westinghouse Staff Reports on Earthquake

In a report on conditions between Tokio and Yokohama during the earthquake, F. C. Middleton, of the Westinghouse Electrical International Co. staff in Tokio, where it is represented by Takata & Co., says that he walked more than 35 miles between the two cities, starting immediately after the first shock. "The Marunouchi building, completed six months ago by the George A. Fuller Co. of the Orient," says Mr. Middleton, "was still standing. Most of the facing brick had been shaken to the sidewalk. Several persons had been killed or injured by these falling pieces. Foreigners reported the inside decorations mostly destroyed. However, owing to its steel skeleton construction, it did not collapse. The Nippon Oil Co. building, immediately adjoining the Marunouchi building, another steel skeleton structure, was still standing, but the second floor was completely wrecked.

"Adjoining the Nippon building there had stood an eight-story reinforced concrete building, without steel skeleton. This had completely collapsed. It is reported that 200 workmen were killed. At Kawasaki," says Mr. Middleton, "the General Electric plant was still intact, except for what I supposed was the main office building, composed chiefly of windows, which had simply fallen inward, so that it was a total wreck." Not far from the plant, Mr. Middleton mentions the river, which during the flood season spreads out about a half mile. "The long steel bridge," he says, "looked like a futurist painting. The various arches were out of alinement. The piers were in some cases raised up, in other cases they had sunk into the river bed. The rails were humped like a camel's back or else twisted until they resembled a snake. However, the ties held them parallel so that an occasional handcar carrying Japanese officials was able to get through."

Chilean Railroads to Inquire for Rails

The annual rail requirement of the Chilean State Railways, with a branch buying office in the United States at 141 Broadway, New York, will be issued about Nov. 1, bids opening in Chile about the end of the month. The tender will specify 14,000 tons of 100-lb. rails, including accessories. The specifications, made up by the Chilean State Railways engineers, are a slight deviation from the standard A. R. A. specifications. Although previous orders have gone to European makers, the present unsettled conditions in Europe, it is believed, may result in the order being placed with American mills this year.

GERMAN IRON AND STEEL ACTIVE

Heavy Stocks on Ruhr May Be Absorbed in Germany—Much Unemployment in Manufacturing Districts

(By Radiogram)

BERLIN, GERMANY, Oct. 1.—Iron and steel market is active. There is good demand for steel in the unoccupied territory, particularly bars and sheets.

The stock of heavy iron and steel on the Ruhr is estimated at 1,750,000 tons, but removal of the export embargo would not materially affect the world market, as Germany will absorb all she can get. Domestic gold prices do not exceed foreign quotations.

Tariff Changes

The Government has put bars, sheets and most other sorts of iron and steel materials on the free list. Export licenses are no longer needed.

Conditions in the iron-consuming manufacturing industries are bad, especially in the Solingen district, where 20,000 are unemployed.

Machinery Markets and News of the Works

SEPTEMBER TRADE POOR

Worst Month of the Year for Machine-Tool Sales Is General Report

Few Large Orders Being Placed Except by Automobile Interests

September brought out the smallest volume of machine-tool buying of any month this year. A slight exception to this was noted in New England in the last half of the month, but generally reports agree that there was little of an encouraging nature during the month. The falling off of railroad buying contributed in no small degree to this situation, though industrial buying also was at very low ebb. One large company reports that of its sales this year to date 65 per cent have been to the railroads. The general belief is that there will be little more railroad buying of importance this year, but that between now and Jan. 1 budgets will be made up in anticipation of 1924 appropriations.

The automobile companies continue to buy in a fair way. The Ford Motor Co. has bought 16 upsetting machines, the largest order for forging machinery in a considerable time. The Rickenbacker Motor Co., Detroit, bought six lathes. The Chevrolet Motor Co., Detroit, is figuring on a round lot of shop tools but has deferred buying.

The largest buying of the week in the New York market was by the Department of Street Cleaning, New York, which closed for about 10 tools, on which bids were received several weeks ago.

New York

NEW YORK, Oct. 2.

MOST of the machine-tool dealers and special representatives of machine-tool builders report that September was the poorest month of the year in volume of business. One large company states that of its orders this year to date 65 per cent have come from the railroads. Railroad buying has practically ceased, except for the placing of miscellaneous orders for single tools, and no very large expenditures are looked for until next year's appropriations are available. The largest buying of the week was by the Department of Street Cleaning, New York, which gave out orders for about 10 tools, on which bids were received several weeks ago. There were a half dozen engine lathes, a planer, a cold saw, drill presses, etc. The Fruit Growers' Express Co., Washington, D. C., bought a 400-ton wheel press. The Farrell Foundry & Machine Co., Waterbury, Conn., and Buffalo, N. Y., bought an 800-lb. steam hammer, and an order came to an Eastern company for a 36-in. engine lathe from the Illinois Steel Co. The General Electric Co. placed an order for three milling machines.

The Jackwill Mfg. Co., 615 East 134th Street, New York, manufacturer of pipe nipples and kindred products, has engaged Jacob Fisher, 25 Avenue A, architect, to prepare plans for a one-story factory, 75 x 125 ft., on 140th Street, near the Southern Boulevard, estimated to cost $60,000.

Bids will be received by the Quartermaster Section, United States Army, New York general intermediate depot, Brooklyn, until Oct. 11, for wire screen in rolls, electrical supplies and galvanized iron corrugated roofing, circular 24-248.

The State Government, Constantine, Algeria, will have plans prepared for two hydroelectric generating plants, one at Kreneg, with capacity of 5800 hp., estimated to cost $1,500,000; and the other at Beni-Haroun, of 2200 hp., to cost approximately $1,000,000.

The John C. Tilly Ladder Co., 122 Second Street, Watervliet, N. Y., is having plans drawn for a new plant to manufacture metal-reinforced ladders and kindred products, estimated to cost $50,000, with equipment. William E. Clark, Cannon Building, Troy, N. Y., is architect.

Power equipment, ovens, conveying and other machinery will be installed in the three-story baking plant addition, 75 x 110 ft., to be built by Horn & Hardart Co., 600 West Fiftieth Street, New York, estimated to cost $200,000.

H. A. Hoffman, care of H. A. Koelble, 114 East Twenty-eighth Street, New York, architect, will commence the erection of a four-story and basement automobile service building, with machine shop, 100 x 200 ft., on Mount Eden Avenue, to cost $90,000.

The Guatemala Oil Corporation, Guatemala City, Guatemala, Central America, recently formed with a capital of $5,000,000, will make early purchases of machinery and electric power equipment for installation at its properties in the northwestern part of Guatemala. The initial development will cost $500,000 including equipment.

The William F. Kenny Co., 44 East Twenty-third Street, New York, will build a two-story automobile service and repair works, 75 x 200 ft., on Rawson Street, Long Island City, estimated to cost $80,000. A machine shop will be installed.

Manual training equipment will be installed in the two-story high school to be erected at Hicksville, N. Y., estimated to cost $200,000, for which bids will be asked on a general contract this month. Coffin & Coffin, 522 Fifth Avenue, New York, are architects; R. D. Kimball, 15 West Thirty-eighth Street, is engineer.

The Royal Eastern Electrical Supply Co., 114 West Twenty-seventh Street, New York, manufacturer of electrical equipment and supplies, has leased a building to be erected on Jackson Avenue, near Harris Avenue, Long Island City, for a new plant.

The Corona Motor Car Sales & Service Co., Jackson Avenue, Corona, L. I., is taking bids on a general contract for the erection of a two-story service and repair building, 110 x 175 ft., on Jackson Avenue, estimated to cost $50,000.

The Selden Truck Corporation, 238 West Nineteenth Street, New York, manufacturer of motor trucks with plant at Rochester, N. Y., has leased a new one and one-half-story building to be erected on Van Alst Avenue, Long Island City, for a new factory branch. It will be operated in the name of the Selden Sales & Service Corporation of New York.

The Adams Laundry Machinery Co., Troy, N. Y., has purchased property at Kenilworth, N. J., consisting of 25 acres, with main building totaling 100,000 sq. ft. The new owner plans for immediate occupancy. R. N. West is president.

The Board of Education, 22 Valley Road, Montclair, N. J., will receive bids until Oct. 9 for woodworking machinery, including saw table, band saw, etc., for installation in the Nishaune and Hillside junior high schools. Fred P. Reagle is secretary.

The Montclair Ice Co., Pine Street, Montclair, N. J., has awarded a general contract to J. S. Carlson Co., Inc., Walnut Street, for a one-story plant, 125 x 155 ft., estimated to cost $100,000 with equipment.

The Public Service Electric Co., Public Service Terminal, Newark, N. J., has plans for a one-story power house, 60 x 160 ft., to be erected on Passaic Street. The Public Service Corporation, parent organization, will commence the erection of an addition to its plant at 190-94 Morgan Street, to cost $72,000.

The Commercial Interchange Corporation, New York, is disposing of the plant of F. C. Mesa, Chancellor Avenue, Irv-

The Crane Market

The crane market continues quiet with few new inquiries noted. Bids were opened Sept. 26, by the Government of the Philippines, 17 Battery Place, New York, on the two 15-ton, and eight 2-ton, semi-portal, revolving jib cranes and also on the six 2-ton, 28-ft. 11-in. span and six 2-ton, 45-ft., 7⅜-in. span electric overhead cranes, all for the Manila docks. Bids have been forwarded to Manila. Plans call for a total of 48 overhead cranes. The inquiry of the American Smelting & Refining Co., 120 Broadway, New York, has been revised following receipt of bids and new specifications will be issued shortly. The 60-ton overhead crane recently purchased by Viele, Blackwell & Buck, 49 Wall Street for installation in Canada, was awarded to the Northern Engineering Works, Ltd., Walkerville, Ont. Purchase of the 12-ton hand power crane by these engineers has been postponed until a few weeks before it is needed. They are also in the market for a locomotive crane for export. The Norfolk & Western has closed on a locomotive crane with a large builder in the middle West. The International Paper Co., 100 West Forty-second Street is about to place its order for two 15-ton overhead cranes. The American Telephone & Telegraph Co., New York, is said to be receiving bids on used locomotive cranes. It is understood that the Western Electric Co., will purchase its cranes for the new shops in New Jersey in the Chicago district. The list of the General Electric Co., for cranes to be installed at Philadelphia will be issued from Schenectady, N. Y., but probably not for some time. The Griffin Mfg. Co., Erie, Pa., is reported about to close on a 5-ton, 37-ft. span, a 7½-ton, 37-ft. span and a 10-ton, 36-ft. 6-in. span, all 3-motor overhead traveling cranes. The Carnegie Steel Co., Pittsburgh is said to be planning the installation of two additional overhead cranes at the Clairton, Pa., plant.

Among recent purchases are:

Cleveland-Trinidad Co., Flushing, N. Y., a 20-ton locomotive crane with 1½-yd. clamshell bucket from the Brown Hoisting Machinery Co.

Bryden-Neverslip Co., Catasauqua, Pa., a 20-ton locomotive crane from the Brown Hoisting Machinery Co.

Foundation Co., 120 Liberty Street, New York, a 20-ton locomotive crane from the Brown Hoisting Machinery Co.

Safety Insulated Wire & Cable Co., Bayonne, N. J., a 15-ton, 40-ft. boom, locomotive crane from the Browning Co.

Viele, Blackwell & Buck, 49 Wall Street, reported to have purchased a 25-ton, electric driven locomotive crane from the Browning Co.

United Electric Railway Co., Providence, R. I., a 30-ton electric overhead traveling crane from the Northern Engineering Works.

General Electric Co., Schenectady, N. Y., a 15-ton, 40-ft span hand power crane for Brazil, from the Whiting Corporation.

Rockaway Rolling Mills, Rockaway, N. J., through Quackenbush & Sons, Paterson, N. J., a 5-ton, single I-beam hand power crane of the Chisholm-Moore Mfg. Co.

Vermont Marble Co., Proctor, Vt., three 2-ton, single I-beam hand power cranes from the Chisholm-Moore Mfg. Co.

Atlantic Marble Co., Brooklyn, N. Y., a 5-ton single I-beam hand power crane from the Chisholm-Moore Mfg. Co.

Koppers Co., Pittsburgh, a 5-ton, 80-ft. span, bucket handling crane for by-product plant at the Lackawanna works, Buffalo, from the Morgan Engineering Co.

Pennsylvania Railroad, a 5-ton 46-ft. span ashpit crane with ¾-cu. yd. bucket for Olean, N. Y., from the Northern Engineering Works.

Western Plumbing & Supply Co., Chicago, a 5-ton electric cage control monorail hoist from the Detroit Hoist & Machine Co.

Frick Co., Waynesboro, Pa., two 5-ton jib cranes from the Whiting Corporation.

Union Pacific Railroad Co., Omaha, Neb., a 5-ton, self-supporting jib crane from the Whiting Corporation.

Virginia Power Co., Charleston, W. Va., a 100-ton, double trolley, electric traveling crane from the Whiting Corporation.

Aurora, Elgin & Chicago Railroad, a 15-ton hand power crane from the Whiting Corporation.

Western United Corporation, Aurora, Ill., a 20-ton hand power crane from the Whiting Corporation.

Chicago, Wilmington & Franklin Coal Co., Chicago, a 25-ton hand power crane from the Whiting Corporation.

Belle City Malleable Iron Co., Racine, Wis., a 5-ton, 34-ft. span, 3-motor, overhead traveling crane from the Milwaukee Electric Crane & Mfg. Co.

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ington, N. J., previously used for ammunition manufacture, recently acquired from the receiver. The main section has been purchased by the Phoenix Brass Foundry, Inc., 861 Springfield Avenue, size 200 x 300 ft., for a new plant. Another portion has been sold to the American Abrasive Metals Co., with works on adjoining site, to be used for expansion.

The Newark-Flint Corporation, 493 Broad Street, Newark, local branch of the Flint Motor Co., Flint, Mich., is taking bids for a one-story service and repair building, 75 x 185 ft., at 1016-18 South Broad Street, to cost $60,000. W. C. Durant is president. G. W. Backoff, Chamber of Commerce Building, is architect.

Manual training equipment, steam power plant apparatus, etc., will be installed in the new high school to be erected at Clifton, N. J., estimated to cost $150,000, for which bids will be received on a general contract until Oct. 16. Lee & Hewitt, 152 Market Street, Paterson, N. J., are architects and engineers.

The Cook Electric Co., 360-64 Jelliff Avenue, Newark, manufacturer of electrical equipment, is completing plans for a two-story addition, 75 x 95 ft., to cost $40,000. S. S. Cook is head.

The Borough Council, Lavallette, N. J., plans the installation of electrically-operated pumping machinery in connection with a municipal waterworks estimated to cost $80,000. Sherman & Sleeper, 501 Cooper Street, Camden, N. J., are engineers.

The Gas-Kut Corporation, Newark, recently organized, has leased a portion of the building of the Foster Screen Co., 161-69 Ogden Street, for the establishment of a new plant to manufacture gas-burning devices and equipment. Harry Vliet is one of the heads of the company.

Manual training equipment will be installed in the new junior and senior high school to be erected on Main Street, Madison, N. J., estimated to cost $200,000, for which bids are being taken on a general contract until Oct. 23. Guilbert & Betelle, Chamber of Commerce Building, Newark, are architects.

The American Bottle Cap Co. of New York, Inc., 110 West Fortieth Street, New York, has been incorporated with capital stock of $250,000 as a subsidiary of the parent company, Seattle, Wash., manufacturer of bottle caps and metal products. The Eastern plant will be located at Bridgeport, Conn., where a building has been secured. Machinery and equipment will be needed soon, including special machinery. It is stated that orders on hand will keep the plant going day and night for several months. E. J. Dupree is president; J. A. Dupree, vice-president and W. E. Rivard, secretary-treasurer.

Kraeuter & Co., 583 Eighteenth Avenue, Newark, is inquiring for a 7000- to 10,000-gal. steel tank for fuel oil storage.

The Holley Mfg. Co., 181 South Street, Newark, recently organized with $50,000 capital stock, will manufacture electrical devices. E. D. Holley is president.

The Starr-Rawlings-Dickey Corporation, 501 Fifth Avenue, New York, manufacturers' agent for belting, machinery and mill supplies, has established an office in the Vizoso Building, Hanava, Cuba, under the management of René M. Droeshout and is interested in representing other manufacturers on an exclusive basis.

Catalogs Requested

Roku-Roku Shoten, Ltd., a Japanese machinery importer, has advised THE IRON AGE that its head offices in Tokio were totally destroyed in the earthquake and has established offices on the Enokojima Nishiku, Osaka, and also temporary offices in Tokio at 30 Takanawa Minamicho, Shiba. Catalogs and price lists of machine tools and allied equipment are desired to replace those destroyed in the earthquake.

Export Opportunity

Ramdhan & Sons, Jullundur City, India, have advised correspondents in this country that they are in the market for the following: One drilling machine, one polishing machine, one 10-hp. oiler, 10 tons of zinc and lead, and 10 tons of brass soft sheets, brass tubes and bars. The brass tubes and bars are for making cooking utensils.

New England

BOSTON, Oct. 1.

DESPITE the rather discouraging conditions of the first half of the month, the machine tool business shows improvement of about 10 per cent with most dealers for the entire month of September. The last week has been particularly encouraging, giving reason to believe that October business will be more satisfactory. The more liberal attitude of the banks is credited with contributing to this improvement. Although there have been no large transactions in the last two weeks, the following sales, mentioned by one firm, indicate that some business is being done. One buyer bought a lathe, planer and shaper at a cost of about $7,000; another bought a 36-in. lathe; another two power presses, and high speed hammers and upright drilling machines are also included in the transactions. Improvement is also noticeable in demand for second-hand machine tools.

The Chelsea High School, to be erected in Chelsea, Mass., on which bids will close Oct. 3, will cost about $700,000. manual training and machine shop equipment will be installed. The architect is S. S. Eisenberg, 46 Cornhill, Boston.

Plans are in progress by the Boston Trade School, Boston, of which McLaughlin & Burr, 88 Tremont Street, Boston, are the architects.

Plans have been filed by Lander, Frary & Clark, Stanley Street, New Britain, Conn., for the erection of an addition to cost $30,000.

Manual training equipment will be installed in the new high school to be erected at Franklin, Mass., estimated to cost $125,000, for which Ritchie, Parsons & Taylor, 15 Ashburton Street, Boston, are architects.

Fire, Sept. 25, destroyed a portion of the plant of the Tribble Cordage Co., Union Street, Woburn, Mass., with loss estimated at $100,000 including equipment. It is planned to rebuild.

Dixon & Fallis, Cambridge, Mass., manufacturers of mechanical patterns, etc., have inquiries out for screw-cutting lathe, 26 in. swing, with 12 ft. bed.

The Underwood Machinery Co., Boston, recently organized with a capital of $100,000, will take over and expand the plant and business of the company of the same name, with works at 110 Mount Vernon Street, South Boston. Frank E. Underwood is president and treasurer, and William K. Underwood, vice-president.

The plant and property of the Belcher & Taylor Agricultural Tool Co., Chicopee Falls, Mass., has been acquired by new interests. Plans are under way for a reorganization and extensions in the plant.

The J. H. Wisbach Co., 1123 Commonwealth Avenue, Boston, manufacturer of automobile bodies, is said to be preparing a list of equipment for installation in its proposed plant on North Beacon Street.

The Torrington Electric Co., Torrington, Conn., has acquired 100 acres in the Winchester section, and contemplate extensions in its hydroelectric generating plants.

The Common Council, Uxbridge, Mass., is planning the installation of electrically-operated pumping machinery at a proposed plant for the municipal waterworks. Barbour & Dixon, 73 Tremont Street, Boston, are engineers.

Superstructure work is under way on the new one-story and basement addition, 75 x 100 ft., of the Gillette Safety Razor Co., Dorchester Avenue and West First Street, South Boston, exclusively for the manufacture of razor blades. It will cost $200,000 with machinery. Charles T. Main, 48 Federal Street, Boston, is engineer.

The McCulloch Mfg. Co., 216 High Street, Boston, manufacturer of machinery and parts, is planning for enlargements to include the installation of a shaper, lathe, drill press and other tools.

The Connecticut Power Co., New Haven, Conn., is planning for additions in its generating plant at Middletown, Conn., and the installation of new machinery. It will expend about $500,000 during the present year on this and other work, including additional transmission lines.

The Radio Equipment Co., Boston, has leased the five-story and basement building at 11 to 19 Stuart Street for a new plant.

The Norma Co. of America has placed contracts for the erection of the first unit of its new plant upon 17 acres of land recently acquired at Stamford, Conn., facing the tracks of the New York, New Haven & Hartford Railroad adjacent to Glenbrook Station. The buildings under construction will be of one story, saw-tooth roof type and will occupy about 60,000 sq. ft. The company's present plant at Anable Avenue, Long Island City, will be continued for the production of Norma precision open type annular ball bearings. The Stamford plant will be equipped for the manufacture of Hoffmann precision roller bearings, the American rights to which, as well as to all other Hoffmann products, were recently acquired from the Hoffmann Mfg. Co., Ltd., Chelmsford Essex, England. The plant will also be equipped for expansion of the manufacture of Norma precision ball bearings.

The Lally Column Co., Cambridge 39, Mass., is in the market for a gate shear of capacity to handle 1¼-in. x 16-in. material, and at least 30 in. between housings.

John W. Bolton & Sons, Inc., Lawrence, Mass., is inquiring for a 150 or 200-hp. induction motor, three-phase, 60-cycle, 220 volts a.c.

Philadelphia

PHILADELPHIA, Oct. 1

CONTRACT has been let by the Keystone Card Index Co., Philadelphia, to the Smith-Hardican Co., 1800 Callowhill Street, for a new plant at Natrona and Race Streets, estimated to cost $55,000, including equipment. H. B. Weldon, Fuller Building, is architect.

The Willys-Overland Co., Toledo, Ohio, has leased the plant of the George W. Smith Co., Inc., Forty-ninth Street and Botanic Avenue, Philadelphia, for a new assembling works for Overland and Willys-Knight automobiles. Extensions will be made to provide for an initial output of 200 cars per day. Work will commence early in January. The Smith company, operating a woodworking plant, has construction under way on a new factory.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Oct. 16, for 4000 steel bolts for the Philadelphia Navy Yard, schedule 1356.

The North Philadelphia Supply Co., Inc., 3233 Germantown Avenue, Philadelphia, pipe, plumbing equipment, etc., will erect a three-story building to cost $22,000. J. W. Thompson, 703 South Sixtieth Street, is architect.

The Gorgas-Pierle Mfg. Co., 144 East Allen Street, Philadelphia, manufacturer of oil products, will remodel the plant of the American Agricultural Chemical Co., Delaware Avenue, recently acquired, and install additional machinery.

The Sun Shipbuilding & Drydock Co., Chester, Pa., is perfecting arrangements for the installation of a 10,000-ton drydock, with additional equipment for ship construction and repair work. J. N. Pew is president.

The City Council, Philadelphia, has granted an appropriation of $6,000,000 to the Bureau of Water, for extensions and improvements in the municipal water plants and system, including the installation of new electrically-operated pumping machinery. The bureau is developing plans for a large project for additional water supply to involve more than $30,000,000, to include the construction of a power house and electrically-operated pumping plant in the vicinity of Yardley on the Delaware River, with capacity of 600,000,000 gal. per day.

Fire, Sept. 25, at the coal pockets of the George B. Newton Coal Co., Fifty-third Street and Thomas Avenue, Philadelphia, destroyed coal-handling and conveying equipment and other property, with loss estimated at $50,000. It is planned to rebuild.

Foundations are being laid for the initial buildings for the new plant of the General Electric Co., Witherspoon Building, Philadelphia, at Sixty-ninth Street and Elmwood Avenue, estimated to cost $5,000,000 with machinery. It will be used primarily for electric switchboard manufacture.

The Board of Education, Atlantic City, N. J., will commence the construction of a four-story and basement addition to its vocational school at Surf Place, 32 x 115 ft., for which H. A. Stout, Guarantee Trust Building, architect, has prepared plans. A three-story extension, 42 x 125 ft., will also be erected to the industrial school at Indiana and Baltic Avenues. Bertram Ireland, Guarantee Trust Building, is architect for the latter structure.

The Borough Council, Ephrata, Pa., is arranging a bond issue of $50,000, the proceeds to be used for the construction of a municipal electric power plant.

Manual training equipment will be installed in the new high school to be erected at Palmerton, Pa., estimated to cost $300,000, for which bids will soon be asked on a general contract. The New Jersey Zinc Co., has given $150,000 toward the project. The Board of Education is in charge.

Arrangements are being made for the sale of the plant and equipment of the Lehigh Machine Co., Lehighton, Pa., operated by the National Automatic Machine Co.

A machine shop will be installed in the two-story automobile service building, 90 x 120 ft., to be erected by Walter T. Matthews, Paoli, Pa., for which plans are being prepared by Philip S. Tyne, 1509 Arch Street, Philadelphia.

M. S. Kemmerer & Co., Sands Run, Pa., are planning the construction of a new coal washery at their properties, estimated to cost $50,000 including machinery. Work is under way on extensions in the coal breaker.

The Metropolitan-Royalton Electric Co., Royalton, Pa., is being organized by officials of the Metropolitan Edison Co., Reading, Pa., to establish a local power plant and system. Hause, Evans & Baker, Harrisburg, Pa., represent the company.

The Candlenas Coal Co., Silver Brook, near Hazleton, Pa., is planning for the installation of machinery at its coal properties, including electric power equipment, hoisting, mining machinery, etc.

In connection with extensions at its plant, the Bryden Horseshoe Co., Catasauqua, Pa., is arranging for the complete electrification of the works, superseding present steam operation. Contract has been let to F. B. Glassmire, Bethlehem, Pa., for a new horseshoe mill unit, with a new rough down mill adjoining. A new gas producer plant will be installed, with two new gas furnaces in the billet department. Machinery from the plant of the Neversiip Mfg. Co., New Brunswick, N. J., recently removed to the local works, will be utilized and considerable additional equipment installed.

The Harrisburg Motors, Inc., Harrisburg, Pa., recently organized under Delaware laws with a capital of $100,000, will act as local representative for the Packard automobile, and will operate a complete machine and repair shop at 1344 Howard Street. H. R. Hamilton is general manager, and Ralph S. Hesser, associate general manager.

The Ulster, Sheshequin and Smithfield Township Electric companies have been organized by O. L. Haverly, Athens, Pa., and associates, to establish power plants and systems in the respective districts for which named. Mr. Haverly will head the companies.

A machine shop will be installed in the two-story automobile service building to be erected at West King and Charlotte Streets, Lancaster, Pa., by John B. Bissinger, 323 Lime Street, estimated to cost $60,000.

The B. B. T. Corporation of America, 810 Atlantic Building, Philadelphia, recently incorporated, will act as American distributers for the products of Barbier, Benard & Turenne of Paris, France, manufacturers of special lighting equipment. Material is at present being imported from the main factory in France, but plans are under way for manufacturing certain parts in this country. W. W. Kellett is secretary-treasurer.

Pittsburgh

PITTSBURGH, Oct. 1.

MACHINE tool business in this territory has suffered a sharp decline the past week, and September, which at its outset gave promise of being a good month in the matter of orders, will prove one of the leanest of the year with most of the trade. The conservatism which has developed among users of steel appears to be spreading into the machine tool buying channels and much of the hopeful feeling which existed in the trade at the beginning of September has disappeared. Business in cranes and other heavy equipment also has been quiet in the past week.

The mills for the East Ohio Mfg. Co., Warren, Ohio which is fitting up a plant for the manufacture of cold-rolled strip steel, were awarded last week. The order was divided between the United Engineering & Foundry Co., Pittsburgh, and Blake & Johnson, Waterbury, Conn. The latter will furnish four 8-in mills, together with recoilers, automatic cutting machine and other auxiliary equipment, and the United Engineering & Foundry Co. was awarded two 12-in. and two 10-in. mills with accessory equipment. Barton R. Shover, Oliver Building, Pittsburgh, is consulting engineer for the East Ohio Mfg. Co.

The Diamond Alkali Co., First National Bank Building, Pittsburgh, recently placed the steel for an extension for its plant at Painesville, Ohio and is inquiring for tools.

Negotiations have been concluded by the Aetna Foundry & Machine Co., Warren, Ohio, for the purchase of the plant and equipment of the Shenango Foundry Co., Sharon, Pa., possession to be effective Oct. 1. The new owner will make improvements and operate as a branch plant.

The Pittsburgh Malleable Iron Co., Thirty-fourth and Smallman Streets, Pittsburgh, has awarded a general contract to Conley & De Mey, 127 North Highland Avenue, for a one-story addition, 95 x 260 ft., estimated to cost $55,000.

Robert Talbott & Co., Fairmont, W. Va., operating coal properties in Monongalia County, are planning the construction of a new tipple. Additional shaker screen equipment, electric power and other machinery will also be installed.

The Penn Public Service Co., Johnstown, Pa., will issue stock for $100,000, the proceeds to be used for extensions and equipment during the year.

The Hupmobile Motor Co., Huntington, W. Va., will install a machine and repair shop in its new local service building, comprising two one-story structures, 90 x 106 ft., and 30 x 90 ft.

The John Eichleay, Jr., Co., Oliver Building, Pittsburgh, operating a marine and shipyard works, structural steel plant, etc., has preliminary plans for a new six-story and basement building at Twenty-first and Wharton Streets, estimated to cost $650,000 with equipment. James P. Piper and Henry M. Kropff, 2237 Oliver Building, are engineers.

The Flow Gas Alarm Mfg. Co., Morgantown, W. Va. recently organized, plans for the establishment of a factory to manufacture alarm devices and equipment. J. S. Facenda, Mona, W. Va., heads the company.

The Warwood Tool Co., Wheeling, W. Va., will commence the erection of a one-story addition to its machine shop, 42 x 85 ft.

A machine shop will be installed in the new two-story automobile service building, 52 x 100 ft., to be erected by W. B. Hohnesk, Jr., Clearfield, Pa., estimated to cost $45,000.

The West Penn Power Co., West Penn Building, Pittsburgh, has arranged for a capital stock issue of $1,500,000, the entire proceeds to be used for extensions in electric generating plants and system and the installation of additional equipment.

The Killarney Smokeless Coal Co., Lynchburg, Va., James Gorman, president, recently organized with a capital of $1,000,000, is planning for the installation of electric power and mining machinery on properties near Killarney, W. Va.

The Grotz Mould & Machine Works, Wellsburg, W. Va., manufacturer of glassworking machinery, plans the installation of additional equipment, including one back-geared shaper, two engine lathes, cylinder grinding machine and other tools. H. S. Grotz is head.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Ridgway, Pa., estimated to cost $160,000, for which foundations will be laid at once. Maurice E. Kressler & Co., Harrisburg, Pa., is architect.

The Kane Mfg. Co., Kane, Pa., manufacturer of wire goods, has awarded a general contract to E. E. Austin & Son, Erie, Pa., for a two-story addition, 40 x 80 ft., to cost $33,000.

The Griffin Mfg. Co., Erie, Pa., has completed the purchase of a factory, a portion of which will be used for storage and the remainder for manufacturing purposes. Equipment consisting mainly of traveling cranes is needed. J. C. Griffin is president.

Buffalo

BUFFALO, Oct. 1.

PRELIMINARY plans are under consideration by the Ford Motor Co., Highland Park, Mich., for a new assembling plant on a 40-acre tract at Buffalo, to supersede the present works at Main and Rodney Streets, which have been outgrown. Locations are under advisement on Hertel Avenue, as well as in the Tonawanda section. It will cost in excess of $500,000 with machinery.

The Board of Education, 1400 Telephone Building, Buffalo, D. J. Sweeney, deputy superintendent of business and accounts, will take bids until Oct. 8 for vocational equipment for various public schools.

The Common Council, Canandaigua, N. Y., is considering the installation of a municipal electric power plant and electrically-operated pumping machinery for the waterworks. Estimates of the cost will be secured by Henry V. Beaman, president Board of Public Works.

P. A. Dunn, 647 East Ferry Street, Buffalo, is planning the establishing of a new factory to manufacture small machine parts for automobiles.

The Tonawanda Power Co., North Tonawanda, N. Y., has acquired a site at Main and Sommer Streets for a new power house.

The Trico Products Co., Ellicott Street, Buffalo, manufacturer of automobile equipment, metal stampings, etc., has plans for an addition to cost $100,000 including equipment.

The International Time Recorder Co., Endicott, N. Y., manufacturer of factory time clocks, etc., is reported to be planning for enlargements.

The Buffalo General Electric Co., Electric Building, Buffalo, has plans for a new generating plant at Hamburg Pike and Childs Street.

The Premier Mill Corporation, Geneva, N. Y., recently organized with a capital of $200,000, is planning the installation of equipment in a local building to manufacture grinding apparatus. S. K. Nester, one of the heads of the company will do the purchasing.

J. A. Cramer, 1010 Main Street, Buffalo, will commence the erection of a three-story addition to his automobile service and repair works, 50 x 130 ft., at 173-77 Pearl Street, to cost $65,000. A. H. Hopkins, 447 Main Street, is architect.

A machine and repair shop will be installed in the new two-story automobile service and repair building, 42 x 110 ft., to be erected by John A. Markett, 157 West Tupper Street, Buffalo.

The S. M. Ryder Mfg. Co., Niagara Falls, N. Y., manufacturer of capping machinery, etc., is planning to rebuild the portion of its factory recently destroyed by fire, and will install additional equipment. S. M. Ryder is head.

The Sommers-Farnsworth Motors, Inc., Clifton Springs, N. Y., is planning for the installation of tools and other equipment for an automobile service and repair department. D. F. Sommers is head.

The General Railway Signal Co., Rochester, N. Y., and the Federal Signal Co., Albany, N. Y., have been consolidated, and the business will be continued under the name of the former company and manufacturing operations will be concentrated at Rochester and the equipment of the Federal company will be moved there.

Baltimore

BALTIMORE, OCT. 1.

THE plant of the Maryland Metal Products Co., Hagerstown, Md., has been acquired at auction by the Poole Engineering & Machine Co., Baltimore, for $160,000. The Poole company used the plant during the war to fill contracts and owned 50 per cent of the bonds of the company. Plans for the future use of the works have not been formulated.

The Baltimore Copper Smelting & Rolling Co., Canton, Baltimore, has acquired the adjoining property, formerly occupied by the Canton Distillery, for $110,000. It will be held for possible future expansion but no plans are being made for extensions at present.

The Baltimore, Chesapeake & Atlantic Railway Co., Pier 1, Pratt Street, Baltimore, will erect a one-story machine shop at Pratt and South Streets.

John C. Easley, Lynchburg, Va., is planning to contract for the manufacture of electric switching equipment, encased in metal casting box, for automobiles and is desirous of getting in touch with metal-working plants in position to handle the work.

The Harrison Automobile Radiator Co., 400 North Henry Street, Richmond, Va., has inquiries out for a lathe, drill press and other equipment.

The General Purchasing Officer, Panama Canal, Washington, will take bids until Oct. 8 for equipment for the Canal Zone, including steel drill rods; 9000 ft. plow steel hoisting rope; 2000 ft. iron or steel rope, ¾ in. diamater; barbed wire, spring wire, etc., circular 1559; until Oct. 10 for 16 drill chucks; 500 ft. of chain; 6 scales; nickel chrome steel pinions; wire; brass tubing; etc., circular 2334.

The Columbus Brick & Tile Co., Columbus, Ga., has acquired 225 acres and plans for extensions and the installation of electric power and other machinery.

The Board of Education, Macon, Ga., will build a one-story vocational shop, 25 x 122 ft., in connection with a new three-story high school estimated to cost $350,000, for which foundations will soon be laid. A list of equipment to be installed will be advertised in the near future. C. H. Bruce is superintendent.

The Rhodolite Co. of New York, Inc., recently organized by Warren R. Palmer, 149 Broadway, New York, and associates, has leased the abrasive properties of the Carolina Abrasives Co., near Willits, N. C., and plans the installation of machinery for development and operation, including electric power equipment It is purposed to purchase and assemble the equipment in New York, and remove as a unit to the plant. R. S. Perry is directing engineer.

The Hatfield Resilient Wheel Co., Munsey Building, Baltimore, Schuyler C. Hatfield, head, is planning the construction of a new two-story factory 50 x 150 ft., to manufacture special automobile wheels. Metal-working and wood-working machinery will be installed.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Oct. 16 for 19,350 sq. ft. of copper wire cloth, for the Hampton Roads and Norfolk Navy Yard, schedule 1360; until Oct. 23 for 4000 ft. of electric wire for the Mare Island Navy Yard, schedule 1357.

The Atlantic Coast Line Railway Co., Wilmington, N. C., is taking bids on a general contract for its new car construction and repair shops at Rocky Mount, N. C., to cost $90,000 with equipment.

Fire, Sept. 23, destroyed the three-story plant of the J. Elwood Cox Mfg. Co., High Point, N. C., manufacturer of bobbins and other textile mill equipment, with loss estimated at $100,000 including equipment. It is planned to rebuild.

The Pyramid Motor Co., 403 North Tyron Street, Charlotte, N. C., will install a machine and repair shop at its proposed service building at East Avenue and North Davidson Street, 140 x 200 ft., for which plans will soon be prepared. Frederick Anderson is general manager.

The Fairfax Pink Granite Co., Inc., 21 Chain Bridge Road, Cherrydale, Va., recently organized with a capital of $50,000, has tentative plans for the installation of a new crushing plant, electrically-operated; electric power equipment and other apparatus. John T. Mallon is president and manager.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for an electric hoist, 10 to 12-hp., also, for one well-drilling machine, and a gasoline locomotive, Plymouth type.

The Chief of Engineers, Room 2825 Munitions Building, Washington, will take bids until Oct. 16, for 25 ventilating blowers, complete with motors and starting regulators, advertisement 24-120.

The Victory Mining Co., Oakland, Md., recently organized with a capital of $500,000, is planning the installation of electric power equipment, hoisting and mining machinery on local properties. G. S. Hamill heads the company.

Electric traveling cranes, hoisting, conveying and other machinery will be installed at the new piers and warehouses to be erected by the Western Maryland Railroad Co., Baltimore, at the McComas Street terminal, estimated to cost $3,000,000.

The Rockingham Paper Co., Rockingham, N. C., recently organized, is planning the erection of a new mill, 80 x 200 ft., with a daily capacity of about 10 tons. A power house will also be built. H. C. Wall is president and E. L. McCall, secretary and treasurer.

The Virginia Fuel Corporation, Portsmouth, Va., recently organized, is perfecting plans for new works at Norfolk, Va., to manufacturer fuel briquettes. Machinery will be electrically-operated. A power house is also planned. S. W. Williamson is general manager.

The Common Council, Goldsboro, N. C., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks, estimated to cost $60,000.

Detroit

DETROIT, OCT. 1.

WORK will commence on a two-story addition to the plant of the Rickenbacker Motor Co., 4815 Cabot Street, Detroit, estimated to cost $75,000, for which a general contract has been awarded to F. J. Winter, 2331 Dime Bank Building.

The Common Council, Grand Haven, Mich., has completed plans for a one-story municipal electric light and power plant to cost $80,000. A. C. Slark, 1151 Columbus Avenue, is architect.

The Detroit Aero Metals Co., 657 Lycaste Avenue, Detroit, recently organized, is having plans drawn for six one-story units, each 60 x 260 ft., to cost $200,000 with equipment. J. E. Thompson is president.

The Reo Motor Car Co., Lansing, Mich., has excavations under way for an addition to its power plant to double the capacity. Work is in progress on other additions to the automobile buildings.

The Nizer Laboratories Co., 3345 Grand River Boulevard, Detroit, manufacturer of refrigerating equipment, cabinets, etc., a subsidiary of the Arctic Ice Cream Co., Detroit, has acquired the plant of the Commerce Motor Car Co., 7424 Mackie Street, with buildings totaling about two acres of space. The new owner will use the property as a new plant for its regular line of manufacture.

Frank Bromley, 2642 East Grand Boulevard, Detroit, is considering plans for a new one-story foundry at Hamtramack, estimated to cost $25,000.

The General Cabinet Co., Battle Creek, Mich., recently organized, has leased the Buck Building, Barney Street, and will install equipment for the manufacture of radio cabinets and kindred products. Clyde D. Buck heads the company.

The Detroit Torch & Mfg. Co., 12441 Cardoni Avenue, Detroit, is said to be arranging a list of machine shop and other equipment at its plant for increased output. It manufactures brass products.

The Michigan Central Railroad Co., Detroit, has awarded a general contract to the Ellington Miller Co., 417 South Dearborn Street, Chicago, for a new engine house and shop at Grand Rapids, Mich., estimated to cost $65,000.

The Cadillac Motor Car Co., 2860 Clark Street, Detroit, has filed plans for a one-story addition to cost $75,000.

Manual training equipment will be installed in the new two-story and basement junior high school addition to be erected at Royal Oak, Mich., estimated to cost $150,000, for which foundations will soon be laid. Frederick Madison, 212 First State Bank Building, is architect.

The Buhl Stamping Co., 2730 Scotten Street, Detroit, manufacturer of stamped metal products, will build a two-story addition to cost $30,000.

The Kalamazoo Sanitary Mfg. Co., Kalamazoo, Mich. is planning the erection of an addition, 275 x 500 ft., to cost $350,000 including machinery.

The Martin-Parry Corporation, 6201 Woodward Avenue, Detroit, manufacturer of automobile bodies, with headquarters at York, Pa., has leased a portion of the former plant of the Milburn Electric Co., Toledo, Ohio, manufacturer of electric automobiles, for branch works.

The M. Mitshkun Co., Detroit, is looking for several steel buildings suitable for reconstruction.

Cleveland

CLEVELAND, Oct. 1.

BUSINESS continues rather dull with dealers and sales are mostly in single machines. Among orders placed during the week was one for four 15-in. motor-driven lathes, which were purchased by the Wilson Transit Co. to be installed on lake boats for repair work. A tendency is noted among lake transportation companies to add to equipment for repairing boats which do not necessitate taking into a shipyard or dry dock.

Orders and inquiries for automatic screw machines show improvement, but with a number of machine tool builders orders have fallen off and September business was disappointing.

The Ford Motor Co. has purchased 14 4-in. and two 3½-in. upsetting machines from a Cleveland manufacturer. This is the largest order for forging machinery placed in a long time. The Rickenbacker Motor Co., Detroit, has an inquiry out for 6 lathes and is expected to buy considerable other equipment. The Chevrolet Motor Co., Detroit, is figuring on the purchase of a round lot of machinery but has deferred buying temporarily.

Plans for the reorganization of the Universal Crane Co., Elyria, Ohio, have been completed and the company has passed to the controlling interests of the Threw Shovel Co., Lorain, Ohio. A new corporation under the same name will be formed and $200,000 in prior preferred stock and 20,000 shares of a total of 30,000 shares of no par common stock will be taken by the Threw interests. The old stockholders of the Universal Crane Co. will exchange their stock for $275,000 in new preferred and will also have 10,000 shares of the no par common stock. F. A. Smythe, president Threw Shovel Co., will probably be president of the reorganized company, and David L. Johnson, the present secretary, will remain in the same capacity. The new financing will provide additional working capital and funds for adding new equipment. Some additional equipment will be purchased shortly.

The Gabriel Mfg. Co., Cleveland, makers of shock absorbers for automobiles, will erect a two-story addition 40 x 160.

The Illinois Alloy & Mfg. Co., South Dearborn Street, Chicago, has purchased the plant of the Standard White Metal Co., Elyria, Ohio, which recently went into the hands of a receiver, and will equip it for the manufacture of pistons, piston rings and bearings. An extension will be erected providing 22,500 sq. ft. of additional floor space. The officers are T. H. Reeves, president; V. A. Dorszeski, secretary and treasurer, and E. M. Williams, vice president and general manager.

The plant of the United Stamping & Machine Co., East 168th Street and Waterloo Road, has been purchased at receiver's sale by the bond holders, who have organized the Metal Stamping & Mfg. Co. with a capital stock of $150,000. W. H. Kelly is president. The company will manufacture metal stampings.

The Homer Engineering Co., Canton, Ohio, is adding equipment to its plant, more than doubling its present capacity. In addition to increasing its motor machine shop equipment, it is installing machinery for the operation of a general manufacturing and sheet metal specialty department.

The Wheeling Match Co., Wheeling, W. Va., has taken the bids for an extension, 100 x 200 ft.

The City Ice & Fuel Co., Cleveland, will erect a 100-ton ice manufacturing plant and enlarge another from 75 to 130 tons daily capacity. It will also erect an 80-ton plant and a storage building at Mason City, Ill., and is planning extensions to its plants in Columbus and Cincinnati, Ohio.

The Philips Body Co. has purchased a factory in Warren, Ohio, formerly occupied by the National Lamp Works, which it plans to equip for manufacturing purposes.

The White Motor Co., Cleveland, has taken an order for 500 taxicabs for the Quaker City Cab Co., Philadelphia, amounting approximately to $1,750,000.

The Cambridge Steel Products Co., Cambridge, Ohio, is in the market for a straightening machine for light rails up to 40 lb.

The Roxana Petroleum Co., Lima, Ohio, has tentative plans for new works to manufacture lubricating oils, estimated to cost $300,000 with machinery.

The Ohio Power Co., Canton, Ohio, is disposing of a bond issue of $6,000,000, the proceeds to be used for the construction of a generating plant at Philo, Ohio, with initial output of 70,000 kw., with new transmission lines.

Chicago

CHICAGO, Oct. 1.

SALES totals of Chicago machine tool merchants in September were the smallest of any month this year. As October opens, inquiries are more numerous, although actual orders are still few and far between. Many users have postponed their buying program until the first of next year and sales of new equipment are still impeded in various directions by offerings of used machinery. The equipment of the bankrupt Mitchell Motors Co. plant at Racine was recently put on the market. On the other hand, prospects for a resumption of railroad buying grow brighter. The large Burlington list has been completely tabulated and today was placed in the hands of the purchasing department with the likelihood that orders will ensue shortly. The Illinois Midland, a small railroad in this State, has purchased an 18-in. by 10-ft. engine lathe. The Sullivan Machinery Co., Michigan City, Ind., has closed for a 20-in. motor-drive shaper. The Burlington has ordered 10 floor grinders, these machines having been handled separately from the list aforementioned.

Among inquiries may be mentioned one from the U. S. Engineers Office, War Department, 537 South Dearborn Street, Chicago, which calls for a single quotation on a 15-in. pipe line dredge and the following tools: A 16 to 27-in. gap lathe, a 16-in. shaper, a 26-in. upright drill, a 12 x 2-in. emery grinder, a 2½-in. drill grinder, a 5-in. hack saw and a 30-in. grindstone. Schweitzer & Conrad, 4435 Ravenswood Avenue, Chicago, are in the market for two 20-in. or 24-in. drill presses with tapping attachment, a No. 2 Kempsmith or equivalent plain miller, and a No. 7 Foster hand screw machine, or equivalent. The Geuder, Paeschke & Frey Co., Milwaukee, is in the market for a straight-side double crank press, double geared with friction clutch, weighing 32,000 lb., opening in bed about 27 x 46 in., width between uprights about 54 in., stroke of slide 9 in. and 14 in. bed, one or two straight-side single-geared trimming presses weighing 10,000 lb., with 12 x 12-in. opening in bed, 20 in. or narrower between uprights, and three to four-in. stroke of slide; and one or two inclinable open back presses, weight about 6500 lb., not geared, with 3-in. stroke of slide, 10 to 11 in. die space, and a fly wheel weight of 1000 lb. The Pullman Co., Chicago, is inquiring for a double end punch with 18-in. depth throat to punch ⅝-in. hole through ¾-in. plate.

The Whiting Corporation, Harvey, Ill., has taken orders for a No. 4 cupola from the Newman Foundry Co., Kendallville, Ind., and a No. 5 cupola from the Pittsburgh Valve & Fitting Co., Barberton, Ohio.

The Western Electric Co., Hawthorne, Ill., has leased from the Ashland Industries Corporation, Chicago, Building N and part of Building O of the former Symington gun

plant at Seventy-fourth Street, 200 ft. west of Ashland Avenue, Chicago, containing 160,000 sq. ft. of floor space. Fully 100,000 sq. ft. will be used for manufacturing purposes and the remainder will be occupied by the merchandise department. More than 1000 people will be employed.

Henry Newgard & Co., electrical contractor, 947 West Washington Boulevard, Chicago, is taking bids through an architect on a three-story factory, 75 x 118 ft., 125 South Morgan Street, Chicago, to cost $90,000.

Fire recently damaged the plant of the Peerless Level Co. at Sterling, Ill.

The Falls Foundry Co., Cedar Falls, Iowa, has completed the foundation of a new foundry building, 70 x 120 ft.

The Michigan Seating Co., Jackson, Mich., is taking bids on construction of a five-story addition, 77 x 132 ft., to contain a power house.

The Toppins Tractor Truck Co., First National Bank Building, Chicago, recently incorporated, is manufacturing a truck chassis with a Fordson engine. At the present it is having its trucks manufactured by contract and is not in the market for metal working machinery. Officers are J. A. Morner, president; Ross D. Netherton, vice-president; B. F. Riplinger, second vice-president; P. D. Gates, secretary-treasurer.

The Superheater Co., 17 East Forty-second Street, New York, is preparing plans for an addition at East Chicago, Ind., 120 x 210 ft., to cost $75,000.

The Western Fruit Express will build a car repair shop at St. Paul, Minn., to cost approximately $150,000.

The Knickerbocker Case Co., Fulton and Clinton Streets, Chicago, is in the market for an alloy suitable for manufacturing trays, and is desirous of getting in touch with producers. Aluminum has been tried, but is not satisfactory.

The Reliance Electric Co., 1313 Moorman Street, Chicago, manufacturer of electrical equipment, has awarded a general contract to the Stoddard Peterson Co., 60 West Washington Street, for a two-story and basement addition, estimated to cost $55,000. Edward Leiss is president.

The Williams Sealing Corporation, Decatur, Ill., manufacturer of metal bottle caps, bottle-capping machinery, etc., is disposing of a bond issue of $150,000, a portion of the proceeds to be used for extensions. George A. Williams is president.

The Eagle Iron Works, 301 East Court Street, Des Moines, Iowa, will take bids for a new one and two-story foundry, 65 x 140 ft., estimated to cost $50,000. At the same time, bids will be asked for a two-story pattern shop, adjoining, 61 x 65 ft., to cost about $20,000. Work is now in progress on a two-story machine and structural shop, 80 x 275 ft., estimated to cost $55,000, and equipment will soon be installed. The Canfield Engineering Co., 406 Flynn Building, is engineer. Theodore Aulman is head.

The Lane Oil Heat Mfg. Co., 111 Endicott Arcade, St. Paul, Minn., manufacturer of oil heating equipment, is planning for the erection of a new factory on site soon to be selected. John J. Lane is president.

The Webster Brothers Mfg. Co., Waucoma, Iowa, manufacturer of wooden boxes, cases, etc., is considering plans for a one-story factory at Mason City, Iowa, estimated to cost $75,000. Machinery will be electrically-operated. N. A. Webster is president.

Manual training equipment will be installed in the two-story and basement high school to be erected at Carleton, Neb., estimated to cost $90,000, for which plans are being prepared by Fiske & Meginnis, Bankers Life Building, Lincoln, Neb., architects.

The Pike Rapids Power Co., Little Falls, Minn., is planning the construction of a new hydroelectric generating plant at Pike Rapids, estimated to cost $100,000, with machinery.

The National Plate Glass Co., General Motors Building, Detroit, has awarded a general contract to Jobst & Son, Lehmann Building, Peoria, Ill., for the initial units of its [illegible] at Ottawa, Ill., operated in the name of the General Plate Glass Co., with power house, estimated to cost $5,000,000 with equipment.

The Free Sewing Machine Co., Rockford, Ill., has tentative plans for rebuilding the portion of its factory [illegible] by fire Sept. 11, with loss estimated at $750,000 including equipment.

The National Crushed Stone Co., Sioux Falls, S. D., care of Chenaweth & Rettinghouse, Paulton Block, engineers, is contemplating the installation of a new stone-crushing plant [illegible] crushing machinery and power equipment.

The Union Drawn Steel Co., Beaver Falls, Pa., announces the appointment of the Milton Pray Co., with offices in the Mercantile Building, San Francisco, Bradbury Building, Los Angeles, and the L. C. Smith Building, Seattle, as Pacific Coast representative.

Milwaukee

MILWAUKEE, Oct. 1

MACHINE tool plants in Milwaukee and in other production centers throughout Wisconsin are receiving an increasing number of orders, none of which is large but makes up a fair aggregate. The labor situation is still an aggravating one, and while in most cases the capacity required by current business is not nearly the maximum, it is extremely difficult to secure the skilled men needed. This condition, to a certain extent, is holding down foundries and machine shops, which are now getting better orders for immediate as well as future delivery. The Gisholt Machine Co. at Madison is advertising for lathe, planer and milling machine operators to handle a moderate accumulation of orders.

The B. F. Sturtevant Co., Hyde Park, Boston, is buying considerable new machinery for installation in its new Western center at Sturtevant, Racine County, Wis. It is now employing 100 operatives and expects to increase the number to at least 300 by Jan. 1. The foundry is being rehabilitated and will be placed in operation between Jan. 1 and Feb. 1. The Sturtevant works have orders amounting to more than $500,000. H. W. Page is general manager at Sturtevant.

The Milwaukee Stamping Co., Sixty-fourth and Fullen Avenues, West Allis, Milwaukee, has increased its common stock from $500,000 to $600,000. It has no intention of making extensions immediately, but this is in prospect, due to the crowded condition of the plant. Small purchases of additional equipment are being made from time to time. August J. Petrie is president and general manager.

The Builders Veneer & Woodwork Co., Rio Creek, Wis., has let contracts for a veneer mill and factory, 50 x 120 ft., two stories, to be ready Dec. 1. Purchases of equipment are now being made. The original plant was destroyed by fire several weeks ago and all machinery was ruined. About $65,000 will be invested in building and equipment. Matthew Bank is president and manager.

The Stanley Baggage Co., Stanley, Wis., has been incorporated with a capital stock of $40,000 to manufacture trunks, suitcases, traveling bags and similar merchandise. It takes over an existing concern and plans to enlarge its factory, adding considerable new machinery, including facilities for making its own stampings and other metal parts. P. A. Fein, O. W. Henderson and S. F. Weber are the principal owners.

The Roberts Brass Co., Lincoln Avenue and Alexander Street, Milwaukee, has placed contracts for a one-story addition to its foundry and machine shop, estimated to cost $25,000, including additional equipment.

The Green Bay Motor Car Co., 316 North Jefferson Street, Green Bay, Wis., will remodel its sales and service building and erect an addition to provide space for an extension of the machine shop. It will cost about $30,000 complete. William H. St. John is principal owner.

The Gerke Concrete Block Co., Merrill, Wis., is erecting a two-story addition, 35 x 75 ft., and a power plant extension, 26 x 30 ft., one-story, and is buying miscellaneous equipment, including a new boiler.

William P. Schwartzburg, North Milwaukee, Wis., will enlarge the garage and service station at Hammond Avenue and Forty-third Street by a one-story addition, 60 x 80 ft., to be used largely for machine shop and service purposes. The investment will be about $25,000.

The Lemm Electric Co., 3324 Fond du Lac Avenue, Milwaukee, will build a new electrical equipment repair and service shop, 30 x 68 ft., at 3404 Fond du Lac Avenue.

The Hoyer Engineering Co., 281 Grove Street, Milwaukee, contemplates the erection of a brick and steel machine shop, 50 x 120 ft., on a site to be selected shortly. Thomas Kotting is president and general manager.

Trustees of St. Agnes Hospital, 390 East Division Street, Fond du Lac, Wis., are preparing to build a two-story power plant and boiler house, 60 x 120 ft., and will purchase additional generating and boiler equipment, pumps, etc. The work is in charge of Schmidt, Garden & Martin, architects, 104 South Michigan Boulevard, Chicago.

The Danish Pride Milk Products Co., Sparta, Wis., plans a $50,000 factory addition to quadruple its existing capacity and will require additional boilers, pumps, tanks, motors and other equipment. M. R. Frederickson is general manager.

The Board of Public Works, Fond du Lac, Wis., will take bids soon on a sewage ejector and other equipment for an addition to the pumping plant of the sewage disposal system. J. P. Hobkowski is secretary.

The General Distributing Co., Appleton, Wis., has been capitalized at $50,000 to deal in mill, factory and shop equipment, electrical appliances and devices, and general industrial machinery. The incorporators are F. F. Daneiko, D. J. Jacobson and Eva Daneiko.

The United States Engineer Office, Government Building, Milwaukee, is asking bids until Oct. 30 for the complete work of constructing a steel barge with derrick, for use in the Great Lakes district. The cost is estimated at about $75,000.

Cincinnati

CINCINNATI, OCT. 1.

THE week showed a little more activity in the machine tool industry. Some fair-sized orders were booked, including a number of miscellaneous tools from a Michigan automobile manufacturer. Single tool orders were also received from the railroads, and at least one safe company in the district was a purchaser of a fair-sized list. While orders were scattered, the week was notable for a healthy increase in inquiries, a number of manufacturers reporting that they had quoted on more business the last week of the month than during all of the three preceding. Second-hand machinery dealers report a fair business, particularly in small tools.

Negotiations are in progress toward a reorganization of the Monitor Stove & Range Co., Cincinnati, which has been operating under a receiver for the past year. Plans provide for the purchase of the controlling interest of the present owners by a group of local business men.

The Cincinnati Industrial Investment Co., Cincinnati, has been incorporated with a capitalization of $1,000,000 by local business men, to assist manufacturing plants in financing their business, and also to aid outside manufacturers in locating in Cincinnati. The company will cooperate with the industrial extension department of the Chamber of Commerce in securing new industries for the city.

W. M. Ginder, Columbus, Ohio, and associates, have purchased the patents and rights to manufacture time locks held by the Recording Devices Co., Dayton, Ohio, subsidiary of the R. L. Dollings Co., which recently went into bankruptcy. Mr. Ginder has as yet made no plans for manufacturing.

The Mitchell Engineering Co., Springfield, Ohio, manufacturer of polishing machinery, has increased its capitalization from $10,000 to $25,000 to provide additional equipment to expand its activities. J. A. Hynes is president.

The Dayton Fan & Motor Co., Dayton, Ohio, has leased two buildings adjoining its plant, giving an additional 20,000 sq. ft. of floor space, which will be utilized primarily in the manufacture of radio parts. Some new equipment has been purchased.

Manual training equipment will be installed in the new two-story high school to be erected at Nelsonville, Ohio, estimated to cost $175,000, for which foundations will be laid at once. William Mills, Nelsonville, is architect.

Indiana

INDIANAPOLIS, Oct. 1.

PLANS are being completed for a one-story addition to the factory of the Rockwood Mfg. Co., 1801 English Avenue, Indianapolis, manufacturer of pulleys, transmission equipment, etc., to be 30 x 115 ft., estimated to cost $75,000 including equipment. Motherhead & Fitton, 540 Meridian Street, are architects.

Fire, Sept. 22, destroyed a portion of the plant of the Amco Mfg Co., 1022 East Michigan Street, Indianapolis, manufacturer of shock absorbers, automobile equipment, etc., with loss estimated at $60,000 including equipment. It is planned to rebuild. William B. Paul is president.

The North Star Coal Co., 301 American Trust Building, Evansville, Ind., recently organized with a capital of $100,000, is planning for the installation of electric power equipment, hoisting apparatus and mining machinery. L. C. Oliver is president.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has acquired property at Pratt Street and Senate Avenue, Indianapolis, for a new two-story factory branch to cost $55,000.

The La Salle Paper Co., South Bend, Ind., will take bids early in October for a new one-story and basement mill, 50 x 400 ft., at Mishawaka, Ind., estimated to cost $100,000 with machinery. A new power house will also be erected. Freyermuth & Maurer, Farmers' Trust Building, South Bend, are architects. Claude N. Nicely is president.

The H. T. Electric Co., 612 North Capitol Avenue, Indianapolis, manufacturer of electrical equipment and supplies, will take bids in October for a one-story and basement addition, estimated to cost $30,000. Edward D. Pierre, 321 Occidental Building, is architect.

The Indiana Reinforced Concrete & Culvert Co., 702 Morris Street, Indianapolis, has commenced the construction of a one-story plant, 90 x 120 ft., at 850 South Harding Street, to cost $30,000. Additional equipment will be installed. E. S. Smith is head.

The Gulf States

BIRMINGHAM, Oct. 1

FIRE, Sept. 21, destroyed the plant of the Hall Foundry & Machine Co., Jacksonville, Tex., with loss estimated at $50,000 including equipment. It is planned to rebuild.

The J. E. Taylor Mfg. Co., San Antonio, Tex., has tentative plans for the establishment of a factory to manufacture children's vehicles, carts, etc. It is proposed to purchase wire and disk wheels in the outside market and the company is desirous of getting in touch with manufacturers. Local headquarters are at 1501 Travis Street.

The Great Southern Lumber Co., Bogalusa, La., has tentative plans for a new pulp mill in the vicinity of New Orleans, estimated to cost $500,000 with machinery. A power house will also be built.

S. F. Dean, Finance Commissioner, Board of Prison Commissioners, State Penitentiary, Huntsville, Tex., will receive bids until Oct. 22 for machinery and tools for installation in the wagon plant at the institution, including automatic filing and setting band saw; vertical boring machine; iron bed wood-turning lathe; spoke facing machine; lag screw boring and driving machine; double spindle shaper; automatic double mortising and boring machine; double belt sander; wheel rim finishing machine; automatic spoke driver; heavy power feed rip saw; automatic axle lathe; automatic wheel boxing machine, and other tools, as per list on file.

Fire, Sept. 22, destroyed the refrigerating plant and other portions of the meat-packing factory of Swift & Co., Birmingham, with loss estimated at $250,000, including machinery. It is planned to rebuild.

The Brown Paper Mill Co., Monroe, La., has placed contracts with the Chesapeake Iron Works, Westport, Baltimore, for traveling cranes for its new mill, and with the Reading Chain & Block Co., Reading, Pa., for several hand-operated cranes. Orders for additional equipment will be placed soon. Superstructure work on the plant has commenced and it is expected to be ready for service in the summer of 1924. The plant will cost about $1,000,000 with machinery. George F. Hardy, 209 Broadway, New York, is architect and engineer. H. L. Brown is president.

The Snyder Utilities Co., Snyder, Tex., is completing plans for an ice-manufacturing and cold storage plant to cost $50,000.

The United States Engineer Office, Mobile, Ala., will take bids until Oct. 8 for one extra heavy, three-side orange peel bucket and one extra heavy clamshell bucket.

Manual training equipment will be installed in the new high school to be erected at Denton, Tex., estimated to cost $150,000, for which foundations will be laid at once. W. G. Clarkson & Co., First National Bank Building, Fort Worth, Tex., is architect.

A power house and refrigerating plant will be constructed by the Texas Packing Co., 110 Milan Street, Houston, Tex., in connection with its proposed five-story meat-packing plant, 56 x 118 ft., estimated to cost $100,000. M. P. Burt, 206 Falls Building, Memphis, Tenn., is engineer.

The Atlantic Coast Line Railway Co., Wilmington, N. C., is completing plans for additions in its car and locomotive shops at Montgomery, Ala., estimated to cost $500,000 including equipment.

The Bluff City Motor Co., Natchez, Miss., will install a machine shop in its new two-story service building, 95 x 125 ft., estimated to cost $55,000. R. E. Bost, Natchez, is architect.

The Birmingham Water Works Co., Birmingham, is planning for extensions and improvements in its plants and system and will install electrically-operated pumping machinery, including a centrifugal unit of 2,000,000 gal. daily capacity at the Rosedale high service station, with auxiliary equipment.

The Gadsden Cooperage Co., Gadsden, Ala., has tentative plans for rebuilding its power house and portion of its plant recently destroyed by fire with loss estimated at $45,000, including equipment.

The Peerless Motor Car Co., Cleveland, is perfecting plans for the establishment of a factory branch at Dallas, Tex. Temporary quarters have been leased on Commerce Street, and within the next six weeks removal will be made to a larger building on Main Street. Plans are now being drawn for a new building, with machine shop, service works and parts department, to cost $75,000. George B. Gillespie will be one of the heads of the local branch.

The Common Council, Kenedy, Tex., plans the installation of electrically-operated pumping machinery in connection with extensions in the waterworks, estimated to cost $30,000. John W. Thames is mayor.

Plans are under way for a reorganization of the Athens Ice Co., Athens, Tex., preparatory to the construction of a new ice-manufacturing and refrigerating plant to cost $75,000. H. A. Drane is manager.

The Central South

ST. LOUIS, OCT. 1.

BIDS will soon be called by the United States Foil Co., 2934 Grand Avenue, Louisville, for the erection of a one-story foundry. O. P. Ward, Lincoln Trust Building, is architect. R. S. Reynolds is president.

The Dawson Daylight Coal Co., Louisville, recently organized, will commence the construction of a tipple near Dawson Springs, Ky. A mechanical washery will also be built, and electric power equipment, loading, conveying and other machinery installed. K. U. Meguire, Louisville, heads the company.

Manual training equipment will be installed in the new junior high school to be erected on Shartel Street, Oklahoma City, Okla., estimated to cost $150,000, for which bids have been asked on a general contract. Layton, Smith & Forsyth, 701 Southwestern National Bank Building, are architects.

The Board of Education, Stillwater, Okla., has plans for a one-story manual training building at the local school. J. J. Patterson, Stillwater, is architect.

The Common Council, Herndon, Kan., has arranged a bond issue for the installation of a municipal electric plant and system. W. B. Rollins & Co., 521 Railway Exchange Building, Kansas City, Mo., is engineer.

The Kansas Electric Power Co., Leavenworth, Kan., is disposing of a bond issue of $1,000,000, the proceeds to be used for extensions in generating plants and system and the installation of additional equipment.

Fire, Sept. 19, destroyed the plant of the Blytheville Compress & Warehouse Co., Blytheville, Ark., with loss estimated at $400,000, including presses and other machinery. It is planned to rebuild.

The Common Council, Gallatin, Mo., is planning for the installation of additional equipment at the municipal electric power plant, including engine, motors and auxilary equipment. C. W. Billings is manager.

Manual training equipment will be installed in the new high school to be constructed at Second and Bridge Streets, Frankfort, Ky., estimated to cost $150,000, for which bids will soon be asked on a general contract. Frank L. Packard, 1212 Hayden Building, Columbus, Ohio, is architect.

The Drakesboro Coal Co., Mogg, Ky., recently organized with a capital of $400,000, is planning the installation of electric power equipment, hoisting, and other coal-mining machinery on local properties. Claude Nichols, Mogg, and Edgar Nichols, Central City, Ky., head the company.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for an automotic saw sharpener for circular saws up to about 64 in. in diameter.

The Common Council, Thayer, Mo., is planning the installation of electrically-operated pumping machinery in connection with a new waterworks plant estimated to cost $55,000. A special election has been called to vote bonds.

The M. & F. Light & Power Co., Flemingsburg, Ky., recently organized, is planning for extensions in power house and system, lately acquired, including the installation of additional equipment for service at Flemingsburg, Maysville and vicinity.

The Wilson Milling Co., Wilson, Ark., is planning the installation of an oil-operated engine, generator and auxiliary equipment at its power house, estimated to cost $30,000.

The American Brake Shoe & Foundry Co., McCormick Building, Chicago, will take bids for the initial units of its proposed plant at North Kansas City, Mo., consisting of a foundry, sand and cleaning shop, and machine and repair shop, estimated to cost $300,000 with equipment. Thomas Finigan, vice-president, is in charge.

The Common Council, Holdenville, Okla., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks, estimated to cost $50,000.

The Canadian Valley Utilities Co., Drumright, Okla., has tentative plans for extensions in its electric plant and system. The company recently increased its capital to $150,000.

Revised plans are being drawn for the new factory branch to be erected by the Westinghouse Electric & Mfg. Co., East Pittsburgh, on Milwaukee Avenue, Kansas City, Mo., to cost in excess of $90,000, for which bids will soon be asked on a general contract. P. H. Anthony, 1108 Waldheim Building, is architect. Local offices of the company are in the Orear-Leslie Building.

Canada

TORONTO, Oct. 1.

DEMAND for machine tools was slightly stronger the past week and sales of one or two machines to a customer reached a good volume. Large lists, however, are still absent from the market, although inquiries for equipment for several plants have recently made their appearance. The automobile industry is constantly entering the market for tools, the pulp and paper industry has been a factor in the steady improvement, and several plants are to be erected in Canada during the next few months which will help to stimulate the demand. Mining interests are making important inquiries and machinery interests look for an active demand for this class of equipment throughout the fall and winter.

The Standard Paper Box Co., 2724 Park Avenue, Montreal, is in the market for an 80 hp. boiler.

The Laurentian Timber Products Co., St. Jerome, Que., is building a plant to cost $25,000. J. Coderre, 6331 St. Charles Street, Montreal, is receiving prices on sawmill equipment.

T. E. Bissell Co., Elora, Ont., is building an addition to manufacture agricultural implements and is in the market for machinery and tools.

The Yorkshire Wool Stock Mills Co., Almonte, Ont., will spend about $50,000 on new machinery to replace that recently damaged by fire.

The Victoria Lumber & Mfg. Co., Chemainus, B. C., is having plans prepared for a boiler house to house seven boilers generating 4600 hp., and to cost $30,000.

L. Villeneuve & Co., 2599 St. Lawrence Boulevard, Montreal, is in the market for band saw and other equipment for a sash and door factory. M. Paquette is purchasing agent.

The Boake Mfg. Co., Dartnell Avenue, Toronto, proposes to erect a woodworking factory to cost $150,000. It is inquiring for prices and information on sash and door machinery, including planers, saw and tenon machines.

J. S. Sutherland, Dayton, Ohio, is preparing plans for a pulp mill to be erected at Winnipeg, Man., to have a daily capacity of 100 tons and cost approximately $1,250,000.

The Hollinger Consolidated Gold Mines, Timmins, Ont., is receiving bids for the construction of buildings in connection with a power development project and will soon be in the market for switchboards, series transformers, meters, etc.

The Harbor Commissioners, Quebec, have called for bids for the construction of a power plant and cold storage warehouse. Tenders for the machinery and equipment will be called separately.

Work has been started on a power plant for the village of Port Elgin, N. B., for which $9,000 worth of equipment will be required.

The Town Council of Jonquiere, Que., is erecting a hydro-electric power development plant at a cost of $75,000 and will install 1500 and 1800 hp. turbines. J. M. Lacroix is clerk. J. F. Grenon, Cincinnati, Que., is engineer.

The Dominion Creosoting & Lumber Co., South Vancouver, B. C., will start work soon on the erection of a mill and creosoting plant on River Road, to cost $250,000.

Belleville, Ont., will call for bids at an early date for a gasoline driven pump approximately, 3,000,000 gal. capacity; also pumping station building to cost $26,000. Gore, Nasmith & Storrie, Toronto, are engineers.

The Yellow Fir Lumber Co., Sathlam, B. C., whose plant was recently destroyed by fire will rebuild immediately at a cost of $50,000.

The Dominion Wheel & Foundries, Ltd., 131 Eastern Avenue, Toronto, will build an addition and bulk tenders are being received by S. J. Nell, manager.

The Beaver Truck Co., Hamilton, Ont., will erect two factory buildings at Brampton, Ont., to cost $150,000. It has secured a 5 acre site and the buildings will be 100 x 350 ft. and 70 x 120 ft., respectively, of steel and concrete. Automobile trucks will be manufactured.

It is reported that plans have been completed and construction will start immediately on the power development project at Bryson, 50 miles above Ottawa, for the Ottawa River Power Co. It is a subsidiary of the Ottawa & Hull Power Co., and owns a site at Bryson. Work on the transmission line to Ottawa is expected to be completed this month.

The Pacific Coast

SAN FRANCISCO, SEPT. 26.

WORK will commence on a branch plant on Seventy-eighth Avenue, Oakland, Cal., for the Victor Talking Machine Co., with headquarters at Camden, N. J., to be two-stories estimated to cost $100,000 with equipment. William Knowles, Central Bank Building, Oakland, is architect.

The Union Rock Co., Azusa, Cal., operating a quarry and rock crushing works, has plans for additions estimated to cost $50,000, exclusive of machinery. The equipment will comprise electric power apparatus, crushing machinery, etc., and will cost approximately a like amount.

The Western Vacuum Ice Co., 235 Montgomery Street, San Francisco, has preliminary plans for a new ice-manufacturing plant to be one-story, 65 x 110 ft., with extension, 35 x 75 ft., estimated to cost $100,000 with machinery. Henry W. Meyers, Kohl Building, is architect. E. W. Crellin is head.

The Common Council, Aberdeen, Wash., is considering plans for a municipal hydroelectric power plant on the Wynooche River, estimated to cost $2,000,000 with transmission system.

The City Council, Clarkson, Wash., is planning for the installation of electrically-operated pumping machinery in connection with new municipal waterworks estimated to cost $300,000, for which bonds are being arranged.

The Grinnell Co., 453 Mission Street, San Francisco, manufacturer of fire extinguishers, etc., has awarded a general contract to the Austin Co., Santa Fe Building, for a one and two-story plant, 90 x 240 ft., at Fifth and Brannan Streets, to cost $80,000.

The Automatic Cain Lock Machine Co., 340 Sansome Street, San Francisco, is planning to remove its plant to a building on Folsom Street where additional equipment will be installed.

Fire, Sept. 21, destroyed a portion of the power plant of the Great Western Power Co., Crockett, Cal., with loss estimated at $100,000, including equipment. It will be rebuilt. Headquarters of the company are at 14 Sansome Street, San Francisco.

The Southern California Edison Co., Los Angeles, will commence the construction of a new storage and distributing plant on a 25-acre site at Alhambra, Cal., to consist of eight individual units, 200 x 500 ft., 80 x 400 ft., 120 x 260 ft., and smaller. One building will be equipped as a machine shop. Electric traveling cranes will be installed, as well as hoisting, loading and conveying machinery. The works are estimated to cost $8,000,000 with equipment.

The California Oregon Power Co., Klamath Falls, Ore., is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for the purchase of the Douglas County Light & Water Co., Roseburg, Ore., and for extensions in power plants and system.

The Pacific Spring Bed Co., 2321 Fourth Street, Berkeley, Cal., is arranging to remove its plant to a larger building at 800 High Street, Oakland, Cal., where additional machinery will be installed.

The Pelton Water Wheel Co., Nineteenth and Florida Streets, San Francisco, will commence the erection of a two-story addition, estimated to cost $100,000 including machinery. W. W. Hanscom, 848 Clayton Street, is engineer.

The Rockford Milling Machine Co., Rockford, Ill., has appointed the Millholland Sales & Engineering Co., 540 Consolidated Building, Indianapolis, as exclusive distributer in Indiana for Rockford milling machines and Sundstrand lathes.

The Valley Rolling Mills, Inc., will move its executive and sales offices from 50 Church Street to 120 Broadway, New York.

Steel and Industrial Stocks

The range of prices in active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	40	41	Int. Har. new...	73½	76½
Allis-Chalm. pf..	90	90⅞	Lima Loco.....	62⅛	65⅛
Am. B. S. & Fdy.	70	71	Midvale Steel....	25⅛	26
American Can..	89⅝	93	Nat. Acme.....	94	101
American Can pf.	107	107⅝	Nat. En. & Stm.	52½	56
Am. Car & Fdry.	153½	157	N. Y. Air Brake.	38	36¾
Am. Locomotive.	68½	70⅛	Nova Scotia Stl..	16	17½
Am. Loco. pf....	115½	115½	Otis Steel	7⅜	7⅞
Am. Radiator....	80	81⅜	Otis Steel pf.....	49⅛	49⅛
Am. Steel Fdries.	35	35⅜	Pressed Stl. Car	48½	50
Am. S. Fdries. pf.	100	100	Ry. Steel Spring.	101	102
Baldwin Loco...	112¾	116¼	Replogle Steel...	10	11¼
Bethlehem Steel.	46⅞	49	Republic	42½	44¾
Beth. pf. new...	91⅝	92	Republic pf.....	87	87
Beth. Stl. 8% pf.	105	106	Sloss	42	43½
Br. Em. Steel...	5⅞	5⅞	Superior Steel...	24	25
Br. Em. Stl. 1 pf.	58⅝	59⅜	Superior Stl. pf.	100	100
Br. Em. Stl. 2 pf.	16¼	16¼	Transue-Williams	31¼	31½
Chic. Pneu. Tool	81	81¾	United Alloy Stl.	30	30½
Colo. Fuel	26	26⅝	U. S. Pipe.....	30¼	33⅛
Crucible Steel...	57½	61	U. S. Pipe pf.....	77⅝	78⅞
Crucible Stl. pf..	86	87	U. S. Steel.....	85⅞	88⅛
Gen. Electric...	168	170	U. S. Steel pf...	116⅞	118⅛
Gt. No. Ore Cert.	26¼	27⅜	Vanadium Steel.	28⅝	29⅝
Gulf States Steel	73½	78¾	Whouse Air Br..	81¾	81¾
Inland Steel....	33⅛	33¼	Ygstown S. & T.	65	66⅛
Inland Stl. 1 pf..	101½	101½			

Industrial Finances

The Iron Products Corporation reports for the six months ended June 30 net income after all charges but before Federal taxes of $1,003,964, equivalent after preferred dividends to $6.84 per share on the 140,854 common shares outstanding. Surplus for the period was $964,472.

Net earnings of the Penn Seaboard Steel Corporation for the seven months ended July 31, after interest charges, expenses and proportion of profit applicable to minority holdings, were $59,819. Output of all plants during the period was 23,205 tons. Extended voting trust certificates for 913,272 shares of capital stock are now authorized to be listed on the New York Stock Exchange.

Plans for refinancing the Hydraulic Steel Co., Cleveland, were discussed at a meeting of the representatives of stock and note holders, Sept. 29, and a committee was appointed to formulate such plans. The meeting was attended by three representatives of the 8 per cent note holders, three of the preferred stockholders and a representative of a security house. The company's financial condition has improved materially recently. It has earned more than the note interest for the last five months but is $1,000,000 in arrears in preferred stock dividends, and the adoption of some financing plan is needed to provide additional working capital.

The Superior Steel Corporation for the six months ended June 30, last, reports net income of $474,247 after expenses and Federal taxes. Net sales totalled $4,664,880. President R. E. Emery said that orders have increased considerably during September. Cold rolled mills are operating at practically 100 per cent but hot rolled mills are running at about 70 per cent of capacity.

The Harrington & King Perforating Co., Chicago, has moved to 5657 Fillmore Street, where it will occupy a new factory. Additional equipment has been installed which will increase capacity considerably.

After Oct. 1, the Michigan office of the Truscon Steel Co. will be located in the new building at 615 Wayne Street, Detroit. The office includes a complete service organization and engineering department. The general advertising department of the company will be located on the same floor with the Michigan office.

New Books Received

Fundamentals of Welding Gas, Arc and Thermit. By James W. Owens. Pages 659, 6 x 9 in.; illustrations 279. Published by Penton Publishing Co., Cleveland. Price, $10.

Cost Control for Foundries. By Frank Everitt and Johnson Heywood, of Miller, Franklin, Basset & Co. Edited by William R. Basset. Pages 226, 6 x 9¼ in.; illustrations 72. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $3.

American Society for Testing Materials. A. S. T. M. Standards adopted in 1923. Pages 126, 6 x 9 in.; illustrated. Published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia.

Kent's Mechanical Engineers' Handbook. By Robert T. Kent, editor-in-chief. Pages 2247, 4½ x 7 in., illustrated. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, $6.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel

	Black	Galv.
⅛ in. Butt	—41	—24
¼ in. Butt	—46	—32
1-3 in. Butt	—48	—34
2½-6 in. Lap	—44	—30
7-8 in. Lap	—41	—11
9-12 in. Lap	—34	— 6

Wrought Iron

	Black	Galv.
⅛ in. Butt	— 4	+19
¼ in. Butt	—11	+ 9
1-1½ in. Butt	—14	+ 6
2 in. Lap	— 5	+14
2½-6 in. Lap	— 9	+ 9
7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18 c. to 19 c.
High brass wire	18½c. to 19½c.
Brass rods	15¾c. to 16¾c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	23 c. to 24 c.
Copper tube, seamless	24½c. to 25½c.

Copper Sheets

Sheet copper, hot rolled, 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14 x 20 Prime	Coke—14 x 20 Seconds
		80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	$10.70	IC	7.00	6.75
IX	13.95	12.55	IX	8.25	8.00
IXX	15.55	13.75	IXX	9.50	9.25
IXXX	17.10	15.30	IXXX	10.75	10.50
IXXXX	18.85	16.80	IXXXX	12.00	10.75

Terne Plates

⅛ lb coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	49c. to 56c.

Copper

Lake ingot	16¾c.
Electrolytic	16¼c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	11c. to 12c.
Solder ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	34c. to 35c.

Old Metals

The market continues dull and values are slightly off. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.25
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, October 11, 1923

ESTABLISHED 1855 VOL. 112, No. 15

White Company Revises Shop Management

Bonus Wage Plan and Other Mechanisms Adopted by Truck Manufacturer—Personnel Research Department a Feature—Provision for Close Touch With Employees

BY F. L. PRENTISS*

THE White Motor Co., Cleveland, for many years has successfully handled its labor problems, has kept its labor turnover remarkably low, and has won the reputation of maintaining the most friendly relations with its employees. Consequently, the White plant by its policy of square and fair dealing has often been pointed out as a conspicuous example of successful industrial management.

The personnel policies followed by the White company have been carried out through three generations and have become traditional with the White family. They were first applied in the 70's in the White Sewing Machine Co.'s plant and are now followed with equal success in a motor truck plant employing 4300 people. Important changes have been made, particularly in the system of management, but the company regards the new practices as a present day application of old time principles.

With relations between management and employees always amicable the company followed a conservative policy and was slow to adopt the newer mechanisms of scientific management. While other companies were adopting new organization plans, employee representation, bonus and piece rate systems, the White company long continued to operate virtually as a one-man organization. It held to a straight day rate for labor and paid wages that kept its men contented and these were often a little higher than the prevailing rates in other plants for corresponding work.

The company's first important change in its industrial relations policy was made in 1915, when it adopted a shop committee plan as a means of exchanging ideas between the management and the men. Thus was established an open forum and no subjects are ruled out of the discussions, not even wages. However, and in this particular it is different from many other shop committee plans, the committees were given no authority. This plan, it may be mentioned, has stood the test of eight years of successful operation.

Following the trend of the times in industrial management, the White company during the past year has made important changes in its organization scheme and with these changes have come the introduction of a bonus system and the working out of various details that are required with the new system of management.

Under the new organization plan full management of the plant is vested in the vice-president in charge of manufacturing, who works through division heads. These executives, the chief engineer, head of factory accounting department, production manager, director of purchases, personnel director, and parts service manager, together with the vice-president, form an executive committee which determines all matters pertaining to plant policy.

Bonus Applied to Machine and Other Work

Under the bonus system the employees are paid the average going wages for the class of work they are doing and the bonus in addition. Time studies were made to arrive at the standard job and bonus classifications. The bonus chart is set at 100 per cent efficiency, but an employee begins to earn a bonus when his production reaches 60 per cent of the standard. If his output reaches 100 per cent his earnings are approximately 25 per cent in excess of the day rate. On the average the men earn about 20 per cent above their regular day rate. Most machine operations and considerable of the assembly work and handling of material are already under the bonus system and time studies are now being made with the view of extending it to other departments where practicable.

*THE IRON AGE, Cleveland.

WITH the relations between the management and employees notably amicable through three generations and with labor turnover unusually low, the White Motor Co., Cleveland, has followed a conservative policy. While other companies were adopting new plans, employee representation, bonus and piece-rate systems, etc., the White company held to a straight day rate for labor and paid wages that kept its men contented. The first important change was in 1915, *when a shop committee plan was adopted. Within the past year other changes, including a bonus system as outlined in this article, have been made. The company regards the new practices, however, as a present-day application of its old-time principles.*

The building of a motor truck involves thousands of operations by a class of employees ranging from common labor to the highest skilled mechanics. All work has been divided into ten classes of jobs. In making these classifications the company has taken into consideration the skill required, time required to learn the job, amount of physical strength required, whether the job is agreeable or disagreeable, whether it is a repetitive operation, and various other factors.

Three rates of pay are provided for each job in order to care for the individual skill of the operator concerned. A beginner at the job is paid the lowest rate, then is promoted to the next higher classification, then to the highest, as his skill increases. These three rates of pay are handled by classifying the job under any one of three basic classifications, for each of which the hourly rate and the bonus rate varies. For example, a job where the average operator would be classified in job class 5, would provide that a beginner would be paid at the rate for job class 4 and an expert would be paid at the rate for job class 6. This automatically cares for a basic pay, and also for a slight variation in the bonus, and enables proper reward to be given the individual.

Specifications have been prepared defining all jobs in the plant. These are typewritten on printed forms and are used to select employees and to see that as far as possible the right man is on the right job. One of these specifications, taking a typical case, shows who supervises the operation, the tools the company and the operator furnish, the material used, the technical training required for the job, the actual operations to be performed, working conditions and the amount of experience required. Other somewhat similar job specifications cover the operation of various types of machines, rather than specifying the operating details for a certain part.

Personnel Director Has Broad Responsibilities

Under the plan of the organization, the personnel director plays a part in the management. Under his department comes personnel research, supervision of training, the medical department, sanitary and safety inspection, the employment department, bulletin boards, the house organ and the preparation of job specifications. One of the personnel departments is called "Personnel Research." The problem of determining the average wage rate for various classes of jobs is one of the functions of the personnel department and the work of the research division is devoted largely to studying economic subjects that affect the rate of wages, published notices relating to wages and employment and government statistics. In other words, the research bureau gathers such information as is needed to intelligently pass on a change in rates, although the rates themselves are set by the factory executive committee. The management believes that economic information to be of any value must be both authentic and up to the minute, and through the research section it aims to have such information always available. The research section keeps a close watch on labor turnover and should the turnover become high in any particular group of employees, it investigates conditions with a view to suggesting changes that may be needed to stop the increase turnover.

Management Keeps Close Touch with Employees

The management through its personnel director has several means in getting in touch with the plant's employees, or in conveying a message to them. These include bulletin boards, moving pictures, the *White Book*, or plant magazine, which is an interesting sixty-page publication, well illustrated and brim full of matter of a personal nature that appeals to the employees, the training departments and the various meetings of the executive and shop committees. It is stated that through one source or another information may be delivered to every man in the plant in three days at the longest.

The bulletin board system is very complete. Throughout the plant are eighty glass-covered bulletin boards on which are posted photographs showing the most approved manufacturing methods for making various parts with accompanying explanations, safety posters and other matter of interest to the men. The matter on the bulletin boards is changed at least once a week. The preparation for material for these boards takes the full time of one employee and part of the time of another. What is regarded as a valuable educational feature is the use of an automatic moving picture machine which shows various approved manufacturing operations on different parts. This machine is operated during the lunch hour and the educational pictures attract a great deal of interest among the men.

The company has no training schools for factory workers. Training of workmen is entirely in the hands of the foremen and this policy has been so successful that the company has never felt the need of making an expenditure for the conduct of training schools. However, it has classes of instruction in mathematics, drawing, business English, and in the mechanics of a motor truck, and in addition a technical apprentice course is provided for college men and other employees of adequate training. Those attending the latter course are given special training in production or special work in the engineering department. Last year over 400 registered in the classes and the most of these were regular attendants at class meetings. Class sessions are held for one hour at 3:45 p. m., starting fifteen minutes after the factory closes for the day.

Starting in a modest way in 1918, the company established a liabrary, which has steadily grown and now contains 875 books owned by the company, and 1200 from the Cleveland Public Library. In addition, there is a technical library in the engineering department. The main library is located in an attractively furnished room 21 by 42 ft., connected to the manufacturing departments.

Employment Department Methods

All applicants for jobs, whether high grade technical men, girls seeking office positions, or factory labor, must pass through the employment office, where they are given identical and courteous treatment. If no position is open, an application blank is filled out and filed in case of a possible need for the service of the applicant later. All men on being hired are given a physical examination, partly to guard against infectious diseases and partly to ascertain what work the applicant is best fitted for. If an applicant proves satisfactory to the interviewer in the employment department, he is interviewed by the head of the department in which he is to work before being hired. A fairly complete record of each man is kept in the employment department; this covering his age, family condition, record in the plant and during employment elsewhere. In addition, condensed information regarding each man is kept on other cards in a visible file.

Food for the men, consisting of coffee, soup, sandwiches and pies, is prepared in a kitchen and delivered to the employees and placed on a table in the locker room. Each employee places his order for what he wants in the morning and pays for it when the order is given. However, it is optional with the men whether they buy all or any of their lunch from the company's kitchen. The kitchen supplies food to about 3000 of the employees. A large cafeteria is maintained for the supervisers and clerical force and in this 500 are fed daily.

Safety inspection work is in charge of a full time inspector, who is given outside expert assistance when needed. One standing rule in the plant is that if a practice is unsafe it must be stopped or made safe. The superintendent and foremen are held responsible for the safe condition of all equipment. The plant hospital is unusually well equipped and has a large staff, including one full time physician, six full time nurses, a part time consulting surgeon, a part time eye specialist and one employee who devotes his entire time in visiting sick workmen at their homes to see if they are getting proper treatment. The hospital facilities are provided for only immediate treatment. The company provides no medical services for the employees at their homes.

Reference was previously made to the shop committee. Each of the fifteen departments, including the office, has its own committee, and each committee member represents ten employees. The committees meet twice a month and discuss such matters as plant and

machinery repairs, replacing of tools with new, operation of the restaurant and kitchen and problems of material and the routing of work.

Good Wages Stimulate Production

The company believes that it gets more work from its men by paying higher than the average wages. It also holds that its ability to pay wages higher than the average is largely due to better than average management and that good wages are largely a question of good management. Under good management it includes skill in planning and routing of work, care in inspecting work, and in procuring uniform materials and training foremen and workmen to use skill in managing their own jobs with the minimum of supervision from the higher ranks. The company aims to inculcate principles of good production management among department superintendents and foremen. Superintendents meet frequently and foremen meet by departments once a week, their sessions occasionally being attended by representatives of the general management, and discuss changes proposed or completed in the production scheme.

Low labor turnover is an important factor in the success of the management of the White plant. As pointed out by the company, low turnover permits of high production, high production permits of higher wage earnings by employees, and high wages, low turnover, and so on. Realizing that providing steady jobs is fundamental in maintaining low labor turnover, the company is filling up the valleys and cuting off the peaks of seasonal demand by manufacturing parts for stock during the dull season and permitting the inventory to run down in the busier season. The labor turnover computed on what is known as the Rochester formula was only 24 per cent during 1922. It is stated that for the past eight years the turnover for men who have been in the company's employ five years was only 6 per cent. The plant has 56 employees who have been on its payroll over twenty years.

WILL HEAR FURNACE CASE

Supreme Court to Pass Upon Power of Federal Trade Commission to Get Cost Data

WASHINGTON, Oct. 9.—The Supreme Court of the United States today through Chief Justice Taft announced that the court would hear arguments in the Claire Furnace Co. case on Dec. 3. This case, which involves a proceeding brought by the Federal Trade Commission against 22 independent iron and steel manufacturers in an effort to compel them to submit cost data and other information to the commission, is one of the most important of the kind that has ever come before the commission. It and the Maynard Coal Co. case have been accepted as a test as to the power of the commission to compel manufacturing and mining interests to provide the commission with reports concerning the cost of production and other items of an intimate business character.

Because of the importance of the Claire furnace case, in which the commission has been defeated in the lower courts, it asked the Supreme Court to advance the date for the argument. The announcement of today of the Chief Justice was in compliance with the request of the commission, made through the Solicitor General of the Department of Justice. Contention was made by the commission that the decisions of the lower courts in the District of Columbia, the Supreme Court of the District, and the Court of Appeals by which the iron and steel interests were granted an injunction restraining the commission from gathering the desired data have hampered the work of the commission in conducting investigations. Being anxious to dispose of the question of its jurisdiction, the commission asked that the Claire case be disposed of as quickly as possible, the outcome of which will be of great importance to both the commission and to the business interests of the country. It is reported, that regardless of the outcome of the Claire furnace case before the Supreme Court, the commission will continue to push the Maynard Coal Co. case, despite its similarity to the Claire furnace case. The Maynard case now is before the Circuit Court of Appeals, the Supreme Court of the District having granted the Maynard Coal Co. an injunction against the commission as had been done in the Claire furnace case. The lower courts based their action on the contention that neither the manufacture of iron and steel nor the mining of coal constituted interstate commerce and that consequently the commission had no jurisdiction to compel the production of cost and other data.

The commission is now engaged in a study of the coal situation at the request of President Coolidge and is going over the voluminous reports of the United States Coal Commission with a view to making recommendations, which, it is said, will deal largely with a better system of distribution of coal to consumers, so as to eliminate as far as possible the profits of middlemen. It is assumed the commission, in view of the adverse decisions for it in the Claire furnace and Maynard Coal Co. cases, will not make any attempt to get cost of production figures in connection with its present coal investigation. The commission feels that inability to get data of this kind directly handicaps its work and it is believed it may seek legislation from Congress, provided it would not conflict with the constitution, so as to empower it with authority to gather the kind of information sought in the Claire furnace and Maynard coal cases.

Clay Fire and Silica Brick Prices Reduced $3 Per 1000

PITTSBURGH, Oct. 8.—Effective last Friday, prices of clay fire and silica brick were reduced $3 per 1000 in all districts. This change establishes a minimum price of $42 per 1000 on high duty clay fire brick and recognizes on silica brick prices which, as intimated in the most recent report on the refractories situation in THE IRON AGE, was quietly being done even by some of the larger producers two weeks ago. There has been a reduction of 50c. a ton in ground clay prices. Former prices for magnesite brick, grain magnesite and chrome brick are undisturbed. Business in clay fire brick and silica brick has been on a tapering scale for several months and as order books have dwindled, competition among producers has increased with the result that prices have shown considerable irregularity. This horizontal reduction of $3 was made necessary by the lower prices developed by the competition for orders. Prices are given on page 1005.

J. H. Williams & Co. Consolidate Brooklyn and Buffalo Plants at Buffalo

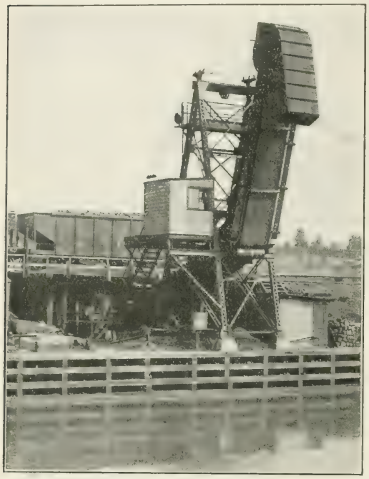
J. H. Williams & Co., manufacturers of drop-forged wrenches and tools, have arranged to consolidate the Brooklyn plant with the one at Buffalo. The Brooklyn property, consisting of 150,000 sq. ft. and additional land having 1252 ft. frontage in the block bounded by Richards, Columbia and Seabring Street and Hamilton Avenue, will be sold. Offering is made as one parcel but proposals to divide will be considered. James B. Fisher Co., 160 Remsen Street, Brooklyn, is agent.

Purdue University, Lafayette, Ind., will offer short courses on "Steel and its Treatment" in 20 Indiana cities during the present scholastic year. Last year classes were held only in Ft. Wayne and South Bend. The courses will consist of six meetings covering the manufacture, hardening and tempering of steel, and will be conducted by John F. Keller, of the university extension staff, under the supervision of Professor Knapp.

New Equipment Facilitates Rapid Coaling of Ore and Coal Boats

Coal conveyors are important factors in enabling ore and coal boats on the Great Lakes to load and unload quickly, but the rapid fueling of vessels so that their will be no delay in replenishing their bunkers is also an important item in effecting quick dispatch of the large cargo carriers. While the quantity of coal consumed by the lake steamers is small as compared with that carried as cargo it amounts to hundreds of thousands of tons per year.

One way of fueling the larger lake boats is by means of elevated pockets located on the docks and



Equipment for Fueling Ore and Coal Boats. The conveyor is shown with the boom folded up

provided with chutes arranged to discharge the coal direct into the fueling bunkers. Another method employed is fueling from lighters which lay alongside a steamer and fill its coal bunkers while it is loading or discharging its cargo. As it is essential that when an order is given for fueling a steamer it should be done at once so as not to cause any delay, consequently a quick means of loading these lighters is necessary.

The Pittsburgh Coal Co. is one of the largest companies handling coal on the Great Lakes and this company has fueling lighters in many of the large ports and fueling docks located on the rivers between the lakes. The latest equipment installed for handling coal from cars in which it is received at the dock to the fueling lighters has just been completed by this company at Ashtabula Harbor, Ohio. The coal is received at the dock in hopper bottom cars on three tracks having a grade sufficient to handle the cars by gravity to hoppers located underneath these tracks. Each hopper is fitted with an apron feeder which discharges the coal to a 54-in. belt conveyor. This belt conveyor is carried out over the slip as shown in the illustration and the outer end is made to fold up clear of the dock line when not in use. The extreme end is fitted with a swinging teloscopic chute so that the coal may be discharged in the pockets on either side of the lighter. The illustration shows the conveyor with the boom folded up.

This conveyor is electrically operated and the driving of the belt, the hoisting and the lowering of the boom and the operation of the chute are effected by independent motors. The feeding aprons are driven from the belt conveyor motor gearing, each apron being fitted with a clutch so that the coal can be discharged to the belt conveyor from any one of the three hoppers under the tracks. All the motions of the apparatus are controlled from the operator's cab, which is so placed that he has a full view of all parts of the conveyor as well as the coal from the time it is received in the hopper until it is discharged into a lighter. This conveyor was designed to handle coal at the rate of 1000 tons an hour, but has actually operated at a capacity of from 1400 to 1500 tons per hour.

This apparatus was designed by J. E. A. Moore, consulting engineer, Cleveland, and was built by the Pittsburgh Coal Co. for the New York Central Railroad, and operates on the latter company's tracks.

Micrometer of Great Accuracy

WASHINGTON, Oct. 9.—A micrometer of the accuracy of hundred thousandths of an inch has been constructed by the Bureau of Standards for measuring the diameter of 12-in. porcelain cylinders to be used in electrical measurements. In order to obtain this degree of accuracy, says a statement issued by the bureau, it is necessary to operate the micrometer from a distance and to take readings from it through a telescope lest the heat of the observer's body warp the thick steel ring enough to cause an error. Both instrument and cylinder must be kept in a constant temperature box during the measurement.

The micrometer consists of a cast iron ring large enough to pass easily over the 12-in. cylinders. On opposite sides are the micrometer screw and the contact pin, while at right angles are adjustable lugs for centering the device on the cylinders. The micrometer screw is driven by a tiny electric motor and when it has pushed the cylinder against the contact pin, the latter breaks the motor circuit and stops the screw. The whole device, when in use, is suspended by three light rods and can move freely the short distance required.

The cylinders which are to be measured will be wound with wire on a precision lathe and will form inductance coils of very accurate construction whose inductance can be calculated from the dimensions.

This research is part of a program for standardizing all of the electrical units in terms of the fundamental standards of length, mass and time.

Inland Negotiates to Take Over Smaller Plants

While the Inland Steel Co., Chicago, has not yet purchased the Acme Steel Goods Co., Chicago and the Milwaukee Rolling Mill Co., Milwaukee, as recently reported in some quarters, negotiations to that end are in progress with the possibility of their completion within the next two or three weeks. The Acme Steel Goods Co. has a plant in Chicago with an annual capacity of 30,000 tons of light cold-rolled strip steel, and a plant at Riverdale, Ill., with a production of 60,000 tons of hoops and bands annually. It is also constructing a large new cold-rolled strip mill at Riverdale, which will be completed in November. The Milwaukee Rolling Mill Co., Milwaukee, Wis., incorporated in 1920, has eight hot sheet mills and four stands of cold rolls, with an annual capacity of 85,000 tons of black and galvanized sheet.

Welsh Steel and Tin Plate Companies Combine

A newspaper cablegram from London states that Richard Thomas & Co., steel and tin plate manufacturers of Swansea, have acquired more than 80 per cent of the shares of the Grovesend Steel & Tin Plate Co., also of South Wales. The latter company will remain a separate entity, but there will be a complete fusion of interests.

The combination will have 159 tin plate mills with a capacity of 8000 tons per week, while the steel output at full capacity will be about 12,000 tons per week.

Outlook in Machine Tool Building

Immediate Promise Not Good but Bright Future Forecasted for the Makers of the Master Tools of Industry at Meeting Last Week

MACHINE tool questions affecting the metal working industries generally were discussed at the annual meeting last week at Lenox, Mass., of the National Machine Tool Builders' Association. Frank statements were made of a present unsatisfactory state of demand for machine tools and of a poor outlook for the immediate future, but of the ultimate activity the meeting was highly encouraging in pointing out the definite trend toward things mechanical and toward continued further improvement of existing mechanisms, all calling for new machinery and more metal cutting and therefore for more machine tools.

To this picture of what is to come, Edward J. Kearney, secretary and treasurer of the Kearney & Trecker Corporation, Milwaukee, and retiring president of the association, made the outstanding contributions. His presidential address, reviewed at some length elsewhere, outlining chiefly the marked strides being taken by the railroads to improve mechanical devices, succeeded in creating the belief by inference that there is an unmistakable expansion broadly in the industries in the way of devices and mechanisms for labor saving and efficiency promotion. It should be added that his address had another aspect and that was that the transportation act must not be tampered with by the next Congress, that transportation is too vital for the country's welfare to be made longer a football of politics and that if the railroads are given a chance to continue to work out their salvation, needed improvements, recognized by many of the railroad executives as necessary, will forthwith be made, including even the replacement of antiquated shop machinery by machine tools which may require in some cases only one-third the number of men now employed.

In respect to the prospects of the machine tool builder, Mr. Kearney in the course of the meeting, referred also to an important development in the art of printing calculated to bring about a new and large manufacture of printing machinery. For the next few months he described business as likely to be neither good nor bad, "but in ten years," said he, "or maybe in five, we shall make more tons of machine tools than ever before in our history."

Other features of the meeting were these: A preliminary report on what may be termed an ideal division of the country for dealer territories; a consideration of splitting commissions between dealers when a machine is bought in one agent's district and delivered in that of another—these covering a conference between representatives of the manufacturers and representatives of the dealers; a tentative draft of a code of ethics and approved business practices, and a specific illustration, explained by General Manager Ernest F. Du Brul, of how one machine tool builder successfully steered his course in the light of the statistics collected by Mr. Du Brul, for all the group of manufacturers making a given type of machine.

The sentiment of the meeting was formally taken at one session and indicated unanimous approval of the present arrangement of convening outside of the large cities and limiting the attendance practically only to members. If it were necessary to describe briefly the achievement of the convention it would be to say that the members have further cemented the friendships and understandings made possible by the few meetings of the present type, particularly in this last one by definitely recognizing on the program the desire for relaxation, such as reserving the forenoons for the playing of golf.

Officers and New Directors

R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt., was elected president for the ensuing year by the board of directors. He was one of the directors elected at the meeting, the others being H. M. Lucas, president Lucas Machine Tool Co., Cleveland, and J. G. Benedict, treasurer and general manager Landis Machine Co., Waynesboro, Pa., and also H. P. Dix, secretary and general manager Wilmarth & Morman Co., Grand Rapids, Mich., elected for the unexpired term of the late Winslow Blanchard, O. B. Iles, president International Machine Tool Co., Indianapolis, was elected first vice-president and Frank N. MacLeod, president Abrasive Machine Tool Co., East Providence, R. I., was elected second vice-president. Mr. Lucas was elected treasurer.



R. E. FLANDERS

Elected President of the National Machine Tool Builders' Association. He is manager of the Jones & Lamson Machine Co., Springfield, Vt., a member of the American Engineering Council of the Federated American Engineering Societies and represents the American Society of Mechanical Engineers on the National Screw Thread Commission. He began as a machinist apprentice in the shops of the Brown & Sharpe Mfg. Co., Providence, in 1897. He was four years associate editor of *Machinery* and joined the Jones & Lamson company in 1912

About half of the membership was present. The meeting took place at the Aspinwall Hotel, Lenox. The first regular session was held on the afternoon of Oct. 2 and there was a session on the evening of that day and a round-table discussion provided on the afternoon of Oct. 3. The evening of Oct. 3 and the morning of Thursday, Oct. 4, were reserved for the usual committee meetings.

The convention voted a strong resolution against any amendments being made to the transportation act.

Learning that Past President J. B. Doan, president American Tool Works Co., Cincinnati, was temporarily confined to a hospital at Utica as the result of an automobile accident, a telegram of good wishes was sent to him.

Numerous topics were submitted for the round-table discussions but there was no active participation in this portion of the program. Mention was made of a plan offered by a Mr. Evans whereby sheets of standards could be drawn up for the benefit of designers, covering the matter of pulley sizes, widths of belting, spindle diameters, sizes of tee-slots and the like, and the president appointed as a committee to look further into the standard data sheet Mr. Lucas and E. P. Burrell, Warner & Swasey Co., both of Cleveland.

Little was said about the prospects of export business. More particularly it was mentioned that the outlook for doing much business with England was poor, due to high prices from the British standpoint, a reaction following the American tariff and a belief that they, the British, are making good machines.

Matters of Research

Mr. Flanders told how steps are now in progress for investigating the strength of gear teeth with the

object of producing a new formula to replace that contributed some 30 years ago by Wilfred Lewis of Philadelphia. The factor to be investigated is the extent that stress increases as the speed increases. This was arbitrarily held to be a fact originally but with better tooth surfaces and outlines common today it is the view that stress does not increase as much as was thought. Mr. Lewis has devised a scheme requiring a special mechanism which will do the testing without destroying the gears and the importance of the investigation lies in the possibility that lighter gears and gears of narrower faces will hereafter be satisfactory for given requirements. The preliminary estimate of the amount of money required is $3,000 and the American Society of Mechanical Engineers has appropriated $400 and Mr. Flanders' explanation was introductory for making a request for contributions from individual companies.

The subject brought up anew the desirability of the association's going vigorously into research work. A stimulating speech on this score was made by Fred A. Geier resulting in a motion, seconded by Edward D. Welles, for the appointment of a committee for technical research. A part of the discussion revolved round the need of a standard respecting the material handled by a machine tool, and E. P. Bullard, Jr., told how in the Bullard shops a given material was compared with a standard which was a material which could be penetrated to a distance of 1 in. in 40 sec. by a definitely weighted drill. A material would be hard or soft according to whether the penetration took a longer or less time than the standard.

The report on the code of ethics was made by H. M. Lucas as the chairman of the committee, of which the other members are F. L. Eberhardt, president Gould & Eberhardt, Irvington, Newark, N. J., and A. H. Tuechter, president Cincinnati Bickford Tool Co., Oakley, Cincinnati. The committee was requested to consider the subject further and submit its revision at a later meeting.

The report of the committee covering the conference with dealers was made by Chairman J. Wallace Carrel, vice-president and general manager Lodge & Shipley Machine Tool Co., Cincinnati. A map of the United States sub-divided in respect to the ideal territories is to be supplied to the members. The division was offered particularly as likely to be helpful in forming new connections or in revamping old territories whenever the desirability or opportunity may arise. As to the splitting of commissions, the meeting took an almost unanimous stand that 50 per cent ought to be sufficient in the average case for the dealer in the territory where the order originates and 50 per cent for the dealer in the territory of destination.

Following are extracts from the address of President Kearney and report of General Manager Du Brul.

Transportation—The Master Key to Progress*

BY EDWARD J. KEARNEY

Retiring president, before the National Machine Tool Builders' Association

MACHINE tools are called, and rightly so, the "Master Tools of Industry;" but they are not a primary product, creating their own demand, or connected, except very indirectly, with individual consumption. They are the instruments necessary to the creation of machines that themselves reach the final consumer, such, for example, as carpet-sweepers, automobiles, and radio outfits, and also for the creation of machines that are many times removed from the ultimate consumer, such, for example, as the steel mills that make the rails, that carry the locomotives, that draw the cars, that deliver to the consumer the carpet-sweeper, the automobile, and the radio outfit. So it turns out that new developments to which we look to give impetus to our industry are not of our creating. When a new machine, or a more highly developed old one, presents a demand, either for greater precision of manufacture or increased production at less cost, we meet that demand and in that way make our contribution to progress.

During the last 60 years there have been many new developments that were of such magnitude and which came forward with such a rush, that they, together with production already established, created a peak demand for machine tools. Every one of these forward movements left the industry on a higher level than before. Among the developments that have given this added impetus to the industry that may be mentioned as examples are the sewing machine, the electric generator and motor, the bicycle, and the automobile.

Reaction After Post-War Boom

The reaction following the artificial stimulus of the war and the post-war boom, when machine tools were in uncompromising demand, has not yet left us. Our suffering has been long and intense. The statistics which we began to gather in 1920 show that as compared with the first quarter of that year, the business of the third quarter of 1921 was only 10 per cent, due to both reduced prices and reduced volume. The gradual improvement that has been made since shows that our factories, taken as a whole, are now working at only about one-third of their capacity. Under such conditions, it is not surprising that many of our members have been forced into receiverships, and the strongest have seen their surpluses diminish, and, in many cases, their capital impaired. There are no figures on which to base the assertion, but it is my belief that a combined financial statement of the industry made now, as compared with three years ago, would show a shrinkage or net loss of at least 25 per cent in the total net value of the industry. When we met in annual convention three years ago, we had on our membership roll 209. Today, it is reduced to 135.

It is not known among business men generally that the machine tool industry suffers during the downward swing of the business cycle to a far greater extent than ordinary manufacturing lines, for the reason that our product is bought mainly during periods of expansion. The carpet sweeper manufacturer, when his business shrinks 5 per cent, buys no more machine tools, so that our business, as far as he is concerned, falls 100 per cent. The example could be extended almost indefinitely. If we were sufficiently numerous to be of importance in our national elections, attempts would long ago have been made to capitalize our distress at the polls. Is it therefore any wonder that we are asking one another whenever we get together by two's and three's, "What is the next development that will sustain the machine tool industry?" Every one has an answer. I have mine. It is general, mechanical, industrial, and agricultural development and prosperity, with transportation the master key to progress. Unfortunately there are certain elements in our political life that would throw the key into the well and prevent entrance into that temple of well-being—"universal prosperity."

Future progress depends on adequate transportation facilities. So important is this that it should be a matter of the most serious concern to every business man and citizen. It is this view that leads me to present an outline of the case and show where we can do something for ourselves and in the public interest.

There are few people not actively connected with railways or who have not made a study of their growth, who have any idea as to the enormous extent to which transportation in this country has grown, or to where

*In his address Mr. Kearney told in some detail of a tour of inspection and interviews with railroad officials and workmen and described at length what the railroads are doing [illegible] with [illegible] improvements on locomotives.

it will lead with the present rate of growth continued. This is why we should be concerned.

Demands on Transportation Systems

In 1880 the per capita travel was approximately 100 miles, which has continued to grow steadily during each decade until it is now about 400. These figures show their true comparison when it is recollected that the population of the United States in 1880 was only 50,000,000, meaning that the number of passenger miles traveled at the present time is over eight times what it was in 1880.

When we come to the study of the subject of freight, we find a similar condition with the difference that the rate of increase is much more rapid. The per capita ton miles rising steadily during the period, multiplied itself about six to one. In 1880 the number of tons of freight hauled one mile was 32 billion; while it is estimated that for the year 1923 it will be beyond 415 billion.

Keeping the Equipment in Service

One of the greatest economies in railway operation is to keep the equipment in use the greatest possible amount of time. In our own business we recognize the value in reduced overhead when our equipment can be used full time, or better still with more than one shift. The same is true of railway equipment. In order to bring this about, there must be facilities for taking care of locomotives at the terminals so that they will be the least possible time out of service. This means better and larger roundhouse facilities, sanding and coaling devices, boiler washing equipment, and last, but certainly not least, modern machine tools for both the roundhouse shop where temporary and emergency repairs are made, and for the general shop where thorough overhauling is done.

Mechanically the railroads are on the way to handle the ever-increasing volume of traffic and to do it so much more economically as to give promise of ultimate freight rate reductions. Our opportunity is in using our influence with those in authority to promote and maintain a Government policy favorable to the development of transportation, the master key to progress. Vital to mechanical progress by the railway is the investment of vast capital. Underlying such investment is confidence in the stability of railway income. Behind this in turn is stability of Government policy. Efforts are being made to repeal the act or so as to amend it that the revival of railroad credit will be impossible and public interest suffer irreparable damage. The immediate objective is a further trial of the transportation act without experimental amendments. In future years the objective is so to guide the progress of perfecting the law that always embedded in it will remain the principle of net income adequate for the attraction of investment capital.

Status of the Machine Tool Industry*

BY ERNEST F. DU BRUL

SINCE our last convention there has been some further recession in orders. At our last meeting we wondered if the slacking off in April was merely a temporary fluctuation. It now looks as though it would be wise to consider the signs, to see if demand is likely to pick up to the March level, which was itself considerably below capacity.

The business cycles have been running from 32 to 44 months, from top to top, or from bottom to bottom. January, 1920, was the recognized peak of the post-war boom—38 months. Later, March, 1923, was a peak. In 1920 it was several months after the peak had passed before men were willing to face the fact that a slump was on.

We have now passed 44 months since the January, 1920, peak, so unless previous history reverses itself, due to causes not now evident, we can fairly believe that business is on a normal down swing at this time.

The machine tool business, compared with some others, got but little action during this period. From signs now apparent it seems to be prudent to prepare for a decidedly lower scale of demand from now on, and therefore to beware of expanding inventories at this time. Hand to mouth schedules are not easy to operate, nor are they pleasant to contemplate, but they seem to be the safest schedules to work to for some months to come.

As nearly as we can estimate from the units shipped by the firms reporting units in certain groups, shipments have been running somewhere around 60 per cent of the 1913 monthly average for the last few months. Taking the war peak as a basis of comparison this means somewhere about 26 per cent of capacity. Of course the war peak was reached by overtime, night shifts and other such supernormal utilization of plant, but in face of plant additions the present shipments are certainly still far below capacity, measured on a one-shift basis.

When the indexes seem to point quite markedly to some recession, should we not be hopeful pessimists rather than reckless optimists? We always have time in this industry, after a decided upturn in general business, to prepare for an oncoming demand for machines. This industry has to worry more about getting overloaded with inventories just before a slump than it does about not having goods enough to supply legitimate purchases on a rise. Even though some seasonal rising movement should develop this fall, it would not be in accord with previous experience for it to continue very long.

Studies of Sales Ratios

Dozens of special services have been rendered to individual members in the past few months, covering about all the subjects listed on our activities chart from accounting to traffic. This is a very gratifying development of the association's work—most of it being of a highly confidential nature.

During the summer the members were asked to join in a study of the ratios of sales to merchandise, sales to fixed assets, and sales to net worth. Twenty-six reports were received from member companies. They are of such different size and manufacture such a variety of product as to be fairly representative of the industry. Averaging these ratios gives some interesting side lights on the financial problems of the industry. A most significant condition is shown by these ratios; a great change seems to have occurred in the rate of turn-over of merchandise, compared to the turn-over of fixed assets. This is strikingly shown on the charts of the results of this study.

In the years 1911, 1912, and 1913, the yearly turnover of merchandise was about 250 per cent, while the turn-over of fixed assets was about 150 per cent. During the war years these ratios came together so that in the years 1919-1922 the inventory turn-over was at just about the rate of turn-over of fixed assets. Does this mean that costs have climbed faster than prices, or has the industry been injudicious in expanding inventory out of proportion to sales possibilities? Whatever the cause of this radical change, it deserves consideration.

A ratio of turn-over lower than before the war shows that the inventory must now be higher in proportion to sales than it was before the war. Each executive should study his own condition to see whether he has too much stock on hand in proportion to his sales. He has little hope of reducing the cost factor of the inventory units. If he cannot reduce the quantity carried, improvement in the ratio can then be realized only by selling more units at the same price, or by getting higher prices per unit sold. But when the quantity sold lies very largely outside of his control,

*From the general manager's report for the annual convention of the National Machine Tool Builders' Association.

he can only look to the price factor for improvement. Here he is limited by competition.

This very limited ratio study has in itself proved the need of much more consideration of finance being given by the executives of the industry. Naturally slow turn-over of fixed assets and inventory requires a relatively high rate of profit to yield an adequate return on investment. Besides a slow rate of turnover, our industry is subject to long periods of depression. It can make its profit and accumulate its reserves only in short spurts of activity.

To this uncontrollable condition add the fact that the tax laws make no allowance for losses in years of depression to offset the gains during the active years. On top of all this throw demands for excessive service to some customers that more reasonable users do not require. Throw on also the complaints that machine tools are too expensive, even though they often save their cost in four, and six months. Add a number of other troubles, and you have quite a bed of thorns on which the "Makers of the Master Tools of Industry" are expected to lie in luxurious ease.

Cooperative study of the facts is necessary before the industry can combat the evils that it complains of. Those executives who know the bearing of these facts owe it to their own stockholders to join in such study, not only for their own information but for the education of those who are not well informed.

Machine Tool Research

Since our last convention several research movements have started in connection with machine tools. Most notable of these is an appropriation of $10,000 per year, from the Michigan Manufacturers Association, placed at the disposal of the University of Michigan for research on questions affecting machine tool design.

The American Society of Mechanical Engineers has appointed a sectional committee to act as a clearing and steering committee on machine tool research. This committee hopes to make available all possible research already done in connection with machine tools. It also hopes to get in touch with all work now going on, so that unnecessary duplication shall be avoided. In addition to this clearing function, the committee will act as a steering committee to set out the main problems in the order of their importance to the industry, and to urge that these be taken up in advance of less fundamental things.

Utilizing Association Statistics

Some of our members still labor under erroneous ideas of our work on statistics. Some think that the statistical work is a burden on our budget. We have five groups making unit reports of orders, shipments and production. These are the lathe, radial drill, upright drill, shaper and milling machine groups. These reports now take up none of the general manager's time, unless something outside of routine work comes up.

With group reports of orders to show the actual course of demand for specific machines, every contributor can plan his own financing and sales production schedules to better advantage. With specific information before you, you can slow down production of slow selling sizes, and speed up on the faster sellers. You can revise your production schedules if a wave of cancellations is reported. You will not be misled into expanding your plant beyond reason, because of a temporary spurt of orders; nor will you work overtime to accumulate a high cost stock when demand is really dropping off.

If your own orders are not coming in as fast as the figures show they ought, you can spur your sales department or push your designers into getting out those improvements that should have been made. If unfilled orders show excessively high you know that you can choose your business; if low you know that you have to fight for business. If shipments are below capacity while current orders are above capacity, you know that production trouble is afoot somewhere. If stocks are high relative to demand, you sense that somebody is going to be pressed for cash. If stocks are low, and demand high you know that production must be pushed up or new competition will spring up to supply the demand. Statistics tell us a lot of things if we will only listen to them. Our reporting groups know that this service is valuable.

*Mr. DuBrul displayed a number of unusually interesting charts. One group showed how one manufacturer compared his own monthly experience with the totality of figures compiled for all makers of his type of machines and was thus able to avoid for example increasing stocks when he should not. He also showed a pig iron price forecasting chart by which he believes he can closely prophesy the trend and extent of pig iron price movements. Also he had on view his arrowhead curves to give at a glance the simultaneous relation and the import of such factors as orders, production and shipments of a given commodity.

Link-Belt Acquires Meese & Gottfried Co.

Charles Piez, president of the Link-Belt Co., Chicago, announces the purchase of the Meese & Gottfried Co., San Francisco, Los Angeles, Seattle and Portland. For the past 10 years Link-Belt Co. has been distributing its products on the West Coast through its subsidiaries, the Link-Belt Northwest Co. of Seattle, and the Link-Belt Pacific Co. of San Francisco. Improvement in distributing facilities is effected by the consolidation and additional manufacturing facilities acquired.

Meese & Gottfried Co. and its predecessors have been manufacturers of power transmission machinery and distributers of conveying and transmission machinery on the Coast for more than 40 years. The new organization will be known as Link-Belt Meese & Gottfried Co., with headquarters at San Francisco. The officials will be: Charles Piez, chairman of the board; B. A. Gayman, president; Harold H. Clark, vice-president and sales manager; Leslie W. Shirley, treasurer and Richard W. Yerkes, secretary.

Mr. Yerkes went to Chicago from the Link-Belt Philadelphia plant, as the newly-elected treasurer and secretary of the Link-Belt Co., to succeed Mr. Gayman. All officers, with the exception of Mr. Piez and Mr. Yerkes, are located at the company's headquarters at San Francisco.

In Seattle, the Link-Belt Northwest offices, warehouse and shop will house the new organization, while at San Francisco, Portland and Los Angeles, the former Meese & Gottfried plants and offices will be used. Offices, plants and warehouses are now as follows: San Francisco, Nineteenth and Harrison Streets; Los Angeles, 400 East Third Street; Seattle, 820 First Avenue, South; Portland, 67 Front Street.

The Link-Belt organization now has manufacturing plants at Chicago, Philadelphia, Indianapolis, San Francisco, Seattle and Toronto, Ont.

During the current year the Polish State Railways expect delivery of 43,880 uew cars, 6375 of domestic manufacture, and 7505 of American 30-ton type, at present in course of delivery out of excess army stocks from the United States, says a report received by the Department of Commerce from the office of the Assistant Trade Commissioner at Warsaw. A deficit of 4050 cars will exist over the estimated requirements for the year. This deficit will be covered by hiring 1737 cars, by the use of foreign return cars and by cars furnished on the basis of agreements covering the use of freight cars in international communications.

James B. Clow & Sons, manufacturers of cast iron pipe, plumbing supplies and heating apparatus, Chicago, have purchased the plant of the Sullivan Machinery Co., manufacturer of mining machinery, on the east side of Talman Avenue, east of the Chicago & North Western right-of-way, running from Lake Street north to Fulton Street, Chicago. The ground area aggregates approximately 149,000 sq. ft., and the total floor area of the buildings is 142,000 sq. ft. This plant was vacated when the Sullivan Machinery Co. moved to its new works at Michigan City.

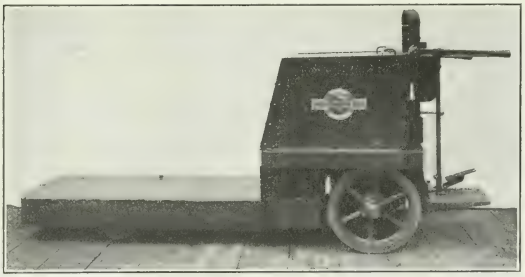
Adds to Line of Industrial Trucks

The Crescent Truck Co., Lebanon, Pa., has added to its line of industrial trucks a four-wheel tractor, designated as the type TT-23, and a type GEL elevating platform truck.

The four-wheel tractor, shown in the left-hand illustration, is designed for heavier work than the company's three-wheel tractor in pulling loads carried on trailers and pulling or pushing machinery or other heavy material into desired locations. It has two wheel drive and two wheel steer. The normal and ultimate draw bar pull is 600 lb. and 2400 lb. respectively, and the speed is 7 to 8 miles per hour light and 5 to 6 miles per hour under load. The wheel base is 42 in.



The Four-Wheel Tractor Is for Pulling Loaded Trailers or Pulling or Pushing Heavy Machinery into Place. The elevating platform truck handles loads on skids, platforms or portable bins



The drive is through a hardened steel worm to a bronze wheel, four pinion bevel gear differential, self-alining ball bearings, to full floating chrome-nickel steel axle shafts. A General Electric Co. 48 volt, 45 amp. 1500 r.p.m. motor is used. The controller is of the drum type, ¾-in. fingers, adjustable, three speeds forward and reverse, the safety switch being also of the drum type and integral with the controller. The circuit is broken automatically when the operator leaves the seat. The brake is of the external contracting type mounted on the drive shaft, and is operated by foot pedal. Heavy bumpers, which are steel castings, are provided front and rear. The overall length is 80½ in., height 52½ in. and width 44 in. The weight of the chassis, without battery, is 2250 lb.

The elevating truck, shown in the right-hand illustration, is for handling material on skids, platforms and portable bins. The platform of the truck may be raised 4½ in., which is accomplished through the truck's power mechanism, and the platform may be raised while the truck is in motion. The truck may also be used as a straight platform truck when material not on skids is to be moved. The capacity is for a load of 4000 lb. and the speed is 6 miles per hour light and 4½ to 5 miles per hour with rated load. The wheel base is 58 in. The tread of the driving wheels is 30 in. and of the trailing wheels 14 in. A General Electric Co. motor is used and a Cutler-Hammer drum type controller providing three speeds forward and reverse and having ¾ in. adjustable fingers. The safety switch is integral with the controller and connected with foot brake pedal.

A separate motor is employed for the elevating mechanism, which consists of inclosed chrome-nickel steel reduction gears, hardened and ground jack-screw and bronze nut, ball thrust and radial bearings, solenoid brake, drum type control switch on the dash, and a limit switch. The platform, which is of ¼ in. steel plate, is 11¼ in. high when in down position and 15¾ in. high in the up position. The time to raise and lower the platform is 10 and 7 seconds respectively. Steering is by means of a vertically operated hand lever, all four wheels being steered. Steering knuckles pivot on ball thrust bearings.

The overall length is 108 in., the width 39 in. and height to steering lever 43 in. The chassis, without battery, weighs 2550 lb.

A Book on Die Castings

The Doehler Die-Casting Co., Brooklyn, has published an illustrated booklet, 4½ x 7½ in., 84 pages, devoted to "Die-Castings; Their Manufacture and Use."

The term "die-casting," as used by engineers in this country, applies to metal castings made by forcing molten metal, under pressure, into a metallic mold or die. The origin of the name is not known, having simply grow up with the industry. The term "pressure casting" is synonymous with "die-casting" and is undoubtedly more descriptive of the product. However, the name "die-casting" has been almost universally adopted for this product in the United States.

Prefacing its booklet with the above explanation, the Doehler Die-Casting Co. proceeds to a thorough discussion of the processes employed in the work, including details regarding the design of dies, design of die-cast parts, cost of dies, life and maintenance of dies, cost of castings, etc. The success met with in the die-casting of zinc, tin, lead and aluminum base alloys, has stimulated attempts to produce die-castings from copper-base alloys, such as the brasses and bronzes, and to this work the booklet also devotes a chapter. Data sheets giving instructions in the use of various metals for die-castings of various kinds occupy a portion of the booklet. Many illustrations show the great variety of products which can be made from die-cast parts. The booklet is of value to engineers, manufacturers and others interested in any way in the use of die-castings.

The rail mill of the Algoma Steel Corporation, Sault Ste. Marie, Ont., has been shut down for an indefinite period. As a result of the completion of rail orders the company recently blew out one of its blast furnaces and now has three furnaces blowing, one of which is on foundry and two on basic. Pig iron is being sold in the United States.

BLAST FURNACE SKIP HOISTS*

Characteristics of Single-Bucket Equipment as to Control of Hoisting Speeds

BY A. C. CUMMINS AND A. R. LEAVITT

IN one skip hoist studied, the first 30 ft. of the incline is at an angle of 45 deg., the next 130 ft. at an inclination of 68½ deg., while the final 20 ft. is at an angle of 20 deg. Each time the angle of inclination of the hoist changes there is a difference in the horizontal and vertical components of bucket velocity and in the relation of each to the other. If the changes in components of the velocity occur too rapidly, bucket oscillations are produced. In the case of this particular hoist, this feature of the design of the incline necessitates operating the hoist at reduced speed past both points of change of incline slope. Such a condition imposes a severe handicap on the performance of the hoisting equipment for a number of reasons.

(a) So much time is consumed in passing over the slow-speed portion of the incline that the maximum speed must be made excessively high, to compensate for the time so lost. The motors must, therefore, be larger, the peak power demand is higher, and the rheostatic losses greater.

(b) High ratio of high speed to low speed gives poor torque characteristics on some types of hoist, even though field control is used. The writers found at one plant that operators frequently must operate magnetic controller by hand, in order to pull buckets that were stuck on the incline on that account.

While there is no question that blast furnace skip hoists are giving reliable and fairly efficient service throughout our furnace plants, tests made indicate that there is still room for improvement. Can the electric hoisting engine stand a comparison with a Unaflow steam hoist if it wastes 73 per cent of the usefui energy in heating resistance, as is now done in the single-motor equipment tested? Even in the modern two-motor equipment 43 per cent of the total energy is used to produce useless heat. It is, therefore, desirable in future installations that attention be paid, not only to obtaining rugged and reliable hoists, where a minimum of service interruption will occur, but also to those features which will bring the efficiencies and performances of our hoists to a point corresponding to the rapid advances in efficiency being made in other branches of our profession.

With this end in view, it is suggested that the following general features be kept in mind when making blast furnace hoist applications.

1. Keep the maximum hoisting speeds as low as possible, and the accelerating rates as high as possible. Keep the period of operation at slow-down speeds short.

2. Keep the incline free from changes of inclination, if possible, but if such changes cannot be avoided have them located near the extremities of the incline.

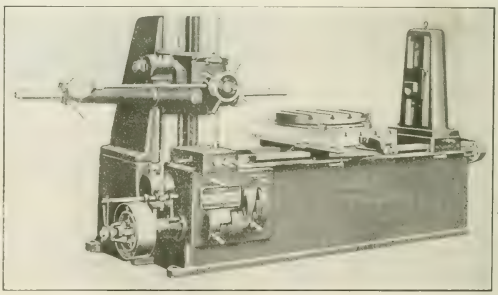
3. Consider the use of types of control which avoid large rheostatic losses, because of the smoother accelerating characteristics, greater efficiencies, greater simplicity, and reduced peak power demands.

*Abstract of paper read at Buffalo convention of the Association of Iron and Steel Electrical Engineers. Both authors are in the electrical engineering department, Carnegie Steel Co., Duquesne, Pa.; Mr. Cummins is electrical superintendent.

Cleveland Boring, Drilling and Milling Machine Improved

The Sommer & Adams Co., Cleveland, has made important changes in the design of the Cleveland horizontal boring, drilling and milling machine which was formerly manufactured by the Cleveland Machine Tool Co. The outer support has been made wider and is now tapered instead of straight as formerly. This, which in the old machine was a single arm with an overhead, has been made a double support, being supported on both sides of the bed. These changes make the head wider at the base and of more rigid construction. The bed has also been redesigned and is of the deep box type, strongly ribbed on the inside.

All gears are inclosed and centralized control is provided, all handles being operated from one working position. The machine is driven by a 14-in. constant speed pulley with a 4-in. belt and has 12 speed changes in geometrical progression. The platen has four ⅝-in. T slots, a working surface of 20 x 42 in. and a power transverse feed of 30 in. in either direction. There are 16 head platen and bar feeds, 8 for each position of the spindle back gear. All feeds are reversible.



The Outer Support Has Been Made Wider and Is Now of Tapered Construction. The bed has also been redesigned

The machine is supplied either with or without a swiveling table above the platen. Its principal dimensions are: Diameter of spindle, 2½ in.; Morse taper No. 5; traverse of spindle, 23 in.; range of feed per revolution of spindle, 0.005 to 0.333 in.; vertical adjustment of head on column, 18 in.; minimum height above platen to spindle, ¾ in.; maximum height above platen to spindle, 19 in. The maximum distance from the face of the platen to the center line of the outer support is placed at 5 ft. in the machine as now designed.

Industrial Activity at Rochester

Metal-working and other industries at Rochester, N. Y., are running full for the most part, with orders on hand to insure this basis of operation for a number of months. The Northeast Electric Co. has adopted an overtime schedule at its electric equipment manufacturing plant, and expects to continue on this basis for at least six months. The Gleason Works, manufacturer of gear-cutting machines, is maintaining active production with regular working force, as is also the Taylor Instrument Companies. Operations at the Eastman Kodak Co. plant have reached the highest point in the history of the organization, giving employment to close to 10,000 operatives in different departments. The Bausch & Lomb Optical Co. is running under heavy production and reports a good volume of incoming business. The Stromberg-Carlson Telephone Co., manufacturer of radio equipment, is maintaining a good basis of production, with full working force.

Steel Needed for Mexican Railroads

Rehabilitation Will Require Large Quantities in Rolling Stock and Trackage—Prospects of Business Coming to the United States

BY JOHN EOGHAN KELLY*

"THE Government is to make prompt return of the National Railway System to private management and to the control of a board of directors agreed upon with the committee. It recognizes its obligation to restore such railroads, including rolling stock, to their condition at the time the Government took over the railroad lines." (Page 7.)

The foregoing paragraph from the "Agreement for the Readjustment of the Mexican Debt" is of the utmost interest, not only to the equipment manufacturers, but to holders of Mexican bonds and to American business generally. For Mexico is one of our best customers; in 1921, without recognition, and with large portions of the country stagnant commercially, the volume of American trade was greater than with France or with Italy. Since the National Railways of Mexico reach every part of the republic except the upper Western corner, and are by far the greatest common carrier, American trade and interests in Mexico will prosper in direct ratio with the condition of the National lines.

Of the 22 issues of Mexican bonds totalling $508,830,777 which are included in the agreement, 14 with a value of $243,734,777 are railroad bonds. Of these, the greater portion cover all or parts of the National system, the remainder the so-called "Anexos" or operated lines. The value of the bonds depends not only upon the stability of government, but upon the earnings of the railroads, and the earnings bear a close relation to the condition of the roads and their ability to handle increased traffic.

The National System

The National system, including the operated lines, contains some 10,000 miles of trackage, about 75 per cent of which is standard gage, with 60-lb. rails. The system connects the important inland cities, such as Mexico, Guadalajara, Saltillo, Monterey, Torreon, Chihuahua, Durango, San Luis Potosi, Zacatecas, Aguas Calientes, Puebla, Oaxaca, Victoria, etc., with the frontier and the ports at Tampico, Vera Cruz, Puerto Mexico, Suchiate, Salina Cruz, Manzanillo, Juarez (El Paso), Piedras Negras (Eagle Pass), Laredo, Camargo and Matamoras (Brownsville). Only one of the privately owned systems, the Southern Pacific of Mexico, serves independent territory, and that region contains few cities of importance. For commercial existence, Mexico is practically dependent upon the National lines.

With the exception of short branches, the entire system is in operation, with schedules closely approximating those of pre-revolutionary days on the main lines. The line from Laredo to Mexico, the principal artery, is in first class shape, with two passenger trains daily in each direction, delays being once more the exception, not the rule. The cars are clean, and Pullman cars operate on the Mexico-Laredo, Mexico-El Paso, Mexico-Guadalajara, Monterey-Matamoras lines. Cars of Pullman construction, owned by the Government, are operated on the Southern lines.

Worked Wonders

Compared with conditions as they existed in 1917, when the railways were at their worst, the administration of the National lines has worked wonders. Other countries might well take a lesson from Mexico in Government operation of railroads. One of the few ameliorations, in 1917, of a ride in a windowless, dusty car, bumping over uneven tracks and packed with tatterdemalion soldiery, was listening to newly arrived students of Spanish striving to pronounce the glaring legends on the car's sides: "Constitucionalistas de Mexico," as President Carranza renamed the National lines.

To return the lines to the condition in which they were when the Government took over control early in the revolution will require the expenditure of large sums for rolling stock, rails, machinery, buildings and supplies, for all of which the United States is the logical market. There are at present in service 649 oil burning locomotives and 296 coal burners. Most of these are of small to moderate size, and many are 15 to 20 years old. At least 200 locomotives are required to refit the system and enable it to handle the expected increase in traffic resulting from the recognition of the Obregon regime. Oil is the logical fuel for Mexican locomotives, because of the poor quality of the Mexican coal deposits and because of the short haul of oil from the Gulf.

Results of Revolution

The revolution took heavy toll of the system's rolling stock. Of the 15,000 freight cars of all classes listed in 1911, but 8760 are in good order today. The various revolutionary leaders used the railroads and cars for troop movements and barracks, and had no compunction in destroying rolling stock and right of way rather than surrender them to a rival. Orozco employed a track crane and locomotive to tear up 70 miles of the Mexican Central north of Chihuahua, piling the ties and rails into great heaps and firing them. For years the twisted rails, like "Jeff Davis' neckties," lay beside the new road. Villa burned hundreds of cars in his raids in Chihuahua, and the story was repeated, in greater or less degree, throughout the republic. The Mexican shops are now said to be building and repairing cars at the rate of 3000 per annum. At this rate, and allowing for repairs to cars now in service, three years would elapse before the pre-war figure would be reached. It is doubtful whether the terms of the agreement would permit such delay. Hence, orders abroad provide the only recourse.

The passenger service is in even worse state. Exclusive of Pullman and sleeping cars, the official report lists only 323 passenger, baggage and express cars in first class shape. These cars are more difficult for the local shops to construct and considerable orders should come to American manufacturers. There is a need for light-weight combination passenger and mail cars for the branch lines. Motor cars should also be of service in the short runs from the trunk roads, such as from Irapuato to Guanajuato, or Zacatecas to Guadalupe.

New Trackage Needed

To restore the trackage, probably not less than 3000 miles of new rails will be required, for both standard and narrow gage lines. A large quantity of cross ties will also be purchased. The railroad shops must have new machinery, and a large number of stations and warehouses must be built. It has been suggested that steel buildings of the Truscon or Bancroft type be used instead of adobe or stone structures wherever feasible. These buildings have given satisfactory service in other tropical countries and should withstand Mexican climates successfully. Other items of the rehabilitation include telegraph, telephone and barbed wire.

The privately owned railroads, such as the Mexico

*Engineer, 30 Church Street, New York.

Northwestern, which runs in a semi-circle from Juarez through Pearson, Madera and Miñaca to Chihuahua City, and the "Queen's Own," as the British-owned Mexican Railroad from Vera Cruz to Mexico City is known, suffered severely, but, as far as regards repairs, they are in a different category. The Mexican Railroad was operated for some years by the Mexican Government and returned early in 1920 to the British management. Only the blessing of a fearless operating staff prevented the Mexico Northwestern from being abandoned, so savage were the assaults upon the line and trains. The private railroads have large claims pending with the Claims Commission for damages and unpaid-for use of trains during the revolution. These claims, which are to be given precedence, will provide funds for the rehabilitation of the private lines.

Needs of Narrow Gage Railroads

Another, though smaller, market for equipment manufacturers lies in the numerous narrow gage railroads being repaired or constructed by the large mining companies. The sugar plantations in Morelos, which often contained up to 75 miles of narrow gage railroad per plantation, and which were looted during the Zapata troubles, are being re-equipped. At one time, 40,000 tons of junk from Morelos plantations was assembled in Mexico City for sale as scrap.

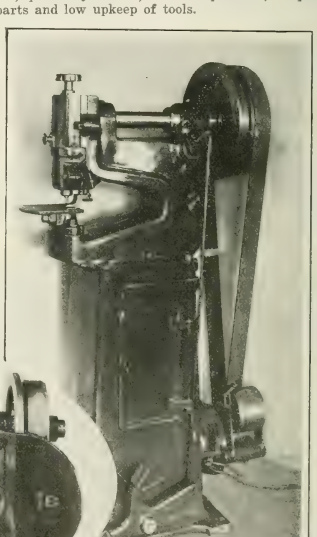
The agreement provides for the return of the railroad management to the corporation owning the lines. The Mexican Government owns or controls a majority of the stock and will have 12 of the 21 directors. The present operating heads have proved efficient, a fact easily shown by the improvements they have effected with the scanty funds at their disposal. It is doubtful, given the strong nationalistic temper of the Mexican people, and the Mexican control of the corporation, whether the reappearance of foreign managers would result satisfactorily. American bondholders and business men are interested primarily in the efficient operation of the lines, that traffic and earnings may be increased, that American trade with Mexico may be facilitated and the bondholders rewarded for their lean years, and the simplest way to this desired end would seem to be to confide the operation of the rehabilitated National lines to the Mexican executives who have brought the system from chaos to its present condition.

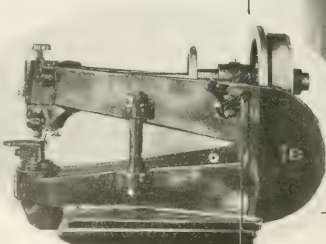
New Nibbling Machines

Two additional machines are now included in the line of nibbling machines being marketed by Andrew C. Campbell, Inc., Bridgeport, Conn. These machines were exhibited at the machine tool exhibition held recently at Yale University, and mentioned in THE IRON AGE report on that exhibition.

The principle of operation of these machines is somewhat on the order of a combination slotting and punching action. The first machine of the line was described in THE IRON AGE last year when the first tool appeared on the market. In this machine sheet stock of whatever material, including steel, brass, aluminum, bakelite, fiber, etc., may be quickly cut to desired outline of regular or irregular contour, through the use of lines scribed on the sheet, or the work may be guided by a template superimposed on it, the amount of feed being governed by a stop pin which is a part of the cutting tool or punch. The older machine is built with a capacity of 3/16-in. mild steel plate and 6-in. throat depth.

One of the new machines is known as No. 1-B and is essentially the same as the No. 1 or 6 in. machine, except that it has a throat depth of 24 in. It will cut a maximum of 3/16-in. stock and requires ½ hp. for that purpose.





The Nibbling Machine With Twelve-Inch Throat Is Shown at Right This machine has a capacity for cutting up to ⅜ in. mild steel. It may be used for roughing-out automatic screw machine blanks, stripper plates, etc. The 24-in. throat machine shown in oval is suited for lighter stock up to ¼ in. where a greater throat depth is required to accommodate wide sheets

The No. 2 machine, which is the second of the new sizes, will cut sheet up to ⅜ in. thickness, for which 1 hp. is required. This machine has a throat depth of 12 in. At the New Haven exhibition this machine was employed on demonstration roughing out Brown & Sharpe automatic screw machine cams. It produced a five-lobe cam from ⅜ in. stock, ready for filing and hardening, in 1 min. 50 sec. It was also used on making stripper plates. The machine is adaptable for production of a limited number of duplicate parts.

For these machines are claimed features of rapid action, quick adjustment, ease of operation, simplicity of parts and low upkeep of tools.

Machines may be furnished for belt drive or may be equipped for direct motor drive.

Specifications

	No. 1B	No. 2
Floor space	3 ft. 2 in. x 2 ft. 2 in.	2 ft. 9 in. x 1 ft. 7 in.
Height	4 ft. 7 in.	5 ft.
Pulley	12 in. x 2 in.	15 in. x 3 in.
Pulley speed, r.p.m.	450 to 500	300
Throat depth, in.	24	12
Horsepower required	½	1
Weight, lb.	770	950
Maximum capacity, mild steel, in.	3/16	⅜

Italian Meeting of Iron and Steel Institute

American Experience with Special Steels Resistant to Corrosion—The "Purer" the Steel the Better for Structural Purposes

(Special Correspondence)

[Continued from THE IRON AGE of Oct. 4. Owing to the pressure upon our columns last week, it was possible to give only the first day's proceedings of the Iron and Steel Institute meeting at Milan, Italy, Sept. 17-18.—EDITOR.]

MILAN, ITALY, Sept. 20.—The Iron and Steel Institute session of Tuesday morning, Sept. 18, was opened with a paper by Dr. W. H. Hatfield on "The Influence of Nickel and Chromium on the Solubility of Steel (in Relation to Corrosion)." Sir William Ellis took up the subject from an engineering point of view and intimated that the work of research was only in its beginnings. It was of the utmost importance to know how the effect of immersion in sea water and exposure to damp air would affect our great steel structures, on which enormous sums of money had to be spent annually by way of applying protecting coatings. If these coatings could be avoided by making a steel that did not need them, even a high priced steel would be possible of consideration. There was a danger in using laboratory figures, in that these were always too high, or exceptional cases which were difficult of regular reproduction on a works scale. Once, however, a long run of actual operation results become available the matter would be different.

Special Steels Resistant to Corrosion

Doctor Mathews, in discussing the paper, stated that the new steels were all right practically and had been developed and tried out sufficiently long to establish their availability in daily practice. They were being made of all kinds of compositions suited to special corrosion resistance needs, and in the United States the trade name Resistol was given the group his company was producing. These steels had been tried out in liquid air—in fact, were used for mechanism operating in this medium—and for conducting acid mine water, with perfect success. The Bureau of Mines had made many tests in this direction, and the iron alloys in question were no longer laboratory curiosities but actual articles of daily works production. It would be of interest to state that Faraday had proposed the use of these steels probably 100 years ago in connection with his search for permanent reflectors. When it comes to cutting these steels, the acetylene torch had to be improved to a great extent before this could be done, and even now it takes 10 to 15 times the effort to do the work as with the ordinary steels.

E. L. Dupuy had observed in high nickel steels a selective corrosion along the lines of separation of the crystals, with the result that a separation of the grains took place. This did not occur when chromium was added. The chromium assured homogeniety of the metal, besides stabilizing the constituents at low temperatures.

Dr. Ridsdale discussed the paper and asked if the Hatfield alloys are now used as resistance grids and heating units for operation with current.

Doctor Hatfield in reply enlarged on the general problem of steel structures. It was a fact that when experimenting with nitric acid on steels of 12 to 14 per cent chromium a remarkable resistance was obtained to corrosion. Even with 5 per cent chromium the resistance was noticable, showing the complexity of the problem. Were it not for the scarcity of chromium, the earth's crust having but 0.35 per cent, the use of chromium steels where corrosion has to be dealt with would not be prohibitive. In the United States copper has been tried along this line—some 0.10 to 0.20 per cent having been used. But copper has not the influence claimed for it. He held that in the final analysis it was a question of pure steel. The purer—that is free from phosphorus, inclusions, etc., the better the steel resisted corrosive influences. Still, that would naturally be the solution for the millions of tons of steel going into structures, while for the hundreds of tons of special work, the new steels could not be surpassed as we know them now. He looked forward to comparing records of English with American steels as the subject was developed further.

The president here read a cable from Sir Robert Hadfield regretting his enforced absence from the meeting and wishing it all success. A reply was ordered by the meeting.

The paper by Cesare Martelli and Toto Sotgia on "The Iron Ore Mines of Nurra (Sardinia)" was read by the secretary and not discussed. Then the paper by W. T. Griffiths on "The Change Points in Some Nickel-Chromium Steels" was read by the secretary, and discussed by M. Dupuy, who did not agree with the second conclusion of the author. In the studies he had made with the Charconard dilatometer on the heating and cooling curves of some chromium-nickel steels in connection with their mechanical properties he had found some differences in the critical points of the curves. Quenching cracks are liable to form, and there is danger in heating the steel too high before quenching.

The paper of E. D. Campbell, J. F. Ross and W. L. Fink on "The Relative Efficiency of Dry and Moist Hydrogen on the Decarburization of Steel at 950 deg. C. and the Effect of Hydrogen on the Phosphorus Content" was read by the secretary. The paper was not discussed.

The remaining papers were read by title. In closing up the sessions a vote of thanks was given the members of the executive and reception committees of Milan, as well as its Chamber of Commerce. The members of the institute and their ladies then proceeded in a body to the City Hall, where a wreath was placed upon the tomb of the unknown soldier. The delegation was received by the Mayor of Milan, with the usual felicitations and responses, and a collation was served.

Works Inspection and Pleasure Trips

In the afternoon the members were taken to visit the large works of the Breda Co. This great plant is essentially a producer of rolling stock. Cars, locomotives, steam and electric, are turned out on a large scale, also aeroplanes in considerable numbers, some being exhibited in action during the visit. One of the striking features of the plant is a great laboratory building, which in effect is a technical school in itself. The wisdom of experimental investigation by competent staffs is here seen very plainly. The ladies were taken to the International Exhibition of Decorative Art at the palace at Monza. Special cars were provided and this beautiful palace, presented to Italy by the King, was inspected and appreciated. In the evening the president of the institute gave a dinner in honor of the Italian metallurgists.

On Wednesday, Sept. 19, a special train conveyed the 180 institute members and their ladies to Lake Como, where a steamer took the party to Caddenabia, stopping at Bellagio on the way. The beautiful Italian lake was enjoyed to the utmost, and on arrival at the destination the party was conducted to the famous Villa Carlotta, where a superb dinner was tendered the party. The excursion was given by the Association

of Italian Metallurgical Industries, and the Italian Government gave the use of the villa for the entertainment—the first in its history for this kind of a reunion. The Villa Carlotta is famous as the Italian home of the Duke of Mecklenburg, and it was confiscated by Italy during the course of the war.

The party returned to Milan in the early evening, and made ready for an early start on an elaborate series of visits to Italian industrial cities, to last until Oct. 3. For this trip an endless round of courtesies had been arranged.

R. M.

FOR TRADE WITH RUSSIA

An American's Observations on Opportunities Now Open to This Country

Herman Saxon of the Allied-American Corporation, 165 Broadway, New York, who has just returned from a five months visit in Russia, sees improving opportunities for trade between the United States and Russia. He says there is still much misunderstanding of conditions in Russia among the people of other countries. The Russian, Mr. Saxon says, has settled down to work, there is no disorder, and while the country still is suffering sorely from the effects of the revolution, it is going ahead to reestablish its industries and agriculture. He believes Russia's ability to import from the United States is considerable, if American manufacturers are willing to make suitable credit arrangements. The Russian Government has the import situation well in hand. No goods can be imported except by Government license, and the licenses are limited to those articles which are regarded as immediate necessities in the rehabilitation of the country. Motor cars, for example, are on the prohibited list for one year, the result being that the limited number of automobiles in Russia are being bartered back and forth at ridiculously high prices.

Most of Russia's imports are now coming from Germany and England, the former country in particular having extended liberal credit. Cotton, tin, lead and other metals, hand tools, small and medium-sized farm implements, and actual necessities, as food and clothing, comprise the bulk of the imports. Russia needs a couple of good crops, Mr. Saxon says, before the country can extend its purchasing power into other channels.

While railroad equipment has deteriorated to a considerable extent, trains are running on all lines. In Petrograd life goes on much as before the war, except for the absence of some of the glitter. Theatres, the opera, street cars, shops, are proceeding along normal lines. The Russian Government is willing to offer concessions to foreign capital to develop oil wells, mining, steel manufacture, etc., and American capital and enterprise are particularly invited.

Mr. Saxon leaves New York this week on a tour to various manufacturing plants in the United States before returning to Russia. His company represents a number of American manufacturers there.

La Follette Coal and Iron Co.'s Improvements

The La Follette Coal & Iron Co., which operates three large coal mines, several iron mines and a blast furnace at La Follette, Tenn., is making a number of important improvements to its manufacturing facilities in the iron department. First is the installation of a pig casting machine of the Pittsburgh coal washer type. It will be a single strand machine but arranged for installing a second strand later. The single strand machine will handle 300 to 400 tons of iron per 24 hrs. The iron will be delivered to the casting machine in Pugh hot metal cars of 75-ton capacity. Special attention has also been given to the form of molds so as to produce pigs which can be easily piled in stock, readily broken and still not be too heavy for one man to handle.

The company is also building a number of concrete ore storage bins to replace old wooden bins. This reconstruction has been under way for a number of years and when the present new bins are completed the entire trestle and bin storage system will be of reinforced concrete, equipped with automatic doors, delivering coke, ore and limestone into charging cars on an outside ground level track instead of the tunnel. The improvement will reduce considerably the number of employees required for handling both raw materials and pig iron.

The La Follette Coal & Iron Co. began a general program of rehabilitation some six or seven years ago, starting with the electrification of the haulage system for the coal mines and the substitution of electric mining machinery for pick mining, followed by the complete re-building and enlargement of the blast furnace in 1921. Plans are under consideration for the installation of a by-product coke plant of sufficient size to take care of the present and anticipated needs of the company.

Stocks of Coal and Coke

WASHINGTON, Oct. 9.—The average stocks of bituminous coal at steel plants on Sept. 1 consisted of 33 days' supply as against 35 days on Aug. 1, while stocks at by-product coke plants consisted of 30 days, as compared with 27 days, according to a report issued by the Bureau of the Census and the Geological Survey. Of the steel works stocks, there were 28 days' supply of steam coal and 42 days' supply of gas coal on Sept. 1, while respective figures for by-product plants were 31 days and 29 days.

The report states that consumers of soft coal continue to add to their storage piles during August and on Sept. 1. They had on hand approximately 56,000,000 net tons, an increase of 4,000,000 tons over Aug. 1. Measured in terms of tons, stocks increased 7.7 per cent in August. Measured in terms of days' supply, the increase was 4.5 per cent. The smaller increase in days' supply is accounted for by the fact that the rate of coal consumption increased in August.

Cast-Iron Pipe Statistics for August

WASHINGTON, Oct. 8.—The Department of Commerce announces statistics on the production, orders, sales and shipments of cast-iron pipe for August, 1923. The report includes returns from 12 establishments and is confined to bell and spigot pressure pipe exclusively. The summary by total tonnage for each of the principal items of the industry is as follows:

	Tons
Cast-iron pipe produced during the month	84,588
Cast-iron pipe shipped during the mounth	84,843
Orders for cast-iron pipe specified to be shipped from stock	14,727
Orders for cast-iron pipe specified to be made on orders	165,518
Orders for cast-iron pipe not specified as to sizes	6,860

Pennsylvania Employment and Earnings

Information supplied by the State Department of Labor and Industry of Pennsylvania for August includes reports from 652 plants having 263,775 employees. The payroll for one week was $7,142,705, giving an average wage of $27.07 per week. Steel works and rolling mills included 42 plants, 47,605 employees, $1,363,898 payroll, and $28.65 average wage. Structural steel works shows the highest average wage of all with $46.04 per week. Glass workers with $40.55 are in second position. Automobile workers had an average wage of $26.20; car builders and repairers of $31.38, employees of foundries and machine shops of $32.47; blast furnace workers of $27.32 per week.

French Industrial Building Construction

Features in a French Automobile Plant Include Glass Roofs, Light Weight Trusses and Tile—Round Pole Framing During the War

BY H. M. LANE

ALL through France the method of building construction varies greatly from that generally found in the United States, and in most cases shows clearly that our French friends have been attempting to save small amounts of metal at the expense of a larger expenditure in fabrication labor than is the case in America.

Another interesting feature in their plants is the extensive use of glass roofs in areaways, connecting buildings, above loading platforms and in other similar locations. This is made possible on account of two conditions which do not exist in most of our country. Both the snow and the wind loads encountered are much less than here. In Paris the temperature is so mild that there is practically never ice enough on the Seine to impede navigation, and they do not have such violent windstorms as we do.

Fig. 1, a glass-covered court between two buildings in the plant of Andre Citroen, illustrates a general type used in many French factories, and particularly in Mr. Citroen's automobile factories. It will be noted that the roof truss is of very light construction, and that there are longitudinal braces made of light lattice trusses. The sheets of glass in the roof itself are considerably over two meters (6½ ft.) in length, but the glass is not wire glass, and in fact wire glass is not extensively used in France.

Fig. 2 shows a loading platform covered with a glass

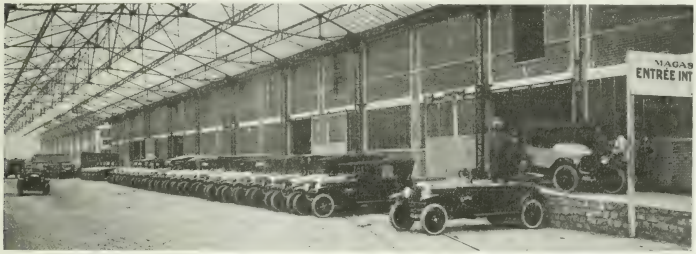


Fig. 1—Glass Roof Court Between Two Buildings. The very light trusses which support this roof, being typical European design, are of considerable interest to American engineers

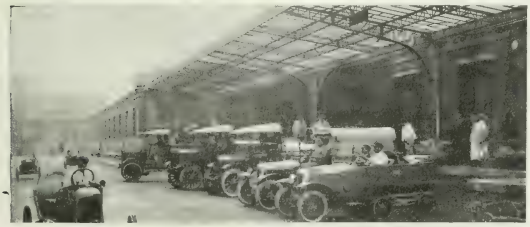


Fig. 2 — Glass Marquise Over Loading Platform. The trusses supporting this roof are typical of ornamental trusses extensively used throughout France, the lower chords of the trusses adjacent to the columns being in the form of arches



Fig. 3—Typical French Saw-Tooth Building. Three adjacent saw-tooth sections of this roof are framed as one truss, and there is a compression member that extends across above the points of the saw tooth

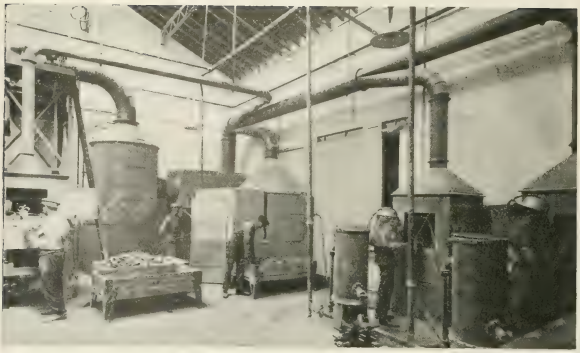


Fig. 4—Sand-Blast Equipment in Heat-Treating Department. Above these machines can be seen a typical French tile roof supported on wooden rafters, with very light wood strips for purlins

roof marquise. This extends out over the main portion of the bodies of the trucks being loaded, and protects the loading operation from the weather. In this case, also, the lightness of the structural steel members is noticeable, but this truss is markedly different from that shown in Fig. 1 on account of the fact that at the column the lower chord of the truss takes the form of an arch, and this is true in many French buildings.

In the right foreground of this view is one of the standard 10-hp. Citroen cars with a caterpillar attachment, such as was used on the cars that crossed the Sahara desert last winter. In the left foreground is one of the 5-hp. cars under test. Around between the buildings is a runway used for testing all of the 5-hp. cars as they are turned out.

Many of the buildings have saw-tooth roofs and there is ample light, which usually is arranged to face the north. Fig. 3 shows, in a portion of the assembly department of the plant, in which the 5-hp. motors are assembled, a considerably different type of roof. The lower chords of the trusses are made of built-up channels or girders, and over the top of the roof are carried top chord members of the truss, so that three saw-tooth bays are spanned by one truss. The roof itself in this case is made of light concrete arches thrown between channels, and this in turn is covered with a standard French tile roof.

Particular attention is called to the height of the plant, and to the remarkably light and airy appearance of the entire structure. This is true of all of the buildings of this organization, and particularly so of the newer buildings. Some of the old buildings which were taken over from previous organizations naturally do not comply with Mr. Citroen's desires so completely as those which have been built under his direct management.

Fig. 4 shows a corner of a sand blast room in connection with the heat-treating department, and in the upper central portion of this can be seen the under side of a typical French tile roof. In this case light steel trusses at approximately 20-ft. centers support light longitudinal lattice members, which in turn carry wooden rafters a little smaller than our 2 x 4's. These in turn carry wooden strips upon which the clay tiles are supported. The individual tiles are not very heavy and this makes a light, substantial roof structure which is used on a large proportion of the French manufacturing buildings.

Fig. 5, another typical illustration in one of the assembly units of the Citroen factory, shows another method of illumination commonly used in these plants. The upper third of the roof is a glass skylight supported on light steel trusses. This illustration shows also the light lattice columns in use, though in this particular plant the columns are much heavier than usual on account of the fact that this building was arranged to carry light traveling cranes if necessary. At the far end of the right-hand bay can be seen the typical arched windows used in the gables of all buildings which run out to the street.

At present progressive assembly is used to a very large extent in putting the cars together, but they now have plans for progressive assembly conveyors, which are being designed by the Palmer Bee Co., Detroit, and progressive enameling ovens, designed by Young Brothers, Detroit. The European markets demand a much wider variety of bodies than do the American markets; this necessitates having on the floor at any given time a large number of body types, as will readily be seen in this illustration.

An article of this kind would not be complete without saying something about the war-time buildings. During the war structural steel could not be had, and yet it was necessary to put up many large manufacturing plants and to put them up quickly. Some French engineers solved the problem in a truly characteristic manner. The buildings were fabricated entirely with round poles just as they came from the tree, the poles simply having the bark removed from them.

Fig. 6 shows a typical interior of one of these build-



Fig. 5—Assembly Department of Automobile Factory. Particular attention is called to the height of this plant, and the amount of light afforded by the central skylight, and also to the arch windows in the end of the building facing the street



Fig. 6—Building with Roof Trusses Framed from Round Poles. During the war it was impossible to get steel and hence a great many buildings were put up in France, the frames of which were constructed entirely from round poles, which were fastened together with bolts, drift pins, and sheet metal strips

ings with its round pole roof trusses. It will be noted that the vertical members in the center of the trusses have been carried 2 or 3 ft. below the lower chord line, so as to afford a joint into which the diagonal longitudinal members which support the ridge could be framed. All of these diagonal braces were held in place by drift bolts or spikes, and, in addition, were joined by sheet metal pieces which were stamped or formed into the approximate shape of the face of the timbers they were to join, and then were hammered into place and nailed to the timbers. The result is a very substantial structure, and these buildings should, in the natural course of events, have a remarkably long life.

WILL NEED MACHINE TOOLS

Probable Requirements of Japan—Narrow Escape from Recent Earthquake

Arthur Jackson, representative of the Potter & Johnston Machine Co., Pawtucket, R. I., was in Japan at the time of the great earthquake. He has arrived in Seattle and in a letter to THE IRON AGE says Japan will need all kinds of machine tools. He gives the following account of his experiences:

"I shall be greatly obliged if you will kindly report in THE IRON AGE the safety of both wife and myself, after going through the Japan earthquake. Jay W. Myers of the National Acme Co. is also safe. I met him on the President Jefferson two days afterward; he was uninjured.

"At the time of the earthquake, I was in our agent's office, the Yamatake Co. of Tokio. The building did not fall but nearly all the buildings around did and the fires started immediately; so it is very doubtful if it is saved.

"I helped in rescue work for two hours and then started to walk to my home in Yokohama. I passed the office of Andrews & George, which was still standing, but the fires were creeping toward it. I passed the following engineering works which were down or on fire: Shibaura Engineering Works, Oki Denki, Nippon Electric Co., all of Tokio; Tokio Gas & Electric Co. of Omori; Niigata Iron Works of Kamata; Nipponophone Co., Tokio Electric Co., and the Kanagafugi Mill, all of Kawasaki; Asano Dockyard of Tsurumi, Yokohama Dockyard and every factory in Yokohama. The Yokosuka Naval Arsenal is also entirely destroyed. There were large oil tanks on the hills above the town of Yokosuka, all of which caught fire and sent streams of fire into the town and dockyard.

"The loss of life is enormous, as many were caught in the factories or in homes and there was no chance of escape. Thousands got caught in the rivers of burning oil that came from the oil stores of the large oil companies. I had many narrow escapes from falling buildings, or of being roasted alive, but I managed to get through it all and found my wife safe, except for a few bruises, in a field near what was left of our house, at 3 o'clock the next morning.

"We walked through the ruins of Yokohama the next day to the shore, where we were picked up by a boat from the Steel Navigator. We stayed on her decks all that night and transferred to the President Jefferson the next day. We were much pleased to meet Mr. and Mrs. R. Kimbara aboard her, both unhurt. Mr. Kimbara is a partner of the Yamatake Co. We lost all our personal possessions, except some underwear, a jacket and a safety razor that I managed to get from the ruins of our home. The clothes that I was wearing were ruined by oil, fire and water.

"Japan will be in the market for every type of machine tool, especially if it is decided to build up the devasted area. It is very doubtful if Yokohama will ever be rebuilt again. It seems as though the factories of Osaka, Kobe and Kyoto will have a very busy time ahead of them, as they are out of the earthquake zone."

Australian Plant Will Need Equipment

WASHINGTON, Oct. 8.—The State Government of Australia has authorized the Chief Commissioner of Railways to replace the present railroad work shops at Islington with an entirely new and modernly equipped plant, says a report received by the Industrial Machinery Division, Department of Commerce from Consul Henry H. Balch, Adelaide, Australia. The buildings and the equipment, according to official estimates, will cost not less than £200,000 sterling. The work will begin at an early date. Some idea of the importance of the shops is obtained from the fact that there are about 2350 miles of railroad lines on which about 500 locomotives are run.

The plant is to be equipped with modern machinery such as any up-to-date railroad shops require, and most of the equipment will have to be imported. The equipment will consist of wheel lathes, ordinary lathes, drills, drill presses, shapers, planers, boring machines, cranes, etc.

"Anti-Friction Bearings in the Steel Mill" is the title of a paper read before the Association of Iron and Steel Electrical Engineers by A. M. MacCutcheon, chief engineer Reliance Electric & Engineering Co., Cleveland. This paper, together with the discussion upon it, has been reprinted by the Reliance company in a pamphlet of 52 pages, which is available for distribution on application to the company. The paper is of general interest and value to users and designers of machinery and power equipment, not only in the steel industry but in other industries.

Low Type of Electric Lift Truck

The Elwell-Parker Electric Co., Cleveland, has brought out a new low type of electric lift truck which has been designed particularly for handling the same load platforms that are used in connection with the hand life type trucks which elevate the load by pushing down the handle. This truck has been developed especially for plants using large numbers of platforms on which material is placed while going through the manufacturing processes or while in storage.

The truck has a riveted steel frame and its motor drives 22 by 3½-in. rubber-tired wheels through a worm reduction running in oil. The frame is suspended on springs over this drive axle. A compartment located directly above the driving axle houses an electric storage battery of either alkaline or lead type. This battery is of sufficient capacity to operate the truck continuously an entire day. It is stated that the motor will drive the loaded truck up a 10 per cent incline or a grade that cannot be made with a hand lift truck. The axle beneath the truck platform is equipped with 5¾ by 4-in. wheels and the top of the movable platform is built of ¼-in. steel plate, 18 in. wide and 46 in. long. This platform clears the floor 6¼ in. when in its lowered position and 9¾ in. when elevated, providing a 3½-in. lift.



New Low Platform Truck. Flexibility is a feature

The truck platform is supported on three heavy steel links, pivoted on the truck frame. Each link has a pressure greased renewable bushing to assure easy action and low upkeep. The platform is raised or lowered by rocking and lifting simultaneously. In other words, the loaded platform is moved slightly toward the operator when being raised and clears any obstruction located beyond the load which might interfere with the elevation of the load. The load is lifted by means of an arm or screw ram attached to the rear of this rocking platform between two of the supporting links. The other end of the ram is drawn into a threaded nut which is the hub of a bronze worm wheel which in turn is driven by a steel worm directly splined onto the armature shaft of a second motor which receives power from the battery.

To pick up a loaded platform the operator drives the narrow platform of his truck beneath it, closes a switch and the motor actuates the mechanism which lifts the load in ten seconds, stopping automatically when it has reached full height. The platform may be stopped manually at any intermediate point. After reaching its destination the load is electrically lowered.

Flexibility is a feature of the truck which can be operated through aisles that have been laid out for hand lift trucks. All four wheels are steerable. The truck can carry a load and at the same time haul a loaded lift truck as a trailer. The truck's capacity is 4000 lb. and its speed loaded, 300 to 400 ft. per min.

The fall convention and annual meeting of the Ohio State Foundrymen's Association will be held in Toledo, Ohio, Nov. 15 and 16. A program of unusual interest is being prepared and details will be announced at a later date.

Mechanical Engineers to Meet in Chattanooga

Oct. 23 and 24 have been selected for the fall regional meeting of the American Society of Mechanical Engineers at the Hotel Patten, Chattanooga, Tenn., when the power development of the South will form an important part of the program. Practical applications of welding will be featured, while the session of Oct. 24 will be devoted to management problems. Senator Newell Sanders will preside at each of the three technical sessions. The program follows:

Tuesday Morning, Oct. 23, Session on Welding

"Welding in Locomotive Repair Shops," by Fred E. Rogers, Davis-Bournonville Co., Jersey City.

"Welding Pressure Vessels and Pipe Lines." by S. W. Miller, Rochester, N. Y., Welding Works.

"Arc Welding," by Richard D. Reed, H. B. Smith Co., Westfield, Mass.

Motion Picture: "Oxygen the Wonder Worker."

Afternoon: Excursion to Hales Bar Steam Power Plant.

Evening, Session on Power and Fuel

Address by President John Lyle Harrington.

"Power Development of the Southern Appalachian Slope," by John A. Switzer and W. R. Woolrich, both of University of Tennessee, Knoxville.

"Use of Pulverized Fuel as Applied to the Open-Hearth Furnace in Small Plants," by R. H. Lowndes.

Wednesday Morning, Oct. 24, Session on Management

"Methods of Measuring Management," by Joseph W. Roe, New York University.

"Computation of Ratios for the Measurement of Management," by D. W. Knowles.

Discussion of Principles Governing Location and Size of Industrial Plants.

Afternoon: Excursion to Crane Co. enamelware plant and points of scenic interest.

Lake Superior Iron Ore Shipments in September

Shipments of iron ore from Lake Superior in September were 9,095,981 gross tons as compared with 6,801,299 tons in September, 1922. This is an increase of 2,294,682 tons or 33.74 per cent. The season's shipments to Oct. 1, this year, have been 45,988,845 tons as compared with 33,111,238 tons to Oct. 1, 1922, an increase of 12,877,607 tons or 38.89 per cent. The following table gives the September and season shipments by ports and the corresponding figures for 1922 in gross tons:

	September		To Sept. 1	
	1923	1922	1923	1922
Escanaba	569,060	820,520	4,564,527	3,325,625
Marquette	312,643	311,758	2,120,986	1,625,903
Ashland	1,050,443	928,712	5,199,694	4,642,345
Superior	2,744,199	1,781,670	13,751,785	8,484,713
Duluth	3,486,943	2,159,754	15,310,275	10,183,478
Two Harbors	902,693	798,885	5,041,578	4,849,174
Total	9,095,981	6,801,299	45,988,845	33,111,238
Increase	2,294,682	2,888,177	12,877,607	14,450,044

The Duluth proportion this year to Oct. 1 of 33.29 per cent is larger than a year ago when it was 30.76 per cent of the total. The Great Northern dock at Superior is credited with 26.42 per cent of the total shipments this year against 22.96 per cent last year.

Natural Gas in 1919-1921

A pamphlet, by R. S. McBride and E. G. Sievers, that is a portion of the publication of "Mineral Resources of the United States," has been issued by the Geological Survey. It is pointed out that more than 2,600,000 domestic consumers and about 21,000 industrial or commercial consumers use natural gas for fuel. About $175,000,000 of natural gas was used in 1921, compared with $250,000,000 in manufactured gas. The unit price of the latter is much higher and its heating value per cubic foot much lower than with natural gas.

Production of natural gas is reported at 798,823 million cu. ft. in 1919; 860,540 in 1920, and 724,052 in 1921. The average price at which this gas was sold increased during the three years from 21.6c. per M. cu. ft. to 24.6c. and 26.4c. Prices of manufactured gas have been between 90c. and $1 continuously, except for a dip in 1916 and 1917 to a minimum of 87c.

Electric Transportation in Steel Mills

Considerations of Cost of Installation, Operation and Maintenance—Why Third Rail Is Better Than Overhead Wires —Comparison with Steam Locomotives

BY F. O. SCHNURE*

YARD transportation within a steel plant probably represents the largest variety, if not the most severe work, of any industrial haulage. Yard electrification as a factor in bringing lower haulage costs should be of prime interest to the steel industry.

Present steam practice, and electric in other fields, indicate that two sizes of locomotive are required for steel plant service and that these should average about 40 and 80 tons per unit. This classification makes it simple to standardize on the 40-ton unit, the control on which should be so arranged that two such units could be operated in multiple by one man on the heavier service. Since the maximum operating speed does not exceed 12 to 15 miles an hour, it is a question whether it would be necessary to consider the more expensive double truck or articulated unit, although it is felt that this type may present certain advantages on service where sharp and irregular curves abound. Forty-ton units, equipped with four railroad type motors, when operated in multiple, would draw proportionally less power from the distribution system than large, high-speed single unit locomotives, and would therefore mean considerable saving in feeder and station capacity.

In a plant employing 25 steam locomotives, ranging from 50 to 75 tons capacity, it is altogether likely that 20 electrical units would perform the same work.

Reasons for Third Rail

The third rail lends itself more readily to steel plant yard electrification than an overhead trolley for two reasons: First, it does not interfere with the work of locomotive cranes; second, it is better able to handle the heavy operation at low voltage. There are two kinds of third rail systems, one the top contact and the other the bottom contact system. For yard work, where switchmen and plant employees may not be denied free and safe passage over all portions of the yard, the bottom contact system is preferable.

The third rail should be built as low and close to the track as possible and be covered with impregnable wood or other insulator, so that its bottom and about ¾-in. of its lower vertical surfaces are exposed. Placing it low makes it easy to step across and, with the insulated cover, it can be stepped on without danger. Locating it as close to the track as clearances of the rolling equipment will permit, makes it easier for the contact equipment to cross switches and crossings and enter buildings.

Costs the Deciding Factor

In the steel plant there is small possibility of increased traffic on existing tracks, so that electric transportation must show its advantages over steam in lower fuel, operating and maintenance costs. The Maryland plant of the Bethlehem Steel Co. having fundamentally adopted electric drives in its mills for both the main rolls and auxiliaries, because of convenience, reliability and easy maintenance, and having had good results from third-rail transfer car operations on blast furnace trestle and motor car operation at the coke ovens, has been anxious to demonstrate the third rail for yard service.

Accordingly 1900 feet of under-hung bottom contact third rail was placed in service May 31. This is a 250-volt straight electric installation, current being supplied through automatic reclosing circuit breakers from the existing power system. The installation of the third rail cost $2 per running foot, distributed as follows:

Rail	17 per cent
Insulators	12 per cent
Guard	10 per cent
Brackets	5 per cent
Bonds	5 per cent
Miscellaneous bolts, wire, etc.	11 per cent
Labor	40 per cent

Operating Results

Three months' operation of our third rail on hot metal work has resulted in only two failures—one from the derailment of a truck which required repairs to both track and third rail, and the other from grounding of a rail insulator by hot metal spillage. From the results obtained so far, it would appear that the adoption of a third rail over the entire plant would be satisfactory, with possibly the addition of cable reels for use on open-hearth charging floors and shops when the physical location of the rail might be objectionable.

The locomotive used on this installation is a home-made rigid frame motor car to which two 75-hp. (½ hr. rating) back-geared mill type motors have been adapted. Similar units are in service handling the receiving car at the coke batteries. This unit weighs about 20 tons and has an estimated draw bar pull of about 8000 lb. It will handle two 100,000-lb. loaded ladle cars or four 65,000-lb. empty ladle cars at a speed of 12 to 15 miles per hour.

The labor required for its operation consists of one operator and a switchman, both being open-hearth employees. During June, 6864 tons of hot metal were handled, requiring 380 round trips, making a total mileage of 274. The average trailing load—metal, ladle and car—was approximately 50 tons and the locomotive and safety car about 34 tons. The power consumed was 3600 kwhr.

Comparison of Fuel Usage

Some time ago, tests of several days duration on a few of our steam locomotives, covering each class of service, such as hot metal, furnace stock, in and outgoing freight, mill and shop service, have given us data that allows comparison with electrically operated units of the same size in other yards. By basing this comparison on the amount of coal required per trailing ton mile, allowing 2 lb. of coal per kwhr. for the electric units, we obtain a fuel ratio of 18 per cent with steam locomotives, with no allowance for banking fires. The average trailing ton miles, which is the weight in tons of the loaded train excluding the locomotive and tender, times the miles traveled, was practically the same per day for both.

Our motor car operation showed a fuel ratio of 43.6 per cent on the same basis as the other comparison. This does not show up so well as might be expected, due doubtless to several factors, inefficient gearing, being worked continuously on curves, pushing the loaded ladle up a slight grade, car trucks not in first class condition, presenting two or three times the rolling friction usually encountered in railroad work and more idle movement than was observed. The greatest saving, which is not brought out in the fuel ratio, is the entire absence of standby losses in maintaining a steam pressure to serve the open-hearth as the steel was required.

Storage battery locomotives, which have proved so satisfactory on light and intermittent service, are now receiving some consideration in the steel plant yard.

*Electrical engineer Bethlehem Steel Co., Sparrows Point, Md. This is abstract of a paper read before the Buffalo convention of the Association of Iron and Steel Electrical Engineers.

High battery depreciation, covered by a guaranteed life with low replacement costs and spare batteries to allow continuous operation, may make this unit a valuable adjunct to the third rail operation, if not closely paralleling it.

Steel plants, with so much available fuel in the form of blast furnace gas, that may be transformed into cheap power, should not hesitate to explore the possibilities in yard electrification. Steel mill electrical engineers should be looking forward to the day when the only boiler stacks belching smoke will be those attending the power station.

Discussion

In answering questions regarding details of the electric transportation system for steel mills, Mr. Schnure pointed out that the brackets (⅜ in. x 8 in. sheet bar) carrying the third rail in the Sparrows Point plant are so heavy that there has been no trouble from falling objects. Guards are fitted at appropriate places to shed minor slopping of hot metal, but it is impossible to make provision against a heavy spill, as also against derailments or other wrecks. In any such case, the rails have to be replaced anyway and the third rail goes along with the job. Circuit breakers and other line protection avoid trouble from short circuits.

Units using gasoline engines and direct connected motors for propulsion are not heavy enough for the service. The third rail system was installed in preference to overhead lines, because of the necessity to use locomotive cranes in the plant, these being particularly destructive of overhead work. Gaps in the third rail are taken care of by an idler car, which would be used for hot metal service anyway, and which serves the purpose of giving contacts 40 ft. apart, thus spanning the space.

The third rail consists of 3 in. billets which had been discarded because of off analysis or for other reasons, insulated with bakelite from ¼ to 5/16 in. thick and covered with wood fenders. In entering the open-hearth department, where third rails along the floor would be impossible, a cable reel operating automatically is being considered. This would take up or let out cable upon connection being made at the entrance to the building.

THE IMMIGRATION PROBLEM

President Biggert Advocates Adoption of More Liberal Plan

Observations of F. C. Biggert, Jr., president United Engineering & Foundry Co., Pittsburgh, made from time to time to employees of the company through the company's house publication are usually interesting, sound and constructive. It will be recalled that Mr. Biggert was among the first to detect danger in the furious pace of general business during the fore part of this year and to sound a warning. He now makes some interesting suggestions on the subject of our immigration laws. While he would not open wide the door of entry to the country, he points out the restrictions imposed by the law of 1921 were altogether too drastic and would go back to near the pre-war average as the basis upon which to fix the number admitted. Mr. Biggert condemns unrestricted immigration as the idea of unthinking employers desiring abundant and cheap labor. He says in part:

"Immigration is a matter of importance to all of us because it has a very great effect upon the increase in number and the character of our people. Just now it is of particular importance because our next Congress must pass a new immigration law to replace the present one, which expires in 1924.

"The importance of immigration in this country will be evident from the fact that from 1900 to 1915 we averaged about 1,000,000 immigrants each year. Before 1907 no record was kept of those going out, but from that time until 1915 about 300,000 went out each year, and if we assume the same number as going out from 1900 to 1907, we have had remaining each year about 700,000 as an increase in population due to immigration. In these years we gained about 10,000,000 people by immigration or something over one-third of the whole increase in our population during these years.

"The great war changed the whole trend of immigration and during the years of 1915 to 1920 we gained about 150,000 per year from this source. If the war had not stopped immigration, we should probably have had 3,000,000 more people in this country than we did have in 1920. At the close of the war, there was great fear that a deluge of people would come here because of the distressing conditions in Europe. A law was hurriedly passed which has held down immigration so that only 270,000 have been gained each year from 1920 to 1923. In these years we gained 810,000 or about 1,000,000 less than under the pre-war rate. As a result of the war and after-war conditions, we are therefore short at least 4,000,000 people.

"This act was originally passed for only one year, but when it was about to expire in 1922 it was extended to 1924; hence, the next Congress must take some action on immigration and the general opinion is that this should be more than a mere extension of the per centum act.

"What Congress does regarding immigration will be greatly influenced by public opinion and it therefore behoves us to think about the question and in our own minds form a reasonable opinion.

"We can promptly decide that too much immigration is bad. Just *how much* is *too much* is hard to say, but I think a great majority would be in favor of letting in less than we received in the late pre-war years.

"Suppose we say that 800,000 may come in each year. That will be less than we have been accustomed to receive and yet not so much less as to disturb our balance. It represents roughly 8-10 of 1 per cent of our present population whereas we have been receiving around 1 per cent. But if we hold to the 800,000 for 20 years, our population will have increased so that it may represent only 6-10 of 1 per cent of our then population and so on. A law framed along these lines would give us the immigration we now need, prevent a deluge at any time and gradually accustom the country to get on with a decreasing proportion of immigration to population.

"Of course, there should be provisions in the law to keep out undesirables and some scheme should be worked out to induce people of the most desirable types to come in. This selection of types also should gradually take effect so as not to prevent our admitting substantially all of the 800,000 we believe we now need. Just how this can best be done could only be decided after a deep study of the situation, but the idea would be to let in the whole 800,000 the first year regardless of nationality and gradually shift to an allotment basis favorable to the desired nations.

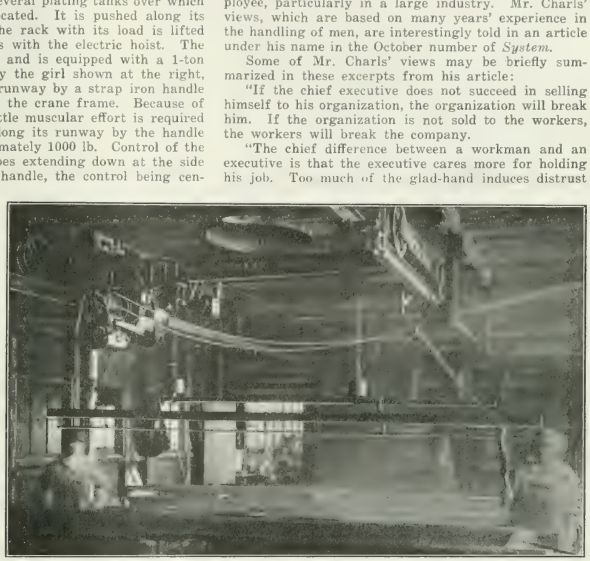
"You may disagree with my figure of 800,000. If so, set your own figure, only do not set it too low. I believe we can properly absorb and Americanize 800,000 well-selected foreigners a year and, if we can, we should.

"This country has always been a haven of hope and safety to the oppressed and crowded peoples of other lands. Never until the per centum limitation act of 1921 has that door of safety been so nearly closed. If we open it too widely, we run the risk of destroying all our advantages as a haven. To close it more than is necessary is contrary to the basic ideas upon which our Government was formed."

Crane Saves Labor in Plating Shop

A labor-saving adaptation of a hand propelled crane equipped with electric hoist, in the plating department of a large manufacturing plant, is shown in the accompanying illustration. A feature of this crane is that it was built to be operated by a girl and was especially designed for ease in operation and with control safety devices, making it foolproof.

The crane is used for handling bundles of material on a rack to and from several plating tanks over which the crane runway is located. It is pushed along its runway by hand and the rack with its load is lifted in and out of the tanks with the electric hoist. The crane has a 14-ft. span and is equipped with a 1-ton hoist. It is operated by the girl shown at the right, being pushed along its runway by a strap iron handle that extends down from the crane frame. Because of the ease of operation little muscular effort is required in pushing the crane along its runway by the handle with its load of approximately 1000 lb. Control of the hoist is through the ropes extending down at the side of the crane-operating handle, the control being centered at the one point within easy reach of the operator. The hoist has the usual hoisting limit switch and is also equipped with a spring bumper and a bell which rings when the hook approaches the safe limit of travel. The crane runs on Hyatt roller bearings.



Labor Saving Adaptation of Crane in Plating Work. It is pushed along the runway by hand and the loaded racks lifted in and out of the tanks by the electric hoist. Ease of control is a feature

Before this crane was installed the work was handled by two girls with two hand-operated trolleys, one at each end of the rack. This method of handling required considerable muscular effort and was very fatiguing to the operators. With the equipment illustrated one girl does the work formerly done by two and with much less exertion. In addition, the load on the rack has been increased 25 per cent or to as much material as the rack will hold.

The crane and hoist were designed and built by the Stamp Electric Hoist Co., Cleveland.

Oil Burner Manufacturers Form Association

The American Association of Oil Burner Manufacturers, a national organization of both home and industrial oil burner manufacturers, was recently formed in Chicago. Broadcasting accurate data concerning oil burning and the oil burner industry is one of the association's principal aims. Wallace C. Capen, Home Appliance Corporation, St. Louis, was elected president, and Leod D. Becker, editor of *Fuel Oil for Heat and Power*, Galesburg, Ill., was made acting secretary. Temporary headquarters will be maintained at 518 Bank of Galesburg Building, Galesburg, Ill., and Room 605, 20 East Jackson Boulevard, Chicago. The association will gladly answer inquiries from interested individuals or firms concerning all kinds of oil burning.

Executives' Relations with Employees

"Workmen do not want to help manage. They think, and rightly, that of such is the boss's job. But they do want a chance to kick—to feel that they are persons of importance."

This statement sums up, in a degree, the philosophy of George H. Charls, vice-president and general manager of the United Alloy Steel Corporation, Canton, Ohio, as regards relations between employer and employee, particularly in a large industry. Mr. Charls' views, which are based on many years' experience in the handling of men, are interestingly told in an article under his name in the October number of *System*.

Some of Mr. Charls' views may be briefly summarized in these excerpts from his article:

"If the chief executive does not succeed in selling himself to his organization, the organization will break him. If the organization is not sold to the workers, the workers will break the company.

"The chief difference between a workman and an executive is that the executive cares more for holding his job. Too much of the glad-hand induces distrust—workmen do not like to be fawned on. What they want is what we all want—upstanding fairness.

"Keeping the way open from the work bench to the front office is one of the biggest jobs of the leader. And, as a matter of fact, it takes but little time, for it is the principle of having access to the head that counts. The actual access is not often taken advantage of.

"I am afraid of complete methods and unfailing panaceas for labor troubles. * * * Perhaps some day a man will come along with a solution—but I shall not be the first to accept him. I shall find out what he has to say—what he can teach."

Foreign Commerce Hand Book

Issued by the Chamber of Commerce of the United States, a 40-page pamphlet under the above title gives information of various sorts regarding matters of interest to export and import organizations. The handbook is intended to serve as an indication of sources of export and import service in the United States, and the activities of the advisory committee of the Chamber. The effort has been made to give a straightforward indication of the best sources on all topics covered, which include procedure, statistics, bills of lading, insurance, consular service, foreign corporation laws, tariffs, and a wide variety of other matters.

The Gilbert & Barker Co., West Springfield, Mass., gasoline tanks, has made a substantial cut in its working forces and has abolished the night shift. The plant will close at noon on Saturdays, making a five and one-half day week.

Electric Heating of Finishing Rolls

Device for Ridding Sheet and Tin Plate Mills of Roll Breakage, Due to Uneven Expansion—Greater Uniformity Obtained in Sheet Thickness

BY GORDON FOX*

FINISHING rolls of practically all sheet and tin plate mills are made of cast iron. That the working surface of the rolls may have sufficient wearing qualities, this portion is cast in an iron mold, which causes the molten metal adjacent thereto to solidify quickly. The carbon in this rapidly cooled iron remains in its combined state. The chilled portion of the roll has a white crystalline structure and is very hard and brittle. The clear chill ordinarily has a depth of about ½ in. to 1 in. and tapers off gradually. The entire center portion of the roll, including the necks and wobblers, is gray iron, which has been cooled sufficiently slowly to permit the carbon to assume graphite form.

This composite structure is primarily responsible for troubles due to roll breakage. The chilled outer portion of the roll has an expansion rate about twice as great as the inner gray iron portion. Thus, dimension *A*, Fig. 1, tends to expand twice as rapidly as dimension *B*. This may cause shearing stress along some such line as *C*, compression along the line *A* and tension along the line *B*. Similar forces occur in an axial direction. Also, due to the more rapid expansion, the chilled portion tends to pull away from the central portion of the roll, setting up radial tension forces.

These conditions would exist even if the roll were uniformly heated. They are decidedly aggravated by the fact that the rolls are heated from the outside and the external portions reach fairly high temperatures before the interior is perceptibly heated. The combination of materials having different rates of expansion, heated at different rates and to different degrees, particularly in view of the hard and brittle nature of the chilled metal subjected to stress, renders care in the treatment of rolls highly desirable.

These finishing rolls are operated dry and hot; the cooling of the pack is thus minimized. As the hot pack is in contact with the central portion of the rolls the heat enters the rolls at this point. The ends and necks of the rolls are naturally cooler than the center, as their heat is dissipated through contact with the bearings and otherwise. Moreover, to maintain proper lubrication of the roll necks and prevent burning of the grease, water cooling of the roll ends is ordinarily employed.

To obtain sheets having uniform gage across their width it is necessary that uniform pressure be maintained across the pack as it passes between the rolls. This means that the contour of the upper and lower rolls must be parallel. As the temperature of the center is higher than the ends, the rolls expand more in the center, increasing their diameter. To compensate for this effect, one or both rolls are turned to have a slight concavity of contour when cold. When they attain working temperature, the expansion causes the straight roll to become slightly convex and the concave roll decreases its concavity to such an extent that uniform gages are obtained. If a mill has too much concavity it is said to be "hollow" and the pack has horns or fish tails. If the mill is "full" in the middle, the pack is longer in the middle than on the sides and the sheets are thinner in the center than on the edges.

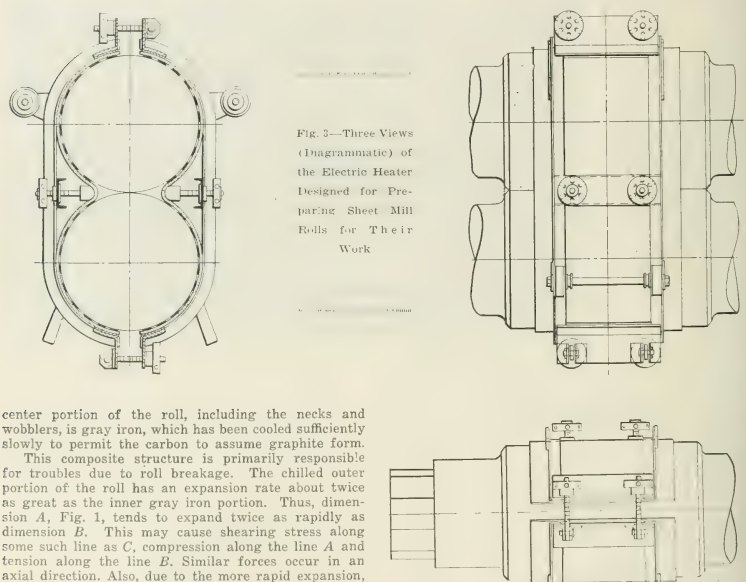


Fig. 3—Three Views (Diagrammatic) of the Electric Heater Designed for Preparing Sheet Mill Rolls for Their Work

Finishing mill rolls are operated usually at temperatures between 550 deg. and 750 deg. Fahr. at the hottest point. Tests made by the Steel Corporation a few years ago proved that the chilled portion of the roll has the greatest resistance to breakage stresses at about 750 deg. Fahr. The strength diminishes only

*Electrical engineer, Freyn Brassert & Co., Chicago. This is abstract of a paper read before the Association of Iron and Steel Electrical Engineers.

slightly at lower temperatures down to 350 deg., below which point a material weakening was found. At temperatures above 750 deg. the strength was found to diminish until, at a temperature of 875 to 900 deg., which is a low red heat for cast iron, breakage occurred readily under comparatively light stress.

The distribution of heat in the rolls under normal operating conditions is shown in Fig. 2 and Table I.

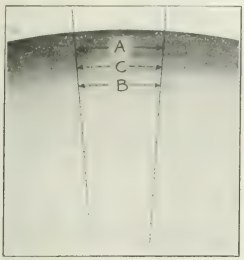


Fig. 1—Stresses Near Roll Surface Are Caused by Unequal Expansion. Thus, expansion at A is twice as rapid as at B, which may cause compressive stress along A, shearing along C and tension along B

These temperatures were obtained, in a test made at Vandergrift, by thermo-couples inserted in the top roll, collector rings being supplied to connect with the meter. The mill was rolling light gage sheets and care was taken not to exceed safe temperatures. It should be noted that the surface temperatures at points *A* and *C* indicate about 200 deg. Fahr. difference.

Table I Temperatures at points indicated in Fig. 2, during normal operation:

Point A	703 to 736 deg. Fahr.
Point B	641 to 674 deg. Fahr.
Point C	510 to 542 deg. Fahr.
Point D	378 to 483 deg. Fahr.
Point E	399 to 447 deg. Fahr.
Point F	330 to 366 deg. Fahr.

As rolls are stronger and less brittle at normal rolling temperatures and as they have their proper shape only when heated, and, further, to minimize expansion and contraction stresses, it is highly desirable that roll temperatures be maintained as uniform as possible at the best operating point. On fast schedules it is possible to bring the rolls to a dull red heat. To restrict temperatures to safe limits, it is customary to cool the rolls, either with dry steam or with air.

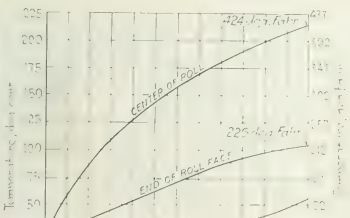


Fig. 4—Results of Test of a Sheet Roll Heater Showing Growing Temperatures at Roll Center, at End of Face and at End of the Roll

Many seemingly perfect rolls are broken during the warming up process, when there is no pack in the mill. This is caused by the surface becoming heated so rapidly that the interior did not get warm enough to expand the slight amount its preponderating mass would require, to take care of the very rapid expansion of the face or chilled portion, and the roll is torn in two. Most roll breakage occurs in the fore part of the week, before the rolls have reached their final working temperature, and there is more breakage in the extremely cold winter months than in the summer, due to the lower temperature at which the warming up starts.

Records of one mill show that only 15 per cent of the rolls are discarded because they have been dressed down below the chill. The other 85 per cent are lost through breakage. Some rolls serve over 100 days, some less than 10 days. The average for this mill is about 47 days. A 28-in. x 44-in. roll weighs about 6 tons and costs about $70 per ton, or $420. The scrap value is about $15 per ton, or $90. All labor put on the roll is lost when it breaks. If it has served but half its useful life, the loss is $150 or more.

Some months ago the Inland Steel Co. undertook the development of a device for heating the rolls electrically. After a period of experimenting an equipment was evolved, consisting of a light angle frame, built in two halves and vertically split, as shown in Fig. 3. Space heaters, used as the heating medium, are of special dimensions and rating and somewhat special construction. The heating units are mounted in a flexible member attached to the frame and are suitably backed up by heat insulation inclosed between sheet metal protecting plates. The design has been developed to take care of ordinary variations in diameter of rolls. The two halves of the heater are clamped to the stationary rolls, usually after they are in place in the housing. The heating elements make direct contact with the roll surface. Thus they convey the heat to the rolls effectively and do not acquire temperatures more than a few degrees higher than the roll temperature.

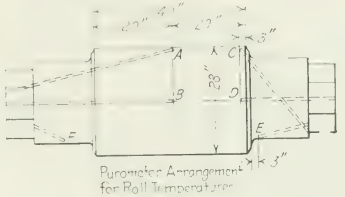


Fig. 2—(Upper View) Pyrometer Arrangement for Measuring Roll Temperatures at Various Points

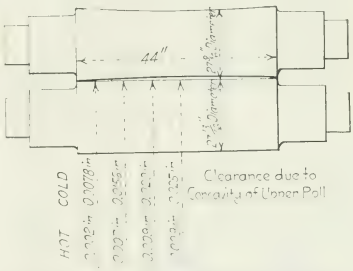


Fig. 5—(Lower View) Clearances Found in Test of a Sheet Roll Heater

Fig. 4 shows the temperatures afforded with the heater and the distribution of heat in the roll. These curves were prepared from data taken in a recent test on a pair of 28-in. x 44-in. rolls. The rate of heating indicated was obtained by continuous application of about 28 kw. of energy for a period of 6 hours. The total power consumption of about 170 kwhr. represents

a cost of about $2 for the heating period. It will be noted that a maximum temperature of 424 deg. Fahr. was obtained at the center of the roll face and 226 deg. at the end of the roll face after 6 hr. heating. This represents a temperature difference of 198 deg. Fahr., which corresponds closely with the temperature difference between these points existing when the rolls are in normal operation.

These results do not necessarily represent the best that can be secured. Temperatures higher than 424 deg. Fahr. may be attained, if desired, either by longer or more rapid heating. In the above test the voltage was 15 per cent low. As the heat produced varies as the square of the voltage, this reduced the heating ability of the equipment 28 per cent. The heating units will stand considerably higher temperatures without damage.

The more rapid the heating, the more the center of the roll is heated and the less time the heat has to flow to the roll necks and ends. Moreover, with rapid heating, the roll surface is no doubt considerably hotter than the roll interior, although probably much less so than with gas flame heating.

The effect of electric pre-heating on the shape of the rolls in reducing concavity clearance is well shown in Fig. 5. It will be noted that, when cold, these rolls had a maximum separation at the center of 0.025 in. At the end of the run, after the heaters were removed, the clearance was 0.009 in. Thus about two-thirds of the concavity was removed by pre-heating. This test was made on a pair of rolls which had been dressed to about half the original chill.

In a test run last November a pair of 28-in. x 44-in. rolls was pre-heated to a temperature of 348 deg. Fahr. at the center of the face. After running through three or four crop ends to set the mills, some 28 x 30 x 96 orders were run. The first pack had about 12-in. fish tails. A sample strip, cut across the pack, was calipered, the dimensions of each strip and the average of several measurements of the pack being given in Table II.

Table II—Measurements of Thickness of First Pack (28 x 30 x 96) and the Individual Sheets in It (Inches)

Sheet No.	Left Edge	Center	Right Edge
1	0.0111	0.0124	0.0112
2	0.0103	0.0144	0.0120
3	0.0109	0.0143	0.0120
4	0.0105	0.0140	0.0110
5	0.0120	0.0147	0.0118
6	0.0120	0.0146	0.0113
7	0.0136	0.0145	0.0134
8	0.0112	0.0128	0.0117
Average	0.0114	0.0140	0.0118
Total	0.0917	0.1117	0.0946
Measuring thickness of pack..	0.1081	0.1144	0.1056

Individual sheets are about 0.002 in. heavier in center than at ends. Pack is about 0.008 in. heavier in center than at ends.

In considering these data, cognizance should be taken of the fact that this mill was found to be hollow the entire week and fish tails of 8-in. to 10-in. resulted on the same order on succeeding turns. Orders of 28 x 36 x 96 have been successfully rolled on the first turn after preheating with the electric heater. As the rolls can be brought nearly to normal operating temperatures and shape by electric pre-heating, there is good reason to believe that practically all limitations, both as to character of orders and quantity of output, may be safely removed by this practice.

Causes of Accidents in Handling Objects

Most Numerous of All Classifications, but Not the Most Serious—Machine Accidents Worst

BY C. H. SMITH*

FOR the purpose of making an analysis of accidents we can assume every accident may be allocated to the existence of a cause or hazard. The cause may be considered not only from the material but also from a somewhat less material point of view, in that we give consideration to the hazard of carelessness and the morale.

In this particular instance we are concerned with the cause of accidents due to handling objects. In this category we would include all accidents due to the handling of objects with the exception of those due to hand tools.

For the purpose of making a practical study and obtaining an idea of the relative importance such accidents occupy in the scale of all accidents a statistical analysis must be made. In order that results be indicative care must be taken to see that a sufficiently large number of accidents are considered so the law of averages may hold. The analysis about to be discussed, based upon 89,436 accidents, should prove of value, as the assumption upon which the American accident table was based has never been disproved by any subsequent study of large numbers of accidents.

Prepared by the Industrial Commission of Wisconsin and covering a period of six years, ending 1920, the accidents here analyzed are reported as compensa-

*Continental Casualty Co., Chicago; this is abstract of an address before Mid-Year Safety Conference.

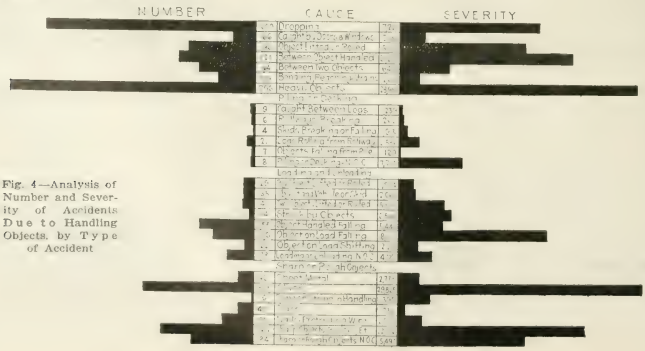
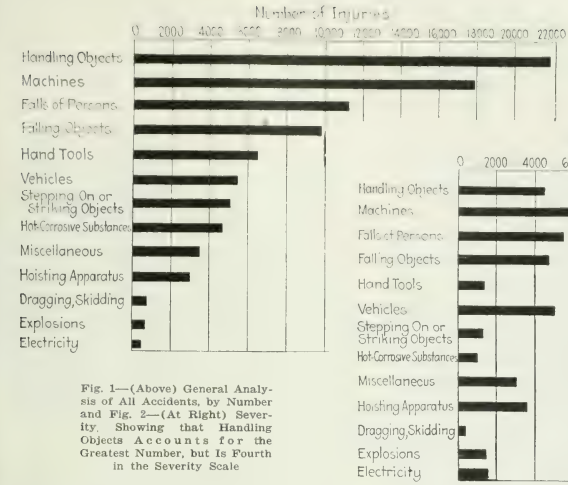


Fig. 4—Analysis of Number and Severity of Accidents Due to Handling Objects, by Type of Accident



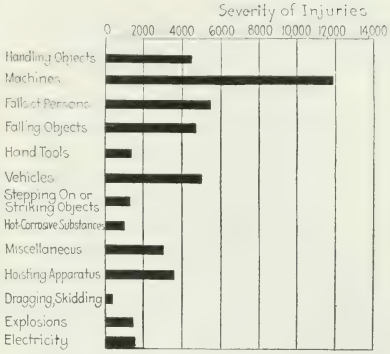


Fig. 1—(Above) General Analysis of All Accidents, by Number and Fig. 2—(At Right) Severity. Showing that Handling Objects Accounts for the Greatest Number, but Is Fourth in the Severity Scale

ble injuries. As there is a seven-day waiting period in Wisconsin, the actual number of occurrences in all probability was about 40 per cent greater.

During this six-year period the total of 89,436 accidents were distributed by cause as illustrated on Fig. 1. Close to 22,000, or approximately 24 per cent of all accidents, were due to the hazard inherent in handling objects. Distribution as to severity is illustrated on Fig. 2. Here it is noticed that, while handling of objects produced the greatest accident frequency, when analyzed by degree of severity, accidents of this class occupy fifth position.

A graphical illustration of the relative importance of object-handling accidents is illustrated in Fig. 3, which has been prepared to give a rough idea of the number and importance of the various divisions of object-handling accidents. The horizontal distance represents the number of accidents, while the vertical distance represents the severity expressed in terms of 300-day years. Now that we have a mental picture of the position these accidents occupy in the scale of all object-handling accidents, we are ready for the final analysis, or a study of the cause of these accidents.

An analysis of the number, cause and severity of the various divisions into which accidents due to handling objects are divided is shown on Fig. 4. This chart represents 3538 accidents reported to the Industrial Commission of Wisconsin during 1920. Numbers of accidents have been plotted on the left, while the severity has been plotted on the right to the scale of days lost. A study of these causes in descending order of severity proves interesting.

First position is occupied by accidents due to slivers, which are of only third importance as to number. Accidents due to handling of heavy objects occupy second position as to severity and first as to number. As these charts are largely self explanatory, it would be demonstrating the obvious to enter into a lengthy discussion or interpretation.

The charts are based upon figures compiled in one State only, and might vary somewhat were a much greater exposure to be taken. Industries in Wisconsin are pretty well diversified, however, and the results obtained are of sufficient importance to be taken as indicative.

The metallurgical industries of the United States, exclusive of iron blast furnaces, employed 44,000 men during 1922, an increase of nearly 18 per cent over 1921, according to statistics gathered by the Department of the Interior through the Bureau of Mines. The volume of work at mills in 1922 showed an increase of 37 per cent over the previous year; the increase at smelters was 9 per cent, while an increase of 69 per cent was shown for construction work, shops and yards connected with the mills and smelters. Accidents reported to the Bureau of Mines during the year resulted in the death of 45 men and in injury to 6678 men.

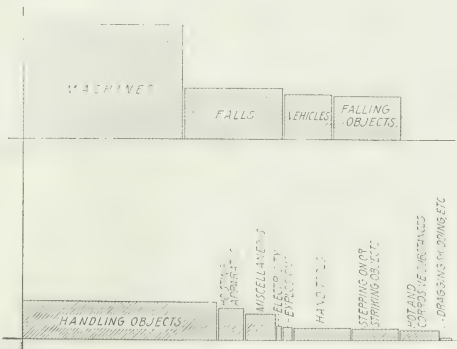
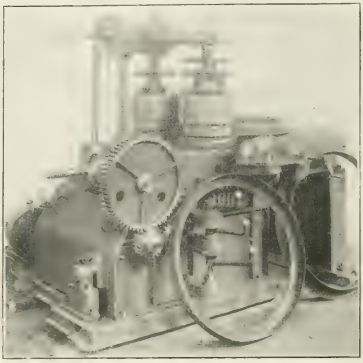


Fig. 3—In This Diagram the Number of Accidents Is Represented by the Length of the Block and Their Individual Severity by the Height. Thus the area of the block Indicates the total seriousness of the cause of accident, or total number of days lost for each accident cause

Machine for Bending Angles Cold

An improved angle bending machine, designated as Hercules type PB, is being placed on the market by Amplex, Inc., 6 West Thirty-second Street, New York. Six sizes are available, ranging in capacity, on the smallest and largest machines respectively, for angles of 2¼ x 2¼ x 5/16 in. to 8 x 8 x 1 in. maximum, with legs out. It will also roll angles with legs in, but on this operation the capacity is for angles of a smaller size. Beams and channels ranging from 3 in. to 12 in. for the different sizes of machines may also be bent, as well as flats, rounds and squares. The smallest diameter to which work may be rolled is 24 in. and 60 in. for the smallest and largest machines respectively. In



The Rings or Segments Are Formed Horizontally. The auxiliary rolls at the ends of the table are to prevent material from twisting or slipping. The motor is mounted as shown

bending angles and other shapes cold, it is claimed that true circles or segments may be produced without the use of skilled labor, as no straightening or other adjustment is required after the work leaves the machine.

The machine consists of a cast base on the top surface of which the rolls are mounted, with roll shafts in a vertical position, operated by the driving mechanism contained in the base. The roll mechanism is what might be called a pyramid type except for its being vertical instead of horizontal in position. The drive is applied to two rolls which are in fixed position. The third roll is of idler type and adjustable for center distance, being mounted on a horizontal slide, the axis of which is at right angles with the common center line of the two fixed roll shafts. The power available to move the slide on which the adjustable roll is mounted is sufficient to move it when under pressure, being twenty times what is necessary to move the slide when the machine is running idle.

Provision has been made for vertical adjustment of the rolls on their shafts. This is accomplished by adjusting screws acting through bevel gears. By means of capstan handwheels the rolls when adjusted may be locked in place. This adjustment is simply for the accommodation of varying thickness in the legs of different size angles, thereby obviating the necessity of changing rolls when the size of work is changed.

Auxiliary rolls are provided to support the work as it passes through the machine, thereby tending to prevent twisting. These rolls are adjustable vertically and radially to accommodate different thicknesses of work and diameter of circles being rolled.

Bearings are provided with ample lubrication. The larger machines have outboard bearings for the roll shafts, and provision is made for opening the auxiliary bearing yoke to permit removal of closed rings.

A feature claimed for the machine is centralized control permitting one operator to handle the common run of work. On larger work a helper is required in handling the material. Gears are cut from the solid, and those subject to heavy strain are of steel. Shafts are forged, and their journals run in renewable bronze bearings. Either belt or motor drive may be provided.

Special rolls may be employed on the machine for bending rails or other than standard structural shapes.

Steamed Coke in Blast Furnaces

Recent studies at the Pittsburgh experiment station of the Bureau of Mines have revealed some interesting facts as to the probable behavior of steamed coke in the blast furnace. The literature on the chemistry of the blast furnace was thoroughly reviewed, and with this information in mind, the probable behavior of the coke sulphur in the blast furnace was deduced. Enough small-scale tests were conducted to furnish a check on most of the important deductions, and the conclusions derived therefrom accord with what is already known in regard to the forms of sulphur in coke, and fit in well with the general opinion concerning blast furnace reactions.

The results of this study suggest two possible methods for correcting the coke sulphur trouble in the blast furnace; first, this surface sulphur could be removed by some such process as steaming, or hydrogenation: or secondly, it could be prevented from entering the spongy iron at this zone by dipping the coke in some material which would absorb the sulphur more readily than would the iron. Possibly lime could be used in this case; but whatever the nature of the substance it should be such that it will not interfere with the proper combustion of the coke at the combustion zone. Further studies along this line would no doubt lead to some interesting discoveries as to the behavior of the sulphur in the blast furnace. The results of this study, made in cooperation with the Carnegie Institute of Technology, are given in Serial 2518, "Forms of Sulphur in steamed coke and their action in the blast furnace," by John H. Thompson, research fellow, which may be obtained from the Department of the Interior, Bureau of Mines, Washington, D. C.

Historical Monograph on Mechanical Power Transmission

An historical treatise on "Power; its application from the 17th dynasty to the 20th century," has been published by the Morse Chain Co., Ithaca, N. Y., it being the reproduction of an address delivered by F. L. Morse of that company before the American Mining Congress at Milwaukee, Wis., Sept. 27. An interesting observation is that the evolution of power transmission has been closely allied with the rise and fall of nations; great changes in political history have inevitably followed the improvements and inventions for the utilization of power in mining, manufacturing and transportation. The booklet is profusely illustrated with wood cuts and some half tones, many of the illustrations of the early days of civilized history having been taken from the only available sources, namely the few hieroglyphics, sketches and bas-relief on pottery, and from the writings of the philosophers of that period.

L. M. Graves, National Union Bank, Boston, Charles A. Reed, Reed, Fears & Miller Inc., Boston, pig iron, and Jacob Grossmann, L. Grossman & Sons, Quincy, Mass. have been made trustees of the Wollaston Foundry Co., Norfolk Downs, Quincy, Mass., property by the referee in bankruptcy. It is the purpose of the trustees to sell the property. The foundry is equipped with a 17-ton cupola, electric crane and other general equipment.

The will of the late Gordon Battelle, Columbus, Ohio, director of the American Rolling Mill Co., provides for the establishment of a metallurgical institute at Columbus, for the discovery of new and advanced metallurgical processes and the better education of men for employment in metallurgical industries.

Safety Council Meets in Buffalo

Annual Congress Had Large Attendance—Metals Section Overshadows Others, Having Practically All Large Steel Mills Represented



L. A. DE BLOIS

BUFFALO, Oct. 5.—The twelfth annual congress of the National Safety Council was concluded here today. In point of attendance, general enthusiasm and sincerity of purpose, the congress is regarded by leaders in the safety movement as the best ever held. Each section had a greater attendance at the sessions than previous years brought out and the exhibits of safety devices and appliances were of a larger variety than viewed at early meetings.

In relative importance the Metals Section overshadowed other units. The several sessions of delegates representing iron and steel industries were largely attended. Motion picture exhibitions, showing the progress of the safety movement in steel mills, added to the value of the meetings.

L. A. De Blois, Wilmington, Del., was chosen president. He is chief of the safety work at the Wilmington plant at E. I. duPont de Nemours & Co. Since 1922 Mr. De Blois has served as vice-president of the council. The following were chosen vice-presidents: C. B. Auel, East Pittsburgh, Pa.; Marcus A. Dow, New York; George T. Fonda, New York; H. A. Renninger, Allentown, Pa.; David Van Schaack, Hartford, Conn.; vice-president and treasurer, Homer E. Neisz, Chicago.

Executive committeemen: C. B. Auel, East Pittsburgh, Pa.; Walter G. King, New York; C. E. Pettibone, Boston; L. A. De Blois, Wilmington; George T. Fonda, New York; Henry A. Hall, New York; Julian H. Harvey, Kansas City; Robert E. Herdegen, Walkerville, Can.; Col. C. M. Minkle, Chicago; Homer E. Neisz, Chicago; A. D. Risteen, Hartford, Conn.; Herbert A. Rowe, New York, and R. B. Stroeckel, Hartford, Conn.

Past-presidents: Arthur H. Young, Chicago; Marcus A. Dow, New York.

Representing sections: David Van Schaack, Hartford, chairman street and highway safety; A. W. Whitney, New York, chairman education section; James P. Barnes, Louisville, chairman electric street railroad section; F. P. Walker, Detroit, chairman ice, refrigeration, taxicab and delivery section; A. L. Watson, Niagara Falls, N. Y., chairman chemical section; H. W. Jones, Boston, chairman public utilities section; Fred Metcalf, St. Paul, chairman steam railroad section.

Newly-elected officers of the Metals Section are as follows: T. H. McKenney, superintendent of labor and safety Illinois Steel Co., Chicago, chairman; A. C. Gibson, Spang-Chalfont Co., Pittsburgh, vice-chairman; Fred Benett, Buckeye Steel Castings Co., Columbus, Ohio, secretary.

Officers of the Automotive Section are as follows: L. E. Averill, Oakland Motor Car Co., Pontiac, Mich., chairman; E. H. Cotcher, Maxwell Motor Co., Detroit, Mich., vice-chairman; R. F. Thalner, Buick Motor Co., Flint, Mich., secretary.

Coincident with the congress, the ninth annual first aid meet of subsidiary companies of the Bethlehem Steel Corporation was held at the Broadway Auditorium on Oct. 5. Teams representing fourteen units of the corporation competed for trophies and cash prizes for quickness and efficiency in working out designated first aid problems.

T. H. McKenney stated that delegates to the council from iron and steel plants gain valuable ideas from the papers and discussions on those features of safety work having particular application to the steel industry.

"The two principal sessions were attended by more than 400 delegates who paid rapt attention to the subjects and stories of accomplishments by those who participated in these meetings," said Mr. McKenney. "The motion picture forwarded to Buffalo and shown at the second session of the metal section, touching on the subject of fire protection and prevention in the plant of the Youngstown Sheet & Tube Co., was one of the most instructive features of the congress.

"Practically every large steel mill in the country was represented in the metals section sessions, and all the papers showed careful preparation and wholesome desire, on the part of those who have made progressive steps in the conservation of life and property, to share their accomplishments with fellow delegates."

One of the most instructive and entertaining features of the congress was a playlet, "A Scene in a Foundry," by a group of workers from the Edgar Thomson works of the Carnegie Steel Co., Braddock, Pa. The playlet was given in the ball room of the hotel on Thursday afternoon. The actors, attired in working garb, showed careful preparation and their offering came as a climax to a general round table discussion, "Getting Safety Across to the New Man."

The annual banquet of the organization was held in the Hotel Statler ball room Thursday night. Sir Thomas Oliver, chief of the medical division industrial bureau, home office, England; Judge Ambur, New York, and Dr. Forbes Godfrey, minister of public health and labor in Ontario, were the speakers.

Safety on the Plant Railroad

AS C. F. Dullenkopf, superintendent of yards, Bethlehem Steel Co., Bethlehem, Pa., was not present, the chairman called upon J. M. Woltz, of the Youngstown Sheet & Tube Co., Youngstown, Ohio, to lead in remarks and discussion in connection with this subject.

He enumerated some of the items of protection for different classes of cars on the plant railroad, particularizing regarding the operation of narrow-gage or "dinky" railroads, such as means of safely connecting the small engine to the larger equipment, and some special arrangement as to coupling. He suggested, as a point for discussion by the meeting, the use of an automatic coupler, the possibility of devising an automatic coupler that can be used on ingot cars and also successfully used on dump cars; also, in taking care of trackage, all switches to be properly numbered, and a bulletin or booklet containing the information as to the location and names of tracks and switches.

The chairman stated that his plant had devised an automatic coupler and is equipping all dinky equipment with them, and that they are working very successfully.

Mr. Johnston of the American Mutual Liability Insurance Co., Boston, stated that, as former acting foreman of transportation and safety inspector Newport News Shipbuilding & Drydock Co., he is interested in

this problem. He mentioned a few of the methods used on the plant railroad, as follows: Standard-gage tracks only were used, operated with two 60-ton steam locomotives, two 30-ton and one 20-ton General Electric Co. storage battery locomotives; all the flat cars, originally received as second-hand equipment and in poor condition, in course of time were made thoroughly safe for some rated capacity, which was stencilled on the side of each car, one of the strict rules of the safety department being that no car was to be moved if overloaded. All such cars were equipped with standard couplers, and a rule was made that no car ought to be moved unless such couplers were in perfect shape, and any found damaged were immediately reported and the car sidetracked for repairs. All cars within two weeks of their reception had four side steps and grabirons and, if a step was bent or a grabiron pulled loose, that car was immediately sidetracked for repair. This was necessary, as the train crews rode the cars frequently on the longer hauls, and were in the habit of boarding them after some considerable speed was attained.

Regarding hauling long trains, where there were no automatic brakes on the cars, the braking being done only on the locomotive, it was found necessary to reduce the size of trains to six cars or less. On foreign cars coming in from the Chesapeake & Ohio Railway they hauled as high as 15 or 18 cars, but always by hooking up the automatic air. On the locomotives a sign was placed on the forward and rear end: "Danger! Keep Off!" And the train crews insisted that the men around the plant should not ride on the running-board.

He stated that the most difficult problem from the standpoint of safety was crossings at grade, which formerly were guarded by watchmen who flagged road traffic for trains about to pass. They did away with this method, and had the conductor of each train advance ahead of the train to flag traffic, giving pedestrians and motor vehicles the right-of-way wherever possible. A rule was made and inforced that train crews should not step on the front running-board between rails, but mount it from outside the rail, getting on when the train was barely started.

The company standardized the switches for safety with good throws, names, track names, with orders to train conductors to spot cars in certain locations, beyond certain switches by their names, tracks also by their names—with the final result that no accidents of any kind whatever occurred due to the transportation of materials on flat cars or foreign cars about the yard. He concluded by saying that the transportation of materials had been made safe by rigid rules and severe discipline for infringement, and by maintaining standard equipment, standard couplers and standard side steps and grabirons; also standard switches and tracks, together with proper loading.

Mr. Oartel, Carnegie Steel Co., Pittsburgh, a former chairman of this section, stated that as a steel mill man he knew that the plant railroad question is vital. His company a few years ago had adopted safety measures upon finding that about one-third of the very serious accidents were being caused by the plant railroads; it was not due to overloading or defective equipment, but to man failure. He particularized as follows: Standing in middle of track and stepping on footboard of approaching locomotive; coupling on short side of curve; trespassing—men going from one department to another, crossing either at crossing or somewhere else and being caught; hanging on side of car which is sideswiped somewhere; climbing over cars instead of using bridge over track, etc.

They had a "railroad drive" or campaign for two years, which proved very successful; every month the plant and department safety committees put "Plant Railroad Drive" on their programs to keep the subject before them; used bulletins picturing dangerous practices that caused accidents; on all literature used in inter-mill work printed the slogan "Make Railroading Safe." In the Homestead plant the narrow-gage department formerly produced a lot of accidents, but today it is one of the safest departments in the entire company, because they had cleaned up the accidents and cleaned up the causes of the accidents and now use automatic couplers on both broad and narrow gages, and had lately installed a very effective device on the hot-metal ladles.

J. W. Benner of the Homestead plant supplemented Mr. Oartel's remark in connection with safety devices on the hot-metal ladle cars. Before the safety campaign they had no brakes—the trains that carried from four to six ladles using the engine brakes. They finally secured a device in the form of a slow-acting valve controlling the automatic air brake on each ladle. This worked successfully and they devised means for coupling up the cars on any curve or on any grade, which also had proved very successful and had been in operation now over two years. On the narrow-gage there were about 5000 cars; had started with the common link-and-pin coupling, which smashed fingers and cut off hands, and had finally adopted the Jenney coupler, as on the broad-gage cars, and thus eliminated a great many accidents in that way.

Benjamin F. Faunce emphasized the importance of safe operation of plant railroads in the larger organizations, stating that in plants like the Homestead and Bethlehem, at Johnstown, it was a bigger undertaking as a management proposition than any division superintendent of any railroad in the country had. It is surprising how many times the material is handled in these plants. They work at great disadvantage, as these old plants were built when locomotives and cars were small and safety considerations were not a problem, with the result that trestles and a thousand other things were too close to the rails, etc. Old equipment stands in the way; piling material close to the rails is bad and dangerous; clearances are a big factor in safe operation.

Dr. G. H. McKinstry of the Collinwood Steel Co. stated that accidents do not "happen." They are caused from some improper condition. This applies to plant railroads as well as other operations. His company considers its railroad equipment as ideal as can be made; standard clearances of 8 ft. are maintained and the crossings are clear and well lighted and are guarded by a safety gate and also a watchman. Where cars enter a building they must be preceded by a switchman; no flying switches are permitted inside the plant, and no one is allowed to mount or ride cars except train crew, safety engineer or yard superintendent. On all inclines the rails are provided with stops which must be kept locked, and at the approach to all buildings there are stops which must be kept in place. This has eliminated practically every accident from a railroad cause. Guarded cross-overs are provided with filler blocks to avoid catching shoes inside the rail. The layout of tracks is such that none cross each other. When car repair is going on, a sign is placed on the track.

Secretary Northwood stated that a report had come into his office recently of an accident in the plant to a railroad man, from one of the old safety chains that they had insisted on putting on a hot-ladle operation; the man had hurt his hand climbing in to hook the safety chain. They wanted to know if there was not some way they could take off the safety chain, and he had replied, "We insist on those safety chains and on the railroad men hooking them up before hooking our cinder ladles to the dump." The speaker wondered if anybody present had had accidents from using the safety chain on the hot-ladle trains. The trouble had not been so much with the equipment but with the jay-walking—they had been driving very strongly on "plant jay-walking"—men walking between rails instead of along tracks and crossing without looking, etc. The main trouble has been with the men themselves, the human element, and plant committee has been driving strenuously to make every man stop, look and listen before he steps over a railroad track.

Safety Committees

DECLARING the most important single factor in the development of safety work in all industrial establishments to be the safety committee, Arthur H. Young, manager Industrial Relations Department, International Harvester Co., Chicago, stated that the work of safety committees in the International Har-

vester Co. plants has laid the foundation for personal contact between men and management that has brought about better economical and industrial relations.

"Safety is the one subject on which executives and workers can get together on a non-controversial basis, and the very fact that all parties discussing the subject, and taking steps toward the conservation of life and property, are agreed on its value and usefulness, leads to a harmonious foundation on which other topics, vital to both sides, can be taken up," Mr. Young said.

The speaker stressed the fact that safety efficiency should be a matter of participation by the worker and not simply a matter of cooperation.

"Every plant striving for greater safety measures needs 100 per cent participation," he said. The speaker advocated mixed committees; not only groups of foremen, superintendents and other executives, but groups of employees working in concert with foremen and superintendents. The speaker referred to safety development in the harvester plants as a builder of morale, because it has brought about pride of accomplishment.

Discussing "Plant Publications," Mr. Young said: "The true function of the plant magazine is to aim at a contact point between executives and workers. Industrial publications cannot be mere organs of propaganda for the management, but must be constructed in a manner that will be acceptable to both workers and managers.

"The same is true of the other side of the question; the plant publication cannot be limited to an organ of propaganda for the worker only, but should be edited in a way that will serve the mutual interests of both."

The speaker dwelt on the necessity of making plant organs simple and dignified and easily understood by the men.

STEEL TREATERS AT PITTSBURGH

Record Attendance at Opening Sessions—Exhibition a Marked Success

PITTSBURGH, Oct. 9.—Most auspicious has been the opening of the fifth annual convention and exhibition of the American Society for Steel Treating. Members and visitors from many sections of the country have gathered in large numbers and the prospects are that this year's affair will far transcend any previous one. Elaborate arrangements have been made by the Pittsburgh chapter under the general direction of J. Trautman, Jr. of the Colonial Steel Co., for the convenience and entertainment of the organization. The first day's registration, estimated at about 850, exceeds the splendid record made last year at Detroit.

The First Session

The first session was held in the ballroom of the William Penn Hotel, the headquarters of the convention, at 10 o'clock yesterday morning. The portion of the meeting preceding the technical program was presided over by J. Trautman. A welcome to Pittsburgh was extended on behalf of the Pittsburgh chapter by W. J. Merten followed by a brief address of welcome by Mr. Trautman. In the inforced absence of the Mayor of the city, H. M. Irons of the mayor's office also extended a cordial welcome to the society after extolling the city's position in the steel industry. On behalf of the Pittsburgh Chamber of Commerce, A. L. Humphrey, its president, who is also a member of the steel treaters' organization, completed the welcoming formalities, followed by a felicitous response by T. D. Lynch, president of the steel treaters.

The first technical session followed these exercises. It was presided over by W. J. Merten, chairman of the Pittsburgh chapter. An attendance of over 300 at this meeting attests to the enthusiasm of the convention. Three papers were presented and discussed. They were delivered by the authors as follows: "Metallography and Testing of Oxyacetylene Welds," by J. R. Dawson, research metallurgist Union Cabinet & Carbon Research Laboratories, Inc., Long Island City, N. Y.; "Some Observations on Furnaces and Fuels, Including the Electric Furnace for Heat Treating," by E. F. Collins, consulting engineer General Electric Co., Schenectady, N. Y., and "The Tempering of Tool Steels," by J. P. Gill and L. D. Bowman, metallurgists Vanadium Alloys Steel Co., Latrobe, Pa. Abstracts of these papers, which were not preprinted, and of the discussions will be published in the full report in THE IRON AGE, Oct. 18.

The Exhibition Very Large

The steel exhibition, which is housed in Motor Square Garden, some six miles from the headquarters, was opened at 1 p. m. yesterday. It is an impressive display both in its comprehensiveness and in the general layout. Nearly every booth was ready for visitors. The entire available space has been filled while about 35 per cent of the total, applied for in addition, had to be rejected. Orchestras on both floors is an innovation this year. Full details will appear in the complete convention report.

In a room in the exhibition building's basement, what is designated as King Tut's room, are held the afternoon sessions and symposiums, the morning sessions taking place at the hotel headquarters. Yesterday afternoon there was a brief session on sheet steels at which two papers were presented, one on "Automobile Sheet Steel Specifications," by H. M. Williams, metallurgist General Motors Research Corporation, Dayton, Ohio, and one on "The Annealing of Sheet Steel," by F. G. White metallurgical engineer National Enameling & Stamping Co., Granite City, Ill.

Today's sessions include one this morning on the general subject of "Carburizing" with a round-table discussion under the direction of the Standard Committee, with R. M. Bird, chief metallurgist Bethlehem Steel Co., as chairman.

The annual smoker and entertainment, always a feature eagerly looked forward to and well attended, is in progress tonight at the William Penn Hotel.

Statistics of Common Carriers

In a 32-page pamphlet the Interstate Commerce Commission has made a preliminary abstract of statistics for the Class I railroads. Outstanding features show 777, 132 stockholders and a total investment, including current assets, etc., of $24,763,506,472.

Physical quantities reported include 234,986 miles of road, with sufficient second and additional tracks, yard track and sidings to make a total trackage of 382,101 miles. Locomotives at the end of the year included 64,139 operated by steam and 373 others, mainly electric. Freight cars at the end of the year numbered 2,293,402, with an aggregate capacity of 98,847,236 net tons or an average of 43.1 tons.

Employees averaged 1,627,120, with total compensation of $2,640,738,182, or an average of $1,623 each. Consumption of fuel amounted to 127,213,184 net tons. Revenue freight carried aggregated 1,840,954,570 net tons, and 339,285,347,571 ton-miles, showing an average haul of 184.3 miles. Passengers carried numbered 967,384,978 and 35,469,841,029 passenger-miles, giving an average of 36.67 miles. Revenue per ton of freight was $2.17, while per ton mile it was 1.177c. Revenue per passenger averaged $1.11, while per passenger-mile it was 3.027c.

Express company and the Pullman Co. operations are included.

Stockholders of the Dorris Motor Car Co., St. Louis, will meet on Nov. 2 to consider an offer from Eastern financial interests to buy the company. The refinancing or other disposition of the property has been discussed since the failure of the recent plan to merge the Dorris with the Haynes and the Winton in a new company along the lines of the General Motors Corporation.

NOT MARKET MENACE

Official Statement as to Steel Vessels to Be Scrapped by the Navy

WASHINGTON, Oct. 9.—The total quantity of steel in the battleships and battle cruisers to be sold by the Navy and scrapped by purchasers under the terms of the four-power treaty for limitation of armaments has been officially estimated at 205,000 tons. This compares with 199,677 tons of ferrous metal which was estimated by THE IRON AGE last week. The official estimate was announced by Capt. E. W. Bonnaffon, officer in charge, in the sale of naval vessels. He issued a statement on the subject in response to inquiries which indicated that there was some concern that the scrapping of these vessels would have an adverse effect on the market. The statement of Captain Bonnaffon disposes of any apprehension on this point.

The statement in part follows:

"The total amount of ferrous materials contained in the 21 battleships and battle cruisers to be sold by the Navy Department in October and November, and scrapped by the purchasers in accordance with the treaty limiting naval armament, is estimated at approximately 205,000 tons. As the total annual production of scrap metals in this country is estimated at 20,000,000 tons, half of which is produced by the mills and half obtained from outside sources, it will be seen that this is little more than 1 per cent of the total production. The sale of this scrap will be distributed over more than a year, so there is not the slightest probability of this metal overloading the market or affecting it in any way.

"Experts tell us that the scrapping of these vessels presents no problems which have not been solved in this as well as other countries, and can readily be accomplished by modern methods of cutting and breaking. Of the ships under construction on the ways, a comparatively small proportion of their designed tonnage has been erected. Only a small amount of armor has been placed on them—259 tons on the Indiana, 511 tons on the South Dakota, lesser amounts on other vessels, and on some none at all. The thickest armor plate can be cut, it has been demonstrated, and this is being done continually on other vessels that are being broken up.

"The older battleships afloat can be broken up by the same means which are being successfully used in the scrapping of the Kentucky, Ohio, and other vessels which were previously sold, and are now being scrapped by the purchasers.

"In Great Britain, Germany, Holland and other countries ship-breaking has become quite an industry. In England one firm has purchased 135 vessels for scrapping. The most modern methods are already in use by firms engaged in ship-breaking in this country, the most advanced apparatus is available, and there is no reason why the business should not be made successful in America as it has been abroad. The Navy will take pleasure in furnishing the fullest information available to prospective bidders, if they will call upon or address Officer-in-Charge, Sale of Naval Vessels, Room 1008, Navy Department, Washington."

TARIFF SUSPENDED

Increase in Short Haul Freight Rates Not Approved by Commission

WASHINGTON, Oct. 9.—Acting upon protests from 42 iron and steel companies and commercial organizations in Pittsburgh, Bethlehem, Beaver Falls, and Coraopolis, Pa.; Buffalo, N. Y.; Parkersburg, W. Va., and Cleveland, Elyria, Youngstown, Alliance, and Lorain, Ohio, the Interstate Commerce Commission last Saturday suspended from Oct. 7 to Feb. 4 a total of 71 tariffs proposing increases in short haul rates on iron and steel products in western Pennsylvania, eastern Ohio, and northern West Virginia.

While the railroads estimated that the increase in rates would average approximately 15 per cent, the iron and steel manufacturers pointed out that increases as high as 60 per cent were proposed in some instances. The object of the schedules was to do away with so-called fourth section departures which were condemned by the commission in passing upon the complaint of the American Shipbuilding Co. against the Director General and the carriers affected. The fourth section departures which the commission ordered removed consisted of joint rates higher than the aggregate of intermediates, the latter being made of so-called short haul rates.

The new rates proposed from Pittsburgh to typical points in western Pennsylvania and eastern Ohio, such as Beaver Falls and Newcastle, Pa., and Youngstown and Cleveland, represent an increase of 15.7 per cent; from Woodlawn, Pa., to the same destination, 34.2 per cent; from Beaver Falls, 24.7 per cent; from New Castle, 23.1 per cent; from Struthers, Ohio, 23.9 per cent; from Youngstown, 18.8 per cent; from Akron, 25 per cent, and from Cleveland, 16 per cent.

The Jones & Laughlin Steel Corporation in its protest maintained that there was no necessity for the increases, particularly from Woodlawn, inasmuch as there had been no departures in rates from that point. Railroads contended that increases from Woodlawn were necessary in order to prevent disturbance of the old rate relationships. The greatest increase proposed in the schedules is from Woodlawn to Wheeling, W. Va., a distance of 81 miles. The present rate is 11.5 cents per 100-lb., while the proposed rate is 18.5 cents, an increase of 60.9 per cent. Other sharp increases proposed are from Woodlawn to New Castle and Struthers. The proposed increase in these cases is 50 per cent. Other increases proposed include those from Wheeling to Cambridge, from 9.5 to 13 cents or 36.8 per cent; from Woodlawn to Youngstown, from 8 to 10.5 cents or 31.2 per cent; from Beaver Falls to New Castle from 7 to 9.5 cents or 35.7 per cent, and from Canton to Alliance, Ohio, from 6 to 8 cents or 33⅓ per cent.

United States Behind in Shipbuilding

Not only Great Britain and Germany, but Italy, France and Holland, as well, are building more tonnage than the United States today, says a statement just issued by Lloyd's Register of Shipping, giving returns for the quarter ended Sept. 30. In the past four years, it is pointed out, this country has fallen from first to sixth place among the shipbuilding nations of the world.

World construction at the close of the quarter just ended was smaller than at any time since the close of the war, Lloyd's Register states, and this represents a decline of more than 165,000 gross tons in comparison with the preceding quarter, ending June 30, last. In the past three months the aggregate of American construction decreased 34,000 tons, that for Great Britain and Ireland, 66,000 tons, and for all other countries combined 65,000 tons.

The following table shows in gross tons the comparison of construction orders now, as compared with three months ago:

	October 1	July 1
Great Britain and Ireland	1,271,195	1,337,759
United States	99,383	133,660
Other Countries	1,007,119	1,072,437
World Total	2,377,697	2,543,856

Mechanical stokers sold during August are reported by the Department of Commerce at 135, of 71,693 hp. total. This compares with 52,518 hp. in July, 59,719 hp. in June and a monthly average of 76,403 hp. in the first half-year. January, April and May showed larger totals than August, May leading, with 100,513 hp.

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips 1st *Vice Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building, Boston: 410 Unity Building Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg Buffalo: 833 Ellicott Square, Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Case of the Railroad Brotherhoods

The railroad train service men are asking for an increase of wages, specifically a restoration of the maximum that they were paid in 1920, from which they were reduced by the Railroad Labor Board in 1921. There must appear to them to be a good deal of merit in their contention. They suffered a reduction. Their compensation never rose so high in comparison with the pre-war rate as did that of other railroad employees, and now it is relatively much lower than what the latter get. Moreover, when they view the high wage rates for building mechanics, and indeed suffer from them, they justifiably may think that they have grounds for dissatisfaction.

All of this may sound strange, considering that the men who operate the trains are united in strong labor unions. Either the brotherhoods have been moderate heretofore, or unionism does not have the commanding effect upon wages that is commonly supposed.

However, none of these things is a valid reason for now increasing the wages of the trainmen. The fact is that their present compensation bears about the same proportion to the pre-war as does the general economic index. In other words, these workers are neither better off nor worse off than they were. The other railroad workers are better off, to be sure, but their good fortune is at the expense and pain of other people. The trainmen will increase that pain if they get what they are asking and what they think they want. Perhaps they do not appreciate what they would be doing.

Yet it is obvious enough that any increase in the cost of railroad labor must be either at the expense of the stockholders of the roads or at that of people who pay for freight and passenger traffic. The yield of railroad investment is already so low that they are no longer attractive and consequently there is but little extension and improvement of the means of transportation. On the other hand, the high rates for freight and passage are a burden and grievance to millions of people.

Putting the case simply, the trainmen are now getting compensation that is closely in harmony with the general writing-up of values. They are asking for more than the average because their fellow workers in the maintenance service are getting more. Granting the demands of the brotherhoods would merely aggravate an economic situation that is already bad. Brute force may accomplish that, just as the anthracite coal miners managed it. The full power of brute force is not, however, always exercised with advantage to the strong. What may look like advantage turns out to be quite otherwise. So is it now with the affairs of management and labor. The former is not trying to screw down the latter. In resisting the demands of labor, it is simply trying to avert a capsizing of the boat. Labor is doing its utmost to produce that calamity, not understanding that if it should happen its millions of workers would prove to be the poorest swimmers.

The rank and file of labor is not expected to understand this. To them an advance in wages is like manna from heaven. They wot not that in present circumstances it has the poison of toadstools. The leaders of labor, however, are intelligent. Especially so are the leaders of the brotherhoods. It is their duty to guide their followers wisely; not to let themselves be pushed by clamor and strike votes. The rank and file may be disappointed and discontented, but that will not be so bad as a half million railroad workers out of jobs, as happened in 1921. It is no cry of wolf to say that tightening of the stranglehold of labor is leading to the like of that again.

Steel Capacity and Performance

Rated, or theoretical, steel ingot capacity in the United States, taken from the annual statistical reports of the American Iron and Steel Institute, has been as follows, in gross tons, at the end of the years named:

1919	53,193,905
1920	54,802,225
1921	55,817,685
1922	56,060,770

Capacity in steel castings has been about 2½ million tons.

The capacity left by the war may be taken as that at the end of 1919 rather than that at the end of 1918, as there was uncompleted work when the war suddenly ended.

The figures given above show a post-war increase of 5 per cent in capacity, which is quite

different from the dismantling of war time plants that had been predicted in some quarters. There is indicated, not a belief that the country needed more capacity, but a desire on the part of individuals to build. In other words, the steel industry is competitive as industries very naturally are.

Capacity was not reported prior to 1913, the earliest statement being that of Dec. 31, 1913, when existing plant was rated at 39,689,265 tons for both ingots and castings. The small tonnage of electric steel capacity was not separated as to ingots and castings, making an uncertainty of a few thousand tons, the ingot capacity being approximately 37,925,000 tons.

Production of ingots in 1913 was 30,280,130 tons. Some new plant came in during the year. There was considerable enforced idleness late in the year on account of lack of orders. Study of the various points indicates that if the 37,925,000 tons rated capacity had been available throughout the year, and the supply of orders had not fallen off late in the year, production would have been about 35,000,000 tons, which would be 92 per cent of rated capacity.

In 1916 there was full operation practically throughout the year, with a production of 41,401,917 tons of ingots. Rated capacity was stated at 43,827,500 tons at the beginning of the year and at 47,588,695 tons at the end of the year. If 31 per cent of the new capacity be added to the original capacity, the average capacity during the year was 45,000,000 tons, of which the reported production was 92 per cent. Thus the factor is given some standing.

In 1916 and in previous years the steel mills were able to operate well as long as they had orders. Since then there have been various difficulties, in respect to transportation, labor and other matters. It may be that in making the last returns the steel mills took account of such conditions and rated their capacity more conservatively. Applying the 92 per cent factor to the last reported capacity gives 51,500,000 tons. Under favorable conditions the industry might do better than this. Its best actual *rate* of production was a trifle over 49,000,000 tons a year, last April. On account of high labor costs, more attention must be given to the fact that some productive units are less efficient than others, and thus the real commercial capacity would be less than the capacity under the most favorable conditions.

Composite Prices as Indices

The value of the composite prices of THE IRON AGE as a real gage of market tendencies has been demonstrated over and over in the conditions that have prevailed in iron and steel markets for the past six months. The outstanding fact in the unusual developments so widely discussed in this eventful period is that while pig iron has steadily declined, finished steel products have gone week after week with substantially no change. As April opened the pig iron price curve was at its high point for 1923, THE IRON AGE composite for basic and foundry irons being $30.86. On Oct. 9, after a practically uninterrupted decline our pig iron composite stood at $23.79, representing a fall of $7.07 or close to 23 per cent.

On the other hand the changes in the finished material composite in the six months interval have been negligible. The average of the seven representative products chosen for our finished material composite—steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets—stood at 2.810 cents at the beginning of April. An advance in plain wire in the third week of April raised the figure to 2.824. On May 1, a reduction in bars from 2.50 cents to 2.40 cents Pittsburgh, restored the composite to 2.810 cents. A week later a reduction in No. 28 black sheets to 3.85 cents resulted in a composite of 2.789 cents and this in turn fell to 2.775 cents on July 24, on a further reduction in sheets to 3.75. And the 2.775 cent composite stands today, representing a change of but 1¼ per cent from the 2.810 cents of six months ago.

The two composites—one for pig iron and one for finished steel products—give an exact picture of what has taken place in the market—a considerable decline in pig iron, that has been the comment of the trade, and a practically stationary market for rolled steel, that has been equally a matter of comment for the contrast in the conditions governing the two classes of product.

A composite price made up of pig iron, semi-finished steel and finished products has been no index to what has happened in the steel market in this important period—nor to what has happened in pig iron, for that matter. It has shown a practically uninterrupted decline in iron and steel, giving no idea of the extent of the pig iron decline and entirely misrepresenting the stabilizing influences that have been so marked in the products of the rolling mill.

Substitution in Fuels

On account of the great increase in the rate of petroleum production in the last year the question has been raised whether oil may be substituted for coal to such an extent as to equalize matters. The coal situation has been such that any suggestion of getting away from coal is favorably considered. On account of production of the three fuels, coal, petroleum and natural gas being reported in their own units, tons, barrels and cubic feet, a direct comparison of fuel values requires reduction to a common standard, and a statement of the relative importance of production of the three fuels at the present time may be of interest.

During the first eight months of 1922 production of petroleum ran quite steadily at about 1,500,000 barrels a day. Then began a steady ascent, until a rate of 2,104,742 barrels was reached last July. August showed an increase, but only to a 2,119,871 barrel rate. The Geological Survey remarks, in making the report for August: "It is noteworthy, after many months of rapidly increasing production, that the rate of increase materially slackened." Ups and downs in oil production, fears of scarcity and dangers of overproduction, have alternated, and thus it may be that oil will take care of itself. However, oil produc-

tion at two million barrels a day may be taken as a basis of study.

Production of coal in the first nine months of this year has been 413,435,000 net tons of bituminous and 71,264,000 net tons of anthracite. Bituminous coal stocks increased 20,000,000 tons from Jan. 1 to Sept. 1, and of course anthracite accumulated, but it will do no harm to take this year's coal at one-third greater than the nine months' actual production, or at 646,000,000 net tons.

Production of natural gas this year may be estimated roughly at 750 billion cubic feet.

At 14,250 B.t.u. per pound of coal, 6,000,000 per barrel of petroleum and 1,025 per cu. ft. of natural gas, the heat units in these fuels would compare as follows, the thermal units, in first column, being in trillions:

	B.t.u.	Per Cent.
Coal	18,400	78.1
Oil	4,380	18.6
Gas	770	3.3
	23,550	100.0

Oil, of course, will go farther in replacing coal than the heat unit comparison would indicate, because more of the heat can be utilized. Even at that it is seen that a relatively small reduction in the use of coal would represent a relatively large increase in the use of oil. By the heat unit comparison, to make up for a 10 per cent decrease in coal would require a 42 per cent increase in oil.

The future of oil production and the future of coal marketing both present great uncertainties, but they are of quite different character, and the consumer therefore may choose with which group of uncertainties he will take his chances. Naturally substitution of oil for coal occurs more readily at points far removed from coal mines.

The Machine Tool Meeting

Concrete indications of continued increase in consumption of iron were supplied by the machine tool builders' meeting last week. Several pictures were sketched of mechanisms for labor saving and efficiency promotion where there are none now and of better devices to replace those that exist. The movement will be noteworthy with the railroads, if President Kearney is a prophetic observer, and sooner or later it will take up the present slack in machine tool capacity. It is not new to expect an ever mounting per capita consumption but it is uncommon to have such reassuring hints of specific forms which it will take.

Bearing on the displacement of hand labor by mechanical appliances is the contention of Thomas A. Stroup of the Utah Fuel Co., that mechanicalization might well be pursued as a means of making the wage earner happy. At present it is merely a route to cost reduction, without recognizing that it may also be used to relieve the less competent of sustained demand for initiative, judgment and responsibility. Mr. Stroup, in a survey prepared for the American Institute of Mining and Metallurgical Engineers, goes so far as to suggest it as a cure for the ills of unionism, arguing that it has proved one factor toward destroying unionism in the metal mines and would be effective also in righting the situation in the coal mines. Whether it would have this two-fold result or not, the trend toward replacing hand labor and multiplying its power is clearly continuing and the engineering industries are bound to be busy as a result.

As a means of accelerating such movements, the trade association has no small place. Undoubtedly the address of President Kearney will help bring about railroad improvements in so far as the railroad executive grasps the conditions which govern machine tool building and at the same time appreciates, as his mechanical department does, the highly developed equipment provided for railroad needs. Trade associations have done little to educate their buying clientele as a whole. Much needs to be done in dispelling erroneous views and in developing mutual rather than diverse interests of the buying and selling groups.

CORRESPONDENCE

The Wealth of "the Rich"

To the Editor: The editorial upon the above subject, appearing on page 912 of your issue of Oct. 4, concludes as follows: "They (the deductions of Dr. Ingalls) constitute a powerful refutation of the dangerous fallacy that is now influencing the minds of many of our people."

I fully realize the existence of the "dangerous fallacy," and I wish that Dr. Ingalls's conclusions and his undoubtedly competent correction of the figures themselves could be made to carry the refutation so greatly to be desired. You refer to the Western agrarian slogan of "Soak the Rich," based upon a belief "that 2 per cent of the people of the United States own 65 per cent of the wealth," which belief has become a commonly asserted argument for the so-called radical legislative program.

In correcting the heretofore uncontroverted statement contained in the report to Congress referred to, Dr. Ingalls has accomplished a most difficult and a most important task. In the interest of exactness, in the correction of important statistics, it certainly is of high value that so glaring an error should have been revealed; the stated 65 per cent falling gradually, as Dr. Ingalls's article proceeds, until from stage to stage it finally establishes itself at 30 per cent.

Evidently, however, the Farmer Laborites, the LaFollettes and the Brookharts, are not resting their right of attack upon corporations and wealthy persons upon mere mathematical, mere statistical accuracy, but upon the underlying claim itself, which is that an immense, an entirely disproportionate amount of the wealth of the country is actually in the possession of an insignificantly small number of individuals.

Now, as to this one basic and fully admitted fact, what does it matter whether this amount is 30 per cent of the wealth of the country (Dr. Ingalls's minimum) or 46 per cent (his maximum) or the 65 per cent of the incorrect Government report? The quarrel is that these few individuals have no business to have these immense possessions, quite out of proportion to the holdings of the people as a whole; as to which it would seem likely that Dr. Ingalls's article, now robbing the subject of all manner of doubt, may be employed as furnishing the final proof of these claims and as justifying the conclusions based thereon.

What has been done is to correct the figures. The facts themselves, the possession of a huge proportion of the wealth by a very few persons—these things,

whether right or wrong, whether expedient or inexpedient, whether justifiable or unjustifiable, remain unchanged. The various questions which they involve can only be solved as the result of broad study and of wide experience; and with the doctors of economic science themselves at the very poles of difference, little surprise need be felt at the vagaries characterizing the views of our political demagogues, some of whom—unless I quite miss my guess—will be found triumphantly flaunting Dr. Ingalls's article as constituting complete vindication of their platform.

Chicago, Oct. 8. FRANK J. LLEWELLYN.

A. H. Cordery's Long Service with the Phoenix Iron Co., Philadelphia

A. H. Cordery, who has just retired from the Phoenix Iron Co., Philadelphia, after 54 years and six months of active service, started with the company as a telegraph operator in March, 1869, and for the past 20 years had been general manager of sales. In an interview with a representative of THE IRON AGE Mr. Cordery chatted interestingly of his early days in the iron and steel business.



A. H. CORDERY

"When I became associated with the Phoenix Iron Co., through being employed as telegrapher on the private wire connecting the works at Phoenixville with the main office at Philadelphia, there were no steel shapes except rails and not many of those," said Mr. Cordery. "Rolled iron was used for rails, shapes and plates, and the principal producers were located along the Atlantic Coast, the Phoenix Iron Co. being the largest producer.

"In 1869, when I started, the main production of the company was bar iron, although shapes were beginning to be an important factor, and as the use of shapes for building and ship construction increased, the bar business became less and less a factor, until the company finally ceased making anything but structural shapes, which is now its only product.

"During these changes, I had left the telegraph desk to take charge of bar sales, and started out in 1881 to establish personal connections with our trade; rather an unusual thing at that time. The distribution of rolling mill products was generally through merchants, but the increasing use of structural shapes and the unfamiliarity of dealers with the technical questions involved, necessitated closer relations with the consumers, opening a new field for the salesman. The center of business in my early career was at Philadelphia. Prices were based on Philadelphia, but later moved to Pittsburgh.

"Of the many changes in methods of doing business, I do not know of any more radical than in transportation. The last order for rails filled by Phoenix will indicate our ancient methods. This order was loaded on canal boats at Phoenixville, brought through the Schuylkill River Canal to the Delaware River below Philadelphia, up the Delaware River to Bordentown, through the Delaware and Raritan Canal to New Brunswick, N. J., down the Raritan River to Newark Bay, through Kill Von Kull to the Hudson and up the Hudson to Albany, taking about two weeks.

"The Southern States were large consumers of rails, and many of the rails torn up by the Union troops in the 'march to the sea' came from Phoenixville. In the early days of iron shipbuilding, most of the shapes came from Phoenixville, but when steel came into use, this business as well as other lines rapidly centered in Pittsburgh."

EIGHT HOURS IN GERMANY

August Thyssen Writes Judge Gary the Short Day Has Not Been Satisfactory

August Thyssen, of H. Thyssen & Co., Mülheim-Ruhr, one of the leading steel masters of Germany, has written a letter to Judge Elbert H. Gary, chairman United States Steel Corporation, giving his views in regard to the 12-hr. day, especially in connection with the change from the 12-hr. to the 8-hr. day in this country. His letter is as follows:

Mülheim-Ruhr, Sept. 10, 1923.

Dear Mr. Gary:

I duly received your kind lines of July 23 and thank you sincerely for the submitted report on the 12-hr. day containing the letters exchanged with the President and your interview with the representatives of the newspapers.

The contents were of great interest to me. After the 8-hr. day had been introduced in Germany—about five years ago—we had some experience with it. The formerly-made assertion that in eight hours without intervals the same production would be secured as in 12 hours with intervals—where after deduction of the intervals still 10 hours are left—has not proved to be correct, and therefore the cost was increased considerably. If you estimate this increase of cost at 15 per cent this would be rather too low than too high. Exact statements on his point we cannot make yet, as since the introduction of the 8-hr. day we have not worked again under normal conditions.

On a former occasion I once said that, if the workmen found the 8-hr. day to be their ideal, I certainly would not take from them their ideal, but I observed at the same time that we must clearly understand that in these eight hours the work had to be done very intensely and that at all events the production must be greater than formerly, especially in the conditions under which we live today in Germany.

I further pointed out that it could not generally be done with the 8-hr. day, for even while I might understand the eight hours for the heavy work before the furnaces, it could not be justified for light work. Levelling of work or labor in that unreasonable way as it was done in the last years cannot be maintained and every judicious workman will agree that when a furnace man works eight hours, those who do lighter work will not be entitled to work also only eight hours.

What the clergyman has written you that the industrious workman will nevertheless work not less than formerly, has found its confirmation here. The men who are industrious do not like to be idle after having finished the 8-hr. shift; therefore they do afterwards still other work, in their profession or otherwise, and so they work indeed more than eight hours every day. The people who are satisfied with the eight hours' work for the day are just those who are not industrious and zealous, or youngsters who are used to wasting their time and money only on pleasure or useless trifles. Of course, nothing shall be said against recreation, so far as it is done in reasonable bounds.

Whether the whole will be of advantage for the training up of an efficient and reliable new generation is at any rate very doubtful. Though I may imagine that the shorter work-day may mean advantages, especially for the hygienic and moral conditions of the working people, I am not sure whether these advantages will be greater than its disadvantages; on the contrary, as far as my observation goes, the disadvantages are prevailing.

Believe me to be, dear Mr. Gary,

Cordially yours,
AUGUST THYSSEN.

Hon. E. H. Gary,
71 Broadway,
New York.

The Ford Motor Co., Detroit, has commenced the erection of a Piron twin coke oven at its River Rouge plant for the manufacture of steam coke. This plant will have a capacity of 1000 tons per day. The Ford company has completed its sintering plant which will be placed in operation this month.

JAPAN FORMS BUYING BOARD

To Plan Rebuilding and Buy and Sell and Settle Claims—Large Inquiries Current

NEW YORK, Oct. 9.—Trade with Japan is still quiet, but fairly heavy purchasing of galvanized sheets, plain and corrugated, from British mills is reported and the Imperial Government machinery is rapidly operating toward a systematic scheme of reconstruction in the areas devastated by the earthquake. On Sept. 22, the "Emergency Supply Act" was adopted, permitting the Government to enter into the buying, selling, exchanging and stocking of foodstuffs, building materials, etc., in the devastated areas. This act permits the Government to purchase materials directly from the manufacturer or through properly accredited sources. This was the preliminary step toward organization of the "Metropolitan Reconstruction Board," Sept. 27, headed by Viscount Goto, Minister of State, under the supervision of Viscount Yamamato, the premier. The board includes two vice-chairmen and about 660 staff members. It is divided into seven separate bureaus: Secretarial division, division of material purchase and supply, civil engineering division, architectural division, divison of designing and drafting, divison of land claims adjustment, and division of finance and accounting.

An ordinance providing severe penalties for profiteering, designed to curb speculation, has been adopted. Officials and others in close touch with Japanese affairs believe that purchasing, although in the aggregate large, will probably be spread over many months. On the other hand, a fairly large immediate business is evidently developing, if judgment is based upon the reported inquiry for 60,000 tons of plain and corrugated sheets, galvanized, and 7000 metric tons of wire nails of miscellaneous sizes. A report from Washington states that favorable replies have been received from iron and steel manufacturers on this emergency inquiry, which was put out through the Japanese Embassy with the cooperation of the Department of Commerce. Responses made by producers indicate that they will be able to deliver this material quickly, once the contracts are placed. The Japanese Embassy has also issued an inquiry for large consignments of lumber. These requirements are for immediate purposes and will be followed by much greater inquiries for the rebuilding of the devastated areas.

The emergency galvanized sheet tonnage is to be divided equally between plain and corrugated material and calls for Nos. 28 and 30 gage. It is estimated that the order for these sheets, together with the nails, will involve between $8,000,000 and $9,000,000. Inquiries were sent to the trade through the Department of Commerce, each producer being asked what proportion of the total requirements he was willing to bid on. Secretary of Commerce Hoover specifically stated that the department would have nothing whatever to do with prices or terms of the sale.

In connection with this purchase of material it is rumored that a purchasing board will be formed, made up of importers in New York. Official representatives of the Imperial Government state that they have no knowledge of such an arrangement, which, according to one report would be a buying syndicate made up of five Japanese export houses: Mitsui & Co., Mitsubishi Shoji Kaisha, Suzuki & Co., Takata & Co. and Iwai & Co. In fact officials are inclined to consider the report as without foundation, as, it is pointed out, any such arrangement would lead to untold complications.

"The fact that American steel and concrete buildings suffered practically no loss from the earthquake will be of immense significance in the future building program of the downtown sections of Tokio," says F. R. Eldridge, Jr., chief of the Far Eastern Division of the Department of Commerce in a recent bulletin. "The question whether Yokohama will be rebuilt seems now to be under consideration by the committee of 47 business men appointed by the newly created Japanese Ministry of Reconstruction on Sept. 8, and the question undoubtedly will be decided ultimately by the relative expense of dredging a channel from the present Yokohama harbor to a suburb of Tokio, some 10 or 15 miles distant, as compared with the value of land and of property not destroyed in Yokohama. It is probable that the interests, particularly those shipbuilding concerns and factories, iron works, etc., which escaped damage in Yokohama may oppose such a move, but an engineering problem of such proportions as this must receive the most careful consideration."

Mr. Eldridge states that judging from the methods pursued in the past, it would not be surprising were a huge purchasing syndicate formed under the auspices of the Japanese Government to which would be intrusted the whole question of providing the Ministry of Reconstruction with materials for rebuilding and repairing damaged machinery, equipment and public works. If a purchasing syndicate should be formed, says Mr. Eldridge, advantage would undoubtedly be taken of the opportunity to purchase machinery in the United States and other foreign countries under the agency arrangements of such firms as Mitsui & Co., Takata & Co., etc., already established with American manufacturers.

On the whole, Japanese trade at present, exclusive of the direct inquiry for reconstruction purposes, is beginning to resume a normal appearance. Inquiries continue for wire nails, some galvanized wire, light gage black sheets, 13 and 27 to the bundle, tin plate and rails. The tender for rails is from Kobe municipality and calls for bids on six miles of 91-lb. or 93-lb., high T grooved rails and one mile of 122-lb. sections of high T, grooved rails, bids opening Oct. 16.

Iron Ore Beneficiation

A comprehensive study of the problem of iron ore beneficiation has been undertaken by the Department of the Interior, at the Southern Experiment Station of the Bureau of Mines, Tuscaloosa, Ala. The first part of this work consisted in the compiling of a list of the companies doing work of this nature. A survey was started in the Birmingham district by Oscar Lee, assistant metallurgist. The purpose of this survey is to acquire information regarding all the plants in operation, as well as others which have been abandoned. It is believed that such information will furnish data from which it will be possible to determine what might be expected in the future from new methods. Definite information regarding the success of any particular type of machine or method of beneficiation will be available and it will be possible to summarize the work which has been done throughout the country in this connection. This work was transferred from the North Central Station of the Bureau of Mines, Minneapolis, to the Southern Experiment Station, at Tuscaloosa, on July 1.

Effective Oct. 1, the Replogle Steel Co. has discontinued operations at its Scrub Oak iron ore mines, near Dover, N. J., throwing approximately 250 men out of work. The property was opened a few years ago, when the company took over the Wharton blast furnaces, and this is the first actual shut-down at the property; no indication has been given as to how long the curtailment will continue. The Empire mine at Oxford, near Wharton, is also inactive, having been closed down by the company a number of weeks ago.

Detailed requirements of the railroads for locomotives, cars, rails and other facilities for the next ten years were made the basis of the discussion of the Committee on Government Relations of the Chamber of Commerce of the United States, which met in Washington last Thursday to consider the final draft of its report. The committee is dealing with problems involved in securing the development and expansion of railroad facilities that will be needed to handle the enlarged traffic expected in the next decade.

The Durant Motors, Inc., has adopted an 8-hr. day, 44-hr. week operating schedule at its main works at Elizabeth, N. J.

Germany Quotes in Gold Marks

Prices Twice and Three Times Pre-War Level—Release of Ruhr Stocks Not Considered a Menace—Industry Depressed

BERLIN, GERMANY, Sept. 21.—In the Ruhr the French lately began moving heavy iron, particularly stocks seized from the Hoesch, Phoenix and Rhenish Metal corporations; but large stocks, produced early in the occupation, remain. The Essen Bergwerks-Zeitung estimates the stock of unsold pig iron and steel at 1,750,000 metric tons. France's claim to have removed 700,000 tons of iron is obviously exaggerated. As the demand for iron and steel in unoccupied Germany is great, the cessation of the Ruhr export embargo is not expected to cause any over-supply or to affect prices materially.

Although depression in the heavy iron and steel industry seems to be made impossible by the chronic under-production, conditions are worse with the finishing mills. The chief factor seems to be the adoption of gold prices and gold wages. Unemployment is increasing. The latest report of the Iron and Steel Wares Association of Elberfeld shows that in the Solingen steel district alone there are 20,000 unemployed, which is about the same number as in all Germany in September, 1922. The Solingen district has been completely isolated, no material leaving the works. World-market prices are exceeded. In the Hagen district conditions are worse and several hundred concerns have suspended operation. Practically no domestic orders are received, and export is checked by the high production costs. In the Schmalkalder district many shops are working only two days a week. Nearly all companies have adopted the dollar or pound sterling for calculation. Conditions in the machinery industry have everywhere grown worse. Orders are not being received; wages and the cost of raw materials and coal are high; and sometimes where there are still unfilled orders materials cannot be obtained. In all these branches of industry hope of recovery is based upon the reestablishment of stable currency. It is now realized that with the introduction of gold calculation the bounty given to industry by the declining paper mark was bound to disappear.

The pig iron syndicate and the steel syndicate are both quoting in gold prices. Before September the system pursued was to quote basic paper mark prices on the assumption of a given dollar or sterling exchange, and to alter the basic paper mark prices in proportion to subsequent exchange movements. Today, with prices directly quoted in gold, paper mark payments are made on the basis of the paper mark's gold value on the date of payment. The steel syndicate quotes in gold marks, whereas pig iron prices are quoted in sterling. The following table shows the steel syndicate's new gold mark rates, and its rates of July, 1914, both per metric ton:

	Sept., 1923 Gold Marks	July, 1914 Gold Marks
Ingots	165.90	82.50
Blooms	189.60	87.50
Billets	202.40	95.00
Slabs	210.10	97.50
Structural forms	239.20	110.00
Bars	240.00	97.00–99.00
Bands	298.10	105.00
Wire rods	254.30	117.50
Sheets:		
5 mm. and heavier	270.50	105.00
3 to 5 mm.	302.20	110.00
1 to 3 mm.	359.40	126.00
Less than 1 mm.	400.10	Not quoted

Foundry iron No. 1 is quoted at 122s. 6d.

Gold prices of iron and steel are now from 100 to nearly 300 per cent higher than pre-war. This is largely a result of the enormous increase in the price of coal, partly because of the 30 per cent coal tax. On Sept. 17, when coal prices were put on a gold basis, the rate per ton, including tax, was 28.08 gold marks, or about 125 per cent higher than the pre-war price of about 12.50m. Foundry coke is 42.70 gold marks, against 20 marks before the war. Prices of metals and coal are relatively much higher than most other commodities. The price policy of the steel and iron producers and of the foundries is being severely attacked, particularly by the machine and sheet industries and by street railroads and private railroads.

Because of the Ruhr occupation, foreign trade figures are imperfect. The latest are for July, and these give no values. July shows a slight recovery in exports of rolling-mill products, general iron wares and machines. Exports of rolled materials and iron wares were 69,793 metric tons, against 59,171 tons in June, and a monthly average of 193,015 tons in 1922; machine exports were 27,622 tons, against 18,247 tons in June and a monthly average in 1922 of 39,914 tons. As a result of the depressed condition of the steel making plants, exports of scrap have increased and imports decreased.

The rise in gold prices has compelled the Government to institute measures for fostering export. The whole system of foreign trade control is in course of liquidation. From Sept. 27 goods which have hitherto been on the export-prohibition list, which means exportable only under license, may be exported freely without license. Exceptions are foodstuffs, raw materials and certain semi-finished materials in which domestic manufacturers are particularly interested. In carrying out the currency reform, imports will be restricted by imposing duties on products which are at present duty-free and increasing the tariff on other goods. This measure will apply mostly to luxuries or semi-luxuries.

Decrease in Steel Plant and Mill Activity in the Mahoning Valley

YOUNGSTOWN, Oct. 9.—Steel making and finishing mill operations in the Mahoning Valley are on a somewhat reduced basis this week, as compared with the week before.

The Youngstown Sheet & Tube Co. has reduced the number of active open-hearth furnaces from 20 to 14, and the number of sheet mills from 21 to 14. The Republic Iron & Steel Co. has placed its plate mill on the inactive list. The Sharon Steel Hoop Co. has reduced the number of sheet mills from seven to five. Of 120 sheet mills in the Valley, 76 were scheduled this week, as compared with 83 the week previous.

The A. M. Byers Co., Pittsburgh, is operating 80 of its 88 puddle furnaces at Girard, Ohio, representing a high point in recent schedules. Its blast furnace is now undergoing repairs and will be cold for at least six weeks longer.

The Sheet & Tube company is operating six of its nine stacks in this district, and the Republic company four of six. The Carnegie Steel Co. has the blast on six furnaces at the Ohio Works.

The Trumbull Steel Co., Newton Steel Co. and Falcon Steel Co. are operating at a rate close to normal.

Manufacturing consumers of steel products are likewise operating at a rate near normal.

The photographic department of the Youngstown Sheet & Tube Co., Youngstown, has now on file nearly 10,000 negatives, illustrating every operation in the plant, every stage of construction of important units, most of the company's housing units and many other things of interest and value as visual records. The department serves almost every department of the company, including medical, engineering, safety, legal, publicity and others.

Iron and Steel Markets

CARS AND RAILS

Prospects of Large Purchases Promising

Current Steel Bookings on Increase—Improvement in Operations—Foundry Iron Lower

The appearance of the largest railroad car inquiries that have come out since the early months of the year has produced a more cheerful view of steel market prospects. Leading steel producers at the same time report bookings of finished material for the first week of October at a rate slightly better than the September average.

Operations by the Steel Corporation are at 93 per cent of capacity in the Chicago district and at 88 per cent for the Carnegie Steel Co., with an average close to 90 per cent. Independent companies in the Pittsburgh, Youngstown and Wheeling districts are still running at 70 to 75 per cent.

The better outlook for railroad buying is dwelt on, because present steel prices have been considered too high to encourage contracting on a large scale. It remains to be seen what concessions will be made to the car makers and what economies the latter can enforce to keep their prices within bounds.

The Southern Pacific has led off with an inquiry for 8730 freight cars, 152 passenger cars, 58 locomotives and 5000 refrigerator cars. For the Union Pacific, also, large purchases are planned. The St. Louis & San Francisco is in the market for 2500 cars and the B. & O. for 1400, and the Chesapeake & Ohio inquiry may reach 4000. All told, the steel trade expects soon to have before it plate and other requirements for a total of 40,000 cars.

Rails already booked and those in sight will make a large draft on rail mill capacity for the first half of 1924. Estimates of the Pennsylvania Railroad's coming orders run as high as 200,000 tons, or one-third more than the 1923 total.

It is still difficult to take the measure of Japanese buying. The 60,000 tons of galvanized sheets and 7000 tons of wire nails for which inquiry has been taken up through Washington are considered emergency needs. Structural steel demand on any scale is some distance in the future. The sheets wanted are of thin gages and not commercially attractive to the mills.

Broadly speaking, the immediate demand for plates, shapes and bars is about what it has been —shipments being well in excess of new business. Steel pipe and tinplate are still the lines of largest activity, with wire products a fair second, while sheets are weaker. Concessions beyond the 3.75c. that has been available for some time are now reported.

Steel production held up better in September than was indicated by the 6.5 per cent falling off in the pig iron output of the steel companies. At 3,313,000 tons for 25 working days, the September steel rate was 132,534 tons a day, or only 2.7 per cent less than the daily rate of 136,214 tons in August. Pig iron and steel alike have now fallen off 16 per cent from the peak production rate of last spring.

Low prices have led to considerable pig iron business in the Buffalo district, where $23 has been shaded, but at Chicago, where prices are down $1 further and in other centers where added weakness has appeared, buying has been limited to rather small tonnages. Southern iron is selling at Chicago on a basis of $20, Birmingham, but $21 is still regarded as the ruling quotation in other centers. In eastern Pennsylvania no further reductions have developed, but the market is unsettled. Competition has grown stronger in New England between New York and eastern Pennsylvania furnaces.

Lake shipyard prospects are more promising. Inquiries have been received for two or three freighters, following those for two boats for the Canadian National Railways and orders for two boats for the Ford company.

Bookings of fabricated steel work, amounting to 13,000 tons, are under the weekly averages of August and September, but fresh inquiries at 23,500 tons are the largest in two months.

On plates for the Big Four railroad a Cleveland mill quoted 2.385c., Pittsburgh.

The Cockerill and Ougrée Marihaye works of Belgium have divided a 45,000-ton rail order from Argentina, and the latter company has booked 15,000 tons for Spain.

For 25 weeks or nearly one-half a year, THE IRON AGE finished steel composite price has shown but one change, and that of 28c. a ton. For 12 successive weeks it has remained at 2.775c. per lb., following 13 weeks at 2.789c.

The further decline in foundry iron brings THE IRON AGE pig iron composite price to $23.79, from $23.96 last week. This is the lowest figure since mid-July of 1922.

Pittsburgh

Moderate Improvement in Some Lines, But Still Much Conservatism

PITTSBURGH, Oct. 9.—While business in steel shows improvement in some lines, notably in wire products, and as far as the Steel Corporation is concerned, in plates, general demand still reflects much conservatism on the part of consumers. There is not much doubt that the heavy purchases of the fore part of the year exceeded actual requirements and consumers now are well able to get along with the tonnages still due them on old orders supplemented by very moderate new purchases. The dominating thought of users of steel is to get their inventories down.

The idea is so common that the next change in prices will be down, that this also is a factor in the demand. The Steel Corporation sold much further

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 4, 1923	Oct. 2, 1923	Sept. 11, 1923	Oct. 10, 1922
No. 2X, Philadelphia†	$24.76	$24.76	$26.26	$33.14
No. 2, Valley furnace†	*24.00*	24.50	25.00	32.50
No. 2, Southern Cin'ti†	25.05	25.05	27.55	31.55
No. 2, Birmingham, Ala†	21.00	21.00	23.50	27.50
No. 2 foundry, Chicago*	*25.00*	25.00	27.00	32.00
Basic, del'd, eastern Pa	*24.50*	25.00	25.00	29.50
Basic, Valley furnace	24.00	24.00	25.00	31.00
Valley Bessemer, del P'gh	27.26	27.26	28.26	35.27
Malleable, Chicago*	*25.00*	26.00	27.00	32.00
Malleable, Valley	*24.00*	24.50	24.50	32.00
Gray forge, Pittsburgh	25.26	25.76	25.76	33.77
L. S. charcoal, Chicago	30.04	30.04	32.15	36.15
Ferromanganese, furnace	110.00	110.00	112.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	42.50	40.00
O.-h. billets, Pittsburgh	40.00	40.00	42.50	40.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	40.00
Forging billets, base, P'gh	47.50	47.50	47.50	45.00
O.-h. billets, Phila	45.17	45.17	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb	2.40	2.40	2.40	2.00
Light rails at mill	2.15	2.15	2.15	2.25

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.475
Iron bars, Chicago	2.35	2.35	2.40	2.50
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.44
Tank plates, Pittsburgh	2.50	2.50	2.50	2.15
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.84	2.84	2.84	2.49
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.84	2.84	2.84	2.44
Steel hoops, Pittsburgh	*3.15*	3.00	3.15	2.90

Sheets, Nails and Wire,	Oct. 9, 1923	Oct. 2, 1923	Sept. 11, 1923	Oct. 10, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.75	3.75	3.75	3.50
Sheets, galv., No. 28, P'gh	5.00	5.00	5.00	4.50
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$18.00*	$19.00	$20.00	$25.00
Carwheels, Philadelphia	20.50	20.50	21.00	23.00
Heavy steel scrap, P'gh	*16.00*	16.50	18.00	21.50
Heavy steel scrap, Phila	16.00	16.00	17.00	18.00
Heavy steel scrap, Ch'go	*14.15*	15.00	16.50	18.50
No. 1 cast, Pittsburgh	*20.00*	21.00	22.00	24.00
No. 1 cast, Philadelphia	*19.50*	20.50	21.50	23.00
No. 1 cast, Ch'go (net ton)	19.00	19.00	20.00	21.00
No. 1 RR. wrot. Phila	19.00	19.00	19.00	23.00
No. 1 RR. wrot. Ch'go (net)	*14.00*	14.50	16.00	18.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.50	$11.00
Foundry coke, prompt	*4.75*	5.00	5.75	13.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*13.00*	13.75	14.12½	14.12½
Electrolytic copper, refinery	*12.75*	13.00	13.62½	13.75
Zinc, St. Louis	6.30	6.30	6.55	6.62½
Zinc, New York	6.65	6.65	6.90	6.97½
Lead, St. Louis	*6.65*	6.70	6.72½	6.35
Lead, New York	*6.85*	7.00	7.00	6.60
Tin (Straits), New York	*42.25*	41.87½	42.12½	33.50
Antimony (Asiatic), N. Y.	7.50	7.50	7.50	6.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Oct. 9, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Oct. 2, 1923,	2.775c.
Sept. 11, 1923,	2.775c.
Oct. 10, 1922,	2.460c.
10-year pre-war average,	1.689c.

Composite Price Oct. 9, 1923, Pig Iron, $23.79 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 2, 1923,	$23.96
Sept. 11, 1923,	25.29
Oct. 10, 1922,	30.94
10-year pre-war average,	15.72

ahead than did the independents when demand was active and now has a much heavier order book than its competitors. The real sustaining influence in prices is the increased labor cost incident to the elimination of the long work day. While the extent of the effect of this change cannot, of course, be accurately stated until the 12-hr. day is entirely a thing of the past in the industry, it is probably large enough to prevent price cuts that would bridge the gap between current quotations and the present invoice prices on much of the Steel Corporation shipments. It is fully realized that prices above those now prevailing on the steel now going to buyers would not be attractive to them.

The past week has brought no important price changes by mills in this and nearby districts, aside from the fact that there seems to have been a pretty general withdrawal of prices below 3.15c., base, for hot-rolled flats. The sheet market is softer in tone and while there have been no definite price reductions, there is not much doubt that need of orders, particularly for black sheets, is more pressing. Concessions from regular quotations not only are more frequent, but embrace practically all finishes. Hitherto, price cuts have been chiefly in black sheets. It is still a buyers' market on bolts, nuts and rivets, and observance of the regular base on cold-finished steel bars no longer is very rigid. Boiler tube prices also are soft and the disappearance of recent low prices for hot-rolled flats is looked upon in some quarters as temporary, since there is not enough business to give all producers a share.

There has been no definite turn for the better in the situation in the primary materials. Indeed, a further drop of 50c. a ton is noted in foundry and malleable iron, and quotations on the steel-making grades appear to be what producers are trying to get rather than what customers are willing to pay. There is practically no outlet for the scrap iron and steel coming upon the market, and prices have continued to seek lower levels. The demand for coal and coke is so limited that sales are difficult even at prices well below producing costs. The Carnegie Steel Co. is operating at about 88 per cent of its ingot capacity, which compares with from 70 to 75 per cent, the common rate on steel works operations by independent companies in the Pittsburgh-Youngstown district.

There has been no particular change in active blast furnace lists in the past week. The Jones & Laughlin Steel Corporation recently blew out its No. 1 Eliza furnace for repairs, but at the same time turned on the blast in its No. 1 Aliquippa furnace. The Bethlehem Steel Co. has six of its 11 furnaces at Johnstown in blast, five on pig iron and one on ferromanganese.

Pig Iron.—The market still is extremely dull and, as is usual in markets of that kind, reports of cut prices are very numerous. Definite facts, however, are not always available. There has been a decline of 50c. a ton in foundry grades with one sale of 2000 tons for delivery over the rest of this year noted at $24, Valley furnace, for No. 2. It is reported that there have been sales of this grade as low as $23.50, Valley furnace, but this can not be verified. The most recent business in standard basic iron was at $24, Valley furnace, or Valley furnace basis, and there has not been enough demand lately to determine how firm that price is. It is the common quotation, however, and probably will be observed until there is some evidence of interest in supplies on the part of melters. We also continue to quote the market on standard Bessemer iron at $25.50, Valley furnace, based on the most recent sales rather than upon the price ideas of those now seeking tonnages, some of whom claim to have had a lower quotation. Malleable iron is offered at $24, Valley furnace, but there have been no recent sales.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$24.00
Bessemer	25.50
Gray forge	23.50
No. 2 foundry	24.00
No. 3 foundry	23.50
Malleable	24.00
Low phosphorus, copper free	30.00

Ferroalloys.—Failure of British ferromanganese producers to meet prices recently done on resale British material and their reaffirmation of a price of $117.50 c.i.f. Atlantic seaboard, duty paid, appear to have steadied the general market on this product. Resale offerings of British material have disappeared and $110, Atlantic seaboard, now is the minimum price, this on domestic material, makers of which still are holding at that price. Not much business is being done in this district, as important consumers are covered for the remainder of this year and are not inclined to do much about their early 1924 requirements at the moment. It is admitted by some consumers that unless there is a material decline in manganese ore prices, the likelihood of a dip below $110 is slight. Spiegeleisen is offered as low as $42, furnace, for average 20 per cent material. Hardly enough is going on in 50 per cent ferrosilicon to clearly define prices. There is some talk of lower prices for Bessemer ferrosilicon and silvery iron. Prices given on page 1005.

Semi-Finished Steel.—Billets, sheet bars and slabs are quotable at the prices of a week ago. There seems to be a little more selling pressure in billets and slabs than in sheet bars and this shows in prices since all recent definitely known sales in sheet bars have been at $42.50, Pittsburgh or Youngstown, while billets and slabs have sold at $40 and still can be had at that price when the inquiry is of attractive size. Forging billets still are quoted at $47.50, base, but not much is going on and it is believed that less could be done on a sizeable tonnage. The market on skelp is not very firm at 2.40c., although local makers deny having gone below that price. Just a fair market for wire rods and on the small lots selling $51, base, still is the prevailing price. The Carnegie Steel Co. is operating at about 88 per cent of ingot capacity or more than 15 per cent above the general average of independent companies in this and nearby districts. Prices are given on page 1005.

Plates.—This product is looking better as far as the Steel Corporation is concerned, as, in addition to the 10,000 tons recently placed for the two lake steamers for the Ford Motor Co., it also will furnish the steel for two gas holders amounting to 6000 tons, and between 12,000 and 17,000 tons for a water pipe line for Portland, Ore., contract for which recently was awarded the East Jersey Pipe Co. Orders to independent companies have run generally in small tonnages and while some of them plainly need business to maintain profitable operations, all are holding firmly in price at 2.50c., base, Pittsburgh. Prices are given on page 1004.

Wire Products.—The more general report this week is of increased orders and at least one large independent maker here now has such a backlog that he cannot accept all prompt delivery business tendered. This is an exceptional case, however, as most manufacturers including the American Steel & Wire Co. can make prompt deliveries on practically all products except possibly manufacturers' wire. In a general way, buying is for the replenishment and rounding out of stock and forward buying is not especially conspicuous, as jobbers still are inclined to keep their inventories down as the end of the year draws near. There is close observance of quoted prices on the part of local mills. Prices are given on page 1004.

Steel Rails.—Light billet rails still are quotable from 2.15c. to 2.25c., base, the lower price applying on orders classed as desirable. Not many such orders are coming out and on small lots the common quotation is 2.25c., base. The soft coal market is so dull and depressed that there is no incentive for operators to fresh development work.

We quote light rails rolled from new steel at 2.15c. to 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Demand for standard pipe is as urgent as it has been for some time past and this product constitutes one of the really active spots in the market. Oil country goods still are slowing down and there is not much activity in line pipe, the oil companies evidently waiting for a time when the mills are badly enough in need of business to cut prices. Although reports from California indicate a falling off in the production of crude oil, the supply situation has not improved to a point that encourages expectations of an early revival of oil well pipe demand. Boiler tube makers are busier on old than new orders. There are continued reports of price concessions of boiler tubes, but shading of pipe prices is practically unknown. Discounts given on page 1004.

Sheets.—Orders are coming along fairly well, but the pressure of buyers for deliveries no longer is urgent and there are few mills which are passing up chances for business. The leading interest probably has a better order book than any of its competitors, but will have to have additional business to maintain its present rate of operation of about 85 per cent of capacity throughout the remainder of the year. There is an unmistakable tendency toward conservatism on the part of sheet consumers, who are more disposed to buy small tonnages frequently than to enter contracts for a long period. The market is holding fairly well on all finishes except ordinary black sheets and the weakness in that line does not yet appear to be extending to tin mill black plate. Reports emanating from brokerage circles have it that blue annealed sheets have been offered as low as 2.65c., base. Galvanized sheets out of mill stocks have gone as low as 4.75c., base, but concessions from regular quotations as a rule do not run over $2 a ton. Prices are given on page 1004.

Tin Plate.—Tin plate supplies for the remainder of the year are practically a closed book and interest is turning to 1924 requirements. There are no indications of an over pack of perishable foods this year and there are few of the container manufacturers who will carry much tin plate from this year into 1924. It looks as though next year would be another good one in tin plate and in the absence of any weakening as yet in tin mill black plate, the expectation is that the present price of $5.50 per base box, Pittsburgh, will be continued for the first quarter of next year. Prices for that period probably will not be announced until after the first of next month.

Cold-Finished Steel Bars and Shafting.—Buyers are confining their takings very close to their known re-

quirements and at the same time exerting much pressure against prices, and are meeting with some success in this direction, although makers here still insist that they are getting the full quotation of 3.25c., base. Chicago district makers several weeks ago went as low as 3c., base, Pittsburgh, to secure desirable accounts and it has since been rather difficult, particularly in large centers of consumption like Detroit to obtain full prices. There are no public quotations of less than 3.25c., base, but lower figures are being developed by definite offers. Ground shafting still is quoted at 3.65c., base, f.o.b. mill, for carload lots.

Iron and Steel Bars.—Mills in this territory still are holding to 2.40c., base, for steel bars, but are not finding orders either numerous or large and not much tonnage is moving east owing to lower prices by mills in that direction. Quotations on iron bars also are closely observed by makers in this district.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Cold-Rolled Strips.—This product is steady in price, with enough business coming out to provide most makers with a reasonably high mill operation.

Hot-Rolled Flats.—Obtainable a week ago as low as 3c., base, Pittsburgh, hoops, bands and strips have stiffened to 3.15c. this week, through the withdrawal of the lower figure by those recently naming it and at which a fair amount of business was taken. This base applies on all gages and widths, with the usual differential for hot-rolled strips for cold-rolling and for rim stock, which are priced at 3c. The market is not especially active, buyers being inclined to purchase what they require rather than to enter long time contracts. Prices are given on page 1004.

Structural Material.—The market is very slow but there is no shading of prices. Fabricating shops in this district feel the decline in structural awards quite as much as those in other districts and, while several of them have sufficient old business to keep them fairly well engaged over the remainder of the year, they are fully covered on the steel required. Prices are given on page 1004.

Export Business.—Makers of wire products are having a good many export inquiries for nails and galvanized wire and are booking a very fair amount of business, although the individual sales are small. Inquiries for good sized tonnages of galvanized sheets for shipment to Japan still are coming out, but on account of the gage and size, few mills are at all eager for the business.

Bolts, Nuts and Rivets.—Makers are not yet filled up to a point where they can assume an independent position with regard to prices. Competition for orders still is pretty keen, and for spot or early shipment tonnages it is still necessary to name prices somewhat under what are regarded as the regular quotations. Prices and discounts are given on page 1004.

Track Fastenings.—Buying has not yet assumed the proportion it was expected to in view of recent heavy rail orders, and there is some irregularity in prices due to concessions being made by those most badly in need of orders. Prices are given on page 1004.

Coke and Coal.—The market still is quotable at $4 per net ton at ovens for standard furnace coke, but this is merely the price which producers are trying to get rather than what they might sell for if there was a demand. Furnaces in blast are covered against their fuel requirements for the remainder of the year, but current production greatly exceeds these needs and an outlet for the surplus is very hard to uncover. It is probable that a bid of $3.75 would be quickly snapped up. Although as high as $4.50 is asked for tonnages for shipment over the remainder of the year, it is probable that a firm bid of $4 would get attention. Spot foundry coke is quotable at $4.75 to $5.50 for selected grades, while there have been some offerings of unselected 72-hr. coke as low as $4. Heating coke is said to have gone as low as $3 for shipment East. There is so little demand for coal and so much available that prices are altogether of buyers' making. Mine run steam coal is quotable all the way from $1.45 to $2.25 per net ton at mine; mine run gas grade at $2 to $2.25, and coking coal from $1.85 to $2.

Old Material.—Melters still are largely out of the market, being disposed to use up present stocks before making fresh purchases. There is practically no place to put the material coming upon the market, since there are comparatively few short sales that remain uncovered and prices have not yet reached a level where dealers feel safe in throwing much tonnage on their yards. Difficulty of sales makes for continued weakness in prices. We again present prices that are merely appraisals based largely upon dealers' ideas. It is doubtful if the dealers would entertain bids from consumers as low as they are naming, but right now it would be difficult to sell at higher than the prices given. It is no secret that the desire of some dealers is to get prices down to a level that will make possible the averaging down of the cost of early September purchases, made in anticipation of a demand which never materialized. Heavy stocks of pig iron enable most of the steel companies to remain out of the market.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$16.00 to 16.50
No. 1 cast, cupola size	20.00 to 20.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 18.50
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	12.00 to 13.50
Railroad knuckles and couplers	20.50 to 21.00
Railroad coil and leaf springs	20.50 to 21.00
Low phosphorus bloom and billet ends	23.00 to 23.50
Low phosphorus plate and other material	22.00 to 22.50
Railroad malleable	20.00 to 20.50
Steel car axles	20.00 to 20.50
Cast iron wheels	18.00 to 18.50
Rolled steel wheels	20.50 to 21.00
Machine shop turnings	12.50 to 13.00
Sheet bar crops	18.00 to 18.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	13.50 to 14.00
Heavy breakable cast	17.50 to 18.00
Stove plate	14.50 to 15.00
Cast iron borings	14.50 to 15.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50

Proposed Reduction of Freight Rate on Billets Suspended

WASHINGTON, Oct. 9.—The Interstate Commerce Commission today announced the suspension from Oct. 10 to Feb. 7 of tariffs proposing reductions in rates on iron and steel billets from $1.65 to $1 per 100 lb. from the New York piers of the Southern Pacific Co. and the Atlantic steamship lines to points in Arizona, California and Mexico when routed by water to Galveston, Tex., and Southern Pacific Co. and subsidiary lines beyond. It was proposed in these tariffs to reduce the rate on billets as well as on other commodities to the same basis as is currently in effect from Chicago territory points to the same destinations by all rail routes.

The Wallace Barnes Co., Bristol, Conn., by way of announcing its selection, by invitation, to become a member of the Rice Leaders of the World Association, publishes an illustrated booklet tracing the development of its business through six decades of successful manufacturing. In October, 1857, the company began and its first product was a hoop-skirt frame. Not long after this, Wallace Barnes turned to the production of clock springs.

St. Louis building permits in September amounted to $5,592,630, as compared with $1,715,117, in September, 1922. Permits for the nine months of this year amount to $31,295,965, as compared with $17,060,560 in the same period of 1922 and $25,210,503 in all of 1922.

Chicago

Car Buying May Prove an Important Factor in Determining Prices

CHICAGO, Oct. 9.—New business in finished steel shows some slight improvement, but it is still true that shipments exceed current bookings and that the backlogs of the mills are steadily shrinking. At the same time, consumers continue to hold back their purchases in the expectation that prices will break, with the result that they are reducing their stocks almost to the vanishing point. The acid test of the market appears to be drawing near and it is not unlikely that the issue will be decided in favor of the buyer or the seller before the current month closes.

In this connection, it is interesting to note that railroad car buying, which has been negligible since the early months of the year, may prove an important factor in establishing the future trend of prices. The program of the Southern Pacific calls for 8730 freight cars, 5000 refrigerator cars, 78 electric cars, 74 passenger cars and 58 locomotives. The locomotives are now being figured on and inquiries for the cars are expected to be in the hands of builders shortly with the likelihood that orders will be placed before the close of the year. The Union Pacific is also expected to enter the market in a big way, while probable inquiries by the Pennsylvania are placed at 15,000 cars. The St. Louis-San Francisco is now asking for bids on 2500 refrigerator cars and the Baltimore & Ohio is taking figures on 1000 steel gondola cars, 440 hopper bodies and 107 box car bodies. Other important lines are known to be feeling out the market preparatory to issuing inquiries. At first glance, it might be thought that steel prices considerably higher than those of last spring might deter purchases of cars at this time. Car builders, however, are hungry for business, having discharged most of their old obligations, and are sharpening their pencils with a view to interesting the carriers in placing orders. It is also probable that they are again enjoying their usual preferential terms in placing tonnage business with the mills, so that the matter of material prices may not prove to be such an obstacle to equipment buying as might otherwise be expected.

The Illinois Steel Co. still has 23 active blast furnaces out of a total of 27 steel works stacks and is producing steel at the rate of 93 per cent of capacity. The Inland Steel Co. continues to operate all three of its blast furnaces with its steel works on a 75 to 80 per cent basis.

Pig Iron.—The market has shown further weakness, but melters are evincing increased interest in their requirements, indicating that they believe that prices are approaching bottom. Orders still call for early delivery, however, rarely exceeding 30 days. Sellers are making strenuous efforts to hold prices on Northern pig iron to $26 base, furnace, but inquiries for sizable tonnages have brought out keen competition and as low as $25 has been done in a number of instances. Southern iron remains weak, although no quotations below $20, base, Birmingham, have been reported in this district, and a few sales have been made at as high as $21. Inasmuch as buyers are at present interested in quick deliveries, they are not always willing to wait for shipments from outside producing centers. Nevertheless an outside interest has taken orders for over 2000 tons of Northern iron in southwestern Michigan and northern Indiana. Included in this total were 500 tons of malleable for a Michigan melter and 500 tons of foundry for an Indiana user. A number of good sized tonnages have been bought from sources of supply in the Chicago district. A local user has closed for 2000 tons of malleable and foundry. Another melter in the metropolitan district has placed 1200 tons of foundry and a third has ordered 1000 tons of malleable. A number of small sales of silvery have been made at the Jackson County schedule. A current inquiry calls for 700 tons of 8 to 10 per cent silvery for delivery over the remainder of the year. The Thomas furnace at Milwaukee is expected to blow out tomorrow.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$30.04 to $30.15
Northern coke, No. 1, sil. 2.25 to 2.75	25.50 to 26.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	25.00 to 26.00
Malleable, not over 2.25 sil.	25.00 to 26.00
Basic	25.00 to 26.00
High phosphorus	25.00 to 26.00
Southern No. 2	26.01 to 27.01
Low phos., sil. 1 to 2 per cent, copper free	33.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—Sales of ferromanganese have involved small tonnages, the most recent being 50 tons. The lowest current price appears to be $108.50, Eastern seaboard, and as resale material is being absorbed, the market is gaining strength. Spiegeleisen has been sold at as low as $45, delivered.

We quote 80 per cent ferromanganese, $116.88, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $45, delivered.

Plates.—The appearance of the largest railroad car inquiries since early in the year has given the plate market, and the steel market generally, an impetus which it has lacked for months. The Southern Pacific has asked for figures on 8730 freight cars, 74 steam passenger cars, 78 electric cars, 58 locomotives and 5000 refrigerator cars for the Pacific Fruit Express. The Union Pacific is also expected to issue large inquiries shortly and for the two roads the total outlay for new equipment will be close to $90,000,000. The freight cars now on inquiry by the Southern Pacific will alone involve more than 140,000 tons of plates, shapes and bars. The St. Louis-San Francisco has entered the market for 2500 refrigerator cars, while the Baltimore & Ohio is inquiring for 1000 gondola and 400 hopper cars. An inquiry from the Milwaukee Gas Light Co. for a gas holder involves 1500 tons of plates. The Producers & Refiners Corporation has placed two 55,000 bbl. oil storage tanks, calling for 600 tons.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—Demand shows a seasonal let up and manufacturers are showing greater flexibility as to price, indicating that they are in need of new business. Water pipe in practically all sizes above 6 in. is now available at $49, Birmingham, and variations above or below that price are due to delivery considerations. On extended delivery makers are willing to name lower prices than on early shipments. White Cloud, Mich., rejected figures on 100 tons. St. Louis is inquiring for 1000 tons of 6-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $61.20; 6-in. and above, $57.20; class A and gas pipe, $5 extra.

Sheets.—While Japanese inquiries are slow in developing, eventual purchases for reconstruction work in that country are confidently expected to exceed 100,000 tons. In the meantime, domestic business in sheets is light and it is evident that mills are making a strenuous effort to maintain their present price level while buyers continue to hold back their purchases in the hope of breaking the market. No important change in the situation has taken place.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Bolts and Nuts.—Specifications are better than they have been for some time, coming from practically all sources, including the farm implement makers, who, while still operating at a low rate, are showing some improvement. Most buyers are closing contracts for fourth quarter, although this is not true of the jobbers, who apparently do not wish to take any action

which would tend to sustain present market levels. Large machine bolts appear to be freely available at 60 and 10 off list. Sellers are making fewer concessions to compensate for the new list prices.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—The Kansas City Southern has placed 6000 tons of rails with a local mill. The Baltimore & Ohio, Chicago terminal, has ordered 2000 tons of rails from the Inland Steel Co. This is in addition to the 50,000 tons bought by the Baltimore & Ohio proper, previously reported in these columns. Inquiries for track supplies are the largest in months. Pending business includes over 20,000 tons of tie plates, 60,000 kegs of spikes, 30,000 kegs of bolts, as well as some angle bars, although the latter are usually bought with the rails.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.35c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—While fabricated lettings for the week were not particularly large, a number of important new projects have come up. A bank and office building for the Brotherhood of Locomotive Engineers at Cleveland will involve about 9000 tons. Revised plans for the Ford Motor Co. plant at St. Paul call for 10,000 tons. Bids have been taken on the Twin Branch power plant, Mishawaka, Ind., requiring 4500 tons, and an early award is expected. Local prices on plain material remain firm and unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Knowing that they can obtain good delivery, buyers and jobbers, particularly, are placing orders for material as they need it. Mill bookings still fall short of shipments. Prices remain unchanged. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1004.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Bars.—Current shipments of soft steel bars from local mills still exceed new business. Specifications, however, show some improvement and new orders generally call for quick shipment, confirming the view of sellers that consumers' stocks are low. Nothing resembling heavy buying has developed, but this is hardly to be expected so long as users can obtain early deliveries against their current requirements. Nevertheless there are indications that buyers are holding back considerable business pending a possible break in prices. Whether such a break will come or prices will hold at present levels will be disclosed by developments during the current month, according to views held in some quarters. Business in bar iron and rail steel bars remains quiet, with prices unchanged. The bar iron mill of the Interstate Iron & Steel Co. and the hard steel bar mill of the Republic Iron & Steel Co. have both resumed operations.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.35c. to 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Reinforcing Bars.—Awards of both large and small tonnages have been few during the week, but prices have held steadily at 2.75c., Chicago warehouse. Few new prospects have appeared, although there is still considerable tonnage pending. Awards include:

Eleven-story hotel, Detroit, Mich., 465 tons to McRae Steel Co.

Cook County, Ill., bridges, one at Barrington and other over the Little Calumet River near Lansing, 110 tons to Corrugated Bar Co.

High school building, Chillicothe, Mo., 100 tons to Joseph T. Ryerson & Son.

Phoenix Utility Co. warehouse, Duluth, Minn., 150 tons to Kalman Steel Co.

Pending business includes:

Sanitary District, Chicago, McCormick Highway, 500 tons.
Illinois State road work, 100 tons.
Elks' Memorial building, Chicago, 200 tons.

Old Material.—Scrap prices are so soft that it is difficult to put one's finger on ruling quotations. Buyers continue to place orders sparingly and stocks are steadily increasing in the hands of sellers. While present prices are exceedingly low, no sustaining influences are in sight, and it is probable that the market will go even lower before it rebounds. Railroad offerings include the Northern Pacific, 2000 tons; the Missouri, Kansas & Texas, 1500 tons, and the Baltimore & Ohio, Chicago terminal, 300 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$20.00 to $20.50
Cast iron car wheels	18.00 to 18.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.00 to 20.50
Rails for rolling	16.50 to 17.00
Steel rails, less than 3 ft.	18.00 to 18.50
Heavy melting steel	14.50 to 15.00
Frogs, switches and guards cut apart	15.00 to 15.50
Shoveling steel	14.00 to 14.50
Drop forge flashings	10.50 to 11.00
Hydraulic compressed sheets	12.00 to 12.50
Axle turnings	12.00 to 12.50
Steel angle bars	16.50 to 17.00
Per Net Ton	
Iron angle and splice bars	20.50 to 21.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	25.00 to 25.50
Steel car axles	17.00 to 17.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	8.00 to 8.50
Cut forge	13.50 to 14.00
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.50 to 14.00
Steel knuckles and couplers	17.50 to 18.00
Coil springs	19.00 to 19.50
No. 1 machinery cast	18.00 to 18.50
No. 1 railroad cast	18.00 to 18.50
No. 1 agricultural cast	18.00 to 18.50
Low phos. punchings	16.00 to 16.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	7.50 to 8.00
Cast borings	9.50 to 10.00
Short shoveling turnings	9.50 to 10.00
Stove plate	16.50 to 17.00
Grate bars	14.00 to 15.00
Brake shoes	15.50 to 16.00
Railroad malleable	18.00 to 18.50
Agricultural malleable	17.50 to 18.00

No Cause for Acting Under Dumping Law

WASHINGTON, Oct. 8.—In a Treasury decision today it was held that there was no cause for acting under the dumping law regarding imports of steel rope wire. The decision grew out of several dumping notices received from the appraising officer at Seattle, Wash.

"While it appears that the purchase price was less than the foreign home market value," said the decision, "the canvass by the special agents of American manufacturers and dealers does not disclose any injury; in fact, shows very little interest in the matter."

Alfred Box & Co., Philadelphia, builders of electric and hand-power cranes and hoists, have appointed Vrabeck & Kessler, 149 Broadway, New York, representatives for the Metropolitan district, and also Albany, Utica and Port Jervis, N. Y.; Trenton, N. J., and Connecticut. Export sales will be handled by the Wonham, Bates & Goode Trading Corporation, 251 Fourth Avenue, New York. Vrabeck & Kessler also represent the Stedman Foundry & Machine Works, Aurora, Ind.; the Stearns Conveyor Co., Cleveland, and were formerly sales representatives for the Champion Engineering Co.

New York

Prospects Encouraging for Renewal of Car Buying—Pig Iron Weak

NEW YORK, Oct. 9.—Inquiries for pig iron are without exception for early delivery; in fact, consumers seem to have gotten the habit of buying from hand to mouth and there is no indication that they intend to change their policy. The Gould Coupler Co., following its recent purchase of 500 tons of malleable, has sent out an inquiry for 2000 tons of basic for delivery at the rate of 500 tons per week, beginning immediately. Another company, whose identity has not been revealed, is quietly negotiating for about 2000 tons of foundry grades. Other inquiries include two for 500 tons each, three for 200 tons each, one for 300 tons, all for spot delivery. The Ingersoll-Rand Co. has purchased 1500 tons of foundry grades at low prices. The market is weak and $23 can be done without difficulty on both No. 2 plain and No. 2X, Buffalo, while in some cases $22.75 has been quoted. The usual eastern Pennsylvania quotation is $23.50 for No. 2 plain, and it is probable that this could be shaded by 50c.; in fact, the market is so demoralized that it is impossible to state with any accuracy what could be done on a desirable tonnage.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$26.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.77
East. Pa. No. 2, sil. 1.75 to 2.25	25.77
Buffalo, sil. 1.75 to 2.25	27.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94
No. 2 Virginia, sil. 1.75 to 2.25	29.44

Ferroalloys.—Included in the inquiries for ferromanganese totaling 1000 tons, mentioned last week, was one for 600 tons, which has not been closed, it is reported, but some of the smaller lots have been placed. There appears to be less resale material offered as low as $108, seaboard, duty paid, but carload lots have been sold at $109. The British price has not been changed, remaining at $117.50, but no sales are being made. One maker of spiegeleisen has made sales of the 19 to 21 per cent as low as $40, furnace, but it is understood that this furnace is now pretty well sold up. Fifty per cent ferrosilicon is offered at prices ranging from $80 to $85.

Cast-Iron Pipe.—Demand is lessening somewhat as the season advances and makers are slightly more anxious for tonnages, except in the smaller sizes, on which most foundries are still well filled up toward the end of the year. The 20,500 tons of water pipe for Porto Rico, on which new bids were obtained recently is reported to have again drawn the lowest bid from a Belgian maker and award is still pending. The Department of Water Supply, Gas and Electricity, New York, has called for new bids on its 3000 tons of 8-in. water pipe, new bids to be opened Oct. 17. The previous bids were not submitted according to the specifications and were declared informal. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. Demand for soil pipe is lighter and competition is becoming keener as the season of slack business approaches. While discounts are generally unchanged, a distinct weakness is undoubtedly developing and the old quotations of 50¾ per cent off list for 6-in. heavy pipe and 40¾ off list for 6-in. standard are becoming more common. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Warehouse Business.—Just as, in most instances, September registered a slight decrease in business from August, so October, judged from activity thus far in the month will register a further decline in purchases of material out of stock. Although business has undoubtedly lessened considerably, prices are holding quite firm, even the market on black and galvanized sheets showing but little evidence of shading. Warehouse business seems to have fairly well simmered down to the regular customers, consumers of small tonnages. The larger buyers who are forced into purchases from stock when mill conditions are such as to preclude anything like early deliveries, have returned to buying from the mills, which are offering fairly prompt shipment in most cases. We quote prices on page 1026.

Finished Iron and Steel.—Such hopes as have arisen within the past week for improvement in steel buying have been due largely to reports, apparently trustworthy, that some of the railroads will purchase a large number of freight cars before the end of the year. Some estimates of the number of cars to be bought run as high as 100,000, but this is conjecture, as only a relatively few inquiries have been received by car builders, as noted in another column. The Baltimore & Ohio is expected to buy at least 4000, while other inquiries that are expected to come into the market shortly include 30,000 to 40,000 cars for the so-called Harriman lines, the Southern Pacific and Union Pacific; 10,000 to 15,000 for the Pennsylvania Railroad (previously mentioned); 4000 to 5000 for the Chesapeake & Ohio; 5000 for the Nickel Plate, and an indefinite number for New York Central lines. Car builders have enough work on hand to carry them pretty well through the year, so any cars bought this fall would probably be for spring delivery. Some steel companies report a slight increase in the volume of business this month, both domestic and export trade having shared in this improvement. In the export market Japan and the Philippines have figured prominently in orders booked. Structural steel shows fair activity in the metropolitan district, but the plate market is weak and dull. It is worthy of note that the largest producers of plates are adhering rigidly to 2.50c., Pittsburgh, notwithstanding the diligent efforts of two or three of the smaller Eastern mills to get business at 2.40c. Nor have the 2.40c. quotations of two Eastern shape mills seriously disturbed the determination of the larger mills to adhere to 2.50c., Pittsburgh, on shapes. Steel bars at 2.40c. and bar iron at 2.35c., Pittsburgh, are holding well, though there are reports of rerolled concrete bars going at concessions. The marked strength of steel pipe, tin plate and wire products with a fair degree of stability in sheets, is not lost sight of by close observers of the steel market, notwithstanding the much less favorable situation in plates, shapes and bars. A large independent maker of steel pipe is allocating its tonnage among its regular customers, and will probably be obliged to do so until the end of the year, so urgent is the demand for pipe from jobbers. The New York Central Railroad on Oct. 3 opened bids on 5000 tons of plates, shapes and bars; 500 tons of nails and staples, 250 tons of forging billets, and a fair tonnage of other steel products, including axles and wheels. An inquiry before the tin plate trade is for 14,000 boxes wanted by Thomas J. Lipton, tea importer.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—Although prices on both furnace and foundry coke continue unchanged from last week, the market is slightly firmer, believed to be the result of putting out of ovens. Standard furnace coke is still quotable at $4 to $4.25 per ton, with medium sulphur at $3.75 per ton and standard foundry ranges from $5.25 to $5.75 per ton, with some brands up to $7 per ton. By-product is quoted at $11.41, Newark and Jersey City, N. J.

Old Material.—The market is weaker and prices show a further decline this week with dealers offering only $15 per ton, delivered eastern Pennsylvania, on No. 1 heavy melting steel, a decline of $1 per ton. Railroad grade or equivalent, delivered to an eastern Pennsylvania consumer, is also off $1 per ton. Specification pipe is inactive, but shipments to Lebanon, Pa., for which $15 per ton is being paid, keep the quotation unchanged. Machine shop turnings and mixed borings and turnings are weaker by 50c. per ton. Stove plate is still holding its own, shipments going forward to a Harrisburg, Pa., consumer and to New Jersey foun-

dries, but $17.50 per ton is about the high price for either shipment. The market as a whole is extremely quiet with most of the present buying on old contracts.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$11.00 to $11.50
Steel rails, short lengths, or equivalent	12.00 to 12.50
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	17.00 to 17.50
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	10.50 to 11.00
Machine-shop turnings	9.50 to 10.00
Mixed borings and turnings	9.00 to 9.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.00 to 11.50
Stove plate	13.00 to 14.00
Locomotive grate bars	13.50 to 14.50
Malleable cast (railroad)	17.00 to 18.00
Cast-iron car wheels	16.50 to 17.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $20.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 19.50
No. 1 heavy cast, not cupola size	17.00 to 17.50
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 17.50

Cleveland

Reduction of Pig Iron Prices Stimulates Business—Low Prices on Strip Steel

CLEVELAND, Oct. 9.—While shipments of Lake Superior ore are falling off the October movement is expected to reach 7,000,000 tons or 2,000,000 tons less than during September. With close to 46,000,000 tons moving up to Oct. 1, late estimates indicate that the movement for the season will be between 55,000,000 and 56,000,000 tons. Ore firms already have finished shipments to some of the smaller consumers but still have considerable tonnage to ship on contracts with large consumers and the Steel Corporation has not curtailed shipments. On Oct. 1, there were 7,019,518 gross tons of ore on Lake Erie docks as compared with 5,907,272 tons on Sept. 1 and with 9,028,708 tons on Oct. 1 last year. Receipts at Lake Erie ports during September were 6,775,657 tons as compared with 5,230,831 tons during September of last year. Receipts at Lake Erie ports for the season up to Oct. 1 were 33,577,075 tons as compared with 23,902,450 tons during the corresponding period a year ago. Shipments from Lake Erie docks up to Oct. 1 were 26,383,339 tons as compared with 16,103,472 tons up to Oct. 1, 1922.

Pig Iron.—The recent reduction of prices has stimulated buying somewhat in some sections, particularly in the Buffalo district. The market continues soft with competition very keen among sellers and prices not well established in any of the Central Western producing centers. Considerable of the business placed during the week was for deliveries extending into the first quarter. In the Valley district, foundry iron has declined to $24 and Cleveland producers have reduced their quotations to $24 for outside shipment. For local delivery, Cleveland furnaces are still adhering to $25 at furnace, but in view of the fact that a Buffalo producer recently sold for Cleveland delivery a round lot at the same delivered price as quoted by Cleveland furnaces, it is not unlikely that the local $25 price will be shaded on the next good inquiry. Buffalo foundry iron is freely offered at $23 and there are unconfirmed reports that a western Pennsylvania furnace is quoting the same price, Valley basis. In Michigan the market is holding steady at $25. One producer reports sales aggregating 20,000 tons during the week, a large share of this being booked for shipment from Buffalo. The American Radiator Co. has purchased 1000 tons of foundry iron for early shipment, 500 tons for Detroit and 500 tons for Springfield, Ohio. The Jeffrey Mfg. Co., Columbus, has placed 2000 tons of foundry and malleable iron at $24, furnace. Local furnaces quoted $24 on the Columbus and Springfield inquiries, but other producers had lower freight rates. A fair volume of inquiry is pending including one of 2000 tons of foundry for the first half, this being a first inquiry that has come out for shipment beyond the first quarter. Steel making iron is inactive. We note the sale of a small lot of Bessemer at $25.25 Valley furnace.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$24.00
Northern No. 2 fdy., sil. 1.75 to 2.25	25.50
Southern fdy., sil. 1.75 to 2.25	27.00
Malleable	25.50
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00

Bolts, Nuts and Rivets.—Consumers are showing some hesitancy in placing orders owing to price irregularities. Manufacturers appear to be adhering rather closely to 60 and 5 per cent off list for large machine bolts for the fourth quarter, but some are quoting 60 and 10 per cent off list for early shipment. Semi-finished hexagon nuts S. A. E. have been reduced 5 per cent. Rivet prices are irregular and quotations depend more than usual on quantities involved. The leading manufacturers make quotations ranging from 2.85c. to 3c. for both current orders and for fourth quarter contracts. Small rivets are weak. On these, quotations of 70 per cent off list have appeared.

Semi-Finished Steel.—Curtailment of sheet production has caused the holding back of shipping orders for sheet bars, but some new specifications have come from mills for material for filling Japanese orders. There are virtually no new inquiries. Leading mills appear to be holding firmly to $42.50 for sheet bars, but billets and slabs are quoted at around $40.

Finished Iron and Steel.—The volume of new business shows some gain, but consumers are still following a cautious policy and are buying in small lots. As a rule, manufacturers' stocks are very low. Efforts are still being made by buyers to break regular prices on steel bars, plates and structural material, particularly on plates, because of the price concessions in the East, but these have so far apparently been without success. For desirable orders an Eastern mill has made a concession in quoting plates at 2.50c., Pittsburgh, for quick shipment, but mills in the East are usually holding to 2.50c. at mill for plates for shipment in this territory. Lake shipyards have received inquiries for two or three more lake freighters, these being in addition to inquiries for two boats from the Canadian National Railways, previously reported, that have not been placed and with the two Ford boats recently ordered, the outlook in the lake shipbuilding industry has become more promising. The only large new structural inquiry is for 6000 tons for an assembling plant for the Ford Motor Co. in St. Paul. Bids will be taken during the week for the Western Reserve Hospital buildings and the Brotherhood of Locomotive Engineers' bank building, Cleveland, requiring 6500 tons of structural material. The demand for light plates has improved with an increasing volume of business coming from the railroads. Quotations as low as 2.70c. have been made on hot-rolled strip steel, although some business is being taken at 3c. On hoops under 5 in. wide, the regular 3.15c. price appears to be holding firmly.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Rails.—The Clover Leaf Railroad has placed additional rail orders for 2000 tons equally divided between the Carnegie Steel Co. and the Inland Steel Co. The Nickel Plate Railroad is figuring on its 1924 rail requirements, and a local manufacturer has an inquiry out for 2500 tons of light rails for industrial track fabrication.

Sheets.—The market on black sheets is very weak. While 3.75c. is commonly quoted, a 3.70c. price has appeared, and a leading northern Ohio automobile

manufacturer is understood to have purchased a round tonnage at 3.60c. or 3.65c. The same buyer has placed 5000 tons of full finished sheets with an Eastern mill. Two inquiries aggregating 1900 tons are pending for black sheets for Japan. Blue annealed sheets are firm at 3c. Several quotations at 4.90c. have appeared on galvanized sheets. Generally the market is quiet. Many consumers bought in excess of their third quarter requirements and are now taking the material.

Alloy Steel.—While there is some buying by leading Detroit automobile companies, the market generally is dull and prices are weak. Concessions of ¼c. or more per lb. have been made by some mills.

Reinforcing Bars.—New inquiry is fair. The Patterson Leitch Co. has taken 400 tons for a warehouse for the Fisher Brothers, Cleveland. The Brotherhood of Locomotive Engineers building will require 250 tons. Other inquiries including St. Joseph's Infirmary, Louisville, Ky., 625 tons; a sewer in Erie, Pa., 300 tons; the Harding Junior High School, Cleveland, 100 tons.

Old Material.—There is some small lot buying by consumers, but generally the market is dull and inclined to weakness. Borings have declined 25c. a ton and turnings 50c. and several other grades have been marked down. Railroad wrought scrap has declined $1.50 a ton. Railroad scrap offered this month is reported to have brought good prices. Heavy melting steel offered by the New York Central Railroad was purchased in the Youngstown district at around $18. Local mills have a great deal of scrap coming on contracts. Shipments to the McKinney Steel Co. have exceeded handling facilities and an embargo has been declared against scrap by that plant. Some producers are holding their scrap with the expectation of getting better prices later. We quote dealers' price f.o.b. Cleveland per gross ton.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$15.50 to $16.60
Rails for rolling	18.50 to 19.00
Rails under 3 ft.	17.75 to 18.00
Low phosphorus melting	19.50 to 20.00
Cast borings	12.50 to 12.75
Machine shop turnings	12.00 to 12.50
Mixed borings and short turnings	12.00 to 12.50
Compressed sheet steel	14.50 to 14.75
Railroad wrought	13.50 to 14.00
Railroad malleable	20.75 to 21.00
Light bundled sheet stampings	12.00 to 12.50
Steel axle turnings	14.50 to 15.50
No. 1 cast	21.00 to 22.00
No. 1 busheling	11.50 to 12.00
Drop forge flashings	12.00 to 12.50
Railroad grate bars	16.50 to 17.00
Stove plate	16.00 to 17.00
Pipes and flues	11.50 to 12.00

Buffalo

Fair Volume of Pig Iron Buying at Lower Prices

BUFFALO, Oct. 9.—The pig iron market continues in an unsettled condition and only one producer is especially active. The general run of inquiry is greater and several big tonnages are engaging attention. The largest of these is one for 5000 tons, but it is out of the district. One interest has done considerable business outside of the immediate Buffalo territory at $23 furnace, but $22.75 has been quoted even on No. 2X. On the usual run of carload lots of foundry iron for local delivery, $23.50 base is in effect. About 12,000 tons of new business has been placed. Recent weakness has the effect on a number of buyers of deferring immediate placing of new business in the expectation that considerably lower prices are possible.

We quote f.o.b. gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$23.25 to $23.50
No. 2 foundry, 2.25 to 2.75 sil.	22.75 to 23.50
No. 2 plain, 1.75 to 2.25 sil.	22.75 to 23.50
Basic	24.00
Malleable	24.00
Lake Superior charcoal	28.28

Finished Iron and Steel.—Little out of the ordinary has occurred to disturb the even balance in demand for finished material. Bar and shape prices hold and the only exception are occasional rumors of 2.40c. being quoted on structural shapes east of Buffalo. In the district, however, 2.50c. is the usual quotation on shapes and plates. Bar prices are firm and while new business is not especially brisk, the volume is fairly satisfactory. A large tonnage of black sheets can be placed without difficulty at 3.75c., but the average tonnages are sold at 3.85c.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—There is absolutely no buying and heavy melting steel continues to weaken. One mill is offering $16. Another buyer recently placed orders for several big tonnages at stop shipment. An unusual lot of material is being thrown on the market. Cast scrap is particularly plentiful due probably to the weakness in pig iron. The price of heavy melting steel is not sufficiently low to warrant dealers stocking up. Although there is no scrap buying, none of the consumers has any considerable tonnage on hand, and would have to come into the market should any activity develop.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$16.00 to $16.50
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 busheling	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	16.50 to 17.00
Railroad malleable	20.00 to 21.00

Birmingham

Stocks Increase Slightly in September—Market Is Not Active

BIRMINGHAM, ALA., Oct. 9.—The Southern pig iron market continues slow though a number of small lot orders, practically all stipulated immediate delivery, are being received. The aggregate of the business is a little under the make still and some iron is going to the yards. The Alabama Co., with two blast furnaces in operation and maintaining the $24 per ton price for local delivery, has cleared its yards of all surplus iron and is booking into the middle of December with prospects of going through the rest of the year before this month is over. Alabama produced 213,083 tons of pig iron in September with 21 blast furnaces in operation and the surplus stocks on yards were increased 8337 tons. That pace has increased some this month. The start made by the Woodward Iron Co. to bring about a readjustment of the costs of production is being watched, and another of the independent iron companies will shortly take a similar step. The Woodward company put in a 15 per cent reduction in wages with the coal mining circles and notified the ore mining labor of the same intentions while furnace labor also received word. Several hundred of the men in the coal mining section entered protest, but listened to the arguments as to the cost of production in comparison with the $21 per ton price at which iron was being sold in the Middle West. While $24 is being obtained in the Southern territory, to meet competition in the Middle West, with a freight rate of $6.02 to Chicago, it was necessary to sell at $21. The surplus stocks in Alabama on Oct. 1 amounted to 108,298 tons, of which 88,272 tons is sand cast, 5260 machine cast and 14,766 tons basic. Two companies of the district have almost three-fourths of this amount. On Sept. 1 there was 99,961 tons on yards, of which 76,426 was sand cast, 8109 tons machine cast, 250 tons on warrant and 15,176 tons basic. Inquiries have been received here seeking lower levels in prices, but there is positive denial that anything has been done lower than $21.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon, 1.75 to 2.25	$21.00
Basic	22.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—The pressure pipe plants continue capacity operation with additional orders every week. No changes in quotations are announced, but it is still

understood that concessions are allowed on some tonnage. The sanitary pipe makers have failed to bring about any steadiness in an effort to maintain prices, and the $5 per ton advance of a few weeks ago does not appear to be sustained. While the large sized pipe makers are taking their usual amount of iron, the smaller pipe makers have cut down their requirements considerably.

Coke.—The coke market in the Birmingham district is weak and the business is in small lots. None of the local consumers is buying for the future. The quotations are weak, $7.50 being the average price for foundry coke. The bee-hive coke is not being hurried through ovens. By-product coke ovens are continuing their full operation. The 8-hr. day is to be put into effect at once by the big by-product coke oven plant of the Tennessee Coal, Iron & Railroad Co.

Old Material.—There is nothing being done in the scrap iron and steel market in this district. Dealers assert that the weak quotations shown in the price list are not significant, that many of the melters are practically making their own price. Some old contracts are still being worked on for the reason that for weeks melters have been holding back shipments though not cancelling their orders for old material.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Cast iron borings	8.00 to 9.00

St. Louis

Pig Iron Weakened by Low Prices Quoted by Chicago Sellers—More Basic Sold

ST. LOUIS, Oct. 9.—The St. Louis pig iron situation has been disturbed somewhat by the action of makers in Chicago, who have been selling their iron here at less than the prevailing market price. An East Side melter who bought 5000 tons of basic a week ago from a Chicago maker at a price said to be $25.50 Chicago, bought 5000 tons this week, paying $25. A St. Louis melter bought 1500 tons of foundry iron from a Chicago maker at a concession. This situation and the recent reduction in Southern iron to $21, Birmingham, have caused the market to become weak. Most melters continue their waiting policy. A Quincy stove manufacturer wants 500 tons of foundry iron. Other inquiries for carloads and up to 200 tons make another 500 tons.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$27.16
Northern malleable, sil. 1.75 to 2.25	27.16
Basic	27.16
Southern fdy., sil. 1.75 to 2.25	26.17

Finished Iron and Steel.—A few railroad inquiries constitute about the only business now before the market. The Missouri Pacific Railway wants 2000 kegs of standard track spikes and also has inquiries for prices on fourth quarter requirements of tank steel. Warehouse business is very quiet, and there is no buying from that source. Manufacturers who use steel are busy on old orders, but new business does not justify further purchases of raw material.

Coke.—Dealers are showing more interest in domestic coke with the approach of cold weather. Very little interest is being shown in foundry coke. Connellsville coke is selling at $5.50 to $6 for spot delivery, while some grades are bringing as high as $7.

Old Material.—The market for old material is weaker, and most items on the list are lower. The decreases range from 50c. to $1.50. Railroad lists are still heavy, but dealers continue to absorb them. This is about all the buying there is, as consumers are buying almost nothing, and will not buy until their piles of old material are cut down somewhat. New railroad lists include: Missouri Kansas & Texas, 2200 tons; Missouri Pacific, 2000 tons; Chicago & Eastern Illinois Railroad, 1000 tons; St. Louis Southwestern, 1000 tons; Kansas City Southern, 700 tons; Pullman Co., St. Louis, 500 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron Rails	$16.00 to	$16.50
Rails for rolling	17.00 to	17.50
Steel rails less than 3 ft.	18.00 to	18.50
Relaying rails 60 lb. and under	26.00 to	27.00
Relaying rails, 70 lb. and over	33.50 to	34.50
Cast iron car wheels	18.50 to	19.00
Heavy melting steel	15.50 to	16.00
Heavy shoveling steel	15.50 to	16.00
Frogs, switches and guards cut apart	16.00 to	16.50
	Per Net Ton	
Heavy axles and tire turnings	12.00 to	12.50
Steel angle bars	14.50 to	15.00
Steel car axles	17.50 to	18.00
Iron car axles	25.00 to	26.00
Wrought iron bars and transoms	18.00 to	19.50
No. 1 railroad wrought	14.50 to	15.00
No. 2 railroad wrought	14.50 to	15.00
Railroad springs	16.00 to	16.50
Cast iron borings	10.00 to	10.50
No. 1 busheling	15.00 to	15.50
No. 1 railroad cast	19.50 to	20.00
No. 1 machinery cast	20.00 to	20.50
Railroad malleable	16.50 to	17.00
Machine shop turnings	10.50 to	11.00
Champion bundled sheets	8.00 to	8.50

Boston

Lower Prices on York State and Buffalo Iron Bring Out Business

BOSTON, Oct. 9.—Keen competition among New York State and Buffalo furnaces in this territory has brought out more business. Among the largest sales reported the past week was one of 1200 tons for a Lynn, Mass., plant, and approximately 1000 tons No. 2X and No. 1X, fourth quarter delivery, for a Framingham, Mass., foundry. Other transactions brought the total sales up to better than 6000 tons. One New York State furnace is reported to have done business on a basis of $27 delivered for No. 2X, while another has done $27.66 delivered on that grade and $28.16 on higher silicon. The last two quotations are equal to $22.75 furnace for Buffalo iron. Buffalo iron is reported to have sold at $23 furnace for No. 2 plain and No. 2X, or $27.91 delivered, and apparently figured to a greater extent than other irons in sales the past week. Reports of $23.50 eastern Pennsylvania furnace base cannot be substantiated here, but $24 has been quoted frequently with differentials waived. Virginia is offered at $24.50 and $25 furnace base and Alabama can be done at $21. A Massachusetts textile machinery maker is in the market for 500 to 1000 tons No. 2X and No. 1X, and a Providence, R. I., machinery maker for 400 tons of similar iron, November and December delivery. Inquiries otherwise concern small tonnages. The New England foundries collectively are operating at about 65 per cent of capacity.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$27.65 to	$28.15
East. Penn., sil. 1.75 to 2.25		27.65
Buffalo, sil. 2.25 to 2.75	27.91 to	28.41
Buffalo, sil. 1.75 to 2.25	27.91 to	28.41
Virginia, sil. 2.25 to 2.75	30.42 to	31.42
Virginia, sil. 1.75 to 2.25	30.42 to	30.92
Alabama, sil. 2.25 to 2.75		*31.10
Alabama, sil. 1.75 to 2.25		*30.60

*Nominal.

Cast Iron Pipe.—The Warren Foundry & Pipe Co. was awarded a considerable tonnage of 12-in. pipe by Woonsocket, R. I., and approximately 125 tons of similar pipe by Nashua, N. H., this being the only business of importance closed recently in this territory. Gardner, Mass., has taken bids on 100 tons of 6-, 8- and 10-in. pipe for late fall delivery, and Salem, Mass., on a small tonnage to complete its fall requirements. Pipe prices remain firm on a basis of $67.10 delivered Boston common rate points for 6-in. and larger, with $5 differentials on gas and Class A pipe. Representatives report unsatisfactory labor conditions and high operat-

ing costs at foundries, with little indication of lower prices on finished product the remainder of 1923.

Warehouse Business.—Warehouse prices on soft steel bars, refined iron and angles under 3-in. have been reduced 10c. per 100 lb. to $3.51½, structural steel and plates 10c. to $3.61½, steel bands 48½c. to $4.31½, and large sizes of open-hearth steel bars $1.50 to $6.50. Small open-hearth bars are unchanged at $10 per 100 lb. Cold-rolled strip steel, in car lots, prompt shipment, is now offered at $2.75 net Pittsburgh, and *in* less than car lots at $3.75. The demand for warehouse products is fairly active, with competition among sellers growing. Warehouse prices follow:

Soft steel bars, $3.51½ at 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steel, $3.61½; tire steel, $4.50 to $5.15; open-hearth spring steel, $6.50 to $10; crucible spring steel, $12; regular steel bands, $4.31½; bands over 6 in wide, $5.05 to $5.30; hoop steel, $5.80 to $6.30; cold rolled steel, $4.75 to $5.25; refined iron, $3.51½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.60 to $7.10.

Coke.—Foundries continue to specify against by-product fuel contracts freely, such specifications in some instances being urgent. The largest local coke maker is two to three weeks behind on deliveries, but is shipping as fast as car supply permits. The other producer is doing better, but is behind on shipments. Both continue to quote foundry coke at $13.50 delivered in New England. Some foundries are putting out tentative feelers on first half 1924 fuel, but collectively little interest is shown. Connellsville district foundry coke is offered at prices much under the delivered basis of New England product, but sales are practically nil.

Old Material.—More activity is noted in purchases of machinery cast by New England foundries. Sales the past week include No. 1 at $23.50 to $24, but in such cases the freight rate was rather high. On the other hand, a larger tonnage sold at $22 and $22.50 delivered, which represents a drop of about 50c. a ton in the market. The scrap market otherwise is quiet. In the opinion of some dealers, business is quieter than at any previous period this year. Cast iron borings for chemical purposes, which a month ago were in limited supply, are offered freely now and prices are about $2 a ton lower. Increased offerings of yard wrought, machine shop turnings and rolling mill borings have caused a drop of about $1 a ton in the market, and of railroad wrought, blast furnace borings and turnings and shafting of about 50c.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	16.50 to 17.00
Railroad malleable	22.00 to 22.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 rail wrought	13.00 to 13.50
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Cast iron borings, rolling mill	8.50 to 9.00
Cast iron borings, chemical	10.50 to 11.00
Blast furnace borings and turnings	7.50 to 8.00
Forged scrap and bundled skeleton	8.50 to 9.00
Shafting	17.50 to 18.00
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

Detroit Scrap Declines

DETROIT, Oct. 9.—The market on waste materials has shown more of a softening tendency during the past week with a number of grades recording declines of 50c. to $2 per ton. Dealers are not actively interested in present offerings other than sufficient tonnage for prompt movement.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$12.00 to $12.50
Shoveling steel	12.00 to 12.50
No. 1 machinery cast	17.00 to 17.50
Cast borings	10.00 to 11.00
Automobile cast scrap	24.00 to 25.00
Stove plate	16.00 to 17.00
Hydraulic compressed	10.50 to 11.25
Short turnings	10.00 to 11.00
Long turnings	9.00 to 9.50
Flashings	8.50 to 10.00

Cincinnati

Southern Ohio Iron Rules at Low Price—Alabama Iron Is Weak

CINCINNATI, Oct. 9.—Two fair-sized tonnages were reported to have been placed last week, the one carrying the most interest for the trade being an order for 1200 tons placed by a central Ohio melter. While few of the details of the deal are available, indications are that the order was equally divided between two southern Ohio furnaces and one Cleveland district stack. The price at which the order was placed has not been disclosed, but it is known that a quotation of $23.90, Ironton, was not low enough to take the business. On a 500-ton inquiry for a radiator company with a plant in the district $23.50, Ironton basis, was quoted, but the party making the quotation did not get the order. The Southern market is dull and weak. One furnace interest, in an effort to book home tonnage, made a price of $20, Birmingham, last week, but failing to get any response from the trade, moved the price up again to $21. It is admitted that on a fair-sized tonnage less than $21 would be considered. Sales generally speaking were very light, and consisted, with the exception of those noted above, of one and two car lots for immediate shipment. The only inquiry of importance is for 1500 tons of Northern foundry iron from a melter in this district.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.27
Basic Northern	26.27
Malleable	26.27

Finished Material.—Little change is noted in the demand for finished materials, and orders are still being booked on a carload basis. Some sellers report a slightly improved demand, however, but the market can still be described as quiet. So much cannot be said for the buyers, however, who are hounding the mills for delivery of their orders. This is perhaps the most encouraging feature of the whole situation, as it is taken as an indication of the low point to which stocks have been allowed to dwindle. However, so long as transportation conditions continue as they are today, little change in the policy of the buyers is expected. Prices generally are very firm, and there have been no reports of price shading in bars, plates or structural shapes, which are still quoted by mills in the Middle West at 2.40c. and 2.50c. respectively. Little activity is noted in wire products, and with the exception of nails, concessions are reported to have been offered on manufactured products by some of the smaller mills. On bolts and nuts, prices are weak, but some fair-sized orders are being placed. There is also a good demand for pipe, with prices very firm.

Sheets.—Demand keeps up very well, and carload orders are more numerous. Prices are being well maintained, and while concessions are reported to have been made on black sheets, the market generally is quotable at 3c., 3.85c. and 5c. for blue annealed, black and galvanized respectively. Tin plate orders are also being booked, but no delivery promises are being made by some mills, other than that it will probably be some time during the first quarter. Prices are very firm.

Structural Shapes.—Not a single inquiry of importance has come out in the past week, although many projects are about ready to break. There is a fair demand for structural shapes from jobbers and fabricators who have work in hand. Prices show no change, 2.50c., Pittsburgh, being the regular quotation.

Reinforcing Bars.—A large number of small projects go to make up a fair tonnage on inquiry. An addition to the plant of Rauh & Mack, Cincinnati, requiring 400 tons, has been awarded to the Ferro-Concrete Construction Co. Prices generally are unchanged from last week, ranging from 2.20c. to 2.40c.

Warehouse Business.—Local jobbers report fair de-

mand for small angles. Reinforcing bars are also moving in better volume. Business generally is showing improvement, though orders are confined to small lots. Wire products are moving in fair volume. Prices have not been changed for some months, and no reports of shading are current.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.2xc., shapes, 3.60c., plates, 3.60c., cold-rolled rounds, 4.50c., cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—Fair activity marked the coke market and sales of foundry fuel were much more numerous than last week. Prices generally are unchanged. Connellsville furnace is quoted at $4.50 and foundry at $5. New River remains at $12, and Wise County at $5.50 for furnace and $6.50 to $7 for foundry. Tentative inquiries from two southern Ohio furnaces for coke are before the trade and at least one of these will go into blast in the next two weeks.

Old Material.—Dealers report very light business in old materials, and prices are off again from 50c. to $1. Some buying to fill old contracts is being done by dealers, but consumers are buying in only small quantities for immediate shipment.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$11.00 to $11.50
Iron rails	14.00 to 14.50
Relaying rails, 50 lb. and up	27.50 to 28.00
Rails for rolling	15.00 to 15.50
Heavy melting steel	13.50 to 14.00
Steel rails for melting	14.00 to 14.50
Car wheels	13.50 to 14.00
Per Net Ton	
No. 1 railroad wrought	12.00 to 12.50
Cast borings	8.00 to 8.50
Steel turnings	7.50 to 8.00
Railroad cast	15.00 to 15.50
No. 1 machinery cast	18.00 to 18.50
Burnt scrap	11.50 to 12.00
Iron axles	22.00 to 22.50
Locomotive tires (smooth inside)	13.00 to 13.50
Pipes and flues	7.50 to 9.00

Philadelphia

No Signs of Better Conditions in Pig Iron and Steel—Scrap Weaker

PHILADELPHIA, Oct. 9.—The first week of the final quarter of the year has brought no improvement in the steel and pig iron trade. Buyers are pursuing a very cautious policy, and nothing has occurred to alter the situation as it stood a week ago. Pig iron has shown no further decline, but the bars are down and there is no telling what might be done on attractive tonnage. Some steel companies which noted a slight gain in their bookings in September over July and August say that orders thus far in October are not on a par with those booked during September. The scrap market more and more reflects the declining rate of operation in the Eastern steel trade, and nearly all scrap prices are lower this week.

Pig Iron.—Temporarily, at least, the decline of pig iron prices seems to have been checked. This is due partly to the fact that two furnace companies which went after business aggressively have booked enough orders to tide them over for a while and will probably refrain from active competition for a few weeks. One furnace company which went below $23.50, furnace, on a part of its sales gathered orders totaling close to 10,000 tons and is now quoting $24, furnace, as its minimum. The outstanding plaint of pig iron sellers is that there will be no real improvement in the market until production is materially cut down. There is talk of several furnaces going out of blast, but no definite dates have been fixed for blowing out, each operator apparently hoping that some of his competitors will be the first to go out. There is no demand for basic, but one or two sellers would be willing to quote $24.50, delivered eastern Pennsylvania, which is 50c. a ton below the last important sale. Very little foundry iron business has been closed in the immediate Philadelphia district, most of the current orders coming from the New York and New England districts. One of the largest sales was 1500 tons to a Phillipsburg, N. J., machinery company.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.26 to $25.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.76 to 26.13
East. Pa. No. 1X	25.26 to 26.63
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	24.50 to 25.00
Gray forge	24.50 to 25.00
Malleable	25.00 to 26.00
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—With resale material available at $108 to $110, most of the current transactions are restricted to these offerings. Spiegeleisen, 19 to 21 per cent, has been sold at low as $40, furnace.

Coke.—Blast furnace coke on contract for delivery over the remainder of the year is offered at $4.50, Connellsville, but apparently few contracts are being made, as spot coke is obtainable at $4, ovens.

Semi-Finished Steel.—Eastern mills have noted the quotation which some Pittsburgh or Youngstown mills have made on billets, namely $40 on rerolling quality, but have not yet gone that low. There has been no business of sufficient importance to test the market. Forging billets are still generally quoted at $47.50, Pittsburgh.

Plates.—The quotations of 2.40c., Pittsburgh, made by at least two Eastern mills on plates have apparently not affected the determination of the larger producers to adhere to 2.50c., Pittsburgh. Two of the large Eastern producers say they have not deviated from the latter price. There is very little plate business and some of the mills are down to a 25 or 30 per cent operation.

Structural Material.—A pier at Baltimore for the Baltimore & Ohio Railroad, requiring 3000 tons, is the largest structural project up for bids in this district. The demand for structural shapes is very light, and the mills which are selling at 2.40c., Pittsburgh, are not getting enough tonnage to operate at a full rate. One mill is down to a very low rate of operation. The larger makers of shapes continue to quote 2.50c., Pittsburgh.

Bars.—The demand for steel bars is neither better nor worse. A fair number of orders is being received, but they are small and for immediate requirements only. A much improved demand from the railroads for staybolt and engine bolt iron is reported by makers of bar iron. Bolts, nuts and rivets, however, are very dull and the demand is light. Steel bars are firm at 2.40c., Pittsburgh, except that occasional concessions on rerolled concrete bars are reported, while bar iron is quoted at 2.35c. and 2.40c., Pittsburgh, according to the mill.

Sheets.—Specifications for sheets are sufficiently good to insure a fair rate of operation over the remainder of the year. One Eastern maker of blue annealed sheets will continue to run its sheet mills at a full rate through the fourth quarter. The only price concessions reported are on black sheets, usually about $2 a ton, but these concessions apparently are confined to one or two mills in the Pittsburgh or Youngstown district.

Warehouse Business.—A fair demand continues for steel products out of stock. Prices are unchanged, and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; universal plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c. squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 6.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Ore.—Receipts of ore from abroad last week were

unusually light, consisting of only 887 tons of iron ore from Germany and 1500 tons of chrome ore from British India.

Old Material.—One Eastern steel mill which is usually in the market at all times for scrap has withdrawn entirely, due to its low rate of operation, and this has caused weakness in the products it consumes, mostly bundled sheets and turnings. No. 1 heavy melting steel is slightly easier and it is doubtful if the market can be quoted either above or below $16, delivered. A sale of 1000 tons at $16.50 was made late last week, but since then further weakness has developed. Prices on many grades are down 50c. or more a ton from last week's quotations.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00
Scrap rails	16.00
Steel rails for rolling	$18.50 to 19.00
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Cast-iron car wheels	20.50 to 21.50
No. 1 railroad wrought	18.00 to 18.50
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	13.50 to 14.00
Bundled sheets (for steel works)	13.00 to 13.50
No. 1 busheling	15.00 to 15.50
Mixed borings and turnings (for blast furnace use)	11.50 to 12.00
Machine shop turnings (for steel works use)	13.00 to 13.50
Machine shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	14.00 to 14.50
Cast borings (for chemical plants)	17.00 to 17.50
No. 1 cast	19.50 to 20.50
Heavy breakable cast (for steel plants)	18.50 to 19.00
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 18.00
Railroad malleable	20.00 to 20.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 15.50
Shafting	23.00 to 24.00
Steel axles	22.00 to 22.50

San Francisco

Japanese Business Develops Slowly—General Conditions Quiet

SAN FRANCISCO, Oct. 3.—Notwithstanding the many expressions of an optimistic character with reference to business conditions in the iron and steel branches of industry, there is an unmistakable undercurrent of easiness, and the Pacific Coast situation is experiencing the same slipping process which has been so clearly defined in the leading centers of the Eastern States for several weeks. There has been considerable newspaper talk since the great earthquake disaster in Japan, describing with much detail how the stocks of iron and steel commodities in China, the Philippines and on the Pacific Coast were being rapidly absorbed to supply the reconstruction requirements of the devastated sections of Japan. It is true that the demand for lumber and food supplies, particularly the latter, shows a moderate increase, but as far as iron and steel are concerned the inquiries thus far have not developed into any enlarged actual business. Those familiar with the situation say it is too soon to expect much in this line, for the simple reason that very extensive preliminary work has to be done before permanent constructive plans can be prepared. In a general way, business remains in about the same state of quietness as for the past two weeks. Prices, while not much lower, are only fairly well sustained.

Pig Iron.—Following the sharp decline in the price of Southern pig iron, prices in this part of the country naturally weakened, but not as much as some dealers expected. Current quotations are given by importers as from $33 to $34 per ton on imported, and probably as high as $36 on domestic, although scarcely any of the latter has been sold in this vicinity recently. Some orders for domestic for Los Angeles have been booked during the last two or three weeks for future delivery and more business for prompt shipment to that part of the State is confidently expected. As heretofore reported, there are some inquiries here but the resultant business is confined to small orders. Both mills and foundries seem to be well supplied for all immediate needs and there is marked hesitancy in what might be termed stocking up, the impression being prevalent that prices have not yet touched the lowest levels. It is stated that several cargoes of pig iron are now being negotiated for arrival here about the end of the year. During the last few days, several orders have been booked for Los Angeles aggregating about 500 tons per month for the next three months.

Finished Iron and Steel.—As might be expected, business is more quiet than during the middle of summer, but factors say there is not much cause for complaint thus far, notwithstanding rumors of increasing dullness. There is a steady demand for bars for reinforcing concrete. A large amount of work is under way, not only in this city, but in the nearby counties, and contractors report considerable more construction work being planned. Prices are held steady. Steel bars (merchant) round, flats, squares, angles, channels all meet with ready sale at 3.75c. mill price and 3.25c. in carload lots. Structural steel is 3.85c. to jobbers and 3.35c. in carload lots.

Coke.—Sales are few and far between, the demand being unusually light, but some improvement is looked for before the end of the year. Several small lots of foreign coke have been sold at about $20 per net ton ex-ship. A few days ago the Southern Pacific Co. asked for bids for furnishing 600 tons of coke under its usual specifications.

Old Material.—Sales continue in a very small way with supplies more than ample for the present. While prices are quoted the same as two weeks ago, there has been some shading as a possible inducement to some of the regular buyers to increase buying orders. This is said to have little effect, however, for like pig iron, there is a general belief that prices will be lower. Present prices are quoted at from $14 to $15 per ton for the best selected grades and correspondingly lower for the off and mixed lots. One lot of heavy melting steel was sold within the week at $15, but this was said to be an exceptionably good lot. Prices on old material in Los Angeles are reported as a little firmer than in this city.

Canadian Scrap Market

TORONTO, ONT.—While the general opinion among dealers is that the Canadian iron and steel scrap market is about due for some improvement, the demand for these commodities during the past week or ten days does not carry out these expressions. Some contracts have been booked for scrap for future delivery, but the greater part of the demand is for material for immediate use and melters are buying chiefly on a hand-to-mouth basis. The Montreal market has been dull of late and dealers point out that resale possibilities are stagnant. No change is reported in Montreal prices for the week, but Toronto dealers have made several reductions in their buying prices. Canadian dealers are now offering the following prices for scrap:

Dealers' Buying Prices—Gross Tons

	Toronto	Montreal
Steel turnings	$10.00	$7.00
Machine shop turnings	10.00	8.00
Wrought pipe	8.00	8.00
Rails	12.00	13.00
No. 1 wrought scrap	14.00	14.00
Heavy melting steel	12.00	11.50
Steel axles	15.00	18.00
Axles, wrought iron	18.00	20.00
Net Tons		
Standard car wheels	15.00	16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	20.00	20.00

The plant of the Miami Cycle Co., Middletown, Ohio, will be sold by order of the Common Pleas Court at Hamilton, Ohio, on Nov. 5. The company some months ago was placed in the hands of a receiver. It is reported an offer for the purchase of the property has been made which, if accepted, would enable the company to pay its creditors 30c. on the dollar.

British Iron and Steel Market

Japan Still Buying Heavy Tonnages of Sheets — Finished Steel Easier; Galvanized Sheets Higher —Belgium Secures Large Rail Orders

(By Cable)

LONDON, ENGLAND, Oct. 9.

Improved demand for pig iron is resulting from the feeling that prices are low, and inquiries are spreading over the first quarter of next year. In Scotland 44 furnaces now are blowing. Continental demand is expanding but the position generally is dependent on a settlement (or otherwise) of the boilermakers' lockout.

Hematite is firm, with increased sales on better demand for steel products.

Foreign ore is dull. Low grade Mediterranean ores are selling at cheap rates. Bilbao Rubio is held at about 22½s. ($5.13) c.i.f. Tees.

Finished steel is in better demand. Australia has bought good lines of plates. The Leeds Forge Co. has been awarded a contract for 50 steel coaches for Australia. India has purchased structural material. Japan is buying sheets, wire and wire nails. Steel makers generally are so anxious to secure orders that they are disposed to make concessions.

Continental position is practically unchanged. There is little disposition on the part of consumers to buy forward, owing to the uncertainty of prices and the status of the Ruhr settlement. Quotations generally are in francs.

In the Ruhr the coke ovens and blast furnaces are preparing to resume but the works' weakened financial position makes the outlook uncertain. The German home demand is falling off.

In France 109 blast furnaces were blowing on Sept. 1. In Belgium the Société Anonyme d'Ougrée Marihaye and the Société Anonyme John Cockerill, jointly, have secured an Argentine rail order of 45,000 tons. d'Ougrée has obtained also an order from Spain for 15,000 tons of rails.

In Holland the (new) Royal Netherlands Blast Furnace & Steel Works plans to blow in its (two) furnaces early next year.

Tin plate market is firm, on large buying by merchants and consumers. Makers are sold out for October delivery. Of stock plates there is a short supply. Export markets are active. Richard Thomas & Co., Ltd., Swansea, Wales, and the Grovesend Steel & Tin Plate Co., Ltd., Gorseinon, Wales, have merged their interest. There is other amalgamation talk going on.

Galvanized sheets are firm, with fair buying on India, Australia, South America and Far East specifications.

Japanese demand for black sheets is being maintained. The works are heavily sold and not keen sellers. Japanese 6 x 3, 13's, 107 lb., are being sold at £21 (4.27c. per lb.).

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£1	18s.				$8.66	
Bilbao Rubio ore†	1	4				5.47	
Cleveland No. 1 foundry	5	2½				23.37	
Cleveland No. 3 foundry	4	16				21.89	
Cleveland No. 4 foundry	4	11				20.75	
Cleveland No. 4 forge	4	8	to £4	9s.		20.66 to	$20.29
Cleveland basic	4	10	to 4	14		20.52 to	21.43
East Coast mixed	4	18½	to 5	0		22.46 to	22.80
Ferromanganese*	17	10				79.80	
Rails, 60 lb. and up	8	0	to 9	0		36.48 to	41.04
Billets	7	10	to 8	5		34.20 to	37.62
Sheet and tin plate bars, Welsh	9	2½				41.61	
Tin plates, base box	1	3½	to 1	3¼		5.27 to	5.30
						C. per Lb.	
Ship plates	9	0	to 9	10		1.83 to	1.93
Boiler plates	12	10	to 13	0		2.54 to	2.65
Tees	9	10	to 10	0		1.93 to	2.04
Channels	8	15	to 9	5		1.78 to	1.88
Beams	8	10	to 9	0		1.72 to	1.83
Round bars, ⅝ to 3 in.	10	5	to 10	15		2.09 to	2.19
Galvanized sheets, 24 g.	19	0	to 19	5		3.87 to	3.92
Black sheets, 24 gage	13	15				2.80	
Black sheets, Japanese specifications	15	5				3.10	
Steel hoops	12	0	& 12	10*		2.44 &	2.54*
Cold rolled steel strip, 20 gage	17	5				3.51	
Cotton ties, Indian specifications	15	0				3.05	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron:							
Belgium	£5	2½s.				$23.37	
France	5	2½				23.37	
Luxemburg	5	2½				23.37	
Billets (nominal):						C. per Lb.	
Belgium	6	12½	to £7	0s.		30.21 to	$31.92
France	6	12½	to 7	0		30.21 to	31.92
Merchant bars:						C. per Lb.	
Belgium	8	7½	to 9	0		1.71 to	1.83
Luxemburg	8	7½	to 9	0		1.71 to	1.83
France	7	10				1.53	
Joists (beams):							
Belgium	8	0				1.63	
Luxemburg	8	0				1.63	
France	7	10	to 7	12½		1.53 to	1.55
Angles:							
Belgium	8	0	to 8	5		1.63 to	1.68
½-in. plates:							
Belgium	8	10				1.73	
Germany	8	10				1.73	
⅝-in. plates:							
Luxemburg	7	15				1.58	
Belgium	8	0				1.63	

Treasury Department Decision as to Tariff on Scrap

WASHINGTON, Oct. 9.—The customs division of the Treasury Department today rendered a decision holding that all scrap steel valued at not more than 7c. per lb. is dutiable at the rate of 75c. per ton under paragraph 301 of the Fordney-McCumber tariff act. The opinion was based on the fact that there was a variance in practice at the ports of Philadelphia and New York in the classification of scrap steel valued at more than 7c. per lb. It is the practice of the New York appraiser to assess a duty upon this steel scrap at 75c. under paragraph 301, while it is the Philadelphia practice to assess a duty at 75c. under paragraph 301, plus 8 per cent under paragraph 305, for the reason that the scrap steel contained more than 6/10 of 1 per cent of tungsten. Paragraph 305 provides that in addition to the rates of duty called for in schedule 3, steel in all forms and shapes and by whatever processes made and by whatever name designated containing more than 6/10 per cent tungsten shall be assessed with duty in addition to the rates provided for in the schedule at 8 per cent.

The decision points out that the Treasury Department construes paragraph 305 as relating to articles which are incomplete or partly manufactured, and not waste or scrap material resulting from the manufacture of the material into further advanced material or articles, and it is accordingly of the opinion that scrap steel is not covered by paragraph 305. Consequently it approved the practice of the appraiser at New York in assessing a duty of 75c. per ton on scrap. Some time ago the customs division held that scrap steel valued at more than 7c. per lb. is dutiable under a basket clause calling for a duty of 10 per cent on waste.

Acquires Sole Control of American Nickel Corporation

The Mond Nickel Co., Ltd., of London, England, has purchased the minority stock previously held by Charles T. Hennig and G. P. Bassett, Jr., and is now the sole owner of the American Nickel Corporation, Clearfield, Pa., manufacturer of 99 per cent pure malleable nickel.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. ..... 2.50c.

Structural Materials

Beams, channels, etc., base, per lb. ..... 2.50c.
Sheet piling ..... 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 2.40c.
Soft steel bars for cold finishing ..... $3 per ton over base
Reinforcing steel bars, base ..... 2.40c.
Refined iron bars, base, per lb. ..... 3.25c.
Double refined iron bars, base, per lb. ..... 4.85c. to 5.00c.
Stay bolt iron bars, base, per lb. ..... 8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, base, per lb. ..... 3.15c.
Bands, base, per lb. ..... 3c. to 3.15c.
Strips, base, per lb. ..... 3c. to 3.15c.
Cotton ties, per bundle of 45 lb. $1.63

Cold-Finished Steels

Bars and shafting, base, per lb. ..... 3.25c.
Bars, S. A. E. Series, No. 1000 ..... 4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300 ..... 6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100 ..... 5.50c. to 5.75c.
Strips, base, per lb. ..... 5.00c.

Wire Products

Nails, base, per keg $3.00
Galvanized nails, 1 in. and over ..... $2.25 over base
Galvanized nails, less than 1 in. ..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. 2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg 3.45
Cement coated nails, base, per count keg 2.70
Woven fence, carloads (to jobbers) ..... 67½ per cent off list
Woven fence, carloads (to retailers) ..... 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 to 60, 10 and 5 per cent off list
Machine bolts, small, cut threads,
60 and 10 to 60 and 5 per cent off list
Machine bolts, larger and longer,
60 and 10 to 60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
60 and 10 to 60 and 5 per cent off list
Cut threads ..... 60 to 50, 10 and 5 per cent off list
Larger and longer ..... 60 to 50, 10 and 5 per cent off list
Lag bolts ..... 65 and 10 to 65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads ..... 50 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 5 per cent off list
Larger and longer sizes ..... 50 and 5 per cent off list
Hot pressed square or hex. nuts, blank ..... 4.00c. list
Hot pressed nuts, tapped ..... 4.00c. list
C.p.c. and t. square or hex. nuts, blank ..... 3.75c. off list
C.p.c. and t. square or hex. nuts, tapped ..... 3.75c. off list
Semi-finished hex. nuts:
⅜ in. and smaller, U. S. S. ..... 80 per cent off list
⅝ in. and larger, U. S. S. ..... 75 per cent off list
Small sizes, S. A. E. ..... 80 and 10 per cent off list
S. A. E., ⅝ in. and larger ..... 75 and 10 per cent off list
Stove bolts in packages ..... 75, 10 and 5 per cent off list
Stove bolts in bulk ..... 75, 10, 5 and 2½ per cent off list
Tire bolts ..... 60 and 10 per cent off list
Bolt ends with hot pressed nuts ..... 60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers ..... 5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws ..... 70 per cent off list
Milled set screws ..... 70 per cent off list
Upset cap screws ..... 75 and 10 per cent off list
Upset set screws ..... 75 and 10 per cent off list
Milled studs ..... 50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $2.75 to $3.00
Small rivets ..... 65 and 10 to 70 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb.	$3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb.	$3.15 to 3.50
Spikes, ⅞ in.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ¾ in. and larger, base, per 100 lb.	$4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.	5.00 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, base, per 100 lb.	2.75

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	55	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased 4 points, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2¾ in.	— 2
3½ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	45	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	32	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than two changes heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base ..... 83 per cent off list
Carbon 0.30 to 0.40, base ..... 81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	2½-in. O.D. 9 gage	56
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box $5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
		25-lb. coating I. C.	16.20
8-lb. coating I. C.	11.30	30-lb. coating I. C.	17.35
12-lb. coating I. C.	12.70	35-lb. coating I. C.	18.35
15-lb. coating I. C.	13.95	40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. ..... 3.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. ..... 3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. ..... 5.35c.

Galvanized

No. 28 (base), per lb. ..... 5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb. ..... 5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. ..... 3.35c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.235	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.34
Pac. Coast, ship plates	1.20
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	39c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$42.00 to 45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	41.00 to 44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	80.00 to 82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines			$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines			23.50
Per 1000 f.o.b. works:			
Fire Clay:	High Duty	Moderate Duty	
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00	
Maryland	47.00	42.00	
Ohio	42.00 to 43.00	37.00 to 39.00	
Kentucky	42.00 to 43.00	37.00 to 39.00	
Illinois		37.00 to 42.00	
Missouri	42.00 to 45.00	35.00 to 40.00	
Ground fire clay, per net ton		6.00 to 7.00	
Silica Brick:			
Pennsylvania			42.00
Chicago			49.00
Birmingham			50.00
Ground silica clay, per net ton			8.00
Magnesite Brick:			
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)			65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)			40.00
Chrome Brick:			
Standard size, per net ton			50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00 to $42.80
Rolling billets, 2-in. and under	40.00 to 42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00 to $42.50
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	3 per ton over base
Wire rods, carbon 0.41 to 0.55	5 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10 per ton over base
Wire rods, acid	15 per ton over base
Skelp, grooved, per lb.	2.40c.
Skelp, sheared, per lb.	2.40c.
Skelp, universal, per lb.	2.40c.

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.15c. to 2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅞-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$ 4.80	$ 4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1-in.	58.50	60.50
1⅛-in.	83.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers —	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Over 23,000 Tons in New Inquiries and Awards of 13,000 Tons

Orders for 13,000 tons of fabricated steel work and inquiries for 23,500 tons, not including 13,000 tons of plate work for a water pipe line for Portland, Ore., made the past week a notable one. However, October so far does not show the volume of bookings of either September or August, but the fresh additions to jobs under consideration total much more than in any recent weeks. Awards include the following:

Public school No. 108, New York, 1300 tons, to Easton Structural Steel Co.; this in addition to other schools totaling 2600 tons taken by same company, as reported in THE IRON AGE of Sept. 20.

Hayman loft building, Newark, N. J., 200 tons, to Hedden Iron Construction Co.

Bricken loft building on West Thirty-seventh Street, New York, 1000 tons, to Levering & Garrigues Co.

Bricken loft building, on West Thirty-eighth Street, New York, 650 tons, to Harris Structural Steel Co.

Columbia Machine Works, Brooklyn, 600 tons, to McClintic-Marshall Co.

Hudson Towers Hotel, Seventy-second Street and West End Avenue, New York, 2000 tons, to A. E. Norton, Inc.

Grand Street Boys' Club, New York, 125 tons, to Easton Structural Steel Co.

Loft building on West Thirty-seventh Street, New York, 550 tons, to Lehigh Structural Steel Co.

Central Railroad of New Jersey, bridge at Allentown, Pa., 250 tons, to Phoenix Bridge Co.

Apartment building at 1133 Park Avenue, New York, 550 tons, to Paterson Bridge Co.

Jersey City *Journal* Building, Jersey City, N. J., 1000 tons, to Taylor-Fichter Steel Construction Co.

Apartment building on Park Avenue, New York, 750 tons, to Post & McCord.

Southern California Telephone Co., Washington Office Building, Los Angeles, 727 tons, to Ralston Iron Works.

Bridge over Columbia River, Hood River, Ore., 900 tons, to American Bridge Co.

Producers & Refiners Corporation, two 55,000 bbl. oil storage tanks for Oklahoma, 600 tons, to unnamed fabricator.

Middle West Utilities Co., Tulsa, Okla., addition to power house, 322 tons, to Kansas City Structural Steel Co.

Vicksburg, Shreveport & Pacific Railroad, New Orleans, bridges, 300 tons, to unnamed fabricator.

Minnesota State Bridges Nos. 3058 and 3056, 243 tons, divided between Illinois Steel Bridge Co. and Iowa Bridge Co.

Northern States Power Co., St. Paul, Minn., one self-supporting steel stack, 127 tons, to Minneapolis Steel & Machinery Co.

Union Pacific System, one through plate girder span on the Orchard Boise line, 100 tons, to American Bridge Co.

High-Long Building, Columbus, Ohio, 350 tons, to International Steel & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

City of Portland, Ore., pipe line, 13,000 tons of plates; bids received, but low bid was above estimate of cost. T. A. Gillespie & Co., New York, may receive order for fabrication of pipe if lowest bid on general contract is accepted.

Hurt Building, Atlanta, Ga., 2300 tons.

Section 3, Fourth Avenue subway, Brooklyn, 2500 tons; T. A. Gillespie & Co., New York, low bidder; work not yet awarded.

Baltimore & Ohio Railroad, pier at Baltimore, 3000 tons.

James Monroe High School, Bronx, New York, 3000 tons; bids received but job will be refigured and readvertised.

Ford Motor Co., plant at St. Paul, Minn., 10,000 tons. Figures asked on revised plans.

Milwaukee Gas Light Co., gas holder, 1500 tons.

Garfield Smelting Co., plant, Garfield, Utah, 400 tons.

Grain elevator, Oswego, N. Y., 600 tons, general contract awarded to James Stewart Construction Co., Chicago.

RAILROAD EQUIPMENT BUYING

Promise of Large Volume of Car Orders in Early Future

The crystallizing of railroad car business inquiries is a feature of the steel market. Freight car awards totaled 2100, but definite inquiries appeared for 3850 and expectations of early negotiations covered upward of 40,000 cars. Some of the items are as follows:

The Baltimore & Ohio has inquired for 1000 70-ton mill gondolas, 440 hopper car bodies of 55 tons capacity and 107 40-ton box car bodies. It is expected that this road will inquire for about 4000 cars in all.

The Chicago & Alton has come into the market for 250 gondola cars and 350 gondola car bodies.

The St. Louis-San Francisco has an inquiry out for 2500 refrigerator cars.

The Minneapolis & St. Louis has let a contract to the General American Car Co. for the repair of 600 cars.

The Nickel Plate has ordered 200 steel underframes for cars from the American Car & Foundry Co.

The Long Island Railroad has ordered 60 motor passenger cars from the American Car & Foundry Co.

The Fruit Growers' Express Co., Washington, is disposing of a bond issue of $4,050,000, the proceeds to be used in connection with the construction of 2000 new steel underframe refrigerator cars, each of 40 tons capacity, at its own shops. The company is controlled by the Atlantic Coast Line Railroad Co., Pennsylvania Railroad Co., Southern Railway Co. and other roads. H. B. Spencer is president.

The Southern Pacific is expected to purchase the following equipment before the close of the year: 8730 freight cars, 5000 refrigerator cars, 78 electric cars, 74 steam passenger cars, 32 freight locomotives and 26 passenger engines. The Union Pacific also contemplates entering the market.

The Pennsylvania is expected to issue inquiries for 15,000 cars.

The Long Island has placed 60 motor coaches with the American Car & Foundry Co.

The Rapid Transit Subway Construction Co., New York, is inquiring for 100 steel subway motor cars.

The Chesapeake & Ohio has awarded 6 mail and express cars to the Pullman Co.

The Mexican Petroleum Corporation has ordered 100 10,000-gal. 50-ton tank cars from the American Car & Foundry Co.

The Delaware, Lackawanna & Western has placed 100 box car repairs with the American Car & Foundry Co.

Trade Changes

On Oct. 1 the Salt Lake office of the Sullivan Machinery Co., Chicago, was moved from the Walker Bank Building to the Dooly Block, 121 West Second Street. B. B. Brewster is manager of the inter-mountain territory comprising Utah, Southern Idaho, Eastern Nevada and Western Wyoming.

The Arctic Ice Cream Co., Detroit, has purchased plant and real estate from the Commerce Motor Car Co., embracing four acres of ground at Green, Mackie, Solvay Avenues and the Wabash Railway, Detroit. The modern factory buildings which cover two acres will be immediately converted to the use of the Nizer Corporation, a subsidiary of the Arctic Ice Cream Co., for the manufacture of Nizer automatic refrigerating cabinets. The Nizer factory is at present located at 3980 Gibson Avenue. Production of Nizer products will be quadrupled in the new plant.

The W. O. Conley Electric Co. of Philadelphia will represent the Reinforced Switch & Mfg. Co., Inc., Pittsburgh, in Southern New Jersey and Eastern Pennsylvania.

Interests identified with the Scovill Mfg. Co., Waterbury, Conn., have acquired the entire capital stock of the Hamilton-Beach Mfg. Co., Racine, Wis., one of the largest manufacturers in the West of fractional horsepower motors and motor-driven industrial and domestic appliances. The principal owner was Fred J. Osius, founder of the business, who is retiring to devote his time to extensive real estate interests at Miami, Fla. It is stated that there will be no change in the name or the policy of the Racine works. E. O. Goss has been elected president; T. M. Myers, vice-president and general manager; A. T. Druse, secretary and treasurer, and J. V. Montague, assistant secretary.

The Laughlin-Barney Machinery Co., Union Arcade Building, Pittsburgh, has been appointed Pittsburgh representative for the R. S. Newbold & Son Co., founders, Norristown, Pa.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Oct.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
3	13.50	12.87½	41.87½	6.85	6.65	6.65	6.30
4	13.50	12.87½	42.62½	6.85	6.65	6.65	6.30
5	13.50	12.87½	42.50	6.85	6.65	6.65	6.30
6	13.25	12.87½	....	6.85	6.65	6.65	6.30
8	13.00	12.75	42.25	6.85	6.65	6.65	6.30
9	13.00	12.75	42.25	6.85	6.65	6.65	6.30

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Oct. 9.—The market continues very quiet, with marked weakness in copper, which has declined to 13c., delivered. The tin market has been moderately active, with a slight gain in prices. Lead is steady but dull, and there are no price changes in zinc, which nevertheless is weak and dull.

Copper.—Weakness in the British market has had its effect here. The copper market showed further signs of weakness a few days ago, and sales of Lake were made at 13c., delivered. There has been no marked demand, in fact the market is very quiet and dull. Consumers continue to observe a very conservative policy. They would have no difficulty, it was apparent today, in covering their requirements for the remainder of the year at 13c.

Copper Averages.—Through a typographical error last week, the average price of Lake copper for September was given as 13c. It should have been 13.92c.

Tin.—Although the market has been fairly quiet through the week, there were fair sales, mostly to dealers, between Monday and Friday of last week, more than half of the week's business, totaling perhaps 1000 tons, being negotiated on Wednesday and Thursday, when it became clear that supplies for October delivery would be rather light. Some dealers found themselves short of their requirements and were heavy buyers. From Friday until the close of business today (Tuesday) the market was dull. Spot Straits tin was quoted today at 42.25c., New York. London cables reported quotations there today as follows: Spot standard, £206; future standard, £202 5s.; spot Straits, £209; Singapore price, £203 10s.

Lead.—The market is exceedingly quiet and prices are unchanged. Prices generally quoted are on the basis of 6.65c., St. Louis, and 6.85c., New York, but some sellers are asking as high as 6.95c., New York.

Zinc.—Further weakness has developed in the zinc market, though this has not been reflected in price changes as yet. Quotations are mostly at 6.30c., St. Louis, and 6.65c., New York, but some quotations are said to have been as low as 6.27½c., St. Louis. Efforts are being made by the Joplin ore producers to restrict production, which is in excess of the demand, by shutting down the mines one week of each month.

Old Metals. — Prices are lower and business is very quiet. Holders are generally refusing to sell on the present low basis. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	11.75
Copper, light and bottoms	10.50
Heavy machine composition	10.25
Brass, heavy	7.50
Brass, light	6.00
No. 1 red brass or composition turnings	8.50
No. 1 yellow rod brass turnings	6.75
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.50
Sheet aluminum	16.50

Nickel.—Quotations on shot and ingot nickel are maintained at 29c., the price of the leading producer, while electrolytic nickel is held at 32c. In the outside market there are some quotations of 28c. per lb. on shot and ingot nickel.

Antimony.—Chinese metal in wholesale lots for early delivery is unchanged at 7.50c. to 7.60c., New York, duty paid.

Aluminum—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., New York, duty paid.

Chicago

OCT. 9.—The market is quiet with tin, lead and zinc lower than a week ago. We quote in carload lots, Lake copper, 14.25c.; tin, 41.50c.; lead, 6.70c.; spelter, 6.30c.; antimony, 9c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5.25c.; zinc, 4.25c.; pewter, No. 1, 22c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

SEPTEMBER STEEL OUTPUT

Daily Rate Only 3680 Tons a Day Below That of August

Steel output in the United States held up well in September, there being a decline of but 2.7 per cent from the rate in August, whereas pig iron output last month showed a falling off of 6.4 per cent. The statistics of the American Iron and Steel Institute, just published, indicate a daily rate of ingot production last month of 132,534 tons, as against a daily average of 136,214 tons in August, the decrease being 3680 tons a day. In August the falling off from July was 4356 tons a day.

The September production of companies which made 95.35 per cent of the country's total in 1922 was 3,159,283 gross tons, which, assuming that the 4.65 per cent not reporting produced the same percentage of the total as in 1922, would mean a September output for the whole country of 3,313,354 tons. Taking the daily rate of 157,776 tons for the year's peak month of April as the basis of comparison, the falling off in the rate of production, as shown by the September returns, is 16 per cent from the high point.

The table below gives the production by months for 1923 of the different kinds of steel, together with estimated daily rate for all companies. Following it is a table showing the production by months in 1922:

Monthly Production of Steel Ingots, January, 1923, to August, 1923, Reported for 1923 by Companies Which Made 95.35 Per Cent of the Steel Ingot Production in 1922

Months 1923	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies, Gross Tons
Jan.	2,906,892	728,270	9,487	3,822,369	141,569
Feb.	2,613,564	669,903	10,797	3,454,918	143,955
March	3,046,309	799,525	12,841	4,046,854	149,883
April	2,974,579	772,485	13,933	3,944,412	157,776
May	3,136,558	847,418	16,719	4,195,890	155,400
June	2,821,239	737,845	15,483	3,748,890	144,188
July	2,658,449	680,884	11,496	3,514,241	140,570
Aug.	2,796,370*	701,059	9,326	3,677,771*	136,214*
Sept.	2,536,972	613,709	8,602	3,313,354	132,534
9 mos.	25,490,932	6,551,098	108,664	33,718,609	144,715

*Revised.

Monthly Production of Steel Ingots, January, 1922, to December, 1922, Reported by Companies Which Made 84.15 Per Cent of the Steel Ingot Production in 1922

Months 1922	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies, Gross Tons
Jan.	1,260,809	331,851	822	1,891,857	72,764
Feb.	1,395,835	348,571	616	2,071,772	86,324
March	1,818,570	451,386	795	2,814,667	104,247
April	1,997,465	445,939	1,109	2,902,240	116,090
May	2,214,774	494,893	1,474	3,218,794	119,215
June	2,143,708	487,851	2,918	3,127,775	120,299
July	2,020,572	464,047	2,485	2,952,806	118,112
Aug.	1,807,710	464,379	2,893	2,629,256	97,380
Sept.	1,911,147	460,127	2,505	2,818,261	108,395
Oct.	2,352,207	518,010	2,198	3,410,285	131,164
Nov.	2,360,903	525,945	2,449	3,430,309	131,935
Dec.	2,241,104	536,214	2,572	3,300,416	132,017
Total	23,624,404	5,469,213	22,836	34,568,418	111,511

PERSONAL

George F. Greene, whose appointment as secretary-treasurer of the American Iron, Steel and Heavy Hardware Association was referred to in these columns last week, has taken up his duties at the headquarters of the association, 47 West 34th Street, New York. Mr. Greene is a native of Kentucky and started his business career with the banking house of Strong, Sturgis & Co., serving through the panic of 1907. In recent years his work has been in financial and credit lines and he has had experience in selling and in field work. In 1918 he went with the Midvale Steel & Ordnance Co. as assistant to the vice-president and later became assistant credit manager. His experience in that capacity and his acquaintance in the iron and steel trades will be of material help in his new work.



GEORGE F. GREENE

James L. Gough, for 20 years identified with the machine tool business in Chicago, has been appointed sales manager of the Stocker-Rumely-Wachs Co., that city. Frank R. Taylor, formerly with the Addressograph Co., Chicago, has joined the sales force of the Stocker-Rumely-Wachs Co.

Newman M. Marsilius, who recently resigned as general manager of the Woodstock Typewriter Co., Woodstock, Ill., has been appointed works manager of the Bilton Machine Tool Co., Bridgeport, Conn.

George F. Pichel has established himself as a manufacturers' representative at Rio de Janeiro, Brazil, with headquarters at 50 Avenida Rio Branco.

Milton C. Fidgeon, for several years connected with Joseph T. Ryerson & Son, Inc., has been appointed eastern machinery sales manager, with office at 30 Church Street, New York.

E. B. Hite, formerly general manager Lancaster Steel Products Co., Lancaster, Pa., has been appointed general manager of the Eastern Ohio Mfg. Co., Warren, Ohio, now equipping its plant to manufacture cold rolled strip steel.

Frank Osler, consulting industrial engineer, Indianapolis, has been appointed assistant manager of the factory of the S. F. Bowser Co., Fort Wayne, Ind.

A. W. Gregg, foundry superintendent Whiting Corporation, Harvey, Ill., has resigned to become connected in that capacity with the Bucyrus Co., South Milwaukee, Wis. G. P. Fisher, metallurgist of the corporation, has been appointed to succeed him.

H. Rodemeyer has accepted a position as works superintendent of the Barnes, Gibson, Raymond Corporation, Detroit, manufacturer of springs.

Walter E. Irving, president Irving Iron Works, Long Island City, N. Y., manufacturer of subway grating and steps, entertained the selling organization of the company at a clambake at his home in Glenbrook, Conn., on the evening of Sept. 14. About forty salesmen attended a sales conference at the plant on Sept. 12, 13 and 14.

L. B. Breedlove has been appointed consulting engineer to the bond department of the Chicago Trust Co., to act in an advisory capacity in the analysis of public utility and industrial properties. He will be recalled as the author of several articles having to do with different developments of the Ford Motor Co.'s River Rouge plant.

W. H. Jelley, formerly connected with the eastern Pennsylvania office of the United American Metals Corporation, at Philadelphia, has been transferred to Pittsburgh, where he will manage the sales of Syracuse babbitt metals and Autocrat bushing bronze in western Pennsylvania.

A. A. Loeffler has been appointed manager of sales for the Globe Steel Tube Co., Chicago, in charge of Michigan territory, with headquarters at 5-169 General Motors Building, Detroit. R. R. Lally, formerly of Baltimore, has been appointed manager of sales in charge of Eastern territory, with headquarters at 110 East Forty-second Street, New York.

Bryant A. Rhine, formerly of the Bethlehem Steel Corporation, has become affiliated with Hiram Swank's Sons, Inc., Johnstown, Pa., as assistant to the president, succeeding Albert A. Smith, resigned.

George T. Trundle, president Trundle Engineering Co., has been elected president of the Cleveland chapter of the Society of Industrial Engineers.

Roy L. Kneedler, formerly foundry superintendent Climax Engineering Co., Clinton, Iowa, has been appointed foundry superintendent of French & Hecht, Davenport, Iowa.

Albert Walton, formerly general manager Bateman & Co., Inc., has been appointed general manager and assistant to the president of the Enterprise Mfg. Co. of Pennsylvania, Philadelphia.

H. A. Wilson has been appointed manager of the Detroit branch of the Gibb Instrument Co., Bay City, Mich., vice F. M. Luchs, resigned. Mr. Wilson was formerly New York manager for A. P. Munning & Co.

E. G. Todd of Isbecque, Todd & Co., machine tool merchants, Brussels, Belgium, is spending a few weeks in the United States. During the past week he has been at his firm's New York office at 150 Nassau Street, and this week will leave on a trip to various machine tool plants, whose products he handles in Belgium. Mr. Todd reports that the importation of machine tools by Belgium from the United States is still greatly hampered by the unfavorable rate of exchange.

Edward C. Smith has been appointed manager of pig iron sales, with headquarters at Ironton, Ohio, for the Belfont Iron Works Co., Ironton.

Joseph Wainwright, for many years New England district manager of Manning, Maxwell & Moore, Inc., with headquarters in Boston, has been made Philadelphia district manager. W. B. Lawton, heretofore covering the Hartford, Conn., and Springfield, Mass., districts and that west of Springfield in New England, succeeds him as New England district manager. Mr. Wainwright probably was one of the most widely known machine tool representatives in New England.

William G. Stebbins, a director in charge of purchases and employment manager of the Millers Falls Tool Co., Millers Falls, Mass., was presented with a gold watch last week by the directors of the company in honor of his 50 continuous years with the company.

E. A. Miller, chief engineer Wickwire Spencer Steel Corporation, Palmer, Mass., has resigned to accept a position with the Fisk Rubber Co., Chicopee, Mass.

E. E. Hall has been made general superintendent of the Saco-Lowell Shops, Biddeford, Me., maker of textile machinery.

H. R. Stuyvesant, superintendent of blast furnaces Alabama Co., Birmingham, Ala., for the last four years, has resigned.

H. H. Rogers of Williams, White & Co., Moline, Ill., has been elected chairman of the Tri-City group of the machine shop practice division of the American Society of Mechanical Engineers. Other officers are Charles A. Carlson, Deere & Co., Moline, secretary-treasurer; A. E. Lindburg, Moline Tool Co.; Lawrence Roys, Western Structural Co., Moline; Harry Holsington and D. J. Luckett, Davenport, executive committee.

M. G. Babcock, formerly sales representative of the

Laclede-Christy Co. of Pennsylvania, has succeeded P. M. Offill, resigned, in charge of the Pittsburgh office, Laclede-Christy Clay Products Co. of St. Louis, at 901 Oliver Building.

George M. Verity, president American Rolling Mill Co., Middletown, Ohio, will be the principal speaker at the annual meeting and dinner of the West Virginia Manufacturers' Association at Huntington, W. Va., Nov. 1. His subject will be "Problems of Management."

W. L. Delker, Henderson, Ky., was elected president of the Carriage Builders' National Association at the annual meeting held in Cincinnati, Oct. 3-5. G. W. Huston, Cincinnati, was elected secretary and treasurer.

Harry L. Brunger, works manager Aultman & Taylor Machinery Co., Mansfield, Ohio, for nine years, is now works manager of the Vulcan Plow Co. of Evansville, Ind.

J. B. Doan, president American Tool Works Co., Cincinnati, and A. E. Robinson, works manager, were severely injured in an automobile accident near Utica, N. Y., on Sept. 30. They were riding with W. H. Birdsall, Syracuse, the company's Eastern representative, and Mrs. Birdsall, at the time of the accident. Mr. Doan suffered severe lacerations of the scalp, Mr. Birdsall a broken collar bone, and Mr. Robinson severe bruises. Mr. Doan was taken to a hospital at Utica, but his condition has so improved that he will be able to leave for home this week.

Palmer E. Hanson, formerly superintendent of one of the foundries of the Lakey Foundry & Machine Co., Muskegon, Mich., has become associated with the Cream City Foundry Co., Milwaukee, as general superintendent.

William Ruddy, formerly foundry superintendent Grinnell Co. of Canada, Ltd., Toronto, Ontario, sailed for Paris Sept. 19, to take charge of operations at the new malleable and gray iron foundries of André Citroën.

Charles F. Abbott, recently with the National Aniline & Chemical Co., New York, and previously director of sales of the Celluloid Co. of New York, has been appointed executive director of the American Institute of Steel Construction. Offices have been taken at 350 Madison Avenue, New York. Lee H. Miller, who has been managing director of the institute, will continue as chief engineer and will be in charge of the Cleveland office. The organization is devoted to the promotion of the use of structural steel.

Waldo L. Phillips of F. R. Phillips & Sons Co., iron and steel importers and exporters, will have charge of the company's New York office at 50 Church Street. Mr. Phillips has been in the company's Philadelphia office and recently returned from a trip to the Orient.

H. E. Root, who represents the McClintic-Marshall Co., Pittsburgh; Robert W. Hunt & Co., New York, and F. R. Phillips & Sons Co., Philadelphia, in Yokohama, has cabled his principals that he lost his wife and two children in the earthquake. He is on his way back to the United States.

David Baker, who has been general manager of the steel works at Newcastle, Australia, built some years ago under his direction for the Broken Hill Proprietary Co., Ltd., recently tendered his resignation, which the board of directors received with regret. Mr. Baker felt that his health would not permit him to continue in the performance of his laborious duties. Arrangements were made by which he will take a leave of several months, returning to Australia early in the new year to aid in the reorganization made necessary by his retirement. Later, he will be connected with the company in a consulting capacity. Mr. Baker sailed from Australia for the United States on Sept. 6.

Prof. John Airey of the University of Michigan, Ann Arbor, Mich., has been made a life member of the American Society of Mechanical Engineers for his paper "On the Art of Milling."

Edward A. Langenbach, chairman of directors United Alloy Steel Corporation, has been elected trustee, and H. H. Timken a vice-president of the McKinley National Memorial Association at a meeting held in Canton, Ohio, Oct. 3.

A. L. Johnson, chairman and managing director of Rd. Johnson, Clapham & Morris, Ltd., Manchester, England, manufacturer of wire and hardware specialties, and A. W. Shaw of the same company, are in the United States on a business trip.

Fayette Brown, who has been vice-president of the Stewart Furnace Co., Cleveland, has been elected president of the company to fill the vacancy caused by the recent death of his father, Harvey H. Brown. Harvey H. Brown, Jr., has been elected vice-president to succeed his brother.

OBITUARY

ANTOINE J. LANGELIER, president and treasurer Langelier Mfg. Co., Arlington, Cranston, R. I., died on Sept. 19.

MERRITT ASHMUN POTTER, last survivor of the original incorporators of E. C. Atkins & Co., Indianapolis, died at the Methodist Episcopal Hospital, that city, on Sept. 25, following long illness. He had been prominent in the business and civic life of Indianapolis for more than 40 years. Mr. Potter was born in 1855 at Clarkston, Mich., and attended the University of Illinois. He went to Indianapolis in 1874 and when the Atkins company was incorporated 11 years after, he became treasurer, in which position he remained until becoming secretary in 1911. He held that position at the time of his death. Mr. Potter will be remembered for his many philanthropic endeavors.

CHARLES GIFFORD, sales manager Monarch Steel Castings, Detroit, died at his home, Oct. 2, aged 60 years, after an illness of six weeks. Mr. Gifford came to Detroit from Hudson, N. Y., 25 years ago, and became connected with the casting business. He had been identified with the Monarch company for the last 20 years. The company has not been operating since 1920, during which time Mr. Gifford was in charge of the affairs of the company.

BENJAMIN F. AUFDERHEIDE, SR., president American Sash Weight Foundry Co., Davenport, Iowa, died Sept. 22, aged 65 years.

JOHN GEIST, formerly chief engineer Wisconsin Bridge & Iron Co., and more recently associated with Hool, Johnson & Whitney, general contractors, Milwaukee, died Sept. 30, aged 61 years. He was a native of Norway and was widely known as a designing engineer.

A Tribute to Dr. Henry M. Howe

As a memorial to Dr. Henry Marion Howe a service will be held in the Episcopal Cathedral of St. John the Divine, New York, on Friday afternoon, Oct. 25, at 5 o'clock. The service is intended not only to be a tribute to an eminent scientist, but also to express the relation which exists between science and religion. Dr. Howe was a lifelong churchman and both the authorities of the cathedral and his friends in the engineering societies have desired that this public tribute should be paid to him. A large attendance is expected, and THE IRON AGE urges that there be a special effort to make it representative. The service comes at the close of the afternoon session of the American Iron and Steel Institute's October meeting in New York, and all members of the institute are asked to join in the cathedral tribute. The principal address will be made by Dr. Michael Pupin of Columbia University.

Strong Plea to Give Railroads a Rest

President of American Railway Association Urges Cessation of Political Agitation and Legislation, Declaring Ample Regulation Is Now Provided

BOSTON, Oct. 9.—A period of rest from political agitation and legislation in order to permit the railroads to demonstrate to the public what they can do under the present system of regulation was urged tonight by R. H. Aishton, president of the American Railway Association, addressing the New England Railroad Club.

"With the Government, through its different bodies —that is, Congress, the Interstate Commerce Commission, the Railroad Labor Board and the various State railroad commissions—exercising complete control over the question of rates charged by the carriers; the amount paid for labor by the carrier; their income regulated to a 'fair return' to be determined by a Government institution; the value of the carriers' property, upon which the fair return is based, also determined by the Government; with the power vested in a Government body to determine whether or not the management is 'honest, efficient and economical' and 'expenditures for maintenance of way and structure reasonable'; with the question of whether or not stocks and bonds are to be issued and, if so, in what amount, governed by the Government, and with all favoritism or unjust discrimination in favor of any of the carriers' patrons expressly forbidden, can anyone with reason contend that the carriers are not now under existing law adequately regulated, or that any interest of the shipping public is not fully recognized and adequately protected? If, then, no such reasonable contention can be made, should the carriers not be given a period of rest from political agitation and legislation, and be permitted to demonstrate to the public what they can do under this system of regulation?"

Common Sense Needed

Application of "common horse sense treatment" in meeting the economic situation in certain sections of the country, for which "high freight rates" have been blamed, was urged by Mr. Aishton. As an illustration, he said a drop some time ago in shipments of seed potatoes from Maine to the Southern trade was blamed on freight rates by farmers and shippers in that section of the country. To ascertain the actual situation, he said, President Todd of the Bangor & Aroostook Railroad proposed to the Aroostook Potato Growers' Association that if it would select a competent man to investigate the real reason, the railroad would pay all expenses. A man unknown to the railroad officials was selected and after visiting most of the Southern States, he made a report to the Potato Growers' Association which was practically to the effect that freight rates had nothing whatever to do with Maine losing the seed potato traffic, but that the real responsibility rested on the potato shippers themselves.

Farmers Know Real Trouble

"The result is," said Mr. Aishton, "that the farmers of Aroostook County now know what the trouble is, have quit their talk about freight rates and are devoting their attention to providing the real remedy for the discovered trouble. There isn't any question that arises regarding any phase of transportation, either in Kansas, Texas, or the State of Maine, or even Minnesota, whether affecting potatoes or wheat, or what-not, that isn't susceptible of similar treatment.

"Some time it will be found that the remedy may and does exist in the transportation company. The railroads are just as glad to know this as anybody else. On the other hand, a great many of the half-baked and unproven ideas that are today perverting the minds of the people in various sections of the country, when submitted to this analysis, are completely and satisfactorily corrected. You will find that the American people as a whole recognize the truth and truth will prevail."

Regarding the program unanimously adopted by the railroads of the country last April in New York "to provide adequate transportation service in 1923," Mr. Aishton said that substantial progress has been made in carrying it to success.

Heaviest Car Loading

"Loading of revenue freight," he said, "from Jan. 1 this year to Sept. 1, inclusive, has been the heaviest for any corresponding period in history, being 5,554,042 cars in excess of the same period in 1922; 7,407,172 cars in excess of 1921, and 3,248,151 cars in excess of 1920. In this period for 12 weeks this year, loading has been over 1,000,000 cars a week, with a peak loading for the week ended Sept. 1 of 1,092,567 cars, which really means that when you take into consideration the cars awaiting repairs, the cars held in grain districts for loading (and practically out of service for a time), that every available car in this country was loaded, moved to its destination, unloaded and put back for another load in less than two weeks.

"The railroads also from Jan. 1 this year to Sept. 1 installed 116,117 new freight cars and 2,583 new locomotives, while they also have on order with deliveries being made daily 72,906 new freight cars and 1517 new locomotives. When it is considered that this financing of equipment was very largely done through borrowed money; that the return of the roads has been less than 5¾ per cent on their valuation, it must be evident that the railroads making these vast capital expenditures are dependent on the fairness and self interest of the American people.

Progress of Repairs

"The program also provided that locomotives awaiting heavy repairs be reduced to 15 per cent by Oct. 1. This figure was met on Sept. 1 and is now in the neighborhood of 14.7 per cent, the lowest number of locomotives held for repairs since the Car Service Division has had records.

"The program further provided that every effort should be made to bring down the percentage of freight cars awaiting repairs to 5 per cent by Oct. 1. On Sept. 1 it was 7.7. When the figures are compiled for October, it will be somewhat less than that. Despite the handling of a peak business this year, there has been a surplus of equipment in good repair and ready for business at all times, and there has not been a single day that the entire transportation requirements have not been reasonably well met."

Mr. Aishton said that on Sept. 1 the average load per loaded car was 28½ tons, which exceeds that for the same time last year by 3½ tons and 1921 by 1 ton. The average movement per car is also 7 miles per day over 1922 and 6 3/10 miles per day over 1921.

Under orders of the Car Service Division, he also said the Eastern and Southern lines delivered to Western lines through the gateways of Chicago and St. Louis alone, from April 16 to Sept. 23 this year, 114,530 empty box cars belonging to Western railroads, as well as 27,200 box cars owned by Eastern lines to be used for the movement of crops. There has been no complaint as to shortage of box cars or refrigerator cars in any territory up to this time.

Despite the fact that the plant of the British Empire Steel Corporation, Sydney, N. S., is actively engaged and the company is contemplating blowing in an additional blast furnace, and plans putting in operation another battery of coke ovens, the company has closed down another slope of its Bell Island iron mines, throwing some 300 men out of employment. This is the second time within a few weeks that mining operations have been curtailed.

Week Devoted to Management Problems

Management Week will be observed throughout the country beginning Oct. 22, and meetings in leading industrial centers are being planned. Organization of the country into 17 areas under the direction of a national committee is proceeding from headquarters in Cleveland, John Younger, representing the American Society of Mechanical Engineers, being chairman of the committee. Other members are V. P. Geffine, National Association of Cost Accountants; J. F. Price, Society of Industrial Engineers; Keppele Hall, Taylor Society, and D. W. K. Peacock, American Management Association.

Two meetings will be held in New York and Chicago and in central Ohio a series of meetings will be held under the auspices of Ohio State University. Pittsburgh, Atlanta, Birmingham, St. Paul, Minneapolis, Memphis, Chattanooga, Boston and Seattle are other cities in which meetings will take place. A two-day meeting will be carried out in Detroit under the direction of the Society of Industrial Engineers. Nebraska and other State engineering bodies are also arranging management events. During the week a meeting will be held at Tulsa, Okla., in connection with the International Petroleum Exposition.

The general aim of management week is to promote the science of management, which has developed rapidly and now includes problems not only of production, but of finance, purchasing, sales, accounting and personnel administration. "Can management be measured?" is one of the questions which will be discussed.

New England Foundrymen's Association

The New England Foundrymen's Association held its regular October meeting on the evening of the tenth at the Exchange Club, Boston. George Furman, sales manager Beardsley-Piper Co., Chicago, was the chief speaker of the evening. His talk was on sand machinery and its uses and covered a wide range of foundry work, including general jobbing, automobile cylinder, sanitary ware and harvesting machinery molding operations, and was illustrated with moving pictures.

Walter M. Saunders, Saunders & Franklin, Providence, R. I., and R. F. Harrington, Hunt-Spiller Mfg. Corporation, South Boston, both members of the committee on standardization of sands, etc., American Foundrymen's Association, also were speakers, on the subject of sands and the benefits to be derived from practices outlined by the committee. The meeting was largely attended.

Welding Society to Meet in Pittsburgh

The American Welding Society will hold its third fall meeting at the Fort Pitt Hotel, Pittsburgh, Oct. 24 to 26. Welding in all of its phases will be discussed and inspection trips will be a feature.

An industrial application session will include a report on the industrial applications of welding and its possibilities by E. H. Ewertz, general manager, Moore Plant, Bethlehem Shipbuilding Co., Elizabeth, N. J. T. F. Barton, master mechanic, Delaware, Lackawanna & Western Railroad, and president of the society, will address the convention on the "General Relations of the Society to the Industry," and C. A. Adams, director American Bureau of Welding, will speak on the "Technical Work of the Society." The fall dinner will be held on the opening day.

The arc welding of non-ferrous metals, structural steel and thin sheet metal, the speed and cost of welding, and standards of arc welding will be discussed at a meeting of the electric arc welding committee, and a review of available information on the gas welding of pipe lines and manganese steel will be presented at a session of the gas welding committee. It is expected that at the meeting of the committee on the training of operators the course on the training of arc welders will be completed. This course will be similar to the course for the training of oxy-acetylene welders, which was outlined in THE IRON AGE of May 3, page 1304.

An inspection trip to the Homestead works of the Carnegie Steel Co., which will include a visit to the open-hearth, blooming mill and welding divisions, is planned for Oct. 26. A trip will also be made to the plant of the Westinghouse Electric & Mfg. Co., East Pittsburgh. Luncheon will be provided by the Westinghouse company. Members of the society have been invited to attend the annual dinner and meeting of the Pittsburgh Railway Club, to be held Oct. 24.

"Welding and Insurance" is the subject of a paper by A. D. Risteen, director of technical research, Travelers' Insurance Co., which will be presented at the last session. The paper explains the attitude of the insurance companies toward gas and electric welding, and outlines the relation between welding and insurance in the past. The "Railroad Situation" will be discussed at this session by G. D. Ogden, traffic manager, Pennsylvania System, Pittsburgh.

The fall meeting of the Eastern States Blast Furnace and Coke Oven Association held at the Westmoreland Country Club, Pittsburgh, Friday, Oct. 5, was featured by a paper, "Combustibility of Coke," by Harold J. Rose, Koppers Co. laboratory, Mellon Institute of Industrial Research, Pittsburgh. Mr. Rose touched upon the laboratory methods of testing coke and also attacked the claim made in some recent Government reports that combustibility was not a factor in coke. Discussion of the paper converged on the latter phase with several attachés of the Bureau of Mines participating. E. T. Vogel, Youngstown Sheet & Tube Co., Youngstown, president of the association, was chairman of the meeting.

COMING MEETINGS

October

American Society for Steel Treating. Oct. 8 to 12. Annual convention, Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

American Engineering Council of the Federated American Engineering Societies. Oct. 12 and 13. Meeting at Rochester, N. Y. L. W. Wallace, 26 Jackson Place, Washington, secretary.

West Virginia and Kentucky Association of Mining, Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention, Hotel Frederick, Huntington, W. Va.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Iron and Steel Institute. Oct. 25, fall meeting in New York; Oct. 26, visit to Aberdeen Proving Ground, Md. E. A. S. Clarke, 40 Rector Street, New York, secretary.

Society of Automotive Engineers. Oct. 25 and 26. Production meeting at Cleveland. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

American Gear Manufacturers' Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, [illegible] director.

MECHANICALIZATION

For Coal Mine and Other Labor Ills—Average Mentality the Factor

Asserting that the preponderance of the nation's workers are subnormal, Thomas A. Stroup, superintendent of the Utah Fuel Co., Clear Creek, Utah, says, in a survey of the cause and growth of unionism among the coal miners, prepared for the American Institute of Mining and Metallurgical Engineers, that unionism, called "an unnatural condition," can be checked in the mining industry by a thorough mechanicalization of the mines.

"The first steps in checking the spread of unionism in the coal mines and in restoring the industry to a sound position, on labor at least, will be," says Mr. Stroup, "to abolish the contract system, to mechanicalize the mines thoroughly, to standardize every operation down to the minutest detail so that no responsibility of any kind will fall on the worker.

"In the metal mines the tradition of the individual miner, capable and responsible, has been abolished, the mines have been thoroughly mechanicalized, all operations have been standardized, nothing has been left to the initiative or judgment of the miner himself.

"The trade of metal miner has ceased to exist; they are now all mine workers fitting into the niches and conforming to the routine laid out by their managers, and are certainly more efficient, more contented, and happier than in the old days of the individual worker. Engineers have brought these things about even though they were not always cognizant of the fundamental reasons for their desirability.

"In coal mining, on the other hand, the tradition of the individual worker has been maintained, even extended; mechanicalization has been very slowly and reluctantly brought about; operations at the face are left to the judgment of the miner himself. The influence of the engineer has scarcely been felt in the coal mining industry. This has caused to exist a group of skilled workers intensely jealous of their special knowledge and easily maintained in compact organizations for the purpose of preventing other men from acquiring or utilizing this special knowledge, and incidentally of exploiting their employers.

"The parallel between the metal workers and the railroad employees is exactly the same as between the two groups of miners. The metal workers have been made to fit into vast routine organizations, but the tradition of individual skill still holds the railroad workers in its grasp; that element has not been removed from train operation.

Routine Maker of Machine Parts Notably Contented.

"But the routine maker of machine parts is apt to be more pleased with his job, more contented and in every way better off personally than the skilled railroad man, with his exaggerated ideas of his own consequence and his exercise of individual judgment, initiative and skill; things made so much of by ignorant social workers and union leaders, but which perhaps not more than one-fourth of even this relatively intelligent group possess the natural brain equipment continuously to perform with safety to their mental equilibrium.

"This condition is closely related to the breakdown of certain intellects under the strain of modern civilization, and the fact that the routine worker relieved of the stress of making independent decisions keeps his mental poise much better than the responsible worker. Not the least of the crimes of our educational system has been to teach the mental equality of men."

It has been shown, according to Mr. Stroup, that 50 per cent of the nation's population is under development mentally, and that it is incapable of self-direction or of exercising independent judgment. It is probable, he says, that from 80 to 90 per cent are incapable of clear thinking or self-direction. In view of this, he finds the great success of the modern factory system not surprising, and the cause of the failure of all the well intentioned schemes of employee participation in management, profit sharing, etc., is made clear.

"This simple fact of the preponderance of the subnormal in our working population," he continues, "must be the point of departure for all successful schemes of employer-employee relationship, and its full import and significance must be grasped by every industrial manager. It must also be the basis of an education system to supersede the present nightmare of experiments in public schools and of many things, social and political; but this knowledge also brings greater responsibility to management and greater opportunity for service to mankind, a responsibility and opportunity which past experience tells us will not be shirked."

Employment Conditions

In the September report of the Industrial Commissioner of New York State employment in the State is compared with the high point of 1919-20 and the low point between 1920 and 1922. Based on the earlier high point as a 100 per cent, only two of the 12 items in metal working industries are now above 100, these being heating apparatus at 125 and railroad equipment and repairs at 102. These reached a low point during the intervening period at 62 per cent and 44 per cent respectively, the low being in each case about 20 months previous to the present high. All other items show a considerably lower employment volume now than in 1919-20, as indicated in the table:

Industry	Percentage Based on High Points of 1919-20 Low of 1920-22	High of 1922-23
Shipbuilding	19	32
Iron and steel	24	82
Firearms, tools and cutlery	22	62
Automotive	44	66
Railroad equipment and repairs	44	102
Structural iron and steel	48	80
Jewelry and silverware	49	69
Instruments and appliances	50	86
Sheet metal and hardware	51	82
Machinery and electrical goods	54	84
Brass, copper and aluminum	55	90
Heating apparatus	62	125

Heavy building construction accounts for the very high position of heating apparatus. Sheet metal and hardware and structural iron and steel fall also into this same building movement.

Graphite Crucibles of American Materials

As the result of experiments conducted by the Department of the Interior, through the Bureau of Mines, it is indicated that American graphites, bonded with American clays, can be used in substitution for foreign graphites in the manufacture of crucibles for the melting of steel.

In the past, American crucible makers have given preference to graphite imported from Ceylon and Madagascar, the Ceylon graphite having been preferred, when available. In the Bureau of Mines experiments, made under the direction of the Ceramic experiment station, Columbus, Ohio, graphites from Alabama, Texas, Montana, New York, and Canada were tested in comparison with graphites from Ceylon and Madagascar. When all factors were taken into consideration, the Texas and Alabama graphites gave superior service to those from foreign lands. The analysis of the steel after the first melts showed that the Texas and Alabama graphites carbonized the steel less than did the graphites from Ceylon. This low-carbonizing feature is important because it permits the production of a steel of more nearly the desired analysis. A preliminary report of these experiments is given in Serial 2512, "Graphite from steel-melting crucibles," by R. T. Stull and G. A. Bole, which may be obtained from the Department of the Interior, Bureau of Mines, Washington, D. C.

The Standard Tank Car Co., Sharon, Pa., has secured a large order for box cars from the Ford Motor Co., and is maintaining operations at its plant at close to normal basis, with assurance of continuing on this schedule with present orders on hand until well after the first of the year.

Foundrymen Tour France and Belgium*

Industries Going Forward in War-Racked Districts—Visits to the Famous Cockerill Works, the Harvester Plant at Lille and to a Historic Fort

BY HENRY M. LANE

PARIS, FRANCE, Sept. 25.—You will be interested in some account of the trip through France and Belgium taken by the Americans who attended the recent international congress of foundrymen.

I joined the party here in Paris after the convention and we left on the night of Sept. 18, going to Nancy. The next morning we visited a salt mine about 12 miles from Nancy. We went down to a depth of 570 ft. and saw them mining salt by the present methods. We also saw the old workings where they used to mine by a combination of washing and entering by means of water and then subsequently blasting against this opening from the sides. This method had to be abandoned about 45 years ago on account of the fact that the salt is underlaid with a marl. The water softened the marl and some of the pillars crushed into the marl causing a partial cave in the mine. The French Government then passed a law against this method of mining. At present they are mining by the regular pillar and stall method by which they remove 75 per cent of the salt, and they are working a vein approximately 20 ft. thick. The salt measures themselves are several hundred feet deep, but the upper part is not pure enough to be mined for packing salt.

After looking at some of the galleries, of which there are over 20 miles in a mine, we were taken to a chamber fitted up as a reception room and there found a table of salt on which were set out for our lunch delicious cakes and champagne. Each member of the party was also given choice samples of rock salt.

On the surface we were shown two plants where table salt or cattle salt was being made by evaporating brine solutions. One of the plants was using the waste heat from the soda works.

In the afternoon we visited a cut glass works, and saw the entire process of making beautiful cut glass ware, including vases having two colors of glass, one laid over the other. They were subsequently cut in such a way as to make beautiful patterns of the two colors. This plant specializes in wine glasses, tumblers and perfume bottles.

Over Historic Battle Grounds

The next morning we took motor cars to see the battle front, back of Verdun. We passed a portion of the Argonne Forest where the American soldiers fought, and visited two American cemeteries, one containing 6000 graves and the other 14,000. After visiting a number of the towns that had been destroyed, we came to a German officers' headquarters where we saw their massive concrete dug-outs and underground hospital for first aid; later circling through the battlefields up the ravine known before the war as the "Ravine of the Lady" and during the war as the "Valley of Death." All along this front the trenches are still intact and the dug-outs in position, though many of them are caving in. The wire entanglements are just as they were left, the French entanglements being supported by wooden staves, and most of those of the Germans by steel staves. We visited Fort Dumo, one of the two forts taken by the Germans; then motored to Verdun where we had tea. I forgot to say that we had lunch at St. Mihiel, which was the point from which the American troops started their first principal offensive.

After tea at Verdun we motored to Metz. This region between Nancy and Metz was the principal steel making region of France before the war. The Germans showed a great deal of spite in the way they destroyed plants in this region. At present a considerable number of the blast furnaces are in operation, but many are idle on account of the lack of coke.

Through Luxemburg to Belgium

We had only a few hours in Metz on Friday morning and after that took train for Liege. This brought us through Luxemburg. There was a decided contrast between the condition of the country we had passed through in France, which had been so thoroughly destroyed by the Germans, and the little country of Luxemburg which showed no destruction. As soon as we passed the Luxemburg border into Belgium we began to see signs of terrible destruction and some of our party were able to tell us of the way in which the various mills and mines which we passed had been wrecked.

We reached Liege in the evening and the next morning were taken in charge by the Belgian Foundrymen's Association. President I. Léonard was ably seconded by Marcel Remy and Hyacinthe Proyard, together with other members of the association. The members were given the choice of visiting a number of works, including a brass mill, a pipe foundry, the National Arms Works where typewriters, automobile castings, firearms, and many other products are turned out.

Large Use of Gas Engines

The largest party visited the noted Cockerill Works. This company has its own coal mines, iron mines, blast furnaces, steel mills and general engineering works. In the power plant are two pairs of gas engines, each engine being of 8000 hp., the two pairs representing a total of 32,000 hp. In addition to this they have something over 40,000 hp. of other gas engines operating smaller electrical units for blowing air for the blast furnaces.

This region has an exceedingly interesting arrangement for the general distribution of power to the different industries. The current generated by blast furnace gas at the different blast furnaces and by-product gas at the coke ovens is all handled through central stations so that each concern can draw from the central what it requires and the balance of the power is turned over to the public utility corporations. An arrangement of this kind tends to conserve coal.

The party were much interested in the gray iron and steel foundries at the Cockerill Works and also in the extensive machine shops.

After lunch the Belgian Foundrymen's Association had a rare treat arranged for the visiting members. The party was taken in automobiles to the fort which was the last to surrender, and here they were conducted through the fort by the commander who was in charge of it at the time of the surrender. The Germans had cleared up some of the débris about the fort and arranged steps and walks so as to use it as a show place to illustrate how destructive the German cannon were. But the value of the fort is well shown when one considers that for six days the commander had very little difficulty in silencing every battery of guns that the Germans brought into action against him, preventing the Germans from moving toward Brussels, since he had both the wagon road and the railroad under his guns.

The Germans finally constructed heavy concrete foundations in the town and mounted 42 cm. guns on them. They also arranged for simultaneous fire from many batteries of smaller caliber from positions covering approximately two-thirds of a circle surrounding

*Extracts from a private letter from Mr. Lane to friends in the United States. Mr. Lane has been engaged for some time on the erection of a large foundry at the Citroen automobile plant in Paris.

the fort. For 26 hours the fort was under continuous bombardment, with an average of between 20 and 30 shells a minute falling on it. In spite of this terrific bombardment, it was not until several direct hits had been made by the 42 cm. shells that they were able to do any material damage, the final destruction of the fort being caused by the explosion of its own magazine. The garrison consisted of only 550 men, of whom 176 are still alive. Practically every man in the fort at the time of the explosion of the magazine was wounded, and they were subsequently taken prisoners. Approximately one-half of the garrison were killed by the explosion of the magazine, and today lie buried under the ruins of the fort.

In spite of the terrific bombardment none of the gun turrets was put out of business until the explosion of the magazine, though several of them show evidence of having been struck by large shells which exploded on the surface of the turrets.

Dinner With Belgian Foundrymen

In the evening the Belgian Foundrymen's Association gave their visitors a dinner which will long be remembered. The dinner was all that could be asked in every respect, but what will always remain with the visitors was the evidence of hearty good fellowship and the way in which our Belgian friends entertained us with singing and recitations in both the languages spoken there.

On Sunday morning the party took train for Brussels and on Sunday afternoon were shown the many interesting sights of this old city, ranging all the way from a view of a portion of the old wall which was built in the ninth century down to many points of interest in connection with the recent war. Probably the thing which touched both British and American members most was a visit to the place where Edith Cavell met her fate. Few of us realize that on this same spot over 50 others met a similar fate, including a French nurse who was killed in the same way.

A fitting climax for this day was a visit to the site where the balloons for the James Gordon Bennett cup race were sent up. The day was anything but suitable for a balloon race. During the afternoon there were many little showers and the wind was irregular on the surface, though it blew at a considerable speed on a higher level. The balloons were far too close together and this resulted in such damage to two of them that they could not go up, and we could not help but feel that the race should have been postponed. Subsequent accidents certainly bore out this belief.

Harvester Company's French Plant

On Monday morning the party left the charming Belgian capital for Lille, where they were met by representatives of the International Harvester Co. After lunch at the hotel the party went by automobile to the plant of the International Harvester Co., and all were much interested in seeing this typical American plant operating in a French setting. Naturally, the foundrymen spent most time in the gray iron and malleable foundries.

After a visit to the works, refreshments were served and a very delightful hour spent with the host of the occasion. The party then returned to the hotel and all were tired enough to turn in early. On Tuesday morning they came by rail through the battle-swept section down to Paris. Though the French have done an almost unbelieveable amount of work in the rebuilding of this region, there is still much to see as a result of the terrible destruction due to the heavy fighting which took place here. In one place close to the track an abandoned tank was left in the position where it had been stopped by shell fire, and every town showed sections which were still in ruins.

President Clamer and several other members left the party in Brussels and went to Switzerland, while other members tarried in Belgium. Three members of the British Foundrymen's Association accompanied the American party.

Jones & Laughlin Steel Corporation's Service Station at Memphis

PITTSBURGH, Oct. 8.—The Jones & Laughlin Steel Corporation late last week exercised an option it recently took on an 8-acre site on the Mississippi River at Memphis, Tenn., on which it will soon begin the construction of a steel distributing and storage depot with rail and river terminal, which will be used as a service station in supplying the South and Southwest with the company's products. While this terminal is primarily for the purpose of handling and stocking barge shipments of the company and full advantage will be taken of the river stages to ship as heavily as possible that way, the company also plans rail shipments to that point. The company for the past two years has made Memphis the Southern terminus of its river shipments for transfer by rail to interior Southern and Southwestern points and this experience has disclosed that Memphis enjoys exceptional railroad freight rate advantages for distribution in this manner. Establishment of the terminal for the company's own use, W. T. Mossman, who directs the Jones & Laughlin down river shipments, says, does not mean that it is proposed to compete with the existing municipal terminals and indeed that the company would probably from time to time continue to use the public terminals in addition to its own facilities.

The Jones & Laughlin terminal site is on the Wolf River industrial canal, Memphis Harbor, a short distance north of the municipal terminal, and is served by the Illinois Central and Belt Line railroads, the latter running around the city of Memphis and affording connections with nine trunk line roads operating in and out of that city. In addition to railroad distribution facilities, Memphis also is a port of call of the Federal Barge Line, which will enable the company to ship steel by river to New Orleans and for export from that point.

The company's next river shipment, to consist of nine steel barges each of 850 tons capacity in tow of the steamer Warren Elsey, is scheduled to leave the company's steel mills on the Ohio and Monongahela Rivers here during the last week of this month for Louisville, Evansville, St. Louis and Memphis. At these cities, the contents of the barges will be distributed inland by rail. Considerable material for the Texas and Wyoming oil fields is being delivered in this manner, going from 1000 to 1200 miles by river and 1100 to 1300 miles by rail. This tow will participate in the formal opening of the new floating terminal at Memphis on Nov. 15.

Electric Smelting of Zinc Ores

The electric smelting of zinc ores for the production of spelter can now be termed metallurgically feasible, according to B. M. O'Harra, associate metallurgist of the Department of the Interior, attached to the Mississippi Valley experiment station of the Bureau of Mines. The question of cost then becomes of paramount importance. Up to the present time, the plants in Norway and Sweden are the only ones that have been able to achieve commercial success. Little data on their costs are available, but the plants have been able continuously to maintain and expand their operations during more than 15 years. They are favored by having very cheap power available, and it is probable that their process would not be commercially practicable in this country. Judging from published reports, their metallurgical results are not as good as have been obtained in much of the work in this country. Mr. O'Hara has begun a study of the electrothermic metallurgy of zinc, under a cooperative agreement between the Bureau of Mines and the Missouri School of Mines and Metallurgy. The results of a preliminary survey of the situation are given in Bulletin 208, which may be obtained from the Department of the Interior, Bureau of Mines, Washington, D. C.

Machinery Markets and News of the Works

JAPANESE INQUIRIES

Cincinnati Lathe Builder Asked to Quote on 100 Machines

Japanese Houses in New York Receiving Many Cables Regarding Tools

Many interesting cables are being received from Japan, principally by the large Japanese importing and exporting houses, regarding purchases of machine tools to replace those destroyed in the earthquake. A few machines, urgently required, have been sold, but it is believed that the bulk of the prospective buying will not materialize for weeks or possibly months. A Cincinnati machine-tool builder has received an inquiry for 100 engine lathes in sizes ranging from 12 to 60 in. This is regarded as a bona-fide inquiry, with fairly good prospects of the business being closed.

While there is little, if any, definite improvement in the volume of current machine-tool orders, inquiries are more numerous. Many projects are in the formative stage and may not develop until late in the year or early next year, but the mere fact that more manufacturers are figuring on the purchase of additional equipment has created a more hopeful feeling.

Automobile manufacturers are today's principal buyers, and are expected to place further orders in anticipation of next year's operations. The Rickenbacker Motor Co., Detroit, bought about 20 turret lathes. The Buick plant is buying considerable equipment and the Maxwell Motor Sales Corporation is expected to buy shortly for an Indiana plant. The Willys-Morrow Co., Elmira, N. Y., is an active buyer.

There continues to be a moderate amount of railroad buying, but action on several large lists that have been pending for some time is still deferred. The Nickel Plate, which came into the market a few months ago for about 15 machines, has placed the bulk of this business with a Cleveland machinery dealer. The Pittsburgh trade is hopeful that orders will be distributed this week by the Pennsylvania Railroad against a recent inquiry for 34 tools.

New York

NEW YORK, Oct. 9.

MACHINE-TOOL business continues very dull. There is neither inquiry nor buying of importance. Machine-tool builders who attended the convention of the National Machine Tool Builders' Association at Lenox, Mass., last week visited in New York on their way back to their homes and reported conditions throughout the country very quiet. A few stated they had received fairly good orders recently from automobile companies, but other industrial companies and the railroads are placing very few orders. The Southern Pacific last week inquired here for three engine lathes for Western shops. The Pennsylvania Railroad bought a heavy duty planer, 42 x 42-in. x 16 ft., for its lines West. A number of interesting cables have come from Japan regarding the machine-tool requirements of that country to replace equipment destroyed in the earthquake. A few machines have already been ordered here, but the bulk of the expected buying, it is believed, will not develop for weeks or months.

The Unique Art Mfg. Co., 60-66 Shipman Street, Newark, N. J., is in the market for a 100-hp. portable type, horizontal, return tubular boiler. It also needs an oil-storage tank of about 5000 gal. capacity.

Plans are being prepared by the Rubel Coal & Ice Corporation, 197 Glenmore Avenue, Brooklyn, for a new two-story ice-manufacturing plant, 125 x 150 ft., at 50-60 Lorimer Street, estimated to cost $500,000 with machinery. E. M. Adelsohn, 1770 Pitkin Avenue, is architect.

The Reo Motor Car Co. of New York, Inc., 1709 Broadway, New York, will take bids for its proposed six-story branch, 100 x 170 ft., with service and repair departments, on West Fifty-fifth Street, estimated to cost $200,000, with equipment. Parker & Shaffer, 280 Madison Avenue, are architects. R. H. Scott is president.

The Patron Machine & Millwright Co., 118 Centre Street, New York, plans the purchase of additional woodworking and saw machinery. E. Paton heads the company.

The Adirondack Power & Light Co., Amsterdam, N. Y., is planning extensions in its plant and system to cost approximately $3,000,000. The work will include an addition to the steam-operated electric power plant on the Mohawk River, South Amsterdam, to increase the capacity 40,000 hp.

J. A. Franklin & Sons, 722 Broadway, Schenectady, N. Y., are taking bids for a one-story machine and repair shop, 75 x 93 ft., to cost $15,000. L. R. Nichols, 125 Broadway, is architect.

The Consolidated Gas Co., 130 East Fifteenth Street, New York, has purchased land extending from Halleck Street and East Bay Avenue to the Bronx River, totaling 40 city blocks, as a site for a new gas manufacturing plant, with steam power house, generator, etc., estimated to cost more than $1,500,000.

The Todd Dry Dock & Construction Corporation, 25 Broadway, New York, has leased the dry dock of the United States Shipping Board at Weehawken, N. J., for extensions in its ship repair plant.

Hochman & Barr, 305 Monroe Street, New York, will commence the construction of a one-story machine shop, 25 x 100 ft., at 30 Jackson Street, for which plans have been prepared by Levey & Berger, 375 Fulton Street, architects.

The Queens Borough Gas & Electric Co., Rockaway, L. I., is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions in electric plants and system. Carleton Macy is president.

Electric power equipment, conveying, and other machinery will be installed in the new plant to be established at Hudson, N. Y., by the Canada Dry Ginger Ale, Inc., 544 West Thirty-eighth Street, New York, which has acquired a building, 100 x 300 ft., with 7-acre tract.

The Hoboken Paper Mill, Inc., 151 Fifth Avenue, New York, is reported to be planning to rebuild the portion of its plant at Goulds Station, Hudson, N. Y., recently destroyed by fire. The work, with machinery, is estimated to cost $250,000.

The Alderton Dock Yards, Ltd., 518 Hamilton Avenue, Brooklyn, operating a shipbuilding plant, has leased the dry dock of the Government at Newport, R. I., for extensions in its ship repair works.

L. D. Van Hessen, 2785 Sixth Avenue, Troy, N. Y., has plans for the construction of a two-story automobile service and repair building, 45 x 115 ft., at Fifth Avenue and 105th Street, estimated to cost $50,000.

The Water Committee of the Board of Trustees, South Orange, N. J., will receive bids until Oct. 19 for one motor-driven triplex pump, capacity 225 gal. per min., with control equipment, etc.; also for one steel standpipe, 25 ft. in diameter and 60 ft. high. Nicholas S. Hill, Jr., 112 East Nineteenth Street, New York, is consulting engineer.

A machine shop will be installed in the three-story automobile service building to be erected on West Broadway, Paterson, N. J., by J. E. Crandall, 119 Broadway, estimated to cost $165,000.

Manual training equipment will be installed in the new junior high school to be erected at Cherry Street and Westfield Avenue, Elizabeth, N. J., estimated to cost $200,000, for which bids will be received on a general contract until Oct. 24. Kilham, Hopkins & Greeley, 9 Park Street, Boston, are architects.

William A. Rodgers, borough clerk, Matawan, N. J., will receive bids until Oct. 16 for one steel water tank, with ca-

The Crane Market

The volume of new inquiry for both electric overhead and locomotive cranes continues small, but there is still a fairly large number of pending orders. Among recent inquiries still pending is a 5-ton hand power crane for the New York Central & Hudson River Railroad and two 125-ton, double trolley, overhead traveling cranes for the Public Service Electric Co., Newark, N. J. The report that the cranes for the New Jersey plant of the Western Electric Co. would be purchased from Chicago is incorrect. According to the engineers, the inquiry will probably be issued from New York.

The Hendrick Mfg. Co., Carbondale, Pa., is in the market for a 5-ton, 28 ft. span, 3-motor overhead crane with magnet.

Among recent purchases are:

International Paper Co., 100 East Forty-second Street, New York, two 15-ton electric traveling cranes from the Northern Engineering Works.

Dayton Power & Light Co., Dayton, Ohio, a 30-ton hand power crane from the Whiting Corporation.

Ford, Bacon & Davis, engineers, New York, a 20-ton hand power crane for the Pennsylvania Cement Co., Nazareth, Pa., from the Whiting Corporation.

Illinois Coal Corporation, Chicago, a 15-ton hand power crane from the Whiting Corporation.

Northern States Power Co., St. Paul, Minn., a 5-ton, 1-motor traveling crane with 1½-cu. yd. bucket from the Whiting Corporation.

Griffin Mfg. Co., Erie, Pa., two 1-ton, 3-motor, wheel-pitting trolleys from the Milwaukee Electric Crane & Mfg. Co.

United States Gypsum Co., a 2-ton, 3-motor monorail bucket hoist from the Milwaukee Electric Crane & Mfg. Co.

Chesapeake & Ohio Railroad Co., Richmond, Va., six 150-ton, self-propelling, steam wrecking cranes from the Industrial Works.

Gaybell Steel Construction Corporation, Binghamton, N. Y., a 15-ton, 45-ft. boom, 4-wheel, used Ohio locomotive crane from Philip T. King, New York.

pacity of 150,000 gal., elevated on a steel tower, about 115 ft. high. William A. Goff, 922 Stokes Avenue, Collingswood, N. J., is engineer.

The Maccar Truck Co., Inc., Scranton, Pa., manufacturer of motor trucks, has leased a one-story building, 75 x 100 ft., at 342-46 Sixth Avenue, Newark, for a new factory branch for assembling and service work.

The Fiber Products Co., 240 North Tenth Street, Newark, manufacturer of radio horns, etc., has leased the plant at 30-38 Orange Street, Bloomfield, N. J., totaling 22,000 sq. ft. of floor space. The present business will be removed to the new location and tripled in capacity. Edward H. Felsberg is president.

Fire, Sept. 27, destroyed a portion of the plant of the Baker Castor Oil Co., Avenue A and Second Street, Bayonne, N. J., with loss estimated at $100,000, including hydraulic presses and other equipment. It is planned to rebuild.

The Public Service Electric Co., Public Service Terminal, Newark, has plans for an addition to its power plant at Point-No-Point, meadow district, estimated to cost $30,000 exclusive of equipment.

The Foley-Chevrolet Motor Sales Co., 957 Broad Street, Newark, local representative for the Chevrolet automobile, has leased property at 113-15 Washington Avenue, Belleville, N. J., for a new service and repair works.

A machine and repair shop will be installed in the one-story automobile building to be erected at Sussex Avenue and Summit Street, Newark, by the Yellow Cab Co., 11 Centre Street, to be 165 x 200 ft., estimated to cost $140,000, for which a general contract has been awarded. Edward V. Warren, Essex Building, is architect.

The Goodwin Antipilferage Automatic Lock Corporation, 233 Broadway, New York, recently organized with $50,000 capital stock, is preparing to have locking devices manufactured by contract. Address care of J. D. Jolkovski.

New England

BOSTON, Oct. 8.

WHILE business in September aggregated much better than many machine tool houses anticipated, October starts out with little indication of being a profitable month. A cotton goods manufacturer is still negotiating on a sizeable list of shop tools for a Southern subsidiary; a railroad, it is expected, will shortly appropriate several thousand dollers for a few machines, and two or three other industries have under consideration the purchase of metal-working equipment in limited amounts. Otherwise prospects are few, several heretofore classified as active having gone into the discard. Some idea of the unimportance of going business can be realized when it is taken into consideration that a new 10 gage squaring shear bought by a Worcester firm, a used vertical milling machine which went to a New Hampshire shop, and a used 51-in. boring mill and a 3½-ft. radial drill to a Wakefield concern, constitute the most important sales the past week.

Reports that the Saco-Lowell Shops, Boston, textile machinery, have received a large contract for equipment from Japan cannot be substantiated, but Providence machinery makers and fine tool manufacturers have emergency orders from that country. Japanese customers, it is reported, are requesting longer terms of credit.

Textile machinery makers generally are less active than a month ago. Heater manufacturers and stove makers are operating full, but comparatively little metal working equipment is required in this industry. The present status of the local machine-tool business is generally attributed to the growing uncertainty of business for the average machine shop, to the fact that those industries well employed are amply covered on equipment requirements, and the tendency among manufacturers to keep down inventories. Certain plants instead of buying machinery are reducing production costs by eliminating unskilled help. New England machine tool builders in general are fairly busy. Some are less so than two months ago, while others are more active, due to orders received from automobile manufacturers in the Middle West.

Small tools and machine parts are in excellent demand. One large dealer in such products reports September sales the heaviest, with one exception, in the history of the organization. Abrasives also are in good request. One of the largest Massachusetts makers of wheels says that while business is not on a war time peak basis, 1923 sales will average six times more than for the best year previous to the war.

The Stanley Insulating Co., Great Barrington, Mass., vacuum bottles, etc., has awarded contract for a one-story concrete and frame manufacturing unit on River and Pleasant Streets.

Bids closed last week for a contemplated machine shop to be erected by the Textile Finishing Machine Co., Summer Avenue, Providence, R. I. Lockwood, Greene & Co., Boston, are the engineers.

Negotiations are practically complete whereby the Eaton, Crane & Pike Co., Pittsfield, Mass., paper, will purchase the plant of the Pittsfield Machine Tool Co. on Mill Street. The property consists of approximately five acres on a railroad siding and one large and several small manufacturing units.

A vocational department will be included in the new $150,000 high school being erected by the city of Belfast, Me.

A vocational department will be included in the extensions to the high school building for the city of Central Falls, R. I., to be built at a cost of $112,000. William R. Walker & Son of Providence are the architects.

A. Lee Ellis, 10 High Street, Boston, has inquiries out for one turbo-generator, 500 kw., to operate at 150 lb. steam pressure, non-condensing.

The Automatic Cone Co., 83 Clark Street, Cambridge, Mass., is having plans drawn for a three-story and basement addition, 40 x 100 ft., to cost $30,000. Nathan Douglas, 393 Broadway, is architect.

Bird & Son, Inc., East Walpole, Mass., manufacturer of prepared roofing, etc., has awarded general contract to the Central Engineering & Construction Co., Pawtucket, R. I., for a one-story machine shop, 80 x 138 ft., estimated to cost $40,000.

The Hyde Machine Co., 13 Hope Avenue, Worcester, Mass., will commence the erection of a two-story addition, 75 x 100 ft., estimated to cost $45,000.

The Connecticut Light & Power Co., Meriden, Conn., has acquired property at South Meriden for the construction of a new power house.

New interests have acquired the plant of the Aetna Nut Co., High Street, Southington, Conn., and will remodel for the production of iron and other metal castings. The name

of the purchasing company is temporarily withheld. James H. Pratt is president of the Aetna company.

Manual training equipment will be installed in the new East Side junior high school to be erected at Meriden, Conn., estimated to cost $200,000, for which Walter T. Arnold, Meriden, is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Oct. 23, for nine motors, spare parts and control appliances for the Portsmouth, N. H., Navy yard, schedule 1397.

The Boston Gear Works, Haywood Street, Wollaston, Mass., is planning for the early installation of equipment in a two-story addition, 85 x 100 ft., to cost about $50,000, for which a general contract recently was awarded to the Canter Construction Co., 6 Beacon Street, Boston.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Oct. 30 for the following machine tools for installation at the Boston Navy Yard: 12 lathes, schedule 1403; pipe bending machine, schedule 1404; boring mill, schedule 1406; drill press and other tools, schedule 1407; also for one blower, cupola, furnace and oven, schedule 1405.

A one-story and basement power house, 30 x 65 ft., will be erected at the new Cary Hospital, Caribou, Me. H. W. Rhodes, 574-A Congress Street, Portland, Me., is architect.

A manual training shop unit, with foundry, machine shop, woodworking shop and other departments will be constructed in connection with the new Warren Harding high school at Central and Boston Avenues, Bridgeport, Conn., to cost $500,000, for which bids will be received on a general contract until Oct. 16. Caldwell, Walker & Beckwith, 886 Main Street, are architects.

Work has commenced on extensions to Building No. 8 at the plant of the Moore Drop Forge Co., Chicopee, Mass., estimated to cost $35,000, including equipment. McClintock & Craig, 33 Lyman Street, Springfield, Mass., are architects.

Philadelphia

PHILADELPHIA, Oct. 8.

BIDS will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Oct. 23 for 42 forced-draft blowers and 42 fuel oil burners for the Philadelphia Navy Yard, schedule 1402; also for armature machines and auxiliary equipment for the Philadelphia and Boston Navy Yards, schedule 1401; and for 7000 steel shackles for the Philadelphia yard, schedule 1392.

The Locomobile Co. of America, Bridgeport, Conn., will establish a factory branch, with service and repair departments, at 1411 Spring Garden Street, Philadelphia. Fred C. Ditmars will be in charge.

The Olney Foundry Co., 180 West Duncannon Street, Philadelphia, has awarded a contract to the Northern Construction Co., Inc., 515 Fisher Street, for the erection of an addition to cost $57,000.

The R. W. Hartnett Co., 1010 Race Street, Philadelphia, manufacturer of printing equipment and supplies, has awarded a general contract to Gill & Co., Otis Building, for a three-story and basement plant, 50 x 95 ft., to cost approximately $60,000.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has purchased 56 acres at the foot of Erie Avenue and the Delaware River as a site for a new generating plant, estimated to cost $6,000,000 with machinery. Work will commence early in 1924. Plans are also projected for the erection of a large power distributing station in the northeastern section of the city. The company will furnish power to the West Jersey & Seashore Railroad from its plant on Somerset Street, and will install lines and equipment for this purpose. The railroad purposes to discontinue the operation of its electric generating station at Westville, N. J.

The Industrial Bureau, Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Port au Prince, Haiti, in the market for machinery for a match manufacturing plant. Also, from a company at Shanghai, China, desiring to get in touch with American manufacturers of toy and amateur motion picture machines.

The Supply Officer, United States Navy Yard, Philadelphia, will take bids at once for one motor and spare parts, N. S. A. requisition 361½; also for 150 boiler tubes, Y. and D. requisition 35.

The Godfrey Roller Co., 1219 Race Street, Philadelphia, manufacturer of printing plant equipment, is considering the construction of a new plant, four or five stories, at 211-15 North Camac Street.

C. W. Rudisill, Philadelphia, care of the Nelson-Pedley Construction Co., 1615 Spruce Street, will erect a two-story automobile service and repair building, 130 x 155 ft., with machine shop, at Fifty-fifth and Sansom Streets, estimated to cost $200,000, with equipment.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, has plans for the construction of a general yard service and repair building at Camden, N. J. Samuel T. Wagoner is company architect.

L. Shutte, 650 East Marion Street, Lancaster, Pa., is planning for the erection of a one-story foundry, 42 x 90 ft., to cost $20,000.

Fire Oct. 4 destroyed a portion of the fertilizer manufacturing plant of Jacob Tranley & Son, Limited, near Pottstown, Pa., with loss estimated at $50,000 including machinery. It is planned to rebuild.

The Liberty Can & Sign Co., North Water, near Chestnut Street, Lancaster, Pa., has acquired property on North Plum Street and the Pennsylvania Railroad and plans the erection of a new four-story factory to cost $75,000.

Leroy E. Yagel, Hartleton, Pa., is organizing a company to build and operate an electric power plant and system for service in Hartleton and Hartley townships.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is said to be planning for the complete electrification of its classification yards and service buildings at Enola, Pa.

The Central Railroad of New Jersey, 143 Liberty Street, New York, is negotiating for the purchase of property in the Westside district, Bethlehem, Pa., for the construction of a new engine house and repair shops.

The Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., has acquired about 5 acres adjoining its plant, heretofore held by the Steelton & Harrisburg Brick Co., to be used for future expansion.

The Berwick Lumber & Supply Co., Berwick, Pa., is planning to rebuild the portion of its planing mill and plant recently destroyed by fire with loss estimated at $100,000, including machinery. More than 40 machines and tools were destroyed.

Paul Beilich, Dupont, Pa., has acquired property at 65 South Front Street, Coplay, Pa., for the operation of a plant to manufacture concrete products.

The Bally Mfg. Co., Bally, Pa., manufacturer of cedar chests and other wood products, is planning to rebuild the portion of its plant destroyed by fire Oct. 3, with loss of $100,000, of which about $25,000 is represented by machinery. George W. Melcher is president.

Interests represented by John E. Snyder, attorney, Harrisburg, Pa., are organizing the Manada Electric Co., to install and operate a power plant and system in a portion of South Hanover township.

The Frick Co., Waynesboro, Pa., is inquiring for a used horizontal punch with 12-in. throat; also a used vertical punch with 60-in. throat.

M. J. Margulies, 312 Liberty Building Philadelphia, is inquiring for rounds, squares, and hexagons, 1 in. to 2 in., 3 ft. and over in length and not over .025 per cent carbon free of alloys.

Pittsburgh

PITTSBURGH, Oct. 8.

ALTHOUGH machine tool business in this district still is of moderate proportions and confined for the most part to single tools representing necessary replacements, the trade is encouraged by reports that orders for the 34 tools for the Pennsylvania Railroad, inquired for several weeks ago, will be distributed this week. The regular quarterly list of the Westinghouse Electric & Mfg. Co has been issued and contains about 60 tools. The most interesting development in heavy equipment is the placing by the Carnegie Steel Co. of an order for a 46-in. x 66-in. blast furnace gas engine for its Youngstown works, with the Mesta Machine Co. The engine will drive a 4000 kw. 6600 volts, three phase, 25-cycle electric generator, order for which has been awarded the General Electric Co.

Baker Motors, Inc., 821 Commerce Building, Erie, Pa., has been incorporated with a capital stock of $500,000 to manufacture power units and equipment. Baker steam power units are now being manufactured at the factory, 1709 Liberty Street, but the company will also consider placing some manufacturing contracts. The motors are used for driving automobiles, cranes, hoists, craft and for general shop work. G. A. Frantz is president.

A one-story machine shop will be erected by the Independent Brewing Co., South Twenty-second Street, Pittsburgh, for which plans have been drawn.

The Penn-American Refining Co., Oil City, Pa., will make extensions in its plant to cost $200,000 with machinery, to include an electric power plant, steam boiler plant, coal tipple, gasoline refinery and new stills for main refinery.

The Monongahela-West Penn Public Service Co., West Penn Building, Pittsburgh, has arranged for a new bond issue of $1,500,000, a portion of the proceeds to be used for extensions in its plants and system in the vicinity of Morgantown and Grafton, W. Va. A. M. Lynn is president.

The Continental Coal Co., Fairmont, W. Va., recently formed with a capital of $700,000, is planning for the installation of electric power and mining machinery at its properties in Monongalia County. Howard M. Showalter is president.

Bids will be received by the Superintendent of Buildings, Board of Education, 1326 Fulton Building, Pittsburgh, until Oct. 15, for boilers, fans, motors, air washers, stokers and auxiliary equipment for the new South Hills high school. Alden & Harlow, 2403 Farmers' Bank Building, are architects.

The Emmons-Hawkins Hardware Co., 1028 Third Avenue, Huntington, W. Va., is planning the erection of a new six-story distributing plant, 200 x 210 ft., to cost $100,000.

The City Council, Keyser, W. Va., is planning the installation of electrically-operated centrifugal pumping machinery in connection with extensions in the municipal waterworks. Steel tanks and water towers will also be installed. J. N. Chester, Union Building, Pittsburgh, is engineer.

The Penn Public Service Co., Vine Street, Johnstown, Pa., has awarded a general contract to the Wilson Construction Co., Johnstown Trust Building, for a two-story automobile service and repair building, 55 x 110 ft., estimated to cost $75,000.

The Raine Lumber Co., Marlinton, W. Va., has acquired the property of A. D. Neill at Clover Lick, Pocahontas County, comprising lumber plant, railroad and 5000 acres of timber, for $250,000. Plans are under consideration for the installation of additional equipment, including electric power and sawmill machinery. Joseph Raine is in charge.

W. J. Early & Sons, Ltd., 812 Sarah Street, Pittsburgh, has filed plans for a one-story addition to its foundry, estimated to cost $60,000. It specializes in the manufacture of iron and steel castings.

The plant and property of the Sharon Pressed Steel Co., Sharon, Pa., will be offered for sale on Oct. 23. It is now in receivership.

The National Mining Co., Monongahela, Pa., has plans under way for a new tipple at its Ginger Hill mine, with connecting runway, to cost $500,000 including machinery. Work will commence early next year.

Manual training equipment will be installed in the new high school to be erected at Washington, Pa., estimated to cost $125,000, for which bids will be received on a general contract until Oct. 15. G. H. Schwan, Peoples Bank Building, Pittsburgh, is architect.

The Winsted Coal Co., Uniontown, Pa., has tentative plans for the installation of electric power and mining machinery at its properties along the Monongahela River.

Buffalo

BUFFALO, Oct. 8.

PLANS are being arranged by the Brace Mfg. Co., Mayville, N. Y., for the establishment of a new plant to manufacture mechanical control devices.

Excavations are being made for the erection of a two-story service and repair building, 77 x 92 ft., for the Buick Motor Corporation, 1100 Main Street, Buffalo, estimated to cost $75,000.

The Perry Electric Light Co., Perry, N. Y., will build an addition to its generating plant and install additional equipment. Extensions will also be made in the transmission system.

The Batavia Iron Works, Inc., Batavia, N. Y., recently organized to take over the plant of the Batavia Car Works, Inc., will operate a department for locomotive repair work. The company will be affiliated with the Ferguson-Allen Co., Buffalo, operating a similar plant.

Manual training equipment will be installed in the high school addition to be erected at Dunkirk, N. Y., estimated to cost $500,000. The Board of Education is in charge.

A one-story power plant, with steam-operated electrical equipment, will be built by the Perry Knitting Co., Perry, N. Y.

J. A. Cramer, 171 North Pearl Street, Buffalo, will build a one-story addition to his automobile service and repair building, estimated to cost $72,000 including equipment.

Electric power equipment, conveying and other machinery will be installed in the new one and two-story plant, 340 x 400 ft., to be erected by the American Lithographing Co., 571 Amherst Street, Buffalo, estimated to cost $225,000, for which a general contract has been awarded to Harding & Crea, White Building.

Frank A. Reppenhagen, Buffalo, is planning the erection of a one-story works, 50 x 85 ft., at 339 Oak Street, to manufacture printing press rollers, etc.

Michael Williams, 405 Amherst Street, Buffalo, is planning for the establishment of a factory for automobile and wagon parts manufacture and repair.

The United States Pulp Products Co., Inc., Newark, N. Y., is planning the construction of a new plant to replace its works recently destroyed by fire.

The J. Gleason Co., 1095 Sycamore Street, Buffalo, is planning for the installation of sheet-metal working machinery.

The Kant-Kool Electric Water Heater Co., Inc., 22 North Water Street, Ogdensburg, N. Y., has been organized with capital stock of $100,000 to manufacture electric water heaters and kindred products. Factory buildings have been secured and the company will soon be in the market for equipment. M. Katzman heads the company.

The Premier Mill Corporation, Geneva, N. Y., has been organized with $200,000 capital stock to manufacture mechanical products and is planning the installation of equipment. The company will specialize in the manufacture of grinding apparatus. S. K. Nestor is one of the heads.

The Chemical Toilet Corporation, Liverpool Road, Syracuse, N. Y., is in the market for a used power riveter, capacity ¼ in.

R. Harris, 642 Clinton Street, Buffalo, is inquiring for new 3-in. steel tubing, 11 to 14 gage.

Detroit

DETROIT, Oct. 8.

H. E. BRISTOL, Battle Creek, Mich., formerly connected with the Buchanan Pattern Works, Buchanan, Mich., has acquired property at 14 State Street, E., for the establishment of a new shop to manufacture metal and wood patterns.

The Department of Purchases and Supplies, Detroit, 700 Marquette Building, is planning to purchase a grinding machine for the municipal street railroad.

The Columbia Motor Co., 6501 Mack Avenue, Detroit, manufacturer of automobiles, has tentative plans for a one-story addition to its works on Charlevoix Avenue, to cost approximately $100,000, with equipment.

A one-story power house to cost about $25,000 will be erected at the new three-story school to be built on Cameron Street, Detroit, to cost $570,000. Malcolmson, Higginbotham & Palmer, Industrial Building, are architects.

The Consumers Power Co., Jackson, Mich., has preliminary plans for a hydroelectric power plant on the Manistee River, near Jackson to cost $250,000 with transmission system. The Fargo Engineering Co., Citizen-Patriot Building, is engineer.

The Federal Drop Forge Co., South Washington Street, Lansing, Mich., will commence the erection of a one-story addition, 50 x 60 ft., for a heat treating department.

The G. U. Body Co., Lansing, Mich., has been organized as a subsidiary of the Godfrey-Urquhart Body Co., manufacturer of automobile bodies, and will take over the repair department of the parent company. It will also install a department for the production of special bodies.

The Republic Creosoting Co., Hammond Building, Detroit, has contracted with the Columbia Steel Corporation, San Francisco, for the entire output of the coal tar by-product from its new coke ovens in Utah County, Utah, for a period of years and plans the establishment of a new works in the vicinity of the steel plant to cost $100,000 with equipment.

The Atlas Forge Co., Lansing, Mich., has work under way on extensions and the installation of additional equipment, including boilers.

The Valley Paper Co., Kalamazoo, Mich., recently organized, has plans for the erection of a new mill, with power house, machine shop and other buildings, to cost $800,000 with machinery. It will specialize in the manufacture of fine book ppapers. George O. Comfort, formerly head of the Monarch Paper Co., is president; Edwin H. Hacking, secretary and treasurer. Billingham & Cobb, Press Building, are architects and engineers.

The National Spring & Wire Co., Albion, Mich., has work in progress on a new plant for the manufacture of spring seats for automobiles.

Baltimore

BALTIMORE, Oct. 8.

THE plant of the Maryland Bolt & Forge Co., Falls Road and Smith Avenue, Mt. Washington, Baltimore, which for more than a year has been partly operated by a creditors' committee, will resume operations on a large scale as the Maryland Bolt & Nut Co. S. Forry Laucks, president York Safe & Lock Co., is president of the new company, and Linus Keating, president Harrison Bolt & Nut Co., Harrison, N. J., is vice-president and treasurer. Additional machinery is being installed and when the plant is in full operation it will employ about 100.

The Anthracite Fuel Corporation, with temporary offices at 706 Continental Building, Baltimore, is planning to erect a building to manufacture briquettes. The first unit will have an annual capacity of 60,000 tons. F. A. Weymouth is president.

The Besto-lite Mfg. Co., Baltimore, has established a plant at Biddie Street and Park Avenue, for the manufacture of automobile parking lights and to do plating work. W. Bernard Duke is president and C. Hall is manager.

The Baltimore & Ohio Railroad will install 3000 hp. in motors at its property at the foot of Andrae Street, Baltimore.

Inquiries are being made by the Roberts Coal Mining Co., Inc., 213 St. Paul Street, Baltimore, for electric power, hoisting and other equipment for installation at its properties.

The Maryland Steel Rolling Co., Baltimore, will commence extensions at its plant at 599 Ingraham Avenue, Trenton, N. J., to include the installation of box strap annealing furnaces, variable speed motor-driven mills, automatic power reels and auxiliary machinery. It is purposed to develop a large capacity in the cold rolled stamping steel department.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Oct. 30, for 1000 mine trucks for the navy mine depot at Yorktown, Va., schedule 1388.

The Common Council, Inman, S. C., plans the installation of electrically operated pumping machinery in connection with waterworks extensions, to cost about $50,000.

A power plant will be constructed by the Queen Anne Textile Co., Burlington, N. C., at its proposed cotton mill estimated to cost $1,000,000. J. M. Cook is vice-president.

Downie & Co., Inc., Portsmouth, Va., manufacturer of agricultural equipment, plans the installation of additional equipment, including lathes, drill press and other tools. C. E. Downie is head.

The Columbia Railway & Navigation Co., Columbia, S C., has preliminary plans for the initial unit of a new hydro-electric power plant on the Cooper River, with capacity of about 40,000 hp., estimated to cost $1,000,000 with equipment and transmission line.

The Georgia Kaolin Co., Gordon, Ga., recently organized by officials of the Savannah Kaolin Co., Savannah, Ga., has acquired the local properties of the Columbia Kaolin & Aluminum Co., and will provide machinery for an output of close to 100 tons of washed clay per day. It will operate with a capital of $145,000.

The General Purchasing Officer, Panama Canal, Washington, will receive bids until Oct. 27 for electric wire, high tension insulators and fittings, steering engine, eye and ring bolts, cable clips, valves and miscellaneous equipment, circular 1564.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for one 500 kw. turbo-generator, three-phase, 60 cycle, 440 volts, condensing, to operate at 200 lb. pressure; also, for two 300-hp. water-tube boilers, to operate at 200 lb. pressure, with automatic stokers and super-heater; and for one 1000-hp. open feed-water heater, Cochrane or Webster type, second-hand, in good condition.

The Enterprise Lumber Co., Mount Olive, N. C., is planning to rebuild the portion of its plant destroyed by fire, Sept. 27, with loss estimated at $100,000 including machinery.

The Union Electrical Co., Baltimore, has leased the three-story building at Charles Street and Lafayette Avenue, for the establishment of a new plant.

Electric power, conveying and other equipment, ovens, etc., will be installed in the new five-story plant to be erected by the Planters Nut & Chocolate Co., Suffolk, Va., 80 x 150 ft., estimated to cost $230,000 with machinery.

A one-story power house, 80 x 120 ft., will be constructed by the Wall Street Tobacco Co., 79 Wall Street, New York, at its proposed plant at Ahoskie, N. C., estimated to cost $350,000 with machinery, for which plans are being prepared.

The Poole Engineering & Machine Co., Woodberry, Baltimore, has authorized plans for remodeling the plant of the Maryland Metal Products Co., Hagerstown, Md., recently purchased for the production of pressed steel products. Additional machinery will be installed. Oscar Eurich, formerly connected with the Maryland company, has been appointed general superintendent of the plant under the new ownership. S. Proctor Brady is president.

Bids will be received by the Board of Aldermen, Andrews, N. C., until Oct. 24, for a municipal hydroelectric power plant on the Hiwassee River, for an initial capacity of 1250 kw., including power dam, 40 ft. high and 390 ft. long, and transmission line, 11 miles. The Ludlow Engineers, Winston-Salem, N. C., is engineer.

The Common Council, Westminster, S. C., plans the installation of electrically-operated pumping machinery in connection with a new municipal waterworks, estimated to cost $150,000.

The Industrial Machinery Division, Room 815, Bureau of Foreign and Domestic Commerce, Washington, will receive catalogs and price lists of refrigerating plant machinery for reforwarding to Riga, Latvia, for transmission to the office of the American trade commissioner, Riga, Latvia.

Bids will be received by the Board of Water Commissioners, Macon, Ga., until Oct. 16, for one steam-driven centrifugal pumping engine, with capacity of 7000 gal. per min., single stage, with condensing equipment and auxiliary apparatus, for installation at the municipal waterworks.

The Taylor-Parker Co., Commerce Place and Water Street, Norfolk, Va., has inquiries out for one 100 hp. engine, and three 100 hp. boilers, with stacks and auxiliary power equipment.

The Harley Hardware Co., Valdosta, Ga., has inquiries out for an engine and auxiliary equipment, about 70 hp.

Cleveland

CLEVELAND, Oct. 8.

INQUIRY for machine tools increased somewhat during the week and October promises to show a gain over September in the volume of business. The Rickenbacker Motor Co., Detroit, purchased about 20 turret lathes, 15 of which were placed with a Cleveland manufacturer. Used machines made up the remainder of the purchase. A fair volume of business continues to come from other Detroit automobile manufacturers but buying is in small lots. It is understood that the Maxwell Motor Sales Corporation will purchase considerable equipment to be installed in an Indiana plant. The Nickel Plate Railroad, which came into the market a few months ago for about 15 machines, placed the bulk of this business during the week with several local machinery houses.

The Packard Electric Co., Warren, Ohio, has started the erection of a two-story transformer plant, 110 x 220 ft., which will involve the expenditure of $350,000. The present works will be used exclusively for the manufacture of automobile cable. With the new building the company will largely increase its transformer capacity and will manufacture transformers in capacities up to 7500 kva.

The Phillips Custom Body Corporation, Warren, Ohio, which has purchased the former plant of the National Lamp Co., Warren, will equip it for the manufacture of custom built automobile bodies. The company has been incorporated with a capital stock of $375,000. Frank Phillips, president, was formerly the head of the J. B. Judkins Co Marranac, Mass. The Phillips company has acquired the plant for the Artcraft Top Co., Cleveland, which will be operated as a separate unit.

The Toledo Chevrolet Co., Toledo, which has about completed a large extension, is preparing for further additions and will erect another building, 150 x 250 ft.

The Norwalk Enamel Products Co., Norwalk, Ohio, has acquired a site on which it plans to erect a new factory shortly.

The William Campbell Co., which recently decided to move from Detroit to Alliance, Ohio, has placed contract for the erection of a plant which is expected to be ready for operation about the first of the year.

The Wellston Mfg. Co., Wellston, Ohio, is in the market for a 5-ton electric hoist, 220 volts, a.c., 60 cycle, 2 phase.

The Eaton Axle & Spring Co., Central Avenue and East Sixty-fifth Street, Cleveland, has plans for an addition to

cost about $90,000, including equipment. C. S. Rider & Co., Century Building, are architects.

Manual training equipment will be installed in the new two-story Lincoln junior high school to be erected on Sixth Street, Canton, Ohio, estimated to cost $500,000, for which bids are being taken on a general contract until Oct. 15. George F. Hammond, 130 Tuscarawas Street, is architect.

The National Ice Co., Mansfield, Ohio, is asking bids on a general contract for a new plant, 42 x 60 ft., estimated to cost $50,000, with machinery. A. C. Bishop, Guardian Building, Cleveland, is architect.

Chicago

CHICAGO, Oct. 8.

BUYING remains slow, but there are increasing evidences of a revival of interest in the market. Considerable prospective business is in the formative stage, but has not yet resulted in the issuance of actual inquiries. A railroad supply company which recently built a plant addition in Chicago, is now surveying its equipment requirements, and a tractor manufacturer contemplates the purchase of special purpose machinery. The extensive Burlington list has not yet been acted upon, but is expected to be closed in the near future. So far as can be ascertained, no other railroads will buy in a large way at this time.

The Chicago, Indianapolis & Louisville has put out inquiries for a 300 cu. ft. air compressor, a double head bolt cutter to cut 1½ to 2-in. bolts, a 3-ft. radial drill, a 5-ft. radial drill, and a motor-driven wet and dry grinder. The Rock Island has placed orders for a 36-in. shaper and a 5-ft. radial drill. The Illinois Central has put out inquiries for a 54-in. heavy duty motor-driven wheel lathe for Waterloo, Iowa, and a 1¼ to 6-in. motor-driven tube cutting machine for Vicksburg, Miss.

Although the Buick Motor Co. is reported to be buying extensively at Detroit, automotive companies in this district are not particularly active. The most recent purchase by the Nash Motors Co. was a cylinder lapping machine. The Public Service Co. of Northern Illinois which has been in the market for machine tool equipment for its new Waukegan, Ill., power plant, has purchased a 14-in. x 14-ft., and a 24-in. x 16-ft. geared head motor drive engine lathe. Other tools which were included on the same inquiry follow: A 3-in. horizontal boring mill, 26-in. band saw, 12-in. two-wheel floor grinder, drill grinder, hack saw, 4-ft. radial drill, and a 24-in. shaper. All of the machines were to be motor driven. The National Lock Co., Rockford, Ill., is inquiring for an abrasive grinder.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: A 5-ton cupola for the Brooklyn Foundry Co., Astoria, N. Y.; three 10-ton cupolas for the Landis Machine Co., Waynesboro, Pa.; 9500-lb. steel ladle for the Maynard Steel Castings Co., Milwaukee, a 30 x 60-in. tumbling barrel for the Reliance Foundry Co., Schlesingerville, Wis., and 5-ton cupolas for David E. Allen, foundry, Yonkers, N. Y., and the Allen Foundry Co., Adams, Mass.

The Hurley Machine Co., Chicago, is inquiring for a 36-in. x 36-in. x 8-ft. motor-driven planer.

The Colozona Mines Co., has been incorporated in Arizona and will erect a 125-ton concentrating mill. In addition to gold it will produce a high grade concentrate of vanadium and molybdenum for use in making steel, aluminum and copper alloys. The company is in the market for one 125 and one 150-hp. oil burning engine, rod crushing mill, large jaw crusher, electric motors, hoisting cable, 500-ft. compressor and other used mining equipment in good condition. A. B. Frenzel, 1540 Sherman Street, Denver, is consulting engineer.

Contracts have been awarded for a two-story plant, 100 x 200-ft., for the manufacture of commercial automobile trucks, at 3830-38 South Michigan Avenue, Chicago, to be occupied by the American La France Fire Engine Co., Elmira, N. Y. It will cost $70,000.

The Blue Valley Creamery Co., 700 South Clinton Street, Chicago, is taking bids through S. Scott Joy, 2001 West Roosevelt Road, on a three-story factory, 81 x 119-ft., 1137-43 West Jackson Boulevard, to cost $160,000.

The Armstrong Machine Co., Three Rivers, Mich., is erecting a shop addition to be used for the construction of steam traps.

The foundry of the Free Sewing Machine Co., Rockford, Ill., was recently damaged by fire. It was a one-story frame structure, 100 x 300-ft.

The Ross-Carrier Co., Benton Harbor, Mich., will build a one-story addition to cost $10,000. The company manufactures lumber carrying machines and the addition will increase its capacity approximately 50 per cent.

The Benton Harbor Malleable Foundry Co., Benton Harbor, Mich., will erect a steel building at a cost of $20,000, to take the place of a wooden structure which was built when the plant was started some 15 years ago.

The Blackhawk Machine & Foundry Co., Davenport, Iowa, will build a one-story foundry addition, 42 x 75 ft., to cost $3,500.

The International Lamp Corporation, 736 West Monroe Street, Chicago, has purchased the Vitanola plant in Cicero, Ill., and will occupy it for the manufacture of lamps and furniture. The building has 225,000 sq. ft. of floor space and is located on the southwest corner of South Fifty-second Avenue and West Nineteenth Street.

The Studebaker Sales Co., 427 Franklin Avenue, Minneapolis, Minn., local representative for the Studebaker automobile, will install a machine shop in its proposed three-story service building, estimated to cost $100,000. Samuel J. Beck is vice-president and manager.

The Lennox Furnace Co., Marshalltown, Iowa, is considering the erection of a one and two-story addition, 70 x 145 ft., to cost about $25,000.

The Illinois Coal Corporation, Old Colony Building, Chicago, is contemplating the construction of a power plant, 60 x 65 ft., at Mason, Ill. Other buildings, including a mechanical shop, 60 x 140 ft., and hoisting engine house, will also be built. The work will cost about $150,000.

Bids will be received by the Quartermaster Department, Intermediate Depot, United States Army, 1819 West Pershing Road, Chicago, until Oct. 16, for 1200 jig saw blades; large quantities of carriage bolts, machine bolts and stove bolts; brass wire cloth; wire nails; circular wheels; lead-burning outfits, etc., circular 24-30.

Manual training equipment will be installed in the two-story and basement high school to be erected at Proctor, Minn., estimated to cost $95,000, for which plans are being prepared by E. P. Broomhall, 710 Alworth Building, Duluth, Minn., architect.

The Common Council, Albia, Iowa, plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks to cost $80,000. Brown & Cook, Ottumwa, Iowa, are engineers.

The Bortner Mfg. Co., Chicago, manufacturer of plumbing equipment, fittings, etc., has leased a building at Lakeside Avenue and Stanley Street, Waukegan, Ill., for a new plant.

The Continental Gas & Electric Corporation, Lincoln, Neb., is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for extensions in generating plants and system.

James B. Clow & Sons, 544 South Franklin Street, Chicago, manufacturers of heating, waterworks and plumbing equipment and supplies, have acquired the plant on Taiman Avenue, heretofore held by the Sullivan Machinery Co., for $375,000. The property consists of several buildings, one to six stories, and will be remodeled for new works.

Cincinnati

CINCINNATI, Oct. 8.

AFTER a quiet trade in September, machine tool manufacturers report considerably more activity the first week of October, and sentiment in regard to the future is much more hopeful. Inquiry is improving and more orders are being placed, but generally for only one and two machines. However, the number closed the past week indicates a need of tools in many plants, which will probably develop into a healthy buying movement during the next two months. Automobile manufacturers continue to place orders for replacement and are expected to buy further in preparation for next year's operations.

Railroads have been fair buyers. The Missouri, Kansas & Texas has placed orders for a number of machines, and the Pennsylvania has also been in the market in a small way, buying several drilling machines. Action has not been taken on its lathe inquiry, however. The Burlington is reported to have placed some orders at Chicago, but the bulk of its list, including engine lathes, has not

been closed. The Willys-Morrow Co., Elmira, N. Y., is reported to be purchasing steadily.

An inquiry from Japan for 100 engine lathes, including 25 12 to 14-in., 30 24-in., 30 32-in., 10 48-in., and 5 60-in. has been received by a local manufacturer. This is considered a bona-fide inquiry, and prospects are good for placing the order in a short time.

The Kelly-Roth Wagon Co., Cincinnati, has purchased the former plant of the Ferro-Concrete Construction Co., Richmond and Harriet Streets, and will move from its present location on Depot Street. The company, which manufactures truck bodies, will greatly increase its output by the acquisition and considerable additional equipment will be installed. J. J. Kelly is president,

The Randle Radio Co., Cincinnati, has been incorporated with a capitalization of $100,000 to manufacture radio apparatus, specializing on an inside loop that does away with outside aerials. W. E. Randle, Jr., of the Randle Machinery Co., at which plant the new company will carry on its manufacturing operations, heads the company.

The Lion Mfg. Co., Fifth and Heaton Streets, Hamilton, Ohio, has been incorporated with a capitalization of $20,000 to manufacture special machinery, tools, dies, jigs and fixtures. Albert Hossfeld is president.

The Central Brass & Fixture Co., Springfield, Ohio, is building a two-story addition, 50 x 150 ft.

The United States Engineers' Office, Louisville, Ky., will take bids until Oct. 22, on six steel derricks. Plans and specifications are on file at that office.

Indiana

INDIANAPOLIS, Oct. 8.

BIDS will be received by the Board of Public Works, South Bend, Ind., until Oct. 16 (extended from Sept. 19), for equipment for waterworks extensions and improvements, including two Corliss pumping engines and auxiliaries, each with capacity of 5,000,000 gal. per day; two 100 hp. watertube boilers, to operate at 200 lb. working pressure, with superheaters and auxiliaries; coal and ash-handling and storage equipment. John W. Toyne, South Bend, is engineer; the Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

The Hutchison Auto Co., 963 North Meridian Street, Indianapolis, plans to rebuild the portion of its service building and two-story repair shop destroyed by fire Oct. 1, with loss approximating $50,000. Andrew Hutchison is president.

The Ries Furniture Co., 306 South Michigan Avenue, South Bend, Ind., will commence the erection of a new three-story plant at Lafayette and Monroe Streets, to cost approximately $100,000 with machinery. Freyermuth & Maurer, Farmers Trust Building, are architects.

The Elam Paper Co., Marion, Ind., is being reorganized with a capital of $1,100,000, for general expansion. Plans are being perfected for the establishment of a plant at Dayton, Ohio, and the removal of the Marion works to this location.

The Interstate Public Service Co., Indianapolis, will install a plant and system at Winamac, Ind., for local service, where the operation of a municipal electric plant is being discontinued. Electrically-operated pumping machinery will be installed at the municipal waterworks, replacing present steam-driven equipment..

The Bastian-Morley Co., La Porte, Ind., manufacturer of heaters, boilers, etc., will commence the erection of a one-story addition, 54 x 200 ft., estimated to cost $75,000, including equipment.

The New York, Chicago & St. Louis Railroad, Cleveland, has acquired 200 acres at Fort Wayne, Ind., for a new classification yard and freight terminal. A portion of the property will be used for an engine house and locomotive repair shop.

Manual training equipment will be installed in the two-story and basement junior high school to be erected at Ewing and Fellows Street, South Bend, Ind., estimated to cost $600,000, for which bids will soon be asked on a general contract. Austin & Shambleau, 111 North Lafayette Street, are architects.

The Standard Electric Stove Co., Toledo, Ohio, will remove its business to Goshen, Ind., where a portion of the plant of the Engman-Matthews Range Co., has been leased. The capacity will be increased.

The Meridian Sheet Metal & Repair Co., Indianapolis, has removed to its new building at 1331-33 North Capital Avenue, where the capacity will be increased. Frank N. Scanlon is general manager.

Milwaukee

MILWAUKEE, Oct. 8.

THE quiet tool market of recent months is gradually becoming more active with the appearance of increased orders. Industries apparently view the future with a greater degree of certainty, for it is noted that in the past few weeks more extensions of shops are projected than since last spring. This condition always is accompanied by a better demand for machine tools, and inquiry is more active. Much of this, however, is being put out for the purpose of estimating costs and is largely confidential.

The city of Milwaukee contemplates the construction of a central machine shop and service station at Sixteenth and Canal Streets at an estimated cost of $100,000 to $150,000 for servicing all municipal automotive equipment. Tentative plans are being drawn by J. P. Schwada, city engineer. Works probably will not start until Jan. 1 and equipment purchases consequently will not be made until next spring. Roland E. Stoelting is commissioner of public works.

The J. W. Hewitt Machine Co., 131 North Commercial Street, Neenah, Wis., specializing in paper mill machinery, has placed contracts with the C. R. Meyer & Sons Co., Oshkosh, Wis., for a $25,000 addition to be completed by Jan. 1. Considerable new equipment will be required but details are not yet available.

The Dells Paper & Pulp Co., Eau Claire, Wis., which is starting work on a $400,000 pulp and paper mill improvement and enlargement program, has placed an order for four large pulp grinding units with the Green Bay Barker Co., Green Bay, Wis. L. A. DeGuere, Wisconsin Rapids, Wis., is consulting engineer and in charge of purchases.

Members of Williams, Cole & Wolff, Inc., manufacturers' agent, 610 Sycamore Street, Milwaukee, have organized two new Wisconsin corporations which will engage in the manufacture and sale of high speed steel and tools. The Jolite Co., Inc., with 1000 no-par shares, has been organized to produce the steel, and the Jolite Tool Co., capitalized at $10,000 preferred and 1000 no-par shares, will design and produce tools from the metal. Dean R. Williams, Cyrus L. Cole, George M. Wolff, Winfield S. Nussbaum and John Last are the principals.

The Village Board, New Holstein, Wis., will close bids Dec. 18 for the complete construction and equipment of a municipal water works and sewerage plant estimated to cost $175,000 and being designed by Jerry Donohue, consulting engineer, Sheboygan, Wis. The water system will require 30,000 lin. ft. of 4, 6 and 8-in. cast iron pipe, 41 hydrants, and a 60,000-gal. elevated steel tank on a 100-ft. steel tower. Bids on the engine, pumps, boilers, etc., will not be taken until the artesian well has been drilled and actual requirements ascertained. Louis Hipke is village clerk.

The Luick Ice Cream Co., 183 Ogden Avenue, Milwaukee, which built the substructure and basement of a proposed four-story garage and service building, 120 ft. sq., last spring, will now begin the construction of the superstructure. Practically an entire floor will be set aside as a machine shop. Leenhouts & Guthrie, 420 Jefferson Street, Milwaukee, are the architects.

The Kohler Co., Kohler, Sheboygan County, Wis., will close bids Oct. 15 for a new enameling shop, 67 x 120 ft., and a one-story packing room, 60 x 140 ft. Alfred Treick is engineer in charge.

The Pawling & Harnischfeger Co., Milwaukee, has taken an order for a large excavating machine for a mining interest in Mexico, which is the forerunner of other large requirements to be placed within the coming six months, it is stated.

The Thurner Heat Treating Co., 126 Ferry Street, Milwaukee, which recently incorporated with a capital stock of $50,000, is letting contracts through George Kemnitz, architect, 1107 Island Avenue, for the first unit of a new plant at 487-495 National Avenue. The initial building will be 48 x 80 ft., and with equipment will cost about $25,000. Rudolph J. Thurner is president and general manager.

The Racine Investment Co., 401 Lake Avenue, Racine, Wis., has let the general contract to the Charles O. Johnson Co., 224 South LaFayette Avenue, for a $50,000 garage and service building for the Lawson Motor Co. It will be 82 x 122 ft., part two and three stories. Edmund B. Funston is the architect.

The Marion Light & Power Co., Marion, Wis., has been incorporated with a capital stock of $25,000 to establish a commercial light and power plant and transformer station to use hydroelectric current purchased from other sources. F. H. Josslyn, Oshkosh, Wis., is the chief owner.

The Chas. W. Fish Lumber Co., Elcho, Wis., is placing contracts for a considerable list of new sawmill and woodworking equipment for the reconstruction of the part of the plant which was destroyed by fire on Sept. 8. The loss was $150,000. Charles W. Fish is president and general manager.

The Koehring Co., 3100 Concordia Avenue, Milwaukee, manufacturer of concrete mixers, pavers, contractors' hoists and gas engines, will soon enter the market for a large list of miscellaneous equipment for a one-story brick and steel addition, 120 x 360 ft. Plans are being completed by Van Ryn & DeGelleke, 114 Grand Avenue, Milwaukee. Bids for the building probably will be taken after Nov. 1. Philip A. Koehring is secretary-treasurer.

The Winther Motor Co., Kenosha, Wis., has been incorporated in Wisconsin with $500,000 capital stock by the stockholders' protective committee which recently bid in the assets of the bankrupt Winther Motors, Inc., for $130,000 and will reopen the plant about Nov. 1. Some retooling will be necessary but details have not been given out. R. D. Moch, president Bessemer Motor Truck Co., Grove City, Pa., and formerly vice-president Hydraulic Pressed Steel Co., will be active manager of the property. Dr. E. W. Timm, 922 Third Street, Milwaukee, chairman of the stockholders' committee, will be president.

The Gridley Dairy Co., 120-130 Eighth Street, Milwaukee, will invest about $35,000 in enlarging the power house of its branch plant at 1329-1335 North Avenue, by an addition, 30 x 105 ft., and is buying additional engine, boiler and refrigerating equipment. John LeFeber is president.

The Nestles Food Co., New York, plans immediate reconstruction of its powdered milk plant at Valders, Sheboygan County, Wis., wrecked by explosion and fire on Oct. 1, which caused a loss of $90,000 or more.

The Wacho Mfg. Co., Milwaukee, has been incorporated with a capital stock of $30,000 to manufacture machinery for repairing milk cans and other sheet metal containers. The principals are E. J. Cunningham, C. G. Ortmayer and A. E. Welch, 204 Browning Building, local. A statement concerning plans will be made later.

The city of Appleton, Wis., will soon be in the market for additional boilers, pumps and filtration equipment for an extension of the filtration plant of the municipal water system. Contract for the building has been let to the Appleton Construction Co. at $20,000.

Roman Kalpinski, Eighth Avenue and Mitchell Street, Milwaukee, has let contracts through Voelz & Siebert, architects, 373 Broadway, local, for a garage and machine shop, 45 x 120 ft., part two stories and basement, estimated to cost $30,000.

The Gulf States

BIRMINGHAM, Oct. 8.

NEGOTIATIONS are under way by the Coosa Pipe & Foundry Co., Gadsden, Ala., for the purchase of additional property for extensions. Otto Agricola heads the company.

The Ford Motor Co., Highland Park, Mich., has authorized plans for a two-story assembling plant, 150 x 200 ft., at Dallas, Tex., to cost $200,000 with equipment. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Common Council, Leesville, La., is planning for the installation of electrically-operated pumping machinery in connection with a new waterworks system to cost about $150,000. E. T. Archer & Co., 609 New England Building, Kansas City, Mo., are engineers.

The Madison Oil & Coal Co., Westheimer Building, Houston, Tex., is planning the construction of a coal tipple and power plant at its properties near Calvert, Tex., and the installation of mine cars and other equipment. A portion of the machinery previously used at another location will be removed to the new site. Hall Etter is president and general manager.

The Bessemer Galvanizing Works, Inc., Bessemer, Ala., is perfecting plans for a new factory for the production of galvanized bolts, nails and kindred products. A complete galvanizing works will be installed.

The Kansas City Southern Railway Co., Kansas City., Mo., will commence the erection of a one-story car repair shop, 100 x 300 ft., at its terminal at Shreveport, La. J. M. Weir is chief engineer.

Fire, Sept. 23, partially destroyed the Dallas, Tex., branch of the Westinghouse Electric & Mfg. Co., 701 Elm Street, with loss estimated at $50,000. It will be rebuilt.

The Alabama Power Co., Birmingham, has tentative plans for a new hydroelectric power plant on the Coosa River, near Gadsden, Ala., with ultimate capacity of 100,000 hp. It will cost in excess of $3,500,000, with transmission system. The company has acquired the plants and property of the Tuscaloosa Railway & Utilities Co., Tuscaloosa, Ala., and plans a bond issue of $4,000,000, a large part of the proceeds to be used for extensions and the installation of additional machinery.

The Faust Brothers Lumber Co., 53 West Jackson Boulevard, Chicago, has construction in progress on a new band mill at Jackson, Miss., to be equipped for a daily output of 60,000 ft. It will cost in excess of $125,000, with electric power and other machinery. The company has acquired the local mill of the Henry Maley Lumber Co., Jackson, with rated capacity of 40,000 ft. per day, and will continue in operation.

The Electrical Mfg. & Developing Co., Greensboro, Fla., has inquiries out for electric machinery, also for concrete mixers and kindred equipment, and for two water turbines, with auxiliary equipment.

The new pulp mill to be erected by the Great Southern Lumber Co., Whitney Building, New Orleans, will be operated in the name of the Bogalusa Paper Co., Bogalusa, La., a subsidiary organization. It will vary from two to five stories, 200 x 600 ft., with power house, estimated to cost close to $600,000 with machinery.

R. L. Hopkins, Huntsville, Ala., operating a marble works on Lee Street, has acquired the plant of the Southern Stone & Marble Co., and will consolidate the properties. Extensions will be made and additional finishing and other machinery installed.

The Universal Gypsum Co., Chicago, is disposing of a preferred stock issue of $1,000,000, the proceeds to be used for the construction of its proposed plant at Rotan, Tex., on which preliminary work has commenced. Tentative plans are under consideration for a new mill at Port Clinton, Ohio, to cost more than $500,000 with machinery. The company recently acquired a controlling interest in the Gypsolite Co., Batavia, N. Y. J. F. Haggerty is secretary.

The Galveston, Harrisburg & San Antonio Railroad Co., San Antonio, Tex., operated by the Southern Pacific Railroad Co., has plans for an addition to its engine house and repair shop on Hackberry Street, to cost about $65,000.

The Baton Rouge Ice Co., Baton Rouge, La., is having plans drawn for a five-story addition to its cold storage plant at Louisiana Avenue and Repentance Street, 100 x 100 ft., to cost $90,000 with machinery. George E. Wells is company engineer.

The Garrett Motor Co., 1107 Commerce Street, Fort Worth, Tex., will install a machine shop at its proposed two-story service and repair works, for which plans will soon be drawn.

The Central South

ST. LOUIS, Oct. 8.

THE Illinois Power & Light Co., Peoria, Ill., has tentative plans for a new steam-operated electric power plant in the vicinity of Tecumseh, Kan., estimated to cost $2,200,000, including transmission system.

Manual training equipment will be installed in the two-story and basement junior high school to be erected at Thirty-ninth Street and Hyde Park Avenue, Kansas City, Mo., estimated to cost $500,000, for which bids are being taken on a general contract. C. A. Smith, 602 Finance Building, is architect; J. A. Brady, Library Building, is mechanical engineer.

The Union Iron Works, Inc., Union, S. C., is perfecting plans for a new plant to replace the portion of its works destroyed by fire several weeks ago, with loss approximating $25,000. J. M. Morse heads the company.

The Common Council, Okmulgee, Okla., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks to cost $1,000,000. Burns & McDonnell, Kansas City, Mo., are engineers.

Work has commenced on a new two-story and basement plant, 40 x 305 ft., by the Security Metal Products Co., 2416 East Eighteenth Street, Kansas City, Mo., to cost $40,000, for which a general contract recently was awarded to John Gosling, 243 Railway Exchange Building.

The Board of Directors, University of Kentucky, Lexington, is considering plans for a central power house for all buildings, estimated to cost $200,000 with equipment.

The Water Commission, Tulsa, Okla., will receive bids until Oct. 26 for equipment for the Mohawk Pumping Station to be used in connection with the Spavinaw water supply project for municipal service, including aerator, sluice gates, pumps, etc. J. D. Trammell and W. R. Holway, 508 Wright Building, are engineers. Dabney H. Maury, 1445 Monadnock Block, Chicago, is consulting engineer.

Fire, Sept. 25, destroyed a portion of the plant of the McGrew Coal Co., Lexington, Mo., including power plant and

machine shops, with loss estimated at $90,000. It is planned to rebuild.

The Southern Arkansas Oil Co., Pine Bluff, Ark., recently organized with a capital of $1,000,000, is contemplating the establishment of a plant estimated to cost $150,000 with equipment. Frank P. Tomlinson is president.

Fire, Oct. 2, destroyed one of the buildings at the plant of the Southern Engineering Co., East Washington Street, Louisville, used as a general machinery repair works, with loss estimated at $27,000. It is planned to rebuild.

The Kentucky Face Brick Co., Second National Bank Building, Ashland, Ky., recently organized with a capital of $500,000, is perfecting plans for the erection of works to manufacture face brick, building tile, etc., with electric power plant, estimated to cost $150,000. A. J. Russell is secretary.

Manual training equipment will be installed in the proposed two-story and basement high school to be erected at Centerview, Mo., estimated to cost $100,000. Charles A. Smith, 800 Finance Building, Kansas City, Mo., is architect.

The City Foundry, St. Louis, recently organized with a capital of $40,000, will operate an existing foundry at 811 Park Avenue, specializing in the production of gray iron castings. It is purposed to develop an output of about 50 tons per day. Fred W. Priep is president, and Henry F. Welsch, secretary and treasurer.

The Wabash Railway Co., Railway Exchange Building, St. Louis, has awarded a contract to the T. B. Smith Co., Decatur, Ill., for an addition to its local car and locomotive shops, to cost $150,000 including equipment.

Fire, Sept. 24, destroyed a portion of the J. B. Rolater Building, 24 West First Street, Oklahoma City, Okla., occupied by the Sigmon Furniture Mfg. Co., Western Electric Co. and the Mee-Oakes Auto Supply Co., causing a combined loss of about $100,000, including equipment. The different plants will be re-established.

The Pacific Coast

SAN FRANCISCO, Oct. 3.

PLANS have been filed by the San Pedro Lumber Co., Wilmington and San Pedro Roads, Wilmington, Los Angeles, for a one-story machine shop, saw mill and electric power station, to cost about $23,000 exclusive of machinery.

The De Carie Incinerator Co., Portland, Ore., manufacturer of garbage disposal machinery, is arranging for the removal of its plant to Sacramento, Cal., for considerable increase in production, including a new department for the manufacture of steam machinery and parts.

The National Paper Products Co., a subsidiary of the Zellerbach Paper Co., 534 Battery Street, San Francisco, has acquired a 25-acre tract at Santa Ana and Independence Avenues, Cudahy, near Los Angeles, for a new plant, estimated to cost $2,000,000 with machinery. A power house and machine shop will be erected.

S. M. Feazle, The Dalles, Ore., has plans for the construction of a new lumber mill and box manufacturing plant, to cost about $50,000 including machinery. It is proposed to install electrically-operated equipment.

The Barnett Auto Body Co., 430 Golden Gate Avenue, San Francisco, is planning for the removal of its business to another location for enlargements and additional equipment.

Fire, Sept. 25, destroyed a portion of the industrial alcohol manufacturing plant of the Mason Distillery Co., Sausalito, Cal., with loss estimated at $100,000 including equipment. It is planned to rebuild.

The Consolidated Independent Sugar Co., Salt Lake City, Utah, has acquired the sugar mill and property of the Fallon Beet Sugar Co., at Fallon, Nev. Plans are being considered for extensions and the installation of additional equipment.

Mathew Brothers, 1661 West Washington Street, Los Angeles, manufacturer of batteries and other kindred electric equipment, has purchased a site at 1729 Santee Street for a new plant. It is expected to commence work early next year.

The Richfield Oil Co., Los Angeles, plans the construction of a new distrubuting plant at Fresno, Cal., to cost about $200,000 including equipment. C. M. Fuller is president.

The American Quick Coupling Co., Robert Dollar Building, San Francisco, has arranged for the operation of a plant at 1168 Bryant Street, for the manufacture of a new type of metal coupling. E. C. Northrup and Arthur Browne head the company.

The Christie Machine Works, 193 Fremont Street, San Francisco, will remove its plant to a building at 222 Howard Street, where additional equipment will be installed.

C. B. Bellows, Dodge Automobile Sales Agency, Long Beach, Cal., will install a machine shop in his new works at Twentieth Street and American Avenue, two stories, 120 x 170 ft. The Austin Co., 737 Bartlett Building, Los Angeles, is preparing plans and will probably receive the general contract.

The Otis Elevator Co., 2300 Stockton Street, San Francisco, has plans for a two-story factory branch and repair shop, 135 x 275 ft., estimated to cost $350,000, including machinery.

Manual training equipment will be installed in the new group high school to be erected at Santa Monica, Cal., estimated to cost $200,000, for which plans are being prepared by Allison & Allison, 1405 Hibernian Building, Los Angeles, architects.

The Atlas Mixed Mortar Co., Los Angeles, has acquired the rock crushing plant of the Lawrence-Moore Co., Stough Canyon section. Plans are under way for enlargements and the installation of additional machinery. G. W. Moore, formerly connected with the selling company, has been appointed general manager at the local works.

William N. Voegtly, Jr., 625 Market Street, San Francisco, is inquiring for a forging press of about 500 tons capacity, available for prompt shipment.

Canada

TORONTO, Oct. 8.

THE demand for machinery and machine tools continues and sales the past week or two are somewhat better than for the corresponding period a month ago. While interest is still being shown in new equipment, second-hand and re-built lines are forging steadily ahead. Inquiry for machine tools is more pronounced and covers all lines of industry but in most cases requirements are for one or two tools for replacement purposes, and for additions recently completed or now under way.

Hay & Co., Woodstock, Ont., are in the market for a 7 x 12, two drum hoisting engine.

The Gummed Paper Co., Henderson Street, Brampton, Ont., will build an addition to cost $12,500 and will purchase machinery to the value of $5,000.

The Castle Trethewey Mines, Ltd., Standard Bank Building, Toronto, propose to erect a 100-ton mill at Gowganda, Ont., under supervision of F. J. Ennis, consulting engineer, Porcupine Mines, Schumacher, Ont.

The International Fibre Board Co., Ltd., Canada Cement Building, Montreal, contemplates the erection of a factory at Midland, Ont.

Atchison & Co., Cornwall, Ont., are in the market for equipment for planing mill.

J. V. Dore, 260 St. Helene Street, Quebec, is in the market for machinery for a blacksmith and machine shop.

Findlay Brothers, Carleton Place, Ont., manufacturers of stoves, furnaces, etc., are preparing to manufacture electric stoves and are installing an electric annealing oven of 100 hp., capacity.

The Globe Printing Co., 124 St. Paul Street West, Montreal, is in the market for printing presses, paper cutter, etc.

P. Tranchemontagne, Fournier, Ont., manufacturer of vehicles, etc., is asking for woodworking machinery and tools.

The Fort William Paper Co., Fort William, Ont., proposes to practically double the present capacity of its mills. It is estimated that the addition will involve an expenditure of between $2,000,000 and $4,000,000 and will bring the output of the plant up to about 400 tons of newsprint per day.

The Castle Trethewey Mines, Ltd., Standard Bank Building, Toronto, Ont., proposes to buy complete equipment for a milling plant.

The Mica Mine, J. B. Lalonde, purchasing agent, Mica, Que., is in the market for hammers, drills, air compressors, etc.

A. Belanger, Ltd., Montmagny, Que., is in the market for equipment and machinery for the manufacture of stoves, etc. C. Belanger is purchasing agent.

The Garden City Paper Co., Merritton, Ont., will build an addition to its paper mill at St. Catharines, Ont., to cost $400,000 and is interested in prices on equipment.

Fallow Brothers, Water Street, Cornwall, Ont., is in the market for polishing and cutting machinery and tools for marble works. A. Fallow is purchasing agent.

The Italian Mosaic & Tile Co., Toronto, has secured a site on Bridgeman Street, and will erect a factory.

The Great Lakes Pulp & Paper Co., Fort William, is

completing arrangements for a pulp and paper mill to cost $3,000,000. Howard Ferguson, New York, N. Y., is engineer.

The Essex Border Utilities Commission, is having plans prepared for a filtration plant at Ford, Ont., to serve five municipalities at a cost of $150,000. Bids will be received about Nov. 1. J. C. Keith, 300 Ouellette Avenue, Windsor, Ont., is engineer. Material and equipment will be purchased by the Commission.

The West Dome Consolidated Mines, H. M. Pellatt Building, Bay Street, Toronto, is in the market for drills for underground work for mines at South Porcupine, Ont.

The Canadian Dirigible Headlight System, Quebec, will purchase machinery for the manufacture of lighting devices for steam and electric railroads. W. Stoleo, 3 Aberdeen Avenue, Quebec, is interested.

STEEL AND INDUSTRIAL STOCKS

The range of active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers..	40	41⅜	Inland Steel	36	37⅝
Am. B. S. & Fdy.	70	70½	Int. Har.	71¼	73½
Am. Can	88⅜	94⅛	J. & Laughlin pf.	103	108
Am. Can pf.	106½	107	Lima Loco.	62⅛	65⅝
Am. Car & Fdy..	153¾	159	Midvale Steel ..	25⅝	26¼
Am. C. & F. pf..	118	118	Nat. Acme	85	85
Am. Locomotive.	68⅞	72¼	Nat. En. & Stm..	45	52⅜
Am. Loco. pf....	116	116	N. Y. Air Brake.	56¼	57⅞
Am. Radiator...	81½	82¼	Nova Scotia Stl..	14½	19
Am. Roll. Mill pf.	98	98	Otis Steel	7⅝	7⅞
Am. Steel Fdries.	34	35⅜	Pressed Stl. Car.	49	51
Am. Stl. Fd. pf..	108¾	109¾	Pressed Stl. pf..	86¼	86½
Bald. Loco.....	113	120¾	Replogle Steel ..	10	11⅜
Bald. Loco. pf...	114	114	Republic	42⅜	45⅝
Bet. Steel	45⅜	49¾	Republic pf....	84⅜	85⅝
Beth. Stl. 7% pf.	90½	92	Sloss-Sheffield ..	40¼	41⅜
Beth. Stl. 8% pf.	104	104⅝	Steel of Canada.	67½	68½
Br. Em. Stl. 1 pf.	60	60	Superior Stl. 1 pf.	97½	97½
Br. Em. Stl. 2 pf.	17½	18⅝	Un. Alloy Steel..	30⅝	31½
Chic. Pneu. Tool	79⅝	81½	U. S. Pipe.....	30½	40
Cole Fuel	26	28¼	U. S. Pipe pf....	79	82¼
Crucible Steel ..	153¼	163	U. S. Steel.....	86⅝	89½
Crucible Stl. pf..	86	86	U. S. Steel pf...	117¼	119
Deere pf.	63	63	Vanadium Steel.	28⅝	29⅞
Gen. Electric ...	170⅛	172	Va. I., C. & Coke	54	54
Gt. No. Ore Cert.	27	28⅝	Whouse Air Br..	82	82
Gulf States Steel	74⅛	80¼	Ygstown S. & T.	65¼	65½

Industrial Finance

The Board of Directors, Vulcan Iron Works, Wilkes-Barre, Pa., has been authorized to increase the capital of the company as conditions may require up to an amount of $3,000,000.

Kern Dodge has been appointed temporary receiver for the Vim Motor Truck Co., Philadelphia, Pa., with bond of $50,000. It is stated that the company has assets showing a book value of $2,468,081, with debts amounting to $1,301,277, and an additional capital stock liability of $650,000.

Gross income of the American Ship Building Co. for the year ended June 30, 1923, after manufacturing expenses, was $2,010,092. Deducting taxes and other expenses there was net profit from operations of $238,472. The addition to surplus for the year without provision for dividends was $765,115.

W. F. Robertson, president W. F. Robertson Steel & Iron Co., Cincinnati, who recently purchased the plant of the Hudson Sheet & Tin Plate Co., Marietta, Ohio, has made no definite plans for the future operation of the mill. The plant is being put in first class condition and, according to Mr. Robertson, very little work will be required to get it ready. It is understood that negotiations are in progress with a number of Eastern capitalists for the organization of a can manufacturing company to build a plant in Marietta and that this company will take practically all the product of the Hudson mills. Definite announcement of the organization of this company is expected to be made in the next few weeks.

Owing to the forthcoming termination of its charter through statutory limitations, the Robesonia Iron Co., Ltd., manufacturer of pig iron at Robesonia, has transferred its property and its business to Robesonia Iron Co. No change of ownership or of personnel is involved, and the new company merely succeeds the old one and business will be transacted as before. The officers of the new company are: William C. Freeman, president; Allen Butler, vice-president; Robert C. Lea, secretary and treasurer. Its main office, occupied jointly with the company's sales agents, Robert C. Lea & Co., is at 426 Stephen Girard Building, Philadelphia. Walter A. Barrows, Jr., with offices at Robesonia, Berks County, Pa., is manager in charge of the company's blast furnace and ore mining operations.

NEW TRADE PUBLICATIONS

Regenerative Furnace Control.—American Heat Economy Bureau, Wabash Building, Pittsburgh. A 12-page pamphlet by K. Huessner on control of coke-oven gas-fired open-hearth furnaces. The paper was presented as discussion on the "Economical Use of Fuel in Steel Plants" at the Buffalo meeting in September of the Association of Iron and Steel Electrical Engineers, and has now been reprinted.

Polyphase Motors.—Century Electric Co., St. Louis. A small pamphlet and a retail price list covering squirrel cage induction motors, type SC of ¼ hp. to 5 hp., and designed for 2 or 3-phase current. An accompanying sheet gives delivery charges for various locations. The tabular matter in the retail price list gives pulley dimensions, rotative speed, weights, and amperes under varying conditions.

Light Reflectors.—National X-Ray Reflector Co., 235 West Jackson Boulevard, Chicago. Folders 427, 428 and 429 are devoted to reflectors of various types for throwing light where it is needed for best illuminating effects. They are designed to diminish eye-strain, and the particular ones illustrated are intended for office and show-window use.

Gas Valve Control System.—Selas Co., Philadelphia. An 88-page catalog devoted to the industrial application of gas in the interest of fuel saving. The system includes a machine designed to maintain automatically at a constant value any desired gas pressure. The specific gravity of the gas is regulated, stabilized and rendered constant. Specific applications covered in the pamphlet show heat treating equipments, stereotype pots, rivet forges, baking ovens, blow torches, oil forges, enameling and japanning, etc. Engineering service is included with each equipment, and the advantages are said to include low first cost and maintenance cost, steady and silent operation, low operating cost, and automatic operation independent of the operator's skill.

Pulverized Coal in Malleable Foundries.—Grindle Fuel Equipment Co., Harvey, Ill. Bulletin No. 6 of 16 pages is devoted to the use of powdered coal for furnaces melting malleable iron. Advantages claimed are the elimination of hand firing, with its intermittent character, and consequent reduction of labor, saving in time, in fuel, and in furnace lining repairs, due to more constant temperature, saving in metal, because of a steady temperature and better combustion, a higher percentage of good castings, due to fewer blow holes. Melting capacity of the furnace is estimated at 25 to 50 per cent greater, while smoke, ash and slag are greatly lessened. As applied to annealing furnaces, somewhat the same conditions are reported.

Positive Pressure Blowers.—Connersville Blower Co., Connersville, Ind., Catalog No. 21, 9 x 12 in., 63 pages. Describes and illustrates various blowers made by the company and the different drive arrangements, giving also the application of the blowers in various processes and industries. Different types of blowers are compared and construction and advantages of the company's standard blower described in detail. Illustrations are numerous and the descriptions clear and well arranged.

Tachometers.—The Bristol Co., Waterbury, Conn. Bulletin No. 317 of 32 pages describing both pneumatic and electric types of recording and indicating tachometers. Specimen charts are shown, samples of work done and illustrations of various models. Details to assist in ordering are given. Size 8 x 10½ in.

New Tool Price List.—Consolidated Tool Works, Inc., 296 Broadway, New York, Catalog "E" and a new quotation sheet, No. 29, effective Oct. 1, on its entire line.

Blast Furnaces.—William B. Pollock Co., Youngstown, Ohio. Booklet illustrating a new 60-ton charcoal blast furnace which the company fabricated for the Maharajah of Mysore, India, to be operated by the Bhadravati, Mysore State Railways.

Herbert W. Hayes, 40 Court Street, Boston, has been appointed district sales agent of the Surplus Steel Exchange, New York. Mr. Hayes has been connected with the steel trade in New England for 30 years, having been agent for the Cambria Steel Co. during that period. The Boston office will cover all the New England States, with the exception of Connecticut. Mr. Hayes also has been appointed district sales manager for the New England National Drawn Steel Co., East Liverpool, Ohio.

Plans of New Companies

The Miller Utility Co., New York, has been incorporated with capital stock of $100,000 to manufacture cooking utensils and similar products. It does not propose manufacturing immediately but as soon as organization matters are completed, plans for operation will be considered. The incorporators are W. P. Miller and N. J. Karayanis, care of William Cristwell, 150 Nassau Street, New York.

The Progress Watch Co., New York, incorporated with capital stock of $30,000 will manufacture watches and watch movements. J. and L. Feinstein and I. Nuchman are the incorporators. Plans for operation will be developed later. Address care of Bertrand Ettinger, 50 Court Street, Brooklyn.

W. B. Wason, Inc., Nassau Street, New York, organized with capital stock of $20,000 to manufacture cabinets, will for the time being confine activities to handling cabinet makers' tools for manufacturers. A. C. Rippier, W. B. and A. B. Wason are the incorporators. C. H. Luscombe, 41 Park Row is representative.

The Royal Standard Co., 429 Sixth Avenue, New York, has been organized to manufacture metal products, chief of which will be boilers. Initial capacity is estimated at 25 boilers per week. Equipment on hand is sufficient for present needs. F. Stiffler and R. and M. Morgan are the principals.

The Walker-Ely Products Co., 388 Broadway, New York, has been incorporated with capital stock of 1500 shares of no par value stock and purposes to manufacture vaults and like products. Details of manufacturing will not be taken up for some time, and a plant may be purchased somewhere in the Middle West.

The Enameled Steel Products Co., Elizabeth, N. J., incorporated with $25,000 capital stock, will manufacture enameled iron and steel products, but it is unlikely that operations will begin for some time. A. J. Davis, 215 Broad Street, Elizabeth, represents the company.

The Field Hardware Mfg. Co., 111 East Thirty-first Street, Kansas City, Mo., incorporated with $25,000 capital stock., will continue an established business in the manufacture of hardware building specialties. E. Stanley Field is general manager.

The Acorn Iron Works, Russel and Alluvion Streets, Baltimore, incorporated with capital stock of $25,000 will manufacture fire escapes, iron stairs, elevator inclosures and bank railings. John Klein is secretary.

Towne Mines, Inc., subsidiary of the American Smelting & Refining Co., which recently purchased the properties of the Compania Metalurgica Mexicana, is planning the construction of an arsenic plant to be built at San Luis Potosi at an estimated cost of $400,000. This plant will be an auxiliary to the new copper smelter to be built at the same place at a cost of $1,500,000.

Craig Oil Tool Co., with office and plant at Mendocino and Water Streets, Long Beach, Cal., has been organized with capital stock of $100,000 and will manufacture oil well tools and supplies. The company has leased a machine shop formerly operated by a shipyard and is amply equipped for present demands. J. F. Craig is president; W. W. Cole, vice-president and general manager; L. D. Gardiner, secretary-treasurer.

The Bridgeport Automotive Products Co., 1427 Railroad Avenue, Bridgeport, Conn., recently incorporated with capital stock of $50,000 to manufacture automobile parts and equipment, advises that no construction is contemplated at this time. The incorporators are Robert B. Davis, Governor Stinson, and George W. Hudson, Popular Terrace, Bridgeport. M. F. Judd of the Raybestos Co. is vice-president.

The Hershey Forms & Construction Co., recently organized under Pennsylvania laws, will manufacture patented forms for concrete construction work. Plans are indefinite but it is expected that a building will be secured for manufacturing purposes and at that time equipment will be needed for cutting and boring steel and for forging parts. Other equipment including concrete mixers, carriers, and shovels may also be needed. Address care of P. H. Hershey, Dauphin, Pa.

B. J. Mockenhaupt & Co., 217 North Des Plaines Street, Chicago, have been appointed sales representatives in the Chicago district for the Reinforced Switch & Mfg. Co., Pittsburgh.

The Morelite Intensified Corporation, New York, has been incorporated with $100,000 capital stock and will manufacture projectors and electric lighting equipment, principally for motion picture service. Lester Neuberger and Irving Kabat are the incorporators. Representative is Max Greenberg, 112 Madison Avenue.

The Oil Heater Distributing Co., 51 West Forty-second Street, New York, incorporated with $50,000 capital stock, has secured Eastern rights for the Marvel oil heater, manufactured by the Marvel Motor Co., Chicago. Warehouses will be maintained at several points in the East, but central quarters will be in New York. No manufacturing will be done, James B. Pinkham, D. G. Nelson and E. P. Lanfranchi are the incorporators.

The Skinner-Hill Co, Canadian Pacific Building, New York, has been incorporated with $100,000 capital stock as importers of brass, bronze, copper and other metal products. The company will act as United States and Canadian representative of Fearson-Page Co., Ltd., and the Hill-Ouston Co., Ltd., Birmingham and London, England. The incorporators are E. R. Mead, A. G. and S. P. Skinner, 228 Seeley Street, Brooklyn.

The Cavilla Egg-Timing Machine Co., 61 Lispenard Street, New York, has been incorporated with $100,000 capital stock to manufacture electric equipment for domestic service. Plans for operation are still indefinite. Herbert Goldthorpe, Thomas Borras and R. J. Cavilla are the incorporators. Julius H. Reiter, 415 Broadway, is corporate representative.

The Post Radio & Electric Corporation, 21 Flatbush Avenue, New York, has been organized to conduct a business as distributers for makers of wireless equipment and devices. Incorporators are S. Modell, S. S. Leff and M. Silberman.

The Reliant Saw Works, 336 Ogden Street, Newark, N. J., has been organized to manufacture oil burning equipment and circular saws, fitting saw bands from ¼ to ⅛ in. and circular saws up to 72 in. Shop and equipment will be rented. The company expects to carry a stock of small-size saws in the near future. F. H. Clark heads the company.

The Acme Sectional Oil Burner Corporation, New York, has been organized to manufacture oil burning equipment and devices. During the next week plans for operation will be taken up. Louis Marder, M. Dienstein and Charles Pearle, 256 Broadway, New York, are the principals.

The Natstone Manhattan Corporation, 1520 West Farms Road, New Rochelle, N. Y., incorporated with capital stock of $40,000, will manufacture concrete and cement tile for building purposes. G. Vander Roest is secretary-treasurer.

The Grass Gripper Rake Co., 543 West End Avenue, New York, has been organized with $200,000 capital stock to manufacture rakes, hoes and like tools. Manufacturing will be done by contract. Offices are maintained in Chicago and Boston. A. C. Johnstone and John Olsson are the incorporators.

The American Tobacco Machinery Co., Wilmington, Del., incorporated with capital stock of $1,000,000 to manufacture tobacco treating machinery, is only in the formative stage and, though equipment may be required later, nothing will be done in that regard for a considerable time. George J. Wise, 44 West Eighteenth Street, New York, represents the company.

The Walker Hardware Co., 410-12 Main Street, Vincennes, Ind., has been incorporated as a reorganization of the former company by that name. New personnel and financing have been drawn into the concern. The company will operate as jobber and retailer, handling stoves, furnaces and general hardware products. T. M. Shirliff is one of the principals.

The City Foundry Co., St. Louis, recently organized with capital stock of $40,000 to manufacture iron and steel castings, has purchased the foundry business of the Christopher & Simpson Co., that city, and will continue to operate at the present location, 811 Park Avenue. The company will specialize in gray iron castings from 1 lb. to 10 tons. U. S. Arnold is general manager.

The Coltexo Corporation, Monroe, La., has been organized as a consolidation of the Columbian Carbon Co. and the Texas Co., to engage in production of carbon black and natural gas gasoline through the development of properties owned by the Texas Co. in Monroe, and also of the Parks fields of Texas.

The Electrical Mfg. & Developing Co., Greensboro, Fla., has been incorporated with $60,000 capital stock to manufacture electrical equipment and to develop timber lands. Plans call for the construction of a light and power plant, the manufacture of storage batteries, construction of a lumber plant and the building of homes. William Petschel is president.

The Reading Automatic Machine Co., Third and Buttonwood Streets, Reading, Pa., has been incorporated with capital of $50,000 to manufacture machinery. It has acquired the business of the Vertomatic Mfg. Co. and will make vertical automatic machines, special dies, tools and machinery. Louis J. Laroche is one of the heads.

The American Wrench Mfg. Co., Richmond, Va., organized with capital of $25,000, purposes to manufacture wrenches and other tools but has not made definite plans for operation. John D. Blair, 212 North Eighth Street, heads the company.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ⅛ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel Black	Galv.	*Wrought Iron* Black	Galv.
⅛ in. Butt..	—41	—24	⅛ in. Butt.. — 4	+19
¼ in. Butt..	—46	—32	¾ in. Butt.. —11	+ 9
1-3 in. Butt .	—48	—34	1-1½ in. Butt —14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap..... — 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap — 9	+ 9
9-12 in. Lap.	—34	— 6	7-12 in. Lap. — 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18 c. to 19 c.
High brass wire	18½c. to 19½c.
Brass rods	15¾c. to 16¾c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	23 c. to 24 c.
Copper tube, seamless	24½c. to 25½c.

Copper Sheets

Sheet copper, hot rolled, 20¾c. to 21¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14 x 20 Prime	Seconds
		80 lb..	$6.55	$6.30
		90 lb..	6.65	6.40
		100 lb..	6.75	6.50
IC..	$12.55	$10.70	IC..	7.00	6.75
IX..	13.95	12.55	IX..	8.25	8.00
IXX..	15.55	13.75	IXX..	9.50	9.25
IXXX..	17.10	15.30	IXXX..	10.75	10.50
IXXXX..	18.85	16.80	IXXXX..	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	45c.
Bar	49c. to 56c.

Copper

Lake ingot	16¼c.
Electrolytic	15¾c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	11c. to 12c.
Solder ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market is lower in sympathy with new metals. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light bottoms	9.00
Brass, heavy	5.75
Brass, light	4.75
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	7.50
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, October 18, 1923

ESTABLISHED 1855 VOL. 112, No. 16

Power Plant Problems of Steel Mills

Efficiency of Various Forms of Prime Movers—Importance of Frequency—Blowing and Electric Generating Equipment—Selling Off-Peak Power

BY L. B. BREEDLOVE*

ANY decided reduction in the cost of power required to produce a ton of steel in the finished state will vary the total cost per ton only a fraction of a per cent, as considered by past practice, yet this item is fast becoming of more importance. Rising costs of coal, difficulties of transportation and the possibilities of closer margin of profit have quickened the effort to utilize all available heat units. It is a common mistake for the engineer to design a power plant of good efficiency, yet lose sight of the fact that the investment must be as low as possible. Operating costs and interest costs should never be separated. One is as much a part of the cost of energy as the other. The lowering of the cost of production in a power plant depends on getting the maximum work out of the investment; consequently, to meet the competition now offered by the central stations and to care for the increasing demands of the steel industry successfully, the power engineering must follow a broad and comprehensive policy.

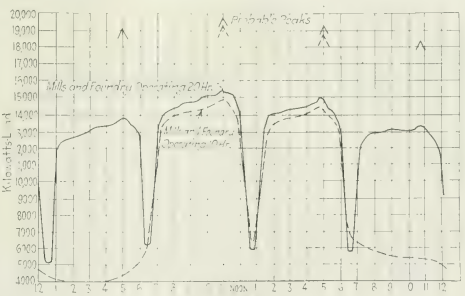


Fig. 1—Expected Daily Load Curve from Midnight to Midnight, Showing the Total A. C. Load When the D. C. Demands Are Cared for by Conversion in Substations. Just when the peak loads will occur is unknown and there is a diversity factor between the a. c. and d. c. peaks. Solid lines cover 20-hr. operation of the mills and foundries; dotted lines, 10-hr. operation

It is the purpose of this paper to indicate in a general manner some of the important economic considerations. For this purpose certain assumptions have been made. The plan assumed consists of five 500-ton blast furnaces, two of which supply the foundry and the others the open-hearth plant. The foundry is equipped with complete mechanical system. The mills consist of 40-inch blooming, 24-inch continuous mill and two 12-inch continuous mills. The yearly production assumed for the mills is 600,000 tons of steel. Operation schedule of the mills and foundry calls for 310 days per year. Fig. 1 shows the expected electrical load curve for this plant. The motors were carefully chosen to avoid oversizing. The energy consumption from ore to finished steel per ton is estimated at around 67 kwhr., and from ore to finished castings at the foundry the energy consumption is 32.5 kwhr.

To take care of this load condition two 10,000-kw. units will be required a greater portion of the time, and a third is installed as a spare, so that the generating equipment assumed consists of three 12,500-kva., 0.80 per cent power factor, 60-cycle, 6600-volt turbine generator units. The maximum probable peak demand will be 19,000 to 20,000 kw. Since the cost of a power plant depends so very much upon the maximum load it must carry, careful consideration must be given to the expected peak load, as this is usually estimated too high.

Frequency in steel mill plants is of special importance. The lower speed limit for 60-cycle motors has been pushed considerably downward and the tendency seems to be strongly toward this frequency as a standard. For main rolls 60-cycle motors cost about 10 per cent more than the 25-cycle type, but elsewhere the 60-cycle are less expensive and more efficient in operation. In the case of a new plant, even where it is expected to generate all its own power, 60-cycle equipment should be installed, if located in a 60-cycle district. In additions to existing plants, it is advisable to install 60-cycle equipment if the added capacity is as much as 50 per cent of the existing capacity. The only condition in which two frequencies should be mixed in one plant is that one of them is to be abandoned entirely within a reasonably short time.

Transmission of energy at 6600 volts is economical up to about 6.5 miles. It is usual now in new plants to generate and transmit at this voltage. The expense of installing and operating sub-stations must be justified by the savings made in the shortening of the distribution feeders. The location of sub-stations should be as near as possible to the center of consumption of the district to be served. By studying the operation schedule, the expected yearly energy consumption of each motor or group of motors doing similar duties

*Consulting engineer, Chicago.

may be found. Knowing the consumption and location of the motors, the center of energy consumption for any sub-station group may be found by theory of moments. This method gives more accurate results than the method of assuming demand factors. Careful study of diversity factors between feeders and sub-stations must be made, since the utilization of this

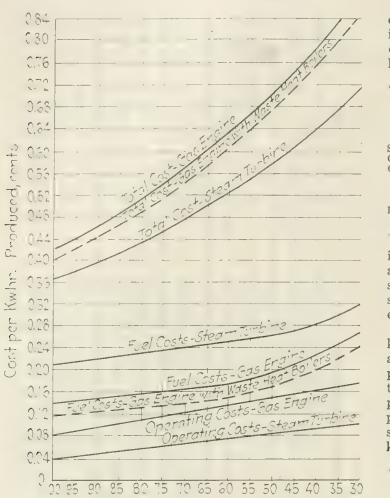


Fig. 2—Comparison of Operating and Total Costs of Plants of Varying Description (See Table II)

factor allows considerable saving in generating equipment.

One condition to be determined is the steam pressure and temperature satisfactory for the type of plant under consideration. The trend in steam practice is toward higher pressure rather than extreme superheat. It is more difficult to design equipment to withstand continuous operation at high temperature than at high pressure. The amount of heat available for conversion into work, when expanding to a certain vacuum, is greater for high pressure and moderate superheat than for lower pressure and correspondingly higher superheat. Several plants are now operating at 350 lb. steam pressure with a total temperature of about 750 deg., and there are under construction plants for 650 lb. pressure and 750 deg. total temperature. Due to the decrease in the tensile strength and elastic limit of the metals used, at temperatures above 750 deg., that seems to be the limit of temperature. A pressure of 250 lb. with a total temperature of 600 deg. corresponds to the latest steel plant practice.

Table I
Heat Consumption B.t.u. Per Net Kwhr. for Stations Supplying 15,000 Kw. Average Working Load

	Gas Engine Plant With Gas Producer Reserve		Gas Engine Plant With Steam Turbine Equalizer	Steam Turbine Plant
Direct Heat Consumption of main units	17,600	20,060	19,600	18,350
Gas washers	500	500	400	0
Auxiliary pumps	350	350	350	2,000
Ignitors, direct connected, exciters, etc.	0	0	0	0
Total B.t.u. per net kwhr.	18,450	20,910	20,350	20,350
Efficiency of main unit, per cent	19.4	17.0	17.4	18.4
Efficiency of plant, per cent	18.50	16.38	16.81	16.80

Most gas engine people insist that efficiency of 20 per cent is correct. The table gives both 20 per cent and 17 per cent, which seems more nearly correct.

Steam at 250 lb. per sq. in. gage, 250 deg. Fahr. superheat, 29 in. vacuum.

The choice of blowing or generating equipment is entirely an economic question, as all general types are in successful operation. Considerable progress in heat economy of turbo blowers and turbo generator units has been made in recent years, while at the same time improvements have been made in the design of boilers and auxiliary apparatus. Table I shows the heat consumption per kwhr. produced for a gas engine plant, a steam turbo plant and a gas engine plant with turbine equalizer for an average load of 15,000 kw.

Table II
Cost of Plants, in 1921

	Total Cost	Cost per kw.	Fixed Charges Per Cent
Steam plant	$5,100,000	$113	12
Gas engine plant	6,700,000	150	13
Gas engine plant with waste heat boilers	7,420,000	166	13¼

Coal of 12,500 B.t.u. per lb. to cost $2.50 per ton, f.o.b. plant.

Distribution cost 0.07c. per kwhr., not shown.

Fig. 2 shows the operating, fuel and total costs per kwhr. produced by the steam plant, gas engine plant and the gas engine plant with waste heat boilers, plotted against yearly load factor. Air horsepower in the blast is converted to equivalent kwhr. for this comparison. The steam used in the turbo generator unit per kwhr. produced was divided into the quantity of steam used by the turbo blower unit, to give equivalent kilowatt units. In this comparison large boilers using blast furnace gas and pulverized coal were used. This comparison results favorably to the steam plant.

Table III

Equipment / Type	6 Gas Fired Boilers, 4 Stoker Fired Boilers	5 Gas and Pulverized Coal Fired Boilers
Fixed charges, 15 per cent	$225,000	$140,000
Boiler hp. years produced	28,300	26,600
Fixed charges per boiler hp. year	$8.00	$5.35
Operating costs per boiler hp. year	8.00	8.27*
Total costs per boiler hp. year	16.00	13.62
Fuel costs per boiler hp. year	38.30	36.70
Fuel saving per boiler hp. year	None	Credit 3.60†
Grand total cost per boiler hp. year	$54.30	$45.72

*Figuring blast furnace gas costing same as coal per B.t.u. supplied, since blast furnace gas is usually charged to power costs in this manner.

†Coal 12,500 B.t.u. per pound at $2.50 per ton.

Fig. 3 shows the production costs at assumed plant load factor as plotted against coal cost per ton at the plant. The intersections of the total operating costs for the different types of equipment give the costs of coal at which total costs are the same. The higher the load factor the lower the cost of coal at the intersections, thereby showing effect of heat economy of the gas engine at high loads.

Table IV
Operating Cost Comparisons

Item	Stoker Equipment	Pulverized Coal Equipment
Yard switching	7.0c.	7.0c.
Coal unloading and distributing	8.0	2.0
Labor: Coal preparation	0.0	14.3
Firing	14.0	11.2
Ash removal	7.1	2.5
Electric energy	3.3	6.8
Dryer fuel	0.0	5.1
Maintenance	9.0	6.3
Total cost per ton fired	48.4	55.2

Extra cost of installation of stoker equipment and boiler for it, $434,000.

If there are no local conditions prohibiting the use of surface condensers, this type of condenser should

be used. A comparison made for this assumed installation resulted favorably to the surface condenser as the most economical investment, but only by a small amount. There is not enough in its favor to offset any local conditions existing which are undesirable for surface condensers. The power house should be designed with the boiler room as the middle section, turbo blowers in one side section and the turbo generators in the other side section. The boilers should be elevated so that ashes may be dumped directly into standard railroad cars at yard level. The condenser floor line for both turbo blowers and turbo generators should be at or near the ground level. On a floor above the turbo blowers the evaporator and feed water heaters should be installed, with control and switching equipment on a floor above the turbo generators. This type of design gives the least building wall surface and volume, consequently the lowest cost for the installed capacity. One of the points impressed by a visit to a few European power plants was the considerable saving in building costs per unit of capacity as compared to American power plants, yet without loss of architectural harmony with the vicinity.

Table VI

Estimated Cost of Complete Power System for Two Types of Equipment

Type of Equipment	6 Gas Fired Boilers, 4 Stoker Fired Boilers	5 Gas and Pulverized Fuel Fired Boilers
Station capacity, kw.	30,000	30,000
Number of blowers	6	6
Excavations and foundations	$500,000	$400,000
Power house building—steel and brick	560,000	420,000
Boilers with superheaters, stacks and settings	954,000	650,000
Gas cleaners, piping and burners	450,000	450,000
Stokers, fans, ducts, etc.	120,000	.....
Induced and forced draft fans	75,000	.....
Pulverized coal equipment complete	.....	100,000
Pulverized coal equipment building	.....	15,000
Coal storage, crane, ash handling	50,000	40,000
Feed water heaters	18,000	18,000
Make-up evaporator plant	25,000	25,000
Turbine generators and air washers	640,000	640,000
Turbo blowers	780,000	780,000
Condensers for generating and blower units, including pumps and exhaust connections	390,000	390,000
Pump and screen house, tunnel	430,000	430,000
Piping and covering	150,000	100,000
Exciters, motor-generator sets, switching, transformers and yard wiring	125,000	125,000
Gages, meters, etc.	25,000	25,000
Cranes (2)	20,000	20,000
Construction plant equipment	25,000	25,000
Total direct items	$5,337,000	$4,853,000
Contingencies, 5 per cent	266,850	233,200
	$5,603,850	$4,886,200
Engineering and supervision, 10 per cent	506,385	488,620
	$6,110,235	$5,374,820
Interest during construction, 5 per cent	305,500	268,741
Grand total	$6,416,000	$5,644,000
Fixed charges, 12 per cent	769,920	677,280
Fixed charges per kwhr.*	0.32c.	0.28c.
Cost per kw. capacity (equivalent)	$139	$122

*Assuming 158,000,000 kwhr. equivalent to blowing of furnaces, + 10 per cent auxiliaries. Total 236,000 kwhr. produced per year. This corresponds to a load factor per year of about 40 to 45 per cent, as determined from load curves and operation schedule for plant.

The steady load on this assumed station is 17,500 boiler hp. which at 190 per cent rating calls for four 2250-hp. boilers. One 500-ton blast furnace will supply enough furnace gas over the stove requirements to operate one of these units continuously at 165 per cent rating.

Adding pulverized coal equipment to operate under the same units provides a method of caring for boiler load fluctuations at better economy, and thereby reducing capital investment considerably without any large increase in the attendance required. Lower grades of coal may be used and in addition large percentages of breeze coke coming from the by-product coke plant. Table III gives a comparison of the total cost per boiler hp. year produced by the two types of boiler equipment. Table IV gives a comparison of the cost per ton of coal fired in stoker and pulverized equipment. Table V gives the detailed estimated plant steam consumption. Five fuels—blast furnace gas, coke oven gas, tar, coke and coal—have been burned simultaneously with good efficiency under the same boiler. This provides a method of promptly caring for load fluctuations, and fuller utilization of all by-products. This method provides for considerable fuel savings and may indicate future tendencies.

Connection with a central station system, because of the diversity factor, allows a reduction in the reserve generating equipment, even if no energy is normally interchanged. The sale of surplus energy increases the rate at which the investment is worked, at practically no labor cost increase, and thereby holds the prospect of some profit, depending upon the conditions at hand. In the assumed plant with one furnace out of blast, the blast furnace gas will care for the blast and, in addition, 7500 kw. load at time of tapping (one furnace at a time) and 10,000 kw. for the remaining time. Thus 3000 kw. for 13 hr. and 6000 kw. for 4 hr. must be supplied, in addition to the blast furnace gas. Peak load conditions will require around 6000 kw. more for 6 to 7 hr.

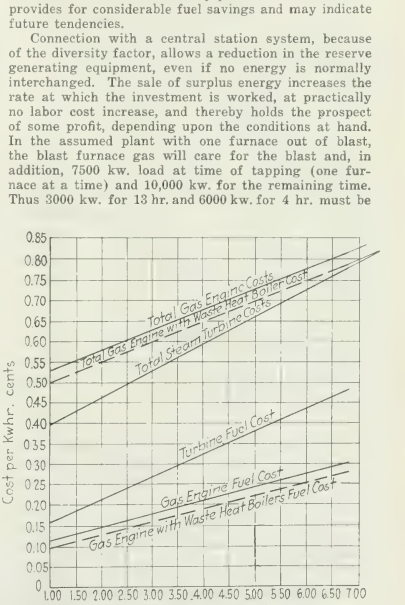


Fig. 3.—Unit Cost of Power Based on Cost of Coal per Ton, Showing Both Fuel Cost and Total Cost Under Three Different Plant Conditions

The by-products available each day are 4,000,000 cu. ft. coke oven gas, 5000 gallons tar, and 400 tons of small coke. No exact balance between demand and supply of these by-products is possible, however. Figuring a 50 per cent availability of these by-products, and 22,000 B.t.u. per kwhr. produced, 200,000 kwhr. could be produced from these by-products.

Deducting the 90,000 kwhr. required to make up the energy needed in excess of that generated by blast furnace gas, 100,000 kwhr. of energy could be sold. If 3000 kw. were sold for 21 hr. and an average of 10,000

The most efficient load on boilers in point of fuel costs is around 180 per cent rating. The return on the investment will increase with the capacity secured, while labor costs will decrease to a point where the decrease in efficiency will offset such added return. The rating of the boiler units and the number of units should be chosen so that the 10 or 12-hr. load may be carried at or near the most efficient boiler rating, and at the same time have sufficient capacity to carry the maximum load which may be carried on the station.

Table V

Steam Consumption for the Two Types of Equipment for Power House

	Type of Equipment	6 Gas Fired Boilers, 4 Stoker Fired Boilers		5 Gas and Pulverized Coal Fired Boilers	
1.					
2.	Net station output, kw.	15,000	6,000	15,000	6,000
		Pounds	Pounds	Pounds	Pounds
3.	Turbo-generators (2)	186,000	138,000	186,000	138,000
4.	Turbo-blowers (5)	175,000	175,000	175,000	175,000
5.	Circulating pumps serving condensers of generators and blowers	18,000	15,900	18,000	15,900
6.	Air and condensate pumps serving condensers for generators and blowers	5,100	4,600	5,100	4,600
7.	Excitation	1,500	1,200	1,500	1,200
8.	Induced draft fans	21,000	28,000	0	0
9.	Forced draft fans	1,600	800	0	0
10.	Drying cylinders	0	0	200	150
11.	Station lighting, house service pumps, etc.	800	650	800	650
12.	Pulverizing plant energy	0	0	600	450
13.	Total items 3 to 13	419,000	364,150	388,000	337,000
14.	Steam supplied other depts. (normal temperature)	110,000	110,000	110,000	110,000
15.	Steam supplied by waste heat boilers at open-hearth furnaces	60,000	60,000	60,000	60,000
16.	Net outgoing steam	50,000	50,000	50,000	50,000
17.	Total items 13 and 16	469,000	414,150	438,000	387,000
18.	Boiler blow-off leaks—8 per cent	37,520	33,128	35,040	30,960
19.	Sum of items 17 and 18	506,520	447,278	473,040	417,960
20.	Boiler feed pumps	25,325	23,960	23,650	20,895
21.	Contingencies	20,000	19,000	18,000	17,000
22.	Total demand on boilers	551,843	490,238	514,691	455,855
23.	B.t.u. in auxiliary exhaust	40,700,000	28,400,000	38,000,000	26,400,000
24.	B.t.u. in condensate	28,187,500	25,450,000	24,400,000	23,677,000
25.	B.t.u. in make-up (90 deg. evapor.)	1,947,000	1,490,600	1,330,000	1,180,000
26.	Total items 23 to 25	70,834,500	55,340,600	63,730,000	51,257,500
27.	Item 26 ÷ item 22	120	115	120	112
28.	Boiler feed temperature	210	205	210	201
29.	B.t.u. delivered by boilers, per hour	627,447,565	558,872,320	585,205,667	419,674,700
30.	Steam per kw. load (equivalent)*	12.5	14.2	11.5	13.15

Boilers 2300 hp. rated capacity.

*Deducting for steam outgo from station. Equivalent load is taking kw. equivalent of blowing turbo (air hp./1.34 × efficiency of turbine generator and not of turbo blower unit).

kw. for 3 hr. peak load time, the energy can be put out at a cost around ½ cent, and sold at a price of at least 1 cent, thereby making a net return of $500 per day. This amount is interest on a large part of the plant investment. For the above the B.t.u. price for the by-products is figured on a basis of 13,500 B.t.u. coal at $2.50 per ton. This charges the power plant a price higher per heat unit than they can usually be sold for, as the most profitable method of selling these by-products is in the form of electrical energy.

STEEL WORKERS COOL

Union Organizers Meet with Little Success Owing to Change to Shorter Day

That efforts to organize the steel workers of the country are meeting with little success has been admitted by William J. Hannon, secretary of the committee of 14 International unions of the American Federation of Labor that has had the organization plans in charge.

The coolness of the workers and also of International officers is attributed to the change from the 12 to eight hours and 10 hours which has been in progress since Aug. 16. In the official journal of the International Association of Machinists, Mr. Hannon makes some very interesting observations.

"In the 'steel campaign' now being conducted, there is an opportunity for our members who are seeking employment to get positions in the steel mills," says Mr. Hannon. "The 8-hr. day has been inaugurated in some of the mills in some departments, but a large percentage of the men still work 10 and 12 hours.

"But in the steel mills operating on an 8-hr. basis employment therein will be found as desirable as anywhere else. The chief complaint in the past against employment in the steel mills has been the long workday, and while that is still in effect to a great extent, through the proper effort by organized labor every man working in the steel industry can have his hours reduced to eight. Therefore, so far as the machinists are concerned, it will be well for our officers to urge our membership to secure employment, if possible, in the steel mills and there spread the gospel of organization among the workers.

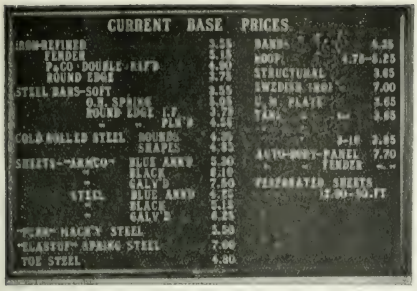
"While the campaign as conducted at present is not meeting with the sensational success we experienced in 1918-1919, it is due entirely to changed conditions. The 8-hr. day and possibly the 10-hr. day, with an increase in wages, has checked the rush for organization that otherwise would have taken place. Therefore the campaign in this direction will be slower until we are able, through other methods we may employ, to interest a sufficient number of men in the movement.

"Indifference on the part of men toward joining the organization, since our movement has created for them a shorter workday, with increased hourly rates, is not confined to the unorganized steel mill workers. Little interest has been manifested by officers and representatives of the several international organizations who should be interested in the success of this campaign. Without the cooperation of salaried officers and members of local lodges in the steel mill districts the work of organization must necessarily be slow. Even with cooperation, the task is not going to be easy."

Record Portland Cement Output

Production of Portland cement in September is reported by the United States Geological Survey at 13,109,000 bbl.—the highest figure in the history of the industry. This displaces the record made in August of 12,967,000 bbl., which itself had barely exceeded the May record of 12,910,000 bbl. Production for the first nine months is reported at 101,016,000 bbl., which figure exceeds the total for any 12 months except 1920 and 1922.

Shipments fell off from the high record of 14,971,000 bbl. in August to 13,698,000 in September, this figure being slightly below July, 13,712,000, and considerably below May, 14,257,000. Except for the three months mentioned and for July and August of 1922, September shipments were the highest on record. The total for the nine months aggregates 104,607,000 bbl., compared with 88,684,000 bbl. for the nine months last year, which was a record up to that time.



A Chart of Current Prices Is Hung In the Office Where It Is Constantly Before Men Who Make Quotations, and May Readily Be Seen by Visitors

New Steel Warehouse in Philadelphia

Unusual Details of Storage and Handling Among Features of Potts Plant—Large Employee Participation

CONVENIENCE in handling material has been carried to a high point by one of the oldest steel merchants in the country in the design and construction of a new plant. Horace T. Potts & Co., for many years on North Third Street, Philadelphia, has recently moved to its new quarters in the northeast section of the city.

The warehouse is of brick, concrete, metal sash and glass, or what is known as "daylight" construction, covering an area of 225 x 370 ft. Of this space there are five 30-ft. bays totalling 150 x 200 ft. devoted to dry storage. There is a 75 ft. x 370 ft. bay devoted to heavy storage. The building is covered with reinforced gypsum tile which is fireproof, light and not subject to condensation. At the ends of the building are railroad sidings and driveways, as well as a machine shop for repairs of motor trucks, a transformer room and locker-rooms. Attached to the main building is the office building. Adjoining are a garage for storage of company and employees' cars and a residence for the garage foreman who also acts as supervisor of plant watchmen.

Facilities for handling material into and out of the plant have been well thought out and provided. At one end are two railroad tracks side by side from which material coming in may be unloaded to the platform or floor of the warehouse. On the other side of the tracks is a 25-ft. driveway used when it is desired to load trucks direct from the freight cars. At the other end of the building is a driveway giving to a platform of sufficient length to accommodate ten trucks at once. In this way material coming in does not interfere with that going out, but progresses through the building for storage and to the other end for delivery.

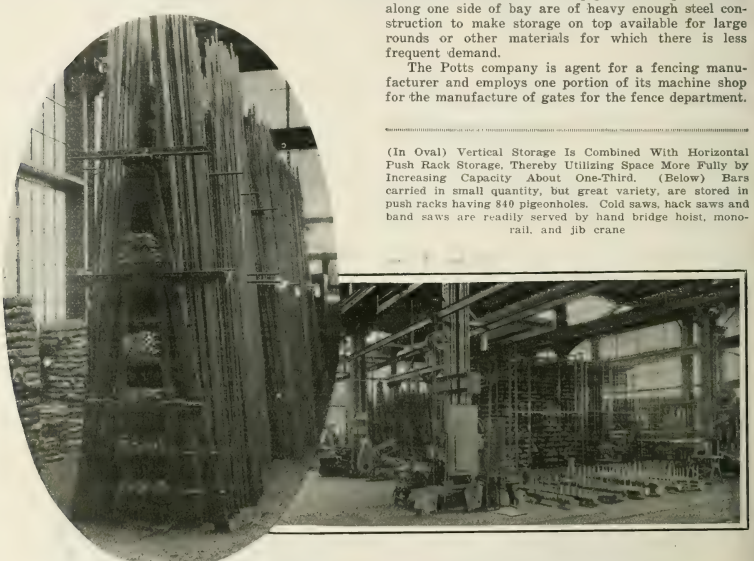
To further the easy handling of material there is a transverse driveway on floor level through the middle of the warehouse. This leads out of the building at one side to driveways which wind around either end of the building and down to the level of the main drives at each end. Electric industrial trucks are used on these drives.

The first impression created is that the whole warehouse is unusually neat and orderly. In the section devoted to dry storage are hot air ducts which deliver dry air to the enclosure to prevent rust. This portion of the warehouse may be entirely cut off from the rest of the plant by electrically operated rolling steel shutter doors. Such doors are also provided at other points, so that the building may be entirely closed in winter. The middle bay in the dry storage section is left clear for through handling of material on a 7½-ton crane.



At One End of the "Daylight" Warehouse Are Two Spur Tracks Adjacent to the Unloading Platform. A 25-ft. driveway permits material to be loaded direct from car to truck when desired

To one side of this center bay is the tool and alloy steel storage, the bulk of the company's business being on brands or specification analysis. This material is cared for in two ways, vertical and horizontal storage. The vertical racks are made of triangular supports, so arranged that material is stood on end along the connecting ties. The triangular supports are also provided with cross members which serve to carry bars in horizontal arrangement, thus increasing the capacity of these racks, about one-third over the ordinary use. Another rack in this department is exclusively used for horizontal storage and has 840 compartments. This rack is for stock carried in comparatively small amounts but in great variety of sizes. This part of the dry storage is served by an electric hand crane supplemented by monorail with chain hoists and a jib crane, so located as to properly serve the saws. As the bays are of standard construction, provision is made for a power crane if later needed. In this part of the dry storage sheets of odd widths are carried in vertical racks.



(In Oval) Vertical Storage Is Combined With Horizontal Push Rack Storage, Thereby Utilizing Space More Fully by Increasing Capacity About One-Third. (Below) Bars carried in small quantity, but great variety, are stored in push racks having 840 pigeonholes. Cold saws, hack saws and band saws are readily served by hand bridge hoist, monorail, and jib crane

The regular sheet storage is on the other side of the center bay. The main floor and a mezzanine, which is 60 x 75 ft. and capable of sustaining 1000 lb. per sq. ft., are used for this purpose. The mezzanine is served by an elevator which also serves the cafeteria on its other end, the floor of which is at the same level as that of the storage gallery. In this portion of the sheet storage material is stacked in horizontal piles. In the sheet department are a set of corrugating rolls and a squaring shear of ¼-in. capacity both accommodating sheets up to 12 ft. between the housings.

In the 75 ft. bay devoted to heavy storage are two cranes of 7½ tons each, one of 30 ft. span, the other of 45 ft. These cranes operate on parallel runways. To avoid placing a row of columns down the length of the bay thereby cramping handling room, the building was designed with a roof of bridge type construction from which one runway for each crane is suspended. This leaves the entire 75 ft. width clear for handling material.

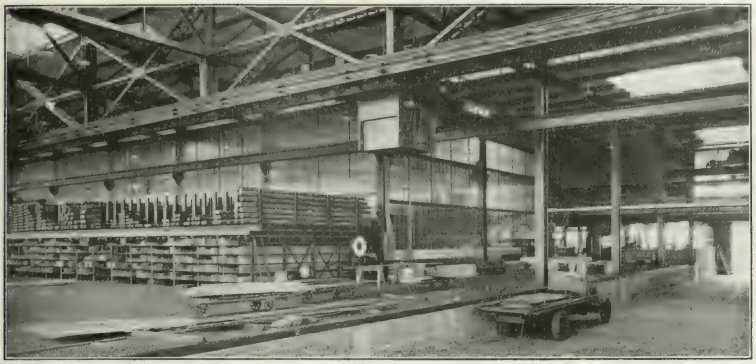
Incoming material when being unloaded from cars is weighed at once, count being taken of the total of each size of stock in the car. For this purpose there are two 10-ton scales on the unloading platform, each provided with weighttograph attachment for quick reading. This avoids dependence on track scale weight which would register shortage on a whole car load, but would not indicate on which particular size in a miscellaneous car the shortage was. The weights of individual classes are checked against invoice weights of each item and proper shortage, if any occurs, may be traced immediately.

It has been found that space may be saved by orderly laying of flat stock, channels, etc. These are arranged in staggered layers, each layer being about 6 in. thick. The ends of alternate layers overhang, permitting a crane sling to be placed under and raise the layer, thereby avoiding the use of space consuming sling clearance strips in the racks used for stacking this class material. The "pigeon-hole" push racks along one side of bay are of heavy enough steel construction to make storage on top available for large rounds or other materials for which there is less frequent demand.

The Potts company is agent for a fencing manufacturer and employs one portion of its machine shop for the manufacture of gates for the fence department.

Several schemes which tend to keep its employees' interest keyed to the highest point have been worked out. In the first place, group insurance is carried. An employee with the company six months secures a policy for $1,000, which is increased from time to time up to $3,000 after 15 years. In addition, there are 56 of the employees who have subscribed to the employees' 7 per cent participating preferred stock, $60,000 having been issued to date. Interest on this stock must be paid out of the company earnings before any distribution to the partners. In the division of company earnings, the capital investment of each partner is credited at 7 per cent, and when any interest bonus on capital is paid to them, the employees' preferred stock receives the same addition. This interest bonus is paid to employees holding preferred stock in addition to the profit sharing which is participated in by all employees.

Of these 56 employees, 30 have been with the company 5 years or longer. Those who are not in position to subscribe to the stock, which is issued in $100 denominations, may avail themselves of the company's savings account plan, which pays 5 per cent. This is an incentive to build savings to the point



The Delivery Platform Will Accommodate Ten Trucks at Once. Two 7½-ton cranes are mounted with one runway of each supported from the roof structure in the heavy storage bay. Push racks are constructed sufficiently heavy to carry large rounds on top

where shares of stock may be bought. It has been found that the encouragement to employees to become stockholders has caused them to be boosters of the company's business among their friends, thereby adding to the good will and influencing additional business to the company.

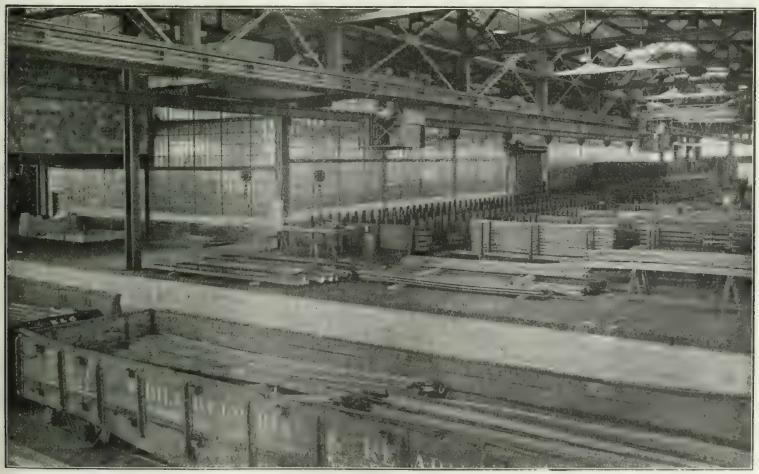
Crucible Steel Co. of America Makes Favorable Report

The Crucible Steel Co. of America reports net profits of $5,302,243, after deductions, for the year ended Aug. 31, 1923. After payment of preferred dividends there remained $6.45 per share on the 550,000 shares of common. This is the most favorable showing since the peak year, 1920. Last year there appeared a deficit of $3,709,517 before dividends, and a final deficit of $6,459,334. On the balance sheet current assets totaled $29,749,963, against $28,256,731 in the year previous.

Chairman of directors H. S. Wilkinson in his statement to stockholders said in part:

"We take pleasure in reporting a decided improvement in this year's business over last year. The demand for our products has increased, and notwithstanding the low prices which have prevailed in the steel business during this year, the earnings of your company have increased each quarter.

"The number of customers on our books today is the largest since the company was organized. We are rapidly increasing our production of high grade steel by installing new improvements in our manufacture, which is not only reducing our cost per ton of steel, but is making it possible for us to supply to the trade a larger volume of fine steels than we have been able to produce before."



Each Class and Size of Material from Miscellaneous Cars Is Weighed and Checked Against Invoice Weights, Rather Than to Depend Upon Car Scale Total Weight. Flats, channels, etc., are stacked in staggered layers to avoid need for strips, to permit sling clearance. Suspended crane runways with two cranes show clearly in this illustration

Forge Shop with Charger-Manipulator

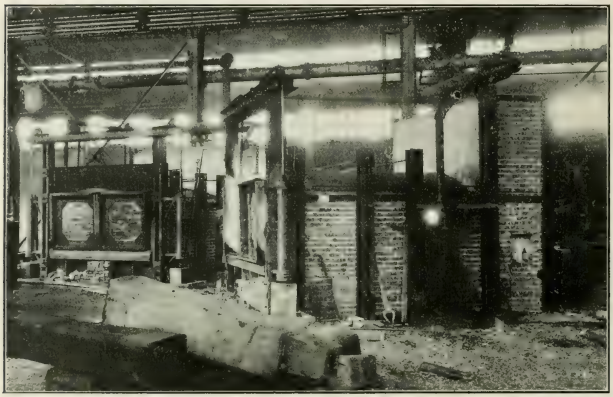
Machine Operates on Turntable, with Heating Furnaces Grouped Radially About It—Flexible Heat-Treating Furnace a Feature

WITH the completion of the reconstruction program of the Union Electric Steel Corporation, Pittsburgh has added another quality steel-making unit. This company is now an interest of the Edmund W. Mudge Co., Pittsburgh; through liberal expenditures during the past year there has been created a modern, efficient and economical plant.

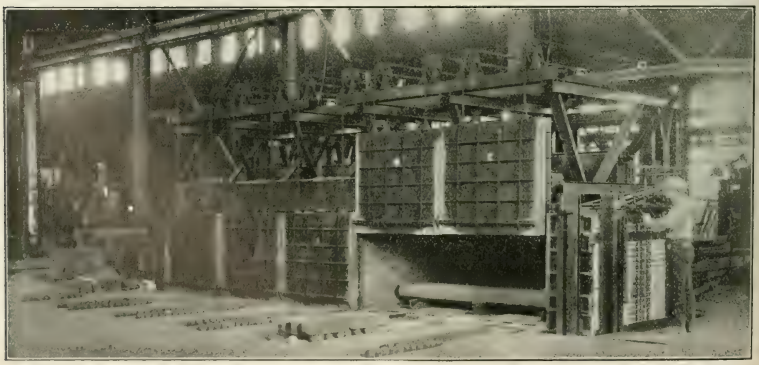
New equipment has been installed, consisting of a new heat-treating department, a combination manipulator and charger of special design, a new power plant, new forging furnaces and numerous additions to the machine shop equipment. Little of the former equipment, except the 1000-ton forging press, the 5000-lb. hammer, two smaller hammers and the two Heroult electric furnaces, has been retained, and the management believes that the plant now is the equal of any in the country, for the production of electric steel.

It was proved at the United States Naval Ordnance plant at South Charleston, W. Va., that electric steel is superior to other steels in giving the proper transverse, as well as longitudinal, tests in gun forgings, the physical properties of which are similar to those required of steel used in the manufacture of die blocks, except for the greater hardness of the latter. It was, therefore, decided here that all steel used in the manufacture of die blocks, trimmer steel, shoes, rams, piston rods, as well as other supplies for the drop forge industry, should be electrically melted. The equipment for this at present consists of two 6-ton Heroult furnaces, each capable of producing 24 tons of steel daily.

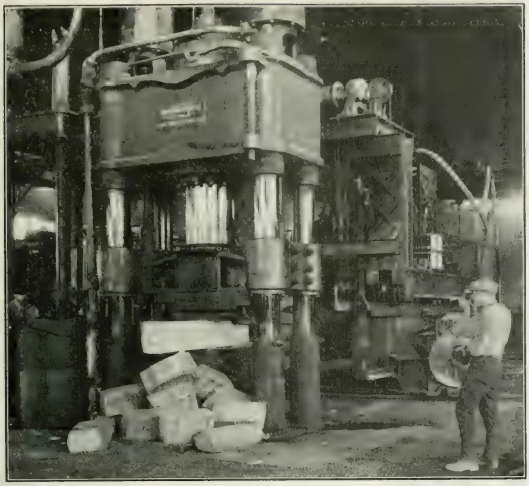
It is the practice of the new management to keep the carbon within a 5-point range, the manganese within a 10-point range and alloys within similar limitations, while sulphur and phosphorus are kept



At Left — Forge Furnaces in which the Air Is Heated in the Rear and Conveyed to the Heating Chamber Through Calorized Pipes, Protected from the Furnace Flame by a Baffle Wall



Below—Heat-Treating Furnace; This Furnace Can Be Employed as a Single Unit or as Five Separate Units, by the Use of Sliding Partitions



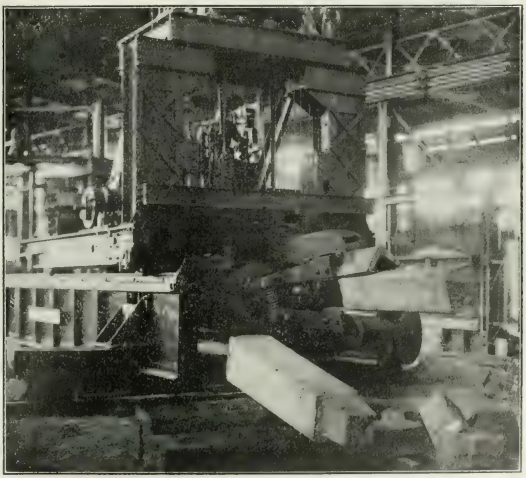
Charger Holding Ingot in Forging Press; Operator Using Optical Pyrometer. As the charging machine virtually rotates about a central point, just as a locomotive turn-table rotates, by running on wheels on a circular track, it can handle ingots or billets into and out of furnaces arranged radially about that center. Cold ingots are deposited within its reach by the overhead electric traveling crane

under 0.02 per cent. As an extra check, each heat is examined microscopically before forging, to insure a clean steel in the finished product. As an additional safeguard to quality, the temperatures during heating are controlled pyrometrically within narrow limits and an accurate reading of the temperatures of all ingots during forging is made and recorded. Hardness tests are made and recorded on all blocks and each piston rod is tested physically as to tensile strength, elastic limits, elongation and reduction before shipment.

Grouped radially around the revolving manipulator, the forging furnaces are oil-fired and of special design, in which the air is preheated in the rear of the furnace and conveyed through a series of calorized pipes to the burners. The doors are operated by hydraulic cylinders.

The manipulator or charger, designed and built by the Alliance Machine Co. from specifications submitted by this corporation, not only fits the requirements perfectly, but promises to pay for itself within a short time, since, in the physical handling of material during heating and forging, the number of men and the time required for each operation have been materially reduced.

Operation of this machine is extremely interesting, as it revolves around a center table on a 34-ft. diameter circular track. Like the open-hearth charging machine, it is controlled and operated by one man. Ingots are placed within reach of the manipulator by



Charger With Ingot Ready for the Forge or Preheating Furnace. This machine not only rotates on its circular track, as on a vertical axis, but has a considerable in-and-out motion on rails on the lower girders, just as an open-hearth charging machine operates. In addition, and again like the open-hearth unit, the "peel" has its own rotary motion about a horizontal axis, thus turning the piece to any desired angle under the forge

electric cranes, after which all charging and discharging of furnaces and manipulation under the press are taken care of by this machine. The forging operation is now the work of but two men, the press and manipulator operators with a third man to hold the cutting tool below the ram of the press, in case the ingot is to be cut into die blocks.

The recuperative heat-treating unit, built by the W. S. Rockwell Co., New York, is a ball-operated type, under-fired oil furnace, a feature of which is its flexibility. With its five doors, it may be used as a single unit or as two, three, four or five separate compartments, made by the adjustment of steel-bound "silocel" partitions. Its construction is such that additions can be made to either end at any time. Temperatures are controlled by a Leeds & Northrup recording pyrometer system.

Plans of the corporation call for the building of additional forge furnaces placed radially around the manipulator, and as increase in business warrants, a second manipulator with its complement of forging furnaces and equipment will be installed, at which time additional heat-treating units and another electric furnace will be necessary.

Acme Spot Welding Machine

The Acme Electric Welder Co., Los Angeles, Cal., is introducing in the East an improved type of its electric spot welding machine. The welders have the transformer located close to the rear end of the horns thus to minimize loss of current and give high efficiency. They are made in two styles, one having stationary and the other adjustable, lower horns. Sizes range from 13 kw. to 15 kw. and from 12 to 30 in. throat and they operate on 220 alternating current but may be wound for other current.

The horns are made of cold drawn copper and of



The Transformer Is Located Close to the Rear End of the Horn, an Arrangement Intended to Minimize Loss of Current

2-in. diameter, which has proved to be ample to eliminate overheating of the electrodes. The horns are reversible and any length horn can be used in either machine. The lower horn can be dropped or moved to either side by adjusting one bolt. The machine is provided with a socket wrench which fits all the adjustments.

When lower horn is dropped it is very easy to weld in the bottom of steel boxes, tanks, cabinets and similar pieces. The electrodes can be adjusted to any desired angle which gives the operator a chance to get into corners of difficult places. The upper electrode comes in contact with the work under spring pressure and two springs are provided for heavy or light material. The voltage regulator control switch has eight steps to suit different thicknesses of material, which may range from No. 30 gage to ½ in. wire.

The upper horn is carried by a rocker arm which is brought into contact with the work by pressing the foot pedal. This presses together the parts to be welded and by further pressure the current is applied until the weld is made, at the same time holding the pressure long enough to let the weld cool, an important feature in spot welding. Working parts are inclosed in a cast iron casing which saves operator from coming in contact with live wires.

Distributers of the welder have been established in the Bourse Building, Philadelphia, and at 536 West Twenty-fifth Street, Chicago, where the machines are carried in stock.

Car Building in the South

BIRMINGHAM, ALA., Oct. 15.—The Chickasaw Shipbuilding & Car Co., subsidiary of the Tennessee Coal, Iron & Railroad Co., has completed about one-fourth of an order for 1000 ventilated box-cars for the Louisville & Nashville Railroad Co. High officials of the road, including the chairman of the executive board, Henry Walters, W. L. Mapother, president; George Evans, vice-president in charge of operations, and several directors and others, recently visited the plant and saw the actual manufacture of the cars.

The Virginia Bridge & Iron Co. is turning out some cars for the Central of Georgia Railroad.

The shed and other portions of the Gadsden Car Works, subsidiary of the Southern Railway, destroyed by fire at Gadsden, the past week, are being rebuilt. Sixty-six finished box cars were destroyed in the fire which was of undetermined origin. The loss was $250,000.

Specifications are in sight for a number of new cars and expectation is that much work of this kind will be placed in this district.

Transmission of Heat Through Steel Pipes

In a study of transmission of heat through steel pipes, being conducted at the Pittsburgh and Minneapolis stations of the Bureau of Mines, Department of the Interior, work on several sizes of steel pipes, calorized and plain, has been completed. Further tests will cover 2, 4 and 6-in. pipes. Air velocities and temperatures in the heating chambers, as well as the size of pipes, are being varied over appropriate ranges. Temperatures are being measured in the center of the pipes and in the heating chamber one and two inches from the outside wall. It has been found that steel pipes offer a higher resistance to the transmission of heat after calorizing than before. Under the conditions of the test but slight effect was noticed on the calorized pipe, while the plain steel pipe oxidized quite readily. The results obtained furnish a basis for the design and construction of preheaters.

James J. Weiler & Sons Structural Steel, Ornamental Iron & Metal Products Co., established at Huntington, W. Va., since 1916, will build a fabricating plant at Second Avenue and Elm Street, that city. Hitherto fabricating was done in Pittsburgh and Cincinnati, the company maintaining a warehouse and taking offices in the Robson-Prichard Building. Four buildings will be erected on the newly acquired property, one a steel frame structure with concrete block construction will measure 200 x 300 ft., and will be equipped with steel sash. A crane runway will traverse the entire length. Construction work will start within 30 days, providing plans are carried out.

Treatment of the Modern Industrial Gear

Advantages of Helical Gear of Low Helix Angle—Quick Quenching of Low-Carbon Gears Gives Great Toughness and High Surface Hardness

BY W. H. PHILLIPS AND L. F. BURNHAM*

POWER must be transmitted by gearing continuously, with a degree of reliability that insures the uninterrupted operation of the particular equipment. The seriousness of vibration, whether of great or small amplitude, has always been recognized and, to no small degree, vibration may be traced to the gear. The bearings that wear out too quickly, the shafts and pedestals that get out of alinement, the machine parts that become fatigued and fail, the motors that wear out commutators and brushes too quickly, and the armature leads that break—all these may be traced, in part at least, to vibration. Any formula figuring depreciation of equipment must be multiplied by a constant representing vibration.

Increasing the life of a hard-worked gear means far more than the saving in initial investments, which may be trivial. Tripling the life of the gear cuts the cost of the gear to one-third, but it also does away with removing two worn-out gears and installing two new gears. It eliminates the necessity of having the particular equipment shut down, possibly for hours, with its effect upon still other equipment dependent upon the first. These shut-downs often entail enormous loss of production. These far-reaching delays are serious and, in the interest of lower costs, must be avoided.

Permissible reduction in sizes due to improved material, heat treatment and greater tooth strength through design offers new possibilities in effecting substantial savings in material and space. This, together with higher efficiency through better tooth forms and greater accuracy in manufacture, affects power consumption and, while this effect may be small, it is continuous.

Design

There is little strictly new today in gear mathematics. The writers are in possession of portions of Willis' "Principles of Mechanism," 1841; also edition of 1870. Willis mentions practically all the properties of gearing as now understood, with references to early writers, as far back as 1615. It is fair to say the history of modern gearing starts contemporaneously with the mechanical revolution of the last two centuries or earlier. However, accurate gearing had to await the development of the modern machine tool, for gearing is no better than the means to produce it.†

Most early gears were cast, instead of machined, using the cycloidal tooth form. Cast gears still survive for rough service in mills, etc., but are found less and less frequently, as the modern, heat treated, cut gear gives superior action and life. Very recently, with the development of die casting, a die-cast gear for small powers has been brought out but has not received wide approval, as it is made of non-ferrous alloys. Today, for uniform power transmission, the cut steel involute gear is predominant.

There are many curves which could be used for gear tooth contours, but of these the involute is the most valuable. It permits alteration of center distance without effect on uniform velocity ratio, it is easily cut by the generating process and its mathematical properties are susceptible to exact study for the purpose of designing gearing according to any desired specifications. The cycloidal system is lacking to some extent in the properties mentioned, and is seldom, if ever, found except in a cast or rotary cut gear.

The first street railway helical gear set ran 500,000 car miles, is less than one-fourth worn, is still running, and has at least doubled car mileage on the pinion. Just as it is difficult to visualize the advantages of the long and short addendum, so with the helical gear. Apparently, however, the helix permits a minute section of tooth face and a correspondingly minute load to enter engagement, the load picking up as the face in mesh widens out, thus preventing tooth deflection.

The superiority of this gear was first thoroughly proved in railway service and for the last few years this type has been placed in all sorts of industrial service. The end thrust varies from 10 to 13 per cent. Where this is too great, a smaller helix angle is selected. There should be some provision for end thrust; usually this is found in collars already on shafting or in the resistance of the rotor to leaving its magnetic center. When the helical gear was developed, the features of long and short addendum gearing, high pressure angle, and a certain percentage of stubbing were incorporated in the tooth to give it the advantage of these desirable qualities.

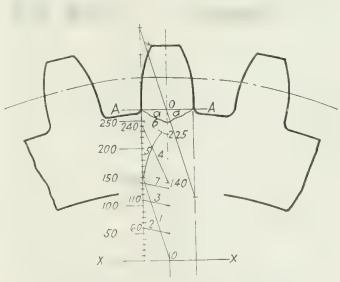


Fig. 1—Tooth Loading for Various Steels

Material and Heat Treatment

As the tooth is loaded as a cantilever beam, the grain structure in the raw material should be radial if possible, to give the tooth the benefit of the full strength of the steel. This is being accomplished to some extent in the upset hammer-forged pinion, and to a greater degree in the drop forging. The forged and rolled steel gear blank is also produced with this radial grain. When castings are used, especially when they are heat treated, clean steel is necessary, particularly at vital sections. With heavy masses tied together with thin sections, a surprisingly small flaw will cause failure of the piece in heat treatment.

Referring to Fig. 1, it can be seen that the tooth is joined to the heavier mass representing the body of the gear across section *AA*. Any structural changes involving heavy internal stresses at this point will impair seriously the strength of the tooth, which is stressed most heavily across this section in performing its work. This condition has eliminated alloy steels

*Manager, engineering department, and mechanical engineer, respectively, R. D. Nuttall Co., Pittsburgh. This is a portion of a paper read before the Engineers' Society of Western Pennsylvania.

†Watt and Boulton were in high glee when they reached the point of getting a cylinder within ⅜ inch of "round."—EDITOR.

in heavy gearing, since they fail through fatigue indicated by *aa*.

Both by estimation and failure of steels in certain services curve 3 has been established as the stress curve on a certain gear, the maximum stress occurring at *C*, dropping to *O* at the neutral axis and going into maximum compression at *C'*. Curve 1 is an untreated steel in this service, failing almost immediately through fatigue, the surface and the material to a considerable depth being stressed beyond the ability of the steel to carry the load. Curve 2 is a 0.40 to 0.50 per cent carbon, oil-treated steel, failing almost as rapidly as curve 1. Curve 3 is a 0.55 to 0.65 per cent carbon, oil-treated steel, failing in the same way but much more slowly.

Curve 4 is the ideal steel to resist just such a load as shown by curve 3. Its strength is proportional to the load it has to carry. The grading off in strength and hardness reduces the heavy initial stress that must be set up when a steel is hardened uniformly throughout. Its maximum strength is ample to carry the peak-load. Curve 6 is an alloy steel showing but a slight drop in hardness and strength through the section. While the apparent strength should provide ample margin over the tooth loading, the initial stress in the steel drops the effective strength below curve 3 at the surface, thus starting fatigue which progresses rapidly. The dotted curve shows the difference between actual strength and internal stresses.

An effort is being made to duplicate curve 4 with an alloy steel by selecting an analysis that drops the carbon with respect to the eutectoid point in proportion to the carbon steel of curve 4. Any curve crossing curve 5 represents a steel that has fallen below the actual tooth stress required in this application. This form of heat treatment, which grades the structural change, permits the successful handling of large masses. Gears up to 10 ft. in diameter, weighing 14,000 lb., have been successfully treated, showing Brinell hardness limits of 364 to 477.

Both cast steel and forged steel are now being treated in industrial gearing. Most cast steel is acid open-hearth, and we are successfully heat treating acid open-hearth carbon steel down to as low as 0.28 per cent carbon, producing over 400 Brinell hardness, without causing excessive warping by quenching rapidly. Briefly, the theory of quenching is this:

In a casting or forging which is called a pearlitic steel, the carbon is combined chemically with three parts of iron (cementite) and again mechanically with seven parts of iron which, in turn, is distributed through the rest of the iron as a network. In heat treating we heat it up to the critical temperature, at which temperature the carbon goes into solution in the iron. If it is cooled down slowly it comes back into the pearlitic state.

If we cool it fast enough we can hold the carbon in solution in the iron, getting a solution of carbon and iron. We can cool a 300-lb. gear of 1 per cent carbon steel in oil in 8 minutes and get 500 Brinell hardness. At that point wear is eliminated as a serious factor. This is practically a tool steel. If we cut down that carbon content, still maintaining the hardness, we get a solid solution of iron and carbon with smaller percentages of carbon in the solution, giving a tougher steel. To harden this steel, however, we have to increase the speed of quenching; and we have succeeded in cooling these 300-lb. gears in water in 3 minutes. We have gone still further and quenched in a special solution in 1½ minutes and, on account of that very drastic quenching, can drop our carbon content to as low as 0.28 per cent.

This, we have found, is the most successful heat treatment for most classes of industrial gearing, giving a very tough gear, with a low carbon content and a high surface hardness. Its resistance to fracture under impact is enormous and its hardness is still sufficient to maintain a low percentage of wear. In fact, it quadruples the life of the untreated gearing; on a casting it will increase the life 3½ times. These figures are pretty well established through years of following up the heat-treated gear in service.

One of the difficulties in heat treating industrial gears is that many gears were designed merely to carry the load, without regard to how the light and heavy sections are blended and what the stiffness of the gear is. As a result, when some of these designs are put through the quenching operation, we get distortion or set up enormous strains.

Properly designed gears up to 10 ft. in diameter, and weighing up to 5 tons, can now be readily heat treated. This is our maximum capacity at present, but we are contemplating treating them up to 15 ft. in diameter. The saving is obvious, especially where the gear is subjected to severe service. Considering the importance of keeping the equipment running, when a shut-down would mean serious loss of production, the slight increase in cost over the untreated gear pays for itself many times over.

Inspection

The gearing itself must be inspected when cut. Different types of gears demand different types of inspection. First as to accuracy of tooth contour, this may be established by special involute contour instruments. They work on the principles of involute tooth generation. To measure pitch displacement, the method for machine measurement of the table worm wheel can be utilized. There is also a tool which measures from tooth to tooth, measuring by the involute curve properties.

The final inspection of gears is as follows:

Spur gears are checked for tooth thickness and addendum by use of tooth verniers or gages, on small jobs. On quantity jobs, the gears are run on fixed centers. Special test machines are used, together with an indicator to check eccentricity, thin and heavy teeth, errors of indexing, interference, bearing alinement, runout, etc.

Bevel gears are checked in a similar manner for tooth dimensions. They are checked on a surface plate for shaft angles. The center distance from the backing of the bevel gear on a surface plate to the center of bore of the pinion in mesh therewith is checked. This is important and should be insisted on by prospective customers. While still set up, the face alinement is checked.

Helical and *herringbone gears* are checked in a similar manner to spurs. The pinion face is left long in herringbones to take care of pitch displacement errors and when alined up the extra face is removed.

Worms and *worm wheels* have teeth and threads checked for dimensions similar to spurs. The worm is seated on the wheel and checked for center distance, misalinement, angle of the meshing teeth, lead of the worm, and central position of the worm on the worm wheel. Where the quantity justifies it, this is done on centers.

Installation and Maintenance

A gear is designed to have the entire width of face carrying the load. Misalined or inadequate bearings tend to localize loading and, while the gear quickly adjusts its face by rapid wear to take care of these conditions, fatigue may have been started which will ultimately cause failure.

Any tendency to wear ridges on gear teeth should be eliminated, since riding on this ridge of the meshing member causes heavy localized loading. It is essential to maintain proper depth of meshing. Meshing too close on centers causes wedging of the teeth, resulting in enormous loading.

When flywheels are part of the equipment, the overload stress to buck the motor is tremendous. When flexible couplings are installed on both sides of the gear reduction, they relieve the gearing, but often to their own detriment.

Proper lubrication is good economy and it pays to watch the accumulation of dirt and grit in the gearcase and clean the case periodically. In street-car service, as high as 35 per cent of grit has been found in a supposedly well lubricated gearcase.

Sixteen old passenger cars at different points in Texas are offered for sale by the International-Great Northern Railroad Co., C. B. Porter, Houston, Tex., purchasing agent.

Labor Unions in the Field of Banking

Probable Effect of New Movement on Strikes—Report to Portland Convention Discusses Possible Influence Through Banks and Insurance Companies

BY L. W. MOFFETT

WASHINGTON, Oct. 16.—Labor has definitely entered the field of finance and much greater ownership of industries. In other words, labor is stepping in the shoes of capital. The length to which it has moved in this direction probably is not realized generally in either the financial, commercial or industrial world. The trend is looked upon as being especially significant as it concerns the status of labor and capital, and, in fact, is making the words almost synonymous. Organized labor has used restrictive measures and the strike to obtain better wages and working conditions, but under new conditions, provided the present movement grows, as apparently it will, it is suggested that the strike and restrictive measures may be abandoned to a large extent.

It appears, evident that labor is striving for control of credit and, if successful, it is maintained, will be in a powerful position to exact its demands. On the other hand, the contention is made that, with labor accumulating credit and ownership in industries, it will find its interests closely paralleling those of officials and heavy stockholders of financial and industrial institutions and even will find its membership advancing to official positions in these institutions. In such cases, it would be expected that the strike would be progressively laid aside as a weapon for frequent use. The effectiveness of unionized labor which relies so largely on this weapon manifestly would be greatly reduced, should this eventuate.

This movement of labor that has taken on such a strong impetus has been given considerable study by Richard Boeckel, Washington, a labor economist, who at one time was expert for the Industrial Board set up during the war by former Secretary of Commerce Redfield.

Labor Banks Established

In its annual report to the Portland convention of the American Federation of Labor, the Executive Council of the Federation stated that there are now "practically 23 labor banks either doing business or about ready for business. In addition about 20 more such banks are now in process of organization," said Mr. Boeckel.

The actual number of labor banks in operation at this time is 15. The fifteenth was opened at Cincinnati Oct. 6 by the Brotherhood of Railway Clerks. Twenty banks probably will be in operation before the end of the present year and 50 by the end of 1924. The present resources of these banks exceed $50,000,000.

This movement, which has shown such a remarkable development during the last three years, in spite of the hostility of some "two-fisted, fighting leaders" of organized labor, calls for attention and close study on the part of intelligent American employers, in the opinion of Mr. Boeckel. This is not a movement that has developed out of theory and on the basis of propaganda, he contends, but it is a development out of the conditions that have confronted the workers and brings with it the promise of a complete revolution in trade union methods.

Financial Cooperation

Through its new banks, and the investment and insurance companies by which they are to be flanked, organized labor is for the first time inviting real cooperation—financial cooperation—with it by the general public. It is inviting the cooperation also of intelligent and liberal employers, in an effort ultimately, as Mr. Boeckel believes, to bring about a real "industrial democracy" in the United States.

An Important Power

A resolution introduced at the Portland convention of the American Federation of Labor proposed to give the official endorsement of the federation to the labor banking movement and urged all trade unionists to deposit their funds in labor banks. Should trade unionists generally shift their deposits to the new workers' banking institutions, organized labor would immediately become an important financial power. It behooves intelligent employers, therefore, to learn how the present financial power of the new capitalistic institutions of the workers is being used, Mr. Boeckel urges, and how their increased power is likely to be used in the future.

"For anyone who has studied the new labor banking movement—the 'new radicalism' in the United States—the conclusion is inescapable that its principles are in direct conflict with much of the philosophy of the old trade unionism," said Mr. Boeckel. "This fact is recognized abroad, for a recent article in the London *Socialist Review* urged that many of the old trade union methods be abandoned and that a 'capital conscious movement' be inaugurated in Great Britain. 'America,' the article concluded, 'has shown the way.'

"The example being set by American workers is bound to exert a profound influence upon the labor movement throughout the world. Even in Germany, where conditions are far from propitious, a large trade union bank is at present in process of organization. And Germany has something to give American workers by way of a return example.

"The National Union of Metal Workers (Metallarbeiterverband) one of the largest European trade unions, has recently established a Research Department which collects statistics upon the financial condition and the profits of all industrial enterprises in which German metal workers are employed. These statistics are furnished in detail to the works councils in the various metallurgical establishments, and the wage and other demands of the workers are largely based upon them. When such methods as these begin to be adopted, and the workers are found to be in control of a substantial part of the credit without which industry cannot function, the time when industry must of necessity be transferred to a cooperative basis is not far distant.

Putting on Business Basis

"How rapidly American trade unions are being put upon a real business basis, under the influence of the new labor banks, is indicated by what is happening in the bookkeeping departments of many unions. Heretofore, many of the 'fighting' leaders of labor have been intolerant of any system of accurate accounts. Not a few unions have kept their funds, sometimes amounting to hundreds of thousands of dollars, in the names of individual officers. Embarrassment to the unions because of the carelessness or the dishonesty of these individuals has often been the result.

"The new labor bankers are quietly asking questions about trade union balance sheets, vouchers and other matters in which they as bankers are interested. Approved business methods in the business management of the unions have been coming into wider use

(*Concluded on page* 1092)

Commercial Alloys of Chromium and Iron*

The 20 Per Cent and Higher Chromium Mixtures in Different Carbon Ranges—Physical Properties, Heat Treatment and Structure

BY C. E. MAC QUIGG

CHROMIUM has well-defined effects when added to the iron-carbon system. These effects depend on the amount of chromium added and on the composition of the iron-carbon alloy to which the addition is made, i.e., whether low or high-carbon steel, cast iron, etc. In the case of the low-carbon steels, the chromium addition, when not in excess of several per cent, appears to exert an influence on the properties by its influence on the critical range. In the higher chromium alloys, the physical properties are influenced chiefly by the formation of new complexes, such as iron-chromium solid solutions and, with higher carbon contents, iron chromium carbides of great hardness.

Examination of the published data on the critical range phenomena of chromium bearing steels up to several per cent chromium indicates an agreement on the following points:

1. Alloys of iron and chromium without carbon have their magnetic change point A_2 depressed, the depression being function of the chromium content. The elements iron and chromium form an unbroken series of solid solutions and the lag between Ar and Ac is quite small, and the position of neither is much affected by previous heat treatments.

2. Chromium raises the thermal critical range, the elevation of the range being a direct function of the amount of chromium present and the amount of carbon contained in the alloy.

The outstanding effects on steel of chromium additions up to several per cent are the development of hardness without brittleness in the treated specimens, a finer grain, and the lessening of the mass effect in heat treatment. The effect of lowering the carbide change, by even moderately slow rates of cooling, is to cause the chromium steels to assume desirable physical properties with treatments much less drastic than are required for plain carbon steels of like carbon content. This results from the suppression of the critical range by under cooling.

Until recently there has been a gap in the plain chromium steels (from about 1.5 per cent chromium to the stainless-steel range). Some excellent steels have been described by Aitchison and unusually good properties obtained with 2.5 to 3 per cent. chromium.

The combination of hardness, tensile strength, and toughness suggests the use of such compositions for rails. It has been found that the air-hardening properties of chromium give a refinement of grain, even with large masses air cooled; this might be expected to improve greatly the structure at the center of rail head over that common to plain carbon-steel rails.

Chromium as an alloying metal in high-speed steels has long been indispensable, many standard brands containing it in quantities up to 4.5 per cent. Satisfactory tools have been made with about 18 per cent chromium and no other alloying elements but vanadium. There has been much controversy as to whether tungsten or chromium is chiefly responsible for the self-hardening properties of high-speed steels.

With the exception of the plain nickel steels, most of the well-known engineering steels are alloys containing chromium and one or more alloying elements in addition to the carbon, such as nickel, vanadium, molybdenum, etc. Their properties are fully described in several standard references.

The place of so-called "stainless steel" in cutlery has become well established. The composition is generally 12 to 13.5 per cent chromium with 0.3 to 0.4 per cent carbon. Since the development of the stainless steels, stainless or rustless irons have been experimented with. With from 9 or 10 per cent up to 14 or 15 per cent chromium and less than 0.10 per cent carbon, this class of alloys does not require heat treatment to develop stainless qualities.

Alloys with 12 or 15 per cent or more chromium and the balance iron or one or more elements, as nickel, cobalt, tungsten, molybdenum, etc., have been brought to a quite useful stage of development in a number of compositions. Many of these have received well-known trade names in this country and have been extensively used for electrical resistance, high-temperature resistance, tools, etc. Examples that may be cited are Nichrome, Rezistal, and Stellite.

Alloys with 20 Per Cent or More Chromium

Although this investigation has extended over a number of years, some points are still of a controversial nature because of a lack of knowledge of the behavior of metals and alloys in general from the standpoint of physical chemistry. The information is therefore presented largely from the standpoint of engineering interest.

It may be well to picture alloys between 20 and 30 per cent chromium as having, in a general way, similarities to the plain carbon steel-iron series. The alloys low in carbon resemble steels in being forgeable; they gradually shade over into the white-iron or chilled-iron alloys in the high-carbon range. While the similarity is somewhat distorted, the two series are in many qualities comparable. No graphite will be found, however, in the iron-carbon-chromium series of this range. For convenience in discussion, the alloys may be divided into three purely arbitrary groups, according to carbon content: Low-carbon, up to about 0.5 per cent; medium-carbon, 0.5 to 1.5 or 2 per cent; high-carbon, 2 per cent and more.

Chemical Characteristics: The outstanding chemical property is resistance to oxidation at high temperatures, or in fact to any oxidizing action. Exposure to air at 1000 deg. C. will cause, on bright samples, a light tarnish, or at most a thin and toughly adherent scale that acts as a protective coating that arrests or prevents further attack. The mechanism of oxidation has been discussed elsewhere on the basis of the quality of the oxide formed and, as has been pointed out by Bancroft, the property of non-corrodibility is a function of the quality of the scale or product formed. It has been noted in tests that the maximum amount of scale is formed early and that indefinite exposure does not seem to increase materially the percentage of scale in many cases.

Carbon content does not seem to influence the resistance to oxidation. On the other hand, increase of chromium from 16 to 18 up to about 20 or 22 per cent increases the oxidation resistance to an appreciable extent. Above about 22 per cent, the relative improvement in oxidation resistance with increase in chromium is not so marked. This effect is believed to be due to the tendency to form a tougher and more adherent scale if alloys are above 20 per cent chromium than if they are below 20 per cent.

All of the alloys are remarkably resistant to nitric acid in all concentrations and temperatures. They are not resistant to hydrochloric acid and are not recommended for resistance to sulphuric acid, more particularly at temperatures much higher than 50 deg. C.

Electrical Properties: The specific electrical resist-

*From a paper presented at the August meeting of the American Institute of Mining and Metallurgical Engineers at Montreal, Aug. 30. The author is metallurgist with the Union Carbide & Carbon Co., Research Laboratories, Long Island City, N. Y.

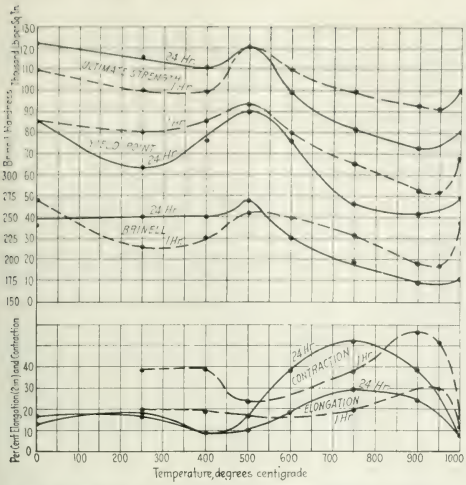


Fig. 11—Strength and Ductility of Low-Carbon Chrome-Iron Alloy; Specimens Air Cooled After 1 and 24 Hr. at Temperatures Indicated

ance of the alloys is high and the temperature coefficient is large. An alloy with 0.27 per cent carbon, 23.49 per cent chromium, gave the following data: 17.3 microhms per cu. in. at room temperature and 2.6 times this value at 1100 deg. Fahr. This test was made on 0.025-in. wire.

The permeability of the alloys is rather low, but is higher the softer the alloy. In general, the permeability is less than one-half that of cast iron. Carbon lowers the permeability to some extent, but manganese lowers it greatly.

Physical Properties: The mean specific heat between room temperature and 200 deg. C. was found to be 0.15; between room temperature and 600 deg. C. it was 0.165 on the same sample.

The thermal coefficient of expansion is not far from that of steel, being about 0.0000066 per deg. Fahr. in the rolled alloy. The relation is linear between 0 and 1500 deg. Fahr.

The thermal conductivity between room temperature and 100 deg. C. is about one-half that of soft steel, as shown by some rather approximate tests.

Hot and Cold Working Properties

Low-carbon Alloys: The alloys with about 0.3 to 0.5 per cent carbon have a fracture in the cast condition which depends on the rate of freezing. A casting may have a large, shiny or coarse-grained fracture with single facets extending nearly across a thin section; some grains will show a cubic crystallization under a hand glass, like galena. The transverse strength of such metal is likely to be low. The same metal, cast under different conditions and more rapidly cooled, will show a fine-grained fracture like a well-forged low-carbon steel. This refining of grain is naturally attended by an improvement in strength and these castings will be quite tough. On the other hand, in one or two instances, a low-carbon fine-grained casting was brittle; on investigation this alloy was found full of minute inclusions; in other words, the metal would correspond to a "dirty steel." It is believed that these non-metallic inclusions act as crystallization nuclei and bring about a fine-grained structure, but one without good mechanical strength or resistance to shock stresses.

The low-carbon alloys are readily forgeable and will stand forging through nearly the same temperature range as a steel. Because of their greater hardness and toughness at elevated temperatures, they require a higher low limit for hot working than do the steels—namely, about 800 to 850 deg. C. They work best at 950 to 1050 deg. C., depending on the operation. Plate and rod have been rolled on a commercial scale with practically the same procedure as for steel, the factors affecting production being about the same as for ordinary medium-carbon steel. Wire drawing is quite practicable, but has certain differences from steel practice. More care seems to be required in the early draws, but after a few draws have been made the drafts can be considerably increased.

Hot pressing has been done on an experimental scale and has demonstrated its practicability and there are indications that cold stamping is also feasible. Seamless tubing also has been forged; the process appears to be entirely commercial.

High-carbon Alloys: The difficulty of hot and cold working increases with increase of carbon content; the workability seems to depend to a much greater degree on the carbon content than on the chromium. It is possible to forge alloys with 2.5 or 3 per cent carbon and 26 to 28 per cent chromium, but the forging is dif-

(*Concluded on page* 1091)

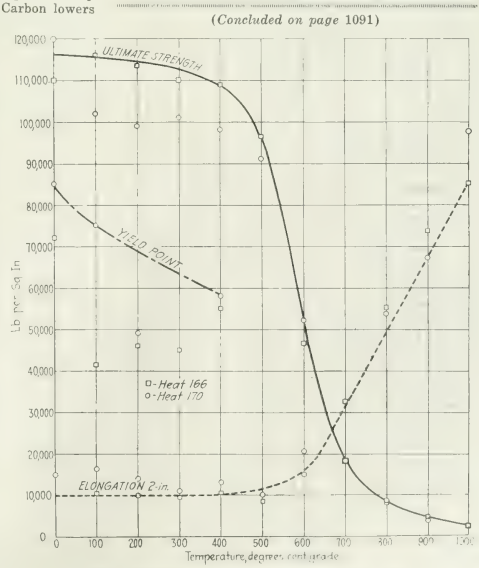


Fig. 12—Results of High-Temperature Tensile Tests

Head of Engineering Council Resigns

ROCHESTER, N. Y., Oct. 13.—Resignation of Mortimer E. Cooley, dean of the college of engineering and architecture, University of Michigan, as president of the American Engineering Council of the Federated American Engineering Societies was announced at the opening session of a two-day meeting of the executive board of the Council held in Rochester, Oct. 12 and 13. In presenting his resignation to the board, Dean Cooley said that he retires on account of ill health. He also made it known that he has been granted leave of absence by the University of Michigan for the second half of the academic year 1923-1924.

Succeeding Herbert Hoover as president of the Federated American Engineering Societies, two years ago, Dean Cooley, now in his sixty-ninth year, has been identified with numerous national undertakings in the public service, notably investigation into the two-shift system in continuous industry, and the study of coal storage now going on throughout the country.

Eulogizing the leadership of Dean Cooley as productive of dignity, respect and public confidence, the executive board of the council adopted a resolution at its session, today, expressing regret that Dean Cooley is forced by ill health to relinquish the presidency of the Federation. Dean Cooley's successor will be elected at the annual meeting of the council in Washington early in January.

Meetings of Mechanical Engineers

Following is a list of sectional meetings scheduled for the immediate future of the American Society of Mechanical Engineers:

Atlanta, Oct. 18, at the Chamber of Commerce Building. Subject: Industrial Management as Applied to the Steel Plant. Speaker: Robert Gregg, president, Atlantic Steel Co.

Buffalo, Oct. 22, at Hotel Statler. Joint meeting with Engineering Society of Buffalo. Subject: Industrial Management. Speaker: J. M. Larkin, assistant to president, Bethlehem Steel Co.

Rochester, Oct. 15, at Chamber of Commerce. Subject: Management. Speaker: Dean Dexter S. Kimball of Cornell University.

St. Louis, Oct. 26, at American Annex Hotel. Subject: Management. Speaker: W. A. Layman, president, Wagner Electric Co.

COMING MEETINGS

October

West Virginia and Kentucky Association of Mining, Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention. Hotel Frederick, Huntington, W. Va.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Iron and Steel Institute. Oct. 25, fall meeting in New York; Oct. 26, visit to Aberdeen Proving Ground, Md. E. A. S. Clarke, 40 Rector Street, New York, secretary.

Society of Automotive Engineers. Oct. 25 and 26. Production meeting at Cleveland. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

American Gear Manufacturers' Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

Gear Manufacturers' Fall Meeting Program

The American Gear Manufacturers' Association will hold its seventh semi-annual meeting at the Mountain House, Lake Mohonk, N. Y., Oct. 25, 26 and 27.

Maj. Earle Buckingham, Niles-Bement-Pond Co., is scheduled to read a paper, "Analysis of Milled Gears," on the opening day of the meeting, while "Training of Shop Executives," is the subject of a paper to be presented by John Kottcamp at the second general session on Oct. 26. A. W. Copeland, Detroit Gear & Machine Co., will preside over a special meeting, also on Oct. 26, of the automotive group for the discussion of conditions in that industry.

Following the regular informal dinner at 6.30 p. m. Friday evening the third general session will convene for an address by R. M. Hudson, division of simplified practice, Department of Commerce. The fourth and last general session of the meeting will be held Saturday morning, the principal address being on "New Applications for Gears" by E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt.

Some Improvement in Finished Lines at Youngstown

YOUNGSTOWN, Oct. 16.—In this district the finished steel market shows a measure of improvement, as compared with a month ago. Orders for sheets, for instance, are more numerous, though the tonnages involved are small in most instances. There has likewise been a somewhat firmer demand for plates. The requirements for standard merchant pipe are such as to place it among the most active of finished steel lines at this time. Tin plate producers are well sold over this year and interest in this market centers chiefly on the requirements which will develop for the first half of next year.

Sheet makers are maintaining production in this district at an average of 60 to 65 per cent, and have largely reduced their unfilled tonnage, especially in black sheets, during the past month and a half. The independents are reported less favorably situated in this respect than the leading interest.

The major producers maintain they are adhering to a 3.85c. base on No. 28 gage black sheets, but a price of 3.75c. appears occasionally. Galvanized sheets are quotable at 5c. and full-finished at 5.35c. The leading independent maker of automobile body stock is operating at a rate close to normal and still has a comfortable backlog in this grade.

Merchant bars are weak, with the price nominally at 2.40c. Pig iron is admittedly weak and prices are unsteady. Standard basic is pegged at $24 for the time being.

Operations in the Mahoning Valley

YOUNGSTOWN, Oct. 15.—The Youngstown Sheet & Tube Co. is this week maintaining production at 75 per cent at its district properties. The Republic Iron & Steel Co. is operating around 65 per cent. Of its 18 sheet and jobbing mills at the Niles plant, eight are under power.

Among the independents in this district, the Trumbull Steel Co. is operating closest to normal, with all departments active, except a number of cold tin plate mills.

The Falcon Steel Co. is operating all of its eight sheet mills, at its Niles property.

Of the 120 sheet and jobbing mills in the Mahoning Valley, 76 are under power this week, a decline from last week, while 16 of 17 pipe furnaces are fired.

Complete Electrification of Foundries

Practice and Production Problem Rather Than Electric—Mechanical Molding and Sand Handling—Purchased Power Advocated

BY LEONARD W. EGAN*

ELECTRIFICATION of the foundry entails more than the mere selecting and installing of motors, controllers, wiring, etc. It covers maintenance of the entire plant equipment and its production of continued, uninterrupted service. It is inseparably linked with the design and application of all the equipment and the manner that it enters into foundry production.

This is accordingly not intended as an engineering discussion, but rather as a discussion with the foundryman of the possibilities of electrified methods and systems as applied to the process of molding, together with the reasons why.

We are endeavoring to show this whole problem from the producing and the operating man's standpoint, more than from the electrical man's, the considerations being mostly tonnage, improvement of production, reduction of the man-hours per ton, both in productive and non-productive labor, simplifying the labor problem, reducing the various foundry operations to a more mechanical and stabilized basis, and eliminating the great amount of laborious operations that exist in most foundries today.

The matter has become one of foundry practice; a foundry production problem rather than an electrical one but, like the electrification of the modern steel mill, the two are so intermingled and overlap to such an extent that the electrical man of today is vitally interested in production and how and why it is done, and must be as familiar with the plant production as with the application and care of the equipment.

It was originally intended to discuss and illustrate the various styles of electrical apparatus used in the foundry. It soon became apparent that the paper would reach a prohibitive size and be reduced at last to a catalog of foundry equipment. For this reason it was decided to devote the paper to a discussion of the effect of electrification on the increase of production, the speeding up of the work and the stabilizing of the maintenance situation in general. The discussion has been divided into eight general subjects:

1. Electric molding machines:
   Roll-over, pattern draw machines, sand-slingers.
2. Sand handling systems.
3. Electric furnaces:
   Melting furnaces for non-ferrous metal; core ovens.
4. Cranes.
5. Purchased power.
6. Electric welding.
7. Safety.
8. Air and electric hoists.

Molding Machines

There is great need in the foundry of reducing, as far as is consistent, the making of a mold to a predetermined mechanical operation, the sequence of which has been previously worked out and determined upon. This should be developed to the highest degree obtainable in order that the production of the mold may be accomplished without dependence upon the personal skill and judgment of the workman.

Adoption of mechanical molding by the use of molding machines reduces the greatest part of the mold production to a mere predetermined mechanical routine action. This permits the use of a cruder grade of labor in about 80 per cent of the operation and, in conjunction with overhead bins and flask filters, entirely eliminates the laborious work which was heretofore the heritage of the molder.

Molding machines are divided into four general classes; squeezers, plain jolters, pattern stripping machines and roll-over-jolt pattern draw machines, all of which have been operated by compressed air heretofore.

Each type of machine has its own field of application, from the squeezer, mounted on wheels and rolled from place to place and used to a large extent in stove plate foundries and the production of small castings, to the direct-draw, roll-over jolt machines with pattern draw, used for the production of heavy castings on both copes and drags, where accurate drawing of the pattern is required.

Two outstanding features which might be called epochal, in the electrification of machine molding, have been brought out in the last few years. These are the roll-over-jolt-pattern-draw machine, with electrically operated pattern draw and roll-over, equipped with electrically operated runout car, and the sand-slinger.

Roll-Over Pattern-Draw Machine

Made by the Osborn Mfg. Co., Cleveland, the roll-over pattern-draw machine has been electrified in all of its operation except that of the jolt, which is still air operated. Some investigation has been made in the past for electrifying this portion of the machine, but to date no satisfactory substitute for the air cylinder jolt has been found. There is an instant reversal at the end of a stroke of the moving parts, including the mold on the table, without rebound which is required for the packing of the sand and to allow for the escape of air by filtering out between the particles of sand. The most logical method of producing this effect electrically would be to do it magnetically.

Electrification of the power operations of the machine renders them positive and uniform in their action and increases the speed of the machine to a degree not heretofore possible in the air operated machine. This has been a pioneer movement in the electrification of the molding machine and, while it has not been complete in all the movements of the machine, those that are operated electrically have shown such gratifying results, such savings in time and money, resulting from the improved service of the machine and the unprecedented speeding up of the molding operation, that study is being given to the electrification of the jolting mechanism of the machine.

Now that it has been demonstrated so conclusively that the electric molding machine is superior to the air operated one, it is only a question of time until other types of machines will be electrically operated.

Sand-Slinger Molding Machine

The sand-slinger molding machine, made by the Beardsley-Piper Co., Chicago, employs a radically different principle in its operation from that of any other type. The sand is pitched or thrown into the mold at a high velocity, which rams or packs it around the pattern. The operation is analogous to the old practice of the molders throwing handfuls of compressed sand into the depressions and pockets of an irregular pattern.

Briefly, the machine consists of a spindle or revolving shaft, with an electric motor direct connected at one end and an impeller head upon which a hand or cup shaped casting is attached. The impeller head rotates at motor speed, usually about 1200 r.p.m. for iron castings and 1800 r.p.m. for steel castings. At each revolution of the head a lump or slug of compressed sand is slung into the mold at a velocity of from 2700 to 6000 ft. per min., and at the rate of 5 to 10 cu. ft. per min.

The machines are made in four types or arrangements: stationary, tractor, locomotive and portable. Each type has its field of application in the foundry.

The stationary type is for use in foundries which

*Special engineer Ohio Steel Foundry Co., Lima, Ohio. This is abstract of a paper read at the Buffalo convention of the Association of Iron and Steel Electrical Engineers.

have a sand conveying system or other equipment arranged to supply sand to the machine. It may be used in conjunction with two stripping-plate machines and located between them.

The tractor type is a combination of slinger, sand cutter and elevator, self contained in one machine and mounted on wheels. The machine tows cope and drag patterns either on carts or mounted on strippers. The molds and flasks may be handled with overhead cranes or by special crane towed by the machine.

The locomotive type is for adaption for specialty or jobbing foundries where a number of castings are made from one pattern. The machine is mounted on wheels and travels on rails, having a track gage of 9 ft., and moves under its own power.

Portable Machine

The portable type differs from the tractor type in that it is not mounted on wheels nor equipped with sand cutter screws. It must be carried from place to place in the shop and the sand must be delivered to it at the bucket elevator, where then all the rest of the operations of the tractor type slinger are repeated. Great flexibility is claimed for this machine; it will ram any size mold and can be placed anywhere on the floor and then moved to a new location at will. It can be used on pit jobs or on any flask. On long molds such as engine frames, and so on, the machine can be used first on one end of the flask and then on the other end.

One of the chief drawbacks to machine molding has been the costly installation in air compression, air receivers and connected piping necessary to serve the machines when they were installed. The absence of sufficient air compressor capacity has been one of the principal reasons against the more general use of machines in the foundry. This condition will be eliminated with the advent of electrically driven machines; practically no special apparatus will be required outside the self contained machine itself. One of the aims of electrification is to reduce the air load to a minimum. The air systems of the foundries, especially some of the larger ones, are great wasters of power in the air lost through leaks. One installation was noted where about 30 per cent of the total air compressed was required to furnish air for the leaks. Except for the sand blast, the portable air hammers and rammers and the jolt mechanism of the molding machines, the air compressor could be entirely eliminated in foundries.

Sand Handling Systems

A complete, well built and motor operated sand handling and conditioning system is needed in every foundry of any importance. The work entails a number of operations. The sand, after being shaken out of the flask, must be collected; it must be screened and the foreign matter in the shape of scrap, nails, gaggers, etc., removed; new sand must be added to rejuvenate the old; the mixture must then be tempered, mixed and aerated; it must be left to rest for a short period, to get a uniform moisture content, and finally the prepared sand must be returned to the molders.

Certain standard units that go to make up the system are used. In a typical arrangement, the sand is conveyed by belt or other type of conveyor, from the floor; is passed through a priming screen for the removal of the larger foreign matter; is raised in an elevator to another screen for removal of other foreign matter; is passed over a magnetic separator; is passed through a tempering, aerating and cutting machine; thence usually into a temporary storage bin. It then passes through a feeding cutter for continuously cutting the tempered sand and feeding it by overhead conveyors to individual overhead hoppers in front of the molders.

There are other applications, especially in the smaller jobbing foundries, where a less elaborate and more self-contained system has been worked out, which is now standard. The sand is carried to a hopper on the handling system by bucket. It is then screened, cut, conditioned and returned to a storage hopper, whence it is distributed by bucket to the molding floor. A system of this nature can be installed in any average foundry. This type of sand system forms a highly efficient unit in the jobbing foundry.

Electric Furnaces

The electric furnace is entering largely into the manufacture of castings by the steel melting furnace, the annealing and heat-treating furnace and furnaces for the melting of non-ferrous metals—copper, brass, bronze, aluminum, zinc, etc. It is represented also by the low temperature oven for baking cores, a unit that is receiving favorable consideration in foundry production, and is coming into more general use.

In the electrification of the industry, the steel melting furnace has a broad field of application in the jobbing foundry, especially where it can be run near to its capacity. However, in the larger steel foundries the open-hearth furnace holds a strong position and, where large tonnages are handled, will form the main process of melting for some time to come.

Electric annealing furnaces and heat-treating furnaces have had a considerable development in the past five or six years, especially the treating furnace. It has a high degree of flexibility and, where quantity production and a uniform type of casting is possible, it offers unlimited possibilities in heat treatment. The use of this type of furnace gives complete control of the temperature, of the atmosphere, and of the manipulation.

It permits an unlimited and sequential repetition of the treating cycle. It permits the unidirectional, continuous flow of the product through the furnace, entering at the cold end and leaving at the hot end. This permits the casting to be heated progressively over a uniform range, so desirable in heat treatment. It eliminates the human factor to a high degree, thus placing the treatment of the product more in the hands of the metallurgist and less in the hands of the furnace attendant.

Under average foundry conditions the electric annealing furnace cannot compete with the combustion type of furnace in fuel costs but, where uniformity of the product or nicety of the treatment is involved, the electric furnace has no equal. Heat treated castings have not heretofore been considered to any great extent, but rather it has been largely a question of getting sufficient section in the casting. The near future, however, will see a reduction of the section and weight of castings, with a corresponding increase in strength, necessitating heat treatment, and there will be a field for the electric treating furnace there.

In the melting of non-ferrous metals such as copper, bronze, brass, aluminum, zinc and the multitude of special metals and alloys, including cupro-nickel metals, bearing metals, white metals, etc., the electric furnace is finding a broader application every day. The development of the electric furnace in this field has been more significant and far-reaching in its effect than in any other branch of the art.

There are four principal types of electric furnaces in use in this branch of melting: The open arc, the muffled or smothered arc, the resistance and the induction furnace.

The direct or open arc furnaces are represented by a number of makes and types such as the Snyder, the Booth-Hall, the Volta, the Geolette, etc. The Geolette furnace, however, is in general use for brass melting by the arc process. The muffled arc furnace is represented by one type only, the General Electric. The resistance furnace also is represented by one type only, the Bailey. The induction furnace is represented by two types, the Ajax-Wyatt and the General Electric. [Some of the outstanding features of these furnaces, as outlined in this paper, form the subject of a later article in THE IRON AGE.—The Editor.]

Core Ovens

Electrically heated core ovens are coming into more general use every day, not only because of the vast improvement in the quality of the cores but, where the cores are irregular in shape, and of the smaller variety, heating can be done cheaper and faster. The cost of attendance is greatly reduced in the electrically heated

oven as compared with the fuel-fired oven. The cost of maintenance is almost negligible, since the temperature throughout the entire oven is uniform and is not much in excess of the baking temperature of the cores themselves. Combustion furnaces arranged with pit construction for coke, oil and coal involve frequent renewals and replacements.

The electric core oven may be of the car type, the rack type or the drawer type. Car type ovens usually are arranged in size about 5 x 8 x 10 ft., which lines up with a number of the ovens in the larger foundries. The heating elements or resistors are usually placed under the car, along the length of the floor and also along the length of each side wall, three or four tiers high.

Cranes

In the average foundry the cranes receive an enormous amount of abuse, most of which is unnecessary. The use of a foot-brake is a rarity in a foundry; the author has viewed cranes in a foundry without foot-brakes, fuses or other current protection, and the hoists without either load brakes or arranged for dynamic braking. The cranes or their trolleys are used for dragging cars, buggies and flasks around the floors and from one place or building to another, all without consideration for the effect on the crane in general or the motors in particular. Usually the trolleys are equipped with a 3 to 5 hp. motor, instead of 15 hp., where this type of service is required.

Such a crane should be heavily braced and should be of a wide span to keep it square and rigid. It should have large motors to withstand the enormous demand upon it by the quick starting, increased speeds and abusive plugging. It should have all the mechanical parts so arranged that replacements can be made in the shortest possible time, and by crude workmen if necessary. The cycle of operations to which the crane will be subjected, the excessive rate of acceleration and deceleration, the abnormal plugging of the motors, all side pulls and dragging operations and the speeds required, should be carefully looked into.

Where a scrap yard runway is provided it is usually of the typical single girder arrangement, with no connection between the two girders, each being supported independently of the other. The head room from ground level to crane rail, in most cases about 25 ft., limits for all time the piling height of the stock. The tendency of late years has been to build the runways higher and tie them together above the crane. In one installation, the runway columns were mounted on piers 7 ft. above ground level, and the total head room from floor level to crane rail was 42 ft., or 17 ft. higher than in the old single girder construction. The advantages to be gained by this additional piling height are important. In any event, no other method of handling scrap equals that of the overhead crane.

Purchased Power

A foundry is intended solely for the purpose of manufacturing and selling castings. When it enters the field of the manufacture of power it takes over an enormous amount of troubles, worries and trials which attend this branch of manufacture, and in addition it is compelled to compete with a highly developed business by the public service corporations in the conversion of heat into electrical power.

For the small, inefficient power plant to attempt to compete with the service corporation of today is an extravagance on the part of the foundry owner. In the last few years the dependability of the service furnished by the central station plants has so improved that the former interruptions are now becoming rarities.

Electric Welding

Welding of castings occupies a very important position in their reclamation, chiefly by welding and plugging. A large amount of this work is still done by the gas process and there are a large number of acetylene gas generating plants in the foundry industry. There is no logical reason why gas welding should be used; it is possible to take a portable truck type electric welder to any location that a set of tanks can be taken and, aside from portability, no excuse exists for gas welding. It is possible to perform the same amount of welding by the arc process as by the gas torch, at a great reduction in cost. For cutting, however, the gas torch is more applicable than the electric arc.

Air and Electric Hoists

Air cylinder hoists are used to a large extent in the foundry industry, chiefly in conjunction with hand-moved jib cranes. They are wasteful users of power by reason of the leakage of air around the valves and piston rods and in the connected piping. There is no logical reason why these hoists should be operated by compressed air, in fact, even neglecting the leakage, the electric hoist will operate at less than half the power cost of the air hoist.

In a discussion of the relative merits of the two types of hoist, figures were submitted to show the amount of power used by an air cylinder hoist and an electric hoist. For purposes of comparison, take a 1-ton hoist making 100 capacity lifts per day; 6-ft. lift; direct current. Current consumed by the electric hoist was figured out at 814 watt-hours per day or 244.2 kwhr. per 300-day year. The air hoist, at 100 lb. receiver pressure, called for 27.7 watt-hours per lift, 2.77 kwhr. per day or 831 kwhr. per year. This is three times as much as the electric hoist needed. Electric operation of the compressor was assumed, because it is more economical than steam operation.

In conclusion, the advancement toward the complete, stable and dependable electrification in the foundries, that now exists in the steel mills, will not receive the corresponding impetus as that of the steel mill until the foundry managements recognize the necessity of giving a higher standing to the electrical man. They must give him higher authority, allow a broader scope in his efforts, more consideration for his opinions and recommendations in the development of the industry. On the other hand, they should demand of him a broader knowledge of industrial-electrical applications and maintenance management in general.

Discussion

It was pointed out that one of the main drawbacks to machine molding, particularly in a small foundry, lies in the air compressor. This is an expensive piece of equipment of low efficiency, particularly when account is taken of the apparently unavoidable leakage of air through the valves and the joints of the line. By operating molding machines by electricity, all of these elements of inefficiency and high cost are overcome.

E. S. Carman, chief engineer Osborn Mfg. Co., Cleveland, and past-president American Society of Mechanical Engineers, pointed out that the mechanical molding process is in its infancy. It has been known in successful form for only 20 years, while only 11 years have elapsed since it became possible commercially to ram the mold, turn it over, and draw a pattern out by machinery. He mentioned a particular case in the Bethlehem Steel Corporation where a mold, weighing 12,500 lb. and measuring 4½ ft. x 9 ft. x 19 in. was turned out at the rate of 150 per working day at 7½ hr. This means one of these large molds every 3 min. Because of this high rate of production, it was necessary to handle it with great expedition, the raising of the mold for turning over taking only 16 sec., while it was turned and lowered in another 7 sec.

According to Mr. Carman's experience, the resilient action such as is obtained from air destroys the mold surface as the pattern is being drawn from it, because there is a cushioning effect which is ended by a sudden jerking from the mold as the pattern is drawn. This is not so with electrical appliances, as the pull is uniform and without a jump. Devices electrically driven are arranged with automatic control so that the first 2 in. of raising of the pattern goes slowly, changing then to a rapid elevation to get the pattern out of the way. The same considerations have to do with rolling the mold over.

On the other hand, certain resiliency is needed in the jarring of the mold and the speaker does not believe it feasible as yet to apply electricity to this part

of the process. Electricity, however, he states, is much cheaper for all the other operations.

Trend of Price in Fuels

F. A. Coleman, president F. A. Coleman Co., Columbus, in speaking of fuels for core ovens, listed the four items: coke; oil; gas (manufactured and natural); electric current. Of all these, he considers electricity the most universally available. He eliminated natural gas because it is fast disappearing. Coke is placed at from $5 to $12 per ton, varying with locality; oil at 3c. to 10c. per gal.; gas at from 40c. to $2 per M. cu. ft. and electric current from 0.3c. to 5c. per kw-hr.

Of these four fuels, the general price trend during a period of years has been steadily upward, except with electric current, where the trend has been downward. Coupled with this fact is the steadily increasing field of application of electric current, which is causing it to crowd out other fuels.

The speaker pointed out the uncertain control of core oven temperatures, except for the thermostatic control of electric ovens. Oil varies in fluidity, and consequently in supply, and as the air supply fluctuates, there may be smoke at one extreme or explosive conditions at the other. The tendency of purchasing agents to buy coke at a low price results in uncertain quality, frequently poor, which spoils the cores and costs more than a good quality of coke. All advantages appear to lie with the electric oven.

Only with large production does the car type oven pay. The drawer type permits continuous operation with practically no leakage of heat during the withdrawal of the drawer, for the solid back end closes the furnace as effectually as the solid front end. With the rack type, however, there may be a drop of 200 deg. or more, from the desired oven temperature of 400 to 425 deg., every time the rack is drawn out and a new rack of cold cores inserted. The drawer type gives twice the output per square foot of area and consequently has only half the fuel cost per ton of cores.

Advantages of Direct Current

James A. Shepard, president and chief engineer Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., made a plea for direct current motors, particularly for hoisting work, because of greater simplicity of equipment and ease of control. He stated that the only advantage of the a.c. motor is the fact that it has no commutator.

This question of simplicity and ease of control assumes a particular importance in view of the large proportion of the time of the crane which is not employed in actual hoisting. The idle movements of getting to the place of work, lowering the chain and getting the slings adjusted around the piece to be hoisted, as well as the idle movements following the deposit of the piece at its destination, take far more time than the actual hoisting, transporting and lowering of the piece. It is possible with d.c. motors to perform these idle movements at 2½ times the a.c. speed. Equating this over the proportionate time of the crane shows that the d.c. equipment may have 25 per cent more useful activity per hour than with a.c. motors.

Mr. Shepard made a special plea for a new factor of safety in designing cranes and other machinery, which should be based upon the elastic limit of the material instead of on the ultimate stress. He pointed out that this would diminish largely the present practice of operators to overload cranes and other equipment to a dangerous degree—a practice which in some cases has resulted in stressing materials beyond their elastic limit and thus producing permanent deformation, resulting in inaccuracy of operation and a condition altogether dangerous.

INCREASED PRODUCTION

British Empire Steel Corporation Makes Substantial Gain Over Last Year

TORONTO, Oct. 15.—The British Empire Steel Corporation, Montreal, Que., reports production for the first nine months of 1923, showing substantial gains over the corresponding period of 1922, notwithstanding the drawbacks of labor troubles, and it is evident that the demand for the company's products has undergone a marked revival. The coal production for September last totalled 414,857 tons as compared with 425,045 tons for the corresponding month a year ago. The August, 1923, output reached 553,023 tons, as against 225,492 tons in August, 1922. For the first nine months of the present year, including September, the output of coal totalled 3,924,630 tons as compared with 2,838,180 tons for the corresponding period last year. This favorable showing was made despite the fact that the month of July was lost owing to the coal strike.

The production of pig iron for the first nine months of this year reached a total of 193,072 tons as compared with 63,127 tons for the same period of 1922. Ingots produced amounted to 220,725 tons compared with 56,395 tons in 1922, and the production of blooms reached 191,885 tons in the nine months ending with September last as compared with 55,520 tons for the corresponding period a year ago.

The increased activity of the corporation's plants is indicated by the following figures dealing with coal, ore and limestone consumed during the nine months under review:

	1923 Tons	1922 Tons
Coal	612,535	245,161
Wabana ore	248,820	111,537
Limestone	152,456	164,027

The decrease in the consumption of limestone is purely temporary, and is of no great significance. One of the most encouraging features in the outlook is the fact that there has been of late a marked decrease in labor agitation.

One source of keen disappointment to the British Empire Steel Corp. has been the loss of its German trade in iron ore from Wabana. The occupation of the Ruhr, with its consequent closing down of factories and its injection of a hazardous element in the credit situation in respect of these shipments, cut off what was becoming a very profitable market and one that was counted on to produce about $500,000 profit to the corporation this year. The business lost has, however, been compensated for in some degree by new business gained elsewhere. The company has shipped iron ore to Wales this year for the first time since 1913. Shipments have also been made to the United States, the first since the beginning of the Great War. In finished steel the company has recently closed good business with Japan, for reconstruction purposes following the earthquake, and it is predicted that before the end of November three vessels will have sailed to Japan from the company's plants.

Steel Corporation's Orders Decline Again

Unfilled business on the books of the United States Steel Corporation as of Sept. 30 amounted to 5,035,750 tons, or 378,913 tons less than on Aug. 31. During August unfilled orders decreased 496,100 tons, in July 475,498 tons, in June 595,090 tons, in May 307,158 tons, and in April 114,823 tons, while in March they increased 119,343 tons, in February 373,213 tons, and in January 165,073 tons. A year ago the unfilled business was 6,691,607 tons, or 1,655,857 tons more than on Sept. 30 last. Following is the unfilled tonnage as reported by months since January, 1920:

	1923	1922	1921	1920
Jan. 31	6,910,776	4,241,678	7,573,164	9,285,441
Feb. 28	7,282,989	4,141,069	6,935,887	9,502,081
March 31	7,405,332	4,194,148	6,284,765	9,892,075
April 30	7,288,509	5,096,913	5,845,224	10,359,747
May 31	6,981,351	5,254,228	5,482,487	10,940,465
June 30	6,386,261	5,635,531	5,117,868	10,978,817
July 31	5,910,763	5,776,161	4,830,324	11,118,468
Aug. 31	5,414,663	5,950,105	4,531,926	10,805,038
Sept. 30	5,035,750	6,691,607	4,560,670	10,374,804
Oct. 31	.....	6,902,287	4,286,829	9,836,852
Nov. 30	.....	6,840,242	4,250,542	9,021,481
Dec. 31	.....	6,745,703	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, at 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

American Society for Steel Treating

Fifth Annual Convention and Exhibition at Pittsburgh Establishes a Record—Excellent Papers and a Large Attendance

AN organization which can successfully stage a technical convention and exhibition of the high order and magnitude of the one held in Pittsburgh last week, Oct. 8 to 12, by the American Society for Steel Treating, at once takes its place in the front rank of societies of this class. That this has been possible after only four years of existence is the striking fact. The event, both from the technical and exhibition standpoint, has become one to be looked forward to with keen interest. Out of a total membership of over 2700 there was a registered attendance of nearly 1500, exceeding any previous meeting. The membership registered at Detroit a year ago was about 1250. In expansion, enviable progress was made in that the net increase in membership in good standing last year was about 18.75 per cent.

The technical sessions without exception were featured by large audiences and an enthusiasm naturally the accompaniment of a large group of comparatively young men. The papers on the whole compare favorably with those in the programs of some of the much older technical organizations. The only drawback was the unavailability of so many of them in printed form.

The steel exhibition was the most successful of the kind ever held anywhere and it was also the largest. Entire satisfaction was voiced by nearly all those who had booths, many of them reporting excellent business booked or in prospect. The experiment of not opening the exhibition until afternoon of each day appeared to be a success.

The Technical Sessions Well Attended

PAPERS of a high order, both theoretical and practical, were presented at the technical sessions. Very few, however, were available in printed form before delivery. Out of over 30 scheduled papers, only about 25 per cent had appeared in print before the convention. As is often the case, free discussion was therefore hindered, though in some cases the net result was satisfactory. The attendance at the main or principal technical sessions was excellent and keen interest was evidenced. The fact that the exhibition was not open in the morning was beneficial to the morning programs, which were carried out in the ballroom of the William Penn Hotel. The five morning sessions of the five days, Oct. 8 to 12, were all technical except the annual meeting on Oct. 10. The afternoon sessions, which were less formal and elaborate, were all held in a small room on the lower floor of Motor Square Garden, where the exhibition was held, six miles from the hotel headquarters. These were largely symposiums or round table discussions. Compared with the Detroit convention last year, the technical sessions as a whole were not only of a higher order but were much better attended. Undoubtedly the separation of the exhibition from the convention in the forenoons was a successful experiment. Very few if any papers stood out above all others in the programs. The one on "Conical Illumination in Metallography" may be pointed to, however, as striking in its revelations and as of wide significance in the future. The papers on theories of the hardness of steel by Dr. Zay Jefferies and Dr. E. C. Bain were both outstanding contributions to the subject. A new development this year was the presentation by title of three papers by eminent metallurgists of England, France and Japan.

Session on Lathe Tools and Steel Hardness

A session, regarded by some as one of the best of its nature ever held, embraced papers by leading authorities on lathe tool performance, discussed by H. J. French and Jerome Strauss of Washington; on theories on the causes for the hardening of steel by Dr. Zay Jeffries, R. S. Archer of Cleveland, and Dr. E. C. Bain of Dunkirk, N. Y., and on the crystallization of iron and its alloys by Prof. Albert Sauveur of Harvard University, Cambridge, Mass.

Effect of Heat Treatment on Lathe Tools

The time-temperature relation in the hardening and tempering of high-speed steels and their effects upon lathe tool performance, constitution and dimensional changes, were discussed in a paper on the "Effect of Heat Treatment on Lathe Tool Performance and Some Other Properties of High-Speed Steels," by H. J. French, physicist Bureau of Standards; J. Strauss, material engineer United States Naval Gun Factory, and T. G. Digges, assistant physicist Bureau of Standards, Washington. The paper was read by Mr. French at a morning technical session presided over by H. M. Boylston, professor of metallurgy, Case School of Applied Science, Cleveland.

Comparisons of endurance are given at various cutting speeds of the four most important of the current steel types for roughing tools, and the relative advantages and disadvantages of each are discussed. In addition, the "Taylor" and "breakdown" tests for lathe tools are compared and some of the limitations of the former are described in detail. Finally, the prevention and elimination of so-called "flaky fractures" in the heat treatment of high-speed steels are considered. The present tests supplement those described in Bureau of Standards Technical Paper, No. 228, on "Lathe Breakdown Tests of Some Modern High-Speed Tool Steels," by Messrs. French and Strauss. Practical conclusions drawn from the tests are summarized in the paper.

Hardness of Steel and the Causes

"The Hardening of Steel," a paper by Zay Jeffries and R. S. Archer, research bureau, Aluminum Co. of America, Cleveland, read by Mr. Archer at the same session, was actively discussed. It is of a theoretical nature, giving a general definition of hardness, a brief statement of a general theory of the hardening of metals and a detailed conception of the nature of hardened steel and the causes of its hardness. Martensite is considered to owe its hardness chiefly to the very small grain size of the alpha iron of which it is composed. Ageing or mild tempering causes a precipitation of very fine particles of cementite, which constitute an additional hardening factor. The softening of the hardened steel by tempering was stated to

be due to the growth of the alpha iron grains and of the cementite particles. S. L. Hoyt, General Electric Co., Schenectady; E. C. Bain, Atlas Steel Corporation, Dunkirk, N. Y., and Professor Ellis, University of Toronto, were among those who took part in the discussion.

Secondary Hardness of High-Chromium Steels

E. C. Bain, research metallurgist Atlas Steel Corporation, Dunkirk, N. Y., in a paper on "Secondary Hardness in Austenitized High-Chromium Steels," gave a summary of hardness measurements made with the Rockwell hardness tester on four grades of high-carbon, high-chrome steel with a variety of quenches and a series of draws. Photomicrographs of the steels at certain characteristic stages were shown. In all the steels a quench from a high temperature produced an austenitic state which was permanent at room temperature and rendered the steel quite soft. Reheating to 900 to 1100 deg. Fahr. martensitized these austenitic steels and restored the hardness to nearly what could be developed in a lower quench. Steels quenched for the maximum hardness (martensitic) gradually softened by drawing up to 700 to 800 deg. Fahr., then more rapidly at higher draws. In these experiments the ordinary heat-treating furnace was used and specimens were drawn in an electric furnace, representing ordinary practice.

A paper on the "Effect of Temperature on the Impact Resistance of Low-Carbon Steel Which Has Been Worked or Deformed at Different Temperatures," by F. C. Langenberg, metallurgist Watertown Arsenal, Watertown, Mass., was presented by title.

Dendritic Segregation and Heat Treatment

A description of the dendritic crystallization of iron-carbon alloys and its further transformations, with emphasis on the importance of its study, is given in a paper on the "Crystallization of Iron and Its Alloys," by Albert Sauveur, professor of metallurgy, Harvard University. In this paper, which was preprinted in the society's July *Transactions* and read by title at the meeting, it is shown that the properties of steel depend upon its microstructure and its persistent dendritic segregation, and that the latter is not affected by the usual heat treatments, while hot working causes deformation of the segregated areas and results in directional properties. The action of certain reagents in revealing dendritic segregation is explained, as well as the relation existing between the dendritic or solidification structure and its microstructure.

In conclusion it is stated that, leaving out of consideration the chemical composition and the presence of inclusions, it seems reasonable to assume that the physical properties of steel depend (a) upon its microstructure and (b) upon its persistent dendritic segregation. It is pointed out that the influence of the microstructure has been exhaustively studied, but that the dendritic segregation has been much neglected; Indeed, there are many who do not even suspect its existence. The paper is a plea for the study of that influence. Brief discussion of Professor Sauveur's paper was presented by Professor Ellis, University of Toronto, and E. E. Thum, Linde Air Products Co., New York, the latter taking exception to some statements of the author.

Session on Carburizing

One of the most interesting technical sessions of the entire convention was the one held Tuesday morning, Oct. 9, devoted almost entirely to the general subject of carburizing, with A. H. D'Arcambal, metallurgist Pratt & Whitney Co., Hartford, Conn., in the chair. The first paper presented was "Measurement of Carbon Penetration in Carburized Steels," by S. P. Rockwell, consulting metallurgist, Hartford, Conn., and Frederick Downs, chemist New Britain Machine Co., New Britain, Conn. Mr. Rockwell presented the paper in abstract. The object of the investigation was announced as an attempt to determine, if possible, whether any relationship exists between different steels under different methods of measuring depth of case hardening. There are many methods of depth measurement, some of them more important and more commonly used than others. The most generally used methods were enumerated as follows:

1. A sample taken directly from the carburizing pot, quenched direct and broken.
2. A sample taken directly from the carburizing pot, quenched or cooled slowly, single or double treated, and broken.
3. The foregoing samples, enumerated under methods 1 and 2, polished and etched with acid and a scale measurement made of the depth.
4. The samples enumerated under method 3 examined and measured with the aid of a microscope.

Five major case-hardening steels, recommended by the Society of Automotive Engineers, were selected for the test. The steels used were as follows: S. A. E. 1015, 2315, 3115, 6120, and a 5 per cent nickel case-hardening steel equivalent to S. A. E. 2512. The authors then give details of the results on these five samples and offer the following general conclusions:

1. Examination by microscope of pot cooled samples or by scale, which is not always practical, shows that measurement at this stage is indicative of a case depth considerably less than quenched samples.
2. In general the double-treated specimens show the greatest depth by various measurements. This is particularly true of the alloy steels.
3. It appears that there is as much as 70 per cent difference in case depth by measuring under different methods and different heat treatments.
4. In general as regards hardness of case the single treated specimens show the best hardness of case.
5. In general the core hardness of the pot quenched specimen is harder than specimens subsequently quenched.
6. This report shows the necessity of a more definite set of specifications to describe case depth.

In the discussion, H. M. Boylston, professor of metallurgy Case School of Applied Science, Cleveland, asked Mr. Rockwell what the criterion was for getting the depth of case, stating at the same time that there is considerable difference of opinion as to how far into the steel one should measure the case. In reply, Mr. Rockwell said that no matter what method is used he considers that the fracture is pretty fairly defined. This is particularly true in the etched specimen, the fracture being well defined to the eye.

Asked by the chairman as to which steel showed the greatest depth of hardening under the same conditions, Mr. Rockwell stated that he thought that 5.50 per cent nickel showed the greatest depth, with the regular nickel steel next.

The chairman then called upon various members for a statement of their method of measuring the depth of case. H. B. Northrup, metallurgist Diamond Chain & Mfg. Co., Indianapolis, stated that his method was to test the fracture and judge it under the microscope, with the line of demarkation generally where a marked increase in carbon content is shown between the core and the case. L. A. Lanning, assistant metallurgist New Departure Mfg. Co., Bristol, Conn., testified that, in their regular routine testing, it is their custom to use a double-treated specimen taken from the pot. A piece is withdrawn from the pot when we assume it has been there about the correct length of time, and hardened in oil; this is cooled in the air and then reheated and hardened in oil or then reheated and quenched in water. The depth of fracture is judged by the eye.

A. B. DeForest, research department American Chain Co., Bridgeport, Conn., stated that a good deal of work has been done on the magnetic test, correlating the magnetic with the depth of hardness, and that it has become apparent that the depth of hardness, as seen by the fracture and as determined by the etched specimen, varies in its ratio according to something that is not determined. For example, in the case of a few hundred specimens, there would be a 50 per cent variation in the difference between two methods of determining the depth, and he said that it has been found that the depth as determined by the single quench fracture was quite misleading, if the gradation from the highly concentrated case was gradual.

The author, Mr. Rockwell, said he felt that an explanation ought to be made that in a great many carburizing operations even a 50 per cent variation in the depth case is not detrimental.

Case Hardening Cast Iron

A comparatively new subject, the case hardening of gray cast iron, was presented by H. P. Knowlton, instructor Central Continuation School, Milwaukee, Wis., under the title "Case Hardening and Other Heat Treatment as Applied to Gray Cast Iron." The paper describes certain experiments which were conducted in heat treating gray cast iron, after a report had been received that such iron could sometimes be case hardened with commercial success. Some of the treatments used are similar to those used in case hardening steel. Several other schemes of heating and cooling were used and described in the paper. It was found, said the author, that under certain conditions gray cast iron can be made much tougher in the center and, and at the same time, be given a hard surface.

The author states in his conclusions that the paper is not complete and exhaustive enough to be the basis for any final statement, because there are many things yet to be worked out. He states, however, that his work demonstrates the possibility of greatly improving the quality of gray cast iron. The best samples dealt with in the paper were hard and, at the same time, had a toughness almost comparable with that of a case-hardened low-carbon steel. He reports that they were considerably stiffer than malleable castings, and that it would seem that the production of such a combination of properties from cheap gray cast iron might have considerable commercial value.

In the discussion, H. J. French, Bureau of Standards, Washington, stated that he was not quite convinced that it is proper to refer to this heat treatment as a carburizing or even a case-hardening action. He asked the author whether it is not possible to produce the same results without imbedding the samples in a carburizing compound, or isn't it possible that there is a surface reaction between the compound and the metal so as to promote diffusion? In reply, the author showed photomicrographs on the screen of some results obtained by heating in clay for 3 hr., stating that in the latter case the depth of case was much less.

Barium Carbonate in Cementation

The paper entitled, "The Influence of Barium Carbonate upon Wood Charcoal Used for Cementation," by B. F. Shephard, metallurgical department Ingersoll-Rand Co., Phillipsburg, N. J., was presented in abstract by S. C. Spaulding, metallurgist Halcomb Steel Co., Syracuse, N. Y. The paper gives the results of a series of experiments, the results of which are given as follows:

1. Additions of barium carbonate increase the depth of carbon penetration obtained with wood charcoal used as a carburizing agent, small percentages being more effective than larger amounts.

2. These compounds are not suitable for commercial mixtures, the shrinkage being high, the increase in weight when packed also high and the compound dusty, dirty and disagreeable to handle.

3. Chrome-vanadium steel absorbs carbon much more readily than a simple carbon steel, regardless of the strength of the compound. It also produces a hyper-eutectoid zone of such depth and carbon concentration as to be extremely harmful.

In the absence of the author the discussion was limited. Mr. Spaulding, however, called attention to the statement regarding chrome-vanadium steel, especially the reference that this steel produces a hyper-eutectoid of such depth and carbon concentration as to be extremely harmful. He stated that he had carburized some chrome-vanadium steels and, although they absorb carbon more readily than a straight carbon steel, still unless the time is unusually long he did not realize that the case was necessarily such as to be unsuitable for use. Another member, Mr. Chandler, stated that while he was with the Ford Motor Co. he used many thousands of tons of barium carbonate for case hardening; that it is true that a hyper-eutectoid zone will thus be formed, but that generally it is crowded to within one or two points of the outside and is ground off.

Salt Baths and Containers

A paper which excited considerable interest was entitled "Salt Baths and Containers," by Sam Tour, metallurgist Doehler Die Casting Co., Brooklyn, N. Y., and chairman of the New York chapter. The author discusses certain salt baths used by W. J. Merten, discussed in a paper in *Forging and Heat Treating*, entitled, "Molten Salt Baths in Heat Treatment." Other subjects considered are desulphurization in such baths, decarbonization, and the question of containers. He recommended that these should be thin-walled; as strong as possible at the operating temperatures used; possess resistance to oxidation; not made of cast iron; and not possible of being acted upon by the salt mixture. The author's conclusions are briefly as follows:

For fine heat treating work on delicate and expensive pieces, an intermittent or "batch treatment" is necessary. A good salt bath, for temperature range from 1150 to 1650 deg. Fahr., consists of equal parts of barium, calcium and sodium chlorides. Desulphurization is accomplished by use of cast iron chips. Pitting and decarburization do not go hand in hand. Many baths develop decarburizing properties with use. Decarburization, however, is usually quite small. Furnaces should be properly designed and operated to obtain maximum service from containers. High chromium alloy pots deteriorate from action of a chloride bath. Cast steel and pressed steel pots seem to be the best containers.

Session on Welding and Tool Tempering

The first technical session of the convention held Monday morning was of a decidedly general nature so far as the subjects discussed were concerned. Out of five papers scheduled for the meeting, only three were presented.

Oxy-Acetylene Welds

The subject of oxy-acetylene welds was discussed by J. R. Dawson, research metallurgist Union Carbide and Carbon Research Laboratories, Inc., Long Island City, N. Y., under the title "Metallography and Testing of Oxy-Acetylene Welds." Starting out with the statement that welding is a metallurgical operation, the author mentioned among the important factors—the method of operation; the selection of men with special regard to their honesty, patience and dexterity; the training of the welder, which he emphasized as very important; and the supervision of the operation, which he pointed to as vital.

The welding of low-carbon steels was reported as now applied to water, oil, gas and steam pipes, even high-pressure steam pipes. Analyses of various rods used and photomicrographs of some of the welds which are now being obtained were thrown on the screen. The author particularly emphasized that weld metal as now produced is not a casting. The paper also discusses manganese welding and the conditions under which it can be successfully carried out, and also takes up the subject of cast iron welding. Oxy-acetylene welding, said the author, is a dependable process if conducted by dependable men, but a knowledge of metallurgy and heat treating is necessary. The author's conclusions were as follows:

It has been the purpose of this paper to point out briefly some of the applications of welding and to emphasize the dependability of the process. A study of the rapid growth of welding and the increase of its application leads to the conclusion that the opportunities it offers for increased industrial efficiency are great.

A knowledge of metallurgy and heat treatment is necessary for proper understanding of the art, and members of this society are especially fitted to appreciate the fundamentals of welding and its application to individual plants. It has been pointed out many times that actual loss results from failure to take advantage of the opportunities offered by this society to aid in keeping pace with progress in heat-treating knowledge and methods, and in the same way it is

unquestionably true that present-day industries can ill afford to neglect the savings offered by modern welding methods.

Although it is true that heat treaters might well make greater use of welding, to an even greater degree the welding industries are in need of the interest and advice that you gentlemen are able to give, on account of your knowledge of [illegible] metals at various temperatures.

Replying to a question as to what is the thickness of metal which can be welded, the author stated that in his opinion there is no limit except as a matter of economy and cost. The cost of welding of an article probably increases as the cube of the area that must be filled in and it is, therefore, a matter of volume, with each job presenting a problem of its own. There is also the matter of the comparative cost of a new part in place of the one to be welded.

Furnaces and Fuels

"Some Observations on Furnaces and Fuels, Including the Electric Furnace for Heat Treating," was the subject of a paper by E. F. Collins, consulting engineer General Electric Co., Schenectady, N. Y. It was presented in abstract by the author. This paper, as well as the preceding one by Mr. Dawson, was not pre-printed.

The paper, which the author characterized as largely a word picture and one which does not lend itself to adequate abstracting, was only briefly outlined. Mr. Collins pointed out the fact that the selection of a furnace is largely influenced by the promoter, but that engineers should make the selection. Furnaces in general, whether electric or fuel, are fitted to processes, and not processes to furnaces. The author seemed to favor the metal resistor type of furnace for heat treating, which with capable handling and management was emphasized as an efficient unit. While the human element may often modify results, the control which is possible and the evenness of temperature which can be obtained are important factors. There are, however, many cases where the author has found that a fuel furnace is sometimes better adapted to the conditions prevailing.

In reply to a question as to what cost one could pay for electric current so as to operate an electric furnace economically as compared with gas, Mr. Collins said that one of the objects in writing his paper was to prevent the asking of just such a question, which he admitted was a difficult one to answer. However, he said that the last question that one should ask in choosing as between the electric furnace and any other type is the question of the relative cost of the B.t.u. developed electrically and by fuel, because there are so many other considerations usually met with whose economic value is very much greater than the relative cost of the B.t.u. generated electrically as compared with fuel, that is, taking average values.

Another member asked the author whether a heating arrangement has ever been made that will take small voltages for forgings. Answering this, Mr. Collins said that in the past he had operated electric furnaces in which billets were heated to about 1200 deg. C., but this furnace was a carbon type of resistor which had not proved satisfactory. When it comes to applying the electric resistor to a forging proposition under conditions as they exist today, Mr. Collins said that "we are not quite ready yet to talk about that matter."

Tempering Tool Steels

An interesting paper on tool steels, entitled "The Tempering of Tool Steels," was presented by J. P. Gill, co-author with L. D. Bowman, both metallurgists of the Vanadium Alloys Steel Co., Latrobe, Pa. Mr. Gill prefaced his presentation with the statement that this paper was presented in part before some of the Northwest chapters of the society early in January, and, because of the general interest shown at that time, the authors' experiments have been carried somewhat farther and were embodied in this paper.

The paper is largely a study of the effect of time, temperature, and mass on the tempering of tool steels, including high-speed steel. The authors show that tempering colors are dependent on time, as well as temperature, and that all tempering colors can be produced on the surface of a piece of steel successively at low temperatures, 250 to 300 deg. Fahr., if held a sufficient length of time. The time element, however, is less effective, the higher the drawing temperature. The authors have found that mass has only a small effect upon the rate of tempering, and that molecular re-arrangement takes place in hardened steels at atmospheric temperatures, the speed of which increases with the temperature, but is not proportional to the temperature.

The authors have also shown in the paper that the first measurable degrees in hardness take place in a 1 per cent carbon tool steel at a temperature of about 275 deg. Fahr. when tempered for a length of time not greater than 2 hr. The same is true for a number of light alloy tool steels. As the percentage of carbon and alloys increases, it requires a proportionally higher temperature to soften the steel until in high-speed steel tempering within a certain range actually increases the hardness of the steel. They also state that the specific gravity increases and the volume decreases with the tempering of carbon and light alloy tool steels. A number of tempering diagrams are given in the paper from some standard types of tool steels. High-speed and tool steels should be slowly cooled from the tempering temperatures. Quenching from these temperatures will, however, produce some brittleness. The paper also includes a short discussion of the phenomena of "temper brittleness" as it refers to tool steels.

Cobalt Steel

In the discussion, the question of cobalt steel, as compared with 18 per cent tungsten steel, was brought up with particular reference as to whether there was a difference in the drawing between the regular tungsten and the cobalt steels referred to, to which Mr. Gill replied that there is very little difference between the high-tungsten and the cobalt steels; in other words, one figures upon the same drawing for both.

A. H. D'Arcambal stated that the authors have shown clearly that the type of tool steel containing 1.25 to 1.50 per cent tungsten resists tempering no better than does the plain carbon tool steel. He added that it might be of interest at this point to state that some small tool makers have recently put on the market taps made of this low tungsten tool steel, and have called them "semi-high-speed" steel taps. The speaker characterized this as a misnomer, because they have absolutely no more high-speed properties than does a plain carbon tool steel. Besides this, many of these low tungsten tool steels contain also about 0.50 per cent chromium, which means that the steel will resist tempering at a lower temperature than the plain carbon tool steel.

H. J. French, Bureau of Standards, Washington, expressed his interest in Mr. Gill's paper, and assumed that the authors had used in all cases a hardening practice similar to that which is the usual custom. However, he felt that it was desirable to state that the characteristics of the hardness tempering temperature curves for tool steels are largely dependent upon the original hardening treatment given a steel of a given composition and a given size. He cited as an example that a 1 per cent carbon steel, which is hardened from a temperature such as is customarily used, may show a decrease in hardness with rise in tempering temperature, but if that steel is heated to a high enough temperature and then quenched, one may get an increase in hardness with a rise in tempering temperature. Mr. French also asked the author whether in his experience he has found that the slow cool or the quench gives the highest impact value, and whether the question is not yet settled. In reply to this, Mr. Gill stated that the investigation was absolutely in the field of tool steels and that it had not gone into structural steels or the alloys. In the field of tool steels, all those which could be made file hard by ordinary hardening methods did show that they were more brittle by quenching from the tempering temperatures.

W. J. Merten, chairman of the Pittsburgh chapter, presided over this meeting.

Session on General Subjects

The paper, "Investigation of the Treatment of Steel for Permanent Magnets," by R. L. Dowdell, instructor in metallography, University of Minnesota, Minneapolis, scheduled for the technical session of the morning of Oct. 9, was presented on Friday morning. It was not pre-printed. In this paper the author deals with the various treatments to give the greatest permanence to tungsten, chromium, cobalt-chrome and various magnet steels. The apparatus for testing bar is explained and open circuit coercive force, a new type, is compared with the usual or closed circuit coercive force. Curves are given for the magnetic saturation of these steels and the effect of drawing temperature on the remanent induction and coercive force of hardened bar magnets is shown. There is a smaller percentage of loss of remanent induction in magnets with a high than those with a low coercive force when the bar is subjected to impact forces. Natural and artificial ageing curves for 17 different treatments are given and it is pointed out that magnets should have the highest possible sclerescope hardness without cracking. The results show that the magnets giving the greatest permanence were those which had a treatment of a draw at 100 deg. C. for about 10 hr., then magnetized and quenched 10 times in ice water from boiling water.

Other papers presented at this session, of which Paul D. Merica, research department, International Nickel Co., New York, was chairman, were "Protective Coatings for Selective Carburization," the joint effort of J. S. Vanick, metallurgist, and H. K. Herschman, assistant physicist, Bureau of Standards, Washington; "The Physical Properties of Metals at Elevated Temperatures," by Vincent T. Malcolm, metallurgist, Chapman Valve Mfg. Co., Indian Orchard, Mass.; "The Seasoning of Steel," by W. P. Wood, department of metallurgy, University of Michigan; "Conical Illumination in Metallography," by H. S. George, Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y.; "Carbon and Carbon-Vanadium Steel Castings—A Comparison," by J. M. Lessells, mechanical engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh and "The Theory in Quenching Steels," by Kotaro Honda, Tohoku Imperial University, Sendai, Japan. The last paper was presented by title only. Discussion of the several papers was limited by reason of a plant visitation scheduled for noon.

Selective Carburization

The paper of Messrs. Vanick and Herschman details that, in a search for an effective protection of steel surfaces from carburization, coatings of copper plate and mineral base pastes, such as fireclay, kaolin and enamel mixtures were experimented with. Copper plate is known to provide an effective protection, but it is subject to defects inherent in electro-deposits. These defects are most readily overcome by increasing the thickness of the coating. The thickness of plate necessary to protect surfaces against carburization was determined for comparatively long exposures and the methods employed were somewhat more thorough than those hitherto recorded. The data so obtained are shown in a chart and expressed by empirical curves for coating thickness and plating time. Of the mineral base coatings, a thin coat of the enamel ground and a thick coat of a fire clay sodium silicate paste provided moderately satisfactory protection. The ease with which the former is applied and the slightly better protection which it offered add to its points of merit. Microscopic evidence of nitrogen contamination and cementite concentration prompted a search for the source of the former and led to a discussion of the latter. An infiltration of nitrogenous gases through the protective coatings apparently caused the nitrogen contamination, although the decomposition of a nitrate was held responsible for similar effects in the specimens coated with the enamel mixture.

W. P. Wood in his paper detailed the results of a year's seasoning of carbon, nickel, chrome-nickel, chrome-vanadium, silicon-manganese and high-speed steels, which showed a loss in tensile strength, but increases in elongation and in reduction of area. Mr. Wood stated that he had not arrived at definite conclusions because of a desire to pursue investigations further.

Conical Illumination

Mr. George presented lantern slides showing the effect of light rays from different angles and was complimented by speakers on having opened up a new field of micro-photography, which supplements and extends the results hitherto attained by prisms and the silvered mirror in the deflection of rays upon the material to the photo-micrographed. A full abstract of this paper will be published in a later issue of THE IRON AGE.

Session on Forgings

The essential features in the production of heat treated forgings, more particularly those used in locomotives, were discussed in a paper on the "Manufacture of Heavy Forgings" by W. R. Klinkicht, foreman, heat-treating department, Pollak Steel Co., Cincinnati, presented at a technical session on heavy forgings, at which J. J. Crowe, metallurgist, Navy Yard, Philadelphia, was chairman. The meeting room adjoined the exposition floor and notwithstanding the handicap of the noise occasioned by the demonstration af adjacent machinery, Mr. Klinkicht's paper was received with evident interest.

The great responsibilities resting on the successful performance of railroad or ordnance forgings was emphasized, as well as the necessity for taking every precaution to produce sound homogeneous forgings capable of withstanding the terrific shocks and stresses incident to their daily use. Heavy forgings are made of open-hearth steel, usually basic, whether of plain or carbon alloy. For straight carbon steel the carbon range differs. The American Railway Association has adopted a standard of 0.38 to 0.52 per cent carbon, 0.40 to 0.70 per cent manganese, with phosphorus and sulphur under 0.05 per cent. Other specifications, it was said, will classify the forgings by size, in which case the carbon range of 0.38 to 0.52 per cent will be acceptable for forgings up to 7 in. in diameter, a range of 0.45 to 0.60 per cent being required for larger sections.

Alloy Forgings for Locomotives

That the demand in recent years for increased strength and less weight has brought alloy steel into prominence was pointed out, and it was said that the railroads are slowly incorporating these steels in their equipment. "Alloy steels are here to stay," said Mr. Klinkicht, "although only a few of those made today are used to any extent in locomotive forgings. Of these alloys, the chrome-nickel, chrome-vanadium and carbon-vanadium are probably the most popular, and they are used mainly for reciprocating parts. A few roads have extended their use to the driving and trailer axles and there seem to be indications that the alloys will gradually displace the carbon steel for locomotive forgings."

To bring out the best qualities of an alloy steel, oil quenching and tempering was recommended, although some forgings are furnished normalized and annealed, especially carbon-vanadium. Where an alloy steel is used the percentage of alloy is, it was said, kept within its lower limits, and, with one exception, carbon-vanadium, the carbon is generally reduced when another alloy is present.

The work of the testing departments of the railroads was outlined and these departments were said to be of benefit to both the manufacturer and the railroads, because they are usually in charge of a competent metallurgist who is in a position to see that material of good quality is not handicapped by improper design or faulty machining, as most forgings are finished in the shops of the railroad company. The need

for utmost care in the machine finishing operation was emphasized.

Essential factors to be considered in applying steel for forging were reviewed and the operation of forging described. Forgings pressed directly from ingots were said to be superior to those forged from blooms, because of deeper and more uniform penetration characteristic of press performance, and the more accurate control of the heating possible in the forge shop. The ingots are usually of the sand cast, corrugated type, the smallest about 18 in. in diameter and weighing 7 tons. It is not commercially practical to forge the smaller material from ingots and for this class blooms or billets are used. The examination before forging of ingots, blooms and billets for surface defects, and the chipping out of these defects, were outlined.

The need of close attention and skilled operators in the heating of ingots for forging was emphasized, the heating for forging being said really to be the beginning of the heat treatment of the steel, the factors considered in the heat-treating operation being just as applicable to the forging. Tests and charts used to determine accurately the length of time necessary to heat the steel thoroughly were shown and discussed. After thorough heating the ingot is removed from the furnace by a crane and placed under the press for the breaking down operation, which begins in the center. During the forging the scale is constantly blown off the steel and the dies kept clean so that none of it is pressed into the forging. The temperature at which the forging has been finished was said to have as important a bearing on the final structure of the steel as the maximum temperature to which the steel has been heated, and it is always desirable to have the forgeman finish as near the upper critical range of the steel as possible. The finishing temperature, it was emphasized, will also have considerable influence on the success of the final heat treatment. On completion the forging is laid on a cinder bed for cooling, after which it is removed to the saw bay for sawing to length. Hollow boring, when specified, precedes the heat treatment.

The forging is then annealed or quenched and tempered, according to the specification. Should annealing be specified the forging is loaded on a car-type furnace which is heated by oil burners so arranged as to permit of uniform heat distribution throughout its length. Here again factors of time, temperature, mass and surface play their part, as not only most complete grain refinement takes place, but certain physical qualities must be brought out. To relieve forging strains and break up pre-existing coarse grain structure, the forgings are normalized and annealed, which will require about 24 hr. for forgings about 12 in. in diameter. For 0.40 to 0.50 per cent carbon steel a normalizing temperature of 1550 deg. Fahr., followed by an anneal at 1100 to 1200 deg. Fahr., will give excellent results, unless the steel has been overheated in the forging operation, when a normalizing temperature of 1650 to 1700 deg. may be necessary.

For quenching and tempering of large shafts vertical furnaces with special loading facilities are employed. They are oil fired by means of bull type burners arranged so that the flames swirl around the forging without impinging directly on it.

The heating preparatory to quenching is probably the most important operation in the thermal treatment of steel and especially so for large sections. After numerous experiments with quenching baths a soluble oil was finally adopted. With this oil a fairly high elastic limit was said to be possible without the attendant danger of water quenching.

After treatment tensile and, if specified, bend tests are taken from a full size prolongation left on about 20 per cent of the forgings, one being selected at random from a furnace charge. A proof test follows this.

Other Subjects

An abstract of a paper on "Some Fundamental Defects of Hardened Steels," by Dr. Leslie Aitchison, Birmingham, England, was read at the forging session by R. T. Bayless, editor of the *Transactions*. This paper is concerned with certain properties of fully hardened steels that can be regarded only as defects, being defects in the sense that the steels would be better if they did not possess these properties. Two such "defects" are dealt with in the paper, these being (1) the abnormally low value of the limit of proportionality, or what is often called the elastic limit, and (2) the instability of volume which characterizes the hardened steels.

The "Process of Transparent Metallography" was the subject of a paper read by L. V. Foster, Bausch & Lomb Optical Co., Rochester. "Determining Heat Treating Costs," by H. F. Wood, metallurgist, Wyman-Gordon Co., Ingalls-Shepard division, Harvey, Ill.; "Practical Heat Treatment of Carbon, Alloy and High-Speed Steel Tools," by J. J. Jones, metallurgist, Pittsburgh, and "Spark Testing of Steel," by Don Stacks, consulting metallurgical engineer, Hartford, scheduled to be read at the forging session, were presented by title only.

Symposium on Hardness Testing

Beside the scheduled papers at the technical session held at Motor Square Garden on Thursday afternoon, with Maj. A. E. Bellis, Bureau of Standards, Washington, D. C., chairman, E. G. Herbert, Manchester, England, described his pendulum hardness tester, both by word and lantern slides, and gave a practical demonstration of the instrument. This was described in THE IRON AGE, May 31, 1923.

Hardness and Magnetic Tests

The hardness testing symposium proper started with a discussion of the paper of A. V. deForest, research department, American Chain Co., Bridgeport, Conn., on "Magnetic Indications of Hardness and Brittleness." In this paper the author details the magnetic effects of the different elements of a heat treatment on 18 per cent tungsten high-speed steel, with specimens ⅜ x ⅜ x 3 in. The hardness and brittleness magnetic measurements were plotted respectively along two axes at right angles to each other and these factors are expressed in terms of quenching and drawing temperatures. One of the outstanding results of the work so far is the great variation encountered in heat-treated specimens, even when made from the same bar of stock. If a group of 10 pieces is hardened from 750 to 800 deg. C., instead of these forming two groups, they will almost invariably form nearly a continuous series from one minimum to one maximum specimen. From this series samples can be selected for test to show the differences to be regularly expected. Conversely, the differences between the different specimens of the same stock and supposedly the same heat treatment give a logical measure for the improvement of the whole heat-treating process. Magnetic tests can be applied to the raw material from which tools are made and its suitability of structure and physical state determined. Tests on the finished product can prove the acceptability of the tool and indicate which step is at fault in the heat treatment. As in the case of analagous mechanical tests, differences of size or material will produce results which cannot be interpreted without reference to service tests. This means that after the testing apparatus is at hand a period of investigation is necessary to interpret the findings into terms of service.

In the discussion of this paper it was brought out that the magnetic test was not applicable to nonferrous metals because they were nonmagnetic; also references to hysterisis, the magnetic shakeup, with the breaking down in the cohesion of the fibers and the changes in dimensions.

How to Use Different Machines

H. M. German, metallurgist, Henry Disston & Sons, Philadelphia, in his paper, "Testing Steels for Hardness," undertook through a recitation of tests to answer the question, "Would it not be possible to formulate some instructions as to how to use the different (hardness testing) machines?" He discusses the Brinell, Rockwell and scleroscope machines and deals with the elements and factors that introduce errors in their operation. A variation in reporting Brinell hardness, the

author states, is a good reason for standardized practice. It is pointed out that gage limitations of specimens to be tested by the Brinell method are influenced by the hardness of the specimen, noting the slighter impression in a thin section of high tempered than low tempered steel. An impression which shows on the opposite side will not give accurate results and should be discarded. The speed of the application is one avenue of error, since the impression is greater if the application is rapid than when it is slow and gradual. Tendency of the steel balls to crack or become deformed he characterizes as a weakness of the Brinell machine. The author defines the uses and limitations of all three machines and concludes that all three are valuable in their own particular fields. He suggests as a means of interchangeability of terms of the three machines the preparation of a series of test pieces of the same gage and finish and the taking of readings with the different machines and the plotting of a curve which will show direct comparison of the readings.

Hardness of Sheet Brass

"The Hardness of 'Common High' Sheet Brass," the contribution of Alvan L. Davis, metallurgist Scovill Mfg. Co., Waterbury, Conn., to the hardness testing symposium referred to commercial sheet brass of an approximate composition of 66 per cent copper, 33½ per cent zinc and ½ per cent of lead, iron and other impurities combined, and set forth the average hardness as determined by various methods as well as the range of hardness to be expected in annealed and hard-rolled sheet brass of quarter hard, half hard, hard, extra hard and spring tempers. The hardness of brass is not developed in the same way as is generally the case in steel, hardness in brass of a given composition being due to cold work, together with the degree to which such work has been relieved by annealing. In annealed brass its previous history, as to annealings and as to the stages and amounts of cold-rolling, exerts a notable influence on the resulting hardness. Interesting figures of the various hardness tests are presented and the variations, the mean hardness and the per cent of reduction by cold-rolling. The author finds merit for all of the testing appliances, the Erichsen cup, Shore universal and magnifier hammer, Rockwell and Brinell, within certain fields.

Session on Sheet Steel

One of the afternoon sessions, that of Monday, was devoted to sheet steel. This session was presided over by J. Weaver Smith of the Indianapolis chapter, in the absence of W. H. Harper, originally designated as the chairman.

Annealing Sheet Steel

A paper entitled "The Annealing of Sheet Steel," by Francis G. White, metallurgical engineer National Enameling & Stamping Co., Granite City, Ill., was presented by A. W. F. Green, metallurgist John Illingworth Steel Co., Philadelphia, in the absence of the author. The paper discusses the annealing of low carbon sheet steel from the mill standpoint, and also takes up the problem of grain growth caused by a slow cooling rate from the annealing temperature, the phenomenon being illustrated by photomicrographs.

The complexity of sheet steel annealing will be realized, says the author, when it is recalled that at times as many as 40 tons of sheets are placed in one furnace. He points out that the heat must be driven through an annealing cover, as well as a blanket of air or gas surrounding the sheets, and then actually distributed throughout a mass of steel probably 3 or 4 ft. thick. While at this temperature as much air as possible must be excluded, the material cannot be exposed to the air until it is cooled, otherwise severe scaling of the sheets results. Slow cooling from this temperature is ideal for grain growth. If the sheets were heated to the upper critical range, says the author, it would be impossible to open or separate them, because of "sticking," even though the cooling time could be shortened. The author also includes in the paper a discussion of various furnace designs, temperature curves and stamping tests, and the general practice used in one plant is briefly discussed.

In reply to a question by the chairman as to whether such sheets can be annealed in a continuous conveyor type of furnace in the form of single sheets, J. H. Nead, metallurgist American Rolling Mill Co., Middletown, Ohio, replied that they can be so annealed, but that the chief objection is the cost. In annealing sheets, he said, a low cost must be obtained, although the process referred to is being carried out in some cases. There is the advantage in the continuous conveyor method that when you anneal by that process the annealing can be carried on more nearly at theoretically correct temperatures. In box annealing, it is impossible to anneal according to the constitution diagram, because, as already pointed out, if the proper temperature were maintained the whole pile would remain stuck together.

The question of the difference between Bessemer and open-hearth steel was brought up, particularly as regards sticking, to which Mr. Nead replied that such a comparison was hard to make, because it is customary to put phosphorus into steel for sheets to enable them to be opened after the hot rolling. Of course, Bessemer steel is very satisfactory for that purpose, said Mr. Nead. He also said, in response to a question as to whether a high percentage of silicon is put into the steel for the same purpose, that most soft steel sheets are made without silicon.

Annealing Sheets Electrically

Another member asked whether is would be possible to anneal a large batch of sheets in an electric oven economically, thus eliminating the need of a protective covering, because of the presence of a neutral atmosphere. Mr. Nead again replied that his company had done nothing along that line, but that it would depend upon the cost of current as to whether it could be done economically. A member of the Westinghouse company volunteered the information that they have had some experience in annealing sheets without boxes in a muffle furnace, and that a great deal of trouble had been experienced in keeping the oxidation to a minimum, although the problem was simplified because of the high silicon content of the steel. Referring to the question of annealing sheets in an electric furnace, with the heat applied on all sides, the same authority stated that the thermoconductivity of sheet steel is very low in a direction perpendicular to the laminations. Another reason for not using this method is that when the furnace is opened one would have a considerable number of electrical connections to be removed, which would be a disadvantage.

Automobile Sheet Specifications

The other paper presented at this session was entitled "Automobile Sheet Steel Specifications," by H. M. Williams, metallurgist General Motors Research Corporation, Dayton, Ohio. Mr. Williams in his paper pointed out that the developments of specifications for the inspection and test of automobile sheets is occupying the attention of many metallurgists and engineers, and that the demand has at least equalled the supply. Because of this, a postponement of standardization of this important automotive material has been necessary. Very great losses in unusual stampings and in labor to repair defective ones have resulted from unsuitable material, defective forms, and improper die construction. It is, therefore, a question of finding a quality of sheet that will produce the desired part in a certain die, which often makes it necessary for some sheet mill to produce a new quality of sheet. The author pointed out that at the present time one sheet mill is producing over 50 different kinds of sheets varying in surface finish and temper. This is the situation which results in great economic loss to both producers and consumers. Mr. Williams said that only the full cooperation of sheet mills and the autobody and parts makers can remedy this condition and standardize sheets, design and die construction.

Mr. Williams' paper, which was read from manuscript and not preprinted, then takes up various phases of the problem, such as the question of the gage of sheets, the difficulties encountered in the production and utilization of sheets, their surface inspection, stretcher strains, grain size, scale, and other matters. He concluded by reading extracts from a copy of the tentative specifications for automobile sheet steel of the General Motors Corporation, which he offered as a basis for discussion and criticism. There was, however, no discussion of this paper.

Round Table Meeting on Standards

The only round table discussion was held Tuesday afternoon, Oct. 9. It resolved itself into an informal meeting under the direction of the standards committee of the entire organization with R. M. Bird, chief metallurgist, Bethlehem Steel Co., Bethlehem, Pa., as chairman. The object of the meeting was to obtain an expression of opinion from various members on certain activities of this national committee. The committee's chairman, Mr. Bird, delivered a brief address covering some of the work of the committee in the past year, and outlined some of the subjects which it had under consideration, such as recommended practice; limits of heat treatment, including a plea for preferential attention for work for which there is a demand; the work of the committee as a clearing house, which should also act as a judiciary committee. Among other things he suggested that a paid secretary should be appointed.

Two matters of prime importance, which he said were uppermost in the present work of the committee, were data sheets and heat treatment definitions. Discussing the latter subjects, various members informally gave their views as to the meaning of certain heat-treating terms, particularly annealing, taking this term as one typical of present misunderstanding in the steel industry in general. It was pointed out that this term carries various meanings in various localities, and the necessity for general accord as to a definition of this particular term was emphasized. It was pointed out that other societies, such as S. A. E. and the A. S. T. M., have certain interpretations of this heat-treating process, and the question was brought up as to whether the steel treaters should take up the task of developing not only a standard definition for annealing but a standard set of heat-treating terms. Hugh Tieman, Pittsburgh, pointed out the variety of meanings of the term "annealing" and was in close accord with the general sentiment of other speakers. A suggestion made by A. H. D'Arcambal that a committee be formed made up of those using annealing processes, this committee to formulate a definition for further discussion, met with general approval.

The remainder of the meeting was taken up with reports of four sub-committees of the standards committee. F. E. McCleary, metallurgical engineer Dodge Brothers Co., Detroit, delivered an interesting report of progress for the sub-committee on the treatment of steel. The report of the sub-committee on pyrometry was published in the September issue of the *Transactions* under the authorship of J. H. G. Williams, chairman, and was pointed to as a splendid step forward. The report of the sub-committee on the treatment of case hardening steel was given briefly by R. J. Allen, metallurgist Rolls Royce Co. of America, Springfield, Mass., chairman of the committee, who reported progress on work not yet fully completed, this work including a study of the efficiency of various carbonizing materials and a study of methods of measuring the depth of case. It was pointed out that the paper delivered at the carburizing session Tuesday morning by S. R. Rockwell represented part of the work of the committee. The committee on the heat treatment of tool steel, of which W. J. Merten was chairman, was referred to by Mr. Merten, as published in the September *Transactions*, and as containing recommended practice on the heat treatment of plain carbon tool steel and recommended practice on the heat treatment of 18 per cent tungsten high-speed steel.

The Steel Exhibition an Impressive Display

THE comprehensiveness and expanse of the exhibition this year probably exceeded the expectations of the most enthusiastic steel treater. The attendance of members, guests and residents was the greatest in the history of the organization, the evening crowds being unusually large. On the last evening the largest number ever housed in Motor Square Garden was in attendance. This enthusiasm was stimulated by the inauguration of a "steel week" in Pittsburgh with small exhibits of many of the steel companies in the show windows of the large stores and with a prize competition for essays on steel among school children.

In floor space occupied, this year's exhibition was about 50 per cent larger than the one at Detroit last year. The entire floor space was about 75,000 sq. ft. taken by about 140 exhibitors against 55,000 sq. ft. used by 100 exhibitors a year ago. Actual floor space contracted for was 30,000 sq. ft. against 20,000 sq. ft. at Detroit. It is the first time that in an exhibition at Motor Square Garden all the space had been taken before the exhibition opened.

Heat-treating equipment of all kinds; stainless and non-corrosive alloys; machine tools; displays by steel companies; electric, gas and oil furnaces in operation were some of the outstanding features. A general account of some of the leading exhibits follows.

Extensive Exhibit of Machine Tools

A wide variety of machine tools, including production units, was on view. In the space of the Motch & Merryweather Machinery Co., Pittsburgh, several machine-tool companies exhibited, the machines being for the most part under power and demonstrated by manufacturers' representatives. The Cincinnati Milling Machine Co., Cincinnati, had a No. 4 high power vertical miller in operation, and also its No. 2 universal high power miller with new rectangular overarm. The new Cincinnati centerless grinder, in operation on piston pins, drill rods and shackle bolts, was a center of interest. A Cincinnati 12 x 18 in. universal cylindrical grinder and a No. 1½ universal tool and cutter grinder, with an exhibit of cutters capable of being ground on the machine, were also shown. The No. 10 automatic surface grinder of the Blanchard Machine Co., Cambridge, Mass., equipped with magnetic chuck, continuous-reading work gage and new wheel dresser was in operation, and the Bullard Machine Tool Co., Bridgeport, had a 36-in. vertical turret lathe in operation. Tools shown by the American Tool Works Co., Cincinnati, included a 6-ft. plain radial drill in operation on armor plate, a 3-ft. radial drill, a 14-in. tool room lathe and a 24-in. heavy pattern lathe driven by a 20-hp. motor and turning a chrome-nickel spindle forging.

Other exhibits in the space of the Motch & Merryweather company included a 32-in. shaper of Gould & Eberhardt, Irvington, N. J., and a No. 121 drilling machine of Baker Brothers, Toledo, Ohio, both in operation. The latter machine is essentially a production unit and new features included a foot treadle for engaging the feed, in place of the usual handle under the tripping box. The Giddings & Lewis Machine Tool Co., Fond-du-Lac, Wis., had its No. 32 horizontal boring, drilling and milling machine in operation, and the Ransom Mfg. Co., Oshkosh, Wis., had a tool grinder and a snagging grinder on view. A No. 13 Natco 16-spindle drill with tapping attachment and rotating table, and a No. 30 Natco 12-spindle drill, with 25 in. diameter head, automatic electric rapid traverse, tapping and spot facing attachment and rotating table, were exhibited in operation by the National Automatic Tool Co., Richmond, Ind.

The Keller Mechanical Engineering Corporation, Brooklyn, N. Y., exhibited a new automatic die cutting machine in operation on a forging die. The capacity is for dies up to 48 x 24 in. and push button control is a feature. The features of the No. 2½ inclinable press shown by the V & O Press Co., Hudson, N. Y., included the double length slide, special finger safeguard and press clutch. The Warner & Swasey Co., Cleveland, demonstrated its 3A turret lathe in operation on a 15-in. diameter, 140-lb. locomotive stoker casting. The McCoy-Brandt Machinery Co., Pittsburgh, exhibited several machines from stock, including 17-in. Sidney geared head and cone head heavy pattern lathes in operation, a 16-in. cone head, standard pattern, and a Kelley 24-in. shaper.

Machine tool manufacturers were also represented at the booths of the Laughlin & Barney Machinery Co., Pittsburgh. Among these were the Hendey Machine Co., Torrington, Conn., which exhibited its No. 2-G universal milling machine in operation, and its 1922 model lathe with all attachments. A No. 25 24-in. high duty drill of the Foote-Burt Co., Cleveland, was on view. The Avey Drilling Machine Co., Cincinnati, exhibited a No. 1½ high-speed drill in operation, and a three-spindle machine, No. 2 size, having one spindle automatic, one semi-automatic and a third hand operated. A No. 3 single-spindle machine with power feed was also shown. The 32-in. Dreadnaught shaper of the Ohio Machine Tool Co., Kenton, Ohio, was on view, and automatic drill pointers in two sizes, and a die making machine for sawing, filing and lapping operations were shown by the Oliver Instrument Co., Adrian, Mich.

The Oilgear Co., Milwaukee, demonstrated a 6-ton broaching and assembling press. High speed steel ground thread taps, internal micrometers and other gages were shown by John Bath & Co., Worcester, and collapsible taps by the Murchey Machine & Tool Co., Detroit.

Sawing, Welding and Other Equipment

Several metal sawing machines were shown in actual operation. A 6 x 6 in. hack saw with automatic feed of work, Nos. 1 and 2 Marvel hacksaws, a metal cutting band saw, showing application to tool room work, and its No. 23 hand-operated punch, shear and bender were exhibited by the Armstrong-Blum Mfg. Co., Chicago. The Racine Tool & Machine Co., Racine, Wis., had its No. 5 high-speed 6-in. capacity machine, No. 01 Jr. high-speed machine, and its No. 14 band saw in operation. Its 6 x 6 in. and 13 x 13 in. motor-driven universal shaping saws, the latter having improved features, and a new gap saw were exhibited by the Peerless Machine Co., Racine, Wis. In addition to a broad line of metal cutting and other saws, E. C. Atkins & Co., Indianapolis, exhibited its 8 x 8 in. Kwik Kut hacksaw and No. 3 metal cutting band saw. Henry Disston & Sons, Inc., had inserted tooth milling and other saws on view and a Higley milling sawing machine in operation. An impressive display of saws was that of the Hunter Saw & Machine Co., Pittsburgh, which exhibited a large variety of metal cutting circular saws, including large inserted tooth saws. Inserted tooth grinders and a new friction disk knurling device were also shown.

Among welding and cutting equipment exhibitors was the Air Reduction Sales Co., New York, which featured its radiograph for use in cutting plates and structural material. Automatic operation is a feature. Its camograph for production cutting of small work was shown roughing out racks from 1-in. stock. A full line of torches, tips, regulators and other material, including a new cutting gas, "Calorene," were also on view. Welding outfits in operation and a wide exhibit of oxy-acetylene equipment were shown by the Linde Air Products Co., New York. The Federal Machine & Welder Co., Warren, Ohio, exhibited its standard power drive spot welder in operation and its new No. 70 butt welder, in which slides that formerly gave trouble in alinement have been eliminated.

Other machinery exhibits included nine sizes of riveting machines and its model A 50 sensitive bench drill press shown in operation by the High Speed Hammer Co., Rochester. Henry Pels & Co., New York, punching and shearing machines, was represented and the National Machinery Co., Tiffin, Ohio, bolt and nut machinery, had a booth. A Berwick electric rivet heater and two rod heaters were in operation at the booth of the American Car & Foundry Co., New York, and the R. G. Haskins Co., Chicago, displayed its flexible shaft equipment and portable grinders. A wide variety of gears, including a heat-treated quenched and tempered gear 9 ft. in diameter, was featured by the R. D. Nuttall Co., Pittsburgh.

Sand blast equipment was shown in operation by the Pangborn Corporation, Hagerstown, Md., and its 2A metal washing machine, featuring the revolving wash arm, was exhibited by the Crescent Washing Machine Co., New Rochelle, N. Y. The Spencer Turbine Co., Hartford, showed two sizes of its turbo-compressors for blowing oil and gas furnaces, and the Pennsylvania Pump & Compressor Co., Easton, Pa., had a straight-line compressor supplying air for the Pangborn exhibit.

In material handling equipment Crescent tractors, platform trucks, Plimpton hand lift trucks and a Drake 1-ton electric hoist were among the items shown by W. E. Hamilton & Associates, Pittsburgh, who exhibited also Macleod furnaces, torches and sand blast equipment. An Elwell-Parker crane truck of 3000-lb. capacity was exhibited by the Frank B. Ward Co., Pittsburgh.

Heat-Treating Furnaces in Operation

Heat-treating furnace manufacturers were well represented, and the equipment, for the most part in actual operation, was a center of interest.

In electric equipment the Westinghouse Electric & Mfg. Co., East Pittsburgh, exhibited heat-treating units, with automatic control, melting pots, laboratory furnaces, air heaters and space heaters. Direct-heat electric heat-treating furnaces, air-drawing ovens and other units, in operation with automatic temperature control, were shown by the General Electric Co., Schenectady. The Geo. J. Hagan Co., Pittsburgh, featured a box-type electric heat-treating furnace, with metal hearth and automatic temperature control. High and low pressure oil burners of various types were also shown. Electric melting furnaces, one for laboratory use, were shown in operation by Holcroft & Co., Detroit, photographs and data of latest types of heat-treating and other furnaces being also shown. The Hoskins Mfg. Co., Detroit, featured its type FK continuous heat-treating furnace in which material is pushed through by an automatic pusher, no conveyor being used. The unit was shown in operation equipped with automatic temperature control. William Swindell & Bros., Pittsburgh, displayed photographs of its continuous type electric heat-treating furnaces and other equipment.

Tate-Jones & Co., Inc., Pittsburgh, exhibited its 164 B general hardening furnace for oil or gas, burners and automatic control apparatus. An 8 x 16 x 12-in. oil-fired, portable Mahrvel tool furnace was shown in operation by the Mahr Mfg. Co., Minneapolis, as well as a small model of heat-treating furnace employing an over-fired burner. The Bellevue Industrial Furnace Co., Detroit, had in operation a complete muffle vertical high-speed furnace, a new unit, in connection with a Geissinger automatic control valve. Oil and gas burners and high temperature fire brick were also shown. A model of its rotary annealing and heat-treating furnace, oil burners and blast gates were shown at the W. S. Rockwell Co., New York, booth. The Ryan-Austin automatic control valve, with charts of performance, was a feature of the exhibit of F. J. Ryan & Co., Philadelphia. The American Gas Furnace Co., Elizabeth, N. J., was represented.

Venturi burners for all types of industrial furnaces, a Venturi water-cooled open-hearth oil burner with automatic triple cut-off valve and universal adjusting device, portable rivet forges and ladle heaters were among the items shown by the Hauk Mfg. Co., Brooklyn, N. Y. The Surface Combustion Co., New York, exhibited high and low pressure inspirators, oil burners, and velocity burners for coke oven or producer gas. A heating medium, Lavite, for hardening and tempering,

was demonstrated by the Bellis Heat Treating Co., New Haven.

The Stewart-Bellis triple pot Lavite furnace exhibited by the Chicago Flexible Shaft Co., Chicago, was in operation hardening high-speed steel chasers and taps, standard Stewart oven furnace being also demonstrated. Two-heat-treating furnaces with 24 x 36 in. hearth, natural gas fired, were exhibited by the Combustion Utilities Corporation, New York. On one furnace a recuperator, intended to utilize the waste heat to preheat the air was installed, and savings due to recuperation were shown by indicating and recording pyrometers. Automatic temperature control was a feature, and flow meters were used to measure gas. Small melting furnaces and small hardening furnaces were also displayed. The N. C. Davison Gas Burner & Welding Co., Pittsburgh, had a furnace in operation connected to recording instruments showing efficiency of burner. Various sizes of low and high pressure burners, some in operation, were exhibited. A new type of high-speed steel furnace, featuring a waste gas preheating chamber, in which temperature can be accurately regulated, was in operation at the booth of the Dempsey Furnace Co., New York. Various oil and gas burners and the Constantator, a device for adjusting the speed of stokers, fans and dampers were also on view.

Large Variety of Testing Instruments

A large variety of indicating and recording instruments, metallurgical laboratory, testing and other instruments were exhibited. An exhibit which attracted attention was that of the Leeds & Northrup Co., Philadelphia, which in addition to potentiometer pyrometers, indicating, recording and controlling, and optical pyrometers, featured the Hump method of heat-treating, the equipment being in full operation actually heat-treating tools. A furnace for checking the accuracy of thermocouples was also shown. The Bristol Co., Waterbury, Conn., exhibited automatic control apparatus, indicating and recording pyrometers and thermometers, and other instruments. Automatic control apparatus, indicating and recording instruments, and its new electrical CO_2 meter, with recorder, were among the many items shown by the Brown Instrument Co., Philadelphia.

The Bacharach Instrument Co., Pittsburgh, exhibited CO and CO_2 indicating and recording apparatus, and several other items, including radiation pyrometers in operation. Automatic furnace control equipment with mercury relay as a feature, electric gas-analysis recorders and a general line of indicating and recording pyrometers and thermometers were shown by Charles Engelhard, Inc., New York. The Taylor Instrument Co., Rochester, featured its solenoid valve for automatic control of gas fired furnaces, showing also electrical pyrometers, both indicating and recording, thermocouples, and thermometers.

A new model of its large metallographic outfit was exhibited by the Bausch & Lomb Optical Co., Rochester. The microscope and illuminating system are now on a common base and can be removed without disturbing any of the adjustments. Metallurgical microscopes and accessories were also on view. E. Leitz, Inc., New York, displayed its "Micro-metallograph," an assortment of instruments including a new ore-dressing microscope, and grinding and polishing machines for preparing specimens.

The Tinius Olsen Testing Machine Co., Philadelphia, exhibited a small universal testing machine with accessory equipment, the Herbert pendulum hardness tester and a broad line of other equipment. Scleroscopes with special work holding jigs and pyroscopes were shown by the Shore Instrument & Mfg. Co., Jamaica, N. Y. The Pittsburgh Instrument & Machine Co., Pittsburgh, exhibited Brinell machines, impact testers, sheet metal testers, metallographic grinders and the Buvinger weight calculating instrument. Brinell machines, scleroscopes, a new optical pyrometer, carbon combustion train, and polishing machines were among the items of the booth of the Scientific Materials Co., Pittsburgh. The Wilson-Maeulen Co., New York, demonstrated Rockwell hardness testers, and the Tapalog multi-record, multi-color pyrometer recorder, and the Steel City Testing Laboratories, Pittsburgh, showed late model Brinell machines.

Exhibits of Some of the Steel Companies

The Colonial Steel Co., Pittsburgh, told the story of crucible steel from pig iron to the muck bar and then through the successive stages of melting in the crucible pots through slits, showing the condition of the charge, quarter, half and the full way through melting period. The exhibit also included tool steel, forgings, die blocks, broken specimens to show fracture and hardened specimens of the company's steel grades. The exhibit of the Union Electric Steel Corporation, Pittsburgh, embraced pistons, rams, die blocks and trimmer steel in all grades.

The Firth-Stirling Steel Co., McKeesport, Pa., featured an open fireplace of stainless steel, as was the frame of the mirror above the fireplace, while a remarkable representation of the fire was made by blue chip turnings. Another feature of this company's exhibit was a display of the stainless steel in a great many forms, not the least interesting of which were golf club heads which had been in actual use for several months and still had all of their original lustre as a result of merely wiping them after use with a soft dry cloth.

The Cutler Steel Co., Pittsburgh, displayed a wide variety of uses to which Duraloy (chrome-iron), the product of this company, may be put. Deep drawn, rolled carburizing pots, seamless tubes, wire, bars, sheets, plain and corrugated, plates and numerous castings, among which was a pump impeller. The Jones & Laughlin Steel Corporation, Pittsburgh, showed cold-finished steel sections for high speed steel work; also tin and black plate samples and nails and other wire products.

The exhibit of the Bethlehem Steel Co. was an educational effort in which the materials entering the blast furnace, the coke ovens and into the manufacture of nickel chrome steel (S. A. E. series 31-30) with proportional samples of the various materials and the products.

The Central Steel Co., Massillon, Ohio, showed the process of the company in a series of photographs and transparencies and also, in action, the transmission gears of a motor car. The Witherow Steel Co., Pittsburgh, displayed sample pieces of the products possible in continuous die rolling.

The Interstate Iron & Steel Co., Chicago, featured a film showing the making of alloy steels at its South Chicago plant. It also had an automobile transmission gear in action. The exhibit included heat-treated rivets, forgings, finished automobile parts and springs.

The exhibit of the Crucible Steel Co. of America included welded high speed steel knives for wood surfacing, cracker shear blades, Rezistol standardized pipe gages and household utensils, the latter of very high ultimate strength and almost indestructible; drop forgings, including turbine blade made to a tolerance of 0.002 in., and a Rickert-Shafer collapsing tap.

The Ludlum Steel Co., Watervliet, N. Y., exhibited for the first time Delhi rustless iron, finding extensive use in automobile pump shafts, golf club heads, cooking utensils, turbine bucket blades, bolts and nuts, sheet steel gages, and templets and ball bearings; its Purple Cut line of molybdenum steel for bridge reamers and threading dies and taps; Utica oil-hardened die steels, which combine the oil-hardened non-warping features of the low carbon high manganese die steel with the cutting efficiency of the high carbon straight carbon steel; Silcrome, a heat-resisting, nonbattering, noncorrosive steel finding its principal use in valves in high priced automobiles, and Nevastane, a nonstaining, noncorrosive cutlery steel.

The Pittsburgh Crucible Steel Co., Pittsburgh, featured in its exhibit carbon-vanadium in steel for heavy forgings, the crankshaft used in the new Buick six automobile and axles of various analyses.

Molybdenum was featured by interesting displays by the Climax Molybdenum Co. and the Molybdenum Corporation of America, New York.

Besides several companies displaying stainless iron and steel, the American Stainless Steel Co., Pittsburgh, exhibited an attractive line.

Insulating brick for furnaces and ovens was among the products exhibited by the Armstrong Cork & Insulation Co., Pittsburgh, and high temperature cements for laying up fire brick settings and other uses were shown by the King Refractories Co., New York. E. J. Lavino & Co., Pittsburgh, showed chrome, magnesite and silica brick, ferromanganese and ferrotungsten. A complete display of Sil-O-Cel heat insulation, including a standard blow torch test on the brick, was seen at the booth of the Celite Products Co., Chicago. The Quigley Furnace Specialties Co., New York, showed insulating brick and the application of its Hytempite cement in building and repairing furnace walls. Refractories for use in electrical heating devices, including muffle lining and plates for use in resistance type steel treating furnaces were exhibited by the Electrical Refractories Co., East Palestine, Ohio, and refractories and furnace cements were among the products at the booth of the S. Obermayer Co., Chicago.

There were several exhibits of heat treating materials. Case hardening compounds, cyanides, quenching and drawing oils were exhibited by the Park Chemical Co., Detroit, and cutting oils, carburizers and tempering and drawing oils by E. F. Houghton & Co., Philadelphia. Cutting, drawing and quenching oils were among the products of the Dearborn Chemical Co., Chicago. The Rodman Chemical Co., Verona, Pa., exhibited case hardening materials and oils, and the Case Hardening Service Co., Cleveland, showed its Bohnite case hardening compound, Caseite, a cyanide mixture, and non-case anticarburizing paint, for localizing case hardening and for the protection of steel from absorption of carbon. Chemicals were exhibited by the Roessler & Hasslacher Chemical Co., New York, and carburizing pots and boxes by the Swedish Crucible Steel Co., Detroit.

Heat Resisting Alloys

A splendid display of heat resisting alloys under various trade names and in a variety of shapes was found in booths occupied by the General Alloys Co., the Driver-Harris Co., the Ohio Steel Foundry, the Calorizing Co., as well as some others mentioned above.

Other Details

Space does not permit detailed descriptions of some of the features of the displays of the Atlas Steel Corporation, the Cleveland Steel Tool Co., the Halcomb Steel Co., the Haynes Stellite Co., the International Nickel Co., the Midvale Co., the Pittsburgh Crucible Steel Co., the Tacony Steel Co., the United Alloy Steel Co., the Vanadium Alloys Steel Co., the Vanadium Corporation of America, the Vulcan Crucible Steel Co., and others.

An interesting booth was that of the Heppenstall Forge & Knife Co., where a novel device for testing steel balls attracted much attention.

The Annual Meeting

The annual meeting of the society on Wednesday morning was enlivened by a spirited discussion of the revision of the constitution and by-laws of the organization as recommended by a committee headed by S. M. Havens, Wyman-Gordon Co., Harvey, Ill., and some independent proposals, relating chiefly to the manner of selecting the nominating committee and limiting both the power and salary of the secretary, fathered by the Detroit chapter.

The apparent contradiction between articles 1 and 2 of the revised constitution provoked the suggestion that either the name of the society should be changed to harmonize with its objects or the objects should be made to conform to the name. Since the scope of the society's activities has expanded beyond the treatment of steel, not a few of the delegates favored a change of name more compatible with its present range of endeavors. There were many suggestions for new names, some of which were so high sounding as to bring out the expression that if the society was to continue to appeal to the men in the shop, the backbone of its strength, a name that sounded too imposing would keep many shop men out of the membership. It was finally realized that an agreement on the subject was impossible and debate was terminated by a motion from the floor.

The meeting assumed a parliamentary character, when the matter of the change in the mode of electing national officers and the selection of the nominating committee, particularly the latter, came up for consideration. Motions, amendments and substitutes were made in quick succession and it was often necessary for the chairman to ask that the motion to be voted on be restated. The Detroit chapter proposals included increasing the number of directors from four to seven, a nominating committee chosen by the general membership on a numerical basis and not by presidential selection, the taking away the vote of the secretary at board meetings and the fixing of the secretary's salary at $6,000 a year. William P. Woodside of the Detroit delegation expressed regret that Detroit proposals had created an impression that they were directed at the secretary and, upon the presentation of a motion embodying the ideas of Detroit chapter as to the selection of the nominating committee, he announced the withdrawal of the Detroit chapter's proposals.



GEORGE K. BURGESS, Director of the Bureau of Standards, Washington, the new President of the American Society for Steel Treating, Has Long Been Identified with Research in the Heat-Treating Field. The symposium on pyrometry which he conducted in 1919 for the mining engineers is only one of his many contributions to scientific advancement. Dr. Burgess last June completed a year's service as president of the American Society for Testing Materials

After much discussion, a motion which provided that the nominating committee should be composed of delegates selected by chapters, on a basis of one delegate for each 100 members or fraction thereof, to meet on the Monday of the annual convention and to be empowered to pursue the work either as a committee of the whole or by a subcommittee, was tabled. The question of expense and the ability of a large committee to agree, the unfairness to small chapters in the numerical basis of representation, all were stressed by speakers. It was finally voted to advise the committee on constitution and by-laws to devise a scheme for the placing of the committee selection in the hands of the membership and that they be elected from each chapter, with one delegate from each chapter.

Election of Officers

Report of the tellers of election told of the election of George K. Burgess, Bureau of Standards, Washington, as president; Robert M. Bird, Bethlehem Steel Co., Bethlehem, Pa., second vice-president; Dr. Zay Jeffries, Aluminum Co. of America, Cleveland, treasurer, and J. F. Harper, Allis-Chalmers Mfg. Co., Milwaukee, a director for two years.

President Lynch, in his address, reviewed the activities of the society during his term of office, noting a gain in membership of 18.75 per cent, the passing of the Bridgeport, Conn., chapter, but the organization of the Los Angeles chapter, leaving the society with the same number of chapters as a year ago, or 28. He commended the work of the various committees and commented upon the success of this year's convention. He said that one-third more floor area was occupied by exhibits this year than in Detroit last year and also told of the plan of meeting convention expenses from the rentals.

Report of the retiring treasurer, J. V. Emmons, Cleveland Twist Drill Co., Cleveland, showed the soci-

ety to be in an exceedingly prosperous financial condition, with a reserve of $24,000 and income for the year ended Dec. 31, 1922, $16,000 in excess of expenditures. He detailed the working of the budget for the first eight months of the year, showing that actual receipts exceeded the expected receipts by over $5,000 and that expenditures were only about $2,000 more than expectations. As of Aug. 31 last there was a surplus of $11,406 as against $7,977 at the end of 1922.

W. H. Eisenman, secretary, reported a membership as of Sept. 1 last of 2746, a net gain for the year of 433. He urged an increase in junior memberships, which on Sept. 1 totaled 99. He commented on the growth of the society publication and detailed the data sheets now under preparation.

R. M. Bird, general chairman standards committee, recommended that the name of the committee be changed to committee on recommended practice, and told of the need of standard definitions of heat treating terms. It was the sense of the meeting that the name of the committee be changed and the matter be referred to the committee on constitution and by-laws.

The Banquet

The annual banquet, held in the English Room, Fort Pitt Hotel, on the evening of Oct. 11, was featured by the presentation to Emanuel J. Janitzky, metallurgical engineer, Illinois Steel Co., of the Henry Marion Howe memorial gold medal, annually awarded by the society for the best paper presented on steel treating during the preceding year; the presentation to Mrs. Henry Marion Howe, who was present, of a duplicate of this medal in bronze and the distribution of cups and money prizes to six Pittsburgh high school students who contributed the best essays on steel in a contest conducted jointly by the Pittsburgh chapter and a Pittsburgh daily paper. Three of the six prizes in this contest were won by girl students.

Officers of the society elected for the coming year were called upon by the retiring president, Tillman D. Lynch, and each made a brief speech. George Neilson, president Braeburn Steel Co., was toastmaster and introduced Capt. Irving O'Hay, who spoke on "What the World Needs—More Humor," a combination of the humorous and serious, filled with many of the personal experiences of the speaker, who participated in nine wars (some were mere revolutions of brief duration) and is said to have been the figure around whom Richard Harding Davis wrote the book, "Soldiers of Fortune." Governor Pinchot of Pennsylvania also was a speaker, his talk centering on his efforts to put the State on a sound financial basis and to stamp out saloons.

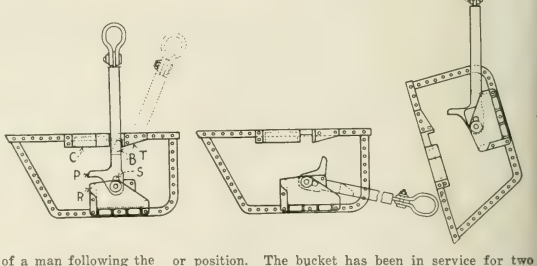
Next Year's Meeting

For the next convention invitations have been received from Boston, New York, Cleveland, Buffalo, Atlantic City and Chicago. The location will be decided at the next meeting of the board of directors, to be held at Washington Nov. 2.

A NEW ONE-MAN DUMP BUCKET

Specially Designed Bail Permits Crane Operator to Handle It Alone

It is claimed for the Forsythe dump bucket, which has been patented by J. W. Forsythe and is being marketed by John D. Hiles Co., Oliver Building, Pittsburgh, that it eliminates the necessity of a man following the bucket to the place where it is to be dumped, or a man stationed at the dumping location, as the crane operator can dump the bucket, from his position on the crane, without any assistance.



In the Center the Bucket Is Shown in Position for Being Loaded; at Left, the Bail Has Been Raised and Locked in Position for Hoisting by *B* slipping past *T*; at Right Is the Dumping Position

Fig. 1 shows the bucket with the bail down in the position for loading. Fig. 2 shows the bucket in position for being lifted. This is accomplished by moving the crane so that the bail will go up against the stop *C*. Then the bail may be raised, which causes the block *B* to go up into the slot between the stop *C* and the tipper cam *T*, which will prevent the bucket from tipping. The bucket can then be carried to any place for dumping. Note the slotted opening in the bail ends, marked *S*. The bail is attached to the bucket by a heavy trunnion.

Fig. 3 shows the bucket in position for dumping. The crane operator, to dump the bucket, merely lowers it to the place of dumping, then slackens the cable to allow bail to lower in slot. The bail is then tilted into the position shown on dotted lines, Fig. 2, with *B* past the projection *T*. The operator then moves the crane slightly and pulls upward, which permits the bucket to dump its load. The load merely spills out of the bucket, avoiding the impact usually caused by dropping the load, and injury to the equipment into which the material is being dumped.

A level place is not required for dumping, as the bucket will operate from practically any inclination or position. The bucket has been in service for two years in steel mills, handling roll scale, spiegel, hot cinder, hot crop ends from shears and saws, concrete, sand, gravel, dirt, coal, brick, etc.

Bids on Plates for Big Four

An erroneous impression has been caused by a statement made in THE IRON AGE of Oct. 11 that on plates for the Big Four Railroad a Cleveland mill quoted 2.385c., Pittsburgh. The lowest bidder, a Cleveland company, made a quotation of 2.53c., Cleveland. This price was arrived at by taking the 2.50c., Pittsburgh basis, adding 31c., the freight from Pittsburgh to Indianapolis, making 2.81c., and deducting 28c. for the freight rate from Cleveland to Indianapolis. The plates are to be delivered by the Cleveland company to the Big Four Railroad at Cleveland, which will ship them to Indianapolis.

LUXEMBURG MARKET WEAK

Coke Shortage Serious—Buyers Await Lower Prices—French Competition for Export Severe

LUXEMBURG, Oct. 3.—Following a slight improvement in August, the situation in Luxemburg became almost critical in September. Arrivals of coke were smaller and smaller and all works are reducing their production; meanwhile, the blowing out of some furnaces appears inevitable.

The iron and steel market has declined as a result of the revival of activity in some of the Belgian works, which have quoted low prices to secure tonnage, and also because of the effort of French plants to export part of their products, in order to gain benefit of the coke bounty allowed on export tonnages, amounting to more than 100 fr. per ton on rolled steels. The Société De Coke De Hauts-Fourneaux can no longer continue such reductions and for October the bounty has been reduced to 30 fr. per ton of coke. Meanwhile, the situation in Luxemburg has been rendered acute.

The improvement of exchange has also affected the market, and buyers, impressed by this and by the contemplated settlement of the Ruhr situation, are showing some hesitation in placing orders, hoping for an important decrease in prices shortly.

The considerable transactions, generally speculative, with Japan, have been counteracted by the measures taken by the Japanese Government to control the importation of materials for reconstruction. These measures were so precise and rational that they immediately stopped all speculation and the stoppage of the necessary credits has resulted in an immediate canceling of the contracts already placed.

The following prices are quoted for export, f.o.b. Antwerp, Belgian currency:

	Fr. Per Metric Ton
Castings No. 3	460 to 465
Ordinary Bessemer	445 to 450
Semi-finished products:	
Blooms, Bessemer	600 to 610
Billets	610 to 625
Largets	630 to 640
Rolled steels:	
Joists	700 to 710
Bars	740 to 750

The number of blast furnaces in activity on Sept. 29 was 27, with the furnaces at Esch and Rumelange all down. The output was 135,054 metric tons of pig iron and 109,737 metric tons of steel.

FRENCH MARKET UNSTEADY

Fluctuates with Political Developments—Coke Shortage a Factor—Export Rises and Falls with Exchange

PARIS, FRANCE, Oct. 5.—Every day sees a change in the situation of the market, according to the developments in international politics. When the end of passive resistance was announced, there was optimism not only in the financial but in the business world and immediately the franc rose in exchange, but it has again declined since the political situation in Germany is again cloudy and a prompt settlement of reparations no longer seems possible. As a result market conditions are totally changed.

When the pound sterling dropped to 72 fr., British dealers had an opportunity of selling in France and at the same time French exporters were less favorably situated for export, so that in the end the market has been quite unsettled.

Now that the pound sterling has again increased to 78 fr., British sellers can no longer enter French markets and export is once more improved. Business is naturally much affected by such fluctuations and it seems that the crisis is far from ended. Prices will remain firm until the pound drops again.

Coke.—The perequation price for coke has finally been established, and the increase does not appear to have had any great effect on prices generally. From Sept. 26 to 30, 29,853 tons of coke was received from the Ruhr, or 135,000 tons for the month of September, 30,000 tons more than August, a daily average of 4500 tons. At a meeting Oct. 2, it was decided to advance the price of coke to 212 fr. per metric ton, against 200 fr. for September. At this price, it is expected that it will be possible to deliver 50 per cent of the consumption capacity of the plants. Extra supplies would cost 250 fr. per metric ton.

Pig Iron.—The production of pig iron will not, apparently, be increased for some time because of coke scarcity, and consequently transactions are limited. Prices are fairly well sustained and vary according to the activity of the plants. No. 3 P. L. has been quoted at 430 to 450 fr. per metric ton. In hematite, transactions are much easier, even among sellers with large tonnages on hand. The current quotation is 475 to 500 fr., free, according to region. Cleveland No. 3 GMB is offered here at 480 fr., which is still considered high, and East Coast is higher at 500 to 510 fr., Paris. Lorraine sellers are quoting f.o.b. Antwerp, No. 3 P. L. 450 to 460 fr. (Belgian currency), and basic Bessemer ordinary casting, 445 to 450 fr. per metric ton.

Ferroalloys—Production has been increasing but only during the first half, so that both domestic and export requirements have been difficult to meet with stocks on hand. This situation is now slightly improved, as prices have been influenced by the fall of exchange. French ferromanganese, 76 to 80 per cent Mn., quoted at 1600 fr. per metric ton but a few weeks ago is now worth 1550 fr. and British grades are quoted at 20 to 30 fr. lower. Spiegeleisen remains unchanged at 750 fr. for 18 to 20 per cent Mn. grade and at 625 fr. for 10 to 12 per cent Mn., both delivered.

Semi-Finished Material.—Available tonnages are still scarce. None of the Ruhr seized products has been so far sold on the French markets. Few transactions are noted, as works are well booked ahead. Open-hearth steel blooms have been sold at 640 fr. per metric ton, f.o.b. works, Meurthe and Moselle.

Rolled Products.—A declining tendency is evident. Export business is smaller and British products are now competing. Another factor is the arrival on the domestic market of the Ruhr seized products. For instance, the department of the Nord was supplied on Sept. 5 to 19 with 3345 tons of iron and steel, which is now being sold at a price practically equal to that of the world market. The average quotations for rolled steels is about 67 to 70 fr. per 100 kg.; however, a few transactions have been made in soft steel bars on a 72.50 fr. basis and open-hearth semi-hard has gone for 81 fr., base, with the price of coke at 200 fr. Lorraine mills quote, f.o.b. Antwerp, in Belgian currency: 750 fr. and have shaded prices from 10 to 20 fr. per metric ton for close business.

Beams.—Offers have been made by a large maker in the East on an order of 200 tons, as follows: Delivery 2 to 3 months, base price 660 fr. per metric ton, f.o.b. works. This contract, based on the current price of coke is revisable, at the rate of 2 fr. variation on 1 ton steel, per 1 fr. variation on 1 ton of coke. The contract is void should coke be quoted under 200 fr. or above 250 fr., or should the works receive less than a 50 per cent share of its average supply of coke. The current quotation of last week for beams was about 62 to 64 fr. per 100 kg., at works. Lorraine mills are asking, f.o.b. Antwerp, 725 fr. (Belgian currency).

Sheets.—Orders in heavy and medium sheets are still favorable and have improved in the lighter grades. Base prices continue unchanged and are as follows, f.o.b. cars Lorraine works:

	Fr. Per 100 Kg.
Large plates	65 to 67
Heavy sheets	67 to 70
Medium sheets	87 to 90
Light sheets	95 to 100

Plane galvanized sheets range from 195 to 120 fr. per 100 kg., according to sizes.

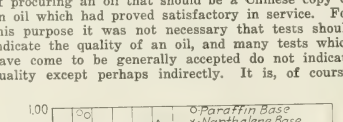
Testing the Quality of Lubricating Oils

Usual Tests Do Not Always Indicate Either Suitability or Durability—Other Tests Less Well Known May Be Better

BY WINSLOW H. HERSCHEL*

THERE are two ways of buying oil, by brand and by specification. The former method must be used by those whose expenditure for lubricants is not large enough to warrant maintaining an oil testing laboratory. When oils are bought by brand it is in effect buying lubrication; that is, the price of oil includes engineering advice. It is known, however, that brands do not run uniform, and large consumers of oil usually prefer to employ their own chemists and lubrication engineers and to buy by specification. Government tests and specifications have been published.

Not many years ago laboratory methods of test were used mainly for identification, to determine whether two samples of oil were alike or different, or whether an oil fulfilled the requirements of specifications. These specifications were written with the idea of procuring an oil that should be a Chinese copy of an oil which had proved satisfactory in service. For this purpose it was not necessary that tests should indicate the quality of an oil, and many tests which have come to be generally accepted do not indicate quality except perhaps indirectly. It is, of course,



Relation of Carbonization to Viscosity

admitted that service tests are the court of last appeal, and laboratory tests can serve only to reduce the number of expensive and time consuming service tests required, but it must be remembered that service tests as well as laboratory tests are subject to misinterpretation.

Properties of a Lubricant

Lubricants may be solid or fluid, but are mainly liquids. A solid lubricant, like graphite, appears to act by forming a smoother rubbing surface than that of the metal. A most striking example of this is furnished by the use of "aquadag" in drawing the tungsten filaments for electric lights. The dies were once made as smooth as possible; now they are made purposely rough, better to retain the graphite surface with which the tungsten actually comes in contact. It is now coming to be believed that a liquid lubricant, owing to its property of so-called "oiliness," has a similar effect in coating the rubbing surfaces with an adsorbed film of colloidal dimensions.

For the most general condition of lubrication with a liquid, there are two régimes to be considered, that of complete film lubrication, at high speeds or low pressures, and that of incomplete film lubrication due to low speeds, high pressures or inadequate supply of lubricant. In either case the necessary properties of the lubricant may be divided into two classes—those which assure that the lubricant will be suitable for the purpose at hand, when new, and those properties which indicate durability; that is, the maintenance of the original properties for a sufficiently long period of time in storage or in use.

The first essential of a lubricant is that it shall be fluid enough to reach the rubbing surfaces and viscous enough to remain in place and prevent metallic contact. The lower the coefficient of friction the better, provided it is not obtained at too great a sacrifice of factor of safety or durability. The most commonly made tests are gravity, color, flash, fire, pour point and viscosity. Some of these indicate neither suitability nor durability.

Gravity Tests

As there is no relation between gravity and viscosity, gravity has been discarded as a basis for fuel-oil specifications and fuel oil is now purchased by the Government on viscosity. Similarly, there is no relation between gravity and volatility, and specifications for gasoline are based on a fractional distillation.

At present, when the market is full of mixed oils and oils from the mid-continent field, it is often impossible to describe an oil as either distinctly of paraffin or of naphthene base. It is believed that satisfactory lubricants may be made from any crude and, in Government specifications, by the omission of gravity and by other means, care has been taken not to eliminate any satisfactory oil on account of its source. Gravity has a legitimate use in determining absolute viscosity, as it enters into the relation between absolute viscosity and the time of flow as measured in the most commonly used types of viscosimeters.

Color Tests

The unwarranted emphasis put upon color may be due partly to the fact that the fatty oils, in use as lubricants before petroleum oils were put upon the market, were of light color, and color is a property easily observed. Refiners claim that they have to make oils of good color, whether they believe them of better quality or not, because the public demands it. Doubtless also refiners have educated the public to believe that a clear, light-colored oil is always of good quality. This is, however, not confirmed by test, and a water-white oil tested by the Bureau of Standards was found both by laboratory and engine tests to be wholly unfit for use, as it gummed badly.

Fire and Flash Points

The flash point is to some extent a measure of the volatility of the most volatile constituent and hence an indication of fire hazard and loss from evaporation. The flash point of a blend, however, is higher than that of the lighter oil. The weakness of the test is that it gives no indication of the amount of this volatile matter, which information can be obtained only by an evaporation test or fractional distillation. Unfortunately these tests have not been standardized or generally adopted. The fire point serves as a check on the flash point, too great a difference between the two tests sometimes indicating that the flash point is incorrect because of failure to dry out the sample bottle after washing with gasoline.

Naphthene-base oils are as a rule lower in fire and

*U. S. Bureau of Standards. The paper, of which this is an abstract, was published by permission of the director of the bureau. It was read before the Engineers' Society of Western Pennsylvania.

flash points than corresponding paraffin-base oils of the same viscosity. In the Government specifications the fire point has been omitted and the flash point has been kept low enough not to cause the rejection of oils from any crude.

Pour Point

The effect of cold upon an oil may be expressed as a melting point or as a temperature of solidification, the present tendency being to discard the former and adopt the latter under the name of pour point. When machinery is to be used out of doors in winter, the pour point becomes of great importance. At lower temperatures the oil will not flow and hence cannot reach the rubbing surfaces. The pour test may be regarded, therefore, as an important suitability test.

There is no sudden change in consistency of oils at the pour point, as there is with water when it freezes; so that in cranking an automobile, for example, the question may arise whether a very viscous oil at a temperature above its pour point offers more or less resistance than another oil, which, at the same temperature, is below its pour point. The evidence appears to be that the viscous oil may offer the greater resistance because it winds about the shafts and sticks to them, while the oil which has solidified acts more like a grease, and "channels"; that is, a shaft or gear cuts a channel which does not fill up. As the machine continues to operate, the oil will heat until it ceases to channel, so that the temporary increase in friction due to lack of adequate lubrication will not be serious.

A very low pour point can be obtained only by the complete removal of paraffin, if originally present in the oil, so that the requirement of a low pour point may be more burdensome to some refiners than to others; yet when a pour point of minus 40 deg. Fahr. is necessary, as for airplane machine guns, it must be had, regardless of expense. On the other hand, to specify a lower pour point than required may needlessly restrict competition and increase the price of oil.

Viscosity Tests

A most important test for suitability is that for viscosity, although it is not a quality test at all unless viscosity is determined at two temperatures. All oils decrease in viscosity with an increase in temperature, but some decrease more than others, and an excessive change in viscosity is undesirable. The addition of fatty oils in compounding decreases the change of viscosity with the temperature.

The standard temperatures are 100, 130 and 210 deg. Fahr. Considering viscosity as a suitability test, the viscosity at only one of these temperatures is not a measure of quality. Porpoise jaw oil may be excellent for watches but it would be entirely unsuitable as an airplane motor oil and, conversely, castor oil is a good oil for heavy work but unsuitable for sewing machines. For any given machine there is a viscosity of minimum friction, and the ratio of the viscosity of the oil film at the operating temperature to the viscosity of minimum friction may be regarded as the factor of safety. Wilson suggests that a suitable factor of safety is 5, and shows that the actual factor of safety attained in practice is inconsistent.

Viscosity is more completely under control of the refiner than any other property. Any desired viscosity can be obtained by blending, as in mixing a spindle oil with cylinder stock, which has, however, the disadvantage that the cylinder stock is not so readily filtered as an oil of moderate viscosity. Cylinder stock (so called because it is the basis of steam-engine cylinder oil) is not usually made from naphthene-base crudes, which, however, furnish unblended oils of higher viscosity than do the paraffin-base crudes.

The measurement of viscosity with accuracy presents numerous difficulties. It is known that, after prolonged use, viscosimeters tend to show too high a time of flow. One explanation offered is that this is due to adsorbed films which accumulate in spite of the usual frequent cleaning of the outlet tube with gasoline. If this is the case, some better solvent such as benzol should be used.

Viscosity is the last on the list of tests in common use. It will be seen, after running through the list, that none of these tests is found to throw much light upon the quality of the oil. Even the test for viscosity is deprived of its potential value by the custom of taking observations at only one temperature.

Miscellaneous Tests

Other tests which give promise of indicating quality have been less frequently used and are consequently less thoroughly standardized. They are forced to win their way if possible against considerable opposition and it often becomes a question whether the burden of proof is on the consumer to prove that a test is of value, or upon the producer to prove that oils which would be rejected by the test are better than those accepted, or at least as good.

Oiliness

Another most important property which influences suitability is oiliness, which causes a difference in friction between two lubricants of the same viscosity at the temperature of the oil film, when used on the same bearing under the same conditions of speed and pressure. Oiliness has no effect when there is complete film lubrication, so that at first sight it would appear to be unimportant except with gearing and heavy work, but there is incomplete film lubrication with all machinery on starting, unless some special device is provided, and there is always a possibility of incomplete film lubrication during operation if anything goes wrong.

Oiliness appears to be due to adhesion, adsorption or a segregation of some constituent of the lubricant at the boundaries, but it is imperfectly understood and cannot be definitely defined. Numerous methods have been proposed for measuring it, but it is still too early to predict what will eventually be the method adopted for routine tests.

There is no longer any doubt, however, that the property of oiliness exists and may be measured under suitable conditions of low speed or high pressure. Low speeds appear to be preferable as less liable to roughen the rubbing surfaces, and Deeley has shown noteworthy differences in oiliness between mineral and fatty oils. The superiority of fatty oils in this respect has long been conceded, and what is of more interest is whether there is any material difference in oiliness of mineral oils from different crudes. Various investigators are at work and it is to be expected that data will soon be available to help settle this question.

Emulsion Tests and Organic Acidity

There is considerable difference of opinion in regard to the best test to give assurance that an oil will be serviceable for long periods of use in circulating systems as in turbines and automobiles. The chief requirement for a turbine oil is that it must not emulsify in use, or, as it used to be expressed, the oil must separate readily from water. Now this specification is of no value because vague and indefinite, and it may be stated as a fundamental principle that a requirement of a specification cannot be enforced unless expressed as a numerical value which may be obtained by a reproducible method of test.

There are two general classes of emulsion tests. In the first, the oil is agitated by steam and the apparatus required is comparatively simple. It also has the advantage (or disadvantage) that the oil is kept at a high temperature, which facilitates the separation of oil from the water. In the other class of tests, mechanical agitation is employed, which permits the use of any temperature and any emulsifying liquid desired.

There is some justification for the use of an alkali solution in a suitability test, since alkali waters occur in arid regions and steam may be contaminated from boiler compounds. But more important is the question whether an emulsion test with caustic-soda solution is of value as a durability test.

It is said, as an objection to an emulsion test for automobile oils, that the oil will in any case emulsify after use for a short time, that it does not come into contact with water, and that even if it does it is better

to have an emulsion formed than for the water to freeze and stop the oil pump. But this is losing sight of the fact that an emulsion test for automobile oils is not a suitability but a durability test.

Carbon Residue Test

What the automobilist demands of an oil is "mileage" and freedom from carbon deposits. Mileage is, to a large extent, determined by the amount of dilution of the crank-case oil by the heavy ends of the gasoline, and is thus a fuel rather than a lubrication problem. Carbon also depends to some extent upon the tightness of piston rings and quality of fuel, since a lubricant reduced in viscosity by dilution with the fuel will more readily find its way into the cylinder. But to the extent that carbon is determined by quality rather than quantity of the lubricant that reaches the cylinder, a suitable test of the lubricant should indicate the amount of carbon deposits to be expected.

Waters Carbonization Test

The precipitation test gives the amount of asphaltic matter insoluble in petroleum ether and is used for steam-engine cylinder oils and car oils. Steam-turbine and automobile oils would all show a zero precipitation, but when they are heated they turn dark from the asphaltic matter developed by oxidation, and in the Waters carbonization test the amount of this asphaltic matter is determined.

The oils are heated under standard conditions for a given length of time at a standard temperature, in 150-cc. Erlenmeyer flasks, selected to have a maximum inside diameter of 65 mm. (2-9/16 in.). In the case of used oils the carbonization is the difference in asphaltic matter before and after heating.

Not all oils will pass this test, which is as would be expected, since it determines chemical instability, which is difficult for refiners to control. Since, however, the greater part of the oxidation is due to the lighter fractions, the carbonization value would be reduced by eliminating the more volatile constituents of the oil—that is, by making narrower cuts—in order to raise the boiling point of the lightest constituent for a given viscosity of the oil as a whole. The narrowness of cut may be determined by a fractional distillation, but a high vacuum is necessary to avoid cracking, and on this account the test is therefore much less likely to come into general use than the fractional distillation test for gasoline.

It seems preferable to use the Waters test, which detects a lack of resistance to oxidation, whatever may be the cause. There is considerable evidence that freedom from sulphur compounds is possibly an even more potent cause of low carbonization than narrowness of cuts. From the point of view of conservation, it is preferable that this should be the case, since the making of narrow cuts would make it difficult to utilize all fractions of the crude oil.

JAPAN'S BUYING STILL LIGHT

Fairly Active Business With Warehouses—Chilean State Railways Issue Rail Tender

NEW YORK, Oct. 16.—Although rumors continue current of fairly large inquiries for all kinds of material from Japan, the large Japanese export houses are awaiting specific tenders from the proper department of the government, covering requirements for temporary construction in the devastated areas. In the meantime, a fair business is reported in small lots of sheets, both black and galvanized, wire nails and similar material from warehouses in Osaka and Kobe, which are replacing stocks that have already been drawn upon for immediate needs. One export interest reports an order from Japan for 1000 tons of wire rods and 400 tons of light rails and some purchasing of wire rods is rumored to have been done recently with Canadian mills.

A report, of which Japanese sources in New York as yet have not received confirmation, states that the Imperial Government will shortly issue a large list of machine tools for the arsenal.

Chinese purchasing is light, but a few transactions in wire rods are noted and it is currently reported but not confirmed that several thousand tons of second-hand material have recently been sold to Chinese merchants.

Bids on the annual rail requirements of the Chilean State Railways will be opened Nov. 27, at the main office in Chile. Specifications are available at the New York office of the railroad, 141 Broadway, New York, but bids are to be submitted direct to the railroad in Santiago, Chile. The specifications call for 16,500 tons of 100-lb. rails, including accessories, according to the requirements of the Chilean State Railways, which differ slightly from both the A. R. A. and A. S. C. E. specifications. Because of the uncertain European conditions this year it is believed that there is an excellent opportunity for American mills to obtain the business which two years ago was awarded to Germany.

As a sidelight on this tender it is noteworthy that, according to recent reports, a bill has been approved by the Chilean National Council of State, shortly to be submitted to Congress, calling for the expenditure of considerable sums annually on new railroad construction in Chile. The bill proposes to finance the new lines with surplus earnings of the existing State railroads, which are increasing as the result of lessening interest requirements as old loans are liquidated.

British Pig Iron and Steel in September

LONDON, ENGLAND, Oct. 13 (*By Cable*).—The pig iron production in September showed a decrease of 41,200 tons from that of August, while the steel ingots and castings output registered an increase of 112,400 tons. The pig iron make last month was 558,600 tons with the steel ingot and castings total 695,100 tons.

Comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	839,000
1920, per month	669,500	755,600
1921, per month	217,600	302,100
1922, per month	408,300	486,000
January, 1923	567,900	634,300
February	543,400	707,100
March	633,600	802,500
April	652,200	749,400
May	714,200	821,000
June	692,900	767,700
July	655,100	624,200
August	599,800	582,700
September	558,600	695,100

The ventilating equipment for the new electrified No. 2 mill at the Lackawanna plant of the Bethlehem Steel Corporation will consist of two double width turbo conoidal blowers manufactured by the Buffalo Forge Co. Each is rated to deliver 60,000 cu. ft. of air per minute. Two Carrier air washers will be installed to clean and cool the air delivered by the blowers.

The Hartford Chapter, American Society for Steel Treating, announces a section meeting in Hartford in May, comprising chapters from New York, Boston, Providence, Springfield, Worcester, New Haven and Hartford, the first time the section meeting will have been held east of Bethlehem, Pa.

Sale of the Townsend combination armature coil winder and puller has been taken up by George Bender, 128 Centre Street, New York. The machine is an adjustable slot device and has attachments so that the winder after winding the coil pulls it into shape on the same machine.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: Park Building. Boston: 140 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Where Will It End?

A GREAT problem of the present time is how to educate the citizenry of this country respecting the fundamentals of economics. Failing to make any headway in that direction, we shall be subject constantly to the handicap of arbitrary restrictions and unwise regulations, together with now and then some positive crime of major order, as, for example, would be the granting of a bonus to the ex-soldiers. It would be excellent if members of Congress, labor leaders, and the members of governmental commissions, and even some bank presidents, could be compelled to pursue the curriculum of a good school in which economic theory and fact are taught.

The chairman of the Ways and Means Committee of the House of Representatives recently made these remarks:

> An accumulation of $1,000,000 in the hands of one man is no more useful for carrying on business than an average accumulation of $100 by 10,000 men if the accumulations be joined, as they usually are, through bank deposits or other means, or otherwise used so as to render a useful return. There is much loose talk about the manner in which business is affected by national taxation. In these days when nearly every factory is running full blast, when railroads are moving more freight than ever in our history, when sales of commodities are at a high peak, it is merely cheap claptrap to assert business is being ruined by high taxes.
>
> Now, there is a glimmering of truth in this gentleman's words, but only a glimmering. A million dollars in the hands of 10,000 men, if combined, would indeed have the same usefulness as if it were owned by one man. So far the thought is sound in theory. The weakness is in fact. It has been adequately demonstrated that the process of diffusing a million dollars does not transfer $100 apiece to 10,000 men, but, rather, $100 apiece to 5000, the remainder being wasted in the process. Something of that kind is being shown in our diminished rate of national saving.
>
> This idea may be obscure to some minds, but there should be no obscurity to any in the vagary respecting the effect of taxation. The elemental economic working of taxation is the diversion of labor from direct production to the purposes of government. At the present time something like 10 per cent of the workers of this country are thus occupied. Yet the chairman of the Ways and Means Committee imagines that percentage to be doubled and taxes raised correspondingly in order to pay the salaries. Activity in business would continue, for government employees must be fed and clothed and kept warm like other people, but very soon the diminished production of 80 per cent of the workers as compared with the previous 90 per cent would tell its story in higher prices and curtailed consumption. This effect of high taxation ought to be obvious. Not unlike this fallacy is that of the executive council of the American Federation of Labor, which "has no hesitancy in emphasizing the fact that the most potential factor against unemployment is resistance against wage reductions, which mean abridgment of power to purchase, to consume and to use the products of labor."
>
> We shall not mind the carelessness that let the word "fact" be used instead of "belief," but shall merely point out that resistance to wage reductions is producing already a strangulation of industry and is the very thing that is going to cause unemployment. It ought to be obvious to this executive council that the raising of the price of anthracite in order not to abridge the purchasing power of 150,000 miners, *ipso facto* does abridge that of other workers. But they would probably agree with the idea of Governor Pinchot that such an advance ought to be absorbed by the operating companies so as to abridge the purchasing power of their stockholders. There seems to be an abridgment somewhere, however we figure it out.
>
> Yet none of this sounds any more absurd than the opinion of the erudite though unlamented Coal Commission that operating companies earning more than some stipulated rate of profit ought to be penalized for their efficiency by taxation on their excess.
>
> All of this pales into insignificance, though, in the face of the idea entertained by the great majority of Congressmen that we ought to provide the ex-soldiers with spending money owing to their loss of opportunity to profit out of the war.
>
> But let us stop. It is all too much like the economics that might have been taught to Alice in Wonderland. We are surely going to have difficulty in steering our ship of state if such loose thinking continues to be prevalent in quarters that ought to know better. Out of the war people learned much that is useful and stimulating and also much that is unsound and dangerous. At times it seems that the latter predominates.

A 1920-1923 Contrast

THREE years ago the disease of "cancelitis" was widely prevalent. Orders and contracts were canceled or repudiated in some cases; in other cases indefinite postponement was insisted upon. There arose a clamor against these actions. It was claimed that industrial activity was being killed, but that if men were forced to carry out their obligations the activity would continue and prosperity would be preserved.

After the lapse of only a few months it became clear to the majority of men that the trouble lay not in the cancellations, but in the unsoundness of the commercial transactions the carrying out of which was thus avoided. There had been commercial activity which industrial activity was unable to carry out.

In important respects the condition today is the reverse of that which obtained three years ago. The volume of commercial activity, in the making of contracts and purchases, is much smaller than the volume of industrial activity. In the long run the two must balance. Three years ago there was more of the former than the latter could carry out, and some had to be canceled. There was, therefore, an unsound condition. Now there is a gap on the other side, and it is by no means unreasonable to feel that this indicates decidedly a condition of soundness.

The gap can be bridged either by commercial activity increasing or industrial activity decreasing. It would be easy for commercial activity to increase, while unless there is unsoundness not laid bare thus far, industrial activity has no reason for decreasing materially. Contracts and sales orders do not provide buying power. Industrial activity does. It makes payrolls and profits. The income of the people of the United States is running very large at the present time. Unless the buying activity has been due chiefly to borrowing, it can continue. The appearance is that it has rested chiefly upon income. Credit has not been strained.

Throughout this present year there have been opportunities for comparing developments and circumstances with those of 1920, for both years have been big and active. Almost every comparison has shown a striking dissimilarity. Under apparently similar circumstances things have moved differently. That is because after 1920 men recognized that they had made mistakes, and this year they have been firm in their attitude to avoid those mistakes. All that we have seen thus far suggests that things will now move differently from their course at the end of 1920. Naturally it would be unsafe to predict that we shall not next year see any of the things we saw in 1921, but it is plain that if we do reach any of those things it will be by a different route, one which is not now to be seen. Three years ago there had been an excess of confidence. Now if there is any excess it is one of conservatism.

A simple illustration of the difference in conditions may be added. On July 1, 1921, the United States Steel Corporation had 5,117,868 tons of unfilled obligations, and in that month it operated at about 25 per cent of capacity. At the beginning of this month the corporation had a slightly smaller tonnage, but its customers seem to desire that it operate at 85 or 90 per cent of capacity.

Some Labor Tendencies

RECENT developments of importance in the relations of capital and labor indicate a different attitude on the part of some of the labor leaders. To what extent conditions will be permanently improved, no one can predict at the present time, but certain changes of policy are entitled to receive thoughtful consideration.

The admission by the secretary of the committee representing 14 international unions that the effort to organize the steel workers of the country has been coolly received, not only by wage workers but by international union officers, since the substitution of the eight-hour and the ten-hour day for the twelve-hour day is virtually a surrender on the part of those who had hoped greatly to extend membership in unions. The result will be received with considerable satisfaction by the advocates of the shorter day. It is a fact long recognized that where working conditions are satisfactory, many workers have little use for unions and the propaganda of militancy constantly carried on by their leaders, and the present aloofness of steel works employees furnishes new evidence of that fact. It should be noted that union officials have not yet given up hope and will attempt to "bore from within" by getting men who are not now engaged in steel plants to obtain employment there, but the movement is not likely to gain much headway as long as steel workers are satisfied with their wages and working conditions.

The progress made by labor unions in the past three years in establishing banks, as reviewed in our Washington letter in this issue and as reported to the Portland convention of the American Federation of Labor, shows a decided change of policy, which is described as an effort to substitute for the strike the labor unions' money power as a more effective weapon for the workers' defense. To what extent the strike will be discouraged by the banking institutions of the labor unions remains to be seen, but it is certain that as the labor unions get into banking they will understand more clearly the attitude of the business man. The banks of labor unions will exert a conservative influence, and employers generally will welcome them.

Another conservative tendency of late is shown by the opposition of some of the labor unions to the Red element. There has been room for a house cleaning and every step in that direction will improve the relations of all employers and employees who really want to get along together. It is particularly interesting to see the American Federation of Labor now putting Foster, the leader of the steel strike of 1919, where he belongs, and to recall the white-washing this man was given in the steel strike report written by radicals and foisted upon the Interchurch World Movement.

DAILY production of electricity by public utility plants in the United States is one measure of industrial activity, admitting that it also includes consumption for household and other uses. Expressed in millions of kilowatt-hours per day,

the average for the first eight months of 1923, as gathered from reports of the United States Geological Survey, was 151 against a daily average for all of 1922 of about 130.5. The 1922 figure resulted from a rapid rise in consumption of electricity in the latter half of the year, reaching nearly 149 in December. The noteworthy fact is that since then the daily average has not dropped below December, save in July when it was 147, and has not been greater than 154, reached in February. Instead, production has remained on a high level, not only nearly one-sixth better than in 1922, but over one-fourth higher than in 1920 and over 40 per cent above 1919. Outstanding is, of course, the evidence of the expansion of the central station, due undoubtedly to more industrial plants depending for light and power on the central station and to the greater use by the family of electricity for lighting and other household appliances. Statistics are not available at this writing as to the part taken in different years by water-power stations, but at the present time about 60 per cent of the electricity comes from fuel-burning plants and 40 per cent from hydraulic developments.

The Steel Treaters' Movement

THE demand for an organization such as the American Society for Steel Treating was strongly demonstrated last week in Pittsburgh. At its fifth annual gathering this society successfully put through a technical program and a steel exhibition which would reflect credit on a much older body. In the quality of the papers presented, in the scope of the products exhibited, and in the attendance, the meeting was a surprise to some of the most ardent steel treaters.

A feature of the convention from a technical standpoint was the high standard set by the program as a whole. In a single session the names of some of the most prominent metallurgists of the country on the list of participants made it an occasion that recalled meetings only a few years ago of the steel section of the mining engineers. A second feature was the general youthfulness of the membership, testifying to enthusiasm in their work and to the impelling power behind the accomplishment of the future. Here, in a comparatively new field, or one in which scientific knowledge, methods and apparatus are transforming a crude art, are possibilities from which much will be heard in the near future.

The exhibition, commercially and in every other way, was a success and now ranks close to the older one which is a feature of the annual gathering of American foundrymen. There were some suggestions that there is danger of giving too much prominence to the commercial side. It is to be hoped that the commercial features will not be overstressed or to the point of detracting from the technical possibilities of so promising an organization. Besides the usual showing of heat-treating equipment of all kinds were the attractive exhibits of large and small steel companies and machine tool interests.

The new society is thus affording a meeting place, not only for the steel treater and metallurgist, but for all steel makers and users who would have American steel products benefit to the fullest extent from the scientific advance that is now so prominently before the industry.

Steel Producers as Consumers

AT intervals the question has been discussed whether it is well for a steel producing interest, meaning a producer of the ordinary rolled forms of steel, to work up any of that steel into manufactured products for the market, or in other words for the steel producer to be also a steel consumer. Thus far there has been no strongly marked trend in that direction, as has been the case with several important companies on the Continent of Europe. The great bulk of the rolled steel produced in the United States changes ownership before anything further occurs to the steel.

Since the steel producing capacity of the country is now very large and marketing is not altogether as easy as it was before the war, there may be more disposition on the part of mills to add to their organizations, by construction or purchase, manufacturing departments to furnish outlets for portions of their rolled steel output. It is characteristic of steel enterprises to grow, and if there is no occasion to grow in tonnage then occasion may be found to grow in other ways.

Another factor in this question is the well recognized trend in steel manufacture to adapt the rolled steel product to particular uses. There is more carbon steel, more alloy steel, more special finish steel, than formerly. In adapting the steel to various particular uses, the work of producing and the work of consuming are brought closer together, and it would not be unnatural that the ownership of the two classes of work should be combined.

Among steel manufacturers in general there has been from the beginning a feeling that the steel producer should not compete with his customers. To establish a department for working up steel is, theoretically, to set up competition with the customers who are producing similar finished articles. In theory, of course, that policy is eminently sound, but there is left room for the question why the steel mill should want to sell also to those consumers.

This brings up a still broader question, why the ambition of almost every steel producing interest has been to have such a wide market. It is notable that such is the case. Almost every steel producer desires to have a "full line" of the various products. Also, there is a desire to sell all over the country. If the producer is in the East it is considered natural to seek a combination with a producer in the West, so as to "save freight." The result of all this is to increase competition.

If the country were growing smaller or the number of steel mill products were decreasing, the ambition so long possessed by steel manufacturers might bear promise of fulfillment, but the reverse is the case. It would seem more natural for mills to select their geographical territory and to select the finished lines on which they will specialize and then, where feasible, to connect themselves with consuming departments to work up their respective mill products. This would involve a complete reversal of a policy that seems to have been fundamental with the typical steel producer from time immemorial.

REFERS TO PITTSBURGH BASE

Unusual Course of Interstate Commerce Commission in Deciding Rate Case

WASHINGTON, Oct. 15.—In a decision announced last Thursday the Interstate Commerce Commission held as not justified proposed increased rates on iron and steel products in carloads and less than carloads from the Pittsburgh-Buffalo territories and territories east to Virginia cities and points taking the same rates. The decision grew out of complaints filed by a large number of protestants including the Donner Steel Co., manufacturers of iron and steel in Ironton, Ohio, and Ashland, Ky., the Newport News Shipbuilding & Drydock Co. The proposed increases range from 2 to 4.5 per cent per 100 lb. Typical of increases proposed was an advance of from 38c. to 40.5c. per 100 lb. from Pittsburgh, Dubois and Punxsutawney, Pa., to Newport News, Norfolk, Portsmouth, and Richmond, Va.

In seeking these increases, the railroads attempted to justify their action by the fact that the rate from Pittsburgh to the Virginia cities should be made on the Columbus, Ohio, to Baltimore basis. It was contended by the railroads that the adjustment developed from demands made upon their operating routes from Pittsburgh to the Virginia cities by way of junctions in central territory by iron and steel producers in the Mahoning and Shenango Valleys and southern Ohio for rates from these Ohio points and through those junctions equal to those applicable from Pittsburgh over Eastern routes. The present 38c. rate from Pittsburgh to Newport News, Norfolk, Richmond and Portsmouth, applies only through certain Eastern gateways and from so-called 60 per cent territory only. It does not apply through or from Western gateways, such as Columbus or Circleville, Ohio, or Kenova, or Huntington, W. Va. The railroads maintained that the contention of commodity rates from Pittsburgh and Buffalo to Virginia cities will force reductions from producing points west of the 60 per cent group from which the class rates to the Virginia cities are the same as from 60 per cent territory "thereby producing demoralization in the iron and steel rates and absorbing the entire rate fabric-iron and steel articles from central territory to trunk line on territory." The Donner Steel Co. objected to Buffalo being tied to Columbus and pointed out that from Buffalo to Norfolk by way of Columbus, the distance is 998 miles, while over the short line the distance is 582 miles.

The report of the commission in its conclusion took the rather unusual course of referring to the Pittsburgh base case and said that inasmuch as steel prices are fixed on the Pittsburgh base and the freight to destination is added, an increase in rates from Pittsburgh would mean an increase in the price of steel. This doctrine now is the subject of a long drawn out hearing before the Federal Trade Commission and it is considered rather remarkable that a body like the Interstate Commerce Commission should have made mention of the Pittsburgh base case in this decision.

Its comment on this subject follows:

"In the iron and steel industry the price of steel articles, outside of Pittsburgh wherever manufactured, is the Pittsburgh price plus the freight rate from Pittsburgh to destination. Because of this so-called Pittsburgh basing point for steel practice, an increase in the freight rate from Pittsburgh increases in like amount the price of steel, no matter where the purchase is made. This, however, respondents state, is no fault of theirs, and they do not benefit therefrom."

TO FIGHT PITTSBURGH BASING

Nineteen States Form New Organization, Which Will Hold Meeting in Chicago

The Associated States Opposing Pittsburgh Plus, a new organization embracing 19 States, will hold its first meeting at Chicago, Oct. 18. The formation of the association followed the appropriation of $55,000 by Illinois, Iowa, Minnesota and Wisconsin to fight the Pittsburgh basing point practice. A joint commission formed by those four States invited the cooperation of other States with the result that the governors and attorneys general of 15 additional commonwealths have given the movement their support. The initial meeting of the 19 associated States will consider methods for stimulating the campaign against "Pittsburgh plus" and will arrange to provide additional funds therefor.

W. E. McCollum, secretary of the Western Association of Rolled Steel Consumers, the organization which started the campaign against "Pittsburgh plus," has been retained as assistant secretary of the new body with offices in the City Hall Square Building, Chicago. H. G. Pickering, counsel for the Western Association, has been retained to make a digest of the 18,000 pages of testimony and 1500 exhibits thus far taken and filed in the Pittsburgh basing point hearings before the Federal Trade Commission. The new body is described as "an association to relieve the ultimate consumer of rolled steel and rolled steel products from the artificial and unjust practice of steel producers known as 'Pittsburgh Plus.'" It is understood that it is planned to file a brief on behalf of the associated states with the Federal Trade Commission, to be signed by the governor and attorney general of each State participating. Chapters in the brief will show how the practice affects industry in each State and the extent to which it imposes a tax on the ultimate consumer.

The joint commission representing Illinois, Wisconsin, Iowa and Minnesota has already been active in the case before the federal commission. The taking of rebuttal testimony, first scheduled for Aug. 6, was postponed at the instance of the joint commission until Dec. 10. This was to permit further inquiry to be made into the economic phases of the case, to rebut claims of the respondent, the United States Steel Corporation, which bases its defense on the grounds that the Pittsburgh basing point practice is the result of the operation of the economic law of supply and demand. According to its theory, Pittsburgh, as the point of surplus production of rolled steel, naturally dominates the market and sets the price.

To combat this argument, the joint commission of the four States retained the services of Dr. John R. Commons, professor of economics at the University of Wisconsin. He will be assisted by Dr. Frank A. Fetter, professor of economics at Princeton University, and Dr. W. Z. Ripley, professor of economics at Harvard University, and all three will testify in the pending case.

The member States belonging to the Associated States Opposing Pittsburgh Plus are listed below. Other States have been invited to join and it is possible that before the rebuttal in the federal commission case begins more will be enrolled as members.

Members of Associated States Opposing Pittsburgh Plus

State Commissions

Illinois—Hon. B. F. Baker, Kewanee, chairman; Senator John T. Denvir, Chicago, vice-chairman; Hon. Robert Scholes, Peoria, secretary; Senator Randolph Boyd, Galva; Hon. J. E. McMackin, Salem; Hon. Burton F. Peek, Moline; Hon. S. H. Thompson, Quincy.

Iowa—Governor N. E. Kendall, Attorney-General Ben. J. Gibson.

Minnesota—Governor J. A. O. Preus, Attorney-General Clifford L. Hilton.

Wisconsin—Governor J. J. Blaine, Attorney-General Herman L. Ekern.

Directors-at-Large

Florida—Governor Cary A. Hardee, Attorney-General Rivers Buford.

Georgia—Governor Clifford Walker, Attorney-General George M. Napier.

Idaho—Attorney-General A. H. Conner.

South Dakota—Governor W. H. McMaster, Attorney-General Buell F. Jones.

Indiana—Governor W. T. McCray, Attorney-General U. S. Leash.

Kansas—Governor Jonathan M. Davis.

Kentucky—Governor Edwin P. Morrow, Attorney-General Thomas B. McGregor.
Michigan—Governor Alex J. Groesbeck, Attorney-General Andrew B. Dougherty.
Missouri—Governor A. M. Hyde, Attorney-General Jesse W. Barrett.
Montana—Governor Joseph M. Dixon.
North Dakota—Governor R. A. Nestos, Attorney-General George F. Shafer.
Nebraska—Attorney-General O. G. Spellman.
Nevada—Governor M. A. Diskin.
New Mexico—Hon. Jose A. Baca, acting governor; Assistant Attorney-General, J. W. Armstrong.
Oklahoma—Attorney-General George F. Short.

The subject of "Pittsburgh plus" will also be discussed at a conference of the governors of all the States which will be held at West Baden, Ind., Oct. 18 and 19.

SALVAGING WASTE MATERIAL

Detroit Company Adds to Profits by Reclaiming Steel from Scrap Piles

Reclamation of steel from the scrap pile, such steel to be remanufactured into toys and other articles instead of being sold for re-melting purposes, has proved such a profitable enterprise for the Velick Scrap Iron & Machinery Co., Detroit, that it has organized a subsidiary company, the Steel Materials Co., which will make a business of salvaging material that can be used for manufacturing purposes.

Sheet metal scrap has proved to be a profitable soure of reclaimable material. Ordinarily most of the sheet metal scrap produced in the manufacture of stampings is bundled and sold to steel plants to be remelted in the open-hearth furnace. Some of the Detroit plants produce large quantities of sheet steel scrap and much of this, particularly that coming from automobile body plants and stove plants, contains pieces large enough for use in making other products.

Good Profit in Salvaged Sheets

After a section for an automobile body, for example, is cut from a sheet, pieces several inches long and wide can be salvaged from the resulting scrap. This scrap on reaching the scrap yard of the Velick company is looked over and pieces that are large enough are cut off on a small shear and sorted according to gages and class of material. It is stated that as much as 75 per cent of some of the sheet steel scrap can be salvaged and that a laborer can shear two tons of reclaimable pieces of this material at a cost of $2.50 a ton. The cost of salvaging this scrap and delivering it to a customer is placed at $7 to $8 a ton and it is stated that the material brings from $20 to $30 a ton delivered. Sheet stampings that are left after the salvaging are bundled in the usual way.

The salvaged material is sold to small stamping plants and is used mostly for the manufacture of toys. As the scrap is in varying sizes, samples are submitted to the prospective customer to show him the range of sizes so that he can determine whether he can use the material in making his product. One toy manufacturer purchases the salvaged pieces of sheet steel in carloads.

The Steel Materials Co. will install stamping presses and manufacture from sheet scrap blanks for various parts according to a customer's specifications and these blanks will be shipped to the buyer's plant for the forming operations. The company will also make various products from the stamping scrap. Among the sheet scrap that it is receiving are discs about 8 in. in diameter that are produced as scrap in stamping disc clutches for automobiles. These discs are being formed into plates for building stanchions.

Bolts and Nuts Also Reclaimed

Bolts, nuts and rivets in sizable lots reach the yard as scrap. These are rolled in tumbling barrels to take off the rust after which they are oiled and look about as good as new. Scrap pipe is being converted into nipples and couplings. Old boiler tubes 4 in. in diameter are being converted into building stanchions instead of being sold as busheling scrap. These are first straightened after they are bent, then they are put in long tumbling barrels to take off the rust after which they are cut to length and dip painted.

The Velick company conveys scrap from the various Detroit producers' plants in a fleet of 54 trailers of 5 ton capacity built by the Detroit Trailer Co. These trailers are left at the plant to be loaded and are hauled away by trucks that leave empty trailers, a truck hauling two loaded trailers. The trailers have bodies 10 ft. long and 3 ft. high and the sides and ends may be pried out for convenience in unloading material. A special locking device is provided to prevent the sides and ends from bulging out at the top when the truck is loaded. This method of leaving trailers at plants to be loaded with scrap as produced has been adopted by several Detroit scrap dealers and has proved a convenience to scrap producing plants and altogether appears to be a very satisfactory transportation method when applied to plants that produce scrap in large quantities.

Pipe Rate Not Unreasonable

WASHINGTON, Oct. 16.—In a tentative report announced last week, Examiner Henry C. Keene of the Interstate Commerce Commission held that rates on pipe from McKeesport, Pittsburgh, Woodlawn and Elwood City, Pa., Lorain and Youngstown, Ohio, and Wheeling, W. Va., to Taft, Cal., are not unreasonable or prejudicial. He consequently recommended dismissal of a complaint filed against these rates by the Standard Oil Co. of California. Combinations on Chicago and Bakersfield, Cal., of $1.50 from McKeesport, Pittsburgh, Woodlawn, Elwood City and Wheeling, $1.48 from Youngstown, and $1.45 from Lorain are now applicable to Taft.

The complaint was directed against rates on pipe prevailing since Feb. 5, 1921, up to the present time. It was contended that the rates are unreasonable to the extent that they exceed transcontinenal rates on pipe from corresponding points of origin to other California destinations, including Bakersfield.

Temperatures Encountered in Charcoal Furnace Practice

Data collected from six charcoal iron furnaces have been studied by technologists of the Minneapolis experiment station of the Bureau of Mines, Department of the Interior, in the preparation of a report on the temperatures encountered in charcoal furnace practice. Temperature readings on the slag, metal and tuyeres have been tabulated for comparison with similar observations on fifty-one coke furnaces. A material balance for each furnace is under way. The small slag volume in charcoal practice leads to some interesting conclusions regarding the effect on slag temperature produced by changes in the proportion of total slag derived from ash in the fuel.

The decline in construction volume which began in June continued through September, according to F. W. Dodge Corporation. However, the September drop from August was only 3 per cent. This year's construction volume to date in the 36 Eastern States has amounted to $3,012,610,500. Last month's record for the 36 States included the following important items: $111,906,000, or 39 per cent, for residential buildings; $55,010,800, or 19 per cent, for public works and utilities; $44,141,700, or 15 per cent, for business buildings; $38,059,300, or 13 per cent, for industrial buildings, and $16,399,000, or 5 per cent, for educational buildings.

R. A. Bull, research director, Electric Steel Founders Research Group, was the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association at the General Forbes Hotel, Monday evening, Oct. 15. His subject was "Cooperation as a Factor in Making Better Castings Cheaper."

BELGIAN MARKET FIRM

Exchange a Factor—Buyers Await Lower Prices Export Sales Fair—September Pig Iron Production Higher

ANTWERP, BELGIUM, Sept. 29.—Nominal domestic prices, f.o.b. cars, producer's works are as follows per metric ton, with the dollar at 18.50 fr.

	Fr.	
Commercial iron No. 2	700	or $38.00
Commercial iron No. 3	775	or 42.00
Commercial iron No. 4	800	or 43.25
Heavy sheets	800	or 43.25
Light sheets	1,150	or 62.00
Iron bars	750	or 40.50
Rails	750	or 40.50
Heavy beams	725	or 39.20
Rods	950	or 51.50
Open-hearth steel, ordinary	760	or 41.00
Rounds	1,400	or 75.60
Spring steel	1,350	or 73.00
Basic Bessemer ingots	560	or 30.20
Blooms	600	or 32.40
Billets	620	or 33.60
Largets	640	or 34.60

It has generally been expected that as the franc increased in value, iron and steel prices would decline and buyers have, therefore, refrained from purchasing except for immediate requirements. However, the large producers are fully booked up to the end of the year and consequently are not at all inclined to lower prices. Instead prices have been firm and generally have been maintained at the same level, except for slight concessions by a few works that had not yet sufficient tonnage ahead. British importers have made several firm offers, but at no increase in sterling prices. Such business was not accepted considering the low price this would mean with the present exchange rate of 85 fr. to the pound.

Commercial iron seems more affected than most other products, transactions in No. 2 iron being reported at as low as 675 fr. or $36.40. There is keen competition for orders among the large works, as domestic business is not heavy and export orders are at present extremely scarce. The better grades of iron are firmer. Only a few works have accepted orders for No. 3 iron at low prices such as 700 fr. or $38. The current quotation is 750 to 775 fr. or $40.50 to $42.

Business in steel products is light. In order to book as many orders as formerly, prices would have to be reduced almost proportionate to the decline in exchange. Makers, however, are firm and as most mills are at present well provided with orders, prices will probably hold at about the present level until the situation is again normal. Exporters have generally been able to place orders with works not yet fully booked at prices such as 725 fr., f.o.b. Antwerp for iron bars ($39.20, about $1.50 under the nominal domestic price) and 700 fr. f.o.b. Antwerp ($38), for beams compared with a domestic quotation of 725 to 750 fr., ($39.20 to $40.50). Other steel products, which are in greater demand are firmer and prices are well maintained.

In August there were 39 blast furnaces in operation, producing about 200,000 tons of pig iron and about 210,000 tons of rough steel. This is an increase over previous months. The production of castings direct from furnaces was 5800 tons; finished steel 174,000 tons, and finished iron 17,500 tons.

Pig iron is quiet, Furnaces are disposing of a satisfactory tonnage to domestic customers, but although no large lots have been piled it has been necessary to reduce prices. The ruling price for No. 3 is 460 to 475 fr., $24.80 to $25.20 per metric ton delivered to consumer's works, or f.o.b. Antwerp. Lorrain foundry No. 3, high phosphorous is also plentiful at about the same prices. Only Luxemburg makers are maintaining higher quotations, as they are facing a coke shortage and unless arrivals from Germany increase several furnaces may be blown out. The same situation prevails in Luxemburg, iron and steel products, so that contrary to the usual situation Luxemburg mills for offering on the Belgian market small quantities at higher prices than French or Belgian works. At one time it was thought that pig iron makers would be compelled to reduce prices drastically as the rate of exchange declined to 80 fr. to the pound sterling. The Middlesbrough makers had, in the meantime, reduced their prices so that this grade of iron, equal to the best Belgian brand, was offered at about 104s. c.i.f. Antwerp, nearly 416 fr. per ton, or about 434 fr., delivered, $23.40. Later the rate of exchange improved so that this grade of pig iron is now costing about 440 fr. at Antwerp.

Good tonnages of British hematite have been placed in Belgium, notwithstanding, reductions by Belgian and French makers as a result of declining exchange. The British, French and Belgian prices are nearly the same.

Basic Bessemer iron is quoted at 445 to 450 fr., $24.20. No large quantities, however, are available and Belgian producers are even buying large quantities from Lorrain works to supply customers.

The coal market is satisfactory with demand heavy and prices going still higher principally because of higher wages. Coke prices are not much changed. The production in August was nearly 365,000 metric tons. Arrivals from Germany, although not sufficient, have been larger than were expected. About 112,000 tons of coal was imported from the Ruhr during the first 20 days of September, including about 22,000 tons of coke.

Truscon Steel Co. Anniversary

Officials and employees of the Truscon Steel Co., fabricating interest of Youngstown, will observe on Oct. 23 the twentieth anniversary of the founding of the business. A "family" meeting will be held, when a message delivered by President Julius Kahn will be broadcasted to the company's agents throughout the country. The Truscon Employees' Relief Association will be formed at this time, for the benefit of plant workers who become sick or disabled.

Another feature of the anniversary will be the launching of a vigorous three-months' sales campaign, under the direction of C. I. Auten, manager of the steel building department; W. C. Conger, manager of the hy-rib and lath department and M. T. Clark, manager of the sash department.

President Kahn states the company was formed 20 years ago with an initial capital of $200,000, and a "handful of employees," The original plant was located in Detroit.

Hearing of Assigned Car Cases

WASHINGTON, Oct. 16.—Protests made by iron and steel and other interests owning private cars have resulted in the Interstate Commerce Commission entering an order reopening the assigned coal car cases. Oct. 22 has been fixed as the date for hearing evidence and further arguments, which will take place in Washington under the direction of Commissioner Aitchison. Meanwhile the effective date of the decision in this case has again been postponed, this time to Dec. 1.

Sizer Steel Corporation plants at Buffalo and Syracuse, N. Y., will be operated until Dec. 31 under authorization of Federal Judge John M. Hazel, Buffalo, who signed an order on Oct. 10 whereby receivers may issue certificates for $50,000 to be used for this purpose. The corporation went into receivership July 3, when liabilities were reported at $2,000,000, about 75 per cent of which was in secured mortgages. At that time President C. B. Porter and S. F. Hancock, a Syracuse lawyer, were named receivers.

Standard couplings for hose connections in fighting fire are now in use in about one-fourth of all the towns in the United States. The value of the standardization was demonstrated at a recent meeting of the National Fire Waste Council in Washington by Maj. J. H. Howland, engineer of the National Board of Fire Underwriters, assisted by the Bureau of Standards of the Department of Commerce.

Iron and Steel Markets

SHIPMENTS STILL HEAVY

New Buying Falls Short — Railroad Demand Leads

Price Concessions on Various Products— Large New Structural Projects

The steel market shows substantially the same cross-currents that have been recognized for six weeks or more. Consumption is somewhat less, though still heavy; shipments from mills are well in excess of new orders; and there is yielding in finished steel prices, though rarely in plates, shapes or bars. On the favorable side is the prospect of good equipment orders from the railroads, sustained building demand and unusual November-December building of automobiles.

Last week the expected renewal of car buying was encouraging. Car builders now say that this is not likely to come before the first of the year, the price of car steel being an undetermined factor. This week several large locomotive inquiries have come up, including 80 for the Missouri Pacific and 39 for the Louisville & Nashville. These, with lots for the Southern Pacific, B. & O. and Pennsylvania, make a total close to 200.

Reports of large bar inquiries for the Ford Motor Co. and for other Detroit buyers have been given prominence but these are only in line with automobile plant schedules already announced.

Apart from the banking of two blast furnaces at Joliet, Ill., the Steel Corporation's operations are unchanged. Independent producers are under rather than over the 70 per cent mark.

An indication that the heavy shipments of leading mills in the past two months have given some buyers more steel than they need is the cropping up of resale business here and there at less than current mill prices. The bar market has furnished a number of examples.

In warehouse business in the Central West weakness has developed from the same cause, jobbers having gone $2 a ton below recent prices on plates, shapes and bars.

A 5 per cent reduction in nuts and bolts, effective Oct. 13, has been made by one large Central Western maker.

At Chicago inquiries for tie plates, spikes and bolts are large. The distribution of the Missouri Pacific rail order gives 14,000 tons to Chicago, 10,000 tons to the Colorado mill and 8000 tons to Ensley, Ala.

The sheet market continues to show that various mills are making concessions because they need orders, but the September orders booked by independent mills reporting to the statistical association were 107,000 tons more than in August, last month's total being 223,000 tons. For the first month since March sales were in excess of shipments.

Large consumption continues in fabricated steel. While the week's bookings dropped to 10,000 tons, fresh projects calling for 75,000 tons appeared, over two-thirds in the New York metropolitan district.

American chances are considered good for supplying the Chilean State Railways with 16,500 tons of 100-lb. rails and accessories on which bids will be taken Nov. 27. The purchases of two years ago were made in Germany. A 10,000-ton rail order for China has just been booked by Belgium.

Prices for semi-finished steel have a range of about $2.50 a ton, as indicated by $40 to $42.50 for rerolling billets and $45 to $47.50 for forging billets, with smaller deviations from the $42.50 contract price for sheet bars.

Cleveland reports a 5000-ton sheet bar inquiry from Japan and a Chicago mill has booked 3000 tons of black and galvanized sheets for Tokyo.

Domestic cast-iron pipe manufacturers lost the 4000-ton order at Los Angeles, Cal., to the French plant at Pont-a-Mousson. Shipment will be made through the Panama Canal. Business has been so good with all the pipe foundries that this single contract will not be missed, but it shows that Continental competition is to be reckoned with at any time.

Weakness of Southern pig iron is most pronounced at points distant from Birmingham, as shown by a quotation of $19, Birmingham, or $2 below the recent price made to a Western company which was able to obtain a still lower delivered price on Northern iron. Buffalo iron has receded to a basis of $22 and eastern Pennsylvania to $23, and the market is not firm at the new quotations. Owing to the almost entire absence of transactions at Pittsburgh, prices are untested. Numerous merchant furnace operators are considering the advisability of an early blowing out.

The scrap market is extremely weak in nearly all centers, the latest declines ranging from 50c. to $2 per ton.

In spite of recent curtailment of Connellsville coke output, supply still exceeds demand, and spot coke has sold down to $3.75. More ovens are going out and the decline seems about at an end.

Pig iron at $23.54, according to THE IRON AGE composite price, is nearly $7 below the figure one year ago and is at the lowest point in 17 months.

Pittsburgh

Shipments of Steel Products Still Exceed Orders—Pig Iron Prices Not Tested

PITTSBURGH, Oct. 16.—While steel orders in a number of directions have shown some increase numerically in the past week, they have not been sufficiently large individually to materially defer the time when most manufacturers must seek business to maintain economic plant operations. Shipments of practically all products still are running well ahead of incoming orders. Demand for standard pipe holds up remarkably well and makers of tin plate are well supplied with business, but otherwise matters are quiet notwithstanding the recent announcement of railroad programs for buying rolling stock, and reports that the

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Oct. 16, 1923	Oct. 9, 1923	Sept. 18, 1923	Oct. 17, 1922
No. 2X, Philadelphia	*$24.26*	$24.76	$26.26	$23.11
No. 2, Valley furnace	24.00	24.00	25.00	32.50
No. 2, Southern, Cin'ti	*24.62*	25.05	26.05	31.55
No. 2, Birmingham, Ala	*20.00*	21.00	22.00	27.50
No. 2 foundry, Chicago*	25.00	25.00	27.00	31.00
Basic, del'd, eastern Pa	24.50	24.50	25.00	29.50
Basic, Valley furnace	24.00	24.00	25.00	30.00
Valley Bessemer, del. P'gh.	*26.76*	27.26	28.26	35.27
Malleable Chicago*	25.00	25.00	27.00	31.00
Malleable Valley	*23.50*	24.00	24.50	33.00
Gray forge, Pittsburgh	25.26	25.26	25.76	32.77
L. S. charcoal, Chicago	30.04	30.04	32.15	36.15
Ferromanganese, furnace	110.00	110.00	110.00	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	42.50	40.00
O.-h. billets, Pittsburgh	40.00	40.00	42.50	40.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	40.00
Forging billets, base, P'gh.	47.50	47.50	47.50	45.00
O.-h. billets, Phila	45.17	45.17	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	**2.25**	2.15	2.15	2.00

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.475
Iron bars, Chicago	**2.40**	2.35	2.40	2.50
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.15
Tank plates, Chicago	2.60	2.60	2.60	2.20
Tank plates, New York	2.84	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Oct. 16, 1923 Cents	Oct. 9, 1923 Cents	Sept. 18, 1923 Cents	Oct. 17, 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.50
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.50
Sheets, blue anTd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$17.50*	$18.00	$20.00	$25.00
Carwheels, Philadelphia	*20.00*	20.50	21.00	23.00
Heavy steel scrap, P'gh	16.00	16.00	18.00	21.50
Heavy steel scrap, Phila	*15.00*	16.00	16.50	18.00
Heavy steel scrap, Ch'go	*14.00*	14.50	16.25	18.50
No. 1 cast, Pittsburgh	*19.50*	20.00	22.00	24.00
No. 1 cast, Philadelphia	19.50	19.50	21.50	23.00
No. 1 cast, Ch'go (net ton)	19.00	19.00	20.00	21.00
No. 1 RR. wrot. Phila	*17.50*	19.00	20.00	22.00
No. 1 RR. wrot. Ch'go (net)	*13.00*	14.00	15.50	17.75

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$3.75*	$4.00	$4.25	$10.00
Foundry coke, prompt	4.75	4.75	5.25	12.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*13.12½*	13.00	14.00	14.12½
Electrolytic copper, refinery	*12.62½*	12.75	13.37½	13.62½
Zinc, St. Louis	6.30	6.30	6.45	6.85
Zinc, New York	6.65	6.65	6.80	7.20
Lead, St. Louis	*6.60*	6.65	6.80	6.35
Lead, New York	6.85	6.85	7.12½	6.65
Tin (Straits), New York	*41.50*	42.25	41.50	34.50
Antimony (Asiatic), N. Y.	7.50	7.50	7.50	6.75

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Oct. 16, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Oct. 9, 1923,	2.775c.
	Sept. 18, 1923,	2.775c.
	Oct. 17, 1922,	2.460c.
These products constitute 88 per cent of the United States output of finished steel	10-year pre-war average,	1.689c.

Composite Price Oct. 16, 1923, Pig Iron, $23.54 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Oct. 9, 1923,	$23.79
	Sept. 18, 1923,	25.04
	Oct. 17, 1922,	30.27
	10-year pre-war average,	15.72

Ford Motor Co. is negotiating for a large tonnage of automobile steel with the Carnegie Steel Co.

Published quotations remain practically where they have been for several weeks past, but this cannot be presented as evidence of strength, since there are sufficient deviations, notably in sheets, to warrant the suggestion that buyers are having more to say about selling prices than was recently the case. Weakness in the primary materials is still unchecked. As low as $3.75 has been done on furnace coke, while a continued lack of interest on the part of melters is reflected in further declines in scrap iron and steel prices. There has been one sale of basic iron at $22, Valley furnace, this through a middleman, believed to have sold the market short to this extent, and while producers are not willing to go that low, their asking price of $24 on this grade does not appear to be obtainable. The market is at least 50c. a ton lower on malleable and Bessemer.

Steel works operations in this and nearby districts are holding at about the recent gait, with the Carnegie Steel Co. operating close to 90 per cent of ingot capacity and the independents about 70 per cent.

Pig Iron.—It is doubtful whether trading ever before was so nearly at a standstill as it has been in the past week. Even the small lot tonnages of foundry iron, which come out in all kinds of markets have been exceedingly few. There has been practically no demand for the steel making grades and just where prices actually are puzzles even those most actively identified with the trade. No. 2 foundry and basic iron still are quoted at $24, Valley furnace, but no business has developed at that level. This is not surprising in view of the fact that Valley furnaces now are having stiffer competition from outside furnaces with more favorable freight rates to destination points and an inclination on the part of the latter to go to prices at which sales can be made. Foundry iron has been bought at the equivalent of $23 to $23.50, Valley furnace, and so long as iron is available that low the quotation of the Valley furnaces is mostly an asking price. We note a sale of 100 tons of No. 3 foundry at $23.50, Valley furnace, but it is doubtful if that price could be repeated. We reduce our quotation of Bessemer iron to a minimum of $25, Valley furnace, as that price recently was quoted on a small in-

quiry. There is considerable pressure to sell malleable iron and very low prices have been quoted. This grade has been offered at $23.50, Valley furnace, without takers. A small lot of low phosphorus iron has been sold at $30, Valley furnace.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$24.00
Bessemer	$25.00 to 25.50
Gray forge	23.50
No. 2 foundry	24.00
No. 3 foundry	23.50
Malleable	23.50
Low phosphorus, copper free	30.00

Ferroalloys.—Activity still is lacking in ferroalloys in this market, although domestic producers claim to have taken a few small tonnages of ferromanganese for early delivery and that a few first quarter of 1924 contracts have been entered, all at $110, Atlantic seaboard. British producers still are quoting $117.50, but sales at that figure are out of the question, with domestic material so much cheaper and seemingly the only reason why British producers have not reduced the price is the expectation that settlement of the Ruhr situation will mean a strong continental European demand. Quotations on spiegeleisen are unchanged, but it is well established that the higher figure is hard to obtain, except possibly on small tonnages. Interest in 50 per cent ferrosilicon still is low and prices are indeterminate because there are so few sales. Prices are given on page 1085.

Semi-Finished Steel.—There is no quotable change in prices. The undertone of the market is soft, since activity in finished products, notably black sheets, is not sufficient to produce much demand and specifications against contracts are in few instances up to the usual quotas of the nonintegrated manufacturers. It is intimated that less than $42.50, Pittsburgh or Youngstown, is being done, but positive evidence is lacking, although if there is a substantial basis for claims that there is only a slender margin of profit for the sheet makers who buy their sheet bars with sheets at current prices, that price is high and with billets and slabs to be had at $40, buyers have an additional argument in favor of lower prices, especially as producing costs are pretty nearly the same. It is still claimed that forging billets are fetching $47.50 base. The skelp market locally is untested and the price merely nominal. A slight betterment in orders for wire rod products is reflected in rod orders and specifications and prices are somewhat steadier than they have been. The Carnegie Steel Co. maintains the recent rate of ingot production of close to 90 per cent, but the independent rate in this and nearby districts is hardly above 70 per cent. Some of the independent steel makers recently reduced sharply their ingot mold specifications; this ordinarily is a clear forecast of what is ahead in steel works operations. Prices are given on page 1085.

Plates.—The Carnegie Steel Co. has a fairly substantial backlog, but with the independents shipments against old orders considerably exceed fresh purchases, and the need of orders will be more pressing if the mills' schedules are to be kept up. We note no shading of the regular base of 2.50c. by local mills. Prices are given on page 1084.

Wire Products.—Some manufacturers are doing well, while others do not find orders to be coming along as well as recently. The more general condition of business is that both jobbers and manufacturers are placing orders rather than contracts, the idea being to keep stocks well in hand. Prompt deliveries are being promised by most makers on practically all products and so long as there is no immediate prospect of higher prices, the incentive to large forward buying is lacking. Locally, there is close observance of quoted prices, but as is not uncommon in markets like the present one, there is some shading by Middle Western makers of prices of coated nails. Bright nail obligations are not especially heavy just now, but production keeps up, as the mills are not carrying big stocks and can afford to add to them. Prices are given on page 1084.

Steel Rails.—Regular producers of light rails, rolling them from new steel, still insist that on such business as they are getting, the price is 2.25c., base. It is asserted that a quotation of 2.15c., base, would not bring orders in competition with rerolled light rails, which have lately sold as low as 1.85c., base, in eastern Pennsylvania, and costs do not permit meeting such a price by new steel rail makers.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Most makers of steel pipe have enough business to keep them running at a relatively high rate over the remainder of the year and there is not so much concern over the current lack of demand from the oil industry that there otherwise might be. Business keeps up in standard pipe in good shape and reports as to the stocks of pipe in the oil producing sections encourage the belief that the mills will feel promptly any material betterment in the oil situation. In some fields it is said that refiners now are taking all oil offered instead of prorating their acceptances. Another favorable indication is that production is declining in the gusher fields. The supply situation, however, still is unfavorable to any immediate increase in drilling operations. Movement of standard wrought iron pipe is good, but makers are more dependent upon new orders than are the makers of this class of steel pipe. There is still better movement in boiler tubes against old than new business. Generally, quotations are well observed by producers, although there is some shading in boiler tubes. Discounts are given on page 1084.

Sheets.—With increasing reports of price cutting and few of the independent manufacturers making much pretense of holding out for 3.85c., base, for black sheets, buyers are encouraged to look for lower prices on all finishes and to move cautiously in the matter of purchases. The leading interest now is taking business for early delivery, since there is not the pressure there was a short time ago for shipments against old orders. This company last week operated close to 90 per cent of its sheet mills and is scheduled at that rate for this week. The sheet industry as a whole is averaging about 70 per cent. Prices are given on page 1084.

Tin Plate.—New features are lacking. Production over the remainder of the year has been pretty well spoken for and the attention of the trade is directed toward the requirements of the early part of 1924. Present indications point to a big demand, and unless there is a drop in the price of sheet bars, it is probable that the present base of $5.50 per base box, Pittsburgh, for standard cokes, will be continued.

Cold-Finished Steel Bars and Shafting.—Orders are in fairly good volume, with some demand now appearing from the textile machinery manufacturers, but no claim is made that new business is equal to completed orders, save in the case of some manufacturers whose shipments have been restricted by requests for later deliveries. The official quotation still is 3.25c., base, Pittsburgh, but the market is not solid in all consuming districts at that figure; indeed, in Detroit, where competition for business is keen, 3c., base, is a fairly common price. Ground shafting is unchanged at 3.65c., base, f.o.b. mill, but that price is an "official" price.

Iron and Steel Bars.—A fair number of small lot orders for steel bars are coming to makers, but the aggregate still falls considerably short of making good in completed business. Mills in this territory are holding firmly at 2.40c. base and not meeting lower equivalent prices made by mills in other districts. There is no easing in iron bar prices.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Hot-Rolled Flats.—This line is extremely slow of sale and those makers holding firmly to the regular base of 3.15c. are not faring very well in the distribu-

tion of such business as is coming out. That base implies a price of 3c. for rim stock and hot-rolled strips for cold-rolling, but the report is persistent that less than 3c. is being done on rim stock and on the wider sizes of strips. Maintenance of 3.15c. base as a price seems to be due to a belief that a reduction would not create business. Prices are given on page 1084.

Cold-Rolled Strips.—Business could be better, but on such as is coming out, no particular difficulty has been experienced by local makers in getting the quoted price of 5c., base, Pittsburgh.

Structural Material.—Structural shops in this district are experiencing the lull in orders common to this time of the year, and their bookings are running entirely to jobs involving only very small tonnages. Demands upon the mills for plain material are correspondingly small, and very prompt deliveries now are promised by all of the mills. There is no evidence that the regular price of 2.50c. for large structural shapes is being shaded by local mills. Prices are given on page 1084.

Bolts, Nuts and Rivets.—Conditions still are favorable to buyers, chiefly because there are so many makers who want a share of the passing business which is not sufficient to go around. Bolts are pretty well down to 60 and 10 per cent off list for large machine bolts, although the quotation of 60 and 5 has not been officially withdrawn by makers here. Large rivets still are quotable at $2.75 to $3 base per 100 lb., but on large orders running chiefly to one size as low as $2.75 has been done. Prices and discounts given on page 1084.

Track Supplies.—Much irregularity still exists in spike prices, notably in the smaller sizes, but local makers still insist that they are not meeting the lower prices, which are said to have been made by Eastern makers. Few inquiries of a size to induce price concessions are coming out. Prices given on page 1084.

Old Material.—There has been no change in the attitude of consumers toward the market and with the steel manufacturers well stocked with pig iron and looking toward a period of lighter steel works operations, expectations among dealers of an early revival of scrap buying are fading. Most of the dealers are working for lower prices in an effort to secure cheap yard material and with the consumers largely out of the market, they are having some success in that direction, since in the lack of consumptive buying they make the prices on material coming out. A Pittsburgh district steel maker is reported to have recently paid about $15.50 for a small tonnage of compressed sheet scrap, but ordinary material of this grade cannot now be moved above quotations. Foundry grades and specialties are suffering in price due to lack of demand. Norfolk & Western Railway will take bids until noon, Oct. 17, on 25,561 gross tons of scrap iron and steel, the list including 12,000,000 lb. of old car wheels. The huge size of this list is explained by the fact that much material offered in last month's list could not be sold at a satisfactory price and was withdrawn.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$16.00
No. 1 cast, cupola size	19.50 to 20.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.50 to 18.00
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.00 to 13.50
Railroad knuckles and couplers	20.50 to 21.00
Railroad coil and leaf springs	20.50 to 21.00
Low phosphorus bloom and billet ends	21.50 to 22.00
Low phosphorus plate and other material	20.50 to 21.00
Railroad malleable	19.00 to 19.50
Steel car axles	19.00 to 19.50
Cast iron wheels	18.00 to 18.50
Rolled steel wheels	20.50 to 21.00
Machine shop turnings	11.50 to 12.00
Sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	14.50 to 15.00
Short shoveling turnings	12.50 to 13.00
Heavy breakable cast	17.00 to 17.50
Stove plate	14.00 to 14.50
Cast iron borings	13.00 to 13.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	16.00

Coke and Coal.—Although there has been a considerable curtailment of the Connellsville production of coke, supplies still exceed the demand and sale of the surplus is possible only at prices which it is claimed are at least 50c. a ton below actual producing costs. Spot furnace grade is quotable this week from $3.75 to $4 per net ton at oven, and spot foundry coke at from $4.75 to $5.50. There is a belief that the market is close to a bottom, as large numbers of ovens daily are going out and barring further blast furnace suspensions it is reported the coming week will find a more nearly even balance between production and consumption. The coal market is as weak as ever, despite efforts to bring about a better relation between supply and demand through curtailed production. Mine run steam coal is priced anywhere from $1.50 for West Virginia coal to $2.15 from mines located on the Panhandle road. Mine run coking coal takes a range from $1.85 to $2.25, and gas grade $2 to $2.25. Slack grade coal ranges from 95c. to $1.25.

Coke Production Declines

WASHINGTON, Oct. 16.—Production of coke in by-product ovens continued to decline slowly during September, says the Geological Survey. The total output for the month was 3,112,000 net tons. The daily output was 103,729 tons, as against 104,402 tons in August, a decrease of 0.7 per cent. Of the 70 plants, 65 were in operation and five were idle. The coke produced was 85.8 per cent of the present capacity of all the plants.

Production from beehive ovens also declined. The month's output of beehive coke is estimated at 1,373,000 tons, as against 1,494,000 tons in August. The total output from both types of ovens declined from 4,733,000 to 4,485,000 tons.

The decreased activity in coke manufacture reflected in part a decline in the output of pig iron and steel, in part the settlement of the anthracite strike.

A New Electric Steel Furnace

Holcroft & Co., Detroit, have recently entered the electric steel furnace field by putting on the market a new 3-phase furnace for steel melting and refining. It will be offered in sizes from 100 lb. for laboratory use up to 10-ton units for commercial operations.

The Massachusetts superior court has authorized the sale of Stevens-Duryea, Inc., Chicopee Falls, Mass., automobiles, for $450,000, to a syndicate headed by Ray M. Owen, New York, and including Roy Rainey, who is identified with coke and steel industries. The syndicate ownership dates from July 31. It has not completed plans but will continue to manufacture automobiles. The plant was completed early in 1920, and comprises 32 acres and approximately 250,000 sq. ft. manufacturing space. It has a capacity of 2000 cars annually. Mr. Owen has been prominently identified in the distribution of automobiles during the past twenty-five years.

The Dominion Alloy Steel Corporation, Royal Bank Building, Toronto, may call for bids next month for steel for foundation work for the proposed plant to be erected at Sarnia, Ont. Engineering work will be done by the company's own engineers. George A. Simpson, Charlton Apartments, Hamilton, Ont., is superintendent of building.

Third-quarter bookings of the General Electric Co. declined 20 per cent, dropping from $84,249,710, for the previous quarter, to $65,483,549. This compares with $58,914,620 in the third quarter of 1922. For the nine months ended Sept. 30 orders amounted to $229,747,304, against $176,171,194 in the like period of 1922.

Chicago

Steel Bookings Show Some Improvement—Pig Iron Market Weak

CHICAGO, Oct. 16.—Prospective railroad buying continues to be the chief point of interest in the market. The Pennsylvania is in the market for 200,000 tons of rails and the Missouri Pacific has distributed orders for over 30,000 tons. Inquiries for track supplies have shown a material increase since the first of the month. Car buying is slow in materializing and while the Southern Pacific and a few other lines have formulated important programs, railroad equipment manufacturers are doubtful whether orders will be placed in any great number before the first of the year. Meanwhile steel bookings of local mills show some slight improvement over those for the same period in September, but on the whole there has been no important change in the situation and new commitments still fall short of current shipments.

Operations have undergone a further recession, the Illinois Steel Co. having temporarily banked two blast furnaces at Joliet pending necessary repairs to the mills at that location. This interest has 21 active stacks out of 27 steel works furnaces and is producing steel at the rate of 90 per cent of ingot capacity. The Inland Steel Co. remains on an 80 per cent basis.

Pig Iron.—The market is quiet and weak, and while there have been reports of further concessions in prices, they lack confirmation. In fact, buying is on such a limited scale that prices remain largely untested. The few sales that have been made are largely in small lots ranging from carloads to a few hundred tons. However, 2000 tons of malleable was sold to a Michigan melter for delivery over the remainder of the year. Likewise 750 tons of malleable and 500 tons of foundry were bought by two other Michigan melters. A Wisconsin melter received a quotation of $19 base, Birmingham, of 5000 tons of foundry, but obtained a better delivered price from Northern sources of supply. This instance illustrates the flexibility of producers when large tonnages are offered. On small lots the minimum on Southern iron is $20, Birmingham, and some furnaces are holding for $21. The weakness of the market has been accentuated by the appearance of small tonnages of resale material, which are generally offered at less than current furnace quotations. Pending inquiries include 1000 tons of foundry and malleable wanted by a Racine melter and a similar tonnage asked for by a Milwaukee user. A small lot of charcoal was sold at 50c. under the market, but whether the material involved was resale or not has not been learned. A small tonnage of low phosphorus has changed hands at $33.25, delivered Chicago. The Thomas furnace, Milwaukee, which blew out last week, has disposed of its stocks of low phosphorus, but still has malleable to offer. A Wisconsin user has closed for 150 tons of 8 per cent silvery. Foundry operations in this district show considerable variation, some melters being very busy while others are operating part time or are down altogether. The average melt is estimated at from 60 to 70 per cent of capacity.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$30.04 to $30.15
Northern coke, No. 1, sil. 2.25 to 2.75	25.50 to 26.50
Northern coke, foundry, No. 2 sil. 1.75 to 2.25	25.00 to 26.00
Malleable, not over 2.25 sil.	25.00 to 26.00
Basic	25.00 to 26.00
High phosphorus	25.00 to 26.00
Southern No. 2	26.01 to 27.01
Low phos., sil. 1 to 2 per cent, copper free	33.25 to 34.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—As resale lots of ferromanganese are being absorbed prices are stiffening. The most recent sales were at $110, seaboard, and it is said that cannot now be done. British producers, of course, are holding at $117.50, seaboard, but as yet are not getting any business. Spiegeleisen has been weak, but is expected to strengthen in view of the fact that the low seller has disposed of most of his stocks.

We quote 80 per cent ferromanganese, $117.56, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $45, delivered.

Plates.—In view of the large amount of railroad car business in prospect mills look for heavy plate orders in the current quarter. Meanwhile, pending the actual placing of that business, mill bookings still fall short of shipments. Commitments thus far in October, however, are larger than those undertaken during the same period in September. No new orders or inquiries for oil storage tanks are reported. Local plate prices are holding firmly.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c for plates out of stock.

Cast Iron Pipe.—While $49 Birmingham still appears to represent the ruling market on water pipe in sizes above and including 6-in., some business has gone at less than that figure, indicating increasing pressure on the part of sellers to obtain new tonnage. Detroit has divided 500 tons between the Lynchburgh Foundry Co. and the National Cast Iron Pipe Co. Part of this was Delavaud pipe made by the centrifugal method, which is approximately 20 per cent lighter foot per foot than other cast pipe. Shops making the Delavaud pipe are just getting on a production basis and it is probable that they will soon announce separate prices for that product, which will be higher than those for the older type of pipe. St. Louis has awarded 1000 tons of 6-in. to the Hammond-Byrd Iron Co. Lake County, Ohio, has placed 1200 tons with the United States Cast Iron Pipe and Foundry Co. subject to the floating of necessary bonds. Tulsa, Okla., will take bids Oct. 26 on 2500 tons of 30- and 42-in. Spring Wells, Mich., will take figures Oct. 17 on 700 tons of 6- and 8-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $61.20; 6-in. and above, $57.20; class A and gas pipe, $5 extra.

Sheets.—A local mill has booked 3000 tons of black and galvanized sheets for Japan. This material is for December and January shipments, whereas many of the current Japanese inquiries call for earlier deliveries than this producer is able to make. This Japanese tonnage consists largely of very light gage material in 30 to 36 in. widths, which in times of pressing demand would be classed as undesirable by American mills. Besides a considerable quantity of sheets, bars and plates are also sought by Japan. Domestic buyers of sheets are still proceeding cautiously, pending a change in the market situation. While by shopping around consumers can find smaller producers who will sell at concessions, the larger mills are holding tenaciously to their prices.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Bolts and Nuts.—With jobbers and railroads still hesitant about placing fourth quarter contracts, sellers' ideas of discounts are growing more liberal. On large machine bolts and small bolts with cut threads 60 and 10 per cent off is the common discount, while on small machine bolts with rolled threads 60 and 10 and 10 off is freely available. On carriage bolts 60 off is being done on cut threads and larger, and 60 and 10 off on small with rolled threads. On small rivets 65 and 10 and 5 is the usual quotation. All of these discounts are on the basis of f.o.b. Chicago.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—The attitude of railroad purchasing agents has undergone a change since Oct. 1,

and this has been manifested particularly in connection with inquiries for track supplies. New inquiries for tie plates, spikes and bolts are large and there is every prospect that they will result in orders. At the same time, the carriers continue to proceed with their rail programs for next year. The Pennsylvania has definitely decided to purchase 200,000 tons, but for a number of other important lines the exact tonnage which will be bought is still undetermined. The Missouri Pacific, however, has placed 14,000 tons of rails with Chicago mills, 10,000 tons with the Colorado mill and 8000 to 10,000 tons with the Tennessee producer.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material.—Reluctance to place large contracts for structural work characterizes the attitude of many prospective builders, but numerous small projects continue to go ahead and fabricators generally are still very busy. While the view is held in some circles that the cost of labor and materials is too high, the pressure of improvements is too great to permit sufficient suspension of activity to bring about a recession. In some instances only a part of a project is being undertaken now, in the hope that it may be completed at lower cost later. Bids are now being taken by the Commonwealth Edison Co., Chicago, on about 1000 tons for the foundation and first three stories of a substation building which has been planned to have an eventual height of 22 stories.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Buyers are still reticent about ordering ahead, and bookings of the mills continue to fall short of shipments. While current business is not as satisfactory as had been hoped for, it is characterized as between fair and good. Prices are holding and are shown on page 1084.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Bars.—Orders and specifications for soft steel bars from the railroads have shown material improvement since the first of the month. Jobbers and industrial buyers are still marking time, awaiting developments. Total mill bookings for the first half of October, however, show an encouraging gain over the business taken in the same period in the previous month. Actual consumption of bars is holding up well, although some important automobile makers have curtailed operations. The automotive industry, while temporarily less active, is preparing for a resumption of production on a broader scale than ever before, beginning with the new year. The Ford Motor Co., for example, expects to increase its output to 10,000 cars a day. Business in bar iron is still slack, but having failed to stimulate buying through low prices, mills have advanced to a minimum of 2.40c. mill, which, it is said, represents the lowest figure at which they can take orders without sustaining a loss. Rail steel bars are also quiet, although one mill has accumulated enough work to operate at double turn. Hard bar prices are unchanged at 2.30c. mill.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Reinforcing Bars.—New business is still of limited volume and competition for tonnage is active. While concessions have not entirely disappeared, sellers are no longer willing to slash their quotations to the extent of incurring sharp losses. In a few instances recently business was taken at a price equivalent to the mill quotation, thereby depriving the sellers of any margin for warehousing or engineering. Even in holding at 2.75c., warehouse, as compared with the mill price of 2.50c., bar jobbers have an exceedingly slim spread to cover their costs. Recent lettings include:

Elks Memorial building, Chicago, 250 tons to Corrugated Bar Co.

Piper Hotel building, Madison, Wis., 250 tons to Kalman Steel Co.

Illinois State road work, 200 tons to Kalman Steel Co.

Illinois State bridge work, 150 tons to Kalman Steel Co.

Pending business includes:

State Teachers College, Winona, Minn., 250 tons, general contract awarded to J. A. McDonald, Minneapolis.

Capitol Theater, superstructure, Seventy-ninth and Halsted Streets, Chicago, 175 tons.

Commonwealth Edison Co., Chicago, Lake Street substation, 100 tons, bids on general contract to be taken Oct. 15.

Vassar-Swiss Underwear Co., Chicago, 150 tons.

Old Material.—Consumers continue to buy sparingly as prices sink still lower. With the market weak in all departments and with nothing in sight to prevent further declines, dealers, like users, are awaiting developments, being disinclined to buy or to sell. In fact, present selling prices do not justify the cost of the sorting and preparation of yard stocks and this work has largely been suspended. Railroad lists, however, are still large, including the Rock Island, 4500 tons; the Wabash, 3700 tons; the Chesapeake & Ohio, 5600 tons; the Chicago & Alton, 1300 tons; the Chicago Great Western, 1000 tons, and the Soo Line, 700 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$19.50 to $20.00
Cast iron car wheels	17.50 to 18.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	18.00 to 18.50
Rails for rolling	15.50 to 16.00
Steel rails, less than 3 ft.	17.50 to 18.00
Heavy melting steel	14.00 to 14.50
Frogs, switches and guards cut apart	14.50 to 15.00
Shoveling steel	13.50 to 14.00
Drop forge flashings	9.50 to 10.00
Hydraulic compressed sheets	11.50 to 12.00
Axle turnings	11.00 to 11.50
Steel angle bars	16.00 to 16.50
	Per Net Ton
Iron angle and splice bars	19.50 to 20.00
Iron arch bars and transoms	19.00 to 19.50
Iron car axles	24.00 to 24.50
Steel car axles	16.00 to 16.50
No. 1 busheling	11.00 to 11.50
No. 2 busheling	7.50 to 8.00
Cut forge	13.00 to 13.50
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	13.00 to 13.50
Steel knuckles and couplers	17.00 to 17.50
Coil springs	18.50 to 19.00
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	18.00 to 18.50
No. 1 agricultural cast	18.00 to 18.50
Low phos. punchings	15.50 to 16.00
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	7.00 to 7.50
Cast borings	9.50 to 10.00
Short shoveling turnings	9.50 to 10.00
Stove plate	16.00 to 16.50
Grate bars	14.00 to 14.50
Brake shoes	15.50 to 16.00
Railroad malleable	17.50 to 18.00
Agricultural malleable	17.50 to 18.00

Up to the present time, employees of the Western Electric Co., New York, have purchased and are paying on partial payment system for more than 140,000 shares of stock of the company and that of the American Telephone & Telegraph Co., the parent organization, with current value approximating $18,000,000. About 2000 workers, or 30 per cent of the working force, eligible to take advantage of the plan, are participating.

Sales of the International Harvester Co. this year have shown improvement over those in 1922. In his statement to stockholders President Alexander Legge said: "As compared with 1922, the trade in United States and Canada shows some improvement. Foreign business (excluding Canada) will show an increase in volume of approximately $10,000,000."

New York

Large Structural Work Appearing—Pig Iron Prices Lower

NEW YORK, Oct. 16.—Salesmen who have thoroughly canvassed the Metropolitan district and New England territory during the past week or two report that nearly all foundries are supplied with at least 90 per cent of the iron which they will need for the remainder of this year, and are melting probably 20 per cent less than they did a month or two ago. Under these conditions, it is not surprising that there is very little buying at the present time. Sales last week amounted to probably 5000 tons and prices were very low. No inquiries of importance are pending. The Buffalo price has now touched $22 and that price has been named for No. 2 plain. In fact, very little attention is being paid to silicon differentials. Prices are also lower in eastern Pennsylvania, where $23 is now quoted rather freely on No. 2 plain. A number of furnace operators are considering the blowing out of their stacks, but definite announcements are lacking. It is, however, generally believed that there will soon be a sharp curtailment of pig iron production in the East and in Virginia.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.27
East. Pa. No. 2, sil. 1.75 to 2.25	25.27
Buffalo, sil. 1.75 to 2.25	26.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94
No. 2 Virginia, sil. 1.75 to 2.25	29.44

Ferroalloys.—Demand for ferromanganese is very light and made up of a few carload lots for early delivery. British producers have not reduced their prices from $115, seaboard, and the opinion is again general that very little resale alloy is now available. The alloy is, however, obtainable from some domestic sources at prices which figure at about $110. There is very little demand for spiegeleisen which continues to be quoted by the leading producer at $45 to $47.50, furnace. There is also very little demand for 50 per cent ferrosilicon, which is quoted at a range of $82 to $87 per ton, delivery, depending on the quantity and point of consumption.

Cast-Iron Pipe.—Demand has slackened considerably and while makers are well sold up on the smaller sizes, on which prices are firm, some weakness may develop before long on the heavier specifications. Practically no business is expected from New England until after election, and then only feelers on prices for delivery next spring. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $73.60, with $5 additional for Class A and gas pipe. The soil pipe market has entered upon the dull season and prices continue weak, although makers are fairly well filled with tonnage for delivery in the next four or five weeks. Concessions of five points more discount are being made on prompt shipment orders, but makers are not inclined to quote for extended delivery. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 35¾ per cent off list; heavy, 45¾ per cent off list.

Warehouse Business.—A noticeable improvement is reported to have occurred in the past week, particularly in the volume of orders, which, however, are still small. On the whole warehouse business seems to have taken a slight upward turn and October is expected to be as satisfactory a month, or better than September. With the exception of sheets, prices continue fairly firm with only isolated instances of shading reported on bars and structural material. Sheets, both black and galvanized, are fairly firm at 4.75c. and 5.75c. per lb., base, respectively, with 5c. and 6c. per lb. quoted for out-of-town delivery. Steel pipe is fairly firm at present discounts, but wrought iron is still being shaded by some dealers. Swedish charcoal iron bars are quoted at 7.25c. per lb. for small lots, but 7c. per lb. can be done on fair tonnages out of stock. We quote prices on page 1104.

Finished Iron and Steel.—The local steel trade continues to take a slightly more hopeful view of the outlook notwithstanding the fact that the inflow of new business is not in keeping with the present rate of shipments from mills. Not only does this optimism spring from the expectations of further railroad car purchases, as mentioned a week ago, but also from the considerable number of structural inquiries now in the market or expected shortly, some of them running into very large tonnages. The New York Telephone Co. work is expected to be out for bids within two weeks. This will be about 18,000 tons. Two other large jobs to be heard from soon are a power plant at Kearny, N. J., for the Public Service Corporation of New Jersey, to require 12,000 to 15,000 tons of steel, and buildings for the Western Electric Co., also at Kearny, which it is estimated will require 10,000 tons or more. Two loft buildings now being figured on for one speculative builder will require a total of 9000 tons, and there is a Coney Island project, thus far not openly figured on, which will take quite a tonnage. Local fabricators say that they have not had so much before them for figures in several months. Construction work also includes quite a lot of concrete reinforcing steel. The Western Electric Co. will require 1000 tons for one of its buildings at Kearny, N. J.; 900 tons will be bought for the American News Co. building, New York, which the Turner Construction Co. will erect; the New York Telephone Co. building takes 200 tons; bids are being asked for on 2000 tons for the Baldwin reservoir extensions in Cleveland; 600 tons are required for a warehouse for the Port Commission, Norfolk, Va., and the Concrete Steel Co. has just been awarded 1100 tons for the Ashley River bridge, Charleston, S. C. No further car inquiries have come into the market, but it is reported that the New York Central Lines will shortly inquire for 25,000 freight cars. The price situation on steel remains unchanged. The larger mills adhere to 2.50c. on plates and shapes and 2.40c. on bars, with some of the smaller mills quoting 2.40c. on plates and shapes. With the exception of slight weakness in black sheets, hot rolled bands and bolts, nuts and rivets, other steel products appear to remain firm at the prices which have existed for fully six months. Orders are almost entirely for small lots for early shipment with the exception of the specific projects in structural steel.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The coke market is weak with business almost entirely confined to orders for a few carloads for prompt shipment. Standard furnace coke is quotable at from $4 to $4.50 per ton, with medium sulphur at about $3.75 and standard foundry ranges from $5 to $6 per ton with some brands up to $6.50 and $6.75 per ton. By-product is quoted at $11.41, Newark and Jersey City, N. J.

Old Material.—Prices on most grades are appreciably weaker, although heavy melting steel is still holding at $15 per ton delivered eastern Pennsylvania consumers, and $16 for Johnstown with a slightly higher freight rate. So little tonnage is moving from this district that it is difficult to determine current prices. Prices which dealers and brokers are paying for borings and turnings delivered to eastern Pennsylvania consumers figure back to $7.50 and $8 per ton here and at points in New England. A fair estimate of the buying price today on clean cast borings is $9 to $9.50 and chemical borings have declined steadily to a current price delivered eastern Pennsylvania of $14.25 per ton. Machine shop turnings are quiet at $8 to $8.50 per ton. Some borings and turnings are going forward to consumers at Wierton and Earlston, Pa., but on the whole the market is exceedingly dull. Stove plate is unchanged at $17.50 to New Jersey foundries, but the price being paid delivered to Harrisburg, Pa., is reported weaker. Specification pipe is off 25c. per ton to $14.75 per ton delivered Lebanon, Pa. Shipments of

heavy melting steel are going forward to Conshohocken, Coatesville, Pottsville and Bethlehem.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$11.00 to $11.50
Steel rails, short lengths, or equivalent	12.00 to 12.50
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	17.00 to 17.50
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	9.00 to 9.50
Machine-shop turnings	8.50 to 9.00
Mixed borings and turnings	7.50 to 8.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	13.00 to 14.00
Locomotive grate bars	13.50 to 14.50
Malleable cast (railroad)	17.00 to 18.00
Cast-iron car wheels	16.50 to 17.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00 to 18.50
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 16.50

Buffalo

Pig Iron Weak, With Limited Sales—No Interest in 1924 Requirements

BUFFALO, Oct. 16.—Continued weakness in Buffalo pig iron has not served to bring out additional buying and the activity of the last few weeks which indicated a buying movement has disappeared. One new development, however, is that the tendency to get new business through price reduction is not confined to one producer. Up to a few days ago only one interest was going out and meeting competition outside the district, but another furnace is now prepared to make concessions. Several sellers, however, have not joined in the recent price cutting wave and are holding the price $1 higher than the two interests referred to, and doing no business. Demand is considerably less active and new business does not exceed 12,000 tons. Inquiry has fallen off as well. Buffalo iron makers are not interested in 1924 inquiry, and there has been no movement on the part of consumers to look into the new year situation. Only one foundry has asked prices on first quarter of 1924, and the furnace which received this inquiry declined to quote. Fourth quarter needs appear to be well filled and such new business as appears is for small tonnages. Three furnaces are now quoting $23 on average business, but $22.75 has been done in several instances. Reduction of operation in blast furnace circles elsewhere has not spread to the Buffalo district and the same furnace operation is continued, but no one can promise how long this percentage of operation will continue.

We quote f.o.b. gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$23.25 to $23.50
No. 2 foundry, 2.25 to 2.75 sil.	22.75 to 23.50
No. 2 plain, 1.75 to 2.25 sil.	22.75 to 23.50
Basic	24.00
Malleable	24.00
Lake Superior charcoal	30.28

Finished Iron and Steel.—Demand for all semi-finished material is slower, but prices on all material with the exception of black sheets hold firm. The market on galvanized sheets is undisturbed, but several desirable black sheet tonnages have brought out prices of 3.75c., although the price of 3.85c. which has prevailed for some months is the usual quotation on small lots. Bars are firm at 2.40c., and demand in this product, as well as shapes and plates, is slower. Car builders and other railroad equipment makers are not very active, but there is a prospect of improvement in this class of buying. The demand for pipe is the one outstanding feature of this market.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—This market is lifeless and demand is even less than recently. Prices are nominal, and despite the fact that there is no buying a better feeling is in the air. Inspections are rigid and material going out on new orders is closely examined.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$16.00 to $16.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	13.50 to 14.50
No. 1 busheling	14.50 to 15.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	14.50 to 15.50
Railroad malleable	18.50 to 19.00

Boston

Competition Between Northern and Eastern Pennsylvania Furnaces Is Still Keen

BOSTON, Oct. 16.—Competition between northern and eastern Pennsylvania furnaces for business in this territory is still very keen, with Northern iron prices softer than heretofore. Unconfirmed report has it a textile machinery maker the past week bought 1000 tons of York State No. 2X and No. 1X at a delivered price of or very close to $27, which figures back to approximately $22, Buffalo furnace. Buffalo iron, which previously sold at $23, furnace base, with differentials waived, has been offered at $22.75, or $27.66 delivered, but the amount of business booked was unimportant. Misleading statements have been made in this territory by foundry owners regarding eastern Pennsylvania iron prices. Differentials have been waived by such furnaces on offers of high silicon iron, whereas foundries in giving out information have deducted these differentials. So far as can be ascertained, no eastern Pennsylvania iron is offered in New England at less than $23.50, furnace, and most furnaces ask $24, with and without differentials. A New Hampshire machinery maker is about to close on 100 tons of malleable, 100 tons No. 2X and 100 tons silicon 3.25 to 3.75, a Providence, R. I., foundry on 700 tons of high manganese iron, and another Providence foundry on about 900 tons of No. 2X and No. 1X. No other prospective business of importance is reported, and general opinion among pig iron interests is that sales will be limited the remainder of October.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$27.15 to $28.15
East. Penn., sil. 1.75 to 2.25	27.15 to 27.65
Buffalo, sil. 2.25 to 2.75	27.66 to 28.41
Buffalo, sil. 1.75 to 2.25	27.66 to 27.91
Virginia, sil. 2.25 to 2.75	30.42 to 31.42
Virginia, sil. 1.75 to 2.25	30.42 to 30.92
Alabama, sil. 2.25 to 2.75	*31.10
Alabama, sil. 1.75 to 2.25	*30.60

*Nominal.

Coke.—In contrast with conditions prevailing in the Connellsville coke market, New England producers of by-product foundry coke the past week or ten days have secured premiums of 50c. to $1 a ton on car lot prompt shipment fuel from buyers not protected by contracts. Shipments against contract continue to be made on a basis of $13.50 delivered in New England. With October half gone, shipments against September specifications have not been completed, in some instances due to the continued pressure on coke producers to supply an urgent domestic fuel demand. Connellsville foundry coke is offered at prices far below those quoted on local, but iron melters display little interest, no sales of importance being recorded since last reports.

Old Material.—Business in old material is so dull that some of the largest dealers gave employees an extra holiday last Saturday in addition to Columbus day. Offerings of heavy melting steel at $12 are increasing, but mills apparently are not interested; consequently lower prices are expected. Borings and turnings also are coming into the market in larger quan-

tities, with almost no takers, and while not actually lower, the market is decidedly unsettled. On the other hand, there is a still further improvement in the demand for No. 1 machinery and textile cast. The latter is in limited supply with holders generally demanding 1c. a pound. No. 1 machinery is selling in car lots mostly at $22.50 and $22.75, with some rejections due to faulty loading.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	16.50 to 17.00
Railroad malleable	22.00 to 22.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
No. 1 rail wrought	13.00 to 13.50
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Cast iron borings, rolling mill	8.50 to 9.00
Cast iron borings, chemical	10.50 to 11.00
Blast furnace borings and turnings	7.50 to 8.00
Forged scrap and bundled skeleton	8.50 to 9.00
Shafting	17.50 to 18.00
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

Birmingham

Pig Iron Lags with Wide Difference in Quotations for Local and Distant Shipment

BIRMINGHAM, ALA., Oct. 16.—The Southern pig iron market is still lagging, numerous sales, small lots, still aggregating less than the make, and the quotations are uncertain, ranging from $20 to $24. Local melters who are buying in car lots say that they are being called upon to pay $24 per ton, No. 2 foundry, while reports from the Middle West, where competition is met with furnace interests of the North, are to the effect that iron is being shipped from here on a $20 per ton base. Even a lower price has been rumored. A few sales of 500 tons have been made recently, but not many, and a little iron goes to the surplus stock from week to week. The local melt is not improving any; in fact, there is a slight reduction. The pressure pipe plants are still operating to capacity, but sanitary pipe and fittings producers are not doing so well and some of the larger foundries and machine shops are without contracts sufficient to keep them going steadily. The lead of the Woodward Iron Co. in reducing cost of production is not commented on, so far as can be learned, though it is generally understood there is to be a similar move made at once by the iron-making companies of the district.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon, 1.75 to 2.25	$21.00
Basic	22.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—Lettings the past week with the three large cast iron pipe making companies of this district were smaller than they have been for some time. Some disappointment is expressed on the loss of the order for 4000 tons of pipe at Los Angeles, Cal., the business being awarded a French manufacturer of pipe. This pipe will be made at Pont-à-Mousson, France, and will be shipped to Los Angeles through the Panama Canal. No change in cast iron pipe quotations is noted, but it is admitted that there are concessions on tonnages. Pipe consumers are looking for lower prices owing to the fall of the pig iron market.

Coke.—The coke market is very dull and some tonnage is bound to go to the yards if the production is maintained and no new business comes in. Quotations are weak, around $7.50 per ton, foundry coke, and consumers not willing to buy in greater quantity than one car at a time.

Old Material.—Dullness pervades the scrap iron and steel market in the Birmingham district. Very little new business is to be noted. Heavy melting steel is absolutely lifeless, the largest melter of the product not being in the market at all. Machine shop turnings and cast iron borings were marked up $1 each the past week. Dealers in old material assert that the quotations given are nominal and that melters are able to make their own prices practically.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.00 to 10.00

St. Louis

Pig Iron Weak—Old Material Prices Are Again Reduced

ST. LOUIS, Oct. 16.—The market for pig iron is rather weak, with buying in this district extremely light. Melters are simply waiting to see what will happen in the way of price fluctuations. They seem to feel that the market will go lower, and they are buying only when it becomes absolutely necessary to do so. Such purchases are small. The only inquiry of note is for 1000 tons of foundry iron from a central Illinois melter. Sales of the St. Louis Coke & Iron Co. during the week amounted to 200 tons in carload lots. Its present price is $26.50 to $27.50, Granite City. Northern iron is quoted nominally at $25, Chicago, and Southern iron at $21, Birmingham.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$27.16
Northern malleable, sil. 1.75 to 2.25	27.16
Basic	27.16
Southern fdy., sil. 1.75 to 2.25 (rail)	26.17

Finished Iron and Steel.—The rail purchases of the Missouri Pacific Railway will total about 30,000 tons, but the allocation will not be determined for at least a week. The delay is said to be due to the fact that some of the rails will be used on Western lines. The contract for 150 tons of reinforcing bars for the Tate Motor Co. building, St. Louis, went to the Laclede Steel Co. Warehouse business is dull.

Coke.—A few contracts for last quarter, one for 300 tons, were made for foundry coke during the last week. Makers are disinclined to take on contracts for 1924. Foundry grades are selling at $6 to $7.50 at the Connellsville ovens. There is no especial demand for domestic grades, the warmer weather and a more plentiful supply of coal being the cause of the lack of interest.

Old Material.—The market for old material showed further weakness during the last week, a decline of $1 being recorded in all grades except railroad and machinery cast, which are unchanged. There has been no buying whatever by consumers, and trading between dealers small. Railroad lists continue heavy, causing a further weakening influence. New lists include: Chicago & Alton, 1200 tons; Rock Island, 4000 tons, and Wabash, 4000 tons.

	Per Gross Ton	
Iron rails	$15.00 to	$15.50
Rails for rolling	16.00 to	16.50
Steel rails, less than 3 ft.	17.00 to	17.50
Relaying rails, 60 lb. and under	25.00 to	26.00
Relaying rails, 70 lb. and over	32.50 to	33.50
Cast iron car wheels	17.50 to	18.00
Heavy melting steel	14.50 to	15.00
Frogs, switches and guards cut apart	15.00 to	15.50
	Per Net Ton	
Heavy axles and tire turnings	11.00 to	11.50
Steel angle bars	13.50 to	14.00
Steel car axles	16.50 to	17.00
Iron car axles	24.00 to	25.00
Wrought iron bars and transoms	18.00 to	18.50
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	13.50 to	14.00
Railroad springs	15.00 to	15.50
Cast iron borings	9.00 to	9.50
No. 1 railroad cast	19.50 to	20.00
No. 1 machinery cast	20.00 to	20.50
Railroad malleable	15.50 to	16.00
Machine shop turnings	9.50 to	10.00
Champion bundled sheets	7.00 to	7.50

Cincinnati

Pig Iron Prices Shaded Sharply in an Extremely Dull Market

CINCINNATI, Oct. 16.—The market is unusually dull. A sale of 1000 tons to a sanitary company went at about $23, Ironton. A sale of 600 tons to an Indiana melter is reported to have gone to a lake front furnace on the basis of $23.50 furnace, or the equivalent of $23.25 Ironton. Southern Ohio furnaces are reported to have quoted $23.75 Ironton on this deal, and at least one quotation of $23 Ironton was made by a broker. An inquiry for 1500 tons from a Kentucky melter had not been closed on Tuesday, but it is expected to go to a southern Ohio furnace. The same melter is in the market for Southern iron, and this probably will be closed this week. Prices generally are weak. Southern Ohio iron can be had in round tonnages at $23.75, and in the South, while $21 is the nominal quotation, it is admitted that $20.50 can be done, and possibly $20 on large tonnages. Some sellers, however, are of the opinion that the bottom of the market has about been reached, and are looking for an upturn. Inquiry is confined almost entirely to carload lots for immediate shipment. Three furnaces in southern Ohio and northern Kentucky are preparing to blow in, Jisco on silvery and Belfont and Norton on foundry and Bessemer respectively.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.05 to $25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.55 to 25.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.77
Basic Northern	25.77
Malleable	25.77

Finished Material.—A slight improvement is noted in the demand for finished materials, but orders continue to be placed only for one or two carloads for immediate delivery. Prices generally are holding up well. On an inquiry for the Big Four Railroad a Cleveland district mill quoted 2.53c., Cleveland, on ¼-in. and heavier plates. On bars the lowest quotation was 2.40c., Pittsburgh. On forging billets a quotation of $48.50, delivered Cincinnati, was made by a Kentucky manufacturer. On wire products prices generally followed current prices, although on wire nails a price was quoted of $3.10 per keg, delivered Cleveland. There is a fair demand for track materials. The L. & N. Railroad will close today for 14,700 kegs of spikes, 5500 kegs of track bolts and 31,000 pairs of angle bars. On spikes 3.15c., Pittsburgh, is reported to have been the general quotation, with Chicago manufacturers quoting a similar price, f.o.b. Chicago.

Structural Materials.—A number of large projects came up during the week. The biggest was the Hurt office building, Atlanta, requiring 2500 tons. The Louisville & Nashville Railroad is taking bids on 1600 tons of bridge work for Newport, Ky., and the Big Four and Cincinnati Northern Railroads on 800 tons of plate girder work. Bids will probably be asked about Nov. 1 on the Third National Bank, Dayton, Ohio, and for the Masonic Temple at Portsmouth, Ohio, requiring 300 tons. Revised plans have been sent out for bids for the Hurth Hotel, Portsmouth, Ohio, involving 300 tons. Two school buildings at Piqua, Ohio, 200 tons, are up for figures. There have been no lettings.

Reinforcing Bars.—An inquiry for 650 tons of reinforcing bars for St. Joseph's Infirmary, Louisville, Ky., is being figured on. Bids for this project closed Oct. 9, but the contract has not been awarded. A warehouse for the Standard Sanitary Mfg. Co. at Indianapolis will require about 200 tons. Prices generally range from 2.20c. to 2.40c.

Sheets.—While it is generally considered that black sheets can be had for 3.75c. or even less, mills in this district have been booking orders right along at the regular price of 3.85c. The tonnages, however, have been light, ranging from one to three carloads. Concessions of $2 per ton have also been reported on galvanized sheets, but blue annealed sheet prices remain firm at 3c.

Warehouse Business.—Orders continue in good volume, though somewhat spotty. Bars, small angles and blue annealed sheets are in most demand, although some wire products are moving fairly well. Cold-rolled steel is also in slightly better demand. Prices are unchanged, and indications point to the maintenance of the present schedules for the remainder of the year.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.25c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Fluorspar.—Some small sales of fluorspar are reported at prices unchanged from previous quotations. Some shading is being done by the smaller interests, but prices generally are being well maintained.

Coke.—Little activity is noted in foundry coke. We note two contracts for furnace coke, however, of 9000 tons per month each for the next two months, from southern Ohio furnaces, at undisclosed prices. Reports are current of much distress coke, particularly in the Michigan territory. Prices are about the same as last week, Connellsville furnace being quoted at $4 to $4.25 and foundry at $5 to $7. New River is unchanged at $12, for foundry; Wise County furnace at $5.25, and foundry at $6 to $7. By-product foundry is quoted at $9, Connellsville basis. Some ovens are being put out in the West Virginia district.

Old Material.—Dealers report a lessened demand each day for scrap. Some small sales are being made, however, but prices are very weak, being at least 50c. lower than the previous week. Offerings are heavy, the Norfolk & Western list being for 35,000 tons.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$10.50 to	$11.00
Iron rails	13.50 to	14.00
Relaying rails, 50 lb. and up	27.50 to	28.00
Rails for rolling	14.50 to	15.00
Heavy melting steel	13.00 to	13.50
Steel rails for melting	13.50 to	14.00
Car wheels	13.00 to	13.50
	Per Net Ton	
No. 1 railroad wrought	11.50 to	12.00
Cast borings	8.00 to	8.50
Steel turnings	7.50 to	8.00
Railroad cast	14.50 to	15.00
No. 1 machinery cast	17.50 to	18.00
Burnt scrap	11.00 to	11.50
Iron axles	21.50 to	22.00
Locomotive tires (smooth inside)	13.00 to	13.50
Pipes and flues	7.00 to	8.50

Detroit Scrap Market

DETROIT, Oct. 16.—Mills and furnaces that ordinarily consume a large part of the scrap in this district are following a hand-to-mouth policy on waste material purchases. This is also true of the pig iron melters who are piecing out their contracts until inventory period. The situation is analogous to that of a year ago, with prospects of buying for current needs only over the remainder of the year. Prices are unchanged.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$12.00 to $12.50
Shoveling steel	12.00 to 12.50
No. 1 machinery cast	17.00 to 17.50
Cast borings	10.00 to 11.00
Automobile cast scrap	24.00 to 25.00
Stove plate	16.00 to 17.00
Hydraulic compressed	10.50 to 11.25
Short turnings	10.00 to 11.00
Long turnings	9.00 to 9.50
Flashings	9.50 to 10.00

The measurement of water under almost any conditions as the result of a method devised by Prof. C. M. Allen of the Worcester, Mass., Polytechnic Institute, is announced by the Engineering Foundation, New York. By the use of salt and electricity measurements of remarkable precision are said to be accomplished. Professor Allen's new method is indirect. It is based on the fact that common salt increases the electrical conductivity of water in proportion to the quantity of salt dissolved in the water.

Cleveland

Pig Iron Fairly Active in Indiana and Michigan—Dull in Northern Ohio

CLEVELAND, Oct. 16.—Iron ore firms have completed shipments on many of their smaller merchant furnace contracts, but large consumers are still moving ore in good volume. Owing to the cautious buying by many consumers early in the season, there have not been many cancellations of contracts or postponements of deliveries until next season on account of blowing out of blast furnaces.

Pig Iron.—Sales increased during the week in Michigan and Indiana and with several orders ranging up to 1500 tons, the market has been fairly active in those States, but in the northern Ohio district business is virtually at a standstill. Prices show no strength, but in the absence of business local furnaces are still naming a $24 price for foundry and malleable grades for outside delivery. However, an inquiry of sufficient size to test the market would probably bring out lower quotations more in line with Valley prices. In the Valley district, the market is openly quoted at $23.50 to $24, but there are unconfirmed reports of $23 and even lower quotations. Buffalo furnaces appear to be holding to $23 for some shipping points, but Buffalo iron has been offered in New England at $22.50. Business in Michigan and Indiana is coming largely from automobile foundries, although the American Radiator Co. purchased 1200 tons of foundry iron for its Detroit plant for prompt shipment. Inquiries for several thousand tons of malleable and foundry iron from the same districts are pending. Southern iron is inactive. We note the sale of two 100-ton lots of low phosphorus iron by a Valley producer at $30, but this price has been shaded for iron shipped to the Chicago territory. A Cleveland district consumer has placed 3000 tons of standard low phosphorus iron with an Eastern producer at $28.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$24.00
Northern No. 2 fdy., sil. 1.75 to 2.25	25.50
Southern fdy., sil. 1.75 to 2.25	27.00
Malleable	25.50
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00

Bolts, Nuts and Rivets.—The maximum discounts that have been quoted recently on machine and carriage bolts have become more common. A leading Cleveland manufacturer Oct. 13 announced a 5 per cent reduction in its prices to the extreme discounts that have been prevailing and made a 25c. reduction on hot-pressed nuts and also a 5 per cent reduction on semi-finished hex. nuts. The 5 per cent reduction on bolts about offsets the advance that was made in the new price lists recently issued. Some makers are getting a fair volume of business, but others are in need of orders. Considerable rivet business is being booked in fourth quarter contracts by a leading producer at 2.85c. to 3c., but a 2.75c. quotation is still appearing for early shipment orders.

Semi-finished Steel.—An inquiry has come out for 5000 tons of sheet bars for Japan, but otherwise the market is lifeless. Sheet bars appear to be held firmly at $42.50, Youngstown, but billets and slabs can be purchased at around $40.

Finished Iron and Steel.—Mills are getting a fair volume of orders on contracts and there is a moderate volume of inquiry for small miscellaneous lots of steel bars, plates and structural material. Business seems to show a slight gain, particularly in plates. Buyers generally are placing orders for immediate requirements only, feeling that they may secure lower prices later. Prices on steel bars, plates and structural material are firm. While a Cleveland mill was reported to have shaded the regular plate price in a quotation to the Big Four Railroad, this proved incorrect, as the quotation was based on Indianapolis instead of Cleveland delivery and while a 2.53c. Cleveland price was named, this figured back to 2.50c. Pittsburgh. Eastern mills are quoting plates at 2.60c., Pittsburgh for this territory, but have shaded this price. Outside of plates, shapes and bars, some price concessions are appearing. The demand for hot-rolled strip steel has become somewhat more active, but prices are still irregular, although some mills are holding to a minimum of 3c. and are making small sales of 3.15c. Cold-finished steel bars lack firmness, the regular prices being shaded $3 a ton to 3.10c. on good size orders. Spikes also are somewhat irregular, sales being made as low as 3.10c. In the building field, considerable new work continues to come out. Bids were opened today for the Brotherhood of Locomotive Engineers' bank and office building requiring 3000 tons of structural steel.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Sheets.—Demand is rather light and some of the mills are in need of orders. Blue annealed sheets are firm at 3c. and galvanized sheets are holding up well to the regular 5c. price, although some shading is reported. On black sheets 3.75c. is common.

Reinforcing Bars.—The Cleveland Water Works Department will receive bids Oct. 24, for an administration building, two filter houses and seven valve houses for the Baldwin Reservoir requiring 2000 tons or more of reinforcing bars. The Ohio State Highway Commission has taken bids for road work requiring 400 tons if concrete construction is decided upon for all the work. Rail steel bars are not firm with 2.20c. as the common quotation. Billet steel bars are quoted at 2.75c., Pittsburgh, but this price is shaded $2 a ton for desirable orders for early delivery.

Warehouse Business.—Weakness has developed in warehouse prices on steel bars, plates and structural material and some business has been taken at around $2 a ton below regular quotations. Jobbers have recently been getting shipments on low priced steel placed at around $10 a ton below present mill prices. The weakness in warehouse prices on blue annealed and galvanized sheets recently noted has spread to blue annealed sheets, which can be purchased at 3.60c., or a concession of $3 a ton.

Old Material.—The market is weak owing partly at least to the hold-up of shipments by a leading local consumer and most grades have been reduced 50c. to $1 a ton. Borings and turnings are particularly weak, having declined $1 and the latter are being purchased by dealers at $11 for yard stocks. Mills are buying very little scrap and there is somewhat of a deadlock in the market, dealers claiming that producers are holding their material rather than selling it at prices that consumers are willing to pay.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$15.00 to $15.25
Rails for rolling	18.00 to 18.50
Rails under 3 ft	17.00 to 17.25
Low phosphorus melting	19.00 to 19.25
Cast borings	11.50 to 11.75
Machine shop turnings	11.00 to 11.50
Mixed borings and short turnings	11.25 to 11.50
Compressed sheet steel	13.75 to 14.00
Railroad wrought	12.75 to 13.00
Railroad malleable	20.00 to 20.50
Light bundled sheet stampings	11.50 to 12.00
Steel axle turnings	12.00 to 12.75
No. 1 cast	20.50 to 21.50
No. 1 busheling	10.75 to 11.00
Drop forge flashings	11.50 to 12.00
Railroad grate bars	16.00 to 16.50
Stove plate	16.00 to 16.50
Pipes and flues	10.00 to 11.00

Wm. H. Muller & Co., Inc., 11 Broadway, New York, exporter and importer, has been appointed exclusive agent in the United States and Canada of the recently formed Swiss Aluminum Rolling Mills Syndicate. The rolling mills of Switzerland in June formed a syndicate under the name of the Swiss Rolling Mills Association, Ltd., with headquarters at Basel. The products consist principally of aluminum sheets, wire and disks.

Philadelphia

Pig Iron and Scrap Show Further Weakness —Steel Demand Light

PHILADELPHIA, Oct. 16.—Further weakness in foundry pig iron and scrap are the chief developments of another week of very light demand. No improvement has taken place in the steel trade, but Eastern plate mills are basing hopes for a revival of plate demand on inquiries from five roads for a total of 200 to 300 locomotives. While the larger steel mills are making every effort to hold prices of plates, shapes, bars and sheets, further weakness in some of these products has come to light. Steel bars are being so freely shipped by one large producer on old orders, with invoice prices ranging from 1.70c. to 2.25c., Pittsburgh, that some resale lots are being offered in the market by either jobbers or consumers at prices considerably below the current mill quotation of 2.40c., Pittsburgh. Black sheets are more freely offered at 3.75c., Pittsburgh, and it appears that quotations of 4.90c., Pittsburgh, have been made on galvanized sheets, which hitherto have held pretty well at 5c.

The outstanding characteristic of all markets is there are no clear indications as to the future. Buyers are plainly convinced that any price changes will be downward and are acting accordingly.

Pig Iron.—A test of the foundry iron market was made last week by a large company which had inquired for 2500 tons for its New Jersey plant. Two or three eastern Pennsylvania furnaces were offered all or part of the tonnage at $22, furnace, but it is stated that the offer was refused in every instance. A part of the business was placed with one furnace, which is said to have realized slightly less than $23, furnace, on the base grade. Nearly all eastern Pennsylvania furnaces are now quoting $23, furnace, on No. 2 plain, $23.50 on No. 2X and $24 on No. 1X. One sale of No. 2X is reported at $23.25, furnace. Despite the fact that the market still has all the appearances of further weakness, there is a more definite feeling among sellers that prices are now close to bottom if they have not already reached it. Sales are mostly in small lots for early shipment and furnaces are continuing to pile iron.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.76 to $25.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 25.63
East. Pa. No. 1X	24.76 to 26.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	24.50 to 25.00
Gray forge	24.50 to 25.00
Malleable	24.50 to 25.50
Standard low phos. (f.o.b. furnace)	28.00 to 3000
Copper bearing low phos (f.o.b. furnace)	28.00

Ferroalloys.—Domestic furnaces continue to quote $112.50 on ferromanganese, but are taking little business, as resale lots at $108 to $110 continue to dominate the market. These resale lots, it is stated, are being rapidly cleaned up and producers have hope of a better situation from their point of view.

Semi-Finished Steel.—Open-hearth rerolling billets are freely offered at $40, Pittsburgh, and forging billets at $45, and it appears that even these prices would be shaded on attractive lots.

Plates.—Eastern plate mills have felt a slight improvement in demand for plates, as compared with a few weeks ago, but they are still operating at a very low rate, some of them at not more than 25 per cent. The Pennsylvania Railroad has not released any of the plate tonnage it held up about two months ago, though urged to do so by some of the mills. The price situation remains the same, two of the smaller mills quoting 2.40c. and the others 2.50c., Pittsburgh. As there is not enough business even at 2.40c. to fill up the mills, quoting that price, the situation, from the producers' viewpoint, is discouraging. Prospective car and locomotive buying has raised hopes somewhat, but it is not yet certain whether the talked-of business will develop in time to give Eastern plate mills the tonnage they need to finish out this quarter. The Baldwin Locomotive Works is bidding on upward of 200 locomotives, of which 58 are for the Southern Pacific, 80 for the Missouri Pacific, 39 for the Louisville & Nashville and the remainder for the Baltimore & Ohio and the Pennsylvania. The Standard Oil Co. of New Jersey has let contracts for eight barges, five of which will be built by the Sun Shipbuilding Co. and three by the New York Shipbuilding Corporation. The plates, about 4000 tons in all, will be rolled by the Carnegie Steel Co.

Structural Steel.—Two or three prospective jobs requiring a total of about 5000 tons of steel are expected to be in the market shortly, but at present there are no important projects up for bids in the immediate Philadelphia territory. Two mills continue to quote 2.40c., Pittsburgh, on structural shapes, the others quoting 2.50c. No real test of the 2.40c. price is reported, but buyers believe that 2.35c., Pittsburgh, has been quoted on some lots.

Bars.—Though steel bars have been holding well at 2.40c., Pittsburgh, so far as the mills are concerned, a good deal of resale material is being offered for concrete reinforcing purposes. It appears that some jobbers or consumers, it does not appear which, are getting more bars from a large producer on old contracts than they have any immediate use for, and this is the material that is being thrown on the market. Some of this steel is on orders taking prices as low as 1.70c., Pittsburgh, and scarcely any of it is invoiced at more than 2.25c. As long as these buyers had a definite use for the large shipments which have been coming to them in recent weeks, there was no thought of reselling it, but now with the year-end inventory period approaching they are willing to sacrifice it rather than carry it in stock. To meet this competition one or two independent mills have quoted 2.30c., Pittsburgh, but this has not in some instances been low enough. Sales of concrete bars are reported to have been made from 2.15c. to 2.25c., Pittsburgh. Bar iron demand is light and prices are unchanged at 2.35c. to 2.40c., Pittsburgh. Structural rivets are being sharply cut. One Pittsburgh company has made quotations of 2.75c. per lb., Pittsburgh, which is $5 per ton below quotations of some makers.

Sheets.—Quotations of 3.75c., Pittsburgh, on black sheets are more common, and galvanized sheets have been quoted at 4.90c., but blue annealed appears to be firm at 3c. Very little sheet business is being placed with the mills by consumers in this district.

Warehouse Business.—Local warehouses are shipping out a very satisfactory volume of steel. Many consumers, regularly mill buyers, are now satisfying their immediate requirements out of jobbers' stocks. Prices are unchanged, and for Philadelphia delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Ore.—Receipts of iron ore from abroad last week totaled 30,720 tons, of which 12,400 tons came from French Africa, 9820 from Sweden and 8500 from Newfoundland.

Old Material.—Not in a considerable period have there been such sharp declines in prices of various grades of scrap as in the past week. Scarcely an item quoted in the table below has escaped, and the reductions range from 50c. to $2 a ton. A large buyer of heavy melting steel bought 15,000 tons last week at $15, delivered. The same consumer also bought a considerable tonnage of blast furnace borings and turnings at $11.50. One of the principal consumers of

bundled sheets and machine shop turnings for open-hearth use bought 1500 tons at $12, and then reduced its price to $11, which is now the maximum that can be obtained. Except for these few transactions, the market is very dull and indications point to further reductions.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00
Scrap rails	15.00
Steel rails for rolling	$17.50 to 18.00
No. 1 low phos., heavy 0.04 and under	21.00 to 22.00
Cast-iron car wheels	20.00 to 20.50
No. 1 railroad wrought	17.50 to 18.00
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	12.50 to 13.00
Bundled sheets (for steel works)	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	11.00 to 11.50
Machine shop turnings (for steel works use)	11.00 to 11.50
Machine shop turnings (for rolling mill use)	12.00 to 12.50
Heavy axle turnings (or equivalent)	13.00 to 14.00
Cast borings (for steel works and rolling mills)	12.50 to 13.00
Cast borings (for chemical plants)	16.00 to 17.00
No. 1 cast	19.50 to 20.00
Heavy breakable cast (for steel plants)	16.50 to 17.50
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	18.00 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to 15.00
Shafting	20.00 to 21.00
Steel axles	20.00 to 21.00

British Iron and Steel Market

Japan Still Buying Heavy Tonnages of Sheets—Tin Plate in Strong Demand—Belgium Secures Chinese Rail Order

(By Cable)

LONDON, ENGLAND, Oct. 16.

There is an improved tone to the pig iron market, though prices as yet are unaffected. Buyers are displaying more interest in forward prices, particularly the Continental consumers. General consumption is increasing and higher prices are looked for in the future.

Hematite is firm. Continental purchasers are rather more active. Foreign ore is dull. Sellers of Bilbao Rubio ask 22½s. ($5.71) c.i.f. Tees.

Heavy steel is dull, owing to the continuance of the boilermakers' dispute, which is causing shipyard stagnation. There is some Continental inquiry covering shipbuilding material.

September exports of pig iron, excluding ferro-alloys, were 45,015 tons. The total of all iron and steel amounted to 333,985 tons.

William Beardmore & Co., Ltd., Glasgow, has secured a contract from the Latvian Government for a 2800-ton ice-breaker.

Belgium has secured an order from China for 10,000 tons of steel rails.

Continental markets are disorganized by the exchange fluctuations, and little business is moving through traders here.

In Belgium 41 blast furnaces were blowing on Oct. 1.

In Germany the Ruhr works are discharging men wholesale. Operations in the immediate future, therefore, are likely to be restricted.

In Poland a general strike is disorganizing industry.

In Upper Silesia the majority of the mines and works are idle.

Tinplate is in strong demand, particularly with regard to domestic consumers, who are covering for their November-December requirements and some going into January-February. Exports are improving; Canada is inquiring. The CW 20 x 14's have been fixed at 20s. ($4.54) f.o.b. for October only.

Galvanized sheets are firm. India is buying on a small scale. Other markets, especially in the Far East, are active. Japan 67's are being sold at £29 10s. (5.98c. per lb.) f.o.b., for January delivery. Thin gage makers are well sold and some are not quoting.

Black sheets are strong on continued Japanese demand. CA 24-gage has been sold at £14 (2.84c. per lb.) f.o.b. Japan 6 x 3, 13's, 107 lb. sheets are bringing £21 10s. (4.36c. per lb.) f.o.b., May. The works are heavily sold.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.54 per £1, as follows:

Durham coke, delivered	£1	19s.		$8.85	
Bilbao Rubio ore†	1	4		5.45	
Cleveland No. 1 foundry	5	2½		23.27	
Cleveland No. 3 foundry	4	16		21.79	
Cleveland No. 4 foundry	4	11		20.66	
Cleveland No. 4 forge	4	8	to £4 9s.	19.98	to $20.20
Cleveland basic	4	10	to 4 14	20.43	to 21.34
East Coast mixed	4	18½	to 5 0	22.36	to 22.70
Ferromanganese*	17	10		79.45	
Rails, 60 lb. and up	8	0	to 9 0	36.32	to 40.86
Billets	7	10	to 8 5	34.05	to 37.45
Sheet and tin plate bars, Welsh	9	2½		41.43	
Tin plates, base box	1	3⅞	to 1 3¼	5.25	to 5.28
				C. per Lb.	
Ship plates	9	0	to 9 10	1.82	to 1.93
Boiler plates	12	10	to 13 0	2.53	to 2.63
Tees	9	10	to 10 0	1.93	to 2.03
Channels	8	15	to 9 5	1.77	to 1.87
Beams	8	10	to 9 0	1.72	to 1.82
Round bars, ¾ to 3 in.	10	5	to 10 15	2.08	to 2.18
Galvanized sheets, 24 g.	19	0	to 19 5	3.85	to 3.90
Black sheets, 24 gage	14	0		2.84	
Black sheets, Japanese specifications	15	5		3.09	
Steel hoops	12	0	& 12 10*	2.43	& 2.53*
Cold rolled steel strip, 20 gage	17	5		3.50	
Cotton ties, Indian specifications	15	0		3.04	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron:					
Belgium	£5	5s.	to £5 10s.	$23.83	to $24.97
France	5	5	to 5 10	23.83	to 24.97
Luxemburg	5	5	to 5 10	23.83	to 24.97
Billets (nominal):					
Belgium	7	0		31.78	
France	7	0		31.78	
Merchant bars:				C. per Lb.	
Belgium	8	7½	to 9 0	1.70	to 1.82
Luxemburg	8	7½	to 9 0	1.70	to 1.82
France	7	10		1.52	
Joists (beams):					
Belgium	8	2½		1.65	
Luxemburg	8	2½		1.65	
France	7	10	to 7 12½	1.52	to 1.55
Angles:					
Belgium	8	0	to 8 5	1.62	to 1.67
⅛-in. plates:					
Belgium	8	10		1.72	
Germany	8	10		1.72	
⅜-in. plates:					
Luxemburg	7	15		1.57	
Belgium	8	0		1.62	

A Tin Plate Amalgamation and a Central Selling Agency—Export Trade Unsatisfactory

LONDON, ENGLAND, Oct. 4.—Conditions in the iron and steel markets are still far from bright, the prolonging of the boilermakers' dispute causing home consumers particularly to refrain from purchasing on any substantial scale. At one time it was hoped that an end could be brought to this disastrous lockout, but at the moment there is little light on the horizon. The shipyards in Scotland are, of course, suffering most severely, as there is practically nothing moving in new shipbuilding, but it is stated that there are orders to be placed, and that once the boilermakers get back to work the yards will be kept busy for some time to come.

Home railroads continue to place a certain amount of requirements, and here and there some structural orders are secured for shipment overseas, but apart from the very strong demand fom Japan for galvanized and black sheets the export trade still remains in a very unsatisfactory state. Prices do not recede much, but on the fortnight are about 5s. easier, but even with this decrease some makers say that they are rolling without any margin of profit. Certainly the cost of production shows no sign of going down to anything

like an economic level, chiefly owing to the high price of fuel. At one time it seemed as though coke would be cheaper, but with the improvement in the franc rate continental demand for British fuel became strong again, and prices in consequence hardened. The production of pig iron has been cut down fairly considerably, but the demand for foundry grades is so poor that makers are continually granting concessions in an endeavor to clear out the stocks in their yards. The demand for hematite, however, has improved, and with the output of this grade of material still restricted, supplies are quickly absorbed and prices maintain a fairly steady level. No. 3 Cleveland G.M.B. is weak at about 96s., and East Coast mixed numbers are quoted in the neighborhood of 99s. and upward.

A little time ago a notice was issued that the Grovesend Steel & Tinplate Co. had absorbed the Duffryn, Mardy and Dynevor Tinplate Works, and had thereby become the second largest tinplate producer in South Wales. Now comes the indication that the Grovesend and Richard Thomas & Co., the latter company being the largest manufacturers of tinplates in the world, owning 14 tinplate works, comprising 111 mills with a capacity of over 4500 tons of tinplates a week, and of over 6500 tons of steel bars a week, have come to an agreement so that the total capacity of the amalgamation of the two companies will result in a steel production in South Wales alone of about 11,000 or 12,000 tons a week. Great efforts are being made in certain directions to establish a tinplate central selling agency, and it is evident that this amalgamation is in connection with this proposal. Whether the selling agency will eventually develop or not it is difficult to say, but certainly at the present time many of the tinplate makers are putting up a strong opposition.

Wages in Industries Rise

WASHINGTON, Oct. 15.—Total earnings of 2,352,516 employees in 51 manufacturing industries in September during one week amounted to $61,507,092 the Labor Department has announced. The same industries in August reported 2,352,945 employees with a total payroll of $61,436,603. A combined total from the 51 industries showed 80 per cent reporting as working full time, 18 part time and 2 per cent closed.

The September payroll by Youngstown, Ohio, industries, principally iron and steel properties, aggregated $6,803,933, the third highest month since January, 1921. Total expenditure for wages the first nine months in the year is $57,331,828, a figure higher than the totals for the full years of 1921 or 1922. It is expected the payroll figures for the year will exceed $75,000,000, a gain of 50 per cent over the previous year.

Clifford B. Connelley, director of industrial relations, Carnegie Institute of Technology, will have charge of the public relations section of the Pittsburgh Personnel Association this year. This section has planned a series of general meetings to be carried on this winter to bring to the attention of all of those interested in the industrial and commercial welfare of Pittsburgh the best modern practice in handling human relations.

Gross sales of the American Chain Co., Inc., for the eight months ended Aug. 31 reached $20,945,648. Net earnings for the period amounted to more than two and one-half times the net earnings for all of 1922. The balance sheet as of July 31, last, showed quick assets of $14,343,500 against quick liabilities of $2,385,000.

A cablegram from London says the fusion of the Grovesend Steel Tin Plate Co. with Thomas & Co. is now complete, the latter company having paid £1,100,000 for control.

BRITISH FOREIGN TRADE

August Steel Exports Larger Than in July Imports But Slightly Changed

August exports of British iron and steel showed an increase over July of about 15,900 tons. This is the first increase in several months. The August exports were 330,431 gross tons as compared with 314,522 tons in July. The imports in August of 121,906 tons were the smallest since May; these compare with 128,486 tons in July. Comparative data for both exports and imports, scrap being included, were as follows:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Aver. per month, first quarter, 1923	358,208	128,032
April, 1923	398,507	133,929
May, 1923	435,630	114,132
June, 1923	373,277	130,066
Aver. per month, second quarter, 1923	402,471	126,042
July, 1923	314,522	128,486
August, 1923	330,431	121,906
Average per month, 1922	295,980	82,215
Average per month, 1921	144,886	152,734
Average per month, 1920	274,881	128,685
Average per month, 1919	188,519	50,801
Average per month, 1913	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month

	1913	1922	August 1922	August 1923
Pig iron }	93,700	66,159	{ 30,643	55,107
Ferroalloys }			{ 15,867	15,247
Steel rails	42,200	21,300	22,358	16,874
Steel plates	11,200	6,700	6,273	15,434
Galvanized sheets	63,500	43,600	47,404	41,787
Steel bars, rods, etc.	20,900	19,100	17,533	27,930
Tin plates	41,200	37,400	36,817	41,798
Black plates and sheets	11,700	18,700	18,577	26,038

Data as to importations of importance are as follows in tons per month:

	1913	1922	Jan.-Aug., 1923
Iron ore	620,000	289,400	522,213
Manganese ore	50,100	28,109	42,652
Pig iron and ferroalloys	18,000	12,800	10,989

Exports of scrap iron and steel in August were 6554 tons, or 9975 tons per month for the first eight months of this year, as compared with 12,880 tons per month in 1922. In 1913 there were 9600 tons per month.

The Interstate Commerce Commission, on complaint of several steel manufacturers and consumers affected, has suspended until February the new tariff recently announced, reestablishing the 21½c. rate on steel between Pittsburgh and Cleveland and other Ohio points. Consequently the 19c. combination rate will remain in effect until further action is taken.

The members of the Electric Hoist Manufacturers' Association report a decrease of 2.7 per cent in the number of hoists sold during September as compared with the previous month, and a decrease of 6 per cent in the value of hoists ordered. Shipments for the month of September decreased 21.4 per cent as compared with the previous month.

The Ford Motor Co. is operating its valve manufacturing plant at Northville, Mich., at maximum capacity, giving employment to about 350 men under three 8-hr. shifts. Current production is at the rate of 2,500,000 valves per month, including those for Ford automobiles, trucks and tractors. About 10,000 tractor valves alone are being turned out daily.

The Baker R & L Co., Cleveland, manufacturer of Baker trucks and Raulang automobile bodies, reported in stockholders' meeting that orders in hand for both divisions will extend well into the spring months. Dividends were declared at 7 per cent for preferred and 6 per cent for common stock. President F. W. Treadway stated that surplus is now about $500,000.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling.....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, base, per lb.....3.15c.
Bands, base, per lb.....3c. to 3.15c.
Strips, base, per lb.....3c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.63

Cold-Finished Steels

Bars and shafting, base, per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ in. and smaller, rolled threads..60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts.....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads..50 and 10 per cent off list
Other style heads.....50 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜ in. and smaller, rolled threads
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.00c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts
⅞ in. and smaller, U. S. S....80 to 80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 to 75 and 5 per cent off list
Small sizes S. A. E. 80 and 10 to 80, 10 and 5 per cent off list
S. A. E., ⅜ in. and larger
75 and 10 to 75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts.....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers.....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs.....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.$2.75 to $3.00
Small rivets.....65 and 10 to 70 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$3.15
Spikes, ½ in., ⅞ in. and ⅝ in., per 100 lb.....$3.15 to 3.50
Spikes, ⅜ in.....3.15 to 3.50
Spikes, boat and barge, per 100 lb.....3.50
Track bolts, ¾ in. and larger, base, per 100 lb..$4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..5.00 to 5.50
Tie plates, per 100 lb.....2.55 to 2.60
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	3
½	56	42½	¾	28	11
¾	60	45½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1¼ in.	+18
2½ to 3¾ in.	37	1⅜ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3½ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	44	3½ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes *Cold Drawn*			
1 in.	55	3 and 3¼ in.	34
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	33		
Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	14	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	1½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.80	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic	$.8.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	.2.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.15
Pac. Coast, ship plates	1.34
Birmingham	0.53
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

The minimum carload on most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	6.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, o.t.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	39c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$42.00 to 45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	41.00 to 44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	80.00 to 87.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois		37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton	6.00 to 7.00	
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00 to $42.50
Rolling billets, 2-in. and under	40.00 to 42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00 to $42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	3 per ton over base
Wire rods, carbon 0.41 to 0.55	5 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10 per ton over base
Wire rods, acid	15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.15c. to 2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅞-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill.	2.40c.
Bars, common iron, Pittsburgh mill.	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$ 4.80	$ 4.80
⅜-in.	5.50	6.00
⅜-in.	6.50	7.00
⅞-in.	9.00	9.50
½-in.	11.00	11.50
⅝-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1-in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico-Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Week's Awards Show Drop, But Large Tonnage Under Active Consideration

Contracts of fabricated steel work coming to light in the past week show a drop to 10,000 tons, but fresh inquiries involving 25,000 tons appeared and much encouragement was taken in five or six projects now actively considered in the New York metropolitan district and estimated to require 50,000 tons. These are mentioned in the New York market report covering finished iron and steel. Awards of the week include the following:

Structural Projects Awarded

Siegal apartment building, Amsterdam Avenue and Seventy-third Street, New York, 1000 tons, to Hay Foundry & Iron Works.

Highway bridge at Pequannock, N. J., 125 tons, to Phoenix Bridge Co.

Norfolk & Western Railroad, bridges, 400 tons, to a Virginia fabricator.

Highway bridge in West Virginia, 125 tons, to Roanoke Bridge Works.

Philadelphia & Reading Railroad, bridges, 250 tons, to Belmont Iron Works.

American Gas & Electric Co., power plant in Indiana, 2200 tons, to American Bridge Co.

Wilson Foundry Co., Pontiac, Mich., foundry, 520 tons, divided between Whitehead & Kales and Continental Bridge Co.

Vicksburg, Shreveport & Pacific Railroad, four track crossing over Marshall Street, Shreveport, La., 312 tons, to Mt. Vernon Bridge Co.

J. B. Murphy Memorial, Chicago, 308 tons, to Morava Construction Co.

High school building, Mishawaka, Ind., 263 tons to Elkhart Bridge & Iron Co.

Accomac Realty Co., St. Louis, lumber shelter, 180 tons, to Wood Construction Co.

Village of Hibbing, Minn., water tank and tower, 136 tons, to Minneapolis Steel & Machinery Co.

Tomahawk Kraft Paper Co., Tomahawk, Wis., digester building for paper mill, 108 tons, to Wausau Iron Works.

A. O. Smith Corporation, Milwaukee, framing and miscellaneous work, 200 tons, to Lakeside Bridge & Steel Co.

Commercial and apartment building for Stotzer Granite Co., Milwaukee, 100 tons, to Lakeside Bridge & Steel Co.

Lakeside Power Co., St. Francis, Milwaukee County, steel for superheaters, 200 tons, to Lakeside Bridge & Steel Co.

Quinze Power Co., Kippawa, Canada, Viele, Blackwell & Buck, 49 Broadway, New York, engineers, 210 tons, to the Hamilton Bridge Works Co., Hamilton, Ont., and 100 tons to Hepburn & Disher, Ltd., Toronto, Ont.

Maternity and Babies' Hospital, Cleveland, 1950 tons, to Forest City Steel & Iron Co., which has placed the steel with the Bethlehem Steel Co.

Erie County Home, Buffalo, N. Y., 800 tons, to Buffalo Structural Steel Co.

Kelleys Island Lime & Transport Co. viaduct at Kelleys Island, Ohio, 150 tons, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Horn & Hardart Co., extension to bakery at 600 West Fiftieth Street, New York, 500 tons.

Steinway & Sons, piano warehouse and salesrooms, Fifty-seventh Street, New York, 1500 to 2000 tons.

Public school No. 210, Bronx, New York, 1100 tons.

Public school No. 205, Brooklyn, New York, 1100 tons.

Lapidus apartment building, New York, 800 to 1000 tons.

Greenbaum loft building, 256 West Thirty-eighth Street, New York, 1000 tons.

Culver apartment building, New York, 300 tons.

Perth Amboy, N. J., bridge over Raritan River, 6000 tons, being readvertised, former bids having been rejected.

Parental school, Queens, New York, 250 tons.

Power plant, Stone & Webster, Boston, general contractors, 500 tons.

City of Philadelphia, tunnel, 500 tons.

Standard Oil Co. of New Jersey, structural work, 150 tons.

Standard Oil Co. of Indiana, structural work for erection at Cleveland, 150 tons.

Natanson loft buildings, New York, 9000 tons in two structures.

East Lake Street substation, Commonwealth Edison Co., Chicago, 1000 tons.

Mercy High School Building, Chicago, 650 tons.

St. Paul Bridge & Terminal Railway Co., bridge over Mississippi River, St. Paul, Minn., 600 tons.

Missouri Pacific Railroad, 11 plate girder spans, 350 tons, bids taken.

Pennsylvania Railroad, Southwestern Region, 92-ft. girder span, 110 tons, bids taken.

Knights of Columbus club house, Springfield, Ill., 300 tons, bids taken.

Louisville & Nashville Railroad, bridge work, 1600 tons, bids closed Oct. 23.

Big Four Railroad, bridge work, 800 tons, bids closed Oct. 23.

High schools, at Piqua, Ohio, 200 tons, bids being taken.

Hotel, Portsmouth, Ohio, 300 tons, bids being taken.

City of Cleveland, administration and other buildings for Baldwin reservoir, 600 tons; bids to be taken Oct. 24.

Bourne-Fuller Co., Cleveland, addition to steel warehouse, 600 tons.

Harding junior high school, Lakewood, Ohio, 100 tons.

RAILROAD EQUIPMENT BUYING

Fresh Spurt in Locomotive Inquiry, but Little Buying of Cars or Engines

In addition to the inquiry of the Southern Pacific for 58 locomotives, mentioned last week, the Louisville & Nashville has asked for prices on 39 and the Missouri Pacific on 80. The Pennsylvania and the Baltimore & Ohio are also figuring on the purchase of a considerable number of engines, according to reports in the railroad equipment trade. There seems to be some doubt, however, as to whether this business will be placed this year. In the case of the Southern Pacific it is stated that its inquiry has already been cut in half.

The locomotive equipment of the railroads of the country is now in the best condition it has been in years, according to reports of the car service division of the American Railway Association. On Oct. 1 15.3 per cent of the total number were in need of repair, the smallest number in need of repair for any period for which there are records.

The Department of Commerce has announced September shipments of railroad locomotives from the principal manufacturing plants. Unfilled orders at end of September were: Domestic, 1102 and foreign 76, against 1406 and 91 a month ago.

The Interborough Rapid Transit Co., New York, has come into the market for 100 to 250 all-steel subway cars.

The Philadelphia & Reading Railroad had ordered 50 passenger cars from the Harlan & Hollinsworth plant of the Bethlehem Shipbuilding Corporation.

The St. Louis Southwestern is inquiring for 150 steel underframes for stock cars.

The Nickel Plate has ordered 10 underframes for caboose cars from the Pennsylvania Tank Car Co.

Swift & Co. are inquiring for 100 refrigerator cars.

The Minneapolis & St. Louis has placed 100 box car repairs with the General American Car Co.

The Louisville Henderson & St. Louis is inquiring for 2 coaches, 2 coaches with middle smoker compartment and 3 combination baggage and mail cars.

The Chicago, Milwaukee & St. Paul contemplates placing repairs on 30,000 freight cars. The trucks of old equipment will be salvaged and new underframes and superstructers will be built.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
		Electro-					
Oct.	Lake	lytic*	New York	New York	St. Louis	New York	St. Louis
10.....	13.25	12.75	41.62½	6.85	6.65	6.62½	6.27½
11.....	13.25	12.62½	41.37½	6.85	6.65	6.62½	6.27½
13.....	13.12½	12.50	....	6.85	6.60	6.60	6.25
15.....	13.00	12.50	41.62½	6.85	6.60	6.62½	6.27½
16.....	13.12½	12.62½	41.50	6.85	6.60	6.65	6.30

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Oct. 16.

Some of the markets are more active than a week ago. Copper, after selling lower, is again higher. The tin market has been very dull. There has been very little change in the lead situation, but there has been a slight improvement in the zinc market. Friday, Oct. 12, was generally observed as a holiday.

Copper.—The electrolytic copper market, after falling to still lower levels during the week, has turned more active with the price tendency higher. In the last few days there has been fairly heavy buying by foreign consumers and a much more active inquiry from domestic melters. An interesting feature is the tendency of some consumers to inquire for delivery even into next year. In the past week sales have been made as low as 12.75c., delivered, although not all producers would meet this price. Today the market is a little higher at 12.87½c. to 13c., delivered, with some producers unwilling to do business at less than 13c. The market has every appearance of at least a brief rally.

Tin.—An unusually quiet week has prevailed in the market for Straits tin. The largest business was done last Thursday, Oct. 11, when about 200 tons changed hands. About half of this was futures or October-November shipment, which sold at 40.62½c. to 40.87½c. On one day two dealers attempted to sell futures but did not succeed. The holiday on Friday was also a factor in the prevailing dullness. Both yesterday and today the market has also been dull with a little business done yesterday in October delivery at 41.50c. An interesting announcement is that the New York Metal Exchange has inaugurated the practice of two calls a day instead of one, namely at 10.30 a. m. and 2.30 p. m. Spot Straits tin was quoted today at 41.50c., New York. Prices in the London market today were about £5 per ton lower than a week ago, with spot standard quoted at £201 15s., future standard at £199 17s. 6d. and spot Straits at £202 15s. The arrivals thus far this month have been 2265 tons, with 8414 tons reported afloat.

Lead.—The market continues very quiet with prices practically unchanged. Demand is good but not sufficiently in excess of production to create any premiums. The leading interest continues to maintain its quotation at 6.85c., New York. In the outside market quotations are 6.85c., New York, and 6.60c., St. Louis.

Zinc.—Due partly to an advance of about £1 per ton in the British market and also to a slightly improved domestic inquiry prices of prime Western have stiffened in the past few days until today quotations range from 6.27½c. to 6.32½c., St. Louis, or 6.62½c. to 6.67½c., New York. Bids of 6.30c., St. Louis, are reported rejected. There is also some prospect of further sales to England.

Nickel.—Shot and ingot nickel continues to be quoted at 29c., the price of the leading producers, while electrolytic nickel is held at 32c. In the outside market there are some quotations of 28c. per lb. on shot and ingot nickel.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 7.45c. to 7.55c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., New York, duty paid, with some sellers unable to obtain the metal from their principals.

Old Metals.—Business is very dull and values are off again. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	11.50
Copper, light and bottoms	10.25
Heavy machine composition	10.00
Brass, heavy	7.25
Brass, light	6.00
No. 1 red brass or composition turnings	8.50
No. 1 yellow red brass turnings	6.50
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.25
Sheet aluminum	16.25

Chicago

Oct. 16.—Copper, lead and spelter are lower, while tin has advanced. Scattered reductions have been made in the old metals. Business is still very quiet. We quote in carload lots: Lake copper, 13.75c.; tin, 42c.; lead, 6.65c.; spelter, 6.25c.; antimony, 9c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9c.; red brass, 8.25c.; yellow brass, 6c.; lead pipe, 5.25c.; zinc, 4c.; pewter, No. 1, 22c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

September Sheet Sales Showed Substantial Increase

PITTSBURGH, Oct. 15.—Sheet steel manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers in September made sales aggregating 223,556 tons, a gain as compared with August of about 107,000 tons. Sales for the first time since last March were in excess of shipments. Production in September was 49,000 tons less than in August and there was a decline of 29,000 tons in September shipments compared with those of the month before. Unfilled tonnage at the end of the month was approximately 27,000 tons greater than at the end of August.

September figures in net tons compare with those of August and July as follows:

	Sept.	August	July
Per Cent Reporting	68.8	69.5	69.6
Sales	223,556	116,659	92,358
Production	185,577	234,112	174,910
Shipments	205,772	234,486	192,261
Unfilled tonnage	343,096	316,972	404,868
Unshipped tonnage	84,338	102,354	109,068
Unsold stock	29,975	32,252	32,062

Record Car Loading

More cars were loaded with revenue frieght in the week ended Sept. 29 than in any other week in railroad history. The total was 1,097,274 cars. This exceeded by 4707 cars the previous record which was established for the week of Sept. 1, this year, when the total was 1,092,567 cars.

Detailed instructions for the proper installation, operation and care of electric motors and generators are given in a booklet which has been published by the motor and generator section of the Electric Power Club. The instructions are grouped under the five headings: General installation, method of drive, operation, care and maintenance. Standard definitions referring to motors and generators are also given in this booklet, copies of which undoubtedly may be obtained by applying to the Electric Power Club, 900 Keith Building, Cleveland.

Warehousing and transportation economies in distribution are discussed in a leaflet prepared for general circulation by the Domestic Distribution Department of the Chamber of Commerce of the United States, Alvin E. Dodd, Mills Building, Washington, manager.

TRADE WITH MEXICO

Resumption Will Be Gradual—Some Lowering of Iron and Steel Duties

BY CHARLES L. SMITH

EL PASO, TEXAS, Oct. 15.—Recognition of Mexico by the United States has improved conditions in that country to a considerable extent, but there has not been time enough for the opening up of channels through which foreign capital travels. The improvement has been mainly in collections. El Paso exporters of hardware and machinery supplies have been especially successful in collecting accounts, some of which were long past due. The general opinion is that a feeling of confidence on the part of the Mexicans themselves has brought into circulation considerable money that has been hoarded for some time past. To a certain extent this confidence is shared by a number of foreign mining companies whose properties have either been idle or operating with greatly reduced forces for a number of years. These companies are quietly making plans for reopening their mines, but it is too early to expect machinery orders from them.

The principal drawback with the mining companies, as well as with manufacturing concerns in Mexico, is the labor question. In many sections of Mexico radical labor has been in control, and while there are evidences that labor leaders are losing their grip to some extent, there are yet many vexing experiences in different localities that seem to be holding back investors.

On the other hand, companies such as the American Smelting & Refining Co., made up plans for expansion nearly a year ago and are going ahead with developments. The company is making extensive additions to its smelting plants at Chihuahua City and Asarco, and early in August ground was broken at San Luis Potosi for a new smelter that will have a larger capacity that that at Chihuahua City. Most of the machinery has been bought, but some shop equipment is yet to be provided.

The National Railways of Mexico are understood to have requisitions in hand for shop equipment, many of which are dated as far back as 1921. On account of the delay in determining whether the National Lines will be turned back to the original stockholders or continued under Government operation, it is not likely that these machine tools and other equipment will be purchased for some time yet. The Mexico Northwestern Railway, an independent system operating some 500 miles of track in northern Mexico, is also short of shop equipment, but no plans have been formulated for buying to fill its needs. It is somewhat surprising to note the excellent condition of the rolling stock of this railroad that has been operating under a handicap for more than ten years. This statement also applies to the passenger equipment of the National Railways of Mexico. Naturally, later a good many machine tools will be shipped to Mexico, but business just now is limited to a few single tools for replacement purposes.

Dealers in electrical equipment have more business in sight just now than anyone else in the machinery line. In different parts of Mexico some large hydroelectric plants are under way, or already have been completed. Among the latest of those now operating is a large generating plant at La Boquilla dam, about 90 miles from Chihuahua City and about equally distant from the Cusihuiriachic mining district in the State of Chihuahua. Transmission lines are now under construction to both Chihuahua City and the mining district, and the project has been productive of a number of inquiries for electric motors and electrical fixtures.

Recent changes in Mexican import duties lower the schedule on a few items of iron and steel. Quoted in Mexican money, which for practical purposes may be figured at 50 per cent discount, they are as follows: Plain bars, 7 centavos per kilo; reinforcing bars, 8 centavos per kilo; structural steel, $6.50 per 100 kilos; barb wire $1 per 100 kilos; plain wire $3.50 per 100 kilos; woven wire fence $3.50 per 100 kilos; poultry netting, 18 centavos per kilo. Mining machinery is admitted free of duty.

Developments on the west coast of Mexico include an extension of the Southern Pacific Railroad of Mexico, work on which is now under way.

Progressive Policies of W. M. Horner, President Mahr Mfg. Co., Minneapolis

In taking over the general management of the Mahr Mfg. Co., Minneapolis, Sept. 1, 1923, W. M. Horner, president, has promulgated a new policy in having sales engineers in the field deal directly with the engineering department, leaving matters of small detail only to the sales department. This, he believes, secures better service to the field engineers, which in turn is passed on to the customer. Mr. Horner, in other words, believes in direct dealing.



W. M. HORNER

Since investing in the company in 1917, and on taking an active interest in its affairs, he made, as one of his first recommendations, the creation of an engineering department. Because of the technical nature of oil burning equipment sales engineers were established at every important business center.

In addition to the business practices mentioned Mr. Horner has put into effect original methods of dealing with employees. In January, 1921, he promulgated a profit sharing plan so that all members of the company would share in the profits of the business. He has put in operation a plan for paying wages to shop men during sick leave, group life insurance, free clinical examinations for employees who appear ailing, and has also done away with clock punching at the noon hour, and high shop wages are paid, notwithstanding the benefits enumerated.

Liberal treatment of employees has not adversely affected output, as is sometimes said to be the experience. Improved output per man in the shop and the general zeal of all members of the company in their work is the report.

American Iron and Steel Institute—The Henry M. Howe Memorial

The memorial services for Dr. Henry Marion Howe, to be held in the Cathedral of St. John the Divine, New York, on Thursday afternoon, Oct. 25, at five o'clock, were arranged some time ago by correspondence between Bishop Manning of the Episcopal Diocese of New York and Judge Gary, president of the American Iron and Steel Institute. Dr. Howe was an honorary member of the institute and President Gary hopes there will be a general attendance of members who on that day attend the sessions of the American Iron and Steel Institute. The principal address will be by Dr. Michael Pupin of Columbia University.

A goodly number of reservations are being received for the banquet of the institute to be held Thursday night, Oct. 25. There will be ample time after the adjournment of the afternoon session for members to attend the services at the cathedral and return to the Hotel Commodore for the banquet.

The trip to the Aberdeen Proving Ground will occupy the following day, the train starting from New York Thursday night after the banquet and returning Friday night, arriving in New York at 11:30.

PERSONAL

Thomas F. Du Puy, who has been variously connected in the steel trade, is now representative in the Eastern territory for the Electro Alloys Co., Elyria, Ohio, with office at Room 1959, 50 Church Street, New York.

Frank R. Frost, who has been in charge of Western sales for the Superior Steel Corporation, Pittsburgh, has been named general manager of sales upon the withdrawal from that company of Harry F. Devens, formerly Eastern sales manager, to become vice-president of the Morris & Bailey Steel Co. division of the Oliver Iron & Steel Corporation. Mr. Devens succeeds G. B. Morris and will have charge of cold-rolled strip steel sales, the product of the Morris & Bailey division.

R. T. Cadwell, formerly secretary-treasurer, Holcroft & Co., 6545 Epworth Boulevard, Detroit, has been appointed vice-president, and H. L. Ritts, previously sales manager of the company, succeeds him as secretary-treasurer.

Samuel Mather, Pickands Mather & Co., Cleveland, has made a gift of $1,000,000 to Lakeside Hospital, Cleveland. This donation will be used for the building of a nurses' home in connection with the new hospital and is one of several gifts that have been made by Mr. Mather to this institution.

C. K. Leith, professor of geology, University of Wisconsin, Madison, addressed the Engineers' Society of Milwaukee on Oct. 17, on "The International Iron and Steel Situation in Its Bearing on the Ruhr."

George M. Gray, Peter Gray & Sons, Cambridge, Mass., who is touring England, France and Germany, is expected home about Nov. 1.

E. C. Herman has announced his withdrawal from the Barrett Co. and associated interests, New York.

Dr. W. L. McDougald, chairman of the Montreal Harbor Commission, Montreal, has confirmed reports of his resignation from the directorate of the British Empire Steel Corporation.

Raymond Sendell, sales manager the Groner Co., Inc., Phillipsburg, N. J., has resigned to join the sales force of the Treadwell Engineering Co., Easton, Pa.

Robert A. McDonald has resigned as general superintendent of the Crucible Steel Co. of America, and has severed his connections with that company. Mr. McDonald will take a well earned vacation before resuming active business. He has been identified with the steel industry in Pittsburgh for more than 30 years; during much of that time as a plant executive. He was superintendent of the plant of Miller, Metcalf & Parkin, which is now the Crescent works of the Crucible Steel Co. of America, and of which Mr. McDonald remained as manager after it was merged into that company. He also has been manager of the Park works of the company and also of the Pittsburgh Crucible Steel Co., a subsidiary of the Crucible Steel Co. of America. For the past two years he has been general superintendent of the company.

George R. Norton, formerly director of sales Witherow Steel Co., Pittsburgh, has become affiliated with the investment banking firm of Clapp, Dulaney & Co., 433 Union Trust Building, Pittsburgh.

E. C. Peck, works manager of the Cleveland Twist Drill Co., will address the Cleveland Engineering Society, Oct. 24 on "Standardization in its Relation to Management."

N. S. Bates, who has been connected with the Pratt & Whitney Co., Hartford, Conn., since 1902, where he more recently held the position of superintendent of equipment, has become connected with the Hartford Special Machinery Co., Hartford, Conn., as factory manager.

Walter V. Houck has been appointed sales engineer for Crane-Schiefer-Owens, Inc., and will be located in the home office at Buffalo. He was formerly chief engineer and production manager of the King Sewing Machine Co., works manager of the Sterling Engine Co. and general manager of the Buffalo Metal Goods Co., when it was acquired by the General Motors Corporation.

Henry R. Lewis, who for several years was connected with the Standard Parts Co., Cleveland, as supervisor of orders, has joined the sales department of the American Welding & Mfg. Co., with headquarters at the main office in Warren, Ohio.

Richard W. Yerkes, formerly general manager of the Philadelphia plant, Link-Belt Co., has been appointed treasurer, succeeding B. A. Gayman, whom President Charles Piez of the Link-Belt Co. selected to head the newly acquired Meese & Gottfried Co., San Francisco, which will operate under the name Link-Belt, Meese & Gottfried Co. Mr. Yerkes will be located at the company's general offices, 910 South Michigan Avenue, Chicago.

L. Wechsler has taken supervision of the New York office of the Canton Foundry & Machine Co., Canton, Ohio, manufacturer of alligator shears, portable cranes, turntables, etc. Mr. Bergere, who was formally at the New York office, is now in charge of the New England division at 261 Broadway, New York.

Richard B. Sheridan, formerly in charge of the metallurgical laboratories of J. H. Williams & Co., Brooklyn works, has joined the metallurgical staff of the same company at the Buffalo works.

David Baker, who recently resigned as general manager of the steel works of the Broken Hill Proprietary Co., Ltd., Newcastle, Australia, will have as his address while in the United States the office of James B. Ladd, 1011 Chestnut Street, Philadelphia.

Harry S. Sternberg has been appointed sales manager of the Blakely Mfg. Co., Detroit, with general charge of distribution. He was for four years with the Signal Motor Truck Co. and is now vice-president and member of the board of directors. During the war he was with the Bethlehem Steel Co. at Bethlehem, Pa., intrusted with the development of its sources of supplying ordnance materials with the title of supervisor of ordnance subcontracts. Charles A. Goodspeed, factory manager, will continue in charge of manufacturing and W. W. Blakely will devote his time to the development of new lines.

H. F. Noyes has recently been appointed general manager of the La Follette Coal & Iron Co., with headquarters at La Follette, Tenn. Mr. Noyes recently returned from Australia, where for a number of years he was assistant general manager of the steel department of the Broken Hill Proprietary Co. of Newcastle, N. S. W. Prior to this he was connected with various iron and steel interests, among them being the Dominion Iron & Steel Co. and the Dayton Coal & Iron Co.

Obituary

EDGAR W. HOUSER, founder of the Houser Elevator Co., Syracuse, N. Y., died at the Clifton Springs Sanatorium on Oct. 15, having suffered a stroke of apoplexy early that morning. He was born at Pompey, N. Y., in 1842 and until ten years ago was president of the company which he founded in 1889.

HARRY C. MALLORY, mechanical engineer and inventor, died in City Hospital, Mount Vernon, N. Y., on Oct. 10, from the effects of an apoplectic attack suffered a week earlier. He was 56 years old and a resident of Bellport, L. I. Mr. Mallory was a member of the Engineers' Club, New York, and of the American Society of Heating and Ventilating Engineers.

WALTER EYERMANN, son of Peter Eyermann, who will be remembered in the United States in connection with the introduction of blast furnace gas engines in the United States, died at Mürzzuschlag, Styria, on Sept. 29. He was born in Cleveland, Ohio, 20 years ago. For several years he had been in training in metallurgical engineering, his father having charge at Vienna of the Austrian Government's operations in iron and steel.

IRON AND STEEL IN BRAZIL

Company in Minas Geraes Gets Forty-Year Subsidy Under Certain Conditions—Reports from Other Countries

A recent Brazilian federal decree granted the Companhia Siderurgica Belgo Mineiro, Sabara, State of Minas Geraes, special concessions for a period of 40 years provided it complies with certain federal laws with reference to subsidy of steel plants, Assistant Trade Commissioners Cremer and Connell report to the Department of Commerce. This company at present has operating one blast furnace and plans to erect another as well as an open hearth furnace and two rolling mills.

The Companhia Electro-Metallurgica of Ribeirao Preto, State of Sao Paulo, reports a production for the first half of 1923 of 1382 metric tons of electric furnace pig iron and 2561 tons of steel from Bessemer converter and electric furnaces.

It is reported from both Rio de Janeiro and Sao Paulo that the iron and steel import market is quiet. Existing stocks at the end of August were low and buying for future deliveries from foreign sources light.

Australian Steel Industry Again Active

It is reported that from January to May, 1923, the Broken Hill Proprietary Co.'s steel works at Newcastle, N. S. W., produced 40,070 long tons of steel products, including 27,691 tons of rails. At present the plants are working on large orders of rails for the Commonwealth, Vice Counsul W. T. Costello, Newcastle, informs the Department of Commerce.

French Production of Iron Ore

The toal iron ore mined in France in July, 1923, amounted to 1,833,121 metric tons, against 1,891,257 metric tons during June. There is a new increase in the stocks at the mines, 4,635,273 metric tons on July 31, against 4,579,879 metric tons on June 30 last.

Czechoslovakian Iron and Steel Exports

According to a report received by the Department of Commerce from Acting Commercial Attache H. L. Groves, iron and steel exports from Czechoslovakia for the first half of 1923 amounted to 330,020 metric tons. Of this total 180,000 tons went into Germany, 35,000 tons to Poland, and 20,800, 15,300, 14,600 and 8200 tons, respectively, into Roumania, Hungary, Austria and Switzerland.

Will Investigate Strike of Nova Scotia Steel Workers

TORONTO, Oct. 16.—The Royal Commission appointed by the Federal Government to investigate the Sydney, N. S., steel strike will, it is understood, confine its activities to the dispute between the British Empire Steel Corporation and its steel workers. Through some misunderstanding it was announced that the scope of the inquiry would be widened to include the coal mining industry in Cape Breton. It is pointed out, however, that the coal miners are working under a contract which does not expire until next January, and that when they went out on strike at the time of the steel dispute they did so "out of sympathy" and not because they had any dispute with the employers as to wages. Moreover, James McLachlan, who was responsible for the coal miners' strike was "outlawed" by John L. Lewis, head of the International organization in the United States. The whole question has been under consideration by the Dominion Cabinet at one or two recent meetings, and it has been decided that there is no warrant for extending the scope of the commission's investigation. An organization meeting of the commission, which is headed by Dr. J. W. Robertson of Ottawa, will, it is understood, be held in Ottawa immediately, after which the hearings will be opened at Sydney, N. S.

PROPOSED RAILWAYS IN CHILE

Bill Provides for Use of Surplus Earnings of Present Lines in Construction of Additional Mileage

WASHINGTON, Oct. 16.—A bill calling for the expenditure of considerable sums annually in new railroad construction has recently been approved by the Chilean National Council of State and will shortly be submitted to Congress, according to a report to the Department of Commerce from the Commercial Attache's office in Santiago. It is believed inadvisable to delay longer the construction of lines needed for the development of some of the best agricultural sections of the country.

The bill proposes to finance the new lines with surplus earnings of the existing state railways which are increasing as the result of more efficient management and lessening interest requirements as old railway loans are liquidated.

The bill provides that large deposits be made by the State railway administration during 1923 and 1924, and that preference be given to construction of railroads for which property has been ceded gratuitously or money or materials given by neighboring property owners.

NEW TRADE PUBLICATIONS

Air Brush Painting.—Paasche Air Brush Co., 1909 Diversey Parkway, Chicago. Circular describing outfits for painting tanks, structural steel structures, etc. Illustrations and descriptions of various outfits, with selling prices, are given.

Diesel Marine Engines—Crosshead Type.—McIntosh & Seymour Corporation, Auburn, N. Y. An 8-page folder, 8½ x 11 in., describing the reversible type of marine engine, giving details of design and construction, including lubrication and maneuvering gear. The illustrations cover a 1400-hp. engine of six cylinders. The last page is devoted to marine auxiliary generating sets varying from 50 to 300 hp. and from 1 to 6 cylinders.

Diesel Marine Engines—Trunk Piston Type.—McIntosh & Seymour Corporation, Auburn, N. Y. An 8-page pamphlet, 8½ x 11 in., featuring the non-reversible engine with the trunk type piston. Illustrations show engines varying from 390 to 960 hp., the smallest ones being maneuvered by hand and the largest by power. Lubrication is featured in some detail, as well as the gear for maneuvering the engine. The last page is devoted to auxiliary generating sets varying from 50 to 300 hp.

Diesel Engines.—McIntosh & Seymour Corporation, Auburn, N. Y. In a splendidly illustrated 48-page booklet, 8½ x 11¼ in., featuring the plant where the Diesel engines are built and the design and construction of the engine itself, the company has put forth a story of engines of high efficiency. Both marine and stationary units are covered in detail. Sizes run from 100 to 3000 hp. for stationary engines, and 390 to 3000 hp. for marine engines, 25 ships having been equipped. Among the various users shown in the illustrations are included mine power plants, ice plants, stone quarry machinery, steel plants, sugar mills, oil mills, irrigation, flour mills, cement mills and electric power stations, as well as oil pipe-line pumps, street railway stations, and municipal work.

Achievement in Motor Ships.—McIntosh & Seymour Corporation, Auburn, N. Y. In a 36-page pamphlet, 8½ x 11¼ in., have been gathered illustrations and details of Diesel engines designed for marine use. The ships in which they have been installed include tramp steamers, auxiliary schooners, tankers and other types, and the sizes range from 390 to 3000 hp. In one graphic comparison showing ships of identical size preparing for a long voyage, one lighter with fuel oil is shown alongside the motor ship, while three lighters with coal are shown alongside the steamship and the motor ship, because of its small fuel requirements, is able to carry 27 cars more of freight on a total dead-weight tonnage of 10,000 tons.

Commercial Alloys of Chromium and Steel

(*Concluded from page* 1041)

ficult and the metal must be worked quite hot, say about 1110 deg. C. Castings are readily made. Shrinkage allowance is about ¼ in. per ft. In the range of 0.6 to 1.5 or 1.75 per cent carbon the cast alloys are machinable or may be made so by heat treatments. Brinell hardness varies, with carbon content, from 200 to 600 in the cast condition.

[The author here discusses the structural constitution of the various alloys, giving photomicrographs.]

Heat Treatment

Thermal Arrests: The alloys with around 0.3 per cent carbon have a feeble thermal critical point at about 575 deg. C. on cooling. Murakami found no thermal arrest in an alloy with 27.5 per cent chromium and 0.28 per cent carbon, but did find a magnetic arrest point A_2 the position of which was not affected by the initial temperature.

Thermal Treatment: Alloys up to about 0.5 per cent carbon cannot be hardened by heating and quenching, although some alloys may be made brittle, as described later, and this treatment will show as a slight increase in scleroscope hardness. Higher carbon, 0.7 per cent or more, may be readily hardened by heating to 850 deg. C. or above, and quenching. With higher carbon alloy (1.5 per cent), the quenching may be omitted and hardening obtained by air cooling. Softening will result from heating to about 800 deg. C., slow cooling to 600 deg. C., then more rapidly cooling.

In the experimental work on heat treating the alloys in the lower carbon ranges, that is to harden or soften them, in general, it has not been possible to affect to any extent the appearance of the alloy under the microscope. The solid solution and the carbides do not change their appearance to any material degree.

Physical Properties

Transverse Strength: The transverse strength of castings has been found to vary considerably with the method of casting and the composition of the alloy. As the compositions used in castings have been higher carbon as a rule, the amount of deflection is not high, being only a few hundredths on the standard arbitration bar. Low-carbon alloys show less transverse strength, but an increase in deflection. The following tabulation will indicate the general properties tested transversely:

Specimen	Size	Distances Between Supports, In.	Breaking Load, Lb.	Deflection, In.
0.26 per cent carbon, 27 per cent chromium, cast at high temperature	¾ in. sq.	12	1,650	0.2
Ditto, cast at low temperature	¾ in.	12	3,350	0.53
Carbon 1.16 per cent, chromium 21.17 per cent, average five tests	1¼ in.	12	8,370	none
Carbon 2.63 per cent, chromium 26.72 per cent	¾ in. sq.	4	12,510	none

Tensile Tests: The physical properties of one forged alloy are shown in Fig. 11 which depicts the results of tensile tests on an alloy containing 0.53 per cent carbon, 24.45 per cent chromium, 0.39 per cent silicon, and 0.10 per cent manganese. The metal for these tests was rolled to ¼-in. plate from 5 by 5-in. ingots, the plate being sheared to strips, which were then side milled to give flat tensile specimens; the flat faces were not machined. They were then drawn at the various temperatures indicated. As the carbon content is raised, the tensile strength increases and ductility decreases.

The results of some tensile tests made at high temperatures are shown in Fig. 12. Comparison of the results with those obtained by investigators for various steels shows a high tensile strength at elevated temperatures. Experiments are being carried on to determine the effect of several additional elements on the tensile properties at high temperatures, such as cobalt, vanadium, uranium, copper and molybdenum. Increase of carbon raises the tensile strength, that is, the knee of the curve characteristic of the temperature-tensile tests of steels is pushed toward the right. The property of high tensile strength at elevated temperatures is useful and important for an oxidation-resistant alloy and it is becoming of increasing importance, especially in the oil-cracking industry. It is thought that the useful properties of alloys of this nature are as yet only partly realized.

Tensile properties of cold-drawn wire without subsequent treatment have shown breaking stresses of 112,000 lb. per sq. in. and 11.5 per cent elongation in 2 in. for 0.045-in. wire and 180,000 lb. per sq. in. with 1.5 per cent elongation on 0.021-in. wire. Both wires were low-carbon alloys.

When considering the diverse requirements of the mining and metallurgical industries for materials of high resistance to various forms of attack, it is impossible to recommend any given composition as a cure all; each case must be decided in the light of the particular service conditions. Among the many alloys on the market, some of which have given after years of satisfactory service, it is possible to fit most of the conditions up to 1000 deg. C. or more. One alloy may be forgeable, but is exceeded in strength at high temperatures by an alloy that is non-forgeable; still another alloy may excel in acid resistance and fail in oxidation at more than red heat and so on. To date no one combination has been found to possess the maximum merit under all conditions of service. It is believed by the writer, however, that the general possibilities of numerous alloys in the high-chromium ranges are not yet sufficiently appreciated by the engineering profession. It is also believed that many technical processes can be carried out at a higher efficiency by the installation of equipment which will, in general terms, permit the more efficient transfer of heat, the boosting of temperature and pressure, and the less frequent necessity of shutdowns for repairs. Already installations of the high-chromium or chromium-nickel alloys have been made, or are being discussed, in the walls and hearths of roasters, for heat interchangers of various types, in oil-cracking stills, in the manufacture of ammonia, fuel-burning equipment, chemical manufacturing plants, and in lines where we have not before conceived of the use of metals or alloys.

Unusual Boiler Efficiency

Tests by the United States Shipping Board and the Bureau of Mines have shown a combined efficiency of nearly 85 per cent obtained from a Scotch marine boiler, superheater and airheater, using oil for fuel and forced draft. The boiler is a single ended 3-furnace unit, with separate combustion chambers. The heating surface is 3022 sq. ft.; superheating surface, 774 sq. ft.; and air-heating surface, 1220 sq. ft. The tubes contain retarders.

In a test lasting 8 hr., in which 6704 lb. of fuel oil were burned, the heat balance shows the heat absorbed by the boiler and superheater as 84.6 per cent of that furnished by the fuel. The total water feed aggregated 97,635 lb., or 14.57 per lb. of oil fired. The boiler pressure was 170 lb. per sq. in., with steam superheated 24 deg. Fahr. Gas temperatures include 533 deg. when leaving the boiler, 470 deg. from the superheater and 341 deg. at the exit from the air heater. The feed water temperature was 188 deg. The heating value of the fuel was given as 18,193 B.t.u. per lb.

Stack Gas Analyses From Commercial Blast Furnaces

The cooperation of two large steel plants in Alabama has been obtained by the Department of the Interior for experimental work in taking gas samples from the mantles of two commercial blast furnaces. These companies have signified their willingness to drill holes through the shell and lining of their furnaces to permit taking gas samples from a number of elevations of the mantles. These samples will be used in a study of the reactions taking place in the stacks of commercial furnaces. This work is being done under the direction of the Minneapolis experiment station of the Bureau of Mines.

Labor Unions in Field of Banking

(*Concluded from page* 1039)

as one of the unexpected results of labor's invasion of the field of finance.

"Labor banking is exerting pressure for change in trade union methods in many different directions. For one thing, it is exerting an increasing pressure for the abandonment of the strike and the ultimate substitution of labor's money power as a more effective weapon for the workers' defense, and as an instrument for their advancement."

Mobilizing Financial Resources

Mr. Boeckel, as author of a recent book entitled "Labor's Money," published by Harcourt, Brace & Co., New York, interestingly analyzes the movement started by labor to mobilize its financial resources, its causes, its results up to date and the purposes of the movement. The narrative is set forth comprehensively, and whether one does or does not agree with statements recorded by Mr. Boeckel, they invariably attract deep attention and make it manifest that the movement is of a profound character, as it affects organized labor and the relationship between employers and employees.

A portion of the comment concerns workers in the steel industry as stockholders. It is declared that the experiences of the United States Steel Corporation in the years immediately following the World War had shown profit sharing through stock distribution to be an effective barrier against successful organization of the workers along the world trade union lines.

"The old trade union leaders have always been opposed to profit sharing in all its forms," says Mr. Boeckel. "They have been successful in many cases in forcing abandonment by employers of the so-called bonus plans, but seldom have been able to make headway against profit sharing through the distribution of stock. The reason for their opposition to profit sharing is clear. To just the extent the workers become interested in increasing the profits in which they are entitled under the various plans to share, they lose interest in trade union organization to coerce employers through actual or threatened interference with those profits."

Mr. Boeckel sets forth at length employees shareholding in various corporations, among them the International Harvester Co., the Westinghouse Electric & Mfg. Co., the Republic Iron & Steel Co. and the National Lead Co. He credits the United States Steel Corporation with being the pioneer in employees' stock distribution, and outlines the plan of the corporation in this connection. The effect this has on relationship between employees and employers is denoted when Mr. Boeckel declares that: "When the great steel strike of 1919 was planned by outside trade union leaders, no account was taken of the large stockholdings of employees of the United States Steel Corporation as either an asset or a liability in labor's effort. The contest was conducted as other contests had been conducted in the past, as if these large stockholdings did not exist. Its purpose was 'to organize the steel industry for collective bargaining.'

"And when the strike had resulted in complete failure, it was immediately announced from labor headquarters that a new effort to organize the steel industry by the same method would be undertaken as soon as the time was ripe."

Efforts of William Z. Foster

The author then comments upon the efforts made by William Z. Foster in undertaking this abortive strike and declares that it was not the insistence of the United States Steel Corporation and the independents upon the open shop principle in their own plants so much as their efforts to bring about open shop conditions in other industries that convinced organized labor that the steel industry must be unionized, no matter at what cost. But the cost was very great, Mr. Boeckel declares, and the steel industry was not successfully unionized. He adds: "Nor is there is any prospect that it will be successfully unionized, along the old trade union lines, at any time in the near future."

Mr. Boeckel makes the interesting prediction that it would be possible for the employees of the Steel Corporation to possess a working majority of all the Steel Corporation stock outstanding in 1928, when they would own 2,576,703 shares, upon the assumption that the stock now held remains in the possession of the employees and that they will continue in succeeding years to buy from the Steel Corporation or in the open market the same number of shares purchased in 1921. He presents a table showing a decided falling off in employees' stock subscriptions during 1922, and it is declared that the report for that year of Charles L. Close, manager of the Steel Corporation's Bureau of Safety, Sanitation and Welfare, indicates that only about one-half the stock purchased under the stock subscription plan remained in ownership of Steel Corporation employees.

In a chapter devoted to buying control of employee stock ownership, Mr. Boeckel declares that the investment of employees of the Steel Corporation in Steel common stock is about 20 times as great as that of the street railway employees in Philadelphia Rapid Transit stock. But this investment, it is pointed out, has not been made in any organized way or for any common purpose such as inspired the Philadelphia street car men. At this point Mr. Boeckel says, "Only about one-third of the employees in the mines, mills, furnaces and offices of the United States Steel Corporation are stockholders. Stockholding employees gave evidence, however, as early as 1914, of a readiness for organization along investment lines. Had they been so organized at that time under capable leadership, inside or outside the steel industry, a strike of steel workers in 1919 would have been as remote a possibility as a street car strike is today in Philadelphia."

Possibility of Control by Employees

Mr. Boeckel says that it has been authoritatively stated that directors of the United States Steel Corporation have at no time owned more than 2 per cent of its outstanding stock. He dwells upon the possibility of employees gaining control through "investment to the utmost." He comments upon the periods of depression in the trade when workers are laid off and builds up the hypothesis that a new directorate had been voted into control of the corporation's affairs at this time (1921), "a directorate responsible to stockholding workers in the steel industry, and not to investment bankers, representing the interests of large absentee stockholders. Would this new directorate not have conceived its first duty to the provision of steady employment for stockholding workers?"

Mr. Boeckel theorizes about the employees, after getting into control, securing large orders for steel by making drastic reductions in steel prices. He concedes that dividends might be sacrificed in the process and even that it might be necessary to go farther and cut wages in order to provide full-time employment, but that workmen-stockholders could well afford the loss in dividends, and even a cut in wages, if given steady work in exchange. Mr. Boeckel declares that before workers can assume real control of any large producing corporations through stock purchase, agencies capable of financing large scale industrial operations must be built up in their control. The credit resources of the existing labor banks, he points out, are not adequate for this purpose. He urges that the labor banks must obtain the confidence of the entire working public in order to attain success. He declares that when the need arises labor will have financial agencies capable of supplying both credit and new capital in adequate volume.

"The real contest will not be with the present owners of industry," says the author. "Many of these may, indeed, come over to the workers' side. The real contest, if there is a contest, will be with the present controllers of industry, the investment bankers. Labor can meet the investment bankers on fairly even ground whenever it mobilizes its full money and credit power under its own control."

STEEL AND INDUSTRIAL STOCKS

The range of active steel and industrial stocks from Monday of last week to Monday of this week was as follows.

	Low	High
Allis-Chalmers ..	39½	42
Allis-Chal. pf	92½	92½
Am. B. S. & Fdy.	70½	71
Am. B.S. & F. pf.	103	103
Am. Can	88⅞	92½
Am. Can pf	106⅛	106⅞
Am. Car & Fdy.	155⅞	158
Am. C. & F. pf.	117⅝	118½
Am. Locomotive	68¼	70½
Am. Loco. pf.	117	117
Am. Radiator ..	80½	81¼
Am. Steel Fdries.	34	34⅝
Beld. Loco.	114	118⅝
Beth. Steel	16	19¼
Beth. Stl. 7% pf.	90¾	90¾
Beth. Stl. 8% pf.	103	103
Br. Em. Stl. 2 pf.	15¾	16½
Chic. Pneu. Tool	77	81
Colo. Fuel	25¾	27
Crucible Steel ..	58⅛	61
Crucible Stl. pf..	86	87
Deere pf.	63	63
Gen. Electric ..	169¾	174½
Gt. No. Ore Cert.	28	29
Gulf States Steel	71¾	79⅜
Gulf St. Steel pf.	93¼	98½
Hirbison-Walk. ..	115	115
Inland	35⅞	36
Int. Har.	72	75½
Jones & Laugh'n	108⅜	108⅝
Lima Loco.	59⅜	61½
Midvale Steel ..	24	25⅜
Nat.-Acme	9	9
Nat. En. & Stm.	128¼	128¾
Nat. En. & S. pf.	92¾	92¾
N. Y. Air Brake.	36	36⅝
Otis Steel	7	7¼
Otis Steel pf. ..	43½	44½
Pressed Steel Car	48	48
Pressed Steel pf.	85	85
Republic Steel ..	9	10
Republic	12¼	14
Republic pf	83¾	86¾
Sloss-Sheffield ..	40	42
Steel of Canada.	65¼	66
Superior Steel ..	24	24
Un. Alloy Steel..	30	30½
U. S. Pipe	39¼	40⅝
U. S. Pipe pf....	78½	82⅜
U. S. Steel.....	86	88⅛
U. S. Steel pf...	118⅜	119¼
Vanadium Steel.	27⅝	28½
Va. I., C. & C. pf.	81	81
Whouse Air Br.	81	82
Ygstown S. & T.	65	65½

Pittsburgh Steel Co. Report

Annual report of the Pittsburgh Steel Co. and subsidiary companies for the fiscal year ended June 30, last, just published, shows a net income of $2,022,473 after charging $1,427,-092 for depreciation and depletion, $97,840 for a reduction of inventory values and including in operating costs $2,822,682 for maintenance, repairs and replacements. After paying the regular dividends of 7 per cent on the preferred stock and 4 per cent on common, amounting to $1,295,000, there remained a balance of $727,473, which was added to surplus. Total sales for the year were valued at $29,117,117, an increase of $13,176,172 over the total for the previous year. The company is in a strong financial position, having current assets of $14,116,407 against liabilities of only $2,566,033, the balance sheet shows.

Industrial Finance

The K. & F. Mfg. Co., Kenosha, Wis., manufacturer of metal stampings, tools, dies, and metal specialties, is defendant in involuntary bankruptcy proceedings instituted Oct. 9 by creditors with aggregate claims of $3,348, who claim the indebtedness is upward of $100,000. Assets of approximately $150,000 are claimed. Horace G. Maddock was appointed receiver and instructed to maintain the enterprise as a going concern. Matthew H. Kavanagh is president; Frank L. Kavanagh, vice-president and general manager, and M. E. Kavanagh, secretary-treasurer.

The Milwaukee Rolling Mills Co., manufacturer of galvanized, blue and black annealed sheets, is entertaining offers made by the Inland Steel Co., Chicago, for the purchase of its entire capital stock, according to a statement made by John I. Beggs, president of the Milwaukee company. The mills were built in 1920 with an investment of $1,500,000 and are employing 1000 men. The annual capacity is 60,000 tons. Boyd B. Jack is general manager.

The Continental Can Co. reports net income for the first eight months in 1923 of $2,868,790, after depreciation and Federal taxes. Surplus for the period after provision for preferred and common dividends was $2,301,424. The balance sheet as of Aug. 31 showed surplus of $5,257,220, including $1,485,000 applied in redemption of preferred stock.

The Charcoal Iron Co. of America shows net earnings for the first six months of 1923 before depreciation of $56,784.

Trade Changes

The Robinson-Wagner Co., Lafayette, Ind. recently incorporated with $500,000 capital stock, will manufacture agricultural wagons and trucks, and commercial bodies. The plant of the Indiana Wagon Co. has been taken over and production is now under way. A. L. Waters is general sales manager.

The Holland Mfg. Co., Central Avenue and Bank Street, Baltimore, recently incorporated with $200,000 capital stock, will manufacture nails, tacks, sheet metals and like products, continuing a business established in this line. Franklin Holland and J. Monroe Holland are the principals.

The Flexo-Common-Lath Co., 800 A. G. Bartlett Building, Los Angeles, Cal., has been incorporated with capital stock of $500,000 to manufacture building materials, including lath. Machinery will be built in Los Angeles and installed in mills in various parts of the country. Frank J. Heilmann is president; Walter J. Lumbleau, vice-president and general manager; V. C. Vaughn, secretary-treasurer.

The Davis Transportation Lines, Inc., with offices at 50 Union Square, New York, and operating headquarters at Pier 30, East River, has been organized as successor to the Davis Transportation Co., and will operate a combined freight steamer and truck service. The management passes into the hands of a new group headed by Matthew C. Brush, president American International Corporation and George E. Whitelam, formerly president International Products Co. of South America. Mr. Brush will be chairman of the board of directors.

The Blacker Engineering Co., Inc., New York, manufacturer of Blacker blacksmithing hammers, has appointed George Hess, Pittsburgh, as district representative with office at 421 Wood Street.

The Otis A. Smith Mfg. Co., Middlefield, Conn., maker of wrenches, nipples and small hardware, has been purchased by Nesbit & McKinney, New York, who will continue the business. The Middlefield company has been in business for 75 years. The plant consists of several units.

The Mazda lamp division, General Electric Co., Central Falls, R. I., within a month will be moved to the company's new plant at East Boston. The General Electric Co. acquired the Central Falls plant in 1907 and employed 350 to 600.

The A. Leschen & Sons Rope Co., St. Louis, manufacturer of wire rope, has leased a new building at 808 West Washington Boulevard, Chicago, for an office and warehouse.

The Republic Radiator Corporation, Utica, N. Y., has changed its name to Lincoln Radiator Corporation. Personnel remains the same.

Plans of New Companies

The Conveyor Mfg. & Supplies Co., 53 Garden Street, Passaic, N. J., organized with 2000 shares of no par value stock, will manufacture conveying equipment and supplies. Most of the work is being done in the companies plant but contracts likely will be let for wheels and belting. Repair work on conveyors also will be done. William H. Trowbridge is president.

The American Temperature Regulator Co., 286 Lyons Avenue, Newark, N. J., has been organized by the Frank A. Gentsch interests, 401 Kinney Building. The company will distribute and install heat regulating instruments of the American Radiator Co. Mr. Gentsch is manager.

Zuill & Jones, Inc., Cazenovia, N. Y., recently organized to manufacture engines, will confine activities for the present to operating a general repair shop and garage.

Rainear, Inc., Philadelphia, has been organized to manufacture steam supplies and plumbing equipment. No building will be done for a time. Address care of Victor Frey, Land Title Building.

L. B. Underwood & Co., Inc., Pittsburgh, recently organized, will act as manufacturers' agents, now representing Durham & Co., Cole Metal Box Co., Nyelec Switchboard Co. and the Auth Electric Specialties Co. Address in care of Edward H. Flood, 451 Frick Annex.

The Precision Machine Works, Inc., Hohokus, N. J., is successor to the Precision Motor Regrinding Co. R. C. McWane is president and Arthur L. Ferris superintendent. The company makes a specialty of rebuilding automobile motors.

The Cutaway Harrow Co., Higganum, Conn., incorporated with capital of 1500 shares of common stock and paid in capital of $75,000, will manufacture harrows and agricultural tools. Final plans have not been decided but a plant now owned will suffice for immediate needs. E. S. Hubbard is president; E. R. Austin, vice-president, and A. H. Hubbard, secretary-treasurer.

The Acme Steel Construction Co., 720 Park Building, Pittsburgh, organized to manufacture iron and steel products, has obtained a shop under lease and will soon be on full scale operation. J. Frank Peffer is one of the principals.

The Decker Mfg. Co., 255 Meldrum Avenue, Detroit, has been incorporated with capital stock of $60,000 to manufacture automobile enclosures. No building will be done for a time. William J. Decker is president; A. B. Hoffman, vice-president and treasurer, and W. F. Tant, secretary.

An organization of bondholders has bought property and buildings from a receiver's sale and has organized as the Metal Stamping & Mfg. Co., with capital stock of $150,000. Address in care of Quay H. Findley, 815 Cuyahoga Building, Cleveland.

The Automatic Assorting Machine Co., 404-05 Evening Star Building, Washington, incorporated with $100,000 capital stock, will manufacture special machinery and parts. It has not been decided definitely whether the company shall build or let out its work to contract. Howard C. McClintock is secretary.

The Brooks Steam Motors, Inc., 1304-07 Canadian Pacific Railroad Building, Toronto, Ontario, has been incorporated with $5,000,000 capital stock under Delaware laws, to manufacture steam-driven automobiles and trucks. Like the parent company, Brooks Steam Motors, Ltd., it will likely do assembling processes first and manufacture later on. C. H. Hern is one of the heads.

The National Stamping Co., St. Joseph, Mich., has been organized to manufacture stamped steel products, specializing in connecting rod and main bearing shims, as used in automobile motors. Arthur A. Karcher is president and general manager.

The Beisel Spring Wheel Corporation, New York, incorporated with 1000 shares of no par value stock, has been organized to manufacture automobile wheels. Plans are unknown. Incorporators are W. J. and J. R. Beisel and H. L. Fish. Address care of Mr. Montross, Conklin & Montross, 59 Wall Street, New York.

The Aetna Automatic Oil Burner Co., New York, has been incorporated with capital stock of $3,000,000 to manufacture oil burners and oil burning equipment. John Schmeniger, Jr., who is organizing the company, is now manufacturing in Providence for that territory. The new company will establish a plant in New York to manufacture for the adjacent territory. Other incorporators are D. J. Deasy and E. Celler.

According to an announcement from Kenosha, Wis., the plant of Winther Motors, Inc., sold at trustee sale to a creditors' committee, will be one of the units in a merger of truck companies to be known as the Amalgamated Motors Corporation, with capital stock of $1,000,000. Other plants involved are the Bessemer Truck Co. and the American Motors Co. Operations are expected to commence within 30 days.

The F. R. Phillips & Sons Co., Philadelphia, has moved its New York office from 50 Church Street to room 1005, 90 West Street. Management of the New York office was recently taken over by Waldo L. Phillips.

BOOK REVIEWS

"The Iron Ores of Lake Superior." By Crowell & Murray, Cleveland. Page 332 + vi, 5¾ x 9 in. Published by the Penton Press, Cleveland.

In bringing out this fifth revised edition, the authors have introduced several new chapters, revised the tables to bring them up to date, redrawn some of the maps and added several charts. The book has long been regarded as authoritative in respect to the properties developed on the various Lake Superior iron ranges, one of its sections being a complete directory of the iron mines with analyses of ores produced, names of operators, superintendents and managers of sales, and records of production. The various classes of ores found in the Lake Superior region are indicated and defined and there are chapters on mining methods, ore sampling and methods of analyses. Among special articles is one by R. C. Allen on "Iron Ore"; another by B. D. Quarrie, general manager Otis Steel Co., deals with the "Operation of the Blast Furnace." A valuable feature of the work are the maps of the various ranges.

Elasticity and Strength of Materials, Section III. By C. A. P. Turner. Pages 122 + vi, 6 x 9 in. Published by the author, Minneapolis, 1923. Price $5.

Dealing with the theory of torsion in shafting and with double bending of plates, this section of the work covers chapters 12 to 16, inclusive, and is illustrated by appropriate line cuts, including stress and strain diagrams, loading diagrams, and bond stresses for reinforced concrete work. The story has been carried out as a problem in mechanics with only a moderate use of calculus, and depending in a large way upon results of observation of materials in practice.

Two chapters are devoted to torsion, the first being an analysis of round shafts, while the second is a torsional analysis of square, rectangular, triangular and oval prisms. The next two chapters cover bending and twisting resistance in plates, one chapter being devoted to homogeneous flat plates, while the other takes up composite plates and the theory of continuity with variable moment of inertia. These two chapters are the most extensive of the book, covering more than 80 pages of the total. The fifth and concluding chapter of this volume is devoted to unbalanced moment in monolithic floors and columns. It deals with moments and deflections in loaded spans of continuous beams and with unbalanced loads on a floor resting on a rectangular system of continuous girders made integral with their supporting columns.

Together with its preceding volumes, this work should be of great value to engineers engaged in the design of reinforced concrete structures. It uses graphic analyses in studying the flexure of plates and thus gives the student a concise conception of the relation between stress and deformation, which should in time eliminate fundamental errors in the rules of design in building codes.

"Forty Thousand Better Foremen" is the title of an impressive pamphlet of 48 pages, 9 x 12 in., published by the Business Training Corporation, New York. It is sent out as "a record of experience in developing greater cooperation and productivity among 40,000 foremen in over 600 representative industrial companies." On an early page is a letter from John Calder, director of the course in modern production methods, addressed to William H. Lough, president of the Business Training Corporation, from which it appears that the system of training for foremen in modern production methods dates back only five years, or to 1918. In addition to the fact that nearly 40,000 foremen have gone through the training, two statements are emphasized—that over 84 per cent of the home study called for in the training plan has actually been performed, and that at least three-quarters of all the foreman training in the United States in the past five years has been conducted through the course in which Messrs. Calder and Lough have cooperated. The pamphlet gives much space to the procedure in connection with the training classes that have been organized and to testimony from various companies and groups that have carried on the work.

In a pamphlet entitled "A Pickling Prescription," Marsh & Cochran, Youngstown, Ohio, deal with the matter of acid wastes in pickling shops, particularly the unused acid that passes into the sewer, when vats of "spent" liquor are let down, and the waste due to using more acid to pickle than is necessary. A table is given showing the per cent of sulphuric acid wasted in discharged liquor and in a second table data are given showing the relation between acid used, in pounds, and the amount of surface pickled, the latter unit being used instead of the weight, in tons, of steel pickled. This table permits of calculating the surface of irregular stamped objects as well as flat sheets. Other tables give specific gravities and water and acid percentages of pickling solutions.

New Books Received

Condensed Catalogs of Mechanical Equipment. Pages 678, 8½ x 11½ in.; illustrated. Published by American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York. Price, $5 a copy.

The Mineral Industry. Statistics, Technology and Trade during 1922. Edited by G. A. Roush, A.B., M.S., associate editor Allison Butts, A.B., B.S. Pages 6½ x 9½ in. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $12.

Workmen's Compensation Legislation of the United States and Canada, 1920 to 1922. Bulletin 332 of U. S. Bureau of Labor Statistics. By Lindley D. Clark. Pages 260, 6 x 9 in. Published by Government Printing Office, Washington. Price, 25 cents.

Mineral Resources of the United States, 1920. Part I, Metals. By G. F. Loughlin, United States Geological Survey. Pages 611, 6 x 9¼ in.; illustrated. Published by Government Printing Office, Washington.

Machinery Markets and News of the Works

MARKET IS MORE ACTIVE

Large Buying by Automobile Interests Is the Feature

Further Railroad Purchases Also, but Industrial Companies Are Doing Little

A turn for the better has come in some branches of the machine-tool industry, the improvement being due mostly to renewed buying activity among automobile interests. The Ford Motor Co., Detroit, has placed large orders with a view to increasing its capacity to 7000 to 10,000 cars daily. One order for special production lathes, totaling about $400,000, went to an Eastern machine-tool company. The Willys-Morrow Co., Elmira, N. Y., affiliated with the Willys automobile interests, also placed large orders, said to aggregate about $600,000, and there has been other automobile buying. The Continental Motors Corporation, Muskegon, Mich., has been a steady buyer for some time past. Small orders have been placed within the past week by the Chevrolet, Buick and Maxwell companies and by the Canadian Products Co., Walkerville, Ont. a General Motors subsidiary. The White Motor Co., Cleveland, has issued an inquiry for several tools.

Japanese buying is beginning. A Cleveland manufacturer received an order for eight automatic screw machines for an arsenal in that country and numerous inquiries are pending. A Japanese house in New York has been getting prices on 50 engine lathes. The Westinghouse interests have received orders from Japan for $1,000,000 worth of electrical apparatus.

The Pennsylvania Railroad, Central Region, after much delay, has distributed orders for quite a number of tools, most of the business going to dealers in Pittsburgh. The New York Central continues to buy, and while most of its orders have been for small lots, the aggregate this year places this road among the largest railroad buyers of tools. The Lehigh Valley put out an inquiry last week for a half dozen tools, the Delaware, Lackawanna & Western inquired for three and the Illinois Central has asked for prices on a few machines.

The Pettibone-Mulliken Co., Chicago, railroad specialties, has received bids on 26 tools. The American and Lima locomotive companies have a few tools to buy.

The American Sheet & Tin Plate Co., Pittsburgh, which inquired some time ago for 12 tools, is expected to buy this week. An order for $25,000 worth of tools was placed at Chicago by the Public Service Co. of Northern Illinois for its Waukegan, Ill., power plant.

New York

NEW YORK, Oct. 16.

THE Willys-Morrow Co., Elmira, N. Y., which is affiliated with the Willys automobile interests, placed large orders last week for machine tools and special automatic machines. Its expenditures are said to have reached a total of several hundred thousand dollars. This is the largest buying in the East in some months. General buying by industrial companies is at low ebb, but the railroads are still inquiring and placing orders for a few machines. The Lehigh Valley put out an inquiry last week for a half dozen tools and the Delaware, Lackawanna & Western inquired for an engine lathe, shaper and bushing press. The American Locomotive Co. still has a few machines to buy against an inquiry sent out some time ago. The New York Central has been one of the steadiest buyers of the year, but its orders have been in small units and consequently have not attracted the attention that is accorded to purchases of large lists.

William P. Brew, 50 Church Street, New York, announces that he has engaged in the buying and selling of manufacturing equipment of special types, for which there is at present no outlet. Most of the second-hand machinery dealers confine their activities largely to metal-working machine tools, but Mr. Brew will specialize in machines used in various industries.

The Ulster Iron Works, Dover, N. J., is in the market for a 10 x 10 vertical engine, State make.

Bids will be received by Edward S. Walsh, commissioner of canals and waterways, Albany, N. Y., until Nov. 8, for a new power house at Lock No. 29, Palmyra, N. Y., and incidental work. Plans at the office of the Bureau of Canals, Capitol Building.

The New York Dock Co., 44 Whitehall Street, New York, has plans for a two-story addition at its works, 88-106 Commerce Street, Brooklyn, to cost $22,000. L. E. Driver, 334 Furman Street, Brooklyn, is architect.

The Electric Equipment Division, Department of Commerce, Washington, has available information of a company, including names of officials recently formed at Caracas, Venezuela, to construct and operate a hydroelectric power plant on the Caruso River, with capacity of 3000 hp., and transmission line about 37 miles long, file No. 105419.

The Ford Motor Co., Highland Park, Mich., has acquired the plant of C. E. Johansson, Inc., Poughkeepsie, N. Y., manufacturer of gages and precision instruments. It is purposed to continue the operation of the plant, with later expansion for requirements for Ford automobile manufacture. The purchase is said to include, also, the works of the company in Sweden.

Manual training equipment will be installed in the two-story high school to be erected on the Boston Post Road at Palmer Avenue, Mamaroneck, N. Y., estimated to cost $450,000. Edward Hahn, 290 Fulton Street, Hempstead, L. I., architect, will take bids in the near future.

The board of directors, Albany City Hospital, Albany, N. Y., will soon call for bids for the installation of a steam power house at the institution, to cost $30,000. J. G. Brennan is city engineer.

Fred Hawley, 244 West Forty-second Street, New York, is planning for the purchase of a motor-driven bandsaw.

The American Brass Co., 25 Broadway, New York, a subsidiary of the Anaconda Copper Mining Co., same address, has purchased the plant and property of the National Conduit & Cable Co., Inc., Hastings-On-Hudson, N. Y., and will take over the works to develop maximum output of copper wire, cables, conduits, etc., under a present rating of 5000 tons per month. Ralph E. Day, formerly superintendent of one of the purchasing company's plants at Waterbury, Conn., will be in charge of the acquired works, for which it is said $3,000,000 was given.

Bids for electrically-operated pumping machinery, screening equipment and other mechanical equipment for a

drainage works in British India, estimated to cost $3,600,000, will soon be asked. Full information on file at the office of the Bureau of Foreign and Domestic Commerce, Washington. Reference 105,736.

The Columbia Machine Works & Malleable Iron Co., Euclid and Atlantic Avenues, Brooklyn, has awarded contract to the McClintic-Marshall Co., 50 Church Street, New York, for a new machine shop and foundry to replace the portion of its works recently destroyed by fire. Holmes & Winslow, 134 East Forty-fourth Street, New York, are architects.

Fire, Oct. 8, destroyed a portion of the plant of the Troy Foundry & Machine Co., Watervliet, N. Y., with loss estimated at $60,000 including equipment. The company is now operating under a receivership.

The New System Motor Sales Corporation, 236 West Fifty-fifth Street, New York, has leased the entire building at 649-55 West Fifty-fifth Street, for new works, a portion of the structure to be used for a machine shop and general repair department.

The One Hundredth Street Dock Co., 429 East 100th Street, New York, has plans for a one-story automobile service and repair works, 100 x 200 ft., for company cars. S. J. Sheridan, 5646 Newton Avenue, is architect.

The New York Machinery Co., 200 Fifth Avenue, New York, is planning the purchase of a pipe threading and cutting machine.

The General Motors Corporation, 224 West Fifty-seventh Street, New York, has awarded a contract to the H. K. Ferguson Co., Cleveland, for a new automobile manufacturing and assembling plant in the vicinity of Yokohama, Japan.

The Todd Dry Dock & Construction Corporation, 25 Broadway, New York, and Weehawken, N. J., will remove the floating dry dock at Edgewater, N. J., formerly owned by the Lord Dry Dock Co., recently leased from the United States Shipping Board, to the plant of the Tietjen & Lang Dry Dock Co., Seventeenth Street, Hoboken, N. J., a subsidiary, where additional ship repair equipment and facilities will be provided.

Power equipment, ovens, conveying and other machinery will be installed in the new six-story and basement addition to be erected by the Goodman Baking Co., 638 East Seventeenth Street, New York, estimated to cost $150,000, for which a general contract has been awarded to the Fleischman Construction Co., 531 Seventh Avenue. The McCormick Co., Inc., 41 Park Row, is architect.

The Meeley Tire & Rubber Co., Garfield, N. J., recently organized, has taken over the local plant of the Armstrong Rubber Co., for the manufacture of automobile tires. It is proposed to develop the works to an output of 2500 tires per day. George G. Meeley is president.

Igoe Brothers, Poinier Street, Newark, manufacturers of nails, spikes, etc., will build a one-story addition, 114 x 135 ft.

The Clothel Co., 96 West Seventh Street, Bayonne, N. J., manufacturer of refrigerating machinery, has filed plans for a one-story general repair shop.

New England

BOSTON, Oct. 15.

MOST machine tool houses report no improvement in business the past week, and prospects are as scarce as ever. Some, however, are doing a little better than heretofore, particularly those handling used as well as new equipment. In cases where better business is noted sales involve a limited variety of machines, which implies that large industrial plants are not buying much equipment. A large textile machinery maker, one of the mainstays of the machine tool market for months, is inquiring for special equipment only, and in limited amounts. Other large industries evidently find it to their advantage to let work outside rather than to invest in new equipment.

A new 14-in. x 6-ft. lathe to a Cambridge, Mass., manufacturer, a new 20-in. x 16-ft. lathe to a textile machinery maker, a 16-in. shaper to a Massachusetts paper goods firm; a 14-in. motor driven lathe to go on a steamer sailing from this port, a similar tool for a South American concern, a ball bearing drilling machine to a Chelsea, Mass., firm, three power presses, one going to a Maine and two to a Florence, Mass., shop, two used upright drills, two used lathes and a used forge & hammer to a Holden, Mass., shop, is the largest amount of business closed by any one dealer the past week.

Small tools continue in good demand, but aggregate sales are not as large as a month ago. The Cushman Chuck Co., Hartford, Conn., reports sales almost identical in volume with those of a year ago and at the same prices. The company's peak business for the year probably was reached in April, when it was about 50 per cent larger than for the corresponding period last year. Since April there has been a gradual recession. It anticipates no change in prices for six months, at least.

Foundations have been completed for a one-story foundry addition to be erected by the H. B. Smith Co., Westfield, Mass., heaters. Monks & Johnson, Boston, are the architects.

Chelsea, Mass., is having plans revised for a three-story, 230 x 232 ft., high school to cost $700,000, which will contain a machine shop and manual training departments. S. S. Eisenberg, 46 Cornhill, Boston, is the architect.

An architect has not been selected for the one-story, 50 x 70 ft. foundry, cleaning unit, etc., at Milford, Mass., by the William J. Collins Foundry Co., 22 Franklin Street.

The Crompton & Knowles Loom Works, 93 Grand Street, Worcester, Mass., has awarded contract for a two-story, 50 x 170 ft., addition at 241 Harris Avenue.

The United Cape Cod Cranberry Co., South Hanson, Mass., has begun excavations preliminary to the erection of a two-story, 100 x 100 ft. canning and packing house at East Wareham, Mass. Marcus Duran is superintendent.

The Goss & DeLeeuw Machine Co., New Britain, Conn., has purchased the plant of the Buckley Macaroni Co., Kensington, Conn., and will make improvements and install new equipment.

The Warner Hammer Co., Cromwell, Conn., has purchased property on Main Street, which will be improved for manufacturing purposes. The company for years was located in West Cromwell, but was burned out last May. Since then it has been manufacturing in temporary quarters and also in part of the plant of J. & E. Stevens, North Cromwell plant.

The Atwood Machine Co., Stonington, Conn., has awarded a general contract to H. R. Douglas & Son, New London, Conn., for a two-story addition, to be used as a foundry.

Manual training equipment will be installed in the two-story and basement high school to be erected at Barnstable, Mass., estimated to cost $150,000, for which bids are being asked on a general contract. Charles G. Loring, 7 Water Street, Boston, is architect.

The Hungerford Brass & Copper Co., 296 Franklin Street, Boston, has construction under way on a new two-story works on D Street, South Boston, 80 x 240 ft., estimated to

The Crane Market

Business in overhead cranes is still confined to inquiries for cranes of small capacity, generally hand power. Inquiry for locomotive cranes is extremely light in the New York district. Among the larger crane inquiries expected to close shortly is the list of the Pennsylvania Railroad, eastern region, Philadelphia, Pa., for 33 hand power jib cranes. The Southern Pacific Co., 165 Broadway, New York, has been receiving bids on a 7½-ton hand power crane and the American Locomotive Co. is asking for two 5-ton hand power cranes, one single I beam, the other double I beam, for Schenectady, N. Y. In addition to these, there are the inquiries for 5-ton hand power cranes of the Erie Railroad and the New York Central & Hudson River Railroad. The Pelton Water Wheel Co., San Francisco, Cal., recently closed on a 10-ton, 59-ft. span overhead traveling crane.

Among recent purchases are:

Raritan Foundry Co., Raritan, N. J., a 10-ton, 48-ft. 6-in. span, 3-motor, overhead traveling crane from the Chesapeake Iron Works.

Griffin Mfg. Co., Erie, Pa., two 5-ton and one 10-ton overhead cranes from the Erie Steel Construction Co.

National Tube Co., a 10-ton trolley for its Lorain works, from the Alliance Machine Co.

McClintic-Marshall Co., Pittsburgh, a 40-ton locomotive crane reported to have been purchased from the Industrial Works.

San Antonio & Aransas Pass Railroad Co., Yoakum, Tex., a 15-ton, 54-ft. boom, 8-wheel used Orton & Steinbrenner locomotive crane from Philip T. King, New York.

cost $120,000. William E. Austin, 46 West Twenty-fourth Street, New York, is architect.

The Standard Oil Co. of New York, 50 Congress Street, Boston, will build a pumping plant in connection with its new storage and distributing works at Sumner's Creek, near Middletown, Conn. A one-story automobile service and repair building will also be erected.

A. Lee Ellis, 10 High Street, Boston, has inquiries out for one centrifugal pump, with capacity of 500 gal. per min., to operate under a 100 ft. head, motor-driven; also for one watertube boiler, Babcock & Wilcox type, 500 hp., using oil fuel, to operate at about 150 lb. working pressure.

A one-story power house will be erected by the Glastonbury Tobacco Warehouse Co., Glastonbury, Conn., in connection with a three-story addition, 80 x 180 ft., estimated to cost $45,000. Buck & Sheldon, 60 Prospect Street, Hartford, Conn., are architects.

The General Electric Co., Central Falls, R. I., is perfecting arrangements for closing its electric lamp manufacturing plant and will transfer operations to a new works at East Boston, Mass., where considerable increase in production will be arranged.

The Connecticut Tool & Engineering Co., 304 East Washington Avenue, Bridgeport, Conn., has plans for an addition, 40 x 60 ft., with steam power house. Davis & Dane, Bridgeport, are architects.

The Hanson-Whitney Mfg. Co., 169 Bartholomew Avenue, Hartford, Conn., manufacturer of metal-shaping machinery, has awarded a general contract to the R. G. Bent Co., Asylum Street, for a two-story addition, 50 x 86 ft., to cost $75,000.

Long Brothers, State Street, Hartford, Conn., will commence the erection of a one-story automobile service and repair building, 60 x 242 ft., to cost about $47,000. A machine shop will be installed. F. C. Walz, Trumbull Street, is architect.

Fire, Oct. 9, destroyed a portion of the plant of the Providence Coal Co., Providence, R. I., including coal pockets, handling machinery, etc., with loss estimated at $85,000. It will be rebuilt.

New interests, operating as Nesbit & McKinney, have acquired the plant and business of the Otis A. Smith Mfg. Co., Middlefield, Conn., manufacturer of wrenches, pipe nipples and other small hardware. The new owners plan for a reorganization of the company and will expand the plant for a similar line of manufacture.

Fire, Oct. 6, destroyed a portion of the woodworking plants of Griffith Keiver & Co., and the Hatfield Stair Building Co., 118-24 Western Avenue, Brighton, Boston, adjoining properties, with combined loss estimated at $50,000, including equipment. It is planned to rebuild.

John W. Bolton & Sons, Inc., Lawrence, Mass., is inquiring for a 6-ton flywheel, diameter not over 11 ft. nor under 9 ft., hub not exceeding 14 in. wide, bore not over 10 in. nor under 8 in.

Pittsburgh

PITTSBURGH, Oct. 15.

THERE continues to be a fair run of individual tool orders, but many dealers and agents still report business as rather slack. Price competition is fairly sharp on passing business, which is said to be due to the fact that many more lines than formerly are sold direct by manufacturers, who can pass on a portion of the saving in commissions. The crane market has shown little life and nothing important recently has come out in mill and power equipment.

The past week has been featured by the distribution of most of the tools inquired for by the Pennsylvania Railroad, Central Region, several weeks ago. Orders placed included two Bridgeford 36-in. lathes, three Newton crank planers, two Newton rod boring machines and six Colburn heavy duty drill presses; six safety wet tool grinders to the Brown & Zortman Machinery Co.; one Fosdick 7 ft. radial drill, through Somers, Fitler & Todd Co., and one 24-in., three 26-in. and one 18-in. Cisco lathes through the Reliance Machinery Sales Co. A 96-in. boring mill in the original inquiry was abandoned, but there are two 42-in. mills still to be placed. The Pennsylvania Railroad has put out a new list of ten or eleven tools for its car repair shop at Mingo Junction, Ohio. The American Sheet & Tin Plate Co., which some time ago issued a list of about twelve tools, including lathes, shapers, cold saws, keyseaters, and a hammer, is expected to distribute the orders this week.

The Westinghouse Electric International Co. has received orders for electrical apparatus to be used in reconstruction work in Japan totaling well over $1,000,000. It is understood that the power plants in the earthquake zone were not seriously damaged, but that the distribution systems were practically destroyed.

The Fawcus Machine Co., Pittsburgh, wants to purchase a 24-in. Gleason automatic bevel gear planer; also a 24-in. internal grinder.

Fire, Oct. 10, destroyed a portion of the forge and blacksmith shop at the plant of the Republic Iron & Steel Co., Youngstown, with loss estimated at $40,000, including machinery. It is planned to rebuild.

Work has commenced on an addition to the plant of the Chicago Railway Equipment Co., Franklin, Pa., 62 x 122 ft., to be equipped as a brake beam shop. Headquarters of the company are at Forty-sixth Street and Winchester Avenue, Chicago.

Manual training equipment will be installed in the proposed two-story and basement high school to be erected at Bradford, Pa., estimated to cost $250,000 for which bids will be asked in the near future by Lawrie, Green & Co., Locust Street, Harrisburg, Pa., architects.

The Savage Fire Brick Co., Hyndman, Pa., is planning the construction of an addition to its local plant and the installation of additional equipment. An extension will also be erected at the refractory plant at Williams, Pa. Plans are being arranged for the construction of a new plant at Keystone Junction, near Meyersdale, Pa., to cost $50,000 with machinery, replacing a former works destroyed by fire a few years ago. It is purposed to develop the three plants to a gross output of 160,000 fire bricks and refractory shapes per day. F. W. Minch is secretary and treasurer.

The New England Fuel & Transportation Co., 111 Devonshire Street, Boston, plans the installation of electric power and coal mining and handling machinery near Arnettsville, Monongalia County, W. Va., where more than 2500 acres will be developed.

C. L. Robinson, Winchester Avenue, Charleston, W. Va., has plans for a new three-story cold storage plant, 100 x 140 ft., estimated to cost $70,000 with machinery.

The Keystone Driller Co., Eighth Avenue, Beaver Falls, Pa., manufacturer of oil-well machinery, etc., is planning the erection of a one-story foundry addition to cost $18,000.

The Common Council, Belington, W. Va., is planning to rebuild the portion of its municipal electric power plant recently destroyed by fire, with loss estimated at $30,000 including equipment.

The Guyan Machine Shops, Logan, W. Va., machinery dealer, has inquiries out for two motors, 100 to 150 hp., and 20 to 30 hp., respectively, each 2200 volts, three phase, 60 cycles; also for one 50-hp. portable boiler, complete with grates, stack and fittings.

The Wolf Summit Coal Co., Clarksburg, W. Va., has tentative plans for the installation of additional electric power equipment and other apparatus at its plant. The company recently increased its capital from $750,000 to $1,500,000.

The City Council, McKeesport, Pa., plans the installation of electrically-operated pumping machinery in connection with proposed waterworks extensions and improvements estimated to cost $233,000.

C. J. Allen, Penn and Center Avenues, Jeanette, Pa., will commence the erection of a two-story and basement automobile service and repair building, 60 x 200 ft., with machine shop, at Mifflin and Denny Streets, Pittsburgh, estimated to cost $85,000.

The State Board of Control, Charleston, W. Va., has rejected bids for a three-story and basement addition, 70 x 150 ft., to the West Virginia Industrial School for Boys, Prunytown, W. Va., and will proceed with the work under a day labor plan. It will cost $100,000 including equipment. R. A. Gillis, Fairmont, W. Va., is architect.

The Continental Coal Co., Fairmont, W. Va., has acquired the properties of the Glasscock Collieries Co., Morgantown, W. Va., for $325,000, consisting of 500 acres of Sewickley coal lands. The new owner plans development and will install electric power and other equipment. H. W. Showalter is one of the heads of the purchasing company.

The Montgomery-Oldsmobile Co., Montgomery, W. Va., recently organized to represent the Oldsmobile car, has leased a local building, and will install machine shop and other equipment for a service and repair works. R. S. Long, Eagle, W. Va., is president, and John E. Justice, Montgomery, treasurer and general manager.

The Pittsburgh Terminal Railroad & Coal Co., Wabash Building, Pittsburgh, is planning the erection of a new power house. A transmission system will also be built to Horning, W. Va.

Officials of the Edward Hines Lumber Co., 2431 South Lincoln Street, Chicago, operating the Rivesville Coal Co., Rivesville, W. Va., recently acquired, are perfecting plans

for the installation of electric power equipment, hoisting machinery, etc., to increase the capacity of the plant.

The Penn-Overland Co., 713 Railroad Street, Johnstown, Pa., local representative for the Overland automobile, is planning the construction of a three-story and basement service and repair building, 85 x 125 ft., on Central Avenue, to cost $110,000 with equipment.

Buffalo

BUFFALO, Oct. 15.

PLANS are being prepared by the Acme Road Machinery Co., Frankfort, N. Y., for a new plant at Salem, N. Y., estimated to cost $180,000 with machinery. E. H. Cook, Frankfort, is architect.

The Dahlstrom Metallic Door Co., Blackstone Avenue and East Second Street, Jamestown, N. Y., has awarded a general contract to Chapman & Graham, Inc., Jamestown, for a two-story addition, 50 x 140 ft., estimated to cost $50,000.

The Common Council, Sodus, N. Y., plans the installation of electrically-operated pumping machinery in connection with a new waterworks system, estimated to cost $85,000.

William C. Maltby, 21 Maryland Street, Buffalo, operating a stone works, plans for the installation of a belt-driven air compressor with capacity of about 30 cu. ft.

The Hotel Statler, Inc., Buffalo, has work under way on a new five-story automobile service and repair building, 132 x 181 ft., at 122 Delaware Avenue, estimated to cost $200,000. A machine shop will be installed.

Pratt & Lambert, Inc., Tonawanda Street, Buffalo, manufacturer of oils, varnishes, etc., has preliminary plans for an addition estimated to cost $80,000.

E. T. Donovan, Batavia, N. Y., is planning the construction of a new cold storage and refrigerating plant at Elba, N. Y. A list of equipment will soon be arranged.

Power equipment, conveying and other machinery will be installed in the two-story addition to be erected to the plant of the Egloff Bakery, Inc., 147 Genesee Street, Buffalo, estimated to cost $50,000, for which bids will be called near the end of the year. L. S. Beardsley, 116 West Thirty-ninth Street, New York, is architect.

The Common Council, Hornell, N. Y., is considering the installation of electrically-operated pumping machinery in connection with extensions in the waterworks.

The Hollister Lumber Co., 100 Anderson Avenue, Rochester, N. Y., plans the erection of a two-story addition to its woodworking and lumber mill, 96 x 200 ft., at 320-48 North Goodman Street, to cost $25,000. Machinery will be electrically operated.

Detroit

DETROIT, Oct. 15.

PLANS have been completed by the Board of County Road Commissioners, Court House, Detroit, for a two-story building, 23 x 185 ft., for the highway department, consisting of a repair shop, automobile service works and office, estimated to cost $125,000, including equipment.

The Ranney Refrigerator Co., Greenville, Mich., manufacturer of large refrigerating equipment, has commenced the erection of a two-story addition, 80 x 82 ft., and plans to install machinery within the next 60 days.

The Ford Hydro Electric Co., a subsidiary of the Ford Motor Co., Highland Park, Mich., has applied for permission to build a hydroelectric power plant on the Menominee River, Florence County. It is expected to cost close to $750,000 with machinery.

The Jaxon Steel Products, Inc., Jackson, Mich., a division of the General Motors Corporation, will build an addition to its plant on South Horton Street, estimated to cost $32,-000.

The Acme Red Cedar Chest Co., Niles, Mich., is contemplating the erection of an addition to its local plant. It will also enlarge its factory at Chattanooga, Tenn., and install additional machinery. It is purposed to develop an annual output of 35,000 chests at the two plants.

The Lincoln Automobile Co., Detroit, has extension work under way at its plant on West Warren Street, and will remove equipment to the new building recently completed. Considerable additional machinery will be installed, as well as conveying, hoisting and kindred material-handling apparatus.

Adolph H. Brandt, 639 Plymouth Road, Grand Rapids, Mich., is organizing a company to build a seven-story automobile service and repair building, with complete machine shop and parts department, to cost close to $45,000, including equipment.

The Dollar Bay Lumber Co., Dollar Bay, Mich., is planning for extensions in its plant, to include a new power house and the removal of the machine shop to another location for enlargements.

The Continental Can Co., 61 Broadway, New York, is planning the installation of improved machinery at its Detroit works to manufacture cans and tubes, comprising former departments of the National Can Co., recently purchased, and constituting about 60 per cent of the holdings of this company. The new plant on East Grand Boulevard will be operated as a unit of the Continental company, with considerably enlarged capacity.

The Belding-Hall Refrigerator Co., Belding, Mich., is planning to double its capacity with the two-story addition, upon which work has been commenced, and will install new equipment as soon as the structure is ready.

Manual training equipment will be installed in the two-story high school to be erected at Jonesville, Mich., estimated to cost $100,000, for which bids will be asked on a general contract early in November. Ernest S. Batterson, Hanselman Building, Kalamazoo, Mich., is architect.

Baltimore

BALTIMORE, Oct. 15.

PLANS are being drawn by the Bureau of Yards and Docks, Navy Department, Washington, for electrical equipment for the Pearl Harbor, H. T., Navy Yard, including motor-generator, switchboard, transformers, sub-station equipment and auxiliary machinery, specification 4924, superseding specification 4548. Bids will be received by the bureau until Nov. 14, for fuel oil storage equipment for the Mare Island Navy Yard, specification 4717.

The Porcelain Enamel & Mfg. Co., Baltimore, has awarded contract to the P. C. Street Engineering Co., 406 St. Paul Street, for a one and two-story plant, 100 x 510 ft., at its new works at Eastern Avenue and Twenty-third Street, to cost about $250,000 including machinery. An office building will also be built to cost $50,000. R. C. Sandlass, Main Avenue, is architect. Helnrich Turk is president.

The Pocahontas Coal & Land Corporation, Graham, Va., is planning for the installation of tipple machinery, hoisting, conveying and other equipment at its properties. C. L. Shuffleburg is one of the heads of the company.

R. P. Johnson, Wytheville, Va., machinery dealer is inquiring for a 50 hp. vertical boiler, complete with fittings and auxiliary equipment.

P. T. Etheridge, Empire, Ga., is in the market for equipment for a rock-crushing plant for cement mill service.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Oct. 30 for copper and iron wire cloth for the Hampton Roads, Vt., Navy Yard, schedule 1425, until Nov. 6, for Eastern and Western Yards, a quantity of steel strands and wire rope, schedule 1435.

David H. Kirkland, Raymond, Ga., is organizing a company to build a plant for the manufacture of fire brick, pipe and kindred products, estimated to cost $65,000. Inquiries will be made for machinery at once.

D. R. Peregoy, R. F. D. No. 2, Ashland, Va., operating a sheet metal works, is planning the installation of additional tools and equipment, including a cornice brake.

The Danville Ice Co., Danville, Va., is planning for the installation of additional power equipment at its Southside plant, including oil-operated engine and auxiliary apparatus, estimated to cost $45,000.

The Industrial Machinery Division, Room 815, Bureau of Foreign and Domestic Commerce, Washington, will receive catalogs and price lists of sugar machinery for reforwarding to the American trade commissioner at Johannesburg, South Africa.

Bids will be received by the Chief of Air Service, United States Army, 1050 Munitions Building, Washington, until Oct. 23, for standard airplane utility parts, including bolts, rivets, nails, screws, etc., circular 24-30, until Oct. 22, for hangar material, including 18,000 bolts, 25,000 hook bolts, 10,000 U-bolts, tie and splice plates, etc., circular CAS 24-33.

J. M. Handley, La Grange, Ga., has inquiries out for a power cane mill and auxiliary equipment.

The Murphy Coal & Iron Co., Murphy, N. C., recently organized, is in the market for equipment for a local plant, including steam shovels, ore washing machinery, crushing equipment, drilling equipment and miscellaneous apparatus for the production of iron ore. Scott Litton is president; L. L. Heaton is general manager.

The Community Refrigerating Co., P. O. Box 27, Burlington, N. C., is planning to purchase equipment for a local

ice-manufacturing and refrigerating plant. Second hand equipment, in good condition, will be considered.

The Erwin Cotton Mills, Inc., Duke, N. C., will install electric power equipment at its plant in connection with additions to cost close to $2,000,000. The present No. 2 mill will be electrified and all steam-driven equipment replaced.

The Atlantic Coast Line Railway Co., Wilmington, N. C., is taking bids on a general contract until Oct. 24 for its two new car shops at Rocky Mount, N. C., each 100 x 320 ft., and smaller structures. The works will cost $100,000 with equipment. J. E. Willoughby is chief engineer.

The Bureau of Foreign and Domestic Commerce, Washington, has received an inquiry from Adelaide, Australia, for railroad machine shop and work shop machinery, No. 7887; from Bilbao, Spain, for machinery for the manufacture of wire products, No. 7932.

The Common Council, Sylvester, Ga., is planning the installation of centrifugal pumping machinery, air compressor and other equipment at the municipal waterworks, pumps to be of capacity from 500 to 1000 gal, per min.

The Steel Heddle Mfg. Co., Allegheny Avenue and Twenty-third Street, Philadelphia, has awarded a general contract to W. W. Welch, Greenville, S. C., for its new two-story branch plant on East McBee Street, Greenville, to cost $75,000. J. E. Sirrine & Co., Greenville, are architects and engineers.

A power house will be installed at the new three-story laundry to be erected by Archers Laundry, Howard and Mulberry Streets, Baltimore, for which foundations will be laid at once, estimated to cost $185,000 with equipment. J. K. Stack, Baltimore, is architect.

The Asheville Power & Light Co., Asheville, N. C., is planning for extensions and improvements to cost about $200,000, inciuding the installation of additional machinery. C. S. Walters is vice-president and general manager.

The Hackley Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a coal elevator for unloading cars, with gasoline engine; also, for one 225 kva. electric alternator, belted type, with exciter, switchboard, pulley and auxiliary equipment; one 30-hp., two 20-hp., two 15-hp., two 10-hp., ten 5-hp. and one 2-hp., electric motors, all three-phase, 60 cycle, a. c.; one boiler feed pump, 12 x 7 x 12 in., Burnham type; two steam vacuum pumps, simplex or duplex; one gasoline air compressor, mounted on a 4-wheel truck, about 150 cu. ft. capacity; one portable boiler, 25-hp., mounted on skids or wheels; one hot water storage heater, and two locomotive type boilers, about 50-hp., 100 lb. working pressure.

The Jones Motor Car Co., Richmond, Va., has awarded a general contract to E. L. Bass & Brothers, Richmond, for a two-story service and repair building, 85 x 120 ft., estimated to cost $80,000. Henry T. Barnham, Richmond, is architect and engineer.

Walter Clark, P. O. Box, 824, Wilmington, N. C., has inquiries out for a steam shovel, about ½-yd. capacity.

The Common Council, Staunton, Va., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks, estimated to cost $500,000.

The Oxford Buggy Co., Oxford, N. C., desires to secure information about the machinery required to manufacturer tags, signs, etc., of sheet steel, tin or other such metal, covering processes, cost of installing machines and the like. The question of dies is also to be covered. The company would like information also about painting and baking, and the incidental ovens. The company has its own building. If it goes into this branch of manufacture it would need only machinery and equipment.

Cincinnati

CINCINNATI, Oct. 15.

INQUIRIES continue generally to run to one and two machines, with no particular branch of industry predominating, although automobile manufacturers have placed most of the larger orders booked for the past few months. Nothing further has developed on the inquiry for lathes received from Japan and no action is expected for a few weeks at least.

One of the largest orders for machine tools placed this year was distributed among manufacturers in different parts of the country during the past 10 days by the Willys-Morrow Co., Elmira, N. Y. Purchases amounted to over $600,000 and included milling machines, gear hobbers, gear shapers, broaching machines and various automatic machines. It is reported that one Eastern manufacturer alone received an order totaling over $300,000. Outside of this, improvement is noted generally in the machinery market, though no very large orders have been placed. The Maxwell Motor Car Co. is reported to have placed an order for a number of machines for its Newcastle, Ind., plant, and is expected to buy others. The Chicago, Burlington & Quincy Railroad is reported to have advised that it will place orders for lathes during the week, and action is also expected on the list of the Pennsylvania Lines, Central and Western regions.

The Dayton Fire Door Co., Dayton, Ohio, has been incorporated with a capitalization of $15,000. It has been operating as a partnership. Walter F. Geis is president.

The Norris Mfg. Co., Columbus, Ohio, manufacturer of vending machines, has awarded contract for a factory building which will enable it to practically double its capacity. George Norris is president.

The branch plant at Nashville, Tenn., of the Turner, Day & Woolworth Handle Co., Louisville, Ky., was practically destroyed by fire Oct. 5, involving a loss of approximately $150,000. It will be rebuilt.

The plant of the Western Drop Forge Co., Marion, Ind., recently put into the hands of a receiver, will be sold at auction Oct. 22. It is reported that the plant will be bid in by a large motor manufacturer. Philip Matter, Marion, is receiver.

Cleveland

CLEVELAND, Oct. 15.

LOCALLY the market has become somewhat more active in small lots of machines. The White Motor Co. is inquiring for several tools. The Lima Locomotive Corporation, Lima, Ohio, has an inquiry out for a 60-in. motor-driven vertical boring and turning mill with two heads. One Cleveland manufacturer purchased 5 screw machines.

The Japanese Government has placed an order for 8 automatic screw machines with a Cleveland manufacturer for reequipping one of its arsenals, and other live Japanese inquiries are pending.

Detroit automobile companies continue to buy equipment in good volume. The Ford Motor Co. during the week placed a $400,000 order for special production lathes with an Eastern machine tool manufacturer and virtually closed on a round lot of grinders. It is understood to have a great deal of additional equipment still to place. According to reported plans, the Ford company, which has been a heavy buyer of machinery the last few weeks, will add 25 per cent. to its equipment, which will result in close to a 50 per cent. increase in capacity and increase its output from 7000 to 10,000 cars per day. Considerable business in tool room equipment is now pending from the Ford company. Another Detroit automobile manufacturer during the week issued requisitions for 35 standard machine tools aggregating $80,000 and has placed orders for several of these. Following this company's policy of buying, orders for the remainder will be spread over the next few weeks. Some orders for small lots of machines up to a half dozen tools were placed by the Chevrolet and Buick companies and by the Canadian Products Co., Walkersville, Ont., a subsidiary of the General Motors Corporation. The Michigan Screw Co., Detroit, purchased three large grinding machines.

The Taplin-Rice Clerkin Co., Akron, Ohio, has commenced the erection of a foundry to replace one recently burned. The estimated cost is $125,000.

The Eaton Axle & Spring Co., Cleveland, which has had plans for a $90,000 factory extension, has taken no definite steps toward the erection of this building and the placing of contracts may be postponed.

The Donley Brothers Co., Cleveland, manufacturer of iron and steel specialties, has completed a new one-story factory, 100 x 163 ft., at 139th and Merrill Streets.

The Cleveland Refrigerator Co., 6600 Sideway Avenue, Cleveland, has commenced the erection of a one-story extension 88 x 124 ft. Some new equipment will probably be required.

The Anderson Body Co., Sidney, Ohio, has been incorporated with a capital stock of $150,000, and has taken over the plant of the Sidney Mfg. Co., and will manufacture bus and hearse bodies and closed bodies for automobiles.

The J. Van Nette & Sons' Lawn Mower Co., Tiffin, Ohio, has been organized and will equip the plant for the manufacture of lawn mowers.

Plans are under way for the reorganization of the Gramm-Bernstein Motor Truck Co., Lima, Ohio, which is being operated under receivership. Authority has been given by the Federal Court to sell the plant and members of the former organization are working on the financing plans.

The Anderson Rolled Gear Co., Lakewood, Ohio, is inquiring for a Brown & Sharpe No. 13 heavy gear cutter, with indexing head and mechanism in good condition.

The Columbia-Elyria Power Co., Elyria, Ohio, recently organized by the officials of the Elyria Iron & Steel Co. and the Columbia Steel Co. as a joint subsidiary, is planning for the construction of a new power plant to furnish service at the two steel works. H. B. Wicks is president.

The Gabriel Mfg. Co., 1407 East Fortieth Street, Cleveland, manufacturer of automobile shock absorbers, has awarded a general contract to the A. A. Lane Construction Co., 1869 East Fifty-fifth Street, for a two-story and basement addition, 80 x 125 ft., to cost approximately $80,000. Claude H. Foster is general manager.

The Baltimore & Ohio Railroad Co., Baltimore, is planning the erection of a new eight-story ice and cold storage plant at Toledo, Ohio, estimated to cost $2,500,000, with machinery.

The Colonial Insulator Co., 973 Grant Avenue, Akron, Ohio, is planning the erection of a one-story addition, 30 x 150 ft. G. Ball, Room 616, Metropolitan Building, is architect.

Philadelphia

PHILADELPHIA, Oct. 15.

TENTATIVE plans are being considered by E. I. du Pont de Nemours & Co., Wilmington, Del., for a new linseed oil manufacturing plant in the vicinity of its Harrison paint plant, Thirty-fifth Street and the Grays Ferry Road, Philadelphia, to cost $200,000 with machinery.

C. M. Roswell, 1162 Marlyn Road, Philadelphia, machinery dealer, has inquiries out for one rotary converter, 500 kw., railroad type, with or without transformer and switchboard, also for one air compressor, 2000 cu. ft. capacity, 100 lb. pressure, motor-driven, second-hand, in good condition.

The Philadelphia Taxi Corporation, Walnut and Twenty-second Streets, Philadelphia, has leased the one-story building at Oxford, Turner and Twentieth Streets, for the establishment of a new service and machine repair, and storage works.

The Campbell Construction Co., 910 North Front Street, Philadelphia, is planning to purchase a disk sander for planing mill service. S. Campbell is in charge.

George W. Smith & Co., Inc., Philadelphia, operating a woodworking plant at Forty-ninth and Botanic Streets, has awarded a general contract to the John N. Gill Construction Co. for a new plant, 210 x 370 ft., for assembling and other service, estimated to cost $200,000 with machinery.

The Remington-Burnelli Aircraft Corporation, 25 West Forty-fifth Street, New York, has purchased 4 acres on Magazine Lane, Philadelphia, as a site for a new plant to manufacture commercial aeroplanes and parts, for which plans are now being drawn. A portion of the works will also be given over to the production of bombing planes. The initial plant will cost more than $80,000 with machinery. The company formerly operated works at Amityville, L. I.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, will commence the electrification of its Fort Washington branch for a distance of about 6 miles, with the installation of power equipment, electric feeder system, lines, etc. Bids are also being taken for a new tool house on Kensington Avenue.

The York Machinery & Supply Co., York, Pa., is in the market for a 10-ft. used power brake for No. 10 gage material.

Charles Boyle, Philadelphia, has awarded a general contract to the Smith-Hardican Co., 1809 Cherry Street, for a new automobile service and repair building at 4642-46 Baltimore Street, with machine shop, to cost about $60,000.

Manual training equipment will be installed in the three-story boys' high school to be erected on Hunting Park Avenue by the Catholic Archdiocese of Philadelphia, to cost more than $500,000, for which plans are being prepared by the Hoffman-Henon Co., Finance Building, architects.

The Common Council, Shenandoah, Pa., is planning the installation of electrically-operated pumping machinery in connection with proposed extensions in the municipal waterworks, estimated to cost $200,000.

Power equipment, ovens, conveying and other machinery will be installed by the Norristown Baking Co., Norristown, Pa., in its addition estimated to cost $47,000, including improvements in the present plant. J. B. Chamberlain, Markle Building, Hazletown, Pa., is architect.

The Pennsylvania Power & Light Co., Allentown, Pa., is disposing of a bond issue of $4,000,000, the majority of the proceeds to be used for extensions in power plants and system. The company is organizing a subsidiary, the Telford Power & Light Co., to install a system at Telford, Pa., and vicinity. P. B. Sawyer is vice-president.

A one-story power house will be constructed by the Confederated Home Abattoir Co., American Casualty Building, Reading, Pa., at its proposed new plant at Nazareth, Pa., estimated to cost $65,000. The Gorman-Brown Engineering Co., 40 Rector Street, New York, is engineer.

Manual training equipment will be installed in the new high school to be constructed at Palmerton, Pa., estimated to cost $300,000, for which bids will be received on a general contract on Nov. 1. W. H. Lee, 1505 Race Street, Philadelphia, is architect.

The Watts Water & Power Co., and the Juniata Water Power Co., Juniata, Pa., recently organized, are perfecting plans for a hydroelectric power station development in the vicinity of Iroquois, Pa., on the Juniata River, where a large dam will be constructed. It will cost more than $450,000.

C. T. Helms, Oseola Mills, Pa., will install a machine shop in his proposed two-story automobile service building, estimated to cost $40,000, for which plans are being prepared by A. W. Rudolph, Masonic Building, Altoona, Pa., architect.

Manual training equipment will be installed in the new two-story senior and junior high school to be erected in the West Side district, Norristown, Pa., estimated to cost $500,000, for which bids will be received on a general contract until Oct. 30. Oliver Randolph Perry, 1524 Sansom Street, Philadelphia, is architect.

The Repplier Coal Co., Mount Carmel, Pa., is considering the installation of electric power and mining machinery at the properties of the Dark Water Colliery, near St. Clair, Pa., recently acquired.

The Boyertown Burial Casket Co., Boyertown, Pa., has construction in progress on an addition and will soon commence the installation of machinery, including steam power and other equipment.

Leonard Hengel, Lancaster Pike, Haverford, Pa., will install a machine and repair shop in his two-story automobile service building, 100 x 133 ft., for which bids will soon be taken by Charles Norton, 29 West Lancaster Avenue, Ardmore, Pa., architect.

The E. B. Leaf Co., Real Estate Trust Building, Philadelphia, is inquiring for clean, straight, full-length, used 4-in. tubes.

Chicago

CHICAGO, Oct. 15.

BOTH sales and inquiries are scattered, but on the whole, the market appears to be somewhat more active. The Public Service Co. of Northern Illinois, has concluded purchases amounting to about $25,000 for its Waukegan, Ill., power plant. The Pettibone-Mulliken Co., Chicago, has taken figures on 26 machine tools as listed below. The Illinois Central has issued inquiries for a 75-ton vertical motor-driven hydraulic press, a car wheel lathe, and a flue cutter. No action has yet been taken on the extensive Burlington list. From Detroit comes word that the Ford Motor Co. is purchasing considerable additional equipment, with a view to increasing its production to 10,000 cars a day. A considerable proportion of current orders and inquiries calls for used machines. Carr Brothers, Inc., 65 Broadway, New York, advises that one of its clients is in the market for a considerable amount of second-hand machinery, which, however, must be absolutely modern, not old, out-of-date, or worn out. Included in this list are 44 miscellaneous machine tools, 4 pneumatic hoists, and 21 wood-working machines.

Pettibone-Mulliken Co. List:

One motor-driven keyseating machine to cut up to 2 in. wide keyseats.
One motor-driven ¾-in. keyseater.
Three motor-driven 18-in. x 10-ft. engine lathes.
One motor-driven 4-in. two-spindle centering machine.
Three motor-driven No. 2 universal cutter and tool grinders.
Two automatic planer-type surface grinders, capacity about 24 in. x 18 in. x 4 ft.
One No. 1 or No. 2 universal motor-driven milling machine.
One motor-driven 72-in. frog and switch planer.
One motor-driven 42-in. x 42-in. x 16-ft. planer.
Two motor-driven horizontal boring, drilling and milling machines with 2½ or 3-in. bar.
Two 3½-ft. motor-driven radial drills.
One motor-driven 24-in. x 16-ft. heavy pattern engine lathe.
Two 6-ft. motor-driven radial drills.
Three 28-in. motor-driven shapers.
Two 18 in. x 14-ft. motor-driven heavy pattern engine lathes.

The Missouri Pacific has ordered a 200-ton locomotive crane from the Whiting Corporation.

A. N. Day, with headquarters at present at the Blackstone Hotel, Chicago, is in the United States for the purpose of purchasing machine tools and equipment for a new railroad shop of the South Australian Railways.

The Ero Mfg. Co., producer of automobile accessories, previously located at 753 West Jackson Boulevard, Chicago, has leased a four-story building, 100 x 103 ft., at 2240 Ogden Avenue.

The Gary Motor Truck Co., Gary, Ind., is preparing to double its capacity, which will make its annual output approximately 3000 cars.

The Mulvey Iron Works, 1840 Carrol Avenue, Chicago, will construct a one-story plant, 66 x 200 ft., 328 North California Avenue, to cost $16,000.

The United Auto Register Co., 2316 West Forty-third Street, Chicago, has awarded a contract to E. W. Sproul, 2901 West Pershing Road for a one-story factory, 75 x 90 ft., 2316-40 West Forty-third Street, to cost $18,000.

The Sioux Falls Machine Works, Sioux Falls, S. D., will erect a two-story addition.

The Norris Brothers Machine Shop, Robinson, Ill., is building an addition, 30 x 60 ft.

The Barber-Greene Co., manufacturer of belt and portable conveyors, Aurora, Ill., will erect two additions, one 24 x 45 ft., to cost $3,000, and the other 130 x 175 ft., to cost $26,500.

The Remy Electric Co., Anderson, Ind., has started the construction of a one-story addition, containing 12,500 sq. ft. of floor space, to cost $25,000.

The Graham Brothers Truck Co., Evansville, Ind., has completed plant unit No. 3, and has started the construction of unit No. 6, which will be 90 x 250 ft., and will cost $60,000.

Manual training equipment will be installed in the new two-story high school to be erected at Waseca, Minn., estimated to cost $450,000, for which bids are being asked on a general contract until Oct. 30. William B. Ittner, Board of Education Building, St. Louis, is architect.

The American Radiator Co., 816 South Michigan Avenue, Chicago, has tentative plans for the construction of an additional unit at its new plant at St. Paul, Minn., recently established, to cost about $250,000, including machinery.

The State Board of Charities and Reform, Cheyenne, Wyo., is planning the construction of a power plant at the State Hospital, Evanston, Wyo., to cost $50,000.

Manual training equipment will be installed in the new junior high school to be erected at Beatrice, Neb., estimated to cost $150,000. The J. H. Felt Co., Kansas City, Mo., is architect.

The Public Service Co. of Colorado, Denver, is disposing of a bond issue of $5,000,000, a portion of the proceeds to be used for extensions in power plants and system.

The Common Council, Walthill, Neb., is arranging for a bond issue of $46,000, for the construction of a municipal electric light and power plant, and ice plant. The Prince-Nixon Engineering Co., 501 Peters Trust Building, Omaha, Neb., is engineer.

The S. & H. Motor Co., 203 Hacker Avenue, Joliet, Ill., is planning the construction of a three-story automobile service and repair building, 100 x 150 ft., estimated to cost $65,000. A. M. Selby heads the company.

A. A. Fasig, Anna, Ill., is organizing a company to erect and operate a cement manufacturing plant, with initial output of about 80,000 bbl. per month, estimated to cost $60,000 with machinery. A power house will be built.

The Polar Wave Ice & Fuel Co., 3625 Olive Street, St. Louis, is perfecting plans for a new ice-manufacturing and cold storage plant at Decatur, Ill., estimated to cost $175,000 including machinery.

Indiana

INDIANAPOLIS, Oct. 15.

ARRANGEMENTS are being made by the Fraggate Mfg. Co., F. W. Fraggate, president, Centralia, Ill., for the establishment of a new plant in the Charles Hartmetz Building, Evansville, Ind., recently leased for the manufacture of computing scales and precision equipment. Machinery will be installed immediately.

Bids will be received by the Quartermaster Department, United States Army, Jeffersonville, Ind., until Oct. 22 for one exhaust fan, one rotating type sand blast barrel and one electric spot welding machine, circular 24-32.

Thomas L. Green & Co., 202 Miley Avenue, Indianapolis, manufacturer of bakers' machinery, will take bids at once for a one-story addition, 90 x 120 ft., to cost $37,000. A traveling crane, 5 to 7 tons capacity, will be installed. Charles E. Bacon, 605 Odd Fellows Building, is architect.

The Indiana Oil Refining Co., Columbus, Ind., is planning for a fund of $125,000 to purchase additional equipment for its local refinery. The Graver Corporation, East Chicago, Ind., is interested in the company.

The plant and property of the Arvac Mfg. Co., Anderson, Ind., manufacturer of universal joints, etc., will be offered at public sale on Oct. 23, including power plant, cranes, hoists, etc.

The Terre Haute, Indianapolis & Eastern Traction Co., Indianapolis, is having plans prepared for new car barns and shop at Richmond, Ind., to cost about $50,000.

The Victor Piston Pin Co., Indianapolis, recently organized, will establish a plant at 115 North Noble Street for the manufacturer of piston pins and other automotive products.

The Bucyrus Co., Evansville, Ind., manufacturer of dredging machinery, etc., has preliminary plans for an addition to provide for an increase of about 40 per cent in output. It is expected to commence work early in 1924. Headquarters of the company are at South Milwaukee, Wis.

The Columbus Machine Works, Columbus, Ind., manufacturer of pipe-working machinery, has commenced the removal of a portion of its plant to the new location at Crothersville, Ind., recently selected, and purposes to operate at the latter place under considerable increased capacity at an early date. A portion of the works will be retained at Columbus for a number of weeks to come, and later will be consolidated at the Crothersville plant, with additional equipment.

The New York, Chicago & St. Louis Railroad Co., Cleveland, has completed negotiations for the purchase of a tract of land adjoining its shops at Frankfort, Ind., for a consideration of $12,000, and will have plans drawn at once for the construction of an addition, to include a new engine house, repair shop and other structures.

Fire, Oct. 5, destroyed a portion of the plant of the Honeywell Heating & Specialty Co., Wabash, Ind., manufacturer of radiator valves and heating equipment, with loss estimated at $50,000. It is planned to rebuild.

The Leonard Tractor Co., Gary, Ind., is said to be planning for the installation of a planer and other tools in its machine department.

A portion of the power house and canning factory of Frazier & Norris, Hobbs, near Tipton, Ind., were destroyed by fire, Oct. 4, with loss estimated at $60,000, including equipment.

The United States Shingle Co., Wabash, Ind., manufacturer of asbestos shingles, is negotiating for the purchase of the local plant of the Wabash Tractor Co., now occupied under lease, and plans for extensions and improvements for increased output.

The Interstate Public Service Co., Indianapolis, is perfecting arrangements for the purchase of the plant and property of the Jeffersonville Water, Light & Power Co., Jeffersonville, Ind., for a price of $165,000. Extensions will be made, with additional equipment, for increased capacity.

Milwaukee

MILWAUKEE, Oct. 15.

MACHINE-TOOL orders come rather after the fashion of a trickle than a steady stream. A moderate volume is represented by scattering demands, most of which are predicated upon strict necessities. On the whole, however, sales for the first half of October show an improvement over the corresponding period in September, yet in most instances demand is below that of the same time a year ago. Employment officials speak of a shortage of machinists and helpers, and of heavy-duty labor for foundries, although the lack of men is less pronounced than during the summer months. The agricultural implement situation is showing steady improvement. John Deere interests of Moline reopened the Van Brunt shops at Horicon, Wis., on Oct. 8, after a long period of low-capacity operations. The most active winter in at least three years is indicated by orders on the books of farm machinery manufacturers in Wisconsin.

The A. O. Smith Corporation, Milwaukee, manufacturer of pressed steel automobile frames, forgings, etc., is continuing its enlargement program and is steadily in the market for additional miscellaneous equipment. James L. Sinyard is secretary.

The United States Engineer Office, Federal Building, Milwaukee, will close bids Oct. 30, for furnishing complete

a 1000-ton steel barge, 172 ft. long, with 40 ft. beam, equipped with a steel swivel derrick with a radius of 65 ft., for the Milwaukee and Grand Haven, Mich., harbor projects. The cost is estimated at from $80,000 to $100,000.

The Schalmer Products Co., Milwaukee, identified with the Claybourn Process Corporation, manufacturer of multicolor printing presses, will erect a one-story brick and concrete manufacturing building, 110 x 141 ft., adjoining the Claybourn shops. The work is in charge of Herman J. Esser, architect and engineer, 82 Wisconsin Street, Milwaukee.

The Berg Supply Co., Marshfield, Wis., has purchased the plant, machinery and stock of the Mullins Mfg. Co., Brillion, Wis., manufacturer of steel stanchions, water cups and mangers, and is consolidating with its Marshfield plant, which has recently been enlarged by a new building. Some additional machinery will be purchased soon. Grube Berg is works manager.

The Common Council of Hurley, Wis., is asking bids until Oct. 28 for the complete construction and equipment of a pumping station and water purification plant at Lake Lavina, estimated to cost $37,000. J. H. A. Brahtz, 409 Metropolitan Building, St. Paul, Minn., is consulting engineer in charge of the project. John Emunson is city clerk.

The Harry E. Weber Co., 582-584 Jefferson Street, Milwaukee, operating the Stewart-Warner Products Service Station, will build a $100,000 store, warehouse and shop building, 120 x 128 ft., at Martin and Van Buren Streets. Plans are being drawn by Van Ryn & DeGelleke, architects, 114 Grand Avenue, and will be ready about Dec. 1. Harry E. Weber is president and general manager.

The Madison Nash Co., 155 East Wilson Street, Madison, Wis., has plans by Claude & Starck, local architects, for a $65,000 garage and service building, 75 x 155 ft., part two and three stories. Work will commence immediately and completion is planned for March 1. Equipment will be purchased after Jan. 1. Ray A. Dillon is president and general manager.

The John E. Boettcher Mfg. Co., Madison, Wis., has been incorporated with a capital stock of $50,000 to manufacture dairy devices, liquid measures, scales and other equipment. A small shop is being established at Waunakee, near Madison. The principals are John E. Boettcher and Henry G. Town, both of Madison.

The Kenosha Fruit Co., 452 Pearl Street, Kenosha, Wis., has let the general contract to Bondgard & Christensen, 1135 Mound Avenue, Racine, Wis., for the construction of a $75,000 cold storage warehouse, 60 x 130 ft., two stories and basement, and is buying engine, boilers, generators, refrigerating unit and other equipment. Frank Luxum and Jens Jensen are the proprietors.

The Concrete Specialty Mfg. Co., Milwaukee, has awarded contracts for a $50,000 shop addition, 110 x 132 ft., at Holton and Lake Streets, associated architects, 496 Cramer Street. Mixing and molding machinery, electric motors, conveyors, racks, etc., will be required.

The Milwaukee Electric Railway & Light Co., Public Service Building, will build a $50,000 garage and service building for its subsidiary, the Wisconsin Motor Bus Lines, as an addition to its main car construction and repair shops at Fortieth Street and Cold Spring Avenue. Fred M. Luber is chief architect.

John M. Chapple & Co., Ashland, Wis., proprietors of the Ashland *Daily Press*, has plans by Henry Fuller, architect, for a two-story brick and concrete publishing building, 64 x 120 ft., which with new equipment will represent an investment of $75,000.

The Gulf States

BIRMINGHAM, Oct. 15.

TENTATIVE plans are under consideration by the Gadsden Car Works, Gadsden, Ala., for rebuilding the portion of its erecting department destroyed by fire Oct. 11 with loss estimated at $250,000, including equipment. The company is affiliated with the Southern Railway Co.

The Common Council, Lake Worth, Fla., is perfecting plans for an addition to the local municipal electric power plant to cost $40,000, for which bonds have been authorized.

The Allen-Oden Mining Co., P. O. Box 984, Birmingham, has inquiries out for a jaw crusher and auxiliary equipment.

The Ampco Iron Co., Springfield, Mo., has preliminary plans for the establishment of branch works in the vicinity of El Paso, Tex., for the production of iron and steel products estimated to cost $40,000.

The United States Export Chemical Corporation, Tampa, Fla., recently organized, is perfecting plans for the initial unit of its new plant for the production of super-phosphates for fertilizer manufacture. A power house will be constructed. The plant will cost in excess of $300,000 with machinery. Lorenzo A. Wilson, president Wilson & Toomer Fertilizer Co., Jacksonville, Fla., is one of the heads of the company; Harry A. Pierce is vice-president.

The City Council, Shreveport, La., will install electrically-operated pumping machinery in connection with a new water works system, for which bonds for $1,000,000 have been voted. The pumping plant will cost about $200,000. The J. N. Chester Engineers, Union Bank Building, Pittsburgh, are engineers.

The Mine & Mill Supply Co., Tampa, Fla., is arranging for the erection of a new plant on West Lemon Street, Lakeland, Fla., where it purposes to establish its main works and headquarters. The company recently increased its capital from $100,000 to $200,000 for expansion.

The City Commission, Jacksonville, Fla., has disposed of a bond issue of $850,000, the proceeds to be used for the municipal electric plant and system.

The Ford Motor Co., Highland Park, Mich., has acquired about 9 acres on the St. Johns River, Jacksonville, Fla., for a new assembling and distributing plant, with initial unit estimated to cost $225,000 with equipment.

The Waggoner Ranch Corporation, Vernon, Tex., recently formed with a capital of $10,000,000, is planning the construction of an electric light and power station for general commercial service in connection with the development of a portion of its lands. It will cost in excess of $50,000. W. T. and Guy Waggoner head the company.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, is planning the erection of a four-story factory branch at Houston, Tex., estimated to cost $160,000.

The American Metal Co., Amarillo, Tex., care of the local Chamber of Commerce, has preliminary plans for the erection of new works for the production of zinc and other metal products, to cost $500,000, including equipment. The New Jersey Zinc Co., Palmerton, Pa., is said to be interested in the project.

The Houston Railway Car Co., Interurban Viaduct and Calhoun Avenue, Houston, Tex., is in the market for galvanizing equipment and machinery to be used in manufacturing refrigerator car brine tanks.

Halwell & McQueen, Birmingham, operating a general machine and welding works, are considering the establishment of a branch plant at Selma, Ala.

The Common Council, Celina, Tex., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal water works to cost about $65,000.

The Southern Pacific Railroad Co., El Paso, Tex., has work in progress on an extension program at its car and locomotive shops in different parts of the State to cost more than $400,000 with equipment.

The Texas Steel Mills, Inc., Fort Worth, Tex., is perfecting plans for an addition on South Hemphill Street, estimated to cost $75,000, including equipment.

W. E. Gaither, Rockdale, Tex., is planning the erection of a three-story automobile service and repair building on property recently acquired to cost $65,000.

The Central South

ST. LOUIS, Oct. 15.

A BOND issue of $2,265,000 has been arranged by the Kentucky Utilities Co., Lexington, Ky., operating electric light and power plants and systems, a portion of the proceeds to be used for extensions.

The Eugene Straus Cabinet Co., 1029 Hamilton Avenue, Louisville, has commenced the erection of a new two-story plant on Baxter Avenue, estimated to cost $200,000 with machinery. Eugene Straus is president.

The Sheehan Aviation Field, Inc., Frank Sheehan, president, Owensboro, Ky., is planning the construction of an airplane repair and parts plant at its new aviation field, with hangars, etc., on 25-acre tract recently acquired.

The Kaw Valley Drainage District, 719 Osage Street, Kansas City, Kan., J. A. Shine, secretary, is planning the installation of 20 electrically-operated pumping units in connection with property improvements, estimated to cost $190,000.

Bids will soon be asked by the Ford Motor Co., Highland Park, Mich., for a one-story and basement addition, 200 x 875 ft., to its assembling plant on Winchester Avenue, Kansas City, Mo., to cost $300,000. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The M. S. Cohn Gravel Co., Fort Smith, Ark., recently organized, is planning the development of 1500 acres at Albion, Okla., and will install a steam shovel, conveying and other equipment. M. S. Cohn is president.

The Tennessee Electric Power Co., Nashville, Tenn., is arranging an extension program to cost approximately $18,000,000 during the next 36 months, to include the construction of a hydroelectric generating plant on the Caney Fork River, a steam-operated generating station for auxiliary service at Hales Bar on the Tennessee River, and a third hydroelectric generating plant on the Ocoee River. Another steam-operated plant in the vincinity of Hales Bar is also projected. For initial work, the company is disposing of a preferred stock issue of $1,500,000. B. C. Edgar is vice-president and general manager.

The El Reno Ice Co., El Reno, Okla., has tentative plans for a new ice and refrigerating plant to cost $65,000. Paul Liebmann is general manager.

The Tate Motor Co., St. Louis, is having plans completed for a three-story service and repair works, 125 x 165 ft., at Washington Boulevard and Garrison Avenue, to cost $100,000. The Widmer Engineering Co., Laclede Gas Building, is architect and engineer.

The Owensboro Clay Products Co., Owensboro, Ky., has commenced the construction of a plant to manufacture brick, tile and kindred products, estimated to cost $110,000, with machinery. John A. Bolger is head.

The Ferguson Hardware Co., Paducah, Ky., has tentative plans for a new four-story factory, 116 x 150 ft., to cost about $165,000 with equipment.

The Hoshall Machinery Co., P. O. Box 187, Memphis, Tenn., has inquiries out for one 250 kva. generator, direct-connected to non-condensing, uniflow engine, with auxiliary equipment.

A machine shop will be installed in the three-story and basement automobile service and repair building, 65 x 245 ft., to be erected on Twenty-fourth Street, Kansas City, Mo., by A. F. Seested, 3271 Main Street, estimated to cost $90,000. J. G. Braecklein, 703 Federal Reserve Life Insurance Co. Building, Kansas City, Kan., is architect.

The Hazel-Atlas Glass Co., Blackwell, Okla., with headquarters at Wheeling, W. Va., will commence the erection of a new power house at its local plant, 65 x 100 ft. A building, 100 x 175 ft., will also be erected at the main local works. The two structures will cost approximately $90,000, including equipment.

The Waggoner Refining Co., Electra, Okla., is planning to rebuild the portion of its oil storage and distributing plant recently destroyed by fire with loss estimated at $100,000, including equipment.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for a 10 to 12-ton industrial locomotive, 36 in gage; also, for one air compressor, 150 to 200 cu. ft. capacity, direct-connected, gasoline driven.

The Common Council, Farmington, Mo., plans the installation of electrically-operated pumping machinery in connection with extensions and improvements in the municipal water works and sewerage system, estimated to cost $100,000. Charles A. Haskins, Finance Building, Kansas City, Mo., is consulting engineer.

The Pacific Coast

SAN FRANCISCO, Oct. 10.

PLANS have been prepared by the Stockham Pipe & Fitting Co., Los Angeles, for a new one-story plant, 100 x 145 ft., on Twenty-fourth Street, estimated to cost $30,000. Frank D. Chase, Inc., Title Insurance Building, is architect and engineer.

The Des Chutes Power Co., Spokane, Wash., will make extensions in its power plant and system to cost about $100,000, including the installation of additional equipment. Adolph Galland is president.

The Gold Seal Refining Corporation, Alhambra, Cal., formerly known as the Wadolene Refining Co., is planning the construction of a new oil refinery for the production of lubricating and other oil products, estimated to cost $85,000.

The Board of Education, Los Angeles, has awarded a general contract to Callahan, Schilling & Brown, San Fernando Building, for a one-story vocational shop at the Jefferson high school, to cost about $34,000 exclusive of equipment.

The Los Angeles Motor Bus Co., Los Angeles Railway Building, Los Angeles, has awarded a general contract to the Slater Co., 2314 Santa Fe Avenue, for a one and two-story service and repair building estimated to cost $120,000.

The Climax Engineering Co., Clinton, Iowa, manufacturer of ice and refrigerating machinery, has tentative plans for a branch plant at Los Angeles, estimated to cost $100,000 including equipment.

The Utah-Idaho Sugar Co., Salt Lake City, Utah, is considering plans for the construction of a new beet sugar mill at Bellingham, Wash., with power house, machine shop and other buildings estimated to cost $1,200,000.

The Board of Directors, Milner Canal System, Twin Falls, Idaho, has tentative plans for a new power house for its water system, estimated to cost $125,000.

The Construction Quartermaster's Office, Fort Mason, Cal., has plans for a new power house at the new United States Army post, Anchorage, Alaska, to cost, with other buildings, $700,000.

The Ord Ice Co., Oxnard, Cal., has plans for a new ice-manufacturing plant at the foot of Enterprise Street, to cost $70,000. A. A. Miller, manager of the company at Ventura, Cal., will be in charge.

The Chevrolet Motor Co. of California, Oakland, has awarded a general contract to the Dinwiddie Construction Co., San Francisco, for a one-story and basement addition to its assembling and parts plant, to cost $125,000 with equipment.

F. O. Stallman, 167-73 First Street, San Francisco, is desirous of locating a machine works in this section equipped to manufacturer a small portable typewriter and parts, for Pacific Coast trade. Arrangements have been made with a number of such plants in the East, near distributing centers.

The Great Western Smelting & Refining Co., 75 Folsom Street, San Francisco, has awarded a general contract to the Hayes-Oser Co., Call Building, for a one-story foundry, 135 x 275 ft., to cost $70,000, including equipment.

Canada

TORONTO, Oct. 15.

DEMAND for machine tools the past week was somewhat stronger, with sales chiefly confined to small lots. According to inquiries received, many industrial plants are in need of tools for replacement purposes and selling interests are looking forward to a steady demand for equipment the remainder of the year. The automobile industry is steadily placing orders for machine tools in small numbers, both for replacement purposes and on new works account and the Canadian railroads are entering the market from time to time. A good demand is also reported for equipment and tools of a diversified character.

The McMullen-Perkins Co., is erecting a machine shop at Ottawa, Ont., to cost $7,000 and is in the market for equipment.

The Pendrith Machinery Co., which is erecting an addition at 970 Queen Street West, Toronto, is inquiring for equipment.

The Lake of the Woods Milling Co., Montreal, will build an attition to its plant at Medicine Hat, Alta., to cost about $500,000.

The Universal Wheel Co., which is establishing a plant at Windsor, Ont., is interested in machinery for manufacture of automobile disk wheels.

The Berliner Gram-o-phone Co., Ltd., Montreal, is completing a factory which with machinery will represent an expenditure of $1,000,000.

The Haustine Co., Ltd., Dundas, Ont., manufacturers of sewage disposal systems, septic tanks, drinking fountains, etc., is building a new factory, which is expected to be ready for occupation the first of the year. With the addition now under way the company will be enabled to double its present output.

The Morrow Mfg. Co., recently incorporated to take over the business of W. L. Morrow & Co., Moncton, N. B., carriage manufacturer, is erecting a two-story and basement brick building at a cost of $10,000. Machinery for a forge shop, etc., will be required.

The Dominion Tar & Chemical Co., Ltd., will establish a manufacturing plant at St. Boniface, Man., at a cost of $250,000, according to O. P. Walsh, vice-president and general manager of the company. The company is a subsidiary of Burt, Boulton & Haywood, Ltd., London, England, and English capital will be invested in the Canadian plant.

The De Laval Co., Peterborough, Ont., manufacturer of dairy machinery, agricultural implements, etc., is building an addition, 42 x 114 ft., which will be used for pickling and tinning.

The Ottawa Electric Railway Co., Ottawa, Ont., has started work on the erection of a machine shop, power house and garage. A booster generator to cost $50,000 will be purchased for the power house. Equipment for the machine shop and garage will also be required. Richards & Abra, Home Bank Building, are the architects. John Sutherland is superintendent in charge.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt..	—41	—24	⅛ in. Butt..	— 4	+19
¼ in. Butt..	—46	—32	¼ in. Butt..	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap..	—44	—30	2 in. Lap....	— 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap..	—34	— 6	7-12 in. Lap.	— 3	+16

Steel Wire

	Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic		5.00c.
Annealed soft		5.00c.
Galvanized annealed		5.65c.
Coppered basic		5.65c.
Tinned soft Bessemer		6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17½c. to 18½c.
High brass wire	18 c. to 19 c.
Brass rods	15½c. to 16¾c.
Brass tube, brazed	25½c. to 27 c.
Brass tube, seamless	22½c. to 23½c.
Copper tube, seamless	24 c. to 25 c.

Copper Sheets

Sheet copper, hot rolled, 20¼c. to 21¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin			Coke—14 x 20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Prime	Seconds
			80 lb..	$6.55	$6.30
			90 lb..	6.65	6.40
			100 lb..	6.75	6.50
IC..	$12.55	$10.70	IC..	7.00	6.75
IX..	13.95	12.55	IX..	8.25	8.00
IXX..	15.55	13.75	IXX..	9.50	9.25
IXXX..	17.10	15.30	IXXX..	10.75	10.50
IXXXX..	18.85	16.80	IXXXX..	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	48c. to 50c.

Copper

Lake ingot	16c.
Electrolytic	15½c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals

The market is very depressed and values are lower. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.50
Copper, light bottoms	8.75
Brass, heavy	5.75
Brass, light	4.75
Heavy machine composition	8.50
No. 1 yellow brass turnings	5.75
No. 1 red brass or composition turnings	7.25
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, October 25, 1923

ESTABLISHED 1855 VOL. 112, No. 17

Automatic Conveying in Material Handling*

Vertical Units and Various Types of Horizontal Conveyors in Intensive Use in National Cash Register Works—Factory Parcels Post

BY L. S. LOVE

HANDLING of materials in a plant the size of the National Cash Register Co. is naturally an item of tremendous cost, including as it does everything from raw materials incoming to the finished product going out.

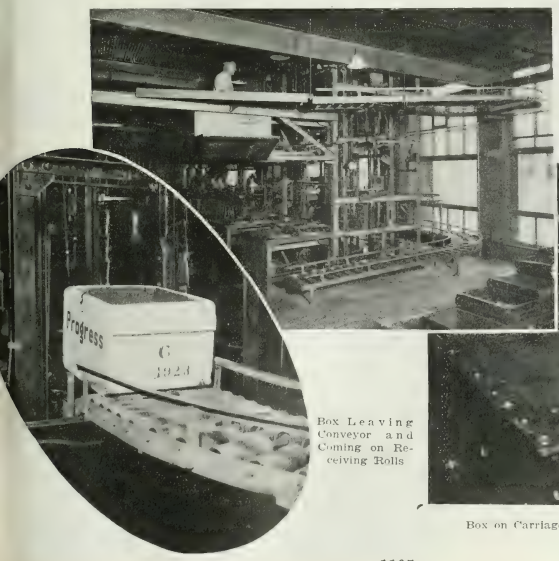
A large number of electric industrial trucks is employed. These are used for handling raw materials from the incoming inspection department, where all materials purchased are inspected before distribution. After inspection the various materials for stock are delivered to stockrooms in the basements of the buildings in which a given class of stock receives most of the operations on it. To facilitate this delivery and all other interbuilding communication, tunnels connect all buildings of the plant. There are 14 miles of such tunnels. This avoids to a great extent unsightly bridges and use of the streets for company business.

Trucks are also used for messenger service, such as the delivery of tools to workmen, and for interdepartment trucking of much material in process.

Industrial Trucks Used for Plant Parcel Post

There is also a regular parcel post system employing special trucks with box bodies developed by the National Cash Register Co., containing drawers for holding matter to be delivered and designated for the various departments. There are parcel post stations for these trucks to visit, which they do on a regular schedule of 2 min, from station to station. These stations have drawers and racks, marked for holding goods to go to different departments, all corresponding to the

*Tool making as practiced in the National Cash Register plant was described in the issue of Sept. 13 and the making and maintenance of machinery were described in the issue of Aug. 30.



At the Transfer Station at the Automatic Vertical Conveyor in Each Building (Left), the Man Handles More Stock Than Any Three Persons in the Entire Factory and Likes It. It is easier than jolting around on a motor truck and wrestling boxes

Box Leaving Conveyor and Coming on Receiving Rolls

Box on Carriage Prepared to Go on Conveyor

drawers on the trucks. There are four trucks in this service.

The plant has a garage for all electric industrial trucks. In this is a charging board which charges all trucks nightly. When the batteries are fully charged, the board automatically cuts out, so there is no danger of overcharging.

The most valuable improvement in material handling is in the conveyor system and the development of the automatic conveyor which has greatly reduced transportation costs. The former use of industrial trucks was a tremendous saving over the old fashioned hand trucking methods. The National Cash Register Co. realized, however, that from the time raw material left the stockroom until it took the form of finished product, it was in actual process only about one-third of the time. This work in process was really "loafing" two-thirds of the time and cut tremendously into profits. Further, floor space which might be used for production was required for aisles and storage platforms for 75 per cent of it is in the four buildings where the automatic conveyors are installed.

The idea of the conveyor was first conceived in 1915 but due to the war the first installation was not made until 1920. At present there are 1½ miles in use, handling 1500 boxes per hr. This includes vertical conveyors, belts, gravity rolls, steel chutes, 35 deg. inclined push bar boosters, 63 sending stations and 49 receiving stations. A transfer station in each building handles material on the vertical section; it unloads automatically.

Before proceeding to a description of the arrangement of belt conveyors and their feeders and the vertical automatic conveyors, it may be well to describe the simpler conveyors first. These are in the shipping department.

After final inspection the registers pass along a set of gravity rolls for supplies, covers, etc., and to have the handles removed and for weighing. They are then transferred to a packing stand. Packing cases already



Transfer Station at the Third Floor of Building No. 1

materials waiting to be conveyed to other departments.

Time is saved between operations, saved through avoiding congestion in aisles, through more expeditious delivery of stock to the various departments, whether for regular production or for special right of way material. About 14 hr. per day formerly lost is saved on trucks waiting for elevators, as the conveyor is always there to take stock. Wear and tear and other loss is saved on floors, partitions and doors and damage from vibration is reduced. Savings are effected by reducing the number of shop boxes by one-fourth and by eliminating the upkeep and cost of operation of many trucks and some elevators.

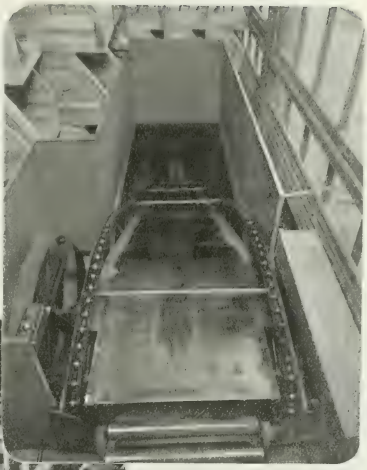
There are savings in number of men needed as material chasers under the old system. As concrete examples, the following might be mentioned: Out of 223 hr., 26.35 were operating hours and 196.65, lost; 14 hr. per day waiting on elevators at 50 cents per hour; 12,240 sq. ft. aisles and 1532 sq. ft. platforms saved; 21,000 shop boxes at $1.20 and upkeep on them saved; interest on $36,381 invested in unnecessary trucks and elevators saved; cost of operating them, $4,200, saved; these figures together with other savings mentioned on a conservation basis show $100,000 annually. There is about $600,000 of material in process at all times and made are brought up to the second floor or packing floor from the basement on a 35-deg. inclined bar booster to a line of rolls. Provision is made for safety in case of a jam; if the receiving rolls are filled, two electric contact switches properly placed provide a double check.

The iron packing stand on which cases are nailed is operated by air, which raises it to the truck level for easy transfer. When nailed the case is trucked to a spiral chute and delivered to the first floor for marking. It is again weighed on a scale in the conveyor line and then proceeds to an air operated switch in the line which diverts the boxes to different lines of conveyors for different destinations, or ways of shipment; one leads to "express," one to "West," one to "New York" and one for "foreign" shipment. These lines lead directly to cars on the siding. Where the rolls cross the floor aisles, a special form of short crowned rolls set in corrugated steel plates serves to convey the cases but is safe to walk over.

This department handled 65 cases in June, 1885, with a total for the year of 514. In October, 1913, the record day's shipment was 14,447, and a total for the year, 145,020. Registers packed for factory stock are diverted to another set of rolls, 6000 to 7000 being carried in this way as average stock.



Roller Conveyor in Final Inspection Department



Looking Down the 37-Deg. Incline Booster Which Lifts Boxes from Basement to Second Floor

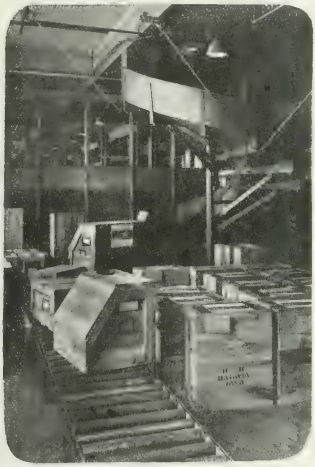


(At Left) Air Operated Switch in Traffic Department

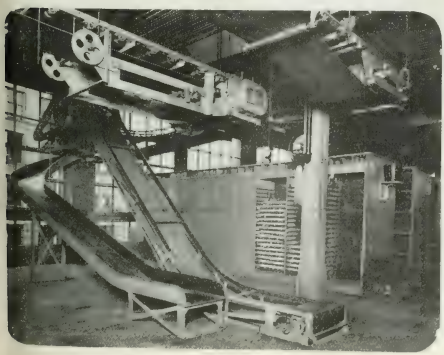
Spiral Chute in Traffic Department



Packing Block and Conveyor Rolls in Final Inspection Department



Booster and Chute in West End of Stock B Department of Building No. 4



From the Final Inspection Registers Proceed to the Packing Department to Which Boxes Are Delivered On a Push Bar Booster. Here are air elevated nailing stands from which the boxed registers are loaded on trucks to be dropped down a chute to the shipping floor where an air operated switch diverts them for shipment



Air Hoists Raise Boxes to the Overhead Horizontal Belt Conveyors. Boxes slide off the hoist to one belt or the other, depending upon the desired direction of travel, to govern which the hoist is set by a regulator

With the use of the automatic vertical conveyor has come a standardization in shop boxes. There were formerly in use 15,000 to 18,000 miscellaneous odd sizes. Now there are two, 15 x 18 in. and 6 in. and 12 in. high. They are made of 13/16-in. lumber and are all numbered. Trays to fit in the boxes are also standardized, making them interchangeable. Stock bins have also been standardized.

There are four automatic vertical conveyor installations in the plant, one each in buildings Nos. 1, 2, 3 and 4. Each single unit consists of a pair of link chains extending from the bottom floor to the top of the build-



From One Transfer Station Material to Be Inspected Is Delivered to a Gravity Conveyor With Spiral Descent to Floor, Serving Also for Storage if the Boxes Come Faster Than the Inspector Can Care for Them

ing. The chains operate over sheaves and run at rates of 60 to 75 ft. per min., there being five speed adjustments in this range. In some of the buildings the installation consists of a pair of the units, there being seven units in the four buildings. A 7½-h.p. motor runs each vertical unit. The entire conveyor outfit consumes under actual test only 39 h.p., although 104½ h.p. is available. This includes verticals, boosters and belts.

Spaced at intervals of 8 ft. on the chains is a carriage or car consisting essentially of a pair of hangers, one suspended from each chain and a pair of angles forming a shelf so spaced that one leg of the angle holds the box, the other leg acting as a fence at the side of the box. The back of the shelf or angle ends is connected by a cross-tie to hold the box at the rear.

In each building is a transfer station, which receives and dispatches boxes from and to the horizontal belt conveyors. As a box reaches the transfer station, the transfer man notes by a card on the box its destination. He places it on a loading carriage which slides out by gravity, placing the box between the chains where the conveyor carriage which straddles the loading carriage will pick it up and carry it along.

An automatic unloading trip is set by the transfer operator, who controls it by an adjustable regulator placed adjacent to the loading carriage. Setting this lever at the proper notch for the floor destination for the box causes an unloading carriage to trip at the proper floor, pushing the box onto unloading rolls. The loading carriage is operated by compressed air. Interference is provided against for any contingency. When a box is on the loading carriage and the regulator set for unloading, the loading carriage deposits it in the first conveyor carriage which comes up. Should that carriage be carrying a box, a stop holds the loading carriage air valve from functioning and it waits until the first empty conveyor carriage comes along. Each unit of the vertical conveyor has a capacity to handle 960 boxes per hour.

A further precautionary measure is a circuit breaker which automatically stops the motor should boxes jam for any reason. The motor may be started again by a push button.

The horizontal belt conveyors, which are hung from the ceilings and travel at 80 ft. per min., are for the purpose of transferring boxes from one building to another, where they may be distributed to the proper floor by the vertical unit. In addition, in one building is an extra gravity roller conveyor which takes material to what is known as Inspection B. Boxes arriving faster than the inspection force can care for them collect in a spiral portion of this conveyor which serves to lower boxes from the ceiling height to floor level. This spiral has a capacity to hold 140 boxes at once. The conveyor has a drop of 2⅛ in. in 10 ft. The inspector weighs two pieces and checks the contents of the box.

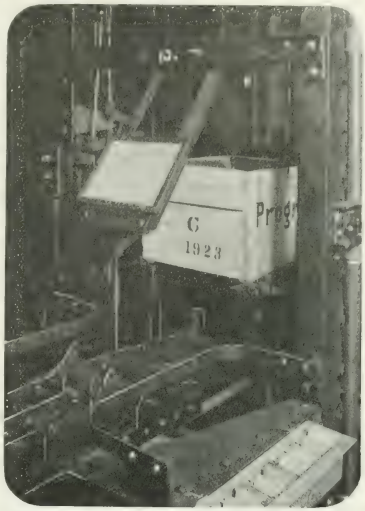
In one of the buildings is a transfer station which has ten conveyor lines to handle. This station is used on stock distribution.

As the belt conveyors are hung from the ceiling it is necessary to have convenient means placed along the floor to deliver boxes to the belt, and the proper belt, these being in pairs, for opposite directions of travel. The delivery is accomplished by a hoist, air operated. The hoist has rollers in its base so placed in their bearings that they tilt from the center. A pin at each end of the hoist holds the box in the hoist, until one pin or the other is withdrawn, permitting the box to roll to one belt or the other. The pin withdrawal is controlled by a regulator which is set by the hand loading the box on the hoist. Should there be a box on the conveyor approaching the hoist, an interlocking device prevents the release of the box on the hoist until that on the belt has passed.

A competitive examination for supervising draftsman to fill a vacancy in the Public Works department at Balboa, Canal Zone, has been announced by the United States Civil Service Commission, Washington, to which application should be made prior to Nov. 27.

Record Performance of Freight Haulage

WASHINGTON, Oct. 19.—Freight traffic during the first eight months this year was the heaviest in the history of the United States, according to reports for that period filed today by the carriers with the Bureau of



The Loading Carriage at the Transfer Station Is Air Operated. It is provided with interlocks to avoid loading to a conveyor carriage which already contains a box. In case of congestion the conveyor stops automatically and is started by a push button when the congestion is cleared. The installation indicates the completeness of the National Cash Register system

Railway Economics. Measured in net ton miles, it amounted to 304,267,000,000 net ton miles. This was an increase of 3.6 per cent over the corresponding period in 1920 which marked the previous record and 5½ per cent greater than the first eight months in 1918 when freight traffic was greatly stimulated by the war.

The average load per car in August was 28½ tons, the same as in July. This is the highest average for any August since the compilation of these records was started in 1917, except in 1918 when the average was 30.1 tons and August, 1920, when it was 29.8 tons.

The average daily movement per freight car during the month of August was 28.2 miles which was an increase of 2/5 mile over that for July this year and the highest for any August since the compilation of these records began in 1917, exceeding by 4/5 mile the average for August, 1920, and 2 1/5 miles the average for August, 1918.

In computing this average movement per day, account is taken of all freight cars, including all cars in transit, cars in process of being loaded and unloaded, cars undergoing repairs, also cars on side tracks, either awaiting repairs or for which no load is immediately available.

Domestic sales of oak leather belting for September are reported by the Leather Belting Exchange, representing about 60 per cent of the total product, at 416,510 lb., valued at $783,871, or an average of $1.88 per lb. This compares with 466,258 lb., $881,228 and $1.89 per lb. in August and with 475,380 lb., $797,213 and $1.68 per lb. in September, 1922.

TRADE INFORMATION

Important Possible Effects of Consent Decree by the Attorney General

WASHINGTON, Oct. 22.—Officials of trade associations interested in the gathering of trade information and market data have been advised of the possible effects of the proposed consent decree of the Attorney General against the Tile Manufacturers' Credit Association through a notice sent out by Nathan Williams, associate counsel of the National Association of Manufacturers.

The Department of Justice proposes to enjoin the Tile Manufacturers' Association from collection of certain types of statistical and other information, a move which is regarded as detrimental to industry in that it may prove an entering wedge for legal action against other trade associations.

Mr. Williams has advised executives of trade associations that the proposed consent decree which would provide, however, that the Tile Manufacturers' Credit Association and others named as defendants might receive and compile, for transmission to any Government agency, such information and statistics as such agency might request as to production, stocks on hand and prices. Such associations would be restrained from distributing information so collected among its members. The permissive features of the proposed decree follow the general lines of the consent decree entered in the case of the Gypsum Industries Association, which made no mention of the subject of statistics.

Because of its possible effects upon the activities of the trade associations generally, Mr. Williams held two conferences this week with A. T. Seymour, assistant to the Attorney General. He urged that in the public interest the draft of the decree be modified by the elimination of all reference to Government departments. Contention was also made that the collection of information by Government departments is properly controlled by statute. It was further urged that in the description of permissible activities of trade associations that cost accounting be included.

In his conference with Mr. Seymour, Mr. Williams made it clear that American industry depended upon accurate business information. He said there would be "serious consequences to the business fabric if the proposed decree should be entered in its present form. In our opinion, such a decree would, in effect, serve notice upon all trade associations that the Department of Justice regards the collection of statistical and other trade information, because occasionally misused, within the condemnation of existing law, and to be prohibited in so far as the Department of Justice was able to accomplish that end."

COMING MEETINGS

October

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Iron and Steel Institute. Oct. 25, fall meeting in New York; Oct. 26, visit to Aberdeen Proving Ground, Md. E. A. S. Clarke, 40 Rector Street, New York, secretary.

Society of Automotive Engineers. Oct. 25 and 26. Production meeting at Cleveland. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

American Gear Manufacturers' Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

November

Electric Power Club. Nov. 19, 20, 21 and 22. Fall meeting at French Lick Springs Hotel, French Lick, Ind. S. N. Clarkson, Rockefeller Building, Cleveland, secretary.

Southern Metal Trades Association

Before the Texas division of the Southern Metal Trades Association at Galveston, J. H. Dore of Houston gave a talk on migration and immigration, referring particularly to the negro migration to Northern cities from many parts of the South. He said that Texas has not yet been very much affected by the migration and he urged that manufacturers do all in their power to improve the conditions of the negroes in the South, particularly in giving them better opportunities for education along industrial lines and for better housing and living conditions. He urged that such a policy would be wise for financial reasons as well as from a moral and religious standpoint.

W. C. Trout, vice-president and general manager Lufkin Foundry & Machine Co., Lufkin, Tex., brought up the subject of freight roads west of the Mississippi that particularly affect the foundry industry in Texas, holding that they have some unjust features. A committee was appointed, consisting of W. C. Trout, chairman; W. S. Mosher of Dallas, George Holmgreen of San Antonio, James H. Dore of Houston, and J. L. Black of Beaumont, to take up the matter with a view of getting rates properly adjusted.

A number of members participated in an informal discussion at the luncheon and a most friendly feeling among competitors was manifested. The importance of bringing about results through association work was urged.

F. H. Elmer, superintendent Lucey Steel Foundry, Houston, gave a practical talk on "Kinks in the Steel Foundry." V. K. Terry of Lufkin read a paper on "An Apprentice System for Skilled and Executive Help."

The association is using its influence to the utmost to encourage its members to produce high grade castings and to adopt cost systems which will enable them to know the real cost of manufacturing. W. S. Mosher, Dallas, and others spoke on the importance of perfecting organization work; and in order to form a closer and more efficient organization, it was decided to hold a meeting Nov. 17 at Waco.

Unemployment Insurance

That legislation like England's unemployment insurance measures probably will never be needed in the United States is the opinion of economists of the National Industrial Conference Board, New York. Economists returning from Europe have commented recently on the unsatisfactory condition of the workers in the United Kingdom, and former Premier Lloyd George in a statement recently in New York confirmed this view. Government doles and insurance against unemployment in the United Kingdom are in contrast with recent developments in American industry, where the workers and their employers have joined hands to insure an all-year-round wage.

Notable among these developments the board cites the Procter & Gamble Co., Cincinnati, which has virtually guaranteed continuous work to its employees. Likewise, the garment workers and their employers in Chicago have reached an arrangement whereby unemployment benefits will be shared by over 35,000 men and women, both workers and employers contributing toward this arrangement.

The Federal Trade Commission has set Oct. 31 as the date to begin hearing in the Bethlehem-Midvale merger case. Proceedings will take place at Washington, New York, Boston, Philadelphia and Buffalo.

Filtering Dirty Gas Through Flue Dust

Dry Cleaning of Blast Furnace Gas, Based on Tests at Monessen Plant of Pittsburgh Steel Co.— Calculation of Areas Required

BY GEORGE B. CRAMP

IN the use of dust as a filtering medium for cleaning gas, it will first be observed that the coarser the filter dust used, the greater the volume of gas and the higher the velocity that may be passed through a given area and thickness per unit of time. The finer the filter dust, the less the volume and velocity permissible, though the gas passing through a given thickness of fine dust will be cleaner than if passed through the same thickness of coarser dust.

Though it is possible to secure cleaner gas by passing it through a thick bed of coarse dust, in practice a uniformly coarse dust is not available and, with the not exceeded, the dust in neither half will be blown from the curtain grids.

In a dust curtain with a uniform thickness throughout its area, but one-half of which is filled with coarse dust and the other with fine dust, gas will pass through both grades. But through the coarse grade the rate of flow will be greater and, while the safe rate of flow through the fine dust is not exceeded, dust will not be carried from the curtain.

It will therefore not be necessary to approach too closely exact uniformity of dust curtain thickness, to maintain comparatively uniform gas flow throughout

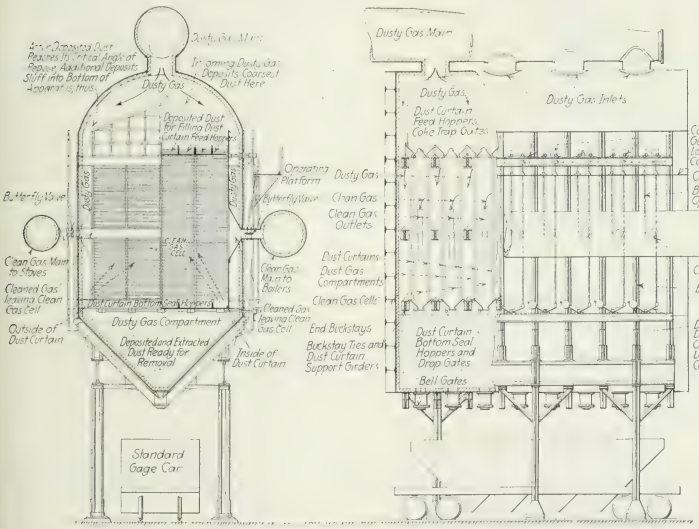


Fig. 3—Suggested Arrangement of a Full Sized Dry Cleaner for a 600-Ton Blast Furnace, There Being Eight Cells, One of Which Serves as a Spare

comparatively fine aggregates that are available, it naturally follows that the thinner the dust wall can be made, consistent with practicability, the less the resistance to gas passage through it.

Filter Dust Considerations

Although it is desirable to secure as nearly uniform thickness and grade of filtering material as possible, it will not be necessary to approach too closely such perfection in arrangement of the filter dust or dust curtain within the grids, as these constructions will be termed. For example, if a single curtain of dust is divided into two equal areas, one being twice the thickness of the other and both filled with the same grade or aggregate dust, gas will pass freely through both halves of the curtain. But through the thinner curtain the rate of flow will be greater, though, while the safe velocity of gas through the thicker half of the dust curtain is the area of the dust curtain, especially when filled with a comparatively uniform aggregate of flue dust such as will be available at or immediately beyond the dust catcher of a blast furnace.

Dust Curtain Grid Construction

In considering a suitable construction for retaining the filter dust in comparatively uniform thickness throughout, and which will permit the maximum surface of filter dust exposed to the passage of gas through it, the vertical grid construction in Fig. 1 has been developed. The advantages of a vertical over a horizontal grid or grate are, that the vertical grids may be filled and emptied by gravity and, when filled to the maximum angle of repose of flue dust, it is impossible to overfill or overflow them. Overflowing is prevented by designing the top edges of each louver forming the grid so that it will come slightly higher

than the foot of each pile of dust when lying at a minimum angle of repose. Overfilling is impossible, as the dust will not rise higher than its maximum angle of repose.

When dusty gas begins its passage through the small piles or heaps of flue dust maintained by the grid construction of Fig. 1, it leaves behind it the dust it carried up to this point and there is a tendency for dust to deposit on the surfaces of the dust heaps. But when these dust deposits reach a critical angle of repose, added deposits sluff off and fall down into the bottom of the apparatus, out of the way of the oncoming gas. This is by far the most important feature in the design of the dust curtain grids, as it prevents accumulation of undesirably fine dust, which would soon interfere with free gas passage, if permitted to build up to any appreciable depth on the surfaces of the dust heaps.

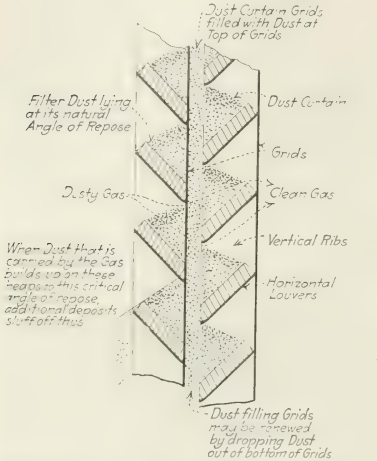


Fig. 1—Detail of Grid Construction, Showing Action of Dust in Forming a Filter for More Dust

Porosity and Permeability of Flue Dust

It is the general impression that flue dust is so extremely fine and fluid-like in action, especially when hot, that it is in itself almost seal tight against the passage of gas. This is true of the very finest dust only. But flue dust as deposited in a dust catcher, or just beyond it, is composed of particles about 1 per cent of which remain on a 20-mesh to the sq. in. screen when sifted, about 8 per cent on a 40-mesh, 16 per cent on 60-mesh, and 54 per cent will pass through a 100-mesh screen, from which it is observed that 66 per cent of flue dust remains on a 100-mesh screen.

As it may be assumed that the spaces or interstices between these dust particles are, on an average, not much less than the coarsest dust which passes through a 100-mesh screen, the size of these spaces may approximate 0.01 in. in all dimensions. This, if true, should permit comparatively easy flow or seepage of gas through an average of 1 in. thickness of aggregate dust.

Experimental Dry Cleaner

As shown in Fig. 2, the experimental apparatus is made up of two simple pyramidal shaped cast iron half shells bolted base to base, the small ends serving as gas inlet and outlet respectively. Inside these half shells, where their bases join, are fixed two adjustable grids, an enlarged section of which is shown in Fig. 1. These grids are filled with the dust to be tested, through the dust hopper on top of the apparatus. When filled, these grids form 1 sq. ft. of the so-called "dust curtain" area, which permits but 72 sq. in. of actual exposure of dust to gas passage through it. The top dust hopper is made gas tight by a cover which is gasketed and bolted on, after the grids and hopper have been filled with dust. This cover has a sight glass for observing any disturbances of the dust curtain, which is indicated instantly when the dust within the hopper suddenly sinks out in any considerable quantity.

On the bottoms of the half shells are provided dust hoppers, also having gasketed and bolted covers. These hoppers receive dust deposited at the various stages of the cleaning operation, as noted on the drawing. The gas inlet is through a 2½-in. pipe controlled by a valve of the same size. The gas outlet is through a 1½-in. connection to a 3-in. manifold having 1¼-in., 1-in., ¾-in. and ½-in. outlets provided with valves. Pressure and differential gage connections are provided on one side of the half shells.

When dusty gas is admitted through the inlet of the apparatus, after it has been assembled and filled with dust to be tested for permeability and cleaning quality, the gas immediately begins to permeate or filter through the dust curtain, thus cleaning itself. It then passes out one of the gas outlets. If the filter dust in the grids is a fine grade or aggregate, one of the smaller outlets is used to exit the gas and, the size of the outlet being known and the pressure noted, it is easy to approximate the volume of free gas passed through the dust curtain per minute.

If a coarser grade or aggregate of dust is used in the dust curtain, one of the larger outlets may be used. The proper procedure in a careful test, however, is to open the smallest outlet first; if no disturbance of the dust curtain is observed through the sight glass, this outlet may be closed and a larger one opened.

Tests were conducted with an experimental apparatus of this description at the Pittsburgh Steel Co. plant, Monessen, Pa., during July, August and September.

Objectives Sought

1.—Whether flue dust, as precipitated in the dust catcher, would permit the passage of gas when used as a filtering medium in the dust curtain grids of the experimental cleaner.

2.—If the dust is so permeable, to determine to what extent it is so, and arrive at the approximate volume of gas that can be passed through 1 sq. ft. of dust curtain per minute.

3.—Whether the gas, after passing through the dust curtain, will be cleaned, and to what degree of cleanness.

4.—To observe the effects of blast furnace gas pressure fluctuations, as they might affect or disturb the flue dust in the dust curtain.

5.—To determine what back pressure might result against the blast furnace if all gas were passed through a dust curtain similar to that used in the experimental cleaner, by noting the differential pressure that occurs in the experimental device, this differential pressure being the difference between the pressure on the inlet side of the dust curtain and that on the outlet side.

6.—To note for how long a period of continuous operation a single charge of flue dust in the dust curtain grids is good.

7.—To observe effects that result from the high pressures that occur during a blast furnace slip.

The experimental cleaner was connected to the dust catcher at No. 1 furnace by a 2½-in. covered pipe, and was provided with water gages on inlet and outlet side of dust curtain. The dust curtain grids were then filled with dust taken from the dust catcher hot. This dust showed the following screen test:

Fifty-Pound Sample

Number of Screen Meshes per Inch	Weight of Dust Remaining on Screen	Specific Gravity	Per Cent of Total Weight
20	0 lb. 10 oz.	1.97	1[1/4]
40	3 lb. 13 oz.	2.32	7[3/4]
60	8 lb. 3 oz.	3.29	16[3/4]
80	8 lb. 1 oz.	3.71	16[1/4]
100	12 lb. 8 oz.	4.08	25
Through—100	16 lb. 13 oz.	4.05	33[3/4]

It will be noted from the table that the two finest parts compose over 58 per cent of the aggregate dust weight. With dust of this screen test used in the dust

curtain grids, the following results were secured, in tests to obtain the objectives enumerated.

Results Obtained

1.—Early in the test it was found that even the comparatively fine aggregate dust used is highly permeable to the passage of gas.

2.—This dust permitted gas passage of 15 cu ft. per min through 1 sq. ft. of dust curtain of 22 sq in effective surface, the working pressure being 10 in water column.

3.—Gas passed through this dust showed a dust content of but 0.083 part of a grain per cubic foot of cleaned gas. Wet washed gas for the tests at the blast furnaces of the company averages 0.122 part of a grain per cubic foot, in tests for cleanness.

4.—With the same size of gas outlet maintained that permitted the passage of 15 cu. ft. of gas per min. at 10 in. water pressure, increases in pressure as high as 20 in. water column were noted, without resultant disturbance of the dust curtain.

5.—Practically no appreciable pressure differential exists between the inlet and outlet sides of the dust curtain. If as much as ¼ in. differential occurred for an instant, it would immediately result in the dust curtain being blown; this does not occur when once a safe outlet size has been established, no matter what the pressure fluctuations.

6.—In tests of 2 hr. duration the tendency of the dust curtain to clog was noted and, from observations made, a single charge of flue dust acting as filtering medium in the dust curtain grids should be effective for at least 12 hr.

7.—As there were no severe furnace slips during test periods, slip conditions were simulated, by connecting a pressure air line to the experimental cleaner and, with the cleaner under a normal pressure of 10 in., air was admitted to a pressure of 15 lb., or 120 in. water column, within a period of 10 sec. With the same size of outlet as when working under normal pressure, 90 cu. ft. of gas or air was passed per minute under high pressure at the same degree of cleanness as during low or normal pressure, and without blowing the dust curtain.

Filtration being the principle on which this cleaning device is based, it follows that, with large filtering areas, low velocities are possible and, with low velocities existing, low differential pressure is effected and perfect cleaning is accomplished.

Dry Dust Cleaner Size for Any Blast Furnace Plant Readily Determined

With a device similar to the experimental cleaner used, connected to the dust catcher or gas main at any blast furnace at a point where it would be desirable or convenient to locate a working size dry cleaner, and with dust as deposited at this point, filling the dust curtain grids of the experimental cleaner; it is practically possible to arrive at the dust curtain area required in a working size dry cleaner for a blast furnace of any given capacity.

For example, if tests made at any 600-ton furnace showed that 15 cu. ft. of gas per min. may be passed through 1 sq. ft. of dust curtain at a normal working pressure of 10 in. water column, then to pass 62,500 cu. ft. of gas per min., which is based on 150,000 cu. ft. of gas per ton of pig iron, there will be required 62,500 ÷ 15 or 4180 sq. ft. of dust curtain, in a working size dry cleaner, to clean gas satisfactorily for stove and boiler use, under all working conditions of the blast furnace, including severe slips.

Arrangement and Dimensions of a Working Size Dry Cleaner

Fig. 3 shows a suggested arrangement of a working size dry cleaner for a modern blast furnace of large capacity. The dust curtain area is arranged to form cells, the insides of which are completely sealed by dust from the outside or dusty gas compartment. In operation, these cells are completely surrounded by dusty gas which must permeate and filter through the dust curtains before entering the clean gas cells, whence the cleaned gas may pass into the clean gas mains which lead to stoves or boilers. The dust curtains would be approximately 17 ft. sq. or 289 sq. ft. in area. Each cell is formed by two of these curtains, making a cellular surface equal to 578 sq. ft. Eight cells of this size should be built in a cleaner to handle the gas from a blast furnace requiring an estimated 4180 sq. ft. of cleaning surface, which allows one cell for a spare, this being necessary when one is shut down for dust curtain renewal.

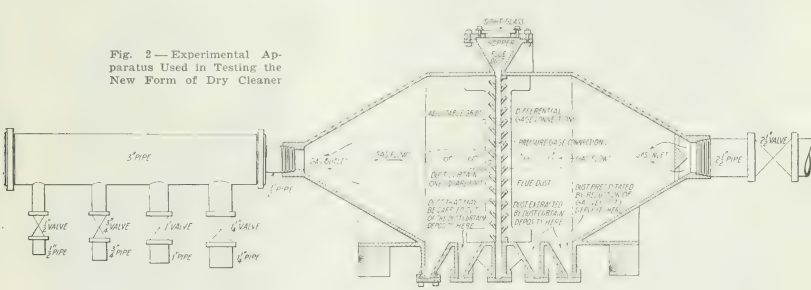


Fig. 2—Experimental Apparatus Used in Testing the New Form of Dry Cleaner

Operation

With the dry cleaner installed as near the furnace as possible, so that the coarser dust may deposit in the feed hoppers above the dust curtains, the gas from the furnace may be permitted to pass through the cleaner with the butterfly valves on all but one cell open. After sufficient time has been allowed to fill the curtains with dust, the single cell that had been closed to the passage of gas will be opened to the passage of gas, but the next adjacent cell is closed for a period to insure its being filled, when it in turn is opened and another closed. This is done with all the cells, after which the cleaner may be said to be dust sealed, and all dusty gas must travel through some part of this dust seal to reach the clean gas cell and thence the clean gas mains.

To renew the dust in the curtains of a cell, the operator first closes the butterfly valves leading from a single cell. He then proceeds to flush out coke or other particles too large to pass through the dust curtain, by dropping the coke trap gates over each clean gas cell. After closing these gates, the dust curtain bottom seal gates are opened for a time sufficient for the dust filling the curtains to drop out, when they are closed. After sufficient time is allowed for the curtains to fill with dust, the butterfly valves are opened and the gas leaving this cell will be clean.

All operations are performed from one platform level by one man, whose time will not be wholly occupied in performing the operation. As there is no necessity for punctual performance of any duty connected with the proper operation of this cleaner, the attendant labor problem associated with this design should not be difficult.

Advantages

Advantages of this dry cleaner will begin at the furnace itself, where the low differential pressure on which the apparatus will operate will at no time affect in any way the performance of the furnace.

Within the apparatus several advantages are realized over other methods of cleaning blast furnace gas, by either the wet or dry process. The most important is that no cleaning medium or power need be supplied to the apparatus, the dust precipitated by the gas serving as this medium. In this respect a

tremendous saving is possible compared with cleaners in which cleaning medium or material, water, power or electric current must be supplied.

The high cleaning efficiency of this method of dry cleaning gives it an advantage even over many wet cleaning systems in present use, and accomplishes thorough cleaning under slip conditions as well as under normal working conditions of the furnace, an accomplishment as yet unequaled in blast furnace gas cleaning.

Possibilities

Beyond the dry cleaner lie tremendous possibilities as a result of its use. In the nature of conservation of sensible heat of the furnace gas there is better combustion in stoves and boilers, with resultant decrease in power costs, due to elimination of labor in upkeep and repair of equipment as a result of complete recovery of flue dust. This, at the average furnace, where no special attempt is made or ineffective means are employed to recover the dust, may run as high as 60,000 tons per year.

The extremely low dust content of gas cleaned by this method makes it possible to clean that part of the gas to be used by gas engines, by passing it through an indirect cooler in which the gas is cooled and the moisture condensed, bringing down with it the remaining dust, thus accomplishing complete cleaning and recovery of the last trace of dust without bringing the gas into direct contact with water.

As this principle of dry cleaning is operative on an extremely low differential basis, practically the same construction as is used for blast furnace gas cleaning may be considered for installation in non-ferrous and non-metallic industries, where it is desirable to remove or reclaim objectionable or valuable dust from furnace gas, that would otherwise be carried up the draft stack and lost.

PIG IRON STOCKS

Large Accumulation of Basic in Pittsburgh and Nearby District—Moderate Tonnages of Other Grades

PITTSBURGH, Oct. 22.—Various estimates have been current during the past few weeks as to the amount of pig iron available for market lying in furnace yards in the Pittsburgh and nearby districts. These estimates have ranged anywhere from 350,000 to 500,000 tons.

With an idea of determining the actual facts as to the stocks of iron available for market, THE IRON AGE asked 25 companies, representing 34 blast furnaces engaged partly or wholly in making iron for the market, located within the area bounded by Johnstown and Erie, Pa., and Dover, Ohio, and Wheeling, W. Va., to furnish figures of such stocks at the close of September. All but five companies, representing seven furnaces, have responded. It is evident from the replies received that the stocks are up to the higher estimate, as the total stocks of the companies reporting are 359,971 tons, and those not reporting are believed from unofficial but reliable information to aggregate approximately 150,000 tons.

Stocks of iron by grades in the hands of 20 producers, representing 27 furnaces as of Sept. 30, follow:

Foundry	48,476
Malleable	35,907
Bessemer	22,683
Basic	252,905
Total	359,971

Some of the basic iron reported as available for market is not strictly standard in analysis; the total given for that grade includes 14,413 tons of off-grade iron. Nor is all of the basic and Bessemer iron strictly available for market, since steel companies may well have a use, in the event of a more active steel market later, for much of the iron now considered as available for market.

Automobiles in Farming Communities

Pointing out that there is more room for automobile sales in the farm field than in cities and towns, the National Automobile Chamber of Commerce, 366 Madison Avenue, New York, estimates that there are now 70 cars per thousand persons in the country districts compared with 127 per thousand in the cities and towns. The greatest per capita use of automobiles is shown to be in villages between 1000 and 5000 population, in which 9 per cent of the people in the United States own 20 per cent of the total number of cars.

Considering cities in order of size, it is found that the largest have, in relation to population, the smallest number of cars. Thus in the cities of over 100,000 people there were 84 cars per thousand inhabitants, compared with 120 cars in cities of 25,000 to 100,000, with 150 cars in towns between 5000 and 25,000, with 230 cars in towns between 1000 and 5000, and with 70 cars in villages and country communities. The total is given as 102 cars per thousand people for the United States as a whole.

Structural Steel Sales in September

WASHINGTON, Oct. 20.—The Department of Commerce announces September sales of fabricated structural steel, based on figures received from the principal fabricators of the country. Total sales of 118,113 tons were reported for September by firms with a capacity of 223,360 tons per month.

Tonnage booked each month by 177 identical firms, with a capacity of 230,675 tons per month, is shown below, together with the per cent of shop capacity represented by these bookings. For comparative purposes, the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month.

	Actual Tonnage Booked	Per Cent of Capacity	Computed Total Bookings
1922			
July	158,012	69	172,500
August	156,559	68	170,000
September	146,827	64	160,000
October	133,037	58	145,000
November	112,367	49	122,500
December	138,737	60	150,000
1923			
January	173,294	75	187,500
February	184,887	80	200,000
March	220,400	96	240,000
April	186,117	81	202,500
May	131,875	57	142,500
June	118,214*	51	127,500
July	117,267**	51	127,500
August	134,189***	58	147,500
September	118,113****	53	132,500

*Reported by 176 firms with a capacity of 230,475 tons.
**Reported by 174 firms with a capacity of 230,280 tons.
***Reported by 172 firms with a capacity of 229,030 tons.
****Reported by 155 firms with a capacity of 223,360 tons.

Westinghouse Establishes New General Engineering Division

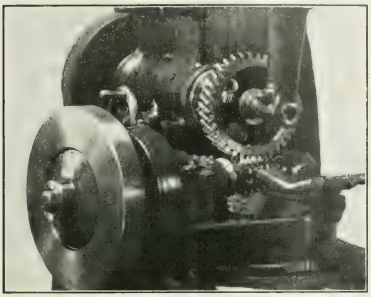
The Westinghouse Electric & Mfg. Co. at its South Philadelphia works has established a general engineering division which will be devoted to the study of central station and industrial plant problems. This will cover the application of steam power apparatus such as steam turbines, condensers and reduction gears. The department will also cooperate with the sales organization in providing engineering service to purchasers of the equipment.

In France powdered coal has been widely adopted as a fuel. In Germany, near Hanover, novel methods are being employed in the distillation of brown coal, a lignite quite different from American lignites, from which various valuable oils, paraffin and gas are being obtained. At Whitehaven, England, coal is being mined under the sea at a point 4½ miles from the shore line.

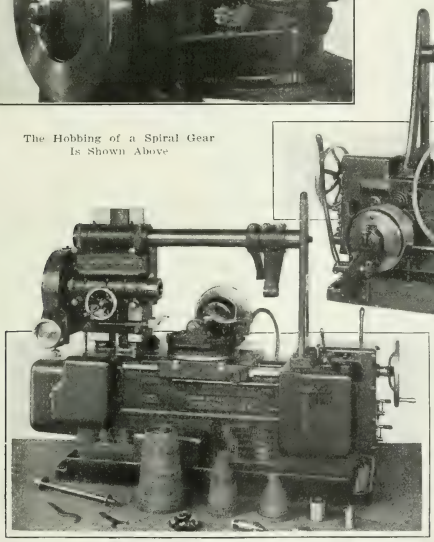
NEW GEAR HOBBING MACHINE

Equipment for Accurate Hobbing of Spur and Spiral Gears—New Features

It is generally recognized that a hobbing machine must be of highly accurate construction if its product is to be accurate to a high standard. In addition, it is desirable to amply proportion and design the parts so that the machine will remain accurate during years of steady service. With these fundamental require-



The Hobbing of a Spiral Gear Is Shown Above



New Gear Hobber Rated to Hob Either Spur or Spiral Gears to 18-In. in Diameter and 3 D.P. in Cast Iron or 4 D.P. in Steel. Low and compact design of the hob slide and swivel and simplicity of control are features. An outstanding feature is a differential that permits the use of any feed desired regardless of the gearing for the index or lead

ments in view the Brown & Sharpe Mfg. Co., Providence, has developed the machine illustrated herewith, designated as the No. 44, which is rated to hob either spur or spiral gears to 18 in. in diameter and 3 diametral pitch in cast iron or 4 diametral pitch in steel.

Low and compact design of the hob slide and swivel places the hob spindle close to the ways, which is intended to assure maximum rigidity. Simplicity and convenience of control are features. An outstanding feature is a differential that permits the use of any feed desired, regardless of the gearing for the index or lead and by the employment of which only one set of lead gears is used for any number of teeth for a certain pitch and angle. The differential is entirely automatic in operation, becoming locked when a gear is removed, as in cutting spur gears.

Power is transmitted directly from the main shaft to a friction pulley and passes to the speed change gears, then forward to the hob spindle and index mechanism and returns along the rear of the bed to the hob slide feed mechanism. For motor drive, the motor is mounted on a bracket at the rear of the machine. The friction type of pulley is considered an advantage, as it permits of moving the slide back and forth by power when the hob is stationary, thus eliminating hand operation. The outer end of the main drive shaft that carries the friction is mounted in ball bearings. The drive leaves the friction pulley sleeve and enters the feed box, where power is taken off for the hob lubricant pump and hob slide rapid advance and return mechanism independent of the hob drive.

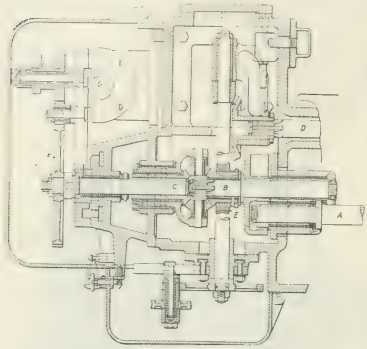
The main drive shaft transmits power to the front of the machine, where by means of change gears it is taken to the splined shaft which leads to the cutter carriage. Ten changes of speed, from 45 to 166 r.p.m., for the hob spindle are available. A bevel gear on the splined shaft, just mentioned, meshes with another on the center of the swivel and drives the hob spindle through a short shaft and helical gears. The front bearing of the hob spindle is removable to permit of easy adjustment and quick changing of hobs up to 5 in. in diameter. Accurate end adjustment is obtained by means of a graduated screw, movement of 0.005 in. being indicated. Endwise adjustment of 1½ in. has been provided for using several sections of the hob before resharpening.

Another feature of the machine is the application of a balance wheel on the hob spindle itself, which tends to steady the cutting action of both the hob and the machine and eliminate chatter. In addition, the gear which takes the drive for the hob spindle runs in its own heavy bearing, the driving pressures being carried by this bearing rather than being transmitted to the hob spindle. This bearing also carries the weight of the balance wheel, the hob spindle bearings carrying the cutting or hob load only.

The hob slide has large, flat bearing surface and long ways, and all gears in the slide and swivel are securely held to minimize backlash. The hob swivel is graduated and may be swung 90 deg. either side of zero, and a vernier is provided to permit settings of 5 min. of angle to be readily obtained. Swiveling either

side of zero is a feature emphasized as permitting the full range of the machine, both in angle of helix or length of face, to be used in cutting either right or left-hand spiral gears.

The splined hob spindle drive shaft *A*, Fig. 1, after passing through the hob slide, extends to the left end of the machine, where it enters the differential inside the machine bed. The shaft *B*, with the spider of the differential on it, rotates, this driving the opposite shaft at twice the speed. From this second shaft *C* motion is transmitted through the change gears to the index wheel. Up to this point the differential does not come into play and the machine acts like a spur gear machine. When the feed starts, however, the horizontal shaft *D*, under the rear hob slide way, which is connected with the feed screw in the feed case, begins to



revolve and transmits power through bevel gears to the lead change gears at the front of the machine. The lead change gears are easily calculated for any particular job by means of a simple formula and for a given pitch and angle of spiral, the gears remain unchanged regardless of the number of teeth or hand of spiral. After passing through the lead change gears the drive runs back to the differential, where by means of a worm it drives the worm wheel *E* keyed to the right-hand gear of the differential. As soon as this gear begins to turn in either direction the driven shaft *C* of the differential is accelerated or slowed down, as the case may be, and the resultant change of relative speed between the hob slide and the index wheel produces helical teeth.

The driven shaft of the differential carries the drive through to the index change gears *F*, which provide for cutting all numbers of teeth from 6 to 50 and all numbers from 50 to 180 excepting prime numbers and their multiples. After leaving the change gears the drive passes to the vertical shaft *G*, Fig. 1, and *A*, Fig. 2, and then through spiral bevel gears *B* to the worm shaft. The double-threaded index worm, *C*, at the bottom of the worm wheel, runs in oil and is hardened and ground all over.

The index worm *C* is clutched to its sleeve, which runs in bronze bearings lubricated by a ring oiler. This sleeve has mounted on it a ball thrust bearing *D*, so that end play can always be eliminated. On the end of the sleeve facing the operator is a hand wheel *E*, which after loosening two nuts *G*, permits the worm to be operated by hand. This is of great value in recutting gears, as it has graduations to indicate the relative adjustment of the work arbor. The worm can also be dropped out of mesh so that the index wheel can be turned by hand when truing up the work arbor. The index wheel *F* is of gray iron, finish hobbed in place.

The work spindle front end has a No. 16 taper hole with a 2½-in. hole through the center for holding shafts. It is fitted to receive a face plate or fixture. The work spindle slide is adjusted by means of a screw operated by a hand wheel and the thrust of the elevating screw is taken on ball bearings. A dial graduated to thousandths of an inch indicated the adjustment. The outer end of the work arbor is supported by means of a large overhanging arm equipped with arm braces. This arbor support has an adjustable center if needed, or a bushing can be used. A device is furnished for relocating the arbor support when the support has once been centered. Additional support for large gears is furnished by an adjustable rest placed back of the rim of the gear opposite the hob.

When the drive leaves the index change gears part of the power is taken off to drive the hob slide, the power first passing through a horizontal shaft on the rear of the machine. By means of transposing gears

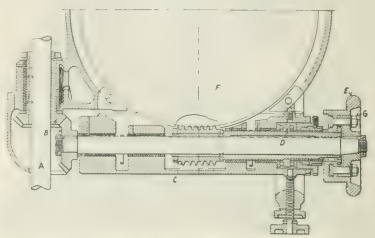


Fig. 1—At the Left, Is a Plan View Through the Differential, Showing the Arrangement of the Mechanism. Fig. 2, above, is a section through the index worm and its bearings

and a set of three bevel gears (which take care of the direction of rotation for right and left-hand hobs) power from the horizontal shaft is transmitted to the feed change gears in the feed case on the right-hand end of the machine. Twelve changes of feed in geometrical progression are provided from 0.010 to 0.153 in. per revolution of work. After leaving the change gears, power is delivered to the hob slide feed screw through a worm and a clutched wheel. The feed screw is actually a lead screw, as it is very accurately made and can be removed easily for replacement.

Two spiral bevel gears, having an intermediate and a clutch between them to give reversal, are mounted on the friction pulley drive shaft and drive the first hob spindle change gear on the front of the machine. On the hub of the bevel gear nearest the driving pulley is mounted a larger bevel gear that runs free on the gear hub and which rotates whenever the driving pulley turns, whether or not the friction is engaged. This large bevel gear drives its mate, which is mounted on a shaft from which the feed case lubricating pump and mechanism for quick movement of hob slide are driven. A vertical lever on the front of the feed case engages a friction clutch in either one of two gears which are driven in opposite directions by bevel gears from this shaft. This lever throws in the quick traverse mechanism. The hob slide also may be moved forward or back as may be required by means of the hand wheel *N* on the right of the feed case.

The feed case and differential mechanism are automatically lubricated by means of a pump in the feed case. The floor space required at right angles to hob spindle, with covers open, is 104 in., and parallel to hob spindle with covers open is 57 in. The net weight is about 6840 lb., which gives the necessary stability for accurate hobbing of gears.

Paul R. Delvin, purchasing agent for McQuay-Norris Co., manufacturer of packing rings, has been nominated for president of the Purchasing Agents' Association of St. Louis. Forty-two salesmen from various industries throughout the city were guests of the purchasing agents.

Preparing to Fight Pittsburgh Basing Plan

Politics Likely to Figure in Agitation in Congress at Approaching Session—Appeals Made to Farmers to Arouse Opposition

BY L. W. MOFFETT

WASHINGTON, Oct. 23.—Despite the manifest sincerity that inspires organizations that have been formed to oppose the so-called Pittsburgh base method of quoting steel prices, the widespread publicity that has been given this proceeding has forced the conclusion that it will be made the matter of politics at the next session of Congress. Evidence grows that this case is now being used as a means of appealing to the prejudices of the agricultural community. Indulgence in this sort of practice is more or less popular for the time being. This is due to the power of the farm bloc in Congress and by reason of the temporary distress of a portion of the agricultural section of the country, particularly the wheat farmer whose production represents 8 per cent of the total crop output of the country. As it happens, his ratio to the total agricultural production is approximately the same as the ratio of organized labor to total employment.

In the case of the wheat farmers, it is realized by the Administration that they are facing a serious situation as a result of over production and the curtailment of export markets, but it has been announced definitely that the Administration will not approve such methods as price fixing, Government warehousing, etc., suggested by some radical members of Congress.

It is believed that the effort of the Administration is to show the agricultural community that only sound remedies will be of any benefit, and among one of the proposals now made is one to lower railroad export rates on agricultural products. The farmers, however, are being appealed to in many directions to give the impression that they are the victims of excessive cost of the products which they buy while suffering from the low prices which they obtain for the products on sale. The Pittsburgh base case is being used in this connection and in view of the activity of legislatures of some of the Middle Western States in instructing their attorneys general to participate in the proceedings now before the Federal Trade Commission, it would not be surprising if members of the farm bloc in Congress undertake some move in opposition to the Pittsburgh base practice. As it happens, the hearings in the case will begin on Dec. 10, which is almost coincident with the reconvening of Congress and this, it is claimed, may give impetus in Congress to the agitation on the subject by the farm bloc. The organization last week in Chicago of the Associated States Opposing Pittsburgh Plus, involving 19 States, represents another phase to the case. It grew out of the appropriation of $55,000 by Illinois, Iowa, Minnesota and Wisconsin for the formation of a joint commission to fight the so-called "Pittsburgh plus" practice. The custom is being attacked from many sides and one of the outstanding features is that it is being tied up with the efforts of the Government to relieve the agricultural situation. Among other appeals being made to the farmers is that they are suffering from high freight rates on steel due to the Pittsburgh base method of quoting prices. The familiar claim is made that they are paying a fictitious freight on steel when it is bought at mills other than those in the Pittsburgh district. In this connection, a so-called estimate has been made that the Pittsburgh plan imposes a tax of $50,000,000 a year on the farmers of the country. Going further, it is declared that while this freight applies only to steel it also enters into other commodities using steel, including agricultural implements.

The claim also is made that materials entering into the manufacture of farmers' machinery, consisting chiefly of steel, representing 47 per cent of the cost, while labor in the farm machinery gets 22 per cent and the manufacturer gets 31 per cent to cover overhead, profits and taxes. Increasing wages 20 per cent in the industry, it is maintained, would increase the selling price 4.4 per cent, while increasing materials 10 per cent would advance cost 4.7 per cent.

James B. Howard, president of the American Farm Bureau Federation, has stated that 1,925,000 farms in 11 Midwestern States use on the average one ton of steel a year each. He contends that the steel sold to these farmers from Chicago, which he says is the chief producing point, costs the farmers an average of $7.60 a ton for so-called "imaginary freight" because while manufactured in Chicago, it is charged for on the Pittsburgh-plus basis. On this calculation, the farming communities of these 11 States, according to Mr. Howard, have to meet an extra expense of something like $29,000,000, but for the entire country he estimates that the total runs up from $75,000,000 to $100,000,000, when consideration is given to such matters as highway construction, office building, etc.

It has been pointed out that no matter how strong the arguments and logic have been in favor of the Pittsburgh base, they are familiar mostly to those in the trade only and that it would be a wholesome influence to counteract the appeals against the plan by acquainting the farming community and others with these arguments and the reason for the Pittsburgh base plan, as well as the fact that it operates only theoretically when supply exceeds demand.

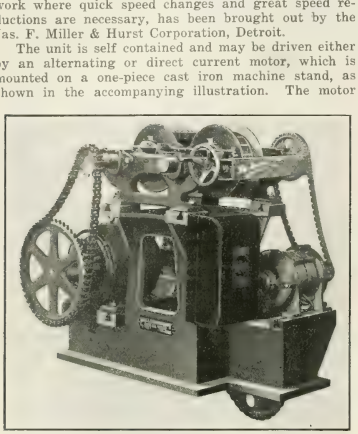
Opponents of Pittsburgh Basing Claim Large Saving

CHICAGO, Oct. 22.—Associated States Opposing Pittsburgh Plus held its first meeting at Chicago Oct. 17 with 10 States represented. B. F. Baker, Illinois, chairman of the executive committee, pointed out the handicap which Pittsburgh basing point system is said to place on the farmer through the increased cost of steel entering implement manufacture, and contended that because of the campaign against Pittsburgh plus steel is now $5 cheaper in the West than it otherwise would have been. B. J. Gibson, Attorney General of Iowa, urged the necessity of wide publicity to arouse sentiment against Pittsburgh plus and ascribed the progress made thus far to the earnest campaign which Western newspapers have waged against the practice. State Senator Randolph Boyd, who will represent Illinois at the hearing of the Pittsburgh plus case when the Federal Trade Commission hearing is resumed at Washington Dec. 10, asserted his State had this year saved $80,000 in the purchase of steel for roads, bridges and culverts as a result of the fight on Pittsburgh plus. This, he asserted, was a handsome dividend on his State's appropriation of $25,000 for fighting the Pittsburgh basing point practice. In addition to the 19 commonwealths mentioned in THE IRON AGE last week as being members of the Associated States Opposing Pittsburgh Plus, Utah, Louisiana and Mississippi have joined and are represented by the following directors: Governor Charles R. Mabey and Attorney General Harvey H. Cluff for Utah, Governor John M. Parker and Attorney General A. V. Coco for Louisiana, and Governor Lee M. Russell for Mississippi.

Power Unit for Operating Conveyors

A power unit, with a variable speed drive for operating conveyors used in handling parts through continuous baking and drying ovens, automobile assembling conveyors and conveyors for other material handling work where quick speed changes and great speed reductions are necessary, has been brought out by the Jas. F. Miller & Hurst Corporation, Detroit.

The unit is self contained and may be driven either by an alternating or direct current motor, which is mounted on a one-piece cast iron machine stand, as shown in the accompanying illustration. The motor



Power Unit for Variable Speed Drive of Conveyors. Quick change and large reductions of speed are features

is connected by a silent chain drive to the constant speed shaft of a Reeves variable speed transmission. The transmission is provided with ratios from 2 to 1 up to 8 to 1 on the same frame, and a range between these ratios can be had by turning the adjusting wheel provided. An intermediate roll chain drive connects the variable-speed transmission to a Ganschow spur-gear speed transformer or reducer, which effects a speed reduction of 132 to 1. The hardened steel gears of the transformer run in oil.

A roller chain drive connects the slow speed side of the transformer to the main drive shaft of the conveyor. With the variable speed transmission and speed transformer a speed reduction of approximately 6000 to 1 can be effected. An important feature of this unit is that any desired speed change can be made without stopping the conveyor and simply by turning the adjusting wheel. The plant may be either set on the floor on which the conveyor is located or it may be placed under the ceiling for the operation of a conveyor on the floor above. All chain drives are protected with safety guards. The unit is available in various sizes from 2 to 50 hp.

Dolomite for Refractories

Research work on the utilization of dolomite in refractories is being continued by the Department of the Interior at the ceramic experiment station of the Bureau of Mines, Columbus, Ohio. The main problem being studied is to combine the lime in the dolomite so that it will be non-slaking and at the same time hold up the refractories, thereby rendering available abundant deposits of dolomite for extensive use as a basic refractory. Work previously done by the Bureau of Mines on different fluxes for rendering dolomite refractories non-slaking indicated that by careful selection and preparation, refractory bricks could be made, one of the best fluxes tried being alumina-iron flux. More recent work done by the bureau consisted of slaking time tests on varying proportions of dolomite mixed with an alumina-iron flux. The proportion of flux to dolomite was varied between 5 and 20 per cent. The refractory properties as well as the slaking tendency of these mixes was studied. After the best proportion of flux to ground rock was determined, bricks were made by the soft mud and dry press processes, using both organic and inorganic binders. Then methods of firing to produce sound bricks were studied. As a result, a composition has been found which, when compounded with the proper binder and burned after a given procedure, produces a strong, non-slaking brick of high refractoriness. The bricks are satisfactory in every respect, except that uniform shrinkage has not been completley attained. During the coming year, bricks will be produced and tried out in the industry.

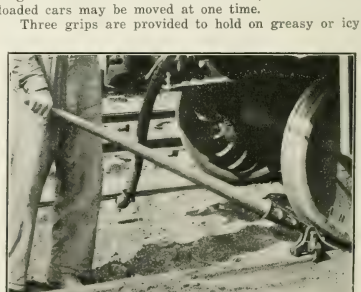
Iron Deposits Discovery in Ontario

TORONTO, Oct. 23.—The discovery of a valuable deposit of high grade iron, said to grade 73 per cent, at a point 64 miles north of Sault Ste. Marie, Ont., on the Mississanga Forest Reserve, has been reported to the Department of Mines. Dr. Miller, Provincial Geologist, and his assistant, R. G. McConnell, have left for the location and developments are awaited with interest. It is stated that if the discovery turns out according to expectation, it will mean a new era in the iron and steel industry of Ontario. The preliminary reports are to the effect that the ore bodies are extensive and that since the discovery of the iron deposit, some 30 claims have been staked, with a real rush on. Veins showing magnetite ore running to 60 and 65 per cent of iron have been uncovered in the claims held by McPhail and his associates. Considerable development work has already been done and a large amount of money expended.

Device for Spotting Cars

The device illustrated, known as the Congo car mover, for use in spotting cars for loading and unloading, for removing cars from one track to another, for spragging cars on grades and other service, is being marketed by Conewango Car Co., Warren, Pa. It is claimed that a loaded car may be moved 8 in. with a single downward stroke of the handle, and that two loaded cars may be moved at one time.

Three grips are provided to hold on greasy or icy



A Loaded Car May Be Moved 8-In. With a Single Downward Stroke of the Handle

rails, one grip at each side of the rail and one in the back. The main body, the operating lever and the operating lever shoe are of cast steel. The side rail grips are cast steel, case hardened, and the side die and rear die are of tool steel. Other parts are of rivet and spring steel, and the handle is of maple.

It is claimed that a car may be moved 40 ft. in a minute or the equivalent of ½ mile an hour on level grade, and the operator can slide the mover along the rail and keep a car in continuous motion. The operation starts with the workman standing in upright position, the handle being pushed downward to within 8 or 10 in. of the rail. Sure grip of the rail is a feature emphasized as preventing the danger of the operators' knuckles being struck or scarred against the rails

MARKETS DIE-CASTING MACHINE

Universal Unit for Large or Small Castings in Aluminum or White Metal Alloys

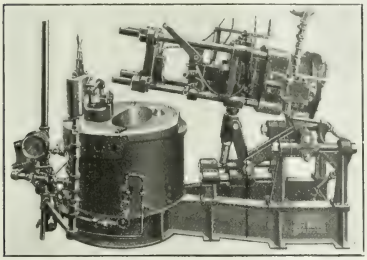
Edgar N. Dollin, 6 Church Street, New York, is marketing the die-casting machine illustrated, an outstanding feature of which is that it is interchangeable as to alloys, making, it is claimed, large or small castings in aluminum alloys or lower-fusing white metal alloys with equal efficiency.

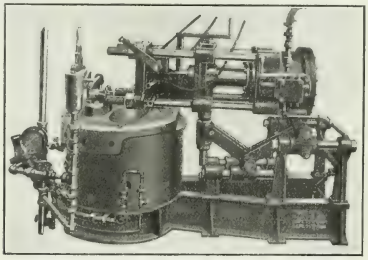
The machine is of the side gated type, the method of gating being on the sides of the dies, between die surfaces. Opening and closing of the dies and shooting of the metal is by power, operation being entirely by two valves. In addition, the machine has ample power to pull cores and slides. Capacity for high quantity and quality production is ascribed to the method of heat regulation, the method of applying air to metal and the size and design of goose-neck. It is claimed that as high as 300 operations an hour has been obtained. Ease of adjustment is also a feature, in many cases dies being changed in 15 to 20 min. Low upkeep cost is attributed to simplicity and ruggedness of design and construction.

The machine is made up of the base, die carriage, furnace, metal pot and goose-neck. The die carriage is operated by an air cylinder, which is 14 in. in diameter and has a 10 in. stroke. The stroke of the cylinder operates the die plates on the die carriage and locks the die to the nozzle of the goose-neck by means of the link, the die carriage being pivoted. Metal is shot into the die under 400 lb. pressure through a separate metal valve. An operating pressure of 100 lb. is constantly maintained in the cylinder, except when the dies are in a closed position, when a third-position of the valve shuts off the back pressure and vents the clearance of the cylinder to the atmosphere making in effect an air lock. This feature is emphasized as a basic development resulting in a saving of about 80 per cent of the power otherwise required to operate the machine.

Adjustments for various sizes of dies are simple. A rack and pinion is employed for endwise adjustment of the die carriage, and screw adjustment for height of the die carriage. The end plate on the die carriage may be moved also for depth adjustment of dies, but it is said that in most cases depth adjustment of the dies is not required, the variation being taken up with the air cylinder. Although one man can operate the machine, better production is said to be obtained with two men, because many dies are complicated and require a great deal of attention.

The distance between centers of bars is 16 in. high by 19 in. wide, and the greatest overall die depth is 18 in. The stationary vertical goose-neck is integral with the pot and is air operated. The pot capacity is about 1000 cu. in. Fuel oil is used for heating, although gas may be used also. The floor space recommended for the machine and two operators is about 9 x 10 ft. The shipping weight is about 3500 lb.





Die Casting Machine in Open and Closed Position. Opening and closing of dies and shooting of the metal are by power. The machine is operated entirely by two valves. Interchangeability of alloys is a feature

Points Similar to Those of Claire Furnace Case Discussed

WASHINGTON, Oct. 23.—A great deal of interest has been shown in the dissenting memorandum filed by Commissioner Van Fleet in opposition to the order announced by the Federal Trade Commission last Saturday against a number of sugar companies requiring them to "cease and desist from conspiring to maintain or retain the monopoly of the beet sugar industry enjoyed by them," etc. Commissioner Gaskill also dissented from the findings and order of the commission.

The memorandum of Commissioner Van Fleet is of particular interest to the iron and steel industry because he brings out points identical with some that are involved in the Claire Furnace Co. case now before the Supreme Court and in which the commission was enjoined by the lower courts from compelling iron and steel producers to submit cost data to the commission on the ground that the manufacture of steel is not interstate commerce. Commissioner Van Fleet points out that the manufacture of sugar is intrastate. The sugar proceeding is based on section 5 of the Federal Trade Commission act which declares unlawful unfair methods of competition in commerce.

Commissioner Van Fleet said the fact that the respondents are engaged in commerce in selling the sugar has no bearing on the case for the reason that the proof does not show any acts of unfair competition in such product. The acts to which the proof is directed, he said, concern only the manufacture. In declaring that it is well settled that production and manufacture are not commerce, Commissioner Van Fleet cites a number of important court decisions. The fact that an article in process of manufacture is intended for export to another State, he maintained, does not render it an article of interstate commerce.

Purely intrastate acts may or may not come under the Federal jurisdiction, depending on whether they affect existing interstate commerce, Commissioner Van Fleet said. And the same acts may or may not be subject to such jurisdiction. When such acts are subject to such jurisdiction, he pointed out, it is not because they are commerce but because they affect it or obstruct it.

Bids will be asked immediately for construction work on three schools and an addition to a fourth by the Board of Education, Huntington, W. Va. The buildings will be of steel and reinforced concrete.

BIDS FOR NAVAL VESSELS

Ships Condemned Under Limitation of Armaments Treaty to Be Scrapped

WASHINGTON, Oct. 22.—Bids for discarded vessels on the ways at Navy yards will be opened at 11. a. m., Oct. 25, and must be received at the Navy Department by that hour. These bids include the battleships South Dakota and Indiana at the New York Navy Yard, North Carolina, at Norfolk, and Montana, at Mare Island, and the battle cruisers Constitution and United States at Philadelphia. These vessels are to be scrapped on the building ways where they now severally lie.

Battleships afloat, which are to be sold Nov. 1, have already been rendered unserviceable for war purposes and are open for inspection. These include the New Hampshire and Louisiana at the Philadelphia Navy Yard, the Georgia and Rhode Island at the Mare Island Navy Yard, and the Connecticut at the Puget Sound Navy Yard. Later sales include vessels on the building ways at private yards, Nov. 8, and battleships afloat at Navy yards, Nov. 30.

Wholesale Prices in September

Reports to the Bureau of Labor Statistics show an increase of nearly 3 per cent in the average price of all commodities in September as compared with August. Of the nine groups of items listed, only fuels, metals and building materials showed a drop, these being slight in every instance. Increases occurred in farm products, foods, cloths and clothing, chemicals and the miscellaneous items, while house furnishing goods at 183 remains stationary, being now the second highest of all groups. Of the 404 commodities or series of quotations covered, 145 showed increases, 85 showed decreases, and 174 remained stationary. Details in the accompanying table, showing the groups of commodities, indicate that in only one group has there been a decrease since last year, that being in fuels, which were excessively high a year ago because of the coal strike.

	Peak of 1920	September, 1922	August, 1923	September, 1923	Advance in One Year Per Cent
Farm products	247	133	139	144	8.3
Foods	248	138	142	147	6.5
Cloths and clothing	346	183	193	202	10.4
Fuel and lighting	281	244	178	176	*27.9
Metals and metal products	203	134	145	144	7.5
Building materials	300	180	186	182	1.1
Chemicals and drugs	213	124	127	128	3.2
Housefurnishings	275	173	183	183	5.8
Miscellaneous	208	116	120	121	4.3
All commodities	247	153	150	154	0.7

*Reduction.

Figures of the National Industrial Conference Board show that the cost of living Sept. 15 was more than 1 per cent higher than the month previous, this being based on increases in food prices of 2.1 per cent, and in clothing of 2.4 per cent. The cost of living in September is thus placed at 63.4 per cent higher than in July, 1914.

Large Use of Blast Furnace Slag in England

British blast furnace owners are now deriving profit from the great slag heaps accumulated throughout long years. J. M. Paul, of the Stanton Ironworks, told a meeting of foundrymen at Manchester on Oct. 6 that the iron can almost be described as a by-product of the up to furnace at the present time. There is practically dant profit obtained from the sale of pig iron but the refra- is now notably valuable. About ten years ago Mines kers began purchasing slag as a substitute for fractor- and during the last three years the demand has tion and great. The slag is first crushed and then one of th tar.

More rec- Stanton Ironworks is selling 40,000 tons of ing time i month and 20,000 tons of this amount is with an with tar. There will be a big market for five dolomite ears to come but it seems, according to Mr. refracto Paul, that the supply is likely to run out before then. At Stanton four years ago there were slag heaps with five million tons of slag and these had been reduced until, at the present time, only a quarter of a million tons is left. In two years' time all the accumulated slag will have gone and a peculiar problem will then have to be faced. It requires 7 tons of tar for 1 ton of slag. It has not been found possible to use the cement made from slag for the manufacture of centrifugally cast cement water pipes, because of the high sulphur content which renders them porous.

Bookings of Steel Castings in September

WASHINGTON, Oct. 22.—The Department of Commerce announces September bookings of steel castings, based on reports from principal manufacturers, by companies representing over two-thirds of the commercial-castings capacity of the United States to have amounted to 47,574 tons, as against 50,515 tons in August. The following table shows the bookings of commercial steel castings for the past nine months by 65 identical companies, with a monthly capacity of 96,900 tons, of which 38,300 tons are usually devoted to railroad specialties and 58,600 tons to miscellaneous castings:

	Total		Railroad Specialties		Miscellaneous Castings	
Month 1923	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January	100,605	103.8	47,879	125.0	52,726	90.0
February	90,152	93.0	39,845	104.0	50,307	85.8
March	142,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,788	101.3	50,705	86.5
June	84,878	87.6	42,773	111.7	42,105	71.9
July*	52,066	53.7	16,741	43.7	35,325	60.3
August	50,515	52.1	18,332	47.9	32,183	54.9
September	47,574	49.1	21,685	56.6	25,889	44.2

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

Republic Iron & Steel Co. Earnings

Net profits of the Republic Iron & Steel Co. for the quarter ended Sept. 30, were $1,693,497, after taxes and charges, compared with a deficit of $138,676 shown for the corresponding period of 1922. After allowing the quarterly distribution of 1¾ per cent on preferred stock together with 3 per cent accumulation, the remainder was equal to $1.68 per share on common. Operating profits for the period were $2,384,527 as compared with $395,756 for that period of 1922. Based on quarterly reports net profits for the nine months of 1923 were $5,434,185.

Unfilled orders on hand Sept. 30, last, were 127,767 tons, as against 187,392 tons on June 30, and 199,431 on Sept. 30, 1922.

Preparation of Super-Refractories

Experimental work in the development of refractories from artificial sillimanite designed to be superior to the natural refractories now in use is in progress at the Northwest Experiment Station of the Bureau of Mines, Department of the Interior, at Seattle, Wash. The work is being done in cooperation with ceramic trade interests. Sillimanite is the normal silicate of alumina, containing 63 per cent Al_2O_3 and 37 per cent SiO_2, and is also made artificially in the electric furnace. The best compound found is one a little richer in alumina than the pure sillimanite. One of the principal problems is the presence of impurities in the local clays that affect the fusing point. It was found that iron oxide present as impurity could be partly removed by reduction, but magnesia and lime could not be removed.

Steel-Furniture Stock Shipments

WASHINGTON, Oct. 22.—The Department of Commerce announces that September shipments of steel-furniture stock goods, based on reports received from 22 manufacturers, amounted to $1,273,259, as against $1,345,147 in August, and $1,062,495 in September, 1922. The averages for the first nine months of 1923 and 1922 were $1,408,000 and $1,013,300 respectively.

Italy Depending on Rehabilitation Through Work and Frugality



DR. GIOLITTI

Large Excess Capacity of Plants Await in Part the Development of Water Power—Views of the Former Ansaldo Head

BY DR. RICHARD MOLDENKE

TURIN, ITALY, Oct. 8.—The September meeting of the (British) Iron and Steel Institute at Milan, Italy, was made the occasion of an extensive inspection of the larger iron and steel establishments of that country. The visitors were much surprised to see the rather large layouts which must have entailed necessarily heavy investments, considering the youth of the country's industry in its larger aspects. Indeed, while admiring the enterprise shown, and particularly the attention given the human problem, a feeling would crop up that here was much overcapacity with the burden of deterioration and increased overhead entailed, which would take time to overcome. It seemed that Italy had not escaped the general overconfidence manifest after the war in imagining that the scale of war-time production would continue indefinitely.

Those of us who have employed Italian labor, and consequently know something of the spirit of the man of the sod, take the important movement of "fascism" as the natural outcome of the desire to protect the innumerable little land parcels from the engulfment of communism, which seeks to take these away from their individual holders. It is a wave of conservatism marking the backward swing of the pendulum from so-called radicalism. This in Italy has found the man of the hour to head it consistently and successfully—even though we may think illegally. Any pubic interest in Italy must, therefore, be considered today in connection with this conservative movement. Abundant discussion with people in all walks of life here indicates that the Italian situation is of a two-fold character—that of the government and that of the people itself.

During the war the self-styled saviors of the world managed to feather their nests more or less successfully by the creation of new offices, socialization of industries, reduction of working time and efficiency and a general chasing of the rainbow millennium. The fascist movement here has cleaned out these incompetents, removed the drones among the necessary government functionaries, is balancing budgets more successfully and has put the government end of Italy on a sound basis. It now has to face internal conflicts which must be weathered successfully, otherwise things will revert to the old-school governmental ways.

So far as the Italian people themselves are concerned, this is quite another story. The complaint of little work for high wages, the suffering of the middle classes, scarcity of money, etc., are heard everywhere. There is much deflation ahead yet but it will be easy as compared with the other nations, for there is leadership at the top and an abundance of brawn and muscle to command at the bottom. Would that Russia and Germany had their Mussolinis to pull them from the slough of radicalism.

So far as the iron industry of Italy is concerned, the problems are somewhat special. Nature has given her some iron ore—and very pure ore at that—but she has to buy her fuel, unless this can be successfully replaced by the abundant water-powers readily available. Should this be accomplished successfully and soon, the existing overcapacity of the plants will be utilized,

DR. FEDERICO GIOLITTI of Turin, Italy, who is probably the foremost steel man of that country, was born near Turin on June 19, 1880. After the usual school work he entered the University of Rome, where he pursued classical and scientific studies, receiving the degree of doctor of philosophy in 1901. Dr. Giolitti then traveled some years, studying at Leipzig and Göttingen, and became professor of chemistry and metallurgy in the University of Rome in 1905. His natural bent for metallurgy brought him into close contact with the rapidly developing steel industry of Italy, and in 1907 he left Rome to join the Ansaldo interests. He soon became active head of this development, and in 1908 he built the great and modern Italian steel works at Genoa for his corporation, where guns, armor plate and ships are produced. In spite of all his activity, Dr. Giolitti found time to accept the professorship of metallography at the Turin Polytechnic Institute in 1912, and remained as active director of the fortunes of Ansaldo until 1919. Then he made his connection a consulting one, and took up a broader field in the general steel metallurgy of Italy and particularly its new development along lines using electric power for heat production. Dr. Giolitti is himself the owner of industrial establishments and is unquestionably a foremost authority on the financial and industrial problems of his country.

and Italy will enter the ranks of competitive exporters of finished steel products of the higher grades.

Interview with Dr. Giolitti

To get the viewpoint of the general situation with its bearing on the iron industry more particularly, the writer was fortunate in discussing the question with the foremost authority on the subject in Italy—Dr. Federico Giolitti of Turin. Dr. Giolitti is well known in the iron and steel world, and particularly to us of the United States. Not so long ago, while Professor Richards was living and presided at a dinner of the iron and steel committee of the American Institute of Mining and Metallurgical Engineers, Dr. Giolitti was the guest of honor and gave an instructive exposition of Italy's war work in steel development, which showed us a few new wrinkles. Hence his views on the present situation will be appreciated. These are about as follows:

Italy has to rely upon her water powers in the north to replace the missing coal she now has to buy. So the foremost immediate problem is the commercial production of pig iron electrically. With but a limited ore supply—though of great purity—and but few furnaces of the ordinary type available, the direction that has to be pursued is in the line of quality rather than huge tonnage of fabricating steel, so far as the home supply of materials is concerned. This, however, does not exclude the importation of semi-finished steel for working up into plates, shapes, wire, etc., and thus using to the utmost the excellent and abundant labor supply of the country. In fact, at the moment tariff legislation is being shaped to make it easy to import pig iron, billets, ingots, etc., for working up at home to supply the demands of the shipbuilding industry, for structural steel, automobile castings and supplies, as well as kindred requirements. The unfortunate European situation is now showing signs of easing up, and the activity of Italian plants may soon resume, as material can be secured.

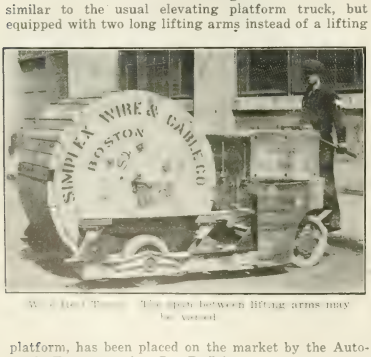
The problem of electrically produced pig iron is well under way for solution. When reckoned on a gold basis, Italian unskilled as well as skilled labor is today receiving less than in pre-war times. Between these two factors, therefore, with the world's supply of ore to draw from as wanted, the steel industry will shortly be on an excellent basis, both internally and for export. The very nature of the processes that must be used, however, will keep the output one of quality and hence financially valuable.

The question of deflation, so intimately associated with wages, is one that must go on very slowly in Italy if disastrous consequences are to be avoided. Sudden jumps upward in values would disorganize everything, and the real problem becomes one of materially increasing the solid wealth of the nation by the cumulative results of hard work, frugality and saving. With the underlying basis of solid accumulation of substance, the rise in the value of Italy's money will come naturally and as gradual as this wealth is created. Hence, while deflation has to come, for Italy it will come gradually and with far less friction than in other countries, as the Italian workman is a naturally contented man who, if protected from sudden fluctuations in living costs and remuneration, will adjust himself to conditions readily.

The Italian situation is, therefore, a hopeful one in spite of the necessary reconstruction burden incident to the great war. It will be worked out from within the country. Dr. Giolitti himself was much opposed to the post-war expansion of all the Italian industries, and actually gave up his active managerial connection with his own industry to devote himself to the coming problems of steel production, so that this growing industry of Italy might be kept within its natural and most effective channels of development.

Truck Designed for Handling Wire Reels

An electric truck for handling wire reels that is similar to the usual elevating platform truck, but equipped with two long lifting arms instead of a lifting platform, has been placed on the market by the Automatic Transportation Co., Buffalo.



Wide Reel Truck—The space between lifting arms may be varied

The lifting arms are built in the shape of a "wishbone," and lift the reel by means of a bar through the core of the reel. The span between the lifting arms may be varied, and is determined by the size of reels to be handled at the particular installation. By means of a device on each lift arm, known as a step-up jack, the truck is able to handle reels up to 84 in. in diameter. The step-up jacks are a series of interlocking terraces adjustable to meet the core of the reel. The front wheels of the truck are rubber tired, 16 x 3½ in., in diameter, and are equipped with large Timken bearings.

The raising mechanism consists of a separate motor and worm gear especially designed for this purpose and is direct connected to the lifting arms. The height of lift is 4½ in., and is accomplished by means of incline planes, which when raised rest on a solid surface, taking the entire strain from the lifting mechanism after the lifting operation is completed. The power or propelling unit consists of a heavy duty "automatic" motor and controller direct connected to worm gearing. A circuit breaker and interlocking device works in conjunction with controller and brake, making it impossible to operate the truck when the driver is not in position.

This truck is built in 6000 and 10,000 lb. capacities. The battery box accommodates several sizes of either Edison or Exide batteries, the particular battery for the truck being determined by the character of the service for which the truck is used.

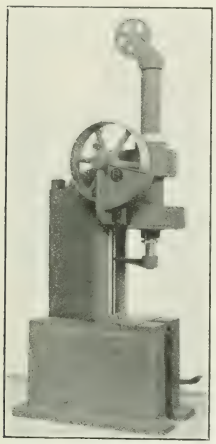
Atlas Steel Corporation Moving Charleroi Plant to Dunkirk

Atlas Steel Corporation has decided to concentrate its manufacturing activities at its Dunkirk, N. Y., plant and has started to dismantle its Charleroi, Pa., plant and to transfer the equipment to Dunkirk. The Charleroi plant was purchased from the Universal Steel Co., Bridgeville, Pa., by the Electric Alloy Steel Co., a Youngstown, Ohio, organization headed by Louis J. Campbell, son of James A. Campbell, president Youngstown Sheet & Tube Co. About a year ago this company and the Atlas Crucible Steel Co., Dunkirk, were merged under the name of the Atlas Steel Corporation. The Charleroi plant has been idle much of the time since the first of this year.

New Screw-Driven Arbor Press

The Fox Machine Co., Jackson, Mich., has placed on the market the power press illustrated, which is available in two sizes, 8 and 20 tons. In this machine, which is termed a "flexible" press, the power is said to be so applied that it is yielding, making a unit which is especially adapted for straightening, pressing in bushings, broaching and similar work. Speed of operation and the ease with which a pressure of 1 lb. or 20 tons may be applied are features emphasized, and the full pressure of the press may be applied without damage to the machine or tools.

In operating the machine the foot treadle is depressed, which causes the ram to travel down rapidly until it comes in contact with the work on the table, after which the pressure on the foot treadle controls the travel of the ram and also the pressure applied to the work. When pressure on the treadle is released a heavy coil spring causes the ram to travel up rapidly.



Power Press in Which Speed of Operation and Ease with Which Power Is Applied Are Features. Pressure on the foot pedal causes the ram to travel down rapidly. After coming in contact with the work the foot pedal controls travel of ram and pressure applied to work

The base of the machine is of box type construction, and is provided with a slot under the center of the ram to permit flanged shafts to be placed on the table. The top of the base forms the table and supports the column, which in turn supports the ram case, the column being of triangular section, heavily ribbed to withstand torsional strains. Tie bolts fasten the table, column and ram case together in one unit. The ram case is ribbed and trussed, as it is the opposite member of the table to take the ram thrust. The worm and worm wheel of the drive and the nut and friction band of the thrust mechanism are entirely inclosed.

The ram is of 0.50 carbon high-manganese chrome alloy steel, having a tensile strength of 135,000 lb. It has a quadruple thread of coarse pitch, which is intended to assure ample strength of section. The nose of the ram is equipped with a hardened steel thrust cap and a special nose piece is provided so that a variety of form tools may be used.

The rotation of the ram is obtained by a steel worm driving a phosphor-bronze worm gear, which is in turn secured to a long steel sleeve carrying the two keys that fit splines in the ram. This driving mechanism is inclosed in a grease case. The thrust of the ram is taken on an oversized ball bearing. The foot treadle, through levers, is connected to a band brake, pressure on the treadle bringing friction to bear on the brake drum, arresting the rotation of the drum and causing downward motion of the ram. When the ram comes in contact with the work, the pressure on the band brake regulates the slippage of the drum and directly governs the pressure of the ram.

On both sizes the maximum distance from the nose of the ram to the table is 20 in.; the stroke of the ram 18 in., and distance from table to the floor, 30 in. The diameter of the ram is 2½ in. and 3 in., and the distance from the center of the ram to the face of the column 8½ in. and 11 in. in the smaller and larger machines respectively. The base of the smaller machine is 22 x 40 in., the height, 115¼ in., and the net weight 3000 lb. The same dimensions of the larger machine are 30 x 52 in., 123½ in. and 5000 lb. net.

Crystallization Effect on Galvanized Iron Sheets

Manufacturers of galvanized iron and steel goods, specially corrugated sheets in which it is desired to obtain the best appearance, have always sought to produce a zinc covered surface having large characteristic spangles. Failure to do this is a frequently recurring source of trouble and loss. The absence of, or the production of, only small spangles has been attributed to many causes. The quality of the steel, either the presence of sulphides and other non-metallic inclusions, or its condition produced by rolling and subsequent treatment, the pickling, either caused by impurities in the acid, by the occlusion of gas by the metal, the temperature of the bath and the purity of the zinc, have all been blamed for the failures.

A paper by J. D. Hannah and E. L. Rhead, presented before the Institute of Metals in September in Manchester, England, gives an account of a research to ascertain the real causes. Little assistance, say the authors, can be obtained from literature on the subject.

The research shows that the metal—iron or steel—has practically no influence on the result if the temperatures are satisfactorily maintained. After the conditions of good work had been established, samples of both good and bad sheet from which the zinc had been stripped, gave equally good results. It was shown that pure zinc did not yield the desired large spangles and that too high a temperature interfered by producing large quantities of a zinc iron compound which crystallized in needles on the metal and interfered with the development of the spangle. The presence of tin or aluminum—contrary to expectation and as commonly stated—did not produce the desired result, but the addition of lead did so immediately.

Judging from the known relationships between zinc and lead the authors argued that the separation of the impure zinc forming the layer on the metal sheet into conjugate solutions—lead rich and zinc rich—at the dipping temperature, and the method of subsequent crystallization, were the causes of the effects obtained. That this occurred was proved by the analysis of different types of spangle occurring on the same sheet, and by the observed differences in the rate of attack of different spangles forming the coating. The separation is attributed to the difference in the surface tensions of the two solutions. That such differences exist was proved by experiment.

Proof of the hypothesis is furnished by the fact that bismuth, the only common metal that resembles lead, more or less, in its relations with zinc, produces similar effects. The temperature at which good results can be obtained is limited by the tendency to form excessive amounts of the iron zinc compound previously referred to, and the time occupied in dipping and cooling.

Foundry and Machine Shop Labor

Reports to the Department of Labor covering 351 foundries and 429 machine shops, and covering 32,166 employees in the foundries and 58,914 in the machine shops, give average full time hours per week as 52.4 for men and boys in foundries, 50.8 in machine shops, and 49.2 for women in both foundries and machine shops. The average hourly earnings in foundries amounted to 55.9c. for men and boys and 40.4c. for women. In machine shops these figures were respectively 55.6c. and 36.6c. The average full time earnings per week in foundries are given as $29.29 for men and boys and $19.92 for women. For machine shops the figures are $28.24 for men and boys and $17.97 for women.

First Japanese Buying Activity Appears

Demand for Gas Pipe and Sheets—Inquiries for Cast Iron Pipe, Nails, Light Rails and Wire—Several Hundred Motor Trucks Bought

NEW YORK, Oct. 23.—A genuine buying movement by Japan seems to have started in the past week, but it is questioned in some quarters whether it will continue, or, when immediate needs have been satisfied, there will follow a brief period of quiet, preceding the purchase of needs for more permanent construction. The present activity, as far as can be ascertained, is confined to purchases by warehouses in Osaka, Kobe and other cities, whose stocks have been reduced by recent heavy demand for emergency material.

In addition to these purchases there are a few inquiries for light rails and a heavy demand for gas pipe. The inquiry of the Imperial Government issued through the Japanese Embassy at Washington and disseminated by the United States Department of Commerce has been considerably curtailed, according to Japanese officials and may not exceed 20,000 to 25,000 tons of material, compared with an original estimate of 60,000 tons. Some confusion apparently prevails over this tonnage and the method that will be pursued in placing it. Imperial Government representatives in the United States are now conferring on plans for awarding this business and whether to deal directly with makers or through Japanese export and import houses, the usual procedure.

Emergency Material Predominates

Inquiries now in the market from Japan include black sheets of Nos. 28, 30 and 31 gage, large tonnages of gas pipe, wire nails, plain and galvanized wire, motor trucks, etc. Concurrent with the revival of Japanese trade, the Chinese markets are exhibiting renewed life, although on a much smaller scale than in Japan. Chinese merchants are actively inquiring for wire shorts and second-hand materials, but exporters report only small tonnages available. Particularly in the East it is difficult to obtain anything like sufficient second-hand plates, sheet bar crop ends and plate cuttings, all of which are popular with Chinese buyers. A few inquiries have been received for crates of galvanized sheets and a general interest in other materials is more apparent today than for some time past.

Heavy Buying of Black Sheets and Pipe

From Japanese purchasers inquiries for black sheets have reached fairly large proportions, ranging in size from as small as 50 ton lots up to 1000 tons to an inquiry. British sellers, it is reported, are unable to offer delivery until well into next year. Actual business booked in black sheets in the past week to ten days has undoubtedly been large. One export house reports a total of 3000 tons of various light gages placed with American mills, another a total of 4000 tons, another about 1500 to 2000 tons and another about 2500 tons. Demand for gas pipe is also reported to have been heavy and a large export interest is said to have booked several thousand tons in the past week. One company's export department reports heavy bookings of various domestic sizes of gas tubing and there are inquiries current for about 1,000,000 ft. in one instance and about 500,000 ft. in another. There is also prospect of a demand for cast-iron pipe, evidenced by a recent inquiry in the New York market for 2000 tons of 10-in. to 24-in. water pipe.

Inquiries for light rails are numerous and some business has been placed. Among the tonnages under inquiry is 25 miles of 60-lb. rails, another for 26 miles of 20-lb. and a recent purchase was made by the Nagoya Railroad, which placed 15 miles of 60-lb. rails with an American mill through an exporter in New York. Report of the award of the 93-lb. and 122-lb. rails for Kobe municipality, bids on which were opened Oct. 15, has not yet been received.

Considerable activity has taken place in purchases of motor trucks through official sources, probably about 300 trucks having been bought thus far. Included among the sellers are Mitsui & Co., 50 trucks; Takata & Co., 60; Mitsubishi Shoji Kaisha, 50, and Kongo-Shoki Co., 50. It is reported that about 100 more are to be bought. Some tin plate has been placed with American mills by exporters in the past week and bids are being submitted on numerous small and large tonnages of wire nails and wire.

Structural Steel Bought

Apparently some of the buying of heavy structural steel may not be as long delayed as was at first believed. Among recent orders booked by export houses was 800 tons of heavy beams taken by Takata & Co. for Kure arsenal of the Imperial Government. The arsenal, which is near Hiroshima, about 150 miles south of Osaka, was far from the devastated area, but the present purchase, it is believed, is for the erection of an additional building. It is reported that the government has a tool list for this arsenal in preparation, which will include upward of 100 machines. Another machine tool inquiry is reported that includes a large number of lathes. Neither of these lists can be confirmed.

Reconstruction Will Be Extended

"It is estimated in Tokio that the rebuilding of the devastated area of Japan will be extended over a period of five to seven years," says Commercial Attaché James F. Abbott in a recent communication. "The full employment of labor during that period, it is believed, will cause great prosperity throughout the Empire. Plans and specifications for the rebuilding of the affected area are being drawn up at present by the capital restoration board and it is expected that they will be completed in time to be submitted to the Diet when it convenes on Nov. 10.

"The shipbuilders and electrical industries were seriously damaged by the earthquake and the demand for electrical equipment is heavy at present. It is stated that the Government will probably make direct purchases of lumber and steel products in the United States.

"It is reported that considerable profiteering is going on, especially at Kobe, in spite of strict measures adopted by the Government to prevent such action. The Tokio Chamber of Commerce estimates an increase of 12 per cent in the average retail prices of 44 representative commodities, as compared with Sept. 1, while they are 5.6 per cent greater than on Oct. 15 of last year.

Yokohama Again Active as Port

"As a result of the heavy demand for shipping in transporting reconstruction materials, charter rates have advanced considerably, especially on lumber shipments. Yokohama is now handling import and export cargo in considerable quantities, and it is expected that it will resume its importance as a shipping port. The docks and warehouse at Kobe are reported to be somewhat congested as a result of cargoes being diverted there from Yokohama."

The General Commercial Co. of China, 9 Hankow Road, Shanghai, China, importer of iron and steel products, such as mild steel bars, galvanized and black sheets, plates, tin plate and copper, is desirous of obtaining the connection of an American exporter as a buying agent.

JAPAN AFTER THE EARTHQUAKE

Total Loss Placed at $915,000,000—Mostly Easy to Replace in Kind

In a review of the Japanese losses and conditions of restoration made by the Far Eastern Division of the Department of Commerce, the wealth of Japan is estimated at 98,846 millions of yen, of which the four provinces affected by the disaster accounted for 14,107 millions. Apportioning the loss by percentages of different types of property, varying from 60 per cent of the buildings, furniture, machinery, etc., in those four provinces to 0.1 per cent of the land, the total loss is placed at 13 per cent of the wealth of the four provinces or 1.9 per cent of the wealth of Japan. The figure is given as 1865 millions of yen or $915,000,000.

Many of the items are regarded as capable of easy reproduction, with a minimum expenditure for raw material, but considerable expenditure of Japanese effort. This includes the buildings, furniture, agricultural products, and many other items, aggregating 1461 millions, or approximately 80 per cent of the losses.

The study points out the fact that building construction in Japan is greatly cheaper than in the United States, because of the light construction of the buildings and the small amount of material going into them. No lath is used and the lumber is much less heavy than in American buildings, because of there being only one or two stories in most cases. The sliding panels forming partitions and in some cases exterior walls have merely a framework of wood, while the rest is Japanese paper. Similarly, with regard to furniture; many Japanese rooms contain no furniture of a structural type. There are no beds, practically no tables, very few chairs and other pieces of furniture indispensable in our homes.

Japan's capacity to finance rebuilding may be gaged by the fact that the deposits in postal savings banks a month before the disaster amounted to $550,000,000. The internal debt of the Government in 1920 was about $741,000,000, while the external debt was approximately $655,000,000. In addition to the savings banks, large amounts of Government bonds are held by Japanese individuals, the total, as shown above, exceeding the external debt of the country. The banking system is said to be so well organized that little difficulty need be apprehended.

As concrete and steel buildings proved structurally sound against the earthquake, and will probably in the future carry a much lower insurance rate than other types of construction, there is every possibility that the larger factories and office buildings will be so built. Japan produces portland cement in exportable quantities and imports practically none. The production in 1921 amounted to 7,686,136 bbl. In steel, however, Japan imports heavily, particularly from the United States.

Agricultural crops, particularly rice, silk, barley, wheat, fruits and other foods, totalled nearly $2,000,000,000 in 1921, these having been untouched by the disaster, and it is noteworthy that the amount of a single year's product in agriculture exceeds the total estimated loss by the earthquake and fire.

BELGIAN TRADE QUIET

Business Affected by Exchange Fluctuation—Pig Iron Weaker—Price Tendency Generally Downward

BRUSSELS, BELGIUM, Oct. 12.—The variation of exchange rates, of the pound sterling in particular, is causing much difficulty in trading. More than ever attention is turned to the stock exchange. Last Wednesday, Oct. 10, the rates continued unchanged, but business was quiet with a weaker price tendency than in the preceding week. Numerous works are making offers of material for early delivery. Some lines of business are completely paralyzed by exchange rates as some of the prices quoted are higher than the parity of the pound.

Pig Iron.—The tendency is toward lower prices, particularly in basic grades for which the current quotation is from 410 to 420 fr. British traders, however, will not contract at more than 400 fr. This weakness is attributed to the news that some of the Lorraine and Luxemburg blast furnaces are soon to be blown in. Satisfactory demand is reported in casting pig iron, and prices are fairly well maintained at 450 to 460 fr., delivered or f.o.b. Antwerp.

Semi-Finished Steel.—The market is unstable and between various mills prices differ from 75 to 100 fr., according to activity. The Hadir Society (Luxemburg-Differdanze) has made important concessions on prices in order to book orders totaling about 90,000 tons. But generally prices show a marked upward tendency. Current quotations are about as follows:

	Fr. Per Metric Ton
Ingots	510 to 530
Blooms	540 to 560
Billets	570 to 590
Largets	600 to 610

Finished Material.—Prices are unchanged with a slight tendency to weakness. Plants with the best backlog have only work left for about two months. The following prices per metric ton are current:

Bars and angles	720 to 725
Beams	685 to 690
Rods	900
Hoops, base	975

Sheets.—Very little activity is noted and less firmness in prices than during the previous week. Prices are as follows, per metric ton for basic material; open-hearth 25 fr. per ton higher:

	Fr.
5 mm. and heavier	750 to 760
3 mm.	800 to 820
2 mm.	850 to 875
1.50 mm.	950 to 975
1 mm.	1,150 to 1,175
0.5 mm.	1,325 to 1,350

Furnaces in Blast

Of 56 furnaces existing Oct. 1, 41 were in blast, 3 out, 12 under construction or repair, showing no change from September. On Oct. 1, 1913, of 58 furnaces existing 50 were in blast and 8 out. The production for August is estimated at about 215,000 tons.

Krupp Interest in Mexico Denied

PARIS, FRANCE, Oct. 12.—Published reports both in the United States and in Europe that the Krupp works of Germany were endeavoring to secure control of the Monterey Iron & Steel Co., located about 100 miles below the United States-Mexican frontier, are declared to me by the Krupp firm to have no trace of foundation. The reports date back as far as March of last year when a Mexican newspaper published the rumor. Now the statement appears in a Washington dispatch to a metropolitan journal, and this last report alleges that the Krupp objective is invasion of the South American market with cut price steel products. The Washington dispatch declares that the developments are being watched with the closest scrutiny by the Government and that developments indicate that the negotiations have been virtually closed by representatives of the Krupps.

I personally turned over this last published statement to the Krupp directorate and, after making a written denial of any truth in the report, that firm added: "We are far too much engaged in overcoming the difficulties in our own district to entertain such extravagant plans as are imputed to us."

It has become somewhat a fashion of late to make a bogey of the name of Krupp, and I gather that this is not appreciated at these works. One English paper has become more or less notorious by its cock-and-bull

stories as to Krupp expansion and I would therefore counsel reserve whenever one reads of Krupp purposes and intentions. My own observations based on recent inspections at the Essen plant leave no doubt in my mind that the Krupp directorate has got its hands full to hold together that which it has without casting about for new fields to exploit.

CAPT. GODFREY L. CARDEN.

French Mines Being Restored Rapidly

Remarkable progress has been made in reconstructing the French mining industry, systematically destroyed by the invading Germans, according to George S. Rice, chief mining engineer of the United States Bureau of Mines, who has just completed a prolonged study of conditions in France, Great Britain, Belgium, Germany, Poland and Czechoslovakia. As a result of the splendid engineering skill in restoration, some of the finest coal-mining plants in the world have been constructed in the north of France. Thousands of miners' houses have been built, replacing those destroyed. These houses are attractive and most of them have gardens redeemed from trenched and blasted ground. Such attention has been paid to welfare projects that the miners of northern France are better housed than miners elsewhere.

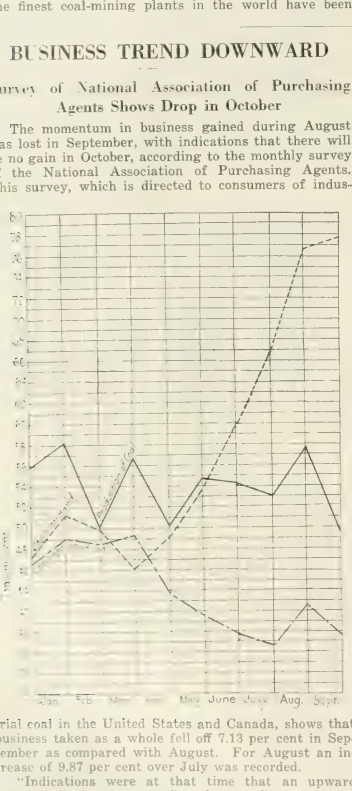
Underground, the mines have been recovered to such an extent that they are producing about 70 per cent of the normal coal output. When all of the water has been pumped out, the coal production of northern France will be greatly increased over pre-war. Ingenious cementation methods have been employed in restoring mine shafts in which the iron linings had been blasted to admit water, which flooded the mine.

Novel methods for obtaining petroleum, involving the mining of oil sands and their subsequent treatment at the surface, were observed by Mr. Rice in Alsace and near Hanover. This makes possible a greater recovery of the petroleum, two-thirds of which, it is estimated, is left in the ground after ordinary extraction by wells.

BUSINESS TREND DOWNWARD

Survey of National Association of Purchasing Agents Shows Drop in October

The momentum in business gained during August was lost in September, with indications that there will be no gain in October, according to the monthly survey of the National Association of Purchasing Agents. This survey, which is directed to consumers of indus-



trial coal in the United States and Canada, shows that business taken as a whole fell off 7.13 per cent in September as compared with August. For August an increase of 9.87 per cent over July was recorded.

"Indications were at that time that an upward swing in business was well under way," says the report. "The contrary has, however, proved to be the case, due to the sudden turn and dropping off of some lines of business.

"Of the total number of reports received from industrial coal consumers for the month of September, 37 per cent indicated increase in business, 22 per cent remained stationary and 41 per cent showed decreases, as compared with the preceding month. These percentages do not indicate improvement for October, as they show the business trend to be downward.

"The lines on the chart showing the consumption and stocks of coal are drawn from data supplied from all parts of the United States and Canada by commercial consumers of coal, and represent all lines and branches of business and industry. The line showing the production of coal is drawn from figures given out by the United States Geological Survey.

"The chart includes both bituminous and anthracite coal, and covers the total stocks in the hands of commercial consumers, the total tonnage consumed and the total production by months. (Coal consumed by the householder and his stocks are not included.)

Stocks on Hand	Net Tons
May 1, 1923	49,022,000
June 1, 1923	53,669,000
July 1, 1923	59,723,000
Aug. 1, 1923	66,937,000
Sept. 1, 1923	76,480,000
Oct. 1, 1923	77,620,000
Consumption	**Net Tons**
Month of April	43,658,000
Month of May	41,532,000
Month of June	39,720,000
Month of July	38,937,000
Month of August	42,750,000
Month of September	39,760,000
Production	**Net Tons**
Month of April	50,209,000
Month of May	54,735,000
Month of June	54,309,000
Month of July	53,062,000
Month of August	57,547,000
Month of September	49,527,000

(Of the September production 46,620,000 tons was soft coal and 2,907,000 tons hard coal.)

"The figures shown for stocks and consumption are estimates, based on monthly reports by consumers.

"The stocks of hard and soft coal in commercial consumers' bins on Oct. 1, were 1,140,000 tons greater than on Sept, 1. Based on the rate of consumption in September, the stocks on Oct. 1 were sufficient to meet the industrial requirements of the United States and Canada for a period of 58½ days on the average.

Coal Market Conditions

"The bituminous market during the month of October continued soft and sluggish, prices finding lower levels, and it does not look as though prices could stiffen any for some time, as production continues to exceed consumption by a considerable margin, and with very heavy stocks in consumers' bins, car supply ample and mines operating short time for lack of orders.

"The first week of October was marked with a sharp decline in the production of soft coal. The total output is estimated at 10,720,000 tons, a decrease of 565,000 tons, or 5 per cent. The chief factor contributing to the decline appears to have been a further softening of the market, resulting in part from the termination of the strike of anthracite miners."

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ESTABLISHED 1855

THE IRON AGE

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 419 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

The Principle of Authority

IN the opinion of Ferrero, the eminent Italian historian and philosopher, the loss of the recognition of the principle of authority was one of the greatest misfortunes that culminated with the war. Dr. Nicholas Murray Butler, in a recent address, expressed a similar thought in his reference to the way wherein now "men are grasping at dictatorship as a substitute for democracy and a relief." Already Italy, Spain and Germany have cheerfully abolished parliamentary government and have welcomed the assumption of leadership by a strong man who is capable of telling the people what they must do and enforcing obedience. In Greece and Turkey there has come about what is practically the same thing, though not in name. Russia, also, reverted to this, but in a perverted way, which, of course, is a great danger. In English-speaking countries democracy, so-called, has been made practicable by the two-party system, but even in them we can discern a crumbling of the principle of authority in the splitting of the great parties in Great Britain and the growth of "blocs" in the United States.

When people trying to govern themselves break up into groups seeking wilfully to have their own ways, the inevitable result is impotence, and if that goes too far, as it did in the first Russian Republic and more recently in Germany, there must ensue a desire for something akin to a dictatorship in order to get anything done. We are not by any means arguing in favor of such an eventuality, but are merely pointing out what is bound to happen. Italy seems to be in the process of recovery from chaos and despair through a beneficent dictatorship, but the Russians passed from the impotence of the Kerensky government to the malignant despotism of Lenin. The precarious position in which the world finds itself is due, Dr. Butler thinks, to the "sea of ignorance" in which humanity is immersed by powers greater than itself; and as Ferrero thinks by the sacrifice of the principle of authority.

At the present time the fate of the whole German people is hanging in the balance. At no time since the Armistice has Germany earned its own living. Its relatively small payments on reparations account and its deficit in domestic economic budget have been met out of liquidation of the residue of internationally negotiable property and out of the sale of German currency to foreign speculators. The aggregate of the sums taken out of foreign countries in the last way is huge. It has been estimated that the American speculation in German marks is measured by something like a billion dollars. It was when the Germans came to the end of their rope in this respect, toward the close of 1922, that they defaulted in reparation payments, which was followed by the French and Belgian occupation of the Ruhr.

This situation in Germany is explained by the Germans not having been hard enough at work. Numerically there has been a high rate of employment, but the performance of work in the aggregate has been inferior to what it used to be in pre-war times. This has been largely ascribable to the shortening of working hours as a consequence of the statutory eight-hour day enacted in the new republic. It has been demonstrated that the German people cannot earn their living, much less pay anything on reparations account, by working only eight hours a day, which has proved to be a diminisher of production.

The present political turmoil in Germany focuses upon this simple economic principle. Some of the political parties are so enamored of the short working day as a benefit to the working man that they are blind to the imminence of the working man starving to death while enjoying the doctrinal blessing. The industrialists, who are called hard boiled, are trying to avert national suicide, which would involve the innocent along with the fools. Stresemann has been given dictatorial powers by the Reichstag except with respect to the eight-hour day. The reservation as to it may be viewed, however, as a gesture for the saving of socialistic faces.

There is the clear-cut prospect that Stresemann will put all Germans to work on long-day time or else that the German people will dissolve in disaster. Either way it is certain that Germany has exposed the fallacy of any people shortening their working hours and retaining their previous scale

of living. Even in the United States, which suffered least by the war, this would still be a fallacy.

Foreign Trade Possible

THE sudden swing in September to a large excess of merchandise exports over imports furnishes practical proof of what has been urged on theoretical grounds, that a large foreign trade for the United States is possible despite our tariff and the depreciated currencies of most foreign countries. The point is that business has adjusted itself to conditions.

Our favorable merchandise trade balance exceeded four billion dollars in 1919, the calendar year after the war, and diminished almost continuously until it disappeared last March, in which month there was an excess of imports of $56,551,000. The excess of imports continued for three months more. July then showed an export excess of $15,575,000 and August one of $35,914,000. The report for September now shows $126,000,000 more exports than imports. The change from August to September, amounting to $90,000,000, is of more importance, even though both months showed export excesses, than the mere change from one side to the other.

The great increase in the trade balance from August to September occurred chiefly through exports increasing, though imports decreased somewhat.

The interest of the country as a whole and the interest of individual business establishments are not necessarily the same in this matter of export trade, although there are many men who would like to believe that they are. It is not only in the matter of foreign trade that men sometimes strain a point in their preaching. Employers will be told that they should pay high wages because that increases buying power and thus benefits all. On the same day workmen will be told that they should not seek high wages, for that increases the cost of living, and is bad for all. We are all competing, but somehow we seem to like to put in the background the fact that there is competition. Each employer wishes to keep down his expenses and each employee wishes to increase his income. That is competition. In foreign trade, circumstances permit exports, but greater exports of one commodity will not encourage greater exports of other commodities—rather the reverse.

The showing of recent statistics of our foreign trade is that large imports are possible, and still larger exports. The new tariff has not shut off imports. Imports in the first nine months of this year were at the rate of $3,880,000,000 a year, just short of our 1919 imports, much short of the 1920 imports and far in excess of the imports in either 1921 or 1922.

Exports in the first nine months of this year were at a rate far below exports in 1919, 1920 and 1921, but slightly above those of 1922. For the nine months the favorable merchandise trade balance is $35,466,000. It is commonly admitted that, ignoring our uncollectible debts, we do not need any merchandise balance to break even. If we wish to invest capital in foreign countries merchandise exports are the means, just as merchandise imports are the means if we wish to collect debts.

Currency depreciation in foreign countries may have placed difficulties in the way of our foreign trade, but there have been adjustments whereby in the case of most countries there are no barriers. The Federal Reserve Board's computation of index numbers for commodity prices in foreign countries, converted to a gold basis by computing from exchange rates, show 156 for England, 108 for France and 178 for Japan, against 159 for the United States, 1913 being 100 in all cases. Thus Japan is well able to buy from us and France well able to sell to us, while in the case of England there is as much freedom either way as in 1913.

Naval Power Cut in Half

ADVERTISEMENTS of the Navy Department covering 21 battleships and battle cruisers to be scrapped, in accordance with the Treaty Limiting Naval Armament, call for sales extending from Oct. 25 to Nov. 30.

It is worthy of note that the designed displacement of these 21 ships, 10 of which are still on the building ways, is greater than the displacement of the 18 ships which the United States is permitted to retain under that treaty. The 21 ships to be sold aggregates 610,050 tons, or an average of 29,050 tons each. The 18 ships to be retained as the backbone of the American navy aggregate 525,850 tons, or an average of 29,214 tons each.

The ships to be sold would have had a total broadside fire amounting to 292,250 lb. of metal on one discharge, while the ships retained can present a broadside of only 268,380 lb., or nearly 10 per cent less. The broadside of the ships being sold represents the fire of 335 guns against 314 guns retained in broadside. Included among the 335 were no less than 104 16-in. guns—the most powerful weapons ever built. Only 24 16-in. guns remain in our fleet, and these are individually less powerful than the ones discarded, because they are shorter guns.

Thus does the United States set the pace in reducing, insofar as possession of many powerful ships constitutes a menace to world peace, the probability of international conflict.

The Wheat Alarm

IT is difficult to grow excited over the wheat situation when some of the other alarms we have had in the past are recalled. In May, 1890, C. Wood Davis wrote that prospects were that home requirements would absorb all our food products by the end of the century, that is, in a decade from the viewpoint of a third of a century ago.

In 1898, before the British Association at Bristol, Sir William Crookes predicted a wheat scarcity for the world and said of the United States: "It is almost certain that within a generation the ever increasing population of the United States will consume all the wheat grown within its borders and will be driven to import." Later, James J. Hill issued more impressive and extensive warnings.

Early in the present century there was a scare

about the exhaustion of our iron ore. Nearly half the life expectancy assigned to the industry by one voluminous magazine writer has already elapsed. We have gotten over the scare.

Wheat will take care of itself, if there is anything to take care of. The wheat farmers represent only a small part of our agricultural activity. For the country as a whole there is nothing in the wheat scare, as can be shown by a very simple computation. Last year's wheat crop at 862,000,000 bushels and the farm price of Oct. 1, 1922, of 90.4 cents made $780,000,000. This year's wheat crop at 788,000,000 bushels and the Oct. 1, 1923, farm price of 93.2 cents makes $735,000,000. The 6 per cent decrease is not precisely calamitous. Furthermore, the corn crop, at 2,891,000,000 bushels last year at 61.6 cents and 3,021,000,000 bushels at 85.7 cents this year, increases from $1,780,000,000 to $2,590,000,000. The increase is $810,000,000, or more than the entire wheat value. That is, wheat could have disappeared entirely and the increase in corn would have more than offset the loss which would have been involved.

There is nothing harsh in making this little arithmetical computation. Even if it were granted that the politicians who are exercised about wheat really love the wheat farmer, no one doubts that the sellers of commodities who have expressed an interest in wheat are really concerned chiefly with the buying power of the agriculturists. They are not particular whether the farmers get money from wheat or from corn so long as they have money to spend.

Further Refutation of the "2 Per Cent 65 Per Cent" Claim as to Wealth

[From a review of Dr. Ingalls's article by "Scrutator" in the Chicago *Tribune*, Sept. 30.]

In the next number of THE IRON AGE W. R. Ingalls, noted mining engineer and economist, will publish an article effectively disposing of the formula that "2 per cent of the population own 65 per cent of the wealth of the United States." Mr. Ingalls shows pretty conclusively that they cannot own more than 30 per cent of the nation's physical wealth.

Readers of this column will recall that this formula, which some of our "progressives" have recently dragged from library shelves to the hustings, was discussed here and the opinion expressed that it would not hold water.

The writer used census figures as to the ownership of farms and urban homes, the known figures as to the ownership of bank deposits, insurance policies and corporation securities, and pointed out that the character of other property such as automobiles, furniture and clothing, indicated its widespread ownership.

The "2 per cent, 65 per cent" formula was derived from probate court statistics. Only this week the writer has received from an Iowa attorney a most crushing refutation of the whole theory of determining the distribution of wealth by such methods, and also an acknowledgment from one of the authors of the formula, that he is of a different opinion now. . . . Mr. Ingalls's paper, which is a most careful extension of the analysis essayed in this column, with an entirely different angle of approach in addition, ought to set the "2 per cent own 65 per cent" slogan to rest, but it will not. Like the myth of the 25,000 "war millionaires" it has become a legend and therefore immortal.

The Service of Wealth to Society

[From a review of Dr. Ingalls's article in the *Engineering and Mining Journal-Metal Market*, New York, Oct. 13.]

The claim that 2 per cent of the people of the United States own 65 per cent of the wealth has been thoroughly refuted by Dr. W. R. Ingalls in a well written article in THE IRON AGE of Oct. 4. Those who are at all acquainted with Dr. Ingalls's methods in compiling and analyzing statistics as, for instance, in his scholarly work, "Wealth and Income of the American People," will have no hesitancy in accepting his conclusion that the claim of 2 per cent of the people owning 65 per cent of the wealth is wide of the mark.

. . . When this subject is under discussion there is another thought that should be contributed. Those who make this claim of 2 per cent owning 65 per cent make the claim purely because they infer that this is all wrong. Probably they would claim it to be more or less wrong for 2 per cent to own 20 per cent or indeed any more than 2 per cent.

Any one who is disposed to think at all on this subject should read carefully a little book that has been widely circulated in the past few years: "The Things that are Caesar's; a Defense of Wealth" by Guy Morrison Walker. With great clearness the point is brought out that much of the so-called "wealth" is the tools of workmen. As wealth increases workmen have better tools and can produce more. They, and society at large, profit by this.

As wealth in the United States has increased, a week's wages has been able to buy more and more.

The main thing is that the wealth exists and performs service for society. It is a detail who owns it. Some of it is owned by those who have created it. To unscramble the wealth, to return machinery into iron ore in the ground, wood work to trees in the forest, and so on, would simply set us back to where we used to be, when men worked from dawn to dusk and got no more than a bare existence out of it.

To grab the wealth and distribute it would do an equal injustice to those from whom it was taken and those to whom it was given. It is idle to say that it was the workmen who created the wealth. The owners of coal land might as well say it as they, for the power derived from coal has had much to do with the creation of all the wealth there is today in the United States.

Public Control of Many Forms of Wealth

[From the leading editorial in the New York *Herald*, Oct. 15.]

"Two per cent of the people," announced Magnus Johnson shortly after his election to the United States Senate, "own 65 per cent of the wealth of the country." He stated it as an awful fact, portending revolution if conditions were not changed. Magnus apparently took this figure on faith from his friends LaFollette and Brookhart and Frear. It has become one of the major articles in the orthodox radical credo. But where did the figure originate, and what is its truth?

It was this last question that started Dr. W. R. Ingalls, author of the "Wealth and Income of the American People," on a quest, the results of which appear in the Oct. 4 issue of THE IRON AGE.

. . . It is of course important to keep in mind that the question of how the legal title to the nation's wealth is distributed is not the same as the question of how the benefits of this wealth are distributed. The richest man is limited in his personal consumption. He can only wear a limited amount of clothes and eat a limited amount of food. When he reinvests his surplus it is devoted to social uses; it gives increased employment, builds more factories, increases the world's sup-

ply of goods. One does not have to be a stockholder in the railroads to ride on them or to ship goods on them. One does not have to own the theater in which one is amused. To find what an immense percentage of the people enjoy the wealth of the country one does not have to resort to statistics. One has merely to look around.

There is another aspect of this subject which should never be lost to sight. It has to do with control over the developed resources of the country as opposed to the ownership of legal title to them. All the great public utilities of the land now in private ownership—railroads, electric light and gas works, street railroads and the like—are under rigid public supervision, which in many cases gives to the people through public officials far greater control over their operation and management than is possessed by the holders of their stocks and bonds. Manufacturers and the proprietors of numerous businesses are in the same general way restricted as to the uses to which their property shall be put and the manner in which their affairs shall be conducted.

CORRESPONDENCE

The Wealth of the Rich

To the Editor: In THE IRON AGE of Oct. 11 Frank J. Llewellyn contributes a thoughtful comment upon the editorial referring to my article in THE IRON AGE of Oct. 4. Mr. Llewellyn fears that my article, which in terms of high compliment he says robs the subject of all manner of doubt, may be employed as furnishing the final proof of the claims of those who want to "soak the rich." In other words, he considers that the difference between the true and fallacious percentages of the concentration of wealth is only one of degree.

Let it be so. The prime thing in our present state of affairs is the establishment of facts. Every one will agree that it is better to discuss things that are so than conjectures that are not. Facts, whether they be of engineering or economics, of the affairs of a single family or those of 27½ million in the aggregate, are often capable of different interpretations, and different persons will be guided by them in different ways. In the present instance we pass naturally from the field of quantitative economics into that of economic policy, or let us say simply politics.

My study made no attempt to measure changes in the distribution of wealth in this country. It is sufficiently an accomplishment to have established a reasonable survey as a starting point. Our present state of economic and statistical knowledge does not permit us to go much further. However, it is clearly indicated that in recent years, as one of the consequences of the economic upheavals of the war, there has been a wider distribution of our wealth.

Theoretically this is a good thing, but practically it may not be so. The conditions that have led to increased diffusion have been accompanied by enormous waste. There is a good deal of room for debate respecting the questions whether the people are happier with conditions of less wealth and greater diffusion or more wealth and less diffusion. In Russia and other parts of Continental Europe where land holdings have been subdivided production appears not to have increased but to have decreased.

In America conditions are quite different from those of Europe. We have none of the great landed estates that have come down by inheritance through centuries. Our wealth is more essentially industrial and is the result of brains and thrift. Our richest men are landlords to but slight extent.

The very creation of their fortunes has been beneficial to the people as a whole. Our American people would not be in their present enjoyment of automobiles to so great an extent if Henry Ford had not invented an ingenious mechanism and succeeded in producing it in an economic way. Nor should we have been able to operate our automobiles if John D. Rockefeller had not blazed the way to gasoline at a low price.

The concentration of great wealth in the hands of a few such men as Mr. Ford and Mr. Rockefeller is not economically detrimental but rather is it beneficial. Their personal consumption of it is so slight as to be negligible. In the main it is necessarily employed for the creation of more capital goods, such as railroads, factories and mines, which accrue to the advantage of everybody. It is far better that things should be so than that these concentrations should be diffused with great waste in the process.

I have a good deal of esteem for my fellow citizens and a good deal of confidence in their rightmindedness. I have discussed this subject with workingmen and have not discovered among them any jealousy of the rich or any objection to the concentration of riches providing that they have been honestly gained. None of us will dissent from the latter qualification. The opinion that I derive from these few personal discussions is supported by my observation that Henry Ford, who is our richest man, is also our most popular.

I am sure that there are no economic facts that we ought to conceal from our fellow countrymen. On the contrary, our great objective ought to be to get the facts before them, and it is our great problem how to do so. If we can succeed in this I am not afraid of any twisting of fact that demagogues may attempt. They will not get very far along on that line and will abandon it as soon as they discover that they are flouting the common sense of the people. Surely this is the best of all reasons for exposing fallacies.

W. R. INGALLS.

New York, Oct. 19.

Wealth a Trust Administered in the Interest of the Many

To the Editor: I was interested in the letter from Mr. Llewellyn which appeared in your last issue, suggesting that the reduced amount of wealth held by the so-called "rich" [as shown in the analysis made in THE IRON AGE of Oct. 4 by Dr. W. R. Ingalls], is still so large as to be unjust. To my mind, now that the amount of property held by the "rich" is approximately determined, emphasis should be given to the point that the holdings carry with them the duty and responsibility of management in the interest of large numbers of employees. Most of the radical speakers seem to hold the idea that the man of great wealth spends the money upon himself, whereas the fact is that the men who possess wealth which might be considered large enough to be dangerous are the very ones who usually live on a reasonable scale and work the hardest in the interest of the organization they control.

STERLING H. BUNNELL.

New York, Oct. 15.

Future of the American Society for Steel Treating

To the Editor: Having in view the solid growth of the American Society for Steel Treating, it is not surprising that the society feels well enough intrenched in its present position to look about for new fields to conquer. Since it has become necessary to amend its charter to conform with certain State laws, this favorable opportunity is being seized upon to redefine the scope of the society, and perhaps even change the name. Such open questions caused much animated discussion throughout the recent Pittsburgh convention, which apparently was valuable chiefly in showing the executive committee what was in the minds of the members.

Changes in the constitution and by-laws must be approved by referendum. Therefore in formulating their recommendations, the drafting committee undoubtedly will avoid jeopardizing the fundamental idea

responsible for the healthy growth of the organization. It might be well to ask, "What is this foundation idea?" Roughly stated, it is an effort to improve the art of steel treating by educating the practitioner, and by "practitioner" I mean workman and scientific researcher, foreman and laboratory worker, metallurgist and manager. Having been a close observer of the growth of the society, I feel sure that this idea is primarily responsible for the efforts of a goodly number of workers, the financial support from a hundred or more metallurgical corporations, and lastly, memberships from over 2000 "heat treaters." It appears obvious that future growth should be along lines which will alienate none of this support, but attract other men whose interests are closely affiliated with those of the present members.

Two different plans were argued at Pittsburgh, pro and con. In the first place, an effort may be made to gather in the non-ferrous metallurgists, that is, the "brass" men. Or on the other hand, the steel treaters may make a more determined effort to attract men working in the mills and foundries, the "steel" men.

It is an open secret that the Institute of Metals, interested in the production of non-ferrous alloys, is not altogether happy in its present association with the American Institute of Mining and Metallurgical Engineers. Could not its members be attracted to the Steel Treaters? The community of interest is that heat treatment is not confined to steel, but benefits other alloys as well. This is an attractive theory, but unfortunately the history of technical organizations in England and America indicates that the relationship between the ferrous and the non-ferrous metallurgist is not particularly close. At any rate, in both countries a split occurred in times past, and separate organizations have since been stubbornly maintained, and in England prosper exceedingly. Study of metallurgical literature also indicates lack of cohesion in men and ideas in the steel trades and those dealing with other metals.

In view of these facts it appears doubtful whether members of the Institute of Metals would be attractive proselytes, despite the circumstance that brass sheet is annealed, and that some steel treaters may sometime be asked to quench duralumin!

Such developments as outlined above might be characterized as sidewise expansion. It would be far better for the Steel Treaters to reach down deeper into their art, and gather in more of the men who are interested in *making* the steels and alloys which later must be heat-treated. Every heat treater has blamed his troubles on "poor steel" so often that if he is open-minded enough to join the society he ought to be glad to know something about the difficulties encountered in making an acceptable steel bar or a sound iron casting. On the other hand, the manufacturer has held the sack so many times that he ought to regard it as good business to join up more closely with his wide-awake customers in a mutual effort to improve profits by removing manufacturing troubles. From this angle, it would seem to be good business for the large corporations to get behind a movement which is primarily educational.

Furthermore, the technical men who will do the work ought to welcome the opportunity, for the steel industry has no technical association of national scope which is functioning in a manner worthy of the name. Without stating an opinion about the reason for this state of affairs, does it not make sense to suppose that hundreds if not thousands of men in steel and iron would give enthusiastic support to a society whose fundamental idea is an effort to improve the art of steel making and steel treating?

In conclusion I would plead that the Society for Steel Treating should strike its roots deep, rather than spread out at the top, having in mind that an oak will withstand a great tempest, but a poplar will fall before a small gust of wind.

E. E. THUM,
Linde Air Products Co.

New York, Oct. 18.

MODERATE IMPROVEMENT

Furnace, Steel Plant and Mill Conditions in the Mahoning Valley

YOUNGSTOWN, Oct. 23.—While still reflecting weakness in steel buying, operations of Mahoning Valley steel properties this week show a measure of improvement in some respects. In this district, plants of the Carnegie Steel Co. are averaging 80 per cent. The Trumbull Steel Co. is close to normal, with exception of four tin plate units, while the Sharon Steel Hoop Co. is operating all departments except three sheet mills.

Of the 46 blast furnaces in the Youngstown district, 27 are pouring. The latest to go down is the Grace stack in the Brier Hill group of the Sheet & Tube company. It is unlikely merchant furnaces which suspended the past 60 days will resume this year, owing to unfavorable conditions in the pig iron market.

Of the 51 independent open-hearth furnaces in the Mahoning Valley, 35 were scheduled at the beginning of the week for melting. All of the Bessemer departments are active, except that production is being kept below capacity through reduced number of heats or reduced working time.

The Trumbull company is operating its three strip mills on three 8-hr. turns. This week the Sheet & Tube company increased the number of active sheet mills from eight to twelve at its East Youngstown works, and is also operating five sheet mills at its Western Reserve plant in Warren. The 12-in. bar mill of the Sheet & Tube company, idle for some time, is also active.

Of 120 sheet mills in the Valley, 74 were scheduled this week. The Newton Steel Co., which has been operating all of its 20 mills, has reduced the active number to 14.

At its Girard, Ohio, plant, the A. M. Byers Co., Pittsburgh, is operating 80 of 88 puddling furnaces, this representing the high point of the year. This situation is due to continued improved demand for the company's product and better labor supply.

Individual operations are:

Youngstown Sheet & Tube Co.—Five blast furnaces, 13 open-hearths, Bessemer plant, two plate mills, two merchant bar mills on single turn, 17 sheet mills, 10 tube mills, four skelp units, rod and wire department and puddle furnaces.

Republic Iron & Steel Co.—Four blast furnaces, 10 open-hearths, Bessemer department, plate mill, two light bar mills, two skelp mills, six tube mills and eight sheet mills.

Trumbull Steel Co.—One blast furnace, seven open-hearths, strip mills at 80 per cent; 15 sheet mills and 25 tin plate mills.

Sharon Steel Hoop Co.—One blast furnace, five open-hearths, four strip and six sheet mills.

A. M. Byers Co., 80 puddle mills and two skelp mills.

Newton Steel Co., 14 sheet mills; Falcon Steel Co., eight and Mahoning Valley Steel Co., six.

At Youngstown, the Carnegie Steel Co. is operating six blast furnaces, the Bessemer department, 13 open-hearths and the blooming mills, in the Ohio Works. At its New Castle property, two of four blast furnaces are pouring, the Bessemer plant and bar mill are active. At the Farrell, Pa., works, three blast furnaces, 14 open-hearths, the bar and skelp mills are active. The 17 bar mills divided between the Upper and Lower Union mills and the McDonald works are all in full operation.

Plants of the American Sheet & Tin Plate Co. at New Castle, Shenango, Farrell and Mercer are operating virtually to capacity, with 90 tin mills and eight sheet mills active. The Farrell plant of the American Steel & Wire Co. is averaging 75 per cent.

Fabricating, car repair and tank plants are operating at a rate close to normal, with enough business to carry them over balance of the year.

Mechanical stoker sales for September are reported by the Department of Commerce to the extent of 60,486 hp., compared with 71,693 hp. in August and with a maximum month in 1923 of 100,513 hp. in May. The September figure is below the average (73,578 hp.) of the preceding eight months.

British Iron and Steel Market

Japan Buying Heavy Tonnages of Sheets—Tin Plate in Strong Demand—Argentina to Place 100,000-Ton Rail Order

(By Cable)

LONDON, ENGLAND, Oct. 23.

Improved tone in pig iron is maintained, with some expansion in both home and export business. Scotland is a particularly active buyer of Cleveland grades and prices are higher. There is talk of increasing output. Hematite is firmer with stocks diminishing. East Coast mixed numbers are being "talked up." On the West Coast 13 furnaces now are blowing.

Steel business expansion is hampered by a continuance of the boilermakers' dispute, now in its twenty-sixth week of duration. A conference is sitting today and hopes of settlement are entertained. Meanwhile new shipbuilding is almost stagnant.

There is some demand for plates and angles from the Continent. Makers are keen for orders and are giving 10 days delivery. Argentina is reporting considering ordering 100,000 tons of rails, probably on the Continent.

Continental position is disorganized by the political upset and exchange chaos. The works want orders, but only the Belgian are quoting in sterling. The other makers have withdrawn.

In Belgium franc prices are easier. Demand has fallen off considerably, owing to the fall in sterling.

In Luxemburg, Hadir has relighted the eighth furnace at Differdange. The Acieries Reunies de Burbach-Eich-Dudelange has banked one furnace at Dudelange.

In France, the Société Metallurgique des Terres Rouges has blown in one furnace at Audun-le-Tiche (Moselle). Thirty-one furnaces now are operating in Moselle.

In Germany (the Ruhr), mines and works are operating on a restricted scale. The Thyssen plants at Hamborn are shut down and 14,000 men have been discharged. Krupp's are contemplating dismissals. The Phoenix Aktien-Gesellschaft at Hoerde is employing only a portion of the labor forces.

Tin plate is firm, on large sales at home and for export. Inquiries are spreading over March. Some works are sold out to the end of the year. Others are giving early shipment, owing to suspension of German orders on account of financial difficulties. In general, Continental demand is quieter. South America is very active.

Galvanized sheets are firm, but sales are only moderate, except to the Far East, which is buying freely.

Black sheets are strong all around. Japanese 6 x 3, 13's, 107 lb., have sold up to £21 10s. (4.30c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.48 per £1, as follows:

Durham coke, delivered	£1	18s.	to	£1	19s.	$8.51 to	$8.74
Ruhbon Rubio ore	1	4				5.38	
Cleveland No. 1 foundry	5	2½				22.96	
Cleveland No. 3 foundry	5	0				22.40	
Cleveland No. 4 foundry	4	11				20.38	
Cleveland No. 4 forge	4	15				21.28	
Cleveland basic	4	10	to	4	14	20.16 to	21.06
East Coast mixed	4	18½	to	5	0	22.96 to	22.40
East Coast hematite	5	12	to	5	0	22.17 to	22.40
Ferromanganese*	17	10				78.40	
Rails, 60 lb. and up	8	0	to	9	0	35.84 to	40.32
Billets	7	10	to	8	5	33.60 to	36.96
Sheet and tin plate bars,							
Welsh	9	2½				40.88	
Tin plates, base box	1	3¹⁵⁄₁₆	to	1	3¹¹⁄₁₆	5.18 to	5.21
						C. per Lb.	
Ship plates	9	0	to	9	10	1.80 to	1.90
Boiler plates	12	10	to	13	0	2.50 to	2.60
Tees	9	10	to	10	0	1.90 to	2.00
Channels	8	15	to	9	5	1.75 to	1.85
Beams	8	10	to	9	0	1.70 to	1.80
Round bars, ¾ to 3 in.	10	5	to	10	15	2.05 to	2.15
Galvanized sheets, 24 g.	19	0	to	19	5	3.80 to	3.85
Black sheets, 24 gage	14	0				2.80	
Black sheets, Japanese specifications	15	5				3.05	
Steel hoops	12	0	&	12	10*	2.40 &	2.50*
Cold rolled steel strip, 20 gage	17	5				3.45	
Cotton ties, Indiaspecifications	15	0				3.00	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:						
Belgium	£5	5s.	to £5	10s.	$23.52 to	$24.64
France	5	5	to 5	10	23.52 to	24.64
Luxemburg	5	5	to 5	10	23.52 to	24.64
Billets (nominal)						
Belgium	7	0			31.36	
France	7	0			31.36	
Merchant bars:					C. per Lb.	
Belgium	8	5			1.65	
Luxemburg	8	5			1.65	
France	8	5			1.65	
Joists (beams):						
Belgium	8	2½			1.63	
Luxemburg	8	2½			1.63	
France	8	2½			1.63	
Angles:						
Belgium	8	0	to	8	5	1.60 to 1.65
¼-in. plates:						
Belgium	8	10			1.70	
Germany	8	10			1.70	
⅜-in. plates:						
Luxemburg	7	15			1.55	
Belgium	8	0			1.60	

Hearing in Assigned Car Case

WASHINGTON, Oct. 23.—Representatives of the iron and steel industry are present this week at the hearing in the assigned car case which was reopened under order of the Interstate Commerce Commission. Only spokesmen for the railroads were called in the first two sessions, and considerable time was taken up with examination of witnesses for the New York Central Railroad. It is expected that the traffic men of the steel industry will testify late this week as indications are that the hearing will be extended for several days.

It was brought out that 41 per cent of the Erie Railroad requirements of 3,800,000 tons of coal came from company mines. F. W. Holt in charge of Erie purchases, stated that 54 per cent came from mines not on the railroad and the remainder was acquired under ordinary contracts. The railroad now has about 65 days' supply on hand.

M. S. Connors, general manager of the Hocking Valley, insisted that abolition of the assigned car would amount to confiscation.

W. C. Bower, assistant manager of purchases and stores, told the commission that without the assigned car railroads would be obliged to contract for 30 per cent more coal than they would use and the result would be increases in price.

Canadian Scrap Market

TORONTO, ONT., Oct. 23.—Melters throughout Ontario and Quebec are adhering to the hand-to-mouth buying policy and as a result trading in iron and steel scrap is slow. As a consequence of the limited demand for scrap, dealers are doing very little speculative buying and are adding to their yard holdings only when offered material below the regular quotations. Dealers in both Toronto and Montreal districts, however, are well supplied with most lines of old material. Canadian dealers are offering the following prices for iron and steel scrap:

Dealers' Buying Prices

	Toronto	Montreal
	Gross Tons	
Steel turnings	$10.00	$7.00
Machine shop turnings	10.00	7.00
Wrought pipe	8.00	8.00
Rails	12.00	13.50
No. 1 wrought scrap	14.00	14.00
Heavy melting steel	12.00	11.50
Steel axles	15.00	18.00
Axle wrought iron	18.00	20.00
	Net Tons	
Standard car wheels	15.00	16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	20.00	20.00

Iron and Steel Markets

A WAITING MARKET

Railroads Expected to Supply the Forward Impulse

Automobile and Building Activity and Japanese Buying—Pig Iron Lower

Some expansion in automobile manufacture, sustained structural steel activity and, for Japan, buying and definite inquiries, stand out in an otherwise featureless steel market. In pig iron the story is one of scattered sales at prices 50c. and $1 below those of a week ago.

In bookings of finished steel the rate so far in October approaches 10 per cent better than for the same period in September. Mills devoted to one or two products have not done uniformly so well, orders with some plate makers not exceeding 30 per cent of capacity.

An improved scale of buying appears to wait on a flow of railroad equipment inquiries, which are expected to gather in volume in December. Meanwhile, necessity purchasing describes the present and immediate outlook. Taking 60 to 65 per cent of capacity, new orders and specifications on contracts are neither large enough to indicate that price cutting would bring an increase nor small enough to allow buyers to cease watchfulness for the upward turn.

The Pennsylvania Railroad's distribution of rail purchases is expected hourly at this writing, yet two roads in the West have asked for suspensions on old orders, one for 10,000 tons and the other for 60,000 tons, possibly for financial reasons. The Missouri-Kansas-Texas placed 18,750 tons with the Steel Corporation, 10,000 tons to be rolled by the Illinois company and the remainder in Alabama. Three roads have asked for 70,000 kegs of spikes, 30,000 kegs of bolts and 18,000 tons of tie plates.

Japan's purchases have included 1300 tons of light rails, 11,000 tons of black sheets, several thousand tons of pipe and 800 tons of structural material, and that country is actively inquiring for upward of 25,000 tons of sheets and a round tonnage of light and standard rails. England's sold up condition in sheets is requiring Japan's taking No. 28 and No. 38 gage in place of the lighter sheets desired.

A Cleveland mill sold 8000 tons of sheet bars on account of the Japanese orders and has reserved 40,000 tons for the first quarter, subject to prices prevailing at time of shipment.

Supplementing 6100 tons bought for October and November, Willys-Overland has closed for 1600 tons additional steel bars for early shipment. A Cleveland maker of automobile parts wants 1000 tons of molybdenum and 1000 tons of carbon spring steel. Detroit reports indicate automobile manufacturing close to capacity.

Among fabricated steel inquiries are some 6000 tons of bridge work, the largest in some time, and 10,000 tons for apartment houses in New York. Awards call for upward of 11,000 tons. September's bookings at 132,500 tons were substantially the average of the preceding three months.

The Canadian National Railways has placed two car ferries at Toledo, requiring 5200 tons of steel.

Strip steel continues weak, with quotations ranging from 2.85c. to 3c. and as low as 2.75c. for widths in competition with blue annealed sheets, light plates and skelp.

Price irregularities mark rerolled light rails, which are obtainable as low as 1.80c., and spikes, which have sold at 3.10c. A quotation of 3.70c. has appeared in black sheets.

Hope of pig iron sellers of being able to stop the downward trend of prices has rested on decrease of production and a number of merchant furnaces have either been blown out or will soon be put on the idle list. Whether this curtailment of operations will proceed rapidly enough to stop further price declines is not certain. Only five merchant stacks are now in blast in the Pittsburgh and Valley districts. Price recessions continue. At Pittsburgh, basic and foundry grades have been marked down $1, while prices in nearly all other centers have been reduced from 50c. to $1. Canadian iron is increasingly prominent. It is in active competition with United States furnaces in Michigan and has been sold not far distant from Chicago.

Large inquiries have encouraged cast iron pipe makers.

Prices of old material are very weak and reductions ranging from 50c. to $3 have been made, particularly in the Pittsburgh and Philadelphia districts.

The recessions in pig iron, both Valley basic and at Philadelphia, have reduced THE IRON AGE composite price to $22.96 from $23.54 last week. This is the lowest figure since early May of 1922.

No change having occurred in THE IRON AGE finished steel composite price, it remains at the 2.775c. per lb. established three months ago. Last year at this time it was 2.467c. per lb.

Pittsburgh

Prices of Pig Iron and Scrap Reduced—Shipments of Steel Exceed Orders

PITTSBURGH, Oct. 23.—The outstanding feature of the iron and steel market in the Pittsburgh district is the softer tone that has developed during the past week in pig iron and scrap. All grades of pig iron, except Bessemer and low phosphorus, have declined in price. Aside from gray forge, which has dropped 50c. a ton, the decrease has been $1 a ton.

Operations of steel works are unchanged from last week, but production and shipments exceeded new business. The most active lines are pipe, wire and tin plate, on which the mills are rather heavily committed. Moderate improvement has been made in cold-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 23, 1923	Oct. 16, 1923	Sept. 25, 1923	Oct. 24, 1922
No. 2X, Philadelphia	$25.76	$25.76	$25.76	$22.14
No. 2, Valley furnace	*24.00*	24.00	24.00	21.00
No. 2, Southern, Cin'ti†	24.05	24.05	25.05	31.05
No. 2, Birmingham, Ala.†	20.00	20.00	21.00	27.00
No. 2 foundry, Chicago*	25.00	25.00	26.00	31.00
Basic, del'd, eastern Pa	24.50	24.50	25.00	29.50
Basic, Valley furnace	*23.00*	24.00	24.50	30.00
Valley Bessemer, del. P'gh.	26.76	26.76	28.26	34.77
Malleable, Chicago*	25.00	25.00	26.00	31.00
Malleable, Valley	*22.50*	23.50	24.50	32.00
Gray forge, Pittsburgh	24.76	25.26	25.76	32.27
L. S. charcoal, Chicago	30.04	30.04	32.15	36.15
Ferromanganese, furnace	110.00	110.00	110.00	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	40.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	40.00
O.-h. sheet bars, P'gh	42.50	42.50	40.00	40.00
Forging billets, base, P'gh.	47.50	47.50	47.50	45.00
O.-h. billets, Philadelphia	45.17	45.17	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.25	2.25	2.15	2.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.325
Iron bars, Chicago	2.40	2.40	2.35	2.50
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.90

Sheets, Nails and Wire,	Oct. 23, 1923	Oct. 16, 1923	Sept. 25, 1923	Oct. 24, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.50
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.50
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$17.50	$17.50	$19.50	$25.50
Carwheels, Philadelphia	*19.00*	20.00	21.00	22.50
Heavy steel scrap, P'gh.	*15.00*	16.00	17.50	21.00
Heavy steel scrap, Phila.	15.00	15.00	16.50	17.50
Heavy steel scrap, Ch'go.	*13.75*	14.00	16.00	18.50
No. 1 cast, Pittsburgh	*18.50*	19.50	21.00	24.00
No. 1 cast, Philadelphia	*19.00*	19.50	21.00	22.00
No. 1 cast, Ch'go (net ton)	*18.50*	19.00	19.50	20.50
No. 1 RR. wrot. Phila.	*17.00*	17.50	19.00	22.00
No. 1 RR. wrot. Ch'go (net)	*12.50*	13.00	15.00	17.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$4.25	$8.50
Foundry coke, prompt	4.75	4.75	5.00	10.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.12½	13.12½	13.87½	14.12½
Electrolytic copper, refinery	*12.50*	12.62½	13.25	13.62½
Zinc, St. Louis	**6.32½**	6.30	6.42½	7.00
Zinc, New York	**6.67½**	6.65	6.77½	7.35
Lead, St. Louis	*6.55*	6.60	6.75	6.40
Lead, New York	6.85	6.85	7.10	6.65
Tin (Straits), New York	*41.25*	41.50	42.25	35.25
Antimony (Asiatic), N. Y.	**8.00**	7.50	7.50	6.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Oct. 23, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Oct. 16, 1923.	2.775c.
Sept. 25, 1923.	2.779c.
Oct. 24, 1922.	2.467c.
10-year pre-war average.	1.689c.

Composite Price Oct. 23, 1923, Pig Iron, $22.96 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 16, 1923.	$23.54
Sept. 25, 1923.	24.38
Oct. 24, 1922.	30.02
10-year pre-war average.	15.72

finished steel bars and strip steel as a result of new business placed by the automotive industry.

While the coke market is easier, prices remain unchanged. Producers, finding the market listless, continue to shut down ovens rather than take business at lower figures. Manufacturers of finished steel generally are of the belief that there will be no marked improvement in demand over the remainder of the year, but they are hoping for an upturn early in the new year.

Pig Iron.—While the market for pig iron continues to be extremely dull, some tonnages of steel making and foundry grades have been sold during the past week at lower prices. The only grades whose prices remain unchanged are Bessemer, which is quoted at $25, Valley, and low phosphorus, quoted at $30, although it is reported that a small lot of the latter has been sold at $2 under the regular quoted price. Sales of No. 2 foundry, involving lots of 200 and 300 tons, have been made at $23, Valley, and a small tonnage of standard basic also has been sold at $23, Valley, a decline of $1 for each grade. Some makers of basic continue to quote $24, Valley. No. 3 foundry and malleable, also dropping $1, have become established at $22.50, Valley, while the new price on gray forge is $23, a decline of 50c. The pig iron market is dull, and the trade is disturbed while awaiting more nearly stabilized conditions. Consumers are cautious and the few who come into the market are buying on a restricted basis and some of them evidently are sounding out the situation in the hope that lower levels will develop. Some producers claim that they now actually are producing at a loss and are declining to offer the expected concessions. This is particularly manifest in the case of Bessemer iron, which still is quoted at $25, Valley, but is in extremely light demand. The attitude of buyers indicates that they want to enter the new year wih as small inventories on hand as possible. Present stocks in the hands of consumers are low, while large tonnages of basic and fair-sized tonnages of foundry grades are stocked in furnace yards in the Pittsburgh and Valley districts. There are only five merchant furnaces producing iron in the Pittsburgh and Valley districts. It

is reported that the Struthers Furnace Co. may place its furnace at Struthers, Ohio, in operation within a short time. The furnace at present is banked.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$23.00
Bessemer	25.00
Gray forge	23.00
No. 2 foundry	23.00
No. 3 foundry	22.50
Malleable	22.50
Low phosphorus, copper free	30.00

Ferroalloys.—Transactions in the ferroalloy market are limited to small tonnages, and prices remain unchanged for standard ferromanganese for early shipment, being quoted at $110, Atlantic seaboard, at which a small amount of business also has been done for first quarter. The price of $117.50, which has been quoted by British producers, is nominal, and is not figuring in the market. Spiegeleisen is dull, with the 19 to 21 per cent grade being quoted at $42 to $45 per ton, furnace. Consumers of both ferromanganese and spiegeleisen seem to still have fair supplies on hand, and activity in the early future is not expected. The market on ferrosilicon is also dull. Prices are given on page 1147.

Semi-Finished Steel.—Quotations on semi-finished steel remain unchanged, and while there are reports that it has softened, some producers announce slightly better specifications. Rolling billets, both 2-in. and under and 2-in. and over, continue to take the spread of $40 to $42.50, Pittsburgh, while forging billets of ordinary carbon steel are quoted at $47.50. Demand for sheet bars by sheet producers is light, but both the Bessemer and open-hearth grades remain at $42.50. Demand for slab and skelp shows no improvement, and prices of $40 to $42.50, Pittsburgh, for the former, and 2.40c., Pittsburgh, for the latter are largely nominal. Buyers of wire rods are receiving some moderate sized orders at $51, base, and are able to provide early delivery. Operations of the Carnegie Steel Co. remain unchanged at about 90 per cent capacity, and independent operations are estimated at about 70 to 75 per cent of ingot capacity.

Plates.—Makers of plates in the Pittsburgh district are holding firmly to the base price of 2.50c., Pittsburgh, despite reports of a somewhat easier tone in the East. Deliveries on new business, which is comparatively small, generally are being made in about 30 days. Consumers are buying on a hand-to-mouth basis, and are said to have no accumulation of stocks, which is looked upon as a hopeful sign from the viewpoint of the mills. Prices are given on page 1146.

Wire Products.—Varying conditions are noted in the mill situation regarding wire products. While all producers report fair business, some of them observe a slight decline in new orders, and others improved activity. Some independent mills do not find the market for nails so active and are able to give quicker deliveries. Other mills are booking 60 days ahead on nails for shipments exceeding production. As a general thing, deliveries on nails are being made in from four to six weeks. Fair demand is being reported for manufacturing, galvanized, barbed and fencing wire. The improvement in fencing wire in the past week is rather marked, due partly to the fact that jobbers are anxious to increase stocks. Prices are given on page 1146.

Rails.—Coal mine operators are manifesting little interest in the market for light rails, but despite reports of shading, producers still are getting 2.25c., base, on the small orders that are being received for rails when rolled from new steel. There continues a spread of 1.85c. to 2c., base, on rerolled light rails.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $42 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Some independent makers report improvement in orders for lapweld steel pipe, but the greatest demand, which is fairly heavy, is for standard pipe. Lapweld grades are being delivered promptly by one of the large producing interests. Others are making shipments in 60 days. Shipments on buttweld steel pipe are more deferred, ranging as high as four months by some makers. Demand for this grade calls for the various sizes, and comes from various sources. Slight improvement in the oil situation is described as the reason for better demand for lapweld sizes. Operations in steel pipe production continue at a high rate. The fact that stocks in the hands of jobbers are not large is an encouraging sign in the trade. Demand for boiler tubes is only moderate, and shipments against old orders are heavier than on new business. Prices are given on page 1046.

Sheets.—Slight improvement in the market for sheets has developed during the past week, partly by reason of the fact that the automotive industry has taken some fair-sized tonnages. Operations of the American Sheet & Tin Plate Co. are approximately 90 per cent of capacity. The greatest demand is for automobile sheets. Other new business is spread more or less evenly among black, galvanized and blue annealed sheets. Production of independent mills remains at about 70 per cent of capacity. Early shipments are being made.

Tin Plate.—Tin plate mills are engaged heavily and present specifications assure operations for the remainder of the year. The American Sheet & Tin Plate Co. is producing close to 90 per cent of capacity. The new price for tin plate for the first quarter of 1924 is expected to be announced in two or three weeks, with the general expectation that $5.50 per base box, Pittsburgh, will be maintained.

Cold-Finished Steel Bars and Shafting.—Specifications for cold-finished steel bars showed a slight improvement in the past week, due largely to the increased buying in the automotive industry. The market generally is quiet, with the quotation of 3.25c., base, Pittsburgh, being continued. Operations average 65 per cent of capacity. Deliveries are being made in from six to eight weeks, although deliveries for some sizes are deferred for 60 days. The price of 3.65c., Pittsburgh, for ground shafting is considered nominal.

Iron and Steel Bars.—Light inquiry is being made for steel bars and small orders also have been placed during the past week, although the market as a whole is quiet. The price is unchanged at 2.40c., base, Pittsburgh, and mills in this district are not meeting shaded quotations said to be made in some other districts. The market for iron bars also is unchanged.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Hot-Rolled Flats.—No improvement is noted in the market for hot-rolled flats, but producers report that prices are holding well at 3.15c., base. It is the position of the makers who are quoting this figure that a reduced level does not bring out new business, and might have an opposite effect. Operations range from 65 to 70 per cent, and deliveries are being made in approximately two weeks.

Cold-Rolled Strips.—Automotive producers have placed fair-sized orders during the past week for cold-rolled strip steel. Generally, the conditions of mills remain unchanged, with operations at 65 per cent of capacity and the price 5c., base, Pittsburgh.

Structural Steel.—New business in the structural market is extremely small, and orders placed involve tonnages for light jobs. The dullness is partly seasonal in character, but is also due to the hesitancy to begin new construction owing to high costs of labor. Fabricating plants are supplied with a fair sized backlog, and consequently are able to operate at a fair capacity. Prompt delivery is being made on structural materials by the mills. The price of 2.50c., base, Pittsburgh, continues to be quoted on shapes. Prices are given on page 1146.

Bolts, Nuts and Rivets.—The market for bolts, nuts and rivets is quiet and producers are making prompt delivery on the business that is being placed. Prices remain unchanged. Prices are given on page 1146.

Track Supplies.—The railroads are buying fair sized tonnages of structural spikes, and deliveries are being

made in from two weeks to 60 days. Mills are well filled with orders. Slight improvement also has been made in the demand for small spikes. Fair demand exists for tie plates, on which some producers are making deliveries in 30 days.

Coke and Coal.—The market for furnace and foundry coke remains unchanged, with the former quoted at $3.75 to $4 and the latter at $4.75 per net ton, Connellsville ovens. It appears to be pegged at these figures. Producers are declining to accept lower figures on the ground that to do so would wipe out small margins of profits where they now exist, and consequently mean a loss. That they appear to be firm in their attitude is shown by the fact that additional ovens are being shut down. The curtailed production, however, leaves an ample supply of tonnages in the market because of the extremely light demand. The closer approach of production to consumption is believed by operators to give a stronger support to the market than would be the case otherwise. The market for coal also continues to be dull, and the coking grade still ranges at $1.85 to $2.25, while the spread on gas coal now is given as $2 to $2.35.

Old Material.—The market for old material has declined from 50c. to $3 per ton this week, all grades except rails for rerolling and No. 1 railroad wrought being affected. Mills and foundries are apathetic, and virtually no inquiry exists. Consumers are operating on stocks on hand, and apparently are guarding themselves against unnecessary accumulations. Mills consuming old rails are restocking and are taking fair-sized tonnages at $17.50 to $18, dealers' yards. No. 1 railroad wrought also continues unchanged at $13 to $13.50. Scrap dealers, when taking tonnages, are doing so at lower prices. The Baltimore & Ohio Railroad is asking for bids for 27,450 tons of scrap, the largest single item involving 3500 tons of old rails. Bids will be closed on Oct. 29 at Baltimore.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$15.00 to $15.50
No. 1 cast, cupola size	18.50 to 19.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.50 to 18.00
Compressed sheet steel	14.00 to 14.50
Bundled sheets, sides and ends	12.50 to 13.00
Railroad knuckles and couplers	18.00 to 18.50
Railroad coil and leaf springs	18.00 to 18.50
Low phosphorus bloom and billet ends	20.50 to 21.00
Low phosphorus plate and other material	19.50 to 20.00
Railroad malleable	18.00 to 18.50
Steel car axles	18.50 to 19.00
Cast iron wheels	17.50 to 18.00
Rolled steel wheels	18.00 to 18.50
Machine shop turnings	10.50 to 11.00
Sheet bar crops	16.50 to 17.00
Heavy steel axle turnings	13.50 to 14.00
Short shoveling turnings	12.00 to 12.50
Heavy breakable cast	13.50 to 14.50
Stove plate	13.50 to 14.00
Cast iron borings	12.00 to 12.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	15.00 to 15.50

Detroit Scrap Market

DETROIT, Oct. 23.—One of the largest producers in the district is offering approximately 4000 tons of short machine shop turnings, regular hydraulic compressed, flashings, borings and heavy melting steel for November delivery on a competitive basis. Sales in this district have been very light on the basis of prices quoted a week ago except borings at $10 to $10.50.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$12.00 to $12.50
Shoveling steel	12.00 to 12.50
No. 1 machinery cast	17.00 to 17.50
Cast borings	10.00 to 10.50
Automobile cast scrap	24.00 to 25.00
Stove plate	16.00 to 17.00
Hydraulic compressed	10.50 to 11.25
Short turnings	10.00 to 11.00
Long turnings	9.00 to 9.50
Flashings	9.50 to 10.00

Buying Improves in Youngstown District

YOUNGSTOWN, Oct. 23.—Both in the number of orders and volume of tonnage involved, business in finished steel lines in the Mahoning Valley registers some improvement over the past ten days. Much of the current buying, though, is of the hand-to-mouth variety, and there is little forward commitment in any extensive way. The railroads are making their steel wants known, however, in a more generous way, and the district independent industry looks for considerable business from this source next year.

The two most active finished steel lines in this territory at present are standard merchant pipe and tin plate. Makers of the latter commodity are sold well ahead over the remainder of the year and are maintaining a satisfactory production rate. It is the pipe business which is sustaining Valley operations to no inconsiderable degree, as pipe capacity looms large in finished steel lines in the Mahoning Valley.

The principal independent maker of full-finished sheets in this territory indicates that new business is somewhat smaller than heretofore, and in consequence production, well sustained throughout the year, has been curtailed. No. 22 gage auto body stock is still quoted at 5.35c., with no deviations, it is reported. Considerable interest in being manifested in the probable 1924 requirements of the automobile industry.

Strip steel buying is also well sustained in this district, the Ford Motor Co. absorbing large tonnages. On the ordinary gages, 3c. base is the accepted price. Pressed steel interests at Warren and Youngstown, closely allied with steel-producing groups, are taking sizable tonnages of strip in both the narrow and wide sizes.

In the semi-finished market, non-integrated sheet rollers are endeavoring to beat down the $42.50 fourth quarter price on sheet bars, maintaining that competitors are able to purchase their raw steel requirements at Pittsburgh and Cleveland for less. One such sheet interest maintains reports are appearing with frequent persistency to the effect that sheet bars are moving in competitive districts at $40. This differential, they maintain, places them at an unfair disadvantage with non-integrated competitors.

The black sheet market is still weak and spotty, with prices ranging from 3.75c. to 3.85c. Business awarded by Japanese interests, in which Valley mills participated, has played no unimportant part in helping to maintain existing schedules. Valley sheet mills this week are operating at an average of 61 per cent.

Davis Machine Tool Co. Sold

Property of the Davis Machine Tool Co., Rochester, N. Y., appraised at $995,000, was sold on Oct. 22 for $259,000 to James E. McKelvey, president American Woodworking Machine Co., acting for the Union Trust Co., of which he is a director. Financial difficulties beset the Davis company two years ago, and Morton H. Anderson was appointed receiver to operate the plant. During the war the company enjoyed great prosperity. The property included four buildings and 50,000 sq. ft. of land. Buildings were valued at $165,920 and the land $130,000. Machinery and equipment were valued at $295,532.

Franklin D. Roosevelt, New York, president of the American Construction Council, last week advised curtailment of building activities for 1924, in order to avert another crisis next spring. Unless emergency steps to this end are taken now, he declared, the industry will suffer again from shortage of labor and materials and from the resultant delays in building projects. It was further recommended that smaller contracts be started in the fall and that repair work or alterations be done in winter, thereby affording steady occupation to workmen and enabling contractors to estimate completed dates with greater accuracy. A too ambitious program, Mr. Roosevelt warned, would defeat itself.

Chicago

Mill Specifications Show Some Increase, But Buying Is Limited

CHICAGO, Oct. 23.—Specifications received by local mills thus far this month are somewhat heavier than during the same period in September, but buying is restricted largely to current necessities. Shipments from mill still exceed new bookings and producers have now reached the point where they are able to make early deliveries. In fact, so satisfactory are mill deliveries that purchases from warehouse stocks are declining proportionately.

The general market situation continues to be characterized by great uncertainty. Consumers persist in their policy of caution in the belief that mills will soon find the need for new business so pressing that they will be forced to reduce their prices. In fact, the turning point in the market is believed to be close at hand and although surface indications point to a decline, producers have not given up hope that the railroads will place large orders for equipment. Car builders are positive in their assurances that early orders are to be expected from the Southern Pacific, although that road has not yet actually issued inquiries. The buying program of the road covers fully 18,000 freight cars, representing the joint needs of the Southern Pacific, the Pacific Fruit Express and the Union Pacific. According to latest advices, separate inquiries will not be issued by the latter line. In the event that these orders are actually placed, the effect on the iron and steel industry will doubtless be far-reaching. More than 180,000 tons of rolled steel will be involved, besides large tonnages of steel and malleable castings.

Local mill and furnace operations are unchanged. The Illinois Steel Co.'s two banked blast furnaces and its steel plant at Joliet will resume operations next week, following the completion of mill repairs.

Pig Iron.—The market remains weak in all departments, with price levels poorly defined owing to the dearth of orders. On Northern grades $25 base furnace appears to be the top of the market, and this price has been shaded in several instances, usually through the waiving of differentials for higher silicon content. The excess product of steel works furnaces as well as Buffalo and Canadian iron are still competing with the offerings from usual sources of merchant supply. The Canadian iron in the higher silicons has penetrated to points close to Chicago. A Wisconsin melter has closed for 1300 tons of malleable and foundry for delivery over the rest of the year. An Illinois melter has purchased 500 tons of foundry for similar shipment. Another Illinois user wants 300 tons of foundry for delivery over the remainder of 1923. Most orders and inquiries, however, are confined to carload lots for prompt shipment. The volume of small orders is somewhat heavier than heretofore, suggesting that melters are exhausting their yard stocks.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$30.04 to $30.15
Northern coke, No. 1, sil. 2.25 to 2.75	25.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	25.00
Malleable, not over 2.25 sil.	25.00
Basic	25.00
Bessemer	25.00
Southern No. 2	26.01 to 27.01
Low phos., sil. 1 to 2 per cent, copper free	33.25 to 34.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—A fair amount of ferromanganese has been sold at $110 seaboard, which appears to represent the bottom of the market. Two hundred tons of spiegeleisen has been placed at $43.80 delivered while carload lots have brought 50 cents higher.

We quote 80 per cent ferromanganese, $117.56, delivered; 50 per cent ferrosilicon, $86 to $87, delivered; spiegeleisen, 18 to 22 per cent, $43.80 to $44.30, delivered.

Plates.—Mills still look forward confidently to liberal car buying as a source of tonnage in plates, shapes and bars. Railroad car orders thus far, however, have consisted of small, scattered lots, recent bookings of Western shops involving a total of not more than 10,000 tons of steel. No large inquiries or orders for oil storage tanks are reported, and reduced oil production, particularly in the California fields, has made the necessity for additional storage capacity less pressing. Miscellaneous consumers of plates are restricting their purchases to necessities and mill bookings continue to fall short of shipments. Prices are unchanged.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast-Iron Pipe.—The appearance of large inquiries has strengthened the attitude of pipe makers. Denver will place 4000 tons of 6- to 48-in. on Oct. 25. A day later, Tulsa, Okla. will consider figures on 2500 tons. On Oct. 24, Chicago will take bids on 570 tons of 8-in. Spring Wells, Mich., has awarded 700 tons to the United States Cast Iron Pipe & Foundry Co. Port Huron, Mich., has placed 250 tons with James B. Clow & Sons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $61.20; 6-in. and above, $57.20; class A and gas pipe, $5 extra.

Sheets.—No additional Japanese tonnage has been booked by local mills, but inquiries from domestic sources are somewhat more numerous, although not bulking large in tonnage. In the main, the market situation is unchanged, prices being steady except for occasional shading on black and galvanized by small producers. The strenuous effort of mills to maintain present price levels is apparently dictated by a desire to protect old orders still unshipped.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb. Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Bolts and Nuts.—The market is soft at the quotations published on page 1146 and on lag bolts as low as 65 and 10 and 5 off is being done. Rivets are especially weak, one order having been taken at $2.70, Pittsburgh, for large structural sizes.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—The chief feature of the market is heavy, inquiry for track fastenings coming largely from the Union Pacific, the Baltimore & Ohio and Chesapeake & Ohio. Fully 70,000 kegs of spikes, 30,000 kegs of bolts and 18,000 tons of tie plates are involved. Roads having terminals in Chicago, however, are taking little interest in new supplies and in some instances have held up shipments on old orders. One road in this district has suspended shipment on 10,000 tons of rails and another on 60,000. In fact, little new rail business is expected from Chicago roads unless the steel market takes such a sharp turn as to warrant reservations of rolling space to forestall extended deliveries. The Pennsylvania, on the other hand, will soon distribute orders for 200,000 tons. A local mill has booked an order of 1300 tons of light rails for Japan. Domestic demand for light rails shows little life and in some instances mills have shaded prices in an effort to interest prospective buyers. Coal mines in this section are not buying, and rerolling mills are taking most of the business which is developing in the South.

Standard Bessemer and open-hearth rails, $42; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.35c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.75c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base, and track bolts, 4.90c. base.

Bars.—Specifications for soft steel bars are somewhat heavier than in September, but generally speaking, buying is still of a hand-to-mouth character. Jobbers are not contracting ahead and industrial users are limiting their purchases to current requirements. Ton-

nage booked by the mills is considerably lighter than shipments, and producers are now in a position to make almost any delivery desired. Bar iron remains quiet, but mills are holding tenaciously to a minimum price of 2.40c., Chicago. Demand for rail steel bars is also light with prices unchanged at 2.30c., mill.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Structural Material.—Mill bookings of plain material are light, but fabricators are encouraged by a revival in inquiry. The local office of one of the largest independent fabricators has figured on three times as much tonnage this month as in September. Bids are in on the Ford Motor Co. plant at St. Paul, requiring 10,000 tons, and on the Brotherhood of Locomotive Engineers bank building at Cleveland, involving 6500 tons. Local plain material prices are firm.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—New business is in fair volume, but individual orders are small and it is evident that no one is willing to buy in sufficient quantities to pile up stocks. Prices are unchanged and are given on page 1146.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.80 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Reinforcing Bars.—The market is inactive and both lettings and inquiries are few. The Ford Motor Co. has awarded 110 tons for a bridge at Dearborn, Mich., to the McRae Steel Co. The Concrete Engineering Co. will furnish 125 tons for a viaduct at Forty-first Street, Chicago, for the Illinois Central.

Old Material.—The market is quiet and weak, with prices still slipping downward. Consumer buying is light and trading among dealers is at a minimum. In fact, brokers hesitate to speculate on either the short or long end of the market. Although the very fact that prices are so low suggests that they are scraping bottom, sellers see no prospects of an early revival of demand and fear that continued lack of business may force still further price recessions. Railroad offerings include the Baltimore & Ohio, 20,000 tons, and the Monon, 700 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$19.50 to $20.00
Cast iron car wheels	17.50 to 18.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	17.50 to 18.00
Rails for rolling	15.50 to 16.00
Steel rails, less than 3 ft.	16.50 to 17.00
Heavy melting steel	13.75 to 14.25
Frogs, switches and guards cut apart	13.75 to 14.25
Shoveling steel	13.50 to 14.00
Drop forge flashings	9.00 to 9.50
Hydraulic compressed sheets	11.00 to 11.50
Axle turnings	11.00 to 11.50
Steel angle bars	15.50 to 16.00

	Per Net Ton
Iron angle and splice bars	18.50 to 19.00
Iron arch bars and transoms	18.50 to 19.00
Iron car axles	24.00 to 24.50
Steel car axles	16.00 to 16.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Cut forge	12.50 to 13.00
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.50 to 13.00
Steel knuckles and couplers	16.00 to 16.50
Coil springs	18.50 to 19.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	18.00 to 18.50
No. 1 agricultural cast	18.00 to 18.50
Low phos. punchings	14.50 to 15.00
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	7.00 to 7.50
Cast borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Stove plate	15.00 to 16.00
Grate bars	14.00 to 14.50
Brake shoes	15.50 to 16.00
Railroad malleable	17.00 to 17.50
Agricultural malleable	16.50 to 17.00

San Francisco

Principal Activity in Southern Part of State —Pig Iron Very Dull

SAN FRANCISCO, Oct. 16.—Business in iron and steel continues very quiet, and there seems to be little prospect for betterment. Although the trade is slow to admit the full measure of dullness in this part of the State, the fact remains that at present, as for the past three months, there is a greater volume of activity in Los Angeles and contiguous counties than in this city and adjacent territory. One prominent importer, in speaking of this difference, called attention to the remarkable amount of building in the southern part of the State, a considerable portion of which is for business purposes involving large quantities of structural steel. The record of permits in San Francisco for new buildings during September represented a valuation of something over $3,200,000, while for the same month the total for Los Angeles was close to $14,000,000.

There has been some inquiry for wire nails, galvanized wire and cast iron pipe for shipment to Japan, but it has not been very extensive thus far. How this Japanese trade will develop is still problematical, but there is a well-defined belief that much of the iron and steel for permanent construction will be ordered direct from Pittsburgh and Birmingham for shipment via the Panama canal. For materials needed at once for temporary buildings this city will doubtless get a goodly share, to accompany the lumber, large quantities of which are constantly going forward.

Pig Iron.—Importers say the market is very dull, with buyers showing little interest. This part of the State, that is, the San Francisco Bay region, opens the fourth quarter of the year with scarcely any new business in sight. Both foundries and mills are still operating, but not at full capacity. All seem to be fully supplied with materials and only small parcels are purchased. Importers say the quotable prices remain about the same as two weeks ago—that is, $34 to $35 per ton. These figures are very easy, however, but it is doubtful whether concession in price would produce any increase in buying orders. Advices from Los Angeles indicate a fair measure of business in progress there, but there are also some indications of slowing down in that district. In a general way, trade conditions there are steadily becoming about the same as in this section of the State, dullness becoming more emphasized as existing orders are completed and very little new business being booked.

Coke.—The local market for coke is almost at a standstill. While there have been some inquiries, there has not been much real business, and importers say they do not expect much improvement for the near future. Prices remain around $20 to $21 per ton, exship, for foreign coke, and domestic is, of course, higher. Some foreign is reported as on the way, but it is inconsiderable in quantity.

Finished Iron and Steel.—While there is not much change in trade conditions, it is noteworthy that promises for immediate delivery are now more readily given than two or three months ago. The demand for steel bars continues active and the inquiry for flats, channels, angles, rounds and squares is steady, with prices on all of them well sustained at the same figures which have ruled for the past three weeks or more. Structural steel is a little less active than a month ago, but prices are held firmly at 3.35c. to jobbers and 3.35c. in carload lots. Sellers say that judging by the present outlook these prices are likely to continue for some time. Sales of wire products are of good volume and the steady prices of the last three months are firmly held.

Old Material.—While sellers quote the same figures as two weeks ago, there is a disposition to shade the prices to some buyers. Only strictly first-class material will bring the full $15 per ton. Buyers are taking only small lots and they almost invariably seek concessions. Both mills and foundries are well supplied. The lower grades move very slowly and even shaded figures fail to arouse a buying interest. A cargo of about 1200 tons is being loaded at a Mexican port and will probably arrive here some time early in December.

New York

Inquiries for Structural Steel Exceed Expectations—Pig Iron Dull

NEW YORK, Oct. 23.—Sales of pig iron have been very light, the largest being 1000 tons to the A. P. Smith Mfg. Co., Bloomfield, N. J., for January to April delivery. It is understood that this was booked at about $23, furnace, by a furnace not in eastern Pennsylvania. The American Locomotive Co. has purchased 250 tons, at not above $22, Buffalo, and it is probable that $22 was shaded. The Worthington Pump & Machinery Corporation is in the market for 400 tons for spot delivery and the American Car & Foundry Co. for two lots of from 250 to 350 tons. An upper State company is inquiring for 600 tons of No. 2X for first quarter. Nearly all of the buying is for early needs and in some cases melters are pressing for deliveries. It is clear that the limited demand is for real requirements and is in no sense speculative. Very little interest is shown in first quarter business. The Buffalo market is weak at $22 for No. 2 plain, with a general belief that $21 could be done on an attractive order. The Low Moor Iron Co. has blown out one of its Low Moor stacks and has blown in the Covington stack. The Low Moor stack is in need of repairing of lining. One Witherbee-Sherman stack at Port Henry has been blown out.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.27
East. Pa. No. 2, sil. 1.75 to 2.25	25.27
Buffalo, sil. 1.75 to 2.25	26.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94
No. 2 Virginia, sil. 1.75 to 2.25	29.44

Ferroalloys.—There is very little demand for ferromanganese and only carload lots are being inquired for. The price situation is unchanged and the actual level at which the small demand is being met is difficult to gage. There does not seem to be much resale alloy available and the basis upon which one domestic producer is quoting makes it difficult to state the market price. British alloy is unchanged at $117.50, seaboard, which is based upon an 80 per cent content of manganese. There has been no change in the spiegeleisen market either as to quotations or demand, but specifications on contract are fairly insistent. The 50 per cent ferrosilicon market is quiet with small lots sold at a range of $82.50 to $85, delivered.

Cast-Iron Pipe.—Quotations are unchanged as yet, but business is a little quieter. Municipal tenders are about at an end, but that some business may appear from Japan seems evident from a recent inquiry for 2000 tons of 10 to 24-in. water pipe received by American makers. The second opening of bids by the Department of Water Supply, Gas and Electricity, New York, on more than 3500 tons of 8-in. pipe with fittings resulted in the following bids on the pipe: Section 1, Donaldson Iron Co., $68.90 per ton, and United States Cast Iron Pipe & Foundry Co., $69.50 per ton; Section 2, United States Cast Iron Pipe & Foundry Co., $69.50 and R. D. Wood & Co., $69; Section 3, United States Cast Iron Pipe & Foundry Co., $69.50. These prices are unchanged from the original bids, which were rejected as informal. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. The soil pipe market is quiet and prices weak. Makers, as a rule, are booked up to about Dec. 1. Sales at the 40¾ per cent for standard and 50¾ per cent discount for heavy pipe have become more numerous. We quote discounts of both Southern and Northern makers, f.o.b New York, in carload lots, as follows: 6-in., 35¾ to 40¾ per cent off list; heavy, 45¾ to 50¾ per cent off list.

Warehouse Business.—The market continues moderately active and prices, with the exception of sheet quotations, fairly firm, although there is an increasing tendency to make longer deliveries free, in some cases no charge being made for motor truck delivery up to 30 and 35 miles from the warehouse. In the past week the market on black and galvanized sheets, which had been apparently gaining somewhat in strength, developed renewed weakness with shading down to 4.50c. per lb. base on black and 5.50c. per lb. on galvanized. As a result one large warehouse in this district began quoting these prices generally on sheet business of any size above a few bundles. Business in wrought iron and steel pipe is extremely quiet, but prices are holding fairly firm on steel with slight shading on wrought iron. We quote prices on page 1162.

Coke.—As a result of recent efforts at curtailment of production, the coke market is beginning to show a slightly firmer tendency. Sellers are no longer inclined to consider much less than $5.25 per ton on standard foundry, up to $6.50 on some brands, and the market on standard furnace is from $4 to $4.25, although a few "distress" tonnages are noted at as low as $3.50 per ton, about the price of medium sulphur, which ranges from $3.40 to $3.60 per ton. By-product is quoted at $11.41, Newark and Jersey City, N. J.

Old Material.—The downward movement in all grades of scrap continues unchecked. Coatesville, Pottsville and Conshohocken shipments of heavy melting steel all bring $15 per ton delivered, with $16 paid for delivery to Johnstown, Pa., which has a higher freight rate. In some instances, brokers are offering only $14.50 and $14.75 per ton delivered eastern Pennsylvania, but little or no tonnage has been obtained at these prices. Some borings and turnings are going forward to Johnstown at $13 per ton delivered and to Coatesville at $11 and in some cases $11.50 per ton delivered. Stove plate to New Jersey foundries is quoted at $16 per ton delivered and to Harrisburg consumers $16.25 per ton.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$10.75 to $11.25
Steel rails, short lengths, or equivalent	11.75 to 12.25
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	17.00 to 17.50
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	8.50 to 9.00
Machine-shop turnings	7.50 to 8.00
Mixed borings and turnings	7.50 to 8.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25 to 10.75
Stove plate	12.50 to 13.00
Locomotive grate bars	13.00 to 14.00
Malleable cast (railroad)	17.00 to 18.00
Cast-iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00 to 18.50
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 16.50

Finished Iron and Steel.—Apart from structural steel there is no activity in the local steel market worth noting. In structural steel there is more work in prospect than is usual at this time of year. Among the new projects is one of 14,000 tons, a power plant at Kearny, N. J., for the Public Service Corporation of New Jersey. A local fabricator says that he has projects up for figures in his estimating department totaling 50,000 tons. These include, in addition to the 14,000-ton job mentioned, about 12 apartment buildings, totaling 10,000 tons or more, and a number of loft buildings of somewhere near the same tonnage. None of the important car inquiries which car builders are expecting has come out, but there are reports that the Southern Pacific's inquiries will ask for bids on 18,000 cars. The total of all cars bought this year is about 64,000, and 20,000 cars have been let out for repairs. There has been scarcely any car buying of importance since May. Manufacturing consumers of steel products and jobbers are still buying very sparingly, but some of the mills report a greater number of inquiries, though the tonnages are small, usually not over a carload, and immediate rolling is generally specified. There are no indications of an early change in this hand-to-mouth policy of buying. The price situation is unchanged. Plates

are quoted at 2.50c., Pittsburgh, by the larger producers, and at 2.40c., Pittsburgh, by two or three smaller Eastern mills; structural steel is obtainable at 2.40c. to 2.50c., Pittsburgh, the larger mills adhering to the higher price; bars are firm at 2.40c. so far as the mills are concerned, but offerings from other sources, probably resale lots, contribute to a slight weakness in that market. Mill representatives say, however, that this competition does not affect sales to their regular trade at 2.40c.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

St. Louis

Sales of Southern Pig Iron as Low as $19 Scrap Prices Again Recede

ST. LOUIS, Oct. 23.—The only sale of consequence made in the local market for several weeks was that by the St. Louis Coke & Iron Co. of 5000 tons of basic for delivery in the last quarter to a melter in the district. The sales for the week in car lot orders amounted to 500 tons. Melters continue their hand-to-mouth buying, despite lower prices, which seem only to cause them to further postpone placing orders for ordinary requirements. One melter in the district, for instance, requiring 150 tons of foundry iron weekly, has been buying only a week's supply at a time and never having more than a week's supply ahead. Other concerns have been buying no more than a month's supply at one time. It is difficult to say just what is the market. A stove foundry bought 500 tons of Southern iron at $19, Birmingham, with the market nominally at $21, and sales of Northern iron have been reported as low as $24, with that market nominally at $26. The St. Louis Coke & Iron Co. has reduced its price to $25 to $26, Granite City. A Tennessee melter is inquiring for 1500 to 2000 tons of malleable. Otherwise there are no inquiries before the market.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$27.16
Northern malleable, sil. 1.75 to 2.25	27.16
Basic	27.16
Southern fdy., sil. 1.75 to 2.25 (rail)	$24.17 to 25.17

Finished Iron and Steel.—The order for 25,000 tons of 90-lb. rails for the Missouri Pacific has been allocated as follows: Colorado Fuel & Iron Co., 10,000 tons; Tennessee Coal & Iron Co., Illinois Steel Co. and Inland Steel Co., 5000 tons each. The 1924 requirements include these and 5000 tons additional on unfilled orders placed in 1923, most of the unfilled tonnage being placed with the Illinois Steel Co. Other railroad business is extremely light. The International & Great Northern bought 400 kegs of standard track spikes. While warehouse stocks are light, the intention is to keep them so for the remainder of the year, and the business from that source is extremely light. Manufacturers of steel products are buying no material that cannot be used in the finished product this year, with the same idea of keeping down inventories of raw products.

Coke.—A better demand is reported this week for foundry coke, and some contracts were made for last quarter and even a few for first quarter delivery. Neither ovens nor consumers want to go beyond 1923 in deliveries on the present basis. Sales of Connellsville district coke were made at $5.50 to $7.50, ovens, the lower price being for spot delivery. Cooler weather is expected to start coke moving from the yards, but it has not affected buying by dealers.

Old Material.—The market for old material shows further weakness. The only buying by consumers is confined to carload lots, and quotations are merely nominal, each transaction being a matter of trading. The situation has been made worse by the curtailing of operations by consumers and the heavy offerings of old material by the railroads. Lists offered during the week brought forth low prices, but the roads are eager to sell and in an endeavor to clean up their stocks before the first of the year continue to unload on an already overloaded market. New lists this week include: Baltimore & Ohio, 20,000 tons, and St. Louis & San Francisco, 2500 tons.

	Per Gross Ton	
Iron rails	$15.00 to	$15.50
Rails for rolling	13.50 to	14.00
Steel rails, less than 3 ft.	15.50 to	16.00
Relaying rails, 60 lb. and under	25.00 to	26.00
Relaying rails, 70 lb. and over	32.50 to	33.50
Cast iron car wheels	17.00 to	17.50
Heavy melting steel	13.00 to	13.50
Heavy shoveling steel	12.50 to	13.00
Frogs, switches and guards cut apart	13.00 to	13.50
	Per Net Ton	
Heavy axles and tire turnings	11.00 to	11.50
Steel angle bars	13.00 to	13.50
Steel car axles	16.50 to	17.00
Iron car axles	24.00 to	24.50
Wrought iron bars and transoms	18.00 to	18.50
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	12.50 to	13.00
Railroad springs	14.00 to	14.50
Cast iron borings	9.00 to	9.50
No. 1 busheling	12.25 to	12.75
No. 1 railroad cast	18.00 to	18.50
No. 1 machinery cast	18.50 to	19.00
Railroad malleable	14.50 to	15.00
Machine shop turnings	9.00 to	9.50
Champion bundled sheets	7.00 to	7.50

Boston

Pennsylvania Furnaces Forced Out of Pig Iron Market by Keen Competition

BOSTON, Oct. 23.—Competition among Buffalo district furnaces for business in this territory has brought out still lower prices on Northern iron and forced those Pennsylvania furnaces with a Buffalo freight rate into New England out of the market. No. 2X Buffalo iron, some of it running high in manganese, sold the past week at $22, furnace, or $26.91 delivered, and occasionally at $22.50, furnace, or $27.41 delivered. No. 2 eastern Pennsylvania sold at $23 and $23.50, furnace, or $26.65 and $27.15 delivered. Furnaces in that district, however, are less inclined to shade prices. Most of them hold at $24, furnace, on small and $23.50 on large tonnages, and intimate a curtailment in production next month. Warrick will put out one furnace this week. Recent sales include small tonnages of Virginia and Alabama for mixture purposes at full prices; 700 tons No. 2X Buffalo to a Providence, R. I., tool maker; and 100 tons No. 2X, 100 tons silicon 3.25 to 3.75 and 100 tons malleable, Northern iron to the Sullivan Machinery Co., Claremont, N. H. The Universal Winding Co., Providence, is expected to close this week on 400 tons No. 2X and 500 tons No. 1X, and another machinery maker on 1000 tons No. 2X and No. 1X, last quarter iron.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$26.65 to $28.15
East. Penn., sil. 1.75 to 2.25	26.65 to 27.65
Buffalo, sil. 2.25 to 2.75	26.91 to 27.91
Buffalo, sil. 1.75 to 2.25	26.91 to 27.41
Virginia, sil. 2.25 to 2.75	30.42 to 31.42
Virginia, sil. 1.75 to 2.25	29.92 to 30.42
Alabama, sil. 2.25 to 2.75	*30.60 to 31.10
Alabama, sil. 1.75 to 2.25	*29.60 to 30.60

*Nominal.

Coke.—New England producers of by-product foundry coke have increased shipments against contract specifications and are nearer caught up with orders than they have been before in months. No definite date is set for the opening of books for first half 1924 fuel contracts, but will be shortly. Both the New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., quote foundry coke at $13.50, delivered in New England. Good Connellsville foundry coke is offered at $10.55, delivered, and higher, with few takers.

Old Material.—Sizable shrinkages in old material values took place the past week. Lower prices quoted in markets outside New England, a continued disinterest on the part of consumers, and a greater desire among owners of scrap to reduce stocks are held largely

accountable for the weakness. The drop in prices has a tendency to make purchasers even more cautious. Borings and turnings are in liberal supply and difficult to move, with the market off $1 to $2 a ton. Shafting values show greater softness than those on any other grade of scrap, not because of any marked expansion in offerings, but because of the almost lack of demand. For the same reason railroad malleable also is much cheaper. Apparently no market for No. 1 yard wrought exists. Dealers will not commit themselves on quotations. While far from active, enough machinery cast is moving to New England foundries to sustain prices.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	16.00 to 16.50
Railroad malleable	20.00 to 21.00
Street car wheels	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.00 to $10.50
No. 1 railroad wrought	12.00 to 12.50
Wrought pipe (1-in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	6.50 to 7.00
Cast iron borings, rolling mill	6.50 to 7.00
Cast iron borings, chemical	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.50
Forged scrap and bundled skeleton	6.50 to 7.00
Shafting	15.00 to 15.50
Street car axles	18.00 to 18.50
Rails for rerolling	12.00 to 12.50

Buffalo

Flurry in Pig Iron Subsides—Price Cutting on Galvanized Sheets

BUFFALO, Oct. 23.—The slight flurry in buying with the coincident price cutting appears to have abated and there is a general absence of the kind of activity that marked this district earlier in the month. Several Buffalo producers have adopted a hands-off policy and refused to join in competition for some of the New England business that developed a base price of $22, furnace. Two sellers are selling on the basis of $22, silicon 1.75 to 2.25, and differentials are to a large extent ignored. Total sales approximate 7000 tons. Inquiry for first quarter of 1924 has appeared in greater measure and while none of these inquirers are interested in large tonnages, the number of inquiries of this character shows consumers are feeling out Buffalo producers. Local furnaces are making no effort to consider any of this business on account of the weak, unsettled situation. Such inquiries as are now engaging attention are for small lots, the largest being one of 1000 tons for shipment to New Jersey, but this is not expected to be placed here.

We quote f.o.b., gross ton, Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$23.00 to $23.50
No. 2 foundry, 2.25 to 2.75 sil	22.50 to 23.00
No. 2 plain, 1.75 to 2.25 sil	22.00 to 23.00
Basic	23.00
Malleable	23.00
Lake Superior charcoal	30.28

Finished Iron and Steel.—Weakness in sheets, which has hitherto been confined to black grades, has now spread to galvanized and price concessions have been made on a few attractive tonnages. For several months the price of 5c. held on galvanized, but 4.90c. has been done here. Further weakness in black sheets is revealed in the price of 3.70c. that has been made in competition. Semi-finished demand is quiet and while inquiry is encouraging, the amount of new business shows a lessened interest on the part of consumers. Bar prices hold at 2.40c. Sellers are not inclined to believe that any notable buying movement will develop this year. Efforts to minimize inventories are already being felt. Pipe demand retains its high average and nails are being sought in great volume. A number of regular buyers are seeking prices on first quarter tin plate, and a big demand is indicated but new prices are not yet available.

Warehouse Business.—Demand for structural material and plates is especially brisk and the general call for warehouse products is on a high level. October tonnages are far greater than was expected.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Only through the fact that a number of dealers have old orders to complete this market would be without any sign of life. Steel rejections are heavier through the fact that mills are applying rigid inspection. There is absolutely no new buying and a general absence of interest.

We quote f.o.b., gross ton, Buffalo as follows:

Heavy melting steel	$16.00 to $16.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	13.00 to 13.50
No. 1 busheling	14.50 to 15.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	14.50 to 15.50
Railroad malleable	18.50 to 19.00

Birmingham

Mild Improvement in Pig Iron with Prices at Low Levels

BIRMINGHAM, ALA., Oct. 22.—The Southern pig iron market shows slight improvement, the sales being a little more numerous, and the aggregate somewhat increased. The quotations are on the low level of $21 per ton, No. 2 foundry, for local delivery, though reports are still current that Middle West melters of Southern iron have been able to place tonnage at $20 and less. The two smaller furnace interests which have been maintaining $24 per ton for iron in the home territory assert that they have seen no reasons for changing their quotations, though some melters but a short distance from Birmingham have been quoted at $23. Twenty-one furnaces have been making iron steadily in this district and the indications now point to the weekly addition to the surplus iron being at an end. Hope is expressed that there will be only a slight increase in the surplus tonnage figures on the turn of the month. Some inquiries have been received also by Southern furnace interests for 1924 delivery, first quarter, but as far as can be ascertained, no business has been booked. The furnace companies are undecided as to what the prices will be for the coming year. The local melt of pig iron shows no improvement.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$20.00 to $21.00
Basic	20.00 to 21.00
Charcoal, warm blast	33.00

Cast-Iron Pipe.—Several lettings are received every week by the cast-iron pipe makers in this territory, and the product of these plants is going in all directions. All plants are operating at capacity production and will continue this way for an indefinite period, despite the fact that some foreign competition has been felt. Comments are still to be heard on the loss of the 4000 tons order at Los Angeles, Cal., to a French manufacturer, the details of the loss being summed up here in tonnage on coal, coke, pig iron and labor, estimated at more than $150,000 to this district alone. The demand lately for the smaller sized pipe has not been so active but specifications are fairly regular on the larger product. The $49 to $50 quoted on the 6-in. and over pipe, Birmingham, is freely shaded.

Coke.—The coke market is in the same condition as the pig iron, small lot orders now being numerous and the aggregate hardly up to the production. The quotations are weak, the foundry coke highest price being $7.50 and furnace coke down to near $6. No curtailment in production has taken place, but serious consideration is being given in this direction. Beehive coke making is still heavy, though the greater portion of the coke being produced in this section is by-product, and

but little, if any, reduction in production is likely with these plants.

Old Material.—Very little business is being done in the scrap iron and steel market in the South, though some fair tonnages are moving. Old contracts have held on longer than usual for the reason that when the market began weakening, consumers ordered deliveries on old contracts to stop and in the meantime new business was placed at lower prices. Old contracts were not cancelled, but by degrees the tonnage is being received.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.00 to 10.00

Cincinnati

Prices of Pig Iron Still Trend Downward—Scrap Is Lower

CINCINNATI, Oct. 23.—There is little change in the pig iron market as far as inquiries and sales are concerned, but prices are still inclined to go lower. In southern Ohio carload sales are being made on the basis of $23.50, furnace, but $23 has been quoted, and this price can still be done on round tonnages. One sale of 1000 tons of Southern iron was made to a melter in this district last week at around $20.50, Birmingham, but today $20 can be done, and this is generally considered to be the market. Buying generally continues of the hand-to-mouth variety, but occasionally inquiries are received for first quarter. A Tennessee melter is in the market for 1500 tons of malleable for first half, and a southern Ohio melter for 500 tons for first quarter. A northern Ohio melter is inquiring for 500 tons for November and December shipment. There is little activity in basic or Bessemer. An Ohio melter, which inquired for 700 tons of silvery, has decided to postpone purchase for the time being. No change is reported in the furnace situation.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.55
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.00
Basic Northern	25.00
Malleable	25.00

Finished Materials.—There is little change in the situation from the past week, most of the orders placed being for one and two carloads. The railroads have been buying track accessories in fair tonnages, the Louisville & Nashville Railroad having placed orders for 14,700 kegs of spikes, divided between a Pittsburgh independent and a Chicago mill, 5000 kegs of specially heat-treated track bolts, and 31,000 pairs of angle bars. Regular prices were quoted on all these inquiries. Plates and shapes are not very active, although the inquiries, small as they are, are slightly more numerous. Some interest is being shown in wire products, but orders are light. This branch of the trade is expected to show improvement, however. Bolts and nuts are in fair demand, though prices are weak.

Structural Material.—An inquiry from an Indiana fabricator for 3000 tons of shapes is current, but this is understood to be for an electric light plant at South Bend on which the company is figuring. There have been no important lettings, the only one reported being the Meredith Building, Huntington, W. Va., 300 tons, to a Pittsburgh fabricator.

Reinforcing Bars.—The general contract for St. Joseph's Infirmary, Louisville, Ky., has been awarded to the Struck Construction Co. The bars, 650 tons, have not been awarded. A number of small projects involving less than 100 tons each are up for bids. Prices of reinforcing bars show little change, the range being from 2.20c. to 2.40c.

Sheets.—One and two carload orders continue to be the rule, and most of these are being placed at the full price. Concessions are reported on black and galvanized, but not in the immediate Cincinnati territory.

Warehouse Business.—Orders are regarded as satisfactory, though the tonnages are small. Immediate delivery seems to be the desire of manufacturers. Prices are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.80c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—There is little activity in foundry or furnace fuels, but a spurt in domestic coke was noted following several cold days. Prices are softer. New river foundry coke is available at $11, which is down $1, while Wise County furnace can be had for $5.25 to $5.75, and foundry at $6 to $7. The by-product price will be unchanged next month at $9, Connellsville basis.

Old Material.—There is no activity in scrap in this district, mills being well covered for the rest of the year. Small sales of foundry grades are occasionally made. Prices are off at least 50c. on all grades. Railroad offerings are still heavy, and in view of the stipulation of some roads that shipping instructions accompany bids, prices offered by dealers are pretty low.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$10.00 to $10.50
Iron rails	13.00 to 13.50
Relaying rails, 50 lb. and up	27.00 to 27.50
Rails for rolling	14.00 to 14.50
Heavy melting steel	12.50 to 13.00
Steel rails for melting	13.00 to 13.50
Car wheels	12.50 to 13.00
Per Net Ton	
No. 1 railroad wrought	11.00 to 11.50
Cast borings	7.50 to 8.00
Steel turnings	7.00 to 7.50
Railroad cast	14.00 to 14.50
No. 1 machinery cast	17.00 to 17.50
Burnt scrap	10.50 to 11.00
Iron axles	21.00 to 21.50
Locomotive tires (smooth inside)	12.50 to 13.00
Pipes and flues	6.50 to 8.00

Cleveland

Pig Iron Prices Still Receding with Slightly More Activity

CLEVELAND, Oct. 23.—Reflecting the further curtailment in blast furnace operations, the consumption of Lake Superior iron ore again fell off in September, being 4,813,942 gross tons as compared with 5,353,147 tons in August, a decline of 539,205 tons. This compares with a consumption of 2,989,545 tons in September last year. Interior furnaces in the central district consumed 2,459,880 tons, a falling off of 303,653 tons for the month; lake front and Canadian furnaces consumed 1,994,703 tons, a decrease of 166,464 tons, and Eastern furnaces consumed 228,722 tons, a decline of 59,716 tons. On Oct. 1 there were 37,449,846 tons of ore on hand at furnaces and Lake Erie docks as compared with 32,831,227 tons on Sept. 1 and with 41,805,430 tons on Oct. 1 last year. Stocks at furnaces Oct. 1 were 30,430,328 tons as compared with 26,923,953 tons on Sept. 1.

Pig Iron.—The market has become more active and under the test of several fair-sized inquiries has shown little resistance to the pressure on prices. As a result, prices are at least $1 a ton lower than a week ago. Sales of foundry iron have been made on a basis of $22.50 Valley by a Cleveland furnace and on some of these the furnace has had to absorb a freight differential which in one case amounted to 65c., making the price $21.85 at furnace. In Buffalo a $22 price has appeared and there are unconfirmed reports that even below $22 has been quoted in the Valley district. In Cleveland foundry iron has declined $1 a ton to $24 at furnace for local delivery. Local producers at present are holding to this price, but this is not low enough to

shut out outside furnaces on a quotation below $22.75 Valley. A Cleveland producer has sold 1000 tons of basic iron at $23 for shipment in the Pittsburgh district from a western Pennsylvania furnace having about the same freight rate as the Valley, and basic iron can probably be bought at $22.50, although there are unconfirmed rumors that this grade is being offered by a broker at a considerably lower price. An inquiry for 2500 tons of basic is pending. Sales of foundry iron include a 5000-ton lot taken by a local interest for November and December shipment from Cleveland and western Pennsylvania furnaces. The General Electric Co. during the week inquired for 2000 tons of malleable and foundry iron for its Erie works and this business has probably been placed with Buffalo furnaces. Considerable inquiry has developed during the past day or two in lots up to 600 tons, mostly for early shipment, but in some cases extending into the first quarter. In addition, several foundries are sounding the market on first quarter requirements and rather indefinite inquiries aggregating 10,000 tons are pending for that delivery. A northern Ohio consumer is still figuring on an inquiry for 1500 to 3000 tons for the first quarter and there is one inquiry for 500 tons for March shipment. In the Michigan territory, competition from Chicago furnaces for business in the western part of the State is keener than usual and a Canadian steel company is an active seller in some parts of the State.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.50 to $23.00
Northern No. 2 fdy., sil. 1.75 to 2.25	24.50
Southern fdy., sil. 1.75 to 2.25	26.00
Malleable	24.50
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00

Semi-Finished Steel.—A local mill has sold several lots of sheet bars aggregating 8000 tons for making sheets to fill Japanese orders, and has made reservations of about 40,000 tons for the first quarter subject to prices prevailing at time of shipment. The falling off in the demand for sheets has caused the holding up of sheet bar shipment and some mills are in need of orders. Sheet bars are still generally quoted at $42.50, but the ruling price on billets and slabs appears to be close to $40.

Finished Iron and Steel.—Business shows some improvement in both orders and inquiries, but orders, as a rule, are confined to small lots for early requirements. Consumers are able to secure almost any desired delivery and with their lack of confidence that present prices will hold, they are allowing their stocks to run low and make replacements only when necessary. While local plate mills do not have a great deal of tonnage ahead, their orders are keeping up with shipments. On steel bars, plates and structural material, the market continues firm at regular prices. An order for two car ferries for the Canadian National Railway has been placed with the Toledo Shipbuilding Co. These will require 5200 tons of plates and structural material, which will be supplied by Steel Corporation mills. Indefinite inquiries are pending for lake boats requiring 8000 tons of steel. Considerable new business is coming from the automotive industry. The Willys-Overland Co. has placed 1600 tons of steel bars for early shipment, supplementing its recent purchases of 6100 tons for October and November delivery. A Cleveland manufacturer of automobile parts is inquiring for 1000 tons of molybdenum and 1000 tons of carbon spring steel. Detroit reports indicate that leading car builders continue to operate at near capacity and that smaller companies have not changed recent production schedules which were reduced several weeks ago. A Canton, Ohio, consumer has purchased 400 tons of bars and is inquiring for 500 tons additional for railroad specialty work. Bands are holding fairly well at 3c., but strip steel continues weak with quotations ranging from 2.85c. to 3c., and as low as 2.75c. for wide strip that comes in competition with blue annealed sheets, light plates and skelp. A price as low as 1.80c. is reported on rerolled light rails, but mills are holding closely to 2.25c. for rails rolled from new steel. Spikes are still irregular and have sold as low as 3.10c. In structural lines fabricators are figuring on considerable work in other districts. Locally the Brotherhood of Locomotive Engineers' Building, requiring 5000 tons, has not yet been placed.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Sheets.—Demand continues slow. Mills are getting a fair volume of orders for automobile body sheets, but car builders are buying only in small lots for early requirements. Black sheets continue weak and on these quotations of 3.70c. have appeared, although 3.75c. is the more common minimum price. There are unconfirmed reports that galvanized sheets have been offered at 4.90c., but blue annealed sheets are firm at 3c.

Reinforcing Bars.—The Bourne-Fuller Co. has taken 200 tons for a building for the Ben Williamson Co., Ashland, Ky., and 125 tons for the Dutch Creek Sewer, Cincinnati. An inquiry is pending for a warehouse for the Harnitt Jewett Co., Toledo, requiring 500 tons. The competition of mills making rail steel reinforcing bars is becoming keener and quotations as low as 2.10c. on these bars are reported, although 2.25c. is the commonly quoted price.

Cast-Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has taken 1200 tons of 4 to 12-in. pipe for work in Lake County, Ohio, a contract for which has been placed with the Lloyd Construction Co.

Coke.—The market is inactive with prices unchanged at $5 to $6.50 for standard Connellsville makes.

Alloy Steel.—Quotations have been reduced ¼c. per lb. on ½ and 3½ per cent nickel, chrome nickel and chrome vanadium alloy steels, following weakness in the market previously reported. We note the sale of 1200 tons of alloy steel for delivery to a Cleveland company making automobile parts.

Bolts, Nuts and Rivets.—New business is only moderate, as consumers are buying closely and only for immediate requirements. Some makers are still holding to the old prices or 60 and 5 per cent off list for machine bolts, although 60 and 10 per cent is more common. Rivet prices are unchanged at 2.75c. to 3c., the minimum price being usually for early shipment orders. Considerable business in fourth quarter contracts has been taken at 2.85c. to 3c.

Old Material.—Consumers are showing no interest in the market and are buying only small lots that dealers are particularly anxious to move. Owing to the light local demand recently, an outside market must be found for some of the Cleveland scrap, which means that it must carry the freight rate to the other consuming point. This has had a further weakening effect on the market and most grades have declined 50c. a ton, although compressed sheet steel has been marked down $1 a ton. Dealers have been able to buy heavy melting steel as low as $14.25. A leading local consumer has released shipments on heavy melting steel and compressed sheet scrap, but is not taking turnings.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$14.75 to $15.00
Rails for rolling	17.50 to 18.00
Rails under 3 ft.	16.75 to 17.00
Low phosphorus melting	18.50 to 19.00
Cast borings	11.00 to 11.25
Machine shop turnings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
Compressed sheet steel	12.75 to 13.00
Railroad wrought	12.75 to 13.00
Railroad malleable	15.50 to 15.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	12.00 to 12.25
No. 1 cast	20.00 to 20.50
No. 1 busheling	10.25 to 10.50
Drop forge flashings	11.00 to 11.50
Railroad grate bars	15.50 to 16.00
Stove plate	15.50 to 16.00
Pipes and flues	9.50 to 10.00

Philadelphia

Pig Iron and Scrap Markets Weaker and Steel Business Shows Little Gain

PHILADELPHIA, Oct. 23.—Whatever price changes have occurred in the pig iron, steel and scrap markets within the past week have been downward. The week has been uneventful, however, and the waiting policy of both buyer and seller is still strongly outstanding. Foundry pig iron prices have slid off a fraction of a dollar, quotations of 2.40c., Pittsburgh, on plates and shapes are slightly more numerous, while in the scrap market the bottom has fallen out entirely and prices are so ragged on some items that many dealers are finding it unprofitable to sell. The most significant development in the entire market was the purchase of a tonnage of pig iron by a New Jersey company for the first four months of 1924, the only buying thus far for delivery beyond Jan. 1.

Pig Iron.—Curtailment of pig iron production, which has been discussed by producers and their agents for weeks as the only way of restoring a balance between supply and demand, is now fairly on the way, but it may have come too late to be of much help to the pig iron market this year. A Warwick furnace will go out of blast this week, also one furnace at Port Henry, N. Y., and the Everett furnace in central Pennsylvania will be blown out about Nov. 1. There is talk of two or three other Eastern furnaces going out soon, but nothing has been decided definitely. In the immediate Philadelphia territory little foundry iron business has developed within the past week, but there has been a fair volume of inquiry and some sales in the New York territory. A manufacturer at East Orange, N. J., is the first to contract for foundry iron for 1924, having purchased 1000 tons or more, about half No. 2 plain and half No. 2X, for shipment in the first four months of next year at an average price of $23.15, furnace. While eastern Pennsylvania furnaces are attempting to hold their prices at a minimum of $23, furnace, this price has applied in some instances not only on the base grade, No. 2 plain, but also on No. 2X, which recently has taken a differential of 50c. a ton over the base grade. In a few instances, $23 has been shaded on No. 2 plain, but this has been done chiefly by furnaces which on certain business were at a disadvantage on freight rates. There have been no transactions in basic iron, but in line with recent reductions on foundry grades it is stated that basic could be purchased at $24 to $24.50, delivered. The regular users of basic in the East, principally plate mills, are well supplied for some time to come in view of the small volume of plate buying.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.76 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	23.76 to 24.63
East. Pa. No. 1X	24.26 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	24.00 to 24.50
Gray forge	24.00 to 24.50
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Sales of ferromanganese have been made at $108 to $110, furnace, but whether these were resale lots does not appear. The leading domestic producer has no stated prices, and the British price is being nominally maintained at $117.50, seaboard, with no sales.

Semi-Finished Steel.—Open-hearth rerolling billets are freely offered at $40, Pittsburgh, and forging billets at $45, Pittsburgh, with indications that the latter price might be shaded on desirable lots.

Plates.—A calculation by some of the Eastern producers indicates that new plate business does not exceed 30 per cent of the capacity of the mills of this district and operations at most of the mills are about on that basis. No improvement is in sight unless there should be a revival of locomotive and car buying by the railroads. Two or three mills continue to name 2.40c., Pittsburgh, on carload lots or larger, and it is indicated that this price has been met in some instances by a larger mill, which thus far has steadfastly adhered to 2.50c. quotations. The Lebanon Boiler Works has been awarded a contract for fabricating 70 tanks for the Pennsylvania Sugar Co. The Newport News Shipbuilding & Dry Dock Co. will build two boats for the Old Dominion Line. We quote sheared and universal plates at 2.40c. to 2.50c., base, Pittsburgh.

Structural Material.—Buyers have been offered structural shapes in carload lots or larger at 2.35c., Pittsburgh, which is $1 a ton under the minimum which two of the Eastern mills have recently been quoting. It appears that quotations of 2.40c., Pittsburgh, are more common, some of the larger mills not being able to disregard entirely the lower quotations of two small mills. It probably is still true, however, that the bulk of current tonnage is being booked at 2.50c.

Bars.—Though mill quotations remain at 2.40c., Pittsburgh, the situation continues to be disturbed somewhat by resale offerings. Mill representatives say that these transactions have not affected their ability to get 2.40c. from their regular customers, but the volume of business is light and showing little if any, improvement. Bar iron remains at 2.35c., Pittsburgh, but sales are almost negligible.

Warehouse Business.—A dwindling of sales of steel products out of stock is reported by leading jobbers. Prices remain unchanged, and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.65c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 4.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.85c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.35c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—The week's transactions in scrap, though limited as to numbers and tonnage, have brought about further declines on nearly all items ranging from 50c. to $1 a ton. The highest price, and in fact the only price, obtainable for No. 1 heavy melting steel is $15, delivered at eastern Pennsylvania plants on old orders, there having been no mill buying during the week. An Eastern consumer of bundled sheets and turnings for open-hearth use has reduced its price to $10.50, delivered, on both items, and this appears to be the only market for these grades. A peculiar situation is that mixed borings and turnings for blast furnace use are slightly higher than turnings for steel plants, a reversal of the usual order. Prices have gone so low that some dealers are in no mood to sell, preferring to hold material in their yards when it is possible to do so.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00
Scrap rails	15.00
Steel rails for rolling	$17.00 to 17.50
No. 1 low phos. heavy 0.04 and under	20.00 to 21.00
Couplers and knuckles	18.50 to 20.00
Cast-iron car wheels	19.00 to 20.00
Rolled steel wheels	18.50 to 19.00
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	15.50 to 16.00
No. 1 forge fire	11.00 to 11.50
Bundled sheets (for steel works)	10.50
Mixed borings and turnings (for blast furnace use)	11.00 to 11.50
Machine shop turnings (for steel works use)	10.50 to 11.00
Machine shop turnings (for rolling mill use)	11.50 to 12.00
Heavy axle turnings (for equivalent)	12.00 to 14.00
Cast borings (for steel works and rolling mills)	12.00 to 12.50
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	19.00 to 20.00
Heavy breakable cast (for steel plants)	16.00 to 17.00
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	17.00 to 17.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	20.00 to 21.00
Steel axles	20.00 to 21.00

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, base, per lb.....3.15c.
Bands, base, per lb.....3c. to 3.15c.
Strips, base, per lb.....3c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.63

Cold-Finished Steels

Bars and shafting, base, per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, automatic machines.....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....55 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads .....50 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.25c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅛ in. and smaller, U. S. S.....80 and 5 per cent off list
¼ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes S. A. E.....10 and 5 per cent off list
S. A. E. ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset lag screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $2.75 to $3.00
Small rivets .....65 and 10 to 70 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lbs.....$3.15
Spikes, ½ in., ⅜ in. and ⅝ in., per 100 lbs.....3.15 to 3.50
Spikes, ⅞ in. and larger.....3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, per 100 lb. 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb. 5.00 to 5.50
Tie plates, per 100 lb.....2.35 to 2.60
Angle bars, base, per 100 lb. 2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	⅛ to ¾	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	25	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	49½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	501
¼ to ⅜	47	30½	¼ to 8	+19	+54
½	53	42½	½	21	7
¾	55	47½	¾	28	13
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	33	8
2½ to 4	57	46½	2½ to 4	39	15
4½ to 6	56	45½	4½ to 6	38	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1¾ in.	+ 2
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes			
Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	32	4½ in. and 5 in.	33
2½ and 2¾ in.	32		
Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than 12 gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	35
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
8-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
12-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
15-lb. coating I. C.		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, one Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), No. 28 gage, per lb.....5.50c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.50c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Jamestown, Buffalo, Geneva	$0.25	Buffalo	$0.25	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.24	Detroit	0.29	Omaha	0.735
New York, export	0.225	Detroit (pipe)	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.335	Chicago	0.34	Denver (pipe)	1.215

St. Louis	$0.43	Pacific Coast	$1.15
Kansas City	0.735	Pac. Coast, ship plates	1.34
Kansas City (pipe)	0.705	Birmingham	0.58
St. Paul	0.60	Memphis	0.56
Omaha	0.735	Jacksonville, all rail	0.70
Omaha (pipe)	0.705	Jacksonville, rail and water	0.415
Denver	1.27	New Orleans	0.67
Denver (pipe)	1.215		

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 45,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	39c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$42.00 to 45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	41.00 to 44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	$2.50 to $5.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	$8c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrotitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	40.00 to 49.00
Ground fire clay, per net ton	6.00 to	7.00
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00 to $42.50
Rolling billets, 2-in. and under	40.00 to 42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00 to $42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	3 per ton over base
Wire rods, carbon 0.41 to 0.55	5 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10 per ton over base
Wire rods, acid	15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.15c. to 2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅞-in, and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill.	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$ 4.80	$ 4.80
5/16-in.	5.50	5.90
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	29.50
⅞-in.	37.00	47.50
1-in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.00 to $3.25
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.50 to 3.75
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.50 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but conformed to by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Awards Slightly Over 10,000 Tons, While Business Pending Exceeds 38,000 Tons

While structural steel awards in the past week were not large, totaling 11,000 tons, as reported to THE IRON AGE, there is a good deal of work in prospect for this season. Projects on which bids have gone in or will go in shortly total 39,000 tons, of which 14,000 tons will be required for a power plant in New Jersey. Apartment buildings to be erected in New York account for 10,000 tons of pending inquiry, and subway work for 4400 tons. Bridge construction pending totals 6230 tons. Apartment buildings in New York account for 3300 tons of the awards, and an office building in Atlanta, Ga., takes 2200 tons. Among the awards are:

Theatre building at 302 West Forty-fifth Street, New York, 400 tons, to Hedden Iron Construction Co.

Loft building at 32-34 West Thirty-ninth Street, New York, 600 tons, to Hedden Iron Construction Co.

Elmer & Amend, Third Avenue and Eighteenth Street, New York, addition, 100 tons, to Hinkle Iron Works.

Guthrie bakery, East Seventy-second Street, New York, 200 tons, to Harris Structural Steel Co.

Paterno apartment building, Seventy-fifth Street and West End Avenue, New York, 650 tons, to Paterson Bridge Co.

Paterno apartment building, Broadway and 108th Street, New York, 850 tons, to Paterson Bridge Co.

Paterno apartment building, Eighty-fifth Street and West End Avenue, 500 tons, to Paterson Bridge Co.

Paterno apartment building, Riverside Drive and 101st Street, New York, 650 tons, to Harris Structural Steel Co.

Paterno apartment building, Eighty-third Street and West End Avenue, New York, 650 tons, to Harris Structural Steel Co.

Virginian Railway, crane runway, 200 tons, to Virginia Bridge & Iron Works.

Hurt building, Atlanta, Ga., addition, 2200 tons, to Levering & Garrigues Co.

American Car & Foundry Co., foundry at Madison, Ill., 300 tons, to Kenwood Bridge Co.

Cushman & Sons, bakery building, 800 tons, let to unnamed fabricator.

Warehouse at Thirty-fourth Street and Eleventh Avenue, New York, 350 tons, to George A. Just Co.

Public School No. 1, Union Hill, N. J., 350 tons, to Fagan Iron Works.

Independent Order of Odd Fellow's Memorial Building, Brooklyn, 300 tons, to Communipaw Structural Steel Co.

Hellman Commercial Trust & Savings Bank building, Los Angeles, 1330 tons, to Llewellyn Iron Works.

Northern States Power Co., sub-station at Aldrich, Minn., 239 tons, to American Bridge Co.

American Brake Shoe & Foundry Co., foundry buildings, Kansas City, Mo., 122 tons, to Kansas City Structural Steel Co.

Alpena, Mich., Ninth Street bridge, 200 tons, to Wisconsin Bridge & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Public Service Corporation of New Jersey, power plant at [illegible] N. J., 14,000 tons.

Twelve apartment buildings to be erected in New York City, totaling about 10,000 tons.

Transit Commission, New York City, elevated construction for subway extension in Borough of Queens, 4400 tons; bids close Nov. 2.

Boston & Maine Railroad, repairs to bridge at Gorham, N. H., 500 tons.

Hotel St. George, Brooklyn, addition, 800 tons.

Power plant at Weymouth, Mass., 400 tons.

Baltimore & Ohio Railroad, two bridges at Chicago, totaling 900 tons; one bridge at Pittsburgh, 300 tons.

Young Women's Christian Association building at Trenton, N. J., 500 tons.

Atlantic Coast Line, shop at South Rocky Mount, N. C., 250 tons.

Shoemaker & Sons, paper warehouse and [illegible] Fifty-seventh Street, New York, mentioned last week as requiring 1500 to 2000 tons, now figured at 2500 tons.

Norfolk & Western Railroad, three bridges, totaling 400 tons.

Calmenson Co., St. Paul, warehouse for paper, 250 tons; bids in.

Buckeye Coal Co., Memocolin, Pa., tipple, 965 tons.

Chicago, Burlington & Quincy, nine girder spans, 630 tons.

South Dakota highway bridges, 2000 tons.

Buffalo & Ohio Railroad, bridge work, 1000 tons.

Kanawha & Michigan Railroad, bridge work, 500 tons.

Harding junior high school, Lakewood, Ohio, 200 tons, bids rejected and to be readvertised.

RAILROAD EQUIPMENT BUYING

Purchases of New Cars This Year Total 64,000—Southern Pacific to Inquire for 18,000

Car purchases for the nine months of 1923 ended Oct. 1 showed a total of only 64,000, which is small in comparison with some of the most active years in car buying before the war. In addition to the new cars contracted for, 20,000 cars were let out by the railroads for repairs. None of the large inquiries for cars, recently mentioned by THE IRON AGE and expected by car builders to make their appearance before the end of the year, has yet come out. The Southern Pacific will probably inquire for 18,000 freight cars, and of the locomotives it considers buying 25 are reported to have been awarded to the Baldwin Locomotive Works.

The Southern Pacific is expected to take early action on a program of 18,000 freight cars, which represents the joint needs of the Southern and Union Pacific and the Pacific Fruit Express.

The Southern Pacific has issued an inquiry for 20 switching locomotives in addition to the 58 engines on which it recently asked figures. The number of these is 43, instead of 58 as first considered, and a Philadelphia dispatch of Oct. 23 is to the effect that the Baldwin Locomotive Works will build 25 of them.

The Missouri Pacific contemplates buying 60 locomotives, instead of 80, as recently reported.

Swift & Co., Chicago, has placed 200 steel underframes with the Cambria plant of the Bethlehem Steel Co.

The Chicago & Alton has placed 350 gondola car bodies with the Ryan Car Co. and 250 composite gondola cars with the Pullman Co., and will shortly enter the market for 250 box cars.

The Burlington is inquiring for 1000 gondola car bodies.

The St. Louis Southwestern is inquiring for repairs on 100 to 1000 box cars.

The Chesapeake & Ohio is inquiring for 25 caboose cars.

The Missouri Pacific is in the market for repairs on 25 to 50 passenger cars.

Improving Car Service

WASHINGTON, Oct. 23.—The Car Service Division of the American Railway Association has just made its sixth report concerning the progress made on the program to provide adequate transportation as approved at the meeting of the American Railway Association and of the Association of Railway Executives in New York on April 5. The report shows that from Jan. 1 to Oct. 1 the railroads put 134,636 cars and 2963 locomotives in service. The cars put in service were classified as follows: Box, 52,963; refrigerator, 17,218; coal, 55,575; stock, 3727; flat, 3192; others, 1961. The number of locomotives on order on Oct. 1 was 1242. For the 39 weeks of 1923, the number of coal cars loaded was 7,208,224 as against 4,913,566 for the same period of last year. The number of cars of coke loaded was 568,699 as compared with 332,429, while the cars of ore loaded totaled 1,880,499 as against 1,217,896.

Liquid oxygen explosives are being extensively used in France and Germany in metal mining and quarrying operations. This type of explosive is not, however, being employed in coal mines, because of the assumed danger of causing coal dust explosions. Tests employing liquid oxygen explosives in quarries and metal mines in the United States are being made by the Bureau of Mines at Pittsburgh and at other field stations.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery.

	Copper, Lake	Copper, Electrolytic*	Straits Tin, New York	Lead, New York	Lead, St. Louis	Zinc, New York	Zinc, St. Louis
Oct.							
17.....	13.12½	12.62½	41.62½	6.85	6.60	6.65	6.30
18.....	13.25	12.62½	41.62½	6.85	6.60	6.70	6.35
19.....	13.25	12.62½	41.50	6.85	6.60	6.75	6.40
20.....	13.25	12.62½	.....	6.85	6.60	6.75½	6.37½
22.....	13.25	12.62½	40.87½	6.85	6.55	6.72½	6.37½
23.....	13.12½	12.50	41.25	6.85	6.55	6.67½	6.32½

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Oct. 23.

Most of the markets are inactive and lower. The advance in copper has given place to easier quotations. The lead market is the only one which is steady to firm. Zinc, after advancing, has again declined.

Copper.—Electrolytic copper early last week advanced until some companies were selling as high as 13c., delivered, but this tendency was of brief duration. Demand has since grown smaller and prices have eased until electrolytic copper today is available at 12.75c. to 12.62½c., delivered, for shipment any time this year. It is probable that the metal could be bought for first quarter delivery at these prices. One explanation of the weakness is the admitted fact that production has not been sufficiently curtailed and still is in excess of consumption. The European situation and the decline of the pound sterling are also factors making for weakness.

Tin.—On only one day in the last week was any business of any magnitude done in Straits tin. This was on Oct. 18, when about 250 tons changed hands with dealers the most active buyers. The continued absence of consumers in the market is a feature; in fact, they have bought almost nothing lately. Yesterday about 75 tons was sold on the New York Metal Exchange at 40.75c. and today the market has been exceedingly quiet. The decline in the pound sterling to the lowest point in the year today and the lack of demand from consumers in particular are the causes of the dullness and lower prices. Straits tin was quoted today at 41.25c., New York, mostly nominal. Cables from London report prices there today to have been £202 5s. for spot standard, £200 5s. for future standard and £203 5s. per ton for spot Straits. Arrivals thus far this month have been 3095 tons with 7639 tons reported afloat.

Lead.—The market continues quiet but strong. One factor in the firmness here is the strength of the London market, which has advanced £1 7s. 6d. per ton in a week. Inquiries are reported as fairly satisfactory and demand is about equal to consumption. The price of the leading interest continues at 6.85c., New York, with independents quoting the same price. The Western market is a little easier with 6.55c., St. Louis.

Zinc.—Prime Western, after advancing during the week to about 6.40c., St. Louis, or 6.75c., New York, has again declined and today is quoted for October-November delivery at 6.30c. to 6.35c., St Louis, or 6.65c. to 6.70c., New York. The advance referred to was due partly to moderate orders from England and to a little better domestic demand, both of which have now lessened decidedly

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market quotations for both shot and ingot nickel are both 29c. to 32c.

Antimony.—Due to conditions in China a scarcity has developed and wholesale lots of Chinese metal for early delivery are quoted as high as 8c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., New York, duty paid, with some sellers unable to obtain the metal from their principals.

Old Metals.—Business continues very quiet and featureless. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	10.00
Heavy machine composition	10.00
Brass, heavy	7.25
Brass, light	5.00
No. 1 red brass or composition turnings	8.50
No. 1 yellow red brass turnings	6.50
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.25
Sheet aluminum	16.25

Chicago

CHICAGO, Oct. 23.—Lead has declined and zinc has advanced, while the other metals remain unchanged. Zinc advanced last week to 6.50c. as a result of foreign demand, but has since declined again following a subsidence of export inquiry. While fair-sized orders for tin and copper have been placed, purchases have been for close-by delivery and the demand for futures has been practically nil. Among the old metals various grades of copper, brass and lead have declined. We quote in carload lots: Lake copper, 13.75c.; tin, 42c.; lead, 6.60c.; spelter, 6.35c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 8.75c.; red brass, 8c.; yellow brass, 6c.; lead pipe, 5c.; zinc, 4c.; pewter, No. 1, 22c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

Automobile Production in September

Continuing the high rate which has prevailed throughout the year, September production of automobiles is reported by the Department of Commerce at 298,910 pleasure cars and 28,455 trucks. Except for January and February, every month of the year has shown more than 325,000 cars, while no month of any preceding year reached 300,000.

The total for nine months amounts to 2,741,377 cars and 288,605 trucks, compared with 1,698,823 cars and 181,228 trucks for 1922, and with 1,223,617 cars and 114,955 trucks for 1921. The nine months' output this year exceeds the full year's output of 1922, which was a record up to that time. The 12 months' production of 1922 was 2,339,703 cars and 245,041 trucks, while for 1921 the figures were 1,535,196 and 147,173.

May was the largest month of 1923, with a total of 393,861 vehicles. April with 382,301, and June with 378,332, followed in second and third positions.

Plans of Ford Motor Co. Plant to Be Built in St. Paul District

DETROIT, Oct. 23.—Plans of the Ford Motor Co. in the St. Paul district, details of which have just been announced, cover a hydro-electric plant with an initial capacity of approximately 18,000 hp., an auxiliary steam power plant and a manufacturing and assembly plant, the latter 600 by 1720 ft., one story. The hydro-electric plant will utilize the Mississippi River dam completed by the Government several years ago with extensive changes to vertical generators rated at 4500 hp. each. Tunnels running beneath the manufacturing building will connect with river rocks and permit the handling of freight by water.

Foundry employers in St. Louis have agreed to an increase in wages to $7.50 a day for molders in St. Louis and Belleville plants. About 400 men in St. Louis and 175 in Belleville are affected. The scale does not apply to stove foundries. The increase followed threats of a strike.

PERSONAL

E. C. Collins has been elected president of the Crucible Steel Co. of America, succeeding Dr. John A. Mathews, whose resignation was tendered last September before he sailed for Europe, and was accepted at the October meeting of the board of directors. After a long and distinguished career, Dr. Mathews was elected president of the company in 1920, but found that the duties of the position made demands upon his time which interfered with work in the field of metallurgy to which he was devoted and in which he had attained eminent success. It is now his desire to be free to devote his entire time to the solution of some of the problems peculiar to his long chosen field of endeavor. Mr. Collins entered the steel business 25 years ago in the sales department of the Carnegie Steel Co. He continued in the service of subsidiary companies of the United States Steel Corporation until 1922, when he accepted the office of assistant to Chairman H. S. Wilkinson of the Crucible company.



E. C. COLLINS

Howard Williams, formerly with the Electric Alloy Steel Co., Youngstown, Ohio, has returned to the sales department of the Youngstown Sheet & Tube Co., and will be associated with E. S. Rooney in the new branch office at Cincinnati.

R. J. Kaylor, publicity manager Youngstown Sheet & Tube Co., Youngstown, Ohio, recently delivered talks on the manufacture of iron and steel at Boston, Mass., and Portland, Me., using illustrated lantern slides showing operations as conducted at the company's works.

James W. Hook, formerly president Allied Machinery Co. of America, has been elected president and treasurer of the Geometric Tool Co., New Haven, Conn., succeeding the late Howard E. Adt. Mr. Hook had taken up his duties as general manager on Oct. 1.

Robert Geddis, for several years a director in the Jones & Laughlin Steel Corporation at Pittsburgh and manager of hot-rolled steel sales, has been made general manager of sales, Western district, with headquarters in Pittsburgh. He will have jurisdiction over selling effort and sales promotion throughout Western States, and particularly on the Pacific Coast. C. S. Bradley, at present district sales manager of the company at Buffalo, succeeds Mr. Geddis, and will have his headquarters in the main offices at Pittsburgh. These changes will become effective on Nov. 1.

R. P. McCormick, for a number of years with the Austin Machinery Corporation, which he represented on the New York district, has been appointed Eastern district sales manager of the Pawling & Harnischfeger Co., Milwaukee. He will be in charge of the New York office, 50 Church Street, and the Philadelphia office, which is locally in charge of T. E. Gallagher.

W. F. Mills has resigned as vice-president and general manager of the Hadfield-Pennfield Steel Co., Bucyrus, Ohio, and has returned to his former home in Sheffield, England.

Frederic H. Dorner was elected president of the Engineers' Society of Milwaukee at its annual meeting on Oct. 17. He was graduated in 1905 from the college of engineering, University of Wisconsin, and for a number of years has been engaged in the sales engineering business, specializing in power plant equipment and apparatus. He served 10 years as secretary of the Milwaukee society.

George W. Knapp, Jr., factory manager National Enameling & Stamping Co., Baltimore, has been appointed chairman of an industrial safety conference committee which has been formed by the Baltimore Safety Council. Under the direction of the committee a series of conferences and lectures is being arranged for superintendents, foremen and others connected with industrial plants in Baltimore.

George A. Morrisey, consulting engineer St. Louis Coke & Iron Co., Granite City, Ill., and Mrs. Morrisey are spending their honeymoon in California.

F. H. Hurd, who for the past four years has been assistant superintendent of furnaces for the Alabama Co., Gadsden, Ala., has been promoted to superintendent, succeeding H. R. Stuyvesant, resigned.

Walter S. Bronk, for a number of years connected with the Badger-Packard Machinery Co., Milwaukee, and for the last two years manager of the Milwaukee Machinery Co., Milwaukee, has resigned as manager and director of that company.

H. A. Baugh, who has been connected for several years with the Pittsburgh sales office of the Shepard Electric Crane & Hoist Co., has been appointed district sales manager to succeed N. P. Farrar, who resigned to become connected with the Philadelphia office of the Pawling & Harnischfeger Co., Milwaukee.

A. P. Swoyer, formerly vice-president Baltimore Tube Co., Baltimore, is president of the newly organized Swoyer Brass & Copper Co., Woolworth Building, New York. He has been connected with brass and copper interests since 1884, having been head of the A. P. Swoyer Co., Philadelphia, and at one time general sales manager of the Bridgeport Brass Co., Bridgeport, Conn.

W. H. Haines, formerly chief inspector of the Schenectady works, General Electric Co., has retired. W. W. Wagner succeeds him.

R. Dawson Hall, editor *Coal Age*, New York, has been elected a member of the executive committee for the National Safety Council.

A. W. Shaw, of Johnson, Clapham & Morris, Ltd., Manchester, England, importers of hardware, will sail Oct. 27 for England after a several weeks' sojourn in the United States.

Gunnar Dillner, managing director of the Swedish ore firm, the Trafikaktiebolaget Grangesberg-Oxelosund of Stockholm, Sweden, with S. Frisell of the same company arrived in this country last week on the steamship *Berengaria*. They will remain here for several weeks.

Anchor Drawn Steel Co. Will Build in Pittsburgh District

PITTSBURGH, Oct. 23.—Incorporated to make high speed and carbon steel drill rods and to specialize in the manufacture of high grade cold-drawn products, the Anchor Drawn Steel Co. has plans under way for the erection of a plant in the Pittsburgh district and expects to being operating early next year. Dean R. Wilson is president of the new company, which has established offices in the Farmers' Bank Building in Pittsburgh. Mr. Wilson was formerly vice-president and treasurer of the Carbon Steel Co. and also was previously connected with the Kittanning Iron & Steel Mfg. Co. as director and treasurer. George W. Morrison is vice-president and general manager of the new organization and formerly was general superintendent of the Electric Alloy Steel Co., Charleroi, Pa., and following the merger of that company with the Atlas Crucible Steel Co., Dunkirk, N. Y., as the Atlas Steel Corporation, he was general superintendent, and resigned on Oct. 1 from that organization.

OBITUARY

HOWARD ELLSWORTH ADT, president Geometric Tool Co., New Haven, Conn., died suddenly at his country home in Woodbridge on Oct. 14. He was born in Haydenville, Mass., in 1862 and received his education in the public schools of Torrington, Conn. In early life he studied medicine, but was persuaded later to enter the business field, where he designed special wire-working machinery with the firm of John Adt & Son, New Haven. In this new field, he became very proficient and for 14 years was designer and superintendent of construction. In 1899 he organized the Geometric Tool Co. On Sept. 20, Mr. Adt returned from a sojourn of three months through Europe. More recently he visited his camp at Big Island, Me., and had shown no indication of ill health. Acute dilation of the heart was the cause of death. Mr. Adt was treasurer of the Bellis Heat Treating Co. and secretary of Geometric Garage Co. He was also a director of the Morris Plan Bank, the Greist Mfg. Co., the English & Mersick Co. and a member of the Quinnipiac Club.



HOWARD E. ADT

HARRY E. HAMILTON, experimental engineer St. Louis Coke & Iron Co., Granite City, Ill., died recently in a hospital there as the result of injuries received in the company's plant. He was a graduate of Oregon Agricultural College, mechanical engineering department, and his first position was with the Youngstown Sheet & Tube Co. At the outbreak of the war, he enlisted in the Navy and was advanced to ensign in the transport division. For a time he was with the Colorado Fuel & Iron Co.

GENERAL EDMOND HAYES, Buffalo capitalist and engineer, died Oct. 19. He was born in Farmington, Me., and for several years after leaving college he was connected with the Passaic Bridge Co., Passaic, N. J. In 1874 he became associated with the Morrison Field Bridge Co., which later was the Central Bridge Co. In the latter years of his life, General Hayes was interested in the Buffalo Bolt Co. and the Ontario Power Co.

WILLIS S. BROWN, SR., secretary and general manager Belvidere Screw & Machine Co., Belvidere, Ill., died on Oct. 6.

Developments in the problems of surface subsidence resulting from mining operations have been observed in Great Britain and France. At St. Etienne, France, mines under important buildings have caused them to sink as much as 20 ft., but without material damage, because of the careful packing methods employed. The mine subsidence problem is of growing seriousness in various European countries. The English Parliament has recently established a commission to study the situation.

Of United States imports by sea 31.42 per cent in the first eight months of 1923 came in American vessels and 68.58 per cent in foreign vessels. Of the exports, 37.31 per cent went under the American flag and 62.69 per cent under foreign flags. Under both headings, the business carried in American ships was a smaller percentage than had been the case in the similar eight months of 1922.

Blast Furnace and Pipe Mills to Be Built by Youngstown Sheet & Tube Co. at Indiana Harbor

YOUNGSTOWN, Oct. 23.—President James A. Campbell of the Youngstown Sheet & Tube Co. announces that plans have been approved for construction of a 600-ton blast furnace at the Indiana Harbor plant in the Chicago district, the installation of two new buttweld pipe mills and other improvements which will increase the finished steel capacity of the Indiana Harbor property.

Work on the foundations of the proposed furnace may proceed this fall, in which event it is expected to complete the stack by the middle of next year. It will be about the size of the blast furnace at Warren, Ohio, of the Trumbull-Cliffs Furnace Co., rated among the largest in the world.

With the new buttweld pipe mills, the company will have a total of 22 tube mills, equally divided between the Youngstown and Chicago plants.

Mr. Campbell believes that pessimism has been overdone with respect to the steel industry. "While business is quiet, it is in better volume than it has been; by April 1 next we should be at capacity again," he says. In explaining the reasons for his viewpoint, he states that the railroads are again commencing to buy heavily for 1924 delivery, that conditions in the oil industry are much improved and that raw material stocks in hands of manufacturing consumers are low. He regards these facts, in connection with the generally satisfactory trade and credit situation throughout the country, as warranting the belief that business will be under strong headway again next year.

Last week Mr. Campbell, as a member of committees representing the National Industrial Council and the National Manufacturers' Association, called on President Coolidge and discussed business conditions with him.

Mr. Campbell states that Japanese orders for sheets have been distributed among many makers and that most Mahoning Valley mills participated in the business.

Refractories for Steel Making

A survey of operating conditions obtaining in open-hearth steel practice will be made by the Department of the Interior, at the ceramic experiment station of the Bureau of Mines, Columbus, Ohio, for the purpose of determining wherein available commercial refractories fall short of giving ideal service. The Bureau of Mines plans later, in cooperation with the steel industry, to undertake the development of ideal refractories for specific services.

Mine owners and miners share in the distribution of profits in an interesting sociological development in the coal mining industry of Great Britain. The mines are grouped in certain districts and monthly, in each district, the gross total expenses of production are deducted from the gross sales. From this gross profit is deducted 6 per cent for invested capital; the remainder, if any, is divided between the owners (17½ per cent) and the miners (82½ per cent). The miners' share, if any, is prorated among the miners of the district.

The plan of employee representation of the Pennsylvania Railroad for the settlement of disputes between men and management was again approved by a secret ballot of shop employes. A recent poll for representatives on various shop craft committees indicated that more than 85 per cent of the employes favored the arrangement.

Machinery Markets and News of the Works

RAILROADS BUYING

Some Orders Are Still Being Placed by Burlington and Other Roads

New York Central Issues an Inquiry for About 20 Machines for Its Collinwood and Elkhart Shops

The principal development of the last week in the machine-tool trade was the placing of orders by the Burlington Railroad on a list of long standing. It was expected by Chicago dealers that the orders would total $100,000 to $150,000. Other railroad buying at Chicago, it is expected, will be of a limited character for the remainder of the year, but the Rock Island and Illinois Central have prepared comprehensive lists which are expected to come out early in 1924.

At Cleveland the New York Central issued an inquiry for about 20 tools for its Collinwood and Elkhart shops. The Nickel Plate has placed orders for a number of tools.

Most of the buying of tools by industrial companies is limited to single machines, and there is a liberal sprinkling of interest in second-hand tools. It has been significant of machine-tool business since the war that when demand for new tools falls off the demand for used tools picks up. With some dealers handling both new and used tools the demand for the latter today is more active than for the former. Many buyers of used tools, however, are insistent on getting machines "as good as new" at prices very much less than those asked for new tools.

New York

NEW YORK, Oct. 23.

THE past week has brought no change in the machine-tool situation, which continues quiet and uninteresting. Some dealers report that last week was one of the least productive of orders for some months. The only exception to this was one dealer who shared largely in the recent orders placed by the Willys-Morrow Co., Elmira, N. Y. There is a fair number of inquiries, but many of these are avowedly for the purpose of making up budgets for 1924 purchases or for inventory.

The Pollack Conduit Co., Inc., 467 Greenwich Street, New York, is planning for the installation of several presses, Bliss type Nos. 18 and 19.

The Auto Table Co., Inc., 120th Street and Jamaica Avenue, Richmond Hill, N. Y., has been making inquiries for a quantity of gray iron castings, 2 to 17 lb. each, plain and cored.

Bids will be received until Jan. 19, 1924, by R. Liddelow, secretary, State electricity commission of Victoria, Melbourne, Australia, for electrical equipment for station "B" of the Morwell power scheme, including transformers, switchgear and auxiliary equipment. Plans at the office of the Bureau of Foreign and Domestic Commerce, 734 Custom House, New York, and Room 830, 76 West Monroe Street, Chicago.

The General Motors Corporation, 224 West Fifty-Seventh Street, New York, has organized a subsidiary to operate in Denmark, Norway and Sweden, to be known as the General Motors A/S, with headquarters at Copenhagen, Denmark. It is proposed to establish an assembling works in the south harbor district of Copenhagen, where a large site has been secured, to be used primarily for Chevrolet automobiles. A parts plant will also be operated. James D. Mooney, vice-president of the parent corporation, in charge of exports, will be in charge. H. G. Zimmerman will be Copenhagen branch manager.

Fire, Oct. 17, destroyed a portion of the five-story factory at 435 East 102nd Street, New York, occupied by the Aluminum Casket Co., and the M. Linder Hardwear Floor Works, with combined loss estimated at $60,000, including equipment. It is planned to rebuild.

The American Fuel Oil Co., Inc., recently organized with a capital of $4,750,000, will take over and expand the plants of the American Fuel Oil & Transportation Co., 25 Broadway, New York, including the installation of additional equipment.

The Government Power Department, Colombo, Ceylon, is planning for the installation of a number of isolated electric lighting plants, comprising self-contained generating units, oil-engine-operated, in different provinces. The purchases will be made and the work carried out by Government agents in the different localities, a list of which is available at the Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, file No. 106994.

The H. C. Oswald Supply Co., New York, recently organized, has acquired the plant and business of the Blue & Queripel Co., 2360 Third Avenue, manufacturer of sheet metal products, roofing, etc., and will continue and expand the business. H. C. Oswald and W. J. Maskiell head the new organization.

Power equipment, ovens, conveying and other machinery will be installed in the new three-story baking plant, 60 x 230 ft., to be erected by the H. C. Bohack Co., Metropolitan and Flushing Avenues, Brooklyn, estimated to cost $450,000 with machinery. Koch & Wagner, 32 Court Street, are architects.

The New York Central Lines, 466 Lexington Avenue, New York, is taking bids on a general contract for a new one-story shop at Harmon, N. Y., to cost $25,000.

The J. Spence Iron Foundry, 921 Garfield Avenue, Jersey City, N. J., has tentative plans for rebuilding the portion of its works destroyed by fire Oct. 11, with loss estimated at $100,000, including equipment.

Bids will be received by the Water Board, Haledon, Paterson, N. J., until Nov. 5, for a new pumping plant for the municipal waterworks. H. J. Harder, 129 Market Street, Paterson, is engineer

The plant and equipment of the Bound Brook Engine & Mfg. Co., Bound Brook, N. J., formerly owned by the American Engine Co., will be offered for sale on Nov. 12, by Hugh C. and V. Mott Pierce, trustees.

Manual training equipment will be installed in the two-story addition to be erected at the high school, Ramsey, N. J., estimated to cost $150,000, for which work will be placed under way at once. C. E. Sleight & Son, Romaine Building, Paterson, N. J., are architects.

Fire, Oct. 16, destroyed the one-story foundry of the Nutley Foundry Co., Nutley, N. J., manufacturer of iron castings, etc. It is planned to rebuild.

The Essex Ice & Cold Storage Co., 204 Murray Street, Newark, has plans for the construction of an addition estimated to cost $35,000. W. O. Bartlett, 738 Broad Street, is architect. A. C. Hensler is president

Arrangements are being perfected for a merger of the Public Service Electric Co., Newark, N. J., and the United Electric Co. of New Jersey, an allied organization, under the first noted name. The Public Service company has acquired 10 acres of additional land in the vicinity of the site of its proposed super-power electric generating plant, Hackensack River, Kearny, making a total of 114 acres secured for the project, which will cost in excess of $10,000,000. The latest purchase will allow for a direct connection between the present Essex power station, Point-No-Point, and the new plant.

Fire, Oct. 20, destroyed a large portion of the plant of the National Fire-Proofing Co., Keasbey, N. J., manufacturer of hollow tile, conduits, etc., with loss approximating $500,000, including machinery. Headquarters of the company are in the Fulton Building, Pittsburgh.

The Cook Electric Co., 360-64 Jelliff Avenue, Newark, manufacturer of electrical equipment, has filed plans for the

The Crane Market

The market for electric overhead traveling cranes is not overly active, although a few fairly good sized orders are pending and an inquiry has been issued by the General Electric Co., Schenectady, N. Y., for about 14 overhead traveling cranes for the new plant at Philadelphia. The three 15-ton locomotive cranes for which the American Telephone & Telegraph Co., New York, has been in the market for some time are reported to have been awarded to a large crane builder in the Middle West. Business in and around Boston is dull. The Edison Co., Boston, is in the market for a 5-ton crane. The Pennsylvania Railroad, Philadelphia, Eastern Region, is receiving bids on a 10-ton underhung crane equipped for a monorail hoist.

Among recent purchases are:

Northern Pacific Railroad, a 200-ton locomotive hoist from the Whiting Corporation.

H. C. Frick Coke Co., Pittsburgh, a 3-ton hand power crane from the Whiting Corporation.

New York, New Haven & Hartford Railroad, a small hand power crane from the Whiting Corporation.

American Smelting & Refining Co., New York, a 30-ton standard overhead traveling crane with 5-ton auxiliary from the Whiting Corporation.

Northern New York Utilities Co., Watertown, N. Y., an electric overhead traveling crane from the New Jersey Foundry & Machine Co.

Ashville Power Co., Ashville, S. C., a 20-ton used Ohio locomotive crane from Philip T. King, New York.

F. J. Lyons Iron Works, Manchester, N. H., a 3-ton cage control electric hoist from Alfred Box & Co.

Philadelphia Rapid Transit Co., Philadelphia, two 5-ton and two 30-ton electric traveling cranes from Alfred Box & Co.

Hudson Coal Co., Scranton, Pa., a 50-ton electric traveling crane from Alfred Box & Co.

Phoenix Utility Co., 71 Broadway, New York, a 2-ton electric traveling crane from Alfred Box & Co.

Remington & Sherman Co., Philadelphia, two 5-ton cranes from Alfred Box & Co.

Pottstown Boiler & Tank Works, Pottstown, Pa., a 5-ton, 35-ft. span, 3-motor, electric traveling crane from Alfred Box & Co.

Baker Brothers, Toledo, Ohio, a 5-ton, 25-ft. span, overhead traveling crane from the Pawling & Harnischfeger Co.

Biggs Boiler Works, Akron, Ohio, a used 5-ton Shaw crane from the Carbon Steel Co., liquidating equipment.

erection of a two-story addition to cost $50,000 with machinery. S. S. Cook heads the company.

The Port Newark Brick Co., Newark, William D. Decker, president, recently organized, has leased 2½ acres from the city at Port Newark, for the establishment of a new manufacturing and distributing plant. The installation of traveling crane, conveying machinery, loading and unloading equipment, with new dock, etc., is provided for in the terms of the lease, which becomes effective Feb. 1, 1924.

The Standard Oil Co. of New York, 26 Broadway, New York, has plans for a two-story mechanical shop, 60 x 100 ft., on Eighth Street, Long Island City, to cost about $50,000. H. D. Best & Co., 949 Broadway, are engineers.

The Hamilton Press & Machinery Co. has been organized for the purpose of manufacturing and selling power presses and special machinery.

The officers are Gordon S. Rentschler, president; C. T. Ziegler, A. A. Byerlein and R. L. Messimer, vice-presidents; J. H. Black, secretary and treasurer. The directors are the above mentioned officers and W. B. Mayo, Henry Rentschler, F. L. R. Francisco and G. A. Rentschler, Jr.

The executive offices are in Hamilton, Ohio. The sales and engineering offices are at 516 Marquette Building, Detroit. Mr. Ziegler is in charge of sales. Mr. Byerlein is chief engineer. Both are practical press engineers.

This company is closely affiliated with the Hooven, Owens, Rentschler Co., Hamilton, Ohio, in whose plants the Hamilton presses will be built. Recently the Hamilton Press & Machinery Co. was awarded a contract for an unusually large press. It will weigh 450,000 lb., is of the "double crank" type, 18 ft. 2 in. between the uprights, and it will exert 1600 tons working pressure.

Philadelphia

PHILADELPHIA, OCT. 22

A PORTION of the former plant of the Standard Roller Bearing Co., Forty-ninth Street, Philadelphia, has been acquired by the Supplee-Wills-Jones Milk Co., Twenty-sixth and Jefferson Streets, for $250,000 for a new mechanical works. The buildings will be arranged for a machine shop, wagon shop, parts shop, paint works, and other departments.

The laboratory, 50 x 400 ft., now being constructed by the Bureau of Yards and Docks, Navy Department, Washington, at the naval aircraft factory, League Island, Philadelphia, will be, it is claimed, the largest plant of this character ever erected. The largest department will be the machine and overhauling shop, where airplanes and motors will be assembled and tested; a forge shop will be installed, with heat-treating equipment; an accessory shop will be provided with machinery for testing motors and parts, pumps, magnetos and similar apparatus; an electrical instrument and dynamometer department will also be installed for testing electrical apparatus as well as gasoline motors. It is expected to have the works ready for operation early next year.

The H. H. Ailyn Rubber Corporation, Colonial Trust Building, Philadelphia, manufacturer of tubing, etc., has leased a portion of the C. B. Rogers Building, Norwich, Conn., for the establishment fo a new plant. Equipment will be installed for an initial output of about 1000 tubes per day.

The Union Transfer Co., Broad Street Station, Philadelphia, has awarded contract to E. E. Hollenback, Inc., 1804 Brandywine Street, for a one-story addition to its machine shop at Tenth and Spring Garden Streets.

The Ellwood Ivins Tube Works, Oakland, Philadelphia, manufacturer of seamless steel tubing, etc., will build a one-story addition, 175 x 200 ft. Two additional furnaces and other equipment will be installed.

C. M. Roswell, 1162 Marlyn Road, Philadelphia, machinery dealer, has inquiries out for three 1000 kva. transformers, 11,000-2300 volts, oil insulated, second-hand in good condition.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 6, for two sets of turbine-driven centrifugal pumps, with spare parts, for evaporated brine circulation, schedule 1445, for the Philadelphia Navy Yard.

The Industrial Bureau, Philadelphia, Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Mexico City, Mex., for American machinery for a soap factory.

The Philadelphia & Reading Railway Co., Philadelphia, has awarded contract to the Belmont Iron Works, for the installation of a crane runway complete at its new engine terminal at Rutherford, Pa.; and to the C. W. Hunt Co., West New Brighton, New York, for coal-handling and sand-handling machinery, drying equipment and auxiliary apparatus. Additional awards will be made later.

Fire, Oct. 13, destroyed four buildings and equipment at the lumber works of Watson Malone & Sons, Laurel Street Wharf, Philadelphia, with loss estimated at $50,000. The structures will be rebuilt.

Fire, Oct. 15, destroyed a two-story repair shop, 200 x 400 ft., of the Pennsylvania Railroad Co., Camden, N. J., with loss estimated at $150,000 with equipment. The plant is known as the Pavonia Works; it is planned to rebuild.

The Ford Motor Co., Highland Park, Detroit, is considering the construction of an assembling plant on 500-acre tract at Cape May, N. J., purchased by Henry Ford a number of years ago. It will cost more than $350,000 with equipment.

E. I. du Pont de Nemours & Co., Wilmington, Del., are planning the construction of an addition to their Philadelphia works, Thirty-fifth Street and Grays Ferry Road, for the manufacture of linseed oil and kindred products. The estimated cost is $250,000, including machinery.

The City School Board, 121 Chestnut Street, Harrisburg, Pa., D. D. Hammelbaugh, secretary, is having plans drawn for a two-story machine and repair shop and supply building to cost $25,000.

The American Bosch Magneto Corporation, Springfield, Mass., has disposed of the plant of the Reading Standard Motorcycle Co., State Street, Reading, Pa., to Keyser Fry of

the last noted city, who plans to remodel the works for a bicycle and bicycle parts plant.

Manual training equipment will be installed in the new three-story junior high and grade school to be erected at Lancaster, Pa., for which bids will be received on a general contract until Oct. 30, estimated to cost $500,000. C. Emlen Urban, Woolworth Building, is architect.

The American Chain Co., Albermarle Street, York, will commence the erection of an addition to its plant, to cost $65,000 with machinery, for the manufacture of automobile bumpers, for which the company recently secured patent rights. Headquarters are at Bridgeport, Conn.

The Pennsylvania Power & Light Co., Allentown, Pa., is perfecting plans for a new hydroelectric generating plant at Hawley, where an artificial lake, 51 miles long and 2 miles wide will be formed to utilize waters from the Wallenpaupack Creek. A dam will be built at Wilsonville. The new station and transmission system are estimated to cost $7,500,000 with equipment. The company has also acquired power property in the Upper Perkiomen Valley section and plans extensions in this district. It is operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Phoenix Portland Cement Co., Nazareth, Pa., has plans for two new buildings, 50 x 200 ft., and 75 x 300 ft., to replace a portion of the works destroyed by fire several weeks ago with total loss of about $500,000. One of the new structures will be used as a machinery building.

The C. Jesnig Mfg. Co., 716 Sansom Street, Philadelphia, has been organized to succeed to the business formerly conducted under the name of C. Jesnig. The company manufactures scientific instruments, precision machinery and production tools. A new line of machinery will be added. Officers of the company are C. Jesnig, president; C. W. Fowler, vice-president; J. M. B. Beecher, secretary and treasurer.

H. C. Weber, 2528 West Lehigh Avenue, Philadelphia, is inquiring for a rolling machine to form cold rolled steel 18 gage and lighter, 8 in. wide, allowing space for five or six pairs of rolls.

New England

BOSTON, OCT. 22.

A FEW machine tool houses in this territory are doing some business, but unless the unforeseen happens October will be one of the most unprofitable months this year, with the majority. No new lists have been issued, and from last accounts a woolen goods manufacturer, contemplating the purchase of a considerable amount of shop equipment for a Southern subsidiary, and a railroad which contemplated spending $30,000 to $40,000 for shop tools, have indefinitely postponed action.

Inquiries largely concern single machines, but occasionally a dealer closes for two, three or four tools to one firm. The most important local business the past week was with a maker of textile machinery who purchased a 30-in. x 20-ft. American lathe costing around $10,000, and another more or less special lathe listed at $2,000, two machine tool houses participating. Other sales include new sensitive drills to a South Boston manufacturer, three used lathes to a Leominster, Mass., shop, power presses, No. 53 Acme automatics, power hammers and various small lathes to other manufacturers. The Grand Trunk Railway is in the market for punch and shear equipment.

New England broaching machine and broach makers are operating on full schedules and constantly taking on new men. Lathe makers generally are busy, but are doing less business than two months ago. They report the outlook as [illegible] machines recently booked a good order from the Westinghouse Electric & Mfg. Co., but is well cleaned up on back orders. Upright drill makers report a tapering off in business. Most manufacturers anticipate getting some Japanese business as a result of the recent earthquake. Shipments from local manufacturer's representatives' stocks to apply to Japanese business already have been made.

The small tool business is spotty. Some dealers are doing little, while others report sales so far this month far ahead of anything on record. Individual orders in some instances have run as high as $2,060, and in the aggregate for this month close to $4,000. Cutters appear to be selling better than other small tools.

Stone & Webster, Boston, are the engineers for a power plant addition to be erected by the Potomac Electric Power Co., 231 Fourteenth Street, Washington.

The Osgood Bradley Car Co., 351 Mountain Street, Worcester, Mass., will erect a one-story forge shop 50 x 160 ft.

Jenkins Brothers, Bridgeport, Conn., valves, will complete its new plant in December, adding approximately 250,000 sq.ft. floor space to their present manufacturing area.

Notice is issued by the National Machine Co., Wethersfield, Hartford, Conn., that its property, consisting of a three-story manufacturing unit, foundry and two-story office building, having about 20,000 sq.ft. of floor space, will be sold in the near future.

The A. C. Bellefleur & Son Co., 81 Hamilton Street, New London, Conn., dealer in new and used machinery, is in the market for machinery with which to fabricate cylindrical tanks, such as steel barrels and gasoline tanks, of 50 to 100-gal. capacity.

The Portland Terminal Co., subsidiary of the Maine Central Railroad, Portland, is arranging for the early installation of machinery in its new car and locomotive terminal shops at Rigby, South Portland, now being roofed, estimated to cost $1,500,000, with equipment. T. B. Wheeler is chief engineer.

A machine shop will be installed in the one-story automobile service and repair building, 90 x 180 ft., to be erected on Forest Avenue, Portland, Me., by E. W. Jones, 102 Exchange Street. Webster & Libby, Exchange Street, are architects.

The Weir Stove Co., Taunton, Mass., has preliminary plans for a one-story foundry and machine shop, 50 x 100 ft., estimated to cost $60,000 with equipment.

The New York, New Haven & Hartford Railroad Co., Boston, has filed plans for a one-story engine house for repair service at 290 Southampton Street, to cost $25,000.

The Skayef Ball Bearing Co., 330 New Park Avenue, Hartford, Conn., has awarded a general contract to the Industrial Construction Co., 721 Main Street, for a one-story addition, 50 x 75 ft., for which foundations will be laid at once.

H. H. Noack, Forest Street, Stamford, Conn., will commence the erection of a two-story automobile service and repair building, 40 x 125 ft., on East Main Street, estimated to cost $65,000.

Ovens, power equipment, conveying, and other machinery will be installed in the new four-story plant, totaling about 40,000 sq. ft., to be erected by the Berwick Cake Co., 2220 Washington Street, Roxbury, Boston, at 24-26 Palmer Street and 1127-31 Harrison Avenue, to cost $70,000. Charles T. Main, 200 Devonshire Street, Boston, is architect and engineer.

The Hartford Woven Wire Mattress Co., 156 Village Street, Hartford, Conn., recently organized, is in the market for cable fabrics, tubing, angle iron, casters, risers, etc. The company is completing its equipment installation and will manufacture steel folding beds, steel couches and cots, and bed springs. Maurias M. Selterman is one of the principals.

Baltimore

BALTIMORE, Oct. 22.

BIDS will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 6 for 1344 carbon twist drills, 96 machinists' hammers, 250 dozen hacksaw blades, 288 side cutting pliers and 25 files, schedule 1451, for the Washington Navy Yard, until Nov. 13 for 17,750 standard nuts and bolts for the Puget Sound Navy Yard, schedule 1453; and on Nov. 13 for miscellaneous pump valves for Eastern navy yards, schedule 1470.

The Roanoke Ice & Cold Storage Co., Roanoke, Va., will commence the erection of a new five-story cold storage plant, 100 x 130 ft., to cost $65,000. Plans are under consideration for an addition to the ice-manufacturing plant to provide 40 tons additional per day. E. C. Tudor is general manager.

The Colonial Forge & Tool Co., Columbiana, Ohio, has acquired the plant of the Enterprise Machine Works, Elkton, Md., and will commence the erection of an addition, including improvements in the present structure. The Columbiana works will be removed to this location and additional equipment installed.

The Construction Quartermaster, United States Army, Munitions Building, Washington, has plans for a one-story addition to the engineering shop at the Bolling Field to C., for motor testing and kindred service.

The Hamlet Sign Works, Hamlet, N. C., is planning

the establishment of a new factory to manufacture electric display signs and metal parts, etc., to cost close to $25,000. M. S. Lynch heads the company.

The Chief of Engineers, United States Army, Room 2825, Munitions Building, Washington, will receive bids until Nov. 16 for 6500 ft. of controller cable, 9-conductor, with reels, advertisement 24-121.

The Dixie Machinery & Supply Co., Dental Building, Spartanburg, S. C., machinery dealer, is in the market for mechanical leather and friction surface belting, and desires to get in touch with manufacturers.

The Schuster-Adams Co., Macon, Ga., recently organized with a capital of $1,000,000, has preliminary plans for a new plant to manufacture chemicals, electric storage battery apparatus, and kindred specialties, to cost about $250,000 with equipment. It is planned to build a power house. Dr. Richard Schuster and Hoke Smith, Macon, head the company.

The Common Council, Charlottesville, Va., is planning for electrically-operated pumping machinery in connection with a new waterworks system, estimated to cost $500,000. Fuller & McClintock, 600 Walnut Street, Kansas City, Mo., are engineers.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a 36-in. gage industrial locomotive, 30 to 36 tons, modern Shay type, second-hand, in good condition.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has preliminary plans for an addition to its generating station on Gould Street, to triple, approximately, the present capacity. It is purposed to install two 20,000 kw. turbo-generators, with auxiliary equipment, within the next 12 months, with the installation of two additional such units closely following. The expansion is estimated to cost $3,000,000. Herbert A. Wagner is president.

The Ideal Table Co., High Point, N. C., has tentative plans for rebuilding of the portion of its factory destroyed by fire, Oct. 4, with loss estimated at $70,000 including equipment.

The Port Deposit Quarry Co., Port Deposit, Md., recently organized with a capital of $150,000, will install quarrying machinery, electric power equipment and other apparatus at its proposed plant near Port Deposit. Charles A. Morrison, Port Deosit, is president and general manager; and R. N. McCullough, secretary.

The Board of District Commissioners, Washington, will receive bids until Nov. 7 for one 12-in. by 5-ft., geared-head, light duty engine lathe, for the local water department.

The Columbus Electric & Power Co., Columbus, Ga., is planning for extensions in its plant and system to cost $100,000 including additional equipment.

The General Purchasing Officer, Panama Canal, Washington, will take bids until Nov. 5 for an electric-lighting outfit, chain blocks, car wheels, foundry brushes, steel cans, and other equipment, as specified in circular 1566.

The Common Council, Albemarle, N. C., is planning the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks, estimated to cost $90,000. L. C. Russell is town clerk.

The Southern Lumber Co., Pembroke, Ga., has inquiries out for a used metal cutting lathe, in good condition.

The Roberts Power Co., Ball Ground, Ga., is planning for the purchase of an air compressor, about 75 hp., motor-driven; also for a number of small motors, transformers and auxiliary equipment.

Lorick & Lowrance, Columbia, S. C., machinery dealers, have inquiries out for a motor-driven grinding stone.

Officials of the Bond Mfg. Co., Fifth and Monroe Streets, Wilmington, Del., manufacturer of metal bottle seals, etc., have organized the Modern Bond Co., capitalized at $400,000, to manufacture metal and machine specialties. A site has been selected at Elsmere, near Wilmington, and work will soon commence on a new plant. The company is also operating the Bond Machine Co., Wilmington. S. C. Bond is president of the parent company, and R. W. Bond, vice-president and treasurer.

The Southern Supply Co., Calvert and Saratoga Streets, Baltimore, pipe and fittings, plumbing equipment, etc., has awarded contract to the Consolidated Engineering Co., Calvert Building, for the erection of a new four-story factory, 78 x 100 ft., estimated to cost $70,000.

The Harley Hardware Co., Valdosta, Ga., has inquiries out for a 60-hp., engine, with governor, shafting and auxiliary equipment.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., has inquiries out for two locomotive type portable boilers, 50 and 100 hp., respectively; also for two flywheels, 14 to 16 ft. diameter, 36 in. face, about 11 in. bore.

T. L. Eberhardt, R. F. D. No. 3, Chester, S. C., has inquiries out for machinery and power equipment to manufacture sand-cement brick.

The Lafayette Mill & Lumber Co., Lafayette Avenue and Pennsylvania Railroad, Baltimore, will build a three-story brick factory and two additional one-story brick buildings at Mosher and Brice Streets, to cost $90,000.

The Maryland Steel Products Co., Morris Building, Baltimore, will erect an additional building at Ridgely and Bayard Streets, to cost $8,000.

Pittsburgh

PITTSBURGH, OCT. 22.

LOCAL machine-tool houses report that general inquiry for equipment the past week has been better than for some time. This may be due in part to the recent annual convention of the American Society for Steel Treating, as representatives of machinery companies and buyers came in personal contact and several good inquiries are being figured upon as the result. Inquiry for cranes and hoisting machinery is reported to be more active than for several months. As yet the railroads are not doing much in the way of buying, but new lists are looked for from two or three local railroads within a short time. It is said competition is severe, as some machine builders in urgent need of more business in some cases are willing to name slightly lower prices. Deliveries can be made promptly.

The Jones & Laughlin Steel Corporation, Pittsburgh, has bought from the Alliance Machine Co., three new bridges to take three cranes which are being removed and placed in another location. Each of the bridges has a span of 96 ft. 6 in., and will be installed in the Southside works.

Recently the Westinghouse Electric & Mfg. Co. issued a list of tools for the fourth quarter delivery. It contains 52 tools and includes planers, drill presses and other equipment. As yet none of the business has been placed, but local machinery houses are figuring on the inquiries.

The plant formerly owned by the Hall Steam Pump Co., Galveston Avenue, N. S., Pittsburgh, has been bought by the Standard Sanitary Mfg. Co., which will use the building for a jobbing department, carrying a complete line of products of the Standard company. The plant had not been operated by the Hall company for a considerable time. It consists of brick buildings on a plot, 200 x 250 ft.

The National Bolt & Nut Co., Pittsburgh, is inquiring for bolt head trimmers, capacity ½-in. diameter and larger.

Contract has been let by the Pittsburgh & Lake Erie Railroad Co., Pittsburgh, to F. Sinnott's Sons, 2301 Perrysville Avenue, for an addition to its repair shop at Dickerson Run, Pa.

Fire, Oct. 17, destroyed a portion of the plant of the Airtight Steel Tank Co., Mansion Street and the Baltimore & Ohio Railroad, Pittsburgh, with loss estimated at $25,000 including equipment. It is planned to rebuild.

The Atlas Steel Corporation, Dunkirk, N. J., has commenced dismantling its plant at Charleroi, Pa., formerly the property of the Youngstown Sheet & Tin Plate Co., and will remove most of the equipment to its Dunkirk works, which will be extended. The Charleroi plant will be discontinued permanently.

J. J. Weiler & Sons, Second Avenue and Elm Street, Huntington, W. Va., iron and steel products, have plans for a new two-story steel fabricating plant, 35 x 200 ft., estimated to cost $50,000.

The McGraw Co., 10-12 South Broadway, Wheeling, W. Va., local representative for the Ford automobile, will commence the erection of a new two-story and basement service and repair works, 85 x 125 ft., at 2011 Main Street, estimated to cost $75,000. F. F. Harris, Wheeling Steel Corporation Building, is architect.

The Erbacon Gas Coal Co., Morgantown, W. Va., recently organized with a capital of $250,000, is planning the installation of electric power and mining machinery at its properties. A. Carl Slagle, Morgantown, is one of the heads of the company.

The Standard Gas Co., Jane Lew, W. Va., has acquired the plant and system of the Jane Lew Light & Heat Co., and plans extensions and the installation of additional equipment.

Fire, Oct. 12, destroyed a portion of the plant of the G. M. Johnson Mfg. Co., Jeannette, Pa., manufacturer of

mining machinery, mine safety equipment, etc., with loss estimated at $55,000 including equipment. It is planned to rebuild.

The Pennsylvania Railroad Co., Pittsburgh, has awarded a general contract to the John F. Casey Co., Union Arcade, for the erection of a new engine house with repair department at Sharpsburg, Pa.

The Tranter Mfg Co., 105 Water Street, Pittsburgh, manufactuer of engines and parts, is having plans drawn for a new building on Ferry Street. Paul W. Irwin, Renshaw Building, is architect.

The American Sheet Glass Co., Clarksburg, W. Va., has awarded contract to the Simplex Engineering Co., Washington, Pa., for extensions in its plant to cost $300,000, including additional machinery.

A one-story automobile service and repair works will be erected by the Peters Packing Co., McKeesport, Pa., for company cars and trucks, in connection with a new six-story and basement plant to cost $175,000. The Gorman-Brown Engineering Co., 40 Rector Street, New York, is engineer.

R. E. Baldwin and K. B. Thomas, West Graham, W. Va., are organizing a company to erect a plant for the manufacture of furniture. A power house will be built. The cost is estimated at $45,000. R. K. Haskew will be in charge of construction. Mr. Baldwin will be treasurer of the company.

The National Plate Glass Works, Blairsville, Pa., operating the former local plant of the Columbia Glass Works, will commence the erection of a new unit estimated to cost $3,000,000 with machinery. A power house addition will be built.

The Common Council, Dunbar, W. Va., plans the installation of electrically-operated pumping machinery in connection with a new waterworks plant.

The Sullivan County Electric Co., Dushore, Pa., is organizing two subsidiaries, the Standing Stone and Asylum Township Electric companies, to install and operate plants for service in the two townships.

The Maple Lumber Co., Fenwick, W. Va., recently organized with a captial of $500,000, has plans for a new lumber mill and power house, to cost $125,000 with machinery. W. S. Taylor, Fenwick, and J. B. Wolfe, Clarksburg, W. Va., head the company.

Buffalo

BUFFALO, Oct. 22.

BIDS will be asked early in November by the Morrison Auto Sheet Metal Works, 26 East North Street, Buffalo, for the erection of a new five-story plant, 90 x 140 ft., estimated to cost $175,000 with equipment. G. M. Wolfe, 1377 Main Street, is architect.

The Champion Switch Co., recently organized under Ohio laws, has taken over the lease of the former plant of the Ferguson Shipbuilding Co., Abbott Road and the Buffalo River, Buffalo, recently secured by the Jeffrey-Dewitt Insulator Corporation, Kenova, W. Va., with which company it will be closely associated. The works will be remodeled and given over to the manufacture of electric switching equipment. Jeffrey-Dewitt insulators will be used for the finished switching units as produced at the plant. F. D. Stranahan is president, and J. F. Sinclair, treasurer and general manager.

The Cutler Ice Co., Binghamton, N. Y., will take bids in November for the initial unit of its ice-manufacturing plant at 310 Front Street, estimated to cost $70,000 with equipment. J. H. Neff, Canton, Ohio, is architect and engineer.

The Common Council, Akron, N. Y., is planning for the installation of new pumping machinery at the municipal waterworks.

The Niagara, Lockport & Ontario Power Co., Niagara Falls, N. Y., has acquired a large tract at Lewiston, N. Y., as a site for a new power house. The company has been granted permission to purchase and merge the plant and property of the Niagara River Power & Water Supply Co., and plans for extensions.

The Rochester Cinder Block Corporation, 300 Maple Avenue, Rochester, N. Y., is having plans drawn for a new two-story factory on Emerson Street, near the city line, to manufacture cement blocks, etc., to cost $22,000. The Rochester Associated Architects and Engineers, Duffy-Powers Building, are in charge.

The Buffalo General Electric Co., Buffalo, will commence the construction of a new power house on the Hamburg Turnpike, to cost about $65,000.

Paul A. Dunn, 2207 Elmwood Avenue, Buffalo, has filed plans for a one-story machine shop.

J. A. Cramer, Buffalo, local representative for the Dodge automobile, has awarded a general contract to the Turner Construction Co., 244 Madison Avenue, New York, for a three-story addition to his service and repair building, 51 x 110 ft.

The Common Council, Orchard Park, N. Y., is planning for the installation of electrically-operated pumping machinery in connection with a new municipal waterworks, estimated to cost $200,000. White & Getan, Mutual Life Building, Buffalo, are engineers.

The Trico Products Corporation, 624 Ellicott Street, Buffalo, manufacturer of metal and stamped metal products is planning the erection of a four-story addition, 96 x 132 ft. J. R. Oishei is president.

The Garlock Packing Co., Palmyra, N. Y., manufacturer of mechanical packings, has awarded a general contract to the Curran-Mason Co., Rochester, N. Y., for a one-story and basement building, 100 x 200 ft., to cost $150,000. J. F. Strobel, E. & B. Building, Rochester, is architect.

The Common Council, Herkimer, N. Y., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks, estimated to cost $50,000.

Electric power equipment, conveying, screening and other machinery will be installed in the flour mill and elevator to be constructed at Childs Street and the Buffalo River, Buffalo, by the Russell-Miller Milling Co., Security Bank Building, Minneapolis, Minn., estimated to cost $500,000.

The Automatic Tool Co., Maplewood, N. J., will manufacture several tools by contract and will consider bids on the work at an early date. L. W. Berger heads the company.

The White Collapsible Construction Corporation, 150 Nassau Street, New York, incorporated with $150,000 capital stock, will manufacture portable, collapsible garages. All work will be done by contract for some time. Bids are now being considered. Samuel White is president and treasurer, H. Garguila, vice-president and D. McDonald, secretary.

Detroit

DETROIT, Oct. 22.

ERECTION will commence on a new one-story plant on Trenton Street, Detroit, for the United Automatic Screw Co., estimated to cost $27,000.

The Dunn Sulphite & Paper Co., Port Huron, Mich., Theodore Dunn, Detroit, president, is considering plans for new works on the St. Clair River, fronting on the line of the Grand Trunk Railroad, Port Huron, estimated to cost $500,000, including machinery. A power house and machine shop will be constructed.

The Wolverine Power Co., Edenville, Mich., is disposing of a bond issue of $1,570,000, the entire proceeds to be used for the construction of four hydro electric generating plants on the Tobacco and Tittabawassee Rivers at Edenville, Sanford, Smallwood and Secords, with generating output of 15,000 hp. The company will also expend an additional $800,000 for a power substation at Edenville and a new transmission line from the last noted place to Zilwaukee, Mich. Holland, Ackerman & Holland, Ann Arbor, Mich., are consulting engineers. Frank I. Wixom is president.

Electric power equipment, control apparatus, conveying and other machinery will be installed in the two-story printing plant, 80 x 154 ft., to be erected by the Franklin-Lansing Co., Lansing, Mich., recently organized, for which a general contract has been awarded to the H. G. Christman Co., Lansing. It will cost about $165,000, including equipment. Richmond Short and George Scovell head the company.

The Ford Motor Co., Highland Park, Detroit, is completing plans for several new building at its River Rouge plant, each one-story, 95 x 1320 ft., 100 x 620 ft., 100 x 420 ft., and 100 x 400 ft., respectively, estimated to cost $500,000 with equipment. Albert Kahn, 1000 Marquette Building is architect.

The Detroit Aero Metals Co., 657 Lycaste Street, Detroit, has filed plans for the erection of its initial plant unit, comprising a one-story building with two-story power house, estimated to cost $75,000.

The Continental Motors Corporation, Muskegon, Mich., manufacturer of gasoline engines, has acquired property on Western Avenue and adjoining sections, totaling 5 acres, for future plant expansion.

The Herndon Fruit Co., 123 North East Street, Detroit, will commence the construction of a new cold storage plant, 30 x 280 ft., estimated to cost close to $50,000.

The Great Western Smelting & Refining Co., 5201 Loraine Street, Detroit, has awarded a general contract to P. H. Piper, Sun Building, for the erection of a one-story foundry.

The Capitol Steel Corporation, Detroit, David F. Stockbridge, president, has preliminary plans for a new one-story fabricating plant on Holmes Street. It is expected to commence work early next year.

The Calumet & Hecla Mining Co., Calumet, Mich., has commenced excavations for a new fuel pulverizing plant at its local property and purposes to have the structure ready for the machinery installation early next year. Tentative plans are under consideration for the installation of additional furnaces, traveling cranes and other equipment.

The Kawneer Mfg. Co., Niles, Mich., manufacturer of metal store fronts, etc., will soon commence the erection of a new three-story and basement building, 50 x 100 ft., to cost $75,000. Holabird & Roache, 104 South Michigan Avenue, Chicago, are architects.

Foundations are under way for the one-story plant, 180 x 240 ft., on East Eighth Street, Holland, Mich., for the Federal Mfg. Co., Holland, manufacturer of stamped metal products, estimated to cost $80,000. Byron E. Parks & Son, 623 Michigan Trust Building, Grand Rapids, are engineers.

The Towson Body Co., Detroit, has awarded a general contract to the H. G. Christman Co., Stevens Building, for a new six-story plant estimated to cost $95,000.

Cleveland

CLEVELAND, Oct. 22.

THE New York Central Railroad has issued a list of about 20 machine, mostly for its Collinwood and Elkhart shops. Dealers are getting a fair volume of single tool orders and inquiry has improved somewhat. The American Bosch Magneto Co. placed an order during the week with a local manufacturer for 6 turret lathes and local dealers made a few small lot sales in the Detroit territory. Some prospective purchasers are showing a hesitancy about placing orders either awaiting an upward turn in business or the booking of pending orders for their own products. The demand for good used machinery is quite satisfactory.

The New York Central list includes the following:

Seven 18-in. lathes.
Four 24-in. lathes.
Two punching and shearing machines.
Two ½ to 3-in. pipe cutting and threading machines.
One 2500-lb. steam hammer.
One 3-lb. radial drill.
One 40-in. band saw.

The Rex File Co., Newcomerstown, Ohio, is considering the erection of four factory buildings that will more than double its present capacity.

The Willys-Overland Co., Toledo, Ohio, has leased the building of the George W. Smith Co., Inc., Philadelphia, and will use it as an assembling plant It will probably be placed in operation by Jan. 1.

The Ohio Power Co. has secured authorization from the State Public Utilities Commission to issue $8,000,000 in bonds for extension work. The company will build a substation at Rockhill, near Lima, and transmission lines from Fostoria to the new substation and from Philo to Canton. Part of the proceeds of the bond issue will also be used to complete a large generating plant at Philo, Ohio.

The Kauffman Metal Products Co., which recently purchased the plant of the Modern Glass Co., Toledo, Ohio, will equip it for the manufacture of ring gears and other products. It will continue to operate its Bellefontaine, Ohio plant.

The Cleveland Wheelbarrow & Mfg. Co., Station D, Cleveland, is inquiring for a No. 4-W, Bliss or equivalent, wiring press, with 24-in. stroke and 50 in. between gibs.

The Ravenna Furnace & Heating Co., Ravenna, Ohio, has tentative plans for an addition to its works on Cleveland Avenue.

The Libbey-Owens Sheet Glass Co., Nicholas Building, Toledo, Ohio, is perfecting plans for new works to cost about $1,000,000 including machinery. A power house will be erected. The Devore Co., Nicholas Building, is architect and engineer.

Manual training equipment will be installed in the new two-story and basement junior high school to be erected at Piqua, Ohio, estimated to cost $175,000, for which bids are being received on a general contract until Oct. 31. Schenck & Williams, Mutual Home Building, Dayton, Ohio, are architects.

Chicago

CHICAGO, Oct. 22.

THE Burlington is finally closing its list of long standing with the probability that it will conclude purchases of from $100,000 to $150,000 worth of equipment before the expiration of the current week. Other railroad buying will probably be of a limited character until the opening of the new year. The Illinois Central has about a dozen inquiries pending and the Rock Island expects to buy a few tools within the next month or two, although it has not yet actually asked for figures. Both the Rock Island and the Illinois Central, however, have prepared comprehensive lists which are scheduled to come out some time early in 1924.

Machine tool orders from industrial sources, although scattered, bulk larger than in September. Typical of small purchases which are being made are the following: Fyle National Co., Chicago, two 14-in. x 6-ft. engine lathes; Link-Belt Co. Indianapolis, a 14-in. x 6-ft. and a 16-in. x 8-ft. lathe; Fairbanks, Morse & Co., Three Rivers, Mich., an 18-in. x 8-ft. lathe; Illinois Watch Co., Springfield, Ill., a 14-in. x 7-ft. lathe. The Pettibone-Mulliken Co., Chicago, has placed an order for a 2-in. forging machine, but has deferred action on the list published here last week until the first of next year.

It develops that A. N. Day, last week reported as sojourning in Chicago for the purpose of buying equipment for the South Australian Railways, will not personally place any orders. The purchase of equipment will be done by F. J. Shea, chief engineer of railroads, Islington, Adelaide, South Australia, who has not yet arrived in this country. It is planned completely to equip a new railroad shop. Tools to be bought include horizontal and vertical boring mills, planers for both general shop and frog and switch work, heavy duty lathes, wheel and axle lathes and other machines generally found in a railroad shop.

James A. Kennedy, care of Van Gunten & Van Gunten, 26 East Huron Street, Chicago, architects and engineers, is having plans prepared for the construction of a one-story machine shop, 125 x 125 ft., at Maywood, Ill.

The Common Council, White River, S. D., is having plans completed for the construction of a municipal hydroelectric power plant and system. J. C. Jacobson, 1624 Harmon Place, Minneapolis, Minn., is engineer.

Manual training equipment will be installed in the high school to be erected at Alden, Minn., estimated to cost $100,000, for which foundations will soon be laid. Gaarder & Gaarder, Albert Lea, Minn., are architects.

The Chicago, Milwaukee & St. Paul Railroad Co., 80 East Jackson Boulevard, Chicago, will commence the construction of a new engine house, with repair department at Monticello, Iowa, estimated to cost $60,000.

The Russell Grader Co., 2037 University Avenue, Minneapolis, Minn., manufacturer of grading machinery, road equipment, etc., will hold in abeyance the erection of its one-story addition, estimated to cost $60,000. E. E. Ellertson is president.

The Northern States Power Co., Minneapolis, Minn., has acquired a site for hydroelectric development on the St. Anthony River, heretofore held by the Pillsbury Flour Mills Co., and will perfect plans for using the property in the near future. The Wisconsin-Minnesota Light & Power Co., a subsidiary, will soon commence the construction of a new plant near Wissota, Wis., to cost about $1,000,000 with machinery. It will also erect new power substations at Red Wing, Minn., and Colby, Wis., to cost $65,000.

Bids will be received by the city clerk, McLeansboro, Ill., until Nov. 3, for pumping machinery and other equipment for the municipal waterworks. The W. A. Fuller Co., Railway Exchange Building, St. Louis, is engineer.

The Midwest Refining Co., First National Bank Building, Denver, Colo., has plans for the construction of an electric power plant in the vicinity of Casper, Wyo., and for the electrification of its properties in the salt Creek oil field in this section, to cost $5,000,000 with machinery.

The Lake Shore Steel & Machinery Co., 168 North Michigan Avenue, Chicago, is in the market for standard brands of high speed steel bars, drills and steel and carbon steel drills.

Milwaukee

MILWAUKEE, Oct. 22.

WHILE the progress of the trade in machine-tools is not rapid, there are no discouraging features in the situation. Demand still is mostly for replacement, but this means more than the mere replacement of worn-out machines and includes the constant effort to increase efficiency and offset skilled labor shortage so far as possible. Locally, foundries and machine shops are holding their own and making only the most urgently needed extensions. Automotive industries apparently have filled their heaviest need for the present, although aggregate sales are of fair volume still.

The American Metal Products Co., Thirty-third Avenue, and Burnham Street, Milwaukee, is inquiring for a cropping shear, a squaring shear, and a roll lathe taking work 72 in. long and 22 in. diameter, for a new rolling mill now being added. The building will be 70 x 120 ft. A Lewis 12-in. bar mill, five stands, three high, and a 16-in. sheet mill, three stands, two high, have been purchased from the Briggs-Turivas Co., Joliet, Ill., together with a 400 hp. General Electric motor. The American company heretofore has made only ingots and castings of Ampco bronze, but at the completion of the new rolling mill will make bars, sheets and plates from straight brass and copper as well as the special process metal. Its business is largely with the automotive, chemical and paper mill industries. Carl J. Zaiser is secretary-treasurer and general manager.

The Peck-Foster Motor Co., Superior, Wis., contemplates the erection of a garage, sales and service building at Ogden Avenue and Belknap Street, estimated to cost $100,000. It will be 100 x 120 ft., two and three stories, with a machine shop area of about 6000 sq. ft. Work will begin about March 15. Dean Foster is vice-president and general manager.

The Triumph Stove & Heater Co., now occupying leased quarters at Forty-ninth and State Streets, Milwaukee, has concluded negotiations with the Chamber of Commerce, Appleton, Wis., to relocate its plant and offices in that city. An existing building will be provided which will require complete new equipment. The Triumph company manufactures a smokeless soft coal stove for domestic and commercial purposes. Herman Klein is president.

The Feilbach Mfg. Co., Mayville, Wis., manufacturer of metal specialties, has ordered plans and estimates for a new shop, 75 x 100 ft., two stories and part basement, to be built early next spring. An investment of $50,000 in building and machinery is contemplated. A. O. Feilbach is president.

The Roberts Brass Co., 178-183 Lincoln Avenue, Milwaukee, which is erecting an addition to its foundry and machine shop, is in the market for molding machines, a buffer and several lesser items of equipment.

The Finkler Motor Car Co., 924-928 Third Street, Milwaukee, let contracts Oct. 16 for a one-story brick and concrete addition, 60 x 100 ft., to be used largely as a machine and service floor.

A. G. Tappen and Axel V. Wallentine, Madison, Wis., patentees of a new type of reciprocative shock absorber, are planning to engage in the manufacture of the device.

The Appleton Pattern Works, established at Appleton, Wis., in May by B. F. Wachholtz, formerly a pattern manufacturer in Milwaukee, has taken additional space in the former Reliance Motor Truck Co. factory and will install equipment for wood and metal patterns, templates, etc. Extension of output is made necessary by enlargement of the trade territory to cover the entire Fox River Valley.

The Milwaukee Coke & Gas Co., foot of Greenfield Avenue, Milwaukee, has placed contracts for a benzol by-products building, 49 x 82 ft., and a tank house, 35 x 100 ft., of steel construction, for the replacemen of its benzol plant, which was wrecked by explosion and fire in August. Equipment purchases are being completed. J. W. Schaffer is president and chief engineer.

The Board of Public Works, Fond du Lac, Wis., is asking bids until Oct. 29, under revised plans, for the equipment and construction of an addition to the sewage pumping station and disposal plant. The work is estimated to cost about $25,000. George H. Stanchfield is consulting engineer, and J. F. Hohensee, secretary of the board.

The Curtis Auto Co., 143-145 Eighth Street, Milwaukee, has deferred for some time its purchases of shop equipment and tools for its new sales and service building at Broadway and Martin Street, owing to a revision of plans by the Federal Engineering Co., 444 Milwaukee Street, which will take new bids on the building after Nov. 1. The structure will be 100 x 128 ft., two stories and basement and cost about $125,000 complete.

The Deerfield Canning Co. of Deerfield, Wis., is being organized by Herman Wertheimer, 217 North Fifth Street, and W. S. Sieber of Watertown, Wis., and G. O. Bergland of Deerfield, to establish a pea cannery by rebuilding the Bergland warehouse. It will be in the market for a new or second hand 100-hp. steam engine, two new 125-hp. boilers, a full complement of motor-driven canning machinery, conveyors, etc.

The Milwaukee Board of School Directors, Tenth and Prairie Streets, will close bids Nov. 1 for a service building at Eleventh and Prairie Streets, which will be provided with machinery for servicing and repairing equipment, furniture, etc., of the Milwaukee graded and high schools. Frank M. Harbach is secretary and business manager.

The Chain Belt Co., Milwaukee, is in the market for a gate shear, capacity ⅝-in. or ½-in. x 10 ft.

The Gulf States

BIRMINGHAM, Oct. 22.

EXCAVATIONS will soon be made for the initial buildings for the new mill of the Southwestern Portland Cement Co., Two Republics Buildings, El Paso, Tex., at Fort Worth, Tex., estimated to cost $1,000,000 with machinery. A power plant and machine shop will be built. O. J. Binsford is secretary and superintendent.

The Valley Electric & Ice Co., San Benito, Tex., is perfecting plans for the construction of a new generating station to cost more than $100,000 with machinery.

Fire, Oct. 14, destroyed a portion of the cottonseed oil mill of the Western Cotton Oil Co., Haskell, Tex., with loss estimated at $100,000 including machinery. It is planned to rebuild.

The Alabama Lumber Co., Selma, Ala., has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss estimated at $110,000, including equipment.

The Sweet Glass Co., P. O. Box 430, Monroe, La., recently organized, is perfecting plans for works to manufacture glass containers, headlight lenses for automobiles, and kindred specialties, estimated to cost $85,000. A power-house will also be built. The equipment will include presses, automatic blow machines, crushers, motors and other power apparatus. A. H. Sweet is president and general manager.

The Common Council, Grand Saline, Tex., plans the installation of electrically-operated pumping machinery in connection with extensions at the municipal waterworks to cost $80,000. H. N. Roberts, 422 Irving Place, Dallas, Tex., is engineer.

The Elephant Butte Irrigation District, El Paso, Tex., has tentative plans for a new hydroelectric generating plant about 20 miles south of the present Elephant Butte development, estimated to cost $3,500,000.

The East Coast Railway Co., St. Augustine, Fla., is perfecting plans for new car and locomotive terminal at South Jacksonville, Fla., with power house and machine shops, estimated to cost $1,000,000. W. G. Brown is engineer.

The Imperial Petroleum Corporation, Tampa, Fla., recently organized with capital of $1,000,000, will take over and expand the local company of the same name. Work will soon commence on a new storage and distributing plant on the Tampa waterfront, to cost $150,000 including equipment. Miller A. Murray is president, and B. L. Hammer, secretary.

The Florida Lime Co., Ocala, Fla., has inquiries out for a rotary dryer, with capacity of about 6 tons per hr.; also for an oil-operated engine, from 65 to 75 hp.

The Gulf Coast Lines, Houston, Tex., has plans under way for a new engine house and general machine repair shops at Brownsville, Tex., estimated to cost $100,000 including machinery. C. S. Kirkpatrick, Houston, is chief engineer.

The Grayburg Refining Co., San Antonio, Tex., operating a local oil refining, is planning for extensions and improvements, to cost $100,000 with equipment. New stills, tanks, refining machinery and other equipment will be installed.

Plans have been authorized by the Ford Motor Co., Highland Park, Detroit, for the first unit of its new assembling plant at Jacksonville, Fla., consisting of a main one-story works, 200 x 560 ft., with daily output of 150 automobiles. It is estimated to cost $275,000 with machinery. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Texas Power & Light Co., Dallas, Tex., is perfecting plans for extensions in its transmission system, including additional power stations and machinery, to cost $1,000,000, for service at Tyler, Palestine and in the Powell oilfields district.

The American Marble & Granite Co., Sylacauga, Ala., recently organized, is perfecting plans for a new polishing and finishing plant, to cost $35,000. In addition to polishing and grinding equipment, other machinery will be installed including air compressors, motors, air drills and auxiliary apparatus. J. D. Ratchford is president and C. C. Farmer, general manager.

The Common Council, Blountstown, Fla., has authorized plans for a municipal electric lighting plant, including improvements in the waterworks system, with electrically-operated pumping machinery. Bonds for $50,000 have been voted.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has engaged A. C. Finn, Bankers' Life Building Houston, Tex., architect, to prepare plans for its factory branch at Broadway and McKinney Street, to be four stories, 125 x 125 ft., estimated to cost $150,000.

The Common Council, Florence, Ala., is planning for the installation of electric pumping machinery at the municipal waterworks, to replace present steam-driven equipment.

The Ehrlich Products Co., Austin, Tex., has inquiries out for lubricating pumping equipment.

The Jewel Battery Co. of Texas, Box 503, Tyler, Tex., organized to manufacture batteries and like products, will be in the market for equipment in the near future. V. T. Kennedy is president.

Cincinnati

CINCINNATI, OCT. 22.

THERE is undoubtedly an improvement in the number of orders placed for machine tools this month compared with September. The past week was a fair one for local manufacturers. Buyers included the Nickel Plate Railroad, Carnegie Steel Co., and the American Laundry Machine Co., Cincinnati. The Michigan Stamping Co., Detroit, also bought a number of miscellaneous tools. While inquiries are not heavy, orders are looked for from the automotive industry during the week, and railroad buying is expected to be resumed with the closing of the Burlington and Pennsylvania lists. Second-hand tools are in good demand, one local dealer reporting the sale of 40 machines of various types to date in October.

The Case Crane & Engineering Co., Columbus, Ohio, has taken over the greater portion of the plant of the Kilbourne & Jacobs Mfg. Co., recently purchased by F. R. Huntington, of the Huntington National Bank, for $900,000. A portion of the property, including 5½ acres and the erecting shop, has been purchased by the Jeffrey Mfg. Co., and will be used as a warehouse. The equipment in the erecting shop will be moved to the Curtis Avenue plant of the Case Crane & Engineering Co. It is the intention of the latter company to operate both plants, according to Paul T. Norton, president.

The plant and equipment of the Quick Change Chuck Mfg. Co., Arcanum, Ohio, will be sold at public auction Nov. 8. It includes a manufacturing building and machine tool equipment. H. R. Fourman is receiver.

The Island Creek Coal Co., Cincinnati, is erecting a coal unloading plant, in which coal handling machinery estimated to cost $50,000 will be installed.

The Andrews Baking Co., Dayton, Ohio, will award contract for the erection of a new plant, 70 x 120 ft., two stories, to cost with equipment, approximately $75,000. The building will be of reinforced concrete. The G. L. Ohmart Co., Springfield, Ohio, are engineers.

The Eden Washer Corporation Paterson., N. J., has awarded contract to the Robbins & Myers Co., Springfield, Ohio, for the manufacture of the Eden washing machine. W. J. Myers, vice-president Robbins & Myers Co., states that production will start shortly and it is hoped to bring the output up to 1000 machines a month. Additional men will be added to the force, although this will take place gradually. The Eden Washer Corporation will maintain general offices at the Springfield plant, with the sales office in New York.

The Cincinnati Planer Co., Cincinnati, Ohio, is in the market for used open side planers, 30 to 48-in.; also used vertical boring mills, 48 to 72-in.

The C. A. S. Products Co., Box 84, Columbus, Ohio, is inquiring for a Cleveland full automatic turret type screw machine, 2¼-in. capacity.

Indiana

INDIANAPOLIS, Oct. 22.

BIDS will be called at once by the H. T. Electric Co., 612 North Capitol Avenue, Indianapolis, for its new plant to manufacture electrical specialties, estimated to cost $25,000. Edward D. Pierre, Occidental Building, is architect.

The International Harvester Co., Illinois and Garvin Streets, Evansville, Ind., has awarded a general contract to the M. J. Huffman Construction Co., Evansville, for a one-story building, 83 x 130 ft., to cost $30,000.

A cold storage and refrigerating plant will be installed in the new four-story factory, 68 x 200 ft., to be erected at 127-33 North Alabama Street, Indianapolis, by the Furnas Ice Cream Co., estimated to cost $90,000, including equipment.

The La Salle Paper Co., 402 East Madison Street, South Bend, Ind., has awarded contract to Kuehn & Jordan, 725 Welber Street, for its one and two-story paper mill, estimated to cost $800,000, including machinery. Freyermuth & Maurer, Farmers' Trust Building, are architects.

The Monarch Mfg. Co., Muncie, Ind., recently organized with a capital of $75,000, is planning the establishment of a new plant to manufacture shock absorbers. The company is now operating a small works, which will be removed to the new site and additional machinery installed.

The Lyvewyre Mfg. Co., Indianapolis, has leased property at 20 South Capitol Avenue, for the establishment of a new works to manufacture battery parts and kindred electrical equipment.

The Central South

ST. LOUIS, Oct. 22.

CONTRACT has been awarded by the Westinghouse Electric & Mfg. Co., East Pittsburgh, to the Miller-Stouch Construction Co., Kansas City, Mo., for its proposed three-story and basement factory branch at Kansas City, 115 x 150 ft., estimated to cost $100,000. P. H. Anthony, Waldheim Building, Kansas City, is architect.

The Pittsburg Monument & Marble Works, Inc., Pittsburg, Kan., has preliminary plans for the erection of new works estimated to cost $100,000, including grinding, polishing, conveying and other machinery. P. W. White is president.

M. L. Hardy, 7370 Manchester Avenue, Maplewood, Mo., will install a mill and power house on timber property recently acquired in the vicinity of Cassville, Mo., to include portable saw mills, bolter mills, rip tables, hauling machinery and other equipment for the production of handle blanks, etc.

The Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, has awarded contract to Joseph E. Nelson, 3240 Michigan Avenue, for a new engine house with repair department at Shawnee, Okla., estimated to cost $45,000.

The Common Council, Lenora, Kan., is planning the installation of electrically-operated pumping machinery in connection with extensions and improvements in the municipal waterworks, estimated to cost $35,000. The Ruckel Engineering Co., Hutchinson, Kan., is engineer.

The Tar River Machinery Co., Cardin, Okla., is planning for the installation of a heavy duty lathe.

The Turner, Day & Woolworth Handle Co., Inc., 1404 Adams Street, Nashville, Tenn., is planning to rebuild the portion of its factory recently destroyed by fire with loss estimated at about $90,000, including machinery.

The Louisville Gas & Electric Co., 311 West Chestnut Street, Louisville, has filed plans for a one-story automobile service and repair building at 701 Ormsby Avenue, for company trucks and cars.

The Nashville Paper Stock Co., Second Avenue and Church Street, Nashville, Tenn., has awarded contract to the Maugaus & Bell Co., Murfreesboro, Tenn., for a new plant, estimated to cost $50,000 including equipment. D. L. Ledbetter is secretary.

The Common Council, Arkansas City, Kan., will soon take bids for electric pumping machinery and other equipment for extensions in the municipal waterworks estimated to cost $50,000.

The North American Co., 60 Broadway, New York, has tentative plans for a hydroelectric generating plant at the Flippin dam, White River, near Eureka Springs, Ark., to cost $10,000,000, with new dam and machinery.

Ovens, power equipment, conveying and other machinery will be installed in the four-story addition to be erected by the Junge Baking Co., Joplin, Mo., at Eighteenth and Joplin Streets, estimated to cost $70,000.

The Common Council, Owasso, Okla., plans the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks, to cost about $25,000. The Holway Engineering Co., Wright Building, Tulsa, Okla., is engineer.

The Ford Motor Co., Highland Park, Mich., has taken options on about 9000 acres in Francois and Washington Counties, Mo., for lead supply for Ford automobiles. A plant will be erected to cost more than $100,000 with machinery for lead production.

The Brunswick-Balk-Collender Co., 629 South Wabash Avenue, Chicago, manufacturer of talking machines, billiard tables, etc., is considering plans for enlargements in its works at Knoxville, Tenn., primarily for the manufacture of talking machines and parts, with complete assembling department.

The American Bauxite Co., Bauxite, Ark., will install additional equipment at its plant in connection with enlargements to cost $150,000, including ore machinery, electric power equipment and other apparatus.

The Pacific Coast

SAN FRANCISCO, Oct. 17.

CONTRACT has been awarded by the Emsco Tool Co., Los Angeles, to the Austin Co., for two one-story buildings at Seventieth and Alameda Streets, estimated to cost $25,000. E. M. Smith is president.

The Deats Sash & Door Co., 1832 East Sixteenth Street, Los Angeles, is having plans drawn for a new one-story plant at Vernon, 100 x 100 ft., estimated to cost $40,000 with machinery. C. C. Rittenhouse, Wilcox Building, is architect.

Fire, Oct. 9, destroyed a portion of the plant of the Hawley Pulp & Paper Co., Oregon City, Ore., including machine and heater departments, with loss estimated at $500,000 including machinery. It is planned to rebuild.

The City Council, Seattle, has authorized the sale of a bond issue for $1,000,000, the proceeds to be used for the municipal light and power department, including extensions and improvements in plant and system.

The Pacific Spring Bed Co., 2331 Fourth Street, Berkeley, Cal., has acquired three acres at Oakland, Cal., and plans the erection of a new factory. It recently arranged for the removal of its works to a building at 800 High Street, Oakland. Austin S. Wickersham is president.

Electric traveling cranes, conveyors, elevators and other equipment will be installed in the new plant to be erected by the Crescent Creamery Co., Los Angeles, on Slauson Ave, consisting of three one and two-story units, estimated to cost $115,000. A power house will also be erected. Morgan, Walls & Morgan, Van Nuys Building, are architects.

The M. Greenberg Sons Co., San Francisco, has removed its brass foundry and machine works from 225 Beale Street to 765 Folsom Street, where additional equipment will be provided for increase in capacity. The new plant will specialize in brass and bronze castings, brass machined and plated products.

The Weber Showcase Co., 316 South Los Angeles Street, Los Angeles, has purchased 14 acres at Slauson and South Park Avenues for the erection of a new plant. The initial units will provide a total floor space of about 300,000 sq. ft., and are estimated to cost $500,000 with machinery. A machine shop and power house are included in the plans.

The Consolidated Paper Corporation, Tacoma, Wash., has acquired property at Anacortes, Wash., and will remodel the buildings for a new plant. Considerable additional machinery will be installed. O. H. Fair is president.

The Southern California Edison Co., Los Angeles, has acquired property at Santa Barbara, Cal., for the construction of a new power station, estimated to cost $150,000 with machinery.

The Yosemite Portland Cement Co., Merced, Cal., is commencing preliminary work on its plant in this section, consisting of a machine shop and stock building, 36 x 145 ft., and other structures. The complete works will cost approximately $1,000,000 with machinery.

The Galena Hill Mining Co., Orient, Wash., is planning for the installation of electric power and other machinery to replace the equipment at its plant recently destroyed by fire.

The Union Pacific Railroad Co., San Francisco, has awarded a general contract to the Unit Construction Co., San Francisco, for a new engine house with repair department at San Pedro Harbor, Los Angeles, 75 x 175 ft.

The Buckner-Woodward Co., 92-4-6 First Avenue, South, Seattle, Wash., machinery dealer, has a customer in the market for metal barrel making equipment. It is requested that manufacturers of hydraulic presses, similar to the Logemann Brothers Co., No. 23-P, submit proposals with blue prints, circulars, weights, delivery dates and dealers' discounts, descriptive matter to be in duplicate.

The Coast Enameling & Plating Co., organized as successor to the Los Angeles Enameling & Japanning Co. and the Reliable Enameling & Plating Co., 116 East Ninth Street and 137 West Sixteenth Street, Los Angeles, Cal., plans the erection of a factory. No immediate manufacturing will be done, although this may be undertaken later. R. P. MacKenzie is treasurer.

Canada

TORONTO, Oct. 22.

SALES of machinery and tools for the past week again show improvement over those of the previous week, and according to inquiries before the trade it is the general opinion that business of the present month will correspond favorably with the record month of this year. While the majority of sales and inquiries are for tools in single units, a few lists calling for a half dozen machines have recently made their appearance. Demand from the automotive industry continues good, and during the past week or two inquiries have increased.

The Joliette Steel Products, Ltd., Joliette, Que., will start at once to rebuild the portions of its plant recently destroyed by fire. Additional land has been secured and some extensions will be made. The pattern and cleaning shops, welding department, sand blast and complete converter plant were destroyed and part of the main foundry building. The electrical furnace equipment, transformers, compressor room and machine shop were saved. H. W. Wardell, consulting engineer, Montreal, is in charge of construction and plans for buildings and equipment will pass through his hands. The following equipment will be required: One 44-ft. crane, 3-tons capacity, for cleaning shop, must be electrically controlled from the ground; one 1200 ft., 100-lb. belted air compressor with receiver and motor; pattern shop equipment: grinders, drill presses, sand blast, air hamers, sand rammers, and miscellaneous small tools.

A. Begin, St. Anselme, Que., will purchase equipment for a foundry.

W. M. Scott, Lachute, Que., is in the market for tools and equipment for stone cutting, etc.

The White Rock Mining Co., Coyne, Ont., will purchase sawmill equipment, small stamp mill, etc.

The Canadian National Railways contemplate building an addition to the St. Malo shops at Quebec, to cost $37,000.

Bids will be received until Nov. 7, by the Department of Trade and Commerce, Ottawa, Ont., through the Deputy Minister, F. C. T. O'Hara, Parliament Buildings, for the erection of a grain elevator and conveyor at Halifax, N. S., to cost $1,200,000.

The Schneider Packing Co., Kitchener, Ont., is having plans prepared by J. C. Klaehn, industrial engineer, 59 Irwin Street, Kitchener, for an addition to its packing plant to cost $100,000. Work will start next spring.

D. C. Cotton, 54 Adelaide Street East, Toronto, is preparing plans for a $55,000 factory to manufacture automobile tops, for Taylor & Loree, care of W. C. Taylor, 911 Bathurst Street, Toronto.

Parson's Pond Oil Co., St. John's, Newfoundland, is in the market for drilling machinery and equipment for an oil field. J. B. Henry is purchasing agent.

Quebec Feldspars, Ltd., Montreal, will purchase crushing, washing and smelting equipment. H. N. Chauvin, 232 St. James Street, Montreal, is interested.

The Newfoundland Milling Co., St. John's, Newfoundland, is in the market for flour mill equipment for a mill at Harbour Grace, Newfoundland. C. B. Jaqua, 453 Park Avenue, Paterson, N. J., is a director of the company.

Ashley Woodburn, 89 Willow Avenue, Toronto, is preparing plans for a refrigerating plant for an abattoir and is asking for information and prices on insulation, waterproofing material and refrigerating equipment.

John Brown, architect, is preparing plans for a sawmill to cost $100,000 for the C. Cedar & Fir Co., Ltd., Vancouver, B. C., to replace a mill recently destroyed by fire.

N. Blain, Ltd., 68 Casgrain Street, Montreal, manufacturer of vehicles, is in the market for wood and metal-working tools and machinery.

The Three Rivers Harbor Commission, Three Rivers, Que., will purchase machinery for loading and unloading ships. J. J. Ryan is secretary.

The Nichols Chemical Co., 222 St. James Street, Montreal, will purchase compressor and concentrating mill.

The Kenehan Wagon Co., 225 William Street, Montreal, is in the market for shears, drills, etc. K. Kenehan is purchasing agent.

The Ferranti Meter & Transformer Co., 26 Noble Street, Toronto, is building an addition to cost $30,000.

The Hull Electric Co., Hull, Que., is having plans prepared for a concrete dam and power house to be erected at Aylwin, Que. Walter J. Francis & Co., 260 St. James Street, Montreal, are engineers. The power house will be 68 x 300 ft. and six turbines will be installed.

The Montreal Light, Heat & Power Co., Montreal, is having plans prepared for the erection of a power house at Lachine, Que., to develop 100,000 hp., and cost $2,000,000. It is expected that work will start this year.

The Dominion Coal Co., Glace Bay, N. S., contemplates the purchase of a turbine to cost $15,000 to replace the present one at Waterford Lake, N. S.

Work has started on the $7,000,000 power development project at Rivieres Des Prairies, Que., for the Back River Power Co., 35 Common Street, Montreal. Preliminary work is being done by William I. Bishop, Ltd., 10 Cathcart Street, Montreal. The owners will call for bids on the remainder of the contracts in about a month.

The sash and door factory owned by P. W. Gardiner & Sons, Harris Street, Galt, Ont., was destroyed by fire with loss to building, equipment, etc., estimated at $250,000. According to J. E. Gardiner, general manager, work will start at once on rebuilding the destroyed sections and new equipment will be installed.

A syndicate in which J. H. Cook, Lions Head, Ont., is interested has leased 6000 acres in Eastnor Township, Ont., and will drill for oil. W. Shaw is in charge and is receiving prices on equipment, piping, tanks, etc.

The Sheet Metal Products of Canada, Ltd., 111 Lombard Street, Winnipeg, Man., is in the market for power machinery for manufacturing sheet iron airtight heaters.

J. M. McCaw, Nampa, Idaho, city engineer, has plans for a one-story municipal machine and repair shop for the city water and engineering departments.

The Mainland Portland Cement Co., Vancouver, B. C., proposes to erect a cement plant at Popcum, about ten miles from Chillawach, B. C., at a cost of $1,000,000. The company has secured the Hart & Damask property, which is rich in marl, and it is stated that work will start in the near future.

The Canadian Westinghouse Co., Hamilton, Ont., has awarded the contract for foundation work for a foundry to be erected on Aberdeen Street, to the W. H. Yates Construction Co., 17 Main Street East, Hamilton. B. H. Prack, Main Street East, is the architect.

STEEL AND INDUSTRIAL STOCKS

The range of active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	39½	40	Int. Har.	72¾	74½
Allis-Chal. pf....	91¾	92	Int. Har. pf.....	106¼	107
Am. B. S. & Fdy. 71		71½	Jones & L'ghlin..	108	108½
Am. B.S. & F. pf.	103	103	Lima Loco.	62¾	64½
Am. Can	90¼	93⅝	Midvale Steel	2⅛	2
Am. Can pf.....	106¾	106⅞	Nat.-Acme	8½	9
Am. Car & Fdy..	154¾	155½	Nat. En. & Stm..	35	44¼
Am. C. & F. pf..	120	120	Nat. En. & S. pf.	88	90
Am. Locomotive.	68¾	70	N. Y. Air Brake	34½	36½
Am. Loco. pf....	118¾	118⅝	Otis Steel	7⅜	8
Am. Radiator ..	81¾	81½	Otis Steel pf....	45	46
Am. Steel Fdries.	34¾	35	Pressed Sti. Car	44	48
Am. Sti. Fd. pf..101		101	Pressed Sti. pf..	84	84½
Bald. Loco. ...	114⅜	115⅝	Replogle Steel ..	8½	9
Bald. Loco. pf...	114½	114½	Republic	42½	44¾
Beth. Steel	46⅛	48⅝	Republic pf. ...	86¼	89
Beth. Stl. 7% pf.	89¾	89½	Sloss-Sheffield .	39½	40½
Br. Em. Stl. 1 pf.	57½	57⅝	Steel of Canada.	65½	67
Br. Em. Stl. 2 pf.	15	15⅛	Transue-Wms. ..	30	30
Chic. Pneu. Tool	80¼	80⅝	Un. Alloy Steel..	30	30
Colo. Fuel	27¾	28⅛	U. S. Pipe.....	36¼	38⅝
Crucible Steel ..	57⅛	60¾	U. S. Pipe pf....	78½	82
Crucible Stl. pf..	89	90	U. S. Steel.....	85⅞	88⅜
Deere pf.	61½	63	U. S. Steel pf...	118⅞	119¼
Gen. Electric	170	171	Vanadium Steel.	27	29⅛
Gt. No. Ore Cert.	28	29½	Va. I. C. & Coke	52¾	54
Gulf States Steel	70	74½	Whouse Air Br.	78⅛	79½
Harb.-Walk. pf..102		102	Ygstown S. & T.	63⅝	65

Industrial Finance

A petition filed with the Federal Court, Newark, N. J., states that 92 per cent of the creditors of the Newark Metal Works, 560 Ferry Street, with claims aggregating $300,000, has consented to a reorganization of the company. Plans are now being developed to this end. The company has been in receivership since March last.

Louis J. Castellano has been appointed receiver for the Deline Engineering Co., Inc., 259-63 Norman Avenue, Brooklyn, N. Y., manufacturer of derricks and kindred equipment.

The Consolidated Gas & Gasoline Engine Co., 33 Park Place, New York, has filed a voluntary petition in bankruptcy, with liabilities stated at $120,220 and assets $440,039, of which $439,883 represents unliquidated claims.

George W. Martin has been appointed receiver for the Empire Stamping & Metal Spinning Co., Inc., 138 Mott Street, New York.

The Baltimore Dry Docks & Shipbuilding Co., Baltimore, has filed a petition in the Circuit Court asking that the company be dissolved and that a receiver be appointed to take charge of its affairs. It is stated that the company is no longer actually engaged in the building, repairing and dry docking of vessels.

Profits of the Ford Motor Car Co. of Canada, Ltd., for the year ended July 31, 1923, after all charges for manufacturing and general expenses, including depreciation and taxes, amounted to $5,106,198, compared with $5,006,521 for 1922. Deducting dividends of $1,050,000, as against $2,100,000 in the previous year, surplus now stands at $16,594,170, compared with $12,537,973. Total sales and other income amounted to $38,556,183, an increase of $9,282,929 over 1922. Total output for the year was 70,328 cars and 3395 tractors, compared with 45,000 and 1192 for the previous year.

Net income of the Virginia Iron, Coal & Coke Co., for the quarter ended Sept. 30, amounted to $170,414, equivalent to $1.07 per share on the $10,000,000 in common stock outstanding, after allowing for preferred dividends. In the same quarter last year, the net available for common was $2.11 per share. Net income of $528,957 was shown for the first nine months of 1923. This amounted to $3.41 per share earned on common, against $1.01 during the first nine months of 1922.

Net earnings of the Sloss-Sheffield Steel & Iron Co. for the nine months ending with Sept. 30 were $2,153,278, which, after allowing for preferred stock dividends, is equal to $18.01 a share on the company's 100,000 shares of common stock. Earnings for the third quarter were $471,856, and for September $125,394. Due to a drop in pig iron prices earnings for the fourth quarter will show a falling off, yet the company is still operating at a fair profit.

Stockholders of the Penn Seaboard Steel Corporation at a recent special meeting approved a plan for financing the company's maturing 7 per cent notes and the provision for the formation of a new company to take over the company's steel casting plant at Chester, Pa.

Despite the fact that the conditions in the industry have been somewhat untoward, the National Steel Car Corporation, Ltd., Hamilton, Ont., in the fiscal year ended June 30, 1923, showed an operating profit as against a deficit in the previous twelve months. The capital and surplus account of the company as of June 30 last shows net profits of $142,887, as compared with a net loss for the preceding year of $79,733.

Business and property of Stroud & Co., manufacturers of road making machinery, Omaha, Neb., will be sold by the Federal Court in bankruptcy at the office of the company on Nov. 1. Arthur C. Thomas is trustee.

Transue & Williams Steel Forging Corporation reports net earnings for the nine months ended Sept. 30 of $387,000, after taxes.

Net earnings of the New York Air Brake Co. in September were $249,635, and for the nine months of 1923 were $2,245,881, which amounts to $7.48 per share on the 300,000 shares of common. So far in October both sales and profits have been decidedly above those of September. On Oct. 1 current assets were $7,791,432 and current liabilities were $432,974.

The Swoyer Brass & Copper Co., Woolworth Building, New York, has been organized by A. P. Swoyer, formerly connected with the Bridgeport Brass Co., Bridgeport, Conn. The company will handle and manufacture a full line of brass and copper in sheets, rods, wire brazed and seamless tubes, iron pipe sizes and condenser tubes, and brass and copper products. A. P. Swoyer is president and T. A. Hammer is secretary-treasurer.

The Jersey Rubber Co., 10 Ames Avenue, Rutherford, N. J., has been incorporated with $25,000 capital stock to manufacture rubber products. The company has secured a plant, but further details are lacking. William H. J. Ely is one of the heads.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	4.85c.
No. 26	4.40c. to 4.65c.	4.90c.
No. 28	4.50c. to 4.75c.	5.00c.
No. 30	4.70c. to 4.95c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 4.85c.
No. 16	4.75c. to 5.00c.
Nos. 18 and 20	4.90c. to 5.15c.
Nos. 22 and 24	5.05c. to 5.30c.
No. 26	5.20c. to 5.45c.
No. 27	5.35c. to 5.60c.
No. 28	5.50c. to 5.75c.
No. 30	5.95c. to 6.20c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+11
7-8 in. Lap	—41	—11	2½-6 in. Lap	9	+ 9
9-12 in. Lap	—41	— 4	7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER Per Lb.

Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17½c. to 18½c.
High brass wire	18 c. to 19 c.
Brass rods	15¼c. to 16¼c.
Brass tube, brazed	25½c. to 27 c.
Brass tube, seamless	22½c. to 23½c.
Copper tube, seamless	24 c. to 25 c.

Copper Sheets

Sheet copper, hot rolled, 20¼c. to 21¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
			Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	$10.70	IC	7.00	6.75
IX	13.95	12.55	IX	8.25	8.00
IXX	15.55	13.75	IXX	9.50	9.25
IXXX	17.10	15.30	IXXX	10.75	10.50
IXXXX	18.85	16.80	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	48c. to 50c.

Copper

Lake ingot	16c.
Electrolytic	15½c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market continues depressed and business is quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.25
Copper, light bottoms	8.75
Brass, heavy	5.75
Brass, light	4.75
Heavy machine composition	8.50
No. 1 yellow brass turnings	5.75
No. 1 red brass or composition turnings	7.25
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, November 1, 1923

ESTABLISHED 1855 VOL. 112, No. 18

Institute Pledged to Country's Cause

President Gary Rededicates the Industry to Patriotic Policy

Semi-Annual Meeting Notable for Unusual Features, Including Visit to Aberdeen Proving Ground—Earl of Birkenhead Speaks on War and Peace—History of Establishing and Abolishing the Long Day in Iron Industry Related

THE American Iron and Steel Institute, since it was organized in 1908, has had numerous meetings important not only to the members of the institute but to the country and to the world, including those never-to-be-forgotten sessions during the war and those of post bellum days at which Foch, Pershing and other great leaders were guests

THE affairs of every man and every line of business should be so conducted, continuously, consistently and persistently, that there could be no just cause for reproach.—From President Gary's address.

of honor. The twenty-fourth semi-annual meeting last week in New York takes high rank among the others in the history of the institute, not only on account of the business sessions of Thursday and the banquet in the evening at which the distinguished Earl of Birkenhead was the principal speaker, but also because the memorial services to Dr. Henry Marion Howe and the visit of 275 members to the Aberdeen Proving Ground on Friday created an atmosphere of unusual spiritual and patriotic inspiration.

After the two sessions Thursday at the Hotel Commodore, memorial services were held at five o'clock at the Cathedral of St. John the Divine at which Prof. Michael Pupin, Professor of Electrical Mechanics, Columbia University, delivered the address. Part of the very dignified services was the singing by the boys' choir and the audience of the Battle Hymn of the Republic, written by Dr. Howe's mother, Julia Ward Howe. Dr. Pupin's address will be found in full elsewhere in this issue of THE IRON AGE.

Standing at Aberdeen in the open air, surrounded by members of the institute and of the Army Ordnance Association, President Gary solemnly rededicated the great industry which he represented to the service of the country and at the same time expressed the fervent hope that its services would not be needed in another war.

After the luncheon served at midday, visitors and members of the Ordnance Association assembled in front of the service building and a brief meeting was held. President Crowell of the association presided and introduced as first speaker, President Gary, who began by graciously expressing appreciation of the members of the institute for the invitation to visit the proving ground and for the splendid program which was being carried out.

"The Army," said Judge Gary, "recognizes the importance of manufacturers of iron and steel in time of war and peace, for if the Army is to be efficient, the industries are likewise important in time of peace to help in developing means of military defense if and when it becomes necessary. A competent military force is the first essential for the protection and preservation of our great country, and the iron and steel industry is ever ready to do its part in strengthening that military force. The Army is and should be always opposed to war, but always ready to fight if it becomes necessary. The soldiers most competent to fight are those who are strongest in maintaining peace but ready to do

MORE and more the general public will give attention to our stewardship. We should not resent nor disregard honest or deserved criticism. Even though sometimes, through lack of information or because of vicious motives, there may be unjust criticism, if it is based on a fragment of truth there should be no objection on our part.—From President Gary's address.

their full duty when the call of their country comes.

"It is not becoming of me," added Judge Gary, "to say much about what we of the iron and steel industry did during the great war. But I may say that from the time the Secretary of War and the Secretary of the Navy asked us to mobilize the industry in the cause of our country until the last gun was fired, we never failed in doing our utmost and we now renew our pledge of allegiance and our promise to serve our country whenever the call may come. At such a time, we shall be proud to follow

the lead of such soldiers as we see here today, such gentlemen of high character. I can promise that you can depend upon members of the American Iron and Steel Institute."

Charles M. Schwab spoke briefly, referring particularly to the patriotism of the iron and steel plants, and in conclusion Major-General C. C. Williams, Chief of Ordnance, thanked the members of the institute for their visit and for their promise of support of the Government.

The Institute Papers

The papers were of the usual high order. At the conclusion of his address, President Gary made an appeal to the members not to leave the room. He urged them to stay and hear the papers which he said had been prepared with great care by able men and were worthy of attention. While he realized that in the past there had been some excuse for members not remaining throughout the sessions owing to the difficulty of hearing some of the authors who read papers, this condition no longer obtained on account of the amplifiers having been installed.

As a result of Judge Gary's request, the attendance in the morning was unusually large, but the attendance at the afternoon session was about the same as in past years. A paper by Col. T. C. Dickson, commanding officer Watertown Arsenal, on "X-Ray Examination of Metals," attracted much favorable comment, especially on account of the very pleasing way in which the subject was presented. Colonel Dickson spoke extemporaneously and used many lantern slides. His address will be given more fully later. Chang Yu Wang, the author of a paper on "The Economics of the Iron Industry in China," was unable to be present, but his paper was read. It contains some original suggestions in regard to methods of figuring prices of ore.

Banquet Address of Earl of Birkenhead

The banquet on Thursday evening was attended by 1290 members and their guests. President Gary presided and gave at some length an account of the long and eminent career of the Earl of Birkenhead, formerly Lord High Chancellor of Great Britain. The earl is a man of great frankness and force of character and his address was listened to with the keenest interest and frequently applauded. Speaking as one who occupied a highly important position as minister in the English Government during the World War, and was thoroughly familiar with all of the inside history of that great conflict, he reviewed the war, the Peace Conference and present conditions in a highly interesting and enlightening manner. In beginning, he paid a tribute to Mr. Schwab, who sat at his side, saying that he knew how much in a financial way Mr. Schwab would have benefited by accepting an offer to make war supplies for enemies of the Allies, but that he chose to devote all his energies to helping the cause of those who were fighting Germany. Lord Birkenhead then spoke of the attitude of the United States, saying he had no complaint to make because this country had not entered into the war at an earlier date, as he realized that it was best for the country not to become engaged in the war until its action was an expression of "the whole national mind." He believed that it would have been a tremendous error had the United States become a belligerent before the country was united and enthusiastic in the cause.

Lord Birkenhead said that he did not consider it profitable to debate the question, "Who won the war?" The French, the Italians, the Belgians, even the New Zealanders, might make a very good argument to show that they won the war, but he did not hesitate to say that the adhesion of the United States to the cause of the Allies at the critical time destroyed the morale of the German nation, including not only the soldiers but the officers of the German Government. "This," he said, "was because when your men began to come over, the Germans slowly came to realize that your infinite resources had become available for their enemies. They saw that when the soldiers of the United States came in millions, there would be, if necessary, more millions and then more millions and still more millions to take the places of those who fell fighting. They saw that to continue the war was hopeless." The earl discussed the debt problem and referred briefly to the League of Nations and the International World Court, saying that he was not an idealist and doubted whether the court or league could effect the results hoped for by their advocates.

Lord Birkenhead spoke at some length of the Peace Conference and said that he appreciated the position of the United States in not ratifying the treaty, as he believed that such a course would not be in harmony with the traditions of the country. He said: "England reluctantly adopted the propositions made by the great executive of your country because to infer that the principles which he advo-

The Price of Unpreparedness



Before introducing Judge Gary at the meeting at Aberdeen, Benedict Crowell, president of the Army Ordnance Association, read the following statement:

"The Central Powers mobilized 22,850,000 *men and inflicted* 22,090,000 *casualties on the troops of the Allied Powers;*

"The Allied and Associated Powers mobilized 42,189,444 *men and inflicted* 15,405,000 *casualties on the Central Powers—The Price of Unpreparedness!*

"It is for us to take action so that the United States will never again be without reasonable preparedness.

"This is the sole aim of the Army Ordnance Association, and we invite you to assist in the patriotic work."

cated were not those of the country would have been to insult your President."

In conclusion the speaker made an eloquent appeal for united action of English-speaking nations, saying that in such action lies the hope of the future of civilization.

Hussein Alai, the Minister of Persia to the United States, spoke at great length in regard to his country and its relation to the United States, making an appeal for American technical and financial assistance for Persia in its efforts to rehabilitate itself.

In accordance with a time honored custom, Mr. Schwab was the last speaker. With some new stories and his old earnestness, he closed the program of the evening.

The Visit to Aberdeen Proving Ground

Greatest Gun in United States Fires Shell Many Miles—Bombs Dropped from Airplanes—Demonstration of Tanks and Tractors

THE visit of the members of the American Iron and Steel Institute to the Aberdeen Proving Ground, about 26 miles from Baltimore, was made upon invitation of the Army Ordnance Association, the trip being by special train after the banquet Thursday night.

The visitors were entertained at the service building where three meals were served, and every detail of the elaborate program was carefully planned and skilfully carried out under the auspices of the association with direct supervision of Col. W. H. Tschappatt, commanding officer. The grounds are very large, being approximately 16 miles long and four miles wide, and it was necessary to go from one part to another by train and in automobiles. The site was selected in 1917 and its achievements in 1918 were of very great value. The first shot was fired Jan. 2., 1918, and activities were at their height when the armistice was declared on the following Nov. 11.

The members of the institute first witnessed the firing of one round of the 16-in. gun, the largest in the United States. It has a range of 28 miles. After hearing its mighty roar and inspecting its marvellous electrical equipment, the members inspected a 14-in. gun, the latest development in "railroad artillery," and also the largest which is believed practicable to construct. This gun, which weights about 75 tons and has complete electrical as well as hand control, fired one shell. The visitors next had their attention called to the armor plate which had been penetrated by an armor piercing projectile. They then witnessed the firing of the 8-in. howitzer, the 3-in. anti-aircraft gun, the dropping of the demolition bombs, the destroying of balloons by aircraft guns and the demonstration of movements of tanks and tractors.

An historical exhibit of field pieces which had been used in the United States Army from the time of the flintlock of 1776 down to the World War was inspected with keen interest. The exhibit was assembled from different parts of the United States by Captain L. M. Bricker, after much study of the history of guns.

Late in the afternoon came the demonstration by the battery of the Sixth Field Artillery, which fired shrapnel at fixed targets and put up a smoke barrage.

The visit to the museum was one of the most instructive features of the day. One feature of this museum consists of machine shops which were mounted for service in the war and actually rendered very important services. Similarly mounted shops are now in use in the Army.

The Display of Tanks and Tractors

The display of tanks and tractors indicated not only the kind of activity carried on during the war but also the developments which have been recorded since the armistice. The tanks and tractors dashed or lumbered about the big rough field in an amazing way, showing how obstructions which could not possibly be overcome by ordinary automobiles were matters of no importance to these implements of war. An extremely interesting model was the medium tank of 1921, a post-war development by the War Department embodying the ideas on tank design as determined by the war. This medium weight tank has the armor and armament of the large tanks combined with the mobility of the light tanks, in addition to speed greatly increased over that of either of the wartime light or heavy tanks. The maximum thickness of the armor is 1 in. on front and turret, the other armor being ⅝ to 4 in. thick. The tank is equipped with a Liberty engine. A radio-directed 6-ton tank which was developed during the war and extensively used was operated with commands from a radio station on "the main front." A 2½-ton tractor, model 1908, equipped with a Cadillac touring car engine and having a road speed of 15 miles per hour, attracted much attention as it dashed around among the tractors and tanks of slower movement.

Events of the Day at Aberdeen

One Round with 16-in. Gun on Barbette Carriage.

One Round with 14-in. Gun on Army Railroad Mount, Model 1920.

Firings of 8-in. Howitzer, Model 1920, with Split Trail and 155-mm. Gun on Self-propelled Mount, Mark IX.

Firings with 3-in. Antiaircraft Gun, Model 1918.

Firings at Two Balloons by Aircraft Machine Guns.

Dropped Two 600-lb. Demolition Bombs.

Small arms and Infantry weapons, including the various aircraft and infantry armament. Certain types of guns and material demonstrated.

Many rounds fired at night, bringing down balloons—Searchlights used.

Tanks

Medium tank, model 1921; medium tank, model 1922; Mark VIII tank with stroboscope; radio-directed 6-ton tank.

Tractors

Two and a half ton, model 1920, towing 75-mm. gun, model 1897, and limber; 2½-ton tractor, model 1918; 2½-ton tractor, model 1918, with increased cooling system, including coils for cooling crank case oil; 2½-ton tractor, model 1918, with Liberty truck engine; best "30" towing 4.7-in. gun, model 1906; Holt T-35 towing ¾-ton trailer; Pavesi (Italian) towing 3-ton trailer; Fordson tractor with Hadfield-Penfield adapter towing cargo carts, model 1923; Fordson tractor with standard wheels towing cargo carts, model 1923; 5-ton artillery tractor towing 155-mm. howitzer and limber;

10-ton artillery tractor towing 155 mm. G. P. F.; Topp-Stewart tractor towing 3-ton convertible wheel and track-laying trailer.

Motor Carriages

Seventy-five-mm. gun motor carriage; 155-mm. gun motor carriage, model 1921; 155-mm. gun motor carriage, model 1920 (Christie); motor carriage, Mark III, for 240-mm. howitzer; 240-mm. howitzer motor carriage (St. Chamond), Mark IV and IVA.

Cross-Country Trucks

Six-wheeled Militor truck (with Chase type track); Dodge truck with Chase track; Nash with caterpillar adapters; Mark VII tractor caisson; roadless Mack truck; Christie Mack truck; cargo cart, model 1923.

Mobilizing Industries in Preparedness Program

Army Ordnance Association Meeting—Assistant Secretary of War Davis Tells of Plans for Allocating Plants Throughout the Country

A BUSINESS meeting of the Army Ordnance Association was held in the Administration Building at five o'clock, presided over by its president, Benedict Crowell, formerly Assistant Secretary of War. The objects of the association were explained and a number of new members were added to the roll.

Finally, as last number on the program, came the night firing on the main front. Many balloons were sent up, located by searchlights and promptly brought to earth, thrilling the spectators and bringing forth many outbursts of applause.

Assistant Secretary of War Dwight Davis stated that an Army and Navy Board is in existence for allocating plants as between the Army and Navy and that his office has allocated some 3000 industrial plants to particular supply branches which, in turn, have allocated them to various districts. This statement was given as one of the many efforts being made in connection with plans for industrial preparedness in which the iron and steel industry essentially is a dominating element. Proper control records for the purpose of coordinating procurement are being worked out, the assistant secretary said.

"But, above all, efficient personnel to carry out the plans is an absolute necessity," he said. "Each chief of a supply branch and the staff of the assistant secretary will need many men of ability, well trained through either Army schools or industrial experience, or, much better, through both to accomplish the desired objective satisfactorily. The Army is concentrating on a schooling system to train its supply officers in the war plans and in the proposed methods of executing them, but the regular officers can man only a small part of the organization in time of war. Business men, engineers, reserve officers, in fact, just such men as you gentlemen of this institute * * * will have to do the bulk. I sincerely hope, therefore, that you will keep up your interest in the great problem of preparing the country industrially for a maximum war effort because upon its sound solution may depend the saving of billions of dollars, thousands of human lives, and the economic welfare of the entire nation."

The assistant secretary divided the problem of industrial mobilization into three main questions: "What must we procure?" "Where can we procure?" and "How will we procure?" Answering the first question, he said that the seven supply branches into which the Army is divided have practically completed the calculations of the requirements by months, amounting to some 23,000 major and 700,000 total items.

"If from these we subtract our reserves, we definitely define our quantity procurement program and this can be worked out to develop in turn the quantities of steel, copper, nitrates, powder, explosives, etc., required," said the speaker.

The answer to the second question was said to be dependent upon the ability of the country to produce. It was declared that it is the desire of the War Department to spread the industrial load throughout the country on the basis of the country's industrial capabilities. With this view in mind, the country has been divided into districts and each chief of a supply branch is endeavoring now to ascertain through his chief of district the ability of that district to help him solve his war problem. The answer to the "How will we procure" was said to involve among many other questions the matter of standardized war contract forms, and the assistant secretary said these are being worked out on the basis of World War experience after consultation with hundreds of business men. A sound and expeditious scheme for payments, it was asserted, is likewise being studied. Plans also were said to be given study to avoid conflicts between branches of the Army and between departments of the Government as to use of specific plants, and as to priorities in raw materials, power, labor, transportation, etc.

President Gary Tells of Abolishing the Long Day

Congratulates Institute on the Change—Praises President Coolidge—Is Mildly Optimistic as to Business Conditions

PRESIDENT GARY devoted a large part of his address to a history of the abolishing of the twelve-hour day in the iron and steel industry. He then made some general observations in regard to business policies and principles, saying that honest or deserved criticism should not be resented or disregarded, but that business should be so conducted that there could be no just cause for reproach. He then touched briefly on the troubled conditions in Europe, referred with much feeling to the death of President Harding and spoke in terms of high praise of President Coolidge, quoting from the words of the new President uttered in past years, particularly those relating to the enforcement of the law, to protecting the rights of the weak and to every man doing his part. In opening, Judge Gary said:

"Hearty congratulations are extended to the members of the American Iron and Steel Institute upon the abolition of the twelve-hour day in the iron and steel industry of the United States of America! Long years ago, before most of the business organizations represented here today were created, the twelve-hour working day became established. To quote the words of Mr. Smith, an intelligent, fair-minded workman connected with the American Sheet & Tin Plate Co., at the annual meeting of the United States Steel Corporation, held in April, 1914: 'The employer never established the twelve-hour day. Every working man who helped

to build up the iron business helped to establish it, and the refusal in many cases to grant the twelve-hour day would have been a sufficient cause for a walk-out many a time.' The hours on duty were long, though the hard work was largely done by machinery, more and more so as improvements were installed; the compensation per day was comparatively large and the workmen, as a rule, insisted upon a continuance of the practice. Because a committee, appointed by the chairman of the Steel Corporation in 1911 and headed by the late Stuyvesant Fish, recommended elimination of the twelve-hour day at its plants, provided the iron and steel industry generally would do likewise, the corporation actively and persistently took steps to carry into practical effect the recommendation referred to. The records of these efforts are preserved and are clear.

IT may be assumed that President Coolidge will be governed by the same motives as those which have actuated an honorable and useful life. Consequently the prosperity of this country will apparently have cordial, appropriate and effective assistance from the national Government, limited only by established rules and principles and the general welfare of all the people.— From President Gary's address.

Considerable and increasing, though not satisfactory, success resulted, until the terrible World War was precipitated, when larger and still larger demand for steel to supply war necessities, first for foreign nations and later for our own country, compelled the utilization by manufacturers of every facility available for largest production. In the dark days of military conflict, no one in this country objected to twelve hours' work per day. The year after the armistice, for the first time, so far as your president recollects, gentlemen claiming to represent workmen demanded with many other things abolition of the twelve-hour day by the steel industry. This demand soon after became a slogan, used largely by gentlemen not in any way directly connected with manufacturing or with manual labor, but many of whom probably were influenced by good motives. The campaign that followed, the sometimes inaccurate representations and unjust accusations that were made, need not be mentioned, nor even remembered by those who suffered from unwarranted attack. We were helpless, for there was legitimately involved the question of propriety and desirability of continuing the twelve-hour day, and we were unwilling to do or say anything which could be construed as a defense of the twelve-hour day, which in our deliberations we had already admitted must be abrogated when and as circumstances should permit.

"From the date of the Fish report there has never been a statement by a prominent steel manufacturer in favor of the permanent continuance of the twelve-hour day in the steel industry, nor against its abolition whenever practicable.

"Finally came the friendly words from that grand and good man who occupied the highest position in the greatest of all nations, the President of our own beloved country. They are of record and are worth repeating: 'I know I need not tell you that I am utterly without disposition to meddle in affairs which are of no official concern to me. The story comes to me that you are contemplating the discontinuance of the twelve-hour day in the steel plants. I would be perfectly willing, if it seems desirable, to lend any consistent assistance in securing the acceptance of the principle in other large establishments. I am only writing to commend and tender any prudent assistance if you really have this plan in mind and you think it desirable to have anything like a concerted effort in the direction of this important change.' Then followed the dinner at the White House, attended by over 40 representative members of the iron and steel industry. Full report of this meeting was made at the annual meeting of the institute, May 26, 1922. It was then said and published: 'The President frankly told all of us what was in his mind. He said: "I declare I have no intention of intermeddling or interrupting and, least of all, of injuring the iron and steel industry. I think there is a well-defined and perhaps a growing sentiment throughout the country against the twelve-hour day and in favor of its abolishment. It seems clear that this cannot be done successfully except by the concerted disposition and action of the industry. I think if we can consistently get rid of the twelve-hour day, it ought to be done, and that is as far as I go. If I can be of benefit it would be very agreeable to me."' We told the President frankly all the facts, our difficulties and our desires. Then the president of the institute, at the White House, and at President Harding's request, dictated a statement of the meeting for publication.

"We pledged our cooperation with the President in the effort to eliminate the twelve-hour day in our industry so soon as it should be practicable.

"Gentlemen, that pledge has never been violated nor neglected nor its fulfillment unnecessarily postponed. Everyone familiar with all the facts will testify to the good faith and earnest endeavor of the industry.

"Now that you have concertedly, with practical unanimity and with most remarkable promptness, relegated to the past a practice you did not inaugurate, but have been willing to recognize as undesirable, you are entitled to praise for having risen to a great occasion involving, as we believe, no question of morals, but one that became a matter of public interest and concern.

"Except for a moderate recession in the volume of our business, which at the psychological moment released a large number of workmen, the change could not have been consummated without further delay.

WE shall probably be censured unduly and subjected to misrepresentation, as we sometimes have been in the past. We may be attacked by those who are vicious and unworthy, those whose motives are selfish or corrupt. In the main, however, it is probable sooner or later we shall receive our just deserts, either because claims against us are justified or because, if not, the public will understand and properly decide.— From President Gary's address.

"In bringing about this change we have met many obstacles, some very difficult. The full facts are not generally known. It is not necessary nor would it be useful to relate them at this time. We have been striving for the accomplishment of a change in business that would meet the demands of a sentiment, which was not one-sided or uncontroverted, as witnessed by volumes of letters we have received; and we are pleased and satisfied.

"The outstanding factor which brought about the necessary concert of action, at the time it was secured, was the good-natured, positive influence of the President, who comprehended our difficulties, and, though he hesitated to interfere, strongly urged a change in hours simply because he deemed it a matter of duty. His manner and method convinced everyone familiar with the facts of his sincerity and friendship. He was strong because he believed he was right. He made

friends, not enemies. We are glad that we gave heed to his advice and reciprocated his friendship, and that he was aware of this before his untimely and universally lamented departure for a better world."

The Administration and Business

In conclusion, President Gary said:

"What is the disposition of the President concerning the affairs of the country? This is shown by a statement recently made by one occupying a prominent official position as follows: 'It is very evidently the aim and effort of the Administration to encourage in every way policies in both business and politics which will tend to the elimination of agitation. The very evident desire in all governmental quarters is to extend the fullest assistance to the constructive forces of the country. The removal of elements of uncertainty and of misgivings, and the stabilization of business conditions, are a constant aim, and the feeling among those most familiar with the reflections of the business situation is that substantial progress is being made along these lines.'

THERE will be temporary interruptions, recessions, and there will be fluctuations, but the man of business courage, with a reasonably clear vision of the long future, pays little attention to temporary hesitation in business progress. He knows that the current of prosperity in the United States is so strong that even though it may be occasionally modified by unnatural or unreasonable obstructions, this will result in accumulation of volume and force which will soon be overwhelming and stronger than ever before.—From President Gary's address.

"It is also important to know the opinion of the Administration concerning the present trend of business. This likewise was referred to by the same authority already mentioned, as follows: 'The impression in Washington seems to be that industry throughout the country is proceeding on a commendably conservative basis, with avoidance, so far as possible, of unnecessary advances in prices, or avoidable expansions which would engender keen competition for labor. With a continuance of this general attitude, it is felt that business should continue generally good for the remainder of this year. While there is reticence about making prophecies for the future, the general opinion seems to be that if this attitude continues there can be reasonable assurance of a projection of generally satisfactory business conditions at least well into next year.' It is believed these statements represent the mind of President Coolidge.

"From these quotations and observations, the business men of this country may form an intelligent opinion as to what may be expected from the governmental administration concerning matters which at this time are of vital importance.

"If the business men will do their part and cooperate with the President and his assistants in conducting their affairs in conformity with the high ideals which we believe actuate the President in the performance of his duties as the chief executive, there is no reason to fear there will be a serious financial or commercial disturbance or depression during the next few months.

"There are, as always, some hindrances to the natural progress and prosperity in the United States. Those patent to everyone are the turbulent conditions in other countries, already alluded to; the unreasonably high and burdensome taxes, national, State and municipal; the high costs of production, in some lines unconscionable; and the high costs of living, measurably, though not altogether, brought about by those who complain the most.

"But there are many reasons for confidence in the economic future in this country, outside of those which are basic and permanent, including our enormous wealth and immense yearly income, which increases as the years go by.

"For the calendar year the iron and steel industry will show considerable profit, though not as much as the capital invested should produce. The new orders are not up to productive capacity, but together with those heretofore accumulated, have resulted in large shipments. In some lines the demand for immediate consumption has been, and still is, in excess of the ability to supply.

"It may be stated with confidence that the outlook is good. Inquiries for iron and steel are unusually large, many of them urgent. Purchases for railroad and general building purposes, for oil development and production, for canning purposes, for the automobile trade and many other lines are now very large as a total and from appearances may be expected to increase materially in volume during the next six months, unless something unforeseen shall be precipitated.

"The actual purchasing necessities of our commodities are very great at present, and there is plenty of money to pay for whatever is needed. It is up to business management in every line to take advantage of the opportunities offered. Let us have faith in the future and do our part, proceeding always with good judgment, prudence and within the limits of our resources, but steadily forward toward the goal of the prosperity which we know is ahead and will be greater than ever before."

Professor Pupin's Tribute to Henry Marion Howe

Memorial Services Held at Cathedral of St. John the Divine Attended by Members of Two Institutes and College Professors

MEMORIAL services to Henry Marion Howe, honorary member of the American Iron and Steel Institute, and eminent metallurgist, were held at the Cathedral of St. John the Divine, Thursday afternoon, Oct. 25. The attendance included members of the American Iron and Steel Institute and members of the board of directors of the American Institute of Mining and Metallurgical Engineers, of which Dr. Howe was a past president. Others in the congregation were Dean George B. Pegram and the faculty of the school of mines, engineering and chemistry of Columbia University, where, as professor of metallurgy, Dr. Howe won worldwide fame, and also a representation from the engineering faculty of New York University.

The service was conducted by the Rev. Henry P. Veazie, precentor of the Cathedral. A special memorial anthem was sung by the full cathedral choir. Dean Howard C. Robbins and other church dignitaries participated.

Michael I. Pupin, noted inventor and professor of electro-mechanics in Columbia, delivered the address, eulogizing Dr. Howe as one whose mental and spiritual attitude "put him in the rank of those great minds and souls which have made history by leading the intellectual and spiritual progress of man from chaos to cosmos." Professor Pupin said:

"The ancient and venerable custom of showing reverence to the blessed memory of a precious life has more than ordinary significance when that life represents one of the guiding lights in the history of humanity. Such a light was the life of Henry Marion Howe. Those who know him by his scientific achievements know that his life is a shining light in the history of science; those who had the good fortune to know him personally always felt that his great scientific achievements were the crowning result of splendid efforts of a superior mind guided by the light of a generous heart and a pious soul. What his work means to science is recorded and known to all who treasure that knowledge; it is a record which will not be forgotten as long as the science of metallurgy has any meaning.

"But the spiritual influence of the life of Henry Marion Howe is known only to those who had the good fortune to know him personally. I am one of these fortunates, and this memorial service offers me the rare privilege to refer briefly to a phase of that influence which was known to me. Twenty-five years ago I became greatly interested in the magnetic properties of steel. I consulted Professor Howe, who was then my colleague at Columbia University. One day I said to him: 'If iron did not have the small magnetic permeability at low magnetization that it has all my efforts in theory and experiment in the domain of electrical power transmission problems would have no technical value.' And then I added: 'It looks as if the good Lord had endowed iron with that remarkable property, in order to give a chance to a poor fellow like me.' Howe looked at me with his wonderfully luminous eyes and said: 'Yes, the good Lord endows all things with remarkable properties, apparently for no other purpose than to give us poor mortals a chance.' I saw in these words a simple statement of the religious creed of a great but very humble and pious scientist, to whom science meant a search for and a study of the remarkable properties of things which God created, and the knowledge of which gives us poor mortals a chance. This creed reminded me often of the scriptural words:

> Speak to the earth and the earth shall teach thee!

and

> Learn the truth and the truth shall make thee free.

"Howe always spoke to the earth, in order to learn from it the remarkable properties of its things, and when he had learned the lesson of this great teacher he was certain that he had gained knowledge which gives us poor mortals a chance, because it is the knowledge of truth which makes us free. Yes, Howe, I am sure, always considered the remarkable properties of things as God's messages, the deciphering of which supplies us mortals with morsels of the eternal truth, and he firmly believed that he who is blessed with many morsels of the eternal truth is truly rich and prosperous: rich in wisdom and prosperous in things which feed the spirit and make it grow. No man was ever more loyal to his mission of deciphering the messages of God and no man was ever more eager to struggle for the physical, intellectual and spiritual freedom of mankind by feeding the spirit of man with morsels of God's eternal truth than was Henry Marion Howe.

"I quote now from a letter of Professor Sauveur, published six years ago, when the John Fritz medal was conferred upon Howe. The letter says:

> Howe has rendered to metallurgists an inestimable service; and he alone could render it. Where most of us could see only chaos and obscurity, he is able to bring order. This, I think, is his greatest achievement—the marvelous coordination which he has brought into the science of metallography through his genius and his labor, tremendous in quantity, marvellous in lucidity.

"The truth of these words never struck me more forcibly than during the last five years of Howe's life. He was then an honorary chairman of the engineering division of the National Research Council in Washington. I watched his activity and marveled at his power of coordination. No other human power is as godlike as this power. It is the fundamental guide of the destiny of the world.

"The Greeks of old believed that the world progressed from chaos to cosmos, from disorder to law and order. The book of Genesis supports that ancient belief, and modern science shows that all terrestrial organisms are endowed with a power of coordination which transforms the non-coordinated forms of energy radiated to us by the sun into coordinated forms and thus supplies a sustenance for all organic life on the earth. Cosmic energy moves from chaos to cosmos.

"Remember that the showers which water the forests, the fields and the meadows; that the gay blossoms of the promising spring, and the mellow fruit of the golden summer season derive their stimuli of activity and life from the coordination of the energy conveyed to them by the radio messages which are broadcasted by myriads and myriads of atoms in the white hot sun, each atom indifferent to the activity of every other atom. This absence of coordination between the activities of the atoms creates a chaos and these chaotic messages would have no meaning and would be lost forever, so far as our terrestrial world is concerned, if the terrestrial organisms were not provided with receiving instrumentalities which are tuned to the wave lengths of the messages intended for them. The power of coordination inherent in our terrestrial organisms and which helps the world to rise from chaos to cosmos is, therefore, based upon the beautiful laws of resonance and harmony.

"When we pass from the physical to the intellectual and spiritual world, we find there also a movement from chaos to cosmos, from disorder to coordination. This, as Professor Sauveur points out, is beautifully illustrated in the scientific life work of Henry Marion Howe. There must be also a power which coordinates the non-coordinated mental and spiritual energies in the messages conveyed to our minds and our souls by the thoughts and sentiments of other minds and souls. Why should we not believe that this power of coordination is also based upon resonance and harmony? Those who had the good fortune to know Howe personally feel, I am sure, just as I do, that his mental and spiritual attitude was that of resonance and harmony with his Creator and with the best thoughts of his fellowmen. That puts him in the rank of those great men who made history by leading the intellectual and spiritual progress of man from chaos to cosmos. I firmly believe that the coordinating power of these men was derived from being in tune with messages which are broadcasted from that great station which is the fountain of the eternal truth. When Newton coordinated the scientific achievements of his predecessors of many centuries before him and out of the chaos of known but apparently unrelated facts and principles he created the cosmos, the beautiful harmony of law and order of modern dynamics, he certainly was in tune with the messages conveyed to him by many minds of many centuries. One cannot contemplate this wonderful science without recognizing that there was a superhuman, a divine element of harmony in Newton's power of coordination.

"When Moses coordinated the moral and ethical experience of many, many centuries and formulated the ten commandments the work was so wonderful that the world believed it to be due to direct inspiration, a highly resonant message from heaven. When the vague moral principles of the many creeds and civilizations were coordinated and summed up in the words of a single sentence, 'Love thy neighbor as thyself,' the Christian world recognized in it a transcendental power of coordination, a heavenly harmony, which cannot belong to any mortal man, and hence our firm Christian belief that its possessor, our Lord Jesus Christ, is the son of God. The Christian world recognized in it the expression of that heavenly spirit which compelled even the brutal Roman soldier to look up to the cross and exclaim: 'Verily, verily, He is the son of God!'

"Let the blessed memory of Henry Marion Howe keep awake these ideas in our minds and thus strengthen us in the belief that humanity will always progress to higher and higher levels under the leadership of men who are in tune with the will of God and with the best of thoughts and sentiments of their fellowmen, and that some day man will live in an ideal democracy founded upon the divine doctrine,

> "'*Love thy neighbor as thyself.*

"That was the doctrine of Jesus Christ. It was followed all his life by Henry Marion Howe."

Temperature and Charpy Impact Value

Investigation of the Influence Between These Elements in a Group of Steels of Varying Composition, Including Stainless Steels

BY F. C. LANGENBERG



DR. F. C. LANGENBERG, a native of Beverly, Ohio, obtained the degrees A.M. at Ohio University and D.S. in Metallurgy at Harvard University. While at Harvard, 1912 to 1915, he was assistant to Prof. Albert Sauveur. Since 1915 he has been metallurgist for the Watertown (Mass.) Arsenal and also director of the Testing Laboratories, Watertown. Additional duties as metallurgist in the Ordnance Department, U. S. Army were given him in 1919. During the last four years he has devoted some time to private practice.

TWELVE different steels, of analyses as shown in Table I, were tested at twenty different temperatures and with different conditions of heat treatment. These followed a set of six steels, previously similarly tested.

The material, received in rolled bars 1⅝ in. square, was marked, cut up, heat treated and machined into test bars, having the dimensions as in Fig. 1. One test bar was taken from each end of each length of the original bars received and tested in the annealed condition and at atmospheric temperature to establish the degree of uniformity of each steel.

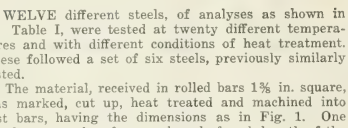


Fig. 1—Charpy Impact Test Bar

Table II gives the foot-pounds absorbed in fracturing representative bars of the steel investigated, when in the annealed condition. The average foot-pounds and the mean divergence from the average, expressed in percentage of the average, are shown. These divergences run from about 3 per cent to 23 per cent.

Temperatures of tests in deg. Fahr. were as follows: —80, —40, —20, 0, 15, 32, 50, 70, 90, 110, 130, 150, 175, 200, 225, 250, 350, 500, 750 and 1000. Two test specimens were tested at each temperature. Temperatures below the atmospheric were obtained by immersing the test bars in a bath of acetone. The acetone bath was cooled to desired temperatures down to 0 deg. Fahr. by means of a calcium chloride solution cooled by an ordinary ammonia refrigerating apparatus. The lower temperatures were obtained by direct addition to the acetone of carbon dioxide snow. Temperatures from 90 deg. to 350 deg. Fahr. were obtained by heating the test bars in a Freas constant temperature oven, and from 500 deg. to 1000 deg. Fahr. the test bars were heated in a Hoskins electric muffle furnace.

Table I—Chemical Composition and Method of Manufacture

Steel	Analyses in Per Cent C	Mn	P	S	Si	Ni	Cr
J	0.57	0.36	0.010	0.015	0.268	0.14	0.54
K	0.38	0.18	0.018	0.022	1.460	23.75	7.08
M	0.40	0.70	0.027	0.060	0.260	0.26	0.12
N	0.56	0.31	0.013	0.025	0.190	1.15	2.25
O	0.11	0.35	0.019	0.022	0.210	3.76	1.39
P	0.39	0.46	0.013	0.025	0.220	3.44	1.58
R	0.22	0.52	0.010	0.021	0.235	0.09	0.91
S	0.38	0.74	0.018	0.022	0.250	0.09	0.79
T	0.23	0.75	0.010	0.031	0.410	trace	0.81
U	0.44	0.71	0.023	0.021	0.455	0.24	0.77
W	0.21	0.50	0.010	0.027	0.225	1.97	0.85
X	0.49	0.34	0.020	0.022	0.165	1.76	0.99

All were electric furnace steels except M, which was made in an acid open-hearth furnace.

Steel J—Similar to the standard S.A.E. No. 7260. Largely used for valves of internal combustion engines. Contains 1.51 per cent W.

Steel K—A steel of the "Stainless" type.

Steel M—Similar to S.A.E. No. 1040. A common structural steel.

Steel N—A rather uncommon steel. Can be used for gears and high duty parts.

Steel O—Similar to S.A.E. No. 3312. A high nickel-chromium steel suitable for case hardening.

Steel P—Similar to S.A.E. No. 3340. A high nickel-chromium steel suitable for high duty structural parts.

Steel R—Similar to S.A.E. No. 6120. A chromium-vanadium steel suitable for case hardening. Contains 0.15 per cent V.

Steel S—Similar to S.A.E. No. 6140. A chromium-vanadium steel suitable for structural parts. Contains 0.15 per cent V.

Steel T—Similar to S.A.E. No. 5120. A case hardening steel, although carbon is slightly higher than commonly desired for this purpose.

Steel U—Similar to S.A.E. No. 5140. Suitable for structural parts.

Steel W—Similar to S.A.E. No. 3220. Sometimes used for case hardening but inferior to a steel containing less carbon.

Steel X—Similar to S.A.E. No. 3250. Suitable for structural parts.

Discussion of Results

Table VI [not reproduced here] shows the average foot-pounds absorbed in the Charpy tests by each steel at each temperature. These figures are also represented graphically in the curves plotted for each steel tested.

Table II—Impact Values in Foot-Pounds and Brinell Number of Annealed End Bars

Test Specimens	Steels J	K	N	O	P	R	S	T	U	W	X
1	....	463.9	378.9	455.2	392.2	1151.4	532.9	....	....	495.3	438.1
2	121.2	552.9	378.9	448.3	482.1	844.5	510.4	573.2	322.4	552.9	395.5
3	97.2	485.9	498.9	343.1	414.0	122.4	775.5	529.4	349.4	552.9	439.7
4	121.2	....	112.6	608.5	412.3	880.5	610.3	624.1	307.9	544.2	370.6
5	126.1	419.5	415.9	644.2	476.4	644.0	283.7	498.9	277.3	468.0	....
6	98.1	467.7	400.3	485.2	438.1	642.2	666.5	552.9	280.4	552.9	397.0
7	97.2	465.6	460.5	801.8	417.5	552.9	602.8	523.8	328.9	514.3	446.4
8	81.9	536.5	203.4	518.4	472.6	742.1	599.2	642.3	290.0	525.7	463.9
9	121.2	466.5	382.1	754.4	446.4	515.0	527.4	567.5	281.9	429.4	415.8
10	127.5	490.4	474.6	608.5	....	781.5	610.3	608.5	309.5	463.9	414.0
11	....	472.8	....	....	....	....	....	527.5	....	....	426.1
12	....	....	....	....	....	....	....	498.9	....	....	....
Average	115.0	484.5	370.6	566.7	429.0	687.6	571.9	558.8	305.2	509.9	420.7
Percentage Mean Divergence from Average	13.7	5.2	22.9	20.5	6.1	2.8	15.1	7.1	6.6	7.1	5.2
Brinell Number	217	274	241	180	226	142	168	147	191	158	202

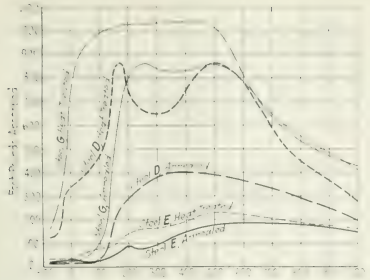


Fig. 2—Results Obtained on Three Plain Carbon Steels —G of 0.17 Per Cent Carbon, D of 0.36 Per Cent and E of 0.83 Per Cent

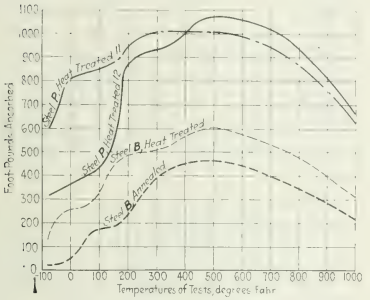


Fig. 3—Medium Carbon Nickel Structural Steel B Compared with Medium Carbon Nickel-Chromium Structural Steel P, Both Steels Being Used for Gun Forgings

A few steels have been selected for particular attention when grouped for comparison in similar classes, or as applicable to similar purposes.

Fig. 2 gives a graphic representation of the results obtained on three plain carbon steels (Steels G, D and E of the previous investigation). The test results are from the material in both the annealed and heat treated conditions. Heat treatment of Steels G, D and E were as follows:

Anneal: Steel G, at 1697 deg. Fahr.; Steel D, at 1652 deg.; Steel E, at 1553 deg.

Heat Treatment: Steel G, heated to 1652 deg. Fahr., held one hour, quenched in oil; reheated to 1400 deg.; held one hour, quenched in oil; drawn at 500 deg. one hour, cooled in air. Steel D, heated to 1562 deg., held one hour, quenched in water; drawn at 1112 deg., held one hour, cooled in water. Steel E, heated to 1472 deg., held one hour, quenched in oil; drawn at 842 deg., held one hour, cooled in air.

Carbon contents were 0.17, 0.36 and 0.83 per cent. At a temperature of zero and lower, there is practically no difference in resistance to impact, when these steels are in the annealed condition. At a temperature of 100 deg. Fahr., the low carbon steel has a resistance to impact at least three times that of the 0.83 per cent carbon steel. At a temperature of 200 deg., the low carbon steel has a resistance to impact nine times that of the 0.83 per cent carbon steel. The very sudden and rapid increase in resistance to impact, in both the low and medium carbon steels in the annealed condition, occurs in the temperature range 100 to 200 deg.

In considering the heat treated condition, it may be remarked that the low carbon steel had received a treatment corresponding to that received by the core of a case hardened article, the medium carbon steel, a quench and a draw such as would be given when the material is used for structural parts. Comparing Steel G, the low carbon steel, in the heat treated condition, with the same steel in the annealed condition, it will be observed that the sudden rise in resistance to impact occurs in the temperature range—80 deg. to 0 deg. Fahr. when the material is heat treated, whereas the rise occurred in the range 100 deg. to 200 deg. Fahr. when the steel was in the annealed condition. Similarly, the great rise in resistance to impact in the medium carbon steel occurs in a very much lower temperature range when the steel is heat treated than when the same material is in the annealed condition.

Although many comparisons can be drawn from this group of curves, one outstanding feature is evident, particularly in the medium carbon steel. The tensile properties of this steel in the annealed and heat treated states were as follows:

	Yield Point, in Lb. Per Sq. In.	Tensile Strength in Lb. Per Sq. In.	Elongation in 2 In. Per Cent	Reduction of Area Per Cent
Annealed	35,500	71,500	25.6	39.2
Heat treated....	47,500	81,650	26.0	60.6

Although heat treatment has not materially increased the tensile properties of the medium carbon steel, its resistance to impact at 100 deg. Fahr. has been raised more than ten times.

On Fig. 3 are grouped a medium carbon nickel structural steel (B) and a medium carbon nickel-chromium structural steel (P). Since steels of both of these compositions have been employed in the manufacture of gun forgings and other ordnance, they are of particular interest. The nickel-chromium steel, represented by the two upper curves on the graphs, was subjected to two heat treatments identical in every respect, with the exception of the rate of cooling from the final tempering or drawing operation, one set of test bars being quenched in water from the drawing

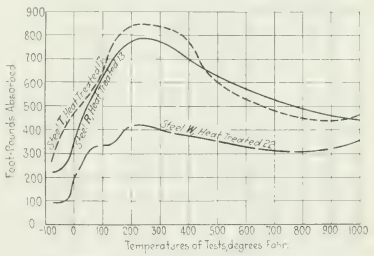


Fig. 4—Results From Three Case-Hardening Steels After Carburizing Operation Followed by a Single Quench

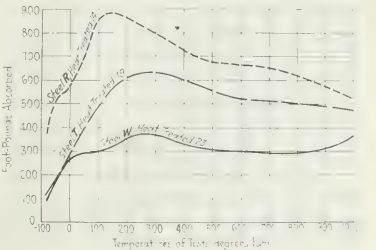


Fig. 5—Compared With Fig. 4, This Shows the Effect of a Double Quench After Carburizing the Same Three Case-Hardening Steels

temperature and the other set being cooled in the furnace.

The tensile properties after heat treatments (the nickel-chromium steel having been slowly cooled from the drawing heat) were as follows:

	Yield Point, in Lb. Per Sq. In.	Tensile Strength in Lb. Per Sq. In.	Elongation in 2 In. Per Cent	Reduction of Area Per Cent
Nickel steel	77,650	99,350	22.8	58.1
Nickel-chromium steel	87,350	100,000	24.3	67.7

Resistance to impact of the nickel-chromium steel throughout all temperature ranges is superior to that of the nickel steel. When the nickel-chromium steel is quenched from the final drawing operation, the resistance to impact in the lower temperature ranges is decidedly increased. It has been the practice in this country to employ a plain nickel steel in the manufacture of gun forgings, whereas certain foreign countries have made extensive use of nickel-chromium alloy steels.

Work at Watertown Arsenal has clearly demonstrated that nickel-chromium steels give satisfactory results when employed in gun forgings—if the steel has been properly made. With any given tensile property, the resistance to impact, particularly in the lower temperature ranges, is decidedly higher for nickel-

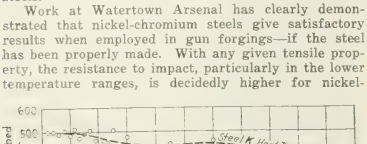


Fig. 6—Upper Curve Shows Results From Steel K, of Stainless Type. With Resistance Fully Maintained Throughout the Low Temperature Range. Lower Curve—Steel J—Shows Violent Fluctuations Below the Boiling Point of Water, With Substantial Uniformity at Higher Temperatures

chromium steels. Difficulties, however, encountered in making satisfactory nickel-chromium forgings are not inconsiderable, and it has been the general experience that the losses in process are considerably higher than when a straight nickel steel is utilized.

There has also been introduced on Fig. 3 a curve showing the variation of resistance to impact of the simple nickel steel in the annealed condition. The much lower values obtained, particularly in the lower temperature ranges, when contrasted with the heat treated state, are to be noted. At a temperature of 0 deg. the heat treatment given to this steel increased its resistance to impact approximately five times. At a temperature of 200 deg. Fahr. the resistance to impact was increased approximately twice.

Fig. 4 represents results obtained from three case hardening steels after being subjected to a treatment corresponding to a carburizing operation followed by a single quench. Under these conditions the maximum resistance to impact is shown by the simple chromium steel. Next in order of impact value is the chrome-vanadium steel, while the chromium-nickel steel is decidedly inferior, particularly at lower temperatures. The chromium steel and the chrome-vanadium steel give values not very divergent.

Curves in Fig. 5 represent results obtained from the steels previously discussed, after they have been subjected to a treatment corresponding to a carburizing treatment followed by a double quench. The double quench has materially improved the behavior of the chrome-vanadium steel, particularly in the low temperature range. Although the nickel-chromium steel has had its values improved in the lower temperature range, the chrome-vanadium steel is still decidedly superior.

As a matter of interest, Fig. 6 is also introduced, on which the results obtained from a steel of the "stainless" type are plotted. With this steel the resistance to impact does not decrease in the low temperature range and, in fact, is higher in the range—80 deg. to 0 deg. Fahr. than elsewhere on the temperature scale investigated. This behavior is in marked contrast to any of the other steels examined, and it is believed that this property in steels of this type may later prove of great service.

Discussion

H. J. French, physicist Bureau of Standards, Washington, pointed out that in tests made at the Bureau it was found that the properties of steel between 70 deg. and 850 deg. Fahr, were functions of both chemical composition and the form of heat treatment to which the particular steel was subjected. Through the next 250 deg. up to 1100 deg. Fahr. the properties of the steel were found to be dependent almost wholly upon the composition. Above 1100 deg. the composition proved to be of even greater relative importance in connection with the physical properties. These deductions were made as a result of 30 series of tests ranging from 70 deg. to 1100 deg. Fahr.

Chromium may be said to be a key element in high temperature work. It appears to stiffen as well as to toughen the metal at all of the temperatures used in the general range of heat treatment.

It is most important for designers and others to realize fully that the behavior of steel at common room temperatures is no criterion as to its behavior with a considerable departure from those temperatures either upward or downward. As a matter of fact, a series of steels having a definite order of values or strengths at room temperature may prove to have even a reverse order at high temperature. It is rare that the order is maintained through any considerable range.

Japanese Orders Help Sheet Mill Operations at Youngstown

YOUNGSTOWN, Oct. 30.—Representatives of independent steel makers in this territory indicate that the steel market is quiet, with incoming orders in insufficient volume to maintain the current operating level. Some improvement is noted, though, in the demand for the lighter steel products, except sheets. Makers are not expected to open their books on 1924 business until the latter part of November, or some time in December.

Virtually all district sheet makers participated in Japanese business placed recently, which while not profitable, nevertheless keeps rolling mills active and workmen employed. The Trumbull Steel Co. is reported to have shared somewhat liberally in this distribution, and has been enabled in consequence to operate its sheet mill department at a high average rate.

New business in recent weeks has been in better volume than during the corresponding period in September, while bookings the last half of October exceeded those in the first half. The improvement, however, has not yet brought new business to the level of shipments, indicating a further decline in operating rates unless orders improve.

Japanese requirements have been largely for the lighter steel products, such as sheets, bars and light structural shapes.

Receding mill operations reflect the quietness in the finished steel markets. With the independents, production is not averaging above 70 per cent, while the Carnegie Steel Co. is operating its district plants around 85 per cent.

Completed Federal highway projects in the United States have increased from 12½ miles to 26,536 miles, with an additional 14,000 miles under construction and a further 6000 miles approved for construction, since 1918, according to Roy D. Chapin, chairman of the board of the Hudson Motor Car Co., in an address before the Motor and Accessory Manufacturers Association in Boston. Adding the efforts of States and counties, the total mileage of improved highway in the United States reaches 350,000, or about one-eighth of the aggregate road mileage of the country.

Utilization of Blast Furnace Slag for Construction Purposes

BY C. L. MC KENZIE



C. L. McKENZIE is a native of Montrose, Pa., and was graduated from Lehigh University in 1893. His early work was on land, mine, highway and railroad surveying, planimeter maps and construction. In 1895 he associated with the Shiffler Bridge Co. and three years later was made assistant general manager. In the following year he became assistant to the Pittsburgh manager of the American Bridge Co. Since 1901 he has been president of the Pittsburgh Construction Co. He was made manager and treasurer of the Duquesne Slag Products Co. in 1906 and in recent years has been president.

AS the total quantity of pig iron produced annually in the United States is nearly 40,000,000 tons, it is closely approximate to estimate the amount of blast furnace slag produced in a year at 20,000,000 tons. This 20,000,000 tons must be taken away or the furnaces must stop making pig iron.

If put into the form of granulated slag and piled on the space occupied by the Woolworth Building (nearly an acre), this quantity would reach up 3 1/3 miles, or about 22 times as high as the Woolworth Tower. Spread out level to a depth of 24 ft., it would cover 640 acres, or one square mile. Since, with rare exceptions, no low lying waste ground is available close to the furnaces, it follows that to dispose of the material in fills it would either have to be transported considerable distances, or piled up on ground already at usable levels.

Slag is the second greatest product of a blast furnace. Without questioning that the purpose of furnace operation is to turn out good pig iron—and plenty of it—it is suggested seriously that it will pay to think also of the value of this second product. Much can be done to help toward a continued and more rapid increase in the quantity used commercially as a structural material of value, rather than continue to treat it as a waste to be handled at continually growing cost.

Prior to the beginning of the present century, only insignificant quantities of blast furnace slag were used in construction. In eastern Pennsylvania, and occasionally elsewhere, as far back as 1880, small quantities were used in unimportant concrete construction and, of course, it was used in crude form near the furnaces to make paths and driveways, just as any handy waste material would be used. Some of these roads remained long years afterward to prove the durability of slag as a road-making material.

About 1895 to 1905 many steel companies began to use it in large quantities in concrete. It was used in about every type of construction for which concrete can be used; heavy and light mass foundations, including those under blast furnaces; walls and floor slabs, sewer pipes, coke ovens; stacks, including one 290 ft. high; water tanks and dams, exposed to dry, hot atmosphere and to alternate drying and wetting, or to alternate boiling and cold water, and to all weather conditions with alternate freezing and thawing.

Commercial slag plant equipment includes magnetic separators. With these, and by hand, there is a recovery of the scrap iron, or "cinder scrap," amounting in some cases to as much as 2 per cent and on the average to at least ½ per cent of the weight of the slag. At present prices this would mean a saving to the furnace companies of more than $500,000 annually.

At present the yearly output (all used) of these "commercial" slag plants in the United States is about 7,000,000 tons. Of this, the subdivision (varying from year to year) will average about as follows:

	Per Cent
Road and street building (other than concrete)	45
Railroad ballast	25
Aggregate in concrete	25
Roofing	1
Miscellaneous, cement concrete blocks, bricks, etc.	4

In the district within shipping distance of the slag crushing and screening plants, the amount of cement concrete placed each year will average at least 40,000,000 cu. yd. Air-cooled blast furnace slag is used as the aggregate in about 1,750,000 cu. yd. of this. In the twenty years of development about 20,000,000 cu. yd. of concrete have been built, using air-cooled blast furnace slag as the aggregate, with practically a total absence of reports of failure.

As an illustration of heavy service, the Curry Hollow arch on the Monongahela Southern Railroad contains 23,000 cu. yd. of concrete in the 50-ft. arch spans, on which there is a double-track railroad fill more than 100 ft. deep. Other structures on this industrial railroad line, in which slag was used as the aggregate in the concrete, amounted to 100,000 cu. yd., including one retaining wall about 50 ft. high. Slag concrete was used also in lining the 1800-ft. double-track tunnel.

Another use for which large quantities have been required is in railroad ballast. In 1920 the Slag Association compiled a list of 40 railroads, all of which were using more or less air-cooled blast furnace slag for ballast and at that time were consuming at an average of about 1,750,000 tons per annum.

In other classes of road building 3,000,000 and more tons is the ordinary present consumption. One comparatively new and little known type of bituminous slag paving (made of slag sand) has been used to cover the equivalent of 200 miles of improved 18-ft. highway in one county, and something over the equivalent of 400 miles of 18-ft. highway of this one class alone has been laid in the United States in the 6 or 7 years since it was introduced.

In the granulated form blast furnace slag finds less valuable—but still valuable—uses in several ways, most of which have not developed far, but promise much. One use that has been definitely worked out is in the manufacture of Portland cement, which requires in the established factories using it about 1,000,000 tons of granulated slag yearly. Its success here is no longer questioned. With the recent great increase in number of Portland cement manufacturing plants, and corresponding producing capacity, it may be a long time before a further great increase in consumption of slag for this purpose can be expected.

Probably another 1,000,000 tons is used to make driveways and back country roads, where traffic is not heavy and where lowest cost is essential, and for similar less important service. There is promise that successful building blocks and bricks can be made of granulated slag with an admixture of a small percentage of other materials. In a few years this line might use 1,000,000 tons of granulated slag, and within 10 or 15 years perhaps 2,000,000 tons or more.

It would thus appear that now (or within the near future) the commercial uses for blast furnace slag may consume one-half the production. What the total can become within the next ten years it would be venturesome to predict, but it is certain that it may be increased greatly and rapidly if its promotion and development be given sufficient forceful, carefully planned attention, with strong support from the furnace op-

erators, including active cooperation in maintaining a satisfactory and uniform character of slag.

One direction in which the furnace operators can help to make continually sure of avoiding complaints and objections to the use of slag is by rigidly insisting that ashes, coke dust, flue dust, sand, clay, stone screenings, coal dust and other refuse that accumulates around the furnaces shall be disposed of somewhere else than in the slag pit. Most of the waste materials mentioned are mineral and could cause little actual damage if mixed in with the slag. But they can cause immense damage and interference with the slag business when the inspector will not believe it possible to have good results with these foreign materials in. Especially would the engineer fear bad results.

Engineers also object to the lack of uniformity in the weight of the slag, due chiefly to the varying proportion of the "honeycomb" slag to the dense slag, free of gas pockets. Attention to the lesser operating details, such as the routine method of pouring the slag, and no doubt other small matters that can be discovered by observation—and that do not add real cost—will help to obviate this difficulty, and substantially reduce market resistance to the sale and use of blast furnace slag.

One danger lies in the possibility of changes in furnace practice, particularly in the direction of using a calcite flux exclusively in preference to a dolomitic limestone, or to mixing a small percentage of dolomite with the larger percentage of straight calcite. Furnaces in which the straight calcite stone is used produce a slag that tends to disintegrate on exposure to the air and cooling to the extent of one-third, even one-half or more, of its volume.

Practically it is impossible to use such a slag in a commercial way and it is fit only to be wasted. In granulated form, of course, a slag of this analysis is useful and perhaps for some purposes better than granulated slag from a furnace in which the flux used is dolomitic. But the commercial (or money) value of granulated slag is as yet insignificant even for the purpose for which it is actually used. The iron scrap salvage is also difficult or largely impossible when the slag is granulated. At present the greatest value is recovered from the slag in the hard, air-cooled form and the immediate possibilities of greatly increased use lie in this direction.

Can the operator afford to neglect these possibilities of the use of a substantial percentage of the total slag to be disposed of, by insisting on producing "limey" slag through the use of straight calcite flux? Practically, of course, it comes down to the question of whether the use of a certain percentage of dolomite or a dolomitic limestone really adds to the cost of operating the furnaces and to the corresponding cost of the pig iron. There seems to be a difference of opinion among blast furnace men on this point, but some have changed the flux from calcite to dolomitic limestone for the special purpose of guaranteeing usable slag for construction purposes. Some claim improved furnace operating results and lower cost resulting from mixing a percentage of dolomite with the calcite flux.



COL. T. C. DICKSON was a Texas candidate to West Point, from which he was graduated in 1892. His career includes five years in the manufacture, design and testing of small arms at Springfield Armory, three years in the manufacture of gun carriages at Rock Island Arsenal, four years as assistant to the chief-of-ordnance at Washington and four more as supervisor of tests at Sandy Hook Proving Ground, of which he later was given command. He was on the staff of Gen. George Goethals as inspector of shops in the construction of the Panama Canal. During the World War he was brigadier general and assistant to the chief of ordnance. Since that time he has been commanding officer of the Watertown Arsenal.

X-Ray Examination of Metals

BY COL. T. C. DICKSON

THE paper entitled "X-Ray Examination of Metals" was the only one which was neither preprinted nor offered in manuscript form. The author, Col. T. C. Dickson, commanding officer, Watertown Arsenal, Watertown, Mass., delivered an address on the subject which was largely an account of the work done at his plant in the development of this method of examining steel castings. A large number of reproductions of X-ray films were thrown upon the screen and explained by the speaker. He recounted the fact that a 300,000-volt apparatus was installed at the arsenal a few years ago, descriptions of which have already appeared in some of the technical journals recently. He recounted the method of application of the film and the Coolidge tube to various castings and stated that it had been possible to successfully make X-ray pictures of metal 1 in. in thickness after an exposure of 2 min., of metal 2 in. in thickness after an exposure of 5 min. and of metal 3 in. in thickness after an exposure of 30 min. This is regarded as the limit of this method of testing up to the present time.

The films which were displayed showed the results of the examination of various castings made at the arsenal, such as muzzle brakes, grousers for artillery purposes, caps for both 2000-lb. and 1100-lb. demolition bombs and other large castings. The reproductions showed how it has been possible to detect shrinkage cavities in all of these castings by means of the X-ray without destroying the casting, and also the detection of slag inclusions, blowholes and other defects. The method of procedure has been to produce one casting according to a molding practice which seemed the best for the casting and then to examine it with the X-ray. The result in each case has been the detection of defects which could be ascertained in no other manner. With this knowledge it has been possible to either change the method of molding or the gateing and heading of the casting, or also when necessary a redesigning of the pattern. It has even been possible to produce castings lighter in weight than had ordinarily been expected possible as a result of the X-ray examination. The results were pointed to as of extreme value to the work of the arsenal and applicable on a commercial scale in the foundry as well as in other phases of the metal industry.

Discussion by Dr. Ancel St. John

A brief discussion of the remarks of Colonel Dickson was contributed by Dr. Ancel St. John of the Union Carbide and Carbon Laboratories, Inc., Long Island City, N. Y. Doctor St. John corroborated many of the points illustrated by the speaker and then emphasized the fact that the use of the X-ray method of testing was not a question as to whether one could afford to install such a tool but whether one could afford not to make use of it. He believed from his own experience that the advantages, which it was possible to obtain and which had been clearly pointed out by the speaker, were such that the employment of such an apparatus could not be dispensed with by modern industry. Doctor

St. John believed that while the present limitations of equipment, which it is possible to obtain, were such as to prevent the examination of metal any thicker than 3 in., it would later be possible to obtain apparatus which would insure the examining on a commercial scale of objects at least 5 in. thick. The possibilities and advantages which would result from this realization were evident.

Recent Developments in Steel Forgings

BY JOHN L. COX

JOHN LYMAN COX, was born in Philadelphia, Pa. 1866 but soon moved to Orange, N. J. He entered Stevens Institute of Technology and was graduated with honors in 1887 as mechanical engineer. In 1888 he joined the Midvale Steel Co. and has since been connected with the plant at Nicetown, having had charge of the forge, armor, projectile and research departments. He has taken out a number of patents on improvements in the manufacture of steel, armor and projectiles. At present he is assistant to the president of the Midvale company



WITHIN the past few years, there has been a revolution in the construction of power plants. The reciprocating engine of 10,000 hp. has given way to the steam turbine of 87,000 hp. The public service steam boiler of 350 lb. pressure, of which a few were built in 1922, is succeeded in 1923 by the boiler of 1200 lb. pressure. The 1500-lb. boiler is under consideration here, and an experimental boiler for 3200 lb. pressure is building in England. Such changes have required much consultation.

In many other directions units are being designed with parts exceptional in size or quality, which must be submitted to the steel manufacturer before confidence can be felt that they are procurable.

Again, a knowledge of the obtainable may make possible designs employing to advantage steel forgings in place of the more commonly used steel castings in parts of great size and weight, or encourage the growing tendency to employ the alloy steels in place of carbon steel in highly stressed forgings much larger than those in which their use has been customary, or influence a decision in favor of substituting hardened and ground forged alloy steel for chilled cast iron in rolls for cold rolling metals.

Alloy Steel Forgings

By the companies manufacturing armor, chrome-nickel steel has for many years been made into plates of great size, and most elaborate heat treatments have been devised to produce in them the qualities necessary for successful ballistic test. For this use, advantage has been taken of the exceptional toughness of this alloy steel rather than its possibilities for high tension test figures, which are those largely employed in the manufacture of parts for automotive engines. Today, industry is availing itself of the widely variable properties of this alloy, or similar alloys, in forgings of considerable size.

A notable instance of this is in the recent introduction of the use of chrome-nickel steel for columns of hydraulic presses, where carbon steel proved too weak and it was impossible to increase the diameters. Such columns are in successful operation today as large as 24 in. in diameter and over 36 ft. long. A treatment giving about 115,000 lb. per sq. in. tensile strength, 85,000 lb. per sq. in. yield point, 21 per cent extension in 2 in. and 55 per cent reduction of area, has answered well.

Chrome-nickel and chrome-vanadium steels find employment in a recently constructed 32-in. built-up container for an extrusion press. The liner is a forging of chrome-vanadium steel fully heat-treated and moderately drawn back. The inner member of the container is of chrome-vanadium steel of 110,000 lb. yield point and the outer member of chrome-nickel steel of 130,000 lb. yield point, the several pieces assembled under shrinkage similarly to a built-up gun, so that when the appliance is working under full pressure of 47,400 lb. per sq. in. no part bears over 61,000 lb. per sq. in. fibre stress.

Hardened Steel Rolls

Another interesting field in an active stage of development is the manufacture of hardened steel rolls. Formerly, nearly all cold rolling of strip and sheet metal was done with chilled iron rolls. In steadily increasing volume these are being replaced by heat-treated, hardened, slightly drawn, ground and polished rolls of alloy steel, usually chromium, chrome-vanadium, chrome-molybdenum, chrome-vanadium-molybdenum, or chrome-tungsten-vanadium. Fully hardened rolls of these alloys may be made much harder than chilled iron rolls; the hardness runs in the neighborhood of 110 to 115 scleroscope. They take a much higher finish, produce a correspondingly better surface on the product, and are reasonably long lived if treated properly, as they deserve to be, for they are among the highest expressions of the steel maker's art.

Today rolls about 25 in. in diameter by 40 in. in length of body are readily supplied in the hardest grades, and rolls as large as 28 in. by 120 in. can be furnished with scleroscope readings of about 80, or over. No doubt, in time, skill and equipment will be available to produce these large rolls with a scleroscope hardness of over 100.

In some cases, remarkable results have been secured in rolling hard wire by the use of properly designed rolls of high-speed steel. Though not so hard by the scleroscope as the other type, Brinell readings are disproportionately high, and the metal of the roll does not indent and groove as readily as does the harder metal of the usual compositions.

Crankshafts

While no new principles have been developed in the manufacture of crankshafts of which I am aware, their production has been much facilitated by a new machine tool invented in Denmark. It consists of two opposed milling heads on horizontal shafts carried by housings, each with three adjustments and feeds at right angles to each other. Between them, over a pit, is a driven table provided with vise jaws adjustable toward each other and with reference to the axis of the table. Clamped between these jaws in a vertical position, adjusted properly with reference to their axes, the pins and webs of a crankshaft can be machined all over by the revolving cutters controlled by the feeds provided by the housings or by the revolution of the table. There results a great economy of time in the machining.

Large Hollow Drawn Forgings

In this field there have been very interesting developments both as regards size and character of forgings.

Recently there have been devised means for increasing the yield of gasoline from crude oil by the application of cracking methods. Depending upon the original character of the oil, this increase may be as much as 13 fold. The oil is heated to about 875 deg. Fahr. under 500 to 600 lb. pressure while circulating through tubes in a furnace, and flows to a large insulated cylinder where the completion of the cracking operation takes place. This cylinder, or reaction chamber, must stand heat, pressure, corrosion by sulphur in the oil, and be absolutely leak proof, for the gasoline under high pressure is well above its ignition point. The use of forged steel cylinders for this purpose has met with signal success.

I have alluded to the high pressure carried by the latest boilers. A Babcock & Wilcox boiler building for the new Weymouth Station of the Edison Illuminating Co. of Boston has approximately 19,743 sq. ft. of heating surface and will furnish about 110,000 lb. of steam per hour at a maximum pressure of 1200 lb. per sq. in. The cross drum of this boiler is a forged steel cylinder 48 in. inside diameter, 56½ in. outside diameter and 34 ft. total length over the ends, which are closed in to take a 12-in. by 16-in. manhole cover. This is one of the largest hollow forgings ever made; the forged weight is 162,000 lb., requiring an ingot of 262,000 lb. to allow for scrap and losses. The billet was cut hot from a 78-in. octagon ingot, was stood on end and upset to about 96 in. in diameter, had a 23½-in. core removed with a hollow punch, was expanded to about 50 in. in inside diameter, drawn on a mandrel to 45 in. inside diameter, 58½ in. outside diameter, annealed, tested, machined inside and out, and after closing-in is to be reannealed, have the throat machined to 11¾ in. inside diameter and the exterior of the head trued up.

Large Solid Forgings

So far as I am aware, with the single exception of the new armor plate press at the idle naval armor plant at Charleston, W. Va., there has been no very large forging press built in the United States for a number of years past, and the agreement for the limitation of armament, by practically ending for 10 years the manufacture of armor plate and heavy guns, makes improbable any increase of their number in the immediate future, but this lack of material progress has been offset by a great increase in manipulative skill, so that today it is possible to handle large masses and produce forgings of unprecedented dimensions with the equipment at hand.

Experience has shown, both in England and the United States, that solid forgings of large diameter, even of soft steel, may contain internal transverse cracks cutting across the axis, and sometimes running to within a few inches of the surface. Such forgings might drop in two in the lathe when deeply turned, although apparently perfectly sound had less metal been removed. If proper precautions be taken in casting, handling, forging and treatment, such cracks are not produced, but as a check upon the makers the most enlightened buyers of such large forgings are today requiring the drilling of an axial hole in diameter sufficient to permit the introduction of a bore searcher (2 in. is about the minimum diameter) by which the interior surface of the mass can be easily viewed and its soundness verified. This should be made a regular requirement, both for the buyer's and the maker's protection. No reputable maker would wittingly send out such a defective forging, but if the buyer will not authorize boring the piece he has only the reputation of the maker as a guaranty of its soundness, unless magnetic or X-ray testing can be developed to include such sizes.

From our early childhood, most of us have been familiar with a toy called the gyroscope, but it remained for Elmer G. Sperry of New York to make practical use of its uncanny powers. He has applied them in many different and most ingenious ways, one of which is of interest to us. He has produced gyroscopes of great proportions which are used to stabilize vessels, damping their tendency to roll. The rotating body is a steel flywheel, or rotor, of uniform density, accurately machined, most delicately balanced and mounted to revolve in a horizontal plane.

For a large vessel, such a rotor becomes of great size. Two such rotor disks measure 12 ft. 6⅝ in. in diameter by 16¾ in. thick each.

Shortly before the World War began, the Midvale Steel Co. began construction of a 20,000-ton forging press. The entablature was to consist of two main steel castings bolted together. After the first half of the entablature had been cast, various considerations led to a decision to substitute nickel steel forgings for the carbon steel castings first planned. The decision resulted in a modification of the design. No such design could have been confidently elaborated without knowledge that its main components were procurable. The forging was 12 ft. wide in the center, about 9 ft. wide at the ends, 4 ft. thick at the column bosses, decreasing to 1½ ft. thick at the center, and about 28 ft. overall. This forging weighed 289,000 lb. and was produced from an ingot of the general type of the 324,000 lb. ingot weighing 458,000 lb.

The press of which this forging is to form a part has not been completed. It awaits a call from engineers of the country for forgings larger than those entering into its own construction, since the treaty for the limitation of armament has for the present ended the work for which it was originally designed.

Discussion by T. D. Lynch*

It has been my pleasure to assist in some of the developments referred to by Mr. Cox in his interesting and timely paper, not as a producer of forgings, but as a consumer, interested in the development and manufacture of turbo generators and other important uses of forgings, with particular reference to high-speed turbine service.

The tendency in the development of turbine work has been for higher speed together with greater diameters, both of which are limiting factors in the production of large turbo units. The maximum stresses permissible for plain carbon steel have already been exceeded and the alloy steels are now being extensively used.

These developments have been along two general lines: First, that of increasing the size of the forgings and, second, that of increasing the quality of the forging.

Large forgings introduce many complications, one of which is that of internal stresses on account of the large mass involved. These stresses may be the result of piping or shrinkage cavities, segregation, cooling or heating of ingot, or the result of the forging operation.

One of the limiting features in these developments was that of available machinery, presses and equipment for handling and forging large masses. The fact that manufacturers are no longer making armor and ordnance renders available these mighty presses for this more useful commercial work which Mr. Cox has described, so that we are now able to use these presses for the production of these relatively new types of forging for commercial purposes.

One of the most important features connected with the success of this development, from our point of view, has been that of being permitted to test the material in a manner that is really representative. It has been our policy at all times to make tests on forgings in the direction of the maximum stresses to which these forgings are subjected in service. In turbo field development this makes it necessary to take the tests in a radial direction.

The point which Mr. Cox brings out of having all large forgings hollow bored is of the utmost importance and we are firmly of the opinion that all large massive forgings should be so bored and the centers thoroughly examined by some periscopic means to insure the absence of piping, cavities or cracks within the forging. It has come to our attention that the failure of large forgings often starts from the center and an examination of fractures has clearly shown that the starting nuclei of these failures were due to piping or

*Westinghouse Electric & Mfg. Co., Pittsburgh.

other flaws and it is surprising to realize how stresses are intensified about an apparently small defect.

Referring to the application of forgings for high steam pressure, I wish to call attention to the fact that steel under stress subjected to these high steam pressures such as 3200 lb. and correspondingly high temperatures will be very much reduced in tensile properties; for example, steel subjected to a temperature corresponding to 1500 lb. steam pressure is equal to approximately 600 deg. Fahr., while a pressure of 3200 lb. will correspond to practically a dark glowing heat and tests that have been conducted on the physical properties of steel at different temperatures are quite conclusive in that the physical properties fall off very rapidly after a temperature of approximately 600 deg. Fahr. has been reached, so that in going up to 3200 lb. pressure a temperature will be reached where all normal steels would lose perhaps 50 per cent of their value.

Mr. Cox's paper brings to us very clearly much of the important progress made in heavy commercial forgings in recent years, and it is very evident that equal care must be exercised in the manufacture and testing of forgings for commercial use as has been given to the manufacture of ordnance, and thus advance civilization and further the interests of mankind.

President Coolidge's Attitude Toward Industries of the Country

WASHINGTON, Oct. 30.—It was made clear at the White House last Friday that President Coolidge does not propose to call a general conference to discuss the industrial situation. The statement was made to refute reports to the effect that "key men" in the various industries would be summoned to Washington to confer with the President. It was made known that the Chief Executive does not believe that this step is necessary, as industrial leaders frequently are in Washington and call at the White House. The President makes inquiry of these leaders as to what the Government can do to assist the industrial situation and often asks the views of industrial leaders concerning current matters. It was also stated that there are times when the President is informed of petty persecutions by Government agents which injure industry and he generally takes such information under advisement. President Coolidge has made particular effort to acquaint himself with conditions in all lines of industry by consulting with representative men.

Detroit Foundrymen Discuss Pig Iron Quality and Cupola Practice

Following a dinner and entertainment in the Adams room of the Hotel Tuller the Detroit Foundrymen's Association listened to an address, "The Blast Furnace in Relation to the Cupola," by E. J. Lowry, metallurgist Hickman-Williams & Co., Chicago.

The speaker brought out the difference in irons made in a coke furnace and a charcoal furnace. The subject was treated from the angles of the relation in the designs of the two types of furnaces, their respective burdens and the effect of the two classes of fuels upon the resulting product through their effect in the reduction of the ores and scrap used in the stacks.

It was pointed out that due to the operating conditions in various furnaces the irons produced were not always of equal quality. The factors entering into the merits of pig iron were brought out in a discussion of blast volumes, temperatures, and pressures, together with the type of burdens used in the furnaces. These elements were shown to affect the total carbons contained in the resulting pig iron.

The quality of the pig iron produced was said to govern the amount of scrap which a cupola mixture could carry in melting iron for foundry use. By virtue of this fact some foundries melting one quality of iron could use more scrap in its charge in the cupola than another foundry using a different pig iron. The amount of scrap used in the foundry charges was also shown to be influenced by the analysis of the mixture entering the cupola.

The discussion of this latter phase brought out the question of silvery iron. The speaker argued that it was better to use this grade of iron in the lower silicon contents, 5 per cent to 8 per cent, than to use the higher silicon contents, 12 to 14 per cent. Illustrations were given to carry this point and it was generally agreed that such was the case.

Following the lecture discussions of the subject and of American foundry practice were entered into by the members and the speaker. The question of the control of carbon in the cupola was brought out by the speaker and debated by Messrs. Wilson, Rayner and Putman. It was finally concluded that the height of the coke bed in the cupola influenced the carbon pick-up and the iron. It was also shown that uniformity in the casting work in a foundry was more easily attainable by the use of a charge which equaled the "tap."

American Locomotives in France

According to an article by M. Lunier, inspector of equipment, Paris-Orleans Railroad, American-made locomotives have proved as successful in operation in France as in America. In 1921 this railroad placed in service 50 Pacific type locomotives equipped with superheaters. Comparing these with French locomotives, the author stated:

"These locomotives require very little maintenance and are greatly appreciated on this account by the engine drivers and master mechanics. Tests confirm the results obtained by American railroads with two-cylinder Pacific locomotives. This type promises excellent service on French roads. These locomotives are simpler and have a smaller resistance to movement than the four-cylinder compound locomotives. Their fuel consumption has been less, but this may be due to their higher superheat."

Increase in the Coal Rates Approved

WASHINGTON, Oct. 30.—Passing upon a complaint of the Pittsburgh Coal Producers' Association, the Interstate Commerce Commission in a opinion handed down last Thursday held that rates of soft coal made by the West Virginia Railroad Commission in comparison with those of the Panhandle part of the Pennsylvania system should be increased 6 cents a ton while 6c. and 7c. should be taken from many interstate rates. The association complained that rates from mines in Allegheny and Washington counties served by the Panhandle to points in West Virginia were unjust and unreasonable and to the advantage of mines in Ohio.

May Build Steel Plant

The award of a contract for the construction of a mile of dock bulkheads for the 1000-acre site recently purchased by the Jones & Laughlin Steel Corporation at Hammond, Ind., is interpreted as forecasting the possible early erection of a steel plant at that location. The building of the bulkheads is probably the initial move in the dredging of the Indiana Harbor ship canal to the steel plant site. The bulkheads are to be installed by the Great Lakes Dredge & Dock Co. of Chicago, at a cost of $250,000.

An arrangement has been effected whereby the Newport News Shipbuilding & Drydock Co., Newport News, Va., takes over the future hydraulic turbine business of the Wellman-Seaver-Morgan Co., Cleveland and Akron, Ohio, including patterns, data, patents and complete records.

Farm Implement Industry Not Well Sold

Price Level Ratio with Automobiles Not Understood by Farmer—Excess Capacity Has to Find Work—Greater Durability Reduces Later Sales

NATIONAL problems, both political and economic, that tend to affect industrial activities, as well as problems particularly affecting their own industry and that of the farmer, were discussed at the thirtieth annual convention of the National Association of Farm Implement Manufacturers, held at the Statler Hotel, Cleveland, Oct. 24 to 26. Various constructive suggestions were made for helping the industry. Figures were quoted to show that the farmers' financial condition is improving and politicians were blamed for circulating misleading information indicating that the farming industry is in a bad way. It was pointed out that farmers this year have been liberal buyers of all commodities except implements. Speakers urged a campaign of education to show the farmers that implement prices are reasonable, considering manufacturing costs, and to convince them of the need of keeping their equipment up to date in order to reduce the cost of farming.

Reducing Manufacturing Costs

J. B. Bartholomew, president Avery Co., Peoria, Ill., in his opening address as president of the association said that implement manufacturers have done about everything possible in the past few years to reduce manufacturing costs, but that little has been done in reducing selling costs. He referred to the economic condition of the farmer, high wages, high freight rates, the exodus from the farms and the sympathetic talk that has been going around for some time in behalf of the farmer, who he said must be placed on a more profitable basis. He declared that implement manufacturers should do something to help the farmers reduce their production costs by making better farm equipment, and that the farmers should reduce their labor and production costs by doing more work with mechanical equipment. In this connection he referred to a probable low fuel cost for the coming year, which would reduce the cost of operating farm tractors. Pointing to some figures indicating that the farmers are buying more automobiles than farm implements, he declared that the automobile is the first on the list of a farmer's requirements.

Increased Durability of Instruments

"Some Problems of the Manufacturer" was the subject of a paper prepared by Alexander Legge, president International Harvester Co., and read by C. A. Ranney of that company. Mr. Legge declared that one of the basic problems which farm equipment manufacturers have to face is excess factory capacity. When the acreage under cultivation was increasing, the demand for farm equipment was in excess of what can be hoped for with business on a mere replacement basis, which is all that now can be expected for some time. Furthermore, with men leaving the farms because they can earn more at other occupations, a shrinkage of farm population may be looked for. Implement manufacturers themselves have contributed to the reduced demand for farm machinery by changing from wood to steel construction and increasing its durability, the efficient usefulness of most implements being now double what it was 20 years ago. With present prices, the unit cost of farm implements will probably figure less today than in the old low-price days, when calculated on the life of the machine or the number of acres it tills.

"However much we may theorize or reason as to the causes leading up to the present situation," continued Mr. Legge, "nobody will dispute the fact that we cannot hope to employ profitably all the facilities now in existence for producing farm machinery, and that the idle expense or excess investment represented in capacity not needed is one of the serious problems of the manufacturer. No doubt some other use will be found for much of the shop capacity now standing idle. In fact, there is progress being made now in converting some of this capacity to other uses.

"Extreme fluctuations in demand for farm implements have doubtless contributed to the over-expansion of manufacturing facilities. We implement manufacturers have been all too keen to increase our facilities to a point where we could take care of maximum requirements of heavy buying years, ignoring the fact that these heavy buying periods are the exception rather than the rule. Another element which the implement manufacturer must consider in making plans for future trade is the part the automobile is taking in the economic life of the American farmer.

Relative Prices

"Perhaps the automobile manufacturer is doing a better job of selling than the implement manufacturer. At any rate, he has the decided advantage of having no past history to contend with in the matter of prices. In a recent publication a prominent automobile manufacturer made the proud boast that his particular make of automobile was now reduced in price to 20c. a lb. About that same time, the average wholesale price of farm machinery had advanced to a little over 10c. a lb. When we consider how largely both industries draw on the same source of raw material supply and compete in the same market for labor, it becomes a question of how it is going to be possible for the implement manufacturer, out of almost identically the same material, and with the same class of labor, to sell farm implements so far below the price that the same material and labor bring in the form of an automobile.

"It is my notion that widespread criticism of implement prices is not the fault of the farmer so much as of the implement manufacturer and dealer. Farmers as a class have not had experience in manufacturing and cannot be expected to know the relative manufacturing cost of a plow and an automobile. Being a newcomer in the field, the automobile never established low price levels during the days of low-cost production which the implement industry passed through a number of years ago. Naturally the farmer forms his opinion of our prices by comparing the figures of today with those prevailing 15 to 30 years ago. He has no such basis for comparison in the case of the automobile.

Influence of Labor Cost

"It is clearly the obligation of the implement manufacturer and retailer to give the farmers the essential facts as to the difference in price levels, and this should not be difficult to do. The cumulative labor content in every implement you gentlemen make is at least 80 per cent of the cost of the goods, and when you ask the farmer to compare the wage level that he has to pay for help on the farm with that of 20 years ago and apply the same ratio of increase to the 80 per cent labor content in the manufactured tool, you have fully accounted for the difference in price.

"We need to do a better job than in the past in presenting to the farmer the facts that determine our costs and prices, and in showing him the true relationship between our prices and those of the other commodities he buys. We must show him, as we can do, that we have no more control over the economic

factors that shape our costs and prices than he has over his own costs of production."

Foreign Trade in Implements

W. H. Stackhouse, general manager French & Hecht, Davenport, Iowa, in a paper on "Certain Aspects of Present Business Conditions," discussed foreign trade, wages, immigration, the railroads and other national problems. In referring to the foreign trade he said that, with the exception of England, the exchange against the American dollar is practicaally prohibitive in most European countries. "On the other hand," he said, "South America, and particularly the Argentine, with its far less unfavorable rate of exchange, is largely a buyer of finished or manufactured products, which makes it a particularly attractive market for the manufacturers of farm operating equipment to cultivate and secure as a permanent customer. During the first six months of this year our exports to Great Britain declined 7 per cent under the similar period of last year, while the value of our shipments to the Argentine showed an increase of 31 per cent, or approximately $14,000,000.

"It should be particularly encouraging to the farm implement industry to realize that exports of implements, in July this year, were over $5,600,000, the highest since February, 1921; and for the first seven months of the present year our implement exports were in excess of $28,000,000, or more than double those for the corresponding period of 1922. Again, the total exports of farm implements for the 12-month period ended June 30, 1923, amounted to $37,738,458, or nearly double those of the previous year.

"Department of Commerce statistics to the effect that, during the first six months of the present year, we exported $22,500,000 worth of agricultural machinery, including over 10,000 tractors, or a gain of 131 per cent over the similar period of the previous year, is particularly reassuring.

Farmers' Condition Not Desperate

"While the farmer is to some extent the victim of an unbalanced industrial situation, his condition, with the exception of the single crop or wheat farmer, is anything but desperate. The price of corn, oats, hogs and wheat are higher than they were a year ago, while the gross receipts of American farmers during this year will approximate $15,000,000,000, or $1,000,000,000 more than last year, and about $2,000,000,000 greater than in 1921. The Department of Agriculture shows that the composite production of all crops for 1923 will equal 97.4 per cent of the average for the 10-year period.

"Since 1920 Congress has created adequate credit facilities covering long periods for the farmers, who have availed themselves to the extent of many hundred millions of dollars, a substantial portion of which loans have been liquidated. Hence it seems that only the farmer who grows nothing but wheat, which approximates but 6 per cent of farm revenue, is seriously affected at this time, and it seems but common sense for all farmers to aim to balance production with demand, and prudently to diversify their crops rather than depend upon unsound and futile legislation, including governmental price fixing, as most economic ills are not susceptible to legislative correctives."

Railroads

Speaking of railroads Mr. Stackhouse mentioned their high taxes, meager net returns, great expenditures for equipment and improvements and threats of certain members of Congress to amend the transportation act, adding:

"It would seem the height of wisdom and prudence to discontinue railroad baiting, and instead to encourage railroad executives to solve their own problems, in a practical manner, and to operate their properties as economically as the burdens already inflicted upon them by politicians will permit, without further unnecessary governmental interference.

"One of the most irritating factors in dislocating the country's industrial equilibrium, is the weakness usually displayed by governmental agencies functioning in employment disputes; they usually ignoring entirely the equities involved, and instead proceeding along the lines of least resistance, arriving at a compromise which, besides being unfair, is extremely expensive to industry and to the general public.

A notable instance is the regrettable timidity, characteristic of professional politicians, displayed by the Federal Coal Commission. When attempting to handle the threatening bituminous coal strike, last year, it yielded weakly to every demand of the unions, including a continuance of war-time wages. A similar injustice recently was imposed on the public in the settlement of the anthracite miners' strike."

Selling the Industry

In a paper on "Our Public," Findley P. Mount, president Advance-Rumely Co., La Porte, Ind., including in "Our Public" not only the users of farm machinery but all those who benefit among the public at large, declared that the implement manufacturers are not using the daily press properly to advertise their wares. Comparing the farm implement with the automobile he pointed out that the press is sold on automobiles and no other industry in the world has ever had so much news publicity. The farmers' balance sheet shows that he was better able to buy in 1923 than in 1922 and that he has purchased liberally from every other industry except the farm implement industry. There may be many reasons for this but, in the speaker's opinion, one outstanding reason is that the farm implement industry has been content to sell itself and its product in a prosaic way to the users alone. The manufacturers have assumed that not only the farmer but the public realize the difference in farming with antiquated tools and with up-to-date tools, with inefficient machinery and with efficient machinery.

Without blaming the newspapers, the speaker said that whatever is lacking is chargeable to the implement manufacturers, in their failure to comprehend the magnitude of their public and to use their best efforts to sell the public on their idea. The message to put across is the message of better and more profitable farming. It is the message of producing two blades of grass at less expense than one was produced before. It is the message of helping to solve the cotton problem of the South, the wheat problem of the West, the corn problem of the corn belt and other problems of the farmer. He declared that the wider use of more up-to-date farm equipment would increase the yield, lower the cost and turn losses into profits.

What Has to Be Made Up

"It is estimated that the farmers are today more than $1,000,000,000 short of their normal purchases of farm machinery, while the Department of Agriculture estimates that from $8,000,000,000 to $12,000,000,000 worth of new equipment is needed on the farm in the next 10 years to equip and to replace a large percentage of worn-out and repaired implements that are losing more than the cost of a new set of tools, through loss of time and efficiency. If this is true, is there any wonder why there are complaints that the cost of production is so high that there is no profit in farming?"

The speaker pointed out that invidious comparisons have been made between the prices of farm equipment and automobiles, which were unfair. Politicians have been preaching to the farmer and the public that farming is a totally hopeless enterprise; the nation's agricultural balance sheet proves the falsity of this assertion. These misleading statements have created a feeling in the public mind against the stability and security of agriculture. Individual efforts have been made to correct these false impressions but, because the effort was individual, it could not hope for real success.

"It takes organized effort," said Mr. Mount, "a well directed campaign, to set right before the public what has so often been set wrong; a campaign backed by the whole industry, calling to its support all the talent of the industry, and having all the effort that the national organization can put behind it; not a

campaign to promote the use of this or that particular tool; not a tractor vs. horse campaign; not a campaign to sell machinery at all, but a campaign to sell the public the industry itself, the good that it is doing, the boundless increase of good that it can do; the right kind of help and cooperation the farmer needs; a campaign of enlightenment, if you please, which will give the farm equipment industry its true and rightful position in the world of business economy."

Bureau of Research Created

In line with suggestions made in Mr. Mount's paper, the association voted to establish a bureau of research for collecting, tabulating and disseminating information relating to farming and the farm equipment industry. This bureau will be located at the general offices in Chicago. Its general policies will be determined by the executive committee, together with an advisory committee composed of advertising managers of members of the association.

Resolutions adopted by the association included the following:

Declaring that it is contrary to public interests for the Government to engage in any form of private business, including any plan which provides for fixing or guaranteeing selling prices by the Government, or buying and selling commodities; favoring the passage of laws that will stimulate the use of United States ships for carrying our products to other parts of the world and favoring the repeal of the La Follette seamen's act; opposing the passage of a soldiers' bonus bill; favoring the repeal of the Adamson act; deploring the adjustment of the miners' wage scale guaranteeing a further advance, thereby postponing a proper and fair adjustment that is bound to come; indorsing the open shop; approving the elimination and standardization work of the Department of Commerce Division of Simplified Practice; opposing the use of convicts for the manufacture of farm equipment; favoring the repeal of burdensome war taxes as far as practicable, but especially all taxes on commercial paper, telephone and telegram messages; declaring that the transportation act of 1920 should not be disturbed, but should be given a fair trial under business conditions more nearly normal than have prevailed since the passage of the act; urging Congress to repeal the present immigration act and replace it with a law permitting the entrance of any foreign national whom we can readily assimilate and who, in addition to being in sound health, possesses the fundamental attributes of character and industry.

H. J. Hirshheimer, La Crosse Plow Co., La Crosse, Wis., was elected president for the ensuing year and Findley P. Mount, president Advance-Rumely Co., La Porte, Ind., was elected chairman of the executive committee.

BIDS ON NAVAL VESSELS

Tenders Received from 17 Companies—Other Sales to Be Held Soon

WASHINGTON, Oct. 25.—Bids for six vessels on the ways at navy yards, which are to be scrapped in accordance with the Treaty Limiting Naval Armament, were opened at the Navy Department Oct. 25. Bids were received from seventeen firms. Bids will be submitted to Admiral Potter, chief of the Bureau of Supplies and Accounts, and will be carefully considered by the Navy Department before making the awards.

The bids received were as follows:

"As Is" (To be Scrapped by the Purchasers)

Merritt, Chapman & Scott Corporation, New York.
- United States $10,000.00
- Constitution 5,000.00

Hyman, Michaels Co., Chicago.
- Indiana $31,189.00
- South Dakota 35,391.00
- United States 45,640.00
- Constitution 41,992.00
- North Carolina 24,554.00
- Alternate bid on all five ships..... 186,566.50

Continental Machinery Co., New York.
- Indiana and South Dakota (both vessels) $110,000.00

N. Block & Co., Norfolk, Va.
- North Carolina $42,365.00

Mayer Pollock, Pottstown, Pa.
- United States $51,666.00
- Constitution 41,444.00

Larner Rosenthal, Oakland, Cal.
- Montana $47,110.00

Boston Iron & Metal Co., Baltimore.
- North Carolina $15,192.00

J. Goldberg & Sons, Kansas City, Mo.
- United States $26,552.00

Bond Brothers Co., San Francisco.
- Montana $5,010.00

Hickman, Williams & Co., Philadelphia.
- United States and Constitution (both vessels) $111,150.40

E. B. Leaf Co., Philadelphia.
- United States $53,111.00
- Constitution 53,222.00
- For two vessels combined..... 109,333.00

Charles S. Hoffman and G. Weissbaum, San Francisco (Bid presented by Gates & Mather, attorneys, Washington).
- Montana $28,962.40

Fred W. Erickson, New York.
- United States $37,500.00
- Constitution 28,000.00
- For both vessels 70,000.00

Columbia Steel Corporation, San Francisco.
- Montana $44,400.00

Other Bids Received

M. Samuel & Sons, Brooklyn.
- Indiana and South Dakota, $2.37 per gross ton or..... $23,700.00 each
- United States and Constitution, $6.37 per gross ton, or..... 44,590.00 each
- North Carolina, as is..... 3,515.50

For material in the Indiana and South Dakota, $11.50 per gross ton, material to be cut by Government to charging box size.

For material in the United States and Constitution, $12.75 per gross ton, material to be cut by Government to charging box size.

David Kaufman & Son Co., Elizabeth, N. J.

Material to be cut by Government to shipping size.
- Indiana $64,267.00
- South Dakota 70,733.00

Steel Scrap Corporation, Philadelphia.

Material to be cut by the Government.
- Indiana, cut to shipping size, $9.51 per gross ton.....Total $92,969.76
- Cut to charging size, $13.06 per gross ton.....Total 127,674.56
- South Dakota, cut to shipping size, $9.51 per gross ton.....Total 103,107.42
- Cut to charging box size, $13.06 per gross ton.....Total 141,596.52
- United States, cut to shipping size, $13.26 per gross ton.....Total 84,996.60
- Cut to charging box size, $14.26 per gross ton.....Total 91,406.60
- Constitution, cut to shipping size, $13.26 per gross ton.....Total 92,024.40
- Cut to charging box size, $14.26 per gross ton.....Total 98,964.40
- North Carolina, cut to shipping size, $8.21 per gross ton.....Total 81,503.88
- Cut to charging box size, $13.51 per gross ton.....Total 134,127.28

The above figures are given for information and are subject to verification and consideration by the Department.

Captain Bonnaffon, in charge of the sale, said:

"In the next sale, on Nov. 1, we will sell the old battleships New Hampshire and Louisiana, at Philadelphia; the Georgia and Rhode Island, at Mare Island, and the Connecticut, at Puget Sound, Wash. The battleship Iowa and the battlecruisers Constellation and Ranger, at the Newport News Shipbuilding & Drydock Co., Newport News, Va., and the battleship Massachusetts, at the Bethlehem Shipbuilding Corporation's plant at Fore River, Mass., will be sold on Nov. 8. The final sale, Nov. 30, will include the old battleships Michigan, Kansas and Minnesota at Philadelphia; the Vermont and Nebraska at Mare Island and the Delaware at Boston."

Metal Working Production Problems

Economics of Standard Machine Tools, Developments in Grinding and Piecework Wage Payments Feature Meeting of Automobile Industry

THE second annual production meeting of the Society of Automotive Engineers was held at the Hotel Winton, Cleveland, Thursday and Friday, Oct. 25 and 26, with an attendance of over 300 composed largely of men who design and those who manufacture automobiles. The first production meeting was held in Detroit a year ago. The aim of these meetings is to bring together the automotive engineers and factory production executives and to discuss problems that are more or less in common and to promote cooperation between the two lines of activity.

The program was arranged in four sessions with different general subjects arranged for each session. There were machine tool, factory managers and scientific management sessions, and the last session was a general one. In the machine tool and general sessions speakers discussed some of the recent developments in machine tools and processes for production work and showed how these machines fit into production plans. During the factory managing session papers were presented on the group plan of wage payment, handling labor and the use of conveyor systems. While little discussion followed the papers, the audience submitted written questions to each speaker at the close of his paper, and the large number of questions indicated keen interest taken in the various subjects.

During the discussions it was pointed out that with improved methods automobile parts of longer life are being produced, and a prominent statistician was quoted as saying that the average life of an automobile has increased from 5 to 7 years. A suggestion was made to the members that in connection with the production meetings the Society of Automotive Engineers provide an operating exhibit of machinery used in making automobile parts. This will be limited to new types of machines. If the suggestion meets with favor arrangements will probably be made for such an exhibit at the next meeting.

A sidelight to the meeting was a statement made by President H. W. Alden during the factory management session that a leading steel manufacturer had told him that, from data secured in his plant from the study of the 8-hr. day, he was just about at a point where he could predict that the introduction of the 8-hr. day in the steel industry would result in a decrease instead of an advance in costs.

R. E. Flanders, president of the National Machine Tool Builders' Association and general manager of the Jones & Lamson Machine Co., in a paper on "Standard Machines for Quantity Production" discussed the problem of combining flexibility, high efficiency, low cost and low overhead in machine tools for quantity production. Mr. Flanders said in part:

A broad statement of the problem relating to standard versus special machines for quantity production is about as follows: How can machine tools be so designed and built that the user will have the advantage of a machine of proved excellence and low cost without losing the advantage of special adaptability and economy which the ideal special machine will give?

There are at least two methods of approach to a solution. One lies along the lines of building up semi-special types of machines out of standard units. The other consists in the design of a more or less universal foundation machine which is adapted to the making of various particular parts by adding a highly specialized tool equipment.

Why Special Machinery Sometimes Fails

The failure of hastily designed and built special machinery may come from a number of causes, such as faulty order of operations, unsuitable location and clamping of the work, etc. The most usual cause of failure, however, lies in the weakness, improper lubrication, or rapid wear of some essential parts of the mechanism, such as clutches, feed gears, sliding surfaces, main bearings, etc. It is difficult for the most skilled machine designer to be completely successful in these features in a new design. It is doubly difficult for the tool designer, however skilled, who attempts an occasional excursion into the field of machine design.

There are some operations where the completely special machine with its attendant difficulties is unnecessary, even when it is desired to have a machine completely adapted to a particular operation on a particular part. For milling operations on cylinder blocks, transmission cases, etc., and for multiple drilling operations on similar parts, special machines may be built up from standard units.

Building Special Machines from Standard Units

Milling machines, for instance, will vary considerably with the design of product. They will consist in general of a planer-type bed and housing, the latter carrying vertical and horizontal spindles as required by the part to be manufactured. In the case of V-type crankcases, spindles will require to be set at an angle.

Such machines as this should be, and usually are, built up from standard units. The spindle, its drive and housing need not vary greatly from machine to machine. The feed mechanism may be the same. Even the bed and work table may be built in standard lengths and widths. These standard units are of tested and approved design, and no fear need be felt of the failure of the machine. It may even be possible to rebuild it to fit a change in the design of the part manufactured, at a cost less than the purchase price of a new machine complete.

Perhaps I may be permitted to interject here a criticism of one common feature of these machines, though it is aside from the subject. They are often built with tables much too long, to take in a long string of work. If we double the length of the table we do not double the output. It takes twice the length of time to feed, twice the length of time to change work, twice the number of fixtures, and somewhat more for the cost of the machine and the floor space occupied.

Sometimes a little is saved by dividing among several pieces the time it takes to get the full depth or width of cut, but usually this is inconsiderable. The long table is probably a relic from planer practice where the planing of long strings of complicated work may be advisable in order to divide the tool setting time among several pieces. The practice has no place in high production milling, with cutters set in a fixed position.

The same principles as given for special milling machines apply also to multiple drills. The spindles themselves, their connection with the driving mechanism, the feed and driving gearing, etc., are proper subjects for standardization and this may be done and still provide a special machine adapted to the machining of a special part.

It is the office of the machine tool man to furnish a strong, reliable, versatile mechanism as a foundation. To do this requires years of development, including some "trial and error." It is not to be done in a day, or to order for quick delivery, if satisfaction is expected.

It is the normal function of the user to mount upon this standard mechanism special equipment which

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Progress Made in Gear Standardization

Two Standards Adopted by Gear Association—Progress in Other Standards Reported—Interest in Industrial Relations—Business Expansion Possibilities Discussed

As at previous meetings reports of standardization committees and discussions occupied the greater part of the time of the semi-annual meeting of the American Gear Manufacturers' Association, held at the Mountain House, Lake Mohonk, N. Y., Oct. 25, 26 and 27. Of the 16 committees on technical standardization, nine have already submitted reports and various degrees of advancement in the work of these committees is shown, from progress reports to definite recommendations. It was apparent that considerable work had been done and the spirit of cooperation was noteworthy. There was active discussion of reports and recommendations and many suggestions were given for further activity. A revised standard for composition gearing was adopted and the standard for transmission chains and sprockets developed by a joint committee of the S. A. E., A. S. M. E. and A. G. M. A. was accepted as recommended practice. Several addresses were made and time was set aside for visitation and recreation.

President George L. Markland, Jr., presided at the sessions, B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, chairman of the general standardization committee, taking the chair when sub-committee reports were presented.

It was announced that the spring meeting will be held in Buffalo, April 28, 29 and 30.

New Members Elected

Six new member companies were elected to membership, the names and executive representatives of which being as follows: Western Gear Works, Seattle, Wash., R. C. Franke; United Engineering & Foundry Co., Pittsburgh, Lane Johnson; Universal Gear Works, Detroit, F. J. Brown; Automobile Machine Co., Cleveland, J. Kreisler; Barber-Colman Co., Rockford, Ill., F. G. Colman, and David Brown & Sons, Ltd., Huddersfield, England, F. E. Brown.

A report of the association's sectional committee of the American Engineering Standards Committee was read by Mr. Waterman, who is chairman of the sectional committee. Two meetings have been held, the nomenclature of gears being considered largely at both meetings and some 60 definitions being approved. Tentative standards for stub tooth gearing, as submitted by the French and Dutch engineering societies, will be taken up at the next meeting of the sectional committee. It was stated that the sectional committee has been enlarged to include other societies than the A. G. M. A. and the A. S. M. E., and that the work of this committee is receiving increasing attention from users of gears.

The report of the association's representatives on the A. S. M. E. research committee on gears, submitted by its chairman, E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., revealed that the work upon the design of the machine for testing gear tooth strength, described by Wilfred Lewis at the annual meeting in Cleveland in April, is about completed. It was stated that changes had been made in the mechanism since last year. Discussion of Mr. Lewis' paper by several English engineers was read in part, the comments being said to have proved helpful. Financial support from gear manufacturers for the completion of this work was sought and several members pledged varying amounts.

A revised standard, presented by the composition gearing committee, was adopted, with a possible change in the title to read "Flanges and Rivet Proportions of Composition Gearing." The subject covers gears made of rawhide and it is intended to give the designer something that will aid in selecting and laying out a pinion of proper proportions with the least amount of calculation. The report is made up of four pages, two of which are given to tables, one to line sketches and one to printed explanation. It is simpler and more condensed than anything heretofore. The results of physical tests on six materials used for non-metallic gears were given by F. G. Sorensen, Cincinnati Gear Co., Cincinnati, chairman of this committee. The tests included impact compression, deflection, transverse and tensile split, and the results for each material in each of these tests were given. Active discussion as to the method and value of these tests followed, centered for the most part around combination tests, running tests and bend tests. The committee was instructed to take the material presented in part at the meeting and work up a report, with photos and sketches for full presentation and discussion at the next spring meeting.

The standards for transmission chains and sprockets developed by a joint committee of the S. A. E., A. S. M. E. and A. G. M. A. were accepted as recommended practice. This report has been printed and copies were distributed. The sprocket committee with C. R. Weiss, Link-Belt Co., Philadelphia, as chairman, is working on uniform working loads, the horsepower transmitted at certain loads.

Standard Tooth Form Discussed

Action on a stub tooth standard was emphasized as especially desirable in the progress report of the tooth form committee, read by H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., chairman. The French permanent standardization committee has requested cooperation from interested societies. It was pointed out that there are at least nine stub tooth systems now in use. But two of these, the Fellows and Nuttall, are in extensive use, with the Hunt system a close third. Protests have been made against change by users of these systems on the ground of cutters on hand and gears now in use.

A previous report suggested harmonizing these objections by offering a composite system, using the Fellows proportions for the finer range of pitches and the Nuttall for the heavier pitches. It is now felt, however, that such an expedient will be but a temporary one. The three well-known systems practically agree on tooth depth proportions. The French propose a tooth still shorter, which it is believed, is too short for good running qualities. Several members of the committee favor a tooth of 1.6 diametral pitch working depth, against the French 1.5 D. P. It was stated to be doubtful if an entirely new system of stub teeth would be commercially acceptable, or would supersede those now in use. The proportions of a stub tooth, recommended for consideration as an American standard, is given in the report.

Progress has been made in the nomenclature and definitions relating to tooth forms, and material is expected to be presented at the next meeting. The committee is considering the various special gear tooth systems, such as Continental, Maag, special patented systems and tooth shapes, etc.

In the direction of standard tooth form it was brought out that the choice of a standard full depth tooth for interchangeable gears is resolving itself into adopting various standards for different purposes. For industrial spur gears running at moderate speeds the Brown & Sharpe involute shape is in general use, a tooth form said to be successful although understood to be of empirical and arbitrary derivation. It was said that later a basic rack for this system, perhaps a composite rack, could be defined. There are also 14½, 15 and 20 deg. standards in use and experience and tests to date were said to favor a long tooth and a pressure angle of 14½ deg.

The committee is not ready to recommend one standard as *the* standard. "To make progress," said Mr. Eberhardt, "we will have to define three different full depth systems, a 20-deg., a 14½-deg. using a standard hob, and another system, a composite cycloidal and involute of 14½ deg." In the discussion of this report, which was accepted as a progress report, it was brought out that the finer the gear is made the finer must be its mounting, this being a factor to be considered in the standardization recommendations. The elimination of "flats," which was of general interest, was also discussed briefly.

A section of the report dealing with long addendum drivers states that it is highly desirable to standardize the methods and values to be used in solving the various problems arising in this group of gearing. The most important departure from the usual standards is enlarging the pinion diameter. This enlarging is done to (1) make a stronger tooth, by eliminating undercut, (2) to obtain maximum bearing on the tooth curve, and (3) to increase the life of the gear by reducing the poor tooth action as the flanks of teeth approach each other and increasing the good tooth action obtained as the teeth recede from each other.

To Reduce Number of Worm Gear Hobs Carried

A report which evoked considerable discussion, and which was set forth as of vital interest to the engineering profession all over the world, was that of the worm gear committee, which was read by J. C. O'Brien, Pittsburgh Gear & Machine Works, Pittsburgh, chairman. It is the same as submitted at the Cleveland meeting except for the addition of the suggestions brought out by the discussion there. It was the object of the committee in offering this recommended practice to try to reduce in number the worm gear hobs which are carried in stock by the various member companies. It was stated that there are hundreds and perhaps thousands of hobs in use when almost all cases would be covered if these thousands were reduced to hundreds. The committee's report not only makes recommendations for new designs, but also makes recommendations for use in connection with hobs already in existence which might not be just right for the recommendations as made by the committee.

A table of formulas offered in the report was said to represent an endeavor to compromise in a commercial, practical and scientific manner those elements of design and manufacture that affect the efficient performance of worm gearing that is used for ordinary industrial service. Worm gearing was divided into groups and the group covered by the report was defined as follows: Linear pitches, ¼-in. pitch to 2-in. pitch, multiplicity of threads, single to quadruple; gear ratios, 10 to 1 to 100 to 1. This group includes the worm gearing demanded by the trade for general commercial uses, where the gearing is furnished without bearings or housings. It does not include the gearing of units, shaft worms, smaller or larger pitches than mentioned, worms having more than four threads, gear ratios greater or less than that specified, gearing with the axis other than 90 deg. or where the duty required or quantity involved justify a further refinement of design than that used in the case of these general purpose worms and gears.

It was stated that in the case of worm gearing a longer period of transition from haphazard methods of designing to standard methods may be expected. In order that the best results might be obtained from existing facilities the report includes recommendations for the use of existing hobs.

In the discussion the question arose as to letting the following recommendation stand: "That triple and quadruple thread hobs should be fluted normal to the thread angle reckoned from the outside diameter of the hob." Difference of opinion was expressed as to advisability of specifying gash angle of hobs, some holding that this could be safely left to the tool makers, others holding that there must be one best gash angle and suggesting experiments to determine it. It was voted to let the recommendation stand for the time being as printed.

It was suggested by one of the members that some of the recommendations included in the report were coming out at a rather late date in view of developments expected which may cause radical changes. As no definite time was set as to when these new developments might be made public, it was thought that the recommendations in the report would be of great help to present practice.

The focus of the discussion was on the worm wheel dimensions rather than on those of the worm. A question was raised as to the advisability of limiting gear ratios to 10 to 1, a ratio of 5 to 1 being suggested by one member. One recommendation felt by many to be outstanding was the giving of a definite rule for the outside diameter of the worm. They standardize a given diameter for a given pitch. It was suggested that the next step was to standardize on shaft worms.

The semi-annual progress report of the spur gear committee of which F. E. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., is chairman, states that on nomenclature the committee is finished up to date. It was also reported that its practical horsepower rules have been in use for several months, with some adverse criticism. More criticism is invited and further revision is expected before the next meeting. The subject of tolerances, now under way, will be submitted to the membership in the form of a questionnaire, suggestions on tolerances or limits as to accuracy, finish, etc., of both commercial and automotive gears being looked for.

Bevel Gear Nomenclature Submitted

The bevel and spiral bevel gear committee, together with the nomenclature committee, submitted a list of more than 60 definitions as accepted to date by the sectional committee. In addition, four charts showing the accepted nomenclature graphically—what each term is, where located and its relation to other terms—were submitted. Comment on the charts was active, centering for the most part on the discussion as to which angle should be called face angle, the angle between an element and the axis of the gear or the complement of that angle. The charts were referred back to the chairman of the committee, F. E. McMullen, Gleason Works, Rochester, for consideration of the points discussed. The definitions were not submitted as recommended practice, but for study and criticism by the members. It is expected that the necessary classifications as required by helical, worm gears and racks will be added as the work progresses.

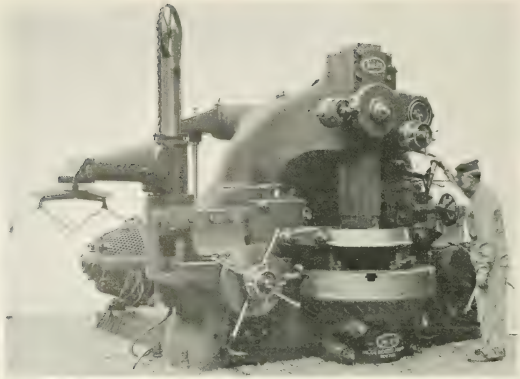
The herringbone gear committee, which is headed by A. F. Cooke, Fawcus Machine Co., Pittsburgh, is working on standardizing single purpose hobs for cutting herringbone gears, a report of which is planned for the next meeting.

A progress report of the differential committee was given by its chairman, S. O. White, Warner Gear Co., Muncie, Ind. The scope of the four-pinion differential design has been revamped and extended. Two sizes of four-pinion differential were submitted and for each size two alternative methods of mounting the side gears. One is that in which the side gear is carried entirely in the spider, this being the most generally used application. In the other the side gear is carried in the hub. Completely dimensioned detail drawings were submitted to the membership and the hope expressed that they would be studied and criticized. It is expected that the two-pinion type of differential in two sizes will be laid out in the near future.

A progress report was made by the gears and pinions electric railway mill and mine committee, which is headed by W. H. Phillips, R. D. Nuttall Co., Pittsburgh. In the discussion objection was raised to the tolerances of plus and minus on the bore of railway gears. Discussion centered on the question of unilateral and bilateral tolerances, the establishment of a unilateral tolerance being advocated. The committee is continuing its work on the advisability of the standard set on extra depth of keyway and the standardization of web holes.

Since June the inspection committee has endeavored

(*Continued on page* 1217)



Vertical Car-Wheel Lathe Designed to Shorten Time Usually Required to Finish Rolled or Forged Steel Wheels. Turning the contour of the tread and flange, facing the hub and run on one side, bossing eccentric hub, if necessary, and undercutting the rim, are done simultaneously. Scribing the wear line is done after the other operations are finished. The capacity of the machine ranges from 33 to 42 in. wheel diameters

Special Purpose Vertical Car-Wheel Lathe

Shortening of the time usually required to finish rolled or forged steel car-wheels is claimed for the vertical car-wheel lathe illustrated, a recent addition to the line of the Niles-Bement-Pond Co. The new machine has been designed as a special purpose unit to replace general machine tools heretofore employed for this work.

The machine receives the wheels as they come from the hot working operation. The machining consists of turning the contour of the tread and flange, facing the hub and rim on one side, bossing eccentric hubs if necessary, undercutting the rim, and scribing the wear line. These operations are done simultaneously, with the exception of the last which is done after the other operations are finished. The capacity of the machine ranges from 33 to 42 in. in wheel diameters. An output of 60 rolled steel wheels per day, approximately 525 lb. of metal removed an hour, is claimed. It is further claimed that the machine actually handles the same number of wheels on the operations mentioned above that formerly required 10 machines, the total number of machines required to accomplish complete machining on the same output being reduced nearly 60 per cent., with a corresponding reduction in labor costs.

The general construction of the machine may be noted from the illustration. It may be noted that there is a rough similarity to a boring and turning mill in the horizontal rotary table and long square steel bar adjustable vertically. The absence of any analogy to a cross-rail is, however, a departure.

The square tool bar is adjustable vertically in the main housing and carries a tool holder with inserted blades which face off the hub and boss eccentric hubs. A special motor provides this bar with power down feed and power traverse in both directions. The main right-hand side head is provided with power feed and is used to rough turn the flange and tread. It carries an auxiliary tool head in which are fitted the tools which face and round the rim, undercut it and another tool that later scribes the wearline. The tools have cross and vertical hand adjustment. The left-hand side head makes the finishing cut on both flange and tread. This head is provided with vertical hand adjustment and power cross feed. The feeds to all heads are independent of each other and all have automatic trips which disengage feeds at any predetermined point.

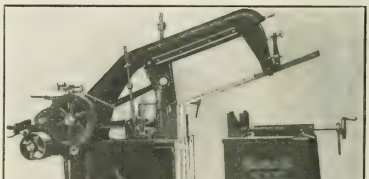
The main driving gear is a Maag cut spur gear with a 12 in. face and twice the diameter of the table. A variable speed motor with a three to one range is direct-connected to the machine. Adequate lubrication has been provided. The table track and spindle run in an oil bath. The lubricant flows by gravity from a reservoir inside the machine to the track and spindle, from which it drains into a filter tank in the reservoir. A small motor drives a pump which returns it to the reservoir. The main drive gears are inclosed and run at high speed in oil, and shaft bearings are provided with sight feed oilers.

Handling and set-up time is minimized by the combination of a pneumatic crane, patented pneumatically-operated center jaws which expand inside the center hole of the wheels, and three serrated driver dogs which support and drive the wheel on the table. A roller on the left-hand side head brought into contact with the wheel before chucking serves to center the wheel in place.

New Type of Power Hack Saw

The power hack saw illustrated, known as a gap saw, has been placed on the market by the Peerless Machine Co., Racine, Wis. When the gap is closed the saw may be used for ordinary purposes; when open, increased work holding capacity of 24 in. in height and 16 in. in width is available.

The work may be clamped either to the finished vertical face on the bed or directly to the base. A piece of steel 16 x 26 in. in size may be cut in two by sawing



Gap Power Hacksaw When gap is closed the machine is used for ordinary purposes; when open an increased work holding capacity of 24 in. in height and 16 in. in width is available

13 in. and then meeting the cut by turning the piece half way around, work of this nature being frequently required in railroad and drop forge shops, and in structural steel yards. Hammered forgings such as used for crankshafts may be blocked out by the saw before the machining operations.

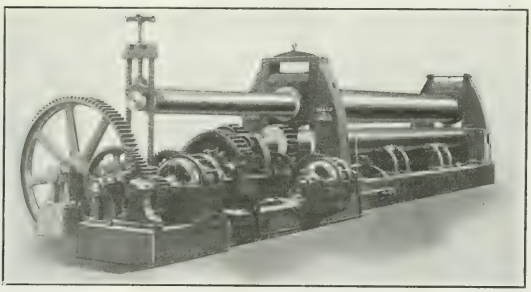
The head and feed mechanism is the same as that used in the company's standard 12 x 16 in. high speed saw. The head lifts up on each return stroke, and when the blade comes to the bottom of the cut, the feed disengages automatically and the head is lifted to the uppermost position by means of springs. Blade pressure or feed may be varied also by raising or lowering the ratchet lever shown at the side of the head. The machine illustrated is equipped with a six-speed stroke mechanism for varying the speed to suit different materials. The machine is driven by belt or motor, and the six-speed gear box may be omitted if desired.

A water trough extending entirely around the base serves to convey the coolant back to the reservoir in the rear of the base. From the reservoir a rotary geared pump delivers the coolant to the distributing pipe. The finished pad opposite the gap on each side of the base is intended for the convenience of the operator when locating work clamped directly to the base. The left-hand edge of the bed is also finished for convenience in measuring.

The capacity of the machine for gap work is 16 x 37 in. The length of blade is 14 to 24 in. and the strokes per minute of the saw frame are 125. The length of the machine is 80 in., the width 30 in., and the weight approximately 3000 lb.

New Large Boiler Plate Bending Roll

An unusually large boiler-plate bending roll, recently installed in the St. Louis shop of the Heine Boiler Co., is shown in the accompanying illustration. This equipment is a new heavy-duty hinged-housing machine designed for plates up to 1 5-8 in. thick, rolling these to relatively small diameters, and was built by the Hilles & Jones works of the Consolidated Machine Tool Corporation of America, Rochester, N. Y.



Boiler Plate Bending Roll With Hinged Housing, Designed for Plates Up to 1⅝ In. Thick, Rolling These to Relatively Small Diameters. The distance between the housings is 26½ ft., amply accommodating plates 26 ft. long. Two interchangeable upper rolls are provided. Two speeds are available, one for the heavier and one for the lighter plates

The distance between the housings is 26 ft. 6 in., providing ample length for rolling plates 26 ft. long. The machine is provided with two interchangeable upper rolls, the larger of which is 36 in. in diameter and the smaller, 30 in. The 36 in. roll is used when rolling the heaviest plate and to ordinary diameters, and the 30 in. upper roll is used when rolling plates to small circles of about 36 in. diameter. The lower rolls are 22 in. in diameter. The roll journal-bearings in the housings are bushed with bronze.

The roll forgings proper are of open-hearth forged steel, and the upper rolls have a solid forged extension which provides for counterbalancing when the back housing is dropped down for the removal of plates rolled to full circles. The rated capacity for the machine is a pressure of 2,500,000 lb. which is regarded as a conservative rating as the factor of safety is high. The housings and driving gears are steel castings and the housing bed plates and gearing bed plates are semi-steel castings of box section design.

The upper roll is supported from the roll necks which are fitted in trunnions having bearings bushed with bronze. The trunnions are carried in yokes, the back yoke being a steel casting, the front yoke, which supports the upper roll when counterbalanced, being a steel forging machined to shape. The raising and lowering of the roll is through a worm and worm wheel drive, designed so that both ends of the upper roll may be raised or lowered simultaneously or one end held stationary while the other end is raised or lowered. This arrangement for operating the upper roll is necessary in rolling plates to conical shapes, and is often found advantageous in ordinary boiler shop practice. The worms are of machined cast bronze and run in inclosed bearings designed to provide for lubrication with either heavy oil or grease. The worm wheels meshing with the worms are made of cast steel and have teeth cut from the solid. The driving pinions on the lower roll necks are steel castings shrouded to the pitch line. These pinions are driven from a wide faced cast steel gear also shrouded to pitch line, and this driving arrangement conveys power directly to both lower rolls.

Two speeds are available, a slow speed for handling the heavier plates, and a high speed for handling lighter plates. The control of the speeds is by hand levers direct to positive clutches. Two roller supports are provided for the lower rolls and each support carries four forged steel rollers finished to 7 15-16 in. diameter. The rollers are carried in closed end bearings, and lubrication is by means of large grease cups. This arrangement is intended to assure adequate lubrication and keep scale and dirt from clogging and stopping the action of the rollers.

High-speed shafts have bearings bushed with bronze, and outboard bearings are provided to carry the outer end of all driving shafts so that there are no overhanging gears.

The machine is operated by two motors, one of 125 hp. being used for driving the lower rolls and one of 60 hp. for raising and lowering the upper roll. The weight of the machine, which is designed as the No. 9 bending roll, is 415,000 lb.

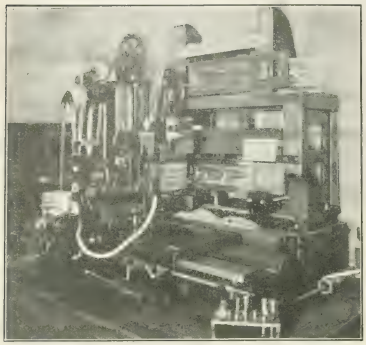
The Baldwin Canadian Steel Corporation, Ashbridges Bay, Toronto, Ont., proposes to resume operations at its tin plate mill early next year. An executive of the company states that two of the English directors will arrive in Canada early in November to consider the whole situation and it is possible that certain reorganizations will be carried out, and the plant reopened early in the new year. The present plan calls for the early rehabilitation of the plant and a large number of men will likely be put on for repair work and completion of the eight furnaces and mills.

Steamships launched in the third quarter of 1923 are reported by Lloyd's register as 98 in number, with a gross tonnage of 248,354. Germany led with 59,073 tons, followed closely by Great Britain and Ireland with 58,498. The United States in third position had 33,622 tons, while Holland and France followed with 23,137 and 19,800 tons respectively.

Adds to Line of Die Sinking Machines

A recent addition to the line of machines of the Keller Mechanical Engineering Corporation, Brooklyn, N. Y., is the B G-482 automatic die sinker illustrated, which was exhibited at the Steel Treaters' exposition held recently in Pittsburgh. The machine was shown in operation cutting a die for a Westinghouse turbine blade.

Machines of this type are built in several sizes, being available for use in sinking forging dies, stamp-



Die Sinking Machine Cutting Die for Turbine Blades. Control of the machine is centered in a group of push buttons

ing dies, core boxes, metal patterns and similar work, one of the machines of this type having a capacity for the largest dies for which hammers are made. The master to be reproduced may be of cement, wood or soft metal. For contouring, a zinc template is generally used. The electric control of the tracer, which exerts only very light pressure against the master, combines the utmost cutting power with close accuracy in reproducing a pattern.

The control of the machine, either hand or automatic, is centered in a single group of push buttons. It has rectilinear motion in three directions and contouring motion in any direction in the one plane. With this feature, any outline, however intricate, may readily be followed and reproduced. This feature was demonstrated at the exposition by cutting in a cast iron plate the intricate contour of the template shown in the illustration, mounted on the machine above the turbine blade master. All the movements are in the head, and are on heavy slides and effected by lead screws. The electric controls are contained in a steel cabinet, and are easily accessible.

Sizer Steel Corporation Resumes

Announcement has been made by J. T. Dillon, C. B. Porter, and S. F. Hancock, receivers of the Sizer Steel Corporation, Buffalo, that the manufacture of commercial forgings has been resumed, following the suspension of business in connection with the receivership. The company turns out open-hearth and electric steel forgings in both carbon and alloy grades, and also wrought iron, in addition to regular lines of electric steel die blocks and oil well billets.

Cast Iron Pipe in September

Figures of the Department of Commerce show the production during September of 77,186 tons of cast iron pipe, and the shipment of 78,101 tons. Both figures are lower than August and lower than the average of a series of preceding months.

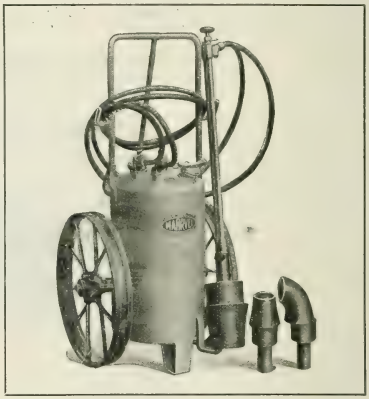
Develops Safety Vacuum Torch

The Mahr Mfg. Co., Minneapolis, has placed upon the market a safety vacuum torch, the operation of which is based upon the same principle as that of the heating element in its portable rivet forges. A feature is that no pressure is used upon the oil tank or hose lines.

The tank has a capacity for 20 gal., and is of heavy gage welded construction. It is carried on a steel axle and roller bearing mounted wheels, and side brackets are provided to carry 12 ft. of hose, extra nozzles and the torch itself. Simplicity of design is claimed as a feature of the torch, patented valve in head construction giving positive shut-off and eliminating dripping at the nozzle. The oil is always at the head and the torch may be started instantly.

There are separate controls for the oil and air, which is intended to provide a range of adjustment and capacity. The air control valve is of the plug cock type, ground to fit, and elimination of restrictions in the air passage of the tank is said to minimize pressure loss. The oil valve is of the piston valve type, and may be finely adjusted. Both valve controls are placed well back from the torch nozzle, for the convenience and comfort of the operator. Oil and air tubes are brazed into the body and head.

A special atomizing nut provided is said to effect complete atomization without restriction of air flow, and to make the flame steady and continuous. In the double chamber nozzle, the vapor is discharged from the atomizer into the first chamber, where it ignites.



New Torch the Feature of Which Is That No Pressure Is Used Upon the Oil Tank or Hose Line

The burning vapor in passing through the choke into the second chamber draws in free air through the auxiliary air openings, making, it is claimed, a good burning mixture within the nozzle, producing a steady flame.

Power Exposition

Plans for the National Exposition of Power and Mechanical Engineering at Grand Central Palace, New York, call for cooperation of national engineering societies. The exposition will be open Dec. 3 to Dec. 8, at the same time as the annual meeting of the American Society of Mechanical Engineers. To avoid conflict between the two events, the technical sessions are set for mornings, while the exposition will open at 1 p. m. each day. At the same time, the American Society of Refrigerating Engineers will hold its annual meeting at the Hotel Astor.

German Iron Industry Paralyzed

New Steel Prices—Political Situation and Lack of Orders. Capital and Stable Currency—Industrialists Make Ten Requests of Government

(*By Radiogram*)

BERLIN, GERMANY, Oct. 29.—Quoted in gold marks, ingots are now $151.40 per metric ton ($36.60 per gross ton). Steel bars are quoted at 219 marks per metric ton (2.36c. per lb.). Thin sheets are quoted at 344.80 marks (3.72c. per lb.).

(*By Letter*)

BERLIN, GERMANY, Oct. 15.—As result of an "Empowering Bill" passed by the Reichstag Oct. 13, all German business, and with it the steel, iron and coal industries, have been removed from parliamentary control, and placed under a dictatorship. The bill authorizes the Cabinet to adopt any necessary measures, financial, economic or social, without obtaining legislative authority, and in doing this the Cabinet can override the constitution or any existing law. The only exceptions are industrial working hours and social pensions, which will still be regulated by law, not by decree.

A more complete dictatorship has never existed in any modern state. The Government was forced to demand, and the Reichstag to grant, these powers by the urgency of the financial and business crisis, and by the slowness of Reichstag procedure. The first cabinet measure under the law has been to put all taxes on a "stable value" basis, which means that the taxpayer must increase his paper mark payments in proportion to the decline in the mark's value. With the proposed *new mark* in circulation, finances are expected to improve.

Control of the 8-Hr. Day

The 8-hr. day question is on the verge of solution. The Socialists until lately held rigidly to this limitation of working hours, and refused to allow Chancellor Stresemann to regulate it by decree. Nevertheless, three-fourths of the Reichstag Socialist members lately voted for a resolution permitting modification of the 8-hr. day, while holding to it in principle. The Cabinet has now submitted a bill permitting increase of working hours to beyond eight, either by agreement between employers and employees, or by official order (in State-owned concerns). Formerly the 8-hr. day could not be lengthened even when the men demanded it. The bill, which will probably pass the Reichstag, enacts that in general industries working hours may not exceed 10 hr. daily, and that in sub-surface mining and in industries prejudicial to health they may not exceed eight. The last provision is a great gain in time, as at present underground coal miners work only 7 hr. Workers employed on the surface in mines will henceforth work 10 instead of 8 hr. This reform is of enormous importance and is an outcome of the admission of prominent Socialists, such as Schiffer and Calwer, that the present impoverished Germany cannot afford a luxury which prosperous pre-war Germany did not enjoy. The prolongation of working hours in mines is associated with a move to reduce industrial production costs, a serious item in which is fuel.

The critical internal and external political situation is paralyzing industrial and trading activity. Employment at the iron and steel works in Germany has been bad for some time in spite of the exclusion from competition of the Rhenish works. Many inland customers have cancelled orders because of poor business and lack of ready capital and consequently manufacturers are endeavoring to increase exports. During the Ruhr occupation and the prohibition of exports from these districts, German firms lost many foreign customers to Belgium and Lorraine and competition from these countries has been considerably strengthened by the absence of German material. German exporters are therefore giving special attention to the Near East markets which seem to be favorable. The engineering industry is also struggling against adverse conditions.

Receding Operations

Costs of production and raw materials, especially cast iron, have greatly increased. The goldmark prices of cast iron have been doubled during the last two months and it is generally recognized that they are too high. At the beginning of October they were about 60 per cent higher than prewar and a reduction of goldmark prices seems imperative if business is to improve. The heavy advances in railroad rates and in taxes are also partly responsible for the high level of prices. Scarcity of capital and difficulty in obtaining credit at a reasonable rate forced many firms to abstain from carrying any more than stocks for immediate needs. Few new orders are being booked and scarcity of raw material is in many instances hampering execution of those on hand. Production has, therefore, been reduced in practically all lines, unemployment is further increasing, and even large companies are only able to maintain their working forces by operating on part time. Many are operating 32 or only 24 hr. per week and the number of firms working full schedule is decreasing every week. The number of unemployed in the metal and engineering industry amounts to about 8 per cent, those on short time to about 32 per cent.

Efforts to Reduce Prices

The strong agitation for the general introduction of gold mark prices has been successful. With the general introduction of the gold mark, prices are governed by the advance in the dollar. The paper mark is however still legal currency and the losses sustained through depreciation from day to day are enormous. Therefore goods are held back in many cases and the amount of business done is reduced. The efficiency of production per head has decreased considerably and Rhenish-Westphalian mine owners had decided to increase working hours to the pre-war standard in order to raise the output. At the same time they were willing to reduce the price of coal by 6 gold marks per ton. In consideration of the internal political developments they were obliged to abandon the enforcement of their demand for the present, but negotiations have now been started with the trade unions for an agreement in this respect.

There seems to be no other possibility of improving conditions in trade, industry and exchange than reducing the prices of industrial raw products so that the gold prices which are at present in many industries above international level are coming down. This point of view has prompted the Government to abolish the coal tax, which has led to an immediate reduction in the price of coal. In order to support the new course, the mine owners have not only lowered prices by the amount of the tax but by another 10 to 15 per cent, which cheapens coal altogether by about 30 to 35 per cent.

The increase in working hours in the Ruhr is at present, only problematical, as the stagnation in railway transport forces many firms to work short time. The northwest group of the German Iron and Steel Association has gone on part time and the great works of Thyssen, Dortmunder Union, Hösch, Bochumer Verein and others are working only 30 hr. per week. Krupp is operating on a 6 hr. day. The Westdeutsche Eisenwerke (ironworks belonging to the Buderus company) has closed because of scarcity of orders. The Rheinische Metallwaren- und Maschinenfabrik (metal goods and engineering firm) has dismissed 50 per cent of its employees as the financial support of the Government is discontinued.

On the liquidation of the Ruhr struggle, Stinnes and other representatives of the mining and iron industry

in the occupied area have submitted a petition to the Government containing 10 requests, which include compensation for the coal requisitioned during the occupation and for the coal tax imposed during that time, abolition of the coal tax in the Ruhr district, preferential treatment of the occupied area in the supply of raw material and foodstuffs, abolition of State control of coal in the Ruhr, authorization of the representatives of the Ruhr industrials to negotiate with the occupation authorities, extension of working hours to 10 generally, and to 8½ in the mines, and discontinuation of the demobilization measures. The question of the formation of a special company for the railroads in the Ruhr under the joint supervision of the Rhineland, France and the industry is also brought in. The Otto Wolff concern has not awaited the results of the petition but has already concluded an agreement with the French, and the Phoenix and Rheinstahl works are again busy on reparation account. This concern has also received permission to export coal and iron products.

There is no sign of a general resumption of work in the Ruhr. Apart from technical difficulties, the employers have no money. Since Oct. 15, the Government has refused to guarantee wages by way of credit, and it announces that unemployed workmen on the Ruhr will receive only the ordinary local unemployment allowances. The complete restoration of work in the coke plants will take, experts declare, at least three months; but the blast furnaces are in good order, and smelting could be resumed at once if ore and coke were obtainable, and if the necessary money for wages could be raised. In Dusseldorf are about 100,000 unemployed, and large numbers are reported elsewhere. Official statistics, being usually more than a month old, do not show this unemployment; but show, nevertheless, a slow aggravation of conditions.

An improvement is not likely. Although the demand for pig-iron, steel, heavy material generally and rolled materials is still active, as a result of the stoppage of Ruhr deliveries, the iron-using manufacturers all complain of a dead home market and of increased difficulties in exporting, owing to the fact that world-market prices have been passed. The rapid rise in home gold prices is shown by the fact that this month for the first time, the commodities index for home-produced goods exceeds that for imported goods. Whereas on June 1, domestic prices as compared with 1914 had risen 10,441 fold and prices of imports 17,345, or more than 60 per cent more, on Oct. 4, domestic prices had risen 156,440,452 fold while prices of imports had risen only 143,368,070 fold.

In particular the Solingen steel, Velbert lock and Schmalkalden small-iron districts complain that their products are dearer than foreign. As this is true also of rolled materials, the Government has been obliged to free such goods from export and from the obligation to procure export licences.

The Iron and Steel Foreign Trade Control Board, the chief function of which was the granting of export licenses and testing export prices, is being dissolved permanently. Meantime, in order to encourage export the board has authorized sales of semi-finished iron and steel abroad at below the ordinary domestic price, on condition that the exporter delivers the same quantity to the home market at the same special low price. Exporters do not believe that the present high gold prices of German steel will be maintained after the currency crisis is overcome; and hold that Germany as before the War and until lately will be easily able to compete.

An understanding has been arrived at between the Swiss machine tool firm Oerlikon and the Magdeburger Werkzeugmaschinen Fabrik (machine tool firm) which is connected with the Stinnes concern. The Magdeburg firm is said to have acquired the majority of Oerlikon. The Motor Aktien Gesellschaft which belongs to the Brown Bovery concern, and the Kolumbus Gesellschaft are merging. The Kolumbus company is interested in South American electrical undertakings.

The Köln-Lindenthaler Metalworks are increasing the nominal capital. The additional capital is to be used for the linking up of other works and negotiations for a fusion with the Iron and Steelworks Krone are nearing conclusion.

The German official trade statistics for August show that export of rolled material increased from 69,793 tons to 91,547 tons, against 193,000 tons, last year's average, while that of machinery decreased from 27,612 in July, to 24,689 during August. Imports of pig iron and scrap were slightly higher than last month, but the exports decreased considerably.

BELGIUM HOLDS PRICES

Few Concessions Noted—Settlement of Ruhr Expected to Force Reduction by Increasing Franc Value

ANTWERP, BELGIUM, Oct. 10.—Notwithstanding the numerous fluctuations of the pound sterling, prices for iron and steel have continued nearly the same as last week, which was somewhat easier and lower than a fortnight ago. Prices per metric ton for domestic consumption, f.o.b. makers' works are as follows:

	Fr.	
Merchant bars	675 to 700	$35.20 to $36.40
Angles	700 to 725	36.40 to 37.80
No. 4	750	39.00
Heavy sheets	775	40.50
Thin sheets	1,150	61.00
[illegible]	750	37.80 to 39.00
[illegible]	750	39.00
[illegible]	700	36.40
[illegible]	925	48.00
Open-hearth steel: ordinary	740	38.60
Rounds	1,400	73.00
Spring steel	1,400	73.00
Basic Bessemer ingots	525	27.40
Blooms	550	38.50
Billets	575	30.00

Business is scarce and the market is apparently becoming weaker. Makers are being slowly forced to come back into the market for tonnage, while buyers still maintain their position, asking for a reduction of prices sufficient to enable them to compete abroad, notwithstanding the lower rates of foreign currencies. Considering the still unsettled situation in the Ruhr and as the idea persists that foreign exchange will soon recover, makers, not in a hurry for orders, are not inclined to make large concessions. They agree to better delivery but try to maintain prices. Buyers and especially exporters seem to expect a favorable arrangement with Germany and as a result a further increase in the value of the franc, which would cause a serious decline of the prices. The result is that little or no business is being transacted and that the real tendency of the market is not defined.

Merchant iron has been quoted at 725 fr. f.o.b. Antwerp for No. 3 quality or $37.80 but without takers. Belgian plates have been offered abroad and at prices such as $37.60 per ton, but even such quotations seemed too high. Still lower prices were being quoted in foreign market. This price however represents about 720 fr. f.o.b. Antwerp which is considerably less than the domestic price.

Quotations for steel are no more favorable. Makers would gladly book orders at the nominal price of 725 fr., but this is equal to 165 s. or $37.75, prices which are again too high. French works have been offering large tonnages of steel products at very low prices which is certainly not improving the situation. Corrugated reinforcing bars are offered at base prices of $48 to $52 f.o.b. Antwerp. Luxemburg makers have been quoting in pound sterling and dollars nearly the same prices for ingots, blooms and billets as Belgian makers. Only one works has underquoted its competitors to book enough tonnage for several months.

In general the coke situation is highly unsatisfactory in Luxemburg, so that these works are nearly out of the market on pig iron. On the contrary, Lorraine works have come back into the Belgian market with large tonnages of foundry iron at the same prices as Belgian sellers are quoting. The price for foundry No. 3 is about 460 fr. per ton or $24, f.o.b. Antwerp or

delivered at consumers' siding. The expectation was that prices would be largely increased by this time, but lack of big demand and dullness in export has made it exceedingly difficult to maintain the present level. Prices for basic Bessemer pig iron are also much easier. An average quotation is 410 to 420 fr. or $21.40 (94 s.) which is still somewhat too high for export to England.

At present 41 blast furnaces are operating. Among these four furnaces are producing high phosphorus foundry iron, one furnace Bessemer hematite and the remainder are on steel making iron. The anticipated production for this month is estimated at about 9000 tons of high phosphorus foundry iron, about 4500 tons of low phosphorus Bessemer and 200,000 of steel making iron.

Some good sized tonnages of British hematite have been sold in Belgium. The lower rate of exchange was of course a factor in this business. Prices quoted on mixed numbers East Coast hematite ran between 105 s. and 106 s., c.i.f. Antwerp or $24.20.

Prices for coal have been somewhat higher. Importation of British industrial coal continues. Prices have been reduced in proportion to the change in rate of the pound sterling. The situation in the Belgian coke market is still satisfactory.

In general the coal and coke markets are firm with higher prices. On the contrary, the iron and steel market is vacilating. Large export business seems possible only in proportion to the favorable fluctuation of exchange or should makers agree to a reduction of prices.

Steel Men Testify in Assigned Car Case

Importance of Private Ownership of Rolling Stock Is Emphasized in Hearing Before I. C. C.—Mr. Schwab and Others on the Stand

WASHINGTON, Oct. 30.—The great importance iron and steel manufacturers and makers of by-product coke attach to the ownership of private cars for their use in transporting coal to furnaces, ovens and mills without restriction has been strongly emphasized at the rehearing before the Interstate Commerce Commission in the so-called assigned car case. Such prominent men as Chairman Charles M. Schwab of the Bethlehem Steel Corporation; President James A. Campbell of the Youngstown Sheet & Tube Co.; Vice-President C. A. Buck of the Bethlehem Steel Corporation, in charge of raw materials; Comptroller F. A. Schick of the Bethlehem Corporation; Harry Colby, member of the firm of Pickands, Mather & Co., and President H. B. Rust of the Seaboard By-Product Coke Co., submitted evidence in an effort to have the commission modify its decision, the effective date of which as now proposed is Dec. 1. The railroads and industries owning private cars contend that the order of the commission, applicable only in times of car shortage, will deprive them of the use of their mines, when they are most necessary, because it would compel them to release their cars for commercial loading. There is a strong prospect that the case may be taken up to the Supreme Court unless the order is modified. The hearings, begun on Oct. 22, probably will continue throughout the present week. Steel executives took the stand under the direction of C. S. Belsterling.

Good Coal Necessary

Mr. Schwab, Mr. Campbell and Mr. Colby testified last Saturday. Mr. Schwab made it clear that the proper kind of coal for making coke is absolutely necessary and that therefore it is essential that the Bethlehem organization be permitted to use its own cars with freedom for conveying the coal from its mines in the quantity and of the quality most suitable for making coke. The Bethlehem company owns 4000 cars, Mr. Schwab pointed out, which were acquired in 1920 as the only way to meet difficulties faced in 1919 and 1920 as a result of the car shortage and the consequent disarrangement of proper coal deliveries. The company, he said, did not wish to enter the business of owning its cars, but was forced to do so in order to get pure fuels for pure materials, and it was because of this that he approved the expenditure of the millions of dollars needed to put the company in a position to send its cars to the mines for coal when it was required.

Mr. Schwab detailed plans of financing the purchase of the cars, and the modern methods of making steel, calling for the right kind of fuel. The cars did not pay, he said, except in service rendered by preventing a breakdown of operations or the serious crippling of them. It was his opinion that the allowance made by the railroad companies for the use of cars was sufficient to provide for their upkeep.

The evidence of Mr. Schwab was approved by Mr. Campbell in practically every way as it applied to the ownership by the Youngstown Sheet & Tube Co. of 1300 standard steel hopper bottom coal cars, 10,500 acres of coal land in Pennsylvania and 4500 acres of coal land in West Virginia. Mr. Campbell's testimony differed slightly from that of Mr. Schwab, however, in that Mr. Campbell declared that the mileage allowance did not cover the upkeep of the cars of the Youngstown Sheet & Tube Co., which he said amounted to 2.5c. to 3c. per ton of coal. Mr. Colby said that the ownership of cars was necessary to assure continuous operations of furnaces. Without the cars, he testified, delays that could not be endured without financial disaster would result as well as difficulties in grading coal. Mr. Schick gave the commission figures concerning the investment by the Bethlehem Steel Corporation in different kinds of property, including coal cars, while Mr. Buck emphasized the necessity of the proper kinds of coal and of cars to haul the fuel when it is needed.

Not Given Preferred Movement

John M. Goss, traffic manager of the Bethlehem Steel Co., presented voluminous figures, the principal purport of which was to show that private cars are not given preferred movement by system cars, as had been charged. Statistics were submitted by him designed to show that system cars actually move more quickly in times of car shortages than private cars do. One set of figures showed that the speed of system cars for a certain period averaged 60.2 miles per day over a distance of 203.9 miles while the average daily speed of private cars was 60.8 miles per day over a haul of 249.3 miles. He said that it is obvious that the speed in similar traffic is the same in the case of private cars used in longer hauls. In reply to a question, he said that system cars should speed up railroad-owned cars because there are always a great many "foreign" cars on the lines hauling them at the rate of $1 per day for each car. It was also stated by Mr. Gross that private cars make less use of the motive power, tracks, yards, etc., of railroads than system cars do and that private cars do not use the railroad terminals.

As coal and coke agent for the Youngstown Sheet & Tube Co., W. B. Prescott pointed out that prior to ownership by the Youngstown company of its cars it was unable to obtain coal regularly in the quantity and quality required at its plants. He declared that this was particularly true of by-product high volatile coal. Since the company has acquired its own cars, it has, with few exceptions, Mr. Prescott said, been able to obtain sufficient tonnages regularly and of the

quality desired. Mr. Prescott expressed the opinion that if the rule is changed as proposed, the company will be unable to accomplish this and will be in the same position it was in before obtaining its own cars.

Large Investment of Steel Corporation

Appearing on behalf of subsidiaries of the United States Steel Corporation which own private cars, Louis C. Bihler, traffic manager of the Carnegie Steel Co., Pittsburgh, and vice-chairman of the committee of traffic men for other subsidiaries of the corporation, declared that the subsidiaries own 5200 coal cars in which is carried 5,000,000 tons of coal and coke annually, equaling 25 per cent of coal used by the corporation each year. Most of the coal hauled in the private cars, it was stated by Mr. Bihler, is of the coking grade for the by-product ovens. A number of the subsidiaries, he said, also own private tank cars for carrying petroleum and its products. The private car investment of Steel Corporation subsidiaries was said to be approximately $16,000,000. Purchase of the cars was begun in 1917 as the result of shortage of railroad rolling stock. He declared, upon cross-examination, that the Steel Corporation did not ask for preference, does not get it and does not want it, but the cars were necessary in order to haul coal, and maintain operations for producing steel and meeting contract obligations. Like other steel men, he said the cars were not wanted except as a necessity for hauling fuel. Denial was made by Mr. Bihler of a report that the Steel Corporation is negotiating with the Norfolk & Western Railroad for the right to use private cars.

Mr. Rust, who was the first witness appearing at the rehearing for private owners of cars, told the commission that if the Seaboard By-Product Coke Co. were deprived of its 1000 cars, it would suffer great damage. Granting that assurance could be given by the railroads of an adequate supply of suitable coal from the mines, Mr. Rust explained that the company would willingly give up its own cars, which were said to have caused the company a loss of $800,000. The cars were referred to as insurance and Mr. Rust said they were bought as a necessity and offhand were not a good investment.

"An Economic Crime"

Burning of raw bituminous coal was described by Mr. Rust as an economic crime, resulting in the loss of billions of dollars worth of natural resources. He declared he did not go so far as to advocate prohibition of coking of coal by the beehive process because this process was said to have its place in times of peak demand. Steel plants, he stated, could not continue competition without by-product coke ovens. The United States was said to be ahead of Europe in this matter, although Germany, according to Mr. Rust, has not produced a pound of beehive coke for 20 years and the ability of that country to hit hard at the beginning of the war was attributed to her preponderance in by-products from coking coal. By-product coke ovens were called the basis for materials of war, for fertilizer, the dye and chemical industry, and for the cheapening of gas and coke for domestic use. Establishment of 1500 by-product ovens was encouraged by the Government during the war, Mr. Rust said, and he estimated the loss caused by the production of 24,000,000 tons of beehive coke at $96,000,000. The sale price of products from by-product operation that were wasted by the beehive process was placed at $4.09 per ton. The materials wasted were said to consist of 25 gallons of sulphate of ammonia, 6000 cubic feet of gas, 10 gallons of tar, the base for dyes and chemicals, and three gallons of motor fuel which, it was said, sometimes could be more profitably sold by including it in other products as heat units.

Great Care Required

The great care required in preparing coal for by-products ovens was explained by Mr. Rust, who asserted that one plant at Bethlehem, Pa., had to be rebuilt in two years at a cost of $2,000,000 because it had used unsuitable coal, while a plant at St. Louis had been used for six or eight years with practically no cost for new ovens, but damage of $250,000 was sustained later because a heater was given coal with which he was not familiar. Mr. Rust said that correspondence with members of the commission itself had given him the impression that the commission thought it would be a good thing for the company to buy its own cars.

President Robert Hobson of the Steel Co. of Canada, with a plant at Hamilton, Ont., told the commission that his company, together with Pickands, Mather & Co., purchased 400 cars in 1920 because of their experience in the preceding year with car shortage in getting coal from the Mather mine in Greene County, Pennsylvania. The carriers are ferried across Lake Erie from Ashtabula, Ohio, when possible. Mr. Hobson said that the purchase of private cars seemed necessary, the only alternative being to establish spare mines as sources of supply when congestion exists at some point. He admitted, however, in reply to a question by Commissioner Potter, that if everybody should do this, the miners probably would work only a day or so and more trouble would come from that source than now exists.

Plant of American Puddled Iron Co. Nearly Completed

The new plant at Warren, Ohio, of the American Puddled Iron Co., Youngstown, is virtually completed and ready for operation. Delayed delivery of minor equipment has prevented its immediate operation. The plant has an initial capacity for producing up to 250 tons of mechanically puddled iron and rolling up to 1000 tons daily. Of four mechanical puddling units, but one has been installed at this time, in order that its operation may be checked and changes made as experience dictates. When operations do start, they will be at a reduced rate, in order that the machinery may be given the proper tests. It is unlikely therefore that the plant will get under full headway for some time. It represents an initial expenditure of approximately $2,000,000 and will manufacture at the start iron for pipe makers. Its customers will be such large manufacturing consumers as the Youngstown Sheet & Tube Co., Republic Iron & Steel Co. and the A. M. Byers Co.

Negotiations of Inland Steel Co. for Purchase of Other Properties

CHICAGO, Oct. 30.—Negotiations between the Inland Steel Co. and the Milwaukee Rolling Mill Co. with a view to the purchase of the latter's sheet plant at Milwaukee have come to a halt following a failure of the two companies to reach an agreement as to terms. The acquisition of the Acme Steel Goods Co., Chicago, by the Inland company, which has also been a subject of recent negotiations, is expected to be an accomplished fact in the near future. The final settlement of the terms of sale awaits the completion of auditing work now under way.

Zinc Mines to Close One Week

ST. LOUIS, Oct. 30.—Approximately 65 per cent of the mines in the tri-state district, embracing southwest Missouri, southeast Kansas and northwest Oklahoma, will close for one week, beginning Nov. 3, to reduce surplus stocks of zinc in the hope of bettering the ore market. According to word received here today from Joplin, Mo., last week's purchase of zinc by the smelters, 19,500 tons, was the heaviest in six weeks. The ore sold at $40 per ton.

Zinc producers believe the smelters now have more ore on hand than they need to supply their demands and that this is likely to lead to a decline in ore prices unless production is curtailed. Then, too, the operator's surplus stocks have been increasing at the rate of 3000 tons weekly. Two or three weeks ago operators curtailed production and ore prices advanced.

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ESTABLISHED 1855

THE IRON AGE

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

U. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago, Otis Building. Pittsburgh: Penn Building. Boston, 420 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng. 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Causes of Industrial Depression

THE course of commercial and industrial activity in the United States in the past five months has been of distinctly novel character. It is doubtful whether it is yet fully recognized how lacking in precedent this period has been, but the change in business sentiment in the past few weeks shows that some thinking has been done.

We have had a period in which commercial activity, or the making of engagements, has apparently been light, while industrial activity has been heavy. In the latter there has been little if any diminution, as indicated by statistics of bank debits, car loadings, employment and other indexes, while on the other hand contracting for construction and other work and buying commodities for forward delivery has been light. It is not a case of industrial activity running on its momentum, for when it is a case of momentum, steel is always a good example. Often the steel industry has run along smoothly on momentum for a given time and then suddenly lost the momentum. In recent weeks, steel mill operations, even in the case of the Steel Corporation, have been based chiefly upon current and recent orders rather than upon old contracts.

For more months than they would care to admit publicly, many business men have felt that an industrial depression was coming, and their concern has been simply to guess the time and to be prepared for it. The course of affairs lately now disposes these men to doubt whether their original conclusion was correct. Some have settled the matter temporarily to their own satisfaction by adopting the idea that there will be simply a little reaction and readjustment. That is not very safe, however, since experience shows that when once reaction has begun, it is particularly difficult to forecast its extent.

The various causes of industrial depression in past experiences may well be reviewed afresh and set against conditions as they are seen to exist. One very familiar cause is excess of construction work in providing facilities that cannot begin promptly to yield an adequate return. A chart in the October survey of business by the Department of Commerce is suggestive in this connection. It shows, on the square foot basis, the volume of building contracts awarded since Jan. 1, 1919, by character. There is seen to have been much activity in 1919 and the fore part of 1920 in industrial building, and relatively little since then. In residential building, on the contrary, there was not so much in that earlier period, while there was an enormous volume from March, 1922, to May, 1923, inclusive. That is, it looks as if there had been in general no unsafe expansion in manufacturing facilities of late. In residential building an excess would hardly make much trouble, while it is not known that there has been an excess.

Sometimes public utilities have expanded too rapidly for the growth of the country. No one thinks that is the case now. The utilities have had difficulty in securing capital and the common view is that greater expansion would be advantageous.

On the other hand, we may be less safe than we think we are in the matter of credit. Overstrain of credit has been a familiar cause of industrial depression and even of panic. We assume that we are safe from that on account of the Federal Reserve System. Times have come in the past when men wanted to borrow and could not. Now, we maintain, they will always be able to borrow, but there is another point, for they may not want to borrow. The net result would not be wholly different.

REVISED figures of the financial damage of the Japanese disaster show that the reconstructive effort need not be so great as was at first feared. Figures published in our columns last week placed the total loss at $915,000,000, of which about 80 per cent will be largely recoverable by the expenditure of effort or work, rather than investment in raw material. Most of the materials used also will again represent Japanese production and not imports. The figure given above, divided by the population of Japan proper, indicates a loss of approximately $16 per inhabitant. This is but a fraction of the per capita taxes in Great Britain for the current year, and may be compared with the total annual tax bill of the American people, which is nearly $100 per person.

Unemployment Insurance

SOME years ago certain reformers undertook a drive which, had it been successful, would have established a system of health insurance for all workers in American industrial plants on a basis similar to that of workmen's compensation. The insurance was against loss to employees through idleness resulting from accidents sustained in industry, and in some cases from occupational diseases. The effort failed, because the cause was unable to stand against the analysis to which it was subjected.

Today a similar effort is making to secure the enactment of State laws establishing unemployment insurance. Under this every idle worker in industry would be compensated for lost time. The system has been in practice in Great Britain for several years. The strongest adherents it has left are the always present small army of people whose idea of happiness is not continuous employment but continuous unemployment. The "dole" system is branded by American investigators who have studied it on the ground, and by even Lloyd George himself, as expressed in a recent utterance, as a colossal mistake, which should not be transplanted to America. Frank F. Dresser, counsel for the Associated Industries of Massachusetts, in an address at the recent annual meeting of the organization, summed up the American unemployment insurance situation as follows:

> They, like the former health insurance bills, are fatally defective in being measures of relief rather than of prevention: that they are palliative merely. They fail to distinguish between unemployment in normal and in abnormal times. As applied to unemployment in normal times they benefit the incompetents and the "won't works" at the cost of the thrifty and industrious, and interfere unduly with the proper conduct of business and with the liberty of the worker himself. As applied to unemployment in abnormal times, I am not prepared to say that some organized measures of relief may not be proper and possible.

In normal times, there are unemployed because of lack of work and exclusive of illness and labor disputes about 10 per cent of the working force. Unemployment due to recurring crises of business depression cannot be so surely analyzed, for elements over which an individual employer has no control play a great part and are not yet understood. Fiscal policies, foreign trade, legislation, all contribute, as well as the psychology of inflation and deflation. Such depressions throw out of work 25 to 30 per cent of the average working force, and a much greater proportion in some industries, and affect not only the workers who are always on the ragged edge of unemployment, but those who are always at work when there is work to do.

It is contended by proponents of bills which will come before the legislatures of Pennsylvania, Massachusetts and Wisconsin that the way to solve the problem of unemployment is to provide a fund in which the three interested parties, the worker, the employee and the public shall contribute, from which payments shall be made to the worker during periods of idleness. The opponents of the measure are not prepared to accept this proposition. In the first place, they hold that a sharp distinction should be made between unemployment in normal times, and unemployment in abnormal times, when general business conditions involve a very great degree of unemployment.

We may be a long way from the passage of the proposed legislation, but if the intention is to force it upon industry rapidly without much consultation with industry, then it would be well for the manufacturer to consider from now on how the two types of unemployment may be successfully differentiated. It would be a service to all to give, through the medium of the printed word, what opinions the reader of these lines holds on a baffling question of no small importance.

Enlarging the Influence of the Institute

THE effort of the directors of the American Iron and Steel Institute to obtain a larger attendance of members to listen to the papers following the usual presidential address of Judge Gary at the opening session of the semi-annual meetings is worthy of hearty commendation. There is probably no other association in the country at whose meetings less than a third of those in attendance listen to the proceedings after the opening address. To one who for the first time attends a meeting of the American Iron and Steel Institute, the exodus of members to the corridors upon the conclusion of the president's speech is indeed surprising.

This withdrawal is not, however, a reflection upon the value of the papers or the ability and painstaking care in preparation of the authors. It is due to the fact that the membership is composed of three classes: the executives, who are not primarily interested in engineering or highly technical discussions; the sellers, who likewise have little interest in engineering problems; and the operating officials and engineers, whose life work is concentrated in large part upon metallurgical, chemical and other technical problems.

In this day of specialization it is futile to expect to find all members equally interested in all the subjects that can be discussed. How, then, can a larger attendance be assured through a greater part of the sessions of the institute?

THE IRON AGE believes that a very large increase in the attendance through the morning session could be obtained by changing the program so that, after the delivery of the presidential address, a short time—perhaps half an hour—could be devoted to searching discussions of the subjects treated in the address. Possibly it would be well to select two or three men to lead in this discussion, but this part of the program need not be cut and dried.

If it were understood that the directors earnestly desired discussion, it would probably be forthcoming. For example, in the case of the address last Thursday by Judge Gary, much additional information might have been offered as to the abolishing of the twelve-hour day and doubtless some of the leaders of the industry would have had much valuable comment to offer in regard to that subject and other features of the address. This discussion might well be followed by a paper on "How to Make the Eight-Hour Day Permanent."

The speakers Thursday treated the abolishing of the long day as an accomplished fact, and it

is, so far as the introduction of shorter hours in many important plants is concerned, but it is by no means certain that the shorter hours would stand the test of such great demand for production as we saw during the World War and at other times. To make the short day permanent, all employers and employees must be as enthusiastically in favor of it as most of them are today. How can this be brought about? The subject is one that should receive earnest attention.

Papers and discussions on economic and commercial problems might well continue through the remainder of the morning. An organization of the size and importance of the institute would have no difficulty in obtaining talent of the highest order to contribute to the program, and we venture the prediction that no urging would be needed to insure the attendance of a very large percentage of the members.

As to the technical papers, we believe they might well be confined to the afternoon session, when those primarily interested would be glad to attend, especially if a little spice in the way of lively discussion were added.

On the whole, the American Iron and Steel Institute is doing splendid work. Its statistics are of great importance and have been increasing in their comprehensiveness, and the meetings have done much to add to the prestige of the great iron and steel industry, but much more could be accomplished by making some modifications in the programs of the meetings.

We are offering the above observations in a suggestive way. They are not intended to be the last word on this subject and we shall be glad to hear from our readers who may approve or disapprove of the ideas expressed, and especially from those who have further suggestions to make.

CORRESPONDENCE

Nickel Steel Direct from the Ore

To the Editor: In the interest of historical accuracy I wish to correct an error in the interesting article by F. H. Mason, published in THE IRON AGE Sept. 20, on the "Production of Nickel Steel Direct from the Ore."

I was president of the Lake Superior Corporation and of the Algoma Steel Corporation where these investigations were conducted. I offered Dr. Haanel free the use of the electric current and of the factory accommodation necessary to demonstrate a type of electric furnace with which he desired to experiment in the reduction of ores. I also offered the services of my technical staff at the head of which was E. J. Sjostedt, and under Mr. Sjostedt's direction the Haanel furnace was erected and operated.

Years previous to this experiment I had purchased nickel properties in the Sudbury district for the Lake Superior Corporation, had opened mines, shipped ore to our Sault Ste. Marie works, erected crushing, pulverizing and roasting plants, utilized the sulphurous gases in the production of sulphite wood pulp, produced ferronickel in the electric furnace direct from the ore in cast bars and had received from the Paris Exhibition of 1900 a medal for the first production of ferronickel pig in the electric furnace under the name of "Clergite." All of this was original investigation and experiment by Mr. Sjostedt under my direction, and had all been accomplished a considerable time before we undertook the experiment with Dr. Haanel's furnace, which, however, we actually ran for some time on our own account after Dr. Haanel discontinued his demonstration work.

Mr. Mason has reversed the sequence of events: Dr. Haanel's experiment had not for its object the proof that nickel ore could be smelted into metallic ferronickel in the electric furnace. This we had accomplished years before; its purpose was to demonstrate that this object could be accomplished economically on a commercial scale in Dr. Haanel's furnace.

F. H. CLERGUE.

Montreal, Oct. 16.

Power Plant Problems of Steel Mills

To the Editor: In his article [page 1027, THE IRON AGE, Oct. 18] Mr. Breedlove does not give any efficiency figures, except that he mentions that the surplus gas from one 500-ton blast furnace will supply enough furnace gas over the stove requirements to operate one of the 2250-hp. units continuously at 165 per cent rating —in other words, should produce 3712 b.hp. per hour.. This figure is considerably below what is actually being obtained. For a coke rate of 2000 lb., 4250 b.hp. can easily be obtained with good combustion efficiency. H. C. Siebert in his very able paper on the "Economical Use of Fuel in the Steel Plant," before the Association of Iron and Steel Electrical Engineers at Buffalo, even puts this figure at 5070 b.hp.

In all his tables, Mr. Breedlove compares six gas-fired and four stoker-fired boilers with five gas and pulverized coal-fired boilers for a station capacity of 30,000 kw. This is unduly favoring the combination of gas and pulverized coal.

The Bethlehem Steel Co. at Sparrows Point, Md., has, for a station capacity of 10,000 kw., two 1291-hp. Babcock & Wilcox gas-fired boilers equipped in such a manner that each is capable of developing steam for the full station capacity. With modern equipment for the combustion of blast furnace gas, boilers of the Babcock & Wilcox type or Hornsby-Bigelow type can safely be operated on loads up to 300 per cent on gas alone, with excellent efficiency.

I differ from Mr. Breedlove in his statement that it would be possible to burn five fuels (blast furnace gas, coke oven gas, tar, coke and coal) simultaneously with good efficiency. Blast furnace gas can be burned with fair efficiency in connection with powdered coal and perhaps with tar, but that the possibility should exist to obtain an efficiency of 80 per cent with any kind of mixed firing I very much doubt. Such efficiency can today be obtained continuously on blast furnace gas alone.

To get a just comparison between gas-fired and stoker-fired boilers on the one hand, and gas and powdered coal on the other hand, he should readjust his figures by giving proper credit for the power which it is possible to generate from blast furnace gas alone. I believe that Table XVII, Scheme 2, in Mr. Siebert's paper would answer his purpose. I reproduce this table, which refers to a 500-ton blast furnace, as follows:

Million B.t.u. in gas from furnace per hour	280.90
Million B.t.u. required by stoves at 80 per cent efficiency	68.76
Million B.t.u. required by blowing engines per hour	40.96
Million B.t.u. available per hour for power production	171.18
Thermal efficiency of steam plant, per cent, boiler	80
Thermal efficiency of steam plant, per cent, turbine	22
Total thermal efficiency of plant per kwhr., per cent	17.6
On the surplus heat, current can be produced at hourly rate of	8,800 kw.

In my opinion the most economical equipment for a plant requiring 17,500 b.hp. per hour and operating two 500-ton blast furnaces would be two 2250-hp. boilers equipped for gas alone, two 2250-hp. boilers equipped for powdered coal alone and one 2250-hp. boiler equipped for both gas and powdered coal, to serve as a standby for the two other units.

K. HUESSENER,
Manager, American Heat Economy Bureau.

Pittsburgh, Oct. 25.

Grading of General Electric Employees

West Lynn Official Tells of System for Selecting New Workers and Promoting Old Ones at Convention of Associated Industries of Massachusetts

THE General Electric Co. some time ago put into effect a shop representation plan which has been tremendously popular and successful throughout its West Lynn, Mass., plant. The company recently instituted a system for selecting new employees and promoting old ones, under which applicants for work are tried on sample jobs. Jeremiah O'Connor of that company told about the plan at the eight annual meeting of the Associated Industries of Massachusetts held Wednesday and Thursday, Oct. 24 and 25 at the Copley-Plaza Hotel, Boston. Mr. O'Connor said:

"Nine months ago we formed in the West Lynn Works of the General Electric Co. a new department whose sole duty it would be to see that the right person was put on the right job, and, if possible, to develop a more or less scientific objective method of doing this, which could be applied by anyone with a fair degree of accuracy. The ideal way, of course, would be to try every person on every job. But as this is out of the question we have made some 35 sample jobs, each one requiring about five minutes, on which we try every new worker. When possible, we re-place each on the kind of work for which the sample job shows him best fitted.

"Take, for instance, inspection work. We have filled a drawer with fifteen to twenty familiar objects: a ruler, a pen, nickel, book, envelope, etc. This we show to a man for one minute, and at the end of the minute cover the drawer and take something out, or merely change the position of one or two objects, and then ask the man what has been taken out or changed. Those men whom we know are our best inspectors can name instantly the change which has been made, whereas the average man will miss from twenty-five to fifty per cent of the changes.

"Several months ago we had an opportunity to select four girls for the same type of inspection work. The girls were first selected very carefully by the employment department and then approved by the foreman. The four were then given this sample inspection job to do. Two of the girls did it almost perfectly and were given an A grade on the test, which is the highest mark obtainable. The other two girls were given a grade of D, the lowest mark given. All four girls were then put on the same kind of inspection work in the factory. One of the girls who got a D left of her own accord at the end of five days, saying that she did not like the work. Both the instructor and her foreman said that she was obviously unfitted for inspection work, and that they realized this very quickly after watching her on the job.

"The second girl who failed to pass the test was kept on inspection work for six weeks and then let go. The foreman said that she had done nothing of value, and that everything she had inspected had to be re-inspected by another girl. The two girls who passed the test with a grade of A are still in the factory and are doing good inspection work.

Tried on Assembly Jobs

"Another job which we give a new employee to do is to assemble nine blocks into a single block. Those men whom we know have mechanical ability, or are mechanically ingenious, can assemble this block in less than three minutes. Those men whom we know are not mechanical require invariably more than five minutes. After two hundred men had taken this test we graded them A, B, C and D, according to the length of time required. We then asked ten foremen and department heads to grade these same men according to what they considered their mechanical ingenuity or ability to think mechanically. Every man who got an A on the test was graded by the foremen either A or B, that is, as above the average. With one exception, every man who got D on the test was graded either C or D by the foremen, that is, as below the average. One man who got D on the test was graded B by the foremen. Every man who was graded A in mechanical ingenuity by the foremen obtained A in the test. Thus, if we choose for jobs requiring mechanical ability only those men who got A in the test, we pick only men whom the foremen consider to be above the average in mechanical ability, and we do an injustice to no one because we include all those men whom the foremen and department heads consider to be of A grade.

"Another sample job which we ask new operators to do is to put three hundred pegs into one hundred holes in a board. Girls who we know are fast with their hands and who are making high piece work earnings, will do it in less than seven minutes. Another sample job is to pick up one hundred of these same pegs with tweezers and put them into a hundred holes.

New Operators Carefully Tested

"All new operators who enter the West Lynn plant are carefully tested by these sample jobs and only those are engaged who can do well the sample, which represents the type of work on which they are to be placed. In addition to this, we are testing every person in the plant also who is not making good, and who is about to be laid off, in the hope that we may find some type of work on which he will succeed.

"An interesting case was a girl who had been with the company for nearly a year and been tried out on three different jobs, but had not made good on any of them. She was about to be laid off, and so was sent into the new department to be tested. She was extremely slow and awkward in using her hands, and all the jobs on which she had been tried during her year of employment had required quickness and dexterity. She was, however, unusually good on the sample inspection job. Instead of laying her off we made her an inspector. She has now been on the job for several months, and although the foreman did not want to take her at the beginning, realizing she had not made good in other departments, he now says she is as good an inspector as he has.

"In addition to this, the new department has been open to anyone in the plant who wished to come in and try the sample jobs. So far approximately 450 persons have voluntarily availed themselves of this opportunity and new men and girls are every day asking to come in. Whenever there is an opening anywhere in the plant, the new department is given an opportunity to recommend two or three men for the vacancy. In this way a large percentage of the openings are filled by men whose qualifications we know, and we are very often able to promote a man in the plant, rather than go outside and hire a new person. As a result, some thirty-five men and girls have been promoted with an average increase in pay of 90c. per week for each person. In addition to this, several of the girls have been changed from piece work to salary time with a consequent reduction in hours per week from forty-eight to forty-four.

A Test for Clerical Work

"One of the foremen who put up a sign in his department saying that he wished a clerk for his office, and that anyone in his department who wished to try the sample clerical job could do so, and he would choose one of those recommended by the test. Twelve girls applied for the job and took the test, and of the twelve, two were recommended to him. He took one

of them and a department head took the other. Both girls had been working on machine glass work for several years, but were anxious to get office work. If it had not been for the tests, they probably would have continued on machine glass work for many years. They are both unusually good clerks.

"Still another way of using the new department is in advising men of their own strong and weak points, and in helping them to overcome their weak ones. Any man who comes to the new department with a definite idea of what he would like to do is tried out on the sample jobs and told whether or not he is fitted for the type of work he wishes. If he is not, the department tries to tell him how, if possible, he can fit himself for the work.

"Since the formation of the new department nine months ago, about 100 persons have been tested before being hired. Two-thirds of these have performed satisfactorily the sample job covering their new work. The remaining third failed on the sample job, but seemed in every other way so well fitted that they were hired despite their failure. Of those who passed the tests with an A grade, 95 per cent are now doing excellent A grade work. Of those who failed in the tests, but were hired despite this fact, only 18 per cent have made good."

Clifford S. Anderson Elected President

Clifford S. Anderson, assistant secretary and counsel Norton Co., Worcester, was elected president of the Associated Industries of Massachusetts, to succeed Col. Charles R. Gow. Mr. Anderson is the first president to be elected who resides outside of Boston. He is a native of Portland, Me., and has resided in Worcester since 1903. He was graduated from Worcester Academy in 1896, from Brown University, Providence, R. I., in 1900, and from the Harvard Law School, Cambridge, Mass., in 1903.

Mr. Anderson and the following were elected members of the executive committee, which is comprised of forty members: Frank P. Cox, manager General Electric Co., West Lynn; Lewis E. Bellows, president Walden-Worcester, Inc., Worcester; Francis G. Echols, vice-president and general manager Greenfield Tap & Die Corporation, Greenfield; Frederick Fosdick, president Fitchburg Steam Engine Co., Fitchburg; Jerome R. George, vice-president Morgan Construction Co., Worcester; Eben S. Keith, president Keith Car & Mfg. Co., Sagamore; Theodore W. Little, vice-president Walworth Mfg. Co., Boston; Charles L. Newcomb, manager Worthington Pump & Machinery Corporation, Holyoke; E. Kent Swift, treasurer and general manager Whitin Machine Works, Whitinsville; John F. Tinsley, vice-president and general manager Crompton & Knowles Loom Works, Worcester; and Reginald Washburn, president Wire Goods Co., Worcester.

Exhibit of Results of Research Work

A new feature of the annual meeting was a special exhibit in the salon of the results obtained by research work. This exhibit was arranged by Skinner, Sherman & Esselen, Inc., Boston, and several firms contributed toward it. There was a demonstration of what research and chemistry has done in the saving of waste material and making something useful out of it.

There were four section conferences—on taxation, on finance, on industrial relations and on technical procedure in business—with many speakers on each topic discussed. In the fourth group, Dr. Gustavus J. Esselen, Jr., Boston, delivered an address on "Front Office Chemistry," showing the importance of chemistry in industry, in management problems and profits.

BETHLEHEM EARNINGS DECLINE

Total for Third Quarter Is $10,518,951—Surplus After Dividends, $1,074,655

Total net earnings of the Bethlehem Steel Corporation for the September quarter were reported at $10,518,951, compared with $11,601,682 for the preceding quarter, when the policy of issuing quarterly statements was inaugurated. After the payment of regular dividends on the preferred and common stock, there remained a surplus of $1,074,655. This figure is considerably below the surplus for the June quarter which was $2,102,262.

Directors declared the regular quarterly disbursement of 1¼ per cent for the current quarter, payable Jan. 2, to stockholders of record Dec. 1. Net income of $4,400,603, after interest, depreciation, depletion, etc., for the September quarter, was equivalent after preferred dividends to $1.84 per share on $180,151,900 outstanding common stock, against $2.42 per share earned in the preceding quarter.

The value of the company's unfilled orders on hand Sept. 30 was $53,134,000 compared with $80,066,000 reported on June 30, and $67,510,007 on Dec. 31, 1922. The income account for the September quarter compared with that of the June quarter is as follows:

	September	June
[illegible]	$10,518,951	$11,601,682
[illegible]	3,197,827	3,245,082
[illegible]	2,920,511	2,930,129
[illegible]	1,400,013	5,426,451
[illegible]	$ 4,400,603	1,679,851
Com. dividends	2,245,741	2,244,358
Surplus	1,074,655	2,102,262

President Eugene G. Grace did not attend the meeting on account of illness. His place was taken by Vice-President H. E. Lewis, who stated that there has been a noticeable improvement in new business, particularly with respect to the railroads which are buying rails and accessories in good quantities.

"A very good tone," said Mr. Lewis, "is also evident in the tin plate, sheet and wire end of the business, with structural tonnages also picking up. October operations also indicate an improvement over September, the company's steel plants showing practically a 75 per cent operation. The rail mill at Sparrows Point, Md., is again resuming the rolling of rails after being shut down since April, 1919."

Mr. Lewis stated that the Bethlehem company is planning to increase the tin plate plant at Sparrows Point, but not in the immediate future. He denied rumors that it was planned to shut down the greater part of the Lackawanna plant at Buffalo. No new financing is contemplated by the company, according to Charles M. Schwab, chairman of the board, who presided at the meeting of directors.

Production of Electrical Machinery

Figures of the Census Bureau for the year 1921 show 1333 establishments engaged in making electrical machinery, apparatus and supplies. The total number of persons engaged in the industry is given as 218,660, of whom 161,204 were wage earners receiving a total wage of $194,242,357, or an average of $1,205 each. The value of products is reported at $833,985,443. Taking out costs of materials, the value added by the manufacturing process amounted to $489,915,480, or an average per wage earner of $3,039.

All of these figures are lower than the corresponding figures of 1919—due to the business depression in 1921. All, however, are much higher than the corresponding figures of either 1914 or 1909. Leading States in order of value of product include Illinois, New York, Pennsylvania, Ohio, New Jersey and Massachusetts. Each of these produced more than $72,000,000, while no other State reached $35,000,000. In the list of products by class, telephone apparatus at $102,000,000 takes the lead, with insulated wire and cables at $98,300,000 in second position, and motors, not including starters or controllers, at $83,000,000, in third. No other item reached $60,000,000.

FLOATING STEEL TANK ROOF

Used Over Oil and Gasoline Tanks to Minimize Both Fire Hazard and Evaporation

Fire tests were conducted Oct. 16 at the Chicago Bridge & Iron Works to show the ability of the Wiggins floating welded steel roof for oil and gasoline tanks to protect the tank contents against fire. Built for experimental purposes, this roof was floated on the surface of gasoline contained in a steel tank 30 ft. in diameter and 6 ft. high.

On top of 3 ft. of water in the tank was gasoline with an average depth of 2½ to 3 in. There is a gas-tight space between the vertical rim of the floating roof and the shoe which presses against the tank shell. This forms the only air space between the liquid surface and the roof, and its size is in marked contrast with the great volume of evaporation—encouraging air in the tank with a canopy roof.

Fire was applied to the aperture between the shoe and shell without fire resulting. Fire applied by blow torch to one of the four 3-in. vents in the horizontal ignited the mixture between the vertical rim and the shoe. Smoke and flame belched forth from the vents, but there was no permanent fire. This test proved that fire resulting from a lightning flash or flame from any source would be only momentary and would cause no damage. Burning waste dropped down the vent caused a similar result.

When a fire was built in the center of the tank by igniting a bucket of gasoline which had been poured on the roof, the gasoline in the tank was not ignited, although the fire on the roof lasted 5 min. and caused flames to shoot up 8 ft. or more. Then gasoline poured around the horizontal and around the edge of the float was ignited; it burned for 8 min. but did not ignite the gasoline in the tank.

Gasoline poured down into the aperture between the roof and shell was ignited and burned; this ignited the mixture between vertical rim and shoe, but only for a moment. The gasoline which had been poured into the aperture continued to burn for 5 min. or so but did not ignite the contents of the tank.

Demonstration of a Foamite hand extinguisher showed that one man could close the opening between tank shell and roof in about 1½ min.

One great value in this roof is the practical elimination of evaporation, which now costs the oil industry about $200,000,000 a year.

Pig Iron from Copper Blast Furnace Slag

"We have produced pig iron at Anyox on a small scale and are still doing it. Whether we shall be able to produce it on a commercial basis remains to be seen, but our technical staff is working hard in the hope that this may prove to be the case." The foregoing announcement by H. S. Munroe, managing director of the Granby Consolidated Mining, Smelting & Power Co., is one of considerable interest and one that may lead to important results. Mr. Munroe was not prepared to go into details of the process of manufacture at this stage, but he went so far as to say that the iron was being made from copper blast-furnace slag and that it was being made in a reverberatory furnace. On a general average, the Granby company produces about 400 tons of furnace slag per day, the iron content of which averages 52 per cent. The principal other ingredients are silica, lime, and alumina. In the past this slag has been an entirely waste product, and its disposal has been a matter of some cost to the company. If in the future this can be turned to useful purpose in the manufacture of pig iron it should materially reduce the cost of copper production at the Anyox smelter.

A little more than a year ago S. G. Blaylock, managing director of the Consolidated Mining & Smelting Co., announced that iron had been prduced electrolytically on a laboratory scale from the tailing of the company's Sullivan mine ore. Since that time the company has been bending its energies in the construction of the new mill at the Sullivan mine and in the erection of a new plant at the Trail smelter to cope with the increased output from the Sullivan mine. The mill was put into operation at the end of last August, the new plant at the smelter is all in place, and now the technical staff at the smelter may be expected to turn its attention to the production of iron on a commercial scale from the Sullivan ore tailing. The Sullivan mill is producing more than 1000 tons of tailing daily, which is composed mainly of the minerals pyrite and pyrrhotite and will contain on an average in the neighborhood of 45 per cent of iron. The original ore is composed of zinc-blende, marmatite, galena, pyrrhotite, pyrite and from 3 to 6 per cent of earthy gangue. At the present time these two companies, the Granby and the Consolidated, are dumping in the form of slag and tailing more than 200,000 tons of metallic iron annually, which, if commercial processes can be devised for its recovery, would be more than sufficient to meet the Province's iron and steel needs for some years to come.

Recovering Coal from Ashes Electromagnetically

WASHINGTON, Oct. 30.—The Friedrich Krupp A. G., Grusonwerk at Magdeburg, Germany, has introduced a simple electromagnetic "dry separating process" which it claims is capable of recovering coke and unburned coal from ashes from industrial firing, at the same time avoiding losses and other disadvantages attaching to previously known processes, says a report received by the Department of Commerce from Assistant Trade Commissioner W. T. Daugherty, Berlin.

The process is based on the fact that hard coal slag responds to attraction in a highly concentrated magnetic field, while coal and coke do not. This striking difference in behavior in the magnetic field is explained by the fact that when the coal is burned even if finely ground, the iron-containing non-magnetic materials are transformed to magnetic iron compounds, which go over into the slag making it responsive to magnetic attraction. Many experiments which the Gruson works has tried with different kinds of coal have shown that an average of 30 per cent weight of coal ashes is recoverable as coke and coal.

Operations Reduced at Duquesne Works

Last week notices were posted in six of the seven merchant bar mills at the Duquesne, Pa., steel works of the Carnegie Steel Co., that one shift of men will be eliminated beginning this week. This will reduce the employment by one-third in these mills and is the first real retrenchment by the Steel Corporation in the Pittsburgh district. There have been three shifts of eight hours each. The shift from 11 p.m. to 7 a.m. has been eliminated. This group is known as the lower works of the Duquesne plant.

Industrial Plants

In volume No. 3 Charles T. Main, industrial engineer, Boston, shows principally by illustration a large number of textile mills, power plants and miscellaneous manufacturing buildings which have been erected from designs and specifications prepared in his office. Most of these have been in New England and along the Atlantic Coast as far south as Baltimore, but one big power development is shown in Montaña and a jute mill in India. The book contains 88 pages, 8¾ x 7¼ in., and features 47 plants.

Electric House Pumping Systems

Under the above title the engineering department of Purdue University has published Bulletin No. 4 dealing with water supply systems operated by electric motors for the use of farms and other outlying property. Conceivably the information might be of great interest to manufacturing plants located away from city water supplies. The pamphlet has 30 pages and includes results of a number of tests.

Iron and Steel Exports 11,000 Tons Higher

September Shows Best Tonnage, with Two Exceptions, Since June, 1922—Japan Buying Heavily—Imports Lowest in 17 Months

WASHINGTON, Oct. 30.—Iron and steel exports in September totaled 172,499 gross tons, valued at $19,871,060, as compared with 161,426 tons in August, valued at $19,402,293, and represented the largest foreign movement for any month since May, when they aggregated 203,389 tons. The increase was largely due to heavier purchases by Japan of black steel sheets, tin plate, steel rails and galvanized wire. Exports of machinery showed a decline in September, being valued at $25,555,407 as against $28,240,760 in August.

Imports in September, amounting to 36,611 tons, valued at $1,785,166, were the lowest since April, 1922, when they amounted to 18,417 tons. The decline is apparently due to the sharp drop in imports of pig iron. Imports in August amounted to 45,439 tons, valued at $2,475,512. Exports of machine tools in September totaled 3744 in number, valued at $513,461, as compared with 19,022, valued at $1,018,613, in August. Imports of machinery in September declined to a value of $518,860 as against $602,665 in August.

For the nine months ended with September of this year, exports of iron and steel totaled 1,475,494 tons, valued at $171,627,880, as against 1,575,399 tons, valued at $143,397,169, for the corresponding period of last year, while exports in September of last year amounted to 129,475 tons, valued at $14,381,877.

For the nine months ended with September of this year imports totaled 651,344 tons, valued at $25,204,949, as against 301,987 tons, valued at $18,387,707, for the corresponding period of last year. Heavy iron ore imports accounted for much of the increase. For September of last year imports totaled 76,393 tons, valued at $3,220,537. Imports of manganese ore in September increased to 35,175 tons as against 23,026 tons in August, while imports of iron ore, amounting to 261,609 tons, showed a slight decline under the August total of 267,677 tons.

The largest single item of export in September was steel rails, foreign shipments of which amounted to 32,772 tons; Canada was the greatest buyer, taking 12,266 tons, with Japan ranking second with 8870 tons. For the nine-months period, shipments of steel rails to Canada totaled 43,966 tons, Japan leading for this period with 58,623 tons. Of the 8227 tons of black steel sheets exported in September, Japan, the heaviest buyer, took 3561 tons, as against 3254 tons for Canada, ranking second.

Pig iron imports declined to 8353 tons in September, of which 6200 tons came from England, which has provided 170,660 tons out of the total pig iron imports of 336,817 for the nine months ended with September.

Sources of American Imports of Pig Iron
(In Gross Tons)

	Sept., 1923	Nine Months Ended Sept., 1923		Sept., 1923	Nine Months Ended Sept., 1923
England	6,200	170,660	Scotland	....	16,771
Canada	322	41,680	Mexico	....	1
British India	786	14,766	Germany	....	20,740
Belgium	395	13,216	Austria	....	299
China	150	1,375			
Sweden	....	705	Total	8,353	336,817
France	....	56,604			

Exports of Iron and Steel
(In Gross Tons)

	September		Nine Months Ended September	
	1922	1923	1922	1923
Pig iron	5,203	2,148	22,767	23,076
Ferromanganese	70	45	1,054	3,265
Ferrosilicon	39	2	566	659
Scrap	2,419	9,681	55,303	49,214
Ingots, blooms, billets, sheet bar, skelp	6,810	8,366	83,231	87,967
Iron bars	....	630	....	11,314
Steel bars	10,881*	11,717	138,757*	122,840
Alloy steel bars	279	276	3,406	1,942
Wire rods	1,401	4,244	36,516	23,919
Plates, iron and steel	5,296	8,750	76,933	92,602
Sheets, galvanized	5,697	7,660	88,899	91,551
Sheets, black steel	9,231	8,227	197,888	77,415
Sheets, black iron	930	1,136	9,519	11,353
Hoops, bands, strip steel	2,502	3,349	24,959	29,857
Tin plate, terne plate, etc.	6,357	9,094	59,902	80,424
Structural shapes, plain material	10,898	9,984	96,696	101,010
Structural material, fabricated	3,054	9,790	35,135	59,809
Steel rails	18,451	32,772	220,472	197,822
Rail fastenings, switches, frogs, etc.	2,723	3,959	26,983	30,012
Boiler tubes, welded pipe and fittings	15,675	16,186	133,526	143,285
Cast iron pipe and fittings	2,218	2,983	19,488	20,880
Plain wire	4,667	7,976	91,412	70,182
Barb wire and twisted wire fencing	7,283	3,310	56,511	58,197
Wire cloth and screening	203	415	1,145	1,581
Wire rope	458	554	3,447	5,058
Wire nails	2,320	3,063	46,826	29,178
All other nails and tacks	659	634	6,642	6,748
Horseshoes	133	106	731	702
Bolts, nuts, rivets and washers, except track	1,404	1,567	13,270	14,234
Car wheels and axles	1,126	2,110	12,630	15,412
Iron castings	664	853	7,541	7,653
Steel castings	173	576	1,713	3,379
Forgings	91	336	1,726	2,454
Machine screws	10	....	145	....
Total	129,475	172,499	1,575,399	1,475,494

*Both iron and steel; they were not reported separately prior to Sept. 22, 1922.

Imports of Machinery
(By Value)

	September		Nine Months Ended September	
	1922	1923	1922	1923
Metal-working machine tools and parts	$20,950	$28,451	$167,465	$293,520
Agricultural machinery and implements	92,862	166,674	2,027,552	2,282,224
Electrical machinery and apparatus*	.....	8,502	.....	22,297
Other power generating machinery*	.....	110,753	.....	1,656,188
Other machinery	572,135	28,451	4,185,396	293,520
Vehicles, except agricultural	63,718	176,029	1,032,832	2,122,982
Total	$749,665	$518,860	$7,413,245	$6,670,731

*Not reported previous to Sept. 22, 1922.

Imports of Iron and Steel into the United States
(In Gross Tons)

	September		Nine Months Ended September	
	1922	1923	1922	1923
Pig iron	46,839	8,353	109,171	336,817
Ferromanganese	10,718	8,756	72,011	73,650
Ferrosilicon	3,615	988	12,774	9,899
Scrap	12,224	10,608	60,087	151,370
Steel ingots, blooms, billets, slabs and steel bars	1,280	2,325	16,057	14,948
Rails and splice bars	705	2,423	21,866	22,522
Structural shapes	259	405	1,784	7,868
Boiler and other plates*	....	262	....	1,574
Sheets and saw plates	42	276	425	1,948
Bar iron*	371	512	4,280	6,753
Tubular products*	....	261	....	3,288
Castings and forgings*	....	148	....	2,176
Nails and screws*	....	41	....	924
Tin plate	75	60	2,230	9,691
Bolts, nuts, rivets and washers*	....	5	....	155
Wire rods	235	827	1,302	3,022
Round iron and steel wire*	....	252	....	3,007
Flat wire and strip steel*	....	49	....	862
Wire rope and insulated wire, all kinds*	....	60	....	840
Total	76,393	36,611	301,987	651,344
Manganese ore	46,869	35,175	327,537	162,413
Iron ore	138,838	261,609	684,387	2,297,144
Magnesite	13,425	1,746	90,190	62,505

*Not reported separately previous to Sept. 22, 1922.

Machinery Exports

By Value

	September, 1922	September, 1923	Nine Months Ended September, 1922	September, 1923
Locomotives	$217,587	$288,457	$7,217,770	$3,271,115
Other Steam Engines	83,335	41,555	1,763,678	918,831
Boilers	168,051	251,288	816,820	983,867
Accessories and Parts	105,066	155,909	4,587,895	4,018,756
Automobile Engines	205,378	397,733	4,215,477	4,244,633
Other Internal Combustion Engines	362,939	561,065	3,187,999	5,280,357
Accessories and Parts for	296,124	375,318	2,920,127	2,605,083
Electric Locomotives	161,795	326,452	347,019	2,982,739
Other Electric Machinery and Apparatus	422,241	756,642	6,329,958	6,263,151
Excavating Machinery	159,992	52,138	1,130,844	1,137,431
Concrete Mixers	62,329	38,099	357,261	401,684
Road Making Machinery	121,043	164,810	793,454	1,341,792
Elevators and Elevator Machinery	275,983	437,329	1,848,362	3,038,724
Mining and Quarrying Machinery	611,245	890,724	1,641,256	7,257,070
Oil Well Machinery	248,829	445,002	3,228,115	4,705,851
Pumps	615,187	798,203	4,141,109	5,458,311
Lathes	54,874	102,321	571,772	669,417
Boring and Drilling Machines	40,628	51,392	436,726	488,022
Planers, Shapers and Slotters	15,758	20,057	209,059	193,392
Bending and Power Presses	11,085	66,664	273,787	260,041
Gear Cutters	14,667	11,144	91,835	128,096
Milling Machines	29,662	23,065	243,535	311,976
Thread Cutting and Screw Machines	22,921	19,490	140,045	402,156
Punching and Shearing Machines	7,171	5,605	119,678	132,637
Power Hammers	20,886	18,321	99,099	133,322
Rolling Machines	3,897		159,046	18,849
Sharpening and Grinding Machines	56,468	114,779	575,806	771,298
Other Metal Working Machinery and Parts of	602,895	395,500	4,292,751	3,521,649
Textile Machinery	640,892	676,374	11,568,612	6,997,988
Sewing Machines	641,009	739,986	4,724,114	6,429,269
Shoe Machinery	74,249	106,633	750,382	1,051,595
Flour-Mill and Gristmill Machinery	28,920	135,897	870,557	865,573
Sugar-Mill Machinery	548,132	837,558	2,939,747	3,259,494
Paper and Pulp Mill Machinery	107,851	153,217	1,391,056	1,684,855
Sawmill Machinery	99,124	29,641	471,092	507,783
Other Woodworking Machinery	113,995	115,430	1,036,751	806,478
Refrigerating and Ice Making Machinery	119,692	160,785	1,406,821	1,712,086
Air Compressors	129,115	122,228	1,393,014	1,815,073
Typewriters	985,996	889,169	8,853,124	10,211,361
Power Laundry Machinery	66,063	63,508	501,158	745,739
Typesetting Machines	290,591	432,118	2,704,293	2,794,067
Printing Presses	173,152	373,115	2,627,527	3,301,875
Agricultural Machinery and Implements	2,514,718	5,522,863	19,051,718	40,001,188
All Other Machinery and Parts	7,699,857	8,333,510	62,807,967	71,596,085
Total	$19,169,208	$25,555,407	$176,776,248	$214,765,378

Exports, January, 1922, to September, 1923, Inclusive

(In Gross Tons)

	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,212,732	243,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
Fiscal year 1921	4,168,619	129,541	82,549
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,439	6,527
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	145,640	1,791	9,353
September	129,475	5,203	6,810
October	122,924	1,553	8,364
November	127,782	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922	1,986,297	30,922	107,201
January, 1923	123,190	2,482	10,563
February	133,902	2,786	7,733
March	163,920	2,881	11,416
April	177,471	1,844	11,247
May	203,389	1,848	12,824
June	171,183	2,960	9,652
Fiscal year 1923	1,816,329	31,891	113,377
July	168,558	2,966	6,480
August	161,426	3,117	9,684
September	172,499	2,148	8,366
Nine months	1,475,494	23,076	87,967

*Calendar years.

Imports of Iron and Steel in Gross Tons

(Monthly Average)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl	26,386	14,132		
1914 to 1918, incl	23,351	4,645	3,281	$47,155
1919 to 1921, incl	23,901	5,708	3,710	37,115
1922	59,545	31,954	9,117	31,204
January, 1923	129,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	46,371	7,221	14,071
May	70,885	39,764	10,182	12,574
June	68,019	30,033	12,794	36,138
Six months' average	85,964	49,706	8,980	13,535
July	53,464	19,760	12,381	23,824
August	45,429	14,564	7,334	23,026
September	36,611	8,353	9,744	35,175

*Not included in "total imports."
†Includes ferroalloys.
‡Average for three years, 1916 to 1918 only.

Sources of American Imports of Iron Ore

(In Gross Tons)

	September		Nine Months Ended September	
	1922	1923	1922	1923
Spain	11,739	7,100	39,936	191,100
Sweden	52,856	75,342	219,808	674,624
Canada	346	580	1,754	23,959
Cuba	33,000	75,175	232,489	602,176
Other countries	59,897	103,212	190,400	805,285
Total	138,838	261,609	684,387	2,297,144

Machine Tool Exports

	Sept., 1923 Quantity	Sept., 1923 Value	Aug., 1923 Quantity	Aug., 1923 Value
Lathes	62	$102,321	95	$99,913
Boring and drilling machines	73	54,392	258	46,283
Planers, shapers and slotters	25	30,057	14	32,891
Bending and power presses	34	66,664	50	77,704
Gear cutters	68	11,144	59	22,131
Milling machines	17	23,065	28	48,481
Thread-cutting and screw machines	40	19,490	109	114,557
Punching and shearing machines	17	5,605	53	23,443
Power hammers	16	18,321	47	22,280
Rolling machines	....	....	1	1,100
Sharpening and grinding machines	469	114,779	852	93,670
Chucks, centering, lathe, drill and other metal-working tools	2,209	22,700	2,429	26,090
Pneumatic portable tools	714	44,923	15,027	410,070
Total	3,744	$513,461	19,022	$1,018,613

Exports by Countries of Destination

(In Gross Tons)

	September,	Nine Months Ended September,
Plates	1923	1923
Canada	6,518	78,081
South America	144	1,043
Japan	80	692
Cuba	41	781
Philippine Islands	19	568
Mexico	14	521
Galvanized Sheets		
Canada	1,311	26,327
Cuba	846	10,376
Chile	845	2,687
Argentina	633	4,263
Philippine Islands	629	5,463
Central America	394	3,094
Japan	372	3,242
Mexico	359	4,692
Colombia	165	2,726
Black Steel Sheets		
Japan	3,561	23,468
Canada	3,254	42,252
Argentina	199	1,889
Cuba	38	1,453
Philippine Islands	16	176
Tin Plate		
Canada	2,596	22,008
Japan	2,301	20,335
Argentina	931	4,724
Uruguay	773	2,996
China	762	6,595
British India	496	3,427
Steel Rails		
Canada	12,366	43,966
Japan	8,870	58,623
Cuba	4,180	39,348
Chile	2,804	4,920
Brazil	413	3,110
Philippine Islands	263	3,669
Chosen (Korea)	....	9,001
Honduras	248	7,590
Kwang Tung	....	11,143

Washington Call for Conference to Discuss Japanese Business

WASHINGTON, Oct. 30.—Information to the effect that British iron and steel manufacturers, in particular, are making a determined drive for the Japanese market for reconstruction materials has brought about a call by Assistant Secretary of Commerce, J. Walter Drake, for a special conference of trade association executives here Friday, Nov. 2. The Department of Commerce is told that many British sales experts have been recalled from foreign fields and others taken from London for special work in Japan. The immense amount of rebuilding now under way makes Japan the prize market for exporters of building material, in particular. The plans outlined by the conferees will have a widespread effect upon all American industries exporting to Nippon.

Commenting upon the conference, Mr. Drake today said: "American goods are well liked in Japan, and manufacturers in this country can compete very favorably in prices and quality. However, we shall lose our opportunity if we sleep at the switch while other nations are very much awake."

Among the trade associations to participate in the conference are: American Hardware Manufacturers, Plate Glass Manufacturers of America, Enamel and Sanitary Ware Manufacturers, American Paper and Pulp Manufacturers Association, Tanners Council, National Boot and Shoe Manufacturers.

Meager Export Business

NEW YORK, Oct. 30.—Export business with Japan continues active with heavy inquiry in the market for a wide range of material and some purchases of black sheets, wire nails and pipe. One Japanese export house has booked 3500 kegs of nails, several hundred tons of light gage black sheets and a small tonnage of gas pipe in the past week. Most exporters are submitting quotations on tonnages of light rails. One of these tenders calls for 23 miles of 16-lb. sections and 15 miles of 20-lb sections, bids opening Nov. 7.

While manufacturers and exporters in the United States are bidding on sheets, nails and wire asked for by the Imperial Government, no action has yet been taken, according to officials of the Japanese government in this country, who are conferring at Washington on the proper method of handling this purchasing.

Japanese Government Sheet and Nail Inquiry

WASHINGTON, Oct. 30.—Announcement was made today by the Japanese Government through the Department of Commerce that bids from American manufacturers for 20,000 metric tons of black and galvanized sheets and 3000 tons of wire nails will be received up to Nov. 1. This material will be used in the reconstruction work. Specifications are as follows: 3500 tons plain galvanized sheets, B. W. G. 28 and 30, size 3 x 6 ft; 3500 tons corrugated galvanized sheets, B. W. G. 28 and 30, size 2.2 x 6 ft; 1300 tons black sheets 28 and 30 gage, size 3 x 6 ft; 3000 tons wire nails, 10 per cent of 5 in.; 10 per cent of 4 in.; 10 per cent of 3 in., 30 per cent of 2½ in.; 25 per cent of 2 in.; 10 per cent of 1½ in. and 5 per cent of 1 in.

The Ohio State Public Utilities Commission has suspended until Nov. 6, the effective date of the new schedules filed by railroads for increased rates on iron and steel products, with the probability that further suspension will be made pending joint hearing by State commissions and the Interstate Commerce Commission. The Ohio commission had set Oct. 29 as the date for hearing complaints from Cleveland and Youngstown steel producers against the new rates. The railroads have indicated their willingness to voluntarily suspend the rates until Feb. 4, 1924, providing a joint hearing is arranged between the State commissions and the Interstate Commerce Commission.

Need for Measuring Management

There is increasing need for more trustworthy evaluations of management, Prof. Joseph W. Roe, head of the department of industrial engineering, New York University, declared in an address before a joint management week meeting of the local sections of the American Society of Mechanical Engineers, the Taylor Society, Society of Industrial Engineers, National Association of Cost Accountants and American Management Association, held in the Engineering Societies Building, New York, Oct. 23.

Among the causes assigned by Professor Roe were the following:

The increasing scale of production. Mistakes in management are more disastrous now than when production was on a smaller scale.

The widening of competition to a national and even international basis. To compete with foreign labor American production facilities must be used to maximum advantage.

The narrowing margin of profit. In the easy-going days a generation or two ago, profits were large enough to permit inefficiencies of management which today would be fatal.

The development of management as a separate function. Formerly the manager was usually the owner. Now, more and more, he is acting for others who are the owners, and is responsible to them. It is desirable that the owners have better means for gaging the effectiveness with which their business is being managed, and that the managers be able to prove their work to the owners.

The diversity of the points of view from which management is, and must be, judged. The interests and personal views of those making these judgments lead to different estimates for the same set of conditions. In so far as they can agree upon a common method, it will be a benefit to all.

The rapid development in management methods. New methods are being tried, some wise, some not. We should be able to determine their effectiveness quantitatively, if possible; to pass judgment on them on the basis of actual fact, instead of predisposition, enthusiasm or habit.

"It is a healthy sign," said Professor Roe, "that responsible industrial engineers and executives are the very ones who are most desirous to have their work measured. They are calling for it and will welcome it as a means for assisting them in their work."

Truscon Steel Co. Celebrates Its Twentieth Anniversary

Last week the Truscon Steel Co., Youngstown, celebrated the twentieth anniversary of its founding with a banquet attended by officials and employees and addressed by President Julius Kahn. He recounted the growth of the company from humble beginnings to its present annual gross business of approximately $20,000,000. In the course of his talk, Mr. Kahn stated there is scarcely a construction project in the country into which Kahn products do not enter in some way or other.

The original investment of $56,000 has expanded to gross assets of $15,500,000. It was stated that an initial investment of $5,000 at the start has expanded to $150,000 of stock without further cash investment, because of stock dividends.

Sales for the year to Oct. 23 were announced as $17,279,000, comparing with $13,322,729 in 1922, a low of $3,849,088 in 1914 and a high of $20,871,000 in 1920. The company received during the week a number of important orders, including one for $133,000 of metal sash from the National Tube Co. at Gary, Ind., and another for $55,000 from the Western Electric Co.

President Kahn received letters and telegrams of congratulation from a number of leaders in the steel industry. Talks were delivered by the sales managers of the company's various departments.

It was announced that the company has decided upon a substantial addition to its structural steel joist department, which will be ready next spring.

The company's principal properties are now located in Youngstown, and it operates a subsidiary plant in Japan. It has 18 warehouses and 43 branch offices in the United States, and employs normally about 2000 men.

INTEREST SHOWN IN WELDING

Industrial Applications Discussed at Three-Day Meeting of Welding Society—Other Features

The third fall meeting of the American Welding Society, held at the Fort Pitt Hotel, Pittsburgh, Oct. 24, 25 and 26, is regarded as one of the most successful thus far held. Many out of town members attended and the local sections were fully represented. The sessions brought home the fact that the applications of welding have greatly increased during the past two years, and that the activities of the society are producing a spirit of cooperation among competitive manufacturers, as well as users, in the welding field, all of which is making for progress in the welding arts.

A report on the industrial applications of welding and its possibilities, presented at the second session by E. H. Ewertz, general manager Moore plant, Bethlehem Shipbuilding Co., included the possibilities of welding as a fabrication process and in the repair field. The possibilities of arc and oxy-acetylene welding and cutting were also discussed, and the use of thermit welding outlined. The report was illustrated by slides.

That the several welding methods outlined constituted one of the most important, far reaching and labor saving processes ever invented, was emphasized by Mr. Ewertz in his conclusion. The field of steel structures was said to offer an opportunity for welding far exceeding that of the present applications taken together. In answer to why more progress had not been made in that field, it was indicated that it was necessary first to prove that welding is better or cheaper or both. "This means," he said, "demonstration on a commercial scale. Some little start has been made with oil storage tanks in this country, with gas holders in Australia, and with small steel vessels, but the field of buildings is practically untouched, particularly as regards the possibilities of spot welding. Full information as to cost as well as design and procedure is lacking in small experimental structures already built." More thorough and comprehensive cooperation through the society was stated as necessary, Mr. Ewertz pointing out that it cannot be expected that a single builder should take the risk of failure and bear the cost of developing the technique of welded construction.

The relations of the society to industry were outlined in a paper by T. F. Barton, president. The technical activities of the society, most of the work of which is accomplished through 11 research subcommittees, was taken up in an address by W. Sparagen, secretary American Bureau of Welding, which is the research department of the society. Mr. Sparagen briefly reviewed the several reports issued by the bureau and, as examples of cooperative activity, referred particularly to the work of the pressure vessel committee involving a program of investigation amounting to $15,000 and the work of the welded rail joint committee amounting to some $80,000. The part of the research council in these investigations was reviewed.

At a meeting of the electric arc welding committee the chairman, W. L. Warner, General Electric Co., Schenectady, reported that the standards for arc welding apparatus had been revised by a sub-committee of the A. I. E. E. These revised standards had undergone further revision by a sub-committee under the chairmanship of H. M. Hobart, General Electric Co., and copies of the last draft were distributed to members of the committee for suggestions as to further revision.

A digest of the available information on the applications of arc welding to shipbuilding, prepared by E. W. Ewertz, Bethlehem Shipbuilding Co., Elizabeth, N. J., under the direction of the committee, is being published as a serial in *Marine Engineering*. The report includes a description of all the welded ships, a number of photographs, test results, cost data, discussion of design and other information.

A report embodying a digest of existing information on the welding of non-ferrous metals was presented by A. G. Bissell, Westinghouse Electric & Manufacturing Co., East Pittsburgh. The members of the committee will review the report and submit comments to the secretary.

Progress was reported by the sub-committee's dealing with the reviews of welding thin sheet metal and speed and cost of arc welding and also the preparation of specifications for specimens to secure data on the arc welding of steel for structural purposes. A training course for electric arc welders was completed at a meeting of the committee on training of operators.

At a joint meeting of the executive committee of the American Bureau of Welding and the board of directors of the society it was voted to appropriate $150 for shipment of some six tons of samples from the Electrical Testing Laboratories to Union College, where tests on them will be made. The series of tests, started during the war, is for determining certain fundamentals of arc welding. It was also decided to publish a directory of the society's membership.

An afternoon was given over to an inspection trip of the Homestead works of the Carnegie Steel Co. About 60 members made the trip and both the steel mill and welding shop were visited. A visit to the plants of the Westinghouse Electric & Mfg. Co., East Pittsburgh, was also made, the members being guests of the company at luncheon at the plant.

The fall dinner of the society was held at the Fort Pitt Hotel and the members of the society were guests at the annual meeting of the Pittsburgh Railway Club, held on the evening of Oct. 25. The meeting was concluded with a joint session with the Pittsburgh section of the society. At this session the attitude of insurance companies toward gas and electric welding was explained by Dr. A. D. Risteen, director of technical research, Travelers Insurance Co. A brief outline of the railroad situation was presented in an address by George D. Ogden, traffic manager Pennsylvania System, Pittsburgh.

A night school course in "Steel and Its Treatment" has been inaugurated in the Rock Island, Ill., high school under the auspices of the Tri-City Chapter of the American Society for Steel Treating. One hundred men from various shops of the tri-cities attended the first meeting of the course. C. H. Burgston, chairman of the Educational Extension Committee of the Tri-City Chapter, is in charge of the course. The first lecture was on the subject, "Manufacture of Steel," and was given by A. H. Putnam, consulting metallurgist, Davenport. The next lecture will be given by L. A. Marsh, inspection engineer, Inland Steel Co., Chicago, whose subject will be "Rolling Mill Practice."

The Iron Age and Its Readers

A FURTHER word on Dr. Ingalls' article, "Distribution of Wealth in the United States," which had first place in our issue of Oct. 4. The amount and character of the comment we have had confirms our own opinion that in presenting it THE IRON AGE did its readers a service much worth while.

In charging that 2 per cent of the people own 65 per cent of the wealth, radical propagandists convey the idea that in late years the wealth has been concentrating in fewer hands. The fact is that it is being more widely diffused.

The question is of such widespread interest and is going to be so much discussed in the coming 12 months that we have prepared a digest of Dr. Ingalls' remarkable article in leaflet form so that it may be generally distributed. Many readers of THE IRON AGE will have use for these reprints and as long as the supply holds out copies will be sent to those who ask for them.

British Iron and Steel Market

Japan Still Buying Heavy Tonnages of Sheets—Makers Quoting Into Next Summer—Prices of Many Products Stiffen

(By Cable)

LONDON, ENGLAND, Oct. 30.

Pig iron is strong on sustained home demand and restricted supply. The output has not yet been increased. Consumers, realizing that lower price levels are improbable, are covering their requirements for several months ahead.

Hematite is firmer on improved steel demand. Foreign ore is under better inquiry and some sales have been made to Wales. Sellers of Bilbao Rubio ask 22½s. ($5.04) c.i.f. Tees.

Increased business in finished steel is mainly in plates and structural material for the Continent. Makers are holding out for higher prices for forward shipments, owing to the uncertainty as to future prices of raw materials.

Continental markets are somewhat disorganized and few orders are being received by traders here. There are some Indian and Far Eastern inquiries.

In Germany the Ruhr plants are very disorganized—either shut down or working short time. French authorities now officially estimate the Ruhr iron and steel stocks to be reduced to 84,000 tons. Small quantities are now commencing to find their way into France, Belgium, Luxemburg and Holland.

Tin plate is firm. There is good business in all markets. South America is an active buyer, as also are domestic consumers. The works are well sold and prices are being "talked higher" for the near future.

Galvanized sheets are firm, with moderate sales to India, Australia and South America. The Far Eastern demand is quieter.

Black sheets are strong on continued Far Eastern demand. All thin sizes of Japan 6 x 3, 13's, 107 lb., are being sold for February shipment at £21 10s. ($4.30c. per lb.) f.o.b. The works are quoting for June and July £21 5s. ($4.25c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.48 per £1, as follows:

Durham coke, delivered	£1	19s.	to £2	0s.	$8.74 to	$8.96
Bilbao Rubio ore†	1	4			5.38	
Cleveland No. 1 foundry	5	7½			24.08	
Cleveland No. 3 foundry	5	0			22.40	
Cleveland No. 4 foundry	4	19			22.18	
Cleveland No. 4 forge	4	17½	to 4	18	21.84 to	21.95
Cleveland basic	4	13½	to 4	15	20.73 to	21.28
East Coast mixed	4	19½	to 5	0	22.29 to	22.40
East Coast hematite	4	19	to 5	0	22.18 to	22.40
Ferromanganese	17	0			76.16	
Ferromanganese*	17	0			76.16	
Rails, 60 lb. and up	8	0	to 9	0	35.84 to	40.32
Billets	7	10	to 8	5	33.60 to	36.96
Sheet and tin plate bars, Welsh	9	2½			40.88	
Tin plates, base box	1	3⅛	to 1	3¼	5.18 to	5.21
					C. per Lb.	
Ship plates	9	5	to 9	10	1.85 to	1.90
Boiler plates	12	10	to 13	0	2.50 to	2.60
Tees	9	15	to 10	0	1.95 to	2.00
Channels	9	0	to 9	5	1.80 to	1.85
Beams	9	15	to 9	0	1.70 to	1.80
Round bars, ¾ to 3 in.	10	5	to 10	15	2.05 to	2.15
Galvanized sheets, 24 g.	19	0	to 19	5	3.80 to	3.85
Black sheets, 24 gage	14	0			2.80	
Black sheets, Japanese specifications	15	5			3.05	
Steel hoops	12	0	& 12	10*	2.40 &	2.50*
Cold rolled steel strip, 20 gage	17	5			3.45	
Cotton ties, Indian specifications	15	0			3.00	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:						
Belgium	£5	5s.	to £5	10s.	$23.52 to	$24.64
France	5	5	to 5	10	23.52 to	24.64
Luxemburg	5	5	to 5	10	23.52 to	24.64
Billets (nominal):						
Belgium	7	0			31.36	
France	7	0			31.36	
Merchant bars:					C. per Lb.	
Belgium	8	5			1.65	
Luxemburg	8	5			1.65	
France	8	5			1.65	
Joists (beams):						
Belgium	8	3¼			1.63	
Luxemburg	8	3½			1.63	
France	8	3½			1.63	
Angles:						
Belgium	8	0	to 8	5	1.60 to	1.65
¼-in. plates:						
Belgium	8	10			1.70	
Germany	8	10			1.70	
⅜-in. plates:						
Luxemburg	7	15			1.55	
Belgium	8	0			1.60	

Pig Iron Too High—Government Orders for Structural Work—Shipbuilding Smallest in 14 Years

LONDON, ENGLAND, Oct. 18.—While it is true that, in certain cases, improved conditions have been noticeable during the past fortnight the general position remains much as it has been for the past few weeks. There has been a little more moving in pig iron, consumers showing more inclination to negotiate for forward supplies. It is clear that the price of pig iron is still too dear to permit of any inflow of orders. Of course makers blame costs, and these undoubtedly are the main stumbling block to selling prices coming down to an economic level. The selling price of No. 3 Cleveland is about 96s., while that of East Coast hematite is quoted at about 99s. and upwards.

In finished iron and steel, the appalling state of the shipbuilding industry is reflected in the poor demand for shipbuilding material and as this is really the backbone of the trade, conditions are far from promising. In this connection it is interesting to note that Sir Frederick Henderson, chairman of Messrs. D. & W. Henderson, shipbuilders on the Clyde, referring to the shipyards, states that the outlook had never been so black as it was at the present time, and it was unlikely that anything like the full capacity of the yards would be occupied for some years to come, only one-third of the berthage being occupied at the present time. The government has recently decided to spend large sums of money upon all kinds of structural work, such as bridge building and railroad track relaying to help to alleviate unemployment in the iron and steel trades, and doubtless this will go a long way toward doing so, but export buyers still refrain from purchasing on anything like the pre-war scale and confine their commitments to bare necessary requirements.

Lloyds Register of Shipping just published report the merchant tonnage under construction in Great Britain and Ireland at the end of September as 1,271,195 tons, which is about 67,000 tons less than at the end of the June quarter, and compared with a year ago represents a decrease of about 346,000 tons. The total includes 242,000 tons upon which work has been suspended for a long time or has been under abeyance owing to the boilermakers' dispute which has been affecting the yards. Deducting this amount in order to enable a comparison to be made with figures for normal times, the actual tonnage under construction at the end of September is 1,029,000 tons, the lowest figure recorded for over 14 years.

Upon a complicated structure of corporation financing, the General Motors Corporation will promote about 70 of its leading executives to the position of "special partners" in a profit-sharing relation. It is provided that the Managers' Securities Co. be formed with capital of $33 000,000. The parent company will subscribe for all class A and B stock, paying therefor $5,000,000 in cash, and will draw a contract with the new company, agreeing to pay to it from 1923 to 1930 5 per cent. of its net earnings above seven per cent. The new company will offer to purchase 2,250,000 shares of General Motors common stock at $15, payable $4,950,000 cash and $28,800,000 in its new seven per cent. preferred. President Alfred P. Sloan, Jr., stated that this plan of profit sharing was devised by directors as a means of retaining valuable men developed in managerial positions.

EXTRA DIVIDEND DECLARED

Chairman Gary Announces Action of Steel Corporation Committee

Slight Decrease in Earnings in September Attributed in Part to Abolishing Long Day Orders Equal Half of Capacity

At a meeting of the finance committee of the United States Steel Corporation, Tuesday afternoon, it was decided to declare an additional dividend of ¼ per cent on the common stock. This announcement was made to representatives of the press by Chairman Gary at the conclusion of the meeting of the committee.

The report for the third quarter of 1923 was made public at the same time. It shows a surplus for the third time since the first quarter of 1921, when the surplus was $2,816,905, while the surplus for the second quarter of 1923 was $7,295,412, as compared with $4,859,351 for the first quarter. The surplus for the third quarter of 1923 was $6,349,235 before making the deduction of $1,270,756 for the extra dividend. The usual quarterly dividends of 1¾ per cent on the preferred and 1¼ per cent on the common stocks were included in the regular statement of earnings. The statement indicated that in the past quarter August was the best month and September was the poorest, but the earnings for the quarter were regarded as satisfactory. Earnings for the first three quarters of 1923 and the three preceding years were as follows:

Quarters	1923	1922	1921	1920
First.....	$34,780,089	$19,339,985	$32,284,722	$42,089,019
Second...	47,838,181	27,286,945	21,892,016	43,155,705
Third....	47,053,680	27,468,339	18,918,058	48,054,540
Fourth...	.....	27,553,392	19,612,033	43,877,862
Net earnings each year		$101,647,671	$92,708,827	$177,174,126

The statement of the earnings for the third quarter ending Sept. 30 was as follows:

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
July, 1923.....	$16,454,777	$687,774	$15,767,003
August, 1923....	17,683,045	685,578	16,997,467
September, 1923.	14,974,695	685,485	14,289,210
	$49,112,517	$2,058,837	
Net earnings			$47,053,680
Less charges and allowances for depreciation and sinking funds on bonds of subsidiary companies			13,127,769
Net income			$33,925,911
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,660,476	
Premium on bonds redeemed.....		257,500	
			4,917,976
Balance			$29,007,935
Dividends on stocks of the United States Steel Corporation, viz.: Preferred, 1¾ per cent.....		$6,304,919	
Common, 1¼ per cent.....		6,353,781	
			12,658,700
			$16,349,235
Less sums appropriated and expended, or to be expended, account of additions, improvements or betterments to plants and properties			10,000,000
Surplus for the quarter.....			$6,349,235

Judge Gary's Statement

In response to questions as to the reason for declaring the dividend, Judge Gary merely smiled and said: "Well, I guess it was because we thought we could pay it." He added: "I assure you this matter of the extra dividend was not considered until 3 o'clock this afternoon and only one member of the finance committee knew that the matter was to be considered. You may guess who that one man was. We directors do not take advantage of any advance information. That is really saying something, for the time was when it was considered by many business men proper to avail themselves of information about contemplated action in order to make money in the stock market."

Judge Gary said that probably the abolishing of the 12-hr. day was responsible to some extent to the reduction of earnings in September, but there were other elements, and no definite information is now obtainable as to the exact effect of the change from the 12-hr. day. He added that such information would not be actually determined for six months and possibly not for a year.

"Our earnings are fairly good," said Judge Gary, "but I would be less than frank if I should say that new business is heavy enough to insure keeping all our works fully in operation. It is natural for orders to fall off in midsummer and even in early fall. Our bookings now are about one-half of our production capacity, but inquiries, which include requests for prices and ask information as to when shipments can be made, are very large. Apparently a good deal of business is in prospect and many of these inquiries may result in orders. The necessities of the public are large and ability to pay is sufficient. As to how much business will develop, no one can tell, but we are confident as to the future."

Dropping into lighter vein, as the judge chatted with the newspaper men, he was asked whether it was true as reported by a writer in a New York paper that his ambition when he was ten years old was to be a labor agitator and strike leader. Judge Gary laughed and said: "When I was ten years old my ambition was to get my lessons so as not to be criticized by the school teacher and I was also fond of going swimming when my duties on the farm permitted. My ambitions were much like those of other boys of ten."

Cold-Rolled Strip Steel Makers Hold Meeting in New York

How to increase the consumption of cold-rolled strip steel was one of the subjects of discussion at a meeting of 35 companies making cold-rolled strip steel held in the Waldorf-Astoria hotel in New York, Wednesday, Oct. 24, representing about 98 per cent of the country's production. E. W. Harrison, Philadelphia, was chairman, and Chas. M. Best, Pittsburgh, was secretary. It developed that many new uses for cold-rolled strip steel are being found. A suggestion that meetings of the cold-rolled strip makers be held quarterly in the future was adopted, and as most of the makers are members of the American Iron and Steel Institute and attend its meetings, it was decided that two of the quarterly meetings would be just prior to or following the semi-annual meetings of the institute. Each manufacturer pledged for his own company his entire cooperation in the devising of ways and means for the disposal of the surplus production, which for some time has been heavy.

Increased costs of manufacture, due to the adoption of the 8-hr. day were also discussed. A canvass of the manufacturers present developed that export business in cold-rolled strip steel is less than 1 per cent of production.

Puddlers' Wages Reduced

YOUNGSTOWN, Oct. 30.—The average price of bar iron shipped by Midwestern mills during the 60-day period ending Oct. 20 was 2.40c. per lb. as compared with the 2.50c. average two months ago. This decline of 10c. per 100 lb. will result in a reduction in puddling rate for November-December to $13.38 per ton as compared with $13.88 paid in September-October. This is the first decline in the puddling rate in a number of bi-monthly periods.

The examination of sales sheets to determine the rate was conducted Oct. 29 at Youngstown between James H. Nutt, secretary of the Western Bar Iron Association and M. F. Tighe, of Pittsburgh, president of the Amalgamated Association of Iron, Steel and Tin Workers.

Iron and Steel Markets

BUYING REDUCED

Late October at 50 Per Cent Basis

Pig Iron Again Lower But Steel Prices Remain Firm

Buying of steel in the last week of October was probably little more than 50 per cent of capacity, and brought the month's total not much above that of September. Indications are that the leading interest and the independents are experiencing about the same reduction in orders. The diminishing backlogs are causing some curtailment of operations here and there.

It is still a question how long replenishment needs can be kept restrained. The consumer's effort to secure price revision is resulting in a temporary freezing of bookings through a refusal to specify against contracts.

The producer still sees no object in reductions, and looks for November to continue the performances of the past two months. Expectations of betterment lie in a swelling of railroad demands, the continued activity of automobile manufacture, the large scale of building construction and the effect of growing Japanese purchases.

The Steel Corporation's statement of earnings gives little, if any, indication of the effects of the increased cost up to Oct. 1 due to the abolishing of the 12-hour day.

Japanese buying is steadily materializing. In Chicago 2600 tons of black sheets were closed for December delivery and a Washington dispatch reports calls for bids on 13,000 tons of black sheets. 7000 tons of galvanized sheets and 3000 tons of nails. The Steel Corporation's bookings appear to total 20,000 tons of sheets.

Railroad developments include an inquiry of upward of 27,000 tons of rails for the Nickel Plate and the purchase by the Chesapeake & Ohio of 17,000 tons of tie plates, divided between the Wheeling and Bethlehem steel corporations, and 2500 tons for the Union Pacific placed in Chicago. The Louisville & Nashville has bought 15,000 kegs of spikes.

In equipment, besides the 43 locomotives for the Southern Pacific, the Lackawanna has bought 25 locomotives. The Baltimore & Ohio is about to buy 1547 cars and the Great Northern has inquired for 500 stock cars.

Of 17,500 tons of fabricated steel bookings, 6000 tons was for railroad work, including a Baltimore & Ohio dock. Last week awards totaled 11,000 tons. Fresh inquiries at 5000 tons were the smallest in a number of weeks.

Prices of pig iron are fairly well maintained on small tonnages for prompt delivery, but considerably lower quotations have developed on a few large size sales. In the active competition of eastern Pennsylvania and New Jersey furnaces, concessions of $1 to $2 per ton have been made and one sale of 2200 tons was at $21, furnace, while a cast iron pipe manufacturer purchased 5000 to 7500 tons at $22.50, delivered. The reductions at Chicago, Pittsburgh and other centers range from 50c. to $1, and in southern Ohio silvery irons have been reduced $2. Charcoal iron has been marked down $1.

Decrease in the average selling price of bar iron in the Central West for the past two months will cause a reduction of 50c. per ton from wages of puddlers, this being the first reduction in a long period.

The booking of tin plate orders for 1924 is expected next week. Present commitments are keeping the mills up to an 85 to 90 per cent basis.

Farm implement manufacturers are operating at not over 40 to 50 per cent of capacity, but own to hopeful view of the immediate future. A fair amount of exporting is being done to South America and France.

The spotty condition of buying is indicated in bolts and nuts. One seller's bookings in October were 25 per cent heavier than in September. Current demand is far from satisfactory and prices still are soft.

Cold finished bars are easier and sales have been made at the 3c. basis.

British prices of pig iron and steel have stiffened all along the line. Black sheets, due to Far Eastern demand, are being quoted for June and July delivery.

THE IRON AGE pig iron composite price has fallen to $22.27 from $22.96 last week, the lowest figure since the $22.23 of May 2, 1922, and $8.59 below the high price of last April.

For 28 successive weeks, save for a 28c. a ton drop 15 weeks ago, THE IRON AGE finished steel composite price has remained unchanged. It is 2.775c. per lb., and compares with 2.446c. per lb. one year ago and with 3.724c. per lb. three years ago.

Pittsburgh

More Cheerful Feeling Prevails, But Improvement Is Not Pronounced

PITTSBURGH, Oct. 30.—Based partly on larger tonnages placed with mills in the Pittsburgh district during the past week, but more largely on prospective business which is assuming tangible form, a more cheerful tone has developed in the iron and steel trade here. Some lines, however, continue to reflect price recessions. This is especially true of gray forge, foundry basic and malleable pig iron, which have declined 50c. a ton. Cold-finished steel bars also are somewhat easier and new business has been taken at 3c.

Some producers of sheets are quoting from $2 to $3 under the market, but without apparent effect upon other mills, which are taking tonnages at so-called regular prices. The Japanese Government has placed an order for a fairly heavy tonnage of black and galvanized sheets with the American Sheet & Tin Plate Co.

Operations of sheet mills range from 80 to 86 per cent of capacity, makers have a fairly large rolling schedule ahead of them, and it has been increased by fair sized tonnages placed by the automotive industry. Operations of tin plate mills range from 85 to 91 per cent of capacity, and most mills are committed for the remainder of the year with prospects for good business in the new year, for which books probably will be

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Oct. 30, 1923	Oct. 2, 1923	Oct. 2, 1922	Oct. 31, 1922
No. 2X, Philadelphia†	$22.65	$23.26	$24.76	$31.14
No. 2, Valley furnace	22.50	23.00	24.50	30.00
No. 2, Southern, Cin'ti†	23.55	24.05	25.05	29.05
No. 2, Birmingham, Ala.†	19.50	20.00	21.00	25.00
No. 2 foundry, Chicago*	24.00	25.00	26.00	31.00
Basic, del'd, eastern Pa.	23.00	24.00	25.00	28.50
Basic, Valley furnace	22.50	23.00	24.00	30.00
Valley Bessemer, del P'gh	26.76	26.76	27.26	34.76
Malleable, Chicago*	24.00	25.00	26.00	31.00
Malleable, Valley	22.00	22.00	24.00	32.00
Gray forge, Pittsburgh	24.26	24.76	25.76	31.26
L. S. charcoal, Chicago	29.13	30.04	30.04	36.15
Ferromanganese, furnace	110.00	110.00	110.00	100.00

Rails, Billets, Etc., Per Gross Ton				
O-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$45.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	40.00
O-h. billets, Pittsburgh	40.00	40.00	40.00	40.00
O-h. sheet bars, P'gh	42.50	42.50	42.50	39.00
Forging billets, base, P'gh.	47.50	47.50	47.50	45.00
O-h. billets, Phila.	45.17	45.17	45.17	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh.. lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.25	2.25	2.15	2.00

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.325
Iron bars, Chicago	2.40	2.40	2.35	2.50
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.00	2.90

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Oct. 30, 1923 Cents	Oct. 23, 1923 Cents	Oct. 2, 1923 Cents	Oct. 31, 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.50
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.15
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$17.50	$17.50	$19.00	$25.50
Carwheels, Philadelphia	19.00	19.00	20.50	21.00
Heavy steel scrap, P'gh	15.00	15.00	16.50	21.00
Heavy steel scrap, Phila	15.00	15.00	16.00	17.00
Heavy steel scrap, Ch'go	13.50	13.75	15.00	18.00
No. 1 cast, Pittsburgh	18.50	18.50	21.00	24.00
No. 1 cast, Philadelphia	19.00	19.00	20.50	22.00
No. 1 cast, Ch'go (net ton)	18.00	18.50	19.00	20.50
No. 1 RR. wrot. Phila.	17.00	17.00	19.00	21.00
No. 1 RR. wrot. Ch'go (net)	12.00	12.50	14.50	17.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$4.00	$7.50
Foundry coke, prompt	4.75	4.75	5.00	10.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	13.00	13.12½	13.75	14.12½
Electrolytic copper, refinery	12.25	12.50	13.00	13.62½
Zinc, St. Louis	6.32½	6.32½	6.30	7.10
Zinc, New York	6.67½	6.67½	6.65	7.45
Lead, St. Louis	6.46	6.55	6.70	6.50
Lead, New York	6.75	6.85	7.00	6.80
Tin (Straits), New York	41.50	41.25	41.87½	37.00
Antimony (Asiatic), N. Y.	8.50	8.00	7.50	6.70

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25 ‡Silicon, 2.25 to 2.75.
The prices in the above table are for domestic delivery and do not necessarily apply to export business

Composite Price Oct. 30, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Oct. 23, 1923,	2.775c.
	Oct. 2, 1923,	2.775c.
	Oct. 31, 1922,	2.446c.
These products constitute 88 per cent of the United States output of finished steel.	10 year pre-war average,	1.689c.

Composite Price Oct. 30, 1923, Pig Iron, $22.27 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Oct. 23, 1923,	$22.96
	Oct. 2, 1923,	23.96
	Oct. 31, 1922,	29.52
	10-year pre-war average,	15.72

open next week. Rail mills also are fully engaged, and the present programs of carriers call for requirements that will assure capacity operations over the first half of 1924.

Inquiries for structural steel running as high as 3000 tons are expected to develop into orders in the near future. Pipe mills are operating at a high rate on standard line sizes up to 3 in. and there are indications of better business in lapweld sizes for the oil country. Wire mills continue to operate at a good capacity. The Carnegie Steel Steel Co. is operating at about 90 per cent of ingot capacity and has 43 of its 59 blast furnaces in operation, while the Jones & Laughlin Steel Corporation has 10 of its 12 furnaces in blast. The tone of the coke market is stronger but prices are not changed. Further declines have been made in prices of old material.

Pig Iron.—Further weakness in foundry iron is reflected by price recessions of 50c. a ton. The Standard Sanitary Mfg. Co. has closed for 3000 tons of No. 2 foundry and No. 2X iron, which, figured on a Valley basis, went at an average price of a little less than $22.50. The iron was purchased from several sources, some of it coming from a Valley furnace at a price said to have been $22.50, at which the market on No. 2 foundry now is quoted. The No. 3 foundry market is $22, Valley. A sale of 500 tons of gray forge by a Valley furnace to a Pittsburgh consumer has been made at $22.50. Malleable iron is quoted at $22, Valley, although it is reported that this grade is being offered at as low as $21.50. There has not been sufficient activity in the market for steel-making grades during the past week to test it. Meanwhile basic is quoted at $22.50, Valley, and Bessemer at $25, Valley. A Valley furnace has sold a small lot of Bessemer iron at $24, Valley, but it is said that this furnace has no sizeable tonnage of this grade of iron, and other makers, who are producing Bessemer, have asked and received $25 for the small tonnages they have sold. The Struthers Furnace Co. will put in blast its furnace at Struthers,

Ohio, the latter part of the present week to make No. 2 foundry.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$22.50
Bessemer	25.00
Gray forge	22.50
No. 2 foundry	22.50
No. 3 foundry	22.00
Malleable	22.00
Low phosphorus, copper free	30.00

Ferroalloys.—The market for standard ferromanganese still is quoted at $110, Atlantic seaboard, by producers but has been disturbed somewhat by a resale transaction by a middle interest of three lots aggregating 800 tons at $108, most of the tonnage being for delivery in the Pittsburgh district. It is reported that this tonnage came from a producer, and was originally intended to apply on contract, but was not specified against. Apparently there are not any further immediate tonnages available at this quotation. Consumers are buying in small lots only, and indications of stimulated demand for the early future are not promising. The market for 19 to 21 per cent spiegeleisen also is quiet and shows a softer tone. While small lots are reported to have moved at $42 during the past week, some makers still quote as high as $45, furnace. Quotations on silvery grades have been reduced $2 by Jackson County makers. Prices are given on page 1213.

Sheets.—Large orders for black and galvanized sheets have been placed with the American Sheet & Tin Plate Co. by the Japanese Government for use in reconstruction of the area destroyed by the recent earthquake and fire. It is noted with interest that these orders call for heavier gages than are usually purchased by Japan. This Steel Corporation subsidiary is heavily engaged and is operating at 86 per cent of capacity on sheets. Operations of independent sheet mills generally in this district are estimated at approximately 80 per cent of capacity. Domestic business is fair and demand calls for the various grades of sheets. Inquiries and orders from the automotive trade are unusually good for this season of the year. As a whole, however, the market is not strong and it is reported that some producers are making concessions of $2 to $3 per ton, but these easier prices apparently have not affected the market perceptibly. Galvanized sheets, No. 28, continue to be quoted at 5c., No. 28 black at 3.85c., and blue annealed, No. 10, at 3c. Prices are given on page 1212. Tin plate operations of tin plate mills in this district reflect comfortable bookings. The American Sheet & Tin Plate Co. operated at 91 per cent of capacity last week and was engaged more heavily than any other week since the early part of the present year. Independent operations are almost as great. The American Sheet & Tin Plate Co. has a rolling schedule which will call for all it can do over the remainder of the year. Prospects for tin plate business next year are bright. It is expected that books for the first quarter and first half of 1924 will be opened next week.

Semi-Finished Steel.—Demand for semi-finished steel is small, and no sizable sales providing a real test of the market during the past week have been reported. Specifications against contracts show only moderate improvement. A range of $40 to $42.50, Pittsburgh, still is maintained on rolling billets for both 2-in. and under and 2-in. and over, with indications that an attractive inquiry would develop the lower figure from some producers. The quotation of $47.50, Pittsburgh, still is quoted on forging billets of ordinary carbon steel, while the light demand for sheet bars brings the quotation of $42.50, Pittsburgh, for both the Bessemer and open-hearth grades. Small lots of wire rods are being placed with producers at $51, base. Business in this line is quiet and quick shipment is being made. The Carnegie Steel Co. is operating at 89 per cent of ingot capacity, while generally operations of independent companies continue to range between 70 and 75 per cent.

Plates.—Makers of plates report a slight improvement in demand during the past week and comes from miscellaneous consuming sources, particularly the railroads. Purchases and specifications, however, involve comparatively small lots and evidently are being made to meet immediate requirements. Producers in this district still are quoting 2.50c., base, Pittsburgh. Deliveries are being made in two weeks to 30 days, depending on the size of the orders and the gage of the steel. The chief demand is for plates ¼-in. and heavier. Operations of plate mills, generally in this district, range from 75 to 80 per cent, and are made possible largely because of backlog business. Prices given on page 1212.

Structural Steel.—While the demand for structural steel continues to be light, several jobs involving lots of 700 to 800 up to 2000 to 3000 tons are before fabricators. Most of the tonnage is for industrial construction. The railroads also placed a little more business during the past week than they did during the preceding week. Early delivery is being made and mills in this district are holding to the quotation of 2.50c., base, Pittsburgh. Operations of structural mills range between 70 and 80 per cent of capacity. The McClintic-Marshall Co. has taken approximately 450 tons for buildings at Tiffin, Ohio, for the Standard Sanitary Mfg. Co. Prices are given on page 1212.

Iron and Steel Bars.—Small orders to meet immediate needs are being placed for steel bars, but the market remains dull. Although lower quotations are said to be quoted by mills in some districts, those in the Pittsburgh district are maintaining the price of 2.40c., base, Pittsburgh. They report fair bookings on old business and operations are estimated at 65 to 70 per cent of capacity. The market for iron bars remains limited with no change in prices.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Hot-Rolled Flats.—A small demand exists for hoops and bands, with makers quoting 3.15c., base. A somewhat better demand is being made for hot-rolled strip steel, quoted at 3c. to 3.15c., and it is reported that the lower figure is being offered more generally than it has been. Operations range from 60 to 65 per cent of capacity, and deliveries are being made in from two to three weeks.

Wire Products.—Orders placed this month with mills in this district for wire products exceed those of September. Specifications against contracts also have been heavier than they were last month. While new business is fairly good, some mills report that it is slightly less than production. Demand is well distributed and covers such leading lines as bright wire, galvanized wire, wire fencing and nails. The greatest demand is for mixed carloads and the jobbing trade reports good business. Some producers are booked for the remainder of the year, while others have a 30-day backlog. The demand for nails is most marked in construction lines. The merchant trade is taking fair sized tonnages of various lines, including wire fencing. While the demand for galvanized wire is fair, this is also true of bright wire for some mills, although some producers report that inquiry for the latter product is a little below the average. Quotations are unchanged. Prices are given on page 1212.

Tubular Goods.—Orders for merchant buttweld steel pipe involve good sized tonnages, calling for black and galvanized sizes up to 3-in. There are large tonnages of unfilled orders which are more than necessary to carry the mills through the remainder of the year. Buyers are bringing pressure for early deliveries. Fair demand is reported for lapweld sizes in merchant steel pipe and it comes from miscellaneous sources. Conditions in the oil fields have resulted in curtailment of incoming business, but the mills have orders on their books on which they are operating and this business will carry most of them either through or almost to the end of the year. Prices are firm in all lines, and no evidence has appeared of concessions being made. Some producers report that the oil country situation gives promise of renewed activity shortly after the new year and think that there will be steady and satisfactory de-

mand for all classes. Inquiries are out for heavy tonnages of line steel pipe and it is claimed the business will be placed soon and will have a stimulating effect. Fair demand also is being made for buttweld sizes of iron pipe, while that for lapweld iron pipe is only moderate. Prices are given on page 1212.

Cold-Rolled Strips.—Demand for cold-rolled strip steel is fair and comes chiefly from the automotive industry, although other consumers have placed small orders during the past week. Makers report that the price of 5c., base, is well established. Deliveries are being made in two to three weeks and operations range from 60 to 65 per cent capacity.

Cold-Finished Steel Bars and Shafting.—The market for cold-finished steel bars has softened and business is now being taken at 3c. by some large makers as well as smaller producers, although the price of 3.25c. apparently has not entirely disappeared. The automotive industry has placed a moderate amount of business, which is said to have been done at 3c. Mills are making prompt deliveries. Ground shafting is steady and unchanged at 3.65c. base f.o.b. mill.

Rails.—Makers of standard steel rails are heavily committed over the remainder of the year, and the carriers are placing orders for large tonnages. Plans they have already made are said to assure capacity operations over the first half of 1924. The rail mills, therefore, are faced with the problem of meeting demands and making deliveries as will be required by the carriers whose program calls for laying of a great amount of trackage. Some of the tonnages being placed involve extraordinarily heavy requirements. Demand for light rails is dull, but producers rolling from new steel say that the price of 2.25c., base, covering rails up to 45-lb., is well established. Rerolled rails still are quoted at 1.85c. to 2c., base. Orders for light rails generally involve car lots.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Bolts, Nuts and Rivets.—The market for bolts, nuts and rivets continues to be soft and some makers in order to attract business are making concessions ranging from 2½ to 5 per cent of the list prices. Others maintain the regularly quoted prices. The railroads are buying small lots of bolts and nuts. Prompt shipments are being made. Operations vary from 45 per cent to full capacity. Prices are given on page 1212.

Track Supplies.—Greater demand is being made for standard spikes. The railroads have shown renewed activity. The Louisville & Nashville Railroad has placed an order in this district for 15,000 kegs. Prices remain unchanged at $3.15 per 100-lb., base. The better demand generally does not call for large orders, but principally involves small lots. Deliveries are being made early, and some producers, who are shipping on back orders, expect to catch up in November or December and report that requirements for 1924 so far are only slight. The market for small spikes is quiet, and will not be stimulated until operations of coal mines increase. The prices for small spikes remain unchanged at $3.50.

Coke and Coal.—Curtailment of additional capacity has given a firmer tone to the market for both furnace and foundry coke. While neither demand nor consumption is any greater, production and consumption are more nearly equalized. The market for 48-hr. fuel is quoted at $3.75 to $4, Connellsville ovens, with some producers insisting on the higher price for standard quality coke. At the same time, scattering lots have been sold at $3.50. Demand for foundry coke is stronger than for the furnace grade, and while the market is quoted at $4.75, Connellsville ovens, sales of the best quality fuel have been made at higher figures. The market for coal is sagging, the coking grade being available at the wide range of $2 to $2.75, depending largely on quality and the urgency of the demand. There are reports of sales of less desirable tonnage at as low as $1.85. The best grade of gas coal commands from $2 to $2.50, mine run, while steam coal is quoted at $1.25 to $1.50.

Scrap.—The market for old material is extremely dull, and some leading grades have shown a further decline, amounting to 50c. a ton. Consumers are showing practically no interest in the market. Heavy melting steel is quoted at $15 to $15.50 a ton, and it is said the cost of production barely is covered at this range. A nearby West Virginia steel mill is said to have bought a fair sized tonnage of this old material, involving rigid specifications at $16, but this is considered to be above the regular market.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$15.00 to	$15.50
No. 1 cast, cupola size	18.50 to	19.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.50 to	18.00
Compressed sheet steel	14.00 to	14.50
Bundled sheets, sides and ends	12.50 to	13.00
Railroad knuckles and couplers	17.50 to	18.00
Railroad coil and leaf springs	17.50 to	18.00
Low phosphorus bloom and billet ends	20.50 to	21.00
Low phosphorus plate and other material	18.50 to	19.00
Railroad malleable	18.00 to	18.50
Steel car axles	18.50 to	19.00
Cast iron wheels	17.50 to	18.00
Rolled steel wheels	17.50 to	18.00
Machine shop turnings	10.50 to	11.00
Sheet bar crops	16.00 to	16.50
Heavy steel axle turnings	13.00 to	13.50
Short shoveling turnings	12.00 to	12.50
Heavy breakable cast	14.00 to	14.50
Stove plate	13.50 to	14.00
Cast iron borings	12.00 to	12.50
No. 1 railroad wrought	13.00 to	13.50
No. 2 railroad wrought	15.00 to	15.50

Recently Acquired Zanesville Plants of the Youngstown Sheet & Tube Co.

The recently acquired Zanesville plants of the Youngstown Sheet & Tube Co., Youngstown, Ohio, secured through purchase of the Steel & Tube company of America, consist of modern tube mills and a plant devoted to the manufacture of special machinery.

The tube mill plant site contains 43 acres, and the buildings have an area of about 300,000 sq. ft. under roof, together with large yards equipped with overhead cranes and modern facilities for carrying on operations. The property has rail connections with the Baltimore & Ohio, Wheeling & Lake Erie, New York Central and Pennsylvania lines.

The plant manufactures its own electric power and gas, the necessary coal being supplied by the mines of the Redfield Coal Co., located about 14 miles away, and also owned by the Sheet & Tube company. Present capacity of the property is about 20,000 tons of pipe per month, ranging in size from ½-in. to 15-in. in diameter. The main building at the works, 160 x 1000 ft., houses two lapweld pipe mills at one end and two buttweld mills at the other, drawing their skelp from storage in the center. Skelp for these mills is now being supplied from the plate mills at Youngstown in the Brier Hill division of the Sheet & Tube company.

There are also two coupling shops, one furnace or welding building, the other finishing or tapping building. The plant also includes the necessary auxiliary departments.

The plant was originally started and operated by the Eastern Tube Co., and turned out its first pipe on Sept. 11, 1901. In 1904, the Mark Mfg. Co., Chicago, acquired the property and assumed control. Many improvements were made under this company's management and ownership, which retained control until the formation of the Steel & Tube company.

Since July 1, 1923, the property has been managed by the Sheet & Tube company, under direction of E. T. McCleary, located at Youngstown, with the title of district manager of the Eastern division.

Chicago

Pig Iron Prices Decline—Railroad Orders Develop Very Slowly

CHICAGO, Oct. 30.—Further declines in scrap and pig iron and continued stagnation in finished steel constitute the main features of the market situation for the week. Although one important mill booked twice the tonnage in the past seven days that it took in the previous week, buying continues to be confined to immediate needs, indicating that consumers have not abandoned their policy of watchful waiting. The approach of the inventory-taking period has still further increased the caution of buyers and many of them are limiting their purchases to small lots from warehouse to keep their stock down to a minimum figure at the turn of the year. In fact, jobbers' sales in October were larger than expected, in some instances exceeding those for September by fully 10 per cent.

Shipments from mills still run heavier than new bookings and in view of the steady contraction of mill backlogs, buyers feel that prices may soon reflect the anxiety of producers for new tonnage. Except for more frequent concessions in sheets, finished steel prices are still firm, however. It is no secret that one of the most potent reasons that producers are holding so tenaciously to present price levels is the belief that lower prices, instead of bringing out business, would merely intensify uncertainty as to the future course of the market.

Prospective railroad car buying, upon which producers have been placing much dependence in gaging steel demand for the coming months, is exceedingly slow in materializing. Perhaps the most encouraging development of the week was the fact that the Southern Pacific, which has been counted upon to buy 18,000 cars, has actually placed orders for 43 locomotives.

Local mill operations show no material change. The Illinois Steel Co. has again turned on the blast on two Joliet stacks that were recently banked and now has a total of 23 out of 27 steel works blast furnaces active. Its steel output is at the rate of 93 per cent of ingot capacity. The Inland Steel Co. is on a 70 to 75 per cent basis.

Pig Iron.—Prices have again given ground in the absence of active demand. With outside producers offering their products from the North, the East and the South, competition is keen and prices show considerable variance. At Chicago $24 base, furnace, appears to be the ruling market on Northern iron, but at outlying points, notably in Michigan and down-State Illinois delivered prices have in some instances figured back to less than that figure, deducting the freight from Chicago. Southern iron for delivery by water and rail is now quoted at $24.75, delivered Chicago. Southern foundry for all rail shipment is freely offered at $19.50 base, Birmingham, and as low as $19 has been done. A report that $18, Birmingham, has been quoted lacks verification. Current orders are small, ranging from carloads to 500 tons, and represent the immediate needs of melters. With inventory taking approaching, users have a further incentive to hold their purchases down. Several hundred tons of charcoal have been sold in Michigan at $26 base, furnace, a concession of $1 a ton. Silvery prices have declined $2 per ton.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$29.15 to $30.15
Northern coke, No. 1, sil. 2.25 to 2.75	24.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00
Malleable, not over 2.25 sil.	24.00
Basic	24.00
High phosphorus	24.00
Southern No. 2	24.75 to 25.51
Low phos., sil. 1 to 2 per cent, copper free	33.25 to 34.00
Silvery, sil. 8 per cent	37.29

Ferroalloys.—British producers have reduced their prices on ferromanganese to $110, seaboard, and while it is said that material can be bought for less, no sales are reported. There continue to be sales of spiegeleisen at the figures published below, but with the exhaustion of the supplies of a producer whose furnace is now down, prices are expected to stiffen.

We quote 80 per cent ferromanganese, $117.56, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $43.80 to $44.30, delivered.

Plates.—Expected purchases of railroad cars have not yet materialized and no new orders for oil storage tanks are reported. New business in plates is light, but such orders as are being placed generally call for quick delivery, indicating that user's stocks are low. Prices are still unchanged.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—Denver has awarded 2800 tons of large sizes to the United States Cast Iron Pipe & Foundry Co. and 1200 tons in smaller diameters to the Colorado Fuel & Iron Co. Joliet, Ill., takes bids on 200 tons of 6-, 8- and 10-in. today. Duluth receives tenders today in 100 tons. The American Cast Iron Pipe Co. was low bidder on 570 tons of 8-in. water pipe for Chicago with a price of $46, base Birmingham. This bid, however, was for extended delivery. On November shipment, $48, Birmingham, appears to be the best going quotation. Prices on Delavaud centrifugal pipe, which will probably be announced soon, will be higher than on sand-cast per ton, but lower per foot.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $60.20; 6-in. and above, $56.20; class A and gas pipe, $5 extra.

Sheets.—A local mill has taken further orders for Japanese delivery involving 2000 tons of black sheets. These are for shipment in December. Domestic purchases of sheets are confined to small lots to cover consumers' immediate needs. Prices are softer, particularly on black and galvanized. As low as 3.70c., base, Pittsburgh, has been done on the former and 4.90c. on the latter. Price concessions are still exceptional, however, and the larger mills are adhering already to their old quotations.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Bolts and Nuts.—One important seller reports October bookings 25 per cent heavier than those for September. Current demand, however, is still far from satisfactory and prices are soft. On machine bolts with cut threads 60 and 10 and 5 off is being done and on carriage bolts with cut threads 60 and 5 off is not an uncommon quotation.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 40 and 5 per cent off; larger sizes, 10 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Rails and Track Supplies.—The Nickel Plate is inquiring for 15,000 tons of standard section rails. The distribution of the Pennsylvania order for 200,000 tons is expected momentarily. The Union Pacific has placed 2500 tons of tie plates with a Chicago mill. The Chesapeake & Ohio recently closed for 17,000 tons of tie plates in the East, having divided the order between the Wheeling Steel Corporation and the Bethlehem Steel Co. Demand for light rails is slack and mills occasionally find it necessary to shade their price of 2.25c. to interest prospective buyers.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.
Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.75c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.
Jobbers quote standard spikes out of warehouse at 3.90c. base, and track bolts, 4.90c. base.

Structural Material.—Fabricators are steadily reducing their obligations and while some of them still have three to four months' work ahead of them, others are showing their anxiety for new business through lower quotations on current inquiries. Lettings during the week were fairly numerous, although involving small tonnages. The East Lake Street substation of the Commonwealth Edison Co., Chicago, will require 1500 tons instead of 1000 tons, as previously announced. A viaduct in the Union Stock Yards, Omaha, will take 1200 tons. Buying of plain material is still on a hand-to-mouth basis and current mill bookings continue to fall short of shipments. Prices, however, remain unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—New buying is limited and purchases for stocking purposes are not expected in view of the early deliveries now available from the mills. The fact that inventory taking is steadily drawing near also tends to discourage forward buying at this time. Present mill bookings cover four or five weeks' work ahead. Prices, which remain unchanged, are shown on page 1212.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Bars.—Orders for soft steel bars show a slight gain, but buyers continue to confine their purchases to their immediate needs. Users' stocks are low, but in most instances their consumption is well maintained. The operations of automobile manufacturers still exceed those of any previous year. Farm implement makers are not running at over 40 to 50 per cent of capacity, but they are taking a more hopeful view of the future. While they are booking little business in the wheat-growing sections, they find prospects improved in other parts of the country and are doing a fair amount of export business, principally for shipment to South America and France. Local prices on soft steel bars remain firm at 2.50c. Demand for bar iron and rail steel bars shows little, if any, improvement, but mills are holding firmly to prices.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Warehouse Prices.—Local jobbers have reduced blue annealed sheets $7 a ton and black and galvanized $10 a ton. These reductions reflect highly competitive conditions among warehouses rather than any important change in mill prices. The new quotations are shown under the paragraph on sheets.

Reinforcing Bars.—Inquiries and lettings of reinforcing bars are few, and while the ruling price remains 2.75c., warehouse, it is possible that better than this could be done on an attractive tonnage. The R. F. Conway Co., Chicago, has a general contract for the McCormick Road to be built by the Sanitary District, Chicago. Approximately 700 tons of reinforcing bars are involved, and these will probably be bought for shipment from mill instead of from warehouse. Lettings include:

Monarch Portland Cement Co. plant, Humboldt, Kan., 200 tons to Kansas City Bolt & Nut Co.

Superstructure for Capitol Theater building, Seventy-ninth and Halsted Streets, Chicago, 175 tons to Concrete Engineering Co.

School building, Council Bluffs, Iowa, 100 tons to Concrete Steel Co.

Pending business includes:

County paving work, Waterloo, Iowa, 400 tons.

Old Material.—With consumer buying light and railroad offerings exceptionally heavy, prices continue to decline. Railroad lists this week are unusually large and the chief interest of the trade at the moment is how much further prices will be depressed through the absorption of so large a quantity of material at this time. The Illinois Central offers 11,000 tons; the Pennsylvania Southwestern Region, 7200 tons; Pennsylvania, Northwestern Region, 3000 tons; Pennsylvania, Central Region, 14,000 tons; Pennsylvania, Eastern Region, 31,000 tons; the Burlington, 7600 tons; the Santa Fé, 3000 tons; the Northwestern, 4000 tons; the Great Northern, 1900 tons; the St. Paul, 1000 tons; the Alton, 700 tons; George W. Jennings, 1600 tons; and the Erie, the Michigan Central and the New York Central blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$19.50 to	$20.00
Cast iron car wheels	17.50 to	18.00
Relaying rails, 56 and 60 lb.	26.00 to	27.00
Relaying rails, 65 lb. and heavier	32.00 to	35.00
Rolled or forged steel car wheels	17.00 to	17.50
Rails for rolling	14.50 to	16.00
Steel rails, less than 3 ft.	16.00 to	16.50
Heavy melting steel	13.50 to	14.00
Frogs, switches and guards cut apart	13.50 to	14.00
Shoveling steel	13.25 to	13.75
Drop forge flashings	9.00 to	9.50
Hydraulic compressed sheets	11.00 to	11.50
Axle turnings	10.50 to	11.00
Steel angle bars	15.00 to	15.50
Per Net Ton		
Iron angle and splice bars	17.50 to	18.00
Iron arch bars and transoms	17.50 to	18.00
Iron car axles	23.50 to	24.00
Steel car axles	15.00 to	15.50
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.00 to	7.50
Cut forge	12.00 to	12.50
Pipes and flues	8.00 to	8.50
No. 1 railroad wrought	12.00 to	12.50
No. 2 railroad wrought	12.00 to	12.50
Steel knuckles and couplers	15.50 to	16.00
Coil springs	17.00 to	17.50
No. 1 machinery cast	18.00 to	18.50
No. 1 railroad cast	17.50 to	18.00
No. 1 agricultural cast	17.50 to	18.00
Low phos. punchings	14.00 to	14.50
Locomotive tires, smooth	15.00 to	15.50
Machine shop turnings	6.50 to	7.00
Cast borings	8.50 to	9.00
Short shoveling turnings	8.50 to	9.00
Stove plates	15.00 to	15.50
Grate bars	14.00 to	14.50
Brake shoes	15.00 to	15.50
Railroad malleable	16.50 to	17.00
Agricultural malleable	16.00 to	16.50

Possible Scrap From Japan

It has been suggested, says the *Ironmonger*, of London, that, as a result of the earthquake in Japan, large quantities of scrap metal will be available for export from that country. It has been argued that, for every ton of new material ordered by Japan, there must be a ton of scrap metal for disposal and that, even if this estimate is halved to allow for loss in collecting and other causes, the scrap available must represent an enormous tonnage. As it is improbable that there will be much demand for scrap metal in Japan for some time to come, it is reasonable to assume that the Japanese will look for markets for this material in Europe and the United States. Hitherto, however, China has been the principal outlet for Japanese scrap, and it is possible, although not probable, that the Chinese market will be able to absorb the quantities arising from the earthquake. A considerable proportion of the material available must be non-ferrous scrap, as it is reported that there has been great destruction of electrical installations. The possibilities that the British and American scrap markets may suffer a reaction due to supplies of scrap from Japan should, therefore, not be lost sight of.

Trade-mark protection in Europe has been studied by the Department of Commerce and a 29-page pamphlet has been issued as trade information bulletin No. 155, obtainable on application to the Government Printing Office, Washington.

The New Departure Mfg. Co., Bristol, Conn., manufacturer of ball bearings, is advancing production at its new works at Meriden, Conn., recently placed in service. Employment is now being given to close to 800 men, and this will be increased materially during the next 60 days.

New York

Sustained Contracting for Structural Material —Low Pig Iron Prices

NEW YORK, Oct. 30.—More interest has developed in the market and sellers are hopeful that considerable business will develop soon on the part of large buyers who have been awaiting favorable conditions as to price, but the only tonnage of consequence placed within the past week was 2250 tons sold at $21, furnace, by a company on the border of the eastern Pennsylvania district to the American Radiator Co. for delivery at Bayonne, N. J. While $23 continues to be quoted in eastern Pennsylvania on No. 2 plain, $22 can be done and the market seems to be settling to a lower basis. The report of the American Radiator Co. being in the market for from 25,000 to 50,000 tons is not confirmed and the only purchase it is known to have made was for the tonnage for delivery at Bayonne. While $22 continues to be the quotation at Buffalo on No. 2 plain or No. 2X, No. 1X has also been sold at that price and reports of $21 being done on No. 2 plain are persistent.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$24.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.27
Buffalo, sil. 1.75 to 2.25	$27.41 to 28.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94
No. 2 Virginia, sil. 1.75 to 2.25	29.44

Ferroalloys.—After many weeks of expectation British producers of ferromanganese reduced their price Oct. 24 to $110, seaboard, from $117.50. This has not stimulated business and the market is exceedingly quiet with sales and inquiries confined to carload and small lots, covering filling-in requirements for certain steel producers. Active competition continues to be experienced by British producers with domestic makers who appear to be taking most of the little business offered. There is no activity in the spiegeleisen market nor any change in prices and the same is true regarding the 50 per cent ferrosilicon market.

Cast-Iron Pipe.—Demand continues fair and prices unchanged. Among municipal tenders closed this week was that of Jamestown, N. Y., for 343 tons of 6, 8, 10, 14 and 16-in. pressure pipe and 20,000 lb. of fittings, bids opened Nov. 1, and a tender for 350 tons of 6-in. and 8-in. pipe from Katonah, N. Y., bids opened Oct. 30. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. Makers of soil pipe are looking forward to a continuance of present activity until the end of the year, at least, as jobbers are still placing orders at the low discounts prevailing and very little is said to be going into stock. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 35% to 40% per cent off list; heavy, 45¾ to 50¾ per cent off list.

Warehouse Business.—It is generally expected that total business for October will prove to have been greater than during preceding months. Some of the larger buyers are apparently purchasing from hand-to-mouth out of stock. Despite the present fairly good demand, weakness is still reported in certain products. Black and galvanized sheets continue to bring as low as 4.45c. and 5.45c. per lb. base, while blue annealed sheets, No. 10 gage, are quoted as low as 4.20c. per lb., with sales for export reported at 4.10c. per lb. in isolated cases, where a good-sized tonnage is involved. Free delivery by motor truck over considerable territory continues the rule with most warehouses. The market on wrought iron and steel pipe is more active than for several weeks, and prices are fairly firm. Brass and copper products are down ½c. to 1c. per lb. We quote prices on page 1232.

Finished Iron and Steel.—Activity continues in structural steel, particularly in the metropolitan district, to a degree that sets it apart from other steel products. The demand for other steel products is extremely dull. Plate mills are greatly in need of tonnage, but there has been no improvement in the volume of orders. Prices on plates continue weak, and Eastern mills, almost without exception, will meet the 2.40c. quotation which until recently has been made principally by two of the smaller producers. The Turner Construction Co. will buy 1000 tons of concrete reinforcing bars for the superstructure of the new Western Electric Co. plant at Kearny, N. J. Stange & Walsh, Cleveland, were low bidders on the Baldwin Reservoir, that city, which will require 2000 tons of concrete bars.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—Prices are practically unchanged, with a slight tendency toward greater firmness. Standard foundry coke is quotable at from $5.25 to $6.25 per ton, depending upon brand and standard furnace at $4 to $4.25 per ton, with medium sulphur slightly firmer at about $3.75 per ton. By-product coke has been reduced 50c. per ton, and producers are contracting on an open price basis for first half of 1924 delivery. By-product coke is now $10.91, Newark and Jersey City, N. J.

Old Material.—The downward movement of prices continues unchecked. No. 1 heavy melting steel has declined to $14.50 per ton, delivered, eastern Pennsylvania, with railroad grade at $14.75 on old orders. Heavy melting steel is going forward to Conshohocken, Pottsville and Bethlehem. Shipments of borings and turnings are still being made to Coatesville at $11.50 per ton delivered. For delivery to a Harrisburg consumer $16 per ton is being paid on stove plate and some shipments are being made at $15.25 to $15.50 to New Jersey consumers. The greatest activity today is in heavy melting steel, but practically all shipments are completing old contracts. Some dealers are showing an inclination to stock up at present prices, while others are awaiting a further decline.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$10.50 to $11.00
Steel rails, short lengths, or equivalent	11.50 to 12.00
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	15.00 to 16.00
Iron car axles	22.50 to 23.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	7.50 to 8.00
Machine-shop turnings	7.00 to 7.50
Mixed borings and turnings	7.00 to 7.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	12.25 to 12.75
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	16.00 to 17.00
Cast-iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00 to $19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00 to 18.50
No. 1 heavy cast, not cupola size	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 16.50

Birmingham

Low Pig Iron Prices and Small Shipments— Some Shipments to Japan

BIRMINGHAM, ALA., Oct. 30.—Developments in the pig iron market in the Birmingham district during the past week did not bring about much activity, if any can be claimed. Local melters can get iron at from $1 to $2 per ton lower than previously, and in some instances more than this, while iron being shipped into the Middle West in competition with the Northern furnaces is being sold on a $20 per ton base, and reports will not cease that still lower has been done. The aggregate business of the past week was not up to the production. However, there has been but little talk of further curtailment of the production and the prospects are that the demand may justify the continuation of present conditions. The Gulf States Steel Co. has lighted its single blast furnace at Alabama City, near Gadsden, after thoroughly repairing the plant, and will during this week be making basic iron again. The same company will put in operation three of the open-hearth furnaces. Pig iron melting plants

in the Birmingham district are still sticking to the plan of buying from hand-to-mouth, despite the lowering of prices. A few sales have been made for delivery into next year.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$20.00 to $21.00
Basic	20.00 to 21.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—Lettings the past week were few, but the plants are operating to capacity and will have warrant for this condition for an indefinite period. No change is reported in quotations.

Finished Material.—Some small lot business from the Japanese orders reached the Birmingham district recently, and there has been a little rush to meet ships leaving Mobile and New Orleans. Wire and nails, in particular, have been shipped from here. Expectations are for a larger amount of business from this source. Steel production during the past week has decreased because of mechanical mishaps. More business placed with the steel making, fabricating and finishing mills of the Birmingham district in October than the previous month and prospects now reported as favorable for the remainder of the year. Steel bars are quoted at 2.60c. in Birmingham.

Coke.—No improvement has taken place recently in the coke market in the South, quotations having $7.50 per ton as maximum for foundry coke, with furnace coke down to $6. Production is being maintained, though old contracts are on the wane.

Old Material.—Absolutely no change is reported in the old material market, and quotations are weaker with a few changes.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.00 to 10.00

Buffalo

Pig Iron Very Weak—Report of Radiator Inquiry Is Not Confirmed

BUFFALO, Oct. 30.— Further weakness in pig iron prices is indicated, but not fully confirmed. Several sales have been made at slightly less than $22, the lowest figure reached up to last week. Total inquiry shows a marked falling off and sales are less than 7000 tons. The entire sales activity of one furnace consisted of a carload of No. 1X iron at $22.50. There is a growing tendency on the part of the Buffalo producers to meet the low priced standard laid out by one of their number. Several furnaces are now quoting $22 for silicon 1.75 to 2.25. It is generally understood that $22 is below cost of actual production and that furnace operation would be materially reduced should any further weakness develop. The reported inquiry said to have been put out by radiator interests for 25,000 to 50,000 tons is not confirmed. Interest exhibited by radiator people is usually the cue to smaller buyers that the time is ripe for placing new business. It is reported that the Tonawanda furnace of the American Radiator Co. will be blown out after the first of the year to permit repairs. Differentials are little regarded.

We quote f.o.b., gross ton, Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$22.50 to $23.50
No. 2 foundry, 2.25 to 2.75 sil	22.00 to 23.00
No. 2 plain, 1.75 to 2.25 sil	21.75 to 22.00
Basic	23.00
Malleable	23.00
Lake Superior charcoal	30.28

Finished Iron and Steel.—Bar demand is extremely light, and while prices are holding firm at 2.40c., it does not appear that this strength will be maintained unless a turnabout occurs. A few desirable plate tonnages have come out and these have been closed at 2.50c. Sheet demand is not as brisk as it was earlier in the fall, and while no reduction from the price schedule is announced, desirable tonnages would bring further concessions. Pressure for pipe delivery is strong and new business continues at the same rate.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Several sales of heavy melting steel at $15 have been made, but the total volume is not sufficient to make a market. The general situation remains dull and trading is extremely light.

We quote f.o.b., gross ton, Buffalo as follows:

Heavy melting steel	$16.00 to $16.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	13.00 to 13.50
No. 1 busheling	14.50 to 15.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	14.50 to 15.50
Railroad malleable	18.50 to 19.00

St. Louis

Pig Iron Week—Some Southern Sold at $19, Birmingham Base

ST. LOUIS, Oct. 30.—The market for pig iron continues extremely dull. Buying during the last week was almost nothing, and the only inquiry of consequence before the trade is for 1000 tons of foundry iron. Market quotations are merely nominal, and each transaction is a matter of bargaining. While Southern iron is quoted nominally at $20 to $21, Birmingham, sales have been made at $19. Better than $25, Chicago, for Northern iron can be done, it is said, on offers of goodsize tonnages.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and $1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$27.16
Northern malleable, sil. 1.75 to 2.25	27.16
Basic	27.16
Southern fdy., sil. 1.75 to 2.25 (rail)	$24.17 to 25.17

Finished Iron and Steel.—The Missouri Pacific Railway bought 3500 kegs of track spikes and 2000 kegs of track bolts for use in connection with their recent rail orders. The only other railroad purchase was of 160 car wheels by the same road. No other railroad inquiries are pending. Warehouse business continues dull.

Old Material.—Lack of demand by consumers and additional heavy offering of lists by railroads have caused further weakness in the market for old material, and prices on some items are lower than last week. Railroad lists include: Illinois Central, 12,000 tons; Atchison, Topeka & Santa Fe, 3000 tons; Chicago, Milwaukee & St. Paul, 1500 tons; Chicago, Burlington & Quincy, 4000 tons; Great Northern, 2000 tons; Pennsylvania, Central Region, 14,000 tons; Southwestern, 7500 tons, and Northwestern region, 3000 tons.

	Per Gross Ton	
Iron rails	$15.00 to	$15.50
Rails for rolling	13.50 to	14.00
Steel rails, less than 3 ft.	15.50 to	16.00
Relaying rails, 60 lb. and under	25.00 to	26.00
Relaying rails, 70 lb. and over	32.50 to	33.50
Cast iron car wheels	17.00 to	17.50
Heavy melting steel	12.00 to	12.25
Heavy shoveling steel	11.75 to	12.00
Frogs, switches and guards cut apart	13.00 to	13.50
	Per Net Ton	
Heavy axles and tire turnings	11.00 to	11.50
Steel angle bars	12.00 to	12.25
Steel car axles	15.00 to	15.50
Iron car axles	22.50 to	22.00
Wrought iron bars and transoms	17.00 to	17.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	11.50 to	12.00
Railroad springs	14.00 to	14.50
Cast iron borings	9.00 to	9.50
No. 1 busheling	12.25 to	12.75
No. 1 railroad cast	17.00 to	17.50
No. 1 machinery cast	17.00 to	17.50
Railroad malleable	14.50 to	15.00
Machine shop turnings	9.00 to	9.50
Champion bundled sheets	7.00 to	7.50

Cincinnati

Southern Pig Iron Prices Decline—Silvery Quotations Marked Down

CINCINNATI, Oct. 30.—Prices continue to sag on the pig iron business being placed. The Southern market is at least 50c. a ton lower and southern Ohio iron has dropped a similar amount. Silvery prices have been reduced $2 per ton by Jackson County makers. There is little inquiry current, and sales generally run to carload lots for immediate shipment, but a number of round tonnage lots have been placed. A Tennessee melter bought 1000 tons of malleable for first quarter shipment and a Hamilton melter 500 tons for prompt. A radiator company bought 600 tons for a Northern plant and 400 tons for a Southern plant. An Indiana melter bought 200 tons of charcoal iron at $26, furnace. On an inquiry for 1000 tons from Detroit, Southern furnaces quoted $19.50, Birmingham, but the probabilities are that Northern iron will be bought. A 500-ton inquiry from a radiator company is pending.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.05
Ohio silvery, 8 per cent	24.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.27
Basic Northern	25.27
Malleable	25.27

Finished Materials.—The week has been a dull one in the steel market, orders generally being for one and two-car loads. There has been little buying of plates, and bars also have been quiet, although we note one or two sales of forging quality bars at the full price of 2.65c. Wire products are moving slowly, and prices generally are being maintained, although it is reported that some mills have been offering special concessions to large buyers. A slight improvement is noted in the demand for hoops and bands, and prices are fairly firm. Track materials have been in light demand, but some of the smaller roads in the mining districts of Kentucky, West Virginia and Tennessee have been placing some orders. The Big Four is reported to be about to take bids on its 1924 requirements. Specialties, such as steel castings, car wheels and car axles, have been in fair demand.

Sheets and Tin Plate.—Tin plate has been in good demand the past week, and sales are reported of approximately 40,000 base boxes. Much of this will be stock plate. Blue annealed sheets are also in fair demand and the price is firmly held. Little activity is noted in black or galvanized sheets, and prices are being shaded from $2 to $3 per ton.

Warehouse Business.—Jobbers report a slowing up in orders, particularly for bars, shapes and plates. Wire products are also moving slowly. Blue annealed sheets have been in fair demand, but black and galvanized are quieter. Prices of sheets have been reduced sharply to meet competition from Cleveland and Chicago. Other products, however, are unchanged.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60c. per 100 lbs.; common wire nails, $3.60 per keg base; cement coated nails, $3.30 per keg.

Structural Activity.—The U. S. Engineers' Office, Louisville, Ky., will open bids Nov. 23 on 20 steel barges, estimated to require about 2500 tons of plates and shapes. This is the only inquiry to come out. The Louisville & Nashville Railroad took bids on 1250 tons of bridge work last week, the Louisville Bridge & Iron Co. being awarded 150 tons, the American Bridge Co. 300 tons, and the Virginia Bridge Co. 800 tons. McClintic-Marshall Co. and the American Bridge Co. are low bidders on 800 tons of plate girder work for the Big Four.

Reinforcing Bars.—Kentucky highway work will require about 200 tons, on which inquiries have appeared. A school at Cincinnati will require an equal tonnage, bids closing Nov. 12. Miscellaneous work makes up a fair total tonnage of reinforcing bars on inquiry, but projects usually run less than 100 tons. Prices of bars are unchanged, the range being from 2.25c. for rerolled bars to 2.40c. for bars rolled from new billets.

Coke.—Only fair activity is noted in coke, the demand being mostly for foundry grade. Prices rule about the same as last week. Connellsville furnace coke is quoted at $3.75 and foundry at $5. New River is quoted at $10 to $11 and Wise County furnace at $5.25 to $5.75, with foundry at $6 to $7. By-product foundry is steady at $9, Connellsville basis.

Old Material.—Japanese inquiries for scrap materials have created some interest, but local business is light. A steel mill bought a small tonnage of turnings at around $9.50, delivered. Some grades are from 50c. to $1 lower. Railroad lists closing this week are estimated to contain 150,000 tons. The high bid on the battleships Constitution and United States was $114,000.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$9.50 to	$10.00
Iron rails	13.00 to	13.50
Relaying rails, 50 lb. and up	27.00 to	27.50
Rails for rolling	13.00 to	13.50
Heavy melting steel	12.00 to	12.50
Steel rails for melting	12.50 to	13.00
Car wheels	12.50 to	13.00
	Per Net Ton	
No. 1 railroad wrought	11.00 to	11.50
Cast borings	7.50 to	8.00
Steel turnings	7.00 to	7.50
Railroad cast	13.50 to	14.00
No. 1 machinery cast	16.50 to	17.00
Burnt scrap	10.50 to	11.00
Iron axles	20.50 to	21.00
Locomotive tires (smooth inside)	12.50 to	13.00
Pipes and flues	6.50 to	8.00

Boston

Buffalo Furnaces Continue to Take Most Pig Iron Business—Coke Price Reduced

BOSTON, Oct. 30.—Buffalo furnaces continue to take most of the available pig iron business in New England, but are meeting stiff competition from one eastern Pennsylvania furnace, heretofore inactive, which has booked several hundred tons at prices equal to or under the Buffalo furnace base equivalent. A Providence, R. I., foundry bought 500 tons No. 1X Buffalo at about $27, delivered, and 400 tons No. 2X eastern Pennsylvania at approximately the same figure. Other invisible Buffalo iron business was closed, involving large tonnages, presumably on a $22 furnace base, with differentials disregarded. Virginia and Alabama iron figure in sales, but only in small lots for mixture purposes. No large inquiries are in the open market, but at least one heater maker will have to buy shortly, not having sufficient iron to carry him through the rest of the year. Generally speaking, foundries are fairly well covered for the remainder of 1923, and are less active than heretofore. A majority of them are taking 60 days to pay their pig iron bills, a few are discounting within 10 days, and a few prepaying on iron in transit.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$26.65 to	$28.15
East. Penn., sil. 1.75 to 2.25	26.65 to	27.65
Buffalo, sil. 2.25 to 2.75	26.91 to	27.91
Buffalo, sil. 1.75 to 2.25	26.91 to	27.41
Virginia, sil. 2.25 to 2.75	30.42 to	31.42
Virginia, sil. 1.75 to 2.25	29.92 to	30.42
Alabama, sil. 2.25 to 2.75	*30.60 to	31.10
Alabama, sil. 1.75 to 2.25	*29.60 to	30.60

*Nominal.

Finished Material.—Structural steel generally is quoted at 2.50c., Pittsburgh base, but a few independent mills for a month or more have freely accepted business at 2.40c. Important fabricating tonnage prospects for the remainder of 1923 are few and far between. Two local building jobs and a Springfield, Mass., bridge job involving large tonnages, together with smaller tonnages, will probably be let early in 1924. The market for bars is quiet on a basis of 2.40c., Pittsburgh. Manufacturers and jobbers generally are well covered for the remainder of 1923.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. have opened their books for first

half of 1924 by-product foundry coke contracts. Such contracts are being taken on a basis of "price ruling date of shipment," a policy followed by both companies during the present year. A large percentage of the New England foundries have covered themselves on these contracts. Both companies also have reduced their price on current shipments against last half 1923 contracts $1 a ton to $12.50 delivered in New England. That price figures back to $9.95 on cars, Connellsville district, whereas good foundry Connellsville cokes are offered at $10.55 to $12.30, delivered.

Old Material.—The outstanding feature of the old material market the past week was the sale of scrap by the Government, on one day at the old Squantum plant of the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., and on another day at the Charlestown Navy Yard, Boston. Prices paid by dealers in numerous instances were high and out of line with those quoted in the regular market. For instance, one dealer paid $750 for 1500 to 2000 tons of sweepings, quantity not guaranteed, most of the material being under ground. Rails, mostly short lengths, of varying weights, sold at $1.05 per 100 lb., while 77½c. per 100 lb. was paid for soft steel chain studs. In the regular market machinery cast has been moderately active at $22.50 to $22.75, delivered New England, for No. 1. Textile machine, in short supply, sold at differentials running as high as 75c. a ton over No. 1 machinery. Business has slowed down the past day or two, indicating foundries are well stocked. Small tonnages of heavy melting steel sold at $10 and $10.25, shipping point, and occasionally at $10.50. Prices are too low to make it profitable for dealers to ship outside New England. Chemical borings are a little more active at $10, shipping point, with offerings steadily increasing. One dealer paid $7 a ton, shipping point, for mixed borings and turnings since last reports, about 50c. above average market price.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	16.00 to 16.50
Railroad malleable	20.00 to 21.00
Street car wheels	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.00 to $10.50
No. 1 railroad wrought	12.00 to 12.50
Wrought pipe (1-in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	6.50 to 7.00
Cast iron borings, rolling mill	6.50 to 7.00
Cast iron borings, chemical	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.50
Forged scrap and bundled skeleton	6.50 to 7.00
Shafting	15.00 to 15.50
Street car axles	18.00 to 18.50
Rails for rerolling	12.00 to 12.50

Cleveland

Ore Movement Will Be About 57,000,000 Tons—Pig Iron Dull and Weak

CLEVELAND, Oct. 30.—Iron ore shipments for October will be about 8,000,000 tons, or 1,000,000 tons greater than estimated early in the month and making the movement up to Nov. 1 approximately 54,000,000 tons. Present indications point to a movement of at least 57,000,000 tons for the season as compared with early in season estimates of a movement of 55,000,000 to 56,000,000 tons.

Pig Iron.—There was little activity in the market during the week and sales were confined almost wholly to orders for November and December shipment. The market still lacks firmness and consumers are not inclined to purchase iron beyond their early needs. Many of the sales during the week ranged from carlots to 100 tons. Locally prices are unchanged at $24 at furnace for foundry iron for Cleveland delivery and around $23 for outside shipment. In the Mahoning Valley, quotations range from $22.50 to $23, small lot sales being made at the latter price. Buffalo foundry iron is commonly quoted at $22. In the southern Ohio district, a 300-ton lot sale was made at $23.50. We note the sale of 1000 tons of foundry and malleable iron to a northern Ohio consumer for early shipment. One producer has several inquiries pending for lots aggregating 4000 tons. Although a report has been circulated that the American Radiator Co. has an inquiry out for round tonnage, the only inquiry that has reached Cleveland producers from that company is for 650 tons for its Springfield plant. Small lot sales of Southern foundry iron are reported at $20.50, Birmingham, but $20 is the price for fair sized lot. Prices on Ohio silvery iron have been reduced $2 a ton to $32.50 for 8 per cent, this being the first change in the silvery schedule for some time. Sales for October by leading producers in this territory were about equal to those in September and two leading interests report that their shipments in the present month have about equalled their production. The Otis Steel Co. will blow out one of its Cleveland furnaces this week. Another lake furnace is scheduled to go out shortly.

A Cleveland producer has sold 2500 tons of basic iron on the basis of $22.50 Valley furnace. There are reports that foundry iron is being offered at $22 and possibly lower in the Valley district.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.50
Northern No. 2 fdy., sil. 1.75 to 2.25	24.50
Southern fdy., sil. 1.75 to 2.25	25.50 to 26.00
Malleable	24.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	30.00

Alloy Steel.—Buying by the automobile industry has increased, some good orders having come from several leading Detroit car builders and mills have much better order books than a month ago. Prices appear firm at the recent reductions.

Reinforcing Bars.—The Bourne-Fuller Co. has taken 500 tons for a warehouse for the Harnett-Jewett Co., Toledo. An inquiry has come out for an unnamed tonnage for the Third National Bank Building, Dayton, Ohio. Rail steel bars are weaker with a 2.15c. to 2.20c. price as the common quotation.

Sheets.—The demand for automobile body sheets has improved and mills making these sheets are comfortably filled for the next few weeks, but car builders are buying only for early requirements. Several Valley district mills are more comfortably fixed than a few weeks ago because of Japanese orders. Most of the black sheet business is being taken at 3.75c. and mills that will not meet this price have been compelled to further curtail operations. Blue annealed sheets are firm and very little shading is reported on galvanized sheets.

Semi-finished Steel.—A Cleveland mill has taken an additional 2000-ton lot of sheet bars for making sheets for Japan at the regular $42.50 price, this being the only activity reported. Quotations on billets and slabs range from $40 to $42.50.

Finished Material.—A few of the mills report some improvement in prospective business, but the market as a whole continues quiet. A leading producer reports an increase in size of orders, although the number of orders shows no gain. The aggregate tonnage booked in this territory by this producer increased approximately 50 per cent in October over September. The Nickel Plate System has sent out an inquiry for 27,000 to 28,000 tons of rails and is expected to come in the market shortly for track accessories to go with these rails. This inquiry covers the rail requirements of Nickel Plate, Clover Leaf and Lake Erie & Western lines for 1924. New inquiries from manufacturing companies are mostly for early requirements to replenish reduced stocks, but one Ohio consumer has virtually closed for 1000 tons of steel bars for first quarter delivery at the regular 2.40c. price. However, buyers generally are still looking for lower prices and are deferring purchases as much as possible. Prices on steel bars and structural material are firm. Efforts to break regular prices seem to be centered at present largely on plates. To meet competition in the Chicago territory, an Ohio mill has shaded plates to 2.40c. Eastern mills have been holding to 2.50c. for plates f.o.

shipment to this territory, but one mill has shaded this price to 2.40c., which figures back to higher than the regular Pittsburgh base owing to the higher freight rate. There are rumors that the Pittsburgh base price is being shaded for this territory, but these have not been substantiated. Ohio shops are figuring on work in Denver requiring 1000 tons of plates. Steel bar orders include one from a Canton, Ohio, consumer for about 1200 tons for railroad specialty work. Irregularity continues in hot-rolled strip steel prices with quotations as low as 2.75c. for wide material, although some mills are not going below 3c. Light hoops have sold at the regular 3.15c. hoop price. The Stenge-Walsh Construction Co. was low bidder for an administration building, filtering houses and other work in connection with the Baldwin Reservoir, Cleveland. This work will require 600 tons of structural material, 2000 tons of reinforcing bars and 1360 tons of cast iron pipes and fittings.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.10c. to 4.25c.; No. 28 galvanized sheets, 5.00c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.05c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Bolts, Nuts and Rivets.—The demand for bolts, nuts and rivets has declined. There is little new buying and specifications are mostly for small lots for early requirements. Rivet prices appear to have settled down from 2.75c. to 2.85c. except for small miscellaneous lots, for which some makers are still getting up to 3c.

Coke.—The foundry coke market is very dull and the supply is in excess of the demand. Some producers who have been comfortably filled with orders are getting to the point where they need business and one producer who has been holding to $7.25 for high grade foundry coke has reduced its price to $6.50. Other standard Connellsville brands are quoted at $5.

Old Material.—Prices have declined on several grades and the market is still weak. Heavy melting steel is being offered at $15 delivered, Cleveland, and a small tonnage has been sold at that price. However, dealers have paid $14.75 to $15 local yard for that grade to fill old contracts with Cleveland mills. Heavy melting steel is being offered freely in the Valley district at $16 delivered and some small lot sales are reported at that price. Borings and turnings are a drug on the market and have declined 50c. or more a ton. There is no local demand for bushelings and flashings, which have been marked down about $1.50.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$14.50 to $15.00
Rails for rolling	17.50 to 18.00
Rails under 3 ft.	16.75 to 17.00
Low phosphorus melting	18.00 to 18.25
Cast borings	10.50 to 11.00
Machine shop turnings	10.25 to 10.50
Mixed borings and short turnings	10.50 to 11.00
Compressed sheet steel	12.75 to 13.00
Railroad wrought	12.75 to 13.00
Railroad malleable	18.50 to 19.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	11.75 to 12.00
No. 1 cast	20.00 to 20.50
No. 1 busheling	9.00 to 9.50
Iron forge flashings	9.50 to 10.00
Railroad grate bars	15.50 to 16.00
Stove plate	15.50 to 16.00
Pipes and flues	9.50 to 10.00

The Amalgamated Motors Corporation, Plainfield, N. J., has been organized with capital of $1,000,000 and 250,000 shares of common stock, to take over and consolidate the American Motors Corporation, Plainfield; Bessemer Motor Truck Co., Grove City, Pa.; Northway Motors Corporation, Natick, Mass.; and the Winther Motor Co., Kenosha, Wis., all manufacturers of motor trucks and parts. The first two companies were merged recently as the Bessemer-American Motors Corporation, with headquarters at Philadelphia. Proctor W. Hansel, president of the latter consolidation, will head the new organization, which purposes to expand the different operating units. Irad M. Lewis, formerly president Bessemer Company, and Ralph D. Mock, previously vice-president Hydraulic Pressed Steel Co., will be prominent in the Amalgamated company.

Philadelphia

Another Drop in Pig Iron Prices—Steel Sales Improve Slightly

PHILADELPHIA, Oct. 30.—Eastern pig iron prices have taken another drop, two fairly large transactions having brought out prices as low as $22.13 and $22.50, delivered, on foundry grades. In one instance the furnace quotation was $21 on both No. 2 plain and No. 2X, the lowest point that the market for this district has reached since the spring of 1922.

Some of the steel companies' sales offices report that tonnage booked in October showed a slight gain over September, and prospects are somewhat better at the beginning of November than they were 30 days ago. Orders are small, lots of more than a carload being the exception, but there is a greater number of these small orders. Other than a more general acceptance of 2.40c., Pittsburgh, on plates by Eastern mills, there is no important change in the steel price situation.

Further declines in old material have brought prices to a point where some dealers prefer to accumulate rather than to sell. Demand from consumers is at a minimum.

Pig Iron.—A further decline in foundry pig iron prices developed in two fairly important transactions of the past few days. A cast iron pipe company bought from 5000 to 7500 tons of iron analyzing 1.25 to 2.25 per cent silicon from two or three nearby furnaces at a delivered price of $22.50. In the case of the furnace having the highest rail freight rate, the net price at furnace was about $21.50, due to the ability of the shipper to obtain a water rate of $1 a ton. A New Jersey radiator plant bought 2500 tons of foundry iron, part No. 2 plain and part No. 2X, at a uniform price of $21, furnace, or $22.13, delivered. This furnace has a freight rate to Philadelphia of $1.64, making its price on this transaction equivalent to $22.64, Philadelphia, for both No. 2 plain and No. 2X. There is a sharp distinction in the prices being quoted on carload lots and large lots. The buyer of a carload will have difficulty in getting better than $23, furnace, for No. 2 plain and No. 2X, but every large inquiry is subject to special consideration. Pig iron sellers see no hope of a recovery in prices until more furnaces have gone out of blast and present large stocks in furnace yards have been worked down considerably. The Reading Iron Co. is putting the Keystone furnace out of blast, and will also let the Thomas furnace at Hokendauqua, Pa., go out soon. Further curtailment of production in this district is expected. Only three furnaces in Virginia are now active, and there is little demand there for iron. A Virginia cast iron pipe company bought 1500 or 2000 tons last week, some of it off-grade iron, at $24, furnace. There is no demand for basic and gray forge, but in line with lower prices on foundry iron it would be possible to buy either grade at $23 to $24, furnace. One thousand tons of French iron arrived at this port last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.64 to $23.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.64 to 24.63
East. Pa. No. 1X	23.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.00 to 24.00
Gray forge	23.00 to 24.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Iron Ore.—Ore receipts from abroad in the past two weeks were as follows: From Sweden, 14,104 tons; from Spain, 11,455 tons; from French Africa, 14,450 tons.

Ferroalloys.—British makers of ferromanganese have notified their American agents to quote $110, seaboard, a reduction of $7.50 a ton. This price is in line with recent sales by domestic furnaces and with

prices at which resale lots have been sold. Spiegeleisen is nominally quoted at $44 to $45, furnace, with few sales.

Coke.—Foundry coke is freely offered at $5, Connellsville; furnace coke at $4, while some distress coke is occasionally offered at $3.75.

Semi-Finished Steel.—There is little demand for billets, and quotations seem fairly uniform at $40 for rerolling quality and $45 to $47.50 for forging quality, Pittsburgh base.

Plates.—A slight improvement in the demand for plates is reported by some of the Eastern mills. With possibly one exception, Eastern mills are quoting 2.40c., Pittsburgh, and while Pittsburgh mills continue to quote 2.50c., it is becoming difficult for them to obtain specifications on their 2.50c. contracts.

Structural Shapes.—A fair number of small orders is coming to Eastern mills, but there are no building projects in this district requiring large tonnages. The range of quotations is 2.40c. to 2.50c., Pittsburgh, the former price being quoted by the smaller mills.

Bars.—Mills continue to quote 2.40c., Pittsburgh, and are getting a considerable number of small orders, many of them less than carload lots. Bar iron is being held at 2.35c., Pittsburgh, with little demand.

Sheets.—Black sheets at 3.75c. and galvanized at 4.90c., Pittsburgh, are more easily obtainable, but blue annealed remains firm at 3c.

Warehouse Prices.—Local warehouses have reduced prices on hot-rolled products in line with an easier mill situation. We quote as follows for local delivery:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅝-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Rails.—The Pennsylvania has not issued formal orders for the 200,000 tons of rails it will buy, but it is understood that the Bethlehem Steel Co. will be awarded 96,000 tons, Inland Steel Co., 12,000, and the remainder will go to the Steel Corporation.

Old Material.—The scrap market continues weak, with some further price declines. A consumer of bundled sheets and turnings for steel works use which had reduced its price to $10.50, delivered, was obliged to raise it to $11 because of inability to get sufficient material at the lower figure. Many dealers are holding yard stocks in the belief that prices are scraping bottom and that it is a good time to accumulate.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00
Scrap rails	15.00
Steel rails for rolling	$17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	20.00 to 21.00
Couplers and knuckles	18.00 to 19.00
Cast-iron car wheels	18.00 to 19.00
Rolled steel wheels	17.50 to 18.00
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	15.50 to 16.00
No. 1 forge fire	11.00 to 11.50
Bundled sheets (for steel works)	11.00
Mixed borings and turnings (for blast furnace use)	11.00
Machine shop turnings (for steel works use)	11.00
Machine shop turnings (for rolling mill use)	11.50 to 12.00
Heavy axle turnings (or equivalent)	12.00 to 13.00
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	19.00 to 19.50
Heavy breakable cast (for steel plants)	16.00 to 16.50
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	17.00 to 17.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	20.00 to 21.00
Steel axles	18.50 to 19.50

BRITISH WAR STOCKS WANING

Will Be Entirely Sold or Otherwise Disposed of in Another Few Months

WASHINGTON, Oct. 16.—In a few more months surplus war stocks of the British Government will be entirely sold or otherwise disposed of and one more feature of economic disruption resulting from the war will have been removed, says Trade Commissioner C. E. Lyon in a report to the Department of Commerce. Only £10,000,000, or 3 per cent of the total, remains to be put upon the market.

A recent report of the Commission gives the total sales, to April, 1923, as £322,229,839. Sales have mainly been made within the United Kingdom, where the total amounted to £232,314,555, or 72 per cent. Sales to France and Belgium totaled £42,989,284; to India, £8,770,246; to Iraq, £8,296,717; to Egypt and Palestine, £7,796,653; to the Army of the Rhine, £3,325,316; to the United States and Canada, £2,991,883; and the remainder in small lots to other foreign countries.

Of sales within the United Kingdom, the largest item was textile and leather equipment, followed by chemicals and explosives, plant and machinery, railway material, dock equipment, ferrous metals, transport, non-ferrous metals, building materials, factories, aircraft stores, raw materials and various miscellaneous stores.

In addition to the £322,000,000 represented by general sales, there was an additional £320,000,000 of sales of raw materials purchased on trading accounts.

Iron and Steel Production in Canada

In its monthly report the Dominion Bureau of Statistics states that the production of pig iron and ferroalloys in Canada in September was 75,216 tons, a decline of 18.8 per cent from the August production of 92,587 tons. The production of basic pig iron was 27.5 per cent less at 46,580 tons; foundry iron amounted to 17,536 tons, a decline of 29.8 per cent while malleable iron showed an increase of 32 per cent to a total of 11,100 tons. As usual, practically the whole output of basic pig iron reported was made for the use of producing firms, but the slackening demand for iron was reflected in the lowered output. September tonnage made for use was only about two-thirds of that reported in August.

The low output of pig iron in September was reflected in a decreased production of steel ingots and castings, the absolute quantity being 66,334 gross tons as compared with 105,056 tons, the preceding month. Practically the whole of this decline was in the production of basic open-hearth steel ingots for the further use of the reporting companies, production of direct steel castings remaining at about the same level as during August.

Detroit Scrap Market

DETROIT, Oct. 30.—More interest was shown in the recent letting by one of the largest producers of approximately 4000 tons of miscellaneous scrap than the offerings for October, and the bidding brought out the lowest prices of the year. Declines of from $1 to $2 were registered in the different grades of old material. There is no evidence as yet of much storing of scrap on dealers' yards.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$11.50 to $12.50
Shoveling steel	11.50 to 12.50
No. 1 machinery cast	16.00 to 17.00
Cast borings	8.50 to 9.35
Automobile cast scrap	22.00 to 23.00
Stove plate	15.00 to 16.00
Hydraulic compressed	9.50 to 10.50
Short turnings	8.75 to 9.25
Long turnings	7.00 to 7.85
Flashings	8.25 to 9.35

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. ..... 2.50c.

Structural Materials

Beams, channels, etc., base, per lb. ..... 2.50c.
Sheet piling ..... 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. ..... 2.40c.
Soft steel bars for cold finishing ..... $3 per ton over base
Reinforcing steel bars, base ..... 2.40c.
Refined iron bars, base, per lb. ..... 3.25c.
Double refined iron bars, base, per lb. ..... 4.85c. to 5.00c.
Stay bolt iron bars, base, per lb. ..... 8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, base, per lb. ..... 3.15c.
Bands, base, per lb. ..... 3c. to 3.15c.
Strips, base, per lb. ..... 3c. to 3.15c.
Cotton ties, per bundle of 45 lb. $1.63

Cold-Finished Steels

Bars and shafting, base, per lb. ..... 3c. to 3.25c.
Bars, S. A. E. Series, No. 2100 ..... 4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300 ..... 6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100 ..... 5.50c. to 5.75c.
Strips, base, per lb. ..... 5.00c.

Wire Products

Nails, base, per keg $3.00
Galvanized nails, 1 in. and over ..... $2.25 over base
Galvanized nails, less than 1 in. ..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. $2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg 3.80
Painted barbed wire, base, per 100 lb. 3.40
Polished staples, base, per keg 3.45
Cement coated nails, base, per count keg 2.70
Woven fence, carloads (to jobbers) ..... 67½ per cent off list
Woven fence, carloads (to retailers) ..... 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads..60 and 10 per cent off list
Carriage bolts, cut threads, all sizes..... 60 per cent off list
Lag bolts ..... 65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads ..... 50 and 10 per cent off list
Other style heads ..... 50 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes ..... 50 and 10 per cent off list
Hot pressed square or hex. nuts, blank ..... 4.25c. off list
Hot pressed nuts, tapped ..... 4.25c. off list
Cold punched square or hex. nuts, blank ..... 4.00c. off list
C.p.c. and t. square or hex. nuts, tapped ..... 4.00c. off list
Semi-finished hex. nuts:
⅜ in. and smaller, U. S. S. ..... 80 and 5 per cent off list
⅜ in. and larger, U. S. S. ..... 75 and 5 per cent off list
Small sizes S. A. E. ..... 80, 10 and 5 per cent off list
S. A. E., ⅜ in. and larger ..... 75, 10 and 5 per cent off list
Stove bolts in packages ..... 75, 10 and 5 per cent off list
Stove bolts in bulk ..... 75, 10, 5 and 2½ per cent off list
Tire bolts ..... 60 and 10 per cent off list
Bolt ends with hot pressed nuts ..... 60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers ..... 5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex head cap screws ..... 70 per cent off list
Milled set screws ..... 70 per cent off list
Upset cap screws ..... 75 and 10 per cent off list
Upset set screws ..... 75 and 10 per cent off list
Milled studs ..... 50 and 10 per cent off list

Rivets

[illegible] rivets, base per 100 lb. $2.75 to $2.85
Small rivets ..... 65 and 10 to 70 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb. $3.15
Spikes, ½ in., ⅝ in. and ⅝ in. per 100 lb. ..... $3.15 to 3.50
Spikes, ¾ in. ..... 3.15 to 3.50
Spikes, boat and barge, base, per 100 lb. 3.50
Track bolts, ⅝ in., base, per 100 lb. ..... 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb. ..... 5.00 to 5.50
Tie plates, per 100 lb. ..... 2.55 to 2.60
Angle bars, base, per 100 lb. 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.
⅛	46	19½
¼ to ⅜	51	25½
½	56	42½
¾	60	48½
1 to 3	62	50½

Iron Inches	Black	Galv.
⅛ to ⅜	+11	+39
½	22	2
¾	28	11
1 to 1½	30	13

Lap Weld

2	55	43½
2½ to 6	59	47½
7 and 8	56	43½
9 and 10	54	41½
11 and 12	53	40½

2	23	7
2½ to 3	26	11
3½ to 6	28	13
7 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½
¼ to ⅜	47	30½
½	53	42½
¾	58	47½
1 to 1½	60	49½

2 to 3	61	50½
¼ to ⅜	+19	+54
½	21	7
¾	28	12
1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	43½
2½ to 4	57	46½
4½ to 6	56	45½
7 to 8	52	39½
9 and 10	45	32½
11 and 12	44	31½

2	23	9
2½ to 4	29	15
4½ to 6	28	14
7 to 8	21	7
9 to 12	16	2

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel	
2 to 2¼ in.	27
2½ to 2¾ in.	37
3 in.	40
3½ to 3¾ in.	42½
4 to 13 in.	46

Charcoal Iron	
1½ in.	+18
1⅝ to 1⅞ in.	+ 8
2 to 2¼ in.	— 2
2½ to 3 in.	— 7
3½ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes Cold Drawn	
1 in.	55
1¼ and 1½ in.	47
1¾ in.	44
2 and 2¼ in.	22
2½ and 2¾ in.	32

3 and 3¼ in.	36
3½ and 3¾ in.	37
4 in.	41
4½ in. and 5 in.	33

Hot Rolled	
3 and 3¼ in.	38
3½ in. and 3¾ in.	33
4 in.	43

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base ..... 83 per cent off list
Carbon 0.30 to 0.40, base ..... 81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	5⅜-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box $5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
		25-lb. coating I. C.	16.20
8-lb. coating I. C.	11.30	30-lb. coating I. C.	17.35
12-lb. coating I. C.	12.40	35-lb. coating I. C.	18.25
15-lb. coating I. C.	13.95	40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. ..... 3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. ..... 3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. ..... 5.35c.

Galvanized

No. 28 (base), per lb. ..... 5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb. ..... 6.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. ..... 3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.15
Pac. Coast, ship plates	1.34
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 1½ gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.15
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	39c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$42.00 to 45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	41.00 to 44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50 to 85.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	30.00
Silvery iron, 7 per cent, per ton, furnace	31.00
Silvery iron, 8 per cent, per ton, furnace	32.50
Silvery iron, 9 per cent, per ton, furnace	34.50
Silvery iron, 10 per cent, per ton, furnace	36.50
Silvery iron, 11 per cent, per ton, furnace	39.80
Silvery iron, 12 per cent, per ton, furnace	43.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr. per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois		37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00 to $42.50
Rolling billets, 2-in. and under	40.00 to 42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00 to $42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	.85 per ton over base
Wire rods, carbon 0.20 to 0.40	3 per ton over base
Wire rods, carbon 0.41 to 0.55	5 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10 per ton over base
Wire rods, acid	15 per ten over base
Skelp, grooved, per lb	2.40
Skelp, sheared, per lb	2.40
Skelp, universal, per lb	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb	2.15c. to 2.25c.
Rails, light, rerolled base, per lb	1.90c. to 2.00c.
Spikes, ⅝-in, and larger, base, per 100 lb	$3.15
Spikes, ½-in., ⅝-in. and ⅝-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb	2.55 to 2.60
Angle bars, per 100 lb	2.75
Bars, common iron, base, per lb., Chicago mill.	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb	2.15c. to 2.25c.
Ground shafting, base, per lb	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$ 4.80	$ 4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1-in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes. Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (1½% Nickel, 10 to 20 per cent Carbon)	$3.00 to $3.25
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.50 to 3.75
5200* (Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Awards Amount to About 17,300 Tons, With New Business Pending Less Than 5000 Tons

Structural steel awards the past week at over 17,300 tons exceed those of last week by about 6000 tons. Railroad work accounts for nearly 6000 tons, a wharf for the Baltimore & Ohio taking 3000 tons. The remainder is made up of about 20 items of miscellaneous orders, the largest of which is a public school calling for 1500 tons. New inquiries, amounting to less than 5000 tons, are the smallest in several weeks.

Gas holder at Honolulu, H. I., 700 tons of plates, to Cruse-Kemper Co., Ambler, Pa.

Vanderbilt University, Nashville, Tenn., addition, 400 tons, to an unnamed fabricator.

Baltimore & Ohio Railroad, pier at Baltimore, 3000 tons, to American Bridge Co.

New York, New Haven & Hartford, bridge repairs at Boston, 400 tons, to American Bridge Co.

Childs Restaurant, Coney Island, New York, 350 tons, to Levering & Garrigues Co.

Public School No. 107, Flushing, N. Y., 1500 tons to Hinkle Iron Co.

Paterno apartment house, West End Avenue and 103d Street, New York, 1250 tons, to Paterson Bridge Co.

Greenbaum loft building, 256 West Thirty-eighth Street, New York, 1000 tons, to Levering & Garrigues Co.

Institute for the Blind, New York, 100 tons, to Hay Foundry & Iron Works.

Mercy High School, Chicago, 612 tons, to American Bridge Co.

Snake River Bridge, Ontario, Ore., 438 tons, to Minneapolis Steel & Machinery Co.

Missouri Pacific Railroad, 11 spans, 349 tons, to American Bridge Co.

Buckeye Coal Co., tipple and hoist house, Nemocolin, Pa., 965 tons, to John Eichleay, Jr., Pittsburgh.

American Smelting & Refining Co., washery building, Rosita, Mexico, for subsidiary, 470 tons, to United States Steel Products Co.

Knights of Columbus Building, Springfield, Ill., 290 tons, to St. Louis Structural Steel Co.

United States Gypsum Co., warehouse addition, Oakfield, N. Y., 170 tons to Pittsburgh Bridge & Iron Co.

Whiting Corporation, four 120 ft. box girders for crane bridges, 250 tons, to Bethlehem Steel Corporation.

Swift & Company, eight 80-ft. deck plate girder spans, 400 tons, to Milwaukee Bridge Co.

Louisville & Nashville Railroad, 1250 tons, bridge work; 150 tons to Louisville Bridge & Iron Co., 300 tons to American Bridge Co., 800 tons to Virginia Bridge & Iron Co.

Big Four and Cincinnati Northern Railroads, 550 tons, American Bridge Co. and McClintic-Marshall Co. low bidders on equal tonnages.

Standard Sanitary Mfg. Co., Tiffin, Ohio, additions, 450 tons, to McClintic-Marshall Co.

Leland-Gifford Co., Putnam, Conn., foundry addition, 100 tons, to McClintic-Marshall Co.

Chevrolet Motor Co., Detroit, plant extensions, 385 tons, to McClintic-Marshall Co.

Buick Motor Car Co., Flint, Mich., plant extensions, 1200 tons to Whitehead & Kales.

Toledo Safety Building, Toledo, Ohio, 350 tons, to Donovan Wire & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Public Service Corporation, power plant at Kearny, N. J., mentioned last week as requiring 14,000 tons; bids now being taken on first section, 7500 tons. Total may exceed 14,000 tons.

Alexander Hamilton Hotel, Paterson, N. J., 1100 tons; former bids rejected.

James Munroe High School, New York, 3000 tons; bids close Tuesday, Oct. 30, previous bids having been rejected.

Y. M. C. A. building, Paterson, N. J., 500 tons.

Union Stock Yards, Omaha, viaduct, 1200 tons.

Union Pacific Railroad, overhead highway crossing, Riverdale, Utah, 105 tons.

Junior high school, Fall River, Mass., 200 tons.

U. S. Engineers' Office, Louisville, Ky., 20 steel barges, approximately 2500 tons, bids close Nov. 23.

Ford Motor Co., Detroit, addition to foundry, 100 tons.

Nurses Home, Erie, Pa., 100 tons.

Harding Junior High School, Lakewood, Ohio, 200 tons. New bids taken.

RAILROAD EQUIPMENT BUYING

Inquiries for New Cars Light—New Business in Locomotives Small

With no orders for cars reported and with new inquiries calling for about 2100, the week has been a meagre one. Of these the largest inquiry is 1547 cars for the Baltimore & Ohio. Locomotives ordered totaled only 43, with no fresh inquiries reported. A summary follows:

In addition to the 25 locomotives placed by the Southern Pacific with the Baldwin Locomotive Works, as reported a week ago, this road has contracted with the American Locomotive Co. for building 18 Mountain type locomotives.

The Delaware, Lackawanna & Western Railroad has ordered 25 locomotives from the American Locomotive Co., of which 10 are Mikado type, 10 Pacific type and 5 Mountain type.

The Great Northern Railroad is in the market for 500 stock cars with steel construction.

It is expected that the Baltimore & Ohio Railroad will award orders this week for 1547 cars, for which it recently inquired.

The Philadelphia & Reading has asked for prices on 50 stock cars and 20 caboose cars.

The Chesapeake & Ohio wants prices on 25 caboose cars.

The Lehigh Valley is in the market for 25 refrigerator cars for milk.

The Nickel Plate has withdrawn an inquiry for repairs on from 100 to 200 box cars and on a similar number of gondola cars.

Mill Activity Declines in the Mahoning Valley

YOUNGSTOWN, Oct. 30.—Rolling mill output in the Mahoning Valley declines this week, while the number of active blast furnaces is increased by one, with the addition of Anna stack, at Struthers, operated by the Struthers Furnace Co., to the furnaces in action. This stack, suspended Sept. 1 because of the dullness in the merchant iron market, has been ordered in blast Nov. 1, and will run on foundry iron. It increases the number of active furnaces in the Youngstown district to 28, of 46.

An attempt will be made to operate the stack on three 8-hr. shifts. It is assured of a continuous run until next Spring, by which time it is believed the pig iron market will be much more active than it is at present.

In contrast with this resumption, however, is the decline in finishing mill schedules in this territory. Of the 120 sheet and jobbing mills in the Mahoning Valley, but 68 were scheduled for operation this week, below the record of last year at this time. The Youngstown Sheet & Tube Co. has suspended for the time being its Western Reserve and Brier Hill sheet mill departments, and has but 12 of its 42 sheet mills under power. The active rolling mills are at its East Youngstown plant.

The Mahoning Valley Steel Co., Niles, has reduced the number of its active mills from six to five.

Independents are maintaining steel ingot output on the following basis—Sheet & Tube Co., 65 per cent; Republic Iron & Steel Co., 70 per cent; Trumbull Steel Co. and Sharon Steel Hoop Co., 100 per cent.

The plate mill of the Republic Iron & Steel Co. is not averaging more than two days per week.

S. S. French, vice-president and general manager of the General Fireproofing Co., Youngstown, states there has been improvement in recent inquiry and that the immediate outlook is encouraging. He believes it will take five years for this country to catch up with its construction requirements. President W. H. Foster of the same company points out that in the past 10 years the increase in the cost of building has not been as great as the increase in wage rates.

The Jones & Laughlin Steel Corporation has moved its Cleveland sales office from the Rockefeller Building to 1409 Union Trust Building.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Oct.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
24	13.00	12.25	41.25	6.85	6.65	6.80	6.30
25	13.00	12.12½	42.37½	6.75	6.45	6.67½	6.32½
26	13.00	12.00	42.37½	6.75	6.45	6.70	6.35
27	13.12½	12.12½	....	6.75	6.45	6.67½	6.32½
29	13.00	12.25	41.50	6.75	6.45	6.67½	6.32½
30	13.00	12.25	41.50	6.75	6.45	6.67½	6.32½

*Refinery quotation; dilivered price ½c. higher.

New York

NEW YORK, Oct. 30.

Business is of small proportions in all the markets and prices are generally lower. Copper, after receding, is advancing again. Tin has been a little more active and slightly stronger. Lead is in moderate demand but a little lower, and the zinc market is a drifting one.

Copper.—The electrolytic copper market continued to decline during the last week until the lowest prices in many months were recorded. Yesterday and today, however, a turn for the better has taken place and the lowest prices apparently have been eliminated. No metal below 12.50c., delivered, appears now to be available, and some companies are asking 12.62½c., delivered. There are two substantial inquiries before the market, involving several million pounds. It is reported that wire mills are well booked even into next year, but that business in brass shows but little sign of improvement, with order books very lean.

Tin.—Compared with recent weeks the past one has been fairly active. The most animated day was Wednesday, Oct. 24, when 350 to 400 tons changed hands with consumers taking over half and with most of the business done at 41.37½c. to 41.75c., with much of it for London account. A feature of the closing days of the month has been the scarcity of spot tin with the October position tight. Spot Straits tin was quoted today at 41.50c., New York, with the market fairly active. London quotations today were £206 5s. for spot standard, £203 7s. 6d. for future standard and £207 5s. for spot Straits, all about £3 per ton higher than a week ago. Arrivals thus far this month have been 6855 tons, with 4119 tons reported afloat.

Lead.—The feature of the market has been a reduction on Oct. 25 by the leading interest from 6.85c. to 6.75c., New York. Some surprise resulted because of the much higher prices obtaining in London, but this is explained partly by the fact that the American market at present is entirely independent of any foreign quotation and that the latter are so much lower than those prevailing here that they have no effect from either an export or import point of view. The same applies also to Mexican lead. The Western market is somewhat easier than a week ago at 6.45c., St. Louis, with the outside market in the East on the same level as that of the leading interest, or 6.75c., New York.

Zinc.—This market is characterized as one devoid of feature and largely of a drifting nature. Prices for prime Western have backed and filled during the week with business very moderate in volume. Domestic demand is light and foreign sales are slack. Prime Western is quoted and has been sold in carload lots at 6.32½c., St. Louis, or 6.67½c., New York. It is stated that with ore $40 per ton, at which heavy sales were made last week, the cost of refining zinc is at least 6.50c.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market quotations for both shot and ingot nickel are 29c. to 32c.

Antimony.—Because of a further scarcity in China, wholesale lots of Chinese metal have continued to advance and are quoted today as high as 8.50c., New York, duty paid, for early delivery.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., duty paid, New York, with some sellers unable to obtain the metal from their principals.

Old Metals.—The market is depressed and business is quiet. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	10.00
Heavy machine composition	10.00
Brass, heavy	7.25
Brass, light	6.00
No. 1 red brass or composition turnings	8.50
No. 1 yellow red brass turnings	6.50
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.25
Sheet aluminum	16.25

MANUFACTURERS MEET

Annual Convention of American Manufacturers' Export Association Considers American Trade Prospects and European Tangle

The fourteenth annual convention of the American Manufacturers' Export Association was held at the Waldorf-Astoria Hotel, New York, Oct. 24, 25 and 26. While the slogan for the convention was "American-Made Products in All Markets," there was a strong tendency by most of the speakers to direct their addresses toward the present European situation. The association maintained the precedent of former conventions in the number of men prominent in business and world affairs who spoke at the various sessions and at the luncheon and dinner.

Among the features of the convention was an exhibit which included shipping companies, brokers, code companies, publishers and several manufacturers—among these Westinghouse Electric International Co., Royal Typewriter Co., Splitdorf Electrical Co., Wheeling Steel Corporation. The following countries were represented with information booths: Colombia, Chile, Peru, Sweden, Czecho-Slovakia, Costa Rica, Brazil, Argentine and the Pan-American Union. In addition the National Foreign Trade Council presented an exhibit displayed on several bulletin boards, of export advertising.

On Thursday, Julius H. Barnes, president Chamber of Commerce of the United States, addressed a luncheon held under the auspices of the National Foreign Trade Council. E. P. Thomas, president United States Steel Products Co., scheduled to preside at the luncheon, was unable to attend because of the current meeting of the American Iron and Steel Institute. At the conclusion of the address by Mr. Barnes, O. K. Davis, secretary of the National Foreign Trade Council, announced the next convention of the council would be held at the Copley-Plaza Hotel, Boston, June 4 to 6.

The dinner, which closed the convention, was addressed by Senator Paul Du Puy, who spoke on "Europe from a Publisher's Viewpoint;" John W. Doty, who described his experiences in the Japanese earthquake; and Colonel William N. Haskell, whose subject was "The Truth About Russia."

The following officers were elected for 1924: President, W. W. Nichols, president Allis-Chalmers Mfg. Co., New York; vice-president, George R. Meyercord, president Meyercord Co., Chicago; and directors, E. P. Thomas, president United States Steel Products Co., E. H. Huxley, president United States Rubber Export Co., New York, Curt G. Pfeiffer, vice-president George Borgefeldt & Co., New York; G. Arthur Schieren, vice-president Charles A. Schieren & Co., New York, Thomas J. Watson, president Computing-Tabulating-Recording Co., New York, W. M. Sloan, treasurer McElroy Sloan Shoe Co., St. Louis, J. L. Kindelberger, president Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., and D. E. Delgado, export manager Eastman Kodak Co., Rochester, N. Y. Maurice B. Dean is permanent secretary of the association.

PERSONAL

Charles P. Tolman has resigned as chief engineer and chairman of the manufacturing committee, National Lead Co., which position he held during the past 16 years, to establish a general consulting practice, specializing in dust and fume control and handling materials. He will continue as consulting engineer for the National Lead Co., and has offices at 111 Broadway, New York.

E. C. Morse has joined the Triumph Electric Co. and the Triumph Ice Machine Co., Cincinnati, as vice-president in charge of sales and member of the board of directors.

W. W. Phillips, who for the past 12 years has represented the Colonial Steel Co., Pittsburgh, in Rochester, N. Y., has been made sales manager in charge of the New York office, at 149 Varick Street, succeeding H. C. Poole, who recently was promoted to general works manager.

G. K. Atkinson, formerly with the Langhaar Ball Bearing Co., Aurora, Ind., is now connected with the New Britain Machine Co., New Britain, Conn., in the capacity of sales representative for Ohio. His headquarters will be in Cleveland.

James R. Miller, an attorney, has been elected director of the Superior Steel Corporation, Pittsburgh, succeeding H. F. Hansell, who resigned Sept. 20. Mr. Miller is also a director of the Standard Plate Glass Co., Creighton, Pa.

George E. Huntoon, formerly purchasing agent Moline Plow Co., has been elected treasurer of the Tri-City Malleable Castings Co., which recently opened a foundry at East Moline, Ill. He will also act in the capacity of purchasing agent.

John Wheeldon, general manager of plants, Wickwire-Spencer Steel Corporation, has been granted a leave of absence until Jan. 1. Charles K. Hardy, general sales manager, assisted by Winthrop G. Hall, assistant to general manager, will assume Mr. Wheeldon's duties during his absence.

David Fergusson, for more than 20 years chief engineer of the Pierce Arrow Motor Car Co., Buffalo, has joined the staff of James Cunningham, Son & Co., Rochester, N. Y., as chief engineer.

J. A. Cecce has been appointed assistant to manager of purchases of the American Short Line Railroad Association, Chicago.

Edmund C. Mayo, president and general manager American Tube & Stamping Co., Bridgeport, Conn., who for the past four years has been chief executive of the company, has resigned. He has been elected vice-president in charge of all plants of the Gorham Mfg. Co., Providence, R. I., and will assume his new duties on Jan. 1.

J. Edward Thebaud has been appointed Philadelphia representative of the Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y., with an office at 1619 Real Estate Trust Building.

Clinton S. Bradley, resident manager of the Buffalo branch office of the Jones & Laughlin Steel Corporation, has been appointed manager of the hot-rolled material department, with headquarters at Pittsburgh. Mr. Bradley has been with the company since 1901, and was in charge of the Buffalo offices for 16 years.

R. C. Hutchings, formerly with the American Steel & Wire Co., has become associated with the Standard Horse Nail Co., New Brighton, Pa., as assistant to the president.

C. A. Dunn, formerly sales manager of the Weldless Tube Co., has been appointed manager of the Delaware Seamless Tube Co., Auburn, Pa.

J. F. Newman, for 12 years purchasing agent of the Weirton Steel Co., Weirton, W. Va., has become president of the Lawrenceville Bronze Co., Pittsburgh.

OBITUARY

CHARLES PROTEUS STEINMETZ, world renowned mathematician and electrical inventor of the General Electric Co., died of heart failure at his home in Schenectady on Oct. 26. He was born in the old city of Breslau in Silesia, in 1865. From the first his love for mathematics and science asserted itself and to the thorough training received at the Universities of Breslau and Berlin, the great scientist often attributed a large share in later achievements. Forced to flee his country to escape persecution for socialistic affiliations, he went to Switzerland penniless, but made his way into the polytechnic school at Zurich, where he studied engineering. In 1889 he came to the United States and gained employment with a company later acquired by the General Electric Co., which made him chief consulting engineer in 1893. In this capacity he spent the rest of his life, developing the most important of his inventions.

HORACE G. REYNOLDS, president Reynolds Wire Co., Dixon, Ill., died at his home in that city on Oct. 21.

WILLIAM P. CLARK, president Clark Tool Works, Inc., Belmont, N. Y., died at his home there on Oct. 22, following protracted illness. He was born at Unadilla Forks, N. Y., in 1851 and in 1877 was sent to Belmont to take charge of the D. Rawson Works, later A. W. Miner & Co., agricultural implements, as manager. At the time of his death, Mr. Clark was vice-president of the Clark Brothers Co., Olean, N. Y., maker of saw mill equipment. In 1917 he organized the Clark Tool Works, Inc.

WILLIAM J. LLOYD, general superintendent General Electric Co., West Lynn, Mass., works, died suddenly on Oct. 28, in an automobile as he was entering the Tedesco Club, Lynn, Mass., grounds. He was born in Philadelphia in 1866, was graduated from Lehigh University in 1883, from which he also received the degree of mechanical engineer, and then entered the employ of the Westinghouse Electric & Mfg. Co. He became associated with the General Electric Co. about 25 years ago.

E. E. STRONG, president of the Strong, Carlisle & Hammond Co., Cleveland, and first president of the National Supply and Machinery Dealers' Association, died Oct. 29. Mr. Strong had for many years been identified with the machine tool industry. His son, Herbert W. Strong, is one of his successors in the National Supply and Machinery Dealers' Association.

W. CHAPMAN BROWN, superintendent wire weaving department, Cheney Bigelow Wire Works, died at his home in Springfield, Mass., on Oct. 26, in his fifty-fifth year.

FRANK F. AMSDEM, general manager of the Lochiel furnace at Harrisburg, Pa., died Sunday, Oct. 28, following a week's illness. He was about 61 years old, and had had a long career in iron making. He was for many years with the Central Iron & Steel Co. and later wtih Joseph E. Thropp.

The General Electric Co., Schenectady, N. Y., has perfected plans for a merger with the Canadian General Electric Co., with plants at Toronto and Peterboro, Ont., which heretofore has operated under an agreement to manufacture equipment of the first noted company in Canada. The acquisition includes the Canadian Allis-Chalmers Co., manufacturer of electrical equipment, with works at Toronto, Bridgeburg, Stratford and Montreal. Expansion will be carried out at the different plants by the American organization.

Progress Made in Gear Standardization

(*Continued from page* 1183)

to establish a suitable method for inspecting shaper and rotary gear cutters, but as yet is not in position to offer recommendations. It was indicated, however, that possibly the most accurate method would be by the use of a lantern in conjunction with a set of master curves established for 1 D. P., then by moving the lantern to compare other pitches. It was stated in the progress report that if this method proves practical cooperation of those member companies manufacturing these cutters should be had. Nothing has been done this year in the line of raw material inspection. Illuminating discussion of the subject of inspection generally was given by Major Earle Buckingham, Pratt & Whitney Co., Hartford, who, among other axioms, pointed out that the accuracy to which we can work depends upon the amount to which we can measure.

New Table of Keyway Sizes

A new table of practical sizes of keyways, keystocks and tolerances was submitted by Lars G. Nilson, Nilson-Miller Co., Hoboken, N. J., chairman of the keyway committee, which, since its last report, has been working with the committees of other societies and has had extensive correspondence with the association's membership. The new table has only 18 sizes of keyways, from ¼ to 13 in., the 4½, 5½, 9 and 11-in. nominal sizes having been eliminated. The number of keyways, dimension and range of same from 7/16 to 6-in. holes or shafts are identical with the final report of a committee of the A. S. M. E. The association's committee believes that there should be only one standard for square or flat keys for any size shaft, the majority of opinions seeming to be, according to the report, square for small and rectangular for large sizes. In rectangular keys the aim has been to make the thickness as near two-thirds of the width as is practicable. Discussion centered around tolerances, several members objecting to those given in the table. There was discussion also as to the diameter at which the change should be made from square to rectangular. Questionnaires are to be submitted to membership on the points discussed.

Specifications for Steel Castings

In the progress report of the metallurgical committee, headed by C. B. Hamilton, Jr., Hamilton Gear & Machine Co., Toronto, it was suggested that the specifications submitted for steel castings be used by members and that the reaction of the foundries be reported at the next meeting. General accord with the A. S. T. M. was expressed, but it was stated that their general specification does not give all that the committee wants, and it is turning to railroad specifications, section 7 of the A 27-21, which calls for steels of the same per cent of impurities as the class B, but differs in carbon specified. Carbon of 0.15-0.25 per cent was suggested for case hardened castings and 0.30 to 0.40 per cent carbon for untreated and water quenched castings. Manganese content is 0.30-0.60 per cent; silicon, 0.25 per cent on all; phosphorus, maximum 0.06 per cent on acid open-hearth and 0.05 per cent on basic open hearth. Sulphur is limited to 0.06 per cent. Water quenching was given as the reason for advocating not over 100 as the combined value of maximum carbon and maximum manganese.

A questionnaire relating to machinability will be submitted to the membership. It is planned to report on the upper and lower limits of hardness for good machinability. A discussion was started as to whether carbon content makes any difference in machinability, given the same hardness.

The publishing by the association of a handbook on gearing containing all gear data and formulae and other related matter was taken up in the report of the library committee, of which E. J. Noble, Horsburgh & Scott Co., Cleveland, is chairman. This committee is to prepare the handbook, which it is expected will not only serve the members of the association, but be in demand among users of gears, where it will prove a potent influence making for the adoption and use of all of the association's standards. It was suggested that the volume be in the form of a loose leaf book similar to that of the S. A. E. handbook. The report stimulated interest and discussion and was voted approved.

Compensating for Errors in Milled Gears

A paper on the "Analysis of Milled Gears," by Ernest Wildhaber, consulting engineer, New York, and Earle Buckingham, Pratt & Whitney Co., Hartford, read by Mr. Buckingham at the first general session, was received with interest. The following quotations from the paper will serve to indicate its scope.

"One of the most widely used methods of machining gear teeth is to mill them with a formed milling cutter, this method employing a series of eight cutters which are adapted to produce gears with from 12 teeth to a rack, each cutter being utilized to produce a certain part of the series.

"In principle each cutter is correct for the smallest gear in its particular series. The extent of the series for which each cutter is used depends upon the change in the theoretical form. As these forms change least with greater numbers of teeth, the range of cutters greatly increases as the tooth numbers increase. Theoretically, a cutter which is correct for a certain number of teeth is incorrect for any other number; practically, however, this error is slight. One purpose of this paper is to analyze the nature and amount of such errors.

"Furthermore, it often happens that a gear wtih 23 teeth, for example, is required while the only cutter available is the No. 4 cutter instead of the No. 5 cutter Another purpose of this paper is to show how this cutter can be used with as good or better results by slightly modifying the depth of cut.

"Again, it is often desirable to provide more backlash on the gears than is present when the gears are cut to the theoretical depth. This is accomplished by sinking the cutters deeper into the blank. Theoretically this displaces the profile and alters the action. Another object of this paper is to determine the amount of excess depth for each gear that will give the best results.

"A study of the errors introduced as noted above will show that they can be reduced and compared to the errors in eccentric gears."

In addition to the determination of errors, the analysis also provides remedies. It develops a distribution of backlash which avoids errors ordinarily incurred through cutting deeper. It shows how the contact may be prevented from shifting too much, either toward the bottom or to the tips of the teeth. It permits the use of compensating cutters, by making one error modify another.

It was emphasized that one of the general and important gear problems is how to avoid safely edge contact at the beginning of mesh. The tip edge of the driven tooth is particularly dangerous to have contact with the flank of the driving tooth. When this danger exists in milled gears, for instance with low tooth numbers, through lack of accuracy in cutting, it may always be avoided by cutting the driven gear a trifle deeper.

Interest Shown in Industrial Relations

The response to a proposed program, outlined by E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati, chairman of the industrial relations committee, showed considerable interest on the part of the membership in the general subject. Allied to this, and in which much interest was also shown, was an address by John Kotteamp, head of the department of industrial engineering, Pratt Institute, Brooklyn, N. Y., on the "Training of Shop Executives."

The remarks of Mr. Sawtelle were in the nature of personal ideas as to the possible activities of his committee, which had been reorganized recently and had no report to make. He emphasized the probable success of a company having high grade management as compared to large financial resources alone, and pointed out the necessity of sympathetic alert cooperation from each employee, the achievement of which was indicated as solving to a large degree the problem of personnel. Ways and means to accomplish this was,

he said, the primary function of any industrial relations committee.

The practical value of wage questionnaires was evidently questionable to the speaker, who thought that the matter of wages was a local problem, fixed by living conditions in each location and conditions in each shop. The cost of labor turnover was emphasized and helping employees think right, and the prevention of radicalism was discussed, as were also the value of stock ownership, profit sharing through wage incentives or actual sharing of profits. It was stated as his opinion that time can be spent profitably in making a comparative study of reports on the various wage incentives, their benefits and how they can be applied. Suggestions and experience on the training of workmen and foremen were thought to be of value, and also suggestions on managerial contact with men and welfare work. A proposal to study the progress of companies notable for success along personnel lines was offered. Mr. Sawtelle reiterated, however, that no two personalities are the same, no two shops are the same, and that industrial relationship is 99 per cent a matter of applied personality. Hence, the whole question is one that each man must solve for himself, he said.

Necessity for the careful selection of raw material for the training and development of successful shop executives was strongly emphasized in Mr. Kottcamp's address on "Training Shop Executives."

Personnel organizations and systems of training executives, adopted by many companies were referred to. In this connection, Mr. Kottcamp said, "To my mind, industry will profit most by selecting from its shop young men who fill the specifications for good raw material. Give these men leave of absence and send them to a technical school giving a short and intensive training. Follow the progress of these men, keep in contact with the school and upon completion of their courses, take them back into their former positions." Giving the men greater responsibility as fast as they merit it and not killing their initiative by exploiting them on a job they can do well, were emphasized.

Cost Committee Active

An outline of the best method for overhead cost distribution in the gear industry was incorporated in a paper by O. C. Kiehne of the Van Dorn & Dutton Co., Cleveland, which was passed to members at the meeting. An equitable and accurate method whereby these expenses may be allocated to cost was emphasized as one of the greater problems in cost finding. The methods of percentage on material, percentage on labor cost, and percentage on the man hours were discussed, and a method of applying the machine rate given. The committee on uniform cost accounting, of which J. H. Dunn, R. D. Nuttall Co., Pittsburgh, is chairman, has been increased to ten members. It is planned to distribute during the year a series of papers similar to that of Mr. Kiehne's, and investigation will be made as to the success of the uniform cost work done by other associations.

A plea for the organized activity of the society in the bigger and broader problems affecting the gear and other industries, in addition to the standardization and other technical work of the society was made by S. L. Nicholson, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in the report of the tariff committee of which he is the chairman. The effect of the tariff, taxation and the policy of the Government in other matters affecting industry was vividly described in its vital bearing on the gear industry, and the creating of a committee to work in this broad field was advocated. It was proposed by Mr. Nicholson that the tariff committee be dropped, but discussion on this point left the matter in the hands of the executive committee which will take under consideration changing the name of that committee.

Discusses Expansion Possibilities of the Gear Business

RESEARCH with a view to ascertaining new uses to which gears may be put was urged by E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., in an address on the "Development of the Gear Industry," at the last session. Several unusual applications of gears were shown by lantern slides and the design and function of these applications explained in detail.

"The work done has impressed upon me," said Mr. Miller, "that the gear business is far from the much touted saturation point. It is apparent, too, that our endeavors should not be confined to standardization work and to human relationship problems, as great and necessary as this work is. We should fare forth as explorers and promoters of the gear industry, remembering that perseverance wins." Keeping posted as to the development of new devices or machines and offering service as gear engineers in connection with the new developments was urged. "It is indeed uncommon," said Mr. Miller, "to find in a mechanical institution a department whose work is business research engineering. The function of such a department would be not only to explore the present gear field, but to ascertain accurately to what new uses gears may be put, thus bringing out potential possibilities."

Among possibilities cited as at present largely unconsidered were the substitution of cut gears for those now having the teeth cast or punched. "In these cases," he said, "not only will the cut gear be a great improvement with respect to quietness and smoothness of operation, but it can be demonstrated that many times the manufacturer can produce them more cheaply than otherwise. Expense of assembly and hand work on the teeth may far exceed cutting costs. Thousands of toothed wheels are being made today which cannot receive our stamp of approval as gear engineers. History is behind these tooth designs. It is usually found that some mechanical genius has worked out a device experimentally. Cut and try methods have resulted in notched wheels which cause the mechanism to work satisfactorily. A market has been developed and the gear teeth are patterned after those in the experimental machine. Special machinery is designed for the production of these gears and they are made in great quantities. Analysis makes plain that these primitive gear tooth shapes are expensive members. The lack of gear knowledge on the part of the designer results in a useless waste of money. The tooth design is such that production cannot keep pace with the development of gear cutters and gear cutting machinery. A change is usually unthinkable, because of difficulty in furnishing repair parts.

"Here is plainly our opportunity. We should go to the full limit of our resources to get in touch with new design work and then offer our best engineering advice."

Several possible new uses of gear teeth were mentioned. "The future may show," he said, "the value of gear teeth for power transmission, when little or no notion occurs between engaging teeth. Gear teeth may become prominent as the chief actors in a liquid measuring device, actually doing the measuring while other teeth in common fashion effect the rotation of the mechanism.

"Gear teeth may occupy an important place in the refrigerating industry. As compressors they may take their place in the multitude of large or small chemical refrigerators which will be in use within a few years. Gear teeth in addition to being transmitters of power may be part of the prime mover. The air turbine whose rotor carries gear teeth may become widely used. Gear teeth may be used uniquely as a positive face clutch."

Other Addresses

"Simplified Practice As a Service to American Industry" was an address by R. M. Hudson, division of simplified practice, Department of Commerce.

S. L. Nicholson, Westinghouse Electric & Mfg. Co., East Pittsburgh, told of his recent trip to New Zealand, Australia and India, outlining the railroad, industrial, labor and general business situation in those countries. Opportunity for American trade in India, in machinery and other commodities was pointed out.

Metal Working Production Problems

(*Continued from page* 1181)

shall make the machine, to all intents and purposes, a special machine for the particular operations and product desired. This tooling likewise demands judgment and wider experience, but it is capable of much more rapid development than the machine itself, and unlike the machine, may be altered from day to day in its approach toward perfection with a corresponding daily improvement in production.

It is one of the standard grievances of the machine builder that this special tool design is so often left to him, when it could best be done in the shops of the user. As between two men of the same ability and experience, the one working where the tools are to be used has the advantage. Working conditions, methods of inspection, condition of forgings, all affect the ultimate tool design in ways which it is difficult for the absentee engineer to take account of. It is true, of course, that the tool designer on the staffs of the machine builder has the advantage of being a specialist in that machine, but that is his only point of advantage. If the user will concentrate on a small variety of standard machines his tool engineer may become a specialist also, instead of spreading his activities over a hundred sizes, types and designs.

Advantages of Standardized Machine-Tool

The advantages thus far urged for the standardized machine tool are: Perfected design, better machine for the money, and this last point of permitting the tool engineer to specialize and thus do better work.

The fewer kinds of machine needed, with standardization, bring also the following benefits:

1. Greater familiarity of staff with upkeep and adjustments.
2. Fewer repair parts to carry in stock.
3. Greater flexibility in shop layout and in assignment of work.
4. Less expense in changing design of product.

From the standpoint of employees are the following advantages:

1. Fewer kinds of operators to train for repairs, adjustments and for machine operation.
2. A man once trained can be used on a greater percentage of the machines in the shop.
3. Training can be standardized and men taught more easily. This affects the cost of labor turnover.

Some of these advantages affect the direct labor cost. Others affect the overhead. The wise manager is giving particular attention to the latter division of the cost of manufacture, for of the three primary elements in cost—labor, material and overhead—it is the overhead which is the most susceptible of improvement; and it is this same element which is most favorably affected by the standardization of a few types of machine tool equipment.

In connection with his paper, Mr. Flanders pointed out some of the features and illustrated with lantern slides some of the production machines made by his company, including single and double spindle turret lathes and automatic lathes of various types equipped with special attachments and tool equipment for different operations in production work and calculated to eliminate the necessity of using special machinery.

Discussion of this paper hinged around practical details of the operation of the flat turret lathe and the Fay automatic lathe. In reply to a question, Mr. Flanders stated that in many cases the time of an operator giving his entire attention to one of the automatic lathes did not result in other than a very reasonable labor charge. He cited one instance in which a completely turned aluminum piston was produced every 17 sec., in which he averred that the time of two men, if required, would not be an excessive charge when prorated over the total output.

Economics of a Special Purpose Machine

E. P. Blanchard, Bullard Machine Tool Co., presented a paper on the "Fundamental Principles in Modern Production Machines" in which he dwelt on the design and operation in the Bullard Multaumatic and Continumatic special purpose machines for large production work. In reply to questions he said that from 200 to 300 parts would be the minimum quantity of production that would be worth while to set the machine up for and that it would pay the manufacturer to install a Multaumatic even if it is used only two months in the year.

The practical nature of the program of the Friday morning general session drew a considerable representation from the shop organizations of the Cleveland district. A suggestion for future meetings was made by R. E. Flanders, who advocated the idea of making comparative studies of several different methods for the production of a specific operation or group of operations on a given part.

Standard Machine Tool Specification Sheet

A brief outline of a new form of standard machine tool specification sheet was presented by A. L. Evans, who stated that this form had been favorably received at the recent convention of the National Association of Machine Tool Builders and is to be perfected at a committee meeting in the near future. This form covers the general characteristics of the machine as to size, weight, floor space and drive requirements. In addition to these features, space is arranged for the inclusion of time study tables, feed and speed characteristics and specific tool and fixture mounting dimensions. A line drawing in the scale of ¾ in. per ft. is included for assistance in the preparation of the usual factory layout.

Developments in Grinding

A. J. Ott and C. L. Ott, president and secretary-treasurer, respectively, of the American Grinder Co., Detroit, presented a paper on spur gear grinding and testing which was devoted largely to a description of a new gear grinder and a gear tester made by their company. The authors called attention to the rapid progress that has been made in the art of grinding during the past 20 years. Manufacturers of grinding machines formerly urged that for plain cylindrical grinding work the parts first be rough turned in lathes and then finished on the grinder to the limits required to make them interchangeable. Automotive engineers and manufacturers had grasped the idea of grinding and its advantages and today no one would think of turning cylindrical parts that are to be hardened, nor would they harden a part after finishing it to size.

The authors stated that by using the machine and methods described by them fine finishing cuts and burnishing and polishing operations can be eliminated in the production of spur gears. Economy in making transmission gears is obtained by roughing out the teeth to about 0.005-in. oversize tooth thickness, depending on the amount of backlash desired, then hardening the gear, grinding the hole or stem, and finally the teeth. A great deal of time should not be spent on finishing operations and the gears then subjected to heat treatment, for some distortion is sure to occur. The finishing can be done best by grinding after hardening and it can be done in the same or even less time.

In reply to questions Mr. Ott said that the additional cost of grinding automobile transmissions is approximately 10c. a gear or 50c. to $1 a transmission, depending upon the number of gears. Ground gears have three advantages, economy, durability and the elimination of noise. He said that two of the leading Detroit automobile companies had made comparisons of the wear of gear teeth ground and not ground and had found that the ground teeth last much longer.

"Developments in Production Grinding in the Automotive Industry" was discussed by Oscar A. Knight, Detroit district manager of the Norton Co. He stated that in production grinding the progress made during the past few years has been along the line of grinding simultaneously multiple parts such as piston rings and ball and roller bearing cups. This kind of grinding brought out the use of wider wheels. With the development of these operations came the cylindrical grinding of square and distributor cams, square shafts, piston relief grinding and double wheel grinding of such

parts as steering knuckles and pinion shafts. To perform these new operations more care has been taken to build machines that are heavy, strong and more accurate. New machines and special attachments have been put into use. Cams formerly were ground individually but with the integral cam grinding attachment the whole cam shaft, having 12 individual cams integral with it, is ground in about the same time as one individual cam by the old method. By means of attachments reliefs are now ground in pistons at the rate of 125 to 175 pistons per hour. The square end of a transmission shaft 1 in. sq. by 3 in. long can be ground at the rate of 65 pieces per hour or a 90 per cent increase in production.

The speaker attributed the principal development in production grinders to the use of wide face grinding wheels. With present types of machines, ends of rear axle shafts are ground at the rate of 100 to 125 per hour as compared with 12 per hour under old methods. During the past year a wheel spindle reciprocating attachment has been developed as well as flat table machines with swivel tables as well as various attachments. A forming device has been brought out to form the wheel for grinding the entire surface including tapers and straight portions. This machine in cases has increased production from 100 to 400 per cent. In ball and roller bearing work special arbors have been made for holding as many rings as can be covered by a wheel up to 10 in. wide and by this method production has increased 100 to 400 per cent. At present the demand of the automobile companies is tending toward grinding machines having self-contained drives and controls. Some of these types were shown in the illustrations.

The new type of heavier machines are equipped with new mechanism for driving the wheel, the wheel spindle being belt driven from the power shaft. In some of the new machines chain drive has been substituted for gears and in grinding crank shafts with this type there have been no complaints of chatter marks. In the discussion Mr. Knight said that there is a tendency toward automatic, semi-automatic and centerless grinding machines.

Economies of Factory Conveyor Systems

"The Application of Conveyor Equipment to a Small Production Plant" was discussed by H. P. Harrison, master mechanic H. H. Franklin Mfg. Co., Syracuse, N. Y. The speaker said that it is first necessary to determine whether a plant has a production large enough to make a conveyor installation advisable, and to consider the question of possible plant rearrangement for routing the work on conveyors. He believed no plant making automobile parts is too small to consider the installation of some conveyor equipment as an aid in reducing costs. However, how far the installation of conveyors should be carried can be determined only by a study of each individual case.

The speaker referred to the problems in the Franklin plant, where conveyors have been installed, for an elastic production schedule of 20 to 60 cars per day. In this system a power driven unit was installed for conveying machine parts and assembly parts between the various machines on which the operations were performed. However, power driven conveyors did not prove satisfactory for this particular work and conveyors of the gravity type have been substituted. In the speaker's opinion, in the average plant of small production it is not practical to use power driven conveyors where the operations are performed directly on the conveyor line.

Mr. Harrison discussed at length with illustrations the complete conveyor system in the Franklin plant, starting with an automatic elevator that carries the cylinder castings from the basement to the cylinder machining department on the third floor. At first an endless belt conveyed the cylinders between the various machining operations but this proved unsatisfactory and was replaced by a double line gravity conveyor which has given good results. With the use of conveyors the company reduced the number of cylinder castings in process by 2000. By the use of a power driven chain conveyor for transmissions, resembling a long bench, the company was able to produce its maximum schedule with 50 fewer transmissions in process and with an 18 per cent reduction in labor costs.

The plant has one power driven conveyor where the only function is moving work between machining operations, this being used for handling axle parts, but the speaker believed a gravity conveyor would serve this purpose just as well if not better. In the axle department a double chain type conveyor is used for assembling the various parts and another for the final assembly of rear axles, both of these being extremely heavy to withstand heavy pounding. By concentrating the manufacturing of axle parts and finished axles into one unit a large amount of handling of bulky finished parts was eliminated and there is not the danger of the shortage of some part coming from another section of the plant, as all the axle parts are made in one room.

The speaker stated that the number of axles in process has been reduced by about 500 and the actual manufacturing cost of axles has been reduced 15 per cent and he declared that the operation of the conveyor leaves no doubt as to the practicability of the unit system of manufacturing for a large portion of the parts produced in plants of capacity similar to that of the Franklin. He added that one of the most interesting installations recently made is a conveyor for handling the trimming of open bodies and at present an extensive installation is being made for handling the finished car through the final inspection and touch-up operations.

Human Element Touched On

"The Human Element in Production" was the subject of a paper by W. F. Jameson, chief inspector Cleveland Automobile Co. He urged the development of concentration on the part of employees by inspiring them with an interest in their work and thereby improving production. The speaker contended that employers have overlooked the possibilities of training the mind behind the man, thinking of the workmen as so many hired hands. Wonderful results have been accomplished from a production standpoint, but he asked if greater results cannot be obtained by cultivating more than the machine side of the man. The majority of workmen are capable of thinking and should be coached to think rightly. A man who takes an interest in his job and applies himself to it will turn out better and be of more worth. Plenty of men take an interest in their work when they apply themselves to it but the difficulty lies in getting them to apply themselves consistently.

Of all incentives, he said, the most productive is the feeling that one is working for himself. It is easy to convince men of the above principles but to keep them "sold" requires repeated efforts on the part of the foreman. He held that the spirit that he is working for himself can be injected into a workman by making him feel that every job can be made a training school of experience and that the factory is an educational institution where important problems are to be solved and where great opportunities are offered for advancement.

Group Piecework Wage Payments

A paper on "Wage Incentive Systems" by Eugene Bouton, supervisor of time study, Chandler Motor Car Co., proved of deep interest and brought out a large number of questions. Mr. Bouton said that practically all managers of modern plants favor some wage incentive plan but there is considerable difference of opinion as to what is the proper system to install. Some of the systems are highly complicated and involve a large amount of clerical work and the employer does not know in advance what the direct labor cost will be nor does the employee know what his earnings will amount to until they are compiled at the end of a pay period.

The speaker described in detail a system placed in operation six months ago by the Chandler company. This is a group piecework plan for the major assembly units and machine departments and straight individual piecework for small parts on which the operations do not lend themselves very readily to group piecework. The piecework prices are established from time study. The group piecework plan, is fundamentally the same as straight piecework. A time study of all the opera-

tions of the group is taken and a price is set on the additive time. In other words all operations to produce the unit are combined in one operation. The group earnings are derived from the number of accepted finished units multiplied by the unit price. The individual workman's earnings are prorated out of group earnings based on his hourly rate and the number of hours worked. The total group piece earnings divided by the total day rate earnings of the group equals the factor by which is multiplied the workman's day-rate earnings, which gives the prorated piecework amount.

Mr. Bouton pointed out that one important factor of the successful operation of the group plan is the differentiation of hourly rates. Careful judgment should be exercised in rating men according to their ability and the skill required for their respective work. Unskilled workmen and new employees should receive the minimum hourly rate and semi-skilled and skilled men should be properly rated above the minimum rate. Maximum and minimum hourly rates are specified and all rates established must be within the two limits. A man granted an increase in his hourly rate receives a higher prorated share of the total group earnings.

Another feature of the group piecework plan is the immediate determination by the foreman of the number of men required to produce any given schedule of units. If it requires 100 men to make 100 units per day and the schedule should drop to 75 it would require practically 75 men to produce 75 units. The group or cost price of each unit should be based on as near a uniform schedule as it is possible to set but any wide variation in production would tend to change the original rate and would necessitate a slight change in the piecework prices in the unit.

When a new employee is added to the group he can be allowed to work two days before participating in group earnings; then he is prorated among the group. Should he be unsatisfactory to the rest of the group or too slow he is taken out. The employees desire to earn as much as possible and it is to their interest to keep the number of men in a group down to a minimum. The spirit of teamwork is developed and inefficient workers are eliminated.

An inspector's coupon shows the number of units completed daily in each group, rejections, etc., and from this the timekeeper makes up a group piecework report and from the latter report the foreman knows by 10 a. m. what each man's earnings were for the previous day. This feature is favored by the employees, some of whom had worked in group systems in other plants where they could not learn what their earnings were until the next pay period.

Referring to the proper size of a group, Mr. Bouton said that his company had found that a group should be limited to the unit itself and that there should not be more than one group in any one unit. The company has one group of 92 men and some as low as 3 men. There are no bonus or premium calculations and with a flat price on any group the management knows at all times the direct labor cost. The speaker pointed out that the system lacks complications and that there is a definite understanding with the man as to the amount of work to be produced for the compensation received. Both the company and employees are satisfied that the system has met all principal objections made to other wage incentive systems.

The following additional facts regarding the system were brought out in questions submitted to Mr. Bouton.

The group plan has had the effect of greatly reducing the labor turnover and attendance has become much better. Men can soon learn to gage their earnings by the production each day but the foreman can always tell them their actual earnings on the following day. The scrap allowance depends on the nature of the work. Only labor is deducted from parts scrapped in the group plan operations, the men not being charged for the loss of material. While the employee is guaranteed only the minimum rate, he must earn considerable more to be efficient enough to stay on the job. The incentive to do good work under the group plan has resulted in some decrease in the inspection work.

About 90 per cent of the work in the plant is on piece rates. In the machine departments the group plan employees make 15 to 25 per cent above a day rate. If the pay of one member of a group is increased, that of others in the same group is slightly decreased. If an employee is penalized for being late, the amount he is penalized is given to the remainder of the group instead of going to the company. Speed men are not employed to speed up work in a group. The tool department is operated on a day work basis. If members in a group object to one of their number, they take the matter up with the foreman; and if there is a justification for their complaint, the man is removed from the unit. Individual effort is found to be practically the same in large as small groups.

The guaranteed hour rates in the group plan are lower than the straight day work rates. Assembly work and many machine operations lend themselves to group work. When there are only one or two operations day rates seem to work out best. One of the questions suggested that under the group plan there might be a tendency for a group to make unreasonable wage demands and possibly quit work in a body should these demands not be granted, but Mr. Bouton said that his plant had experienced no trouble of this kind.

Percy S. Brown, works manager of the Corona Typewriter Co., presented a comprehensive paper covering every detail of the production control methods at the Corona plant from the time an order comes from the sales department until the order is shipped. Starting with scheduling he discussed the work of the method division, of the instruction card division which sets standards for piecework operation, of the route division which keeps the assembly department supplied with parts, of the stores division which issues requisitions on the purchasing department and of the department handling interplant transportation. The speaker showed various forms used in the organization system and made clear how the methods outlined could be applied to automotive plants.

Testing and Inspection Instruments

Standardization of methods of applying the scleroscope was discussed by Albert F. Shore, of the Shore Instrument & Mfg. Co. This dwelt largely on suggestions made by the iron and steel division of the S. A. E. Standards Committee with the view of increasing the accuracy of readings made by the scleroscope in testing for hardness. Among his conclusions were the following: The scleroscope should be set within 1 deg. of plumbness. An error of 0.007 is introduced for each degree up to 5 deg. when the instrument is out of plumb. Inclination at a 10 deg. angle introduces a drop of 8 per cent in readings. A too rough surface on test specimens causes fluctuation in readings. Scale on soft steel influences readings but slightly. When the steel is hard it can be tested through the scale by making allowance. Variations in the shape and dimensions of the test piece have some effect upon the readings.

A. H. Frauenthal, Chandler Motor Car Co., discussed factors governing out-of-roundness measurement. The author pointed out that in order to properly check the out-of-roundness of parts whose contour has an even number of high spots a checking instrument with two opposing measuring points must be used and for parts whose contour has an uneven number of high spots a checking device with three point contact, one point being located on the central line between the other two. For close work with the three point method the angles between the three points of contact must be selected according to the number of high spots. The author expressed the opinion that there is still considerable room for improvement in instruments in checking out-of-roundness and suggested to manufacturers the inclusion of these three features for instruments for this purpose; a flat measuring point large enough to reach the major diameter when it is off centered with the measuring point due to ellipticity; rotation of the measuring point to promote even wear, and a corrected indicator for use with a 90 deg. angle V-block thus eliminating correction by the operator.

Machinery Markets and News of the Works

RENEWED RAIL ACTIVITY

Several Roads Inquiring for or Buying Machine Tools

Baltimore & Ohio, Norfolk & Western and Rock Island Issue Lists—Burlington Purchasing

Apart from railroad purchases and inquiries, the machine-tool markets are extremely quiet. The Baltimore & Ohio, Norfolk & Western and Rock Island Lines have issued inquiries for 10 or more tools each. Tentative orders have been placed by the Burlington on a list issued some time ago. There is also a good deal of miscellaneous railroad buying.

The Baltimore & Ohio list asks for prices on 10 engine lathes and a number of other tools; the Norfolk & Western inquires for about 15 machines, including three radial drills, five engine lathes, three boring mills, two milling machines and other tools.

While formal orders have not been issued by the Burlington, tentative awards have been made of the tools it inquired for months ago.

Further railroad inquiry and buying is expected before the close of the year.

There has been a severe let-down in buying of tools by manufacturers, the past week having been as quiet as any time this year. While some manufacturing plants are still working at full time, others are curtailing schedules. Few plants have orders which will insure operation beyond the close of the year, and this lack of future business probably accounts for the general disinclination to purchase new tools at this time. Continued offerings of used tools in good condition at fairly low prices are also prejudicial to the sale of new tools.

More interest is developing in prospective Japanese buying in view of the fact that some orders already have been placed. A Cincinnati manufacturer took an order for 12 engine lathes on which immediate shipment was required. He was able to take the order because of having the machine in stock.

New York

NEW YORK, Oct. 30.

MISCELLANEOUS railroad buying, mostly in small lots, is the chief sustaining influence in the machine-tool market. Purchase of tools by industrial companies is at a very low point and no improvement is looked for until after the first of the year at least. The Southern Wheel Co., St. Louis, has purchased a 48-in., 300-ton wheel press from an Eastern builder. The Oil Well Supply Co., Pittsburgh, has ordered a 2500-ton steam hammer.

The Baltimore & Ohio Railroad is in the market for the following machines:

One 90-in. journal truing lathe.
Two 36-in. upright drills.
One guide bar grinder.
Two driving box boring and facing machines.
One 7-ft. radial drill.
Two 16-in. engine lathes.
One drill grinder.
One 20-in. upright drill.
One 24-in., one 28-in. and one 30-in. shaper.

The Norfolk & Western Railroad has an inquiry out for the following machines:

One 4-in. radial drill.
Two 6-ft. radial drills.
One 26-in. upright drill.
One nut facing machine.
Two 20-in. engine lathes.
One universal cutter and tool grinder.
One 36-in. draw cut shaper.
One link grinder.
Five 16-in. engine lathes.
One No. 2 universal milling machine.
One 60-in. engine lathe.

The General Motors Corporation states that the recent report that a contract for erection of a plant in Japan had been let to the H. K. Ferguson Co., Cleveland, is incorrect. The General Motors Corporation through its foreign subsidiaries is handling the construction of assembling plants in London and Copenhagen, as later announced in THE IRON AGE, but does not at present intend entering Japan.

The George Haiss Mfg. Co., Inc., 142d Street and Canal Place, New York, is in the market for rolls for bending plate up to ¾-in. thickness. Rolls must be 10 to 12 ft. between bearings.

The Viking Tool & Machine Co., Sixty-fifth Street, Brooklyn, has inquiries out for a number of power punch presses, 3 kick presses and a squaring shear, 30-in.

Fire, Oct. 22, destroyed the two-story machine shop at the yards of the New York Central Railroad Co., New York, at 154th and 155th Streets. An official estimate of loss has not been announced. It is planned to rebuild.

Louis Brook, Inc., Woodward Avenue, near Flushing Avenue, Brooklyn, has plans under way for factory addition, 100 x 160 ft., at its lumber and woodworking plant, estimated to cost $200,000, with machinery, the majority of which will be electrically-operated. Edward M. Adelsohn, 1778 Pitkin Avenue, is architect.

The Brambach Piano Co., 639 West Forty-ninth Street, New York, is planning for the installation of a drill press, 20-in., back-geared.

The J. A. Manning Paper Co., George Street, Troy, N. Y., an interest of the Manning Abrasive Co., has preliminary plans for a new one-story plant at Green Island, 40 x 150 ft., to cost $250,000 with machinery. The main portion of the structure will be equipped as a beater department.

The City of New York Bellevue and Allied Hospital, 415 East Twenty-sixth Street, is having plans drawn for a new ice and refrigerating plant, to cost about $60,000. A. Judd is secretary in charge.

C. Brandes, Inc., 237 Lafayette Street, manufacturer of wireless equipment, has leased another floor in the building at address noted, totaling about 5000 sq. ft. of space, for extensions. The company will be occupying four floors in this building, as well as a new factory at Newark, N. J., lately acquired.

The Standard Oil Co. of New York, 26 Broadway, has acquired the Bayles Shipyard of the New York Harbor Dry Dock Corporation at Port Jefferson, L. I., for $100,000, and will use the property as a new shipbuilding and repair works.

The Astoria Light, Heat & Power Corporation, 130 East Fifteenth Street, New York, has plans for additions and improvements in its plants on Winthrop Avenue, Long Island City.

The American Can Co., 120 Broadway, New York, is planning for additions and improvements in its plant at Fairport, N. Y.

In connection with proposed equipment purchases to involve about $2,860,000, the Long Island Railroad Co., Pennsylvania Terminal, New York, has placed an order with the Westinghouse Electric & Mfg. Co., East Pittsburgh, for apparatus to cost about $600,000. Other contracts for electrical and mechanical equipment will be awarded soon.

Manual training equipment will be installed in the two-story high school addition to be erected at Mount Kisco, N. Y., estimated to cost $200,000, for which plans are being prepared by E. Sibley, Bluff Road, Palisades, N. J.

The W. N. Best Corporation, 11 Broadway, New York, manufacturer of oil burners and oil-burning apparatus, has purchased the plant of the American Tube & Bending Co., 316-22 Coit Street, Irvington, N. J., comprising a one-story structure, 100 x 200 ft., for a new works. Equipment will soon be installed. The company is now operating a plant on Gates Avenue, Brooklyn. Col. Joseph D. Sears is president, and Bertram W. Saunders, secretary.

The Crane Market

Activity in electric overhead traveling cranes and locomotive cranes is at a low ebb. Few new inquiries have appeared in the past week and current business, on which action has not yet been taken, with one or two exceptions, is for cranes of small capacity. Cranes on the recently issued list of the General Electric Co., Schenectady, N. Y., for the Philadelphia plant include nine 3-ton, two 5-ton, two 10-ton and one 25-ton overhead cranes. The list of cranes for the New Jersey plant of the Western Electric Co., which will be sent to a previously selected list of bidders, it is announced, will be issued this week. The Public Service Electric Co., Newark, N. J., is about to close on its inquiry for two 125-ton, double trolley overhead cranes. The American Radiator Co. will probably close on a locomotive crane this week. James J. Weiler & Sons, Robson-Prichard Bldg., Huntington, W. Va., is asking for prices on an overhead traveling crane for a new steel fabricating shop.

Among recent purchases are:

Georgia Railway & Power Co., Atlanta, Ga., a 50-ton, 50-ft. span, electric traveling crane from the Whiting Corporation.

Carnegie Steel Co., Pittsburgh, fourteen 1-motor jib cranes from the Whiting Corporation.

Joseph T. Ryerson & Son, Chicago, a 10-ton, 75-ft. span, 5-motor, overhead traveling crane for their Detroit plant from the Milwaukee Electric Crane & Mfg. Co.

Davies Supply Co., Chicago, a 5-ton 55-ft. span, 3-motor overhead traveling crane from the Milwaukee Electric Crane & Mfg. Co.

Carnegie Steel Co., Pittsburgh, an 11-ton, coal hopper crane for the Clairton, Pa., works, from the Alliance Machinery Co.

Stamford Gravel Co., Stamford, Ont., Canada, a 20-ton, 45-ft. boom, 8-wheel, used Brownhoist locomotive crane from Philip T. King, New York.

West Leechburg Steel Co., West Leechburg, Pa., a 5-ton, 47-ft. 6-in. span, electric traveling crane from the Northern Engineering Works.

Virginian Railway Co., Norfolk, Va., two 30-ton, 47-ft. span, 3-motor, overhead traveling cranes from the Bedford Foundry & Machine Co.

Fire, Oct. 21, destroyed the plant of the Raritan Hollow Tile Co., Keasbey, N. J., with loss estimated at $100,000, including machinery. The machine department, power house, mechanical drying house and clay department sustained the bulk of loss. Robert Lyle is general manager.

The Union County Park Commission, 286 North Broad Street, Elizabeth, N. J., has plans for the construction of a machine shop, general repair works and store house on the Elizabeth-Roselle Park property, to cost about $35,000. C. G. Poggi, 275 Morris Avenue, is architect. W. R. Tracy is engineer for the commission.

Lincoln E. Rowley, city clerk, East Orange, N. J., will receive bids until Nov. 13 for one snow loader, Barber-Greene type, as per specifications on file.

A machine shop will be installed in the new two-story and basement psychological laboratory, 35 x 130 ft., to be erected at Princeton University, Princeton, N. J., estimated to cost $125,000, for which a general contract has been let to the Matthews Construction Co., Trenton. Day & Klauder, Franklin Bank Building, Philadelphia, are architects.

Manual training equipment will be installed in the new high school to be erected at Irvington, N. J., estimated to cost $500,000, for which plans are being prepared by Donn Barber, 101 Park Avenue, New York, architect and engineer.

The Passaic Valley Sewerage Commissioners, Chamber of Commerce Building, Newark, N. J., will take bids until Nov. 13 for an electrically-operated pumping plant at the Yantacaw station, Clifton, N. J., consisting of three centrifugal pumping units, each with capacity of 6,500,000 gal. per day; one gasoline engine-driven electric generating set, capacity sufficient to drive pumps, with switchboard, automatic control, etc., as per plans on file. Joseph H. Quigg is clerk.

Philadelphia

PHILADELPHIA, Oct. 29.

A BOND issue of $10,000,000 is being sold by the Philadelphia Electric Co., Tenth and Chestnut Streets, a large part of the proceeds to be used for an expansion program, including additional generating equipment and auxiliary machinery. Joseph B. McCall is president.

The Koelle-Greenwood Motor Co., 6025 Germantown Avenue, Philadelphia, has awarded a general contract to the Turner Construction Co., Fresser Building, for the erection of a new two-story and basement service and repair building, 70 x 210 ft., to cost $100,000.

Amos H. Hall & Son, 2915 North Second Street, Philadelphia, manufacturers of tanks, etc., have awarded a general contract to the William Steele & Sons Co., 219 North Broad Street, for a new plant and power house on Erie Avenue, to cost $97,000 with equipment.

The Supply Officer, United States Navy, Philadelphia, will take bids for a quantity of duraluminum rivets, screws, nuts and washers, aero requisition 812; also for two indicating annunciating gages, N.S.A.F. requisition 279; and for one high frequency apparatus, M. and S. requisition 36.

The Packard Motor Car Co., Broad and Wood Streets, Philadelphia, has acquired property on Broad Street, 200 x 265 ft., for about $300,000, as a site for a new five-story service, repair and headquarters, estimated to cost $600,000.

The American Ice Co., 121 North Broad Street, Philadelphia, has awarded a general contract to Sutton & Stephensen, Thirteenth Street and Washington Avenue, for a new three-story ice-manufacturing and cold storage plant, 60 x 150 ft., at South and Seventeenth Streets, to cost approximately $90,000.

Fable & Co., Inc., 837 North Third Street, Philadelphia, manufacturer of sheet metal products, has awarded contract to the George Kessler Contracting Co., 1733 North Marvine Street, for a new plant at 510-12 North Third Street, to cost about $42,000.

A one-story addition will be built to the power plant of the National Biscuit Co., Broad Street and Glenwood Avenue, Philadelphia, in connection with an extension to its baking plant, for which a general contract has been let to John Griffith & Son Co., Twelfth and Glenwood Streets.

Gimbel Brothers, Philadelphia, will erect a one-story automobile service and repair building, 60 x 195 ft., for company cars and trucks, on Ludlow Street

The Philadelphia & Reading Railroad Co., Philadelphia, is taking bids on a general contract for the erection of a new car inspection, cleaning and signal works building at its new terminal, Camden, N. J. Samuel T. Wagner is company architect.

Manual training equipment will be installed in the new three-story and basement high school to be erected at Shamokin, Pa., estimated to cost $175,000. W. H. Lee, 1505 Race Street, Philadelphia, is architect.

The Harrisburg Gas Co., Harrisburg, Pa., has plans for a one-story steam power house to cost $30,000; one-story compressor and blower works to cost $17,000, and one-story addition to the laboratory.

Property of the Harrisburg Foundry & Machine Works, Seventh and Curtin Streets, Harrisburg, Pa., including buildings and machinery, will be offered for sale on Nov. 9 by Christian W. Lynch, receiver. The two 15-ton traveling cranes will be included.

The Harrisburg Cement Block & Construction Co., Harrisburg, Pa., will commence the erection of a one-story plant at 1232-38 South Cameron Street.

Fire, Oct. 22, destroyed a portion of the power house and main building at the plant of the Rowland Shovel Co., Central Avenue and Ashbourne Street, Cheltenham, Pa., with loss estimated at $18,000. It is planned to rebuild. The company is operated by the Ames Shovel & Tool Co., Boston.

The Harrisburg Light & Power Co., Harrisburg, Pa., has arranged for a bond issue of $275,000, the proceeds to be used in part for the acquisition of additional property and for extensions in plant and system.

Sullivan & Flynn, Wilkes-Barre, Pa., operating coal properties, have plans for a new coal breaker near the city limits to cost approximately $30,000.

A machine shop will be installed in the three-story automobile service and repair building, 100 x 120 ft., to be erected on Thirteenth Avenue, Altoona, Pa., by H. H. Fleck, Central Trust Building, estimated to cost $130,000 with equipment.

The Maccar Truck Co., Scranton, Pa., manufacturer of automobile trucks and parts, is disposing of a bond issue of $250,000, a portion of the proceeds to be used for extensions. W. D. Woodworth is vice-president and general manager.

The American School Slate Co., Slatington, Pa., will install additional equipment at its works, including power apparatus.

Manual training equipment will be installed in the two-story high school to be erected at Springfield, Pa., estimated to cost $150,000, for which bids are being taken on a general contract by Ritter & Shay, North American Building, Philadelphia.

The Pennsylvania Edison Co., Easton, Pa., has arranged for a bond issue of $791,00, a portion of the proceeds to be used for power plant extensions.

The Reading Engineering Works, 118 Washington Street, Reading, Pa., is inquiring for one or two model No. 41 Marion, railroad type, steam shovels. The company is also interested in a model No. 36 traction type shovel.

New England

BOSTON, Oct. 29.

OCTOBER will be one of the leanest months of 1923 in the New England machine-tool trade. Business the past week was very small, consisting of one or two machines here and there, mostly used equipment, none involving very much money, but some fairly good business is anticipated in November. Any real buying movement is not expected before early next year, however.

In checking up on possible prospects, dealers find a large number of requisitions in purchasing agents' hands, but actual purchases will not be made before 1924. It is also said several large manufacturing concerns intending to purchase lists of tools have been put off this year. Most of the tools sold the past week and under negotiation are production machines. The stability of prices in the face of the extreme dullness is, perhaps, the outstanding feature of this market.

The Edison Electric Illuminating Co. of Boston has purchased lifting and trolley equipment.

The Simmons Machine Tool Corporation, Albany, N. Y., has purchased the metal working equipment of the Pittsfield Machine & Tool Co., Pittsfield, Mass. The plant of the Pittsfield company recently was sold to paper manufacturers.

Plans will be refigured for a factory contemplated by the Marlboro Wire Goods Co., High Street, Marlboro, Mass.

Plans are being drawn for a one-story addition to the plant of the Carr Fastener Co., 31 Ames Street, Cambridge, Mass. Bids will be asked in about a month. The extension will give 16,000 sq. ft. manufacturing space.

Foundations are in for a one-story, 80 x 90 ft. automobile body plant on North Beacon Street, Allston, Boston, for John H. Wisbach, 1123 Commonwealth Avenue, Boston.

Sketches have been made for a three-story, $1,300,000 school to be erected on White Street, East Boston, by the city of Boston. Present plans call for manual training equipment. John M. Gray & Co., 175 High Street, Boston, are the architects.

The Textile Finishing Machine Co., Providence, R. I., has awarded contract for the erection of a machine shop on Simmons Avenue.

Heavy presses are to be installed in an addition to the plant of Bird & Son, Inc., East Walpole, Mass., now under construction. The capacity of the plant is to be doubled.

The Municipal Power Department, Wakefield, Mass., will commence the construction of a new one-story power house.

An electrically-operated pumping plant will be constructed by the Kennebec Water District, Waterville, Me., Dr. F. C. Thayer in charge. Metcalf & Eddy, 14 Beacon Street, Boston, are engineers.

Excavations are under way for a three-story and basement addition, 90 x 100 ft., at the plant of the Judd Paper Co., 166 Race Street, Holyoke, Mass., estimated to cost $85,000. The Casper Ranger Construction Co., 20 Bond Street, has the general contract.

The Warner Hammer Co., West Cromwell, Conn., has leased a building at Cromwell, totaling about 5000 sq. ft., and will remodel it for a new plant.

The Edison Electric Illuminating Co., 39 Boylston Street, Boston, is perfecting plans for the installation of coal and ash-handling machinery at its new plant at Weymouth, Mass.

The Hood Rubber Co., Watertown, Mass., has acquired the plant and property of the Union Carpet Lining Co., Arsenal Street, for extensions for the manufacture of tires and other rubber products.

Foundations will begin at once for a new hydroelectric power plant at Sunapee, N. H., for the Lake Sunapee Power Co., estimated to cost $100,000 with machinery. Charles T. Main, 200 Devonshire Street, Boston, is engineer.

D. W. Baldwin & Son, Park and Crown Streets, New Haven, Conn., manufacturers of automobile and motor truck bodies, have tentative plans for a new three-story plant on the site of the present works. Hilary Watts is head.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Nov. 13 for 12 ventilating sets, schedule 1509; until Nov. 6 for 50,000 attachment plug terminals, schedule 1503.

A machine shop will be installed in the new automobile service and repair building to be erected by J. A. Filgard, 1026 Main Street, Hartford, Conn., on Ann Street, to cost $175,000 with equipment.

The Western Maine Power Co., Limerick, Me., has preliminary plans for a hydroelectric generating station on the Little Ossipee River at South Limington, Me., to cost more than $150,000.

The Curtis & Marble Machine Co., 100 Fremont Street, Worcester, Mass., has awarded a general contract to the E. F. Miner Building Co., Worcester, for a two-story addition to cost $20,000.

The Keene Gas & Electric Co., Keene, N. H., has work under way on a new hydroelectric power plant at Marlboro, N. H., estimated to cost $300,000 with machinery.

A hydroelectric power plant will be built by the Putnam Woolen Co., Putnam, Conn. It will be electrified and motors and other power equipment installed.

Baltimore

BALTIMORE, Oct. 29.

THE Baltimore Copper Smelting & Rolling Co., Canton, Baltimore, is said to have closed negotiations for the purchase of the former plant of the Canton Distillery, Clinton Street and Fourth Avenue, and will remodel it for extensions.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 20, for 6900 ft. of mechanical leather belting for Eastern and Western navy yards, schedule 1489; for 13 sets of valve reseating outfits for the Philadelphia, Mare Island and Puget Sound Navy Yards, schedule 1490; for crucibles for Eastern and Western yards, schedule 1508, and 31,734 ft. steel wire rope for the Puget Sound Navy Yard, schedule 1498.

The Common Council, Westminster, S. C., is planning for the installation of electrically-operated pumping machinery in connection with a new waterworks installation estimated to cost $150,000.

The Hugtite Clothes Pin Co., 417 South College Street, Charlotte, N. C., Ellis W. Henderson, head, has inquiries out for special wire-forming and working machinery for a new plant. Woodworking machinery, including a planer, will also be installed.

The Board of Directors, Teachers' Training College, Greenville, S. C., will commence the erection of a new power house at the institution estimated to cost $125,000.

F. L. Howell, Warrenton, Ga., is in the market for machinery to manufacture cement sewer pipe and kindred specialties.

The Industrial Machinery Division, Room 815, Bureau of Foreign and Domestic Commerce, Washington, will receive catalogs and price lists of veneer machinery for reforwarding office of the bureau at The Hague, Netherlands, which has inquiries for American equipment of this character. Also, for catalogs and price lists of machinery and equipment for furniture manufacture, for reforwarding to the bureau office at Pernambuco, Brazil.

The Nelstone Co. of Georgia, Inc., 509 Candler Building, Atlanta, Ga., recently organized with a capital of $250,000, will erect a one-story plant, 150 x 250 ft., for the manufacture of reinforced-concrete products under a special process, estimated to cost $110,000 including equipment. R. L. Langston is manager and engineer.

The Sullivan Brothers Coal Co., Short Gap, near Eckhart, Md., will install electric power and other machinery at its local properties. A new tipple will be constructed. It recently secured 500 acres of coal lands.

The Maimus Motor Works, Norfolk, Va., is arranging to rebuild the portion of its plant recently destroyed by fire with loss estimated at $27,000.

The Ideal Table Co., High Point, N. C., will take bids at once for a three-story plant, 60 x 100 ft., to replace its factory recently destroyed by fire with loss of about $70,000. Electrically-operated machinery will be installed. B. C. Royal is president and general manager.

The Carolina Power & Light Co., Raleigh, N. C., is arranging for an increase in capital from $8,000,000 to $12,000,000, a portion of the proceeds to be used for electric generating plant construction and transmission line extensions.

The Chief of Air Service, United States Army, Washington, will take bids until Nov. 6 for 100 sets of fuel tanks, circular 24-44; also for 87,500 hose clamps, circular 24-45.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a boiler feed pump and feedwater heater. Also, for one 50 to 75-hp. horizontal return tubular boiler, with stack; one steel water tank and tower, 100 ft. high, with tank capacity of 100,000 gal.; a number of steel storage tanks, capacity about 6000 bbl. each; and for a number of electric transformers 1 to 15 kva. capacity.

The Pan-American Petroleum & Transport Co., 120 Broadway, New York, has acquired a substantial interest in the plant and business of the American Oil Co., Baltimore, with works on Clarkson Street. Plans are under advisement for extensions and the installation of additional machinery.

Lorick & Lowrance, Columbus, S. C., are in the market for an electric-operated grinding machine.

The Home Milling Co., Leesville, S. C., is planning for the installation of additional equipment, including mechanical conveyors, grinding machinery, pulleys, shafting and other transmission apparatus. J. H. Epting is president.

The Board of Aldermen, Rocky Mount, N. C., has preliminary plans for extensions in the municipal electric light and power plant and the installation of additional machinery.

The Denmark Fertilizer Mfg. Co., Denmark, S. C., recently organized, will install electric motors and other power equipment, with mixing machinery, tanks and other fertilizer equipment in a local plant, for which plans are being prepared. J. D. Prothro, Aiken, S. C., is one of the heads of the company.

J. R. Neves, Fort Gaines, Ga., has inquiries out for a high speed planer.

The Hackley Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a 75-hp. slip ring motor, second-hand in good condition; also for a number of electric transformers.

The Roanoke Water Works Co., Roanoke, Va., is planning for extensions and improvements in its plant, to include the installation of additional electrically-operated pumping machinery. F. W. Collins is vice-president.

A power plant will be constructed by the Arcadia Mills, Inc., Arcadia, S. C., in connection with a new textile mill to cost $300,000. Lockwood, Greene & Co., Charlotte, N. C., are engineers.

The Everett Brothers Motor Co., Athens, Ga., Thomas R. Everett, president, has acquired property at Brunswick, Ga., heretofore devoted to the manufacture of marine engines. The works will be improved and equipment installed for the production of a special engine developed by the new owner.

The Vidette Lumber Co., Inc., Vidette, Ga., has inquiries out for an engine, boiler and auxiliary power house equipment.

The Maryland Glass Co., Mount Winans, Baltimore, has awarded a general contract to the Austin Co., Cleveland, for two new buildings at its plant, 100 x 120 ft., and 60 x 140 ft., estimated to cost $65,000.

Louis A. Tarr, Inc., Sharp and Conway Streets, Baltimore, machinery dealers, is in the market for about 600 new boiler tubes, 3 in. x 12 ft.

Grove Park Inn, Asheville, N. C., is inquiring for a Bristol recording voltmeter, 110 to 220 d.c.; also for a motor-driven grindstone, about 24 to 30 in, 220 d.c.

Buffalo

BUFFALO, Oct. 29.

THE Thermo Automatic Oil Burner Corporation, Buffalo, incorporated with capital stock of $200,000, will manufacture industrial and domestic oil burners. Contracts will soon be let for considerable material, including temperature control units, gas control units, copper coils, flush tank ball cocks, gas pilot lights and brass and iron castings. Preparations are under way to maintain distributing centers the country over.

The Medina Case & Furniture Co., Inc., East Center Street, Medina, N. Y., is planning for the rebuilding of the portion of its plant recently destroyed by fire. New equipment will be installed.

The Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, is planning for the construction of a new engine house, with repair shop, at Binghamton, N. Y.

The Rochester Refrigerating Co., Rochester, N. Y., is planning the construction of an eight-story addition, to cost $100,000 including equipment.

Borden Brothers, 5-7 Endicott Avenue, Johnson City, N. Y., are planning for the installation of a lathe and drill press at their automobile service works.

Fire, Oct. 17, destroyed a portion of the plant of the Hecker & Moore Co., Tonawanda Island, North Tonawanda, N. Y., manufacturer of wood fiber, etc., with loss estimated at $40,000, including planers, saws and other woodworking machinery. It is planned to rebuild.

The Water Commission, Potsdam, N. Y., is planning the installation of electrically-operated pumping machinery at its proposed waterworks plant, estimated to cost $175,000. Bogart & Pohl, 30 Church Street, New York, are consulting engineers.

John Schaaf, 1870-72 Genesee Street, Buffalo, has filed plans for a one-story plant to manufacture electric storage batteries. A repair department will be installed. It is estimated to cost $24,000.

The Penn Yan Boat Co., Penn Yan, N. Y., has awarded a general contract to W. A. Randall, Penn Yan, for a new one-story plant, 50 x 187 ft., to cost $45,000. It will replace a works recently destroyed by fire.

The American La France Fire Engine Co., Elmira, N. Y., with branch works at Bloomfield, N. J., for the manufacture of motor trucks, has disposed of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions and improvements.

The Bemis Brothers Bag Co., St. Louis, has acquired the plant of the Kelly-Springfield Tire Co., 711 Northland Avenue, Buffalo, consisting of a number of buildings, two and five stories, 106 x 450 ft., for new works, and plans the early installation of electric power and other machinery. Frank W. Copley is general manager.

The Daily News Paper Corporation, North Tonawanda, N. Y., recently formed with a capital of $1,000,000, has commenced foundations for its new mill on Little Island, to cost $500,000 with machinery. The company is a subsidiary of the Ontario Paper Co., Thorold, Ont. Warren Curtis is general manager.

Pittsburgh

PITTSBURGH, Oct. 29.

INQUIRIES for machine tool equipment are fairly active, but orders are very slow in being closed. The sentiment here is that a great deal of equipment will be needed within the next four to six months, and inquiries are being put out more to get a line on prices for estimating purposes than with the idea of closing in the near future. Most of the equipment inquired for will not be needed possibly until after the first of the year, and intending buyers feel that in holding off placing orders they may be able to avail themselves of lower prices. Two or three large jobs are pending and one may be closed within the next two or three days.

The Jones & Laughlin Steel Corporation is figuring on putting in at its South Side works a large combination bar mill, but has not fully decided whether it will be built. If the project goes through, it will be in the market for considerable equipment.

There is a good deal of live crane inquiry, but chances are only a small part of it will be closed before the first of the year.

The Brown & Zortman Machinery Co. has sold to the American Sheet & Tin Plate Co. two keyseaters and a slotter.

The West Penn Power Co., Pittsburgh, will build at Cheat Haven, Pa., a hydroelectric plant in which will be installed four large units of generators and turbines. The size is not yet known and bids have not yet been asked. This will be the largest power plant near the Pittsburgh district, and will require a very large amount of equipment.

The announcement that the Youngstown Sheet & Tube Co. will build a blast furnace and two buttweld pipe mills at Indian Harbor, is of particular interest to local machinery dealers as it is expected that a good part of the equipment will be bought in the Pittsburgh district.

Bids are being taken by the Iron Trade Products Co., Louis J. Adler, head, Farmers' Bank Building, Pittsburgh, for a new two-story and basement plant at Reedsdale, Walker and Brown Streets. W. E. Clark, 1204 Arch Street, is architect.

The Pennsylvania Railroad Co., Pittsburgh, has tentative plans for the construction of new locomotive and car shops

in the vicinity of Dennison, Ohio, to cost $1,500,000 with machinery.

The Griffin Mfg. Co., Cherry and Huron Streets, Erie, Pa., manufacturer of shafting and kindred products, has work in progress on a new one-story plant, 80 x 235 ft., fronting on the line of the New York Central Railroad, estimated to cost $50,000. J. C. Griffin is president.

The Carbon Fuel Co., Carbon, W. Va., is planning the installation of electric power and other equipment at its plant. K. D. Quarrier, Carbon, is in charge. J. R. Thomas, Charleston, W. Va., is president.

The Board of County Commissioners, Court House, Pittsburgh, has plans for the erection of a two-story repair and work shop, 70 x 325 ft., in the Parkview district, estimated to cost $200,000 with equipment.

The Common Council, Belington, W. Va., is planning to rebuild the portion of the municipal electric power plant recently destroyed by fire, with loss estimated at $30,000, including equipment.

James J. Weiler & Sons, Robson-Prichard Building, Huntington, W. Va., who have inquiries out for a traveling crane will also be in the market for a forge, drill, etc.

Work is under way on a one-story addition, 25 x 130 ft., to the plant of the Hollands Mfg. Co., 342 East Eighteenth Street, Erie, Pa., manufacturer of machine tools, estimated to cost $45,000, for which a general contract recently was awarded to C. Hazleton, 217 East Avenue.

The Monongahela Chain & Mfg. Co., Mannington, W. Vt., recently organized, has plans for the establishment of works to manufacture safety chains for automobile tires, and hardware specialties. A. B. Jolliff is president. F. W. Vance and William F. Staggers, both of Mannington, are interested in the organization.

The W. J. Early Sons Foundry Corporation has been formed under Delaware laws with capital of $500,000 to take over and expand the business of W. J. Early & Sons, Ltd., 812 Sarah Street, Pittsburgh, manufacturer of gray iron and special metal castings. A new heat treating process has been developed. Foundations are being laid for a new one-story foundry, 100 x 290 ft. John N. Early is president; Lee H. Marshall, vice-president; and Charles G. Mahey, secretary and treasurer.

A manual training department will be installed in the new two-story junior high school to be erected at Corry, Pa., estimated to cost $175,000, for which bids will soon be asked on a general contract by W. G. Eckles, Lawrence Savings and Trust Building, New Castle, Pa., architect.

Philip Williams, Elkins, W. Va., has inquiries out for coal crushing machinery for installation in a local building, with daily capacity of about 175 tons.

Work will soon be placed under way on a two-story addition, 40 x 80 ft., at the plant of the Kane Mfg. Co., Kane Pa., manufacturer of wire products, to cost about $37,000.

The State Board of Control, Charleston, W. Va., James S. Lakin, president, will take bids in about 60 days for a new three-story industrial school for boys at Maggie, W. Va., estimated to cost about $150,000. T. T. Stansbury, Martinsburg, W. Va., is architect.

The West Virginia Match Co., Wheeling, W. Va., will remodel a two-story and basement building, 100 x 100 ft., at Thirty-sixth and McColloch Streets, to cost about $50,000, and will install electric power and other equipment. F. F. Harris, 1117 Chapline Street, is architect. E. L. Yeager heads the company.

The Harbison-Walker Refractories Co., Farmers' Bank Building, Pittsburgh, will defer the erection of its proposed new plant at Bessemer, Ala., for the manufacture of fire brick and refractories until next year. It is estimated to cost $500,000 with machinery. W. C. Ifarth is chief engineer.

Detroit

DETROIT, Oct. 29.

BIDS will soon be asked by the Miller-Seldon Electric Co., 1259 West Park Place, Detroit, manufacturer of electrical equipment, for a two- or three-story addition, 60 x 225 ft., estimated to cost $80,000, for which plans are being completed by Baxter, O'Dell & Halpin, Hammond Building, architects.

The Michigan Stamping Co., 11631 Mack Avenue, Detroit, will take bids immediately for a one and two-story addition to cost approximately $75,000. Albert Kahn, 1000 Marquette Building, is architect.

Manual training equipment will be installed in the new three-story and basement high school to be erected at Flint, Mich., estimated to cost $750,000, for which bids will be asked on a general contract at an early date. Malcomson & Higginbotham, F. P. Smith Building, are architects.

The Rickenbacker Motor Co., 4815 Cabot Street, Detroit, has commenced an expansion program at its plant to double the present capacity. The initial work will consist of an addition, totaling about 60,000 sq. ft. of floor area, largely for assembling, to cost $80,000. The plant is now operating on a basis of 50 complete cars per day. B. F. Everitt is president.

Fire, Oct. 17, destroyed a portion of the pumping plant of the Grand Rapids Light Co., Grand Rapids, Mich., with loss estimated at $50,000 including machinery. It is planned to rebuild.

The Detroit Foundry Co., 2642 East Grand Boulevard, Detroit, manufacturer of gray iron castings, has tentative plans for a new one-story foundry on Christopher Avenue, Hamtramck, Mich., to cost $60,000. It is expected to break ground early next year. Frank Bromley is president.

Lorenz Brothers, Lansing, Mich., will commence the construction of a three-story automobile service and repair building on North Grand Street, 85 x 215 ft., to cost $90,000 including equipment.

The Hupp Motor Car Corporation, Mount Elliott Avenue, near Dunn Road, Detroit, has awarded a general contract to the Everett Winters Co., Book Building, for a one-story addition, 120 x 505 ft., estimated to cost $350,000 including machinery.

The Calumet & Hecla Mining Co., Calumet, Mich., is said to have preliminary plans under advisement for a copper rod manufacturing plant in the vicinity of its smelting works at Lake Linden, Mich., comprising the first unit of its proposed fabricating enterprises. It will cost $150,000 with equipment.

The Caille Brothers Co., 6210 Second Avenue, Detroit, manufacturer of coin slot machinery, will soon take bids on a general contract for a two-story addition, 80 x 100 ft., to cost $70,000. Baxter, O'Dell & Halpin, Hammond Building, are architects.

Chicago

CHICAGO, Oct. 29.

ALTHOUGH the distribution of the Burlington list has tentatively been made, few formal orders have yet been received by local dealers. This, however, will be merely a matter of a few days. The Rock Island Lines have issued inquiries for 10 tools, and the Illinois Central has entered the market for a motor-driven upright drill with 36-in. table and capacity for drilling 2½-in. holes with high speed drills. Additional railroad lists are expected to be issued soon, possibly before the end of the year.

Business from industrial sources is still very light, and for most dealers October is expected to be one of the poorest months of the year in new orders booked. Operations of industrial plants equipped with machine tools are spotty, some still being on a full time basis, while others have sharply curtailed their production. Few plants have work which will insure operations beyond the end of the year, and this lack of future business probably accounts for the general disinclination to purchase new tools at this time. Added to this factor of business uncertainty is the continued presence in the market of a considerable quantity of used tools which frequently prove prejudicial to the sale of new equipment. The list issued by the Rock Island Lines follows:

One 54-in. x 16-ft. heavy duty horizontal spindle slab milling machine having a 4-in. arbor.

Two No. 5 Cincinnati, or equal, horizontal universal high power motor-driven milling machines.

Two helical slabbing cutters, 8 in. in diameter, 9 in. long, interlocking, for 3½-in. arbor with ½ round keyway.

One motor-driven 24-in. heavy duty turret lathe having 7½ in. hole through spindle.

One standard duplex motor-driven floor grinding wheel, 18 x 3 in.

One 1¾-in. Gridley four-spindle motor-driven automatic screw machine.

One Harrington, or equal, No. 4 staybolt threading machine head for Lassiter staybolt machine.

One Segur coil spreader complete with attachments.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: No. 7 cupola for the Elyria Foundry Co., Elyria, Ohio; two batteries of 36 x 72-in. tumbling barrels with dust arrester for the American Car & Foundry Co., St. Louis; a No. 3 cupola for the Inman Mfg. Co., Amsterdam, N. Y.; a No. 9½ and a No. 8 cupola for the Wheeler Condenser & Engineering Co., West Carteret, N. J.; a 42 x 60-in. tumbling barrel for the Weir Stove Co., Taunton, Mass.; a 24 x 48-in. tumbling barrel for the Andes Foundry Co., Lancaster, Pa.

C. V. Champion & Co., 527 East Main Street, Danville, Ill., recently incorporated with $20,000 capital stock, will manufacture an electrically-operated corn popper. The company has leased a plant and in the near future expects to install a small engine lathe and a drill press, but has no other plans for the purchase of metal-working machinery. C. V. Champion is president and treasurer, and G. C. Corey, vice-president and superintendent of production.

The Foster-Bolton Co., 549 West Washington Boulevard, Chicago, recently incorporated with $25,000 capital stock, will confine its activities to the merchandising of steam specialties and will not engage in their manufacture at this time. Officers are Charles W. Foster, president; E. W. Bolton, treasurer, and Alice A. McAvoy, secretary.

The Kingsley Die Casting Co., Anderson, Ind., recently incorporated with $15,000 capital stock, has taken over the Forse Machine Co. of that city, and will continue to manufacture the products formerly made by the older organization, namely die castings and bearings. The officers include J. C. English, president; E. M. Kingsley, vice-president, and W. H. Forse, Jr., secretary and treasurer.

The Twentieth Century Saw Co., 846 North Keystone Avenue, Chicago, recently incorporated with $50,000 capital stock, will merchandise a patented hand saw which it is having manufactured under contract. The device is a combination of a hand saw, rule, bevel, square, miter, angle-indicator or protractor, and a level or angle-gage-attachment. Officers are John L. Larson, president; William E. Larson, vice president, and Charles P. Morris, secretary and treasurer.

The Reliable Machine Co., Rockford, Ill., will build a factory at 1103 Tenth Street, to cost $7,500.

The Yavapai Onyx Mining Corporation, a new industry with a plant on West Sixth Street, Dubuque, Iowa, has installed equipment and expects to start operation shortly. The company will manufacture onyx gear shift grips for miscellaneous products and do flat work for wainscoting in buildings, etc.

The Husted Co., Minneapolis, Minn., will build a steel fabricating plant and warehouse in the Northwestern Terminal. The first unit 50 x 170 ft., will cost $25,000, and an additional unit is contemplated for next year.

The Brown Sheet Iron & Steel Co., manufacturer of gas and oil tanks, Minneapolis, has purchased from the Diamond Iron Works the lease to the latter's former plant fronting on the Northern Pacific Railroad, near Twenty-second and Twenty-third Avenues, North. The Brown company will renovate the buildings at once for occupancy.

The Lorenson Harvester Co., LeClaire, Iowa, has moved its plant to Mound Street, East Davenport, Iowa. The latter, however, is a temporary location, and the company plans to purchase a site in the western part of Davenport for a new plant.

The St. Paul Union Depot Co. will erect a round house costing $75,000, adjoining the Union Depot yards at St. Paul, Minn.

Work has commenced on the construction of a power plant to cost $150,000 for the Michigan Agricultural College, Lansing, Mich.

The Western Pipe & Steel Co. of Illinois, manufacturer of corrugated welded pipe, has purchased 14½ acres, west of Western Avenue, east of the Baltimore & Ohio Railroad, and south of the Indiana Harbor Belt Line at Blue Island, Ill., and will erect a plant to cost $150,000. The main headquarters of the company are at 4948 Bloomingdale Road, Chicago.

The American Brake Shoe & Foundry Co., Chicago, has awarded contract for the construction of a foundry in North Kansas City, Mo., to cost $350,000.

C. H. Curtis, who recently opened a machine shop on West Fifth Street, Concordia, Kan., has removed to larger quarters in the Parrish Buick Building.

Van Gunten & Van Gunten, 26 East Huron Street, Chicago, are preparing plans for a two-story pattern shop, 75 x 175 ft., at First Avenue and First Street, Maywood, Ill., for William A. Kennedy.

The E. A. Baumbach Mfg. Co., 1812 South Kilbourne Avenue, Chicago, is taking bids on a two-story foundry addition, 30 x 75 ft., to cost $25,000.

The Ahlberg Bearing Co., 321 East Twenty-ninth Street, Chicago, has let contracts for a two-story plant, 35 x 110 ft., at 317-27 East Twenty-ninth Street, to cost $11,000.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, has awarded contract for a four-story power station, 112 x 232 ft., at 3601 South Crawford Avenue, to cost $900,000.

The Operators Piano Co., 16 South Peoria Street, Chicago, has awarded a contract for a three-story factory, 113 x 126 ft., at 712-35 North Kedzie Avenue, to cost $140,000.

The Fruin Drop Forge Co., 349 Root Street, Chicago, has awarded contract for a two-story addition, 38 x 100 ft., to cost $10,000.

The Western Electric Co., Hawthorne, Ill., has awarded a contract for a four-story warehouse, 160 x 180 ft., on Kostner Avenue, Chicago, to cost $1,000,000.

The Central Steel & Wire Co., 127 Peoria Street, Chicago, is taking bids on a general contract for a new two-story works at Western Avenue and Forty-fifth Street, estimated to cost $300,000. Emil E. Froman, 64 West Randolph Street, is architect and engineer.

The Globe Portland Cement Co., 416 McKnight Building, Minneapolis, Minn., will hold in abeyance the construction of its proposed mill at Dubuque, Iowa, for which plans recently were prepared by Charles L. Pillsbury, Capital Bank Building, St. Paul, Minn., engineer, with cost estimated at $2,000,000.

The Minneapolis Heat Regulator Co., Minneapolis, Minn., will commence the erection of a fourth floor to its present three-story plant at Fourth Avenue, South, and Twenty-eighth Street, estimated to cost $85,000 including equipment.

Bids will be received by M. T. Hoff, city clerk, Madison, Minn., until Nov. 5, for two hand-operated stokers, with hopper feed, for horizontal return tubular boilers at the municipal power plant.

The Department of Foreign and Domestic Commerce, Chicago Association of Commerce, 10 South La Salle Street, has received an inquiry from a company at Los Angeles, Cal., in the market for ice-manufacturing machinery, No. 2461; also from a company at Pernambut, India, desiring to purchase American cigarette-making and match manufacturing machinery.

The American Car & Foundry Co., 80 East Jackson Boulevard, Chicago, will commence the construction of a new foundry at Madison, Ill., to cost in excess of $80,000.

The Fire Pump & Equipment Co., 30 North Michigan Avenue, Chicago, is inquiring for used duplex underwriters fire pumps, 500 to 1000 gal.

Cincinnati

CINCINNATI, Oct. 29.

WHILE there was little increase in the number of orders booked the past week, inquiries were more numerous. Most of these were for one and two machines, but several fair-sized lists are being figured. Among these is the Norfolk & Western Railroad which calls for 15 tools, including three radial drills, five engine lathes, three boring mills, two milling machines, one grinder and miscellaneous small tools. The Baltimore & Ohio Railroad has issued a list for its Glenwood shops, which includes 10 engine lathes. A Milwaukee manufacturer is in the market for miscellaneous machine tool equipment.

Interest is being shown in Japanese buying of machine tool equipment. A local manufacturer of engine lathes booked an order for 12 machines, on which immediate delivery was imperative and the order was filled from stock. Another order for used machine tools for Japanese delivery is reported to have been negotiated locally. Tools for Japan are expected to be much in demand during the next two or three months.

The Ash Cabinet Co., Dayton, Ohio, recently incorporated, is contemplating the erection of a manufacturing building. It manufactures metal cabinets and is planning to make metal toys. A. S. Hageman is president.

The Hinde Paper Box Co., Circleville, Ohio, is contemplating the erection of a plant for the manufacture of fibre containers. The new building will be 80 x 340 ft. Box-making machinery, electrically driven, will be installed.

The Wellston Metal Products Co., Wellston, Ohio, has been organized to take over the factory operated by G. L. Ferris at McArthur, Ohio, in the manufacture of minnow traps, sectional steel boats, washing machines and steam cookers. The business will be moved to Wellston and Mr. Ferris will remain with the company for a time.

The James Leffel Co., Springfield, Ohio, manufacturer of turbine water wheels, has awarded contract for an addition to its boiler shop, 40 x 140 ft.

The National Glass & Lens Co., Lancaster, Ohio, has been incorporated with a capitalization of $75,000 and has

awarded contract for a plant to manufacture ground, polished and silvered lens, as well as pressed and blown glassware. It is expected to be ready for operation about Jan. 1 and 100 men will be employed. Albert Steiner is president.

The plant of the Madisonville Ice & Laundry Co., Madisonville, Ky., was damaged to the extent of $100,000 by fire Oct. 22. The ice making plant and equipment were practically destroyed. It will be rebuilt.

The City Ice & Fuel Co., Cleveland, operating plants in Cleveland, Cincinnati, and Columbus, has purchased property on West Broad Street, Columbus, and is preparing plans for an ice manufacturing and storage plant, work on which will start this fall.

The Cincinnati Artistic Wrought Iron Works, 2941 Eastern Avenue, Cincinnati, has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss approximating $27,000.

The Springfield Brass Co., 821 West Main Street, Springfield, Ohio, will soon take bids for a new one-story foundry, estimated to cost $13,000, exclusive of equipment.

Milwaukee

MILWAUKEE, Oct. 29.

MACHINE-TOOL manufacturers report that October business held its own with September, but in a majority of instances volume fell below that of the same month a year ago. Large-lot business remains absent and trade consists of single tool purchases, with a sprinkling of orders for two or three machines. Buyers have been flocking to the Mitchell Motors Co. at Racine, Wis., to take advantage of the bargains offered by the relatively enormous lot of machine tools being liquidated at bankrupt sale, it having been decided to dismantle the entire plant as no satisfactory bulk bid could be obtained. Several thousand machines of all descriptions are being offered and disposition is proceeding with unexpected rapidity.

The Great Lakes Boat Building Corporation, 333 Becher Street, Milwaukee, has passed into the control of a Chicago syndicate, and arrangements are being made to transfer the works to Chicago, where a 15-acre site has been leased for 20 years at Belmont Avenue and the north branch of the Chicago River. Construction will begin about March 1. The investment will be in excess of $750,000. William C. Morehead will continue as president and Walter D. Beauvais, engineering department Naval Air Service, will become chief engineer.

The Algoma Foundry & Machine Co., Algoma, Wis., is erecting a two-story extension, 50 x 100 ft., to its foundry, to be used largely for warehouse purposes, and the space thus released will be devoted to additional machine shop facilities. A small list of equipment is being purchased. The company manufactures gas engines and farm machine specialties.

The Logemann Brothers Co., 3130 Burleigh Street, Milwaukee, manufacturer of hydraulic and power baling presses, rams, etc., will build a one-story brick and steel addition, 50 x 150 ft., to be used as an erecting shop. Equipment will include one 10-ton electric traveling crane on which figures are being taken.

The Badger Showcase Co., 133 North Pearl Street, Green Bay, Wis., is letting contracts for a new factory and power plant estimated to cost $75,000 complete, at South Broadway and the Northwestern and Milwaukee road tracks. The main building will be 60 x 160 ft., two and three stories, and the power house, 35 x 40 ft. A dry kiln unit also is planned. In the new factory the company will make all metal parts and fixtures. Machinery and additional woodworking tools, with individual electric motor drive are being purchased. John H. Bruecker is president and general manager.

The Burlington Metal Products Co., Burlington, Wis., has leased a building at Eighteenth Street and Thurston Avenue in Racine, Wis., and will establish an automatic screw machine shop. The equipment has been derived from the bankrupt Mitchell Motors Co., which will suffice for the present.

The Underwood Veneer Co., Wausau, Wis., will build a new sawmill with an 8-ft. single band saw and a 300-hp. generating plant, to be ready Jan. 1. Early next spring a planing mill of similar capacity will be erected. Equipment orders for both units are now being placed.

The Board of Education, New London, Wis., has engaged Smith, Reynolds & Brandt, architects, Manitowoc, Wis., to design a new high and vocational school to cost about $300,000. It will consist of a vocational wing, 50 x 75 ft.; auditorium, 61 x 126 ft.; gymnasium, 61 x 118 ft., and classrooms, 50 x 100 ft., all two stories and basement. Bids will be taken about Dec. 1. R. J. MacMahon is superintendent of schools.

The Kickapoo River Power Co, Madison, Wis., is being incorporated with $1,000,000 capital to build and operate a hydroelectric generating plant on the Kickapoo River near Wauzeka, Wis. The dam will be 30 ft. high and develop 1700-2000 hp. The project is in charge of E. E. Dillon, consulting engineer, Madison. Work is to start about March 15.

The Pine-Ihrig Co., Oshkosh, Wis., which recently acquired the assets of the defunct Washkosh Mfg. Co., power and manual washing machines, has transferred the entire equipment and stock to the second floor of its woodworking machinery plant and will continue the operation. A few items of new equipment are being purchased. E. W. Ihrig is president.

The North Milwaukee Foundry Co., Commerce Avenue, North Milwaukee, Wis., let the general contract to Charles Huebbe, 1534 West Twenty-fourth Street, Milwaukee, for a foundry addition, 65 x 75 ft. An additional cupola will be installed. Joseph Ewens is president.

The Board of Education, Wausau, Wis., has let contracts for the foundations and substructure of a $500,000 addition to the Central High School, to be completed Sept. 1, 1924. It will be 200 x 270 ft., two stories and basement, and contain a general vocational school, automobile mechanics department, sheet metal shop, drafting room, etc. Bids on the superstructure will be taken about March 15. The architects are Oppenhamer & Obel, Wausau. W. A. Tegge is president of the board.

The Newman Electric & Mfg. Co., Eau Claire, Wis., has been incorporated with $25,000 capital stock by H. E. Newman, K. L. Bowley and E. J. Sostad to manufacture electrical specialties and do general repair work on motors, generators, etc. It is the outgrowth of a small business which will be enlarged and housed in new quarters shortly.

The partnership of F. A. Albertus & Co., conducting a welding and machine repair shop at 2640-2642 Fond du Lac Avenue, Milwaukee, has been dissolved and Clayton S. Flint retires. The business will be continued under its present name by Floyd A. Albertus.

Albert Blecker and Edward W. Gollin, doing business as the Wisconsin Sheet Metal Works, 2928 Lisbon Avenue, Milwaukee, have dissolved partnership. The entire interest is now vested in Mr. Gollin, who will conduct the business under the present name.

The Gulf States

BIRMINGHAM, Oct. 29.

WORK will commence on a new plant at North Gadsden, Ala., by the Coosa Pipe & Foundry Co., Birmingham, with present works at Gadsden, for which a general contract has been awarded to the Ingalls Iron Works, Birmingham, estimated to cost $80,000, including equipment. The output will be increased about 25 per cent.

The Decatur Cornice & Roofing Co., Decatur, Ala., is planning to rebuild the portion of its works destroyed by fire Oct. 23, with loss of $55,000 including equipment.

W. M. Smith & Co., Birmingham, has inquiries out for an electric magnet to use with a locomotive crane, with or without generator.

Fire, Oct. 15, destroyed a portion of the plant of the Forney Oil Mill Co., Forney, Tex., manufacturer of cottonseed oil products, with loss estimated at $80,000, including equipment and stock.

The Houston Lighting & Power Co., Houston, Tex., is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for extensions in plants and system. Edwin B. Parker is president.

The Humble Oil & Refining Co.,. Great Southern Life Building, Dallas, Tex., is planning the construction of a new gasoline refinery in the vicinity of Mildred, Tex., estimated to cost $200,000 with machinery.

Bids will be received by E. D. Parker, city clerk, Ponchatoula, La., until Nov. 20, for two motor-driven centrifugal pumps, each with capacity of 750 gal. per min., or oil-engine driven power pumps for installation in a new waterworks plant; also for a 50,000-gal. steel tank and tower, cast iron pipe, valves, fittings, etc. Swanson-McGraw, Inc., 705 United Fruit Building, New Orleans, is engineer.

The Houston Power Co., Newton, Ala., has plans for the construction of a new hydroelectric generating plant on the Choctawhatchee River, Dale County, with initial capacity of 3000 kva., estimated to cost $400,000, with power dam and transmission system. The Southern Engineering Co., Albany, Ga., is engineer.

The W. K. Spark Plug Corporation, 1104 Scott Avenue, Wichita Falls, Tex., recently organized, is perfecting plans for the establishment of a factory to manufacture spark

plugs, etc. F. D. Woodruff, secretary-treasurer and general manager, is in charge.

The Common Council, Marshall, Tex., plans for the installation of electrically-operated pumping machinery at the waterworks, in connection with extensions and improvements estimated to cost $50,000.

Henry L. Sherrod, Gadsden, Ala., is organizing a company to build an ice-manufacturing plant, for which a site, 120 x 155 ft., has been purchased. The initial works will cost approximately $100,000 with machinery. Mr. Sherrod will be secretary, treasurer and general manager.

The Hercules Powder Co., Wilmington, Del., has closed negotiations for 600 acres near Bessemer, Ala., and is reported to be planning to use the property for a new branch powder and explosive works, to cost $350,000 with equipment.

The Voth Hardwood Co., Beaumount, Tex., a subsidiary of the Kirby Lumber Co., Houston, Tex., has tentative plans for two new hardwood plants, with power houses, to cost more than $300,000. A new hardwood flooring mill in the vicinity of Voth is also under consideration, to cost more than $100,000 with electric power and other equipment.

The Gadsden Car Works, Gadsden, Ala., will hold in abeyance the reconstruction of the portion of its works, including erecting shop, recently destroyed by fire with loss estimated at $250,000 including equipment. C. H. Bradley is superintendent.

Bids are being asked by the Common Council, Moorhead, Miss., until Nov. 6, for a new waterworoks plant, including pumping machinery, towers, tanks and auxiliary equipment, as per plans and specifications on file. H. A. Mentz, Magnolia, Miss., is consulting engineer.

The Interstate Investment Co., Tampa, Fla., is having plans prepared for the construction of a new cold storage plant in connection with a group of buildings, estimated to cost $750,000. Lockwood, Greene & Co., Healey Building, Atlanta, Ga., are engineers. J. T. Swann, Citizens Bank Building, Tampa, is vice-president.

The Moreman Gin Co., Corpus Christi, Tex., is planning the installation of oil-operated engines, transmission equipment and other conveying machinery in two new cotton ginning plants on neighboring sites. R. L. Moreman is head.

The Dallas Power & Light Co., Dallis, Tex., has commenced the construction of a new power house at Frank and Tuttle Streets, North Dallas, to cost about $200,000 with machinery.

The Common Council, New Iberia, La., has tentative plans for a new municipal electric light and power plant, to replace the present station, estimated to cost $65,000.

The Houston Ice & Cold Storage Co., Houston, Tex., is planning for enlargements and the installation of additional machinery to develop an output of 125 tons per day. A. F. Engel is general manager.

The Smith & Neil Co., Jacksonville, Fla., manufacturer of automobile bodies, has acquired property adjoining its plant on Zielle Street, 75 x 150 ft., for a new works. The forge shop and body-building department will be removed to the new structure and additional equipment installed.

The Benson Hardware Co., Andalusia, Ala., is inquiring for 25 patterns for solid cast iron pulleys, size 2- to 12-in. face, 6 to 24-in diameter.

The New Hope Gravel Co., Inc., Columbus, Miss.., is in the market for a 40 to 50-ton standard gage geared locomotive.

The Eco-Thermal Stove Co., Inc., Alexandria, La., incorporated with capital stock of $100,000 to manufacture stoves and heating equipment, is looking for a manufacturing location. Stephin S. Thomas, Box 139, heads the company.

The Central South

ST. LOUIS, Oct. 29.

THE Mendenhal Motor Co., 2317 Locust Street, St. Louis, is taking bids for a new four-story service and repair building, 39 x 155 ft., on Locust Street, to cost $100,000 including equipment. W. P. Mahon, Title Guarantee Building, is architect.

The Southern Anthracite Coal Co., Russellville, Ark., is considering tentative plans for the rebuilding of its coal tipple destroyed by fire, Oct. 17, with loss estimated at $100,000 including machinery.

The Common Council, Cookeville, Tenn., is planning the installation of electrically-operated pumping machinery in connection with extensions in the municipal waterworks to cost about $85,000.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for bench attachments for 8 and 10-gage circular saws, 72 in. diameter and smaller.

The Banfield Brothers Packing Co., Springfield, Mo., will build a cold storage plant in connection with its proposed two- and three-story packing house, estimated to cost $100,000. Keckenlively & Mark, Springfield, are architects.

The Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, has awarded a general contract to the Wimmer Construction Co., Victoria Building, St. Louis, for the first unit of its proposed plant at Chouteau and Vandeventer Avenues, St. Louis, 130 x 245 ft., to cost $100,000. A large portion of the works will be given over to assembling.

The Quick Meal Stove Co., Kings Highway, St. Louis, a subsidiary of the American Stove Co., same address, has awarded a general contract to the Kellerman Construction Co., Victoria Building, for a one- and two-story addition, 85 x 316 ft., estimated to cost $85,000.

The Memphis Power & Light Co., Memphis, Tenn., has tentative plans for an addition to its main generating station to cost $1,000,000 with machinery. A 20,000-kw. turbo-generator and auxiliary equipment will be installed. It is expected to commence work early next year.

Bids will be received by the United States Engineer Office, Nashville, Tenn., until Nov. 10, for one full Diesel marine engine complete, circular 24-151.

The Lawrence Iron Works, Sixth Street, Lawrence, Kan., is planning the installation of a keyseater and other equipment.

Electric motors, controls, conveying and other machinery will be installed at the proposed plant of the Inland Printing & Binding Co., Springfield, Mo., to replace its works destroyed by fire, Oct. 21, with loss estimated at $200,000 including machinery.

Manual training equipment will be installed in the new two-story junior high school to be erected at Thirty-ninth Street and Hyde Park Avenue, Kansas City, Mo., estimated to cost $500,000, for which foundations will be laid at once. C. A. Smith, Finance Building, is architect.

Bids will be received by the United States Engineer Office, Postal Telegraph Building, Kansas City, Mo., until Nov. 5, for 37,287 pounds of buttonhead rivets, circular 24.

The West Side Machine Co., Webb City, Mo., is planning for the installation of a lathe, drill press and other equipment.

The St. Joseph Lead Co., St. Joseph, Mo., with headquarters at 60 Wall Street, New York, has acquired the properties of the Federal Lead Co., a subsidiary of the American Smelting & Refining Co., 120 Broadway, New York, in the vicinity of its plant at Bonne Terre, Mo., for $10,000,000. Plans are under way for enlargements and the installation of additional equipment. The American Smelting company has contracted with the St. Joseph company for handling material at its Federal smelter, near St. Louis, and will install additional machinery to cost $150,000.

The Missouri Rubber Products Co., care of Laurence Schmitt, Colonial Hotel, Springfield, Mo., is perfecting plans for a new plant to manufacture tires, tubes and mechanical rubber products. The main building will be 90 x 280 ft., estimated to cost $400,000 including machinery.

The Turner, Day & Woolworth Handle Co., Adams Street, Nashville, Tenn., has awarded a general contract to the H. P. Jacobs Construction Co., Independent Life Insurance Building, for a new two-story plant, 60 x 150 ft., to replace a portion of its works recently destroyed by fire. It will cost about $50,000 including equipment. Other units will be erected later.

The ice-manufacturing plant of the Madisonville Ice & Laundry Co., Madisonville, Ky., was destroyed by fire, Oct. 22, with loss estimated at $90,000 including machinery. It is planned to rebuild.

The Common Council, Paintsville, Ky., is planning the installation of electrically-operated pumping machinery at the municipal waterworks in connection with extensions to cost about $50,000.

Fire, Oct. 14, destroyed a portion of the plant of the Pine Bluff Cotton Compress Co., Pine Bluff, Ark., with loss estimated at $50,000 including equipment. It is planned to rebuild.

The Fred A. Groves Motor Co., Cape Girardeau, Mo., will install a machine shop in its new two-story service and repair building, 100 x 100 ft., estimated to cost $85,000, for which a general contract has been awarded to the Gerhart Construction Co., Cape Girardeau.

The Wabash Railway Co., St. Louis, is considering the erection of an addition to its engine house and repair shops at Moberly, Mo., to cost $65,000. A. O. Cunningham is chief engineer.

The Board of Works, Knoxville, Tenn., plans for the installation of electrically-operated pumping machinery in connection with extensions and improvements in the municipal waterworks to cost $2,000,000. A bond issue is being arranged.

The Prest-O-Lite Co., Inc., 30 East Forty-second Street, New York, manufacturers of acetylene products, etc., will commence the erection of a branch plant at Tulsa, Okla., to cost $60,000.

The Kansas City Light & Power Co., Grand Avenue, Kansas City, Mo., has awarded a general contract to the Edelman-Fleming Construction Co., New York Life Building, for a one-story automobile service and repair building for company trucks and cars, estimated to cost $95,000, with equipment.

The Niedringhaus Metalware Corporation, Goodfellow and Natural Bridge Avenues, St. Louis, is in the market for a No. 408-B Bliss press or equal; double crank press, 24 x 42-in. between housings, weight 7000 to 9000 lb., also a No. 92½-H Toledo press or equal.

Cleveland

CLEVELAND, Oct. 29.

THE machinery market has been dull the past week. Dealers booked a fair volume of scattering orders, mostly for single machines, but no new inquiries of any size developed. The New York Central railroad has not yet made purchases against its recent list. The Pennsylvania Railroad has sent out an inquiry for a 4-in. pipe threading machine for its Columbus, Ohio shops. This inquiry is in line with the company's policy of buying equipment piecemeal for those shops. Some purchases were made recently and it is expected that other equipment will be required.

The White Motor Co., Cleveland, has had plans prepared for a one-story addition, 100 x 100 ft.

The Wilson Rubber Co., Canton, Ohio, will erect a four-story factory to cost approximately $65,000.

The Toledo Factories Co., Toledo, Ohio, has placed a contract for a factory, 40 x 100 ft., to be occupied by the Luckey Auto Repair Co.

The American Electrical Switch Co., Minerva, Ohio, has been organized to take over the plant of the former Lewis Electrical Co., and has purchased the equipment. Charles P. Wolfe is general manager of the new company.

The plant of Erie Tire & Rubber Co., Sandusky, Ohio, will be sold by order of the court. The date for the sale was not named. The minimum price was set at $1,000,000.

The pattern department of the Will-Burt Co., Orville, Ohio, has been leased by Frank Porter and C. W. Mackey, Wooster, Ohio, who will engage in the jobbing pattern business.

The Anderson Rolled Gear Co., Lakewood, Ohio, is in the market for a Brown & Sharpe No. 13 heavy gear cutter with indexing head and mechanism in good condition.

The National Stove Co., Lorain, Ohio, a subsidiary of the American Stove Co., St. Louis, has plans nearing completion for an addition to cost $100,000 with equipment.

Indiana

INDIANAPOLIS, Oct. 29.

PLANS are being perfected by the Indiana & Michigan Electric Co., South Bend, Ind., for a new generating plant near the city, to cost $500,000 with machinery. The company is operated by the American Gas & Electric Co., 30 Church Street, New York.

The Marion Experimental Co., Indianapolis, has perfected plans for the establishment of a new machine and mechanical shop at 846 Virginia Avenue.

The Standard Oil Co., Indianapolis, will build a new storage and distributing plant at English, Ind., to cost $50,000 with equipment.

The Interstate Public Service Co., Indianapolis, will issue bonds for $126,000 and stock for $75,500, a portion of the proceeds to be used for the purchase of the Jeffersonville Water, Light & Power Co., Jeffersonville, including power plant and system, and the installation of additional equipment.

The Connersville Automobile Dealers' Association, Connersville, Ind., comprising a number of local automobile companies, will install a machine and repair shop in its new building, estimated to cost $65,000. Fechtman & Cooley, local Ford representative; Green Brothers, local representative for the Overland automobile; and Ward Halliday, representative for the Buick automobile, are interested in the organization.

The Western Gas Construction Co., 1427 Buchanan Street, Fort Wayne, Ind., manufacturer of industrial gas plant equipment, oil refining machinery, etc., has plans for a two-story addition to its machine shop, 85 x 93 ft., estimated to cost $50,000.

William Randel, 212 West Franklin Street, Greencastle, Pa., has work in progress on a new one-story automobile service and repair building, 75 x 110 ft., estimated to cost $40,000. The International Steel & Iron Co., Evansville, Ind., is architect.

The American Steel & Wire Co., Anderson, Ind., has awarded contract for a new boiler plant containing four 300-hp. boilers.

The Robinson-Wagner Co., Lafayette, Ind., has been incorporated with capital stock of $500,000 to manufacture agricultural machinery and implements, including farm wagons, trucks, commercial bodies and cabs. The company is in the market for equipment. J. M. Robinson is president and John Wagner secretary-treasurer.

Canada

TORONTO, Oct. 19.

THE Canadian machine tool market has become more active the past week. Sales, however, are scattered and in most cases are confined to lots of one or two tools, although a few fairly large contracts were closed during the week. Among the orders placed was one for the Portneuf Hydro Electric development to Canadian Vickers, Ltd., Montreal, for a 4000-hp. turbine, 360 r.p.m. The city of Winnipeg, Man., has awarded the contract for turbines and governors to Canadian Vickers, Ltd. at a cost of $118,800, and alternators to the Swedish General Electric, Ltd., Toronto, at $213,000, together with $5,275 worth of spare parts. A good-volume of single orders for equipment from automobile concerns, saw and lumber mills has also been placed. Inquiry is more active and indications are that several mining companies are about to enter the market for equipment.

The Canadian railroads are showing renewed interest in equipment, and the Canadian Pacific Railway Co. is said to be contemplating the purchase of a number of locomotives.

Fort Colborne, Ont., is contemplating the construction of a waterworks plant to cost $90,000. E. H. Darling, 72 James Street North, Hamilton, Ont., is consulting engineer.

The Southern Canada Power Co., Ltd., Montreal, has awarded the general contract to the Foundation Co., 233 Broadway, New York, for a concrete dam and power house in connection with $2,500,000 power development project at Drummondville, Que. Approximately 30,000 hp. will be developed.

The Continental Wood Products Co., Elsas, Ont., is contemplating erecting a pump mill.

P. W. Gardiner & Son, Galt, Ont., are having plans prepared for a planing mill and sash and door factory on Harris Street to cost $100,000.

A. Marleau, Alexandria, Ont., is in the market for a chain hoist.

Foisy & Hotte, Shawbridge, Que., are asking for complete equipment for a sash and door factory.

The Mount Royal Metal Co., Montreal, Que., is building an addition and is interested in brass and iron foundry equipment. J. E. Grivell, 3311 Lanorie Street, Montreal, is purchasing agent.

The Morrow Mfg. Co. has recently taken over the plant and business of W. L. Morrow & Co, Moncton, N. B., and proposes to make additions to plant and equipment. It is in the market for forge shop equipment, etc.

A. Racine, 1990 St. Dominique Street, Montreal, manufacturer of automobile bodies, carriages, etc., will purchase vulcanizing and welding machinery.

The Supreme Foundries, Lt., Pont Rouge, Que., is in the market for a squaring shear with open gap for 12-gage sheets, 63-in. folder for 20-gage sheets, one slip form roller 60-in., for 24-gage sheets.

The Nelson Bode Trap Co. of Canada, Windsor, Ont., recently incorporated with a capital stock of $50,000 to manufacture traps, steel and metal goods, etc., will establish an assembling plant at 32 Sandwich Street West, Windsor.

Tayler Brothers, Vankleek Hill, Ont., are asking for foundry equipment, including presses, etc.

The Canadian Watercraft, Ltd., Peterborough, Ont., is in the market for machinery and complete equipment for building boats, scows, barges, etc.

It is reported that the Dodge Brothers Motor Car Co. have taken over the plant of the Walker Twist Drill & Tool Co., Windsor, Ont. The plant is being renovated preparatory to the installation of equipment for assembling motor cars for the Canadian trade.

The Christie Co., Murray Street, Niagara Falls, Ont., will purchase special machinery, shafting, hangers, pulleys, etc., for a new plant to cost $60,000.

The Pacific Coast

SAN FRANCISCO, OCT. 24

TENTATIVE plans are being considered by the Paraffin Companies, Inc., 40 First Street, San Francisco, manufacturer of box board, etc., for rebuilding the portion of its plant and power house at Antioch, Cal., destroyed by fire, Oct. 15, with loss estimated at $400,000 including machinery.

The Union Oil Co., Union Oil Building, Los Angeles, has plans for the construction of a new storage and distributing plant near Brea, Cal., to cost $1,000,000 with equipment.

The Victor Oxy-Acetylene Equipment Co., 884 Folsom Street, San Francisco, has awarded a general contract to Barrett & Hilp, 918 Harrison Street, for a one-story addition to cost about $25,000.

The Common Council, Port Angeles, Wash., is planning for the installation of electrically-operated pumping machinery in connection with a new waterworks system estimated to cost $500,000. The Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

The Capitol Spark Plug Co., Marysville, Cal., manufacturer of spark plugs, automobile bumpers, etc., has plans for a new factory near the State Highway and will commence excavations at once. It will cost $50,000, with equipment.

The Southern California Edison Co., Los Angeles, is disposing of a bond issue of $11,500,000, a portion of the proceeds to be used for extensions in power plants and system.

Bids will be received by the Constructing Quartermaster, Fort Mason, Cal., until Nov. 16, for oil burning equipment, including fuel oil storage tank, for installation at Fort McDowell, Cal.

The Coast Oil Fields Supply Co., Los Angeles, has awarded a general contract to the Austin Co., Bartlett Building, for a new one-story plant, 50 x 200 ft., at 822-32 East Sixtieth Street, estimated to cost $27,000.

Fire, Oct. 14, destroyed the plant of the Pacific Coast Glass Co. and a large portion of the works of the Ganahl Lumber Co., Vernon Industrial District, Los Angeles, with total loss estimated at $850,000 including equipment. Both companies plan to rebuild. The loss of the first noted company approximates $350,000.

The General Motors Corporation, Detroit, is considering the construction of a new assembling plant at Oakland, Cal., to cost in excess of $400,000. C. S. Mott, vice-president, is in charge.

The Portland Railway, Light & Power Co., Portland, Ore., has arranged for a bond issue of $2,000,000, a portion of the proceeds to be used for extensions and improvements in electric plants and system.

Judson A. Jenkins, Tujunga, Cal., and Edward Greene, Glendale, Cal., are perfecting plans for the construction of a new ice-manufacturing plant, to cost about $65,000.

The Mohawk Oil Co., operating in the Signal Hill oilfield, near Long Beach, Cal., is having plans prepared by Leonard P. Wikoff, 546 Pine Avenue, Long Beach, architect, for a one-story machine shop, 40 x 150 ft.

The Emsco Tool Co., Los Angeles, has been formed with a capital of $1,000,000, and will build a plant at Seventieth and Alameda Streets, for which contract recently was awarded to the Austin Co., Bartlett Building. The company is headed by E. M. and J. S. A. Smith and J. M. Cummings.

The Roger Electric Fixture Co., Los Angeles, Cal., has been incorporated with $20,000 capital stock and will handle and manufacture electrical appliances. At present no manufacturing is contemplated, but within the next 90 days contracts will be let out for this work. Address care of Rudolph & Warne, 810 Union Bank Building.

The Tucker Rubber Corporation, Buffalo, has been incorporated with $300,000 capital stock and will manufacture mechanical rubber goods. It has secured the plant of the United States Rubber Reclaiming Co. and is now ready to install machinery. Mr. Tucker, who heads the company, was formerly connected with the Fiske Rubber Co. W. S. Timme, 350 Madison Avenue, New York, is corporate representative.

STEEL AND INDUSTRIAL STOCKS

The range of active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	37¾	39⅞	Lima Loco. ..	63½	65
Allis-Chal. pf...	91	91	Midvale Steel ..	24¾	25
Am. B. S. & Fdy.	70⅜	71⅝	Nat.-Acme ..	8¾	8¾
Am. B.S. & F. pf.	104	104⅛	Nat. En. & Stm..	38⅝	42
Am. Can ..	91⅝	94½	Nat. En. & S. pf.	92	92
Am. Can pf....	106¼	106¾	N. Y. Air Brake	33	35⅞
Am. Car & Fdy.	156	156⅛	Nova Scotia Stl.	14½	14
Am. Locomotive.	68¼	70⅛	Otis Steel	7	7⅜
Am. Radiator ..	80	81	Otis Steel pf....	45	45
Am. Steel Fdries.	33⅞	35	Pressed Stl. Car	42½	50
Bald. Loco.	115¼	119	Pressed Steel pf.	80	84
Beth. Steel	46½	48⅜	Replogle Steel ..	8	8¾
Beth. Stl. 7% pf.	88¼	89¾	Republic	42¼	44⅝
Beth. Stl. 8% pf.	103	103	Republic pf.	88	88
Br. Em. Stl. 2 pf.	15	15	Sloss-Sheffield ..	40	40⅛
Cambria Iron ..	40	40	Sloss-Shef. pf...	75	75
Chic. Pneu. Tool	81	81⅛	Steel of Canada..	65¾	66
Colo. Fuel	23½	26	Superior Steel...	23½	23⅛
Crucible Steel ..	58½	61¼	Un. Alloy Steel..	30	30
Deere pf.	60¾	61⅛	U. S. Pipe	36	39⅛
Gen. Electric ..	170½	173¾	U. S. Pipe pf....	79½	82⅛
Gt. No. Ore Cert.	28¼	29⅞	U. S. Steel.....	86½	88
Gulf States Steel	71½	75⅝	U. S. Steel pf...	118¼	119
Hardman-Walk..	115	115	Vanadium Steel.	22¾	27⅜
Int. Har.	67¾	74⅛	Whouse Air Br.	79⅛	80
Int. Har. pf....	106	106½	Y'gstown S. & T.	62	63⅜
Jones & L'ghlin.	107½	107½			

Receiver for Hydraulic Steel Co.

As a preliminary step in reorganizing the Hydraulic Steel Co., Cleveland, that company has been placed in the hands of a receiver in a friendly suit brought by the Savage Armstrong Corporation. Thomas B. Goodbody was named receiver by Federal Judge D. C. Westenhaver. The court conferred upon the receiver authority to continue operations. In the depression that followed the war the Hydraulic Company suffered heavy losses and impaired its assets to an extent that made a reduction of its capital stock advisable. Although fixed charges have been high, it is stated that since April 1 this year the earnings of the company have been sufficient to show a profit above all fixed charges.

Industrial Finances

Consolidated income account of the Replogle Steel Co., Wharton & Northern Railroad Co. and Ferro Monte Railroad Co. for the quarter ended Sept. 30, shows net loss of $79,789 after depreciation and maintenance, against $18,741 in the preceding quarter and $93,533 in the quarter ended March 31, 1923, making total loss of $192,063 for the first nine months of 1923. The balance sheet as of Sept. 30 showed reserves and accruals of $149,300.

The National Acme Co. for the quarter ending Sept. 30, last, showed net sales of $2,408,863, contrasted with $1,819,688 for the corresponding period last year. Net profits after bonds interest for the period were $101,810, against $30,977 for that period of 1922.

Sales of the J. I. Case Threshing Machine Co. for the first nine months of 1923 exceed by 20 per cent those in that period last year. Gross sales last year were $15,720,716. President Warren J. Davis, in commenting on earnings, declared that the financial status of the farmer, which demoralized the market, is improving and "these changes mean a restoration of confidence in the farmer and in the banker to whom he must turn for financing, and this, in turn, should be reflected in the implement industry by a growing volume of sales."

A preliminary certificate of dissolution has been filed by the Hartford Electric Steel Corporation, Hartford, Conn. All claims may be sent to Harry S. Blumenthal, 75 Willow Street, Hartford.

Subject to the approval of stockholders, the Northway Motors Corporation, Natick, Mass., will be merged with the Bessemer Motor Truck Co., the American Motors Corporation and possibly other companies with plants stretching practically across the country. The merger, if effective, will be completed in 1924.

The court has appointed Louis L. Driggs and A. Lapides receivers for the Driggs Ordnance & Mfg. Co., New Haven, Conn.

The Industrial Laundry Machinery Co., 110 West Fortieth Street, New York, recently incorporated with capital stock of $50,000, to manufacture laundry machinery and parts, will devote immediate activities to dealing in these lines. The company hopes eventually to take up manufacturing, but this, however, will be in the remote future. The incorporators are A. C. Thompson, M. Landau and S. S. Burnholz.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.20c. to 4.59c.
No. 12	4.25c. to 4.64c.
No. 14	4.30c. to 4.69c.
No. 16	4.40c. to 4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	4.85c.
No. 26	4.40c. to 4.65c.	4.90c.
No. 28	4.50c. to 4.75c.	5.00c.
No. 30	4.70c. to 4.95c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 4.85c.
No. 16	4.75c. to 5.00c.
Nos. 18 and 20	4.90c. to 5.15c.
Nos. 22 and 24	5.05c. to 5.30c.
No. 26	5.20c. to 5.45c.
No. 27	5.35c. to 5.60c.
No. 28	5.50c. to 5.75c.
No. 30	5.95c. to 6.20c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 c. to 18 c.
High brass wire	17½c. to 18½c.
Brass rods	14¾c. to 15¾c.
Brass tube, brazed	25 c. to 26½c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	23 c. to 24 c.

Copper Sheets

Sheet copper, hot rolled, 19¼c. to 20¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55 $6.30
		90 lb.	6.65 6.40
		100 lb.	6.75 6.50
IC	$12.55 $10.70	IC	7.00 6.75
IX	13.95 12.55	IX	8.25 8.00
IXX	15.55 13.75	IXX	9.50 9.25
IXXX	17.10 15.30	IXXX	10.75 10.50
IXXXX	18.85 16.80	IXXXX	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	48c. to 50c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	9½c. to 10c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals

Business is very quiet and values are practically unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.25
Copper, light bottoms	8.50
Brass, heavy	5.75
Brass, light	4.75
Heavy machine composition	8.50
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.25
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, November 8, 1923

ESTABLISHED 1855 VOL. 112, No. 19

Automobile Rims Made in Thirty Minutes

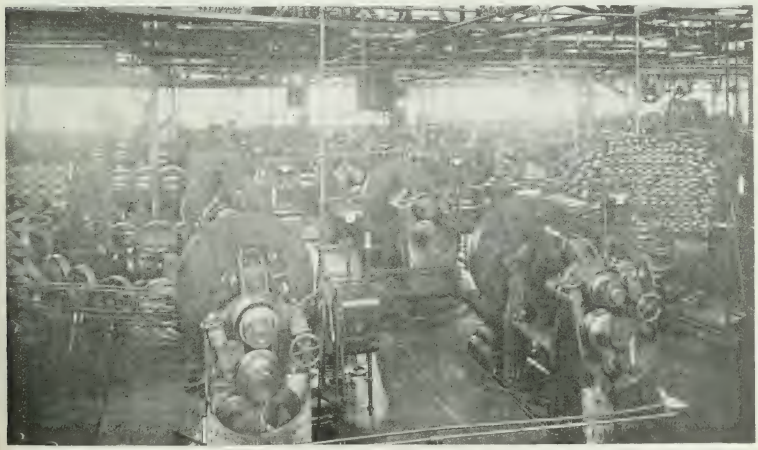
Rapid Movement of Material from Raw Stock Pile to Finished Product in Cars in New Plant of Firestone Steel Products Co.

BY F. L. PRENTISS

ONE branch of the automotive industry that has kept pace with the development of rapid production methods in plants manufacturing hundreds or thousands of completed motor cars a day is the manufacture of steel rims for demountable tires. The rim industry is so closely allied with the manufacture of tires that, when the Firestone Tire & Rubber Co., Akron, Ohio, built a new tire plant 12 years ago, it converted its old tire plant into a rim plant. To engage in the manufacture of rims on a much larger scale and with the most modern methods, the Firestone company organized in 1918 a subsidiary company under the name of the Firestone Steel Products Co., which recently has placed in operation a large plant for the economical manufacture of tire rims and various allied products, including steel bases for solid truck tires, steel felloes for truck and passenger car wheels, and other wheel accessories. The company also manufactures braided cable, used as a reinforcement in the beads of pneumatic tires.

Heretofore Akron had consumed considerable pig iron in the manufacture of tire molds and cores, as well as rubber-making machinery, but the "Rubber City," with the building of the new Firestone plant, has now become a large consumer of rolled steel products in the form of hot-rolled sections and hot-rolled strip steel.

The Firestone plant is arranged for convenient handling and rapid straight line routing of material, from the cars in which the stock is received, through various fabricating operations and the galvanizing department, until the finished product is delivered into cars at the opposite end of the plant. The speed with which operations are carried on is indicated by the fact that, 30 min. after a piece of stock for a Ford rim leaves the steel warehouse, it rolls as a



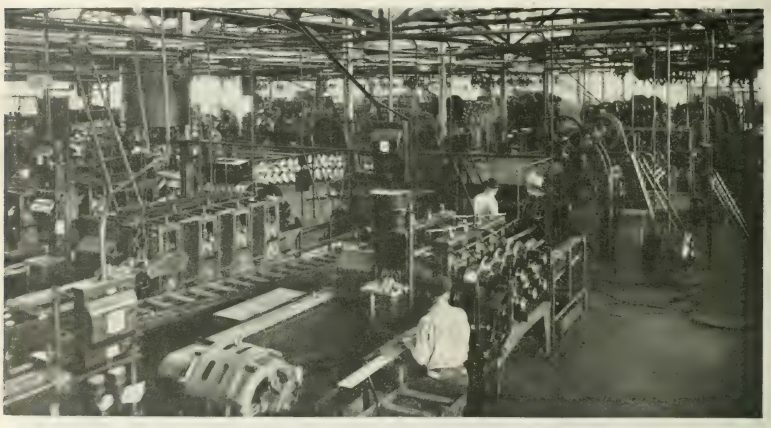
Rims for Automobile Tires Are Circled to Form on Rim Rolls, a Battery of Which Is Shown in the Foreground

finished galvanized rim into a box car for shipment.

The main building of the plant is one-story brick and steel, 860 ft. long and 250 ft. wide, and is divided by building columns into five 50-ft. bays. At one end is the steel warehouse. The material is brought into the building on two depressed railroad tracks that enter the plant and run parallel to the outer wall on the raw material receiving side. This transverse unloading bay is served by a 6-ton Northern crane which delivers the steel from the cars to an inspection platform alongside the tracks. After inspection, the steel is stored in the five bays back of the inspection platform, the portion of each bay that is used for storage being served by a 5-ton electric traveling crane.

In transferring steel from the cars to the storage department, the stock is placed in the bay in which it is to be fabricated, so that, in the manufacturing operations, the transfer of raw material from one bay to another is avoided. Starting at the side of the stock piles, equipment in the fabricating department is arranged down the bays for successive operations in butt welding, the flash is sheared from the weld. Then the welded rim is cold rolled to form on a rim roller, after which it is sized to correct diameter on a tire setter. This mechanically operated machine of 70 tons capacity shrinks the rim to size by exerting a pressure on the outer surface. The final fabricating operation is punching the valve hole. Then the rim is inspected for dimensions and contour by inspectors of the Tire and Rim Association. A finished rim may not vary more than 3/64 in. from correct circumferential dimensions.

The manufacturing processes in making solid tire bases for truck wheels are generally similar to those used in fabricating rims, except that cold rolling to form is eliminated. However, instead of shrinking to size, as is done on the rims, the bases are stretched to size on mechanically operated machines known as expanders, having a capacity of 250 tons. These bases are made in widths up to 14 in., the largest sizes being approximately ½ in. thick. Practically all the machinery used in the fabrication of rims and bases is



Rolls for Forming Side Flanges on Rims

eight units, each unit being complete and independent of the others. Handling of material in process is simple, as one of the first operations is rolling the rim into its circular form and, after being so formed, the piece is rolled in an upright position on a narrow gravity runway from one machine to another, the work not being placed on the floor from the time the steel is taken from the stock room until the rim is loaded on cars for shipment.

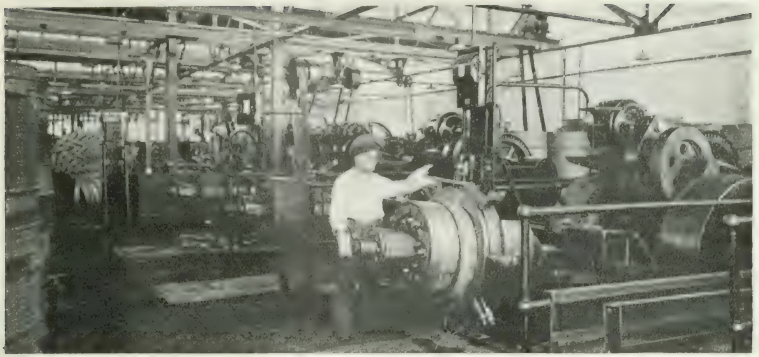
The rims are fabricated from hot-rolled steel made in various special sections, except steel felloes, which are made from flat strips. The special mill rolls required for rolling these sections are made by the steel company which supplies the steel.

Rims are made in nine types, in widths from 3 to 10 in., in various sizes and in both the continuous and split form, the latter not having the two ends welded together after being formed. The hot-rolled steel in the special rim sections comes from the mill cut to length.

Taking a Ford rim as an example of the manufacture of a continuous rim, the first operation after leaving the stock pile is to shear the piece to exact length on a double resquaring shear, which is provided with a table for carrying the strip from the shear. The piece is then formed into a circle on a circling machine. After the two ends are joined by necessarily of special character, and all the machinery used in the Firestone plant, except the punching machines, was designed by the company.

The galvanizing department is one of the most interesting features of the plant. This occupies a floor space 100 x 250 ft. and is equipped with two automatic machines for continuous electro-galvanizing. Rims, after inspection, pass to a conveyor on which they are elevated several feet by means of a belt above that comes in contact with the outer circumference of the rim. From this conveyor the rims pass by gravity into the galvanizing department, where the only manual labor required is in hanging the rims on an endless chain conveyor that carries them through the tanks of the galvanizing machine.

This conveyor is about 5 ft. wide and has two rows of hanging arms, these arms being approximately 4 ft. apart on the conveyor line. On each arm are two hooks, each of which carries a rim, so that the rims, as they pass through the machine, are loaded on the conveyor four abreast. Under the conveyor are six steel tanks containing the various solutions. The conveyor is so constructed that it dips into each tank, immersing the rims, and raises at the end of the tank, lifting the rims out, and continues this undulating movement over all the tanks. The various operations performed, in the order named, are cleaning,



After a Solid Tire Base for a Truck Wheel Is Formed in a Circle and Welded It Is Stretched to Size on Expanders as Shown Here

pickling, galvanizing, rinsing in hot water and drying.

After the final operation, the rim is automatically unloaded from the hook and rolls out on a gravity conveyor, passes by inspection, and through a door to the loading platform and into a car for shipment. The distance traveled in all the galvanizing department operations is approximately 200 ft., this being the length of the machine. All rims except those for disk wheels are galvanized.

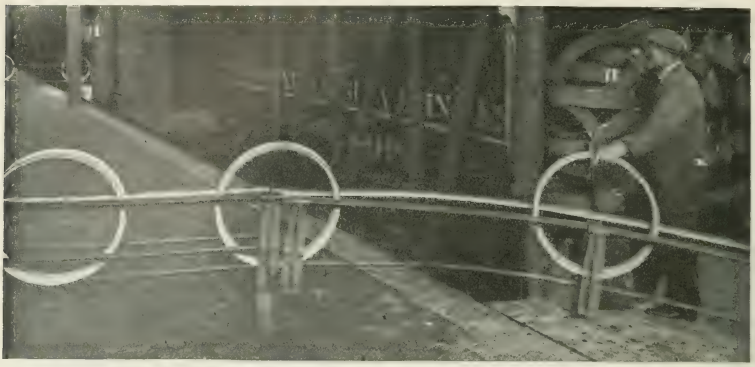
There are two other automatic units in the galvanizing department. One is an oiling machine used for pickling and oiling steel felloes for wood wheels, which are not galvanized. This differs from a galvanizing machine in that the galvanizing part is omitted and in its place is an oil tank. After being dipped in this, the felloe is carried over a dripping pan. The other unit is for brass plating steel bases for solid tires. In this, the plating equipment takes the place of the galvanizing tank. Each galvanizing and plating unit has its own battery of generators supplying 5000 amperes of current. The galvanizing and plating machines were designed by the company.

After developing steel felloes for wood wheels in the experimental department, the company now is manufacturing them on a large scale. They are made of hot-rolled strip steel. The strip is first rolled into its circular form and, after being butt welded, the circle is cold rolled to a channel shape. Holes for the tenon cups in which the spokes fit are then punched in the felloe. The finished felloe, made in various sizes and in various gages of strip steel, is supplied to wheel manufacturers, who assemble the wheel by contracting the felloe over the spokes already assembled in the felloe. The increasing scarcity of wood suitable for automobile wheels has resulted in a new outlet for the use of strip steel for felloes and, at present, 32 automobile manufacturers are using wheels with steel felloes.

Hidden inside an automobile casing and running around the tire near the flange is a closely woven



Rims Are Galvanized in Continuous Electro-Galvanizing Machines, Being Handled Through the Machines by a Continuous Conveyor That by a Downward Movement Dips the Rims into a Series of Tanks Containing the Different Solutions. The rims in the various operations in connection with galvanizing pass along on the conveyor for a distance of 200 ft. The only manual labor in connection with galvanizing is hanging the rims on the conveyor hooks, as shown at the right



After Inspection Following Galvanizing the Rims Are Rolled on Gravity Conveyors into Cars on the Shipping Side of the Plant

wire braid. The yearly demands of the tire manufacturers for this braid require considerable tonnage of light wire. One department in the Firestone plant, equipped with 90 braiding machines, is used for braiding this wire. The wire used is of high carbon steel in various gages and tinned to prevent rust. From 19 to 21 strands of wire are required to make a braid, which is manufactured in various widths.

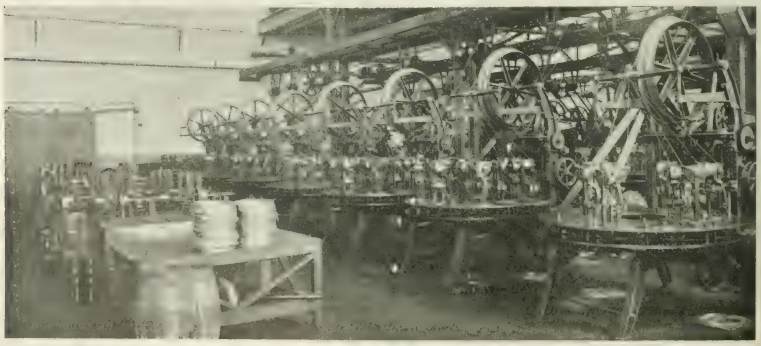
Alternating current for welding and for the motor equipment is supplied through three 417-kva. synchronous motor-generator sets and the current to each bay is metered in order to keep records of power consumption. A high-pressure hydraulic system provides a pressure of 1100 lb. for operating the rim rollers and hydraulic presses. The galvanizing department has an exhaust system for removing the acid fumes, which are carried in ducts beneath the floor and discharged through the top of a tower at the side of the plant.

When operated at capacity, the plant consumes 1500 to 2000 tons of steel per week and, running two 8-hr. turns, has an output of 65,000 rims and parts a day. It can turn out 6000 steel bases for truck wheels a day. The company claims that its plant has the distinction of being the only one in the country that is equipped to manufacture a complete line of rims, steel bases and felloes covering the full range of sizes.

Standards for High-Pressure Flanges

Standardization of steel flanges and flanged fittings has been taken up by the American Engineering Standards Committee, and standards have been developed for steam pressures of 250, 400, 600 and 900 lb. per sq. in. Standards for 1350, 2000 and 3200 lb. per sq. in. are being formulated. In all cases, the maximum temperature was set at 750 deg. Fahr.

For 250 and 400 lb. the two steel standards are to have the same bolt circle diameter and number of bolts as the present American cast iron standard for 250 lb., except that for the 2-in. and 2½-in. sizes the 400-lb. standard will have eight bolts instead of four. For the 600-lb. steam standard the bolt circle and number of bolts will be the same as the 800-lb. hydraulic standard developed by the American Society of Mechanical Engineers. Similarly, for the 900-lb. steam standard, the 1200-lb. hydraulic standard is adopted.



Braiding Department, Showing Some of the Machines Used in Weaving Light Wire into a Braid for Reinforcing Pneumatic Tires

SPUR GEAR GRINDING MACHINE

New Unit for Grinding Involute Teeth on Production Basis Features Outlined

The American Grinder Co., 6534 Benson Street, Detroit, is marketing a gear grinding machine with 30 in. wheel, which, it is claimed, will grind involute teeth on a production basis, produce precise duplication of tooth contour, accurate spacing and smooth finish, the ground gears being interchangeable and running quietly.

The capacity is for gears from 2 to 8 in. pitch diameter up to 2 in. face, with teeth from 12 to 3 diametral pitch, and any pressure angle up to 25 deg. The machine is of the pure generating type, the action being that of rolling a gear along an imaginary rack with wheel 1¼ in. of face wear is said to be obtainable.

Arrangement of the wheel head to swivel to the right or left of center up to 23 deg. is a feature of the machine. This is claimed to be of particular advantage in the case of stem gears, as the stem is placed in the holding arbor while grinding either the drive or coast side of the teeth. Without the swiveling feature, special outboard centers would be necessary, which would be inconvenient and in some cases impractical. The swiveling is also convenient in the case of some cluster gears, the wheel is reversed, and also the diamond-holding arm. The wheel head swiveled to the right 20 deg. and grinding an 18-tooth, 6-pitch stem gear on the drive side is shown in Fig. 3, the wheel swiveled to the left 14½ deg. grinding an 18-tooth 6-pitch stem gear on the coast side being shown in Fig. 4. The latter is the position in which the wheel head is usually used on gears that may be readily reversed.

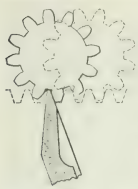


Fig. 1—Diagram Showing Generating Principle

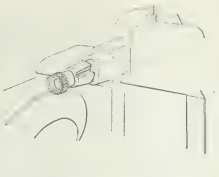


Fig. 5—Sketch of Dotted Locating Ring

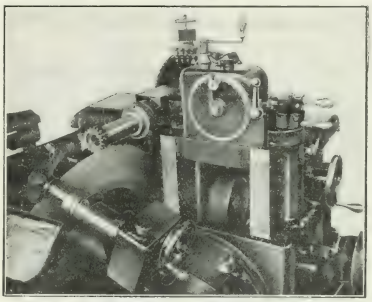


Fig. 3—Wheel Head Swiveled to Right 20 Deg.

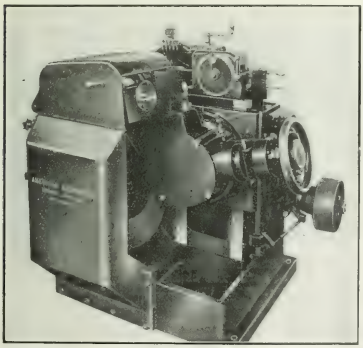


Fig. 2—Front and Right Hand Side View with Water Guard in Place

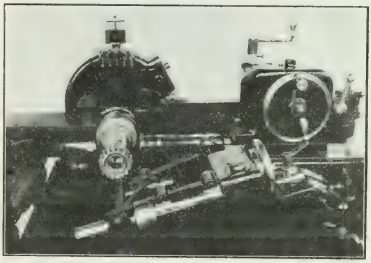


Fig. 4—Wheel Head Swiveled to Left 14½ Deg.

the grinding wheel as one tooth of the rack as shown in Fig. 1.

The machine with water guard in place, covering the wheel and work, is shown in Fig. 2. It may be noted that the machine is compact, self-contained and has a single pulley drive. The wheel spindle is journaled low on the wheel-slide column. It has 1¼ in. lateral feed adjustment and is provided with double-endthrust ball bearings, the main bearings being of Lumen bronze, tapered on the outside to allow for wear adjustment. The feed is controlled by the 12-in. handwheel, which is provided with micrometer adjustment and a positive stop.

The straight edge of the grinding wheel at right angles to the wheel spindle does the grinding, and is kept true by means of a double worm and worm-wheel truing device. The reduction is such that while rotating the handwheel moderately, movement of the diamond is slow, which has been found necessary to secure a smooth and true grinding surface. In this design of

It may be noted that the gear is located at a convenient loading height and is accessible. When the last tooth of the gear has been ground the work carriage stops automatically. The stop is usually set to permit the gear to go around twice, making what might be called a rough and finish grind. During the second time around there is no feed up to the wheel. It is possible to set the machine so that the wheel, as well as the carriage, will stop automatically if desired. This is said to permit one operator to serve two or more machines.

The carriage stops with the gear out of the wheel, so that the arbor may be loaded and unloaded without interference. The quick and correct meshing of the gear with the grinding wheel is accomplished by means of a slotted locating ring attached to the arbor, as shown in Fig. 5. With a knife gage inserted in the ring slot and between two teeth, the gear is positioned for grinding in proper relation with the wheel.

The work spindle is taper journaled in Lumen

bronze bearings and is mounted on the carriage, which is actuated by a drum cam located in the bed of the machine. Generating motion to the work spindle is by means of steel tapes winding and unwinding on a pitch diameter circle or segment as the carriage is driven back and forth. This mechanism is located at the rear of the work spindle. Tapes are used merely to oscillate the work spindle and there is practically no load on them, this being said to permit of driving the carriage at the same speed on both small and large pinions. The tapes are 1¼ in. wide and only 0.008 in. thick. One end of one tape is attached to the segment and the other end to the tape bar, the other tape being attached in the reversed way. Screw adjustment is provided for keeping the tapes tight around the segment, producing uniform duplication of tooth contour.

The indexing mechanism is also located at the rear of the work spindle. Hardened and ground notched plates are used, these having the same number of notches as the number of teeth on the gear to be ground. The notches are ground and lapped to very close limits to assure accuracy of tooth spacing. Less than a second is said to be required to index from tooth to tooth, and the grinding times vary according to the carriage change gears used, of which two sets are furnished as regular equipment.

The cam groove is said to provide a smooth reversing drive and to eliminate the usual load and fire mechanisms, and clutches. The stroke or the travel of the carriage is adjustable to suit the pitch of the teeth, and the position of the carriage in relation to the wheel. Slight variations of tooth contour may be made by more or less angle to the wheel, and also by varying the diameter of the pitch circle or segment.

Unusual Economies Claimed for New Metal Sawing Equipment

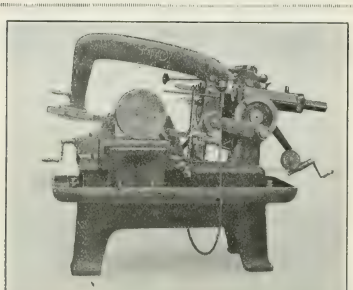
Double the usual output, from six to ten times the output per blade used, and one-half the cost per piece sawed are claimed for the combination of special high-speed steel hack saw blade, blade sharpening machine and sawing machine developed by Edward G. Herbert, Ltd., Levenshulme, Manchester, England. The process of sawing employing this equipment is known as the "Rapidor way."

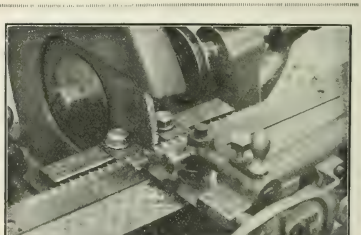
The high-speed steel blade has a patent set which is said to permit of its being resharpened many more times than the usual blade. The saw sharpening machine is intended to provide a simple method of sharpening the blade, assuring that the teeth are ground to the most efficient angles. The sawing machine is adapted to run at high speed and under the conditions required to get the full benefit from the high-speed steel blades.

The blades are of 18 per cent tungsten steel and are hardened throughout. The patent set extends beyond the root of the tooth and the blade may be resharpened until the original teeth have been ground entirely away, the new teeth formed being said to have sufficient set to clear themselves while sawing. It is claimed that the blades cut progressively faster after each sharpening. The blades may be sharpened on any suitable grinding machine and may be used on any sawing machine, but the best results the manufacturers recommend the specific machines mentioned above.

The sharpening machine grinds the blades to models which provide correct shape of teeth for quick cutting. A change of the blade being ground may be made by the wheel illustrated in the accompanying illustration. The grinding wheel is stationary. The blade moves toward the wheel in contact with the models and the teeth are ground on both faces. A diamond rest is provided for truing the wheel to the correct angle. Any size or make of hack saw blade may be ground on the machine.

The sawing machine, also illustrated, is the same as the company's "Rapid" machine, but redesigned for use of the high-speed steel blade. Two sizes are available: No. 1 for 6 in. rounds or squares, and No. 2 for 10 in. rounds and other sections to 8 x 12 in. The machines may be run at 170 r.p.m. while putting heavy pressure on the blade. The main shaft and crank pin are hardened and ground. Lubrication is from a central oil reservoir. The saw holders have an indicator to permit setting of the blade at proper tension, and the dashpot has a device to permit a start to be made on a sharp corner or square bar without danger of breaking teeth out of the saw.





Sawing Machine Using High-Speed Steel Saw Blades Is Shown at Left. The blades have a patent set and may be resharpened until original teeth have been ground away. Teeth are ground to models as shown above

Wages at Peak

Real wage earnings, or purchasing power of dollar earnings as compared with cost of living, were 39 per cent higher in August than before the war, according to figures compiled by the National Industrial Conference Board. Average hourly earnings in August were 54.8c. Average weekly earnings were $26.59, compared with $26.66 in July.

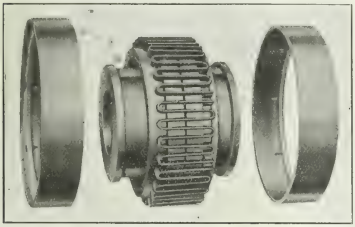
While the real hourly earnings were 39 per cent higher than in July, 1914, the real weekly earnings were only 31 per cent higher, due to the shortening of the number of hours per week. But this means that the average wage earner covered under the survey is 31 per cent better off in purchasing power than he was nine years ago, in addition to having the greater amount of leisure time indicated by the difference in length of work week.

Coupling with Unusual Flexibility as Feature

Unusual elasticity under all loads is claimed for the Falk-Bibby coupling illustrated, which is being manufactured in the United States by the Falk Corporation, Milwaukee. The coupling, the invention of James Bibby, has been made and marketed in England by the Wellman Bibby Co., Ltd.

The coupling is made up of two flanged steel disks, one of which is keyed to each shaft, a tempered steel spring in segments, forming a continuous cylindrical grid, and a shell. On the outside of the flanges are pitched cross grooves in which the spring is placed. The spring is the flexible member and its shape and that of the grooves forms the characteristic feature of the coupling.

The grooves in the disk widen inward toward each other, so that the spring fits closely in them only at



Flexible Coupling for Transmission of Power Between Shafts of Slight Parallel or Angular Misalinement. The spring is the flexible member

their outer ends. The widening of the grooves is in the form of an arc of definite radius, which bears a definite relationship to the thickness of the spring bars. It is designed so that when each bar is bent around this radius the stress in the spring cannot exceed a fixed safe value.

Under light and normal loads, there is a long free span of spring between the points of support on the two flanges, which allows for considerable flexibility. But under heavy loads the spring member becomes supported along the sides of the grooves, automatically shortening the span and stiffening the spring without increasing the stress. Under extreme overloads, the springs are supported at their inner ends and are then in shear, and capable, it is claimed, of resisting many times the load.

By sliding the shell endwise the springs may be easily withdrawn and the shafts uncoupled. Three sizes of the coupling are available, style A, B and C.

The coupling is said to compensate for want of alinement of shafts without setting up cross pulls. The amount of eccentricity which the coupling will accommodate is stated to be more than that caused by worm bearings before they require lining, or more than that by which the bearings are thrown out of line, as from expansion of casings in steam turbines.

The flexible spring member is intended to give unusual elasticity under all loads, the effect of which is to absorb shocks and damp out vibrations on such drives as rolling mills and hoists. The torsional resiliency is also emphasized as of great advantage when herringbone and other gears are used to connect a motor or turbine to a machine.

Freedom from wear and unusual overload capacity are also claimed for the coupling. The working parts are inclosed in the floating shell which provides space for the packing of lubricant.

Bradford Foote has disposed of his interests in the Foote Brothers Gear & Machine Co., Chicago, and has purchased the Crofoot Gear Works, Cambridge, Mass. He will remove the company from Cambridge to Chicago.

Proposed Organization to Meet Needs of Japan

WASHINGTON, Nov. 6.—Organization under the provisions of the Webb-Pomerene export act and the possibility of combining one or more non-competitive lines of manufacture in horizontal groups with joint sales organizations in Japan were the principal suggestions made at a meeting at the Department of Commerce with representatives of trade associations last Friday to discuss plans for more concerted action on the part of American manufacturers in supplying the needs of Japan both during the present emergency and as a possible permanent development. The meeting was called by Assistant Secretary of Commerce J. Walter Drake. No representatives of the iron and steel and related industries were present, and, while it is not thought there is any likelihood of their organizing under the Webb-Pomerene act, it is said some of them may form horizontal groups by associating themselves with chemical, electrical supply and other interests and establish joint sales forces in Japan to supply that market with iron and steel, machinery, etc. So far as the iron and steel industry is concerned, its possibilities in Japan are said to be large and business may be increased over the rather heavy orders now being placed by Japan. At the same time, it is realized that some of the business coming to American steel mills is due to the fact that British mills, which have been quoting under American producers, are already filled to capacity on certain products for Japanese business.

Pig Iron Prices Reduced in Canada

TORONTO, ONT., Nov. 5.—The outstanding feature in the Canadian pig iron market is a reduction of $1 per ton, on all grades effective both in Toronto and Montreal. The prevailing price is No. 1 (2.25 to 2.75 silicon), $29.30; malleable, $29.30; No. 2 (1.75 to 2.25 silicon), $28.30, Toronto. Montreal prices are No. 1 and malleable, $31.20; No. 2, $30.20. For some weeks past Canadian melters have been showing but passing interest in their requirements and buying has been confined to hand-to-mouth needs. Local blast furnace representatives say that only a few of the larger melters have placed contracts for last quarter requirements and point out that most of the present orders call for from one to two cars and all are for spot delivery. Foundries throughout Ontario and Quebec report no falling off in the daily melt, but on the contrary say that business is fairly active and production among some foundries is from 60 to 70 per cent capacity.

To Simplify Types of Heaters

WASHINGTON, Nov. 6.—Inquiry into the practicability of simplifying types, sizes, etc., of gas water heaters, combination boiler and gas water heats, gas storage tanks and pneumatic tanks has been begun as the result of a preliminary conference between representatives of manufacturers, jobbers, plumbers, gas companies and other interested groups with the Division of Simplified Practice on Monday of last week. Cooperation was pledged to the movement by various representatives and a committee was appointed to get recommendations for industries and trades concerned. The recommendations developed will be put before a later general conference for adoption.

The central committee follows:

Frank Sutcliffe, president, John Wood Mfg. Co., Conshohocken, Pa., chairman; R. M. Hudson, Division of Simplified Practice, secretary; M. H. Feldman, general manager of sales, John Wood Mfg. Co., assistant secretary.

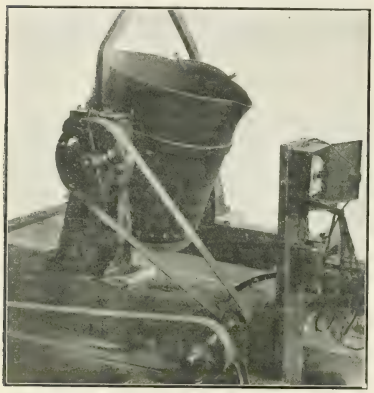
Several weeks ago the Ford Motor Co. passed the 1,500,000 mark in passenger automobiles and trucks produced in 1923. In the same period of 1922 a high record of 935,922 cars and trucks was established—now beaten by 60 per cent.

Tests of Ladle Gearing

The accompanying illustration shows the arrangement of apparatus for testing helical worm ladle gearing of the Whiting Corporation, Harvey, Ill., the test being made primarily to determine the efficiency of the gearing under actual service conditions.

An 8000-lb. capacity crane ladle was set in a pair of standards arranged so that it could revolve continuously in either direction. A standard helical worm gear bracket was mounted on ladle trunnion and the hand wheel replaced by an 18-in. pulley. A 2-hp. motor was set to drive the ladle through the jack shaft so that hand wheel shaft was running at approximately 94 r.p.m. The ratio of the gearing was 58 2/7 to 1, the ladle revolving 1.6 r.p.m. A revolution counter was mounted on the idler trunnion of the ladle and an Esterline recording wattmeter placed in the motor circuit to show graphically the power required to drive the ladle at all times. A counterweight made up of round steel plates weighing 500 lb. was attached to the bottom of the ladle. The maximum power was required only at one point during the revolution of the ladle, when the counterweight was at its greatest horizontal distance from the center of the trunnion.

Starting with the ladle in vertical position and the counterweight at the bottom, turning the ladle 90 deg.



Arrangement of Apparatus For Testing Ladle Gearing

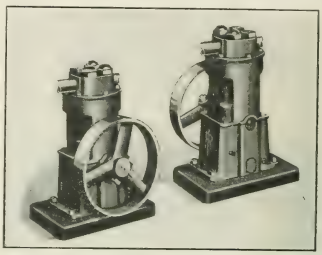
gave approximately the same amount of work for the gearing to perform as if the ladle had been used to pour its capacity of molten metal. On this basis, one complete revolution of the ladle was taken as equivalent to using the ladle twice in the foundry. After 6000 revolutions of the ladle, estimated as equivalent to about 10 years service in the average foundry, the bronze bushings in the bracket were examined. It is claimed that they were found worn perfectly smooth and only a very few thousandths of an inch loose. The pressure on the bearings of the hand wheel shaft, due to the weight of the pulley and the tension in the belt, was several times as great as would occur in ordinary operation. The power input to the motor averaged 0.8 kw. at the peak and 0.2 kw. while the counterweight was traveling downward.

The Inland Steel Co., Chicago, has been granted registration of its trademark on Inland copper alloy sheets. The company put these sheets on the market after exhaustive tests to prove the protection against corrosion which even a small amount of copper gives. The Inland sheets have a minimum copper content of 0.15 per cent.

New Line of Small Vacuum Pumps

A new line of small vertical belt-driven vacuum pumps, designated as type 15, has been brought out by the Ingersoll-Rand Co., 11 Broadway, New York.

Six sizes are available from 4 x 2 in. to 8 x 5 in. single-acting, and 10 x 5 in. and 12 x 6 in. double-acting pumps. The pumps are rated to pull and maintain vacuums between 28.6 in. and 29.25 in., depending on their size. In addition to the standard belt design



Wide Range of Sizes, Different Methods of Drive, and System of Lubrication Are Features

each size is built as a self-contained electric motor outfit, using a short belt drive arrangement or driven through pinion and internal gear. The pump and motor of both the latter arrangements are mounted on a metal sub-base, so that they are not dependent on the foundation for correct alinement.

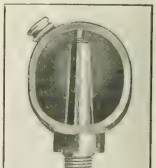
Lubrication is by means of the "constant level" system. The bottom of the pump base forms an oil reservoir of adequate capacity and the amount of oil is determined by high and low level pet cocks. Above the reservoir and directly underneath the connecting rod there is a constant level pan, into which the connecting rod dips and distributes the oil for proper lubrication. The constant level pan is replenished with oil from the supply in the crank case by a valveless oil pump operated by an eccentric on the main shaft.

The 2, 3, 4 and 5 in. stroke single-acting pumps are air cooled by means of an annular ring which encircles the cylinder, the 5 and 6 in. stroke double-acting pumps being cooled by circulating water.

Device for Lubricating Loose Pulleys

The device shown in the accompanying illustration, for lubricating loose pulleys and clutches, has been placed on the market by the Advance Specialty Co., Grand Rapids, Mich. Efficient lubrication, economy of oil, saving in oiling labor, and keeping of belts, floors and material free from oil are advantages claimed for the device. It may be screwed into the old oil hole in the hub of the pulley or clutch, and is said to provide oil for more than a month, without attention.

In this device oil is held in the reservoir and replenished as required through the threaded screw cap shown. As the pulley or clutch carrying the oiler revolves centrifugal force throws the oil to the top of the reservoir and thence through a channel leading to the bearing. This channel is almost filled by a pin, leaving just sufficient space for the delivery of a supply of oil to lubricate the bearing



Loose Pulley Oiler. Economy of oil and cleanliness are features claimed

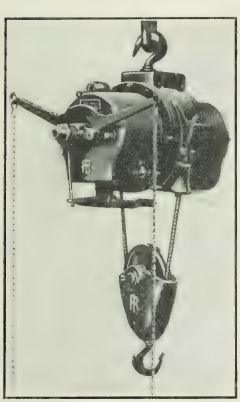
efficiently. The pin is cut to the proper length, so that it just contacts with the bearing to be lubricated and is held in such contact by the coiled spring at the top.

When the pulley or clutch stops rotating there is a partial vacuum in the reservoir, caused by withdrawing oil to the bearing, and as centrifugal force is no longer effective in forcing oil through channel, this vacuum withdraws the oil in this channel to the reservoir.

Small Air Motor Hoist

A new style size A 500-lb. capacity air motor hoist has been placed on the market by the Ingersoll-Rand Co., 11 Broadway, New York. Compactness of design minimizing the head room required and relatively light weight are features claimed. An automatic brake is provided to hold the load if the air supply is disconnected or fails, and a graduated throttle permits close regulation of both the lifting and lowering speeds.

A balanced three-cylinder air motor, which operates in either direction, is employed and the advantages claimed for it include freedom from vibration, ease with which it can be throttled down slowly at all loads and freedom from lubricating troubles. The motor is geared through a mechanical train to the hoisting drum. A safety stop lever is provided to close the throttle and stop the motor when the load is raised to the top of the hoist lift.



Compactness, Light Weight and Automatic Brake Are Features. A graduated throttle permits close regulation of speeds

The automatic brake, a new feature, is made up of a disk attached to the motor shaft and a brake plunger with a friction face, which is held in contact with the disk by springs when the hoist is not operating. The motor and gears are inclosed, the motor operating in an oil bath and the gears turning in heavy grease. Oil passages lead to all bearings. Ball bearings or bronze bushings are provided where necessary.

Dominion Alloy Steel Corporation Will Build Plant at Sarnia

TORONTO, ONT., Nov. 5.—After a meeting of the directors of the Dominion Alloy Steel Corporation, held in Toronto, it was announced by W. B. Boyd, president, that the corporation plans to start work immediately on the erection of a large steel plant at Sarnia, Ont. Mr. Boyd stated that the corporation had reached its objective of $1,000,000 in the security selling campaign in Lambton County and Sarnia and as a result the corporation is now ready to proceed with the erection of its plant. The funds raised by the campaign together with those subscribed by the directors, place the company in a position to carry out its original program. The remaining $2,000,000 has been underwritten by F. G. Warner of Pontiac, who has managed the sale of automobile organization stock for several years, and sale has been started in Detroit and other parts of Michigan. The Dominion Alloy Steel Corporation recently acquired 250 acres on the Indian Reserve on the St. Clair River at Sarnia, adjoining the Imperial Oil Co. property, and will erect a plant for the manufacture of high-carbon, alloy and special quality steel, none of which is at present manufactured in the Dominion. Over 100,000 tons of this alloy steel is used annually in Canada.

Harry R. Jones, formerly president of the United Alloy Steel Corporation, Canton, Ohio, has signified his willingness to join the board of directors. The officers of the Dominion Alloy Steel Corporation, are as follows: President, W. B. Boyd; C. Harold Wills, president C. H. Wills Motor Co., Marysville, Mich.; George A. Simpson, formerly special representative of the Steel Co. of Canada, Hamilton; R. V. LeSuere, M. P., Sarnia; Sir William Mackenzie, Toronto; and J. J. Mahon, consulting steel metallurgist, formerly chief engineer of the Crucible Steel Co. of America.

Electrically Heated Glue Pot

A water jacketed, electrically-heated two-quart capacity glue pot with the thermostatic control has been placed on the market by the Van Dorn Electric Tool Co., Cleveland.

The glue pot is of cast aluminum, the rim of which is machined to give an airtight fit on the water pot, and a drip ring returns condensation to the water pot. The water jacket is an iron casting ground to an airtight fit with the glue pot. The outside of the water pot is telescoped over a rim on the base to prevent the penetration of water to the heating element when re-



New Water-Jacketed Electrically Heated Glue Pot

filling the pot. Replacing of water is said to be necessary only once in three weeks.

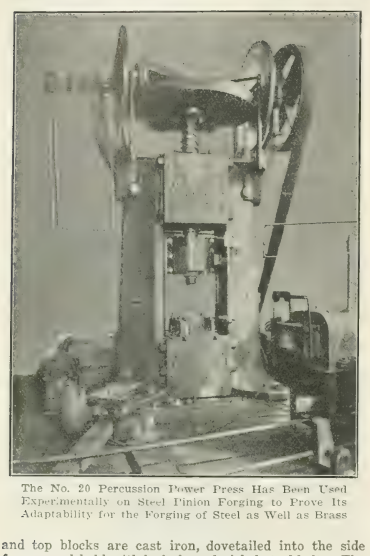
The heating element is of nichrome ribbon, insulated by mica plates and moisture proof. No cement is used. If replacement of the heating element or automatic control becomes necessary, it is claimed that the glue pot may be put back in service in 20 min. The crowned base presses the heating element solidly against the bottom of the water pot, assuring, it is claimed, thermal contact without loss of heat, an asbestos plate and air chamber in the base further providing for heat insulation. The thermostatic control is said to hold the contents of the pot at 150 deg. Fahr. with a variation of less than 5 deg. regardless of room temperature.

A general conference of representatives of manufacturers, distributors and jobbers of range boilers, together with plumbers and other interested groups, held at the Department of Commerce Oct. 30, resulted in a definite reduction in varieties and sizes of range boilers and their component parts from 130 to 13.

Screw Operated Forging Press

A new machine has been put on the market by the Zeh & Hahnemann Co., Newark, N. J., having been designed especially with a view to the use of the screw percussion idea for forging steel.

The percussion power press as built by this company in smaller sizes has been used for coining work and also for forging brass parts. These smaller machines are built with one piece arch top frames of steel in which is set a bronze nut carrying the driving screw. The new machine, known as No. 20, is of built up construction. The uprights are steel castings. The bed



The No. 20 Percussion Power Press Has Been Used Experimentally on Steel Pinion Forging to Prove Its Adaptability for the Forging of Steel as Well as Brass

and top blocks are cast iron, dovetailed into the side frames and held with body-bound nickel steel bolts. The nut is cut directly into the top block giving a cast iron bearing for the screw, rather than to use a bronze nut as in the smaller presses.

The screw is of alloy steel, heat treated, and has triple thread. The upper end of the screw is squared to receive the flywheel. This latter acts also as a friction wheel to take the drive from the two friction disks, it being faced with leather. The lower end of the screw terminates in a thrust bearing in the die-head which is carried on guides in the uprights.

The friction disks are carried on a shaft which runs in ball bearings. These being mounted on opposite sides of the flywheel, and both rotating in the same direction, tend to turn the wheel in one directon or the other, depending upon which disk is brought into contact with the periphery of the flywheel.

The shifting of the disks is controlled in this large machine by compressed air. As the driving disk is applied, the flywheel picks up motion, accelerating as the travel of the screw pulls it toward the periphery of the disk. The action is one of squeezing as the ram is forced down faster and faster, until on reaching the bottom of the stroke, the inertia stored in the wheel, when brought to a sudden stop, gives a final set to the work being formed. It is claimed for this process that the result is a more homogeneous product than is possible by other methods of forging. The ram is returned by application of the other disk to the flywheel, which causes a decellerating motion as the wheel nears the center, or smaller driving radius, of the disk, and a brake is applied to stop it. The disks remain in neutral position until again tripped. Emergency stops are provided to avoid damage to the machine. Knockouts may be provided for top or bottom dies if desired.

The illustration shows the machine on experimental work, making pinions from plain blanks. The finished forging has teeth formed ready for finish cutting.

One advantage claimed for this type of forging machine is that only a low temperature is necessary, which gives longer life to the dies and does not tend to change the structural characteristics of the blank.

Principal specifications are as follows:

Pressure exerted	400 tons
Screw diameter	11 in.
Weight	60,000 lb.
Stroke	20 in.
Distance slide to bed stroke down	14 in.
Distance between uprights	28 in.
Strokes per minute	12
Horsepower to operate	20

New Lists for Stove and Sink Bolts

New lists, effective Nov. 1, covering stove bolts and sink bolts, have been adopted by all leading manufacturers of these products. The principal changes in the old list are the elimination of the ¼-in. lengths over 3 in., and an advance in the list on the longer lengths.

The discount on flat and round-head stove bolts remains as before, but oven bolts, oval head countersunk stove bolts and band bolts, which are special and more costly to make, are quoted at a 10 per cent higher discount.

Flat and Round Head Stove Bolts

List of Nov. 1, 1923. Price per 100.

Length, Inches	3/16 Inch	7/32 Inch	¼ Inch	5/16 Inch	3/8 Inch	½ Inch
⅜	$0.85	$0.85	....	....	....	....
½	.85	.85	$1.20	....	....	....
⅝	.85	.85	1.20	....	....	....
¾	.85	.85	1.20	$1.75	$2.65	....
⅞	.90	.90	1.25	1.80	2.75	....
1	.90	.90	1.30	1.85	2.85	$9.50
1⅛	.95	.95	1.35	1.90	2.95	9.50
1¼	1.00	1.00	1.40	1.95	3.05	9.50
1⅜	1.05	1.05	1.45	2.00	3.15	9.50
1½	1.10	1.10	1.50	2.05	3.25	9.50
1¾	1.20	1.20	1.60	2.25	3.45	9.80
2	1.30	1.30	1.70	2.45	3.85	10.10
2¼	....	1.45	1.85	2.60	4.05	10.35
2½	....	1.60	2.00	2.75	4.25	10.65
2¾	....	1.70	2.10	2.90	4.45	10.90
3	....	1.80	2.20	3.05	4.65	11.20
3½	....	2.00	2.40	3.40	5.15	....
4	....	2.20	2.70	3.70	5.65	....
4½	....	2.40	3.00	4.00	6.15	....
5	....	2.60	3.30	4.40	6.65	....
5½	....	2.80	3.60	4.80	7.15	....
6	....	3.05	3.90	5.20	7.65	....

For nickel plating add $1 to list.

Iron Sink Bolts

List of Nov. 1, 1923. Price per 100.

	1 Inch	1¼ Inches	1½ Inches	1¾ Inches	2 Inches	2¼ Inches
Length..... Diameter ¼ in.	$2.10	$2.20	$2.30	$2.40	$2.50	$2.60
	2½	2¾	3	3½	4	
Length..... Diameter ¼ in.	Inches $2.70	Inches $2.80	Inches $2.90	Inches $3.10	Inches $3.30	....

Cast Iron Pipe from France

The recent award of 4200 tons of cast iron pipe by the Department of Public Service, Los Angeles, Cal., was to the Pacific Pipe & Supply Co. of Los Angeles, as representative of a firm at Port-à-Mousson, France, at the following prices per ton, four meter lengths: 4-in., $64.16; 6-in., 8-in. and 12-in., $60.16. Other bids were as follows: National Cast Iron Pipe Co., 4-in., $65.70; 6-, 8- and 12-in., $61.70; American Cast Iron Pipe Co., 4-in., $65.39; 6-, 8- and 12-in., $61.39; United States Cast Pipe & Foundry Co., 4-in., $66.14; 6-, 8- and 12-in., $62.14.

Shipments are to be made direct by the Panama Canal through to Los Angeles.

Three trainloads of products, comprising 150 cars and 6000 tons, were shipped to the Central Texas oilfields within two weeks by the Petroleum Iron Works Co., Sharon, Pa. The company reports that the tankage included in the first train was fabricated and on the way to Texas three days after receipt of order and arrived five days later.

Proposed Changes in Pig Iron Rates

Animated Hearing at Which Buffalo and Eastern Pennsylvania Producers Differ Sharply—Charge Made That Some Sellers Desire Monopoly

BUFFALO and eastern Pennsylvania pig iron producers were unable to agree on proposed changes in pig iron freight rates to New York and New England rate points at a hearing Wednesday, Oct. 31, at 143 Liberty Street, New York, before the Freight Traffic Managers' Committee, R. N. Collyer, chairman, of the Trunk Line Association.

It was proposed that the eastern Pennsylvania rate be increased from $3.65 to $3.90 to Boston rate points, and that the Buffalo rate be reduced from $4.91 to $4.90, thus establishing a differential of $1 a ton in favor of eastern Pennsylvania as against a differential of $1.26 now existing, which Buffalo producers claim is more in line with the spread which obtained before the percentage increases of the past few years went into effect. The Buffalo producers, Rogers, Brown & Co., the Hanna Furnace Co., Donner Steel Co. and the Wickwire-Spencer Steel Corporation, through their traffic managers, stated that they were willing to have the eastern Pennsylvania rate left undisturbed if the Buffalo rate to Boston points were reduced to $4.65, which would establish the same spread of $1 a ton. Representatives of eastern Pennsylvania furnaces strongly opposed any change. The Bethlehem Steel Co., which has furnaces at Buffalo and in eastern Pennsylvania, through its assistant traffic manager, Harry Crawford, proposed a cut in the Buffalo rate to $4.80, leaving eastern Pennsylvania unchanged, but this was not agreed to by the latter interests.

No Compromise Possible

The Freight Traffic Managers' Committee found at the conclusion of the hearing that no compromise appeared to be possible as between the Buffalo and eastern Pennsylvania furnaces, although both sides were repeatedly urged by the railroad officials to get together on some equitable basis. The hearing was adjourned without action, and it seemed improbable that the trunk line roads would make any move which would meet with disapproval of one side or the other. A possible outcome is an appeal to the Interstate Commerce Commission.

A tentative schedule of new pig iron rates had been prepared by the Freight Traffic Managers' Committee, including not only the rates from Buffalo and eastern Pennsylvania furnaces, but also affecting rates from Pittsburgh and points in that section. While the hearing was called to consider pig iron rates solely, some of the Youngstown interests, engaged in making steel as well as pig iron, attempted to bring into consideration the freight rates on billets, scrap, etc., while those interested in pig iron alone strove to keep the discussion within that channel, leaving billet and scrap rates for separate consideration later, if such should seem to the railroad traffic managers to be advisable.

Proposed Changes

Proposed rate changes were based on an assumed rate of $8.50 on pig iron from Chicago to New York, and were as follows:

From Pittsburgh to New York rate points, $5.10; present rate, $5.42.

From Buffalo to New York rate points, $4.70; present rate, $4.91.

From Josephine, Pa., to New York rate points, $4.90, or 20c. less than the proposed rate from Pittsburgh; present rate, $5.17.

From Johnstown, Pa., to New York rate points, $4.80, or 30c. less than the proposed rate from Pittsburgh; present rate, $5.04.

From Emporium, Pa., to New York rate points, $4.70, same as proposed from Buffalo; present rate, $3.78.

(Rates to Philadelphia, Baltimore and points taking the same rates to be constructed on the usual basis with relation to the proposed rates to New York.)

From Pittsburgh to Boston rate points, $5.50; present rate, $5.92.

From Buffalo to Boston rate points, $4.90, or 20c. higher than to New York; present rate, $4.91.

From eastern Pennsylvania and New Jersey points to Boston rate points, $3.90, or $1 per ton less than rate proposed from Buffalo; present rate, $3.65.

From Dubois and Punxsutawney, Pa., to Boston rate points, $4.90, same as from Buffalo; present rate, $4.91.

From Josephine, Pa., to Boston rate points, $5.30, 20c. under Pittsburgh; present rate, $5.67.

From Johnstown, Pa., to Boston rate points, $5.20, 30c. under Pittsburgh; present rate, $5.54.

From Riddlesburg, Saxon and Earlston, Pa., to Boston rate points, $4.90, same as from Punxsutawney; present rate, $4.79.

From Charlotte, N. Y., to Boston points, $3.90, which makes same advance in present rate as proposed in the rate from eastern Pennsylvania; present rate, $3.66.

From Emporium, Pa., to Boston points, $4.90, same as proposed from Buffalo; present rate, $4.92.

From Port Henry and Standish, N. Y., to points on New York, New Haven & Hartford, south of the line of the Boston & Albany, $3.90, same as proposed rate from eastern Pennsylvania; present rate, $3.65.

The Buffalo Position

All of the producing districts affected by these proposed changes were represented at the hearing, each fighting to preserve the relationships now existing with other districts, except in the case of Buffalo, which sought to reestablish rate differentials more favorable to its own furnaces. The arguments of the Buffalo producers were vigorously opposed by several speakers, among them Richard Peters, Jr., Philadelphia, representing the Eastern furnaces as a whole, and N. C. Moon, traffic manager of the Alan Wood Iron & Steel Co., Philadelphia, the largest eastern Pennsylvania pig iron producer excepting Bethlehem Steel Co.

Mr. Moon presented a typewritten statement, which among other things purported to show that the costs of assembling raw materials for making a ton of pig iron are $12.013 at Swedeland, Pa., as against $7.558 at Buffalo, a difference in favor of the furnaces located at the latter place of $4.455 per ton. This was made up as follows:

	At Swedeland	At Buffalo	Difference in Favor of Buffalo
Freight on 2 tons of ore.....	$7.72	$3.68	
Freight on 1.1 tons of coke...	3.883	3.608	
Freight on 0.5 ton limestone..	0.41	0.27	
	$12.013	$7.558	$4.455

Representatives of Buffalo producers did not dispute the correctness of these figures as based on consumption of Lake Superior ore by eastern Pennsylvania furnaces, but stated that many of the latter furnaces are using local ores and foreign ores at considerably lower cost per ton of iron than indicated by this tabulation. To this Mr. Moon made answer by showing that the seaboard furnaces are also at a disadvantage because of competition of foreign pig iron. He quoted United States Government figures as showing that 509,162 tons of foreign iron came into this country between September, 1922, and July, 1923, nearly half of this, or 243,105 tons, coming in at the port of Philadelphia. He stated that on Saturday, Oct. 27, a steamer unloaded 3000 tons of foreign iron at Philadelphia for John A. Roebling's Sons Co., Trenton, N. J.

That the contention over freight rates is largely one

of commercial rivalry between the producers of Buffalo and eastern Pennsylvania was indicated by this statement from Mr. Moon's brief:

"If the Buffalo furnaces are finding difficulty in shipping as much pig iron to New England as they might desire, it is not wholly because of the efforts of the eastern Pennsylvania furnaces to share the same markets, nor will an increase in the rate from eastern Pennsylvania afford them the monopoly they apparently seek to gain. It is not the first time that Buffalo has sought to fasten a rate burden on eastern Pennsylvania by complaint similar to that put forth in your [the Freight Traffic Managers' Committee] circular letter. One would think that the furnaces operating where the iron industry had its birth, and that have given the railroads serving them millions of tons of traffic, have no rights worthy of consideration, when Buffalo takes a look around, suspicious that some one is trampling on its toes.

"If Buffalo is dissatisfied with the tonnage it is able to market in New England territory, so are we, and we believe the high freight rate we are compelled to pay is a deterrent to our shipments into that territory. Facing this condition, the proposal that the rate be increased further is unthinkable and we would use every resource to prevent it. We will oppose any so-called adjustment of these pig iron rates that is not an adjustment downward in the same way that they were adjusted upward. They were put up together and if an adjustment is necessary, they should come down together and in the same relative way they were advanced."

COKING-IN-TRANSIT RATE

Rainey-Wood Coke Co. Makes Plea for Change in Railroad Tariffs, Alleging Discrimination

The Rainey-Wood Coke Co., Philadelphia, owned jointly by the Alan Wood Iron & Steel Co., Philadelphia, and W. J. Rainey, Inc., New York, has filed a bill of complaint with the Public Service Commission of Pennsylvania against the Pennsylvania, Monongahela, Philadelphia & Reading and Upper Marion & Plymouth railroad companies alleging discriminatory freight rates on bituminous coal and coke favoring the beehive coke industry in its competition with by-product coke which the complainant company produces.

The plea of the Rainey-Wood Coke Co. is that the Public Service Commission of Pennsylvania act upon the recommendations of the United States Coal Commission, made in its report of Sept. 20, 1923, that the railroads establish coking-in-transit rates. In this report the following statement was made:

Consideration should be given by the railroads to the establishment of coking-in-transit rates. Coal is coked at the mines in bee-hive ovens, a wasteful process, now giving way to coking in by-product ovens that save the gas, tar, ammonia, benzol and other products. The by-product coking industry has developed rapidly in the past ten years without having coking-in-transit rates and the railroads in their statements to this commission point to that record as evidence that such rates are not essential to the further development of the by-product coke industry. In this way they are unmindful of the fact that the growth thus far has been in connection with the iron and steel industry. The ovens for steel companies are built at the point of consumption of the coke and there has been no question of rates for transportation of the coke beyond.

There is, however, a large and growing field for the growth of this industry in the direction of supplying gas and coke for municipal and household use. This requires that the ovens be located at or near the larger cities. A few such plants have been built. The gas is piped to the consumers, but the coke must be transported by rail. The coal must be carried to the ovens by rail. There is now no relationship between the two rates. The coke from such ovens must compete with bee-hive coke shipped direct from ovens at the mines, or with anthracite. The bee-hive coke and anthracite are carried on through rates. The coal from mines to by-product ovens and coke from these ovens to consumers are carried on two rates (the one on coke usually a high local rate) which, combined, are much higher than a through rate would be.

A coking-in-transit rate would be a competitive through rate by which the coal would be carried from mines to ovens and after conversion to coke, transported beyond to the consumer. Such rates will advance the by-product coking industry and the conservation of natural resources.

There is nothing novel in the proposal of coking-in-transit rates. A parallel situation is found in milling-in-transit rates by which wheat is transported to the mills, converted to flour and several by-products and the flour carried beyond to consumers. The conversion of wheat by milling is of a like character with that involved in the conversion of coal by coking.

It costs the Rainey-Wood Coke Co. $3.70 to move from the Westmoreland coal district to its plant at Swedeland, Pa., the 1.4 tons of coal necessary to make one ton of by-product coke. In shipping this ton of coke to Philadelphia there is an additional freight charge of 88c., making the total freight coke for delivery of a ton of by-product coke in Philadelphia $4.58, or $1.05 above the $3.53 rate on which beehive coke may be shipped from the Connellsville district to Philadelphia. The complaint cites many other examples, in some of which the excess of cost on by-product coke over cost of beehive coke, delivered at various points, is alleged to exceed $2 a ton.

The present rate structure was built up at a time when there was no production of coke in by-product ovens in eastern Pennsylvania, and the relation which then became introduced between freight rates on coal and beehive coke between western and eastern Pennsylvania was entirely without reference, it is stated, to by-product coke production or to the effect such relation might have upon the latter industry and its success and growth. It is claimed that the respondent railroad companies have denied to the complainant "the benefit of facts and circumstances which justly entitle it to a basis of rates and charges affecting its by-product coke operations to enable it to compete reasonably and successfully with the beehive coke industry."

The Rainey-Wood Coke Co. operates 110 ovens and consumes about 800,000 tons of coal annually.

Employment Slightly Less

The number of wage earners in 1678 manufacturing establishments have decreased consistently since April, according to a report prepared by the National Industrial Conference Board, New York. Figures for the same establishments have been compiled for several years. All of the monthly figures for 1923 to date are lower than the figure for the peak month of June, 1920. At that date the number of wage earners was 697,965. In April of this year—the highest month of the year to date—the figure was 643,623. In August, the last month for which reports have been completed, the number was 613,101, a drop of 1½ per cent from the 622,051 in July.

Appointments by Valley Rolling Mills, Inc.

The Valley Rolling Mills, Inc., which recently purchased a bar mill at Elmira, N. Y., has opened executive and sales offices at 120 Broadway, New York, for the sale of its products, which are billets, bars, bands and light angles. Edward F. Quirke, president, and Marcel K. Sessler, vice-president, will be located at the New York address, while John S. Quirke will be in charge of the mills. Appointments of sales representatives have been made as follows: Philadelphia district, William Hoffman, Land Title Building, Philadelphia; Detroit, Miles-Appleby, Garfield Building, Detroit; Pacific Coast, Milton Pray Co., San Francisco.

Open-Hearth Furnace Regenerators*

Proportionate Sizes of Chambers for Air and Gas —Insulation—Doing Away with the Gas Regenerators Suggested

BY FRED B. QUIGLEY



FRED B. QUIGLEY was born at Harrisburg, Pa., in 1885 and is a graduate in metallurgy from the Case School of Applied Science, class of 1908. His first employment was at the Ohio works blast furnaces of the Carnegie Steel Co., in the year of his graduation. He was given charge of the Niles furnace in 1912 and held this position until 1922 with the title of assistant superintendent of blast furnaces. At present he is superintendent of the open-hearth and bessemer departments of the Ohio works of the Carnegie company, Youngstown, Ohio, which position he has held since June, 1922.

IN the early days checker chambers were built as part of the foundation of the furnace, which was a poor design. There was always the chance of steel breaking through the bottom of the furnace and filling up the checkers. With the regenerators set to one side of the foundation of the furnace proper, repairs can be made to either without disturbing the other. Another early design used horizontal checkers. This had many disadvantages. The full vertical area of the horizontal checker chamber is not heated evenly, because the gases tend to pass through the upper checker openings to the exclusion of the lower openings, while the incoming air seems to seek a different course, which lowers the possible regenerative efficiency, since the air is not preheated to its maximum extent. Also the horizontal chamber gives no propelling action to the gases, since the only draft effect obtained is from the uptake to the furnace.

The design for modern furnaces uses vertical checker chambers for both gas and air. It has numerous advantages. The hot air rises naturally in the vertical chamber, due to the decreased density caused by the increase in temperature of the air as it rises from the cooler checkers in the bottom rows to the hotter ones on top. This produces a positive pressure to the air which forces it through the port and helps to control the projection of the flame on the bath. This pressure is not so necessary with the gas because it comes from the producers under pressure.

Checker Bricks and Checker Design

There are a number of designs for laying checkers. The following are some of these and the advantages claimed by their inventors. [The Danforth, Orth, Quarrie and other types are described here in detail.]

With the use of pulverized coal for fuel in open-hearth furnaces it has been found that special regenerative construction is necessary, in order to take care of the excessive ash content of the waste gases. When first tried with regular checker block it was found that openings closed rapidly, and as a result the practice today is to use large tile, giving large openings, or some other arrangement using piers or baffle walls. It has also seemed advisable to use removable slag pockets to reduce the amount of ash carried over to the checkers. Some method whereby the ash is deposited before entering checker chambers will assist in the successful use of pulverized coal.

The modern flue arrangement for regenerators provides for the checker chambers to be built on an angle pointing toward each other, so that the outgoing flues from the checker chambers will be approximately radial to the stack from both chambers, which will also give the easiest flow line and the shortest route for the gases to the stack or waste-heat boilers. (See page 1246.)

Proportionate Size of Chambers for Air and Gas

The Carnegie Steel Co.'s open-hearth committee has decided upon the following as the minimum requirements in regard to size of regenerators for a 100-ton producer gas furnace:

Air Chamber

30 ft. x 12 ft. x 20 ft. deep } Entire chamber
68 cubic feet per ton of steel }
150 square feet of heating surface per ton of steel

Gas Chamber

30 ft. x 8 ft. x 20 ft. deep } Entire chamber
46 cubic feet per ton of steel }
100 square feet of heating surface per ton of steel

The air chamber should be larger than the gas chamber, because the air comes to its chamber cold, while the gas is at a considerable temperature before it gets to the checker chamber and it requires more than one cubic foot of air to burn properly one cubic foot of producer gas. Theoretically the ratio is about 1.3 to 1. To this must be added a slight excess of air. In actual practice the ratio usually runs 1.5 to 1.

Insulated Checker Chambers

In the past, very little attention has been paid to the heat insulation of the checker chambers and the infiltration of air into the checker chambers, due to the stack draft. As has been shown by carefully made heat balances of open-hearth furnaces, there is a large proportion of excess heat in the waste gases entering the checker chambers which cannot possibly be recovered in preheating the air and gas to the furnace. In the case that the waste gases are allowed to pass directly to the stack, the heat insulation of the checker chambers and the flues and the loss in the valves and the infiltration of air is not important, as it makes fairly small difference to the working of the furnace whether the heat is lost by radiation from the checker chambers or in the stack.

However, with the increasing use of waste-heat boilers for recovering the surplus heat in the waste gases, the insulation of the checker chambers and the prevention of infiltration of air become extremely important, and it has been proved in practice that a much larger amount of steam is produced in the waste-heat boilers if the checker chambers are properly heat-insulated and if care is taken to close up openings which allow air to be mixed with the waste gases before entering the waste-heat boilers. In modern installations, care is also taken to design reversing valves in such a way that the heat and draft losses in these are a minimum. With this type of valve there is less infiltration of air through the boiler setting and a greater economy results.

One of the modern methods of insulating checker chambers is to use boiler plate as a barrier on the outside surface, and between this and the brick is placed some heat-insulating material. One plant has had the walls and roof of the checker chambers of two furnaces insulated for over a year with no harmful results to the roof of the chambers.

Life of Checkers

The life of the checker brick is determined to a large degree by the deposits which collect on them, such as lime, dolomite, ore and other oxides. These

*Abstract of paper read Oct. 25 before American Iron and Steel Institute, New York.

deposits, besides choking up the openings, slag with the brick. Different fuels have different effects on the life of the brick. Natural and coke oven gas are the least damaging, oil and producer gas next, tar next and powdered coal the worst of all. With powdered coal, there is a considerable deposit of coal ash in the checkers, with tar a coke-like substance.

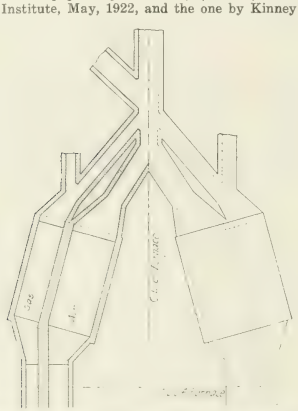
Number of Heats Before Cleaning Checkers

Fuel	No. of Heats
Natural or coke oven gas	300 to 600
Coke oven gas and tar	200 to 300
Oil or producer gas	200 to 300
Tar	175 to 250
Powdered coal	75 to 125

For cleaning the checkers, suction has been tried, but was never successful. The best way to clean is with compressed air. After the furnace is taken off the checkers are either soaked with water or allowed to cool gradually. Then as many rows of bricks as are bad are removed and the rest scraped with an iron scraper and blown with compressed air. After the first run on new checkers, very few if any are taken out. On the next run more brick are removed before good bricks are found. Some checkers in the lower rows have been in as long as 1600 heats.

Doing Away with Gas Checkers

Both the papers by Clements, (British) Iron and Steel Institute, May, 1922, and the one by Kinney and



Modern Arrangement of Checker Chambers and Flues

McDermott show by their figures that the gas regenerators in the furnaces they ran their tests in do little work in preheating. This brings up again the possibility of doing away with the gas checkers and insulating the gas flue from the producers to the furnace. If this were possible, there might be opportunity for a better proportioning of the air chamber, having the additional room occupied by the gas chamber. In such a case, there would be an even greater excess of waste heat available, which could be utilized to advantage in waste-heat boilers.

Insulation of checker chambers for best efficiency of checkers has proved advisable, and especially so in the case of waste-heat boilers. It is also possible to gain thermal efficiency by the insulation of the passageway (fantail) from checker chambers to the slag pockets, and this might be extended to the slag pockets as well.

To provide least resistance to the flow of waste gases to the stack or waste-heat boilers, a straight line valve should be used with chambers and flues built radially to the stack and thereby reduce the draft and the tendency to greater infiltration.

In other words, what is desired is a narrow, deep, efficient checker with smaller openings between bricks which can be easily cleaned while the furnace is operating, a direct passage for the gases to the stack or waste-heat boiler, and a method provided to prevent accumulation of dirt in the checker chambers.

Discussion

Prof. William Trinks, Carnegie Institute of Technology, Pittsburgh, pointed out that Mr. Quigley had assembled data covering all American regenerator designs, and that this is the first time a complete list has been put together. Regarding the placing of regenerators directly under the furnaces, which was formerly current practice, the speaker pointed out that it still is popular practice in steel foundries both in the United States and in Europe. In general, however, the furnace does not rest upon the regenerators as a foundation.

As to the thickness of bricks proper for regenerator use, this depends entirely upon the process, or rather upon the period of reversal. In open-hearth furnace practice, with reversals at 15-in. intervals, the 2-in. thickness is correct, because the 15-min. period permits a penetration of heat to the extent of about 1 in. from each side. For processes, however, in which the period between reversals is longer, a greater thickness may be employed profitably, because with the greater thickness a greater storage capacity for heat becomes available and can be utilized.

As about 10 per cent of the heat units produced by the coal used are lost ordinarily through regenerator walls, both by infiltration of cold air and radiation from the walls, the plan of making air-tight walls by the use of boiler plate or otherwise is recommended, just as boiler settings in modern practice are now made air-tight. Such "iron-clad" regenerators should have explosion doors to relieve the sudden pressure occurring at times, and thus save the checker work from rupture.

Stuart J. Cort, superintendent open-hearth department, Saucon plant, Bethlehem Steel Corporation, pointed out that the fuel cost is from 25 to 30 per cent of the entire conversion cost of producing open-hearth steel. If proper design of regenerators, including their insulation, reduces the fuel consumption of the open-hearth furnace from 650 lb. per ton of ingots to 500 lb., the saving on the production of 45,000,000 tons of ingots per year would amount to 3,000,000 tons of coal per year. He pointed out, however, that insulation of the regenerator walls has its drawbacks because, if the heat be not allowed to escape, the walls are more liable to crumble, this being particularly serious at the skew-back, where two arches of different lengths come together between the gas chamber and the air chamber.

Another point made by this speaker was that practice in the near future is likely to show only one regenerator chamber at each end of the furnace, this being for the air. He pointed out that 14 per cent of the sensible heat in the producer gas, as it enters the furnace, comes from the regenerator brick. To offset this, however, there is a loss approximating 9 per cent due to the decomposition within the regenerator of some of the hydrocarbons in the producer gas. There is a further loss in some installations of as much as 10 per cent, due to the way in which water cooling is practiced. In this case the net loss of heat figures out at 5 per cent, whereas, without the regenerator for the producer gas, this loss would be avoided. Inasmuch as no regenerator is required for natural gas, coke oven gas, blast furnace gas, fuel oil or tar, which are the principal other fuels for this use, the abolishing of the gas regenerator in producer gas outfits would "make it unanimous."

Oxygen from the Air

An attractive loose leaf book issued by M. K. Dunham, 110 South Dearborn Street, Chicago, describes the plant and processes employed in producing oxygen from the air by the "oxeco" liquefaction method. The liquefaction process physically separates oxygen from the air with a consumption, it is claimed, of about one-fifth as much energy as in decomposing water. Illustrations of the equipment as installed in a number of commercial plants are given, together with log sheets, diagrams and various other data covering the subject.

Economics of the Iron Industry in China*

Survey of Ore Deposits and of Producing Capacity of Existing and Projected Plants — Formula Used to Connect Price of Ore with Pig Iron Price

BY CHUNG-YU WANG

INDICATIONS show that the people of the United States have awakened to the idea of the great possibilities of foreign trade in the Far East. The following estimate of ore reserves of the iron deposits so far known in China, suitable to modern blast furnace work as regards type, character and situation (excepting those scattered and unimportant sedimentary deposits found in almost all of the provinces of China, which may amount to 300,000,000 tons and which are adaptable for native furnace work only) shows the quantity to be in the neighborhood of 600,000,000 tons.

As estimated by V. K. Ting, director of the Chinese Geological Survey, the iron ore reserves are as follows in tons:

Provinces	Iron Ore	Theoretical Iron Content
Chili	86,469,000	42,896,000
Fengtien	287,580,000	105,205,000
Shantung	22,920,000	14,138,000
Honan	3,400,000	1,640,000
Anhwei	27,500,000	13,525,000
Kiangsi	18,260,000	8,771,000
Hupeh	52,687,000	30,095,000
Kiangsu	39,080,000	20,787,800
Fukien	15,000,000	7,000,000
Chekiang	2,300,000	1,050,000
Total tons	555,196,000	245,107,800

If we include the 300 million tons of scattered and unimportant sedimentary deposits, we find that China has about one twenty-fifth of the reserves of the world, one-fourth that of America, eight-tenths that of England and one-third that of France or Germany before the war. If the per capita consumption of iron in China were that in the United States, that is 600 lb., as based upon pre-war production, we would have to face the consequence of exhausting the 900 million tons of ore in about four years.

Annual production of pig iron by the modern furnaces in China will soon reach the 1,000,000 ton mark, if the iron market continues to improve and if the concrete proposals that have been made soon materialize. The following is a list of iron works existing or proposed, with their maximum production and their present production in tons:

Name of Company	Locality of Furnace	Maximum Annual Production	Estimated Production for 1923
Han-Yeh-Ping Co.	Hanyang	216,000	100,000
Han-Yeh-Ping Co.	Tayeh	324,000	90,000
Liu-Ho-Kou Mining Co.	Hankow	36,000	30,000
Pen Hsi Hu Coal & Iron Co.	Pen Hsi Hu, South Manchuria	91,000	20,000
Lung Yen Co.	Western Hills, Peking	90,000	.....
Kai Lan Mining Administration	Ching Wan Tao	90,000	.....
Anshanchan	Mukden	100,000	20,000
		947,000	260,000

It is well known that pig iron is still produced in small native furnaces in nearly all of the provinces of China. An estimate of the approximate production of ore and native pig for the year 1915 gives 499,810 tons for the former and 108,330 tons for the latter. The table below shows the chemical composition (in per cent) of the pig iron produced in the various works.

*Abstract of paper read Oct. 25 before American Iron and Steel Institute, New York.

Cost of mining iron ore in China varies according to location and type of ore deposit. Let us take the Tayeh iron mine as a representative type of mining on a large scale. The cost of mining and transportation (about 28 km. or 17 miles from the mine to port of shipment) was about $1.00 Mex.* per ton in 1913, itemized as follows:

	Taels
Salary	0.154
Labor and material	0.241
Transportation	0.074
Loading	0.112
Miscellaneous	0.143
Total	0.724—approximately $1.00 Mex.

*$1.00 Gold = $2.00 Mex. = Taels 1.45.

In 1919, due to rise in cost of material and labor and including interest and depreciation, the cost per ton at port of shipment was $2.80 Mex. I presume the present cost varies slightly around this figure. The cost of mining in the various small and scattered deposits in Hunan, to supply ore to the native furnaces, varied from $0.672 Mex. up to $3.36 Mex. per ton.

It will be interesting to you to know the conditions under which contracts for ore delivery have been made in China. Japan has been the largest buyer of Chinese iron ore, the quantities ranging from 300,000 tons to 600,000 tons per year. Under the terms of an agreement with the Han-Yeh-Ping Co., involving a series of long term loans from Japan, there are specified the following restrictions as to the grade of ore to be delivered, f.o.b. steamer at Tayeh at $3 (Mex.) per ton, with 5 per cent additional for shortage:

> Iron content based at 65 per cent; for every increase of 1 per cent, a premium of 10 c. Mex. is given; for every decrease of 1 per cent, a deduction of 10c. Mex.; refusal, if 50 per cent or less. Manganese content based at 0.5 per cent; for every additional 0.1 per cent, a premium of 10c. Phosphorus, at 0.05 per cent; for each decrease of 0.01 per cent, a premium of 10c.; for each increase of 0.01 per cent, a deduction of 10c.; refusal, if more than 0.08 per cent. Sulphur, 0.1 per cent; for each additional 0.1 per cent, a deduction of 5c.; refusal, if more than 0.5 per cent. Copper, 0.4 per cent; refusal if more than 0.4 per cent. The average sizes of ore should be between 75 mm. (3 in.) and 150 mm. (6 in.); and any sizes less than 25 mm. (1 in.) are rejected.

Recently an agreement has been concluded between the Hupeh Government Mining Bureau, operating the Elephant Nose iron mines at Tayeh, and the Liu Ho Kou Mining Co., operating the Yangtse blast furnace, for the supply of between 60,000 tons and 70,000 tons of ore at $3.60 (Mex.) f.o.b. lighters at Tayeh, under the following terms as to the quality of ore supplied:

> Iron content based on 60 per cent to 62 per cent; for every 1 per cent above 62 per cent, an increase of 10c.; for every 1 per cent below 60 per cent, a deduction of 10c.; refusal, if below 50 per cent. Manganese, 0.5 per cent; for every 1 per cent above 0.5 per cent an increase of 10c. Silica, up to 10 per cent; for every 1 per cent above 10 per cent, a deduction of 5c.; refusal, if above 20 per cent. Phosphorus 0.05 per cent; for every increase of 0.01 per cent, a deduction of 10c.; for every decrease of 0.01 per cent, a premium of 10c.; refusal, if above 0.1 per cent. Sulphur, 0.1 per cent; for every increase of 0.1 per cent, a deduction of 5c.; refusal, if above 0.5 per cent. Copper, 0.2 per cent; refusal, if above 0.2 per cent. The weight of the ore delivered is calculated on the dry basis, with 2½ per cent additional for shortage.

In this connection, the following empirical formula, which has been developed by me, has been accepted in

Name of Company	Si	S	P	Mn
Yangtze Foundry Pig No. 1 (Liu-Ho-Kou Co.)	2.50 to 3.00	0.03 Max.	0.05 to 0.15	0.5 to 0.7
Han-Yeh-Ping Co., No. 1	2.0 to 4.0	0.03 to 0.08	0.25 to 0.33	0.60 to 2.00
Pen-Hsi-Hu, No. 1	.....	0.012 to 0.047	0.07	0.40

principle by the Bureau of Mines for the settlement of the price paid for the ore delivered this year.

Let x = price of pig iron when the original contract was signed.
y = price of ore, agreed upon when the contract was signed.
z = price of pig iron (local market) when readjustment of price of ore is made.
w = a constant.
A = price of ore in $ Mex. delivered f.o.b. Tayeh at the time when the yearly readjustment is made.

$$A = y - \frac{z - x}{w}$$

In this case x = Taels 70, being the local price of pig iron in 1919 when the agreement was signed: y = $4.10, being the price agreed upon at that time: z = Taels 35, being the price of pig iron at the beginning of this year: w = 4, arbitrarily fixed, since the cost of ore for one ton of pig iron is about ¼ of the total cost of smelting.

$$A = 4.10 - \frac{35 - 70}{4} \times 4.10$$

= $ 3.588 (Mex.) say $3.60, which is the ruling price for ore finally agreed upon for this year.

Cost of Iron Manufacture in China

Cost is a thing very fluid, and is not easy to hold for any length of time. Its usefulness lies in giving us a comparison and in the forecasting of future costs. The following table gives at a glance the cost of iron manufacture in China, as compared with that in the United States all in American dollars:

Raw Materials	Tons	Liu-Ho-Kou Mining Co. (Yangtze furnace) 1923	Hanyang 1920	Penhsihu 1921	United States 1923
Iron ore	$1.61	$3.94	$3.33	....	$9.50
Manganese ore	0.02	0.14	0.33	....	....
Limestone	0.40	0.32	0.46	....	1.25
Coke	1.11	10.76	13.46	....	10.50
Scrap	....	....	0.18	....	....
Total		$15.16	$17.76	$14.83	$21.25
Labor		$0.55	$0.28	$1.26	$1.75
Supplies and stores		0.30	0.12	....	
Repairs and maintenance		0.28	0.19	1.29	2.00
Replacement of tools		0.03	0.36	....	
General expenses		2.60	0.96	0.50	
Financial expenses		2.80	3.60	3.32	
Power		....	0.62	1.28	....
Total		$21.72	$23.89	$22.48	$25.00

The number of man-hours per ton of pig iron at the Yangtse blast furnace is on an average about 17, as against between 1.72 and 6.2 in the United States, although the labor cost per ton of pig iron is cheaper in China. This points to a moral: cheap labor is always inefficient. Let us examine the assembling cost of raw materials per ton of pig:

	Yangtse blast furnace, 1923 Gold	Valley furnace (U. S. A.), 1920
Coke	$3.64	$2.77
Limestone	0.18	0.42
Ore	1.04	6.47
Supplies	....	0.50
Taxes	....	0.31
Total	$4.86	$10.47

Under existing conditions China cannot consume more than 100,000 tons of modern furnace pig iron and so the excess of production has to depend upon the Japanese market, which, in fact, indirectly controls the local Chinese market. The price has grown more and more shaky every day. Since the cutting down of prices by the Han-Yeh-Ping Co. a few months ago, even the price of Taels 33.00 fails to interest any buyer at Hankow. Buyers are adopting a "watchful waiting" policy. The same condition prevails in Shanghai, where buyers are not eager to place orders at Taels 36.00.

The 1922 lumber production in the United States amounted to 31,426,922,000 board feet, according to the Census Bureau, in cooperation with the Forestry Service of the Department of Agriculture. This represents an increase of 16.5 per cent over the production of 1921, which was 26,960,864,000 board feet.

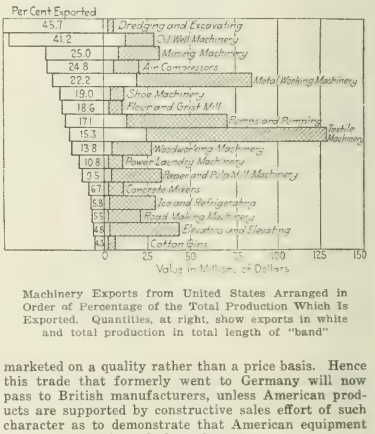
EXPORTS VERSUS PRODUCTION

Comparison on Percentage Basis of Leading Lines of Machinery

Figures prepared by W. H. Rastall, chief of industrial machinery division, Department of Commerce, show in an interesting way the proportion of the American production of certain classes of machinery which entered into our exports. In particular, the largest item of export was dredging and excavating machinery, with 45.7 per cent of the total produced. One of the smallest items consisted of cotton gins, with only 4.3 per cent exported. The diagram, arranged in order of percentage exported, shows clearly the status of the several products covered.

In his analysis, Mr. Rastall points out that before the war Germany furnished perhaps 45 per cent of the machinery which went into international trade, and that since the armistice there have been brief periods when the depreciated condition of the mark, combined with other conditions, gave German manufacturers a peculiar advantage—an advantage which now does not exist.

American engineering and American machinery are distinguished in the world's markets for their superiority. Americans are noted for their engineering achievements but, because of this superiority, American machinery is usually higher in price than similar equipment secured from foreign sources. It must be



Machinery Exports from United States Arranged in Order of Percentage of the Total Production Which Is Exported. Quantities, at right, show exports in white and total production in total length of "band"

marketed on a quality rather than a price basis. Hence this trade that formerly went to Germany will now pass to British manufacturers, unless American products are supported by constructive sales effort of such character as to demonstrate that American equipment is worth the price asked—and more.

Export business is becoming more and more essential to the prosperity of the individual manufacturer. The chart shows that it is vital for manufacturers of dredging and excavating machinery. The difference between a satisfactory and an unsatisfactory export ratio can easily represent the difference between profit and loss on the year's balance sheet. Manufacturers have a definite opportunity to improve their export ratio, and the present international situation provides an unusual opportunity.

The Interstate Commerce Commission last Saturday announced the granting of the application of railroads to establish rates on manganese ore and manganese ore concentrates from Denver and other points in Colorado to Duluth, Minn., Chicago, and Peoria, Ill., and points taking the same rates, dependent upon the value declared in writing by the shipper or agreed upon in writing as the released value of the property.

Acid Electric Steel Castings

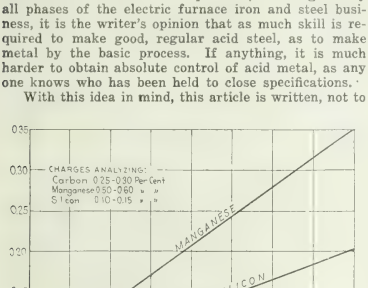
Cardinal Points in Good Practice—Scrap and Making Bottom—Charging and Melting Down—High Carbon and Chrome Steel

BY LARRY J. BARTON*

THE acid electric furnace process has become so important from a commercial standpoint that it deserves the closest consideration. The common idea is that the process is so simple that a green man, in a few heats, can become a melter. This has resulted in the springing up of many "first class electric melters," but has not placed the operation on as high a plane as it deserves.

From a rather broad experience, covering nearly all phases of the electric furnace iron and steel business, it is the writer's opinion that as much skill is required to make good, regular acid steel, as to make metal by the basic process. If anything, it is much harder to obtain absolute control of acid metal, as any one knows who has been held to close specifications.

With this idea in mind, this article is written, not to



Approximate Percentages of Residual Manganese and Silicon in Baths of Acid Steel Melting Down in Carbon Contents

be offered as a text but to give, in detail, the handling of this process as practiced under the writer's direction.

Scrap to Be Used

As the acid process does not in any way eliminate phosphorus or sulphur, scrap metal low in these elements must be used for the charge. The present allowable limits for steel castings are: 0.06 per cent phosphorus and sulphur content respectively. There are many good classes of scrap on the market, which will meet these specifications with ease. Practically any scrap coming from the basic open-hearth furnace will prove suitable. Boiler plate, structural steel, forge flashings, heavy borings, etc., are excellent.

Each car of scrap, as it comes into the plant, should be carefully examined and then segregated. This segregation will take account of several points:

1. The phosphorus and sulphur content of the scrap.
2. The carbon content.
3. Size of pieces.
4. Condition of scrap, as regards rust, etc.

This is very important if regular operations are mandatory, as any material change in the charge will necessarily change the final product. As it is not economical either to boil with ore to eliminate carbon, or add pig to recarbonize, the analysis of each charge should remain as closely the same as possible. In the same manner, a charge of all light scrap will oxidize more than a charge of heavy chunks. Not only that, but a closely packed charge will always melt better and quicker than one loosely placed in the furnace. Dirty or rusty scrap will always melt lower in carbon, manganese and silicon, than one of clean metal, which is very apt to disturb regular analysis.

Therefore, in making up the charges for the furnace, approximately the same conditions should be had for every heat. This will account for the following points:

1. Will phosphorus and sulphur be within limit? If well down, it is often possible to use a small amount of cheaper, basic scrap, but this is not recommended.
2. The proportion of light to heavy scrap should be about the same for each charge.
3. The physical condition of the charge should be regular as regards percentage of clean scrap, medium scrap, and dirty scrap.
4. The chemical proportions of carbon, silicon, and manganese should be kept closely the same.

If these points are adhered to, it follows that the bath, when melted, will in almost every case be of about the same composition, and will require very little "working" to bring it to the point of finishing heat. That the elimination of any extra handling means economy of operation requires no argument.

There are many excellent methods of storing and handling scrap material in use today, and while it may cost a little more to keep the scrap segregated, it surely pays in the end.

Making Bottom

There are two fundamental methods of making the acid hearth—that of burning in bit by bit, and that of ramming all at one time.

Burning in: To make a bottom in this manner, the furnace shell is first lined on the bottom with several courses of good clay or silica brick. Electrodes are then set in the bottom, as in the basic process, and the arc is struck. When the furnace gets up to the point where the bottom brick begin to glaze, sand or ganister is shoveled in and gradually built up to the desired shape. While this makes an excellent hearth, it has certain disadvantages in that it severely strains the roof and side walls, uses considerable current, and is a long heart-breaking job. Secondly, it does not seem, by actual experience, to give any better results than a rammed bottom.

Ramming: As many courses of good clay brick as desired are laid on the bottom. I have found two courses, laid flat, to give good satisfaction. The mixture to be rammed is then made up. The best way of making this is in a small-sized sand mixer, making up an amount equivalent to not over six wheelbarrows at a time. If such equipment is not handy, the mixture can be readily made by hand on a smooth plate or in a plain mud box. This mixture should be of good refractory character, with enough binder to enable it to be well rammed, and of such a character that it will set in one monolithic mass when thoroughly dried and baked. Some prefer to use sand, some ganister, and some crushed silica brick. For a binder, there are many substances: Pitch, tar, molasses, glutrin, etc.

There is one special mixture which is strongly recommended as giving superior service to any which the writer has tried. This is a mixture of 100 per cent ganister mixed with hytempite. The ganister is mixed of about 50 per cent which has passed a ¼-in. mesh, and 50 per cent which has passed a ⅛-in. mesh. This allows a mixture which will pack readily and will hold up well. Hytempite is mixed with water to a very thin consistency—about like cream—and added to the ganis-

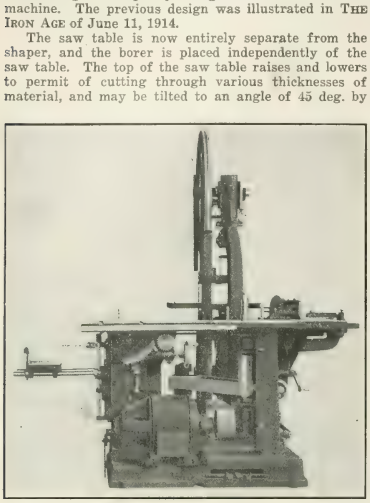
*Box 490, New Orleans, La.

(*Continued on page* 1299)

Improved Wood-Working Machine

The universal wood worker, Nos. 101 to 112, of the Crescent Machine Co., Leetonia, Ohio, has been redesigned, provision for more convenient operation and wider range of capacity being features of the new machine. The previous design was illustrated in THE IRON AGE of June 11, 1914.

The saw table is now entirely separate from the shaper, and the borer is placed independently of the saw table. The top of the saw table raises and lowers to permit of cutting through various thicknesses of material, and may be tilted to an angle of 45 deg. by



Universal Wood Working Machine Made Up of Five Units. Each unit has individual control and all may be in operation simultaneously

means of a handwheel and worm gear tilting device. A scale and pointer indicate the degree of angle.

The machine is made up of five separate units, a band saw, a jointer, a saw table with tilting top, a shaper and a borer. Each unit has individual means for starting and stopping and all five units may be in use at one time, each operator having complete control of his machine and being free from interference by the other operators. Endless belts driving each unit are located within the machine so that they do not interfere. The starting and stopping of each unit, except the shaper, is by means of a belt-tightening pulley operated by a lever. The tightening pulleys may be adjusted for maintaining proper tension. Belts do not run unless the units are in operation. The shaper is started, stopped and reversed by means of friction cones, the lever controlling this mechanism being easily operated by foot. All sliding adjustments are gibbed to take up wear.

The base is a single casting cored-out hollow and provided with reinforcing ribs. It sets flat on the floor, an arrangement intended to give more substantial support than otherwise obtainable. The several units making up the machine are mounted on cast-iron, cored-out hollow pedestals, accurately machined and bolted to the base on machined surfaces. A new feature is that a special motor base is not required, the regular base being designed so that the motor may be conveniently attached. Universally adjustable slide rails for the motor are provided as regular equipment.

The No. 101 machine has an 8-in. jointer, 26-in. band saw, and reversible shaper. It occupies floor space of 77 x 81 in., is 78 in. high and weighs 2330 lb. net. The power required is from 5 to 7 hp.

A new 2500-ton per week blast furnace is about to be blown in by Dorman, Long & Co., near Middlesbrough, England.

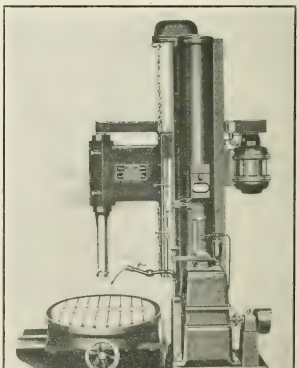
Vertical Internal Grinder

New features have been incorporated in the model L-R Williams vertical internal grinder which is being marketed by the Hy-Way Service Co., Elkhart, Ind. The machine is equipped with a revolving table, as shown in the illustration, and the motor is arranged to counterbalance the overhang of the head, which is claimed to minimize friction and wear in the ways.

The wheel spindle regularly provided grinds holes from 3½ to 20 in. The width of the driving belt is 2½ in. and the spindle speed 7000 r.p.m. The arbor is 3½ in. in diameter, tapering to 3 in., and is 15 in. long. Arbors 18 and 24 in. in length are also available. The feed of the head ranges from 0 to ⅝ in. per revolution of work, and quick traverse is provided to and from the work.

The wheel spindle is driven by a 2 hp. vertical type 3400 r.p.m. motor, which is mounted directly at the rear of the head and travels with it. The revolving table is driven by a ¾ hp. motor having three speeds, 600, 1200 and 1800 r.p.m. This motor is mounted on the left side of the table, and starting, stopping and changing of speeds is controlled by a drum type controller located on the opposite side of the table. A hydraulic oil pump 1 hp. 1700 r.p.m. motor mounted on a separate stand also drives the water pump.

The vertical travel of the head is 28 in. and the distance from the center of the arbor to the apron on the ways is 15 in. The in and out travel of the revolving table is 12 in. The finished top of the table is 24 in. and the outward travel of the table 12 in. The



Vertical Internal Grinding Machine. The motor is arranged to counterbalance overhang of the head

floor space occupied is 42 x 49 in. and the height 7 ft. 6 in. The weight of the machine crated is approximately 5500 lb.

It is estimated by the National Industrial Conference Board that 200,000 new leaders will be required by American business in the next seven years. This includes technically trained men for various managerial positions, as well as leading executives. To fill these positions it is estimated that there are at present in technical schools only about 50,000 students. Hence, it is argued by the board that there is going to be a shortage of men for positions of responsibility.

INVESTIGATING MERGER

Interesting Testimony Presented at Hearing in Regard to Merger of Other Companies with Bethlehem

BOSTON, Nov. 5.—Hearings on a complaint of the Federal Trade Commission charging that the merger of the Bethlehem, Lackawanna, Cambria and Midvale steel companies is in violation of the Federal trade act, were started Oct. 31 in the Federal Building, Boston, and continued this week. They will be continued, according to present plans, in Buffalo and possibly New York. Attorneys Baldwin B. Bane, Edward L. Smith and Roger E. Barnes represent the Government at the hearings, while the Bethlehem Steel Corporation is represented by Attorneys Hoyt A. Moore and W. W. Robertson, of Cravath, Henderson and de Garsdork, New York. Examiner George McCorkle is conducting the Boston hearings.

Questions put by attorneys for the Government were for the purpose of showing, if possible, that the withdrawal of the Midvale, Cambria and Lackawanna companies may be an act in restraint of trade, may have resulted in unfair competition, and may have reduced the available supply of steel mill products. It was brought out during the hearings by the witnesses on various occasions that the supply of steel had not been reduced by the merger of the above companies with the Bethlehem Steel Corporation. Also, that competition is confined to fewer companies. It was testified as well that the Bethlehem Steel Corporation is much more active in the New England field than heretofore. The question of price as it relates to competition now and before the merger of the companies was gone into thoroughly, as well as terms on which contracts for steel are made. A surprisingly large number of witnesses maintained that the price at which steel is purchased is not as much of a factor with consumers as is delivery.

In regard to mills offering to carry accounts longer than 30 days, it was shown that all steel mills have made it a practice to give 30-day extensions when requested to do so. Questions as to competition among steel companies for New England business prior to the Midvale-Cambria-Lackawanna-Bethlehem combination, brought out the statement from one witness that the leaders of the downward price movement of 1921 were first the Cambria, second the Carnegie, and third the Lackawanna companies. Considerable opposition was expressed to the Pittsburgh base pricing on mill products.

Testimony was presented by some witnesses to the effect that deliveries could be improved upon, but the question remained open as to whether the fault rested upon the railroads or the mills due to a congestion of business. Much stress was placed by certain witnesses on the importance of quality of steel in making purchases, this factor rather than price being the determining one.

Approximately 30 witnesses will have been examined before the close of the hearings at Boston. Those already examined include: William C. Smith, treasurer Boston Forge Co., Boston; Fred F. Stockwell, president Barbour, Stockwell Co., Cambridge, Mass., street railway supplies; Carl Stahleker, manager steel department Brown-Wales Co., Boston; Phillip Stanton, Sexton Can Co., Everett, Mass.; Homer B. Belfield, purchasing agent Billings & Spencer Co., Hartford, Conn., drop forgings; Robert C. Loughlin, general manager Thomas Loughlin & Co., Portland, Me., marine hardware; William C. Tobin, vice-president Rogers Drop Forging Co., Worcester, Mass.; Herbert A. Sanderson, purchasing agent Wasson Mfg. Co., Springfield, Mass., railway equipment; J. L. Burke, Bath Iron Works, Bath, Me., shipbuilder; Albert I. Fields, Simonds Mfg. Co., Fitchburg, Mass., saws, files, etc.; E. W. Christ, vice-president Stanley Works, New Britain, Conn., hardware; John M. Collins, Moore Drop Forge Co., Springfield, Mass.; and Fred M. Chipman, International Engineering Works, Framingham, Mass.

Adds to Line of Heavy Duty Lathes

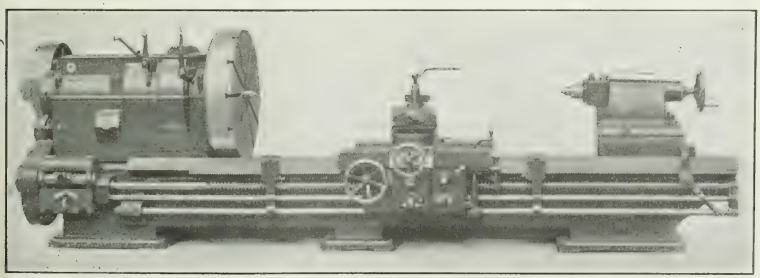
The R. K. Le Blond Machine Tool Co., Cincinnati, has added to its line of heavy-duty geared-head engine lathes 30-in. and 36-in. machines, the latter being shown in the accompanying illustration. In design the larger lathes are similar to the smaller machines described in THE IRON AGE of Dec. 28, 1922.

The headstock is oiled automatically, lubricant being pumped to all bearings and gears running in oil bath. Sixteen spindle speeds, from 4 to 255 r.p.m., are available, speed changes being made by means of two levers. Gears are of steel and heat treated, the sliding gears are of chrome nickel alloy, heat treated and hardened, and have stub form teeth. Multiple keyways in the gears are broached from the solid, and shafts have multiple hobbed splines.

The driving pulley runs at 500 r.p.m. The spindle is of 0.50 carbon crucible steel forging and has replaceable, heavy bronze, babbitt-line bearings which are automatically oiled. The spindle may be started and stopped from the apron or headstock.

The bed is deep and heavy and the rear carriage bearing is flat. The front shear is of the company's improved compensating Vee type, which is claimed to resist tool pressure in all directions and greatly increase the stiffness of the lathe. The bed and carriage are of semi-steel. The apron is a rectangular box in which all the bearings for shafts and screw are cast integral with the apron. All shafts have bearings in both walls of the apron. Both feeds are operated by a single positive clutch, and cross and length feed and screw cutting are interlocked.

The quick change gear mechanism is of unit con-



Heavy Duty Single Pulley Drive Geared Head Engine Lathe. Massive construction and convenience of control are features. Sixteen speeds and 48 threads and feeds are available

struction and all gears are of steel and have special heavy tooth section. All changes are made with two levers. A separate feed rod is provided for driving feeds and the lead screw is not splined. Special coarse leads or metric threads can be cut by applying gears to the end of the box. Forty-eight threads and feeds are available.

The 36-in. lathe illustrated swings 38½ in. over the shears, 29 in. over the carriage and 26⅝ in. over the compound rest. The distance between centers, 12 ft. bed, is 4 ft. 7 in. The driving pulley is 24 in. in diameter, and width of belt 6 in. The spindle has a 2¼ in. hole and No. 6 Morse centers are used. The motor recommended is of 15 to 25 hp. running at 1750 r.p.m. The shipping weight of the 36 in. lathe with 12 ft. bed is 16,200 lb.

PHYSICS OF CAST IRON

Chemical Composition Advocated as Recommended Practice—Further Light on the Subject

The problem of the physics of cast iron, particularly the use of chemical specifications, has been a prominent subject for some time. It was brought up some years ago by William R. Webster, Philadelphia, and has been debated frequently at various sessions of the American Society for Testing Materials and of the American Institute of Mining and Metallurgical Engineers.

In a recent progress report of committee A-3 on cast iron of the American Society for Testing Materials, some recommendations on this subject were made which are of considerable interest. The following extract reveals the opinion of the committee on this subject:

During the past year, the adaptability of the tentative specifications for pig iron for the steel and the malleable foundry, in addition to the iron foundry proper, have been studied and suitable changes and rearrangements are being made which appear to cover the situation properly. In spite of the experience of foundrymen to the contrary, there is a persistent call from consumers of castings for definite compositions for given lines of castings. To respond to this call for information desired by the consumer —information every modern foundryman should have and guide his procedure with—the committee has requested the sub-committee on general castings to take up this matter with a view of constructing tables of analysis ranges for important lines of foundry product. These analysis ranges, however, are to be given as "recommended practice" and not intended for actual specification. In this way, the consumer of the foundry product will get the information he wants; the furnaceman will be guided in the production of his pig irons to prepare for analysis ranges which are more closely standardized and have less of "freak" requirements made by inexperienced metallurgists; and the foundryman will not be bound by chemical requirements he knows will not work out well with his particular regional supplies of melting stock. It is intended to call attention to this work of the sub-committee on standard ranges of analysis of castings in a preamble to the pig iron specifications, so that the specifications themselves are not burdened with such data. It may be stated parenthetically that the specifications for pig iron, as promulgated by the society, are in reality only a guide to the systematic and modern ways of purchasing this material.

It will be noted that this is offered as "recommended practice" and not actual specifications.

The salient points in this long controversy were briefly and concisely discussed by Dr. Richard Moldenke in a "Note on a Scheme for the Study of the Physics of Cast Iron," published as an appendix to the A. S. T. M. tentative specifications and a discussion on the physics of cast iron by William R. Webster, for presentation at the February, 1923, meeting of the mining engineers. Dr. Moldenke's note is reproduced below:

In March, 1895, William R. Webster contributed a carefully prepared scheme for the study of the physics of cast iron to the American Institute of Mining Engineers at its Florida meeting. This summary of the interrelation of the chemical and physical characteristics of cast iron with the operations of daily foundry practice caused a wide discussion of the then little understood though universally used material. Mr. Webster has requested the author to bring the subject up to date, and while glad to comply, it must be said that with all the knowledge that has been gained in the quarter century that has passed since the subject was brought to the attention of the institute—and we now are pretty familiar with cast iron in all its aspects —there is practically nothing to change and little to add to the facts as given by Mr. Webster originally, and in the discussions.

The suggested lines for discussion and investigation as they would appear at the present time are as follows:

I. Relation between chemical composition and physical properties, such as fusibility, fluidity, set, contraction, chill, hardness, strength, specific gravity, etc.

II. Influence of variations in foundry practice upon chemical composition and physical properties, as in the following summary:

- *Mixture Characteristics:* Pig and scrap proportions, steel additions, charcoal or coke irons, "direct" blast furnace metal.
- *Metals' Characteristics:* Clean or with sand, rust, burnt scrap, shot, borings, salamanders and heavy section pieces.
- *Melting Characteristics:* Rational or poor charging and melting practice in cupola or furnace, normal hot iron or oxidized "lifeless" quick-setting metal. Duplexing in electric furnace for better super-heat, deoxidation and desulfurization.
- *Temperature Characteristics:* Pouring temperature and rate of cooling due to mold surface characteristics, whether green or dry sand, metal molds, use of chills, section of castings, refractory quality of mold, gating of molds.
- *Molecular Treatments:* Annealing, seasoning, rumbling, repetition, heating and cooling.

Effect on:
- Grain structure.
- Internal shrinkage, porosity.
- Blowholes.
- Hardness.
- Strength.
- Internal stress.
- Carbon condition.
- Changes in other contained elements.
- Effect on

The following bad characteristics in castings are sufficiently important to warrant special mention in separate paragraphs:

III. *Shrinkage* and *Segregation:* As specially affected by composition, oxidized metal through bad melting practice, cold metal, irrational gating methods, insufficient feeding opportunity, low ferrostatic pressure.

IV. *Blowholes:* As specially affected by oxidized ("burnt") metal in charges or through bad melting practice, cold iron, low ferrostatic pressure, wet mold surfaces, wet or insufficiently vented cores.

While the scheme for study as outlined in 1895 differs but little from the one above given, the conditions obtaining in foundry practice today are, nevertheless, vastly improved. Buying pig iron by its analysis is the rule everywhere and fracture is seldom an issue. The foundry foreman of today has no difficulty in calculating his mixtures chemically, and the compositions of the various types of castings are almost standardized. Melting practice has now been placed upon a scientific basis in the foundry, so that there is little excuse for heavy losses from inferior metal. There still remains, however, a critical study of the principles and practice connected with the rational gating of molds.

A discussion of every point included in the above scheme of study would assume the bulkiness of a book, and hence no attempt will be made in that direction. The summary of a life's work in the production of good

castings—necessarily interwoven with the chemical and physical characteristics of cast iron—is as follows:

1. Use the best materials suited to the production of the castings wanted.

2. Employ correct melting, molding and finishing process.

3. Gate the molds correctly, so that the good materials, properly manipulated, may be given the best chance possible to produce good work.

It was through the active work of the American Institute of Mining Engineers in the study of pig iron that the change was brought about from the purchase of pig iron by its fracture to its classification and purchase by its chemical composition. That work was taken up by the committee on cast iron of the American Society for Testing Materials, who brought into general use their specifications governing the grading and purchase of pig iron.

The present condition of the pig iron situation is about the same as the status of steel when the change was made from iron to the use of steel for structural purposes. At that time every engineer desired to have his name on his specifications. Since then the whole matter has been cleared up and we now have standard specifications which are in general use. These results were brought about by giving the producers and the consumers equal representation and vote on the committees preparing these specifications. This same plan can be followed to great advantage in pig iron. Under the present conditions the requirements of the founders sent to the blast furnace men are not uniform even when they are making the same grade and weight of castings and many requirements are "hair splitting," which entails unnecessary trouble to all parties. The natural solution of the present condition is to collect the requirements under which pig iron has been sold for each of the grades of castings, manufactured malleable iron, acid open-hearth steel, basic open-hearth steel, etc., the work to be done by a committee having an equal representation of blast furnace men, whom we term the producers, and the consumers who manufacture the finished product. The requirements to insure reliability of their finished product have already been put into use and need not be further considered.

If this course is followed out, then it would enable any blast furnace in the country to produce a much larger output on a given grade of pig iron than ever before, as the number of grades would be reduced and the hair-splitting requirements removed. In dull times this would enable the furnaces to stock up considerable of each grade of iron with much more certainty than under the present conditions.

New Methods of Preventing Corrosion of Steel

More Effective Protection from Putting Chromium Salt Solutions in Emulsions, Oil Paints and Concrete—Results of French Investigations

THERE is naturally great interest in methods that will prevent corrosion of iron and steel, and one of the foremost workers in this subject is the Swiss Professor B. Zschokke of the Federal Laboratory for Tests of Materials at Zurich, Switzerland. He contributes a long and interesting article to the *Revue de Metallurgie* for March.

After a short general introduction he gives the results of experiments regarding the passivity assumed by iron and steel when exposed to certain solutions. Attention has been drawn to this fact many times by various workers, and it is known, for instance, that solutions of chromic acid and its salts, of lime and carbonate of soda, etc., exercise, under certain conditions, an extremely effective action against rust. The reasons for this action are not yet known. They may not be always the same. In regard to solutions of arsenic acid or permanganate of potash the preservative action has been attributed to very thin, clear coatings of metallic arsenic or peroxide of manganese which cover the metal when the solutions are sufficiently strong. With other solutions, however, such as those of chromic acid or its salts, the surface of polished steel remains absolutely bright, even after months and years, and some other explanation must be sought.

In any case the formation of rust is in intimate connection with electrolytic action. Results are given of the intensity of electrolytic action produced by the contact of iron with pure water and aqueous solutions of certain salts. The differences of potential for the anti-rust solutions, such as 5 per cent bichromate of soda, 1 per cent chromate of potassium or 0.5 per cent chromic acid are insignificant and in a short time sink to zero. The results show that the anti-rust solutions prevent or at least notably reduce the electrolytic action which accompanies the process of rust formation. The results of these and a large series of other experiments allow the following remarks to be made:

1. Aqueous solutions of salts of chromic acid after reaching a certain concentration preserve iron from rust for an unlimited time without the protecting action of the solutions becoming enfeebled or exhausted.

2. The passivity contributed to iron by these solutions only lasts so long as the metal is immersed in them. If the solution is removed the protection disappears and when the same sample is placed in ordinary water it begins to rust in a short time.

3. The concentration limit of a solution at which it exerts its maximum protection is not a constant amount. The action of the solution depends considerably on the ratio between the total amount of solution and the surface of the metal. If the surface is increased, either more solution must be used or its strength increased.

4. The anti-rust solutions exert their protective action not only at ordinary temperatures but at higher temperatures, up to 100 deg. C. for example.

5. The addition of certain salts to these solutions, notably the chlorides of the alkalies and alkaline earths, and also to an extent not quite as great, the sulphates of these metals, reduce, paralyze or reverse the protective action of the chrome salts, while other salts such as, for example, the carbonates of the alkalies and lime reinforce their action.

6. The protecting action of the chromic acid salts is not exerted solely on all kinds of iron and steel but on other metals such as copper, tin, brass, bronze, etc., whether they are isolated or in metallic contact with iron. For instance, small samples riveted together have been immersed in a 2 per cent solution of bichromate of sodium and are as brightly polished today as at the start of the test.

7. The protective action of these chromic acid salts is not alone on the parts of the metal in direct contact with the liquid but extends for a certain distance to the neighboring parts.

New Solutions as Preventives

These remarks and conclusions furnish the base for several new products and processes which serve, in certain cases, to prevent rust more effectively than present methods. The simplest case is the use of aqueous solutions. Numerous experiments extending over six years have shown that a solution with only 0.1 to 0.2 per cent potassium or sodium chromate, rendered slightly alkaline with sodium carbonate, suffice in most cases to protect iron or steel from rust. The water must be pure, that is, distilled or condensed water, or ordinary soft water. Such additions can be made with advantage to boiler water, to the water in hot water heating systems or in automobile radiators if the latter are not of brass or bronze. Also to the liquids used as cutting compounds during the making of saws, milling cutters, etc.

These dilute solutions can also be used to preserve small polished articles of iron or steel. Finally, materials with large absorption power such as blotting paper, cotton wool, sawdust, etc., saturated with a

mixture of 70 per cent water, 30 per cent glycerine, 2 to 3 per cent potassium chromate and 2 per cent soda, furnish packing material for preserving steel articles for years against rust. The addition of glycerine, a hygroscopic material, is to ensure the packing materials remaining moist, which is an essential condition.

Emulsions as Protection Against Rust

Solutions cannot be used as protection for steel structures. For this purpose emulsions must be prepared with certain mineral, vegetable or animal greases or oils. Only certain greases form an emulsion that does not separate in time into two layers, but these will take up 50 per cent and even 100 per cent of their weight in aqueous solutions. In spite of this considerable addition they form ointments much more tenacious and viscous than the original greases. This brings about extremely great adherence to the metal, and allows thicker layers to be used, not only forming greater resistance to moisture and air, but also allowing more of the anti-rust solution to be brought in contact with the metal. In these cases solutions with 4 to 5 per cent potassium chromate are used. Numerous tests in the laboratory and with practical experience have shown the superiority of these emulsions over ordinary greases, and illustrations of tests are given in the French article. For metallic objects exposed to the sea air emulsions with milk of lime instead of chromium salts are used. Such emulsions as mentioned above, which can be made in any desired consistency, are destined to replace the ordinary greases such as vaseline. They serve to protect from rust any material placed on one side or in storage for some time, such as rifles, pieces of artillery, polished armanent, etc., placed in arsenals.

Chromate Salts in Oil Paints

Also in the domain of oil paints these agents inducing passivity can be used with advantage. Instead of covering the metal with a base coat of red lead a priming coat can be used composed of a special very oily clay mixed with an aqueous solution of 5 per cent potassium chromate. Such a coating dries in three to five hours and adheres very strongly to the metal. As a second coat of paint with a tar base can be used, and for a third coat a paint with a linseed oil base. The two last coats exercise mostly a mechanical action but the first coat a physical action. When moisture penetrates the two outer coats it meets the chrome salt, dissolves it and puts in action the properties that render the metal passive.

Chromium Compounds in Concrete

The final application is in the domain of reinforced concrete. Long experience has proved that, under certain conditions, the concrete preserves the steel it contains for a very long time. These conditions are as follows:

1. The concrete should be as free from porosity as possible.
2. It should not contain any substance which can attack the steel chemically (such as coal ashes, which often contain sulphur).
3. The covering of concrete over the steel should not be too thin.
4. In the course of years the concrete should not crack, neither under the weight that it carries nor by contraction.

In all cases where these four conditions are met the steel reinforcement is assured against rust for a long time. The principal constituent of the cement which brings this about is the free hydrate of lime which during the mixing of the concrete forms in large amounts by the decomposition of the trisilicate of calcium. The more porous or cracked the concrete is, the more easily air enters with its carbon-dioxide and changes the hydrate to carbonate, which has no protective influence. Unfortunately many reinforced concrete structures are porous and show quantities of more or less fine cracks, and there are many cases where the steel has greatly deteriorated. Two methods of using chrome salts can be followed. The steel can be covered with a semi-liquid mass composed of cement and a chrome solution, or the chrome salt can be added to the water used in mixing the concrete. Tests have shown that a considerable addition of a chrome salt to the concrete has no harmful action either on the setting or the crushing strength.

Chrome Salts in Cement Mortar

A somewhat similar case is the replacing of linseed oil paints with a cement mortar containing chrome salts. Practical experience has shown that even the best paints when constantly under water are much less effective in protective action than when exposed to air. The special cement coatings give better results and can be applied with a brush or a cement gun. One piece of construction carried out on this principle in 1917 consisted of a long steel conductor for a hydraulic plant, mounted in a gallery cut in the rock. The steel was carefully cleaned with a sand blast and coated with 2 to 3 mm. of cement mortar containing potassium bichromate. For the last coat ordinary cement mortar was used to avoid leaching of the chrome salts contained in the under layers. After complete hardening of the cement the surface was impregnated with a special grease. After five years the coating is still in splendid condition and it is confidently expected will last two to three times longer than any other coating used previously.

G. B. W.

Malleable Castings Production

WASHINGTON, Nov. 5.—The Department of Commerce announces statistics on the production of malleable castings manufactured for sale, by months. The returns include only those castings manufactured for sale as such and do not include those used in the plant or finished and sold as other products.

Figures are also shown comparatively for June, July, August, and September covering the operations of 103 identical plants for which reports were received each month.

Month	Plants reporting (number)	Total production (tons)	Total shipments (tons)	Orders booked (tons)	Monthly capacity of plants (tons)	Per cent of total capacity operated
May	95	64,726	62,806	52,898	91,174	71.0
June	105	65,168	64,608	42,087	96,240	67.7
July	108	57,881	60,102	41,723	98,241	58.9
August	112	68,069	65,405	39,830	103,068	66.0
September .	112	60,330	59,396	38,636	101,750	59.9

Comparative Summary for 103 Identical Plants

Month	Plants reporting (number)	Total production (tons)	Total shipments (tons)	Orders booked (tons)	Monthly capacity of plants (tons)	Per cent of total capacity operated
June	103	63,298	62,888	39,814	94,840	66.7
July	103	54,433	55,922	39,131	94,826	57.4
August	103	63,038	60,207	36,753	94,858	66.5
September .	103	56,024	54,378	35,452	93,565	59.9

New Books Received

The Prevention of Vibration and Noise. By Alec B. Eason. Pages 163, 5½ x 8½ in.; illustrated. Published by Henry Frowde and Hodder & Stoughton, Lancet Building, 1 Bedford Street, Strand, London, W. C. 2.

The Merchants' Association of New York, Year Book, 1923. Pages 394, 6¾ x 10 in.; illustrated. Published by the association, Woolworth Building, 233 Broadway, New York.

The Welding Encyclopedia. By L. B. Mackenzie and H. S. Card. Pages 437, 6 x 9 in.; illustrated. Published by the association, Woolworth Building, 233 Dearborn Street, Chicago. Price, $5.

Strength and Structure of Steel and Other Metals. By W. E. Dalby, F.R.S. Pages 176, 6 x 9¼ in.; illustrations 169. Published by Longmans, Green & Co., 55 Fifth Avenue, New York. Price, $6.

Journal of the Iron and Steel Institute. Vol. CVII. Edited by George C. Lloyd, Secretary. Pages 806, 5½ x 8½ in.; illustrated. Published by Spon & Chamberlain, 123 Liberty Street, New York.

Carnegie Scholarship Memoirs. Vol. XII. Edited by George C. Lloyd, Secretary Iron and Steel Institute. Pages 295, 5½ x 8½ in.; illustrated. Published by Spon & Chamberlain, 123 Liberty Street, New York.

Fire Protection in Steel Plants

Metal-Working Industries Such as Foundries and Machine Shops Have Hazards All Their Own—How Fire Is Prevented and Fought

BY JAMES M. WOLTZ

In the East Youngstown works we frequently receive 75 to 100 fire alarms a month; each calls from one to three companies into action. It is due to the ability of the firemen and the almost instant response to calls of small fires that we are saved serious conflagrations. Accumulations of oil and dirt in pits, wood lockers (where they still exist), wood piles, oil dipping and spraying tanks, oil-soaked floors, flashes from rolls, motors and trolley bars, hot steel set too close to buildings or in cars of wood contruction, and railroad ties are all serious fire hazards. Oil, benzol and other inflammable material sometimes spill and are set on fire by locomotive sparks, and infrequently there is a hot metal spill that is grief for every one concerned.

An accurate scale map of the plant and its structures is essential. Then a personal inspection of the nooks and corners of cellars, attics, pits and floors of every building should be made:—First, to see that the map is correct; second, to see what the fire hazards may be; third, to plan location of extinguishers, hydrants and hose racks or reels; fourth, to see that ample aisle space is provided *at all times*, to permit unimpeded use of the fire fighting equipment.

What the Maps Should Show

1.—Maps are helpful and a necessity only if accurate and up to date. When the organization is large and the executive offices miles away, the map is usually the only available source of information as to local conditions. It should show, or separate maps should show, water lines, whether high or low-pressure, sprinkler systems, valves, gates, drains, cutouts, pumps, hydrants and other hose connections, hose reels, risers, fire houses and special equipment. Fire extinguishers, whether hand or on wheels, with size and kind, should be spotted. Fire boxes and fire alarm lines should be shown also, and the various zones definitely and accurately indicated.

Survey of Fire Hazards

2.—A careful survey of each building, shack, shanty, pit, cellar, floor and garret is essential to get an idea of the fire hazards. Then an effort should be made to have obvious hazards cleaned up and methods changed or discontinued. Wiping rags, oily waste, greasy overalls and working clothes are hazards. Dust of any kind is explosive when properly mixed with air. Paper and old files have made many bad fires. Electrical equipment, wiring, switches and connections should be gone over with minute care. Storage and use of wood, coal, oils, gas, gasoline, benzine, benzol, zylol, etc., should be carefully checked and regulated. No open fires, lights, cigars, pipes or cigarettes should be permitted where gas, oil or vapor is used, stored or issued, in rooms or in close proximity to them, even in the open.

Steam and hot water pipes should be gone over to check against the chance of wood, paper or other inflammable material coming in contact with them. Heating apparatus, stoves, electric, coal or gas, should be examined and connections checked. Proper protection under and on all sides should be provided. Chemicals and compounds should be checked as to proper storage, containers and use. Paper or cardboard shades for lamps should not be permitted. All openings through which steam, hot air or stove pipes issue should be properly protected by fire resistant material. This is particularly important in wood structures. Waste disposal is important.

Locating Fire-Fighting Appliances

3.—Fire fighting apparatus must be distributed to advantage and where it is easy of access. A few moments lost at the inception of a fire may mean a serious conflagration. Fire doors should be checked daily to see that their automatic action is intact.

To care for fires at inaccessible places it is necessary to arrange special facilities. At each blast furnace we have a 2½-in. water line along the stairway leading to the top of the stoves and along the platforms, to which is attached a 100-ft. length of 1¼-in. rubber, wire-wrapped hose, with regular nozzle having 5/8-in. tip. On an alarm from Box 317, which indicates "Fire on Top of Furnaces," two firemen hasten to the boiler house and speed up the pump attached to the special risers, raising the pressure from the normal 110 lb. to 250. The hosemen and nozzlemen, along with the captain, rush up the flight of 118 steps and stretch the line, going anywhere around the top of the furnace. Fires at this point usually arise from lighted gas igniting the oil-soaked dust, as well as the oil on the cable and wheel of the hoist.

4.—Space should be provided to operate the fire fighting equipment. Do not permit material to be piled in front of, over or around the reels or hose houses. Aisles with ample passages to haul the carts and extinguishers mounted on wheels, and to transport them through the buildings and yards. should be provided and always kept clear of obstructions.

Organization

This depends entirely upon the plant, its size, product, location as to surrounding hazards, installed fire fighting equipment, hours operated and protection available from outside sources. Careful selection of a fire brigade head is most important, for upon him and his lieutenants and their efficiency may rest the future success or failure (by destruction from fire) of the plant. He must be a diplomat, as he will be in more or less constant contact with the operating end and, of course, will have intimate association with the entire force of employees. He should know what is safe to use on the classes of fires that he will have to handle, and be equally familiar with material that is difficult and dangerous to handle. His familiarity with the power lines, water supply, exits, fire escapes, etc., will as a matter of fact come with his work. At a fire his authority should be supreme in the threatened district, superseding all operating officials.

Companies may be composed of from 6 to 12 men: a foreman, or captain, lieutenant, one hydrantman, two to four nozzlemen and the rest hosemen. In some plants salvage corps, ladder truck companies and other special organizations may be required. There are 524 employees in our Youngstown district fire brigades.

Special Knowledge Important

Each battalion has its chief or commander. One company captain is usually designated as assistant. Companies are composed of workmen who can, as a rule, be best spared from ordinary operations, but should have mechanical men, such as electricians, pipe fitters, etc., as these men are, as a rule, scattered throughout the plant, know its electrical hazards, where power can be cut off from affected areas without disturbing others, know the water lines, gates and

*Youngstown Sheet & Tube Co. This is abstract of a paper read at Buffalo before the National Safety Council.

valves. It is highly important to know if it is safe to throw water on a power line or not.

Captains make reports of all responses to alarms and hold at least two drills each month. These are reported on forms, from which we make up our payroll. We pay $1 per month to each member who attends drills. In addition, he is paid 25c. for each alarm responded to upon call and if hose is laid is paid at the rate of 50c. per hr. while on fire duty. This is reported by the captains upon the regular forms. The Youngstown district pay will run about $10,000 per year.

Equipment and Its Care

Hose is tested at stated intervals. Each section is recorded on a card and repairs, inspection and station noted. It is taken from its station, water run through it, outside casing washed, drained and dried, twice yearly. All hose houses have in front a red lamp that is lighted at night. They have also an electric lamp inside that lights automatically when the doors are opened. Hose and all other fire equipment, including hydrants, should be used for fire purposes only. This should be a hard and fast rule.

We use 1-quart, 2-quart, 1-gal. and 10-gal. Pyrene extinguishers, 2½, 5, 20 and 40-gal. soda and acid and 2½ and 40-gal. fire foam extinguishers. These machines are distributed according to the requirements of the works:—the Pyrenes where there are electrical hazards; the soda and acids where the danger is greatest from wood fires, and the fire foam where the oil, light oil, and gas fires are the outstanding hazards. All power houses have 10-gal. tetrachloride units. These are operated by air pressure and have paid for themselves many times over. In winter the soda and acid and fire foam machines are kept in heated compartments.

Roofs are reached by steel ladders equipped with steel safety backs. Hose boxes with a full equipment of hose, wrenches, nozzles, ropes, axes, etc., are located on tops of buildings. Risers from ground to roof are placed at convenient points. This obviates the hauling of hose from the ground to building tops, and the attending labor and danger of this work, especially under cold and icy conditions. Railed cross-overs are provided between high and low bays.

Our triple combination 750-gal. American La France pumper responds to second alarms only, except in our housing plats. This machine carries hand searchlights and approved gas masks. The Gamewell fire alarm system, with 71 boxes, is divided into zones. Fire alarms sound only in the zone from which it is desired to call companies—that is, the zone from which the alarm is sent. If necessary to call additional companies, any one or all zones can be connected and as much man power or equipment summoned as needed. This has the additional advantage of calling to fires only the force really needed and not disturbing the rest of the employees.

Help from Locomotives

As our plants cover many miles of territory, much of it difficult to reach by wagon, road or with a truck, we have equipped each standard gage locomotive with 1½-in. rubber lined hose and nozzles, carried in the cab or on reels on the tanks. The water is supplied from the injector line. Nozzles are protected to prevent burns from heated water. We have found this to be well worth while, as our engines have extinguished many an incipient fire that would have developed into serious consequences had there been no ready fire fighting apparatus at hand. All of our locomotives are also equipped with stretcher, blanket and tourniquet.

This, in a general way, covers our own organization, as well as a number of other of the largest companies who responded to my request for information as to their work, organization and equipment.

IRON AND STEEL MOVEMENT

Distribution of August Exports from United States and from Great Britain—Import Sources

WASHINGTON, Nov. 5.—Nearly 45 per cent, or 72,762 tons, of the total iron and steel exports of the United States during August went into Canada, according to the iron and steel division, Department of Commerce.

Iron and Steel Exports from the United Kingdom and the United States in August

Countries of Destination	(Gross Tons) From United Kingdom	From United States	Countries of Destination	(Gross Tons) From United Kingdom	From United States	Countries of Destination	(Gross Tons) From United Kingdom	From United States
United Kingdom	.....	6,421	India and Ceylon	38,032	472	Dominican Republic	*	1,148
United States	26,614	.....	Japan	20,353	14,326	Guatemala	*	594
Canada	10,710	72,762	Kwantung	*	625	Honduras	*	401
Belgium	6,582	519	New Zealand	5,809	191	Mexico	*	8,300
Denmark	4,836	55	Philippine Islands	.....	2,813	Panama	*	733
France	6,678	105	Straits Settlements	1,883	350	Peru	*	2,523
Germany	32,874	250	British East and West Africa	3,185	71	Uruguay	*	477
Italy	3,055	238	British South Africa	14,849	1,049	Venezuela	*	2,059
Netherlands	5,362	508	Egypt and Palestine	3,442	130	Other South and Central American countries	1,629	1,531
Norway	1,720	379	Portuguese East Africa	921	143	All other countries	15,536	1,669
Portugal	2,182	21	British West Indies	700	1,215	Non-allocated	47,463	.....
Spain	3,873	1,277	Argentine	7,663	2,207	Total	323,877	163,010
Sweden	3,756	571	Brazil	3,131	4,925			
Switzerland	701	127	Chile	1,883	3,467			
Australia	42,028	2,039	Colombia	*	1,801			
China	6,022	2,345	Cuba	*	21,878			
Hongkong	405	285						

*Included under "other countries."

Principal Sources of United States Iron and Steel Imports

Countries of Origin	1923 July	August	Countries of Origin	1923 July	August
United Kingdom	25,164	17,792	Netherlands	67	449
Canada	10,608	8,263	Sweden	1,343	2,367
Belgium	5,434	4,621	British India	228	5,064
France	2,777	1,448	China	211	232
Germany	949	983	Cuba	3,132	3,095

Cuba was the next largest customer, with 21,878 tons, or 13½ per cent of the total, and Japan third, with 14,326 tons, or nearly 9 per cent. Shipments to Canada, England, Spain, Brazil, Mexico and Venezuela increased from the previous month; otherwise, with slight exceptions, there was a general falling off. The most marked decrease was that of Argentina, which took only 2200 tons, against 5300 tons in July and a monthly average of more than 7100 tons for the first half of 1923.

Total imports of iron and steel amounted to 45,432 gross tons, a figure which includes 14,564 tons of pig iron, 7334 tons of ferromanganese and ferrosilicon and 9900 tons of scrap. The important sources, together with the amounts for July and August, are given in the table.

In the table of exports comparison is had between shipments from the United States and shipments from Great Britain. Canada, Cuba, Mexico, Brazil and Chile took more American than British steel. Direct comparison is uncertain, however, as there is a large tonnage of British shipments not yet allocated, portions of which may ultimately be scattered all along the list.

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ESTABLISHED 1855

THE IRON AGE

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Treas.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 100 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Narrow Profit in Steel

ATTENTION is being directed in the steel trade to the fact that while the United States Steel Corporation's earnings in the third quarter have been regarded as satisfactory, they represent a narrow margin per ton. Especially after allowing for the increased manufacturing cost due to elimination of the 12-hr. day, there is room for little decline in prices, if profits are to be secured.

The Steel Corporation had a good operation during the third quarter, between 85 and 90 per cent of rated capacity. Capacity, as can easily be computed from the corporation's annual reports, is approximately 16,500,000 tons a year or 53,000 tons per working day, of steel products in the form in which they leave corporation control, this including a sprinkling of rods, billets and sheet bars with the regular rolled and finished products.

The quarter's shipments amounted to about 3,600,000 tons, which with earnings at $47,053,680 made about $13 per ton. The amount is reached after paying ordinary expenses, also taxes and interest on subsidiary company bonds, but it must provide depreciation and sinking funds, so that by no means does it mean real "profit" even though it be assumed that interest on money owed in the form of bonds ought to be paid out of "profits."

Furthermore, the computation showing $13 per ton does not involve any deduction for profits on products other than steel, such as cement, zinc, etc., or earnings of transportation facilities. It includes what was earned on such highly finished products as derricks, wheels and axles, brads, tin plate, railroad spikes, etc., not simply the ordinary commercial forms of rolled steel.

The expense of 12-hr. day elimination did not fall at all in July or August and it did not fall fully in September. That month, nevertheless, showed a decrease in earnings per ton attributable to that factor. It seems to be a fair estimate that with costs as they will now be, the third quarter earnings would have been reduced from $13 a ton to about $10.

This $10 would not be representative of profits for the Steel Corporation, since depreciation must come out of it, and since it was not earned wholly on the ordinary rolled steel products, the current prices for which are being discussed. In addition, it is generally admitted that on account of various special conditions the Steel Corporation has an "advantage" over the better positioned of the independent steel companies of, say, $2 to $3 a ton.

In the matter of profits, another point is to be considered, the rate at which a manufacturing organization should be required to operate so as to be entitled to make money. The third quarter earnings were with an operation between 85 and 90 per cent. Does the natural course of business warrant an expectation that the average manufacturer can have such an operation year by year? With all the predictions of pent-up demand for steel to be released after the war, the Steel Corporation's average operation in the four post-war years of 1919 to 1922 inclusive, was only between 70 and 71 per cent. At a 70 per cent operation, costs will be higher than at an 85 per cent operation, reducing profits per ton, while total profits will be correspondingly reduced.

As to present prices, shipments in the third quarter were in some cases below the market, being against old orders or contracts, but this tonnage was confined almost entirely to bars, shapes and plates. It is difficult to argue for any lower prices for steel, but if argument is attempted, there should be a distinction as to various products.

GARET GARRETT was once a competent financial editor on the staff of a New York daily and consequently when he joined the ranks of the novelists he was able to choose a subject and write of it knowingly, which many of them can not do. His first book, "The Driver," was not only dramatic but also was a sound treatise on economics. His new book "The Cinder Buggy," just published, is an epic of steel. Although we might be a little critical of his technology, it is good enough. His economic sense is unexceptionable. He tells of the growth of steel-making at Pittsburgh, how the managers conceived it, imagined it, planned it; and how the engineers tooled it. "There was, of course, labor. But labor no more invents the tools that are the means of economic conquests than soldiers invent the

weapons of war, and has generally less understanding of ends than soldiers have of the strategy." These sentences are almost a monograph on economics in themselves.

Mobilizing Great Industries

THE recent visit of members of the American Iron and Steel Institute to the Aberdeen Proving Ground served to recall vividly, even to those who did not go to France during the World War, the horrors of that conflict and to make more ardent the hope that there will never be another one like it, but at the same time the cost of unpreparedness was impressively presented. Taken in connection with the statement of Assistant Secretary of War Davis in regard to the efforts that the War Department is making to prepare industries for mobilization, the trip was one that should have important influence in obtaining hearty cooperation of iron and steel manufacturers in promoting reasonable preparedness.

In a recent extended review by General Pershing of Grosvenor Clarkson's admirable book, "Industrial America in the World War," is this striking paragraph:

> I would that every citizen could know and appreciate even a tithe of the difficulties that were overcome by our efforts on both sides of the Atlantic. No longer would appeals for reasonable foresight in both industrial and military preparedness fall upon deaf ears. No longer would a false economic policy deprive us of the means of doing what common sense and ordinary prudence dictate as necessary in times of peace if we are to maintain our place in a world torn by passion and prejudice and still in the throes of suffering and disorder.

General Pershing then speaks of some of the mistakes in preparing for and carrying on the World War and shows that there is no practicable way in which to prepare adequately and at the same time economically *after* the emergency occurs, because there must be foresight, anticipation and preparation in peace for all eventualities.

Commenting on General Pershing's review, Mr. Clarkson points out that the Council of National Defense, created by Congress in 1916 to study in peace time industrial problems of defense and wrought by the emergency of 1917 into an active war body, is still upon the statute books, although it lapsed into inactivity two years and a half after the armistice because Congress would not appropriate money to pay its expenses.

Congress originally provided that the council should have an advisory body of seven civilians. Its members rendered highly important service in the early months of the war when there was no other industrial war machine. Mr. Clarkson says that, with the council, the advisory board could be called into action whenever Congress provides money. If, however, the old plan is not followed, Mr. Clarkson believes an official, peacetime skeleton organization should be formed, headed by one man having power to formulate policies and initiate methods. "That man," says Mr. Clarkson, "should be an outstanding industrialist who won his knowledge at the great industrial drama centered in Washington in 1917-18, because, as a matter of common sense, industrial problems, for war or peace, should be solved by those industrially trained or those who went through the furnace along the Potomac front during our part in the World War."

Mr. Clarkson praises the work that is being done by Assistant Secretary of War Davis, and says it is taking a long stride forward, but he believes it is not enough, because "knowledge, mapped, charted and classified, of war's terrible demands on industry must be not only technically and mathematically sound; it must be practical, resilient, dynamic to the last ounce called for by successful administration."

Having obtained the cooperation of manufacturers, the efforts of the War Department, aided by constructive criticism of such men as Pershing and Clarkson, would make a powerful appeal for suitable action by Congress.

Economic Missteps in Europe

A RESULT of the war was the division of two of the great countries of Europe into many little countries. If Germany be disrupted, the process will go further. Self-determination may be commendable politically, but how little thought has been given to its opposition to the economic principle of the international division of labor. That principle may be expressed as the desirability of letting every country produce the things that it can most advantageously and exchange its goods freely with all other countries. Tariff barriers are set up in opposition to it, theoretically to help make each country as nearly self-supporting as possible. Not only does every country want to supply its own requirements, but also it wants to be independent in time of war. The more national units there are, therefore, the more duplication of plant, the less advantageous exploitation of resources and application of work, the less efficiency on the whole.

There is in this a direct counteraction of the principle of the international division of labor. This is an economic setback that is quite apart from the serious misstep of shortening working hours at the very time when more work than ever was the one panacea for crippled Europe.

THE administration of the Sherman act and supplemental laws by the Department of Justice and the Federal Trade Commission is one of the vagaries of commercial life in the United States. The copper producers are constantly under suspicion and have to lean over backward in their rectitude. They are subjected to prolonged and costly investigations at times when anyone of market sense from a few days observation of the behavior of the market could pronounce positively that there was no such thing as collusion among them. Indeed, anyone who knows his way around is aware that copper selling is something of fierce competition. The Joplin zinc producers, on the other hand, openly get together and agree upon plans for curtailment of production for the avowed

purpose of raising the price of ore and Washington is in no way concerned. It may be that the Sherman law runs in what is broadly described as Wall Street, and not in the rest of the country. There are other laws that appear to have limited geographical and industrial application. For instance, there are ocular evidences, through the ownership and operation of automobiles and such things, that the income tax laws do not apply to all of the people of the country, but exempt some millions, especially among wage earners who escape reporting by their employers.

Placing the Worker

THE placing of workers in the individual industrial plant so that each may have, as nearly as possible, the task best suited to his skill, strength, adaptability, temperament and otherwise, has been given increasing attention in recent years. Many firms have established systems in the attempt to accomplish this result, some of them very simple systems, others, especially where quantity production is carried on and manufacturing operations are highly standardized, more complex and along what might be called scientific lines. This general phase of management has now been subjected to sufficient test to demonstrate that when wisely conducted, with full coordination of effort between heads of departments and those having in hand the specialized conduct of the system, it gives results which substantially benefit both owners and employees.

One large plant, a wire mill manufacturing many specialties and employing a wide variety of labor, skilled and unskilled, has evolved what is held to be a very effective system, which imposes no great amount of additional responsibility and labor upon the employment office. In the opinion of the management it has served to increase output and at the same time to raise the shop morale.

A man applies for work, is accepted and is turned over to the foreman of some department who has asked for additional help. He is put to work and given the chance to make good. But he may dislike the task assigned him, may realize that it is beyond his strength or not along lines of previous training. Or he may find the environment distasteful. He may then be sent back to the employment office for placement in another job or department. Instances are not uncommon of repeated trials before the right niche is found.

The managing officers of the plant frankly state that their system would be valueless, probably disorganizing in its influence, if they did not have full cooperation between the employment office and the foremen. The personal factor they feel to be all-important. The wrong employment manager could make a great deal of trouble, and so, too, could foremen who were out of sympathy with the plan. When turn-over is only normally active or when the force is not being increased rapidly, the foreman is consulted before a newly hired man is turned over to him, or when a transfer is made to him from some other department. Then, too, when a vacancy occurs, a foreman often recommends his own man, who then goes to the employment office and is hired, with his job already selected. Contrary to common understanding, that heads of departments prefer to hire their own men, without the intervention of an employment office, under this particular system they are fully satisfied with the results attained.

The other extreme of practice, in the sense that scientific tests are employed, is found in the system adopted by the West Lynn works of the General Electric Co. Applicants for work are required to do certain things. With girls to be employed on special manufacturing processes, tests prove quickly whether or not they are deft and nimble with their hands, and whether they are intelligent and adaptable. Workers already employed also receive the tests, which practice has caused many a worth-while transfer. In fact, all employees are invited to take whatever tests they may desire in searching out their own fitness.

These are examples of methods employed in placing workers, each presumed to be adapted to the plant in which it is operating. But owners who have become interested in this side of industrial management realize that the science of fitting men and women into industry is still in its infancy. There is need for the records of those who have experiences of even special as well as broad application.

State Pensions for the Aged

THE subject of old-age pensions is occupying a good deal of the attention of the social reformers, and has been for several years. It chances not to be an industrial question. Industry is interested only as all members of the community are interested, for the laws already enacted in certain States and urged for others make it apply to all persons, whatever their employment may have been, who because of advancing years, with 65 years as the usual limit, have ceased to be self-supporting owing to misfortune or lack of habits of thrift. They must be dependent upon some one, either family or friends or the State. The American movement follows the adoption of the plan in Great Britain.

Paternalism of this character appeals to many people whose vision fails to see more than one side of the question. They see a burden placed upon the children and other relatives of the old people, and perhaps the poorhouse. They fail to see, as a speaker at one of the great industrial association meetings stated the other day, that "State-help kills self-help." Old men and women would be given money which their more fortunate or wiser fellow citizens must furnish in the form of taxes. To accept such a pension constitutes a form of pauperism. Considered from an economic standpoint, an additional burden is placed upon industry in the form of increased taxes.

The strength of the demand for old-age pensions in some form or other is not to be underestimated. This last year old-age pension acts were passed in Pennsylvania, Montana and Nevada, and failed of passage by a very narrow

margin in Illinois. Alaska has extended a similar law enacted in 1915. The subject is under examination by State authorities in Massachusetts and Indiana. Arizona, in 1915, by popular referendum, adopted a scheme of old-age pensions which, however, was held to be unconstitutional because as part of it all almshouses were ordered closed, which was in violation of a provision of the State constitution.

Old-age pensions in industry are a very different matter indeed. They surely have an economic value. There is nothing about the acceptance of such an award to strike at a man's self-respect. His labor and loyalty and long service have earned it for him. It goes alike to the thrifty and the indigent. To be pensioned by an institution like the United States Steel Corporation is a badge of honor.

JAPANESE BUYING ACTIVE

Government Tender on Sheets and Nails to Close Soon—Private Inquiries for Sheets, Nails, Wire and Pipe

NEW YORK, Nov. 5.—Trade with Japan continues quite active with prospect of even heavier buying in the future. Inquiry and purchase on galvanized sheets is diminishing as the galvanizing plants of Japan are able to meet the present heavy demand, but there has been a proportionate increase in the number and size of inquiries for light gage black sheets. Any interest now shown by Japanese buyers in the galvanized product would doubtless be for prompt delivery, as the galvanizing plants are reported heavily booked for the next three to four months. It is estimated by leading Japanese import and export houses in New York that total purchases of sheets, black and galvanized, in the past few weeks has been close to 40,000 tons. Some of this tonnage has been for warehouses in Osaka and Kobe and part for the galvanizing plants. This is exclusive of the pending purchase by the Japanese government, which it is expected, will be awarded this week. This tonnage, which has been current for several weeks has been reduced on the final tender to about 20,000 tons of sheets and about 7000 metric tons of wire nails. Final decision on the method of purchase of this and future tonnages has not yet been made, but it is reported from reliable sources that buying will probably be direct from the mill.

Purchasing of gas pipe has been heavy. Most of the inquiries have been for British specifications, although it is reported that the Tokio Gas Co., on its recent purchase of about 800 tons of pipe accepted American gage. Quoting prices that are slightly lower than the American export quotation, Canadian mills have booked some fair tonnages of wire rods and wire nails. A few lots of structural material and bars are reported to have been placed with Beigian makers, who are quoting as low as $44 per ton base, c. i. f. Japan, on bars, compared with about $60 per ton base, c. i. f. Japan, by American mills.

The major portion of future buying of structural steel, it is believed, will be from mills in the United States, American sections having withstood the earthquake well, or from British makers, whose reputation for quality is also considered excellent by the Japanese.

Current inquiries, beside those for black sheets of Nos. 28, 30 and 31 gage, include some small tonnages of No. 8 gage galvanized wire, probably for fencing, a number of inquiries for wire nails, ranging from 1000 kegs to 3000 and 4000 kegs, gas pipe, bars, some machine tools, etc. Prospect of much of this business being placed with mills in the United States is believed good by most exporters, who report keen competition for orders and considerably improved delivery, November-December shipment being offered on many products.

Much of the recent improvement in trade with China, is explained by exporters to the Far East less as an actual improvement of Chinese conditions and more as a result of the closer approach of American quotations to Chinese price ideas. Exporters to China report that after several months of futile cabling of prices on sheet bar crop ends, plate cuttings and second hand material, the American prices have finally reached a point where some business can be transacted with Chinese merchants. There has also been some fairly good business in galvanized sheets, pipe and tin plate.

Tenders on a precision lathe, including all necessary tools and accessories, have been invited by the chief storekeeper of the Victorian Railways Commission, Melbourne, Australia. The lathe is to have an 18-in. swing with 54-in. between centers. The Bureau of Foreign and Domestic Commerce has the specifications, which are available at the district offices in New York, Boston, and Cincinnati. The department will put American builders in touch with Australian dealers willing to represent them. Bids close Dec. 19.

Kotera Shoten, importers and exporters of metals, 40 Minami-watayamachi, Minamaku, Osaka, Japan, is desirous of making connections in the United States with dealers in brass and copper scrap.

Bids for Battleships Accepted by the Navy Department

WASHINGTON, Nov. 6.—The Navy Department has accepted the following bids for battleships afloat, proposals for which were opened at the department Nov. 1:

American Iron & Metal Co., Oakland, Calif., for the Georgia, $58,666; for the Rhode Island, $47,666. Both vessels now at the Mare Island Navy Yard, Calif.

Walter W. Johnson, San Francisco, for the Connecticut, $42,750, now at the Puget Sound Navy Yard, Washington.

The Boston Iron & Metal Co., Baltimore, for the New Hampshire, $66,560; for the Louisiana, $66,560; both vessels now at the Philadelphia Navy Yard.

Vessels on the ways at Navy yards, bids for which were submitted in the sale of Oct. 25, have been awarded as follows:

Battleship North Carolina, at Norfolk, to N. Block & Co., Norfolk, Va., at their bid on "as is, where is" basis, $42,365.

Battleships Indiana and South Dakota, at New York, to the Steel Scrap Co., Philadelphia, at its bid on a tonnage basis, of $9.51 per gross ton, cut to shipping sizes, f.o.b. car; estimated total for Indiana, $92,969.76; for South Dakota, $103,107.42.

Battle Cruisers United States and Constitution, at Philadelphia, to Steel Scrap Co., Philadelphia, at its bid on a tonnage basis, of $13.26 per gross ton, cut to shipping sizes, f.o.b. cars; estimated total for the United States, $84,996.60; for the Constitution, $92,024.40.

Dr. Siegfried Werner, president of the German Foundrymen's Association, will deliver an address on the Schuermann hot blast cupola before the Chicago Foundrymen's Club, at the City Club, Chicago, Saturday evening, Nov. 10. Dr. Werner holds the patents on this design of cupola and is in this country for the purpose of visiting the first American installation at the 445 North Sacramento Boulevard, Chicago, plant of the Griffin Wheel Co. Those desiring to see the cupola in operation will have an opportunity between 9 a. m. and 2 p. m., Nov. 10.

By sending a piece of German currency, such as a 100,000 mark note, to each of the users and potential users of its flexible tools, the Stow Mfg. Co., Binghamton, N. Y., is emphasizing that the cheap tool in the shop is depreciating just as the mark and by inference account should be taken of equipment that might well be renewed.

OCTOBER IRON OUTPUT

Decline from September 2598 Tons Per Day—Rate Lowest of the Year

Eighteen Furnaces Down or Banked and Eight Blown In—Net Loss of Ten

October's output of the blast furnaces revealed a further decline, but it was by no means as large as in August and September. According to statistics, the loss in daily rate of production in October was only 2598 tons per day compared with 7090 tons and 7382 tons per day in September and August respectively. The net loss of 10 furnaces was also less than in the past two months, September's loss having been 15 and August's 28.

Production of coke and anthracite pig iron for the 31 days in October amounted to 3,149,158 gross tons, or 101,586 tons per day, as compared with 3,125,512 tons, or 104,184 tons per day in September, a 30-day month. The October daily rate was the lowest for the year, although the total showed an increase over September, due to the extra day for operating. There were 18 furnaces blown out or banked and 8 blown in, a net loss of 10.

The total number of furnaces in blast on Nov. 1 was 245, as compared with 255 on Oct. 1. On July 1 there were 323 furnaces in blast, the largest this year. The capacity of the 245 furnaces in blast Nov. 1 is estimated at 99,030 tons per day, as compared with 102,100 tons per day for the 255 furnaces operating on Oct. 1.

Production of ferromanganese continues heavy at 20,015 for October. The largest spiegeleisen output of the year was the 15,931 tons made in October.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from October, 1922, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
October, 1922	66,060	19,032	85,092
November	72,177	22,813	94,990
December	75,179	24,398	99,577
January, 1923	79,991	24,190	104,181
February	80,684	26,251	106,935
March	86,881	26,792	113,673
April	90,145	28,179	118,324
May	96,029	28,735	124,764
June	90,907	31,641	122,548
July	88,798	29,858	118,656
August	86,479	24,795	111,274
September	78,799	25,385	104,184
October	77,355	24,231	101,586

The figures for daily average production, beginning with January, 1917, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921	1922	1923
Jan.	101,643	77,799	106,526	97,264	77,945	53,063	104,181
Feb.	94,473	82,835	105,006	102,720	69,187	58,214	106,935
Mar.	104,882	103,648	99,685	108,900	51,468	65,675	113,673
Apr.	111,165	109,607	82,697	91,327	39,768	69,070	118,324
May	110,238	111,175	68,002	96,312	39,394	74,409	124,764
June	109,002	110,793	70,495	101,451	35,494	78,701	122,280
July	107,820	110,354	78,340	98,931	27,889	77,592	118,656
Aug.	104,772	109,341	88,496	101,529	30,780	58,586	111,274
Sept.	104,465	113,942	82,932	104,314	32,850	67,791	104,184
Oct.	106,550	112,482	50,111	106,212	40,215	85,092	101,586
Nov.	106,859	111,802	79,745	97,830	47,183	94,990	.....
Dec.	92,997	110,762	84,944	87,222	53,196	99,577	.....
Year	104,619	105,496	83,789	99,492	45,325	73,645	.....

Among the furnaces blown in during October were the following: No. 1 furnace of the New Jersey Zinc Co. in the Lehigh Valley; the Robesonia furnace in the Lebanon Valley; one Alliquippa furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Covington furnace of the Low Moor Iron Co. in Virginia; the Norton furnace in Kentucky; the Anna furnace in the Mahoning Valley; the Alabama City furnace of the Gulf States Steel Co. in Alabama and one Allen's Creek (Wrigley) furnace of the Bon Air Coal & Iron Co. in Tennessee.

Among the furnaces blown out or banked during October were the following: C and E furnaces at the Lackawanna plant of the Bethlehem Steel Co. in the Buffalo district and No. 2 furnace of the Northern Iron Co. in New York; one Lebanon furnace of the Bethlehem Steel Co. in the Lebanon Valley; No. 2 furnace of the American Steel & Wire Co., one Edgar Thomson furnace of the Carnegie Steel Co. and two Eliza furnaces and the Soho furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Claire furnace in the Shenango Valley; one Johnstown furnace at the Cambria plant of the Bethlehem Steel Corporation in western Pennsylvania; one Low Moor furnace and the Goshen furnace in Virginia; one LaBelle (or Steubenville) furnace of the Wheeling Steel Corporation in the Wheeling district; No. 1 Brier Hill furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley; the Hamilton (Hanging Rock) furnace in southern Ohio; and the Thomas furnace of the Thomas Iron Co. in Wisconsin.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for October and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	Oct. (31 days)	Sept. (30 days)	Aug. (31 days)	July (31 days)
New York	219,357	208,737	246,347	265,406
New Jersey	19,473	18,293	19,449	18,920
Lehigh Valley	81,614	73,945	79,529	90,231
Schuylkill Valley	91,457	88,699	108,448	116,428
Lower Susquehanna and Lebanon Valleys	60,568	56,531	56,884	74,645
Pittsburgh district	653,970	659,963	713,314	758,159
Shenango Valley	117,658	127,781	117,133	142,419
Western Pa.	157,649	157,960	193,611	205,059
Maryland, Virginia and Kentucky	60,278	55,581	81,826	91,443
Wheeling district	141,593	147,771	159,418	155,324
Mahoning Valley	279,334	286,558	338,466	366,681
Central and Northern Ohio	282,009	273,885	287,641	286,021
Southern Ohio	36,033	37,416	46,779	72,120
Illinois and Indiana	595,457	587,323	631,225	643,043
Mich., Minn., Mo., Wis. and Colo.	117,128	113,460	121,172	139,330
Alabama	213,105	213,083	230,468	236,049
Tennessee	21,427	18,526	17,783	16,056
Total	3,149,158	3,125,512	3,449,493	3,673,334

Capacities in Blast Nov. 1

The following table shows the number of furnaces in blast Nov. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Oct. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Nov. 1 In Blast	Nov. 1 Capacity per Day	Oct. 1 In Blast	Oct. 1 Capacity per Day
New York:					
Buffalo	21	15	6,140	16	6,620
Ferromanganese	1	0	.....	1	100
Other New York	6	3	400	3	735
New Jersey	4	2	625	2	610
Pennsylvania:					
Lehigh Valley	16	6	2,430	6	2,365
Ferromanganese	2	2	210	1	100
Schuylkill Valley	15	9	2,750	9	2,625
Lower Susquehanna	9	5	1,525	5	1,550
Ferromanganese	1	1	65	1	65
Lebanon Valley	6	1	115	1	185
Ferromanganese	2	1	85	1	80
Pittsburgh district	55	43	19,950	47	21,370
Ferro and Spiegel	4	3	485	3	340
Shenango Valley	19	9	3,760	10	3,770
Western Pennsylvania	23	13	4,880	14	4,915
Ferro and Spiegel	2	2	300	2	275
Maryland	5	3	960	3	1,280
Ferromanganese	1	1	100	1	90
Wheeling district	11	10	4,500	11	4,925
Ohio:					
Mahoning Valley	28	19	9,000	19	9,200
Central and Northern	26	18	9,000	18	8,900
Southern	16	3	1,030	4	1,175
Illinois and Indiana	42	35	18,950	35	18,900
Mich., Wis. and Minn.	12	8	3,295	9	3,400
Colorado and Missouri	6	1	410	1	335
The South:					
Virginia	18	4	700	5	645
Kentucky	7	2	400	1	190
Alabama	39	22	6,965	21	6,740
Ferromanganese	3	0	.....	0	.....
Tenn., Ga. and Texas	16	5	600	5	615
Total	418	245	99,030	255	102,100

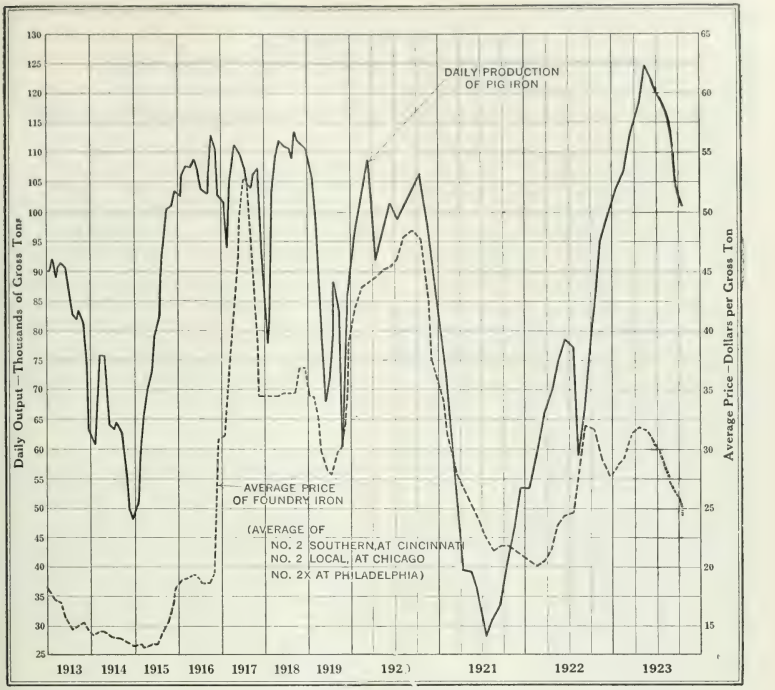


Diagram of Pig Iron Production and Price

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These

Production of Steel Companies—Gross Tons

	Total Production		Spiegeleisen and Ferromanganese			
	1922	1923	1922 Fe-Mn	1922 Spiegel	1923 Fe-Mn	1923 Spiegel
Jan.	1,306,045	2,479,727	6,874	1,230	19,358	12,056
Feb.	1,311,170	2,259,154	3,610	4,930	21,282	3,657
Mar.	1,629,982	2,724,305	11,600	2,095	20,730	13,832
Apr.	1,707,902	2,704,360	14,998	4,211	20,808	7,440
May	1,879,180	2,976,892	15,422	4,902	19,568	9,533
June	1,876,033	2,727,208	18,273	4,817	19,717	18,289
6 mos.	9,710,312	15,871,646	70,787	22,185	121,564	64,807
July	1,931,138	2,752,738	18,873	7,176	26,493	12,876
Aug.	1,415,832	2,680,851	11,402	7,925	22,045	5,586
Sept.	1,615,696	2,363,967	10,681	4,235	23,206	4,478
Oct.	2,047,873	2,394,922	9,193	12,283	20,015	15,931
Nov.	2,165,295	.....	13,232	4,192	.....	.....
Dec.	2,330,545	.....	17,007	10,691	.....	.....
Year	21,216,691	.....	151,175	68,587	.....	.....
10 mos.	.....	26,064,124	.....	.....	213,323	103,673

last, while stated separately, are also included in the columns of "total production."

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1919—Gross Tons

	1919	1920	1921	1922	1923
Jan.	3,302,260	3,015,181	2,416,292	1,644,951	3,229,604
Feb.	2,940,168	2,978,879	1,937,267	1,629,991	2,994,127
Mar.	3,090,243	3,375,907	1,595,522	2,035,320	3,523,868
Apr.	2,478,218	2,739,797	1,193,041	2,072,114	3,549,736
May	2,108,056	2,985,682	1,221,221	2,206,678	3,867,694
June	2,114,863	3,043,540	1,064,833	2,361,028	3,676,445
½ year.	16,033,808	18,138,986	9,428,166	12,050,683	20,841,534
July	2,428,541	3,067,043	864,555	2,405,365	3,678,334
Aug.	2,743,388	3,147,402	954,193	1,816,170	3,449,493
Sept.	2,487,965	3,129,323	985,529	2,033,720	3,125,512
Oct.	1,863,558	3,293,597	1,246,676	2,637,844	3,149,158
Nov.	2,392,350	2,934,908	1,415,481	2,849,703	.....
Dec.	2,633,268	2,703,855	1,469,086	3,086,898	.....
Year*	30,582,878	36,414,114	16,543,686	26,880,383	.....
10 mos.	.....	.....	.....	.....	34,244,031

*These totals do not include charcoal pig iron. The 1922 production of this iron was 224,731 tons.

Three new correspondence courses in hydraulic engineering, intended to meet needs of mechanical, civil, municipal and water works engineers, have been instituted by the Extension Division, University of Wisconsin. The first course deals with pressures, the second with flow, and the third with description, theory and testing of various types of hydraulic motors and pumps.

Iron and Steel Markets

SLOWING DOWN

Shipments Dropping, But Little Price Weakness

Basic Pig Iron Lower—Promising Railroad Business

Steel production has further slowed down, but the closing of the gap between shipments and bookings has had little effect on prices. Buyers are trying for price reductions on current needs, but producers see no promise of expanding operations by taking the price route. Business is largely for early delivery and its volume proves that consumption rather than restocking is a fact.

The attitude of the seller is shown by the opening of books by the American Sheet & Tin Plate Co. for tin plate and sheets for the first quarter of 1924 at the company's current prices. These include 3.85c. for black sheets and 5c. for galvanized sheets. No large buying response appears yet to have been made, but the move, followed by leading independents, is a notable indication of the disregard of the large makers of price cutting uncovered here and there, though 3.75c. has been general enough in black sheets to be a market price and 4.90c. is not uncommon for the galvanized product.

Prospective railroad purchases, known to be large, are being held back in part through concern over adverse turns which railroad legislation may take. These as one of the sources of demand of the early future are being augmented by some increased general buying interest respecting the first quarter.

The ordering of 1000 hopper car bodies by the Baltimore & Ohio and inquiries for 2000 gondolas by the Chesapeake & Ohio and for 1750 automobile cars and probably for 250 gondolas by the Wabash are definite signs of the expected renewal of railroad car buying. More than 200 locomotives are being figured on, of which 60 are for the Union Pacific.

The Nickel Plate has distributed 18,000 tons of rails and the Monon has bought 4000 tons. The Southern Railway is inquiring for 35,000 tons.

Pig iron production fell off less than 2½ per cent from September. Complete returns show 3,149,158 tons for the 31 days of October, or 101,586 tons per day, against 3,125,512 tons in September, or 104,184 tons per day. While the October rate is the lowest for the year, it is higher than any month in 1921 or 1922.

Eighteen furnaces were blown out or banked and 8 were blown in, 6 of which were merchant stacks. The net loss of 10 furnaces last month compares with 28 in August and 15 in September. The 245 furnaces in blast Nov. 1 represent a daily capacity of about 99,030 tons against about 102,100 tons per day for the 255 furnaces in blast Oct. 1.

More interest in pig iron is being shown, especially in Chicago, but sales are not for large tonnages and lower prices have been recorded at Cleveland, where competition with Buffalo furnaces is keen, and at Pittsburgh. In eastern Pennsylvania production has been heavily decreased. A contract made by an Ohio furnace for coke at about $3.50 per ton indicates the possibility of a considerable reduction in the cost of manufacturing pig iron.

The unusual building activity for this time of year is shown by structural steel awards of more than 19,000 tons, while new projects, mostly in New York, total close to 40,000 tons. Of these 18,000 tons is for a new telephone building in New York. Revised plans for the Ford steel plant at Detroit, not included in the week's inquiries, call for 26,000 tons.

A 3c. base for cold finished steel bars has become general and 2.15c. has reappeared in light rails rolled from billets, while for hot rolled strips a base price above 3c. refers usually to small orders. On hoops and bands 3c. is more common.

The weakness in sheets is in contrast with the strength of semi-finished steel. An offer to buy 3000 tons of sheet bars at $40 was ineffectual. Of 120 sheet and jobbing mills in the Mahoning Valley, 63 are scheduled for operation, the lowest production percentage in 18 months.

Save for a change in sheets in July, THE IRON AGE finished steel composite price stands for six months at 2.775c. per lb.

Basic iron having dropped further, THE IRON AGE pig iron composite price has gone to $22.02 from $22.27 last week, being now nearly $9 below the high level of early April.

Pittsburgh

More Inquiry, But Little, if Any, Increase in Orders

PITTSBURGH, Nov. 6.—Sentiment in the steel trade here remains fairly hopeful, but it still appears to be based more upon prospective than actual business. The general inquiry is heavier, but it is doubtful whether orders are any larger than they have been in recent weeks. Buyers still cling largely to the policy of covering their known requirements and are letting their stocks run down. There is no idea that prices are going to be higher right away and while expectations long entertained of the lower prices have been realized only in part, the general feeling among consumers is that nothing is to be lost by "sailing close to the wind" in the matter of purchases.

The various units of the Steel Corporation still are enjoying a good rate of operation, but the lack of forward buying is beginning to tell on the activities of the independents. In the Youngstown district there has been a clear slowing, particularly at the sheet mills, and locally the effort to maintain economical operations has resulted in some additions to stock. The outlook is for further curtailment among the independent companies over the remainder of the year. Chief reliance for improved business is placed upon the railroads, but so far as local mills are concerned,

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 6, 1923	Oct. 30, 1923	Oct. 9, 1923	Nov. 7, 1922
No. 2X, Philadelphia†	$22.64	$22.64	$24.76	$31.14
No. 2, Valley furnace†	22.50	22.50	24.00	29.00
No. 2, Southern, Cin'ti†..	23.55	23.55	25.05	29.05
No. 2, Birmingham, Ala.†	19.50	19.50	21.00	25.00
No. 2 foundry, Chicago*..	24.00	24.00	25.00	30.00
Basic, del'd, eastern Pa..	23.00	23.00	24.50	28.14
Basic, Valley furnace....	*22.00*	22.50	24.00	29.00
Valley Bessemer, del. P'gh.	*26.26*	26.76	27.26	34.27
Malleable, Chicago*	24.00	24.00	25.00	30.00
Malleable, Valley.....	22.00	22.00	24.00	30.00
Gray forge, Pittsburgh...	*23.76*	24.26	25.26	30.77
L. S. charcoal, Chicago..	29.15	29.15	30.04	36.15
Ferromanganese furnace..	110.00	110.00	110.00	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill..	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh..	40.00	40.00	40.00	38.00
O.-h. billets, Pittsburgh..	40.00	40.00	40.00	38.00
O.-h. sheet bars, P'gh....	42.50	42.50	42.50	38.00
Forging billets, base, P'gh.	*45.00*	47.50	47.50	45.00
O.-h. billets, Phila.....	45.17	45.17	45.17	45.17
Wire rods, Pittsburgh....	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb..	2.40	2.40	2.40	2.00
Light rails at mill.....	*2.15*	2.25	2.15	2.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.67	2.67	2.67	2.325
Iron bars, Chicago.....	2.40	2.40	2.35	2.50
Steel bars, Pittsburgh...	2.40	2.40	2.40	2.00
Steel bars, Chicago.....	2.50	2.50	2.50	2.10
Steel bars, New York....	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh..	2.50	2.50	2.50	2.00
Tank plates, Chicago.....	2.60	2.60	2.60	2.30
Tank plates, New York...	2.74	2.74	2.84	2.34
Beams, Pittsburgh.....	2.50	2.50	2.50	2.00
Beams, Chicago.....	2.60	2.60	2.50	2.20
Beams, New York.....	2.74	2.74	2.84	2.34
Steel hoops, Pittsburgh....	3.15	3.15	3.15	2.90

Sheets, Nails and Wire,	Nov. 6, 1923	Oct. 30, 1923	Oct. 9, 1923	Nov. 7, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.50
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh....	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh....	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh..	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago.....	$17.50	$17.50	$18.00	$25.00
Carwheels, Philadelphia..	*17.50*	19.00	19.50	21.00
Heavy steel scrap, P'gh...	**15.50**	15.00	16.00	20.50
Heavy steel scrap, Phila..	15.00	15.00	16.00	16.50
Heavy steel scrap, Ch'go..	13.50	13.50	14.15	17.75
No. 1 cast, Pittsburgh....	18.50	18.50	20.00	23.50
No. 1 cast, Philadelphia..	19.00	19.00	19.50	22.00
No. 1 cast, Ch'go (net ton)	18.00	18.00	19.00	20.50
No. 1 RR. wrot. Phila....	17.00	17.00	19.00	19.00
No. 1 RR. wrot. Ch'go (net)	12.00	12.00	14.00	16.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	$3.75	$3.75	$4.00	$7.50
Foundry coke, prompt....	4.75	4.75	4.75	9.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	13.00	13.00	13.00	14.12½
Electrolytic copper, refinery	**12.37½**	12.25	12.75	13.62½
Zinc, St. Louis.....	**6.35**	6.32½	6.30	7.10
Zinc, New York.....	**6.75**	6.67½	6.65	7.45
Lead, St. Louis.....	6.45	6.45	6.65	6.85
Lead, New York.....	6.75	6.75	6.85	7.15
Tin (Straits), New York..	**41.87½**	41.50	42.25	38.00
Antimony (Asiatic), N. Y.	**9.00**	8.50	7.50	6.60

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Nov. 5, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Oct. 30, 1923,	2.755c.
Oct. 9, 1923,	2.775c.
Nov. 6, 1922,	2.446c.
10-year pre-war average,	1.689c.

Composite Price, Nov. 5, 1923, Pig Iron, $22.02 Per Gross Ton

Based on average of basic and foundry iron, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 30, 1923,	$22.27
Oct. 9, 1923,	22.79
Nov. 6, 1922,	28.86
10-year pre-war average,	15.72

activity in that direction has been largely of inquiry rather than of sales.

Steel prices in the main are well sustained. The American Sheet & Tin Plate Co. late last week opened its books for its first quarter tonnages of sheets and tin plate, reaffirming the present prices. The response has been good in tin plate, but rather feeble in sheets. That was rather to be expected, however, since independent mills desirous of maintaining mill operations continue to take black and galvanized sheet business at least $2 below the Steel Corporation schedules. A 3c. base for cold-finished steel bars has become general since a week ago and 2.15c. has reappeared in light rails rolled from billets, while for hot-rolled strips a base price above 3c. refers usually to small and unimportant tonnages. The market continues in buyers' favor also on bolts, nuts and rivets, but prices on other products are very well maintained considering the moderate proportions of current purchases.

While the scrap market is slightly stronger on some grades, primary materials generally still are weak and demand is so light as to suggest still lower prices. So little business is being done in pig iron that quotations for the most part are merely what producers are asking. There is practically no market in coal and coke. Sheet bars are held firmly at $42.50, but this price impresses buyers as an artificial one, since demands are light and there is an unusually good profit at that price based on current scrap and pig iron costs. Billets and slabs are really easy.

Pig Iron.—An utter absence of important transactions renders difficult the determination of where prices really are. The most recent sale of basic iron, one of 1000 tons to a Sharon, Pa., melter, was at $22, Valley furnace, but it is doubtful if that price could be done again, as available supplies are very heavy and consumers generally are taking only passive interest in the market. At least one middle interest is offering this grade with a silicon content, however, above 1 per cent at $21, Valley furnace. Even that price is not

very interesting to melters, who now are looking for a price of $20 before there is a turn in the market. Bessemer iron has sold at $24.50, which, as in the case of basic, is a drop of 50c. a ton from last week's level. Foundry iron continues at $22.50 for the base grade, but no important sales have been made lately at that price and it is believed that a firm offer of less would get serious consideration. Malleable iron is a good deal of a drug on the market, and hard to sell at any price. Four furnaces have gone on the idle list since a week ago. These include one Edgar Thomson furnace of the Carnegie Steel Co., the Soho furnace of the Jones & Laughlin Steel Corporation, No. 1 stack of the Shenango Furnace Co. and the stack of the Punxsutawney Furnace Co., Punxsutawney, Pa. The stack of the Struthers Furnace Co. has gone into blast after being banked for about two months. The furnace of the American Manganese Mfg. Co., Dunbar, Pa., which lately has been on spiegeleisen, will be blown out within the next few days. W. P. Snyder & Co. report the average price of Bessemer iron from Valley furnaces in October to have been $25.20 against $26.50 in September and on basic $23.25 against $24.50 in September.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$22.00
Bessemer	24.50
Gray forge	22.00
No. 2 foundry	22.50
No. 3 foundry	22.00
Malleable	22.00
Low phosphorus, copper free	30.00

Ferroalloys.—Both domestic and British producers of ferromanganese still are quoting $110, Atlantic seaboard, but evidently those who were in need of supplies for use between now and the end of the year were able to cover them from resale British offerings, as lately business has been very quiet. With the competition from resale offerings eliminated, however, the market is firm rather than otherwise at the quoted price. There is little activity in the other products under this heading and prices show no particular change. Prices are given on page 1277.

Semi-Finished Steel.—Sheet makers without regular sources of steel supplies are trying pretty hard to secure sheet bars at less than the generally quoted price of $42.50, Pittsburgh or Youngstown. One Pittsburgh district sheet maker is offering $40, Pittsburgh for 3000 tons, but thus far has not been able to find a mill willing to take the business. Makers who regularly supply non-integrated producers with sheet bars are disposed to decline business at less than $42.50, not that a lower price would not yield a good profit, but because of the effect the lower price might have on prices of finished sheets. Billets and slabs readily are obtainable at $40 and users do not have to go higher. With rolling billets available at $40, makers find it hard to get more than $45, base, for forging quality, $5 being the ordinary differential between the two grades. Demand is light. Skelp and wire rods are plentiful and slow of sale, but recent quotations of 2.40c., and $51, respectively, are well observed. Prices are given on page 1277.

Tubular Goods.—Some tapering in demand lately has been experienced in standard pipe and this division of the market now is not much more active as far as new business is concerned than oil well and line pipe. Most mills have fairly substantial backlogs in both classes of pipe, however, and expect a revival in demand before these orders are completed. Stocks of pipe in the oil producing districts are moderate and it is believed that on account of the sustained building activities, notably in house building, much of the standard pipe which has been going out has gone into use rather than into jobbers' warehouses. Recovery in the oil industry and the usual spring building activities, therefore, are expected to be felt very promptly by the mills. Price shading in pipe is practically unknown, but there is some cutting in boiler tubes, which are dull and some makers find it necessary to make attractive prices to round out their mill schedules. Discounts are given on page 1276.

Steel Rails.—Lower prices than 2.25c., base, for light rails rolled from billets have again appeared. It is now evident that while that price is commonly quoted and obtained on small tonnages, attractive orders are bringing out quotations of 2.15c., base. These rails, accordingly, are quotable at 2.15c. to 2.25c. Light sections rolled from old standard sections, still are quotable from 1.85c. to 2c., base. General demand is moderate since the coal industry, the principal outlet for light rails, is operating at a very low rate and coal prices are too low to encourage fresh development work.

We quote light rails rolled from billets at 2.15c. to 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Wire Products.—There is a fairly good business, but generally, it is still the policy of jobbers and manufacturing consumers to buy frequently instead of a long time ahead. Most of the business on mill books being in the shape of orders instead of contracts, few are definitely committed for long periods and early deliveries are being promised on practically everything. Observance of quoted prices is fairly close. Prices are given on page 1276.

Cold-Finished Steel Bars and Shafting.—Three nearby makers recently advised the trade of a revision in the price to 3c., base, a reduction of $5 a ton, the new price to apply on both new and unshipped orders. This change was effective Nov. 1, and since has been followed by other makers. The market now is quotable at 3c., base, for carload lots, with the usual extra of 25c. per 100 lb. for less than carload lots. There is a fair demand from the automotive industry, but business in general is moderate and leaves much to be desired. The reduction by local makers amounts to the meeting of competition from Chicago district mills, which several weeks ago went to 3c., Pittsburgh, in the Detroit district and with such a large part of the business originating in that territory, it was necessary for local mills to go to that price to hold their accounts there.

Hot-Rolled Flats.—The regular base of 3.15c., Pittsburgh, still is well observed on hoops, but on other products under this heading that price is largely a quotation, except on very small tonnages. Certainly, those who have fairly large tonnages of strips to place do not have to go above 3c., base, to secure them, which means that rim stock material for cold-rolling in large lots is obtainable at 2.85c. Business with practically all makers improved materially in October as compared with the month before, but there has been no evidence of a departure by consumers from a policy of covering their known requirements. The cotton tie season has closed. Prices are given on page 1276.

Colled-Rolled Strips.—October business gained appreciably over that of the month before with practically all makers, but October bookings for the most part ran to orders rather than contracts, the tendency of consumers being to keep their supplies well in line with their actual requirements. The improvement is largely ascribable to increased demands from the automobile parts makers. The price of 5c., base, Pitsburgh, is well maintained despite the decline in hot-rolled strips for cold-rolling since that price was announced in August.

Bolts, Nuts and Rivets.—Actual selling prices of bolts and nuts are still below published quotations; there has been no abandonment of these quotations, but it is admitted that they are not often realized. Inquiry and orders show some gain, but there is still too much idle capacity for the market to show much strength. Rivet prices still are soft and on large lots less than $2.75 base is being done. Prices and discounts are given on page 1276.

Sheets.—The interesting development of the week is the announcement of the American Sheet & Tin Plate Co. of the opening of its books for first quarter of 1924 business at unchanged prices. These are 3.85c. base for black, 5c. base for galvanized, 3c. base for blue annealed and 5.35c. base (No. 22 gage) for automobile body sheets. There has been no rush of buyers to cover for that period and it would have been surprising if there had been, since there are several independent mills which continue to quote $2 lower than the Steel Corporation bases and would not be adverse to taking

forward delivery business at the lower levels. Current demands are moderate and represent closely the actual needs of buyers. It is a buyers' market in a broad way, although some of the Youngstown district makers show a disposition to curtail operations rather than cut prices. All of the mills of the Republic Iron & Steel Co., Youngstown, are idle this week and that district as a whole is not operating much over 50 per cent of sheet mills' capacity. The leading interest is having an operation of about 80 per cent, but it is doubtful if shipments are that large. Prices are given on page 1276.

Tin Plate.—The leading interest is committed over the first half of next year as a result of orders that have come in following its announcement of the opening of its books for first quarter business at the former base of $5.50 for that period. Its current business has been helped materially by the fact that it will produce over 200,000 base boxes for a large can company, the tin plate plant of which, located in this district, is to go down soon for a period of at least 60 days for necessary repairs. Independent plants in this district are getting near the end of their business for this year and there is a slight slowing down in operations. The leading interest has more than 85 per cent of its hot mills in operation.

Iron and Steel Bars.—Makers of steel bars in this district are holding with great tenacity to the base of 2.40c., although demands are small and most of the independent mills need business. A larger cut than makers feel justified in making would be necessary, it is held, to bring out really desirable orders. Iron bars are easier, reflecting both a light demand and the lower wage rate for the next 60 days resulting from the recent wage settlement.

> We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Structural Material.—Mills in this district are not experiencing large demands, chiefly because the fabricating shops here cannot compete with those in other parts of the country enjoying more reasonable steel prices. Furthermore, this is the quiet season in structural awards and while inquiries are reported to be numerous enough, awards are few and those on the few important jobs at prices so low as to suggest stocks of much steel bought at well below today's prices. Mills here, however, are holding to the base of 2.50c. Prices are given on page 1276.

Plates.—While inquiry for plates is brisk in connection with railroad business, actual orders are light and independent capacity is less fully engaged than at any time before this year. There is close adherence, however, to the base of 2.50c. Prices are given on page 1276.

Track Supplies.—Current activity is limited, but inquiry covering future deliveries is pretty heavy. Recent prices hold, but it is believed that competition for some of the big orders now up will result in lower prices. Quotations are given on page 1276.

Coke and Coal.—The spot market for Connellsville coke has virtually vanished and just where prices are is not easily determined in the absence of sales. The nominal quotation still is $3.75 per net ton at oven, but there are a great many loaded cars which have been lying on track for several days for want of a place to ship. Some of these holdings undoubtedly could be had pretty cheap. Curtailment of production continues and apparently the end of the movement has not yet been reached; nevertheless there are ample supplies and the danger of higher prices seems remote, since there are some plants which cannot be shut down except at greater loss than by selling at the market valuations. Foundry coke still is readily available at from $4.75 to $5.25. The one bit of contract business in furnace grade recently before the market, that of the Struthers Furnace Co. for 15,000 tons a month for five months beginning Nov. 1, was placed with the Youngstown Sheet & Tube Co. at a price equal to slightly more than $3.50 at Connellsville. There has been no improvement in the coal market, which is dull and weak at from $1.45 to $2.10 per net ton at mine for mine run steam coal, $2 to $2.25 for coaking coal and $2.25 for gas grade.

Old Material.—The market reflects a somewhat stronger undertone, although real activity still is lacking and the stronger price ideas of dealers find explanation in expectations of purchases rather than in actual buying. A local steel company which has been embargoed is said to be granting permits for shipments a little more readily than formerly; this is taken to mean that this company is not as well off with regard to supplies as it has been. Other mills have raised their bids slightly and the big spread between scrap and pig iron and the improvement in steel business in October as compared with September also are advanced by those now bullish on the market. It is claimed that $16.50 has been offered for heavy melting steel, but there is no evidence that a sale has been made at that price. Some observers say that the effort to advance prices is nothing more than a repetition of the unsuccessful effort of late August and early September and that those responsible are those who have their yards full and want to move some of their holdings. It cannot be said that the outlook is brilliant for heavier steel works operations over the remainder of the year and the foundries in this district as a general rule are beginning to feel the absence of fresh railroad buying. It must be said that relatively high prices were obtained on railroad scrap offerings in view of the fact that they were so heavy. Heavy melting steel sold up to $16 and material for throwing down in the yards sold above $10 in some instances. Heavy melting steel at $15 is out of the question this week and definitely higher bids have appeared from users of turnings.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$15.50 to $16.00
No. 1 cast, cupola size	18.50 to 19.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va. and Franklin, Pa.	17.50 to 18.00
Compressed sheet steel	14.00 to 14.50
Bundled sheets, sides and ends	12.50 to 13.00
Railroad knuckles and couplers	18.00 to 18.50
Railroad coil and leaf springs	18.00 to 18.50
Low phosphorus blooms and billet ends	20.50 to 21.00
Low phosphorus plate and other material	18.50 to 19.00
Railroad malleable	18.00 to 18.50
Steel car axles	18.00 to 18.50
Cast iron wheels	17.50 to 18.00
Rolled steel wheels	18.00 to 18.50
Machine shop turnings	11.00 to 11.50
Sheet bar crops	16.50 to 17.00
Heavy steel axle turnings	13.50 to 14.00
Short shoveling turnings	12.50 to 13.00
Heavy breakable cast	14.50 to 15.00
Stove plate	14.00 to 14.50
Cast iron borings	12.50 to 13.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	15.50 to 16.00

Trumbull Steel Co. Record

YOUNGSTOWN, Nov. 6.—In October the Trumbull Steel Co. at Warren established a new high monthly record in ingot output, producing 44,212 tons, as compared with its previous high production of 43,001 tons in June last. Present indications are that the company may surpass in November its October production.

Last month the Trumbull company shipped 33,391 tons of finished steel products at an annual rate in excess of 400,000 tons.

Enrollment in vocational schools in Wisconsin during the past year amounted to more than 52,000 children and adults, a report of the director of vocational education reveals. Of this number 35,845 pupils were enrolled in day classes and 26,665 in night classes. The Milwaukee schools had an enrollment of 40 per cent of the total, with 13,098 in day classes and 7005 in night classes, a total of 20,103. Eighteen Wisconsin cities conduct vocational schools. The Racine school ranked next to Milwaukee with 2906 pupils; La Crosse third with 2437; Madison fourth with 2288 and Kenosha fifth with 2234.

Chicago

October Records Improvement Over September—More Optimistic Sentiment

CHICAGO, Nov. 6.—Generally speaking, new business and specifications against contracts received by local mills in October showed an encouraging increase over bookings in September. While new commitments are still smaller than current shipments, the gap between the two has been slowly closing and producers are taking a more hopeful view of the future. Outside of orders for rails and track supplies, however, new business is still confined almost entirely to purchases for nearby delivery. For this reason some observers have not yet abandoned the belief that the mills will be forced to curtail operations materially before the close of the year. In fact it is said that curtailment of production would be preferred by some interests to an abandonment of present prices. Price reductions generally beget further price recessions and the experience of producers in 1921 and early 1922 was so unfortunate that it is a question whether they care to risk a repetition following the recent increase in costs through the elimination of the 12-hour day. Of course, it is hazardous to attempt to forecast the attitude of mills toward a situation which has not yet materialized. Suffice it to say they will not cross the stream until they reach it, and in the meantime they are encouraged by a gradual increase in new business and by the prospect of heavier buying by the railroads. The report persists that not only the Southern Pacific, but the New York Central, the Pennsylvania and other lines will soon enter the market for a total of fully 80,000 cars. The only inquiries of any size which have come into the market during the week, however, are 2000 gondola cars for the Chesapeake & Ohio and 1750 automobile cars for the Wabash.

Mill and furnace operations in this district show a slight loss. The Illinois Steel Co. has blown out a furnace for relining at South Works, leaving 22 out of its 27 steel works stacks in blast. Its steel output has receded to slightly less than 90 per cent of ingot capacity. The Inland Steel Co. remains on a 75 per cent basis.

Pig Iron.—While actual sales are still light, melters are beginning to manifest more interest in their future supplies and some of them are feeling out the market for their first quarter requirements. An inquiry from a northern Illinois melter calls for 800 tons of foundry for first half. An inquiry from a stove manufacturer calls for several hundred tons of foundry for first quarter. While there have been a few sales for first quarter, the tonnage involved has been negligible and the transactions have been significant largely because they represented the first purchases for that delivery. Prominent among other sales may be mentioned 500 tons of foundry bought by a Michigan user for delivery over the remainder of the year and an equal tonnage of malleable purchased by another Michigan melter for similar shipment. An Indiana melter is inquiring for 1000 tons of malleable for delivery in November and December. While the market is still weak, no important developments in prices have occurred during the week.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$29.15 to $30.15
Northern coke, No. 1, sil. 2.25 to 2.75	24.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00
Malleable, not over 2.25 sil.	24.00
Basic	24.00
High phosphorus	24.00
Southern No. 2	24.75 to 25.51
Low phos., sil. 1 to 2 per cent, copper free	32.25 to 34.00
Silvery, sil. 8 per cent	37.29

Ferroalloys.—A sale of 100 tons of 18 to 22 per cent spiegeleisen has been negotiated at $38, furnace, or the equivalent of $43.80, delivered Chicago. Sixteen to 18 per cent spiegeleisen has been sold at as low as $35, furnace. We note the sale of a carload of 50 per cent ferrosilicon at $82, delivered. Ferromanganese is available at as low as $108, Eastern seaboard.

We quote 80 per cent ferromanganese, $116.38 to $117.56, delivered; 50 per cent ferrosilicon, $82, delivered; spiegeleisen, 18 to 22 per cent, $43.80, delivered.

Cast-Iron Pipe.—Chicago has awarded 570 tons of 8-in. water pipe to the United States Cast Iron Pipe & Foundry Co. Duluth has placed 100 tons with the Lynchburg Foundry Co. Richard Burrell, Joliet, Ill., has the general contract for 200 tons for that city. Pleasant Ridge, Mich., takes bids today on 200 tons of 6- and 8-in. water pipe. There have been no new price developments.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $60.20; 6-in. and above, $56.20; class A and gas pipe, $5 extra.

Plates.—New inquiries from the Wabash, the Chesapeake & Ohio and the Great Northern involve 4500 cars, which will require 50,000 tons of rolled steel. It is expected that a substantial portion of this tonnage will be placed with local mills. It is reported that the Magnolia Petroleum Co. has placed a number of oil storage tanks for the Powell field in Texas and that the Standard Oil Co. has bought a number for Casper, Wyo., but details are withheld.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Structural Material.—While lettings for the week showed an increase, inquiries have fallen off, and the anxiety of fabricators for new tonnage is being reflected in sharp price concessions. In some quarters, however, this is believed to be a temporary condition in view of the large amount of work on architects' boards. Bids on the New Palmer House, Chicago, involving 12,000 tons, are expected to be asked about Jan. 1. Building permits issued in Chicago in October were approximately equal to those of September and nearly twice as large as those of October, 1922, in terms of total investment involved. Plain material prices are unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Sheets.—Both the leading producer and the local independent have reaffirmed their prices for first quarter delivery, ignoring the lower prices of the smaller mills. Buying shows no material increase and price recessions by the smaller interests are more common. On black sheets as low as 3.65c. base, Pittsburgh, has been done, and on galvanized 4.85c. has been named.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Bars.—Orders for soft steel bars are more numerous, but in practically all instances involve small tonnages for early shipment. Continued caution on the part of buyers is indicated by the fact that they still refrain from contracting very far ahead. New business in bar iron is so light that mills find it difficult to maintain even partial operations. Orders for rail steel bars have shown some improvement, but mills are still running on a hand-to-mouth basis. Prices on all three classes of bars remain unchanged.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Rails and Track Supplies.—The Nickel Plate has distributed an order for 18,000 tons of rails between the Illinois, Carnegie, Bethlehem and Inland companies. The Monon has ordered 4000 tons of rails from the Illinois Steel Co. The Southern Railway is inquiring for 35,000 tons of rails. The Pennsylvania has not yet placed orders for 200,000 tons. The Southern Pacific has ordered 10,000 kegs of spikes from a local company. Other orders for track supplies

booked by local mills include 6000 kegs of bolts and 2400 tons of splice bars. A Chicago railroad which recently suspended delivery on 2700 tons of tie plates has released the entire tonnage for shipment. Another line which placed what it believed were its entire rail requirements a month ago, has ordered 1500 tons additional.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.35c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.75c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base, and track bolts, 4.90c. base.

Wire Products.—Although specifications are still light, buyers are showing greater interest in the market, suggesting that some of them are recovering confidence in the stability of present prices. Improved conditions in the Northwest are reflected in better sales by jobbers serving that section of the country. Mill prices, which are unchanged, are shown on page 1276.

We quote warehouse prices f.o.b. Chicago; No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Bolts and Nuts.—With buyers holding back their purchases, competition among sellers is keen and discounts are exceedingly soft. In fact, the lack of price stability is discouraging buying.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Reinforcing Bars.—While there were few sizable lettings of reinforcing bars during the week, sellers are encouraged by the prospective business which has appeared. A new office building for the Santa Fe at Topeka, Kans., will require 750 tons. The placing of the general contract for the Knights of Columbus club house, Chicago, forecasts an early purchase of the concrete bars, amounting to 400 tons. Considering the decline in the volume of business booked during the past few weeks, warehouse prices are surprisingly steady at 2.75c., Chicago. Occasional concessions are still reported, however. Lettings include:

Garage for Cork Motor Car Co., Marquette, Mich., 100 tons to Corrugated Bar Co.

State Teachers' College building, Winona, Minn., 250 tons to Kalman Steel Co.

Empire State Ice Co. building, Albany, N. Y., 150 tons to Corrugated Bar Co.

Vassar Swiss Underwear Co. plant, Chicago, 150 tons to Barton Spiderweb System Co.

Pending business includes:

Atchison, Topeka & Sante Fe R. R., office building, Topeka, Kans., 750 tons.

Knights of Columbus Club house, Chicago, 400 tons, general contract awarded to Duffy & Noonan, Chicago.

Wayne Medical Building, Ft. Wayne, Ind., 175 tons, bids taken.

Goodman Mfg. Co. plant addition, Chicago, 180 tons, new figures asked.

Shrine temple, Ft. Wayne, Ind., 200 tons.

Armory for One Hundred Twenty-second Field Artillery, Chicago, 200 tons.

Coke.—Local by-product foundry coke has been reduced $1 a ton to $12.50 delivered in the Chicago switching district.

Old Material.—Consumer buying remains at a standstill and while the activities of dealers are still limited, some of them are commencing to speculate on an advance in the market with the result that the decline in prices has been halted. Transactions involving early deliveries, however, indicate that going prices are unchanged from a week ago. Railroad offerings include the Chicago & Eastern Illinois, 1200 tons; the Pullman Co., 1000 tons; the Pere Marquette, 500 tons, and the Soo Line, 300 tons. Through a typographical error, rails for rolling were incorrectly quoted in the issue of Nov. 1. They should have carried a price range of $14.50 to $15 per gross ton.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$19.50 to $20.00
Cast iron car wheels	17.50 to 18.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	17.00 to 17.50
Railroad tires, charging box size	17.50 to 18.00
Railroad leaf springs, cut apart	17.50 to 18.00
Rails for rerolling	14.50 to 15.00
Steel rails, less than 3 ft.	16.00 to 16.50
Heavy melting steel	13.50 to 14.00
Frogs, switches and guards cut apart	13.50 to 14.00
Shoveling steel	13.25 to 13.75
Drop forge flashings	9.00 to 9.50
Hydraulic compressed sheets	11.00 to 11.50
Axle turnings	10.50 to 11.00
Steel angle bars	15.00 to 15.50
Per Net Ton	
Iron angle and splice bars	17.50 to 18.00
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	23.50 to 24.00
Steel car axles	15.00 to 15.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Cut forge	12.00 to 12.50
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	12.00 to 12.50
Steel knuckles and couplers	15.50 to 16.00
Coil springs	17.00 to 17.50
No. 1 machinery cast	18.00 to 18.50
No. 1 railroad cast	17.50 to 18.00
No. 1 agricultural cast	17.50 to 18.00
Low phos. punchings	14.00 to 14.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	6.50 to 7.00
Cast borings	8.50 to 9.00
Short shoveling turnings	8.50 to 9.00
Stove plates	15.00 to 15.50
Grate bars	14.00 to 14.50
Brake shoes	15.00 to 15.50
Railroad malleable	16.50 to 17.00
Agricultural malleable	16.00 to 16.50

TAX BURDEN DOUBLES IN DECADE

Figures Cited by National Industrial Conference Board in Growth of Cost of Government

Remarkable growth in the increasing burden of taxation in the United States is revealed in a report just made public by the National Industrial Conference Board, New York, which represents the results of a year's study by the board's research staff of the whole problem of the cost of government to the people. Of almost equal importance, the board cites the constantly rising amount of property which has been rendered by various means exempt from taxation, and the value of which, in round figures, is given as $54,000,000,000 in 1922. "This stupendous sum," says the report, "represents slightly less than one-fifth of our national wealth, and is equal roughly to one-third of all property assessed under the general property tax which forms the bulwark of State and local government finance."

Summarizing the growth of the country's tax bill, the report shows that the nation paid last year in taxes $7,061,000,000, compared with $8,363,000,000 in 1921, $2,194,000,000 in 1913, and $1,382,000,000 in 1903. In 1922 the taxes collected by the Federal Government showed a decline of $1,526,000,000 as compared with 1921. This is ascribed to the reduction of income taxes due to the low ebb of business in 1921.

On the other hand, taxes of State and local governments continued to mount. State taxes increased from $307,000,000 in 1913 to $846,000,000 in 1922. Likewise local taxes rose from $1,219,000,000 in 1913 to $3,301,000,000 last year. This rising ratio of taxation to the National income is also shown by the statement that it was 6.4 per cent in 1913, 12.1 per cent in 1919, 16.7 per cent in 1921 and 12.1 per cent in 1922.

The tax burden, figured in terms of each person's income, is also cited to bear out the board's conclusions. The total tax bill last year was $64.63 per capita, as compared with $17.07 per capita in 1913. This represents, as gaged by income, the result of six and one-quarter weeks' work in 1922 for taxes as compared with three and a third weeks' work before the war.

"In a nutshell," says the board, "all taxes stated in dollars were in 1922 about three and one-half times as high as they were in 1913 and twice as burdensome."

New York

Some Railroad Equipment Buying—Wide Variation in Pig Iron Prices

NEW YORK, Nov. 6.—Sales of pig iron the latter part of last week and the first part of this week have been, as a rule, small in tonnage, but the number has been encouraging and the prices in eastern Pennsylvania on the ordinary run of business have been considerably above what had been done on a round tonnage and probably could be done again. The eastern Pennsylvania price on small tonnages is $23 furnace for No. 2 plain or No. 2 X, while $22.50 is done on somewhat larger tonnages and probably the $21 price made in at least one case last week could be repeated on tonnages running from 2000 to 5000. At Buffalo $21 for No. 2 plain or No. 2 X is the usual quotation. Pending inquiries include one for from 2500 to 3000 tons for the remainder of this year for an upper New England melter, one for 1000 tons, fourth quarter, from the same part of New England, and one for from 2000 to 4000 tons, fourth quarter, from a company having plants in New Jersey and Pennsylvania, all being foundry iron. Further curtailment of melt is reported in lower New England, where buyers of castings are clamoring for lower prices owing to recent declines in pig iron quotations.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$24.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.27
Buffalo, sil. 1.75 to 2.25	$27.41 to 26.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94
No. 2 Virginia, sil. 1.75 to 2.25	29.44

Ferromanganese.—New business is limited to fairly frequent sales of carload lots of both British and domestic alloy at prevailing quotations which are being sent to steel producers who are buying as the need arises. It is stated that earlier in the year very few consumers purchased ferromanganese for delivery beyond the third quarter. There has been no change in prices in the last week. Demand for spiegeleisen is also hand-to-mouth with the price situation steady. Steel consumers are buying only such quantities of 50 per cent ferrosilicon as they need for filling in requirements at prices ranging from $82.50 to $87, delivered.

Cast-Iron Pipe.—In general prices are unchanged, although some concessions are reported made by a few shops. Appearance of inquiries from many large gas companies for water pipe on next year's requirements is the cause of some optimism. On the tender for 350 tons of 6-in. and 8-in. water pipe from Katonah, N. Y., bids on which were opened Nov. 1, R. D. Wood & Co. were the low bidders. The city of Boston has asked for about 500 tons of 8-in. to 16-in. water pipe, opening Nov. 7. We quote per net ton, f.o.b New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. Soil pipe makers are looking forward to continued activity. Present business for prompt shipment is on a basis of 40¾ for light and 50¾ for heavy pipe, and jobbers are showing an inclination to place orders for next year's delivery at these discounts. Makers, however, are refraining from action, expecting a recovery of prices on 1924 business. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 40¾ per cent off list; heavy, 50¾ per cent off list.

Warehouse Business.—A general weakness of prices continues through many products. Cold-rolled shafting was reduced on Nov. 1 to 4.40c. for rounds and 4.90c. for squares, flats and hexagons, by most sellers in this district. At the same time the mill price was reduced to 3c. base, Pittsburgh. Black and galvanized sheets show no tendency to stiffen, although a fairly active demand is reported. Blue annealed sheets continue weak. Prices on Swedish charcoal iron bars have fluctuated considerably of late, but a fair estimate of the present market is still 7c. to 7.25c. per lb. base. We quote prices on page 1302.

Finished Iron and Steel.—Car equipment orders and sustained activity in structural steel are the factors of the week. Buyers are trying to secure reductions but producers are stiff in respect to prices, save in a few cases. For example, all of the makers of cold-finished steel bars are now on a 3c., Pittsburgh, base. There have been sales at this figure for some time, but those makers who have been holding out for 3.25c. are now down to the lower level. Rerolled concrete bars are being sold at prices ranging from 2.25c. to 2.35c. Export orders are going at a little less. Black sheets at 3.75c. are easily available, galvanized at 4.90c., while blue annealed continues fairly firm at 3c.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—The market is substantially the same as last week, drastic curtailment of production having thus far maintained fairly firm prices. Still further reduction of ovens in operation is expected if prices are to hold. Standard foundry is quoted at $5 to $6.25 per ton. Standard furnace ranges from $3.75 to $4.25 per ton. Contracting for shipment next year of by-product coke on the "open-price" basis is reported to have been fairly heavy since the recent reduction. By-product coke is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—Plenty of scrap is reported available and prices continue weak, with $14.50 per ton the prevailing price delivered eastern Pennsylvania consumers for both No. 1 and railroad grade of heavy melting steel. Lack of transactions makes it difficult to establish more than nominal prices on most grades. Borings and turnings are unchanged. Some tonnage is reported going to Wierton, W. Va., at $12.50 per ton. Stove plate is holding at $16.25 per ton delivered Harrisburg, Pa., and slightly lower prices delivered to New Jersey consumers. The Steel Scrap Co. of Philadelphia, formed by Luria Brothers & Co. and Perry, Buxton, Doane Co., to acquire the battleships disposed of by the United States Government, in addition to the high bid on two ships at Philadelphia was high bidder at $9.51 per ton broken to shipping sizes, on the "Indiana" and "South Dakota" at the Brooklyn Navy Yard.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$10.50 to $11.00
Steel rails, short lengths, or equivalent	11.50 to 12.00
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	15.00 to 16.00
Iron car axles	22.50 to 23.00
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track	13.00 to 13.50
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	7.50 to 8.00
Machine-shop turnings	7.00 to 7.50
Mixed borings and turnings	7.00 to 7.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	12.25 to 12.75
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	16.00 to 17.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

More Hopeful Feeling at Youngstown

YOUNGSTOWN, Nov. 6.—District Independent Steel Rollers are reaffirming sheet and tin plate prices for the first quarter of 1924, following action by the American Sheet & Tin Plate Co. The naming of 1924 prices, coincident with the improved sentiment in business, is expected to stimulate buying for forward needs.

Steel makers are inclined to believe that a turning point has been reached in the recent sluggish steel market, and that business will improve more rapidly in the next few weeks than it has in the past. It is also hoped that start of buying of sheets and tin plate will be communicated to other steel products.

Buffalo

Lower Quotations on Pig Iron Sheet Prices for First Quarter

BUFFALO, Nov. 6.—The price of $21 for No. 2 plain iron has been shaded in a few transactions; this and the fact that several Buffalo furnaces heretofore holding aloof from price concessions are now quoting $21 for silicon 1.75 to 2.25, are the two elements indicative of further weakening here. New York State foundries are slowing down operations and even buyers in need of iron are withholding their purchases expecting further weakness. A number of buyers predict a price of $20 as close at hand. Some of the inquiries of recent days are tentative; no specific tonnages are mentioned and the inquiries are feelers for prices on spot and first quarter delivery. Differentials do not figure to any extent. About 10,000 tons of new business represents the total activity of all sellers.

We quote f.o.b. gross ton, Buffalo as follows:

No. 1 foundry, sil. 2.75 to 3.25	$22.00 to $22.50
No. 2 foundry, sil. 2.25 to 2.75	21.50 to 22.00
No. 2 plain, sil. 1.75 to 2.25	21.00 to 21.50
Basic	22.00
Malleable	23.00
Lake Superior charcoal	30.28

Finished Iron and Steel.—New prices on tin plate, cold-rolled material and sheets are announced, but it is too early to determine their reception with buyers. Following the lead set by the Steel Corporation, the local sheet mill has announced a price of 3.85c. on black sheets for first quarter delivery. Spot shipment sheets can be obtained at a lower figure. General interest on the part of tin plate buyers prior to the announcement of price schedules would tend to indicate a liberal placement of tonnages within a few days. Bars are holding firm at 2.40c. An independent office finds an increase in the number of orders, but a slowing down in the size of tonnages placed. Sheet demand is extremely weak for prompt shipment and first quarter business is yet to be placed.

We quote warehouse prices Buffalo as follows:

Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—What little activity characterized this market in earlier weeks seems to have disappeared. Some little demand for turnings and borings was maintained by blast furnace interests but continued weakness in pig iron has impaired this call. While all quotations are nominal, heavy melting steel can be obtained for $14. A few dealers are stocking up in anticipation of a turn but not on a large scale.

We quote f.o.b., gross ton, Buffalo as follows:

Heavy melting steel	$14.50 to $15.50
Low phos. 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	13.00 to 13.50
No. 1 busheling	14.50 to 15.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	14.50 to 15.50
Railroad malleable	18.50 to 19.00

Birmingham

Small Lot Sales of Pig Iron at Low Prices—Deliveries Promptly Made

BIRMINGHAM, ALA., Nov. 6.—Small-lot sales of pig iron still predominate but recently the aggregate began showing up better and furnace interests are reporting more than production being sold. The quotations are still weak, though furnace companies say there has been some improvement. No. 2 foundry is being quoted at $21 and $22 per ton, the latter price for the home melters. However, reports from the Middle West are that $20 is still being done here. Denial is made that sales have been made on a $19.50 per ton base though there was some admission that differentials in silicon content were conceded and this may have brought about the 50c. estimated reduction in price. Deliveries are prompt as railroads are in position to handle any and all business of the furnaces. The home melt is not as strong as it has been, some lagging being noted in the sanitary pipe plants. The pressure pipe plants are still receiving small lettings from week to week and added to the business still on books will have steady operations through the winter.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$19.50 to $21.00
Basic	20.00 to 21.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—The American Cast Iron Pipe Co. has orders for pipe from Fort Worth and Dallas, Tex., the two orders amounting to around 808 tons. The United Cast Iron Pipe & Foundry Co. also received some small lettings during the week.

Finished Material.—The steel mills of the Birmingham district are doing fairly well. The rolling mills of the Tennessee Coal, Iron & Railroad Co. are down and there has been some lagging in the big steel plant at Ensley. Steel bar quotations remained unchanged at 2.60c. and demand light.

Coal and Coke.—Coal demand is fair only in this district and with exception of furnace company operations the average is about four days the week. Steam coal demands are lagging. Domestic coal demands are good but steam coal predominates the market. Coke is quoted $5.50 for foundry and $4.75 to $5 for furnace.

Scrap Iron and Steel.—With the exception of a little No. 1 cast, there is very little being done in the scrap iron and steel market in the Birmingham district. The quotations continue weak, no change being reported in the last two weeks. One of the largest dealers in this district announces that he will lay in stock for the coming year, expectations being for a sudden need for various products. Heavy melting steel is standing still.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.00 to 10.00

Cleveland

Pig Iron Prices Marked Down—Heavy Tonnage Required for Ford Steel Plant

CLEVELAND, Nov. 5.—Iron ore shipments for October amounted to 8,099,716 gross tons as compared with 9,095,981 tons during September. In October, 1922, shipments were 6,081,386 tons. The movement until Nov. 1 was 54,088,561 tons as compared with 39,192,624 tons during the same period last year or a gain of 38 per cent. If weather conditions are favorable, the November movement will be close to 4,000,000 tons, making shipments for the season approximately 58,000,000 tons. The Steel Corporation has a shipping schedule for the month of 2,000,000 tons and plans to keep its boats in operation until Nov. 20.

Pig Iron.—Prices have further declined in Cleveland and the surrounding districts and the market continues weak. Sales during the week were light, much of the business being in car lots for early shipment, although a few lots of 500 tons and over were placed, in some cases for the first quarter. Locally prices have declined $1 a ton to $23 at furnace for foundry and malleable iron for Cleveland delivery. In the absence of sales of any size, prices are not definitely established for outside shipment, but a fair sized inquiry would probably bring out a $22 quotation. In the Mahoning Valley district, small lot sales have been made at $22.50, but this could probably be shaded 50c. on a desirable inquiry. The Buffalo situation continues very weak and

this appears to be affecting the price situation in this territory more than anything else. Buffalo iron is being offered in this territory, but no sales are reported. The Buffalo market seems now to be around $21.50, although there are reports that quotations under $21 have been made in the East. Consumers are closely watching the market and there are indications that there will be a fair volume of activity as soon as they are satisfied that prices have reached bottom. However, at present there is no evidence that the bottom has been reached. Steel making grades are inactive. While the last sale of basic iron reported was at $22.50, the market is now not above $22 and Pittsburgh brokers are reported to be offering basic at $21.50.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	23.50
Southern fdy., sil. 1.75 to 2.25	25.50
Malleable	23.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	30.00

Sheets.—The announcement of the American Sheet & Tin Plate Co. that its present price will continue through the first quarter does not seem to have the effect of making the market any firmer. In fact, the weakness in black sheets appears more in evidence and some mills are shading the 3.75c. price. In some cases full finished sheets in heavier gages are being quoted on the blue annealed base, which makes the price equivalent to a 3.60c. black sheet base. Blue annealed sheets continue firm. Demand for sheets is light.

Semi-Finished.—Some of the smaller sheet mills owing to reduced operations are not taking sheet bars to the extent of their contracts and some mills have curtailed production. There is no new demand, but the market appears firm at $42.50. A local inquiry for 500 tons of forging billets is understood to have brought out a quotation under $47.50 delivered.

Bolts, Nuts and Rivets.—The demand for bolts, nuts and rivets is slow and prices are not firm. Concessions of 5 per cent above the regular discount have appeared on machinery and carriage bolts, mostly for the larger sizes. Regular quotations represent ruling rivet prices. New price lists on stove bolts were placed in effect Nov. 1. In these, bolts 7/32 in. in diameter and all diameters larger than ½ in. have been eliminated and on several sizes 6 in. is the maximum length listed instead of 6¾ in. as heretofore. This list finishes the issuing of new price lists started several weeks ago.

Finished Iron and Steel.—Demand for steel continues light and buying is mostly in small lots for early shipment. Some inquiry for steel bars for delivery around the first of the year has come from consumers whose stocks are running low, but who do not want to increase these before inventory time. Some good sized orders were placed during the week by Detroit automobile manufacturers. An Ohio manufacturer of children's vehicles purchased 480 tons of steel bars. Makers of these vehicles are doing a large volume of business. The demand for plates shows a slight improvement. In the structural field, little inquiry has come out, but work aggregating over 10,000 tons on which bids have been taken is pending in this city. Plans for the steel plant for the Ford Motor Co., Detroit, which have been pending for some time, have been revised and the steel requirements have been increased to 26,000 tons, based on actual estimates. It is expected that this work will be placed within a few days. Steel bars and structural material are firm at regular quotations, but more irregularity has developed in plates on which quotations of 2.40c., Pittsburgh, have appeared in outlying districts to meet Eastern and Chicago competition. Some of the Eastern plate mills are now quoting on a basis of 2.50c., Pittsburgh, for delivery in this territory. On hoops and bands 3c. is becoming more common and there are reports that this price is being shaded in spite of efforts of some makers to hold the market at 3.15c. Hot-rolled strip steel in wide material is weak with 2.75c. a common quotation.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Coke.—The demand for country coke is light and is confined mostly to carlot orders. Prices are unchanged at $5 to $6.50 for standard Connellsville foundry coke.

Old Material.—Prices have further declined 50c. a ton on most grades and the market is weak at present levels. Turnings are particularly soft and are not bringing above $10 delivered to Cleveland mills. Prices have now got so low that dealers are laying down considerable material. A Youngstown mill recently purchased some heavy melting steel scrap and sales of this grade to Youngstown dealers to fill this order were made during the week at $15.50. In the southern Ohio district, heavy melting steel was sold at $14.50. Local consumers have good stocks and are buying only small odd lots.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$14.00 to $14.25
Rails for rolling	16.00 to 16.25
Rails under 3 ft.	16.00 to 16.50
Low phosphorus melting	16.75 to 17.25
Cast borings	10.00 to 10.25
Machine shop turnings	9.50 to 9.75
Mixed borings and short turnings	9.75 to 10.00
Compressed sheet steel	12.00 to 12.50
Railroad wrought	12.00 to 12.25
Railroad malleable	18.50 to 19.00
Light bundled sheet stampings	9.00 to 9.25
Steel axle turnings	11.50 to 11.75
No. 1 cast	19.50 to 20.00
No. 1 busheling	8.75 to 9.00
Drop forge flashings	9.00 to 9.50
Railroad grate bars	15.00 to 15.50
Stove plate	15.00 to 15.50
Pipes and flues	8.00 to 9.00

St. Louis

Pig Iron Quoted $22 Chicago and $18.50 Birmingham, and Few Sales

ST. LOUIS, Nov. 6.—The market for pig iron continues dull and weaker. Buying has been extremely light, and sales were at concessions. Even this does not have the effect of stimulating purchasing. Melters are content to pursue the policy adopted some months ago of buying only from hand to mouth. The largest sale was of 400 tons of foundry iron to an Illinois melter by the St. Louis Coke & Iron Co., which also sold about 250 tons in carload lots during the week. This maker reduced its price to $25 to $26, Granite City. Quotations have been reported as low at $22, Chicago, for Northern iron and $18.50, Birmingham, for Southern make. The only inquiry of size before the market is from an Illinois melter for 1500 tons of foundry iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and $1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$24.16 to $25.16
Northern malleable, sil. 1.75 to 2.25	24.16 to 25.16
Basic	24.16 to 25.16
Southern fdy., sil. 1.75 to 2.25 (rail)	23.17 to 24.17

Finished Iron and Steel.—Buying of rails by railroads centering here for 1924 delivery is believed to be ended. Both the St. Louis Southwestern and the Missouri-Kansas-Texas railroads are now taking in rails bought in 1921 and 1922 respectively on a $40 base. The reaffirmation of present prices on sheets for the first quarter of 1924 by the United States Steel Corporation and the Inland Steel Co. is expected to strengthen the situation. The market generally continues dull.

Coke.—The demand for foundry coke is exceedingly light. Warren by-product foundry coke is quoted at $13.50, St. Louis. Connellsville grades range from $3.75 to $7.50. Dealers are heavily stocked with domestic grades, and there will be no buying from that

source until there is a much heavier demand by consumers.

Old Material.—Dealers believe that heavy offerings of old material by railroads have ceased for a while at least. The Missouri Pacific's list of 6000 tons was sold to dealers here on only one day's notice and at low prices. The only other list of consequence during the week was that of the Frisco System, 600 tons. Quotations were unchanged during the week. Some inquiries were received for melting grades and although no business resulted, it had a strengthening effect on the market. There were no inquiries for rolling mill grades.

	Per Gross Ton	
Iron rails	$15.00 to	$15.50
Rails for rolling	14.00 to	14.50
Steel rails, less than 3 ft.	15.50 to	16.00
Relaying rails 60 lb. and under	25.00 to	26.00
Relaying rails, 70 lb. and over	32.50 to	33.50
Cast iron car wheels	17.00 to	17.50
Heavy melting steel	12.00 to	12.25
Heavy shoveling steel	11.75 to	12.00
Frogs, switches and guards cut apart	13.00 to	13.50
	Per Net Ton	
Heavy axles and tire turnings	11.00 to	11.50
Steel angle bars	12.00 to	12.25
Steel car axles	15.00 to	15.50
Iron car axles	22.50 to	23.00
Wrought iron bars and transoms	17.00 to	17.50
No. 1 railroad wrought	12.50 to	13.00
No. 2 railroad wrought	11.50 to	12.00
Railroad springs	14.00 to	14.50
Cast iron borings	9.00 to	9.50
No. 1 busheling	12.25 to	12.75
No. 1 railroad cast	17.00 to	17.50
No. 1 machinery cast	17.00 to	17.50
Railroad malleable	14.50 to	15.00
Machine shop turnings	9.00 to	9.50
Champion bundled sheets	7.00 to	7.50

San Francisco

Buying of Pig Iron and Finished Material Confined to Small Tonnages

SAN FRANCISCO, Oct. 31.—The trade conditions in iron and steel are very much depressed and for the present the market is without feature, with practically nothing in sight upon which to build hopes for betterment in the near future. Both the mills and foundries are sufficiently well supplied for what work they have in hand, but there is a notable scarcity of new business, and although stocks of materials on hand are at the lowest volume of the year, they show no indication of purchasing more than the smallest quantities for immediate use. Nothwithstanding the dullness, importers are striving to maintain prices as steady as possible considering the downward trend so noticeable in the Eastern markets for the last few weeks. As far as the local situation is concerned, about the only business in sight, outside of the usual small trading, is the prospective award of contracts for some 16 new schoolhouses, for which the people of this city voted a $12,000,000 bond issue last March. All of these structures are to be modern in every respect and mostly of reinforced steel and concrete construction. The plans are now approaching completion and work will doubtless begin on some of them early in the coming year. There were some inquiries in this city some ten days ago for large quantities of nails, reinforcing wire, and steel bars said to be for shipment to Japan, but as far as can be learned, they did not result in business and the inquirers have gone East, where the orders will doubtless be booked.

Pig Iron.—Business is extremely dull and buyers are very apathetic but hopeful for a turn in the trade conditions. Importers say there are few inquiries and from present indications little improvement, if any, is looked for before January. Quotable prices are less steady than two weeks ago and some lower. On the best grades $33 is now a maximum figure, but a price range of $32 to $33 probably is nearer the actual selling price. There have been reports of some sales around $30.50 to $31, but if such sales occurred, it was doubtless due to higher silicon content. While consumers were known to be well supplied, the constant usage on small orders for the last two months or more, coupled with comparatively small replenishing, seems to convey the impression that accumulated stocks must be nearly exhausted by this time. This conclusion encourages the belief that new buying may be expected at an early date in order to meet immediate requirements. Recent advices from Los Angeles say the demand for pig iron there is fair, with considerable business in prospect. Prices there are a little lower than in this city. Sales are reported at $30.50 to $31 for foreign material c.i.f. duty paid, San Pedro, within the usual silicon range of 2.75 to 3.25.

Finished Iron and Steel.—While business cannot be called active, there is some trading in progress, with prices well sustained and less disposition to shade asking figures than two or three weeks ago. The demand for steel bars continues liberal. Structural steel requirements in this part of the State are rather light for the present, but the price remains steady at $3.85 to jobbers and $3.535 in carload lots. The demand in Los Angeles shows steady improvement, as might be expected with the large volume of building now in progress and projected in that section.

Coke.—Practically nothing is being done in coke, the supplies on hand being small but apparently ample for all present needs. During the last three months there were small tonnage arrivals by sea and for the past two months nothing came to hand. Some little tonnage is en route, but will not arrive for about three weeks. Current quotations are about $20 to $21 per ton, the same as for some weeks. Domestic coke is nigher.

Old Material.—Sales of old material are very moderate, with prices showing a marked downward tendency. While $14 to $14.50 is the full quotable figure, there are some who ask $15, but it would have to be a high grade of heavy melting steel to bring that price. Only small quantities of cast iron scrap are moving, with $25 to $26 as the prevailing price. Some dealers say $27, but it is doubtful if this could be called a quotable price. Sales are reported in Los Angeles at slightly lower figures and the trading there is said to be active, particularly for the more desirable grades.

Boston

Eastern Pennsylvania and Buffalo Furnaces Divide New England Business

BOSTON, Nov. 6.—A Massachusetts stove maker purchased 1000 tons No. 2X pig iron, two other melters 500 tons each of similar iron and several 200 and 100-ton as well as car lots run the aggregate sales for the past week well up into four figures. Business was about evenly divided between Buffalo and eastern Pennsylvania furnaces. Buffalo interests openly quote $22, furnace, on No. 2 plain and No. 2X, but $21.50 has been accepted. Eastern Pennsylvania No. 2X sold at $23, furnace, but is freely offered at $22.50 and at least one large tonnage was taken at less than $22.50 for No. 2X. Furnaces in that territory also are waiving differentials. Most iron sold is specified as fourth quarter, but deliveries on some of it will extend into January. A car of high silicon Lake charcoal sold on terms better than $27, furnace base.

We quote delivered prices on the basis of the latest reported sales as follows, having added $2.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$26.15 to $27.15
East. Penn., sil. 1.75 to 2.25	25.65 to 26.65
Buffalo, sil. 2.25 to 2.75	26.41 to 27.41
Buffalo, sil. 1.75 to 2.25	26.41 to 26.91
Virginia, sil. 2.25 to 2.75	30.42 to 31.42
Virginia, sil. 1.75 to 2.25	29.92 to 30.42
Alabama, sil. 2.25 to 2.75	29.60 to 31.10
Alabama, sil. 1.75 to 2.25	29.10 to 30.60

Warehouse Business.—Warehouse prices on cold-rolled steel have been reduced 40c. per 100 lb. to $4.35 on rounds and $4.85 on other shapes. Otherwise lists remain as heretofore. The movement of iron and steel out of stock is moderately active. Most warehouses are well stocked although last quarter purchases from mills were light. Warehouse prices follow:

Soft steel bars, $3.51½ at 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steel, $3.61½; tire steel, $4.80 to $5.15; open-hearth spring steel, $6.50 to $10; crucible spring steel, $12; regular steel bands, $4.31½; bands over 6 in. wide, $5.05 to $5.30; hoop steel, $5.80 to $6.30; cold rolled steel, $4.35 to $4.85; refined iron, $3.51½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.60 to $7.10.

Coke.—It is estimated 85 per cent of the New England foundries have contracted with the New England Coal & Coke Co. and the Providence Gas Co. for first half of 1924 by-product foundry coke requirements. Some melters contracted for less than they did a year ago, but collectively there is little variation in the tonnage. Both New England companies quote $12.50 delivered on November specifications.

Old Material.—With dealers still lacking orders and owners of scrap more anxious to sell, prices continue to weaken under their own weight. Transactions the past week centered largely in borings and turnings. Car lots of machine shop turnings and cast iron borings for rolling mills were taken at $7 to $7.50 shipping point, mixed borings and turnings at $6.75 to $7.25, and chemical borings at $9 to $9.50 for the best and $8.50 to $8.75 for less desirable material. Machinery cast is 50c. a ton lower due to a contraction in buying by New England foundries. The market for heavy melting steel is lifeless. Dealers, who last month offered $10 to $10.50 shipping point for such material, say they cannot do better than $9 to $9.50 today and that there is no demand at any price.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.50
No. 2 machinery cast	20.00 to 20.50
Stove plate	16.00 to 16.50
Railroad malleable	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.50 to $10.00
No. 1 railroad wrought	12.00 to 13.00
No. 1 yard wrought	10.50 to 11.00
Wrought pipe (1-in. in diam., over 2 ft. long)	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Cast iron borings, rolling mill	7.00 to 7.50
Cast iron borings, chemical	8.50 to 9.50
Blast furnace borings and turnings	6.75 to 7.25
Forged scrap and bundled skeleton	6.50 to 7.00
Street car axles	12.50 to 13.00
Street car wheels	11.00 to 12.50
Rails for rerolling	11.00 to 12.50

Philadelphia

Extreme Quiet Prevails in All Branches of Iron and Steel Market

PHILADELPHIA, Nov. 5.—Resigned to the belief that present quiet conditions may continue through the remainder of the year, the iron and steel trade is giving more attention to possible developments that may have a bearing on first quarter demand. Chief among the prospects promising renewed buying activity is the railroad program. This may be forecasted at the banquet in New York Thursday evening of the American Railway Association. The car-buying program, of which there has been much talk in recent weeks, has materialized only in a small way. An inquiry of the week is from the Chesapeake & Ohio for 2000 gondolas. Expectations of a large volume of locomotive buying are given fresh impetus through inquiries now in the market, some of which are in such intangible form that the roads are not mentioned by name, but the aggregate is more than 200 locomotives in addition to an equal number reported a few weeks ago. The Union Pacific has inquired for 60 and three other roads account for a total of 150. There is talk of the purchase of 500 by the Pennsylvania Lines, but this is very indefinite. It is upon such prospects that the steel trade is building hopes of renewed buying of steel.

In pig iron there have been no significant developments since the sale, reported last week, of 2500 tons of foundry grades at $21, furnace, the record low price of the year. Small sales are being made at nearer $23, furnace. Scrap prices show a little more resistance and declines this week are few.

Pig Iron.—Surprisingly little pressure has been exerted by pig iron consumers to obtain quotations on foundry iron as low as $21, furnace, made a week ago by a New Jersey furnace on a 2500-ton sale. In fact, there has been no inquiry of sufficient interest to tempt other producers to go that low. Sales have been confined mostly to carload lots, a few sales of 200 or 300 tons being exceptional for this district, although there has been demand of a slightly more important character from New England. The price situation remains much the same as a week ago, furnaces quoting around $23, furnace, on No. 2 plain and No. 2 X on small lots and reserving lower prices for such tonnage as may seem worthy of special consideration. Thirty-two hundred tons of low prosphorus iron from England was unloaded here last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.64 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.64 to 24.63
East. Pa. No. 1X	23.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.00 to 24.00
Gray forge	23.00 to 24.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Both domestic producers and British agents are quoting $110, furnace or seaboard, on ferromanganese. Sales are few and unimportant.

Semi-Finished Steel.—No real test of billet prices is being made, and quotations remain at $40, Pittsburgh, for open-hearth rerolling quality and $45 for forging quality.

Plates.—A large producer of plates reports that sales in October exceeded those of September by 10 per cent and a gradually improving demand over the remainder of the year is looked for, based largely on the fact that many consumers are fast using up their stocks and will need some replenishment. The Newport News Shipbuilding & Dry Dock Co., which was awarded the contract for building two steamships for the Old Dominion Line, has let the steel, about 3600 tons of plates and 1200 tons of shapes, to the Carnegie Steel Co. The latter company will also furnish steel for five barges which the Sun Shipbuilding Co. will build for the Standard Oil Co., and this latter order may be increased either to 15 or 24, each barge requiring a few hundred tons of steel. The Union Pacific Railroad is in the market for 60 locomotives. Prices quoted range from 2.40c. to 2.50c., Pittsburgh, according to the mill and tonnage desired. Plates for export have been quoted as low as 1.98c., Pittsburgh.

Structural Material.—Current inquiries are made up of small lots, mostly of carload size, there being an absence of building projects of size. The general contract for the new Ford Motor Co. plant to be built in Philadelphia has not been let. The contract for this work will be let at Detroit. Prices on plain material range from 2.40c. to 2.50c., Pittsburgh, two Eastern mills naming the lower price. For export a price which is equivalent to 1.98c., Pittsburgh, was quoted.

Warehouse Business.—Orders for steel out of stock are estimated by one large warehouse at about 60 per cent of what is considered a normal volume. Prices for local delivery are as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅞ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅞-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅞-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c. Norway iron, 7c.

Bars.—Demand for steel bars is confined to small lots. Mill prices are firm at 2.40c., Pittsburgh, on bars rolled from new steel, but on rerolled bars quotations are slightly lower. Steel bars for export have been quoted at a price equivalent to 2.08c., Pittsburgh. Bar iron remains at 2.35c., Pittsburgh.

Sheets.—The announcement of the American Sheet & Tin Plate Co. that present prices on sheets will be continued for first quarter contracting has created more confidence among independent sheet producers. While one or two mills are still quoting 3.75c. on black and

4.90c. on galvanized, most of the mills are adhering strictly to 3.85c. on black, 5c. on galvanized and 3c. on blue annealed.

Ore.—Ore imports last week were 12,553 tons of iron ore from Sweden and 8330 tons of manganese ore from Africa.

Old Material.—Prices for scrap begin to show a little resistance to the pressure which has been bearing them downward for the past few months. Large dealers are becoming satisfied that scrap is a good purchase at present levels and are accumulating stocks. Consumers are showing very little interest. The Steel Scrap Co. of Philadelphia, organized and owned by the Perry, Buxton, Doane Co. and Luria Brothers & Co., scrap brokers and dealers, was successful bidders for two uncompleted battleships at Philadelphia and two at Brooklyn. The warship under construction at Norfolk, Va., was awarded to N. Block & Co., that city.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00
Scrap rails	15.00
Steel rails for rolling	$17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	20.00 to 21.00
Couplers and knuckles	17.50 to 18.50
Cast-iron car wheels	17.50 to 18.50
Rolled steel wheels	17.50 to 18.00
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	15.50 to 16.00
No. 1 forge fire	11.00 to 11.50
Bundled sheets (for steel works)	11.00 to 11.50
Mixed borings and turnings (for blast furnace use)	10.50 to 11.00
Machine shop turnings (for steel works use)	11.00 to 11.50
Machine shop turnings (for rolling mill use)	11.50 to 12.00
Heavy axle turnings (or equivalent)	12.00 to 13.00
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	19.00 to 19.50
Heavy breakable cast (for steel plants)	16.00 to 16.50
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	17.00 to 17.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	20.00 to 21.00
Steel axles	18.50 to 19.50

Cincinnati

More Interest in Pig Iron—Inquiries Mostly for Early Shipment

CINCINNATI, Nov. 5.—There are indications of impendence of activity in the pig iron market. Sales are not heavy, but there is more inquiry from widely scattered sources. Most of the inquiries are for November and December shipment, though a few are for first quarter and first half. Sentiment in the trade is undoubtedly better and there are some who believe a buying movement is in the making. Prices are unchanged from last week, though in the case of Southern irons nearly all the producers have named $21, base, as the price at which they will book first quarter business. The market for the rest of this year continues at $19.50, however, and one furnace has booked small orders for first quarter at this price. In the North, the market is still $23, Ironton, though reports are current of this price being shaded in competition with lake front furnaces, which last week were quoting $22 in competitive territory. There is little activity in basic, Bessemer or silvery irons and prices are unchanged. Inquiries include 2200 tons of foundry from West Virginia, 500 tons of malleable from Indiana and two lots of 500 tons of Southern for radiator plants in southern Illinois. Some inquiries for Southern iron are also reported from Michigan, but as the delivered price of Northern iron is so much lower, it is not expected that any business will accrue from this source. Hanging Rock furnace went out last week, and Marting furnace is expected to go out.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.05
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.27
Basic Northern	25.27
Malleable	25.27

Sheets.—The American Sheet & Tin Plate Co. has opened its books for first quarter at the prices named for last quarter of this year. It is likely independent companies will follow the lead, and some of them have already done so. On current business, however, prices of black and galvanized sheets are being shaded by $2 to $3 per ton. Tin plate is in good demand.

Structural Materials.—There is a fair demand for structural shapes in small tonnages, but no large projects have come out during the past week. The Big Four Railroad awarded 535 tons of bridge work. A number of projects, long in contemplation, are expected to develop within the next three weeks, however, and considerable tonnages of steel will be required.

Reinforcing Bars.—The city of Louisville is taking bids on a sewage disposal plant requiring 120 tons of bars. This is the largest inquiry actually reported. An inquiry from Dayton for approximately 500 tons for a bank building is doubtful, the plans for the building having been withdrawn temporarily. Prices of reinforcing bars are unchanged from last week, the range being from 2.25c. for rerolled bars, to 2.40c. for bars rolled from new billets.

Warehouse Business. — Jobbers report business rather quiet during the past week or two, though no price changes have been made.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $2.60 per 100 lbs.; common wire nails, $3.60 per keg base; cement coated nails, $3.30 per keg.

Finished Materials.—Each succeeding week sees a slight improvement in the demand for finished materials, but orders are being placed for only small tonnages for immediate delivery. There has been an increased demand for steel bars and plates, and one inquiry for 1000 tons of tank plates is current for immediate delivery. Prices of bars are being maintained at 2.40c. and plates at 2.50c. On cold-finished bars, however, the top of the market is not more than 3.15c., with 3c. being the more common quotation. Wire products are in only fair demand. Some small orders for light rails have been placed from coal mining districts. Hoops and bands are showing more activity, and prices are firmer. Track accessories are in demand from only a number of the smaller roads, but an inquiry is expected for a large tonnage of spikes, angle bars and tie plates from the Big Four Railroad. Bolts and nuts are moving slowly, with prices weak.

Coke.—Coke demand is light, particularly in furnace and foundry grades. Domestic inquiries, however, are more numerous. Prices generally are unchanged from last week, Connellsville furnace being quoted at $3.75 to $4, foundry at $5 to $6. New River foundry is quoted at $10 to $11, and Wise County furnace, $5.25 to $6, and foundry $6 to $7.

Old Material.—A steel company in this district is reported to have purchased 2000 tons of heavy melting steel at $14.50, delivered. While the market is not active, some dealers report more interest on the part of consumers, and small sales are being made. There is a tendency on the part of dealers to hold the market at present levels, but with large tonnage being thrown on the market through Government sales and railroad offerings, this is likely to prove something of a job, in the opinion of consumers. Prices generally, while nominal, are fairly steady at last week's levels.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$9.50 to $10.00
Iron rails	13.00 to 13.50
Relaying rails, 50 lb. and up	27.00 to 27.50
Rails for rolling	13.00 to 13.50
Heavy melting steel	12.00 to 12.50
Steel rails for melting	12.50 to 13.00
Car wheels	12.50 to 13.00
Per Net Ton	
No. 1 railroad wrought	11.00 to 11.50
Cast borings	7.50 to 8.00
Steel turnings	7.00 to 7.50
Railroad cast	13.50 to 14.00
No. 1 machinery cast	16.50 to 17.00
Burnt scrap	10.50 to 11.00
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	12.50 to 13.00
Pipes and flues	6.50 to 8.00

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3.15c.
Bands, base, per lb.....3c. to 3.15c.
Strips, base, per lb.....3c. to 3.35c.
Cotton ties, per bundle of 45 lb.....$1.63

Cold-Finished Steels

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.25c. to 4.50c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.75c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....50 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.25c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $2.75 to $2.85
Small rivets .....65 and 10 to 70 off list

Track Equipment

Spikes, ⅞ in. and larger, base, per 100 lb.....	$3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb.....$3.15 to	3.50
Spikes, ⅜ in. ..... to	3.50
Spikes, boat and track, base, per 100 lb.....	3.50
Track bolts, ¾ in. and larger, base, per 100 lb..	4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..	5.00 to 5.50
Tie plates, per 100 lb.....	2.55 to 2.60
Angle bars, base, per 100 lb.....	2.75

Welded Pipe

Steel Butt Weld		Iron Butt Weld		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	29½	¼ to ⅜.....	+11	+39
¼ to ⅜.....	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			
		Lap Weld			
2	55	43½	2	23	7
2½ to 6.....	59	47½	2½	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	41½	7 to 12.....	26	11
11 and 12.....	53	40½			
		Butt Weld, extra strong, plain ends			
⅛	41	24½	2 to 3.....	61	50½
¼ to ⅜.....	47	30½	¼ to ⅜.....	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	25	12
1 to 1½.....	60	49½	1 to 1½.....	30	14
		Lap Weld, extra strong, plain ends			
2	53	42	2	23	9
2½ to 6.....	57	46½	2½ to 6.....	29	15
7 to 8.....	56	45½	4½ to 6.....	28	14
9 and 10.....	52	39½	7 to 8.....	21	7
11 and 12.....	45	32½	9 to 12.....	16	2
	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.....	27	1½ in.	+18
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....	+ 8
3 in.	40	2 to 2¼ in.....	— 2
3¼ to 3¾ in.....	42½	2½ to 3 in.....	— 7
4 to 13 in.....	46	3¼ to 4½ in.....	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.	31	4 in. and 4½ in.....	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		
Hot Rolled			
3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in.....	39		

Less carloads, 4 points less. Add $8 per net ton for more than standard gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage....	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage.....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage....	15
2¼-in. O.D. 12 gage..	17	5⅝-in. O.D. 9 gage....	55
2¼-in. O.D. 11 gage..	18	5¾-in. O.D. 9 gage....	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	25-lb. coating I. C....	$14.90 16.20
8-lb. coating I. C....	11.30	30-lb. coating I. C....	17.35
12-lb. coating I. C....	12.70	35-lb. coating I. C....	18.35
15-lb. coating I. C....	13.95	40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.
Box Annealed, One Pass Cold Rolled
No. 28 (base), per lb.....3.75c. to 3.85c.
Automobile Sheets
Regular auto body sheets, base (22 gage), per lb.....5.35c.
Galvanized
No. 28 (base), per lb.....4.90c. to 5c.
Long Ternes
No. 28 gage (base), 8-lb. coating, per lb.....5.30c.
Tin-Mill Black Plate
No. 28 (base), per lb.....3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export...	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.255	Cleveland, Youngstown		Kansas City (pipe)...	0.795
Baltimore, export	0.225	district	0.19	St. Paul	0.60
New York, domestic....	0.34	Detroit	0.29	Omaha	0.735
New York, export.....	0.255	Cincinnati	0.29	Omaha (pipe)	0.795
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.15	Pac. Coast, ship plates	1.34
Birmingham	0.58	Memphis	0.56
Jacksonville, all rail..	0.70	Jacksonville, rail and water	0.415
New Orleans	0.67		

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.95

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore washed, 51 per cent manganese, from the Caucasus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	39c.
Manganese ore, Brazilian or Indian, nominal	43c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	$42.00 to 45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	41.00 to 44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	$2.50 to 85.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	30.00
Silvery iron, 7 per cent, per ton, furnace	31.00
Silvery iron, 8 per cent, per ton, furnace	32.50
Silvery iron, 9 per cent, per ton, furnace	34.50
Silvery iron, 10 per cent, per ton, furnace	36.50
Silvery iron, 11 per cent, per ton, furnace	39.80
Silvery iron, 12 per cent, per ton, furnace	43.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr, per lb. contained Cr, delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr, per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50
Per 1000 f.o.b. works:	

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois		37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00
Wire rods, common soft, base, No. 5 to ⅛-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2.15c. to 2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Rails, ⅞-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$ 4.80	$ 4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 -in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application.

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.50 to 3.75
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Two New York Buildings to Require 23,000 Tons

Of 39,500 tons of structural steel being inquired for, 23,000 tons are involved in two buildings for New York City, one of them for the American Telephone & Telegraph Co. requiring 18,000 tons. Awards for the week total more than 19,000 tons, of which 4400 tons were taken for a subway extension in Queens Borough, New York. Much of the work closed and in prospect is accounted for by the continued building activity in New York, unusual for this time of year.

School No. 205, Brooklyn, 1550 tons, to Hay Foundry & Iron Works.

American Insurance Co. building, Newark, N. J., 300 tons, to Hay Foundry & Iron Works.

Parental School, Flushing, 600 tons, to Harris Structural Steel Co.

Apartment house, 1133 Park Avenue, New York, 500 tons, to Paterson Bridge Co.

School No. 99, Kew Gardens, 350 tons, to George A. Just Co.

Apartment house, 2789 Broadway, 1000 tons, to Paterson Bridge Co.

Loft Building, West Thirty-eighth Street, 1000 tons, to Levgar Structural Co.

Baltimore & Ohio, three bridges, 1250 tons, to the American Bridge Co.

Norfolk & Western, two bridges, 300 tons, to the American Bridge Co.

Power house, Weymouth, Mass., 400 tons, to the Shoemaker, Satterthwait Bridge Co.

Bigelow Hartford Carpet Co., Thompsonville, Conn., 300 tons, to the American Bridge Co.

Atlantic Coast Line, shop at South Rocky Mountain, N. C., 200 tons, to the Phoenix Bridge Co.

New York Central, bridge repair work, 200 tons, to the Phoenix Bridge Co.

Queen's subway, section 2, 4400 tons, Jobson-Gifford Co. low bidder.

Paper-Calmenson Co., warehouse, St. Paul, Minn., 212 tons, to St. Paul Structural Steel Co.

Swift & Co., eight 80-ft. deck plate girder spans for approach to Mississippi River bridge for St. Paul Bridge & Terminal Co., 403 tons, to Wisconsin Bridge & Iron Co. instead of to Milwaukee Bridge Co. as reported last week.

Two public schools, Indianapolis, 350 tons, to Robert Berner Structural Steel Co.

Riley Hospital, Indianapolis, 132 tons, to Hetherington & Berner.

Big Four Railroad, bridge work, 535 tons; 375 tons, to McClintic-Marshall Co., 96 tons, to Fort Pitt Bridge Co., 52 tons, to American Bridge Co., and 12 tons, to Mt. Vernon Bridge Co.

Power plant, Camden, N. J., 8000 tons, bids taken Nov. 5.

Gas holder, at Birmingham, 1000 tons, to Stacey Brothers Gas Construction Co.

National Plate Glass Co., (General Motors Corporation) Detroit, plant at Blairsville, Pa., 1200 tons, to McClintic-Marshall Co.

Herbst Department Store addition, Fargo, N. D., 133 tons, to St. Paul Foundry Co.

City of Portland, Ore., Bull Run Pipe Line, No. 3, 129 tons, to Poole & McGonigle.

National Plate Glass Co., plant addition, Blairsville, Pa., 1238 tons, to McClintic-Marshall Co.

Financial Center Building, Seventh and Spring Streets, Los Angeles, 794 tons, to Baker Iron Works.

Second unit, Dexter-Horton Building, Seattle, Wash., 283 tons, to Wallace Equipment Co., Seattle.

John Marshall High School, Minneapolis, 221 tons, to Crown Iron Works.

Red River Power Co., Grand Forks, N. D., concrete pit and arrangement of conveyor and coal crusher, 120 tons, to Fargo Foundry Co., Fargo, N. D.

St. Paul Bridge & Terminal Railroad, bridge, 400 tons, to Wisconsin Bridge & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Marlborough Building, Broadway and Thirty-sixth Street, New York, 5000 tons.

American Telephone & Telegraph Co., New York, building, 18,000 tons.

High school, Fall River, Mass., 300 tons.

High school, New York, 3000 tons.

High school, Brooklyn, 1200 tons.

Bell Telephone Co., two buildings in Philadelphia and one in Camden, N. J., 1800 tons.

Power plant, Camden, N. J., 8000 tons, bids open Nov. 5.

The Great Northern Railroad, works, 1300 tons.

Pennsylvania Railroad, Northwestern Region, one two-track and one six-track viaduct, Fifty-sixth Street, Chicago, 350 tons.

Standard Oil Co., Cleveland, two crane runways, 550 tons.

RAILROAD EQUIPMENT BUYING

C. & O. in Market for 2000 Gondolas—B. & O. Buys 1000 Car Bodies—Locomotive Inquiries

The expected car and locomotive buying program of the railroads is beginning to develop. The Baltimore & Ohio has placed orders for 1000 car bodies. The Chesapeake & Ohio is inquiring for 2000 gondolas and the Wabash for 1750 car bodies. In addition to the inquiry of the Union Pacific for 60 locomotives, there are tentative inquiries for 150 from three roads. Considerable locomotive buying is expected.

The railroads on Oct. 15 had 10,509 locomotives in need of repair, an increase of 686 over the number in need of repair on Oct. 1, and 16.4 per cent of the total number on line, according to the Car Service Division of the American Railway Association, which also reports that freight cars in need of repair on Oct. 15 totaled 155,637, or 6.9 per cent of the total number on line, this being an increase of 4305 over the number in need of repair on Oct. 1.

The Baltimore & Ohio has awarded 500 hopper car bodies to the Pressed Steel Car Co. and 500 box car bodies to the American Car & Foundry Co.

The Union Pacific is inquiring for 60 locomotives.

The Chesapeake & Ohio is inquiring for 2000 gondolas.

The Wabash is inquiring for 1750 automobile cars and will soon enter the market for 250 70-ton gondola cars.

The St. Louis-San Francisco has decided not to buy 2500 refrigerator cars on which it recently took figures.

The Northern Pacific is inquiring for 1000 underframes for ore cars.

The Louisville, Henderson & St. Louis has ordered 2 coaches, 2 compartment coaches and 3 baggage and mail cars from American Car & Foundry Co.

The Baltimore & Ohio is inquiring for 50 coaches and 4 dining cars.

The Seaboard Air Line is inquiring for 3 combination baggage and mail cars and 1 to 3 horse cars.

The Alabama & Vicksburg is inquiring for 200 box cars of 40-tons capacity and 100 composite gondola and 100 flat cars of 50-tons capacity.

The Cambria & Indiana has placed repairs on 100 to 250 hopper cars with American Car & Foundry Co.

The Southern Pacific has ordered 20 switching locomotives of the 6-wheel type from Lima Locomotive Works.

The Minnesota Steel Co. has placed 1 locomotive with Baldwin Locomotive Works.

The Nashville, Chattanooga & St. Louis is inquiring for 100 combined ballast and coal cars.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Oct.	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
31.....	13.00	12.25	41.75	6.75	6.45	6.67½	6.32½
Nov.							
1.....	13.00	12.37½	41.85	6.75	6.45	6.70	6.35
2.....	13.00	12.37½	41.50	6.75	6.45	6.70	6.35
3.....	13.00	12.37½	.....	6.75	6.45	6.70	6.35
5.....	13.00	12.37½	41.87½	6.75	6.45	6.70	6.35

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Nov. 5.

None of the markets is particularly active and prices are a little higher in some of them. Buying of copper has been fairly active and the tin market has shown some life. There is very little change in lead and the zinc market is holding its own.

Copper.—The turn for the better in the electrolytic copper market, noted a week ago, has made fair progress and sales of from 25,000,000 to 30,000,000 lb. are estimated to have been made last week, largely to domestic consumers. The price has also stiffened until 12.62½c., delivered, is the minimum with some companies taking no orders at less than 12.75c., delivered. There continues to be considerable inquiry before the market and prospects for further sales are fairly good. The key to the entire situation, however, is the rate of production which continues unchecked. Until this is curtailed it is difficult to see how any sustained rise in the market can be long lived.

Copper Averages.—The average price of Lake copper for the month of October, based on daily quotations in THE IRON AGE, was 13.21c. The average price of electrolytic copper was 12.58c., refinery, and 12.83c., delivered.

Tin.—A fairly good business in Straits tin was done last week. About 300 tons changed hands on Oct. 31, bringing the total turnover for the three days, Oct. 29 to 31, to about 700 tons. On Nov. 1 and 2 also transactions involving about 100 tons were recorded daily. The premium on spot delivery has practically disappeared. On the New York Metal Exchange the inauguration of two calls per day on Oct. 29 has brought a moderate revival of business with a turnover of about 300 tons for the week. Spot Straits tin today was quoted at 41.87½c., New York, and prices in London were £208 5s. for spot standard, £207 7s. 6d for future standard and £209 for spot Straits, all about £2 per ton higher than a week ago. Statistics for the month of October show that deliveries for the month were 5540 tons, with 3677 tons in stock and landing on Oct. 31. The October imports were 6855 tons, making the total for the first ten months 58,532 tons.

Lead.—The market is very quiet and steady, with practically no developments having an influence on the course of prices. These are unchanged from a week ago with quotations in the outside market with 6.45c., St. Louis, and 6.75c., New York. The quotation of the leading interest is also unchanged at 6.75c., New York

Zinc.—The market is a little stronger but still exceedingly quiet. Prime Western for early delivery is quoted at 6.35c., St. Louis, or 6.70c., New York. Current transactions are limited to 100 tons in carload lots which are few in number and there is practically no demand from foreign consumers.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 29c. to 32c.

Antimony.—The market is stronger and there is fear of a shortage before the end of the year. There are no offerings at less than 9c., duty paid, for less than wholesale lots, with jobbing lots bringing 9.25c. to 9.75c.

Aluminum.—Virgin metal, 98 to 99 per cent, is quoted by importers at 25c. to 26c. per lb., duty paid, New York, with some sellers unable to obtain the metal from their foreign representatives.

Old Metals.—The market is very unsettled. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.25
Copper, heavy and wire	11.25
Copper, light and bottoms	9.75
Heavy machine composition	9.75
Brass, heavy	7.25
Brass, light	6.00
No. 1 red brass or composition turnings	8.25
No. 1 yellow red brass turnings	6.50
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.25
Sheet aluminum	16.25

Chicago

CHICAGO, Nov. 5.—Tin, zinc and antimony have advanced while copper and lead have declined. Zinc has been strengthened by foreign buying. Antimony has advanced following the disappearance of foreign offerings of that metal. The market is generally somewhat more active, the railroads particularly being prominent purchasers. The old metal prices remain unchanged. We quote in carload lots: Lake copper, 13.25c.; tin, 42.75c.; lead, 6.50c.; spelter, 6.40c.; antimony, 10.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 8.75c.; red brass, 8c.; yellow brass, 6c.; lead pipe, 5c.; zinc, 4c.; pewter, No. 1, 22c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers	37	43½	Int. Har. pf.	106¼	107¼
Allis-Chal. pf.	89½	90	Jones&Laughlin.	107½	107½
Am. B. S. & Fdy.	70½	72½	Lima Loco.	63¾	66⅝
Am. B. S. & F. pf.	104½	104½	Midvale Steel	24¾	26½
American Can.	90⅜	99⅜	Nat'l-Acme	7⅜	8⅜
Am. Can pf.	106¾	107	Nat. En. & Stm.	39⅜	42⅛
Am. Car & Fdry.	153	160½	N. Y. Air Brake	33¼	37
Am. C. & F. pf.	121¾	121⅝	Otis Steel	7	8⅜
American Loco.	68⅛	72⅜	Otis Steel pf.	45	47½
Am. Radiator	79⅝	86½	Pressed Stl. Car	50⅝	55
Am. Stl. Fdries	83⅝	86½	Pressed Stl. pf.	83	85
Am. Stl. Fd. pf.	100¼	100¾	Replogle Steel	8	9¼
Baldwin Loco.	115⅜	124	Republic	41⅝	46
Baldwin Loco pf.	113	113	Republic pf.	88	90
Bethlehem Steel.	46¾	48⅜	Sloss-Sheffield	42	45
Beth. Stl. 7% pf.	89¼	89⅞	Steel of Canada.	65½	69¼
Beth. Stl. 8% pf.	101	104	Un. Alloy Steel.	30	31½
Br. Em. Stl. 1 pf.	55½	55½	U. S. Pipe.	35½	38⅞
Chic. Pneu. Tool	79	82	U. S. Pipe pf.	80¾	81
Colo. Fuel.	20	24¼	U. S. Steel.	86¼	93⅝
Crucible Steel.	57¾	63⅝	U. S. Steel pf.	118	119
Crucible Stl. pf.	87	91¼	Vanadium Steel.	27¼	29¼
Gen. Electric.	170½	182¾	Va. I. C. & Coke	54	54
Gt. No. Ore Ctf.	23½	30⅜	Whouse Air Br.	79	79⅜
Gulf States Steel	71⅜	78¼	Ygstown S. & T.	63	64¼
Int. Har.	66⅜	75⅜			

Steel and Iron Companies' Reports

Net income of the Inland Steel Co. for the nine months ended Sept. 30 was $3,731,356, after interest, depreciation, depletion and taxes, equivalent after preferred dividends to $2.85 per share on 1,182,799 shares of common stock. The regular quarterly dividend of 62½c. on common and $1.75 on preferred was declared.

The American Steel Foundries report net profit for the nine months ended Sept. 30 of $5,724,044, after charges and Federal taxes. This compares with net profit of $2,317,357 in the corresponding period of 1922. Net earnings after deductions for operating expenses and Federal taxes amounted to $6,822,270 as compared with $3,157,463 in the previous year.

Third-quarter report of the M. A. Hanna Co. shows total net income of $679,936, after interest, depreciation, Federal taxes, etc., equivalent after preferred dividends to $1.47 per share on the outstanding 282,844 shares of no par common stock. Total net income for the first nine months of 1923 was $1,938,137, or $4.32 per share on common stock, after allowance for preferred.

Net income of the Reynolds Spring Co. for the third quarter was $112,758, after depreciation and Federal taxes, compared with $121,529 in that period of 1922. Net income for the first nine months of the year after depreciation and Federal taxes was $250,786 against $187,294 in 1922.

PERSONAL

Edward L. Garihan, for a number of years connected with the Bethlehem Steel Co. in various capacities, and also sales manager of the Tioga Steel & Iron Co., has been appointed sales manager of the Chrome Steel Works, Carteret, N. J.

D. P. Bennett, who has been a vice-president of the Pittsburgh Steel Co. for some time, has been elected president of the company, succeeding Willis F. McCook, who died several months ago. All former directors were re-elected and H. J. Miller, secretary of the company, was elected director to succeed Mr. McCook. E. H. Bindley was elected vice-president. Mr. Bennett has been identified with the Pittsburgh Steel Co. for nine years, first as vice-president and treasurer, later giving up the latter position to give his entire time to the vice-presidency. He was born in Leith, Scotland, in 1865 and attended the public schools. His first business experience was in the office of commission merchants in Glasgow, where he remained until he left for America in 1890. He then became identified with the National Railroad Co. of Mexico, starting as stenographer. In December, 1891, he was transferred to Mexico City, where he filled various positions, latterly assistant to the president, until April, 1906, when he became vice-president of the company with headquarters in New York. On the reorganization of the railroad in 1908, he was made vice-president of the new company, retaining that position until 1914, when he resigned and moved to Pittsburgh to join the Pittsburgh Steel Co.

Thomas B. Miller has been appointed general manager of the Powers Foundry Co., Elkton, Md.

H. B. Ackland, mechanical engineer connected for several years with Westinghouse, Church, Kerr & Co. as engineer-in-charge, has been appointed New York manager of the G. H. Williams Co., Erie, Pa.

Albert W. Gray, works manager Billings & Spencer Co., Hartford, Conn., has resigned to join the Bristol Brass Co., Bristol, Conn., in the same capacity, succeeding John W. Wade, who takes on property management, allowing more time for his duties as mayor of the city. Mr. Gray was for several years hydraulic engineer for Stone & Webster, Boston, and prior to that was engaged in hydraulic work for Western bankers. No successor to Mr. Gray will be named, his duties being assumed by President F. C. Billings.

R. A. Olsen has been appointed sales manager for the Tuthill Spring Co., Chicago, succeeding H. C. Wright, who has entered another field.

G. M. Youngkrantz has been added to the Chicago sales force of the Tuthill Spring Co. and will probably call on the jobbing trade of the west, north and central territory.

Edward M. Woodward, Jr., has been elected president and treasurer of the Woodward & Powell Planer Co., Worcester, Mass., succeeding in both offices his father, the late Edward M. Woodward. John W. Robinson, who was secretary, has been made secretary and vice-president, succeeding in the latter office Edward M. Woodward, Jr.

James J. Dale has resigned as vice-president in charge of sales and director of the Consolidated Machine Tool Corporation of America, 17 East Forty-second Street, New York.

Roy M. Ellis, who was connected with the Brown & Sharpe Mfg. Co., Providence, R. I., for seven years in various capacities, has been appointed New England sales manager for the Calorizing Co., Pittsburgh. During the World War he was general manager of the A. H. Fox Gun Co. and subsequently was engaged as industrial engineer with the Industrial Co., Boston, where he will locate his present headquarters.

B. F. Murdock, formerly associated with the Debevoise-Anderson Co., Inc., Boston, is now with John Tredennick, that city.

T. J. McCormack has resigned as hydraulic engineer of the Wellman-Seaver-Morgan Co., Cleveland and has become affiliated with the S. Morgan Smith Co., York, Pa., manufacturer of hydraulic turbines.

Gunnar Dillner, president Trafikaktiebolaget Grangesberg-Oxelosund, Stockholm, Sweden, and S. Frisell of the same company, who have been in the United States for three weeks in the interest of Swedish iron ore, have sailed on the steamship Berengaria.

Slump in British Shipbuilding

The tonnage of vessels actually under construction in British yards at the end of September, 1923, is the smallest for 14 years, according to an analysis of Lloyd's shipbuilding returns by the Transportation Division of the Department of Commerce. The figure given—1,271,195 tons—includes 242,000 tons on which work has been suspended.

A specific illustration of the present condition is shown by the fact that launchings on the Clyde during the quarter ended Sept. 30 totaled 27 vessels of 10,565 gross tons. Thus, for three months' tonnage leaving the ways was about equal to two medium-sized cargo vessels, but actually was spread over 27 craft.

While the immediate cause of this situation is generally regarded as the long-drawn-out dispute with the Boilermakers' Society, many claim that the real trouble lies deeper and that the dispute has been allowed to drag on because this period of poor business was regarded by employers as an opportune time for a fight to the finish on an old issue.

Canadian Scrap Market

TORONTO, ONT., Nov. 5.—While a stronger undertone is beginning to make its appearance in the Canadian iron and steel scrap market, business in general is without feature. Melters are entering the market from time to time but in practically all cases orders are confined to small tonnages and future buying is backward. As a result of the limited demand for scrap trading is quiet, even between dealers, and the latter are only taking in material at prices below the present market level or when they see prospects of an immediate turnover.

Dealers' buying prices are as follows:

	Toronto	Montreal
	Gross Tons	
Steel turnings	$10.00	$7.00
Machine shop turnings	10.00	7.00
Wrought pipe	8.00	8.00
Rails	12.00	13.00
No. 1 wrought scrap	14.00	14.00
Heavy melting steel	12.00	11.50
Steel axles	15.00	18.00
Axles wrought iron	18.00	20.00
	Net Tons	
Standard car wheels	15.00	16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	20.00	20.00

Heavy Loading of Cars

Loading of revenue freight for the week of Oct. 20 continued at record levels, compared with preceding years, the total for the week being 1,072,881 cars.

Although this was 24,393 cars below the week of Sept. 29, when 1,097,274 cars were loaded, the greatest for any one week in history, the total for the week of Oct. 20 was considerably above any week in previous years.

The number of cars loaded in the Eastern district was an increase of 7.1 per cent over the same week last year, while in the Southern district an increase of 7.9 per cent was reported. In the Western district there was an increase of 10.2 per cent. The total for the week of Oct. 20 was an increase of 82,992 cars over the corresponding week in 1922 and an increase of 108,070 cars over the corresponding week in 1921.

This was the eighteenth week this year that loading of revenue freight has exceeded 1,000,000 cars.

OBITUARY

EDGAR A. STRONG, president Strong, Carlisle & Hammond Co., Cleveland, and first president of the National Supply and Machinery Dealers' Association, brief mention of whose death was made in THE IRON AGE of last week, was 82 years old and was engaged in the machinery and mill supply business in Cleveland 36 years as head of one of the largest machine tool and factory supply distributing companies in the Central West. He was born near Manchester, Conn., in 1841. After serving through the Civil War, he located in Cleveland, where he was connected with the William Bingham Co., hardware jobbers, for 20 years. Later he formed a partnership with R. H. Carlisle and W. J. Turney to handle mill supplies. Mr. Turney was soon succeeded by L. H. Hammond, who entered the employ of the company upon its formation and the three men continued their close affiliation as officers of the company for 36 years from its organization until Mr. Strong's death. Mr. Strong was very active in the organization of the National Supply and Machinery Dealers' Association, which was formed in 1905 and, after his retirement as its first president, continued to serve as a member of the advisory board, composed of past presidents, up to the time of his death. Mr. Strong enlisted with the Sixteenth Regiment of Connecticut Volunteers in 1862 and attained the rank of first lieutenant. The last 11 months of the Civil War he spent in seven different Southern prisons. He was a man of lovable character and leaves a host of friends. He was a member of the Union Club, Chamber of Commerce and Old Colony Club of Cleveland. A daughter and one son, Herbert W. Strong, secretary of the Strong, Carlisle & Hammond Co., survive. The latter also has been very active in the National Supply and Machinery Dealers' Association and served three years as its president, being first elected in 1916.



EDGAR A. STRONG

JOHN W. HARRISON of St. Louis, a pioneer Missouri manufacturer, whose iron and steel products were converted into shot and sheli during the Civil War, and into water mains and reinforced structures during the early building days of St. Louis, died Oct. 30, aged 83. He entered the State University at Columbia, Mo., from which he was graduated in 1858. A year later he removed to St. Louis and after taking a special commercial course, went to Irondale, Mo., where he was made superintendent of the Irondale Furnace Co., a position which he held until 1865. It was during this period that his company was engaged in the manufacture of guns and ammunition for the war. He was made vice-president of the Shicle-Harrison-Howard Iron Co. in 1867 and was identified with the firm until 1900. In 1890 he organized the Howard-Harrison Co. of Bessemer, Ala., and was instrumental in building up a large foreign trade, especially with Mexico. He was elected president of the Hillman Land & Iron Co. in 1898 and was active in all his enterprises until he retired in 1906.

WILLIAM F. WENDT, founder of the Buffalo Forge Co. and a lifelong resident of Buffalo, died at his home, 570 Richmond Avenue, on Oct. 30, aged 65 years. He had been ill for some time. In 1877 Mr. Wendt founded the Forge company and served as president until his retirement in 1916. In that interval he became an active figure in several other companies, including the Buffalo Steam Pump Co., the George F. Squier Mfg. Co. and the Carrier Air Conditioning Co. Several years ago he became interested in the development of South American trade and in 1905 he founded a publication printed in Spanish and Portuguese in the interest of South American business. Besides his widow, one daughter survives. Henry Wendt, a brother, is now president of the Buffalo Forge Co.

MICHAEL BARTHOLOMEW RYAN, inventor of an electric automatic chain welding machine, died Oct. 31, at his estate at Milford, Conn. He was born in Richmond, Va., 60 years ago.

FRANKLIN P. CARTER, treasurer and general manager Carter & Hakes Mfg. Co., Winsted, Conn., milling machines and special machinery, died at his home in Winsted, Oct. 30, in his seventy-first year. As a boy Mr. Carter was employed by the Pratt & Whitney Co., Hartford, Conn., and remained in that city until 1899, when he moved to Winsted and helped organize the company in which he was active the remainder of his life.

JOSEPH NESBITT, president Western Heavy Hardware Co., Oakland, Cal., died at the Merritt Hospital in that city on Oct. 24, as a result of injuries sustained when struck by an automobile. He was 69 years of age and had been head of the company for many years.

JOHN EDWARD STEAD, former president of the Iron and Steel Institute (British) and brother of the noted journalist, W. T. Stead, died at his home at Redcar, Yorkshire, England, on Oct. 31, after a long illness. Mr. Stead was an acknowledged authority in England on the metallurgy of steel and was well known for his work as metallurgical chemist. He was the recipient of numerous honorary degrees in science. He was born in 1851.



J. E. STEAD

JOSIAH G. MUNRO, for many years treasurer of the Punxsutawney Iron Co., died in Boston on Nov. 2, aged 75 years. He was founder of the Buffalo Arms Co.

RICHARD THEW, founder of the Thew Shovel Co., Lorain, Ohio, died at Fresno, Cal., Nov. 1, age 77 years.

Mill Activities in the Mahoning Valley

YOUNGSTOWN, Nov. 5.—Rolling mill schedules are still on a declining basis in the Mahoning Valley. The Republic Iron & Steel Co. has suspended the eight active sheet mills which it has been maintaining in operation at its Niles works. The Youngstown Sheet & Tube Co. has suspended a lapwell tube mill and its 110-in. plate mill.

Of 120 sheet and jobbing mills in the Mahoning Valley, 63 were scheduled at the beginning of the week, and 15 of 17 pipe mills. The sheet mill schedule is the lowest in the past year and a half.

Stockholders of the Northway Motors Corporation, Natick, Mass., trucks, have voted to merge with the Amalgamated Motors Corporation. Under plans outlined by P. W. Hansel, president Bessemer American Motors Corporation, at the Northway stockholders' meeting last week, Northway stock will be exchanged for Amalgamated, the Natick company's $200,000 debt will be liquidated, and production increased.

Building permits issued in Milwaukee from Jan. 1 to Nov. 1 aggregated $35,560,485 in value, and a total of $42,000,000 is predicted for the entire year by W. D. Harper, building inspector. The best previous year, 1922, produced an aggregate of $26,489,643.

COMPUTING MACHINE ECONOMY

Formulas Worked Out by Engineers Discussed at Material Handling Conference

Formulas recently completed for computing economies of labor-saving equipment were discussed at a conference of the material handling division of the American Society of Mechanical Engineers, held in the Engineering Societies Building, New York, Nov. 2.

The need of such formulas and their value to both the prospective user and the seller of equipment were emphasized. A letter from another association asking for data as to the conserving of labor by labor-saving devices brought out the fact that there was extreme difficulty in getting scientific data on the amount of labor saved. Undertaking representative researches as to cost, concentrating at first on a specific field, was discussed, and a program of research into truck transportation costs was put before the meeting.

Obtaining fundamental information for applying the formulas was considered by the chairman of the division, H. V. Coes, Ford, Bacon & Davis Co., New York, as a next step, and the appointment of a committee for that purpose was proposed. Getting the ultimate cost per unit of product handled was emphasized as the chief problem, it being difficult at present to obtain the information for making a comparison on a true basis.

A motion was made to have printed copies of the formulas sent out to manufacturers with an invitation to discuss them at the annual meeting of the society in December. Stimulation of the active interest of the local sections of the society in the subject was discussed and cooperation with other societies suggested.

In its work the division found it necessary to have a standard method to yield results truly comparable, and mathematics are combined with economics to produce the desired results. Although devised for use of the materials handling division, it is felt that the fundamental economics as set up in mathematical form are applicable to most cases in which a difference in labor is obtained by the new method as compared with the old, whether it be a material handling device, a machine tool or a new process or method. An abstract of the formula follows:

The whole problem is considered to be one of comparative costs. While it has been customary to charge factory burden or factory overhead to the labor-saving devices, it has not been customary to credit the labor-saving device for its portion of overhead saved, which generally is proportional to the difference in labor, since there is usually a definite relationship between labor and overhead.

In computing the costs, very frequently the labor to be saved has been classed as indirect or non-productive labor and as such is a part of the overhead or burden and should, therefore, not bear any superimposed charge from the other components of the overhead, as this would be pyramiding the charges. But where comparative costs of the economics are desired, then the indirect or non-productive labor should be charged with all the other component parts of the overhead with the exception of itself.

Two common mistakes then have been made, rendering it difficult to secure proper comparative results and frequently obscuring the issue: (1) The omission of burden or overhead charges on that portion of labor saved in comparing costs. (2) The omission of burden charges on indirect labor in comparing costs, although they were added to the direct labor.

The following rule, therefore, for setting a value upon labor saved by an improved process has been evolved: Whatever valuation is arrived at in cost accounting as the cost per unit of labor used in production also establishes the value per unit of labor saved by an improved process. For simplicity, no monetary value need be placed upon labor employed in comparative processes, except upon the amount of difference in labor required at the current rate aid plus "burden" or an equivalent.

Other items of cost should in like manner be accounted at the same rate as for similar items in making up the cost of product.

In calculating comparative cost, a new item is introduced which very likely becomes a factor in regular cost accounting and which the engineers and economists recognize, namely, the monetary value of increased production. Improved methods or devices will reduce the cost of making an article, since more are produced in a stated time, which is the same as reduction in one or more of the items of directly applicable cost. The rule is therefore: In a comparative accounting, increased production will always carry a higher value than that attached to normal production.

With the above consideration as a foundation, the formulas for calculating economies of labor-saving equipment are set forth herewith. Let:

Debit Items—

A = percentage allowance on investment
B = percentage allowance to provide for insurance, taxes, etc.
C = percentage allowance to provide for upkeep
D = percentage allowance to provide for depreciation and obsolescence
E = yearly cost of power, supplies and other items which are consumed, total in dollars

Credit Items—

S = yearly saving in direct cost of labor in dollars
T = yearly saving in fixed charges, operating charges or burden, in dollars
U = yearly saving or earning through increased production, in dollars

X = percentage of year during which equipment will be employed
I = initial cost of mechanical equipment

Results—

Z = maximum investment in dollars justified by the above consideration
Y = yearly cost to maintain mechanical equipment ready for operation
V = yearly profit from operation of mechanical equipment.

Then

$$Z = \frac{(S + T + U - E)X}{A + B + C + D} \quad (1)$$

$$Y = I(A + B + C + D) \quad (2)$$

and

$$V = [(S + T + U - E)X] - Y \quad (3)$$

Feeling that handling machinery, even if left idle a large part of the year, would probably require, under most conditions, approximately the same repair through deterioration as though in use, the committee makes no deduction for such lack of use in the estimated cost of upkeep C. If greater accuracy be considered necessary, use C multiplied by X in place of C in the formulas.

Applications of the formulas are given in the report.

GERMAN IRON AND STEEL MARKET

Wolff May Furnish Pig Iron to Russia—Bars, Sheets and Iron Active

(By Radiogram)

BERLIN, GERMANY, Nov. 5.—The market is quiet, except for pig iron, bars and sheets, for which there is good demand. The pig iron and steel syndicates' prices, which now are quoted in gold marks, are unchanged. But manufacturers of tools and other finished iron and steel goods have announced price cuts averaging one gold mark per kilogram (10¾c. per lb.).

The locomotive market is stagnating; there is great difficulty in getting export orders.

Ruhr production question still is unsettled. There are 340,000 unemployed on the Ruhr, omitting Essen.

Soviet newspapers report that Otto Wolff of Cologne has offered to supply Russia's pig iron deficiency for five years on credit, taking in exchange ore mining concessions.

The plant of the Barney & Smith Car Co., Dayton, Ohio, will again be offered for sale at public auction, Dec. 5. It is reported that one of the larger railroad companies is desirous of purchasing the property, and the sale was ordered to give it an opportunity to make a bid.

The American Locomotive Co., 30 Church Street, New York, has placed its Pittsburgh plant on the market, comprising a number of buildings and 10 acres of land, and will discontinue operations entirely at this point. The works have been closed for some time past.

The plant of the Gramm-Bernstein Co., Lima, Ohio, motor trucks, will be offered for sale Nov. 15 by order of the Federal Court. E. G. Kirby is receiver of the company.

Electric Furnace Types Surveyed

Advantages and Disadvantages of Various Forms for Foundry Use—Arc, Resistance and Induction Furnaces Compared from Many Angles

BY LEONARD W. EGAN*

ELECTRIC furnaces far outclass the best production practice of any of the combustion furnaces in every factor, and from every standpoint, except perhaps the first cost of the installation. They greatly simplify the labor problem and render the manager independent of the melter. They permit the routine repetition of the melting schedule, which has been reduced to the mere charging of the metal into the furnace, stirring and skimming it if necessary and, when melted, pouring it. The time and temperature of pouring are decided by pyrometer and can be placed under the eye of the manager or superintendent at all times.

It is conservative to say that the metal can be melted for half the cost of that of combustion furnace practice, considering the cost of fuel, metal loss, upkeep, etc., and this, not considering the indirect savings in the improvement of the product, uniformity, reduction of rejections, satisfaction of the customer, savings in floor and storage space, absence of worry, and so on. The improvement in working and sanitary conditions in the foundry, brought about by the use of the electric furnace, are highly important items, there being absence of noise, heat and fumes.

Consideration of Furnace Types

There are four principal types of electric furnaces in use in this branch of melting: the open arc, the muffled or smothered arc, the resistance and the induction furnaces. The direct or open arc furnaces are represented by a number of makes and types such as the Snyder, the Booth-Hall, the Volta, the Geolette, etc. The Geolette furnace, however, is in general use for brass melting by the arc process. The muffled arc furnace is represented by one type only, the General Electric. The resistance furnace is also represented by one type only, the Bailey. The induction furnace is represented by two types, the Ajax-Wyatt and the General Electric.

In this discussion we are considering only the four principal type furnaces, applicable to the brass and aluminum foundry. They are the rocking arc furnace, the muffled arc furnace, the resistance furnace and the induction furnace. The four types represent practically the entire field of commercial electric melting, and the few vertical electrode furnaces of the steel melting type in use in melting non-ferrous metals have not been considered.

Rocking Arc Furnace

The rocking arc furnace was developed by Dr. Geolette of the Bureau of Mines, Washington, during the war. A patent taken out on the furnace was donated later to the American public. Thus any one desiring to use the furnace may do so. The rocking mechanism was developed by the General Electric Co. The furnace is made by the Detroit Electric Furnace Co., Detroit.

A horizontal cylinder with a refractory lining, the furnace has a horizontal electrode passing through a round opening directly in the center of each of the cylinder ends. A hand wheel is provided for moving the electrodes in and out. An arc is formed in the center of the furnace, the heat of which is radiated to the walls and the bath. The furnace rests on a roller mechanism somewhat similar to that of the metal mixer in the steel plant. This rotates the furnace in one direction, then reverses and rotates it in the other. In this way heat is transmitted from the arc to the walls of the furnace, and is in turn wiped off the wall by the metal as it passes over it. In addition, heat is radiated to the bath directly from the arc. The arc does not come in contact with the bath, as in the steel melting furnaces, and in reality the furnace is of the indirect arc type.

Principal advantages claimed for this type of furnace are the low kwhr. consumption per ton of metal melted, the ability to melt all grades of scrap and turnings and the speed of melting. This furnace is most rapid in its action and, for heavy production, has the largest capacity per unit of any of the four types mentioned.

Some of its disadvantages are the proximity of a high temperature arc to the metal; the hand operation of the electrode; the necessity of pouring the heat when it is melted and the dependance of the furnace upon the rocking mechanism and water cooling at the electrode ports. The furnace is made in large and small units, as low as 200 lb. capacity, single phase. The current consumption is in the neighborhood of 200 to 225 kwhr. per ton. All of the metal may be poured, if desired, at each heat.

Muffled Arc Furnace

As developed by the General Electric Co. during the war, in the large size only, the muffled arc furnace was a combination of smothered arc and resistance type. Later on other types were made in smaller units, having a hearth capacity of about 950 lb. and a melting rate of 500 lb. per hr. The furnace is two phase, arranged with a cross electrode embedded in the brickwork of the hearth, which connects with the two bottom electrode blocks. The return of the two-phase current supply is fastened to this cross electrode.

Heat is generated by two short arcs drawn between the upper electrodes and the bottom electrode blocks; the arcs are smothered by crushed carbon which surrounds the arcs. Heat is transmitted to the metal by contact with the heated bottom electrode blocks, which are in direct contact with the bath; some heat is given off by radiation of the arcs and reflected by the roof. The furnace has motor-operated electrode regulators, is hand tilting and arranged for water-cooling of the electrode ports.

The consumption on daylight melting is 400 kwhr. per ton for yellow brass (60/40) and 470 kwhr. per ton for red brass (80/20.) The furnace has a rating of 120 kw. in transformer capacity. The hearth capacity is approximately 1000 lb., with a melting capacity of 500 lb. per hr., the melting practice being to pour only 500 lb. of the hot metal, charging the same amount of cold metal into the unpoured remainder of the bath. The furnace operates at a power factor of approximately 95 per cent.

Some of the advantages claimed for the furnace are a large source of heat, at a comparatively low temperature; ability to measure and control the temperature of the metal; a neutral or reducing atmosphere; freedom from contaminating gases, freedom from agitation of the bath, allowing the dirt and slag to float to the surface, where it can be skimmed off, etc.

Some of the disadvantages are the proximity of an arc to the metal in the event the arc is not properly smothered; water-cooling of the electrode ports;

*Special engineer Ohio Steel Foundry Co., Lima, Ohio. This is taken from a paper on "Complete Electrification of the Foundry Industry," read at the Buffalo convention of the Association of Iron and Steel Electrical Engineers.

trouble in holding the unpoured heat for long periods of time; amount of auxiliary equipment, etc.

Baily Resistance Furnace

The Baily resistance furnace was developed by the Electric Furnace Co., Alliance (now of Salem), Ohio, somewhat earlier than either of the two preceding types. The furnace is made in different sizes, the one in most general use having a hearth capacity of 1500 lb., a melting rate of 500 to 800 lb. per hr., and approximately 100 kw. in transformer capacity. Briefly, it is a circular shell with a refractory lining, hand tilting and arranged so that the roof can be raised by a hand-wheel for renewing the resistor material. A trough of silicon carbide, filled with crushed carbon, forms the resistor or heating element.

Heat is radiated by the carbon resistor to the roof and is reflected to the bath; some heat is also radiated from the sides of trough to the bath. The trough itself becomes conductive after being heated, and forms a part of the resistor, a portion of the current being carried by it. It is customary to pour the entire bath each heat, the time of which is about 2 hr. Cold stock is then charged into the furnace, stirred and skimmed when necessary, then poured.

Current consumption is approximately 300 kwhr. per ton and the metal loss under one per cent. The furnace requires no auxiliary apparatus or water-cooling, it is single phase and operates at approximately unity power factor, the nature of the load being comparable to the same capacity of incandescent lighting. Secondary taps are brought out from the secondary of the transformer to points on a hand-operated switch. The voltage, varied by moving the switch from point to point, controls the electrical input and the temperature of the furnace.

Advantages claimed for this type of furnace are uniformity of the metal by reason of the soft reflected heat; the temperature of the roof, the hottest part of the furnace, does not exceed that of the bath by more than 300 deg. Fahr., the metal can be skimmed and stirred at will; the unpoured heat can be held indefinitely without disturbing the metal composition; a neutral or reducing atmosphere; absence of contamination from gases; complete control of the temperature and manipulations; flexibility of operation; low metal loss; absence of auxiliaries and moving parts, etc.

Some of the disadvantages are that the roof must be raised and fresh carbon added to replace wastage; the possibility of breakage of the carbide trough, etc.

Ajax-Wyatt Induction Furnace

The Ajax-Wyatt induction furnace (known also as the Bridgeport Brass furnace) was developed during the war, largely for the casting of cartridge case slabs of yellow brass. It is manufactured by the Ajax Metal Co., Philadelphia, the 60-cycle furnace in 80-kw. size having a hearth capacity of 1500 lb. Circular in shape, the furnace has a refractory lining that has been preformed and burned. This lining is made in a special shape and fits into the shell of the furnace. When the lining is to be renewed the old one is taken out and a new one fitted in place. The operation is comparable to fitting a new crucible into a crucible type combustion furnace.

The circular chamber of the furnace contains the molten bath in one mass; immediately under the bath is the yoke of a single-phase transformer, the secondary of which is a thin shell of metal being melted, constituting one turn around the transformer yoke. A large volume of current at a very low voltage is induced in the secondary or thin shell of metal at the bottom of the bath. The passage of this large current generates heat within the metal itself, which is in turn transmitted to the bath above. The magnetic forces within the transformer set up a rotor effect of circulation of the metal, which is constant as long as the current is flowing. This circulation, inherent in the induction furnace, is not peculiar to this or any other type of induction furnace. The direction and intensity of the circulation are governed to some extent by the nature of the magnetic field set up by the transformer and also by the arrangement of the transformer.

As mentioned above, the heat is generated at the bottom of the furnace at the bottom of the bath and carried to the bath by circulation. As the bath is in a mass and not in the form of a ring, as in the typical steel-melting furnace of this type, there is no "pinch effect" that was so troublesome in this type of furnace. The current flows around the secondary in the vertical plane, instead of in the horizontal plane as in the steel-melting furnace. The temperature is controlled by varying the voltage and the electrical input to the primary of the transformer. The furnace is either nose or trunnion tilted; the nose-tilted furnace is motor-operated while the trunnion-tilted furnace may be either hand or motor-operated.

With a hearth capacity of 1500 lb., the furnace has a melting capacity of about 500 lb. per hr. The current consumption is 200 kwhr. per ton and the metal loss under 1 per cent. It is single phase and has a transformer capacity of 80 kw. No figures are available as to the power factor, but in all probability it is not better than 75 per cent.

Hot metal from some external source must be charged into the furnace to prime it; when the heat is melted, only a portion is poured, perhaps less than half of it. Cold metal to this same amount is then charged into the remaining bath and melted, when the operation is repeated. During the night the unpoured portion of the last heat must be left in the furnace and the current left on, to keep it in a molten state. If the last heat is poured entirely, hot metal from an external source must be charged in the morning, as there must be hot metal to form a secondary before heat can be generated.

Some of the advantages claimed for this type of furnace are that the heat is generated within the metal itself; control of the temperature and manipulations; low power cost and metal loss; constant circulation of the metal, insuring thorough mixing; absence of contamination from gases, etc.

Some of the disadvantages are necessity for priming the furnace with hot metal from an external source, which limits its flexibility in foundry practice; special nature of the electrical application; cooling of the furnace primary coil; circulating currents in the melting of certain grades of metal, etc.

Repulsion Induction Furnace

The General Electric Co. repulsion induction furnace is a recent development just announced. It is built in one capacity only, arranged for nose or trunnion tilting. The furnace has a hearth capacity of 1200 lb. and a melting rate of 750 lb. per hr. It follows the same principles as the Ajax-Wyatt and is to some extent similar in construction, but differs somewhat in the manner of applying the transformer yoke to the furnace. It is arranged with a refractory lining of special shapes which have been preformed and burned, and are fitted into the furnace as in the preceding case.

The circular chamber contains the bath in one mass. Immediately under the bath, and communicating with the circular chamber by two ports, is a thin cylinder of molten metal surrounding the primary of the transformer and forming the secondary. This secondary, as in the preceding case, forms one turn in which a large volume of current at a very low voltage is induced. The passage of the current through the metal of the secondary generates heat within it, which in turn is communicated to the bath above through the two ports located at the ends of the cylinder forming the secondary.

Differences Between Two Induction Furnaces

One of the chief differences between the two types of induction furnaces lies in the manner in which the metal forming the secondary circulates through and communicates the heat to the bath. In the General Electric furnace it passes up through a port at one end of the cylinder, thence through the bath and down

through the other port at the other end of the cylinder. In the Ajax-Wyatt furnace the bottom of the bath forms a sector of the secondary turn and the circulation is a churning action. In the General Electric furnace the isolation from the bath, of the metal forming the secondary is more complete than in the other type.

With the ports under the bath located as they are, and by reason of the primary coil arrangement, the circulation is longitudinal along the coils and unidirectional. Another chief difference in the two types is the ability to control the degree of circulation or agitation of the bath metal by shifting the position of the primary coil on the transformer leg, thereby varying the field. This is patented.

As in the preceding case, hot metal must be charged from an external source to prime the furnace. In melting practice, only a portion of the metal is poured each heat. In this case a little less than half is left in the furnace, into which the cold stock is charged and, when melted, the process is repeated. During the night current must be kept on to hold the unpoured portion of the last heat molten, or hot metal charged into the furnace in the morning.

The furnace has a transformer rating of 75 kw., is single phase, operates at 68 to 75 per cent power factor, has a melting rate of 750 lb. per hr. and a hearth capacity of 1200 lb. The current consumption is 200 kwhr. per ton for yellow brass (60/40) and 230 kwhr. per ton for red brass (80/20). The metal loss melting yellow brass in one per cent and for red brass 0.5 per cent. From the above it would seem that this furnace is more rapid in its action than the preceding, and with economies about the same. Low-pressure air from an external source or a motor-driven blower auxiliary is required for cooling the primary coil of the transformer.

The advantages and disadvantages of this furnace are about the same as those in the preceding case, except that the rapidity of melting is somewhat higher.

Where the Induction Furnace Excels

Theoretically the induction is the ideal electrothermic unit. All the heat is generated directly within the bath itself, none of it being reflected or carried to the bath by any external medium. This is diametrically opposite to all other methods of melting. There is no electrode consumption, water cooling or electrode auxiliary equipment losses, as in the arc furnaces. Induction furnaces can be constructed more compactly than other types of the same capacity, and so on. In melting steel in the induction furnace two or three serious disadvantages presented themselves which practically have disqualified the use of this type of furnace for this use.

One serious disadvantage was the inability to burn in a hearth or lining at a temperature higher than that of the bath. Another serious drawback was the disturbance to the power supply and the splashing and surging of the steel in the narrow channel forming the bath, caused by the "pinch effect" inherent in the furnace. Another drawback was the necessity of charging hot metal to prime the furnace.

In the two types of induction furnaces just described, the first of these disadvantages has been taken care of by inserting a preformed and burned lining into the furnace. The second disadvantage is reduced to a minimum, if it exists at all, since the "pinch effect" is reduced by the weight of the bath. The third disadvantage remains, however, and until it is eliminated the flexibility of this type of furnace and its field of application to the average foundry will be seriously hampered. The induction furnace has not proved satisfactory in the commercial melting of aluminum, which is a very tricky metal in the matter of pouring temperatures.

Resistance Furnace Excels with Dirty Charge

As the resistance furnace inherently is sluggish in its action, no rapid changes in temperature take place in the furnace, which thus forms a thermal flywheel effect in routine operation. However, the resistance furnace approaches nearest to the electrification of the combustion melting processes, with the elimination of a great number of the attending disadvantages, trials and troubles of combustion practice. Anything that can be melted in the average combustion practice can be melted better and cheaper in the resistance furnace. It adapts itself more than any other type to local shop conditions and its flexibility is such that it can be made to suit the average foundry conditions. It permits any degree of mechanical working of the bath, settling out of dirt and slag and allows a variation of manipulation of copper-nickel alloys carrying zinc.

The neutrality of the atmosphere and the control of the temperature in both the induction and resistance furnaces make possible the holding of part or all of the unpoured metal for a long period, without disturbing in any way the composition of the metal. This is a highly valuable feature, lending itself greatly to the local conditions existing at any time in the production schedule or other shop conditions.

It cannot be denied that the furnace, when installed, becomes a shop operating unit, and will receive only that care, attention and treatment which the operating man gives it. To be a commercial success the furnace must suit the operating department; it must be adaptable to the particular foundry practice where it is to operate; it must be sufficiently flexible in operation of being built around and worked into local shop practice and methods, and still be sufficiently positive in its action to produce more and better metal and cheaper at the pouring floor than in the combustion practice.

Deciding Factors as to Choice

The deciding factors or advantages in the use of one type of electric furnace over the other would be the net sum of the various advantages neutralized by the disadvantages, the economies in kwhr. per ton being an important factor, but not the most important. The deciding factors would be the uniformity of the castings produced; the ability to use low grade scraps without undue loss; the ability to melt any grade of metal under special process or procedure in local conditions with any degree of manipulation of the bath by rabbling, skimming, mixing, etc.; by placing the melting in the hands of the superintendent or metallurgist and taking it out of the hands of the melter, thus permitting the use of cruder labor and so on. The circulation of the metal, as in the induction furnace, is an advantage when the alloy is made up of new, clean metal; on the other hand, this is very undesirable in melting dirty borings and small scrap, which is the case in a large portion of melting in jobbing foundries.

There are two distinct fields of application in the two principles of electric furnace melting into which the two types fit. In mills and foundries producing large tonnages of uniform composition, the induction furnace finds its best application, since it is rapid in its action, and probably the lowest in current consumption per ton of metal melted of any of the types in use. It is claimed for the Ajax-Wyatt furnace that it melts 95 per cent of all brass melted electrically, over 50 per cent of all that melted in the brass rolling industry and more than that of all other types of electric furnaces combined. No special claims are made for the foundry industry.

In the average foundry, where different alloys are melted and where the product consists of small and thin-webbed castings, where intermittent operation may be required, where the heat may be made up of different grades of metal, including wash metal and borings that are dirty, etc., the resistance furnace finds its best application.

High Cost a Deterrent

One main obstacle to the application of the electric furnace to the foundry industry lies in its first cost. If a melting unit can be produced in small capacity, which will operate efficiently, and which can

be sold for $1,000 or $1,500, then electrified melting will receive its greatest impetus. It is the same as in the automobile industry: The greatest business in its history came when the "automobile" was reduced in price so that the every-day citizen could purchase one. It is no longer a luxury as in the past. That is what has been and is still the chief trouble with the electric furnace in the brass foundry. While being a necessity in fact, it is still a luxury to the average plant.

PERCENTAGE OF MANUFACTURE

Census Bureau Shows Average Operation of 56.8 Per Cent of Capacity in 1921—Iron and Steel Much Lower

WASHINGTON, Oct. 23.—Final figures of the Bureau of Census for 1921 presenting statistics of output of manufactures, possible output and the actual output compared with the possible output have just been completed and will be published soon. The report shows that 134 blast furnaces, whose products were valued at $419,771,244, operated at 40.1 per cent of possible capacity and that the value of the products, had these furnaces operated at total capacity, would have been $1,045,535,678. Only a slightly better showing was made in this year of depression in 494 steel works and rolling mills. The value of the products of these works was $1,481,659,352, representing 43.3 per cent of possible capacity, while the value of the products on a basis of total capacity is placed at $3,425,271,113.

Figures of interest to the iron and steel and related industries, carried in the report, are given.

The statistical study of 353 industries represented reports from 194,194 establishments reporting operations in 1921. The total actual output of these manufacturers amounted to $42,318,241,453, while the estimated possible output would have aggregated $74,-123,930,736, making the actual production 56.8 per cent of the possible ouput.

	Number of Establishments	Value of Products	Possible Output	Per Cent of Possible Output
Iron and Steel:—				
Blast furnace plants	134	$419,771,244	$1,045,535,678	40.1
Steel works and rolling mills	494	1,481,659,352	3,425,271,113	43.3
Bolts, nuts, washers and rivets*	125	357,734,454	966,630,633	37.0
Cast iron pipe	70	44,321,548	84,610,229	52.4
Steel doors and shutters	45	12,466,701	20,044,867	62.2
Iron and steel forgings*	240	83,191,126	216,553,400	38.4
Iron and steel nails and spikes, etc.*	56	10,976,307	16,951,795	64.8
Wire	61	99,945,614	174,929,486	57.1
Wirework not elsewhere specified	413	66,384,507	128,758,368	51.6
Steel barrels, drums and tanks	31	14,525,010	33,126,246	43.8
Structural work*	1,021	250,085,446	602,471,582	41.5
Iron and steel, processed or welded	220	6,202,156	11,154,553	55.6
Iron and steel wrought pipe	57	56,662,278	119,205,491	47.5
Horseshoes*	12	1,931,812	2,802,210	68.9
Total of group	*3,079*	*2,995,847,000*	*6,848,045,000*	*42.4*
Machinery:—				
Machine tools	348	67,729,362	291,773,840	23.2
Electrical machinery, apparatus and supplies	1,333	833,985,443	1,469,398,706	56.8
Cash registers and calculating machines	49	53,652,943	83,778,206	64
Engines and water wheels	296	199,498,575	630,603,513	31.6
Foundry and machine shop products	9,013	1,565,526,944	3,506,842,559	44.6
Foundry supplies	50	4,965,678	17,276,179	28.7
Gas machines and gas and water meters	65	21,956,424	34,363,178	63.9
Pumps, steam and other power	133	47,239,001	87,116,334	54.2
Pumps, not power	86	22,723,412	39,543,515	57.5
Agricultural implements	353	163,816,679	462,386,925	35.4
Sewing machines, cases and attachments	36	35,608,297	71,447,233	49.8
Stoves and hot air furnaces	357	101,572,793	214,832,574	47.3
Total of group	*12,121*	*3,118,275,000*	*6,909,365,000*	*45.1*
Vehicles:—				
Shipbuilding, steel	126	356,214,854	749,609,001	47.5
Springs, steel, vehicles, heavy machines in steel works or rolling mills	126	31,750,373	73,461,571	43.2
Cars and general shop construction and repairs by steam railroad companies	1,766	1,180,030,133	1,608,708,792	73.4
Cars and general shop construction and repairs by electric railroad companies	560	87,312,426	99,719,090	87.6
Cars, electric railroad, not including operations of railroad companies	10	14,856,068	40,165,004	37
Cars, steam railroad, not including operations of railroad companies	108	325,680,157	753,011,576	43.3
Locomotives not made by railroad companies	22	102,023,358	291,575,891	35
Motor vehicles	385	1,671,386,976	3,875,762,348	43.1
Motor vehicle bodies and parts	1,974	408,016,532	954,000,249	42.8
Motorcycles, bicycles and parts	46	23,091,749	67,055,905	34.4
Total of group	*5,123*	*4,200,362,000*	*8,513,068,000*	*49.3*
Hardware and Tools:—				
Hardware	430	116,688,661	221,140,053	52.8
Steam fittings and steam and hot water heating apparatus	274	127,366,887	237,856,529	53.5
Files	39	7,647,252	20,831,273	36.7
Saws	79	18,185,297	46,350,114	38.8
Scales and balances	65	15,884,770	29,111,726	54.6
Screws, machine	160	18,365,242	52,830,624	34.8
Needles, pins, hooks and eyes	68	18,896,168	30,602,095	61.7
Total of group	*1,115*	*323,034,000*	*639,223,000*	*50.5*
Non-ferrous:—				
Brass, bronze, copper and allied products	911	214,903,735	466,817,539	46
Copper, tin and steel iron work	3,105	148,776,164	278,522,054	53.4
Smelting and refining copper	28	234,895,245	566,356,023	41.5
Lead pipe, sheet and shot	29	10,473,575	18,333,143	57.1
Smelting and refining lead	23	150,593,779	214,590,544	70.2
Smelting and refining zinc	29	37,482,675	101,537,189	36.9
Smelting and refining metals not elsewhere specified	5	7,060,205	43,079,109	16.4
Smelting and refining, not from the ore	60	15,150,055	39,123,111	38.7
Aluminum manufacture	27	45,822,161	97,846,627	46.8
Total of group	*4,337*	*865,158,000*	*1,826,106,000*	*47.4*
Miscellaneous:—				
Coke, not including by-products	176	221,313,363	473,855,300	46.7
Crucibles	17	1,969,930	15,474,048	12.7
Galvanizing	51	4,017,820	8,185,662	49.1
Enameling	43	2,022,927	4,798,680	42.2
Total of group	*287*	*229,324,000*	*502,315,000*	*45.7*
Total, six groups	*26,002*	*11,641,970,000*	*25,238,132,000*	*46.1*

*Not made in steel works or rolling mills.

Rehearing of Assigned Car Case Concluded at Washington

WASHINGTON, Nov. 9.—After lasting 10 days, the rehearing before the Interstate Commerce Commission of the assigned car case was concluded last Thursday. Briefs are to be filed by Dec. 1, and while no date for arguments has been set, it has been tentatively suggested that they be made on Dec. 17-19, inclusive. This arrangement will cause a postponement of the effective date of the order entered in the case which was fixed for Dec. 1 after being postponed from the original and earlier date. In the event the order is not modified, the railroads and industrial interests, including iron and steel manufacturers, have considered the idea of taking the proceeding before the Supreme Court. There are those, however, who doubt that it can be made a court case. They take the view that it is purely an administrative matter resting solely with the commission.

Opposition to the assigned car was expressed strongly by a number of witnesses. Among them was Van A. Bitner, representing the United Mine Workers of America. It was his contention that if all kinds of assigned cars are eliminated it will be but a short time until uneconomical mines will be driven out of business. The result would be to operate only economical mines, he said, equally divide transportaton, stabilize industry and give uniform and steady employment to miners.

Speaking for the National Coal Association, its traffic manager, John D. Battle, said there are two phases to the assigned car situation, one dealing with the railroads and the other with cars owned by industries.

Sympathy for Bonar Law's Family

After obtaining the authorization of leading pig iron makers and steel manufacturers whose offices are located in New York, Gueret, Jacks & Partners, Inc., New York, last week dispatched a cable to H. Arnold Wilson, a director of William Jacks & Co., Ltd., Glasgow, asking him to convey to the bereaved family of the Hon. Bonar Law the heartfelt sympathy and condolence of the pig iron and steel manufacturers of the United States. Bonar Law had been identified many years with the iron and steel industry of Great Britain. Mr. Wilson was asked to convey the message because he was not only a close business associate of Mr. Law for a great many years, but also one of his warmest personal friends.

New Control of Bock Bearing Co.

CLEVELAND, Nov. 5.—At a meeting of the Bock Bearing Co., Toledo, Ohio, held Oct. 31 in Cleveland, a new directorate was elected, vesting the control of the company in the hands of the preferred stockholders.

W. E. Bock, founder and first president and general manager of the Bock Bearing Co., was elected president, and R. B. Wallace, vice-president. The other directors are: Maynard H. Murch, Frank A. Scott and A. V. Cannon. R. E. Clingan remains as general manager, and C. J. Steinbicker, former treasurer, now becomes secretary and treasurer.

No changes are contemplated in the active organization, but the management feels that under the new arrangement the company will have much better prospects for expanding. For the past six years the company has been controlled by the Standard Parts Co., Cleveland, through ownership of the common stock.

Johansson Gages Available to Users

Official announcement has been made by the Ford Motor Co., Detroit, of the acquisition of C. E. Johansson, Inc., Poughkeepsie, N. Y., the American company engaged in the manufacture and sale of the well-known Johansson gage blocks and measuring tools. The purchase, which was reported in THE IRON AGE of Oct. 18, also includes the sole American rights to the gages and the methods by which they are made.

The Johansson gage blocks and other instruments will continue to be manufactured for the trade. It is the feeling of the Ford company that since these measuring intruments are a recognized standard of measurement and precision and of such value to manufacturers and the general public, they should be available to all who desire to purchase them.

Mr. Johansson, inventor of the gages, becomes a factory executive in the Ford organization. He arrived from Eskilstuna, Sweden, Oct. 23, and has begun his work at the Ford engineering laboratory at Dearborn.

Amalgamates with Babcock & Wilcox Companies

TORONTO, Nov. 5.—R. O. McCulloch announces a deal whereby the Goldie & McCulloch Co., Ltd., Galt, Ont., amalgamates with Babcock & Wilcox, Ltd. of London, England and the Babcock & Wilcox Co. of New York, in a new Canadian company to be known as Babcock, Wilcox, Goldie, McCulloch Co., Ltd. The new concern has secured a charter with a capital stock of $3,000,000, and according to official announcement is now operating under direct management of R. O. McCulloch and A. R. Goldie. The new company takes over all of the local business, except the safe works, the latter to be operated separately by a different company to be known for the present as Goldie & McCulloch, and will continue manufacturing operations in its present quarters, although it is pointed out that a new plant will be erected in Galt for this undertaking in the not distant future.

John F. Dailey, who purchased the former gun plant of the Symington-Anderson Corporation at University Avenue, Rochester, N. Y., has sold it to Louis Gibaud of the Louis Gibaud Motors, 255 East Avenue, that city. Mr. Dailey purchased the property several weeks ago from the United States Government and the Todd Protectograph Co. for $300,000. It was sold to Mr. Gibaud for $1,000,000. The Davis Machine Tool Co., St. Paul Street, Rochester, was purchased at sheriff's sale two weeks ago by Mr. Gibaud.

The steel group of the Buffalo Atheltic Club on Tuesday evening, Oct. 30 tendered a farewell dinner to Clinton S. Bradley, former resident manager of the Buffalo office of the Jones & Laughlin Steel Corporation. Eugene J. McCarthy, president of Beals, McCarthy & Rogers, presided. A set of studs of platinum and gold was presented. Mr. Bradley took up his duties Nov. 2 as manager of sales of the hot rolled department with headquarters at Pittsburgh.

COMING MEETINGS

November

Electric Power Club. Nov. 19, 20, 21 and 22. Fall meeting at French Lick Springs Hotel, French Lick, Ind. S. N. Clarkson, Rockefeller Building, Cleveland, secretary.

December

American Society of Mechanical Engineers. Dec. 3, 4, 5 and 6. Annual meeting in New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Exposition of Power and Mechanical Engineering. Dec. 3 to 8, inclusive. Second annual exposition, Grand Central Palace, New York. Headquarters, Grand Central Palace, New York.

American Institute of Chemical Engineers. Dec. 5, 6, 7 and 8. Winter meeting in Washington, D. C. J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y., secretary.

Trade Changes

The Cadillac Machinery Co. has been appointed exclusive sales agent for the Grand Rapids grinding machine division of the Gallmeyer & Livingston Co., Grand Rapids, Mich., to cover the Detroit territory.

The Gas Producer & Engineering Corporation of New Jersey has changed its address from 115 Broad Street to 30 Church Street, New York.

The Landis Tool Co. has purchased all patents, patterns, jigs, etc., of the Oakley cutter and reamer grinder, manufactured by the Oakley Machine Tool Co., Cincinnati. This machine will be manufactured by the Landis company and will be known as the Landis cutter and reamer grinder, with sizes corresponding to the No. 1, 2 and 3 Oakley machines.

The Blaw-Knox Co., Pittsburgh, has opened a Buffalo office at 622 Genesee Building. J. C. McQuide has been transferred from the Pittsburgh organization to manage the Buffalo office, which now will serve Northern and Western New York and adjacent territory.

The Reeves Brothers Co., Alliance, Ohio, makers of steel tanks and oil refinery equipment, cement and mining machinery and creosoting plants, has opened an office at 2012 L. C. Smith Building, Seattle, Wash., from which all western business will be handled. Percy E. Wright, consulting mechanical engineer, has been appointed assistant sales manager of the company and will be in charge of the office.

The Alliance Steel Corporation, 332 South Michigan Avenue, Chicago, announces the opening of a new bar mill.

The Rockford Steel Equipment Co., Rockford, Ill., has changed its name to the Rockford Steel Furniture Co.

The Southern California Iron & Steel Co. has moved offices to Slauson Avenue, Huntington Park. The new address is Box 257, Huntington Park, Cal.

The Morrison & Risman Co., Buffalo, announces the opening of an office in Cleveland at 808 Ulmer Building.

H. W. Gledhill, eastern sales manager Shepard Electric Crane & Hoist Co., 30 Church Street, New York, has opened offices in the City Center Building, 121 North Broad Street, Philadelphia. G. M. Rumsey is connected with the office as assistant sales representative. The New York office will be managed by A. J. Barnes, who will be also in charge of export sales and advertising. H. A. Baugh will have charge of the Pittsburgh office, D. B. Patterson of the Baltimore office, W. B. Briggs of the Chicago office, W. H. Ringe of the San Francisco office, and F. R. Quigley of the Birmingham office.

All interest of the Oakley Machine Tool Co. in Oakley universal tool room grinders has been sold to the Landis Tool Co., Waynesboro, Pa.

The Grant Iron & Metal Co., Buffalo Boulevard and Doremus Street, Detroit, has taken over the Grant-Holub Co., Canton, Ohio, and will operate that plant as a branch of the Grant Iron & Metal Co. All debts will be paid by the Grant Iron company as soon as books have been audited. Harry S. Grant, president of the purchasing company, is also president of the Grant-Holub Co., which is being dissolved.

The F. C. Richmond Machinery Co., Salt Lake City, Utah, representative for the Conveyors Corporation of America, Chicago, has moved offices and salesrooms to 320 West Second South Street, that city.

The Cochise Machine Co., manufacturer of hammer and piston drills, Los Angeles, Cal., has changed its name to the Cochise Rock Drill Mfg. Co.

The Gwilliam Co. has moved its New York equipment from 253 West Fifty-eighth Street, to the Brooklyn headquarters, 23 Flatbush Avenue.

The Chicago Pneumatic Tool Co. has taken over the exclusive sale of the Crescent Pump Co., 743 Beaubien Street, Detroit, and hereafter will handle all inquiries regarding the latter.

President John Kelsey of the Kelsey Wheel Co. has confirmed the sale of a portion of Kelsey interests at Memphis, Tenn., to the Fisher Body Corporation, including 45 acres of land, a double-band sawmill, dry kilns, and an automobile body woodworking plant. The property will be adapted to the new requirements as soon as possible.

The Hendee Mfg. Co., Springfield, Mass., motor cycles, has changed its name to the Indian Motorcycle Co.

The Gulf States Steel Co. reports net income for the third quarter of 1923 of $336,747, after taxes and charges. This is equivalent after deduction for preferred dividends to $2.68 per share on common stock. In the preceding period net income reached $439,928 and in the third quarter of 1922 $382,284.

Plans of New Companies

The Bates-Roebling Patents Co., 50 Church Street, Room 1179, New York, has been incorporated with capital stock of $200,000 to manufacture typewriters and parts. About 15 patents have been purchased and will be incorporated in one small portable machine, which will be sold at a low price. Although the company may eventually manufacture in its own factory, it will likely have parts manufactured by contract for the present and operate an assembling plant. The incorporators are G. W. Roebling, H. Bates, and I. F. Moritz.

The Triamant Corporation, New York, incorporated with 1000 shares of stock, no par value, will manufacture iron and steel products, particularly a tungsten alloy. The incorporators are F. P. Fremont and E. Lessel. Address is in care of L. C. Burdett, 233 Broadway, New York.

The Ross Propeller Corporation, New York, has been incorporated with capital stock of 12,000 shares, no par value, to manufacture propellers and kindred products. The company will concentrate on propellers to be used in motor boats and launches. Operations, when started, will be on a small scale. Incorporators are R. M. Shields, L. Goddard and M. Bauman. J. Wilbur Ross, Brooklyn, heads the company. Address in care of O. S. Carrol, 40 Wall Street, New York.

Mayburner, Inc., 8 Hicks Place, Flushing, L. I., has been incorporated with capital stock of $50,000 to manufacture oil-burning equipment and devices. It is in the primary stages of organization. Incorporators are L. May, R. R. Zeamans and H. Sancier.

M. D. Goodman, who was associated for 10 years with the Electric Controller & Mfg. Co. and who recently was connected with Stephen, Hall & Co., has established a business at 185 Bigelow Street, Newark, N. J., and will act as dealer in used electrical equipment.

The Oakley Valve Co. of Connecticut, 159 Coram Avenue, Shelton, Conn., recently incorporated with capital of 500 shares of stock to manufacture valves, is now in production at its factory in Shelton. It has equipment for present needs. L. W. Holmes is one of the principals.

The Nojar Mfg. Co., Inc., 1755 Broadway, New York, recently organized to manufacture automobile equipment, is now producing a special type of shock absorber.

The American Machine & Mfg. Co., 441 Folsom Street, San Francisco, recently incorporated with capital stock of $250,000, has taken over the business of a partnership manufacturing special machinery. Manufacturing will be continued along the same lines as before. The company purposes to enlarge its plant. M. Renistein is secretary.

The Randle Radio Co., 1723 Powers Street, Cincinnati, has been organized with capital stock of $100,000 for the manufacture of radio equipment. Actual production will be started within the next two weeks. The officers of the company are identified with the Randle Machinery Co., Cincinnati, manufacturer of power plant machinery and tools. W. E. Randle, Jr., is secretary-treasurer.

A. W. Erickson, who recently resigned as superintendent of the Wapakoneta Machine Co., Wapakoneta, Ohio, has established the Pioneer High Speed Machine Knife & Tool Co. at Cleveland. The company is now in production concentrating on cutting tools. Mr. Erickson has had thirty-one years' experience in this field and has brought with him as heads of departments, men with whom he has been associated for many years.

C. R. Bryant, formerly proprietor of the Bryant Garage, Jefferson City, Mo., will soon open a machine shop for the manufacture of tools which he has lately patented, under the firm name of the Jefferson City Machine & Tool Co.

The Lake Shore Steel & Machinery Co., 168 North Michigan Avenue, Chicago, recently incorporated with $10,000 capital stock, is a jobbing organization dealing in cold-rolled steel, machinery, twist drills, reamers, hack saw blades, files, and high speed and carbon tool steel. Surplus stocks of these materials are kept for quick delivery. Officers are J. Ross MacDonald, president and treasurer, and Arthur Johnson, secretary.

The Colorado Fuel & Iron Co. report for the quarter ended Sept. 30 shows a deficit of $356,344, after deducting interest charges, taxes, preferred dividends, etc., as compared with a balance for common of $458,057 in the preceding quarter and a deficit of $171,462 in the September quarter of 1922. For the nine months ending with Sept. 30, last, there was a balance available for common dividends of $564,126, against a deficit of $581,161 in the corresponding period last year and a deficit of $579,092 over that period of 1921.

Machinery Markets and News of the Works

MORE HOPEFUL FEELING

Buying by Railroads Expected During Remainder of Year

New York Central and Other Railroad Lists and Industrial Inquiry Looked for at Early Date

Although the October rate of bookings has been scarcely maintained, prospective business seems encouraging and the tone of the market is generally optimistic.

The New York Central Railroad is reported to be preparing to put out an inquiry soon for about 25 machines. The Delaware, Lackawanna & Western is also said to be working on a list. Action is expected shortly on a list issued some time ago by the Lehigh Valley. Single machines on lists of the Baltimore & Ohio and the Rock Island railroads are being figured on. The Central of Georgia has issued an inquiry for a half dozen machines, said to be for estimating purposes.

It is reported in New York that a large automobile parts manufacturer has been doing experimental work preparatory to a complete renewal of its machine-tool equipment and that a large list may be issued before long. A southern Illinois buyer is inquiring for $35,000 to $40,000 worth of equipment and a Chicago plant wants about $50,000 worth of tools.

Action is expected to be taken on the inquiry for 100 lathes for Japanese shipment. Chicago steel interests are about to close for a number of heavy special-purpose machines.

The Burlington has distributed a number of formal orders against its list, having placed 25 lathes, six shapers and a number of miscellaneous tools.

The Ford Motor Co., Detroit, has placed an order in Cleveland for 60 automatic screw machines and an inquiry is pending for 70 automatics from an Eastern automobile parts maker.

The United Ejector Co., Boston, purchased 60 large turret lathes from a Cleveland manufacturer and the Pacific Mills, Boston, closed on about $50,000 worth of machine shop equipment for a Southern subsidiary. The Westinghouse Electric & Mfg. Co., East Pittsburgh, is reported to have purchased 15 lathes.

New York

NEW YORK, Nov. 5.

WHILE orders for machine tools have not increased, and in fact are at almost the lowest point of the year, prospective business is encouraging. Most of the large Eastern railroads are expected to come into the market between now and the end of the year. The New York Central is preparing to put out an inquiry shortly for about 25 machines, the Delaware, Lackawanna & Western is also said to be working on a list, and action is expected shortly on a list issued some time ago by the Lehigh Valley, which has been held up awaiting the necessary appropriation. The Central of Georgia has issued an inquiry for a half dozen machines, said to be for estimating purposes, but this type of inquiry is usually the forerunner of purchases. A large automobile parts manufacturer has been doing considerable experimental work preparatory to a complete renewal of its machine-tool equipment. A large list may be issued by this company before long. The Toledo, St. Louis & Western Railroad has bought a 400-ton wheel press. The Ingersoll-Rand Co., New York, bought two 6-ft. radial drills. The Crasler-Canfield Midway Oil Co. of California has bought a 1500-lb. and a 3400-lb. steam hammer.

The municipal council, Bloemfontein, South Africa, is planning for the construction of a city-owned electric power plant to cost more than $250,000 with machinery, for which bids will be asked in the near future. The American Consulate office, Johannesburg, S. A., is in touch with the project.

Bids will be taken immediately by the International Harvester Co., 960 Broadway, Albany, N. Y., for a two-story automobile service and repair building, 50 x 210 ft., estimated to cost $100,000. Headquarters of the company are at 606 South Michigan Avenue, Chicago.

The New York Edison Co., 130 East Fifteenth Street, New York, will commence the erection of a one-story power station, 41 x 100 ft., at 27 West Forty-seventh Street, to cost about $95,000 with equipment. William Whitehill, 709 Sixth Avenue, is architect. The company has also purchased property at 268-70 Canal Street, 53 x 102 ft.

The Auto Table Co., Inc., 120th Street and Jamaica Avenue, Richmond Hill, N. Y., is in the market for a combined punch, shear and angle cutter for handling iron up to ¼-in. thick; also for an 8-ft. press, second-hand, in good condition.

A. E. and C. A. Millington, Denver, Colo., engineers, have been engaged by a company being organized to prepare plans for the construction of a paper mill on site near Ketchikan, Alaska, with initial capacity of 120 tons of newsprint per day. The project will include a hydroelectric power plant in the vicinity of Orchard Lake, with output of about 10,000 hp. The new plant is estimated to cost $750,000 with machinery.

The New York Machinery Co., 200 Fifth Avenue, New York, is inquiring for a pipe cutting and threading machine.

The C. Spiro Mfg. Co., 68 East 131st Street, New York, manufacturer of automobile equipment and accessories, has purchased a five-story factory at Main and Chestnut Streets, Dobbs Ferry, N. Y., 50 x 120 ft., for $75,000, and will remodel it for a new plant.

Jacob Marks, 116 North Main Street, Portchester, N. Y., has plans for a two-story automobile service and repair building, 50 x 135 ft., to cost $46,000, including machine shop and other equipment. W. Stanley Wetmore, 1 North Main Street, is architect.

The International Paper Co., 100 East Forty-second Street, New York, will soon commence the construction of a hydroelectric generating plant at High Falls, N. Y., on the Saranac River, to cost $600,000 with power dam and machinery.

The City Council, Guayaquil, Ecuador, has plans under way for a municipal electric light and power plant, and will take bids in the near future. The American Consulate office, Guayaquil, has details.

Baskin Brothers, 185 Sixth Avenue, New York, manufacturing jewelers, have leased space in the new building at 27-37 West Sixtieth Street, for a new plant and will remove to this location. A floor in the building has also been leased to Katz & Ogush, 141 West Thirty-sixth Street, who will remove and expand their jewelry manufacturing plant at the new location.

The American Spectacle Co., 136 West Fifty-second Street, New York, is considering the installation of a cutting machine, power-operated.

In connection with the acquisition of the Canadian General Electric Co., Toronto and Peterboro, Ont., and its subsidiary, the Canadian Allis-Chalmers Co., Toronto, Montreal and other locations, the General Electric Co., Schenectady, N. Y., purposes to expend close to $5,000,000 for enlargements in the different plants for approximate doubling of present capacity, including the converting of the Allis-Chalmers works for other branches of electric machinery production.

Leo F. Robertson, Inc., 540 West Twenty-second Street, New York, operating a general machine works, is planning for the installation of an air compressor.

The Crane Market

Few new inquiries for either electric overhead traveling or locomotive cranes are reported, but the market continues fairly active with old inquiries. The expected list from the Western Electric Co., calling for several overhead cranes for the New Jersey plant, has not yet materialized. The General Electric Co., Schenectady, N. Y., in addition to the 14 cranes for Philadelphia, is said to be receiving bids on a 15-ton, 58-ft. span overhead crane for Pittsfield, Mass. James Stewart & Co., 30 Church Street, New York, have been receiving quotations on two 7½-ton bucket handling cranes for installation in Ohio. Although few new inquiries for locomotive cranes are noted, sellers report good business in prospect, but not yet in the form of actual inquiry. Among prospective export inquiries is the intention of the Port Trust, Madras, India, to call for bids on four 3-ton electric traveling cranes for port service. Tenders will be sent to sellers in India and England and American builders represented in either country may participate. The Helm Cut Stone Co., 578 Locust Street, Appleton, Wis., is asking for a 5-ton and 2-ton hand power cranes and two jib cranes. The National Plate Glass Co., Detroit, subsidiary of the General Motors Corporation is receiving bids on cranes for its new plant at Blairsville, Pa. The Columbiana Foundry Co., McKeesport, Pa., is in the market for a 5-ton crane, either new or used. The Carnegie Steel Co., Pittsburgh, is receiving bids on a 5-ton crane for the McCutcheon works and a 10-ton crane for the Duquesne works. The Carnegie Steel Co. is also receiving estimates on five cranes, presumably for the Ojibway works of the United States Steel Corporation.

Among recent purchases are:

Pennsylvania Railroad, Eastern Region, Philadelphia, a 5-ton, 43-ft span overhead traveling crane from the Case Crane & Engineering Co., Columbus, Ohio.

American Smelting & Refining Co., New York, a 30-ton, 45-ft. span electric crane for San Luis Potosi, Mexico, and a 7½-ton, 65 ft. span, grab bucket crane for Rosita, Mexico, from the Shaw Electric Crane Co.

H. R. Goeller Iron Works, Hillside, N. J., a 2-ton, 27-ft. span, underhung, hand power crane from the Chisholm-Moore Mfg. Co.

Alpena Power Co., Alpena, Mich., a 30-ton, 1-motor overhead travelling crane from the Whiting Corporation.

Aeromotor Co., Chicago, a 5-ton electric traveling crane from the Shaw Electric Crane Co.

Eastwick Engineering Co., 342 Madison Avenue, an 8-ton, 51-ft. 2-in. span, 3-motor overhead traveling crane for the Texas Sugar Refining Co., Texas City, Tex., from the Chesapeake Iron Works.

South Manchuria Railway Co., Dairen, Manchuria, a 200-ton locomotive hoist, purchased direct, from the Whiting Corporation.

The Goodyear Tire & Rubber Co., 123 West Sixty-fourth Street, New York, with headquarters at Akron, Ohio, has secured the patent rights to manufacture Zeppelin aircraft in this country, including engines, machinery and all auxiliary equipment. Plans are being perfected for the establishment of works at the Wingfoot Lake Aviation Field, near Akron, while a portion of the present plant at Akron will also be given over to this production. Edward G. Wilmer is chairman of the board of directors.

The Electro Magnetic Loom Corporation, New York, organized with a capital of $100,000 is said to be perfecting plans for the operation of a plant to manufacture an electromagnetic loom machine for the production of tubing, invented by Charles G. Bauer, Brooklyn. The new company is headed by A. C. Lordly of the A. C. Lordly Co., 320 Broadway, cotton goods broker, who will be president. E. A. Kenney is vice-president, and J. A. Akin, secretary and treasurer.

The Government of South Australia, Adelaide, Australia, has plans for improvements in the South Australian railroad system and will call for bids for equipment in the near future, including wrecking cranes, automatic coal-handling machinery, automatic signal systems and devices and other electrical and mechanical apparatus. Information at the Bureau of Foreign and Domestic Commerce, Washington, Reference No. 108551.

Wright's Health Underwear Co., Second Avenue, North, Troy, N. Y., is planning the installation of a number of motors, from 5 to 50 hp., to a gross of about 200 hp., including compensators, controls and auxiliary apparatus.

Johns-Manville, Inc., Madison Avenue and Forty-first Street, New York, is arranging for the early installation of machinery at its new plant now in course of erection at Asbestos, near St. Johns, Que., comprising two units, 150 x 1000 ft., for the manufacture of brake linings, mechanical packings, asbestos roofing and shingles, etc., to cost more than $500,000 with equipment. It is purposed to have the works ready for service early next year.

The Western Electric Co., Inc., 195 Broadway, New York, has leased four factory buildings at Westside and Claremont Avenues and Halstead Street, Jersey City, N. J., totaling about 240,000 sq. ft. of floor space. Alterations will be made and the structures equipped for the manufacture of telephone switchboards and kindred equipment. The company is preparing to begin production at its new plant on Freilnghuysen Avenue, Newark, for which property recently was leased, and will employ about 800 persons here. Bids are being asked for superstructure work on a number of units at the new plant at Kearny, N. J.

Manual training equipment will be installed in the new high school to be erected at Avenue A, Twenty-eighth to Thirtieth Streets, Bayonne, N. J., for which foundations and superstructure will soon begin, estimated to cost $886,000. D. G. Anderson, 717 Broadway, is architect.

The Essex Wire Cloth Co., Belleville, N. J., care of Allen A. Campbell, 798 DeGraw Avenue, Newark, architect, said to be affiliated with the Newark Wire Cloth Co., Verona Avenue, has plans for a new one-story factory, 55 x 160 ft., on Mill Street, to cost $25,000.

The American Type Founders Co., Communipaw Avenue, Jersey City, N. J., will soon commence the installation of machinery at its new plant at Elizabeth, N. J., for the manufacture of Kelly printing presses and parts. An appropriation of $1,000,000 is available for the plant and equipment, with the removal of the present works. R. W. Nelson is president.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, will commence the construction of a new one-, two- and three-story plant at Linden, N. J., to cost about $300,000 including equipment.

The American Rubber Products Co., Jersey City, N. J., has acquired the factory at Henderson and Eighth Streets, 100 x 250 ft., and will remodel it for a new plant to manufacture mechanical rubber goods.

The Bart Reflector Corporation, Newark, has acquired about one acre at 367 Verona Avenue, Forest Hill district, for the erection of a new one-story plant, 80 x 220 ft., to manufacture indirect lighting fixtures and equipment. The temporary address of the company is care of C. C. Lurich & Co., 4 North Ninth Street, realty agents.

The Tavern Sand Co., Millville, N. J., has commenced the erection of a new site about three miles from the city, for the production of washed silica sand, to cost approximately $100,000 with machinery. It is said to be affiliated with the Illinois Glass Co., Alton, Ill.

The F. W. Devoe & C. T. Raynolds Co., 223 New Jersey Railroad Avenue, Newark, N. J., manufacturer of paints, varnishes, etc., will commence the erection of a four-story addition, 50 x 70 ft., at 34-36 Oliver Street. J. M. Drummond is company architect. It will cost about $50,000, including present plant alterations.

The Portland Cement Lumber Co., Woolworth Building, New York, recently organized, will manufacture a new method of concrete building construction through various builders. Early next year the company hopes to equip a material yard and at that time will be in the market for concrete mixing machinery. Guy C. VanAlstyne is treasurer.

The John W. Ferguson Co., Paterson, N. J., has been awarded contract for the erection of two reinforced concrete buildings at the Tarrytown, N. Y., plant of the Chevrolet Motor Co. The contract also includes heating, lighting and sprinkler equipment.

The Northern Union Gas Co., 1815 Webster Avenue, New York, has plans for a new four-story mechanical and repair shop at 304-12 East Kingsbridge Road, 100 x 125 ft., to cost about $75,000. A portion of the structure will be used for an office. Jardine, Hill & Murdock, 347 Madison Avenue, are architects.

A machine shop will be installed in the four-story and basement automobile service building, 100 x 290 ft., to be erected on Mount Edan Avenue, New York, by M. A. Hoffman, 321 Convent Avenue, estimated to cost $85,000, for which a general contract has been awarded to S. Niewenhous, Inc., 412 Eighth Avenue.

New England

BOSTON, Nov. 5.

AGGREGATE sales the past week were as small, if not smaller, than for the previous week. Sentiment is more cheerful, however, for sufficient prospects are developing to make the November outlook more encouraging than anticipated a fortnight ago. Details regarding prospects are withheld by the trade, but no large volume of sales is in the making. With most machine tool houses, October was one of the leanest months this year. Prices generally are well maintained.

During the latter part of October the Pacific Mills, Boston, fabrics, closed on about $50,000 worth of machine shop equipment for a Southern subsidiary, one machine tool firm getting practically all of the orders. Negotiations for the business, the largest of its kind in several weeks in this territory, were of a more or less private nature.

Hill, Clarke & Co., Inc., 160 Oliver Street, Boston 9, Mass., is inquiring for the following used tools, needed at once; 36-in. diamond face grinder; Walker surface grinder; 36-in. lathe, 20-ft. centers; 14-in. lathe, 14-ft. bed; No. 1½ or No. 2 Cincinnati plain cone type milling machine; 24 or 36-in. planer type milling machine, 12 to 15-ft. table; No. 4 B Becker vertical milling machine; 16 and 18-in. Gould & Eberhardt crank shapers; 400-ton capacity hydraulic embossing press; 2 to 6-in. pipe machine; one hydraulic flanging machine for plates up to ⅝ in. thick.

Plans will shortly be issued for an addition to be erected by the Pickering Coal Co., Lynn, Mass. Handling equipment will be required.

The Norton Co., Worcester, Mass., abrasives and grinding machinery, will construct a one-story, 47 x 95 ft., manufacturing unit on D Street.

Landers, Frary & Clark, New Britain, Conn., cutlery, etc., have taken bids on a six-story addition, 68 x 161 ft., on Ellis Street.

Barker Factory, Inc., Norwalk, Conn., capitalized for $100,000, has purchased the plant of Charles L. Barker, Norwalk, and will manufacture marine motors, automobile trucks and gas water heaters. The plant covers several acres. The personnel of the new company consists of F. L. Tuttle, Jr., George T. Tuttle, T. T. Tuttle and M. T. Tuttle.

The Stanley Works, New Britain, Conn., hardware, etc., will build a 60 x 100 ft. manufacturing unit on property adjoining the Stanley Rule & Level Co., subsidiary, and subsequently a 200-ft. addition to the main plant on Whiting Street.

Negotiations have been concluded with the city of Boston for construction in the Allston district of assembling plants to cost approximately $1,000,000 each, by the International Harvester Co., Chicago, and the International Motor Co., New York, producers of Mack trucks. Locations will be adjacent to the Boston & Albany Railroad. Further details will be announced shortly.

Fire, Oct. 29, destroyed a portion of the plant of the Manchester Marble Co., East Dorset, Vt., known as the Friedley Mill, including roughing, finishing, polishing and other departments, with loss estimated at $100,000, with machinery. It is planned to rebuild.

The Central Maine Power Co., Augusta, Me., has tentative plans for extensions in power plants and systems. It is purposed to increase the preferred stock from $8,000,000 to $15,000,000, and common stock from $2,500,000 to $5,000,000, a portion of the proceeds to be used for the expansion.

The Raybestos Co., Bridgeport, Conn., manufacturer of brake lining, etc., will commence the construction of a new power house, 26 x 55 ft.

The American Box Co., 56 West Canton Street, Boston, Mass., is planning the installation of a cutoff saw, double-spindle boring machine and other woodworking tools at its plant.

H. B. Richie, Aroostook, Me., is organizing a company to construct and operate a new brick-manufacturing plant in the Danville Junction, Auburn, Me., to cost more than $200,000, with machinery. A power house and machine shop will be built. The majority of equipment will be electrically-operated. A tract of eight acres has been acquired from A. F. Redman, Auburn.

The Union Metallic Cartridge Co., Barnum Avenue, Bridgeport, Conn., will build an addition to its power house, for which a general contract has been awarded to the T. J. Pardy Construction Co., Bridgeport.

The New Hampshire Power Co., Newport, N. H., has been organized by Boston interests, with capital of $65,000 and 6,000 shares of common stock, no par value, to install and operate a power plant in this section. The company is represented by Franklin King, 117 Ames Building, Boston.

The Common Council, Morrisville, Vt., has tentative plans for the construction of a municipal electric light and power plant, estimated to cost $55,000.

Long Brothers, State Street, Hartford, Conn., are planning for the installation of a lathe, drill press, hack saw and other tools for an automobile machine and repair works.

The Davol Rubber Co., South Street, Providence, R. I., has awarded a general contract to the O. D. Purington Co., Providence, for a three-story addition, 115 x 170 ft., to cost about $80,000 with machinery. F. P. Sheldon & Sons, Providence, are engineers.

The Bassett Jewelry Co., Providence, R. I., manufacturing jeweler, has awarded a general contract to the C. I. Bigney Construction Co., 184 Washington Street, for the erection of a new plant at Baker Street and Virginia Avenue.

Philadelphia

PHILADELPHIA, Nov. 5.

TENTATIVE plans are being considered by the Penn Motors Corporation, 1714 North Broad Street, Philadelphia, manufacturer of automobiles and parts, for a new assembling plant at Bridgeton, N. J. to cost $75,000 with equipment. H. W. Sofield is general manager.

C. M. Roswell, 1162 Marlyn Road, Philadelphia, machinery dealer, has inquiries out for three 100 kva. transformers, with auxiliary electric equipment, 6000-2200 volts.

The American Ice Co., City Central Building, Philadelphia, will expend about $1,000,000 during the coming year for extensions and improvements, to include the construction of a new ice-manufacturing plant and addition to storage plant at Philadelphia, and similar extensions at Baltimore. The company has disposed of its property and pier on the Delaware River, 1219-25 Beach Street, to the West Jersey Sand & Supply Corporation, Beach and Marlboro Streets, for $215,000, which will use the site for a new storage and distributing plant.

The Fleischmann Co., 701 Washington Street, New York, has awarded a general contract to the B. A. Groah Construction Co., 847 West North Avenue, Pittsburgh, for a two-story automobile service and repair works for company motor trucks and cars, at Twentieth and Venango Streets, Philadelphia, to cost about $118,000, including equipment.

The Ford Motor Co., Highland Park, Detroit, has taken title to 68 acres at Sixty-third Street and Elmwood Avenue, Philadelphia, extending to the Schuylkill River for $450,000. The property heretofore has been held by the Richard De Cou Co., manufacturer of structural iron products, and the William M. Lloyd Lumber Co. Plans are being drawn for an assembling plant estimated to cost $1,500,000 with machinery, primarily for export account. A wharf with traveling crane will be constructed. The Ford company is now operating assembling works at Broad Street and Lehigh Avenue, and this plant will be maintained as an individual operating unit. W. D. MacTaggart is local manager.

J. F. H. Johnson, 202 North Washington Street, Wilkes-Barre, Pa., is planning for the installation of a lathe, bench and hand tools, and other equipment for a machine repair department in his automobile service building.

The Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, has awarded a contract to the William Steele & Sons Co., 219 North Broad Street, for the erection of a new one and two-story plant at Rising Sun Avenue and Adams Road, Crescentville section, to cost $100,000, including equipment.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, will expend about $1,500,000 for the construction of its new piers at Port Richmond, near Philadelphia, of which about $350,000 will be used for electric traveling cranes and other handling and conveying machinery.

The Koehler-Latimer Co., Philadelphia, has awarded a general contract to the Truscon Steel Co., South Penn Square, for a new one-story foundry at the southwest corner of Church and Stiles Streets.

The Yellow Cab Co., 1208 North Thirty-first Street, Philadelphia, has purchased a building on Wood Street, 190 x 400 ft., and will remodel it for a central service and repair works.

FitzGibbon & Crisp, Inc., Calhoun and Durnham Streets, Trenton, N. J., manufacturer of automobile bodies, has awarded a general contract to Newton A. K. Bugbee & Co., Inc., 206 East Hanover Street, for a one-story addition to cost $17,000, exclusive of equipment.

The Armstrong Cork Co., foot of Jefferson Street, Camden, N. J., has acquired the former plant of the Argo Mills on adjoining site, and will occupy the property for expansion. Headquarters of the company are on Twenty-fourth Street, Pittsburgh.

The Dexter Metal Mfg. Co., Camden, N. J., has disposed of its plant at Front and Arch Streets, totaling about 100,000 sq. ft. of floor space, to the J. B. Van Sciver Co., which will occupy the property in connection with its local furniture manufacturing works.

The American Chain Co., York, Pa., with headquarters at Bridgeport, Conn., has awarded a contract to the T. J. Pardy Construction Co., Bridgeport, for an addition to its York plant for the manufacture of automobile bumpers, estimated to cost $500,000 with machinery

The Keystone Cabinet Co., Chester, Pa., will commence the installation of machinery in a plant at Littlestown, Pa. The B. M. Root Co., 30-38 Jefferson Avenue, York, Pa., manufacturer of saw benches and other woodworking equipment, will furnish a portion of the installation.

C. A. McClure, George W. Crowley, Jr., and associates, Philadelphia, are organizing a new group of electric power companies to be known as the Shirley-Huntingdon, Juniata, Catherine, Lincoln-Huntingdon, Walker, Penn-Huntingdon and Huston Township Power companies, to install and operate plants and systems in their respective territories. The new companies are represented by James Collins Jones, Bullitt Building, Philadelphia.

The Pottsville Building Block Co., 1601 Market Street, Pottsville, Pa., W. J. Biever, president, has tentative plans for the construction of a new plant for the manufacture of cement building blocks, etc.

The Kearns-Dughi Motor Co., Danville, Pa., manufacturer of automobiles and parts, has acquired the plant and business of the Belmont Motor Co., Inc., Lewistown, Pa. The new owner will take early possession and will remove the Danville business to that point later. Charles M. Kearns and M. V. Dughi head the company.

A manual training department will be installed in the two-story high school to be erected at Llewellyn, Pa., estimated to cost $115,000, for which plans are being prepared by Frank Reilly, 112 South Centre Street, Pottsville, Pa., architect.

The Hazle-Brook Coal Co., Hazleton, Pa., is planning for the installation of additional electric power and mechanical equipment at its Raven Run colliery in the Schuylkill field. Work has commenced on a new steel coal breaker to cost more than $50,000.

The Derry-Dauphin Electric Co., Harrisburg, Pa., is being organized by W. H. Schubert and L. D. West, to install a plant and system in Derry Township. The company is represented by Cooke & Marvin, Harrisburg.

The Windsor Motor Co., 20 North Fourth Street, Reading, Pa., is having plans prepared for a new three-story service and repair building adjoining its present works. H. G. Mohn, Church and Walnut Streets, Mohnton, Pa., is architect.

Buffalo

BUFFALO, Nov. 5.

A SITE at Childs Street and Hamburg Turnpike, Buffalo, has been acquired by the Buffalo General Electric Co., Electric Building, for a new power house to cost about $80,000.

Fire, Nov. 1, destroyed a portion of the works of the O. C. Malley Motors, Inc., Geneva, N. Y., with loss estimated at $200,000 including equipment. It is planned to rebuild.

The Waters Mfg. Co., Lyons Falls, N. Y., is planning the establishment of a new factory to manufacture automobile equipment and accessories. S. W. Sylvester is one of the heads of the company.

The St. Regis Paper Co., Trust Co. Building, Watertown, N. Y., is having plans prepared for a new mill at Deferiet, N. Y., consisting of five units, with power house, machine shop and other buildings, estimated to cost $500,000 with machinery.

The Saranac Pulp & Paper Co., Plattsburg, N. Y., recently organized, has acquired the former plant of the Lozier Automobile Co. for a new paper mill. H. P. G. Norstrand, previously connected with the Stevens & Thompson Paper Co., Greenwich, N. Y., is general manager.

The Terry-Chevrolet Corporation, Olean, N. Y., local representative for the Chevrolet automobile, is planning for the installation of a drill press, lathe and other equipment in its machine department. L. S. Terry is head.

The Louis Gibaud Motors, Inc., Rochester, N. Y., recently formed by Louis Gibaud, has acquired the former local gun manufacturing plant of the Symington-Anderson Corporation for $1,000,000. The property was purchased from the Government several weeks ago by John F. Dailey, 417 Westminster Road, head of the Monroe Warehouse Co., who has established an automobile service and repair works in one of the main buildings, and the present sale includes this plant and equipment, which will be expanded by the new owner.

The Stuart-Oliver Metal Finishing Co., 222 North Water Street, Rochester, N. Y., is planning the installation of equipment for plating metals, enameling and other service. O. D. Stuart is head.

The Trico Products Corporation, 624 Elliott Street, Buffalo, manufacturer of stamped metal products, has filed plans for a four-story addition to cost $100,000, including equipment. J. R. Oishei is president.

C. Eismann, care of the Buffalo Vegetable Marketing Co., 29 East Market Street, Buffalo, and associates, have organized the Elba Cold Storage Co., Inc., with capital of $100,000, and contemplates the erection of a new ice and refrigerating plant on site at Elba, to cost $80,000 with machinery.

J. A. Dewar, 92 Chestnut Street, Oneonta, N. Y., has awarded a general contract to the Clark Construction Co., Phelps Building, Binghamton, N. Y., for a new automobile service and repair building on Broad Street, to cost about $70,000 with equipment.

The Clipper Tool Co., Inc., Mills and A Streets, Buffalo, will commence the erection of a one-story addition, totaling about 1500 sq. ft. H. J. Turner is general manager.

The General Railway Signal Co., Lincoln Park, Rochester, N. Y., is concluding arrangements for the purchase of the Federal Signal Co., Albany, N. Y., manufacturer of similar equipment. The property will be operated in conjunction with the purchasing company's works and extended.

The Carborundum Co., Niagara Falls, N. Y., is inquiring for a used ball mill with steel lining, size 6 ft. x 22 in. or 6 ft. x 48 in., preferably Hardinge make.

Pittsburgh

PITTSBURGH, Nov. 5.

THE local machine tool trade is finding plenty of inquiry to bid against, but the more general report is that actual orders are not in keeping with the number of quotations being made. Few large individual lists are before the market outside of the regular quarterly list of the Westinghouse Electric & Mfg. Co., which is being closed against to the extent of the appropriation. Business in cranes and other heavy equipment has been moderate in the past week as compared with the two previous weeks.

The National Plate Glass Co., Detroit, a subsidiary of the General Motors Corporation, has placed the steel for a new plant at Blairsville, Pa., and inquiry has gone out for the cranes and equipment. This business will be placed in Detroit.

The Pittsburgh & Conneaut Dock Co., recently bought two G type punches from the Cleveland Punch & Shear Co., which also has taken orders for a bar shear for the Wyckoff Drawn Steel Co., Pittsburgh, and for two double punches and one horizontal punch for the Pressed Steel Car Co., McKees Rocks, Pa.

Tentative plans are under advisement by the United States Radiator Corporation, Corry, Pa., for the erection of several additional buildings at its local plant. Headquarters of the company are at 125 East Grand River Boulevard, Detroit.

Bids will be called in the near future for the erection of a three-story and basement addition to the plant of the Tranter Mfg. Co., 105 Water Street, Pittsburgh, manufacturer of engines, machinery, etc., at First Avenue and Ferry Street, to cost about $50,000. Paul W. Irwin, Renshaw Building, is architect.

The Pittsburgh Steel Supply Co., Oliver Building, Pittsburgh, has leased property at Beaver Avenue and McClure Street, Northside, for extensions.

The West Virginia Power Co., Hinton, W. Va., has secured permission for a hydroelectric development on the New River, near the mouth of the Bluestone River, to cost about $135,000.

The Jaunda Mining Co., 713 Virginia Street, Charleston, W. Va., recently organized with a capital of $130,000 is planning for the development of property in this section and will take bids in about 30 days for electric power and mechanical equipment. C. W. Estep is president and general manager.

Manual training equipment will be installed in the new two-story junior high school to be erected at Bradford, Pa., estimated to cost $250,000, for which bids will be called on a general contract to close about Jan. 1. Lawrie, Green & Co., Locust Street, Harrisburg, Pa., are architects.

The Midland Electric Service Co., West Union, W. Va., is reported to have purchased property on Middle Island Creek for the construction of a new plant.

The Warwood Tool Co., Wheeling, W. Va., will expend about $25,000 for a new one-story machine shop, 42 x 85 ft., and equipment, for which plans have been completed.

The Penn Public Service Corporation, Johnstown, Pa., has arranged for a bond issue of $2,500,000, a portion of the proceeds to be used for extensions and improvements. F. T. Hepburn is president.

The American Oil Works, Titusville, Pa., is planning to rebuild the portion of its refinery destroyed by fire Oct. 29 with loss estimated at about $40,000, including equipment and stock.

Manual training equipment will be installed in the new two-story high school to be erected by the Stafford District Board of Education, Gilbert, W. Va., estimated to cost $100,000, for which bids will be received on a general contract until Nov. 30. L. J. Dean, Huntington, W. Va., is architect.

The Pennsylvania Engineering Works, New Castle, Pa., operating a steel fabricating plant, is planning the installation of additional equipment, including a flanging press, plate planer, vertical punch, rotary shear, etc.

Milwaukee

MILWAUKEE, Nov. 5.

VOLUME of machine tool sales has dwindled slightly, with industrial buyers manifesting less interest in offerings and making purchases only when urgent needs require. While some railroad business is coming to local shops, the amount is very small and it does not balance the decline in the demand from other sources. There is a lot of business in the foreground, but it is not expected to develop before next spring. Automotive industries as a whole are doing very little equipment buying, although a few of the largest builders are piecing out equipment and buying for replacement. Caution is evident in all lines and is a heavy contributing factor in the shrinkage of tool trade.

The Board of Industrial Education, Oshkosh, Wis., has engaged Auler & Jensen, local architects, to design a $350,000 addition to the Beach Memorial vocational school, to provide for manual training shops, gymnasium and classrooms. Bids will be taken about Dec. 15. Equipment for shops has not yet been listed and probably will not be purchased until next spring.

The Board of Public Works, Menasha, Wis., is asking bids for furnishing and installing a 600-hp. oil-burning engine for an addition to the municipal water and light plant, to supplement two 300-hp. Diesel type generators now in use. John F. DeCaro is city clerk.

The United States Automatic Shift Co. of Eau Claire, Wis., has been incorporated with 6000 shares of common stock without par value, by B. R. L'Hommedieu, John S. Allen and A. C. Larson all of Madison, Wis. It will take over the plant of the defunct United States Gear Shift Co. of Eau Claire bid in by Mr. L'Hommedieu at trustee's sale several months ago. Some retooling will be done, as the new owners intend to manufacture a general line of mechanical devices, metal specialties and tools, in addition to hydraulic gear shifting units for motor vehicles.

The Peterson & Egeland Mfg. Co., Sturgeon Bay, Wis., which several months ago equipped a small shop for the manufacture of a patented engine stand for garage use, is purchasing additional machinery. It has taken over the garage building of Peterson Brothers, who are retiring from the automobile trade to concentrate on the production of the fixture.

The Follen-Lorenz Tool Works has been organized at Kenosha, Wis., by Lorenz Follen and Frederick and Henry Lorenz to engage in engineering, tool and die jobbing, metal stamping and deep drawing, and the manufacture of a device for canceling checks, labels, etc. Most of the equipment required has been purchased from the trustee of the bankrupt Mitchell Motors Co., Racine, Wis., which is being installed in a two-story building on Avery Street, Kenosha. In the meantime it is operating in the plant of the defunct K. & F. Mfg. Co., Kenosha, and has taken over all uncompleted contracts, including a large order for steering gear locks.

The B. F. & H. L. Sweet Mfg. Co., Fond du Lac, Wis., wagon and sleigh manufacturer, is adding some equipment and enlarging its capacity for handling several large orders for heavy-duty sleds for use in tractor trains in mining, oil well operation and logging. The Standard Oil Co. of California has placed a contract for 25-ton sleds for hauling machinery to wells, and the Treadwell Mining Co. of Alaska for hauling gold ore.

The Helm Cut Stone Co., 578 Locust Street, Appleton, Wis., which is erecting a new plant, is inquiring for an air compressor, a carborundum saw, one 5-ton and one 2-ton hand operated traveling crane, two jib cranes and several small motors. Christ Helm is president.

The Fox Motor Car Co., Madison, Wis., has acquired a site, 72 x 165 ft., on University Avenue and next spring will build a two-story garage and service building of similar dimensions, at an estimated cost of $45,000.

The Fox River Valley Co-Operative Co., Neenah, Wis., has awarded contracts for the construction of a two-story concrete cheese warehouse, 40 x 80 ft., and is inquiring for artificial ice and refrigerating machinery. Eli Defnet, 157 East Forest Avenue, is secretary-treasurer. The architect is B. E. Mehner, Fond du Lac, Wis.

The common council of Hurley, Wis., has rejected all bids received Oct. 23 for a water purification plant, pumping station and intake, and is asking new tenders under revised specifications until Nov. 13. J. H. A. Brahtz, 409 Metropolitan Building, St. Paul, Minn., is engineer in charge.

The Board of Education, Mineral Point, Wis., has engaged Edward Tough, architect, Washington Building, Madison, Wis., to prepare plans for a new high school with vocational shops, to cost about $150,000 complete. Bids will be taken about Jan. 1, by A. M. Tucker, secretary of the board.

The Winther Motor Co., Kenosha, Wis., a new corporation which has acquired the assets of the defunct Winther Motors, Inc., same city, is engaged in preparing the works for a resumption of manufacturing on Dec. 1. A small number of miscellaneous tools will be needed for replacements and rearrangement of the layout. R. D. Mock has been elected vice-president and will serve also as general manager.

Cleveland

CLEVELAND, Nov. 5.

THE Ford Motor Co., Detroit, has placed an order for 60 standard automatic screw machines with a Cleveland manufacturer and an inquiry is pending for 70 automatic machines from an Eastern maker of automobile parts. The United Ejector Co., Boston, has placed 60 large turret lathes with a Cleveland manufacturer and the Maxwell Motor Car Co., and the Chevrolet Motor Co., Detroit, and the Bronx Equipment Co., New York, each have purchased two similar machines from the same interest. A local manufacturer of turret lathes reports a 30 per cent increase in orders in October as compared with September, most of the orders being for single machines. Machine tool manufacturers are figuring on single machines in the lists recently issued by the Baltimore & Ohio and Rock Island Railroads. Business is quiet with local dealers, sales for the most part being limited to single machines. New inquiry is light.

The White Motor Co., Cleveland, will build extensions and a larger garage involving an expenditure of $125,000. The erection of these buildings will be part of a construction program outlined some time ago. The general contract has been placed with the Watson Engineering Co., Cleveland.

The Park Battery Co., Cleveland, has placed a contract with the Austin Co. for a factory building at 277 East 156th Street. The estimated cost is about $50,000.

The Fisher Body Corporation, Detroit and Cleveland, has purchased a portion of the Kelsey Wheel Co. interests in Memphis, Tenn. The property acquired includes an automobile body woodworking plant, saw mill and dry kilns. The Kelsey company retains the portion of the plant used in the manufacture of automobile wheels.

The Indianapolis Light & Heat Co., Indianapolis, Ind., will erect a new power plant of 60,000-kw. capacity, and the Columbus Railway Light & Power Co. plans the erection of a new power plant of similar capacity to be located at a coal mine near Columbus. The latter company has just placed an order with the General Electric Co. for a 15,000-kw. addition to its Mill Street station in Columbus.

A new plant for the manufacture of steel tubing is being equipped in Warren, Ohio, by I. VanHuffel. It will be located in the manufacturing building formerly occupied by the King Furniture Co.

The Bingham Stamping Co., Toledo, Ohio, has had plans prepared for an extension which will largely increase its present capacity. Additional equipment will be required, including special machinery and furnaces.

The Standard Sanitary Mfg. Co. has placed a contract for an addition to its Tiffin, Ohio, plant.

The National Stove Co. Division of the American Stove Co. is planning the erection of a $100,000 addition to its Lorain, Ohio, works. Tentative plans provide for a two-story brick building with 40,000 sq. f.t of floor space.

The Colonial Tool & Forge Co., Columbiana, Ohio, is moving its plant to Elkton, Md., where larger quarters have been provided. The company, which was formerly the Harrold Forge & Tool Co. manufacturer of screw drivers and other mechanics hand tools. L. V. Blue will remain as president of the company. H. R. Orr, secretary and treasurer, will retire.

Chicago

CHICAGO, Nov. 5.

THE Burlington has distributed a number of formal orders against its list, having placed 25 lathes ranging from 18 to 30-in. swing and six heavy duty shapers, besides a number of miscellaneous tools. The Illinois Central has closed for a carwheel lathe. The Chicago Great Western is inquiring for a used 42-in. x 42-in. x 12-ft. planer. Business from industrial sources is more promising. A southern Illinois buyer is inquiring for from $35,000 to $40,000 worth of equipment, while a Chicago plant wants about $50,000 worth of tools. A Milwaukee user has closed for a 42-in. open side planer and is still in the market for additional machines. The Remy Electric Co., Anderson, Ind., has placed orders for two turret lathes. Local steel interests are about to close for a number of heavy special purpose machines.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: No. 10 cupola for the Kohler Co., Kohler, Wis.; a No. 5 cupola for the Ravenna Iron Co., Ravenna, N. Y.; and a crane reservoir ladle of 4000-lb. capacity for the Maytag Co., Newton, Iowa.

The Nugent Steel Casting Co., 3100 South Wood Street, Chicago, is building a two-story reinforced concrete pattern storage building, 40 x 120 ft., with provision for a future third story which will probably be added within a year. Frank C. Chase, Inc., Chicago, has been retained as engineer.

The Standard Sanitary Mfg. Co. is taking bids through Alfred S. Alschuler, 28 East Jackson Boulevard, Chicago, on a five-story and basement factory, 115 x 203 ft., at 3716-26 Iron Street, Central Manufacturing District, Chicago. The present main factory of the company at 14-30 North Peoria Street, which was planned by the same architect about ten years ago, is now inadequate.

The Grigsby, Grunow & Hinds Co., manufacturer of automobile accessories, 906 West Lake Street, Chicago, has placed contract for a two-story plant, 150 x 188 ft., at 4534-46 Armitage Avenue, to cost $250,000.

Edward G. McClellan, 7441 Cottage Grove Avenue, Chicago, has taken bids on a one-story automobile service station and garage, 200 x 200 ft., at the northwest corner of East Sixty-third Street and Indiana Avenue, for Virgil Cunningham, to cost $140,000.

The Chicago Steel & Wire Co., 10243 Torrence Avenue, Chicago, has awarded contract for a one-story addition, 60 x 249 ft. and a one-story steel shed in the rear, to cost $50,000.

The Aermotor Co., 2500 West Roosevelt Road, Chicago, has let contract for a one-story plant, 80 x 165 ft., at 2508 West Roosevelt Road, to cost $18,000

The Remy Electric Co., Anderson, Ind., has commenced the construction of an addition, 40 x 80 ft., to cost $25,000.

Paper, Calmenson & Co., 975 East Seventh Street, St. Paul, Minn., are in the market for a gate shear, capacity to cut up to 72-in. plates of 1 in. thickness.

The Orton & Steinbrenner Co., 608 South Dearborn Street, Chicago, manufacturer of locomotive cranes, buckets and coal crushers, has completed an addition to its works at Huntington, Ind., which will approximately double the former output. All equipment has been purchased and most of it is in use.

Plans are being drawn by the Minnesota Valley Canning Co., Lesueur, Minn., for the erection of a new power plant to cost $50,000. W. G. Taylor is president.

The Northwest Utilities Co., Spring Valley, Minn., has arranged for an increase in capital from $10,000,000 to $45,000,000, a portion of the proceeds to be used for extensions.

The Eagle Iron Works, Des Moines, Iowa, has plans for an addition, 61 x 66 ft.

The Rocky Mountain Marble Co., Carbondale, Colo., is planning the construction of a new plant, 70 x 250 ft. A machine shop will also be built. The installation will include a 20-ton traveling crane. Inquiries will be made at an early date for equipment, including open side planer, rubbing beds, grinding machines, etc.

The Domestic and Foreign Commerce Department, Chicago Association of Commerce, 10 South La Salle Street, has received an inquiry from a company at Havana, Cuba, in the market for woodworking machinery (No. 2475); also from a company at Chattanooga, Tenn., in the market for a large quantity of metal ceiling (No. 2474).

The Common Council, Owatonna, Minn., is arranging an appropriation of about $350,000, for the construction of a municipal electric light and power plant, for which an engineer will soon be selected to prepare plans.

The Central Light & Power Co., Washburn, N. Dak., recently organized, has acquired the local plant and system of the Central Power Co., and plans extensions and improvements, including the installation of additional equipment. J. G. Robertson, St. Paul, Minn., heads the new company.

The Crane Co., 836 South Michigan Avenue, Chicago, manufacturer of steam specialties, pipe, etc., will take bids within two weeks for a two-story foundry, 160 x 500 ft., at its plant on South Kedzie Avenue, to cost approximately $1,000,000, with machinery. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

The Central South

ST. LOUIS, Nov. 5.

PLANS are being considered by the Pittsburg Marble Works, 101 North Elm Street, Pittsburg, Kan., for a one-story branch plant at Kansas City, Kan., estimated to cost $100,000 with equipment. P. W. White is president.

The National Lamp Works of the General Electric Co., 6251 Etzel Avenue, St. Louis, is said to be planning for enlargements and the installation of additional machinery to increase the output from 60,000 to 100,000 lamps per day.

The Acme Electric Co., 2121 East Thirty-ninth Street, Kansas City, Mo., is planning for the installation of a punch press, about 5 to 7 tons capacity.

The Tennessee Electric Power Co., Chattanooga, Tenn., has acquired the Jefferson City Power & Light Co., Jefferson City, Tenn., and will make extensions and improvements in the plant and system. Operations will also be extended to White Pine, Tenn.

Manual training equipment will be installed in the new high school to be erected at Sedalia, Mo., estimated to cost $350,000, for which bids will be called on a general contract. T. W. Bast, Kahn Building, is architect.

The Dehco Enameling Co., 1305 Waldheim Building, Kansas City, Mo., has inquiries out for a 10 to 12-hp. boiler, and auxiliary equipment.

The Ford Motor Co., Highland Park, Detroit, has acquired property at Bismarck, Mo., heretofore held by the Irondale Lead Mines, and plans development of the property and the installation of equipment.

The American Cigar Box Lumber Co., Johnson City, Tenn., has engaged Lockwood, Greene & Co., 24 Federal Street, Boston, and Charlotte, N. C., engineers, to prepare plans for extensions and improvements, including the remodeling of the present structures and the installation of additional machinery for considerable increase in output.

The Sutton Coal Co., Sutton, Ky., is perfecting plans for the installation of electric power and other equipment at its properties.

The Equipment Sales Co., Independent Life Building, Nashville, Tenn., has inquiries out for two jaw crushers, 48 x 60 in. and 36 x 48 in., respectively.

The Common Council, Maramec, Okla., plans the installation of electrically-operated pumping machinery in connection with a new waterworks system.

The Tennessee Cotton Oil Co., Jackson, Tenn., is planning to rebuild the portion of its plant at Greenfield, Tenn., recently destroyed by fire with loss of about $25,000.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for a No. 1 gyratory crusher, second-hand.

H. H. Hervy, 209 Oak Street, Kansas City, Mo., machinery dealer, has inquiries out for a bar-bending machine.

Bids will soon be asked by the Common Council, Arkansas City, Kan., for pumping machinery and other equipment for waterworks extensions and improvements. M. N. Smoott is city clerk.

A power house will be constructed at the proposed textile mill to be constructed at Camden, Ark., estimated to cost $1,000,000. A company is being organized by J. T. Roundtree, Jr., Paris, Tex., to carry out the project. The Chamber of Commerce, Camden, is interested.

The Common Council, Drexel, Mo., plans for the installation of electrically-operated pumping machinery at its proposed new waterworks, estimated to cost $50,000. J. P. Davis, 305 Central Trust Building, Jefferson City, Mo., is consulting engineer.

The Public Light & Power Co., Chattanooga, Tenn., will commence the construction of a new hydroelectric power plant in the vicinity of Shelbyville, Tenn., estimated to cost $90,000. L. W. Hope is engineer in charge.

The Vernon Asphalt Co., Nevada, Mo., recently organized with a capital of $150,000, is planning the establishment of a plant for the production of asphalt, with installation of electric power equipment, reduction machinery and auxiliary equipment estimated to cost about 80,000. John A. Lohmeyer, Joplin, Mo., is president; and L. A. Johnson, Nevada, secretary.

The B. J. Mullikin Tire Co., Times Building, St. Louis, recently organized with a capital of $250,000, has secured a six-story building for a new plant. B. J. Mullikin is president, and George G. Vost, secretary-treasurer.

The Atlantic Ice & Cold Storage Co., Chattanooga, Tenn., is considering the construction of an addition to its plant to cost $80,000, including equipment.

The Texarkana Water Corporation, Texarkana, Ark.-Tex., is planning for the installation of pumping machinery at its local waterworks, in connection with extensions and improvements to cost $300,000.

The Jarpy Machine Works, 110 West Eighth Street, Lawrence, Kan., is planning for the installation of a bench milling machine, used, in good condition.

The Chaplin & Anderson Stone Co., 332 West Mill Street, Springfield, Mo., is planning the erection of new works estimated to cost $30,000 with machinery.

Cincinnati

CINCINNATI, Nov. 5.

A FAIR number of orders were reported by local manufacturers during the past week, but the October rate of bookings was scarcely maintained. Some dealers who had been figuring on prospects report that there is a tendency to put off buying until after the first of the year. However, the tone of the market is generally optimistic. There has been steady buying by automobile companies, electrical manufacturers, steel interests, and by local safe and lock companies. Railroads, too, have contributed to current activity, and with closing of lists now out, are expected to place a number of large orders the remainder of the year.

Japanese buying is reported to be in prospect. Some orders are being placed for used equipment on which quick delivery can be made, particularly planers and boring mills. Dealers report that options have been taken on all the large planers and boring mills in stock. New machine tools for Japanese shipment have not totaled much as yet, but action is looked for on an inquiry for 100 lathes reported in this column several weeks ago. This inquiry, received through an exporting house in New York, is expected to be turned over to the Japanese embassy at Washington.

The Sawbrook Steel Casting Co., Cincinnati, has been incorporated with a capitalization of $300,000. It will erect a steel foundry, but the location has not been announced. E. S. Sawtelle, C. E. Sawtelle and E. L. Brooks, of the Tool Steel Gear & Pinion Co., are the incorporators.

The Stewart Burner Co., Cincinnati, has been organized to handle the sale of a burner manufactured by the John A. Stewart Co., Water and Vine Streets. It is not the present intention of the company to establish a plant for the manufacture of its product, but eventually this will be done. John H. Stewart is president.

Plans for the reorganization of the Anderson Foundry & Machine Co., Anderson, Ind., recently placed in receiver's hands, are being discussed by Bert McBride, receiver for the Dollings interests in Indiana, and W. T. Durbin, receiver for the Anderson Co. The Anderson Foundry & Machine Co. has been operated at a profit under the receivership, and it is expected that reorganization plans will be approved by the stockholders.

The Gulf States

BIRMINGHAM, Nov. 5.

FIRE, Oct. 29, destroyed a portion of the No. 8 oil refinery of the Chestnutt & Smith Corporation, Ranger, Tex., with loss reported at $500,000 including machinery. It is planned to rebuild. Headquarters are at Tulsa, Okla.

The Capital City Auto Co., Baton Rouge, La., will commence the construction of a new three-story service building, 95 x 130 ft., at Main and Menard Streets, to cost $75,000. The second floor will be equipped for a machine shop. Jones, Roussell & Oichner, New Orleans, La., are architects.

The Gulf States Oil Corporation, New Orleans, has acquired the local refinery of the Island Oil & Transport Co., as well as other properties of the company. Improvements will be made and operations commenced at an early date.

The Granite Brick & Block Co., Sebring, Fla., has acquired local property and plans the erection of a new works. Machinery will be installed for an initial output of 10,000 brick per day.

The Common Council, Lubbock, Tex., has called a special election on Nov. 21 to vote bonds for $50,000, for the purchase of machinery for the municipal electric power plant.

Fire, Nov. 1, destroyed a portion of the plant of the Enochs Lumber Mfg. Co., Jackson, Miss., with loss of about $400,000 including equipment. It is planned to rebuild.

The Southern Iron & Machine Co., San Benito, Tex., is planning for the installation of a new lathe, 42 or 48 in. long, with bed 30 or 40 ft.

Manual training equipment will be installed in the new two-story high school to be erected at Brookhaven, Miss., estimated to cost $110,000, for which ground will be broken at once. Emmett J. Hull, Jackson, Miss., is architect.

The American Fibre Corporation, Kelsey City, Fla., recently organized with a capital of $500,000, has tentative plans for the construction of a plant, to cost about $150,000 with machinery. A power house will be erected. William H. Power, West Palm Beach, Fla., is secretary and treasurer.

The Humble Oil Co., Houston, Tex., will install additional machinery at its pumping plant on the Thompson tract, near Mexia, Tex., including a 150 hp. engine and auxiliary equipment.

The Houston Railway Car Co., P. O. Box 223, Houston, Tex., is planning for the installation of galvanizing and other machinery for the manufacture of tanks and other galvanized products.

The Odorless Plant Food Co., Miami, Fla., recently organized with a capital of $100,000, contemplates the installation of a power house at its proposed plant for the manufacture of fertilizer products. Norman W. Graves, Miami, is head.

The East Coast Improvement Co., Miami, Fla., recently formed with a capital of $100,000, plans for the installation of an electric lighting plant on a 500-acre tract to be developed. A waterworks, with pumping machinery, will also be constructed. A. T. Barkdull, Miami, is president; P. F. Patton, Hendersonville, N. C., is construction engineer.

The American Public Service Co., a subsidiary of the Middle West Utilities, 72 West Adams Street, Chicago, has acquired electric plants and systems at Grand Saline, Alba, Quitman, Winnsboro, Big Sandy, Gladwater and vicinity. Plans are under way for extensions and the installation of transmission lines and other equipment. The purchasing company recently issued bonds for $1,500,000.

The Southern Pacific Railroad Co., El Paso, Tex., is said to be arranging for the construction of new car and locomotive shops at Valentine, Tex., to cost $500,000 with machinery. H. M. Lull, Houston, Tex., is chief engineer.

W. J. Bickerstaff, Brickyard, Ala., has inquiries out for a hoisting engine and kindred equipment for lumber haulage.

The Southern Cabinet Co., 610 North McDonough Street, Montgomery, Ala., has taken over a local building and will install equipment for the manufacture of kitchen cabinets and kindred products. A specialty will also be made of porcelain-top tables. John B. Noble is president.

The Houston Lighting & Power Co., Houston, Tex., has authorized plans for extensions and improvements in its power plant to cost $60,000. Additional equipment will be installed.

The Southern Glass Novelty Co., Monroe, La., has ac-

quired about 5 acres and plans the erection of a new works. The first unit will cost about $60,000, including partial equipment. Other units will be built later. A. H. Sweet, Lancaster, Ohio, heads the company.

The Board of Water Commissioners, Houston, Tex., has preliminary plans for an electrically-operated pumping plant in the vicinity of Buffalo Bayou, to cost about $500,000 with machinery. Work will commence early next year. A new central pumping station at the main waterworks is also proposed, to cost approximately $30,000. James H. B. House is head of the bureau.

The Common Council, Clifton, Tex., is taking bids for the installation of a municipal electric power plant, to cost about $30,000.

Indiana

INDIANAPOLIS, Nov. 5.

PLANS are projected by the Indianapolis Light & Heat Co., Indianapolis, for a new central generating plant on 145 acres recently acquired on the White River, about eight miles from the city. It is estimated to cost about $1,000,000. Work will commence next year. C. C. Perry is president.

Officials of the Arvac Mfg. Co., Anderson, Ind., manufacturer of universal joints, etc., whose plant recently was sold to Winfred Jessup, Richmond, Ind., and associates, have tentative plans for the erection of a new works to replace the former factory, for a similar line of production.

The New Albany Loose Leaf Tobacco Co., Clark and Locust Streets, New Albany, Ind., is said to be planning the installation of a number of hydraulic presses.

Stockholders of the Indiana Oil Refining Co., Columbus, Ind., have authorized a fund of $125,000 for extensions and improvements and the installation of equipment.

Fire, Oct. 28, destroyed a portion of the works of the Hoosier Veneer Co., Massachusetts Avenue and Adams Street, Indianapolis, with loss approximating $70,000, including equipment and stock. It is planned to rebuild.

Kingan & Co., Georgia Street, Indianapolis, operating a meat-packing plant, will remodel an existing two-story building, 80 x 120 ft., for a new chilling and refrigerating plant. Ice machinery and other equipment to cost about $20,000 will be installed.

Detroit

DETROIT, Nov. 5.

FIRE, Oct. 27, destroyed a portion of the plant of the Rich Steel Products Co., Battle Creek, Mich., with loss estimated at $150,000, including equipment. It is planned to rebuild.

The Beatie Machinery & Service Co., 1946 Baker Street, Detroit, has plans for a one-story addition for a general machine and repair shop.

The Detroit Concrete Receptacle Co., 4225-27 Michigan Avenue, Detroit, is considering the construction of a new plant at Woodward Heights Boulevard, estimated to cost $250,000 with machinery.

The Inland Automobile Co., Grand Blanc, Mich., has tentative plans for a one-story addition to cost approximately $35,000. It is purposed to commence work early in the coming year. C. C. Kinnison is president.

The Kroger Grocery & Baking Co., 4760 Merritt Avenue, Detroit, is planning the erection of an automobile service and repair building, estimated to cost $90,000 with equipment.

The Petoskey Portland Cement Co., Petoskey, Mich., has plans under way for extensions to increase the output from 2500 to 4500 bbl. per day. The work will include a new power plant and is estimated to cost more than $150,000 with machinery.

The Valley Paper Co., Press Building, Kalamazoo, Mich., will build a one-story machine shop.

The Auto Specialty Mfg. Co., St. Joseph, Mich., will commence the erection of a foundry to cost approximately $100,000, including equipment, for which plans have been drawn by Davidson & Weiss, 53 West Jackson Boulevard, Chicago, architects and engineers.

The Olds Motor Works, Lansing, Mich., a division of the General Motors Corporation, has work in progress at its plant to provide for a maximum production of 400 complete automobiles per day. Additional equipment will be installed.

The United Automatic Screw Co., Wesson Avenue, Detroit, has awarded a general contract to the Home Building Co., 2187 West Grand Boulevard, for the erection of a one-story plant, 50 x 150 ft., to cost $43,000 including equipment. J. S. Barrow is head.

The Keeler Brass Co., Grand Rapids, Mich., has filed plans for the erection of an addition at 234 Stevens Street, estimated to cost $36,000 with equipment.

The Kelly Well Co., Inc., Grand Island, Neb., manufacturer of special concrete wells, has leased the plant of the Gregg Pump Co., Fulford Street, Kalamazoo, Mich., for the establishment of a new works. The company purposes to form another company under Michigan laws, with capital of $200,000, to be operated as a subsidiary. The acquired works will be improved and equipment installed for production. E. J. Long is general manager.

Baltimore

BALTIMORE, Nov. 5.

CONSTRUCTION is under way on a new plant for the United States Industrial Chemical Co., 110 East Forty-second Street, New York, at Fairfield, near Baltimore, with power house and machine shop, to cost approximately $1,000,000 with equipment. The plant will be used for commercial potash and kindred production. Plans are now being prepared for the erection of another unit for fertilizer manufacture, to cost close to $200,000 with machinery.

The Purchasing Agent, United States Post Office Department, Washington, will take bids until Nov. 16 for one stationary air compressor.

The Virginia-Carolina Housing Co., P. O. Box 131, Richmond, Va., has inquiries out for a hoisting engine, about 15 hp., double drum; also, for a portable concrete mixer, about ½-yd. capacity.

Manual training equipment will be installed in the new three-story high school to be erected at Hagerstown, Md., estimated to cost $250,000, for which plans are being prepared by A. J. Klinkhart, 54 West Washington Street, architect.

The Roanoke Rapids Power Co., Roanoke Rapids, N. C., has awarded a contract to Stone & Webster, Inc., 147 Milk Street, Boston, engineer, for an addition to its generating plant, with installation to include a new 3000 kva. generator and auxiliary machinery.

The Quitman Machine Co., Quitman, Ga., is planning to rebuild the portion of its plant recently destroyed by fire, with loss estimated at about $40,000 including equipment.

The Charlotte Electric Repair Co., Charlotte, N. C., has inquiries out for a number of electric motors, three-phase, 60-cycle.

The Esselman Motor Co., 3325 Greenmount Avenue, Baltimore, will take bids for a two-story automobile service and repair building, 125 x 152 ft., to cost about $50,000. G. Esselman is president.

Willis Irvin, Lamar Building, Augusta, Ga., has inquiries out for equipment for an electric light and power plant.

The Consolidated Power & Light Co., Lynchburg, Va., is disposing of a preferred stock issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements.

The Community Refrigerating Co., Burlington, N. C., is planning for the establishment of a new ice-manufacturing and refrigerating plant at Jacksonville, Fla.

Electric power equipment, control apparatus, and other conveying machinery will be installed in the new six-story printing plant 60 x 250 ft., to be constructed by the *Baltimore American*, Baltimore, to cost $500,000. A building contract has been let to Frainie Brothers & Haigley, 19 West Franklin Street. George R. Callis, Jr., American Building, is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 13, for 100 sets of wrenches for mine assemblies for the navy mine depot, Yorktown, Va., schedule 1541; also, for one set of brine circulating pumps for the Norfolk, Va., Navy Yard, schedule 1533; until Nov. 27, for steel wire nails, for Eastern and Western Navy Yards, schedule 1525; for flashlights for Eastern and Western yards, schedule 1532; and for electrical supplies and apparatus for Eastern and Western yards, schedules 1530 and 1540.

W. A. Williams and F. I. Mason, Rockingham, N. C., are organizing a company to operate a plant for the manufacture of cutters and cutting machines for green cotton stacks and other service.

The Common Council, Williamsport, Md., is considering the installation of electrically-operated pumping machinery in connection with a new waterworks system, for which plans are being prepared by Norton, Bird & Whitman, Munsey Building, Baltimore, engineers.

The Chamber of Commerce, Oakland, Md., has concluded negotiations for a new plant to manufacture skid chains, on which work will commence in about 60 days. The

name of the company which will build and operate the plant is withheld temporarily.

Manual training equipment will be installed in the new senior and junior high school to be erected at Hendersonville, N. C., estimated to cost $300,000. E. G. Stillwell, Hendersonville, is architect.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until Nov. 19, for two watertube boilers, four motors, 10,000 ft. of rubber insulated wire, 434 pounds of magnet wire, 10,000 ft. single conductor wire, machine bolts, carriage bolts, steel rivets, wood screws, 2500 lb. of machine-bolt nuts, and 2000 lb. of lead washers, circular 1569, until Nov. 12 for 100 tumbler switches, 50 mounted switches, 50 surface pipe switches, 388 steel oilers, 10 gross of brass washers, 1000 grip unit nuts, 2000 steel lock washers, locks and other hardware products, circular 2338, and until Nov. 22 for one refrigerating outfit, one gasoline section car, and miscellaneous electrical and mechanical equipment, circular 1570.

The Common Council, Farmville, Va., has preliminary plans for extensions and improvements in the municipal electric power plant to cost about $50,000, including the installation of additional equipment.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a power key-seating machine, to handle material from 1-16-in to 1-in. thick; also for a number of electric motors, 75 hp. and 1 hp.

The Common Council, Woodbury, Ga., is planning to rebuild the portion of the municipal electric light and power plant recently destroyed by fire. New equipment will be installed.

The Roanoke Gas Light Co., Roanoke, Va., is planning for the installation of a new steam power plant in connection with extensions and improvements in its system.

Canada

TORONTO, Nov. 5.

BUSINESS in the machine tool market is holding its own and sales sheets for October will show some improvement over September. Inquiries and prospective business for the present month are promising. In both Ontario and Quebec provinces a stronger tone is noted in the demand for electrical equipment. The automotive industry throughout Canada is actively engaged and is also a steady customer for tools for replacement purposes. Generally speaking, the iron and steel industry of Canada has been a more consistent buyer of tools this year than for some time past and it is expected that business from this source will continue.

L. N. Huart, Commercial Street, Levis, Que., contemplates the erection of power plant on Megiscan River near Temiscamingue, Que., to develop 22,000 hp.

M. Viau, St. Jerome, Que., is asking for prices on machine tools and general foundry equipment.

The Canadian Yellow Cab Mfg. Co., Montreal, Que., recently incorporated, will make and repair taxicabs, and is interested in equipment for this undertaking. A. H. Elder, 22 Summerhill Avenue, Montreal, is purchasing agent.

The Castle-Trethewey Mines, Standard Bank Bldg., Toronto, is asking for stamps, tube and ball mills, pumps, cyanide apparatus and crushers for a 100-ton gold mining mill at Gowganda, Ont.

The Spanish River Lumber Co., Cutler, Ont., is in the market for band saws, resaws, edgers, planers, etc., for steam power lumber and sawmill to replace one recently destroyed by fire. W. J. Bell is manager.

British Iron and Steel Market

Japan Still Buying Heavy Tonnages of Black and Galvanized Sheets—Improvement in Steel Continues—Ruhr Stocks Cause Concern

(*By Cable*)

LONDON, ENGLAND, Nov. 3.

Pig iron is quieter but prices are well maintained. The recent heavy buying has eaten into accumulated stocks and expansion of output is contemplated but not yet effected. Hematite is improving, with few sellers below £5 ($22.30) for East Coast mixed numbers.

Foreign ore is quiet but firmer. Sellers of best Bilbao Rubio ask 23s. ($5.23) c.i.f. Tees.

Improvement in steel continues—mainly in structural material. Makers are reluctant to quote forward delivery except at higher rates. The boiler makers' dispute still is unsettled. Substantial shipbuilding orders are waiting for the settlement.

Continental markets are disorganized. Some works are well sold; others are in want of orders. Buyers generally are cautious, owing to the uncertainty regarding the future disposal of the Ruhr stocks. Luxemburg reports dumping into Holland of Ruhr steel and selling it at low prices.

Tin plate is strong, with large business, both domestic and export. Works are well sold for a few months ahead and makers are asking higher prices owing to a dearer tendency in their steel. It is expected that the price agreement will be extended for a further period of one year. The central selling scheme virtually has been dropped.

Galvanized sheets are firm but quiet. The Far East is buying for early shipment, but the works are heavily committed.

Black sheets are strong; the Far Eastern demand continues. No. 26 gage CA has been advanced to £15 10s. (3.09c. per lb.) and No. 28 gage to £17 (3.39c. per lb.) net f.o.b. Japan 6 x 3, 13's, 107 lb. are selling up to £21 10s. (4.28c. per lb.).

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.46 per £1, as follows:

Durham coke, delivered	£1	19s.	to £2	0s.	$8.70 to	$8.92
Bilbao Rubio ore†		1	4		5.35	
Cleveland No. 1 foundry		5	7½		23.97	
Cleveland No. 3 foundry		5	0		22.30	
Cleveland No. 4 foundry		4	19		22.08	
Cleveland No. 4 forge		4	17½	to 4 18	21.74 to	21.85
Cleveland basic		4	12½	to 4 15	20.63 to	21.18
East Coast mixed		4	19½	to 5 0	22.19 to	22.30
East Coast hematite		4	19	to 5 0	22.08 to	22.30
Ferromanganese		17	0		75.82	
Ferromanganese*		17	0		75.82	
Rails, 60 lb. and up		8	0	to 9 0	35.68 to	40.14
Billets		7	10	to 8 5	33.45 to	36.79
Sheet and tin plate bars, Welsh		9	2½		40 71	
Tin plates, base box		1	1½	to 1 4½	4.79 to	5.46
					C. per Lb.	
Ship plates		9	5	to 9 15	1.84 to	1.94
Boiler plates		12	10	to 13 0	2.49 to	2.59
Tees		9	15	to 10 0	1.94 to	1.99
Channels		9	0	to 9 5	1.79 to	1.84
Beams		8	15	to 9 0	1.74 to	1.79
Round bars, ¾ to 3 in.		10	5	to 10 15	2.04 to	2.14
Galvanized sheets, 24 g.		19	0	to 19 5	3.78 to	3.83
Black sheets, 24 gage		14	0		2.79	
Black sheets, Japanese specifications		15	5		3.04	
Steel hoops		12	0	& 12 10*	2.39 &	2.49*
Cold rolled steel strip, 20 gage		17	5		3.43	
Cottoes, Indian specifications		15	0		2.99	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(*Nominal*)

Foundry pig iron:						
Belgium	£5	5s.	to £5	10s.	$23.41 to	$24.53
France	5	5	to 5	10	23.41 to	24.53
Luxemburg	5	5	to 5	10	23.41 to	24.53
Billets (nominal):						
Belgium	7	0			31.22	
France	7	0			31.22	
Merchant bars:					C. per Lb.	
Belgium	8	0	to 8	2½	1.59 to	1.62
Luxemburg	8	5			1.64	
France	8	5			1.64	
Joists (beams):						
Belgium	7	12½	to 7	15	1.52 to	1.54
Luxemburg	8	2½			1.62	
France	7	17½			1.57	
Angles:						
Belgium	8	0	to 8	5	1.59 to	1.64
⅛-in. plates:						
Belgium	8	10			1.69	
Germany	8	10			1.69	
¼-in. plates:						
Luxemburg	8	7½			1.67	
Belgium	8	7½	to 8	10	1.67 to	1.69

NEW TRADE PUBLICATIONS

Electric Motors.—Wagner Electric Corporation, St. Louis. Bulletin 134, four pages. Describes Fynn-Weichsel constant-speed, a. c. motor. Load characteristics are shown, and also illustrations of the stator and rotor.

Gear Data.—Lees-Bradner Co., Cleveland. Loose leaf book with pages 4 x 7 in. Included in the data is the solution of right angle triangles by trigonometry reduced to simple arithmetic, data on spur gears, gear generation on the company's grinder, finding pitch diameter or helix angle of helical gears, changing spur gears to helicals and other kindred material. Additional sheets will be added from time to time and it is expected that this book will grow eventually into an extensive collection of gear data.

Universal Grinding Machines.—Cincinnati Grinder Co., Cincinnati, 1923 catalog, 33 pages. Describes machine made in eight sizes for grinding straight or tapered work externally and internally, flat work that can be held in faceplate or chuck, and adapted for sharpening reamers, milling cutters and other work. Fixtures for internal grinding, motor drive arrangements, control of the machine and the unit system of construction are described in detail.

Used Machine Tools.—McCabe & Sheeran Machinery Corporation, 50 Church Street, New York. Booklet of 24 pages lists surplus machine tools, blowers, air compressors, pumps, presses, foundry equipment, steel foundry equipment, engines and generators, cranes and hoists, boiler shop and other equipment for sale direct from shop where used. The plants are located in several cities.

Thermit Rail Welding.—Metal & Thermit Corporation, 120 Broadway, New York. Pamphlet No. 15, 6 x 9 in., 72 pages. Treats of the advantages of thermit welded rail joint and how the thermit weld is made. A section is also given to making of special track work by the thermit process and another to repairing cast-iron bound special work. The pamphlet concludes with a theory of rail joints, by Felix Lange.

Foundry Equipment.—Adams Co., Dubuque, Ia. Catalog No. 30, size 8½ x 11 in., 55 pages. Under the title of "Labor Savers for the Foundry," the catalog describes and illustrates in seven sections various items of foundry equipment. Included are squeezers, molding machines, snap flasks, steel jackets and frames, rappers, and other equipment. A feature is an information section giving among other material instructions for making cast match plates, method of operation with match plates and when carded patterns must be used.

Woodworking Machinery.—Hall & Brown Wood Working Machine Co., St. Louis. Sectional catalog of more than 150 pages, bound in loose leaf form. Describes and illustrates the features of the planers, surfacers, new model stickers, molding machines, hollow chisel mortisers, shapers, rip saw benches, cut-off and swing saws, band saw machines, and many other items manufactured by the company.

Woodworking Machinery.—Hall & Brown Wood Working Machine Co., St. Louis. Booklet having pages 21½ in. wide and 13 in. high, 20 pages. Illustrations are on right hand pages, covering the full width of page, the description and dimensions of machines being on the following page. The items shown include planers and matchers, new model inside molder, with top and bottom profilers and resawing machines.

Twist Drill Pointers.—Oliver Instrument Co., Adrian, Mich. Pamphlet of eight pages 8½ x 11 in., explaining the principle of the company's automatic drill pointer. The No. 2, 4 and 5 machines are described and illustrated.

Flexible Couplings. Falk Corporation, Milwaukee. Eight-page pamphlet dealing with the Falk-Bibby coupling, for which great flexibility is claimed. Cushioning, heavy shocks and damping out torsional oscillations are features. Both parallel and angular misalinements are taken care of without the use of rubber or other soft materials. Power is transmitted between two flanges through specially constructed grid springs of tempered steel.

Diesel Engines. Fulton Iron Works Co., St. Louis. Thirty-two-page catalog describing power equipment for the use of oil fuel. The pamphlet is heavily illustrated, including both installation and construction views and diagrams. Among the engines illustrated are several of 1000 hp. or larger.

The Constanator Regulator. Dempsey Furnace Co., 15 Park Row, New York. Eight-page catalog describing a regulator for damper, fan speed, stoker speed, etc., for industrial boilers. It is said to save fuel through greater regularity of operation than with other types of apparatus, and to do this by keeping out of the furnace both excess fuel and excess air for combustion.

Mechanical Hot-Blast Heater. B. F. Sturtevant Co., Hyde Park, Mass. Eight-page folder devoted to heating air for industrial purposes and particularly for the heating of factories. The design depends upon the subdivision of gases of combustion into many small streams which pass in contact with the walls of the tubes and thus heat the air passing through the heater.

Nebulyte Oil Burner.—The Anthony Co., Long Island City, N. Y. 4-page folder devoted to an oil burner operating mechanically to distribute a uniform spray for combustion. Positive mechanical action with definite liquid pressure gives the particles of oil a definite swirling motion, dispersing them into a hollow umbrella cone of spray to fit combustion conditions.

Venturi Low Pressure Oil Burner.—Hauck Mfg. Co., Brooklyn, N. Y. 8-page folder devoted to a burner for fuel oil which is said to produce a clean and intense flame under full control, to insure perfect combustion through perfect atomization and proper air regulation, to light instantly in a cold furnace and to bring it quickly up to the desired temperature. The burner is designed for a wide variety of industrial uses.

Ball Test Applied to Cement Mortar and Concrete

Under the above title the engineering department of Purdue University has issued Bulletin No. 12 of 32 pages, describing tests of concrete in resistance to impact. The tests were intended to show the relation of compressive strength to surface hardness, particularly as affecting concrete roads; the effect of age and mix upon the surface hardness; the effect of tire loads, etc. The results are shown largely in diagrams and appear to bear out the conclusion that the ball test affords a valuable and convenient means of study for the purposes indicated.

Metal Lath Data Book

Issued by the Truscon Steel Co., Youngstown, Ohio, this 48-page booklet, 8½ x 11 in., is said to be the most complete data book on this subject which has ever been published. Numerous details of design for walls and ceilings of various types, together with paneling and ornamental work, make the booklet of value to architects and engineers. Illustrations of buildings where metal lath has been used show methods of treatment, while specifications in detail, both as to the application of the lath and the application of plaster or stucco to it and the use of coloring pigments make the work unusually complete for its specific purpose. Tables of loads are useful in design.

Tests of Powdered Coal Plant

Technical paper No. 316 of the Bureau of Mines covers in 22 pages results of two boiler tests, six dryer tests, and eight mill tests showing the amount of power used by pulverizing mills, the extent to which drying is practicable, and the overall thermal efficiency from the total coal used to the steam. This reached a maximum of 78.2 per cent. Attention was called in the conclusion to the excessive erosion of the furnace lining caused by the high temperature of the flame. This is attributed to the low melting point of the ash in Illinois coal, causing it to run over the lining and wear it away.

Acid Electric Steel Castings

(*Continued from page 1249*)

ter until it begins to feel moist. A small amount can be tried to note how it packs. If too dry, more slurry can be added; if too wet, a small amount of dry ganister is added. This is then shoveled into the furnace and rammed about the sides. An air rammer should be used, both from the standpoint of good hard ramming, and also from a time point of view. This mixture is gradually rammed into the shape desired, and is then run up along the side walls as high as possible. It cannot be rammed too hard, and should be given plenty of attention to avoid any soft spots. When completed, sodium silicate is spread on with a brush all over the banks, and especially where the banks join the wall bricks. This will harden the walls, and prevent any spalling while baking is taking place. It also tends to cement the rammed mixture to the wall bricks.

The roof is now set and a very slow wood fire is started in the furnace. This is kept going until the bricks are heated, and is gradually increased until a good-sized bed of coals are on the hearth and until the heat can be felt on the bottom shell, which will usually take from 10 to 12 hr. A bed of coke is thrown on the coals, about 8 to 10 in. deep, and the electrodes lowered until contact is made. Run power on the lowest possible point until the bed of coke becomes white hot. Power can then be shut off, and run at intervals, only enough being used to keep the hearth in a white hot condition. Four to six hours is ample for this operation, and about 1000 kwhr. will have been consumed. (Figures are for a furnace of 3 to 5 tons capacity). The residue of coke and ashes can now be raked out and the furnace charged for the first heat.

Charging the Furnace

In charging the furnace, care should be taken to have such a charge that, when in the furnace, it will be closely packed and as much under the electrodes as possible. A closely packed charge will melt faster and cleaner than a loose one, and the more of the charge under the electrodes, the greater the percentage of the direct arc which plays on the metal. It is for this reason that high side walls, making a deep, cup-shaped hearth, are recommended. Any scrap along the banks will fall under the arcs by its own weight, giving a saving of time in poking and in raking scrap from the side walls.

The best way to obtain the above is by charging the heavy chunks on the hearth, and then shoveling in the light scrap, which will pack in between the large pieces, making a very desirable charge. When shop scrap is used, it is usually preferable to get it in on the bottom. For general steel casting work, I have found that a charge of from 25 to 30 per cent of heavy scrap, the balance light, will give excellent melting down conditions. This charge should be made up of material averaging about 0.30 per cent carbon and 0.50 per cent manganese. About three large scoops of sand should be spread over the hearth before charging, to furnish slag for the melting down period. Such a charge of metal, if fairly clean, will melt down at about 0.15 per cent carbon, with sufficient residual manganese and silicon to keep from being heavily over-oxidized. If the scrap is heavily oxidized or very dirty, a larger amount of sand is charged for slag. I prefer to melt down under a rather heavy slag, for several reasons:

1. It does not attack the hearth or side walls, the iron oxide of the metal being satisfied with its own slag body.
2. It protects the roof and wall from the arc radiation, eliminating "watery" or "glassy" conditions.
3. By preventing a "watery" condition, over-oxidizing of the metal is eliminated.
4. The slag body throws most of the heat used into the metal, eliminating radiation, with its attendant power loss.

It often happens that, due to heavily oxidized scrap, the bath will melt down too low in carbon, requiring much working to bring it back. Under such conditions of scrap metal, a few shovels of ground coke thrown in with the charge will materially help, by causing the bath to melt down under nearly neutral conditions.

The charge being in, the current is turned on, the doors are sealed and melting begins. During this period, avoid as far as possible any delays as they mean needless oxidizing. The doors should be kept closed as much as possible to prevent air entering the furnace and to conserve heat. As soon as the flame begins to come up around the electrodes, the bath can be inspected, and any loose scrap on the banks shoved in. After heating for 5 or 10 min. the metal should be inspected as to slag conditions, and a test taken for carbon. If the slag is too heavy, enough can be raked off to leave the furnace in a condition ready to finish the heat. If the slag comes down thin, sand can be added.

Much information can be obtained during the melt down, by a careful observation of the flame and color of smoke issuing from around the electrodes. This gives an excellent idea of how melting is progressing, and saves opening the doors. During the early part of the melting down there will be no flame issuing from the roof part, and the smoke will be of a dark brownish color. If any coke has been added to the charge, this smoke will be black until the carbon has either been absorbed in the metal, or burned out by the oxides. When the bath is nearly all melted, and a good-sized pool has formed, the flame will begin to appear. If very sharp and of a bluish color, oxidizing conditions are prevailing, and the chances are the metal will melt dead. The slag, under these conditions, will be very thin. If the flame is luminous, and accompanied by heavy white fumes, you are under a reducing action and the metal will melt down high in carbon, manganese and silicon. The slag will be very thick and gummy on a heat of this character. The best conditions are when a fairly soft flame, together with brownish smoke, is emitted. This denotes a fairly neutral condition, and will result in a slag of the proper consistency, together with metal of the proper analysis.

There are many different methods used in taking this first test for carbon. I prefer to add a pinch of very fine ferrosilicon to the test spoon in order that a sound fracture may be obtained, as this is an aid in reading the carbon. For work of a special nature, where very close analyses are desired, drillings from the test should be sent to the laboratory for carbon and manganese.

There is little to do now until the metal heats up. The slag should be kept of the proper consistency, so that it bubbles easily, allowing any gases from the metal to escape. At this period the slag will usually be of a dirty color—black, brownish, or probably a very dark, dirty green. As reduction proceeds, this color will change to a grayish, then a greenish, gradually becoming lighter in color as the oxides are eliminated, until the perfect finishing slag color of a greenish yellow is obtained.

The first slag of a dark color will owe its color mainly to iron oxide. Such a slag, at melting, will probably contain from 10 to 20 per cent iron oxide, depending on melting conditions. In this slag will also be about 10 per cent of manganese oxide, the balance being silica, with a small amount of lime or magnesia. With such a slag the metal will be "wild" and in no condition to pour. This slag must therefore be "worked" similarly to a basic one, and the proper performance of this is what makes either a good or a mediocre heat.

The first duty is, therefore, the elimination of the iron oxide. This is accomplished by two distinct reactions, in which carbon is the element which causes the reduction. This may come either from the electrodes, the carbon in the steel, or from coke spread over the surface of the slag. If from the bath, your analysis is changing; if from the electrodes, your costs are increasing, due to needless electrode consumption. The most logical way therefore to start the reaction is by spreading a few shovels of finely ground coke over the bath. As the main product of this reduction is a gas, carbon monoxide, the slag must be kept thin enough to allow it free passage.

As reduction proceeds, the slag becomes lighter in color, and also thicker, due to its ever increasing silica content. As soon as the slag is freed from the iron oxide, the reduction will transfer its effort to reducing silicon from the slag.

If allowed to continue, the result will be a bath of metal too high in silicon. The proper method of procedure is, therefore, to pour, as soon as the iron oxide has been thoroughly reduced. The question is, therefore, how to tell when this condition is attained. Our method is to take a metal test every five minutes after the bath is melted. This is inspected for temperature, soundness of metal, and condition and color of slag. If slag is a little heavy it can be thinned by a judicious use of fine lime. As these tests proceed, it is noticed that the slag gradually becomes lighter and thicker as the metal becomes hotter.

The flame from around the electrodes has now changed into a very soft luminous one, and heavy white smoke is emitted. The appearance of the furnace is now similar to the basic process under finishing conditions, except that reduction is not so intense as to cause "snow." This is due to the manganese oxide content in the slag which would have to be reduced before the silica would reduce sufficiently to cause the powdering or "snowy" conditions, so pronounced in the basic process.

The slag will be bubbling vigorously, and all gas in the metal will be rapidly removed. At about the time the metal becomes hot enough to pour, it will be noticed that the slag has a puffy appearance, and seems to be foaming on the bath. A sample taken will be rather viscous and be yellowish green in color. The metal test will show quiet in the spoon and lie rather quiet in the test mold. The manganese is now added to the furnace and the heat poured.

Where there is a great deal of shanking to do on light castings, the metal is further superheated for about 10 min. The silicon picked up is allowed for in our alloy additions. Manganese usually gives a return of 95 to 100 per cent of the amount added, and the practice for a 0.65 per cent manganese content, is to add 0.40 per cent to the furnace and 0.25 per cent crushed to the ladle. Silicon, figured at 0.20 per cent, is added to the ladle in finely crushed pieces. Aluminum is added in the ratio of ½ lb. per ton of metal. Such a heat, when poured into the ladle, will pour very quiet, the slag holding back until most of the steel is in the ladle. The slag will foam up on the ladle, and string out in long threads from the furnace spout. Such a heat will prove of exceptional quality, and regular analyses are constant. Where high carbons are desired, pig iron to the desired amount is added long enough before the pour not to chill the steel. The carbon will rapidly drop, due to being reduced by the silicon, and about 0.05 per cent higher than desired should be added.

Many acid electric operators follow the practice of immersing their electrodes, with the power off, in the bath for a given number of seconds to raise the carbon. This is usually done just before the pour. I do not recommend this practice at all. In the first place, it is rather expensive to use the electrodes at 6c. or 7c. per lb. for a carbonizing agent, and in the second place there are so many variables which will change the result—the heat of metal, volume and character of slag, area of electrode exposed to metal, etc.

The foregoing covers the practice necessary for general operations on soft steel casting work. There are yet other points for consideration.

High-Carbon Steel

Very often specifications come into the shop requiring carbon content of 0.40 to 0.50 per cent, and even up as high as 1.00 per cent for very special work. If a heat was to be melted down under "soft" conditions the amount of pig iron required to raise to 1.00 per cent would be excessive; it would be very uneconomical regarding cost of metallic charge, and would prolong the time of heat and greatly increase the power consumption, due to its chilling effect.

The solution is to melt down "high." This can be done either by charging high-carbon scrap, such as springs, etc., or by the addition of coke to the charge. Either way is satisfactory, and fairly good results can be obtained if a little close calculating is done. The amount of coke to add will vary greatly depending on character of scrap, size of charge, etc., and can be determined for each shop only by experience. When using coke additions to a good grade of boiler steel scrap, I generally figure 10 points higher than desired, assuming the coke to contain 60 per cent effective carbon. This coke is thrown in about the center of the charge, in pieces approximately pea size.

A charge of this kind will always melt down high in manganese and silicon and recourse must be had to the chemist to run a carbon and manganese on the preliminary. Final additions can be calculated from these results. Silicon is judged by the solidity of the test piece and general appearance of fracture. A silicon content of about 0.15 per cent will just give a solid test block. A decrease will result in blow holes, while an increase gives the common "silicon line" to the grain.

In these classes of steel great precaution must be observed as to the temperature of casting. Castings from very hot metal will crack and tear excessively, especially if there is any tendency to obstruct the natural contraction.

Chrome Steel

These steels are easily made, the ferrochrome being added about 5 to 10 min. before pouring, sufficient being added to allow for an oxidation loss of 10 points. If the slag is the least bit thick the lumps should be moistened with water to kick the slag aside. This is good practice on adding any ferroalloys to the acid furnace, and helps greatly to eliminate any hard spots in the finished casting.

While there are, no doubt, many different methods of obtaining regular results, and while other operators may be able to improve on the foregoing practice, I have found it to be very simple, reliable and economical and giving metal worthy of the name "electric steel."

Log of a 3-ton Electric Heat—Soft Steel

Specification:
60,000 lb. per. sq. in. tensile strength.
22 per cent elongation in 2 in.

Steel Made:

Carbon	0.24%
Manganese	0.62%
Silicon	0.30%
Phosphorus	0.049%
Sulphur	0.036%
Tensile strength	72,000 lb. per sq. in.
Elongation	26 per cent
Bend	180 deg., flat on itself

Charge:

Structural steel	3,000 lb.
Shop scrap	1,800 lb.
Boiler clippings	3,000 lb.
Total	7,800 lb.

Shop scrap charged on hearth, the structural steel next, and all holes filled with clippings. Two scoops molding sand on hearth.

Time
8:00: Current on at high voltage.
8:45: Nearly all melted. Slag moderately thick, but melting under good oxidizing conditions.
9:00: All melted, and fairly hot. Changed over to low voltage. Slag test shows fairly thin, dead black in color. Metal test at about 0.12 per cent carbon, judged by fracture; 20 lb. ground coke spread over surface of bath.
9:05: Slag shows thin gray line, but still dirty. Metal unchanged.
9:10: Slag dark green in color, and beginning to thicken; 10 lb. fine lime thrown in under electrodes. Metal test shows a little higher in carbon. Slag well rabbled, and then given another light coke covering.
9:15: Slag bubbling vigorously and of good "dry" appearance. Sample shows greenish blue in color. Beginning to thicken. Metal hot, pouring clean from spoon. Carbon close to 0.18 per cent.
9:20: Reduction very heavy. White smoke and very luminous flames coming from around electrodes. Slag perfect, yellowish green in color and viscous when taken from furnace. Metal hot, quiet in spoon, showing 0.18 to 0.20 per cent carbon. Silicon being reduced from slag, and hearth. Ferromanganese figured at 0.40 per cent added to furnace.
9:23: Heat poured. Ferrosilicon at 0.20 per cent, and manganese at 0.25 per cent added in ladle. Slag foaming on ladle, metal good and hot. All conditions excellent.
Time of heat, 1 hr. 23 min.
Kilowatt hours per ton of charge, 540.

Log of a 3-ton Electric Heat—Hard Steel

Specification:
80,000 lb. per sq. in. tensile strength.
15 per cent elongation in 2 in.

Steel Made:

Carbon	0.42%
Manganese	0.60%

Silicon	0.35%
Phosphorus	0.045%
Sulphur	0.023%
Tensile strength	88,500 lb. per sq. in.
Elongation	19.4 per cent in 2 in.
Bend	160 deg. on 1 in. mandrel

Charge:

Open-hearth rall	2,800 lb.
Shop scrap	4,200 lb.
Total	7,000 lb.

Three scoops ground coke on hearth, together with two scoops molding sand. Shop scrap charged next, with rail on top.

Time
1:00: Current on at high voltage.
1:30: Flames beginning to come from electrode ports showing luminous, with white smoke. Melting down under reducing conditions.
1:50: All melted. Slag rather thick, and dark green in color. Metal test taken, shows about 0.40 per cent carbon. Sent to chemist for manganese and carbon analyses; 30 lb. iron ore added.
1:55: Slag too thick, raked about half off; 30 lb. iron ore again added. Metal test showing too high in silicon.
2:00: Slag conditions better, beginning to bubble. Metal boiling quietly, test showing silicon being removed.
2:05: Chemist reports manganese at 0.29 per cent, and carbon at 0.38 per cent. Slag blue green and looking fine. Metal getting rather hot, carbon test estimated at 0.05 below first test.
2:10: Reducing conditions excellent. Slag bubbling vigorously showing good greenish yellow color, viscous. Metal hot, test showing a slight pick up in silicon. Managanese added at 0.40 per cent.
2:13: Heat poured. Silicon at 0.15 per cent to ladle. No manganese, but 1½ lb. aluminum. Conditions excellent.
Time of heat 1 hr. 13 min.
Kilowatt hours per ton of charge, 510.

Log of a 3-ton Electric Heat—Special Steel

Specifications:

Carbon	0.90 to 1.00%
Manganese	not over 0.55%
Silicon	not over 0.30%
Chromium	0.90 to 1.00%

Steel Made:

Carbon	0.97%
Manganese	0.45%
Silicon	0.26%
Chrome	0.93%

Charge:

Old coiled springs	5,800 lb.
20 lb. ground coke on hearth, with two scoops sand.	

Time
10:00: Current on at high voltage.
10:50: All melted, switched over to low voltage. Slag rather thin and black in color. Metal test taken and sent to chemist. Second metal taken, and broken, but too high to read with any accuracy. Metal shows good, and fairly clear.
11:00: Metal beginning to heat up. Gave two scoops sand to thicken slag. Slag still black.
11:05: Chemist reports carbon at 0.81 per cent and manganese at 0.13 per cent. 200 lb. low phos. pig iron added, and bath thoroughly rabbled. Second test sent to chemist.
11:10: Slag showing trace of green color, and beginning to thicken. Metal moderate in temperature. Light covering of coke spread over surface of bath.
11:15: Slag looking better, showing bluish green. Metal getting rather hot. Reducing conditions good, and silicon beginning to work on slag.
11:20: Slag beginning to work, still bluish green in color, but beginning to assume viscous character. Metal hot and pouring clean from spoon. Chemist reports carbon at 0.96 per cent.
11:25: Slag excellent in every respect. Manganese at 0.35 per cent, and ferrochromium at 1.05 per cent chrome added. Bath given dusting of ground coke.
11:30: Heat poured. Silicon to ladle at 0.10 per cent.
Time of heat 1 hr. and 30 min.
Kilowatt hours per ton of charge, 585.

The J. Friedland Co., Inc., 293 Greenpoint Avenue, Brooklyn, has been incorporated with capital stock of $50,000 to manufacture show cases. It proposes to continue a business already established in this line. Joseph Friedland and Ephraig Goldberg, 2783 Webb Avenue, New York, are the chief incorporators.

Hugo Falck & Co., Ltd., New York, incorporated with $250,000 capital stock, will undertake the development of iron and other ore properties and may manufacture nonferrous alloys. The incorporators are S. H. Hofstadter, H. Riegelman, and P. Berner. Present address is in care of Mr. Samuels, Room 807, 67 Wall Street.

Plans of New Companies

The Superior Saw Mfg. Co., 1324 Metropolitan Avenue, Brooklyn, organized with $20,000 capital stock to manufacture saws, blades, etc., is now operating on these lines.

The Shoe Cleaner Services, Inc., 1160 East Sixteenth Street, New York, incorporated with $100,000 capital stock to manufacture electrically operated shoe-shining machinery, will for the present act as a development company for the Automatic Shoe Shining Machinery Co., incorporated a few months ago. The incorporators are G. P. Grant, L. M. Bainbridge and H. B. Jiltze.

Goodwin-Pray, Inc., Elizabeth, N. J., has been organized with capital stock of $50,000 to manufacture electrical machinery, taking over an established concern in this line. John G. Sauerwin, 715 Elizabeth Avenue, Elizabeth, N. J., heads the company.

The P. L. & W. Surgical Instrument Co., 144 Howard Street, Newark, N. J., has been organized to manufacture surgical instruments, and is now active on a small scale. Frank Pentek heads the company.

The Penn Brass & Copper Co., Erie, Pa., recently incorporated with $50,000 capital stock, has begun manufacturing seamless brass and copper tubes in its factory at 1120-30 West Eighteenth Street. E. S. Roach is president and Karl W. Wilks, general manager.

The Universal Coaler Co., Detroit, has been incorporated with $200,000 capital stock to manufacture electric cooling equipment. Plans are withheld for the present. Address is in care of Patterson Farmer, People's Finance Corporation, 954 Book Building.

The Arbetter Felling Machine Co., St. Louis, has been organized under Delaware laws with capital of $2,500,000 to manufacture textile and other machinery. This follows the consolidation of the company by that name of Boston and the Lewis Felling Machine Co. of St. Louis. Plant and all assets have been transferred to St. Louis where operations will continue as formerly. Charles L. Knower, 3763 Forest Park Boulevard, St. Louis, is one of the principals.

The Percoplate Boiler Sales Co., Newark, N. J., has been incorporated with $100,000 capital stock to make and deal in boilers and equipment. It is not ready to make announcement of plans. H. B. Mead, 111 Gotthart Street, is secretary.

The Sloan & Zook Tank Car Co., Bradford, Pa., incorporated with $125,000 capital stock, will operate as a subsidiary of the Sloan & Zook Co., Bradford. The new company will take over and operate the cars formerly owned by the parent company. William J. Sloan is one of the heads.

The U. S. E. Corporation, 7 West Sixty-first Street, New York, recently organized to manufacture automotive accessories, is now in production on spring bumpers. S. H. Shaw heads the company.

The R. L. Carter Co., Inc., 101 Benedict Avenue, Syracuse, N. Y., incorporated with capital stock of $25,000, has taken over the business of the R. L. Carter Co., that city, and will manufacture electric hand shapers and routers. It is equipped for immediate needs. R. L. Carter is president; E. M. Eustis, treasurer, and R. C. Eustis, secretary.

The Damascus Crucible Steel Casting Co., New Brighton, Pa., incorporated with capital of $300,000, will continue a business established 15 years in the manufacture of castings. A new plant is being built at Hammond, Ind., which will be ready for operation about Dec. 1. Buildings at Hammond were built by the Truscon Steel Co. and will house a 2-ton Heroult furnace. Grinding machines are being built by the Cincinnati Grinder Co. Contracts for the rest of the machinery will be let soon. Charles Capper is president.

A certificatee of incorporation has been granted the Aetna Steel & Iron Co., Inc., Southington, Conn., which recently purchased manufacturing property in Southington. Authorized capitalization is $170,000. The company will begin business with $65,000. Boston and Pawtucket, R. I., interests are interested in the company.

The Carrm Convertible Car Corporation, 46 East Forty-first Street, New York, has been incorporated with $5,000,000 capital stock under Delaware laws, to manufacture automobile bodies. Negotiations are under way to build a special type body. Plans are as yet indefinite, but it is likely that a plant will be located in Pennsylvania or the Middle West.

The Muir Valve & Plumbing Supply Co., New York, has been incorporated with $100,000 capital stock to manufacture and deal in valves, plumbing equipment, fittings, etc. Plans are as yet indeterminate. J. Muir, who is connected with the Mitchell Co., 621 West Twenty-fourth Street, New York, is one of the principals.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.20c. to 4.59c.
No. 12	4.25c. to 4.64c.
No. 14	4.30c. to 4.69c.
No. 16	4.40c. to 4.79c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	4.85c.
No. 26	4.40c. to 4.65c.	4.90c.
No. 28	4.50c. to 4.75c.	5.00c.
No. 30	4.70c. to 4.95c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 4.85c.
No. 16	4.75c. to 5.00c.
Nos. 18 and 20	4.90c. to 5.15c.
Nos. 22 and 24	5.05c. to 5.30c.
No. 26	5.20c. to 5.45c.
No. 27	5.35c. to 5.60c.
No. 28	5.50c. to 5.75c.
No. 30	5.95c. to 6.20c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 c. to 18 c.
High brass wire	17½c. to 18½c.
Brass rods	14¾c. to 15¾c.
Brass tube, brazed	25 c. to 26½c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	23 c. to 24 c.

Copper Sheets

Sheet copper, hot rolled, 19¼c. to 20¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
			Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	$10.70	IC	7.00	6.75
IX	13.95	12.55	IX	8.25	8.00
IXX	15.55	13.75	IXX	9.50	9.25
IXXX	17.10	15.30	IXXX	10.75	10.50
IXXXX	18.85	16.80	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	48c. to 50c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9½c. to 10c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market is very unsettled in sympathy with ingot copper. Dealers' buying prices are nominally as follows:

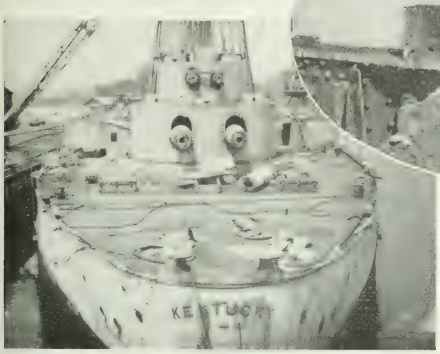
	Cents Per Lb.
Copper, heavy crucible	10.50
Copper, heavy wire	10.00
Copper, light bottoms	8.25
Brass, heavy	5.50
Brass, light	4.75
Heavy machine composition	8.25
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.25
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, November 15, 1923

ESTABLISHED 1855 VOL. 112, No. 20

Ship Scrapping with Oxy-Acetylene





Commercial Operation of Cutting Up Heavy Steel Parts, Such as Armor Plate —Various Methods of Procedure

Fig. 1 and Fig. 2 (Oval)

CONSIDERABLE interest has been aroused in the "infant" industry of ship scrapping by the fact that the Government is selling a large number of naval vessels for salvage. These vessels, which in the aggregate amount to above 600,000 tons, are to be scrapped in accordance with the provisions of the treaty limiting naval armament, and must be dismantled by the purchasers within eighteen months from the date of ratification of the treaty, Aug. 17, 1923.

A number of firms have already had considerable experience in scrapping naval vessels, merchant ships and lighter craft. Naturally, their experiences would prove very valuable to those who are contemplating bidding for vessels now to be sold, since by taking advantage of the lessons learned by their predecessors considerable money, and certainly much time, may be saved.

One of the earliest ship scrapping operations undertaken was breaking up the battleship Maine in Havana harbor in 1911, after the wreck of this old naval vessel had been exposed to the elements for about 13 years. Many of the problems met in this work will not confront those undertaking the scrapping of the vessels now being offered for sale. When it was decided to break up this wreck it was planned to take the plates of the ship apart by cutting the rivets and bolts with an air chisel, or with a hand chisel and sledge, while the more substantial fabrication might be demolished by blasting. Before the job was even attempted, however, the engineers in charge of the work estimated that the time which would be required to break up the wreck, laid bare in an extensive cofferdam, would be so great as to magnify the hazards unduly. It therefore became evident that more practicable means for doing the work must be had.

Cutting with the oxy-acetylene flame was proposed and after the first demonstration of this process the old methods were abandoned. The wrecked forward portion of the ship was thus cut away and cut up, while the bulk of the hull, with a bulkhead built across the cut-off portion, was then towed out to sea and sunk, with naval honors.

Following the success of this pioneer work, whenever ship scrapping was undertaken from time to time, down to the period following the World War, the oxy-acetylene cutting blowpipe was used as a matter of course. Some of the jobs during this period were spectacular in themselves and a few of them attracted public notice, but it was not until the Government began to dispose of obsolete equipment after the war that ship scrapping again received notable attention from the press. About two and one-half years ago bids were asked for the purchase of a number of first-line ships, several transports and many destroyers, submarines and vessels of other types. These were offered for sale to be scrapped and were purchased by those in the scrap business or in allied lines.

In nearly every instance the vessels sold at this time were towed to a point accessible to railroad sidings, there to be scrapped by oxy-acetylene cutting. Much of the propelling and other machinery in the vessel was removed and converted to the uses of commerce and the purchasers of the ships found a profitable market for the brass, copper and other metals used in the fittings. Even the wire constituting the communication systems within the vessels was salvaged. Re-



Fig. 3—Remains of Army Transport Meade, Aground at Low Tide in the Delaware River at Bridesburg, Pa. This ship was 525 ft. long

frigerating machinery, pumps, cranes and handling machinery were removed and resold as parts of commercial equipment. When these vessels were thus stripped of all their portable equipment the oxy-acetylene blowpipe was utilized to reduce the superstructure, the hull and the heavy fittings to charging box size, all previous experiences having clearly pointed to the fact that by no other means could the vessel profitably be reduced to scrap.

Now, at a time when all but possibly one or two organizations have finished the work on obsolete vessels purchased from the Government for scrapping, comes the ratification of the Five-Power Naval Armament Limitations Agreement, which projects the country into a more extensive ship scrapping program than was ever before undertaken. A score or more of ships, from great battleships, thoroughly equipped and in commission, to hulls of new battle cruisers on the ways (designed to be the speediest and most powerful fighting machines afloat) are to be scrapped, and the arrangement under which they are being disposed of provides that they shall be reduced to such a condition that neither the vessel as a whole nor any of its parts can again be used as equipment for combat purposes.

Some vessels, sold under the provisions of this arrangement, are now in course of demolition. In general, the method employed is to moor the vessel alongside a wharf and strip it of its superstructure, masts, stacks, cranes and other appurtenances. A typical arrangement is shown in Fig. 1. Openings are then cut in the deck plates, through which the machinery from below is removed (Fig. 2).* After this work is completed the deck plates themselves and the hull of the ship are attacked, the work proceeding by sections until it almost reaches the waterline. When this time is reached the remainder of the hull is sometimes towed up on the beach at high tide as shown in Fig. 3, and at low tide another row of plates is removed. This process is repeated at each successive high and low tide (Fig. 4) until the keel of the ship can be towed on to land, where demolition is completed. The steel is cut to charging box sizes and then shipped to steel plants for remelting.

Some contractors were able to cut ships to a line where the hull could be converted to use as a barge or a car ferry. The profits derived from the sale of the hull for purposes of this kind have materially aided in bringing up the gross profit derived from the scrapping transaction.

What was at one time considered a serious problem in this work was the breaking up of the heavy armor plate of the naval vessels. Some of the ships sold immediately after the World War were disposed of under the condition that the armor plate should be removed intact and returned to the Government, but at present the vessels are sold under arrangements which provide for scrapping the armor. Here the oxy-acetylene cutting blowpipe reaches its highest degree of usefulness in ship scrapping. It is inconceivable that the reduction to charging box size of the armor plate would be attempted by cold chisel and sledge, but before oxy-acetylene cutting was adopted for this work such tools or drilling and blasting were the only methods available.

Two old naval vessels are now being scrapped at a point where tidewater wharfage is available and where a railroad spur makes it possible to handle the scrap

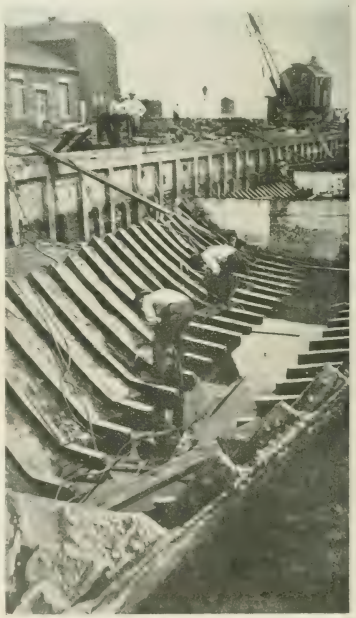


Fig. 4—Last Stages of Demolition of the Army Transport Meade

*The man wears a mask to guard against fumes from the numerous coats of paint on the decking and other steel work.

metal directly from the ships to cars. Direct handling reduces costs and in the same ratio increases the profit made by the company undertaking the salvage work. Cranes of sufficient capacity are so located, also, that it is possible to lift intact such portions of the ship as may be desired to a point on shore where they can be further reduced to size or, for that matter, shipped to a purchaser who can put a mechanical unit into use.

These two vessels (the Kentucky, illustrated in Fig. 1, and the Ohio, in Fig. 5) were ships which had a displacement of about 12,000 tons each. They were more than 360 ft. long, had a beam of 72 ft., and a draft of 23 ft. 6 in. The armor belts were 16½ and 12 in. thick, respectively, and the turret armor was 17 to 12 in. thick. The main armament consisted of four 12-in. guns in the Ohio; four 13-in. and four 8-in. in the Kentucky. Together, the vessels represented about 18,000 tons of steel and several hundred tons of brass and copper fittings.

Scrapping these ships was begun by cutting off and removing the deck fitings and parts of the superstructure. Most of this equipment was cut on the vessel only sufficiently to remove it, and was further reduced to charging box size after it had been lowered to the mainland. Through handling part of the work in this way the operators were enabled to attack the remainder of the superstructure and the deck plates unhindered by work going on above them. The larger guns were cut into pieces in place and the pieces were swung directly from the decks to waiting gondola cars. Cutting this armament represented an interesting oxy-acetylene application and was handled with ease and great rapidity with hand cutting blowpipes.

When the decks were cleared of most of the metal which could be conveniently removed large openings were cut to permit the removal of machinery and fittings. Such of this equipment as could not be economically salvaged and sold for commercial purposes was then reduced to scrap. This remark also applies to much of the piping and other fittings in the hulls of the ships.

About 25 per cent of the weight of such ships is armor. Upon the handling of this material depends, to a considerable degree, the profit of the whole scrapping operation. This contractor removed the armor belt and the turret armor to shore, where it was cut to charging box size.

Several difficulties were met. The first of these was occasioned by the composition and the condition of the armor plate itself. It is, of course, a special alloy steel, case hardened to a depth of several inches on the outside. When in position it was backed by several inches of teak. The hardened outside surface made it advisable to cut the armor while it lay face down; but after the armor was placed in this position no difficulties were encountered in cutting it with either the hand cutting blowpipe or a blowpipe mechanically guided by a straight line cutting machine, as in Fig. 6. Fig. 7 shows that the operation leaves little to be desired for general all around appearance.

The protective deck and the lighter armor was cut in place and loaded directly from the ships to the cars. In various sections of the vessels the plating consisted of several laminations. In many sections these laminations were separated by heavy coatings of red lead or some other type of paint or protective covering which, although at times it rendered the cutting less speedy and less comfortable than it otherwise would have been, did not interfere with the progress.

The proportions of each class of material recovered by scrapping naval vessels naturally varies with the age and type of the ship. It has been estimated, however, as a rough guide, that about 60 per cent of the vessel's weight represents heavy steel scrap, 10 per cent light steel scrap, 7½ per cent brass and copper, 2½ per cent lead, 5 per cent cast iron and 15 per cent wood, dust, rubbish, paint and other waste.



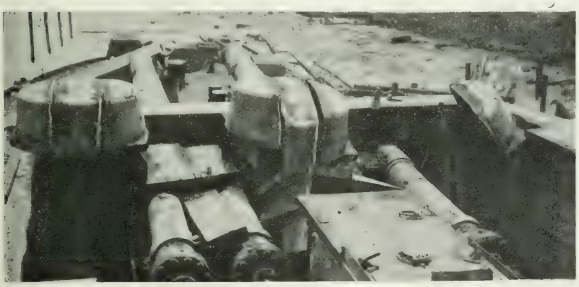


Fig. 5 (Left) Cuts on Forward Turret of Battleship Ohio. Each sighting hood has been cut into three parts

Fig. 6 (Above) Straight-Line Cutting Machine at Work on 16-In. Armor

Fig. 7 (Below) Armor Plate Scrap as Cut up by the Torch, Showing Holes for the Bolts Which Held the Armor to the Ship's Side



National Founders' Meeting

The 1923 annual meeting of the National Founders Association will be held Nov. 21 and 22 at the Hotel Astor, New York. James A. Emery, counsel of the association, will discuss "The Outlook" at the morning session of Nov. 21. The addresses scheduled include the following, all to be delivered in the afternoon session of that day except the last two, which are on the program for the morning session of Nov. 22.

"Personnel Work—Is It Practical? Does It Pay?" by Dr. H. H. Myers, personnel superintendent, Ohio Brass Co., Mansfield, Ohio.

"What I Saw in Europe," by Magnus W. Alexander, managing director, National Industrial Conference Board, New York.

"Bootlegging Mind Poison," by Fred R. Marvin, associate editor New York *Commercial*.

"Educational Motion Pictures," by Dr. Paul Smith, vice-president, American Motion Picture Corporation, New York.

"A Foundry Apprentice Training System That Works," by Horace A. Frommelt, educational director, Falk Corporation, Milwaukee.

"A Talk on Gray Iron Foundry Practice and the Remedy for Some of the Troubles Encountered," by Enrique Touceda, consulting engineer, American Malleable Castings Association.

The reports of officers, President William H. Barr, Commissioner A. E. McClintock and Secretary J. M. Taylor, will be presented at the beginning of the Wednesday morning session. The program provides also for reports of the new membership committee, H. J. Boggis, chairman, and that on industrial education, L. W. Olson, chairman.

At the annual dinner, Wednesday evening, Hon. J. Adam Bebe of Minneapolis will speak.

Program of Mechanical Engineers' Meeting

Pressed metal will come in for special attention at the annual meeting of the American Society of Mechanical Engineers, to be held at the society's headquarters in New York, Dec. 3 to 6, inclusive. Papers on the subject will be presented in the machine shop session on the morning of Dec. 6.

Among other subjects scheduled for the annual meeting are the following: Management, on the afternoon of Dec. 6; fuels on the morning of Dec. 5; development in power economy in the power session on the morning of Dec. 6; and contributions on the corrosion of various alloys, to be presented in the aeronautic section, on the morning of Dec. 6.

Extracts from the program follow:

General Session, Dec. 4—H. A. S. Howarth, Kingsbury Machine Works, Philadelphia, a graphical study of journal lubrication; S. Timoshenko, research department, Westinghouse Electric & Mfg. Co., East Pittsburgh, bending and torsion of multi-throw crankshafts on many supports.

Fluid Meters Session, Dec. 4—Open meeting for discussion of part II of the report of the special committee on fluid meters.

Fuels Session, Dec. 5—O. P. Hood, Bureau of Mines, Washington, fundamental factors in the spontaneous combustion of coal; F. G. Tryon, U. S. Geological Survey, Washington, economic phases of coal storage; H. E. Birch, R. H. Beaumont Co., and H. V. Coes, Ford, Bacon & Davis, Philadelphia, coal handling and coal storage.

Ordnance Session, Dec. 5—Capt. H. W. Churchill, executive assistant, New York District Ordnance Office, some production problems in the War Department's preparedness plan.

Power Session, Dec. 6—E. H. Brown and M. H. Drewry, Allis-Chalmers Mfg. Co., Milwaukee, gains in power-plant economy from extracting steam from stages of main turbines; C. F. Hirshfeld, Detroit Edison Co., Detroit, and F. O. Ellenwood, Cornell University, Ithaca, N. Y., high pressure, reheating and regenerating for steam power plants; C. W. E. Clarke, power engineer, Dwight P. Robinson & Co., New York, boiler test results with preheated air, Colfax Station, Duquesne Light Co.

Machine Shop Session, Dec. 6—D. P. Cook, Boston Pressed Metal Co., Worcester, Mass., some principles and examples of metal development; W. W. Galbreath, president, and John R. Winter, general superintendent, Youngstown Pressed Steel Co., Warren, Ohio, the development of modern stamping practice; progress report on the present status and future problems of the art of cutting metals, a review of the present knowledge concerning the elements entering into the cutting of metals.

Aeronautic Session, Dec. 6—D. Basch, research engineer, General Electric Co., and M. F. Sayre, Union College, Schenectady, N. Y., resistance of various aluminum alloys to salt-water corrosion; H. A. Gardner, Henry A. Gardner Laboratory, Washington, corrosion, cleansing and protection of aluminum alloys, such as duralumin.

Management Session, Dec. 6—R. T. Kent, consulting management engineer, Montclair, N. J., relation of mechanical engineering to management in the metal-working industries.

Ohio Foundrymen to Hold November Meeting in Toledo

Members of the Ohio State Foundrymen's Association will have an opportunity to inspect the plants of the Willys-Overland Co. and the Toledo Furnace Co. at Toledo, Ohio, on the occasion of the annual convention of the association Nov. 15 and 16. The meetings will be held at the Toledo Yacht Club, beginning with a luncheon on Nov. 15, followed by an afternoon session during which several technical and practical papers will be read and discussed. Most of Friday will be given up to plant visiting. Among the papers to be read are the following: "Patterns, the Starting Point of Profit and Loss," by Dan M. Avey, managing editor of *Foundry*, Cleveland; "Your Insurance Costs and the Adjustment of Losses," by W. M. Todd, district manager Western Adjustment Co., Toledo; "Problems in Brass Foundry Practice and Their Solution," by Fred L. Wolf, technical superintendent Ohio Brass Co., Mansfield, Ohio; "Foundry Costs, Ferrous and Nonferrous," by E. T. Runge, E. T. Runge Cost Co., Cleveland.

Officers of the association are: Frank W. Huber, president; Walter L. Seelbach, treasurer, and Arthur J. Tuscany, Century Building, Cleveland, secretary. The Toledo committee having charge of convention arrangements consists of C. C. Smith, Toledo Steel Castings Co., chairman; C. E. Bunting, Bunting Brass & Bronze Co., and William Baker, Baker Brothers.

Section Meetings of Mechanical Engineers

Among meetings of sections of the American Society of Mechanical Engineers scheduled in the immediate future are the following:

Birmingham, Nov. 21, anniversary dinner at Hillman Hotel. Subjects, "Impressions from My Recent Trip Abroad," by James Bowron, Gulf States Steel Co.; "Interesting Experiences in Russia," by Robert Palm; "With the Red Cross in Judea," by H. Y. Carson. (H. L. Freeman, secretary, Alabama Power Co., Brown-Marx Building, Birmingham.)

Cincinnati, Nov. 22, at Literary Club Rooms, "Grinding of Gear Teeth," by R. S. Drummond, Gear Grinding Machine Co.

Detroit, Nov. 23, Hotel Statler. Banquet honoring Dean Mortimer E. Cooley of the University of Michigan and past-president of the society. (F. H. Low, secretary, Ford Motor Co., Highland Park, Detroit.)

Newark, N. J., Nov. 26, Machine shop meeting. (S. H. Libby, secretary, General Electric Co., Bloomfield, N. J.)

New Haven, Nov 20, at Mason Laboratory, Yale University. "Leviathan, Her Reconditioning and Trial Trip," by Prof. H. L. Seward of Yale University. (Prof. S. W. Dudley, secretary, 400 Temple Street, New Haven, Conn.)

Worcester, Nov. 13, at the Boston Store restaurant, dinner at 6.30 followed by addresses. "X-Ray Examination of Metals as Employed by the Government," by Gen. T. C. Dickson, commandant of the Watertown Arsenal, accompanied by Dr. F. C. Langenburg, metallurgist and research engineer of the arsenal. (M. C. Nelson, secretary, 424 Massasoit Road, Worcester, Mass.)

The Trafford City foundry of the Westinghouse Electric & Mfg. Co. set a new high record mark in October in monthly production, when 3,300,568 lb. of castings were produced. That compares with the former record of 3,184,598 lb. in March, 1916.

How Germany Must Work Out Problems

Longer Work-Day Essential to Adequate Production—Ruhr Regarded as Lost to Germany—Interview with Minister of Labor

BY DR. RICHARD MOLDENKE

FOLLOWING up the recent interviews of the writer with Sir Arthur Balfour, for Great Britain, and Dr. Federico Giolitti, for Italy, it seemed essential that France and Germany should be covered similarly. Arrangements were therefore made to get into touch with the most prominent captains of industry in these countries, so that these men might give a message to the iron and steel industry of America telling of the steps taken to return their countries to normalcy, the probable trend of steel production, export and kindred topics. The results were disappointing, as these men would not talk for publication and in some cases evaded a meeting.

The situation is perfectly understandable; in the case of France the great industrials might not interfere with the policy of the Government, which is doing everything to crush German competition; in the case of Germany, the most important steel producers will shortly find themselves ruined by the French policy, and are therefore not making the process any more difficult to bear than they can. Most of the important men were seen, however, and sufficient information was obtained to enable me to draw the deductions given further on; but it should be kept in mind that, except where actually quoted, the responsibility for the statements is on the shoulders of the writer. In other words, the French industrials would not speak for publication —though approached through governmental and industrial channels, and with a loss of three weeks of precious time; and the German industrials dared not speak for publication, because of the impending ruin of their interests in the Ruhr and Rhine regions.

It remained for one man—the highest authority in Germany from the standpoint of the statesman, a member of the Cabinet—to take a farsighted view of the immediate political and industrial situation, and fearlessly combat outward and inward foes so that a disaster may not come to civilization in spite of every outlook for it at the moment. Dr. Heinrich Brauns, the German Minister of Labor, is the man in question, and in addition to the strictly political and industrial aspects of the world problems which he discussed, something will be given on his work in the interest of harmonizing capital and labor—which should also interest considerably the readers of THE IRON AGE.

French Fear of German Numbers

From the many interviews, and an intimate knowledge of the characteristics of the European peoples, the present crisis seems to me to rest upon the following bases, consisting of several lines of policy which shape diplomatic and executive military action. First, one does not hear much in France of reparations; one senses only the obsession that the sixty to forty millions of people ratio must be made fifty-fifty or better, at all hazards. Hence the huge military establishment, with the most modern of war equipment. The debt to America is never mentioned, if thought of, and the vast potentiality of England seems entirely overlooked. The condition today is exactly that of three periods of French history in the last century, when that nation overbalanced all the others.

With the traditional policy of England requiring a balance of power on the Continent of Europe, for which Germany has just suffered, it would seem that war is surely ahead sooner or later. The French policy is none the less understandable as, with the acquirement of the enormous ore resources of Lorraine, it is part of national economy to secure enough coke to utilize them to build up the national wealth again. Numerous selling agencies have been established by France the world over and, were it possible to have access to German coke from the Ruhr as needed, a period of wonderful prosperity would be ahead of the French steel industry.

On the thought above, the following seems to be the

DR. BRAUNS was born Jan. 3, 1868, at Cologne, Germany. Reared in the Catholic faith, he studied theology at the Universities of Bonn and Cologne, and later took up political science and law at the Universities of Bonn and Freiburg, receiving his degree of Doctor of Political Science at the latter institution in 1905. The trend of his activity is seen in the title of his thesis—"The Transition of Hand-Weaving to Factory Operation in the Lower Rhine Velvet and Silk Industry," published at the time and widely commented upon. In 1921 the University of his native city conferred upon him the degree of Doctor of Laws, honoris causa.

From 1890 to 1900 Dr. Brauns filled positions within the scope of his church, and from 1900 on he entered the labor field, as managing director of the National Society of Catholics of Germany, with special attention to the industrial courses taught the workingmen of that organization. He was a member of the National Assembly, for the district of Cologne, that framed the Constitution of the German Republic, and a member of the first Reichstag of the Republic. He represents his district in that body to the present day.

Dr. Brauns is now Minister of Labor (Reichsarbeitminister) over three years, serving continuously in seven cabinets. He is an author of books on labor organization and development, some of the titles of which are of interest, namely: The Christian Labor Unions; the Eight-Hour Day in the Mining Industry; Wages in the Mining Industry of Germany; the Law of the Shop Committees (Betriebsrate); Political Studies on the Wage Question; etc.

Dr. Brauns has the united support of all the organizations of German workingmen, and the complete confidence of all the organizations of manufacturers as well. Hence his name is found in all the cabinets from the time of von Fehrenbach to the present one, and he is likely to remain in office as long as his health will permit.



DR. HEINRICH BRAUNS,
German Minister of Labor

universal opinion in the several countries visited. If German and French ironmasters were to work together in perfect accord and with united interests, steel would eventually be produced at so low a figure that the steel export of all other nations would show sorry figures. On the whole—barring the super-patriots—this uniting of interests and activity is actually engaging the attention of the several French and German groups that would benefit by it. There are, however, some practically insurmountable obstacles to the idea. Even if the Schneider and the Stinnes groups, for instance, were desirous of cooperating closely, the two respective Governments will never agree. All kinds of hindrances would be interposed by way of taxes, tariffs, and what not. Further, it would require the closest kind of study and rearrangement of producing and distributing points to obviate over-prosperity and hardship going hand in hand. It is this problem that seems to me to underlie the second line of policy that is coming to light little by little.

Ruhr Separation Problem

In the equalization of the sixty to forty million, the separation of the Rhine and Ruhr districts from Germany would give France what she is working for, if these districts come under French influence and domination politically and industrially. It seems hardly likely that an actual annexation is contemplated—with what that would mean to English policy. But the creation of a protectorate, or a semi-independent state, is unquestionably the goal of France, and with it there would no longer be any border line between the antagonistic nations. The Ruhr and Rhine Republic, as evidently contemplated by France—in the view of the writer—would be surrounded by a wall, with high export duty for reparations on the German side, and lower duties on the side of France to keep out competition undesirable to French interests.

So much for the French side. Now for the German: It is now admitted almost everywhere in Germany that the Ruhr is lost to the Fatherland, as the consequence of French policy and military action. At the end of this month (October) German aid must necessarily cease in the occupied regions, as there is nothing left in Germany to send there—paper marks having gone to smash. The great industrial leaders are at their wits' ends to provide money to pay those men who have been retained at work to supply the small demand for manufactured products still existing.

Mr. Stinnes himself, the greatest of the industrial and financial leaders of Germany, planning with his staff how to meet the crisis, looked a physical wreck, and complained bitterly of the criticism heaped upon him at home and abroad these last days. He well remembered the writer, who spent an afternoon with him two and a half years ago, when his party had induced President Ebert and his Cabinet to ask President Harding for mediation in the reparations tangle; but Mr. Stinnes pleaded to be excused from making statements at this critical time, though urged to do so by Minister Brauns so that the United States might be able to judge the situation better. The consequence of this inability of Germany to help the Ruhr, the money being seized by France almost as fast as sent, means that, to avoid chaos and a possible futile massacre of the occupation troops, French money or a Rhineland Republic money will have to be provided, and this will be the present result so far as Germany is concerned. There will, however, be a new Alsace-Lorraine question and a very live one, placed upon the records of the world, and already there are no "pacifists" left in Germany.

Germany in a Bad Way

Of the internal conditions in Germany, actual observers who go into the markets—not from hotel balconies or in conducted parties—will find that they are frightful. The writer and his wife saw many tragic cases, but space forbids stating more here. Suffice it to say that there are two classes of German people today: those who sell to the population, and those who buy from these. The latter have to pay what is asked or pillage the shops—this is commencing now. The former naturally charge enough to cover the doubling prices day by day. Since, however, this overcharge is usually more than is actually required, the shopkeepers accumulate money, and then spend it freely, as do foreigners. So that there is a smaller class of regulation "pirates" preying upon a larger class of "victims." These pirates are the ones seen by those Americans who report that Germany is doing well.

It is but just, however, to look at the awful distress in Germany from another angle. The war had disorganized working forces and their efficiency in Germany just as much as elsewhere, and while Germany resumed activity earlier than the other nations, yet even today one sees the men loaf at their tasks, and the actual production per man-hour is still far below that of the pre-war time. The Minister of Labor himself enlarged on this situation in his talk with me and has recently introduced legislation in the Reichstag looking toward an increase of hours per day—in effect, a 10-hr. day, though the pill is sugar-coated in providing the maintenance of the basic 8-hr. principle.

Must Work Harder and Longer

Hence, in my view, the present catastrophe is largely the fault of the German population itself. Germany will have to work more intensely per man, and longer, to make good the handicap that exists in every country which cannot support itself from its home agriculture. As Minister Brauns said: "Paradoxical as it may seem, in order that Germany can sell more goods, it must produce more. Then the production cost will go down, competition will again be possible, and money will flow back to Germany with which to pay for foodstuffs brought from abroad. Shipload after shipload coming from agricultural countries has had to be turned away from German harbors, as there was no money available to pay for them."

So only from within can there come a reversal of the present conditions. The socialistic poison that has flourished so long in Germany has finally engulfed it, and one observes today that the socialists "sing very small." This view is voiced everywhere in the higher social structure here, but must still reach the masses. Unfortunately this truth can be brought home only through starvation, and unquestionably Germany is now facing this. Whether civil war will have broken out by the time this reaches the American public through THE IRON AGE remains to be seen, and will depend upon the coolness of the central Government. The army (Reichswehr) is absolutely loyal, being thoroughly winnowed out and ably officered. The police are dependable only in the smaller cities and the country. Despite reports to the contrary, communism has lost out, and the riots that have begun, and plundering of stores, are not from a revolutionary spirit, but the simple manifestations of desperation from inability to pay for food.

France Not Entirely Victorious

Now for another line of thought: In occupying the Ruhr district, the French had expected an easy victory. They did not reckon with the Westphalian population. Today the French have won a victory, but it is a Pyrrhic one, and has left the iron industry of France badly crippled. Inquiry for pig iron from France, I learned in Italy, showed that there was none to sell.

Two interesting rumors seem to have been in circulation in Europe: that the Germans have spent all their money in works' betterment, to be ready to compete to destruction when the time came; and that the Ruhr today contains 3,000,000 tons of semi-finished steel available for seizure by the French, if they wish to confiscate it. The facts are that, in spite of the original policy to improve the works so that reparations could be met while building up German industry and exports again, the Ruhr occupation has nullified all this again, and today the lesser railroad systems are abandoned and tracks grass-grown, rolling stock is unfit to use, and the bulk of the establishments are in a condition approximating a shut-down plant. The American iron industry need not be reminded what a steel plant is worth after it has been shut down for some time. Hence, with the new state of affairs coming in the Ruhr, production will not increase so rapidly as is

expected and the French budget will be lame for a long time to come.

So far as the rumored 3,000,000 tons of steel are concerned, this figure can safely be reduced by one-third. The danger here for the export business of the United States and Great Britain is that, if dumped upon the world's markets, as has happened with the German paper money seized, it would mean a bad temporary disorganization.

Interview with Dr. Brauns

With the above general discussion of the situation as it existed on Oct. 20, it is now in line to turn to the interview with Dr. Brauns. A short account of his activities appears in another place. I was first presented to him a little over two years ago, and came in contact with him almost daily for several weeks. Of commanding presence, magnificently proportioned, loved by everyone, and with a simple and truly Christian spirit, this man is today the ablest counsel of the cabinet. His is the largest governmental department, and he has in hand the boards, scattered all over the Reich, which care for the war-wounded and war-dependents. His department covers the entire range of legislation—both revision and new—of the labor laws, liability insurance, social welfare, housing and settlements, international labor questions and laws, "out-of-work" benefits, arbitration in labor disputes, etc. Some of the methods worked out will be described later on.

In these very critical times of labor unrest, Dr. Brauns has consistently held to the middle course and thus found agreement between both sides. His ability, the righteousness of his motives, his personal integrity and character above reproach, and his unselfishness of purpose, have endeared him universally, so that in all the recent cabinet changes it was a standing formula that "Minister Brauns must be in the new cabinet. He is irreplaceable at the time, for no other man exists in Germany who commands his field so ably and also enjoys the confidence of workingmen and employers fully and equally." Had Dr. Brauns continued his theological career, he would be today a prince in the Church of Rome.

Reparations Struggle with France

On arriving in Berlin, Dr. Brauns was kind enough to give the writer and his wife an entire evening at his home in the palace housing the Department of Labor. The story of the reparations struggle with France was outlined as actually handled by the various cabinets. One felt as being actually present at the green table and following out the tangled lines of diplomacy into the definite channels of action. The cry of the Ruhr for help, the rage of the men at being asked to work under bayonet rule in times of peace, the continuance of help long after the case was hopeless—to ward off a revolution. The changes in cabinets, the final blank wall of French refusal to deal with the German Government, the hopelessness in expecting a clean-cut discussion with the French premier. There stood out clearly the alternative—"no Ruhr, no Reparations."

Teutonic Recuperation Inevitable

But here again there stands out the statesmanship of Dr. Brauns, for in all this turmoil he is at work planning for a new Germany to work out its destiny on what remains of the once proud empire. If stripped as was Austria of its natural resources, it will be hard and take long; but whether as in the old days of Prussian liberation in the early part of the last century, or in quiet pursuit of contentment, the persistence, ability and strength of the Teutonic race will rise again and make a new Germany. But before this can happen the nation will have to drain the cup to the last bitter dregs, and the time seems to be now.

Naturally, much of the interview was of a confidential character, and will develop day by day as the plans for bettering conditions mature. But a portion of the time spent was devoted to the consideration of what has been done to bring capital and labor closer together, and what methods are in actual operation in the settlement of disputes to avoid strikes and consequent waste of treasure and time. The question was thought important enough to be put into concrete form so that no inaccuracy might eventuate, and Dr. Brauns was good enough to have his legal department chief put it into a short report. This, translated, is quoted as follows:

Binding Wage Agreements

"The idea of a definite wage agreement between employers and employees of a given industry has become a universal procedure in Germany ever since the war. Special agreements replacing such general agreements have practically ceased to exist. Actuated by the conviction that only through the means of such carefully worked out agreements, satisfactory to both sides, would the weakened and disintegrated industrial system of Germany recover again, Dr. Brauns undertook, at the very beginning of his administration, to devote all his strength and resources to the development of the wage agreement idea. Thousands of wage conferences have been held with the active cooperation of the minister and, where of particular gravity, Dr. Brauns himself has presided at the deliberations—this in particular in connection with the mining industry. It is to the credit of the minister himself that the entire mining industry of Germany now has regular wage agreement conferences.

"Laws passed just after the war have given him wide powers. As soon as a wage agreement between employers and employees of an industry has acquired strength enough to be recognized as binding by a large majority of those interested, the Minister of Labor can officially decree—without appeal—that the terms of such an agreement have become binding upon the entire industry, whether the others interested have been parties to the conferences or not. (This is designated the "Allgemeinverbindlicherklaerung"). In the case of these wage agreement conferences, should it turn out impossible to reach an agreement between the associations of wage earners and employers, the minister appoints a tri-party arbitration board consisting of equal numbers (usually three each) of employers, employees and prominent men who enjoy his confidence. Should the verdict of this arbitration board not be accepted by one of the two parties, the others may apply for a decree making it binding upon the objecting party. (This is designated "Verbindlicherklaerung").

"Such a decree of the Minister of Labor, which cannot be appealed, makes the terms of the verdict of the arbitration board binding upon the industry, just as if an agreement had been reached by the two parties in the first place. The enforcement of the decree can be understood to be easy in that it gives the workingman the right to sue his employer for the wage provided in the decree and get prompt judgment for the amount.

Power and Responsibility

"It will be seen that an immense power has been put into the hands of the Minister of Labor, and that the men selected for the arbitration boards must be equipped with a high degree of knowledge and experience. The minister himself must be imbued with a strong social sense of responsibility—all this so that wages may not be set to the damage of the industry involved. On the other hand, workingmen cannot be expected to give service under conditions that are not humanitarian."

Discussing the matter at length, Dr. Brauns gave instances in which very difficult cases had been solved without recourse to strikes. It amounts to compulsory arbitration, in effect. But, with the wisdom and sound sense of the minister, the laws have worked so well that no change or present improvement is contemplated. Dr. Brauns holds out the prospect of a future visit to the United States to study our labor conditions and laws which, so far as I have observed them, differ in many ways from those of Germany or England. In Germany, the heads of the labor organizations are trained political economists to a great extent, and such men can sit down and reason with others of like type who may head the employers' organizations.

Citroën Automobile Shops in France

Equipment and Methods of the Manufacturer Who Plans to Build Motor Cars Also in the United States



BY CAPT. GODFREY L. CARDEN

ANDRE CITROËN, who announced some time ago that he will build automobiles in the United States, has had a very successful career as a manufacturer in France. I first became acquainted with his shops in 1909, when he was employing not more than 40 men. At that time he was located in the suburbs of Paris and was making double helical gears. It was high-class work and stamped Mr. Citroën as a designer of more than usual ability.

Today Andre Citroën is employing more than 10,000 people, and under maximum conditions this number reaches 13,000. He first undertook to build automobiles in 1919, and in the past two and a half years he has put in circulation in France more than 50,000 cars. Two types, only, are made, namely, the 5-hp. and the 10-hp. The 10-hp. car is built at the Javel shops located on the banks of the Seine opposite Passy and only a few blocks below the Citroën Grennelle works. The latter works were installed by Citroën in 1911 and were designed for making helical gears and a general machinery line.

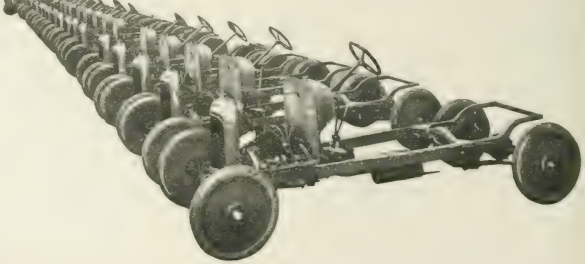
Mr. Citroën was carried on the French military establishment as an engineer officer and the breaking out of war called him into active service. His experience in shop work resulted in his being engaged in connection with projectile manufacture and in this way he became identified with the government projectile works on Quai de Javel. The ground at Javel as late as 1915 was a truck farm. The French War Department caused to be erected here one of the most modern projectile plants in France. For the most part outputs were confined to 75 mm. shrapnel.

At the end of the war when the Javel plant, in common with many others, was no longer required for war purposes, Mr. Citroën and his friends secured control of the property and turned it into an automobile works. This necessitated changes in installation but for the most part automatic machines previously used were lined up for turning out automobile parts. There is a very heavy display of American automatic tools throughout the Citroën shops, but many of these machines will have to be replaced since they have been running from war days.

I visited the Javel shops on March 14 and was accorded every facility. The layout is probably as good as can be found in France. The buildings are all modern in construction, splendidly lighted, and heated and ventilated in accordance with the best modern practice. The discipline and orderliness impresses the visitor at once and the handling of material provides for a steady flow without backtracking. At present the forge department is located at Javel, but it is the intention to move the forges to the Suresnes shops. In the cementation plant I counted 16 furnaces at work. They are the type of Loy and Aube, Paris. Citroën is turning out at present about eighty 10-hp. cars per day and about seventy 5-hp. cars. The 5-hp. cars are built at Levallois. The principal woodworking plant is at Issy-les-Moulineaux.

All presses in use are the type V, of Crampigneul,

At the Head of the Article Is Shown the Main Office Building of the Citroën Automobile Works as Viewed from the Quai de Javel, Paris



Cars Awaiting Tests as They Are Lined Up in the Assembly Shop

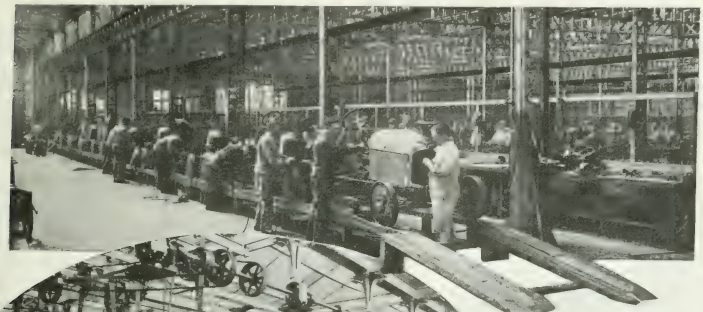
Paris. Women operatives work the press levers. The handling of the plate material is by male operatives. The chassis are assembled in the same shops where the frames are stamped out. Pneumatic tools are employed for this assembling work. Only the 5-hp. chassis are pressed out cold. The 10-hp. power chassis are bent after heating red hot.

The body work for the 5-hp. machines is undertaken at Javel. The chassis come from Levallois. In the spring-making department I observed one electric furnace only. All others are of the usual type. The springs are shaped up by hand, that is, pounded into shape for grouping by hand.

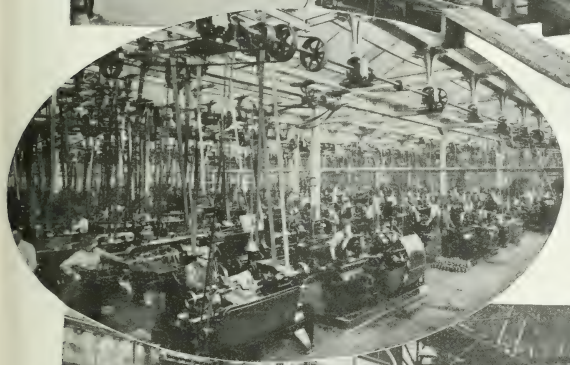
The main foundry is at Suresnes. Here are made the aluminum gear boxes, solid brass plug chamber of carburetor, cast iron cylinder boxes, cast iron flywheels and pistons. Much cast iron is used by Citroën. Just now cast iron is cheap in France. Citroën, I understand, is experimenting with aluminum pistons. In both the Suresnes and Javel foundries I found considerable molding machinery employed.

Many women are employed in the engine assembling works, and it was surprising to see what heavy jobs some of them were taking care of. Just now France is experiencing a very great shortage in workmen. My observations on the Polish shops were that many Polish workmen were going to France because of the higher wages and the demand for help. I assume that the retention of women in the French shops since the war is largely due to this shortage of male help.

Among the American machines in use were many with such familiar names as Brown & Sharpe, Pratt & Whitney, Cincinnati Milling Machine Co., Flather, Becker, Bardons & Oliver, and many others. One man operating two Potter & Johnson machines was turning down wheel hubs at the rate of 5½ per hour per machine. Operatives are now making about 3 fr. per hour working on an 8-hr. basis. These Potter & Johnson machines were formerly used on shell making and many of them have reached the point where they need replacing. For the most part the air compressors have been supplied by the Ingersoll-Rand Co. The



Cars Assembled as They Are Moved Along the So-Called Rolling Way



Many American Machine-Tools Are to be Found Among the Machining Equipment



In the Press Department the Chasses Are Formed and Assembled

painting department is installed in a new shop erected since the war. It is wonderfully well lighted and clear. Car bodies are painted pneumatically and are dried in the drying room. Women are doing most of this work.

Citroën is turning out his 10-hp. de luxe car today, f.o.b. works, for about 18,000 fr. At current exchange of 16.55 the equivalent is about $1,090. The 5-hp. car costs, f.o.b. works, about 9550 francs, which at the same rate of exchange amounts to $577.

I know of no plant in France where more attention is paid to the welfare of the employees than Citroën's. The arrangements with regard to eating, first aid, infirmary, amusements, recreation and comfort are in every detail almost the last word. Cooperative facilities exist and the employees are afforded means for securing through purchase many necessities of living in the way of both food and dress at most advantageous figures.

ROLLER BEARINGS IN ROLLING *

Power Consumption in Wire Mill Compared With Plain Bearings Shows Great Savings

BY A. W. MACAULAY

IN a 9-in. wire rolling mill, consisting of eight pairs of two-high mills, the last pair was equipped with roller bearings. The roll diameter is between 260 mm.

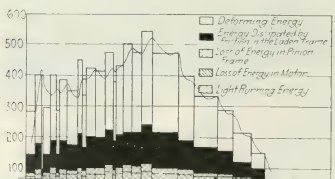


Fig. 1—Energy Consumption, When Using Plain Bearings, of Rolling 5.39-Mm. Wire (No. 5½ Gage) in 14 Passes From 7½-In. Billets, of 0.80 Per cent Carbon Steel and Weighing 110 Lb. The measured maximum load of 520 kw. compares with 545 kw. estimated; the measured energy consumption of 8.0 kwhr. in rolling one billet compares with 8.27 kwhr. estimated

(10¼ in.) and 300 mm. (11.8 in.), and the neck diameter 114 mm. (4½ in.)

To be able to apply bearings of sufficient capacity, the neck diameter was reduced to 90 mm. (3.54 in.) This involved the adoption of chrome-steel shafts, upon which the rolls were shrunk—a practice which has not given any trouble during working. As for the stress

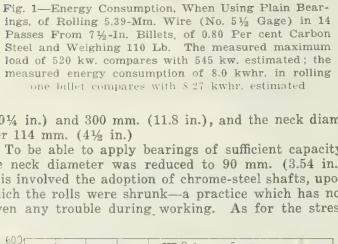


Fig. 2—Energy Consumption With Roller Bearings of Rolling 5.39-Mm. Wire (No. 5½ Gage) in 14 Passes From 7½-In. Billets, of 0.80 Per Cent Carbon Steel and Weighing 110 Lb. The estimated maximum load of 360 kw. and energy consumption of 5.27 kwhr. in rolling one billet may be compared with the plain bearing requirements shown in Fig. 1

in the necks, this would not appear to exceed 5 tons (11,200 lb.) per sq. in., while the average value is probably only about 2½ tons per sq. in. It will be appreciated that in fitting roller bearings the bending moment is somewhat reduced, as the bearing can be brought closer up to the roll.

For results which might be anticipated from an application of this kind, the case of rolling 5.39-mm. (about No. 5½ gage) wire in fourteen insertions from 19-mm. (7½-in.) square billet may be considered. The material is 0.80 per cent carbon, the billet weighs 1 cwt. (112 lb.) and the motor speed is 450 r.p.m.

Regarding the method of estimating the power distribution, the energy absorbed in the roll was figured according to Lang. The power Q in wire rolling is a function of p, the average pressure. The values in this case were obtained from the pressure diagram. To obtain the average load during this time, these p values have been generally reduced by 20 per cent and by 30 per cent for the last frames. It is assumed that the coefficient of friction is 0.06, and that the losses in the coupling pinion frame represent 5 per cent of the total.

Fig. 1 shows the distribution of power as estimated and measured. The bearings being plain brasses all through (with the exception of the flywheel, which was carried on double-row self-alining ball bearings), it will be seen that the agreement is good.

Assuming now that the plain bearings are exchanged for self-alining roller bearings, a coefficient

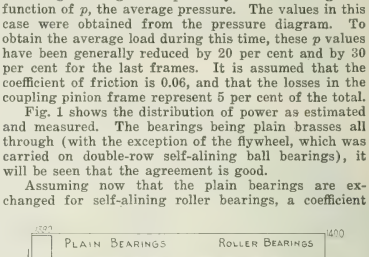


Fig. 3—Savings From Use of Roller Bearings Throughout as Covered by Puppe's Figures Based on a 22½-In. Three-High Mill Rolling in 12 Passes 2-In. Billets Weighing 895 Lb. Each. Consumption of energy per billet was given as 20.4 hphr. for plain bearings and 9.72 hphr. for roller bearings. The numbers alongside areas in the diagram show the hp. required to overcome each part of the resistance

of friction of 0.003 may be expected, and Fig. 2 illustrates the corresponding energy consumption. It will be seen by comparing these figures that the saving is more than 36 per cent, while the difference in maximum load is about 39 per cent.

In the course of these considerations several examples from Puppe's research have been taken and analyzed to determine the distribution of the energy in working. It has been assumed, however, that the energy required for rolling between the two lower rolls is as great as that necessary for rolling between the two upper rolls, which Puppe actually measured.

A typical example is shown in Fig. 3, in which is included the energy consumed by the motor and flywheel. The time during which the rolls run light has been estimated. The right-hand portion of the diagram shows the energy layout when all the plain bearings (including flywheel and pinion frame) are replaced by roller bearings. From this diagram it will be seen that the saving of energy during rolling is between

*From a paper "Some Developments in Ball and Roller Bearing Work," read beford the West of Scotland Iron and Steel Institute at Glasgow.

35 and 40 per cent, and when running light between 60 and 70 per cent. The total saving, which is dependent on the relation between the duration of the light running time and that of the rolling time, lies between 45 and 50 per cent.

If the plain bearings for the roll necks only are replaced by roller bearings, the saving running light will naturally be less, but during working the economy will be about the same as before, that is to say, running light it will be about 45 per cent, and the total saving between 35 and 40 per cent.

Rolling Mill Work in General

Considering the application of roller bearings to mill necks, it is evident that the demands on the bearing will be different in hot and cold rolling, and in the smaller mills the general efficiency and maintenance may be of a higher order. A point of great importance which presents itself at once is the relation between neck and roll diameters. In mill work generally the neck is about two-thirds the roll diameter in hot rolling, but in cold rolling it varies anywhere from 70 to 90 per cent.

Puppe's work shows that many of the necks in the heavier mills investigated by him were only 50 to 55 per cent of roll diameter, and this points to a possibility of applying the roller bearings without any alteration in dimension. For example, the average loads registered in the 570-mm. (22½-in.) train were 70 to 80 tons per journal. Now a roller bearing has been designed of dimensions 300-mm. (11.8 in.) bore and 560-mm. (22 in.) outside diameter by 168-mm. (6.6 in.) wide to deal with such a load at the speed. The existing neck diameter is given as 295-mm. (11.6 in.)

Keeping in mind the fact that the mill may not be operating more than two or three hours per day, a reduction in bearing size can be allowed, giving incidentally a more reasonable thickness of metal between the bearings in the side frames. In considering the extension of the application to heavier work, therefore, the initial difficulties will usually be overcome by a careful review of suitable material, fatigue condition and bearing dimensions.

It is appreciated that the rolling of 0.80 per cent carbon wire may not involve the same neck loads as are present in the working of harder material, and in some plants the wide variation in production in the course of the day involves further complications. One has only to inquire as to the maintenance of such equipment, however, to find the costly character of the operation in many directions, and a frank recognition of this will reveal the strength of the warrant for a trial with roller bearings.

In considering the advantages of such equipment, it will be remembered that the adjustment of the rolls could be carried out with greater accuracy and subsequent readjustment be seldom necessary. This was proved during the tests. The work was more uniform and the scrap greatly reduced. All troubles in the way of water cooling were eliminated, the roller bearings having lubricators fixed on the roll frames and driven from the pinion frames. The grease was under pressure to prevent water or dirt finding its way into the housing. The consumption of grease was trifling.

As for wear, the wire mill equipment has operated for twelve months without the diametric slackness in the roller bearings having sensibly increased.

Investment Value

Taking this case of the wire mill, a rough estimate of the economies from roller bearings may be obtained. Assuming that the wire is soft iron and steel of various dimensions, an average power consumption for this work is 14 kwhr. per ton. The average saving from roller bearings, as shown above, is at least 35 per cent of the power, which equals 4.9 kwhr. per ton. Current in this case costs 0.8d. (1.6c.) per kwhr., and works out per ton as follows:

With plain bearings,.....	9s. 8d. ($2.32*)
With roller bearings.....	6s. 0d. (1.44)
Savings	3s. 8d. (0.88)

The saving in lubricant comes out at about 3d. (6c.) per ton, and the reduction in maintenance 1½d. (3c.) per ton. These particulars have been obtained from a plant the capacity of which is 10,000 tons per year, and the annual saving would therefore be £1,833 ($8,800).

Complete alteration of an old mill, including bearing housings and the work required for the alteration, would in this case cost £2,000 ($9,600). To this will be added the cost of a number of spare bearings.

*At $4.80 per £.

BUFFALO'S ATTITUDE

Opposed to Considering Assembling Costs in Determining Freight Rates

Commenting on the recent pig iron freight rate hearing before the Freight Traffic Managers' Committee of the Trunk Line Association, as reported in THE IRON AGE of Nov. 8, p. 1243, P. C. Sprague, traffic manager of the Hanna Furnace Co., said:

"Briefly the position of the Buffalo pig iron producers is that since 1914 the rates from Buffalo to New England territory have increased 100 per cent, while rates from Eastern producing points have increased but 92 per cent. If the rate from Buffalo in 1914 of $2.45 per gross ton had been increased by the same amount as the rates from Eastern furnace points, the present rate from Buffalo would have been $4.70 per gross ton or $4.79, depending upon the method employed in arriving at it.

"In addition there are many points in New England located on and north of the Boston & Albany Railroad where the service performed from Buffalo is not over 75 miles greater than from eastern Pennsylvania points (in fact, to some points the distance from Buffalo is shorter) and the present spread of $1.26 in the rate is excessive. In addition water competitive rates are carried from eastern Pennsylvania and Port Henry, N. Y., to Long Island Sound points, but no similar adjustment is accorded to the Buffalo furnaces, and the effect is to give undue advantage, especially during the closed season of navigation when the Buffalo furnaces are unable to utilize water transportation.

"Finally the Buffalo furnaces do not believe that the question of assembling cost on raw material should influence in any way the rates on manufactured products. While this feature was given undue prominence at the conference, there was no definite presentation of the assembling costs in the East based upon actual movements of the raw material. There is no doubt that a very wide range of assembling costs would be developed, but I do not know whether they would be higher or lower than at Buffalo. At some furnaces they may be higher while at other furnaces they may be lower, an indication that the Interstate Commerce Commission wisely excluded the question of assembling costs on raw materials from the category of rate measurements.

"The correct measure of any rate is the service involved on the particular commodity to be moved and this has been accepted by the Buffalo furnaces although they come in competition with furnaces at other Lake ports having lower assembling costs and the Buffalo interests do not urge reduced rates on their products for that reason."

The Freight Traffic Managers' Committee was scheduled to hold a meeting on Wednesday, Nov. 7, to consider what further action, if any, should be taken in the matter of revising pig iron rates, but the meeting was postponed to this week.

Employment Executives Club Entertained by U. S. Ball Bearing Mfg. Co.

Favorable reports on business conditions were made by members of the Employment Executives Club of the National Metal Trades Association, Chicago branch, at the recent meeting in the U. S. Ball Bearing Mfg. Co.'s plant, 4535 Palmer Street, Chicago.

The executives were conducted in parties of eight through the plant by Frank R. Schubert, works manager, learning in detail of the intricate machinery. They were then guests at a dinner served by the company. A. F. Boissoneau, superintendent William Ganschow Co., called for a discussion from visiting executives on these vital topics: Employment, business conditions, wage trend and district activities. The responses gave first hand information about the industries in the Chicago area.

An address of welcome by Works Manager Schubert and short talks by Messrs. Allen and Young of the National Metal Trades Association followed. Committee reports were unanimously accepted. The following new committees were appointed:

Library: Charles L. Wachs, president E. H. Wachs Co.

Education: E. G. Hutton, employment manager Goodman Mfg. Co.

Safety and Sanitation: Charles MacDonald, employment manager Acme Steel Goods Co.

Apprenticeship: C. W. Applegate, general foreman Illinois Tool Works, chairman; S. A. Staskey, employment manager Link Belt Co., and J. Nielsen, personnel director Union Special Machinery Co.

Program: J. Wright, employment manager Kellog Switchboard & Supply Co., chairman; Helen R. Horton, employment manager Wahl Co.

Schools Discuss Apprenticeship Training with Foundrymen

Foundrymen of the "Quad City"—Davenport and Rock Island, Ill., and Moline and East Moline, Ill.—cooperating with those in charge of industrial education in the public schools of those cities, held a meeting Nov. 5 to discuss methods of apprenticeship training. Practically all of the school superintendents and high school principals of the four cities met with the Quad City Foundrymen's Association, this being a preliminary to the November meeting of the association on the 26th, which is to be devoted entirely to apprenticeship training. At this meeting H. A. Frommelt of the Falk Corporation, Milwaukee, is to be the principal speaker. Mr. Frommelt devotes his entire time to this subject and has collected a vast quantity of information regarding results obtained not only in Milwaukee but also in other large industrial centers.

Molybdenum Steels

That molybdenum is one of the most powerful and useful alloying elements in steel has been conclusively demonstrated by experiments conducted by Dr. H. W. Gillett, chief alloy chemist, Department of the Interior, at the Ithaca, N. Y., field office of the Bureau of Mines. While the value of molybdenum as a steel alloy is only beginning to be appreciated and its commercial use is still relatively small, the Bureau of Mines considers that it is destined to become widely used as it deserves to be. The United States has abundant supplies of molybdenum which should be available to replace or supplement other metals used as steel alloying elements which at present must be imported.

The early claims for molybdenum as a specific against fatigue failure of steel, which alleged, directly or by inference, that molybdenum steels were vastly superior to other steels for uses to resist vibration, have not been substantiated in the over-enthusiastic form in which they were made. The Bureau of Mines' experiments show that, with one exception, molybdenum steels, and other alloy steels containing nickel, chromium, vanadium, or a combination of these elements, have equal qualities of endurance, and that no one alloy steel stands out above the others on this score.

The exception is in favor of heat-treated molybdenum steels, for the presence of molybdenum makes the steel require a higher temperature in the drawing or tempering process after quenching, and this higher temperature causes fuller release of quenching stresses. The presence of quenching stresses tends to cause poorer performance under repeated vibration. This, however, is not a very great factor, and has a noticeable effect only in very hard steels, for example, those of spring temper. For ordinary structural uses, no alloy steel is appreciably superior for use against vibration to any other when the steels are used in such sizes that they harden throughout on quenching. Molybdenum and certain combinations of nickel and chromium confer depth-hardening properties on steel, and hence these have advantages for use in parts of large cross-section.

Thus it is evident that, as regards endurance, molybdenum steels are the equals of any, and on some scores have slight advantages, but the advantages are slight instead of large. The choice of a composition of an alloy steel will therefore seldom depend on its fatigue properties.

Concord Axle Co. Going Out of Business

The Concord Axle Co., Penacook, N. H., genuine Concord axles, iron hubs, Brown patent roller bearing axle and hub, is in process of liquidation. The company's product is used in connection with horse-drawn vehicles, and the present use of motor-driven vehicles is the fundamental reason for the company's decision to retire from business.

The plant consists of the following departments: general forge shop equipped with oil-burning furnaces; axle finishing shop; iron hub finishing shop; roller bearing shop; foundry and pattern shop. Each department is well equipped, some of the machinery being especially designed for the company's manufacturing practice. Power is developed from water, but a complete auxiliary steam plant is in operation. Plant and equipment will be sold.

The winding up of the company's affairs will eliminate one of New England's oldest industries. The manufacture of wagon axles on the site of the present plant dates back to 1835. Axles for local use only were produced up to the close of the Civil War, when D. Arthur Brown purchased an interest in the business. Shortly afterward the capacity of the plant was materially increased. Following the death of Mr. Brown in 1903, management passed to his son, Henry A. Brown, who has continued as treasurer and general manager. J. E. Fernald is president and Edmund H. Brown clerk. The company maintained offices in San Francisco and in Melbourne, Australia.

Iron from Pyrite Electrolytically

W. B. Timm, chief of the division of ore dressing and metallurgy of the Dominion Department of Mines, has announced that the Canadian Government is building a laboratory at Ottawa for the purpose of continuing the experimental work, initiated at the laboratory at the Trail smelter, of manufacturing iron electrolytically from the pyrite and pyrrhotite tailing of Canadian copper, nickel, and lead-zinc ores. Some 15 months ago, S. G. Blaylock, managing director of the Consolidated Mining & Smelting Company, announced that an exceedingly pure iron had been made in the laboratory at the Trail smelter from the tailing of the company's Sullivan mine ore and that an electrolytic process had been used in the manufacture of the iron. At the present time, the mill at the Sullivan mine, at Kimberly, B. C., is producing daily more than a thousand tons of tailing, which is composed mainly of pyrrhotite and will average in the vicinity of 40 per cent of iron. Should it be found to be desirable the iron content could be raised slightly without great additional cost.

Workable Employee Suggestion System

Two Years of Successful Operation at Remy Company's Plant—Campaigns Conducted Quarterly—Time Studies Used in Figuring Awards—System Administered by Committee

BY L. W. TOMLIN*

WHEN the Remy Electric Co., Anderson, Ind., decided to inaugurate an employee-suggestion system it wanted to make sure that the system would be longer lived than is usual in connection with such campaigns. Two years have passed since the company put its present plan into force, and today there is more interest and active participation in the campaign than at any previous time since its inception.

In inaugurating the system it was realized that it would be a big task and take considerable educational work to get the employees trained to the idea of studying their jobs and their plant with the object of submitting valuable suggestions in the way of improvements. Therefore, when the campaign was started the company was not discouraged and ready to discontinue the plan because the suggestions submitted were at first few and sometimes of little consequence. The plans were set to make the suggestion system an institution. The company gave it plenty of publicity on the bulletin boards and in "The Remy Clan," its shop paper. Many unique ways of conducting the work were devised, and it was not many months after the inauguration that the system was producing results far beyond the original expectations.

Attempts have been made by many companies to elicit from their employees worth-while suggestions making for improvement in manufacturing processes and product. Usually, however, the systems inaugurated to this end have been short lived. An example of a system that was thoroughly planned and well administered, and which after two years of operation still is marked by active employee participation, with gratifying results to the management, is outlined in the accompanying article by Mr. Tomlin.

Campaigns of this nature, it is known, are not new. They have been tried by many different companies with various results. However, the series of successful campaigns conducted by the Remy company for over two years, despite the customary high mortality rate, indicates that if given the proper thought and enthusiastic backing, then the results to be derived are incalculable. The plans were patterned from the best of the prevailing suggestion systems supplemented by ideas originated within the company. Just as the Remy company has profited by the experience of others, so too it is hoped that any concern contemplating such work may get helpful ideas from the following summary of the Remy suggestion campaigns.

How the Campaigns Are Conducted

Four times during the year, for a period of one month each time, the Remy suggestion campaigns are conducted. A suggestion box is placed on the bulletin board of every department for the convenience of the employees. Every man and woman on the payroll is eligible to participate. At the beginning of each campaign period the foremen distribute suggestion blanks to every member of their departments.

The blanks are intended to provide each employee with a convenient method of submitting his suggestions and at the same time they act as a reminder to each person that a suggestion campaign is again taking place. The blanks are perforated, forming two sections, each containing the same serial number. One part is turned in with the suggestion and the other piece is kept for reference. Complete instructions for the submitting of suggestions are contained on each blank, which explain the kind of suggestions desired in five classifications, namely: (1) Improvement of product, (2) reduction in cost, (3) improvement in manufacturing methods, (4) reduction in accident or fire hazard, and (5) conveniences. When employees submit suggestions they are asked to indicate under what class they believe the suggestion belongs.

During each campaign the suggestions are collected from the boxes once a week and the committee which decides on them meets at such times, or oftener, as the work requires. Every suggestion that is submitted is carefully considered and those folks who do not get an award are advised either in person or by mail as to why their suggestion was not accepted. The minimum award is $5 and the maximum depends on the merit of the suggestion itself. As much as $250 has been paid for a suggestion at the Remy plant.

Merit in the Periodical Campaign Idea

Instead of leaving the suggestion boxes up regularly, as previously mentioned, periodical campaigns are conducted, which gives the company an opportunity to make an event of their suggestion system every few months. If the boxes were up all of the time they would become commonplace, it was thought. This way, interest in the matter of submitting suggestions is renewed each time. Before the boxes are put up at the beginning of a campaign or taken down at the close, a series of large posters are placed on the bulletin boards announcing the opening or closing. The plant paper, which is published every other week, also gives an added opportunity to call the campaign to the employees' attention.

Some may argue that this periodical campaign idea is not a good plan as an employee might hit upon a valuable suggestion in between and be obliged to wait two months for the next appearance of the suggestion boxes. To meet such cases the employees have been advised that should they have a suggestion which they think is worthy of immediate action they are welcome to send it in at once. However, there have been very few of these received and the Remy company claim the most noteworthy suggestions are submitted while the regular campaigns are in force.

The suggestion blanks are distributed by the foremen so that each employee will know that the foremen are behind the plan and that, therefore, the men need not be timid about making suggestions. This they might be if the idea did not have the foremen's moral support. When there is no timidity everyone feels freer to express himself.

Employees having a good suggestion to offer and not knowing just how to put it in writing are encouraged to send through a form, sign their names, and say they want to see a member of the committee. This plan

*Chairman of suggestion committee, Remy Electric Co., Anderson, Ind.

has uncovered a great many valuable ideas that would otherwise have gone unknown. Even in a plant like the Remy Electric Co., where there are more than 3000 employees, practically all native-born Americans, able to write intelligently, it is difficult for some to put their thoughts on paper. Especially so when a suggestion has to do with a complicated machine. In such instances, it appears, the employees would sooner demonstrate their suggestions personally at the job affected.

It may be noted that the Remy suggestion plan has been continually referred to as "campaigns" and not "contests." Inasmuch as all the suggestions are judged on their respective merits the Remy company maintain there is nothing spectacular in the way of a so-called contest about their system. They do not want their folks to feel they are playing a game of wits in competition for money prizes when they enter a suggestion, therefore all literature and announcements feature their suggestion periods as the January or April suggestion campaign, and so on.

Committee Administers Suggestion System

A committee of five, made up of the assistant to the general manager, the assistant chief engineer, the director of personnel relations, the head of time studies, and the plant auditor, administer the suggestion work. Several of their meetings are in the form of a trip through the plant to interview personally the suggestors on their job and thereby encourage them. The committee has a method of classifying all suggestions in three groups before they are discussed. These three classes are, first, an entirely new thought, second, an improvement and third, miscellaneous ideas. If the suggestion has to do with an operation a time study is made on the suggested plan against the existing method of operation and the award made accordingly.

To arrive at a certain fixed amount for the rewards, so that suggestions will be equally compensated, the committee has set a three-month period as fair to all. Inasmuch as time studies on all jobs at the Remy plant are continually made and also since its process department is regularly making improvements on various machines, the three-month period was considered a fair average. Therefore, whatever amount is saved over this period by any suggestion submitted, the suggestor is given a percentage of this saving.

On all other suggestions, the value of which cannot be computed by the time study method, such as an improvement in the product, new safety idea, a factory convenience, etc., the committee decides its worth and if adopted pays a fair reward. To make the time that suggestors spend in thought and preparation of suggestions worth while, the committee has arrived at the $5 minimum award. They maintain if the suggestion is at all worthy of adoption surely it merits at least this amount.

Every suggestion is acknowledged either with a check signifying its adoption or else an explanation as to why rejected. Rejections are not handled in a perfunctory manner but a real explanation is given the suggestor as to just why the suggestion cannot be used. In the folks whose suggestions they have to reject the committee recognize good material for future suggestions and they couch their replies in encouraging terms, explaining in detail just what sort of suggestions are desired from them. Oftentimes the same people come back in the next campaign with ideas that are well worth while.

Employees who receive rewards are usually handed their checks personally by a member of the committee and told to keep up the good work. The method of computing the amount of the reward they receive is explained so that there may be satisfaction all around. Then as an added incentive at the end of each period the names and pictures of those who receive awards are published in the plant paper and are oftentimes made the subject of a bulletin board poster.

It may be interesting to know that about 35 per cent of the employees at the Remy plant are female and it has been estimated that about 30 per cent of the suggestions submitted come from the women and girls.

In addition to the advantages of the suggestion system as effecting a saving to the company, there are many other features that make them desirable. They give employees an opportunity to express themselves some way or other, and this opportunity to speak directly to the management makes them feel like they have more than just a mere job. At many a machine is a man or woman of a retiring disposition who has the capacity for a better job, but because of timidness does not often show his or her worth. Here is where the suggestion system helps out, too. It uncovers good material which would perhaps otherwise go unnoticed. A person who is so disposed oftentimes will enter into a campaign of this nature and come through with some real thoughts. Then there is the employee who claims he never had a chance to show what he has in him. This is his opportunity, and, if he keeps submitting suggestions to show what's in him, sooner or later his ability will be discovered.

It may be safely said that if a suggestion system is conducted in an enthusiastic manner, as outlined above, it will be found to pay for itself many times over.

Steel Corporation's Orders Decline

Unfilled business on the books of the United States Steel Corporation as of Oct. 31 amounted to 4,672,825 tons, or 362,925 tons less than reported for Sept. 30. During September unfilled orders fell off 378,913 tons, in August 496,100 tons, in July 475,498 tons, in June 595,090 tons, in May 307,158 tons, and in April 114,823 tons, while in March they increased 119,343 tons, in February 373,213 tons and in January 165,073 tons. A year ago the unfilled tonnage was 6,902,287 tons, or 2,229,462 tons more than on Oct. 31, last, and the high point of 1922. The corporation has less business on its books than at any previous time since March, 1922. Following is the unfilled tonnage as reported by months since January, 1920:

	1923	1922	1921	1920
Jan. 31.....	6,910,776	4,241,678	7,573,164	9,285,441
Feb. 28.....	7,283,989	4,141,069	6,933,867	9,502,081
March 31.....	7,405,332	4,494,148	6,284,765	9,892,075
April 30.....	7,288,509	5,096,913	5,845,224	10,359,747
May 31.....	6,981,351	5,254,228	5,482,487	10,940,465
June 30.....	6,386,261	5,635,531	5,117,868	10,978,817
July 31.....	5,910,763	5,776,161	4,830,324	11,118,468
Aug. 31.....	5,414,663	5,950,105	4,531,926	10,805,038
Sept. 30.....	5,035,750	6,691,607	4,560,670	10,374,804
Oct. 31.....	4,672,825	6,902,287	4,236,329	9,836,352
Nov. 30.....	.....	6,840,242	4,250,542	9,021,481
Dec. 31.....	.....	6,745,703	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, at 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Youngstown Sheet & Tube Co. Plans

The Youngstown Sheet & Tube Co. announces appropriation for new construction at its Indiana Harbor plant, near Chicago, amounting to about $4,000,000, to carry out the improvement program announced some weeks ago.

A new blast furnace, with a capacity of 20,000 tons a month, and two additional butt-weld mills will be erected. The construction of the blast furnace will probably require a year or more, but the tube mills are expected to be in operation by May 1, 1924. This will bring the number of blast furnaces owned by the company to 17, and the number of tube mills to 23.

American De Gama Briquetting Company

To develop in the United States the De Gama process of briquetting metal borings and turnings and such fine material as blast furnace flue dust, the American De Gama Process & Machinery Corporation has been incorporated with headquarters at 347 Madison Avenue, New York. The De Gama process was described in the issue of THE IRON AGE of Aug. 23, 1923. Count D. V. De Gama is president and technical manager. Robert Parkinson, a graduate of the United States Naval Academy, is secretary and treasurer.

The Iron and Steel Industry of Japan*

Sources of Supply of Raw Materials—Much Dependence Placed on the Asiatic Mainland—Water Power Not Dependable

BY DR. ING. E. KOTHNY

WITH the opening of the country and its development into a world power the industrialization of Japan began and demand for pig iron and steel increased. On account of the gradual progress in technical education of the Japanese, a rapid development of the steel industry was not possible. The

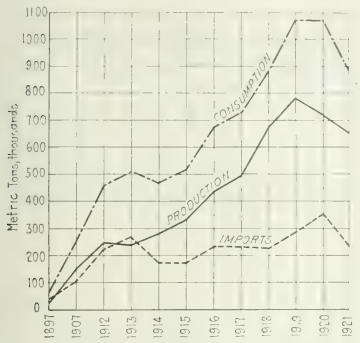


Fig. 1—Pig Iron Production, Imports and Consumption of Japan, Including Korea and Manchuria. Lessening dependence on imports is indicated. (Note that the two first intervals are 10 and 5 years respectively)

foundations of a steel industry capable of tonnage production and of meeting competition are:

1. Sufficient deposits of ore of proper metallurgical quality in the country itself, or an assured supply of ores from other countries;
2. Sufficient deposits of coal, which to a certain extent must be good coking coal. Large sources of water power may partly take the place of coal;
3. An assured domestic market for iron and steel.

How is Japan situated in regard to these three fundamental conditions?

Ore Supply

Japan's deposits of ores suitable for smelting are comparatively small. Table I shows the iron and ore supply, published by Inone Kinosuke at the eleventh International Geological Congress in Stockholm, 1910. The ore supply of Korea has since been estimated higher, on the basis of recent investigations, and is now assumed at 50,000,000 tons. There is a probability of a further increase. But Japan herself, i.e., the main islands, already has been explored thoroughly, and a higher estimate for these parts cannot be expected.

The principal iron ore deposits of Japan are located in the northern province (Kamaishi mines). Smaller deposits are found in the province of Iwate (Senin and Kuriki) and on Hokkaido Island (Abuto). Besides these are rich deposits of magnetite sand in the Chugoku district in the southwestern part of the main island, which formed the basis of the ancient Japanese iron industry. But the mining of ore from the deposits of Senin, Kuriki and Abuto is profitable only when ore prices are high.

Sources for Past Ten Years

Table II, which represents the consumption of ore for Japan's iron industry and the source of these ores for the past ten years, shows that the mining of ore in these districts was of importance only during war times—when iron and steel prices were high. The use

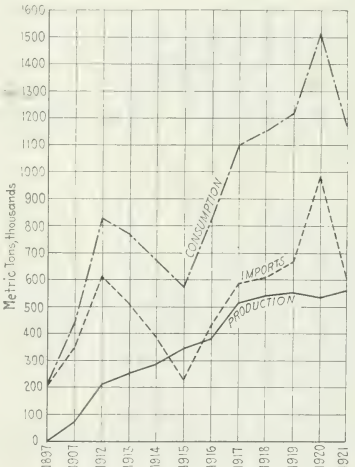


Fig. 2—Steel Production, Imports and Consumption of Japan, Including Korea and Manchuria. Except in 1915, imports have exceeded production. (Note that the two first intervals are 10 and 5 years respectively)

of the magnetite sand cannot be considered for smelting in a coke blast furnace; it can form a basis in the manufacture of only special quality pig iron and steel in an electric blast furnace or an electric steel furnace. Even if further ore deposits are discovered in Korea, a continuously assured supply to meet Japan's domestic demand for pig iron cannot be guaranteed from the deposits of the country.

When Japan began to create its own steel industry, the first endeavor was to insure the necessary ore supply from other countries. It turned its eyes first to China, which contains almost unlimited ore and coal deposits. These endeavors had the ardent support of the Japanese Government.

Chinese Ores

It succeeded during the World War, through the Chinese-Japanese mining agreement of June, 1918, in

*Translated from *Stahl und Eisen*, June 14 and 21, 1923, by Paul Cebrat, Perin & Marshall, New York.

securing valuable concessions for the exploitation of Chinese ore and coal. Japanese steel works, organized during these years, have contributed money and labor to Chinese mining enterprises to supply their blast furnaces. The first ore deposits thus utilized were those in the Yangtse valley. The Government steel plant at Wakamatsu made a contract, soon after its organization, with the Hanyehping Co. for exploitation of the Tayeh ore mines. The body of these mines, furnishing an ore low in phosphorus and sulphur, with an iron content of 52 to 63 per cent, is estimated to contain at least 100,000,000 tons. The equipment today is such that, besides supplying the furnaces of the Hanyehping Co., they can furnish to the Government steel works about 600,000 tons annually.

Table I.—Iron Ore Deposits

(Figures in millions of metric tons actually determined; in addition, there is a small amount estimated to exist elsewhere.)

Part of Country	Kind of Ore	Ore	Iron Content
Islands	Magnetite	55.6	28.0
	Hematite		
Korea	Magnetite	4.0	2.0
	Hematite		
Total		59.6	30.0

In a similar manner other blast furnace plants, built in Japan during war times, Wanishi Ironworks in Hokkaido (Hokkaido Seitetsu K. K.) and Orient Steelworks (Toyo Seitetsu K. K.) in Kyushu, have secured their ore supply for a long time by acquisition of Tuimihen-shan, Hsiuolingtsu, Takushan, Lingmen-shan, Singtaoyan and Wangchiahotau.

The ores of Penshi-hu are high-grade magnetites with 50 to 60 per cent iron. The South Manchurian Railroad ores are only to a small extent high-grade magnetite, but are mainly magnetite with an iron content of only 30 to 40 per cent. These ores are highly silicious and have to be pre-treated to make them suitable for blast furnace smelting.

While, therefore, the situation regarding a domestic ore supply was not favorable for a Japanese steel industry, the Japanese have succeeded, nevertheless, with the effective assistance of their Government, in assuring an ore supply for their steel industry which should render it possible to meet home consumption of iron and steel. It can be assumed that, with the technical perfection of the iron mines and equipment, the cost of the ore will not be higher than in other iron producing countries.

Power Supply—Coal

Table III indicates the coal deposits of Japan, Korea and Manchuria according to figures given by Inone Kinosuke at the International Geological Congress, Canada, 1913. Table IV shows the annual coal production, import and export of coal and the home consumption of Japan for the years 1912 to 1921. It also gives data regarding the coal consumption by the Japanese steel industry, exclusive of coal used in blast furnaces as coke and the quantities of coal converted into coke.

Japan's coal supply cannot be called unlimited. At present Japan is mining sufficient coal to supply its own demands, and will be able to cover an increase in consumption. But it must be assumed that the deposits will be exhausted in about 150 years. The largest number of Japan's coal deposits furnish a bituminous anthracite, which can be used only to a very limited extent for conversion into blast furnace coke.

Consequently even today considerable coal for this purpose is imported from other countries, principally Chinese ore mines or partnership in them. The Wanishi Ironworks has acquired the Tsaishidji and the Orient Steelworks the Taudchung iron ore mines, both located in the Yangtse valley. The latter deposit is estimated at 20,000,000 to 30,000,000 tons.

Table II—Consumption and Source of Iron Ores
(In Metric Tons)

Iron Ore Mined Japan	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Kamaishi	130,470	136,350	99,500	79,570	97,070	148,420	143,680	115,430	131,130	65,130
Abuto	.....	.....	10,600	20,790	22,660	27,560	69,460	98,740	37,680	.....
Senin and Kuniki	8,300	9,800	9,700	10,140	14,860	14,510	18,550	20,110	14,970	1,470
Other provinces	14,300	6,800	1,700	8,440	5,360	77,100	141,100	128,660	131,070	20,380
Korea	122,500	142,050	182,030	209,940	245,420	152,930	430,790	417,000	447,250	232,690
Imported from China	195,650	277,880	297,180	308,070	279,220	295,690	360,930	595,140	650,520	439,770
Other countries	2,590	2,210	1,690	710	580	1,190	1,230	25,930	11,840	138,290
Consumption, Japan and Korea	473,700	575,250	602,540	637,680	665,160	717,410	1,171,060	1,401,040	1,424,480	897,730
Average price, Chinese and Korean ore, in yen	5.63	5.47	5.21	5.59	5.70	8.10	24.30	24.10	18.20	15.30
Average price of pig iron in yen	.....	50.00	49.00	58.00	89.00	215.00	406.00	164.00	133.00	78.00

Ores from Manchuria

Nor did the ore deposits of Manchuria escape the attention of the Japanese; in the province of Penshi-hu are rich deposits of magnetite. In addition there is between Mukden and Kirin a range of hills (south of the Tiehling) rich in iron ore. While the ores of Central China can be transported from the mines to Japan almost exclusively by water, those of Manchuria have to be taken a long way by rail to the sea. In some places in Manchuria are coal deposits in the vicinity of the ore deposits, which furnish a coking coal. Anthracite is found near Yentay, bituminous coal and anthracite near Penshi-hu, gas coal near Kuang-Chentse and Dalai-Nor as well as at the Trans-Baikal border.

Smelting of Manchurian ores was begun in that country on account of the expensive transportation of these ores to Japan. In 1915 the Honkeiko plant was established for the exploitation of the Penshi-hu ores by the Japanese firm Okura. In 1918 the South Manchurian Railroad started construction of the An-Shan plant, to use the ores from Tungshi-An-an, Tichshi-han, China, whence the supply is assured through the above mentioned Chinese-Japanese agreement. The coal deposits of Manchuria are almost exclusively in the hands

Table III—Coal Deposits
(In Millions of Metric Tons)

Government District	Actually Determined: Anthracite	Actually Determined: Bituminous	Actually Determined: Lignite	Probable: Anthracite	Probable: Bituminous	Probable: Lignite	Total
Mezoic	4	....	..	37	10	...	51
Karafuto	..	....	..	..	1,345	...	1,362
Hokkaido	..	336	..	..	2,106	233	2,675
Honshu	1	1	67	20	14	478	581
Kyushu	..	542	..	..	2,374	...	2,916
Formosa	..	....	..	...	385	...	385
Japan total	5	896	67	57	6,234	711	7,970
Korea	7	1	5	33	13	22	81
Manchuria	..	409	..	68	731	...	1,208
Total	12	1,306	72	158	6,978	733	9,259

Table IV—Production, Import and Export of Coal
(Amounts in 1000 Metric Tons)

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Coal mined	19,668	21,345	22,293	20,191	22,902	26,361	28,029	30,300	29,245	28,220
Coal imported	301	576	988	615	556	713	769	715	810	777
Total supply	19,969	21,891	22,251	21,106	23,458	27,074	28,798	31,015	30,055	28,997
Exported	3,469	3,874	3,587	2,924	3,017	2,813	2,197	2,016	2,146	2,387
Home consumption	16,500	18,020	19,664	18,182	20,441	24,261	26,601	28,989	27,899	24,610
Consumed in the steel industry (except coke)	.....	.....	.....	.....	.....	.....	1,183	1,015	1,300	.....
Converted into coke	.....	.....	.....	539	.....	1,026	1,000	1,632	1,485	.....
Average price in cents	9.02	9.03	9.60	10.41	21.78	21.42	32.78	25.00	22.00	.....

Table V—Production, Imports, Exports, Home Consumption and Source of Pig Iron
(Amounts in 1000 Metric Tons)

Character of Production	1897	1907	1913	1914	1915	1916	1917	1918	1919	1920	1921
Coke	26.1	145.5	240.3	300.2	317.7	388.7	411.3	446.7	520.1	444.0	437.0
Charcoal							18.2	37.5	47.0	31.2	13.5
Synthetic and electric	....	....	....	....	....	....	21.2	98.6	28.4	45.9	25.4
Korea coke	....	....	....	....	....	....	....	42.7	78.4	84.1	83.0
South Manchuria coke	....	....	....	....	29.9	49.0	58.6	45.7	106.1	116.0	93.9
Total	26.1	145.5	240.3	300.2	347.6	437.7	489.3	671.2	780.0	721.2	652.8
Imported	39.0	103.4	265.1	169.1	166.8	232.0	232.2	225.1	283.2	348.6	227.1
Production and imports	65.1	248.9	505.4	469.3	514.4	669.7	721.5	896.3	1,063.2	1,069.8	879.9
Exported	....	0.4	0.4	0.2	0.4	1.6	3.3	1.1	1.9	2.5	....
Consumption	65.1	248.5	505.0	469.1	514.0	668.1	718.2	895.2	1,061.3	1,067.3	879.9
Origin of import											
China	....	....	59.9	55.2	82.9	102.4	109.8	157.7	95.2	140.7	76.2
England	....	....	99.4	60.2	36.7	31.6	5.5	17.8	44.8	58.6	22.6
Germany	....	....	11.3	6.3	....	0.4	....	....	....	0.5	3.4
Sweden	....	....	12.1	11.2	6.7	2.8	3.8	4.2	10.8	14.2	13.1
America	....	....	0.5	3.2	1.0	3.7	24.8	13.0	35.6	35.5	1.2
India	....	....	81.9	31.4	38.0	62.8	61.1	7.1	28.9	47.9	34.4
Other Countries	....	....	....	1.6	1.7	28.5	27.3	25.2	68.0	51.2	71.2
Production in per cent of consumption	40.0	58.0	47.6	64.0	67.6	67.0	68.0	75.0	73.7	67.5	74.0

Table VI—Production and Imports of Rolled Steel, Forgings and Steel Castings
(In Metric Tons)

Material	1913		1914		1915		1916		1917		1918		1919		1920		1921	
	Production	Imports	Production	Imports	Production	Imports	Production	Imports	Production	Imports	Production	Imports	Production	Imports	Production	Imports	Production	Imports
Merchant bars	76,250	203,960	78,070	154,330	58,620	58,620	134,160	143,280	123,760	.....	140,730	.....	118,610	.....	123,830	.....	126,150	.....
	27.2%	72.8%	33.6%	66.4%	50.0%	50.0%	48.4%	51.6%										
Shapes	.....	.....	.....	.....	.....	.....	.....	.....	94,490	182,020	80,620	232,640	69,360	162,400	89,290	273,070	115,630	153,120
									72.8%	27.2%	48.8%	51.2%	53.0%	46.4%	43.8%	56.2%	61.2%	38.8%
Plates and sheets	58,010	155,590	46,490	134,720	86,620	120,810	71,930	203,310	77,320	329,050	91,370	190,560	143,930	281,100	124,180	451,950	135,500	284,350
	27.1%	72.9%	25.7%	74.3%	41.8%	58.2%	26.1%	73.9%	19.0%	81.0%	32.4%	67.6%	33.9%	66.1%	21.6%	78.4%	32.3%	67.7%
Tubes	.....	44,240	.....	28,540	(1)	7,470	13,070	12,090	15,340	18,640	22,990	30,070	16,370	24,030	19,220	38,890	18,510	27,990
		100.0%		100.0%			51.9%	48.1%	45.1%	54.9%	43.3%	56.7%	40.5%	59.5%	33.1%	66.9%	39.8%	60.2%
Rails	48,670	60,760	67,310	27,710	59,110	8,770	51,710	4,220	75,850	1,010	56,510	67,770	61,340	120,296	55,900	115,500	59,860	56,280
	44.5%	55.5%	70.8%	29.2%	87.1%	12.9%	92.5%	7.5%	98.7%	1.3%	45.5%	54.5%	33.8%	66.2%	32.5%	67.5%	51.5%	48.5%
Wire, black and galvanized	(1)	34,350	(1)	30,750	(1)	34,710	28,270	40,150	31,240	48,160	34,660	60,750	22,640	66,110	31,100	72,800	26,440	48,510
							41.3%	58.7%	39.3%	67.7%	36.3%	63.7%	25.5%	74.5%	30.0%	70.0%	35.3%	64.7%
Other finished products	(1)	17,080	(1)	11,100	(1)	650	25,650	23,800	13,540	5,930	22,970	21,900	40,790	6,250	12,630	25,670	(2)	30,750
							51.9%	48.1%	69.2%	30.8%	51.2%	48.8%	86.7%	13.3%	33.0%	67.0%		
Forgings	(1)	.....	(1)	.....	(1)	.....	.....	.....	51,270	.....	49,500	.....	36,110	.....	48,800	.....	35,900	.....
Steel castings	(1)	.....	(1)	.....	(1)	53,300	.....	23,330	.....	31,750	.....	33,810	.....	29,690	.....	30,140	.....	
Special steel	(1)	.....	(1)	.....	(1)	3,140	.....	7,290	.....	8,520	.....	9,660	.....	2,810	.....	11,970	.....	
Total	254,950	515,980	282,520	387,150	342,870	231,010	381,230	426,850	513,430	584,810	539,920	603,690	552,620	669,180	537,420	979,190	560,100	601,000
	32.2%	67.8%	42.2%	57.8%	59.7%	40.3%	47.2%	52.8%	46.8%	53.2%	47.2%	52.8%	45.5%	54.5%	35.4%	64.6%	48.2%	51.8%

NOTES Imports represent total imports less exports; % indicates % of home production in total consumption.
(1) Material produced, but not recorded. (2) Imports not separated.

Table VII—Country of Origin of Imports Into Japan
(Iron and Steel in Metric Tons)

	U. S. A.	China	Germany	England	Belgium	Sweden	Other Countries	Japanese Exports
1912	191,700	20	177,900	177,000	.....	4,160	67,700	9,300
1913	97,060	4	197,200	162,000	.....	6,600	66,300	11,600
1914	65,000	....	161,200	115,500	.....	4,180	50,000	11,300
1915	137,000	520	64,500	87,000	.....	4,800	4,450	11,800
1916	279,600	4,200	3,811	115,300	.....	13,300	4,540	14,200
1917	580,300	8,700	....	24,200	.....	4,480	7,090	31,100
1918	625,000	11,300	220	6,820	.....	1,850	4,980	47,300
1919	645,500	1,070	....	69,880	.....	3,470	1,810	61,200
1920	857,300	12,400	1,860	140,600	.....	7,660	6,400	44,600
1921	455,000	1,170	39,250	98,500	24,330	4,060	3,270	23,700

of the Japanese and more particularly of the South Manchurian Railroad, which in Fushun (Bujun) alone mines 2,300,000 tons, or 70 to 80 per cent of the total coal produced in Manchuria. While, therefore, sufficient coal is available at home for steel making, Japan must depend even now on foreign countries for coking coals, in order that the home supply may not be too quickly exhausted.

Water Power

According to estimates Japan has available water power totaling 5,000,000 hp., only 1,200,000 being source of energy could be expected to be an important factor.

Home Consumption of Iron and Steel

Diagrams 1 and 2 and tables V, VI and VII show Japan's consumption of pig iron and steel for the years 1897 to 1921 and 1912 to 1921 respectively. They show to what extent demand has been met by production at home and by importation. The pig iron imported from Manchuria has been included in Japan's production. Tables V and VII further indicate the country from which the material was imported. Table VIII illustrates the quantities and value of machinery imported

Table VIII—Japanese Imports of Machinery and Machine Parts (Tons Are Metric, Where Given)

	1912		1913		1914		1915		1916		1917		1918		1919		1920		1921	
	Tons	1000 Yen	Tons	1000 Yen	Tons	1000 Yen	Tons	1000 Yen	Tons	1000 Yen	Tons	1000 Yen	Tons	1000 Yen	Tons	1000 Yen	Tons	1000 Yen	Tons	1000 Yen
Railroad equipment		3,132		2,075		1,981		619		299		2,219		3,097		6,783		7,117		5,255
Automobiles		894		1,110		498		165		713		2,667		7,673		11,282		10,478		8,067
Bicycles		2,002		2,134		1,035		313		477		710		1,500		2,580		6,730		6,411
Marine equipment	25	3,949	20	4,000	13	2,842	10	2,634	15	10,418	22	8,892	21	3,448	15	468	3	258	3	262
Boilers		1,175		976		860		570		1,367		2,711		7,466		8,336		6,680		7,862
Economizers	627	84	947	146	598	81	421	62	552	119	873	172	471	131	751	272	1,518	614	3,433	1,510
Locomotives		801		2,386		447		228		121		112		398		408		915		1,910
Locomotives-Narrow Gauge	89	33	82	35	43	25	19	89	11	6			11	75	31	24	165	180		
Steam engines		524		633		616		78		262		563	318	738	802	1,377		2,194		2,683
Gas engines	5,295	1,390	1,968	1,261	485	366	142	163	164	180	118	263	233	493	229	966	1,061	4,771	480	1,111
Hydraulic machinery	1,607	809	1,347	729	539	322	139	116	124	115	363	306	66	82	948	1,787	457	779	1,137	1,600
Motors	5,028	3,199	5,352	3,659	3,304	2,407	587	501	305	392	865	1,130	1,857	2,997	2,738	5,246	3,323	6,080	4,762	9,694
Sewing machines	1,228	1,210	878	810	162	219	225	243	492	790	723	1,001	1,816	2,948	2,690	4,765	3,161	6,321	1,574	3,170
Machine tools	7,559	3,966	5,971	3,379	4,555	2,480	1,434	891	1,599	1,783	3,744	3,452	5,165	6,833	6,145	10,563	8,687	13,650	7,159	10,977
Textile machinery	4,304	1,802	13,708	5,097	12,449	5,332	2,755	1,336	3,922	2,408	8,748	4,971	10,844	8,545	13,028	13,864	18,353	18,163	30,946	29,180
Other machinery		13,549		16,807		10,793		4,098		7,719		13,770		22,980		12,243		17,199		17,499
Total		38,519		45,137		30,307		12,107		27,167		42,939		69,104		80,964		102,119		107,161

utilized to date. Hydroelectric power already in use in the steel industry furnishes power for electric furnaces for the manufacture of pig iron, steel and ferroalloys.

In her water power Japan has the disadvantage that the amount of water is subject to considerable fluctuation; the difference between high and low water level is consequently very great. The total available water power cannot be considered so high that this into Japan from 1912 to 1921. Tables VI and VII give detail information regarding production and import of the different kinds of iron and steel products.

From these diagrams and tables it is evident that there is sufficient home demand for pig iron and steel to form the basis of a national steel industry.

(In the following installment a brief description will be given of the development of the Japanese steel industry.)

Swedish Industry Well Engaged

BERLIN, GERMANY, Oct. 29.—The Swedish export of iron ore has considerably decreased this year. The adverse conditions in Central Europe are to a great extent responsible for the decline. The situation in the Ruhr and the standstill of production in the occupied area has influenced export activity considerably and though exporters have successfully fostered trade with other parts of Europe, exports have decreased.

The developments in the Ruhr problem are therefore followed with intense interest in Sweden and an improvement in the ore industry is expected as soon as the factories in the occupied area are in full working order again and the political situation in Europe more settled. The iron industry on the Ruhr and in Westphalia formerly absorbed about 65 per cent of the exports. During the first nine months of this year the largest exporter of ore, the Grängesberg Gesellschaft, which handles about four-fifths of the total production, shipped 3,250,000 tons against 4,160,000 tons during the same time last year, and September shipments totaled 246,879 tons compared with 380,354 tons during August.

The greatest part of the Swedish shipments to Germany are going to Stettin. The shipments destined for the Ruhr districts, which are going to Emden and Amsterdam, have greatly diminished, but the movements to Stettin have increased. The German imports of ore via Stettin totaled 1,551,833 tons in 1913. During 1919 they decreased to less than 400,000 tons and amounted to 632,608 tons last year. This year they have been about 1,250,000 tons till October, and it is expected that they will reach the pre-war figure by December.

The Swedish engineering industry is generally fairly well employed. The electrical industry and the dockyards are busy and have taken on more men. German quotations are in many cases more than 30 per cent below Swedish prices, but the delay in delivery has diverted many orders to Sweden.

Industrial Engineers Elect Officers

New officers were elected, and the date of the next annual convention announced at the annual meeting of the board of directors of the Society of Industrial Engineers, held in New York.

W. G. Sheehan, president Crystal Corporation, Detroit, was elected president of the society and Edward T. Miller, executive secretary United Typothetae of America, treasurer. George C. Dent continues as executive secretary. W. W. Nichols, D. P. Brown & Co., Detroit, and F. E. Rein, consulting engineer, Philadelphia, take office as directors.

The eleventh annual convention will be held in Buffalo from April 30 to May 2.

How to Succeed with the Eight-Hour Day

Superintendent of Open-Hearth Department of Donner Steel Co. Says Absolute Confidence of Men and Management Is Necessary—Relates His Experience

BY KENT HARRISON

THE successful application of the eight-hour day to the steel business is contingent upon the vital factor of absolute confidence between the employees and the management. This implies the complete acceptance on the part of the management of the idea that the men are ready and willing to do their part. It also implies, on the part of the employees, a belief in the just and even considerate attitude toward themselves on the part of the management.

Men are, as a rule, sincere and constructive in their attitude. If, with all this, they are in error, they will respond to the efforts at correction if time and patience are applied to their enlightenment. A few arbitrary cases, if they exist, will seldom jeopardize the co-operation of the well meaning majority.

The manager whose contact with his organization is only at his office desk, and who, because of this, allows department heads to indulge in inconsiderate treatment of men under them, need not be surprised if his suggestions do not carry conviction. Consistent with a personal contact, the widest possible latitude must be given department heads, governed by the fact that the steel business attracts and requires employees of the greatest diversity of skill and talent.

After 20 years' service in the employ of steel companies and in all grades from laborer to executive head of large departments, I am convinced that 99 per cent of labor troubles in this business is due to misunderstandings between managers or their executives and the employees.

Some years ago, I took charge of an open-hearth plant, the record production of which, up to that time, was 16,000 tons from six furnaces per month. When the manager was asked to explain the cause of this low production, he replied: "The men are no good. You will have to get some good men." Afterwards, the same men doubled this production.

Thirty days before we made the move from 12 to 8 hours at the Donner Steel Co., where my position is open-hearth superintendent, I started an active campaign with my foremen concerning our plans. Everybody wanted eight hours, but no one could see how the money end of it could be arranged. The proposition was made that we could take the same force of men that we had on two 12-hour shifts and make up three 8-hour shifts as nearly as possible. It would give us a better chance to keep up the wages. This was discussed fully with every man in the open-hearth department. We had a daily meeting at which everyone entered the discussion, finally suggesting to the men that they appoint a committee to represent the open-hearth and that we would deal with that department through this committee. Our one aim was to impress on every man that if we were going to hold the wages, we would have to work with fewer men on a shift than we had. It meant that every man had to come in the open-hearth ready and willing to give eight hours' work. We suggested that it would be far better to do this and then get out of the works and spend the time with the wife and children at a show, ball game, etc., than actually to work about four hours out of 12 and then lie around on a plank trying to get in the rest of the turn.

We worked up an approximate rate sheet and presented it to the men so as to give them an idea of what their earnings would be. These rates were based so that, if production was increased, they would profit by it. Our labor force in the open-hearth was cut practically 20 men, dividing 30 men into three 8-hour shifts. I might state that, before this move was made, it was impossible to keep labor for our hot work. Under this plan we have 30 men day in and day out. We did away with our third helpers. We promoted all the second helpers we could to first helping, filled their jobs with third helpers, placing the remainder of our third helpers in the open-hearth labor gang as extra men. We reduced our pit force proportionately, also number of cranes, locomotives and stockers on each shift. This entire change was made with an increase of 8 per cent in men and a saving of 580 man hours, thus making a very small increase in our present payroll.

The shifts change at 7:00 a. m., 3:00 p. m. and 11:00 p. m. This was decided by the men. The week change is made in such a way that every three weeks each man has 32 hours off. This also was voted on and decided by the men. Since this move was made we had no decrease in our tonnage. Our bottom-making time

Started as a Laborer

Kent Harrison, the author of this paper, says:

"Men who work for me are my hobby. Nothing affords me the pleasure that the feeling does that my men are all for me 100 *per cent, because then I know I will get results, and I know without this spirit I will not."*

Mr. Harrison was educated at the Virginia Polytechnic Institute, Blocksburg, Va., of which State he is a native. He entered the employ of the Tennessee Coal & Iron Co. at Ensley, Ala., as a laborer in 1901, *in the blooming mill. He worked through the blooming mill, later as a shearman and soaking pit bottom maker, afterward going to the rail mill as a heater. He gave up the mill, going to the open-hearth as a third helper, working up to first helper, then going to South Chicago, with the Illinois Steel Co. in its open-hearths. He was a melter foreman for a number of years, later going to the Maryland Steel Co. at Sparrows Point as an assistant open-hearth superintendent. He then accepted, with the Hess Steel Corporation, the position of superintendent of electric furnace operations at Baltimore. He afterward accepted the supervision over the electric furnace operations, as well as the forge shops and foundry for the Anniston Steel Co., Anniston, Ala. He remained with this company until the end of the war, at which time he was offered the position of open-hearth superintendent for the Ashland Iron & Mining Co. at Ashland, Ky. Later this plant was taken over by the American Rolling Mill Co., with which he remained for a year, going to the Donner Steel Co. just one year ago as superintendent of the open-hearth department.*

has decreased nearly 50 per cent. We have far less actual turnover in men and our trouble from men laying off has practically stopped.

We have a better spirit among our men, manifested in the formation of track and football teams, showing that their time off is being devoted to recreation, which in turn is obliged to reflect in efficiency. I will state that I have never had a more satisfied organization and I believe that the solution to our labor troubles today is fair and considerate treatment, plus a small force of efficient men at a higher rate of pay, rather than a large force of incompetent men at lower pay.

Unfounded Reports as to Steel Stocks in the Ruhr District

German Agents Play Their Part in Attempts to Discourage Activities of American Exporters of Iron and Steel

WASHINGTON, Nov. 13.—Stocks of iron and steel in the Ruhr district of Germany are having the effect of depressing foreign markets for American manufacturers, according to reports received by Government officials. While there is no sound reason for the existence of this situation, it prevails and evidently is being encouraged by German agents who are said to be giving consumers in world markets the impression that the stocks are huge and will be released in the near future at prices far below those quoted by iron and steel makers in other countries. This propaganda is having its effect and foreign buyers in some countries are withholding orders ordinarily placed with American mills or those of other countries under the belief that by waiting they can get their supplies from the Ruhr district at unusually attractive figures.

The fallacy of such an impression is quickly dissipated when the situation is analyzed and undoubtedly is thoroughly realized by American producers, though this does not overcome the effect on foreign markets.

It is clear that the stocks of iron and steel in the Ruhr district have been purposely overestimated by German exporting interests. The United States Government does not possess actual figures showing the quantities of accumulations, but from calculations based on as reliable reports as have been obtainable, the total is not believed to exceed 700,000 or 800,000 tons. Officials say, however, if the aggregate runs as high as 1,000,000 tons, this is not an important figure from a point of production, consumption and world market requirements when there is taken into consideration the military regulations hampering the German owners of this material.

Abnormal Conditions

Being in the occupied territory the stocks and mills are entirely under the control of the French and Belgian Governments and the situation is surrounded by numerous abnormal conditions which reduce it to negligible importance as a factor in export markets in competition with American and other mills. Moreover, the material having lain in stock for a long period, is said to have deteriorated greatly and to be no longer of the prime quality desirable for first class export trade. It is also true that the French and Belgian authorities have stated that steel and other stocks in the Ruhr which they have confiscated, or which have not been confiscated, will not be released in wholesale quantities to break world markets, but will be released in small quantities over a prolonged period. Furthermore, it is the purpose of the French Government to use large quantities of the steel in French colonies and in the war-devastated areas of France, so that this tonnage will never be put on the market. Internal conditions of Germany are another factor that discounts the importance of the steel stocks in the export trade, typical of which are the poor transportation facilities.

Superimposed upon the foregoing hampering conditions are the regulations growing out of military occupation of the Ruhr district. The outstanding features of this phase which seriously strike German effort to export the steel stocks are summarized as follows:

First, there is a 10 per cent export tax payable in gold to France and Belgium for the right of shipping to foreign markets.

Secondly, a license tax of 0.3 per cent ad valorem payable in gold to cover the expense of maintenance by the French and Belgian Governments of the licensing system.

Third, the foreign currency levy to give authority for exchange. This tax was imposed on German exporters originally by the German Government in order to get exchange with which to pay reparations. The German exporter is paid a certain percentage in foreign exchange in which the contract for goods is made, the amount varying from nothing to 100 per cent, depending on the proportion of the foreign materials used in the manufacture of the goods by the German maker. In some cases where imported raw materials and domestic labor dominate as the items of cost, the domestic tax is as high as 100 per cent. In instances where the principal items of cost are raw or semi-finished materials, the tax is not so high. The average has been 26 per cent to meet the levy of that amount.

When these taxes were turned over, the manufacturers were reimbursed by the German Government in paper marks at the rate of exchange at the date of payment. Upon occupation of the Ruhr, the French and Belgian Governments continued these regulations except that foreign currency was supposed to be paid to the Inter-allied Rhineland High Commission, so that it could take foreign exchange for payment of reparations. With the German Government ceasing "passive resistance," and the French and Belgian Governments relaxing control to a certain extent, the German Government on Sept. 27 abolished this system, but so far as it affects the occupied territory, the French and Belgian Governments are still keeping the system in effect. It is conceded that they have been liberal in granting exemptions, but they continue to hold a strong club over the German manufacturers, who will be permitted to export only upon the terms approved by the occupying governments.

Plans for Disposing of Stocks

Plans for disposing of iron and steel stocks seized in the Ruhr develop slowly, according to a report received by the Department of Commerce from Commercial Attaché Chester Lloyd Jones, Paris. An interministerial commission of nine has been appointed, consisting of iron and steel producers and consumers. Meanwhile the Belgians have organized a special comptoir for their portion of the material. The way is being cleared for a similar French organization to have a capital of 1,000,000 francs, represented by shares of 500 francs value, one-fourth paid in, which will be divided one-half among the producers and one-half among the consumers. Prices and conditions of sale will be controlled by the Minister of Public Works on the advice of the comptoir, and the money received will be turned into such treasuries as the Minister of Public Works may designate, after subtraction of the necessary expenses of the comptoir, which are at present approximately 6 per cent of the amount of the sales.

No detailed list of materials has been published. Sales, however, are to begin shortly. The division of seized scrap material, 100,000 tons to France and 75,000 tons to Belgium, will be carried out so far as the amounts given to France are concerned, by direct agreement among steel producers.

SOUTH RUSSIAN INDUSTRY

Some Improvement Reported in a Letter from Engineer in Donetz Basin

Interesting information regarding industrial conditions in Russia as well as the announcement of some improvement in the production of iron and steel in that country is contained in a letter dated Sept. 15 received some days ago by Robert E. Baker, of Arthur G. McKee & Co., engineers, Cleveland, from B. Grebennikov, engineering department, Petrovski State Works and Mines, Enakievo, Donetz Government, South Russia. The letter in part is as follows:

"I am very much interested in further developments of the Egler's patent open hearth ports in your country and I would like to know what you expect to do in the way of promoting this invention in Russia. I believe that a trial equipment could be introduced at one of the working steel making furnaces of the Ugostal's combine. Of course, this would touch the subject of patent rights, which it might be advisable to take up in the near future. When in Moscow last year I visited the patent office and tried in a general way to investigate this question and I have been advised there that a new patent law had to be worked out and it was my impression that the new patent legislation will conform largely with foreign practice.

"Considerable attention is being paid at present in the engineering world in this country to the use of powdered coal in connection with steam boilers and metallurgical furnaces. It promises to have a great demand when industry gets under way in Russia. Most of the steam boilers used in the Donetz Basin are those of Lancashire type, of 1000 sq. ft. heating surface, but some are Babcock & Wilcox type, of 3000 to 4000 sq. ft. surface.

"Drawing your attention to this matter I would deem it a great favor if you would send me catalogs of the American firms manufacturing such equipment, together with some standard work treating this subject at length, if there be any such lately published in the United States.

"Grain handling installations are being discussed. There has always been a great need for grain storage bins and elevators in Russia and it will be one of the first things required in the way of bettering the grain export business of this country.

Plans for 1200 Tons of Iron Daily

"Our Petrovski works has been shut down this summer and we have only coal mines working now. The Jusovka and Brianski works at Ekaterenislaw were started instead. At present two blast furnaces are in operation at Jusovka works and it is expected that the new blast furnace with the McKee top and Otis hoist equipment will be blown in before very long to replace one of those working now. At Brianski works one blast furnace is in blast and a second furnace is expected to be ready in a few months, provided the situation with respect to the transportation of ore and coke does not prevent. The Makeevka works is being put in readiness to start one of its blast furnaces. Scarcity of pig iron in the country forces the starting of the blast furnaces. Altogether it is proposed to have six blast furnaces in operation of the average output of 200 tons per furnace. Combined with them, steel making furnaces and rolling mills will be in operation at each plant. Altogether the plans provide for a very small quantity of metal when compared with the former output of this country, but it is a gain compared with the last year when there were only two blast furnaces in blast."

Mr. Grebennikov, in his letter, acknowledged the receipt of two packages of confections sent him by McKee & Co. and mentioned that the first package reached him two months after shipment, but that it was six months before the second package was delivered.

BRITISH FOREIGN TRADE

September Steel Exports Larger Than August—Imports Practically Unchanged

September exports of iron and steel from Great Britain showed an increase over August of about 14,000 gross tons. There was also an increase in August over July of about 15,900 tons. The September exports were 344,358 tons as compared with 330,431 tons in August. The imports in September of 127,893 tons compare with 121,906 tons in August, which was the smallest this year. Comparative data for both exports and imports, scrap being included, were as follows:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Aver. per month, first quarter, 1923...	358,208	128,032
April, 1923	398,507	133,929
May, 1923	435,630	114,132
June, 1923	373,277	130,066
Aver. per month, second quarter, 1923..	402,471	126,042
July, 1923	314,522	128,486
August, 1923	330,431	121,906
September, 1923	344,358	127,893
Average per month, 1922	295,980	82,215
Average per month, 1921	144,885	152,734
Average per month, 1920	274,881	125,885
Average per month, 1919	188,519	50,801
Average per month, 1913	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month

	1913	1922	September 1922	September 1923
Pig iron } Ferroalloys }	93,700	66,159	{ 69,950 / 17,551	45,015 / 14,282
Steel rails	42,200	21,300	12,375	33,635
Steel plates	11,200	6,700	6,402	15,039
Galvanized sheets	63,500	43,600	35,041	44,056
Steel bars, rods, etc.	20,900	19,100	18,122	23,181
Tin plates	41,200	37,400	35,258	38,725
Black plates and sheets	11,700	18,700	16,640	23,276

Exports of scrap iron and steel in September were 10,373 tons, or 10,019 tons per month for the first nine months of this year, as compared with 12,880 tons per month in 1922. In 1913 there were 9600 tons per month.

Data as to importations of importance are as follows in tons per month:

	1913	1922	Jan.-Sept., 1923
Iron ore	620,000	289,400	504,250
Manganese ore	50,100	28,109	41,992
Pig iron and ferroalloys	18,000	12,800	10,370

Japanese Demand for Woodworking Machines

Clifford P. Egan, president J. A. Fay & Egan Co., Cincinnati, manufacturer of woodworking machinery, on his return to Cincinnati after a trip to the company's Pacific Coast sales offices, expressed optimism as to the outlook for continued prosperity in woodworking machinery. Mr. Egan says: "With the Japanese Government removing the duty on piece lumber, many of the tidewater mills have withdrawn from the domestic market while the Japanese market looks so big."

Inquiries are being received by the J. A. Fay & Egan Co. in good volume and indications point to a moderate revival in building activities, as the sash and door manufacturers have a good volume of business on their books and are looking to increasing production by the use of more modern equipment.

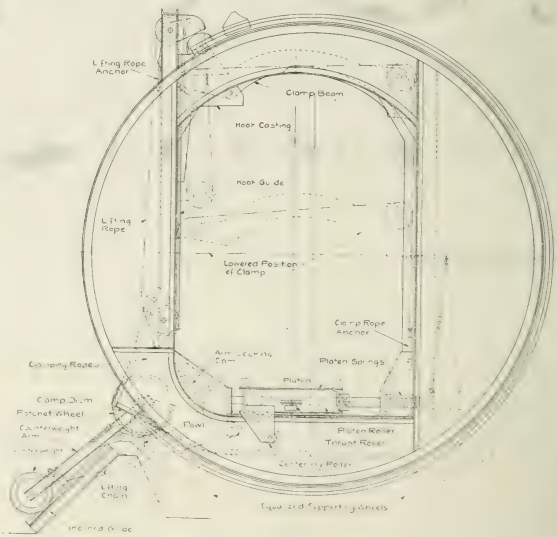
With a view to engaging in exporting springs for use in railroad equipment, the American Spring Manufacturers' Association, Farmers Bank Building, Pittsburgh, has filed papers under the Webb-Pomerene act with the Federal Trade Commission. The officers and members of the association are W. H. Rea, secretary; Richard Sanderson and Frank Metzger, for the Standard Steel Works Co., Philadelphia; Frank J. Foley and W. E. J. Gillahan, for the Railway Steel Spring Co., New York, and R. H. Ripley and A. H. Peycke, for the American Steel Foundries, Chicago.

The American Railway Association will hold its 1924 meetings and exhibits of machinery at Atlantic City, N. J., June 11 to 18.

Semi-Automatic Railroad Car Dumper

All Motions Except Revolving Are Automatic— Car Held by Clamps Rigidly Against Blocking—One Motor Only

TO meet a demand for a machine of low capacity, of simple construction, and adaptable to plants where the installation cost is an important factor, but where high efficiency and low operating cost are required, the Wellman-Seaver-Morgan Co., Cleveland, has brought out a new revolving car dumper which will handle all sizes and capacities of open top railroad cars. A clamping arrangement is provided which automatically adjusts the machine to the size of the car. In operation a car is placed in the machine, a control lever is turned and the car is inverted, discharging the contents into the bin beneath. After dumping, the car is returned to its original position by turning the control lever in the opposite direction. With the exception of the revolving operation all the functions are automatic.



Section Across Car Dumper, Showing Relationships of the Platen, Clamps, and Equalized Supporting Wheels Upon Which the Whole Apparatus Rotates. The circular end sections have toothed segments for obtaining rotation from the operation of spur gears actuated by the motor, which is positioned midway between the ends

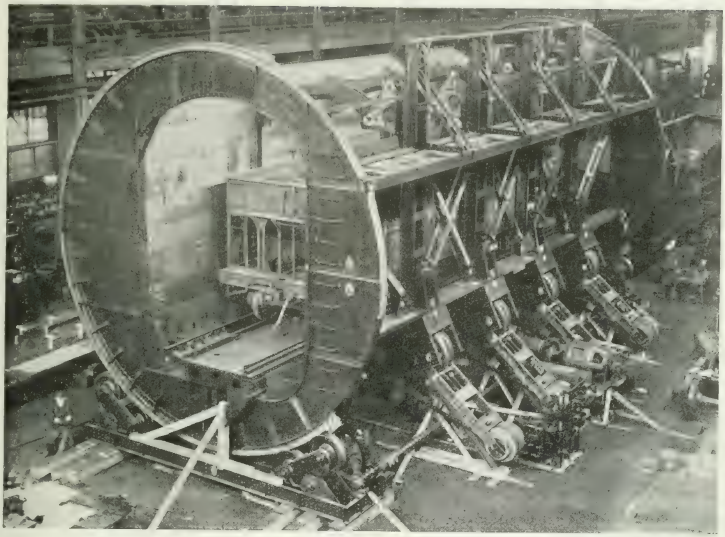
The machine has a car-holding cradle supported at either end by equalized rollers, upon which it revolves. The rollers are carried in structural bases bolted to the foundation. The end frames of the cradle are in the form of circular girders which are partially surrounded by gear segments. Rotation is accomplished by two pinions meshing with these segments and driven by a motor supported on the main foundation at the rear of the cradle. The cradle and frames are connected together by a plate girder construction which forms a box open at the top, in which the car is held while dumping. The track passing through the cradle is carried on a platen which has a lateral movement.

How the Machine Operates

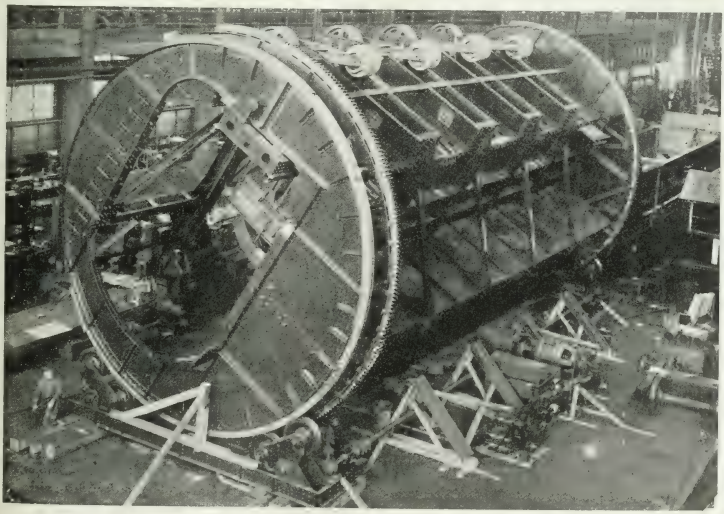
Multiple car clamps hold the car in the cradle while dumping. These clamps are normally held in their upper position when the cradle is ready to receive a load or to discharge an empty car. As the cradle with the loaded car starts to revolve, the platen moves laterally toward the dumping side, until the side of the car engages blocking provided for that purpose, and then the clamps descend until they rest on the top of the car. Continued revolution of the cradle automatically engages the clamp counterweights, which hold the car securely in place while dumping and release automatically as the cradle returns to its initial position. Each set of clamps is independently operated, so that the load on the top flange of the car is evenly distributed to all points of contact of the clamps. A special feature is a pivoted counterweight arrangement which produces a maximum holding power with a minimum of counterweight. The movable platen and the car clamping device follow closely the design of similar parts on other types of this company's car dumpers.

Operation is from a cab at one end of the cradle, elevated to a point where the operator always has a clear view of his work. Only one motor is required to operate the machine and there are no electrical connections on the cradle and no complicated interlocks. The speed of operation depends on the size of the motor used. With a 50-hp. motor—standard equipment—it is stated that the machine has a capacity of 20 cars per hr. This may be increased by the use of a larger motor.

Each main pinion in the revolving mechanism is driven by a single spur gear reduction, connected by a longitudinal shaft which, in turn, is driven by a worm reduction unit direct connected to the driving motor by a flexible coupling. The motor has a magnetic



The Dumper in Its Upright Position, (Above) Showing Clamp Counterweights and Drive, All the Operating Mechanism Being Located on the Side Opposite the Dumping Side (Below) This Shows the Dumper Inverted and Clamps Set. Each clamp is operated by its own drum and counterweight arm, forming a clamping unit.



brake, which is set as soon as the controller is turned to the off position and holds the cradle in any position. There is also an emergency brake controlled by a lever in the operator's cab and electric limit switches to prevent overtravel of the cradle. Steel shafting is used throughout in the revolving mechanism and all bearings are of cast steel with bronze bushings. The gears and pinions are of cast steel except the worm reduction gear, which is bronze. The mechanism is arranged to revolve the cradle to an angle of 160 deg., the side of the car in dumping position being only 20 deg. from the vertical.

During the dumping operation the side of the car must be supported; for this purpose the movable platen is used. This consists of a structural steel platform carrying the car rails and supported on rollers in such a manner that it is capable of lateral movement, which varies according to the width of the car. In the initial position of the cradle, adjustable centering rollers hold the platen in alinement with the car track. The platen is carried by a series of flat tread rollers supported on pins and so arranged as to distribute the load properly into the cradle structure. The blocking against which the side of the car is held while dumping is of a sectional block type made up in units which can be replaced when worn. The side of the car is brought so close to the side of the cradle that only very small material can fall between.

Action of the Clamps

Each of the pivoted counterweight clamps is operated by an independent counterweight attached to an arm pivoted to the cradle. Each clamp consists of a steel beam hinged to a sliding hook casting which moves vertically in guides attached to the cradle frame opposite the dumping side. The beam is raised or lowered and held by ropes wound on an operating drum, which revolves on the pivot of the counterweight arm. The ropes lead to opposite sides of the drum so that, as the clamp lowers, the lifting rope plays off the drum the same amount that the clamping rope winds on. The lifting rope leads from the drum over a sheave at the rear of the cradle, around a sheave in the hook casting and is anchored to the top of the guide crane. The clamping ropes lead direct from the drum to the clamp, passing around sheaves in each end of the beam, and are anchored at the bottom of the dumping side of the cradle. A flat link chain attached to a spiral cam on the hub of the drum is used to revolve the drum in the proper direction to raise the clamp. In designing the clamping mechanism it was the aim to eliminate the human element to the greatest extent possible, the only function requiring manual control being the rotation of the cradle.

Standard machines can be supplied in lengths of 30, 40, 50 and 60 ft. and for handling cars up to 120 tons capacity. This dumper, it is pointed out, can be used economically for handling coal at coke plants where the fuel is discharged into hoppers beneath the car tracks. It is stated that the dumper can be installed in such a position that it will discharge into bins that have already been built for use with hopper bottom cars, with only slight change in the bin construction.

Comprehensive Pension Plan Adopted by Wickwire-Spencer Steel Corporation

The directors of the Wickwire-Spencer Steel Corporation, through their executive committee, have authorized a comprehensive pension plan, which will be put into effect at once.

The plan provides for definite retirement on pension for all male employees who reach the age of 70 and have served the corporation or its predecessors for 25 years or more, and for female employees who reach the age of 60 and have 25 or more years' employment to their credit. Retirement at request with pension is possible to men who reach the age of 65 and women 55 years of age, if they have been 25 years or longer in the service.

Provision is made also for retirement with pension for those who have been 15 years or longer in the service and who become permanently totally incapacitated through no fault of their own or their employment, but as a result of sickness or injuries received while not on duty.

The amount of individual pensions will be determined by multiplying 1 per cent of the average monthly earnings for the last 10 years of service by the number of years of service, except that no pension shall be more than $100 per month nor less than $12 per month. For example, an employee who has been in the service 25 years and whose average monthly pay has amounted to $100 will receive a pension of 25 x 1 per cent x $100 or $25 per month or $300 a year.

The management of the plan is in the hands of a pension board made up of Frank A. Drury, Winthrop G. Hall and C. C. McDonald, the first two being treasurer and clerk of the corporation, respectively, and the latter, assistant to the vice-president with headquarters at Buffalo. Approximately 5000 employees including salesmen and officials will be eligible to participate. Thirty-seven of these have records of service which will entitle them to immediate retirement with pension, seven more reaching that status during 1924.

The corporation's Clinton works heads the list of veterans with 40 employees having service records ranging from 51 to 25 years. Of these, one has been in service 51 years, five from 41 to 48 years, 22 from 30 to 38 years and 12 from 25 to 29 years. Morgan works has one employee with 42 years of service to his credit and another with 41. Five others have been in the service more than a quarter of a century. National has one man who has worked through 40 years, while eight others, including six women, have been employed from 29 to 35 years. Wright works has one 40-year man, one 35, and 14 between 25 and 32. The dean at Goddard works has 46 years' service to his credit, and six others have been employed for periods varying from 25 to 32 years. Palmer works has five men whose service exceeds 25 years.

Spencer works, which celebrated its one-hundredth anniversary three years ago, has two workers with records of more than a half century of service. One of them, Frank Baker, Sr., has been on the payroll for 59 years, and another, Thomas Lanagan, has been on for 55 years. Ten others have been employed from 40 to 45 years, and 24 from 25 to 39 years.

The Wickwire works at Buffalo were started in 1907, so that employments of more than a quarter of a century will not occur there for a few years yet.

Massachusetts Statistics of Labor

The annual report for the year ended Nov. 30, 1922, has been issued by the Massachusetts Department of Labor and Industries. It embodies a large amount of data, mostly statistical, covering employment, wages, hours of labor, etc., and a great variety of occupations —both public service and manufacturing. A special report under the title "Population and Resources of Cape Cod" is devoted to a section which is generally regarded as a summer resort, but which is nevertheless of large commercial importance because of its fisheries and cranberry bogs.

"Eye Hazards in Industrial Occupations," the title of publication No. 12 of the National Committee for the Prevention of Blindness, first issued in 1917, has been revised and enlarged and will be ready for distribution about Jan. 1, according to Lewis H. Carris, managing director of the committee, 130 East Twenty-second Street, New York. The volume will be distributed to heads of departments of industrial plants, to engineering colleges and technical schools, and all others interested in accident prevention and health promotion among industrial workers.

PERSONNEL PROBLEMS DISCUSSED

Management Committees Report on Selecting Employees, Wage Plans and Other Activities

One of the most important phases of personnel work and one which must be given preferential attention if progress is to be made in the next decade is scientific selection of employees, according to the report of the committee on employment plans presented by Earl B. Morgan, Curtis Publishing Co., Philadelphia, at the convention of the American Management Association, held at the Hotel Astor, New York, Oct. 29 to 31.

This phase of employment practice was cited as being in a less developed stage than any other, and although the subject of much experimenting there has been little in the way of definite results. "There is no hesitancy in prophesying," said Mr. Morgan, "that ten years from now we are going to look back on the methods of today and wonder how we ever met the problem."

Job description and man specifications were taken up in a report read by F. W. Pierce, manager personnel department, Goodyear Tire & Rubber Co., job analysis as employed by the Goodyear company with marked success for over ten years being outlined. The work was said to have been to a large degree in the nature of detail time and motion studies which were used as the basis of wage determination. About four years ago by means of job analysis a plan was worked out for determining the proper relation between jobs, thereby fixing the base rate.

"Our ability to show an employee an analysis of the operation on which he is engaged," said Mr. Pierce, "is a very satisfactory method for discussing questions relating to the amount of time allowed to perform the operation, as well as the base rate on which the present price is calculated. By having this organized method of discussion we are able to convince many a disgruntled employee and thus maintain the morale of the workers.

"By an analysis of the job and a detailed time study it is possible to discover many lost motions which can be brought to the attention of the foreman or the operator, resulting in reduced labor cost of the operation. By means of these studies it is also possible to determine with certainty whether the right type of man is being used on any particular operation."

In a report of the committee on remuneration, of which D. W. K. Peacock, personnel director White Motor Co., Cleveland, is chairman, it was stated that a survey of factories employing 250,000 workers indicates that straight piecework is used in three-fourths of the plants and some form of bonus in one-third.

Two forms of wage payment, "the standard hour" and the group piece rate, or bonus, were said to be growing in favor among employers because they overcome some of the difficulties inherent in the piece rate method. The "standard hour" method makes it possible to change the general level of wages when necessary without changing the standard rates on all jobs. It also is more flexible in compensating individual differences between workmen. The group piece rate or bonus eliminates much of the expense of timekeeping, counting, and inspection, and increases cooperation between workmen. Established methods of increasing the interest of "indirect" workers in their jobs were outlined.

Economics for Employees

That a large number of companies and institutions are keenly alive to the need of instruction of employees in economics, and many of them are endeavoring to provide such instruction, was emphasized in a report of the committee on economics for employees, presented by A. J. Beatty, director of education, American Rolling Mill Co., Middletown, Ohio. In this direction, it was pointed out, the chief need is for a clear and simple statement of and discussion of the fundamental principles of economics, in language stripped of technical terms, and elaborated with illustrative matter drawn from everyday business and industrial life, preferably from the immediate environment of the particular study group. Economic facts rather than economic theory were held to be of greater interest to the majority of workers. Of the methods of instruction used, the lecture, house organ, movie reel, and bulletin board, the small discussion group in charge of a competent group leader was said to be the most successful.

That the American workman is generally less efficient in good times when his labor is needed most than in bad times when it is needed least was emphasized in an address on "Labor Efficiency in Good and Bad Times," by Dr. N. I. Stone, Hickey-Freeman Co., Rochester. This was ascribed to a sense of fear of losing his job at a time when there are not enough jobs to go around, and on the other hand to a feeling of independence in prosperous times when there are more jobs than people to fill them.

"The idea that labor can only be made to work by spur of the fear of discharge," said Dr. Stone, "is beginning to be superseded by more modern methods of personnel management. Plant managers are discovering that man responds more readily to the positive incentive of gain than to the negative one of fear. The worker's interest in his job and therefore his productive efficiency are stimulated far more by a sense of economic security than by the amount in his pay envelope at the end of the week.

"Continuity of employment is a possibility for a much larger number of companies than is ordinarily imagined," said Dr. Stone. "Progressive employers, many of whom gave little thought to the business cycle before the depression of 1920, are already working on that basis, learning to plan ahead and to control the volume of their business. The next step is to plan production in a manner to provide greatest continuity of operation possible." Continuity of production was thought to be the greatest problem challenging the ingenuity of the leaders of American industry.

The tremendous cost of labor turnover, estimated at $900,000,000 a year in the United States, was discussed by J. D. Hackett, industrial engineer, New York, in connection with a report of the committee of labor turnover.

C. W. Garrett, assistant to the vice-president in charge of personnel of the Pennsylvania Railroad system, read a paper prepared by Elisha Lee, vice-president of the Pennsylvania system, on "Supervision and Discipline." Mr. Lee's paper described the employee-representation system in the railroad management, and told of its success.

COMING MEETINGS

November

Ohio State Foundrymen's Association. Nov. 15 and 16. Annual Convention, Toledo Yacht Club, Toledo. Arthur J. Tuscany, Century Building, Cleveland, secretary.

Electric Power Club. Nov. 19, 20, 21 and 22. Fall meeting at French Lick Springs Hotel, French Lick, Ind. S. N. Clarkson, Rockefeller Building, Cleveland, secretary.

National Founders Association. Nov. 21 and 22. Annual meeting, Hotel Astor, New York. J. M. Taylor, 29 South La Salle Street, Chicago, secretary.

December

American Society of Mechanical Engineers. Dec. 3, 4, 5 and 6. Annual meeting in New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Exposition of Power and Mechanical Engineering. Dec. 3 to 8, inclusive. Second annual exposition, Grand Central Palace, New York. Headquarters, Grand Central Palace, New York.

American Institute of Chemical Engineers. Dec. 5, 6, 7 and 8. Winter meeting in Washington, D. C. J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y., secretary.

OCTOBER STEEL OUTPUT

Production Rate Only 1241 Tons a Day Below That of September

The production of steel ingots in the United States in October declined less than 1 per cent from that in September and compares with a falling off in the previous month of about 2.7 per cent. The statistics of the American Iron and Steel Institute indicate a daily rate of ingot production last month of 131,406 tons as against a daily average of 132,647 tons in September, the decrease being only 1241 tons a day. In September the falling off from August was 3567 tons, according to revised figures.

The October production of companies which made 95.35 per cent of the country's total in 1922 was 3,382,986 gross tons, which, assuming that the 4.65 per cent not reporting produced the same percentage of the total as in 1922, would mean an October output of 3,547,966 tons.

The table below gives the production by months for 1923 of the different kinds of steel, together with estimated daily rate for all companies. Following it is a table showing the production by months in 1922:

Monthly Production of Steel Ingots, January, 1923, to October, 1923, Reported for 1923 by Companies Which Made 95.35 Per Cent of the Steel Ingot Production in 1922

Months 1923	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies, Gross Tons
Jan. ...	2,908,882	728,270	9,467	3,822,369	141,569
Feb. ...	2,613,564	669,903	10,797	3,454,918	143,955
March ..	3,046,309	799,525	12,841	4,046,854	149,883
April ..	2,974,579	772,485	13,923	3,944,412	157,776
May ...	3,136,553	847,418	16,719	4,195,800	155,400
June ...	2,821,239	737,845	15,483	3,748,890	144,188
July ...	2,653,449	680,884	11,496	3,514,241	140,570
Aug. ...	2,796,370	701,059	9,326	3,677,771	136,214
Sept. ...	2,539,653*	613,709	8,602	3,316,166*	132,647*
Oct. ...	2,724,371	649,452	9,163	3,547,966	131,406
10 mo.	28,217,984	7,200,550	117,827	37,269,387	143,344

*Revised.

Monthly Production of Steel Ingots, January, 1922, to December, 1922, Reported by Companies Which Made 84.15 Per Cent of the Steel Ingot Production in 1922

Months 1922	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies, Gross Tons
Jan. ...	1,260,809	331,851	822	1,891,857	72,764
Feb. ...	1,395,835	348,571	816	2,071,772	86,324
March ..	1,918,570	451,386	795	2,814,667	104,247
April ..	1,997,465	445,939	1,103	2,902,240	116,090
May ...	2,214,774	494,893	1,474	3,218,794	119,215
June ..	2,143,708	487,851	2,918	3,127,775	120,299
July ...	2,020,572	464,047	2,485	2,952,806	118,112
Aug. ...	1,807,310	404,379	2,893	2,629,256	97,380
Sept. ...	1,911,147	460,127	2,505	2,818,261	108,395
Oct.	2,352,207	518,010	2,198	3,410,265	131,164
Nov. ...	2,360,903	525,945	2,449	3,430,309	131,935
Dec. ...	2,241,104	536,214	2,572	3,300,416	132,017
Total.	23,624,404	5,469,213	22,836	34,568,418	111,511

Tremendous Building Shortage Estimated

A survey of the United States by the *Building Age* of New York indicates a probable building shortage approaching $10,000,000,000 in construction value. This survey was conducted by means of a questionnaire directed to 1500 Chambers of Commerce, and the final figures are based on replies received from 441. Replies came from 375 cities and towns under 25,000 population and 66 cities of more than 25,000 population, the total of needed construction in these cities and towns being $965,547,000. Using this as a factor, it is estimated that the total of building requirements for the country, exclusive of farms, is $4,869,700,000. As no figures were obtained for buildnigs on farms nor for such work as public utilities, churches, memorials, military and naval buildings, etc., the comment of the *Building Age* is that "it will be seen that the present building shortage will total well toward the $10,000,000,000 mark."

Of the estimated building shortage, private dwellings make by far the largest item both as to numbers and value. It is estimated that there is a need for 519,110 dwellings, 14,069 apartment buildings, 2739 schools, 1319 hospitals, 1305 theaters, 2944 hotels, 11,012 store buildings, 1000 office buildings, 2791 factories, in cities and towns under 25,000 population, while cities of more than 25,000 are said to require a total of 150,523 dwellings, 15,376 apartment buildings, 343 schools, 92 hospitals, 254 theaters, 174 hotels, 1310 store buildings, 627 office buildings, 2102 factories, while in cities and towns of both classes there is an additional need for upward of 12,000 buildings of miscellaneous types not mentioned in these divisions.

Sale of Naval Vessels

Bids will be opened at the Navy Department, Washington, at 11 a. m., Nov. 30, for the sale of the last six of the 21 capital ships to be sold under the provisions of the treaty for the limitation of naval armaments. These include the Delaware, 20,000 tons, at the Boston navy yard; the Michigan, 16,000 tons, at the Philadelphia navy yard; the Minnesota and Kansas, 16,000 tons each, at the Philadelphia yard; the Vermont, 16,000 tons, at the Mare Island navy yard, and the Nebraska, 14,948 tons, also at Mare Island.

Certain engineering and ordnance material on these vessels is to be landed at the navy yard by the purchaser and left there. Otherwise, the ships are to be broken into scrap for eventual remelting, with such salvage of small parts, valves, piping, etc., and pieces of machinery that may be worth saving in this way.

It is of interest to note that the Michigan was the first American all-big-gun battleship or dreadnought built and that, in fact, she was the first ship of this type designed anywhere in the world. Except for the Michigan and Delaware, the ships in this sale group are of the pre-dreadnought era.

Navy Accepts Bids on Uncompleted Vessels to Be Scrapped

WASHINGTON, Nov. 13.—The Navy Department has accepted the following bids for uncompleted vessels on the ways at private shipyards, to be scrapped in accordance with the terms of the treaty limiting naval armament, proposals for which were opened in the department Nov. 8:

The Steel Scrap Co., Philadelphia, for the Constellation, as is, where is, $45,666.66 on a deferred payment basis; for the Ranger, as is, where is, $10,666.66 on a deferred payment basis; for the Iowa, as is, where is, $55,666.66 on a deferred payment basis; for the Massachusetts, $12.06 per gross ton, shipping size, on a deferred payment basis.

The Constellation, Ranger and Iowa are at the Newport News Shipbuilding & Drydock Co., at Newport News, Va. These are to be scrapped by the purchasers. The Massachusetts is at the Bethlehem Shipbuilding Corporation's plant at Fore River, Mass., and the Government is to arrange for cutting this vessel to shipping sizes.

Power Show to Include Material Handling Equipment

Material handling equipment will be included in the National Exposition of Power and Mechanical Engineering to be held in the Grand Central Palace, New York, from Dec. 3 to 8, inclusive. Conveyors, fireless steam locomotives, industrial trucks, elevators, hoists and large scales are on the list. The managers of the exposition are Fred W. Payne and Charles F. Roth, with offices in the Grand Central Palace. A list of 250 exhibitors has been issued.

The *Far Eastern Review*, a monthly engineering paper published at Shanghai, China, by Americans, has opened a branch office at 50 Church Street, New York, under the management of J. Hamilton of Shanghai. The Tokio office was destroyed in the recent earthquake.

BUILDING RESISTANCE IN TOKIO

American Steel Frame Designs Structurally Intact —Much Surface Destruction

Reports made by the engineers of the George A. Fuller Co., New York, which had erected in Tokio three large office buildings of American type, show that the earthquake damage to these buildings was mainly superficial. All three were heavily braced, from designs prepared by H. V. Spurr, of Purdy & Henderson, engineers, New York, as shown on page 685 of THE IRON AGE for Sept. 13. Extracts from the reports follow:

From Preliminary and Superficial Examination (Entirely from the Outside)

Marunouchi Building

Many cracks in brick and concrete filling between the steel columns on the second and third floors. Outside tiling had been badly buckled in many places and falling off, but this tiling was simply ornamental and added nothing to the strength of building. Steel frame work appeared to be absolutely intact without any shifting of position. No window glass was broken.

N. Y. K. Building

Steel frame absolutely intact with no shift, considerable damage to brick walls and terra cotta between the steel columns on the second and third floors, most of which occurred on the corners; also some of the exterior terra cotta was badly cracked on upper floors. The interior walls on first floor showed no cracks nor was any window glass broken.

Japan Oil Building

Steel frame intact with no shifting, some damage on second and third floors to the brick and terra cotta between steel columns, but considerably less than on the other buildings; also considerable of the terra cotta showed cracks on the upper floors and a few of the granite base blocks were cracked. No window glass was broken, but from the outside view there were indications that a portion of the hollow tile partition walls on first floors had fallen down.

Seiyukai (under construction)

Small damage, as the walls were not cracked, but some damage from the fire caused by scaffolding burning; no indication, however, of any interior damage to partitions or walls, and work on this building can be resumed at once.

From Engineer's Thorough Examination

Structural Steel

The steel frame in every case [in all three completed buildings] seems to have been of sufficient strength to withstand the dead loads and the sudden application of any superimposed loads due to vibrations caused by the earthquake and also seems to have shown a sufficiently high elastic limit to have returned to its original position in every case. That there was undoubtedly a marked momentary deflection laterally in the columns is evidenced by the shattering of a large percentage of the masonry piers surrounding or inclosing the exterior wall columns, and of the plastered partitions between the steel columns of the interior (and the distortion or destruction of the steel cross bracings which were added to the Marunouchi Building after the earthquake of 1922.) While the momentary and violent deflection of the columns laterally, particularly in the second and third stories, was of sufficient strength to shatter the inclosing or contiguous masonry, the agitation was not sufficient to distort the structural steel permanently in any case.

Reinforced Concrete

Except where the principal bays or sections of the parts of each building were joined together, such as the front of the side wings, there was no evidence of any destruction or distortion of the reinforced concrete floor slabs. At the joints between the front and side wings there were some minor cracks in the floor construction showing through the corridor floor surfacing, and indicating that the several sections of the building vibrated independently from each other, the cracks being undoubtedly due to a very severe shearing stress at these points.

In the Marunouchi Building there does not appear to be any marked or serious damage to the reinforced concrete floor slabs or beam coverings. Where reinforced concrete walls were used on the interior there was a minimum amount of damage, except at certain points on stairway walls near the west side of the building. This damage was probably due to the lack of continuity of these walls in a straight line.

Recommendations

as to the design of buildings to be erected in locations subject to earthquake shocks.

Structural Steel

Columns should be placed in straight lines in each direction so that at every panel there will be a maximum number of points of resistance. The sections of columns should be as wide as possible in each direction and should be connected at each floor by girders as deep as the requirements for head room will permit. Both columns and girders should be latticed if the computation of stresses does not require solid web plates. If solid webs are required then the webs should be punched at frequent intervals to permit of the proper application of reinforcing steel. Between the girders at each floor will be the necessary steel beams for carrying the reinforced concrete floor slabs.

In cases where head room or clear interior spaces are absolutely necessary then resort must be had to knee braces. It is recommended, however, that such rooms as absolutely require great height or clear interior be placed on the top story, or as near thereto as possible. Rivets for connection of girders to columns should be in shear wherever possible. Rivets in tension should be studiously avoided.

ACTIVITY IN DETROIT

Automobile Companies Preparing to Increase Production—Pig Iron Outlook More Favorable for Sellers

DETROIT, Nov. 12.—With a higher rate of production of automobiles announced by the leading manufacturers for the first quarter of 1924, with the stove furnace and radiation manufacturers operating on approximately a 100 per cent basis, melters of iron in the Michigan district are showing little interest in covering for their needs beyond Jan. 1. The situation is analogous to this pre-inventory period a year ago when a heavy buying movement occurred immediately following the Thanksgiving holiday.

Probably 90 per cent of the iron to be melted during the first three months of the new year is to be bought and indications are that a buying movement of considerable proportions may be started soon.

The general softness of the pig iron market has given the consumers a feeling of safety on future business, but at the same time it has placed them on a highly competitive basis. The automotive industry especially, which consumes approximately 60 per cent of the pig iron melted in the Michigan district, is passing through the most intensive competitive stage in its history. Producers of parts are of necessity cutting all the corners to lower their production costs as they are being forced to carry a portion of any reduction in the price of the finished car.

Labor in the Detroit district is adequate but not plentiful. Employment decreased slightly during the week ending Nov. 6, the labor barometer of the Employers' Association showing a total working force of 214,017 for the 79 representative firms reporting. This is a falling off of 538 from last week's figures. A year ago the same concerns, whose employees compose two-thirds of the city's working population, reported 175,733.

The city council of Johnstown, Pa., has approved contracts for the erection of Johnstown's two proposed new bridges, the Napoleon Street and Coopersdale spans. The Independent Bridge Co., Pittsburgh, was awarded the Coopersdale bridge contract for $179,400, and the Napoleon Street bridge contract was given to the Farris Engineering Co., Pittsburgh, for $152,718.

BOSTON HEARING CONTINUES

Competition and Deliveries Figure in Investigation of Bethlehem Merger

Evidence introduced during the second week of the Federal Trade Commission's hearing at Boston on the Bethlehem Steel Corporation's acquisition of the Cambria, Midvale and Lackawanna steel properties was along the same lines as introduced the first week.

The hearing was enlivened at one session lasting until after 6 p. m. by a remark made by Robert Sanderson, general manager E. P. Sanderson Co., Cambridge, Mass., steel jobber. The witness asked if a large group from "the Bethlehem sales force" was there to intimidate him in his answers. Considerable wrangling of attorneys followed.

The matter of price, in so far as it related to the merger of the Bethlehem, Lackawanna, Midvale and Cambria companies, was not perhaps gone into as thoroughly by attorneys for the Government the second week as in the first. The tendency was to dwell more on the status of competition among steel producers since and before the combination. Along these lines Clinton D. Baldwin, purchasing agent Bangor & Aroostook Railroad, declared he formerly purchased rails and accessories from Lackawanna and Bethlehem, that competition thereby was established, and that since the merger in question competition in his opinion did not exist.

Testimony submitted on the question of deliveries since the acquisition of the companies involved was conflicting, being about equally divided between favorable and unfavorable. Dealing with the matter of cost, one witness said the steel market is soft at present, but that he had not noticed "any material drop in prices." Throughout the hearing, when reference was made to price and steel market conditions, Attorney Bane frequently asked witnesses if they read THE IRON AGE for the purpose of keeping in touch with steel market conditions. Witnesses said that THE IRON AGE was an authority on matters pertaining to steel and the industry.

Among the witnesses called during the second week of the hearing were: William P. Shine, treasurer Boston Structural Steel Co., Cambridge, Mass.; A Sherman Miller, Jr., treasurer and general manager Eastern Bridge and Structural Co., Worcester, Mass.; Albert H. Inman, Pratt & Inman, Worcester, steel jobbers; E. T. Peverly, secretary Boston Bridge Works; Herbert L. Austin, New England representative Central Iron & Steel Co. and formerly associated with the Boston office Lackawanna Steel Co.; George E. Hamblin, purchasing agent Whitin Machine Works, Whitinsville, Mass., cotton machinery, and G. Morris Congdon, president Congdon & Carpenter Co., Providence, R. I., iron and steel jobbers. Arthur C. Harvey, president and treasurer A. C. Harvey Co., Allston, Boston, iron and steel jobber, was the first witness called during the third week of the hearing.

DIRTY STEEL

Effect of Non-Metallic Inclusions on Endurance Tests—Nickel-Silicon Steels

The endurance work of the Bureau of Mines field station at Ithaca, N. Y., has given results which in general fit in very well with the recent work of the engineering experiment station of the University of Illinois, and which indicate that the conclusions of the Illinois investigation may be extended to apply to a large range of alloy steels.

But, beside corroborating and extending the Illinois results, the work of the bureau has brought out a point which has not been covered completely by other investigators in this country or abroad, although it has been considered to some extent by most workers in this field. This point is the evil effect on endurance of non-metallic inclusions. Dirty steel gives far less uniform results on endurance tests than cleaner steel, and dirty steel is certainly unreliable and unsafe where repeated vibration must be endured.

These inclusions, or other similar inhomogeneities in the metal, are probably the cause of many failures in service. From the relationship worked out by the Illinois investigators and others, and corroborated by the Bureau of Mines tests, the endurance properties of any really clean steel may be quite safely predicted. But when the steel is not clean, it may either give the same results as a clean steel, or far poorer results, depending on whether the most severely stressed spot in a piece made from the dirty steel happens to be locally clean or locally dirty.

The problem of the exact effect of different inclusions or inhomogeneities in steel and other alloys, and the larger problem of how to produce clean steel and alloys, are of vital importance, and involve many factors in the preparation of metallic products, ranging from the methods of elimination of impurities from the ores, down through the smelting of the metals and the melting of the alloys. Much scientific data needed for a proper understanding of the problem are lacking.

To obtain further information on the effect of inclusions, comparisons are being made of endurance tests on specimens cut both with and across the direction of rolling, since the latter, or transverse specimens, usually show the bad effect of inclusions and inhomogeneities most markedly.

As soon as the endurance tests on the series of molybdenum, cerium and comparison steels are completed, tests will be made on a series of nickel-silicon steels previously made by the Bureau of Mines for the Navy, on which tests made by the Navy on properties other than endurance are available. The Navy has supplied specimens cut both longitudinally and transversely, and the bureau has prepared all these specimens for testing. This work should throw some light on the problem of inclusions. But work with inhomogeneities such as inclusions in steel is difficult because of the irregularity of distribution of the inclusions.

In order to study the effect of different kinds of inhomogeneities in different sorts of alloys, work on certain non-ferrous alloys has been begun.

Prior to the fiscal year of 1922-1923 a series of 50 molybdenum, cerium and other alloy steels was prepared for comparative purposes, in cooperation with the Vanadium Corporation of America, and the Welsbach Co., and the necessary tests, other than endurance tests, were made.

Endurance tests are time-consuming, and, save for a short period when the machines were out of commission due to a fire which damaged the laboratory of Sibley College, Cornell University, in which the endurance machines used in this work are located, two endurance machines have been run night and day throughout the present year. These machines will continue to run continuously for a few months longer to complete the program.

Cerium offers no promise of usefulness as an alloying element in steel. Its use tends toward the presence of non-metallic inclusions and toward troubles consequent upon this defect.

The Worcester section American Society of Mechanical Engineers held its first of this season's meetings in Worcester, Mass., on Tuesday evening, Nov. 13. Following a supper, General T. C. Dickson, commandant Watertown Arsenal, Watertown, Mass., discussed X-ray examination of metals as employed by the Government. Dr. F. C. Langenburg, metallurgist and research engineer Watertown Arsenal, spoke along the same lines, his talk being more technical than that of General Dickson. The plan for industrial mobilization as being worked out by the War Department, as has been described in THE IRON AGE, and the part Worcester industries will be asked to take in connection therewith in case of necessity, was gone into by Capt. L. P. Crim, Army Ordnance Department.

Mellon Tax Plans Approved by Many

Bonus and Radicals May Stand in Way of Enactment by Congress—The Secretary States His Position Clearly

BY L. W. MOFFETT

WASHINGTON, Nov. 13.—Set forth comprehensively and frankly, the proposed tax revision program detailed by Secretary of the Treasury Andrew W. Mellon in a letter to Acting Chairman William R. Green of the House Committee on Ways and Means is recognized by students of taxation as a sound plan to stimulate business and industry through the relief that would be afforded by reducing the tax burden. In his letter, Secretary Mellon suggests that the program be made effective Jan. 1, 1924, so that the benefits arising could be of almost immediate application.

Unfortunately, there is no assurance that the program will be adopted. On the contrary, it is certain that it will be strongly opposed in Congress, at least in a number of important respects. The proposed reductions are based on the calculation that there will be no soldiers' bonus and can only be made "possible if the Government keeps within the program of expenditure which the Bureau of the Budget has laid down at the direction of the President." Even Senator Smoot, who probably will be chairman of the Committee on Finance, is on record to the effect that there will be no reduction in taxes of any kind. The matter of a bonus will be vigorously urged and it is quite evident that it will find strong support in Congress, though its passage is another matter. President Coolidge is understood to take the position of the late President Harding in opposition to a bonus unless some specific means for raising the revenue is provided.

Effects of Bonus

Secretary Mellon said in his letter that a soldiers' bonus would postpone tax reduction not for one but for many years. "It would mean an increase rather than a decrease in taxes, for in the long run it could be paid only out of moneys collected by the Government from the people in the form of taxes." His proposal to reduce surtaxes, as well as normal taxes, would be of great benefit to heavily taxed business and industry, but there will undoubtedly be a movement among radicals in Congress to increase rather than decrease these taxes, and to provide decreases to certain classes, such as the agricultural community. While such agitation is not likely to succeed, it is believed, in actual legislation, its danger is felt to lie in the fact that it will block the Mellon tax revision program, which is held to be in the interest of practically every taxpayer in the country, small and large. About 70 per cent of the reduction would be in the brackets of $10,000 or less, and less than 5 per cent would fall in the brackets over $100,000.

The proposals of the Secretary are in any event extremely interesting and it is contended they may eventuate in being partly adopted at least.

The Reduction in Revenue

Involving a net loss of $323,000,000 annually in revenue, the program in a nutshell is given in the table.

The proposed reduction in taxes is made possible by the fact that, as Secretary Mellon states, "the Government of the United States is firmly established on the basis of having balanced its budget each year since the cessation of hostilities," and the balancing of the budget has included the payment of installments on the public debt out of current revenues. The results attained from the establishment of the budget, Secretary Mellon says, give every reason for hope that ordinary expenditures of the Government can be reduced to a total of not more than $3,500,000,000, of which about $500,000,000 will be fixed charges on account of the sinking fund and other retirements of debt. The plan calls for a reduction of about $1,700,000,000 in departmental estimates.

Reduced Internal Revenues

Secretary Mellon declared that many of the internal revenue taxes, such as the higher brackets of the surtax, "are so rapidly becoming unproductive that it is unsafe to assume that even with no changes in the law the revenues from internal taxes would be maintained. It is proposed to reduce the surtax by commencing their application at $10,000 instead of $6,000, and scaling them progressively upward to 25 per cent

	Decrease (In millions of dollars)	Increase (In millions of dollars)
Reduction of 25 per cent in tax on earned income	97	..
Reduction in normal tax	92	..
Readjustment of surtaxes	102	..
Capital loss limited to 12½ per cent.	..	25
Interest and capital loss deductions limited	..	35
Community property amendment	..	8
Repeal of telegraph and telephone tax	30	..
Repeal of admission taxes	70	..
Total	391	68
	68	
Net loss	323	

at $100,000. This, it is pointed out, will readjust the surtax rates all along the line, "and the Secretary recommends the readjustment not in order to reduce the revenues but as a means of saving the productivity of the surtaxes. * * * At the outset it may involve a temporary loss in revenue, but the government actuary estimates that even during the first year, if the revision is made early enough, the net loss in revenue from all the changes in the surtaxes would be only about $100,000,000, and that in all probability the revenue from the reduced rates will soon equal or exceed what would accrue at the present rates, because of the encouragement which the changes will give to productive business." The present system of surtaxes is declared to be a failure because it seriously impedes productive business.

Why Business Is Impeded

"Taxpayers subject to the higher rates cannot afford, for example, to invest in American railroads or industries or embark upon new enterprises in the face of taxes that will take 50 per cent or more of any return that may be realized," said Secretary Mellon. "These taxpayers are withdrawing their capital from productive business and investing it instead in tax-exempt securities and adopting other lawful methods

of avoiding the realization of taxable income." He expresses the opinion that the readjustment suggested will not only produce larger revenues but at the same time establish industry and trade on a healthier basis throughout the country. "The alternative is a gradual breakdown in the system, and a perversion of industry that stifles our progress as a nation."

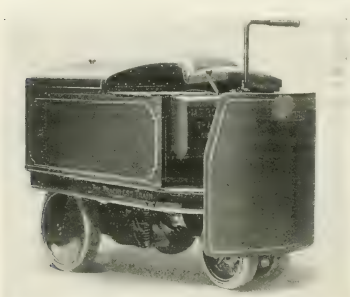
In suggesting a limitation of the deduction of capital losses to 12½ per cent of the loss, the Secretary pointed out that the present revenue law limits the tax on capital gains to 12½ per cent but puts no limit on the capital losses, and he believes it would be sounder taxation policy generally not to recognize either capital gain or capital loss for purposes of income tax.

"In all probability," he said, "more revenue has been lost to the Government by permitting the deduction of capital losses than has been realized by including capital gains as income. So long, however, as our law recognizes capital gains and capital losses for income tax purposes, gain and loss should be placed upon the same basis." It is estimated that this proposal will increase revenue by about $25,000,000. The Secretary also proposes limitation of the deduction from gross income for interest paid during the year and for losses not of a business character to the amount these items exceed the tax-exempt income of the taxpayer. The estimated increase of revenue from this source is $35,000,000.

Tractor with Internal Gear Drive

A type H industrial tractor with internal gear drive as a feature has been placed on the market by the Mercury Mfg. Co., Chicago. An increase of 25 to 35 per cent in the work output efficiency as compared with worm driven models is claimed for the new tractor.

The drive unit is made up of the motor, motor hanger, rear axle housing, rear wheels, rear springs and the driving gears. It is assembled in a single unit which may be readily detached from the frame. Features of the new drive are the balanced arrangement



Internal Gear Drive Is a Feature. The tractor is equipped with the "twin-three" front wheel assembly

of the driving gears within the wheels, the method of positioning the gears, and the provision of an oil and dust tight inclosure for all moving parts.

The motor, joined to a pinion through a self-alining spring coupler, drives a bevel gear in the axle housing, this gear driving in turn the axle pinions to each rear wheel. The axle pinions transmit the power through three idler gears to a large ring gear mounted on the inner diameter of the drive wheel.

A General Electric Co., series-wound, automotive type motor is employed. The coupling between the motor armature and the first driving pinion is of special design. Four coil springs are placed between metal lugs so that the initial starting torque in either direction is cushioned by springs, this arrangement being intended to permit freedom of alinement and to minimize shock. Ball bearings are used throughout the drive unit. The differential is of the conventional six bevel gear type and the axle is of the "full floating" type. The motor cradle, axle housings, wheels and other castings are of electric steel. Driving pinions, gears and differentials are of chrome manganese steel, and are heat treated. The frame, controller, safety features, and wheel arrangement are similar to those employed in the company's previous machine.

The draw bar pull with 18 to 1 gear reduction is 475 lb. normal, and 1700 to 1800 lb. maximum. With 24 to 1 gear reduction the capacity is 600 lb. normal and 2000 to 2100 lb. maximum. The speeds, no load, are as follows: With 18 to 1 gear reduction 660 ft. per min., with 24 to 1 reduction 572 ft. per min. The turning radius is 60 and 75 in. for the twin-three and four-wheel models respectively.

Victoria Chamber of Commerce Condemns Steel Plant

The special committee of the Victoria Chamber of Commerce, appointed to confer with H. J. Landahl, promoter of the Coast Range Steel Corporation and investigate his scheme for the establishment of an iron and steel plant in British Columbia, one-third of the 12 million dollar bonds of which he is asking the Provincial government to guarantee, has turned in its report, which was adopted unanimously by the council at its meeting on Oct. 22. The report of the committee, which contains four members of the Provincial Parliament, is lengthy, but the gist is contained in the last two paragraphs, which are here reproduced: "In view of the inaccuracies as to the general conditions surrounding the industry as placed before us by Mr. Landahl, and having carefully reviewed the whole subject, this committee finds that they cannot change their attitude toward Mr. Landahl's proposal, as shown in the report already presented to you. Generally, we find ourselves opposed to the commitment of the Province to a scheme of this magnitude, believing that to attempt to commence this industry on such a scale as to immediately challenge ruthless competition from established iron centers, would be unwise and courting disaster. We have already stated our view that this industry should be commenced on a moderate scale from an experimental standpoint, either as a government work or by private enterprise assisted by a bonus, in order to demonstrate beyond peradventure the practicability of the industry at this time."

Construction Increased 25 Per Cent in October

October construction showed a surprising increase, according to F. W. Dodge Corporation. Total contracts awarded during the month in the 36 Eastern States amounted to $360,687,000. The increase over September was 25 per cent, whereas the normal season increase is put at 7 per cent. The large increase was heaviest in New York State and northern New Jersey, and in the residential class. Included in last month's record were the following important items: $173,042,000, or 48 per cent of the total, for residential buildings; 18 per cent for public works and utilities; 10 per cent for business buildings; $32,721,000 for industrial buildings, and 7 per cent for educational buildings. The total amount of construction started during the first 10 months of this year has amounted to $2,947,787,000, an increase of 2 per cent over the corresponding period of last year. Contemplated new work reported in October amounted to $556,491,000, an increase of 43 per cent over the September figure.

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Has America Deserted Europe?

THE anniversary of Armistice Day brought up again the relation of the United States to the distress of Europe. The broadcasted address of ex-President Woodrow Wilson made bitter reference to what it called our "sullen and selfish isolation."

What is our fault with respect to Europe? Is it that we kept out of the League of Nations, which has been so largely directing its activities in misguided economic ways that have tended to counteract the rehabilitation of Europe? Is it that when Mussolini threatened war upon Greece we did not stand ready to send our soldiers and sailors to join with other nations in forbidding hostilities? Did any of the other nations who are members of the league stand ready to do that? Is it that we have not given financial aid to Europe?

Our credits to Europe, which enter into the indebtedness for which there is scant possibility that we shall be repaid in full, ran for nearly two years after the Armistice. If wisely used by Europe, which was not so, those credits would have gone a long way toward Europe's economic rehabilitation. Moreover, we have helped Germany to live and pay something on reparations account by our private and disastrous speculation in German marks. We have helped Europe by bringing about some naval disarmament, thereby reducing military expenses, and we have tried to bring about an impartial examination of the economic position of Germany. Therefore, it is not true that we have deserted Europe, although it is unfortunately true that we have among us those who misguidedly would like to do so.

But what is there now that we can do for Europe? Shall we lend more money; *i. e.*, give more goods? That might easily make things worse, and beyond tiding over some immediate difficulties here and there would probably be most disastrous for Europe in the long run. The fundamental thing for the revival of Europe is to get its people to work and to restore the international division of labor as quickly as possible. As has been said over and over again, Europe cannot pay us in gold for what she buys from the United States. As the National Foreign Trade Convention put it, "payment of foreign balances to the United States can be accomplished only in the degree that we are willing to accept goods and services." Yet by raising higher barriers against imports we prevent the people of Europe from working for us where they are, and by immigration barriers we will not let them come to work for us here. At the same time by undue advances in labor costs we make it harder for Europe to buy what she needs from us.

The real help that we can give to Europe must therefore begin at home in the adjustment of our own affairs. This is a purely materialistic, practical, economic conception. Can idealism point any other effective way?

A New Record in Steel Output?

PRODUCTION of steel ingots this year will approximate the record, which was made in 1917 with 43,619,200 tons. Taking as a basis the ingot output for the first ten months of this year (which involves estimating the output of about 5 per cent of the capacity), if production during this month and next averages less than 4 per cent under the rate shown for October a new record will be made, while if the average is 5 per cent under the October rate the 1917 tonnage will not be equaled.

The year has already made one new record, however, by producing during April at the rate of 49,000,000 tons a year, a rate never before attained. The highest rate during the war had been about 47,700,000 tons a year, in September, 1918. A new half-year's record was also made this year, with about 23,213,243 tons produced in the first six months.

The high point was reached in April, with a daily rate of 157,776 tons. Afterwards there were successive decreases, 1.5 per cent in May, 7.2 per cent in June, 2.5 per cent in July, 3.1 per cent in August and 2.7 per cent in September, making a total decrease in September of 16 per cent from the April rate. Then came October, with a much smaller daily decrease, less than 1 per cent from September. Except when

there is special pressure, production tends to decrease in the late weeks of the year, so that it would be injudicious to assume that the October rate will be continued in full. No violence will be done by making an estimate that production will decrease, from the October rate, by a total of 10 per cent by Dec. 31, or an equivalent of 5 per cent less production this month and next.

The year's ingot production would be about 43,600,000 tons on such an assumption. This would approximate the 1917 production and would exceed that of 1918 by half a million tons, while it would surpass the two next best years, 1916 and 1920, by more than two million tons. All other years than the four mentioned would be out of the reckoning by nine million tons or more.

In other words, 1923 is a year of very heavy steel tonnage, and this can be seen by other comparisons. By no less than 20 per cent 1912 and 1913, with about 30,000,000 tons each, had surpassed any preceding year; thus the 1923 tonnage is about 44 per cent ahead of the two best pre-war years. The country meanwhile has grown in population by scarcely more than 10 per cent, so that per capita consumption is much increased. Increased consumption means harder work, increased efficiency in working up steel or important new uses. As we do not think that men are working harder, they must have improved facilities for making their work effective, which is decidedly better.

Another comparison showing how well steel stands this year is that in the four post-war years, with production ranging from the 40,881,392 tons of 1920 to the 19,224,084 tons of 1921, the average for the four years was 32,000,000 tons a year, and 1923 runs 36 per cent more. Thus the wartime predictions of a large pent-up world demand for steel to be released immediately after the war have signally failed of realization. Instead, steel demand will grow as the world gets into working order. The United States is already in that condition.

Lifting by the Bloc System

ARTHUR POUND'S book, "The Iron Man in Industry," took far too pessimistic a view of the human aspects of the machine in modern production. We find it less difficult, however, to agree with what Mr. Pound has written of the minimum wage in the November *Atlantic*, using the heading "Mr. Everyman, Manager." Over against the concentration of the managing function of production in relatively few hands, he shows how individualized is the management of consumption. The shop worker cooperates with hundreds of others in the complicated processes required for the production of a finished article, all in accord with a policy decided by "the management," and carried out under the direction of a superintendent and foremen. But no one supervises the worker's consumption. He and his wife may be good managers of consumption, or on the other hand they may be such strangers to thrift and buying sense that every dollar in the pay envelope depreciates the moment it comes into their hands.

It is not difficult to figure out, therefore, that the wage which in theory is the lowest on which the statistical "family of five" can maintain an American standard of living, and is therefore called a minimum living wage, becomes a saving wage in the hands of a good manager of consumption. Nor is it hard to see that where, by decree of a Government board, as in the case of the railroad workers, or by monopolistic control exercised by union coal miners or building craftsmen, a minimum wage is established for particular groups of workers, such minimums represent the exploitation of all classes of workers not thus favored. Inevitably agriculture feels the burden, and the farmer moves upon the Government with a demand that he, too, be put on the favored list.

Men and women in the professions and clerical workers are entitled to be heard in the same behalf. Perhaps the faster the blocs multiply the sooner will it be demonstrated that economic laws are still superior to decrees of labor unions or of governments, and that even a nation will find it hard to lift itself by its own bootstraps.

Compensation Issues in Ohio

NEWS as to the recent elections in Ohio, as widely published, furnishes a striking illustration of how one is likely to get an erroneous impression in regard to the attitude of the voters. Nearly all the news about the Ohio selections as published outside of that State indicated that the Ku Klux Klan was almost the only issue, and that the State which had been famous for its sanity and political leadership had lost its balance and shown little judgment in the way the ballots were cast. The accounts all but ignored two really important issues which were decided wisely.

Old age pensions met an overwhelming defeat in the vote on a constitutional amendment which was backed by labor organizations, providing for pensioning all indigent persons 65 years of age. At the same time, Ohio voters adopted in a referendum vote an amendment to the State constitution of utmost importance both to employers and employees. This amendment, which will become effective Jan. 1, wipes out what is known as "open liability" of employers, will eliminate damage suits for large sums for injuries and death, and will check the activities of ambulance chasing lawyers.

The present Ohio laws and workmen's compensation act give an injured employee—or his dependents if he is killed—the right to sue for damages in case the injury, death or occupational disease was a result of the failure of the employer to comply with the law for the protection of the life, health and safety of the employee. Under this limitation the old employer's liability was preserved, and under laws passed subsequently the employer was prohibited from carrying liability insurance as a protection against this liability.

It was found that the only way to eliminate "open liability" and correct this serious defect in Ohio workmen's compensation legislation was through an amendment to the constitution. This amendment was approved by both employers and

employees and was passed by the State Legislature some time ago. The amendment as now finally adopted provides that no person or company contributing to the State compensation fund or compensating his employee direct shall be answerable for damages for injuries or death or for occupational disease resulting from employment. The only recourse the employee will have is to the State compensation fund itself. In case the claim is set up that the injury or death or occupational disease was the result of a failure of the employer to comply with State laws protecting workmen, the complaint is to be heard by the Industrial Commission and, if proved, an additional award may be made of not less than 15 per cent and not more than 50 per cent of the award provided for such cases under the compensation act. This award will be paid out of the State compensation fund, but must be repaid to that fund by the offending employer in added assessments.

Briefly, the people of Ohio in defeating the first amendment referred to above refused to go into a socialistic experiment which has proved so expensive in other countries, while in approving the second amendment the voters indorsed a measure which happily had been agreed upon by representatives of both capital and labor. In spite of all misleading rumors, Ohio still maintains its sanity.

The Coal Commission Again

THE U. S. Coal Commission appears to be like an opera singer who finds it difficult to say farewell. We thought that with the filing of its final, summarizing report it was disappearing, but it has bobbed up again with a report on investments and profits in anthracite mining, underlying which there may be an interesting story.

In one of its preliminary reports the commission intimated that there was to be a valuation of the mines, and in fact such a valuation was made by a committee of distinguished coal mining engineers. Reference to this was omitted from the final report. Comment respecting that may be the reason for the commission publishing a secondary farewell.

In this it devotes itself mainly to a comparison of dividends paid by the nine railroad companies and book figures of investments and revaluations. The commission merely mentions that it" obtained from a committee of experienced mine engineers an expert valuation, which puts the present valuation of lands now operated, including development, plant and equipment and working capital, at $843,500,000, and the present valuation of reserve tonnage in lands not owned by operating companies at $146,400,000; total present valuation of all anthracite properties, $989,900,000 * * *. The book values, allowing for companies and holdings not examined by the accountants, are in the neighborhood of $600,000,000."

The commission summarizes its finding of fact and conclusions in characteristic fashion. It says that "to permit the public as a whole to share in the good fortune of the low-cost, high profit operator, we recommend that differential taxation shall be applied to differential advantage." In other words, the Coal Commission would penalize efficiency. We think that the adoption of such a policy would not be very long in making the price for anthracite coal soar higher than ever. We entertain the old-fashioned economic view that the greatest industrial benefactor is he who is most economical. Instead of being blamed for his profits he ought to be blessed.

THE fundamental cause for the hard times among the farmers is that theoretically they are members of the capitalistic class; that is, they are owners of property which they expect to bear fruit. There is, therefore, economically, no common ground between them and the body of wage earners. Mr. Gompers misses this when he advises the farmers to unionize as a means of curing their troubles. He might as well advise the stockholders in industrial companies to unionize themselves. Some of them have troubles as acute as those of the farmers. The distress of the farmers looms large for the reason that they are numerically the greatest branch of the capitalistic class, though they cannot be called the most intelligent.

CORRESPONDENCE

Treatment of the Modern Industrial Gear

To the Editor: Referring to the paper beginning on page 1037 of THE IRON AGE, Oct. 18, the first paragraph on page 1038, referring to the cut on page 1037, should be amended to read as follows:

"Both by estimation and failure of steels in certain services curve 1 has been established as the stress curve on a certain gear, the maximum stress occurring at the left side of the tooth dropping to 0 at the center of the tooth and going into maximum compression at the right side of the tooth. For the purpose of comparison, the first half of curve 1 has been transposed to base line. Curve 2 is an untreated steel in this service, failing almost immediately through fatigue, the surface and the material to a considerable depth being stressed beyond the ability of the steel to carry the load. Curve 3 is a 0.40 to 0.50 per cent carbon oil-treated steel failing almost as rapidly as curve 2. Curve 7 is a 0.55 to 0.65 per cent carbon oil-treated steel failing in the same way but much more slowly. Curve 4 is the ideal steel to resist just such a load as shown by curve 1. Its strength is proportional to the load it has to carry. The grading off in strength and hardness reduces the heavy initial stress that must be set up when a steel is hardened uniformly throughout. Its maximum strength is ample to carry the peak load. Curve 6 is an alloy steel showing but a slight drop in hardness and strength through the section. While the apparent strength should provide ample margin over the tooth loading, the initial stress in the steel drops the effective strength below curve 1 at the surface, thus starting fatigue, which progresses rapidly. Curve 5 shows the difference between actual strength and internal stresses.

"An effort is being made at this time to duplicate curve 4 with an alloy steel by selecting an analysis that drops the carbon with respect to the eutectoid point in proportion to the carbon steel of curve 4. It can be seen that any curve crossing curve 1 represents a steel that has fallen below the actual tooth stress required in this application."

W. H. PHILLIPS,
Manager Works and Engineering,
R. D. Nuttall Co.

Pittsburgh, Nov. 5.

TRADE WITH JAPAN ACTIVE

Rails Bought for Warehouse Stocks Machine-Tool Buying by Russia

NEW YORK, Nov. 10.—Trade with Japan and other Far Eastern markets continues fairly active along certain lines, but buying generally seems to be more nearly normal than was at first expected in certain quarters. Undoubtedly much of the recent purchasing, except for the recent award by the Japanese government, has been for stocks in warehouses and, in the instance of black sheets, for galvanizing plants. This has been particularly true of the purchases of light and medium weight rails, many of the small tonnages having been for stock in warehouses. Some of the gas pipe purchased was for this purpose and many of the machine tools went to dealers, who anticipate an early demand of larger proportions than normal.

A large lot of machine tools is being bought for shipment to Russia by Arcos, Ltd., New York. Recent purchases include two Landis grinding machines, six or seven Kearney & Trecker tools and a lot of Brown & Sharpe machines.

Chinese markets continue more active than formerly, accepting most of the available tonnages of second-hand material that are offered at sufficiently low prices and consistently inquiring for wire shorts, which exporters are encountering considerable difficulty in obtaining. In general, export quotations of American mills are reported to be much more satisfactory to foreign buyers than for some time.

By some Japanese export houses it is roughly estimated that current inquiries from Japan for light and heavy sections of rails total between 3000 and 4000 tons, practically all from private sources, and recent purchases have been of about the same quantity. One export house recently received an order from Japan on an inquiry for 1500 tons of 60-lb. rails. No report has yet been received of the award of the small tonnage of grooved girder rails for Kobe municipality and it is stated that the rails for Otaru have been temporarily postponed.

While it is felt by exporters that the quotations of American mills are much more satisfactory than formerly, reports continue of low priced competition from other steel producing centers of the world. Much of the nail business from Japan is said to be still going to Canadian mills, which are quoting lower prices, although in many cases the transaction is handled by an exporter in the United States.

While the American mill price quoted on export shipments of bars is now about $58 per ton, c.i.f. Japan, reports of lower prices by Belgian sellers are current, although the recently mentioned c.i.f. Japanese port price of $44 per ton, base, said to have been made by Belgian sellers is considered rather lower than is generally possible.

One exporter and importer in New York, recently cabled several of the more prominent mills in Belgium asking for a firm offer on a lot of 3000 tons of 60-lb. rails for a user in the United States. The best price obtainable was $46 per ton, c.i.f. Atlantic port. This same importer recently offered a tonnage of mild steel bars, ⅜, ¾ and ⅝-in., the product of a large Czecho-Slovakian maker, at a price of 2.10c. per lb., c.i.f. Atlantic port, the usual differential for size being disregarded. Warehouses to whom the offer was made showed but little interest in the lot at the price mentioned, which they claimed was not sufficiently below the possible domestic price. Sheet bars have been offered without takers at $37 to $38 per ton at Atlantic port.

It seems as though the sale by an exporter and importer in New York of 1000 tons of spiegeleisen to Belgium, a few weeks ago, was the last for some time. A recent cable from London discloses that British sellers are now offering to accept orders at £8 per ton, f.o.b. British port, and intimate that on a large tonnage a further concession might be made. Caucasian manganese ore is now quotable at 38c. per unit for ordinary and 41c. per unit for washed. An importer of Caucasian ore reports the conclusion of a contract covering a large lot of manganese ore for delivery to a furnace in the East during the first quarter of next year.

The Canadian Government Trade Commissioner, Frederic Hudd, 44 Whitehall Street, New York, offers to put interested purchasers in touch with a St. John, New Brunswick, company that wishes to dispose of 3500 tons of 50-lb. relaying rails, which are at Charlottetown, Prince Edward Island. The lot is offered at $22.50 per ton, f.o.b. cars, Charlottetown, or $24 per ton, in bond, f.a.s. Atlantic port.

Exporters handling sales of machine tools to the Far East claim that the current and future needs of Japan in this line as a result of the earthquake have been in many cases grossly overestimated, although buying has been slightly heavier than normal and a not inconsiderable demand is expected to develop in the next few months. One manufacturer of tools in this country is so certain of a good demand for his line that it is reported that he has made a consignment of three carloads to a Japanese dealer through a New York exporter, standing most of the expense himself.

One exporter in close touch with the Japanese market points out that while there were two or three large manufacturing companies in the devastated area, with plants equipped with about 5000 machines and tools, large and small, there is no reason to believe that these manufacturers will re-equip their establishments fully until such time as demand warrants expansion to former capacity and in at least one case a large company is liquidating entirely, rather than rebuild and re-equip completely as would be necessary. However, there has been a fair demand for tools. In one recent instance a large Japanese export house closed on a list of 15 lathes and in another instance a list of 65 small and large tools went to a leading American toolmaker through its Japanese representative.

The recent award of 20,000 tons of black and galvanized sheets, plain and corrugated, by the Imperial Japanese Government direct to the United States Steel Products Co. and 2000 metric tons of wire nails to the Youngstown Sheet & Tube Co., and 1000 metric tons to the Pittsburgh Steel Co., is said to be the first part of several sizeable lots of material that may be purchased by the Government direct from the manufacturer for use in the devastated area. Shipment, it is understood, will be handled through the Imperial Japanese Navy, which generally purchases direct from maker in the United States and maintains an office in New York at 1 Madison Avenue. The original terms of payment were cash on delivery at Japanese port. Whether these terms were acceptable to the American mills who booked the business or have been modified has not been ascertained.

A large building construction company is being organized in Tokio to undertake the construction of commercial and industrial buildings on the unit basis, says a report received by the Department of Commerce. The company plans to specialize in four-story reinforced concrete buildings designed to withstand earthquake shocks. Funds for the promotion will, according to present plans, be obtained largely from the Government at a low interest rate. At present the company is awaiting announcement of the areas set aside for industrial and business purposes.

Heat Conductivity

Engineering data on heat insulation are being distributed through the Celite Products Co., Chicago, reproduced from blueprints and charts on small sheets 3¾ x 6¾ in. for use in pocket data books. They are worked out in B.t.u. per sq. ft. per hr., varying with the temperature and covering comparative conductivities of various forms of products made by the company. From these charts it is easy to figure heat losses through various wall constructions of furnaces, etc., including ovens, boilers, kilns, gas and glass equipment, oil stills, etc. Copies of these sheets will be sent by the company to engineers who request them.

British Iron and Steel Market

Japanese Government Buying Heavy Tonnages of Black and Galvanized Sheets—Improvement in Steel Continues—Ruhr Steel Rejected

(By Cable)

LONDON, ENGLAND, Nov. 13.

Pig iron is firm and active on increased domestic buying spreading over the first quarter of 1924. There is no sign of expansion of Cleveland output and lower prices are improbable. Hematite is improving on increased demand from steel works and makers are firm on prices.

Steel demand is expanding in the domestic market but export markets generally are still quiet except for specialties. Australia has bought plates. Japan is inquiring for railroad construction material. Recent contracts include 6000 tons of rails for India, to Ebbw Vale Steel, Iron & Coal Co., Ltd. The Tees Side Bridge and Engineering Works, Ltd., is to erect 12 oil tanks for the British Admirality in the Far East [Singapore?]. Vickers, Ltd., has secured the contract for guns and boilers for new Greek destroyers.

October exports of pig iron, excluding ferroalloys, amounted to 54,829 gross tons. The total export tonnage of all iron and steel was 388,599 tons.

Continental position is obscure and there have been few sales, owing to uncertainties. Sterling prices generally are unchanged. The Japanese Government is inquiring for 1500 tons of nails.

It is reported that steel from the Ruhr, arriving in the United Kingdom, has been rejected, owing to unsuitability.

In Belgium the workers have been granted a 5 per cent increase in wages. It is proposed to advance railroad freight rates 10 per cent on Jan. 1.

In France, the Société Anonyme des Laminoirs, Hauts-Fourneaux, Forges, Fonderies et Usines de la Providence has secured 8000 tons of rails to be rolled for Holland.

In Latvia the Phoenix company is restarting the Riga plant.

In Germany, the Becker group has concluded an agreement with the French Ruhr authorities. Thyssen is closing his works entirely. Krupps are discharging labor.

Tin plate is strong on continued good sales in both the domestic and the export markets, but chiefly domestic. The works are well placed and some makers are asking well over the schedule prices.

Galvanized sheets are firm on fair buying but the results from the Indian festival have been disappointing. Japan is buying merchant parcels for early shipment. The works are heavily sold for a few months ahead.

Japanese demand for black sheets is maintained; 6 x 3, 13's, 107 lb. selling up to £21 10s. (4.20c. per lb.) f.o.b. in merchant lots for January and February shipment. The works are quoting June as the earliest. The Japanese Government is inquiring for 5000 tons of sheets.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.38 per £1, as follows:

Durham coke, delivered	£1	19s.	to £2	0s.	$8.54 to	$8.76
Bilbao Rubio ore	1	4			5.25	
Cleveland No. 1 foundry	5	7½			23.54	
Cleveland No. 3 foundry	5	0			21.90	
Cleveland No. 4 foundry	4	19			21.68	
Cleveland No. 4 forge	4	17½	to 4	18	21.35 to	21.46
Cleveland basic	4	12½	to 4	15	20.25 to	21.18
East Coast mixed	5	0	upward		21.90	upward
East Coast hematite	4	19	to 5	0	21.68 to	21.90
Ferromanganese	17	0			74.46	
Ferromanganese*	17	0			74.46	
Rails, 60 lb. and up	8	10	to 9	10	37.23 to	43.61
Billets	7	15	to 8	5	33.94 to	36.13
Sheet and tin plate bars, Welsh	£9	2½s.			$39.96	
Tin plates, base box	1	3⅛	to £1	3½s.	5.06 to	$5.14
					C. per Lb.	
Ship plates	9	5	to 9	15	1.81 to	1.91
Boiler plates	12	10	to 13	0	2.44 to	2.54
Tees	9	15	to 10	0	1.91 to	1.95
Channels	9	0	to 9	10	1.76 to	1.86
Beams	8	15	to 9	5	1.71 to	1.81
Round bars, ¾ to 3 in.	10	5	to 10	15	2.00 to	2.10
Galvanized sheets, 24 g.	19	0	to 19	5	3.71 to	3.76
Black sheets, 24 gage	14	0			2.74	
Black sheets, Japanese specifications	15	5			2.98	
Steel hoops	12	0	& 12	10*	2.35 &	2.44*
Cold rolled steel strip, 20 gage	17	5			3.37	
Cotton ties, Indian specifications	15	0			2.93	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:						
Belgium	£5	5s.	to £5	10s.	$23.00 to	$24.09
France	5	5	to 5	10	23.00 to	24.09
Luxemburg	5	5	to 5	10	23.00 to	24.09
Billets (nominal):						
Belgium	7	0			30.66	
France	7	0			30.66	
Merchant bars:					C. per Lb.	
Belgium	8	0	to 8	2½	1.56 to	1.59
Luxemburg	8	5			1.61	
France	8	5			1.61	
Joists (beams):						
Belgium	7	12½	to 7	15	1.49 to	1.51
Luxemburg	8	2½			1.59	
France	7	17½			1.54	
Angles:						
Belgium	8	0	to 8	5	1.56 to	1.59
¼-in. plates:						
Belgium	8	10			1.66	
Germany	8	10			1.66	
⅜-in. plates:						
Luxemburg	8	7½			1.64	
Belgium	8	7½	to 8	10	1.64 to	1.66

Government Expenditure for Railroad Equipment to Relieve Unemployment—Greater Demand for Pig Iron

LONDON, ENGLAND, Nov. 1.—Considerable improvement is noticeable in the iron and steel markets, mainly due to an increase in the demand for pig iron. The output is limited and, though there is talk of additional furnaces being put into blast, no such steps have yet been taken, and stocks, in consequence, are being reduced considerably. The result is that makers have seized the bull by the horns and advanced their selling prices. The most active buyers at present have been Scotland, Cleveland iron being much cheaper than their own and contracts have been entered into for some few months ahead; some makers, Midland included, have sold their output for the rest of the year. The present price of No. 3 Cleveland G. M. B. is 100s. per ton and of East Coast hematite 99s. 6d. to 100s. a ton, with little indication of prices receding again.

In finished steel a good deal of interest has been displayed by the government's decision to spend large sums of money on work to relieve the unemployment in the country, and it is anticipated that the iron and steel trades will benefit to a considerable degree. The railroad companies are also displaying their programs which, if carried out, will call for larger quantities of iron and steel. The London, Midland & Scottish Railroad contemplates an expenditure of £4,500,000. The Underground Railroads are spending £6,000,000. In addition, various foreign contracts have been awarded for railroad material. These, of course, will all help to keep certain plants employed, but there is as yet no relief in shipbuilding. The dispute of boilermakers drags on, and the yards are almost empty. Far Eastern markets continue to absorb large quantities of thin, plain and galvanized sheets, and the tin plate trade is more active than has been the case for some time past.

In connection with the recent amalgamation of the interests of Richard Thomas & Co., the largest tin plate manufacturers in the world, with those of the Grovesend Steel & Tinplate Co., the former concern is making a new issue to its own shareholders of 438,666 6½ per cent accumulative preference shares of £1, and 219,333 ordinary shares of £1. Both classes of shares have been offered at par to ordinary shareholders in the proportion of two preference shares plus one ordinary share for every 10 ordinary of the present holding.

German Industrial Conditions Chaotic

Ruhr Works Suspending Operation—Prices Reduced in Unoccupied Area—Industrial Concerns Have Taken Up Banking Business

BERLIN, GERMANY, Oct. 29.—The internal difficulties of Germany have been increased enormously by the unprecedented slump in the exchange, and the prevailing conditions make it extremely difficult for trade and industry to continue. The daily struggle with depreciation is using up much of the commercial and industrial energies which would in normal times be diverted into productive channels. Through the depreciation, requirements for legal tender have grown to such an extent that the Reichsbank is unable to supply sufficient quantities of currency and many firms are unable to pay wages and salaries. This leads to controversies, as any delay in payment results in depreciation and there are many spasmodic strikes.

The issue of gold mark notes for general circulation is only gradually taking place. All this is hampering trade and industry and as a result the State railroads, some towns, and many private firms are again issuing "Notgeld" (emergency money) with the acquiescence of the State. Previous issues have been abused for the acquiring of State currency and have thus largely helped to depreciate the mark. Now several German States, provinces and even industrial concerns are issuing non-depreciating "Notgeld" in order to assist commercial intercourse. The Government has published a new order to the effect that an equivalent amount in Government gold bonds must be deposited with every issue of non-depreciating Notgeld. Some States are, however, issuing their own independent gold bonds and the great quantity of different local currencies in circulation is causing much confusion.

Industrial Company Banks

The inflation of currency has made banking business difficult and several industries have established banks for the special needs of their line. The iron and engineering industry has not founded any separate banks, but the great companies have acquired considerable influence in some of the large banking institutions. Some months ago much attention was attracted by the action of Hugo Stinnes, who took a large interest in the Berliner Handelsgesellschaft, one of the greatest German banks. Now the Diskonto-Gesellschaft is entering into similar relations with the Otto Wolff concern. There are even rumors that the company intends to separate the Schaffhausenschen Bankverein from the Diskonto-Gesellschaft and transform the former into an independent bank directly connected with the company.

Gold Mark Iron and Steel Prices

Many German prices are above international level and as a result of the depression in business, several industries have been forced to lower their gold mark prices. Iron and steel are cheaper, and the steel combine has issued new prices. The discrimination in the price of material used for domestic orders, or for export contracts has been dropped, and quotations substituted for the occupied and the unoccupied areas. For the occupied districts previous prices for material for export orders continue but for the other parts of the country new prices have come into force which in the case of bar iron for instance mean a reduction from 240 to 191 goldmarks per ton on material for purely domestic contracts. In the case of iron used on foreign orders, however, there is an increase from the former price of 170 to 191 goldmarks. Customers are still obliged to pay 30 per cent of the order in cash if possible. The surcharge for cold rolled screw iron is also reduced to 15 goldmarks. Works goldmark prices per metric tons for basic and open hearth material are now as follows:

	Occupied Area	Unoccupied Area
Ingots	151.40	132.10
Blooms	173.00	150.90
Billets	184.70	161.10
Sheet bars	191.70	167.20
Shapes	218.30	190.40
Bar iron	219.00	191.00
Wire rods	232.10	202.14
Sheets:		
More than 5 mm	246.90	215.30
3 to 5 mm	275.80	240.80
1 to 3 mm	310.60	270.90
Less than 1 mm	344.80	300.70

Traders have declared that they are unable to do business under the condition of payment stipulated by producers and have withdrawn their representatives from the price committee of the Steel combine on which producers, consumers and traders were equally represented. Thus the situation in the iron and steel market is not clear as traders are not recognizing the quotations of the Steel combine.

Business at Low Level

During the last few months the new orders of construction companies are only about one-third of the average monthly amount of last year and prospects for the near future are considered bad. There is an acute scarcity of working capital and domestic and export demand is diminishing.

The figures of iron and steel production in the Saar show a decrease of nearly 50 per cent during the first half of the present year compared with the last six months of 1922. This is due largely to extensive strikes since February. Production decreased rapidly to a minimum during March, but with the finish of the strikes production figures rose again and during June nearly reached the January figure for open hearth steel while the production of pig iron and basic steel continued much smaller.

Conditions in the occupied area are regarded with considerable anxiety now, as many works have dismissed their employees and even the mines are not working the full number of shifts per week. The August Thyssen works at Hamborn and the Bochumer Verein have been closed down and the Gute Hoffnungshütte has stopped production in most of its plants. The Westphalian steel works belonging to the Rombacher Hüttenwerke has dismissed all its workmen and given notice to the staff. The mines in the Oberhausener districts, are also closed. Altogether about 25 per cent of the mines will be idle and about 150,000 men will be out of work.

Rhenish companies are, however, actively widening their connections in the unoccupied area in order to increase sales on the resumption of full working activity. They have lately made considerable purchases of shares of central German engineering and machine tool works and negotiations for the Interessengemeinschaften are being conducted. An understanding between the Rheinmetall Gesellschaft, Düsseldorf, and the Hansa Lloyd works, Bremen, has been contemplated.

The Saco-Lowell Shops, Boston, textile machinery, has closed its foundry at East Deering, Me., operated since labor troubles started some months ago at the company's Biddeford, Me. foundry.

Iron and Steel Markets

ACTIVITY IN PIG IRON

Important Buyers in the Market After $10 Decline

Railroad Equipment Orders Wait—Russia Buys Machine Tools

Through another week the finished steel market has shown a unanimity of buyers in the policy of reducing stocks against Jan. 1 and an almost equal unanimity of sellers in adjusting output to demand and leaving prices unchanged. The pig iron market has furnished the real news. Inquiries are the largest in months, while actual buying by discerning consumers at $1 a ton or more below last week's prices is especially significant after a $10 decline in seven months.

The Steel Corporation's report of 363,000 tons decline in bookings last month and the falling off of less than 1 per cent in the country's steel output in October check up closely with an 85 to 90 per cent operation by the corporation and a 70 per cent average for independent producers. Today the corporation is running at 86 or 87 per cent and the independents at a little under the 70 mark.

Current output, November orders at close to the October rate, and all that is known of the state of consumers' stocks point to a rate of consumption but little less than that of the past three months.

The advance outline of railroad equipment buying for 1924 is sufficiently promising, but actual orders are held back. Three large car plants in the Chicago and St. Louis districts are expected to close Jan. 1, while another will probably shut down within 30 days.

Some reflection of these conditions is seen in the blowing out of a blast furnace at Gary and the expected stopping of another at Gary and one at South Chicago.

Rail orders still cut a good figure in current bookings. The Southern Railway has placed 46,000 tons with the Alabama mill, 2200 tons at Chicago and 7200 tons elsewhere. The L. & N. has bought 10,500 tons.

Orders for repairs to 800 cars, an inquiry for repairs to 3000 cars and the request for prices by three roads on 600 new cars are the actual developments in the equipment field.

Among fabricated steel bookings of the week, calling in all for upward of 14,000 tons for 17 projects, and among the 22,000 tons of fresh inquiries, railroad bridge work is noteworthy, though still a small percentage of the total.

Tonnage rates of sheet and tin mill workers have been advanced 1½ per cent. The average price of sheets was $3.75 per 100 lb. for the past two months, compared with $3.70 for July and August. The new wage rate is the highest since war time.

It is understood that the Steel Corporation's sheet bar price for the first quarter of 1924 is $42.50, or the same as for the present quarter.

A Belgian mill recently quoted $46 on rails, c.i.f. American Atlantic port, or $1 under the domestic price at mill. Foreign sheet bars have been offered at $37 to $38 ex-ship on this side, against the present Pittsburgh price of $42.50.

Inquiries for pig iron have increased markedly in nearly all centers, with evidence that important buyers have concluded that after the long descent of prices it would be well to cover for at least the first quarter of the new year. Price concessions continue, but these are overshadowed by the increased buying interest. For example, at Buffalo, where $20 was shaded on a sale of 15,000 tons of foundry iron, much heavier buying is probable, and in eastern Pennsylvania, where $21 has been named on round tonnages, early buying on a large scale is expected. The declines of the week include $2 on charcoal and 50c. to $1 on foundry grades in the leading centers. At Pittsburgh the price of malleable iron is $2 lower and that of steel making grades $1.50 lower on sales of moderate size.

More activity has developed in the scrap market and prices have been marked upon most grades in several cities. This sign of recovery is naturally linked with what is happening in pig iron.

Russia has just bought some American machine tools—not many, but it is said that more orders are to follow. The late sales were for cash, New York.

THE IRON AGE pig iron composite price has fallen to $20.94, from $22.02 last week. It is now $9.92 (32 per cent) below the level of early April.

In contrast, THE IRON AGE composite price for finished steel, standing at 2.775c. per lb. for 17 consecutive weeks (after remaining at 2.789c. for 11 weeks), is only 1¼ per cent below the 2.810c. of early April.

Pittsburgh

Increased Orders for Plates, Shapes and Bars —Pig Iron Prices Decline

PITTSBURGH, Nov. 13.—A further decline in the pig iron market, represented by a drop of 50c. a ton in foundry, $2 in malleable and $1.50 in the steel-making grades, is the outstanding feature of the local situation. Whether this low-priced business means, as it often does, a turning point in the market, remains to be seen, but the more common impression is that the sales remove weakly held stocks and that further declines are improbable on the basis of costs. The market is now $9 to $10 a ton below the peak prices reached earlier in the year, and although there has been no particular effect upon steel due to that recession or to the decline in scrap prices, those changes still afford a favorite argument for buyers seeking lower steel prices.

Attention of the steel consuming trade seems to be more firmly riveted than it has been on the end of the year inventories, and purchases are being made to conform closely with the desire to keep down year-end stocks of raw materials. Most of the manufacturers are able to make very prompt deliveries on practically all products, and consumers and distributors are thereby encouraged to limit their purchases to actual needs. Such requirements have been somewhat heavier in the past week than they were previously, and reports of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Nov. 13, 1923	Nov. 6, 1923	Oct. 16, 1923	Nov. 14, 1922
No. 2X, Philadelphia†	$22.61	$22.61	$21.26	$21.11
No. 2, Valley furnace	*22.00*	22.50	24.00	28.00
No. 2, Southern, Cincinnati	*23.05*	23.50	24.05	27.05
No. 2, Birmingham, Ala.	*19.00*	19.50	20.00	23.00
No. 2 foundry, Chicago*†	*22.50*	24.00	25.00	30.00
Basic, del'd, eastern Pa.	23.00	23.00	24.50	28.14
Basic, Valley furnace	*20.50*	22.00	24.00	28.00
Valley Bessemer, del. P'gh.	26.26	26.26	26.76	33.77
Malleable, Chicago*	*22.50*	24.00	25.00	30.00
Malleable, Valley	*20.00*	22.00	23.50	29.00
Gray forge, Pittsburgh	*23.26*	23.76	25.26	29.77
L. S. charcoal, Chicago	*28.15*	29.15	30.04	36.15
Ferromanganese, furnace	110.00	110.00	110.00	100.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	38.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	38.00
O.-h. sheet bars, P'gh.	42.50	42.50	42.50	38.00
Forging billets, base, P'gh.	45.00	45.00	47.50	45.00
O.-h. billets, Phila.	45.17	45.17	45.17	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	*2.25*	2.15	2.25	2.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.325
Iron bars, Chicago	2.40	2.40	2.40	2.50
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.60	2.60	2.60	2.50
Tank plates, New York	2.74	2.74	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.50
Beams, New York	2.74	2.74	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.90

Sheets, Nails and Wire,	Nov. 13, 1923	Nov. 6, 1923	Oct. 16, 1923	Nov. 14, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.50
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$17.50	$17.50	$17.50	$25.00
Carwheels, Philadelphia	17.50	17.50	20.00	21.00
Heavy steel scrap, P'gh.	*16.00*	15.50	16.00	20.50
Heavy steel scrap, Phila.	15.00	15.00	15.00	16.50
Heavy steel scrap, Ch'go.	*14.00*	13.50	14.00	17.50
No. 1 cast, Pittsburgh	18.50	18.50	19.50	23.50
No. 1 cast, Philadelphia	19.00	19.00	19.50	22.00
No. 1 cast, Ch'go (net ton)	18.00	18.00	19.00	20.50
No. 1 RR. wrot. Phila.	17.00	17.00	17.50	19.00
No. 1 RR. wrot. Ch'go (net)	*12.50*	12.00	13.00	16.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$7.00
Foundry coke, prompt	4.75	4.75	4.75	8.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*13.25*	13.00	13.12½	14.12½
Electrolytic copper, refinery	*13.50*	12.37½	12.62½	13.62½
Zinc, St. Louis	*6.45*	6.35	6.30	7.25
Zinc, New York	*6.80*	6.75	6.85	7.60
Lead, St. Louis	*6.55*	6.45	6.60	6.90
Lead, New York	*6.85*	6.75	6.85	7.25
Tin (Straits), New York	*44.37½*	41.87½	41.50	36.87½
Antimony (Asiatic), N. Y.	*9.25*	9.00	7.50	6.60

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 13, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Nov. 7, 1923,	2.775c.
Oct. 16, 1923,	2.775c.
Nov. 14, 1922,	2.446c.
10-year pre-war average,	1.689c.

Composite Price, Nov. 13, 1923, Pig Iron, $20.94 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 7, 1923,	$22.02
Oct. 16, 1923,	23.54
Nov. 14, 1922,	28.02
10-year pre-war average,	15.72

increased orders are fairly common in plates, shapes and bars, and also in wire products. There seems to be some falling away in both orders and specifications for hot-rolled flats, notably in strips from the automotive industry, which, although enjoying the highest rate of operation for November in its history, is very cautious in its steel purchases. Indeed, the leading maker of low-priced cars, through the means of shipment suspensions, is making a pretty determined effort to bring down prices.

Adherence to quoted prices is remarkably rigid in plates, shapes and bars, the strength of the latter being a matter of comment in the face of the fact that the market still is weak on the product of bars. Recent reduction of $5 a ton in cold-finished steel bars to 3c., base, does not appear to have resulted in much more stability than the market had at the former level. It is a buyers' market on bolts, nuts and rivets, with the latter selling as low as $2.60, base, on attractive orders. Concessions from regular market quotations on sheets still are common, and there are reports that some makers have gone as low as 3.50c., base, on black sheets to keep their mills going economically. Prices of wire products and of tin plate and pipe are well maintained. The American Sheet & Tin Plate Co. has put upon its books all the tin plate it can produce over the first six months of next year on a 90 per cent operation, and late last week shared in the distribution of sheet business placed through the Japanese Embassy to the extent of 22,000 tons at a price substantially higher than its own domestic quotations.

The scrap market shows a strong tendency, but conditions in the coal and coke market remain very unfavorable from the producers' standpoint. There is practically no market for coke and only a limited one for coal, and then at very low prices.

Pig Iron.—Prices have given ground on comparatively moderate sales. The Allegheny Steel Co. has closed for about 2000 tons of basic iron, which it was able to buy at $20.50. Valley furnace, as compared

with $22 last week, and at which there was one sale this week amounting to 7500 tons. The latter tonnage, however, was closed without competition, the business going to firms closely allied with the purchaser. Bessemer iron also shows a decline of $1.50 a ton, small sales having been made at $23, Valley furnace, and more of that grade being available at that price. The lowest known sales of foundry iron were at $22, Valley furnace, and the same price now is being quoted, f.o.b. Johnstown, both points having the same rate of freight in Pittsburgh. We note one sale of 500 tons of malleable iron at $20, Valley furnace, and a like tonnage has been sold for delivery from Buffalo at the same delivered price or $21.76. Lake Superior charcoal iron has been marked down $2 a ton to a base of $25, furnace, and several hundred tons, including one lot of 500 tons, have been sold at the new level. Low phosphorus iron still is priced at $30, Valley furnace, but that quotation is merely nominal, since there has been no sale recently

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$20.50
Bessemer	23.00
Gray forge	21.50
No. 2 foundry	20.00
No. 3 foundry	21.50
Malleable	20.00
Low phosphorus, copper free	30.00

Ferroalloys—Sales are few and small, as consumers have practically all the material they are likely to require over the remainder of the year, and expectations of lower prices tend to restrain purchases for early 1924 delivery. Ferromanganese still is quoted at $110, seaboard, by both domestic and British producers, but not much business is being done because of some fresh resale offerings. Some consumers have more of this material coming to them than they see a need for, and are endeavoring to dispose of the surplus. This material has been offered at $108 and it is believed it could be bought for a little less. There is not enough demand for 50 per cent ferrosilicon to determine definitely just where prices are. Makers are quoting $82.50, delivered, but it is believed would consider less. Prices are given on page 1353.

Sheets.—Buying still reflects marked conservatism on the part of consumers, notably the automotive industry, which, no doubt influenced by the price concessions being made by the mills anxious to keep going and the belief that an advance is not immediately ahead, is letting its inventories run down. A Youngstown district manufacturer, having in mind full and economical operations, is reported to have taken considerable black sheet business lately at 3.50c., base. This is somewhat more of a cut than other producers are willing to make for the sake of keeping in operation. Several of the independent manufacturers have adopted the Steel Corporation schedules and are curtailing production rather than cut prices. It is understood that more than half of the Japanese Government sheets placed with the American Sheet & Tinplate Co. is for No. 28 gage material, and the order includes no tonnage thinner than No. 30 gage. This business, which is for delivery by the end of the year, is a material aid to the company's operations, which are above 80 per cent capacity as against little more than 50 per cent by independent companies. Prices are given on page 1352.

Semi-Finished Steel—Trading is extremely slack, in keeping with the fact that finished products are not selling with much freedom, while producers are able to make such prompt delivery that finishing mills are inclined to let them carry the stocks. Doubt that present prices can be maintained also deters buying, although it is understood the Steel Corporation price of sheet bars for first quarter is $42.50, the same price as for the current quarter. The market is fairly firm on sheet bars, but leans in buyer's favor on billets and slabs. Activity is lacking in wire rods, but neither that fact nor the lower level of billets yet seems to have affected the price, which remains stationary at $51, base. Skelp at 2.40c. is an untested price. Prices are given on page 1353.

Wire Products—Orders for the commoner products, particularly nails, for prompt delivery are numerous and reach a fairly sizable aggregate, but there is very little forward buying, and mill operations are maintained largely by production for stock against spring demands. Both jobbers and manufacturing consumers are endeavoring just now to keep down their inventories, and the fact that they can secure very prompt deliveries on their requirements also tends to restrict their purchases. Some of the smaller producers in the Middle West are giving away a portion of their freight advantage over Pittsburgh district mills, this being particularly common in coated nails, but the larger producers are adhering firmly to quoted prices. Quotations are given on page 1352.

Tin Plate.—Barring unforeseen developments, the American Sheet & Tinplate Co. is assured of 90 per cent operations for the first half of next year on the orders booked since it opened its books two weeks ago. Demands upon independent makers for early 1924 delivery are expanding and all indications now point to an active and firm market at least over the first half of next year.

Tubular Goods—Outlook for early betterment in the demand for oil well and line pipe has been somewhat dimmed by fresh recessions in crude oil prices. Demand for this class of pipe for some time has been on a dwindling scale, but mill operations have been sustained fairly well by a considerable tonnage that was on maker's books when the oil market started to decline. These orders are pretty well completed, and some lapweld pipe capacity has suspended in the absence of fresh business. New business also is lighter in standard pipe than it was recently, but distributors are exerting a good deal of pressure on the mills for shipment on old orders in their efforts to round out their stocks before the spring demand develops. Boiler tube business is light, and with makers steadily catching up with their old obligations, the need of new orders is becoming more urgent. Some shading of regular prices on tubes is noted, but on pipe there is close adherence to the cards dated, April 19, last, on steel pipe and Jan. 22, last, on wrought iron pipe. Discounts are given on page 1352.

Cold-Finished Steel Bars and Shafting—The leading producer of ground shafting, effective No. 8, reduced prices $5 per ton to a base of 3.40c. f.o.b. mill, for carload lots, and 3.65c. for less than carloads. This revision is in keeping with the decline noted a week ago in other kinds of cold-finished steel bars and shafting, which were marked down $5 per ton to 3c. base, Pittsburgh. While business in the latter shows some improvement, there still is an absence of forward buying, which, in the case of the automotive industry, probably finds explanation in the fact that Chicago district makers are shading even the new price to secure desirable accounts.

Steel Rails—Demand for light rails still reflects the dull and unsettled coal situation, there being little incentive to purchases by soft coal mine operators with only partial and generally unprofitable operations possible. Leading makers, who roll these sections from new steel, are holding rigidly to 2.25c., base, and losing business rather than meet competition from rerolled sections, which are to be had $5 to $8 per ton less. The local unit of the Steel Corporation is pretty well sold up against probable production of standard rails over the first half of 1924, with some roads ordinarily served from Pittsburgh still to be heard from.

We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Structural Material.—Mills in this territory still are resisting efforts of buyers to secure tonnage at less than 2.50c. Demands run chiefly to small tonnages for prompt delivery, but the aggregate is said to be somewhat heavier than it was last week or the week before. Fort Pitt Bridge Works was the successful bidder of the new plant of the Standard Sanitary Mfg. Co. in Baltimore, for which 3700 tons of steel will be required. In this immediate territory most of the structural lettings involve small tonnages, and there is no sign of life yet in two or three good sized projects which originally appeared earlier in the year. Plain material prices are given on page 1352.

Iron and Steel Bars.—Small lot sales of steel bars are fairly numerous, and it is claimed that it has not been necessary to shade the regular prices of 2.40c., base, to get such orders. Very prompt delivery, however, has been a requisite. Recent cut in iron bar prices does not seem to be much of a stimulus to demand.

We quote soft steel bars, rolled from billets, at 2.40c base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets.—Competition for business in bolts and nuts still is sharp enough to keep actual selling prices below public quotations. On rivets also the market is favorable to buyers, particularly on those sizes where present extras permit increased margins between costs and selling prices. On large lots $2.65, base, 100 lb., is a fairly common price. Prices and discounts are given on page 1352.

Cold-Rolled Strips.—Business could be better, but there seems to be enough to maintain a fair rate of operations for all mills and there is not much shading of the regular price of 5c., base, Pittsburgh. Some of the automobile parts makers, under pressure from their customers, are striving for lower prices, but have not yet been successful.

Hot-Rolled Flats—Business in these products at best is only moderate and prices, except possibly of hoops, are still favorable to buyers. Prices are really soft on strips, since there have been some suspension of shipments on contracts and the mills receiving them need orders for rolling over the remainder of the year. It is claimed that one large lot of hoops recently was closed at 3c., base, but as a general rule, makers do not want business badly enough to go below 3.15c. on the hoop sizes and gages. Only small tonnages of bands or strips can be sold above 3c., base. Prices are given on page 1353.

Plates—Some fairly large tonnages are embraced by railroad car orders recently placed or pending. Baltimore & Ohio Railroad has distributed 1000 cars between the American Car & Foundry Co. and the Pressed Steel Car Co. The former will furnish 500 box cars and the latter a like number of gondolas. The Chesapeake & Ohio Railway has issued the inquiry for 2000 57½-ton gondolas, requiring about 25,000 tons of steel and the Wabash and Chicago & North Western inquiries, each for 2000 cars, will run pretty heavy in steel, although most of the cars in these inquiries are box type. Current business runs chiefly to small tonnages, but the aggregate is somewhat heavier with local mills than last week or the week before. Locally, there seems to be no shading of the regular base of 2.50c. and it is reported there has been a withdrawal of lower prices by Eastern mills. There is some shading, however, in the competitive territory between here and Chicago. Prices are given on page 1353.

Track Supplies—While some large inquiries for spikes, bolts and other rail accessories are being figured against, current business is of small proportions. The Baltimore & Ohio Railroad is reported to have placed 5000 tons of tie plates with the Wheeling Steel Corporation, but no other large orders yet have been closed with local or nearby producers. Lower prices than now are quoted are probable with the closing of the large business now up. Prices are given on page 1353.

Coke and Coal.—Coke prices are holding at the same levels that have now ruled for four weeks, but this comparative firmness is attributable to drastic curtailment of product in the Connellsville district rather than to the size of the current demand. Furnace grade holds at $3.75 to $4 per net ton at ovens, and foundry coke from $4.75 to $5.50. Curtailment of soft coal production seems merely to have brought supply and demand a little closer together and has been attended by no strengthening of prices. Mine run coal still is quoted at from $1.50 to $2 for steam and from $2 to $2.25 for coking and gas grades.

Old Material—Prices still show an upward tendency, the result, however, of short covering by dealers rather than because of any renewal of interest in supplies by melters. Neither the mills nor foundries in this district are buying, but most dealers seem to have become alarmed by the fact that recent prices were bringing out very little material and they have been seeking tonnages a little more anxiously, since yard holdings could not be drawn upon profitably to fill old orders. The belief that next month will bring the melters into the market encourages a firm stand on yard holdings. No heavy melting steel now is to be had at less than $16 and dealers are bidding up to $11.75 for machine shop turnings. Dealers' prices generally are above consumers' bids at present. Norfolk & Western Railway will take bids until noon, Nov. 14, for 15,500 gross tons of old material, the largest items in the list being 2,300,000 lb. of car axles and approximately 7,000,000 lb. of iron car wheels.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$16.00 to $16.50
No. 1 cast, cupola size	18.50 to 19.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va. and Franklin, Pa	18.00 to 18.50
Compressed sheet steel	14.00 to 14.50
Bundled sheets, sides and ends	12.50 to 13.00
Railroad knuckles and couplers	18.00 to 18.50
Railroad coil and leaf springs	18.00 to 18.50
Low phosphorus blooms and billet ends	20.50 to 21.00
Low phosphorus plate and other material	19.00 to 19.50
Railroad malleable	17.50 to 18.00
Steel car axles	18.50 to 19.00
Cast iron wheels	17.50 to 18.00
Rolled steel wheels	18.00 to 18.50
Machine shop turnings	11.50 to 12.00
Sheet bar crops	18.50 to 19.00
Heavy steel axle turnings	13.50 to 14.00
Short shoveling turnings	12.50 to 13.00
Heavy breakable cast	16.00 to 16.50
Stove plate	14.00 to 14.50
Cast iron borings	12.50 to 13.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	16.00 to 16.50

Sheet Mill Schedules Improve in the Mahoning Valley

YOUNGSTOWN, Nov. 13.—Sheet mill schedules in the Mahoning Valley show considerable improvement this week, as compared with last. Eight mills have resumed at the Niles works of the Republic Iron and Steel Co., which was entirely idle for one week. The Youngstown Sheet & Tube Co. is operating five sheet units at its Western Reserve plant, which has been inactive. The Sharon Steel Hoop Co. is operating eight instead of five sheet mills.

The Sheet and Tube company is operating five blast furnaces in this district, but has suspended for the time being its open-hearth plant at East Youngstown. Repairs are being made during the shutdown.

The company is operating four open-hearth furnaces at its Brier Hill works.

The Carnegie Steel Co. and Trumbull Steel Co. are maintaining high average operations in this territory.

Gould & Eberhardt, Newark, N. J., manufacturers of automatic gear cutting machinery and high-duty shapers, announce the appointment of the following selling agents succeeding Eccles & Smith of San Francisco, Los Angeles and Portland, who have represented them on the Pacific Coast: Harron, Rickard & McCone, 139-149 Townsend Street, San Francisco, and at 225 South San Pedro Street, Los Angeles, and Harry M. Fuller Co., 46 Front Street, Portland, Ore. The Hendrie & Bolthoff Mfg. & Supply Co., Denver, will represent Gould & Eberhardt in the territory contiguous to Denver.

The Simplex Metal Products Corporation, 152 West Forty-second Street, New York, desires to get in touch with companies equipped to make a product of sheet metal, nickel plated, similar to conductor's ticket punch. Dies will be furnished. The assembling involves springs and square tubing. Contracts will be on a basis of approximately 100,000 lots.

Chicago

Heavy Inquiry for Pig Iron—Program of Extensive Railroad Buying

CHICAGO, Nov. 13.—Prospects for railroad business are still regarded as favorable, although actual buying is slow in materializing. Reports from the meeting of the American Railway Association last week indicate that the program to be undertaken next year will be nearly as ambitious as that carried out in 1923. Whereas expenditures by the carriers this year will aggregate approximately $1,800,000,000, it is expected that nearly $1,500,000,000 will be appropriated for improvements in 1924.

Railroad car buying, which is one of the largest single sources of tonnage in steel products, has not yet made itself felt to the extent that had been hoped for. In fact, even if large car orders are now placed it will be too late to prevent sharp curtailment of operations among car builders. Three large car plants in the Chicago and St. Louis districts are expected to close Jan. 1 and another important Western car works will probably shut down the middle of December. In the event that large new orders are received, these organizations might possibly arrange their manufacturing schedules and obtain necessary materials for a resumption of activities late in January or early in February.

New business in finished steel booked by local mills continues to show some increase, reflecting pressing current needs of consumers the purchase of which can no longer be deferred. Bookings, however, still fall considerably short of shipments and shipments, in turn, are commencing to diminish. Local prices on plates, shapes and bars remain firm and unchanged, nothwithstanding a further decline in steel plant operations. The Illinois Steel Co. has blown out a furnace at Gary and contemplates the shutting down of another stack there and an additional stack at South Chicago shortly. At present its active list of blast furnaces includes 11 at Gary, eight at South Chicago and two at Joliet, or a total of 21 out of 27 steel works stacks. A number of open-hearth furnaces have likewise become idle and steel output has declined to about 85 per cent of capacity. The Inland Steel Co. continues to run at the rate of approximately 75 per cent of capacity, although its sheet bar bill has been shut down for improvements and repairs.

The most encouraging development of the week lies in the improved status of the primary materials markets. Scrap prices have stiffened and inquiries for pig iron are the heaviest in months.

Pig Iron.—Prices have given further ground, but inquiries which have developed in the past few days are the heaviest that have appeared in a long time. While it cannot be said that prices have yet stiffened under the stimulus of this prospective business, the general interest which melters are evincing in the market is interpreted as indicating their belief that present quotations are scraping bottom. The largest inquiries are for first quarter and first half and were put out by some of the largest melters in the territory. Past experience indicates that it will take just a few large purchases by the bigger interests to cause most of the smaller melters to follow suit. It is for this reason that one important seller is disinclined to take much tonnage for first half at present prices for fear of getting loaded up at those low figures. Recent sales in this market have been at varying figures, making it difficult to ascertain a ruling price. At points intermediate between Chicago and other producing centers, prices have been named which figure back to as low as $22, Chicago furnace. This price, however, cannot be regarded as representative for what is commonly regarded as Chicago territory. Locally the best figure that has been named appears to be $23 delivered in the Metropolitan switch district, or slightly less than $22.50, base furnace. The more common quotation is $23, base furnace. On some of the higher grades of iron, differentials for silicon content have been waived, but prices for the best grades do not appear to be lower than those named above. Southern iron for delivery by water and rail has also been sold at as low as $23 delivered Chicago. One of the largest purchases of the week covered 2000 tons of Southern and 1500 tons of Northern foundry for delivery to a local plant over the rest of the year. Among inquiries for first quarter and first half may be mentioned the following: 3000 to 5000 tons of malleable and foundry for a local company's plant in Wisconsin and Michigan; 2200 tons of foundry, 3800 tons of malleable and 500 tons of 8 per cent silvery for a Wisconsin automobile maker; 1500 tons of malleable and 1500 tons of foundry for a Kewanee melter; 1500 tons of foundry for a brake shoe plant; 1275 tons of foundry for a domestic appliance manufacturer; 1500 tons of foundry for a gasoline engine maker. A radiator manufacturer is inquiring for 1000 tons of foundry for a downstate plant for delivery over the remainder of the year. A Joliet melter wants 1000 tons of foundry for delivery over the next five months. Charcoal iron has declined to $25 furnace and sales of 500 tons and 800 tons respectively for shipment over the rest of the year have been made at that price. A Michigan melter has closed for 600 tons of 8 per cent silvery for the remainder of the year. An Indiana melter is inquiring for one carload of low phosphorus.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago..	$28.15
Northern coke, No. 1 sil. 2.25 to 2.75	$23.00 to 23.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	22.50 to 23.00
Malleable, not over 2.25 sil.	22.50 to 23.00
Basic	22.50 to 23.00
High phosphorus	22.50 to 23.00
Southern No. 2	23.00 to 24.51
Low phos, sil. 1 to 2 per cent, copper free	33.25 to 34.00
Silvery, sil. 8 per cent	37.29

Ferroalloys.—A Michigan melter has purchased a carload of ferromanganese for early delivery at $107, f.o.b. Baltimore. A purchase of 100 tons negotiated here for coast delivery was closed at $112.50, Western seaboard. A Michigan user has bought two carloads of 10 to 11 per cent Bessemer ferrosilicon. A Milwaukee user is in the market for one car of 50 per cent ferrosilicon.

We quote 80 per cent ferromanganese, $115.38 to $117.56, delivered; 50 per cent ferrosilicon, $82, delivered; spiegeleisen, 18 to 22 per cent, $43.80, delivered.

Plates.—Large railroad car purchases are slow in materializing and in the meantime steel plant operations are being curtailed. Local prices on plates, however, remain firm. A Chicago mill has booked 1600 tons of plates for 10 oil storage tanks to be built in the Powell Field, Texas. No other tank business is reported.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Sheets.—The announcement of first quarter prices by the American Sheet & Tin Plate Co. and the local independent has had the effect of bringing out inquiries from a number of the larger buyers. While some business has been closed for first quarter delivery, the chief effect of more active inquiry has been sharper competition by the smaller mills. On galvanized, 4.90c., base Pittsburgh, is more common and as low as 4.75c. was named on one attractive inquiry. On black 3.75c., base Pittsburgh, is the usual quotation of the smaller producers, although 3.65c. has been quoted on desirable tonnages. New inquiries for 1160 tons of sheets for Japan have made their appearance in this market.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Cast Iron Pipe.—Tulsa, Okla., which was in the market for 4000 tons of cast iron water pipe, bought steel pipe instead. Thornton, Ill., took bids yesterday on 375 tons, mainly 6- and 8-in. While there is little new busi-

ness in immediate prospect, advance information indicates that large purchases will be made next year. Prices appear to range from $47 to $48, base Birmingham, for 6-in. and larger sizes of water pipe, although some business is still moving at as high as $49. Pleasant Ridge, Mich., has divided 135 tons between the National Cast Iron Pipe Co. and James B. Clow & Sons.

We quote per net ton, f.o.b. Chicago, as follows:
Water pipe, 4-in., $59.20 to $60.20; 6 in. and above, $55.20 to $56.20; class A and gas pipe, $5 extra.

Reinforcing Bars.—While lettings above 100 tons each are not particularly plentiful, the aggregate volume of business booked is regarded as satisfactory for this season of the year, and prices are firm at 2.75c., Chicago warehouse. In fact, an early advance in concrete bars is not an improbability.

Lettings include:

Water settling basin for the city of Kansas City, Mo., 650 tons to the Kansas City Bolt & Nut Co.

Lowenstein Department Store, Memphis, Tenn., 600 tons of rerolled bars to the LaClede Steel Co., and 100 tons of spirals to the Concrete Steel Co.

Knights of Columbus Club House, Chicago, 400 tons to Kalman Steel Co.

Crawford Avenue Station, Commonwealth Edison Co., Chicago, 160 tons to Concrete Steel Co.

Rails and Track Supplies.—The Southern Railway has placed 2200 tons of rails with a local mill. The bulk of that road's tonnage, however, was divided between Southern and Eastern producers. There is still a considerable tonnage of tie plates and other track supplies pending. The largest order booked here during the week was 1200 tons of rail joints.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.
Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.75c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.
Jobbers quote standard spikes out of warehouse at 3.90c. base, and track bolts, 4.90c. base.

Bolts and Nuts.—The market is very weak. In fact, almost every sale is on a negotiation basis. On large machine bolts 60 and 10 and 5 off is a common quotation and proportionate discounts are quoted on other sizes and classes of bolts. On small rivets 70 off, f.o.b. Chicago, is a representative price.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Structural Material.—Approximately 20,000 tons of fabricated work is now being figured on and Western work soon to be released from architects' boards is estimated at 80,000 tons. Fabricating prices, however, have declined about $20 a ton, or an average of nearly 20 per cent, during the past few weeks. This is accounted for both by the fact that the smaller fabricators are running out of work and by the earlier deliveries available from local mills. When Chicago producers were heavily booked, fabricators frequently found it necessary to obtain a substantial portion of their requirements from warehouse or from mills east of here. The higher prices which they paid for this plain material naturally found reflection in their bids. The largest award of the week is 3100 tons for a viaduct at Omaha. Bids on the East Lake Street substation of the Commonwealth Edison Co., Chicago, involving 1500 tons, were considered too high and the plans are being altered. The most noteworthy inquiry which has come up for figures is the Union League Club building, Chicago, requiring 5000 tons. Local plain material prices are unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—There continues to be an increase in scattered orders for soft steel bars, notably from automobile wheel manufacturers and bolt and nut makers. New business, however, still falls considerably short of shipments, and shipments, in turn, have diminished somewhat. Farm implement manufacturers are buying little at present. Chicago prices on mild steel bars remain firm and unchanged. Demand for bar iron is insufficient to sustain satisfactory mill operations. One important producer of iron bars is finding it difficult to run on a single turn basis and another is operating intermittently two and three days a week. Prices are held firmly at 2.40c., Chicago mill, a figure which is said to represent rock bottom cost. Business in rail steel bars is also of uncertain volume and mill operations are declining. One producer which had succeeded in maintaining double turn operations has now gone to a single turn basis. Prices are firm at 2.30c., mill.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.
Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.
Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—Most mills can make deliveries within 30 days, and judging by their frequent purchases the stocks of jobbers and manufacturing consumers do not cover a longer period. Being assured of good shipment, buyers see no object in contracting for any great distance ahead. Mill prices, which are unchanged, are shown on page 1352.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Old Material.—A large local mill last week purchased approximately 20,000 tons of heavy melting at $14 delivered. This transaction has had a stiffening effect on heavy melting and allied grades and has revived speculation among some of the dealers who have paid higher than current prices for railroad offerings in the hope that the market will advance before deliveries are made. Some observers take the view, however, that no sustained upward swing in prices can be expected because of the curtailment of open-hearth operations in Chicago district plants. Railroad lists include the Wabash, 2700 tons; the Northern Pacific, 2000 tons, and the Soo Line, 500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$19.50 to $20.00
Cast iron car wheels	17.50 to 18.00
Relaying rails, 56 and 60 lb.	36.00 to 37.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	17.00 to 17.50
Railroad tires, charging box size	17.50 to 18.00
Railroad leaf springs, cut apart	18.00 to 18.50
Rails for rerolling	14.50 to 15.00
Steel rails, less than 3 ft.	16.50 to 17.00
Heavy melting steel	14.00 to 14.50
Frogs, switches and guards cut apart	14.00 to 14.50
Shoveling steel	13.50 to 14.00
Drop forge flashings	9.00 to 9.50
Hydraulic compressed sheets	11.00 to 11.50
Axle turnings	10.50 to 11.00
Steel angle bars	15.50 to 16.00
Per Net Ton	
Iron angle and splice bars	17.50 to 18.00
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	23.50 to 24.00
Steel car axles	15.00 to 15.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Cut forge	12.50 to 13.00
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.50 to 13.00
Steel knuckles and couplers	15.50 to 16.00
Coil springs	17.00 to 17.50
No. 1 machinery cast	18.00 to 18.50
No. 1 railroad cast	17.50 to 18.00
No. 1 agricultural cast	17.50 to 18.00
Low phos. punchings	14.00 to 14.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	6.00 to 6.50
Cast borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Stove plates	15.00 to 15.50
Grate bars	14.50 to 15.00
Brake shoes	15.50 to 16.00
Railroad malleable	16.50 to 17.00
Agricultural malleable	16.00 to 16.50

The C. G. Spring Co., Kalamazoo and Detroit, has announced that the business of the company in the East has been incorporated in a separate company known as the C. G. Spring & Bumper Co. of New York, with A. C. Bergmann as manager. The control of this new company is held entirely by the parent company, the C. G. Spring Co. of Delaware.

New York

Steel Activity Chiefly for Buildings—Pig Iron More Active

NEW YORK, Nov. 13.—More life has come to the pig iron market and sales are more numerous, while the inquiry has been broadening and on the whole there is a more hopeful feeling, but prices have again receded and $20 is the ruling price at Buffalo on desirable business, while $21 is the prevailing quotation on round tonnages in eastern Pennsylvania. It is true, however, that considerably higher prices have been paid on small tonnages and we note the sale of 400 tons of No. 2X at $22.50, eastern Pennsylvania furnace. The principal buyer of the past week has been the Central Foundry Co. for its numerous foundries in the East and in the South. It has purchased 10,000 tons for the first quarter of next year and is expected to contract for fully 5000 tons more for the same delivery. Other sales include 1000 tons of No. 3 foundry to a New Jersey melter and 2000 tons of No. 2 plain and No. 2X to another melter whose name has not been announced. The Thatcher Furnace Co. has bought 1000 tons of No. 2 plain and No. 2X and the Otis Elevator Co. from 4000 to 5000 tons of No. 1 foundry. The Sessions Foundry Co. is in the market for 500 to 1000 tons for the remainder of this year and the first quarter of next. An inquiry is pending for 2500 tons of ballast iron, which means any grade.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$23.77 to $24.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.27 to 24.27
East. Pa. No. 2, sil. 1.75 to 2.25..	23.27 to 24.27
Buffalo, sil. 1.75 to 2.25.....	24.91 to 25.91
No. 2X Virginia, sil. 2.25 to 2.75..	29.94
No. 2 Virginia, sil. 1.75 to 2.25...	29.44

Ferroalloys.—Demand for ferromanganese still is confined to a few carload lots for early delivery, with both British and domestic alloy filling the demand. There is no change in quotations. Demand for spiegeleisen is also from a hand-to-mouth character with sales generally made at $40, furnace. Buyers of 50 per cent ferrosilicon are few and their purchases are also confined to carload lots at prevailing quotations.

Cast-Iron Pipe.—Fairly active purchasing by private gas companies continues, although the market as a whole is slightly quieter through seasonal dullness. In many instances, where buyers are willing to accept winter delivery on pipe, makers are offering a concession of $1 to $1.50 per ton, hoping to book sufficient business to carry them through the dull season and up to the period of spring demand. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.10 to $63.60; 4-in. and 5-in., $67.10 to $68.60; 3-in., $77.10 to $78.60, with $5 additional for Class A and gas pipe. Some soil pipe makers, who are well-booked with low-priced tonnage, have reduced discounts by 10 points in an effort to stiffen the market. Present unfilled orders will probably carry most makers for the next 40 to 60 days. These are orders for prompt shipment and taken at the lower prices. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 30¾ and 40¾ per cent off list; heavy, 40¾ and 50¾ per cent off list.

Warehouse Business.—Business continues fairly active. While prices of plates, shapes and bars are holding firm, sheets continue weak in spots, quotations ranging from 4.50c. per lb. base and 5.50c. per lb. base on black and galvanized for shipment to consumers in the metropolitan area up to 5c. and 6c. per lb. base to out-of-town buyers. Cold-rolled shafting has been increased 25c. per 100 lb. by warehouses in New York, bringing the price to 4.65c. per lb. base for rounds and 5.15c. per lb. for flats, squares and hexagons. New Jersey warehouses are still on the former basis of 4.40c. and 4.90c. per lb. base. Brass and copper products in two successive increases of ¼c. have been raised ½c. per lb. by warehouses in this district. We quote prices on page 1368.

Finished Iron and Steel.—It is still a waiting market. The only important tonnages of steel being figured on are for building construction. The building situation continues to look promising for this time of year. Manufacturing consumers are desultory buyers, covering only for their known requirements of about 30 days. A favorable sign in the slightly increasing number of small inquiries, indicating that many consumers are running out of stock. On the heavy products, plates, shapes and bars, the price situation remains unchanged. Eastern mills quote from 2.40c. to 2.50c. on plates, but the Pittsburgh mills adhere to 2.50c. Bar mills seem to ignore occasional quotations of less than 2.40c., Pittsburgh, on concrete reinforcing material, frequently the product of rerolling mills. A disposition to give the usual consideration to certain large buyers, such as shipyards and railroad car builders, is indicated. One large producer recently took 4800 tons of plates and shapes for a shipbuilder at a price under today's market, and it is known that present estimates for freight cars are based on steel at less than 2.40c., Pittsburgh. One or two Eastern plate mills have quoted 2.35c., Pittsburgh, on desirable tonnage, though the ordinary run of current transactions are being booked at 2.40c. to 2.50c., the latter price usually applying to less than carloads. Not more than 4000 to 5000 freight cars are now being figured on by car builders, but the car builders were encouraged to expect more inquiry soon by announcements at the banquet of the American Railway Association in New York on Nov. 8 that the railroads are expecting to appropriate large sums for various betterments and maintenance in 1924.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—The market is holding fairly firm, but stiffening of prices expected to materialize from drastic curtailment of production has not appeared, reduced output evidently having been somewhat offset by reduced consumption. Standard foundry ranges from $5 to $6.25 per ton and standard furnace ranges from $3.75 to $4.25 per ton. By-product coke is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—Weakness continues in all grades with little or no activity reported in any lines but heavy melting steel, stove plate, pipe and borings and turnings. No. 1 heavy melting steel railroad grade continues at $14.50 eastern Pennsylvania. As most contracts call for either railroad grade or equivalent, it is difficult to establish a price on yard steel. Shipments of yard, however, are, when received on a contract calling for railroad, often subjected to a cut of $1 to $1.50 per ton, which would evidently establish the price at $13 to $13.50 per ton, eastern Pennsylvania. Borings and turnings are weaker, $10.50 per ton eastern Pennsylvania being about the average price now paid. Stove plate shipments are mostly confined to New Jersey foundries at about $16 per ton delivered. Specification pipe is reported going forward to consumers in Milton and Columbia at $14 per ton delivered and to Lebanon, Pa., at $13 per ton.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$10.00 to $10.50
Steel rails, short lengths, or equivalent	11.25 to 11.75
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	15.00 to 16.00
Iron car axles	22.50 to 23.00
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track	13.00 to 13.50
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	7.50 to 8.00
Machine-shop turnings	6.50 to 7.50
Mixed borings and turnings	6.50 to 7.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75 to 10.25
Stove plate	12.50 to 13.00
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	14.00 to 15.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

Buffalo

Radiator Interests Buy Round Tonnage of Pig Iron at Low Price

BUFFALO, Nov. 13.—The principal transaction of the week was the purchase of 15,000 tons for first quarter delivery for radiator plants at a shade below $20, furnace. The usual quotation on tonnages of good size is $20, while $21 is paid on small lots. The tendency of most melters to buy for early needs is still marked and this accounts for the frequency of carload lots by buyers ordinarily interested in 500 and 1000-ton lots. Lake Superior charcoal iron has weakened and sales at the furnace have been made on the basis of $25. Some of the recent sales involved in this week's total are of small lots of malleable. Foundry iron inquiries include two for 1000 tons, one for 500 tons and the rest small ones.

We quote f.o.b., gross ton, Buffalo as follows:

No. 1 foundry, sil. 2.75 to 3.25	$21.00 to $22.00
No. 2 foundry, sil. 2.25 to 2.75	20.00 to 21.00
No. 2 plain, sil. 1.75 to 2.25	20.00 to 21.00
Basic	20.50 to 21.00
Malleable	20.50 to 21.00
Lake Superior charcoal	28.28

Finished Iron and Steel.—Some improvement in inquiry is felt; prices have been asked by a number of consumers who have not been active recently. The tin plate announcement has brought out a number of orders and demand for this product, for delivery in the first half of 1924 will likely be on the same high plane as the season drawing to a close. Cold-finished material is not being sought by users. Bar, shape and plate demand is ordinary and all materials are for immediate consumption. Forge interests have been more interested in bars than any other group of users.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Small sales of borings have been made to blast furnace consumers but not in sufficient quantity to indicate any awakening of interest. Two mills which have large quantities of heavy melting steel contracted for have suspended shipments and generally the market is without life.

We quote f.o.b., gross ton, Buffalo as follows:

Heavy melting steel	$14.50 to $15.50
Low phos., 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	13.00 to 13.50
No. 1 busheling	14.50 to 15.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	14.50 to 15.50
Railroad malleable	18.50 to 19.00

Birmingham

Pig Iron Sales Are Confined to Small Lots at Low Prices

BIRMINGHAM, ALA., Nov. 13.—Small lot orders dominate the Southern pig iron market and they are so numerous that no iron is going to the yards as surplus stock. The quotations are uncertain, hovering around $20 per ton for local delivery and $19 for distant points and differentials being ignored. Indications are that curtailing production in the Birmingham district is not now necessary. Occasionally orders for 500 to 1000 tons are coming in. Foundries and other melters are buying in the hand to mouth manner as they have for several weeks in the hope of seeing further reductions in prices or to avoid having any iron on hand at the end of the year. Expectations are at a high pitch that the pressure pipe makers will place some business with the furnace interests in Alabama shortly, their prospects for the winter being good despite the fact that lettings have been slow for several weeks.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$19.50 to $21.00
Basic	20.00 to 21.00
Charcoal, warm blast	33.00

Finished Material.—The steel market in Alabama is showing improvement as new business for immediate attention and contracts for delivery next year come in. The Gulf States Steel Co. is shipping shapes, wire and nails for Brazil and Argentine. The Tennessee Coal, Iron & Railroad Co. and the American Steel & Wire Co. is shipping to the Orient and elsewhere steadily. The Southern Railway has placed an order for 40,700 tons of 100 lb. rails with the Tennessee company, delivery next year and the Missouri, Kansas & Texas, 8750 tons. The railroads have allocated a considerable proportion of their business already to the Birmingham district and the indications are that there will be steady operation of the rail mill. The Bessemer rolling mill operation has been down but this curtailment of production is temporary. The steel fabricating plants of the district are busy. The Southern Steel & Rolling Mills Co., with a daily production of 30 tons of special concrete bars, is producing steadily, using old rails exclusively as material. This company furnished the concrete bars for the warehouse being erected by the Phoenix Portland Cement Co. at this point. The Atlas Portland Cement Co., with a plant in this district working day and night, has announced a reduction of 25c. on the barrel for cement. All of the cement plants of the district are working steadily, the production being around 90 per cent of capacity. Steel bars are quoted at 2.60c.

Coke.—The coke market in Alabama is weaker, though small lot sales are taking up the make. Quotations are lower this week, by-product coke being possible at $5 to $5.50, for the foundry grades. Bee-hive coke is commanding a little better price. No big contracts are being reported though inquiries are in almost every day.

Old Material.—There is no change in the scrap iron and steel market in the South, with very little demand. No. 1 cast has had a little inquiry lately. Heavy melting steel is without inquiry or purchase. The quotations are uncertain. Those buying are practically naming their own prices. Dealers are replacing all stock sold, indicating that they look for some improvement in the trade in the near future.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.00 to 10.00

Detroit Scrap Market

DETROIT, Nov. 13.—The market on waste materials is very soft, with producers anticipating accumulations this month, due to proximity of the inventory period. Small tonnages are being moved on the basis of prices quoted the past two weeks.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$11.50 to $12.50
Shoveling steel	11.50 to 12.50
No. 1 machinery cast	16.00 to 17.00
Cast borings	8.50 to 9.35
Automobile cast scrap	22.00 to 23.00
Stove plate	15.00 to 16.00
Hydraulic compressed	9.50 to 10.50
Short turnings	8.75 to 9.25
Long turnings	7.00 to 7.85
Flashings	8.25 to 9.35

Philadelphia

Pig Iron Continues Weak, Though Demand Is Better—Scrap Slightly Firmer

PHILADELPHIA, Nov. 13.—The first sign of a recovery in prices of raw materials, which have been declining steadily for some time, came within the past few days in the slight advance of a few grades of scrap. No. 1 heavy melting steel is stronger in that dealers and brokers now are unwilling to sell below $15.50, delivered, though such material has been freely obtainable in recent weeks at not over $15. An advance of fully $1 on turnings is due to more active buying by two Eastern steel companies. In pig iron there is a little firmer attitude on the part of furnaces and much more interest on the part of large consumers, many of whom doubtless believe that current prices are favorable for purchase of first quarter requirements. It is expected that fully 20,000 tons of foundry iron will be bought by Eastern melters within a week. One important Eastern furnace has declined to sell for first quarter at the prices it has recently quoted on early shipments.

The steel market continues to be marked by the absence of any distinct trend. Buyers are continuing the policy of cautious buying and this is likely to be in evidence, it is believed here, until the inventory period has been passed. Prices on all steel products are unchanged, due to the somewhat determined attitude of the larger producers and also to the lack of attractive tonnage.

Pig Iron.—Considerably more inquiry for foundry iron than has been quoted on within one week is now before the Eastern pig iron trade, and it is confidently expected that some of the larger buyers in the East, including New England, may close for a total of 20,000 tons within the next week. The largest inquiry is from the J. L. Mott Iron Works, Trenton, N. J., which asks prices on 3000 tons for delivery in December and the first quarter. There are other inquiries, including a number of 1000 tons each, and some business is being quietly negotiated that has not come out as formal inquiry. On business in New England and the New York territory, where eastern Pennsylvania furnaces come into close competition with Buffalo, there have been quotations of $21, furnace, but it has not been necessary for eastern Pennsylvania furnaces to go this low on iron for nearby delivery. Most of the furnaces will quote $22, furnace, on carload lots for either No. 2 plain or No. 2X, and concessions from this level may be expected on some of the large business pending. However, one Eastern producer declines to quote for first quarter, while another is, for the present at least, adhering to a minimum of $23, furnace. The United States Cast Iron Pipe Co. has bought about 3000 tons of foundry iron for its New Jersey p'ant.

The following quotations are with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.64 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.64 to 24.63
East. Pa. No. 1X	23.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.00 to 24.00
Gray forge	23.00 to 24.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Domestic furnaces and British importers continue to quote $110, furnace or seaboard, on ferromanganese, but resale lots are still being sold at $108.50 and $109. Spiegeleisen is scarcely a factor.

Semi-Finished Steel.—Though Eastern mills quote $40 on rerolling billets and $45 on forging billets, Pittsburgh, they have lost business at this level.

Plates.—No improvement in the demand for plates has come within the past week. The price situation is unchanged. On carload lots or larger 2.40c., Pittsburgh, is easily obtainable, while on less than carloads, 2.50c., Pittsburgh, is the ruling quotation. One producer is holding out for 2.50c. even on carload lots.

Structural Material.—The demand for structural shapes is confined to a fair number of small jobs. Even those mills which are quoting 2.40c., Pittsburgh, are unable to get enough business to maintain a good rate of operation. The larger mills continue to quote 2.50c.

Bars.—Mill prices on steel bars are 2.40c., Pittsburgh. Rerolled bars are being offered at about 2.30c., Pittsburgh. There is very little business. Bar iron makers quote 2.35c., Pittsburgh.

Sheets.—No stabilization of sheet prices has followed the recent announcement of the American Sheet & Tin Plate Co. that its present quotations will be continued for first quarter. Some of the mills are shading these so-called "regular" prices at least $2 a ton, this also applying now to blue annealed, which until recently has been scarcely affected by the cuts on galvanized and black.

Warehouse Business.—A fair demand for steel out of stock is reported by local jobbers. The week has brought no price changes. For local delivery the following quotations rule:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, No. 20 gage and heavier, 4.27c.; narrower than 4 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅞-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—Two Eastern steel companies came into the market late last week for machine shop turnings for open hearth use and were obliged to pay $12, delivered, a rise of $1 over previous transactions. Pipe has also gone up 50c. a ton on more active buying. While there has been no important buying of No. 1 heavy melting steel, dealers and brokers are firmer in their views and are not inclined to sell at less than $15.50, whereas recent sales have not been above $15.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	20.00 to 21.00
Couplers and knuckles	17.50 to 18.00
Cast-iron car wheels	17.50 to 18.50
Rolled steel wheels	17.50 to 18.00
No. 1 railroad wrought	17.00 to 17.50
No. 1 yard wrought	15.50 to 16.00
No. 1 forge fire	12.00 to 12.50
Bundled sheets (for steel works)	12.00 to 12.50
Mixed borings and turnings (for blast furnace use)	10.50 to 11.00
Machine shop turnings (for steel works use)	12.00 to 12.50
Machine shop turnings (for rolling mill use)	12.50 to 13.00
Heavy axle turnings (or equivalent)	13.00 to 13.50
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	19.00 to 19.50
Heavy breakable cast (for steel plants)	16.00 to 16.50
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	17.00 to 17.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to 15.00
Shafting	20.00 to 21.00
Steel axles	18.50 to 19.50

Net profits for the first eight months of the year of the Penn Seaboard Steel Corporation totaled $258,-066. Current assets are $2,511,891 and liabilities $1,568,892. About 90 per cent of holders of the company's 7 per cent notes, due Feb. 1, 1924, have assented to the plan for refunding.

St. Louis

Pig Iron Sales and Inquiries Increase but Prices Remain Weak

ST. LOUIS, Nov. 13.—More inquiries and sales of pig iron were reported during the last week than for several weeks, but they were not large enough to lend any strength to the market, and prices still are weak. There is no market price for either Northern or Southern pig iron, each inquiry being considered as a separate transaction and closed after more or less dickering. Sales of Southern iron have been reported as low as $18.50, Birmingham, and Northern iron at $22, Chicago, although $20, Birmingham, and $23, Chicago, are quoted generally. The principal sale of the week was of 1000 tons of Southern iron to a local foundry. The St. Louis Coke & Iron Co. sold 600 tons of foundry iron to a local concern, and a Kansas City melter bought 700 tons of foundry iron from a Chicago maker. A St. Louis melter wants 300 tons each of Northern and Southern foundry iron for first quarter delivery. A St. Louis manufacturer wants 500 tons and another St. Louis melter is in the market for 200 tons of foundry iron. An East Side melter bought a carload of 12 per cent Bessemer ferrosilicon and there is an inquiry for a car of spiegeleisen.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and $1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$24.16 to $25.16
Northern malleable, sil. 1.75 to 2.25	24.16 to 25.16
Basic	24.16 to 25.16
Southern fdy., sil. 1.75 to 2.25 (rail)	23.17 to 24.17

Finished Iron and Steel.—Conditions remain unchanged in these lines. Warehouses are doing very little business, and consequently are buying only small lots to fill in. Manufacturers are buying only such raw material as can be converted into the finished product before the first of the year, and these purchases are negligible. No railroad inquiries of size have been issued in several weeks.

Coke.—The St. Louis Coke & Iron Co. reports the sale of 10,000 tons of by-product coke for shipment throughout the year to a Western smelter. The demand for foundry coke is light. An advance of 25c. a ton is reported on Connellsville coke, with prices ranging from $6 to $7.50, f.o.b. ovens, according to the brand. Domestic coke is moving very slowly. Dealers are well stocked, and consumers are not buying because the weather has been warm.

Old Material.—Prices of old material are higher on some grades, but this is due to the fact that dealers are short on such items and are paying more money for them to deliver against contracts. It is a dealers' market, consumers showing very little interest in anything. It was thought that there would be a let-up in railroad lists, but more of them were received during the week, as follows: Texas & Pacific, 5000 tons; Southern Railway, 4300 tons; Northern Pacific, 2700 tons, and Chicago & Alton, 600 tons.

	Per Gross Ton	
Iron rails	$15.00 to	$15.50
Rails for rolling	14.00 to	14.50
Steel rails, less than 3 ft.	16.50 to	17.00
Relaying rails, 60 lb. and under	25.00 to	26.00
Relaying rails, 70 lb. and over	32.50 to	33.50
Cast iron car wheels	17.00 to	17.50
Heavy melting steel	13.00 to	13.50
Heavy shoveling steel	12.50 to	13.00
Frogs, switches and guards cut apart	13.50 to	14.00
	Per Net Ton	
Heavy axles and tire turnings	11.00 to	11.50
Steel angle bars	12.25 to	12.75
Steel car axles	15.00 to	15.50
Iron car axles	22.50 to	23.00
Wrought iron bars and transoms	17.00 to	17.50
No. 1 railroad wrought	12.50 to	13.00
No. 2 railroad wrought	11.50 to	12.00
Railroad springs	14.50 to	15.00
Cast iron borings	9.00 to	9.50
No. 1 busheling	12.25 to	12.75
No. 1 railroad cast	17.00 to	17.50
No. 1 machinery cast	17.00 to	17.50
Railroad malleable	14.50 to	15.00
Machine shop turnings	9.00 to	9.50
Champion bundled sheets	7.00 to	7.50

Cincinnati

More Activity in Pig Iron with Prices Lower —Some Shading of Sheet Prices

CINCINNATI, Nov. 13.—The pig iron market is showing a little more activity, especially in Northern grades and some sales for first quarter were made last week. These included one for 1000 tons of foundry, another for 500 tons and a number for 200 to 300 tons. The furnace booking this business reports a total of 5000 tons for the week. Prices are slightly lower than the previous week, $22.50 being a common quotation for Southern Ohio iron with reports current that in competitive territory $22 has been done. On Southern iron there is little activity, though we note a sale of approximately 1000 tons for shipment this year at around $19, Birmingham, base. Other sales of Southern iron are carload lots. While the open quotation is $19.50, Birmingham, it is freely admitted that on attractive orders $19 can be done and reports are current of one interest quoting $18.50, but this latter cannot be confirmed. Some sales of silvery were reported at the schedule, but little activity is noted in basic or Bessemer irons. Inquiries include two for 2000 tons each for first half, but a disposition is apparent on the part of producers to quote only for first quarter. Etna furnace of Marting Iron & Steel Co. was banked last week. Norton furnace resumed on Bessemer and Belfont is scheduled to blow this week. Jisco silvery furnace is about ready to resume after having been relined.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	23.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.27
Basic Northern	24.27
Malleable	24.27

Reinforcing Bars—Three projects in Cincinnati, in which large tonnages of reinforcing bars would have been required, were voted down at the election held Tuesday. There are, however, a number of projects up for bids. An office building for the Southern Railway at Birmingham, Ala., will take 800 tons. The Third National Bank Building, Dayton, Ohio, bids for which close Nov. 20, will require about 600 tons. A hotel at Louisville, Ky., on which bids will shortly be taken, will require approximately 1200 tons, according to estimates. Numerous other projects, not ready for bids, but which will likely come out before Jan. 1, will take a large aggregate tonnage. Prices of reinforcing bars are as last quoted, the range being 2.20c. to 2.40c., mill.

Structural Material—The L. & N. Railroad has awarded 800 tons additional bridge approach work to the American Bridge Co., or 500 tons more than recently reported. A Masonic Temple at Portsmouth, Ohio, will take 800 tons, and bids are being asked for this work. The Third National Bank Building, Dayton, Ohio, calls for 1050 tons. Gas-holder manufacturers report having received contracts for approximately 2700 tons of work. Contemplated projects include an addition to the Bourne-Fuller Co. warehouse at Cincinnati, tonnage not estimated.

Warehouse Business—Bars and small angles are moving fairly well, but other lines are quiet. Prices have not undergone any changes, with the exception of sheets, since April, and at this time, none is contemplated.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base; cement coated nails, $3.30 per keg.

Finished Materials—There has been fair inquiry for plates during the past week, and same railroad business was booked. A number of tank builders were in the market for fair-sized tonnages, and reports are persistent that a price of 2.40c. has been made on several deals. This, however, cannot be confirmed.

Bar orders are scarce, though on cold finished materials the reduction in price of $5 per ton is reported to have brought out some business. The L. & N. Railroad has placed orders for 3000 kegs of track spikes, in addition to 15,000 kegs placed two weeks ago. Light rails are not in brisk demand, though some orders are being placed. Wire products are moving slowly, and while some companies are willing to make the Ironton rate on nails to this district, most of the larger ones are holding to the $3 base, with rail freight from Pittsburgh added.

Sheets and Tin Plate—First quarter contracts are in good volume, and there is no indication of prices other than the regular schedule being quoted for this delivery. On business for the rest of this year, black and galvanized sheets are being shaded $2 per ton, and reports are current that on blue annealed sheets 2.75c. has been quoted, but this lacks confirmation.

Coke—There is little activity in coke and prices remain as last quoted. Connellsville furnace is $3.75 to $4 and foundry $5 to $6. New River foundry is quoted at $10 to $11 and Wise County foundry $6 to $7. By-product producers are maintaining the $9 Connellsville basis.

Old Material—The scrap market continues inactive, as far as sales to consumers are concerned. Offerings are heavy, the Norfolk & Western list being for 20,000 tons and the Southern list a like amount. Some mills are holding up shipments on contracts.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$9.50	to $10.00
Iron rails	13.00	to 13.50
Relaying rails, 50 lb. and up	27.00	to 27.50
Rails for rolling	13.50	to 13.50
Heavy melting steel	12.00	to 12.50
Steel rails for melting	12.50	to 13.00
Car wheels	12.50	to 13.00
	Per Net Ton	
No. 1 railroad wrought	11.00	to 11.50
Cast borings	7.50	to 8.00
Steel turnings	7.00	to 7.50
Railroad cast	13.50	to 14.00
No. 1 machinery cast	16.50	to 17.00
Burnt scrap	10.50	to 11.00
Iron axles	20.50	to 21.00
Locomotive tires (smooth inside)	12.50	to 13.00
Pipes and flues	6.50	to 8.00

Boston

Active but Quiet Buying of Pig Iron at Concessions for First Quarter Delivery

BOSTON, Nov. 13.—Because transactions are more or less of a private nature, the pig iron market on the surface is quiet. An unusually large number of foundries have been induced through the medium of price concessions to take on iron for December and first quarter 1924 delivery. Individual orders are in less than four figures, but in the aggregate several thousand tons. The market, therefore, actually is more active than in many weeks, with first quarter buying an outstanding feature. Eastern Pennsylvania iron in 100-ton and larger lots sold the past week at $22 furnace base, with and without differentials; Buffalo No. 2 plain, No. 2X and No. 1X at $21 and $21.50 furnace, and central Pennsylvania at $21 furnace base, with differentials, all for remainder of 1923 and first quarter 1924 delivery. Small amounts of Virginia sold as high as $26 furnace base with differentials, entirely out of line with other iron quotations. The market for Alabama iron is largely nominal. Lake charcoal iron is off $2 at $25 a ton furnace base. A lot of 100 ton Burn, silicon 2.75 to 3.25, iron arrived at this port last week, the first Indian iron shipped direct to Boston. A larger lot is expected to shortly arrive at Bridgeport, Conn.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$25.65 to $26.75
East. Penn, sil. 1.75 to 2.25	25.65 to 26.15
Buffalo, sil. 2.25 to 2.75	25.91 to 26.41
Buffalo, sil. 1.75 to 2.25	25.91 to 26.41
Virginia, sil. 2.25 to 2.75	30.42 to 32.42
Virginia, sil. 1.75 to 2.25	29.92 to 31.92
Alabama, sil. 2.25 to 2.75	29.60 to 31.10
Alabama, sil. 1.75 to 2.25	29.10 to 30.60

Cast Iron Pipe.—The Warren Foundry & Pipe Co. was the low bidder on 1200 to 1500 tons of 12-in. and 16-in. pipe bought by the city of Boston for its high pressure fire service, delivery second quarter 1924. Bids closed Nov. 14 on 3000 tons 6-in. to 16-in., inclusive, pipe also required by Boston, second quarter 1924 delivery. One of the largest New England gas companies has just closed on its estimated 1924 requirements, several thousands of tons of pipe being involved. Bids close Nov. 16 on several hundred tons of 4 in. to 12 in. pipe required by Fall River, Mass., in 1924. Municipalities are coming into the market for next year's pipe requirements much earlier than usual. Prices are not as strong as they were two or three months ago, due to a weakening in raw material and labor costs at pipe foundry districts, but actual concessions, if any, are slight.

Finished Iron and Steel.—Purchases of finished iron and steel continue for immediate requirements only, consequently the market is far from active. The market for bars is steady and unchanged, but on other products is soft, with the tendency to shade prices. On structural steel, most passing business is done on a 2.40c. Pittsburgh base. Stone & Webster, Boston, shortly will call for bids for steel required on a Fall River, Mass., power plant, some 3500 tons being involved. Next month bids will close on steel required for a bridge at Haverhill, Mass.

Soft steel bars, $3.51½ at 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steel, $3.61½; tire steel, $4.80 to $5.15; open-hearth spring steel, $6.50 to $10; crucible spring steel, $12; regular steel bands, $4.31½; bands over 6 in. wide, $5.05 to $5.20; hoop steel, $5.50 to $6.20; cold rolled steel, $4.35 to $4.85; refined iron, $3.51½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.60 to $7.10.

Coke.—Virtually all New England foundries have covered on their first half 1924 by-product foundry coke requirements, on a basis of price ruling date of shipment. Buying for current needs is remarkably good for this time of the year, with the New England Coal & Coke Co. and the Providence Gas Co. quoting $12.50 delivered in New England. That price figures back to $6.95 on cars at Connellsville. The market for domestic coke is easier, due to continued heavy production by by-product ovens and gas makers, and to continued mild weather, making for restricted consumption. Whether the softness of domestic coke prices will have any influence on those for foundry coke next month is problematical, however.

Old Material.—Better prices in other sections of the country are reflected to some degree in this market, but values are still too low and freights too high to permit any large movement of material out of New England. An improvement, however, is reported in the movement of mixed borings and turnings, usually at $7 on cars shipping point, and chemical borings at $9.50 to $10, the latter representing an advance of about 50c. No market for yard wrought apparently exists, but interest in No. 1 railroad wrought is increasing. A small amount of heavy melting steel business was put through the past week at $10 and $10.50 on cars, but the best most dealers can do is $9.50, which price fails to attract sellers. Car lots of textile machinery cast at $22.75 delivered New England foundry are included in the week's transactions, as well as similar tonnages of No. 1 machinery cast at $22 and $22.50. No. 2 machinery cast is a drug on the market.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.75
No. 2 machinery cast	20.00 to 20.50
Stove plate	16.00 to 16.50
Railroad malleable	19.00 to 20.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.50 to $10.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	11.00 to 11.50
Wrought pipe (1-in. in diam., over 2 ft. long)	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Cast iron borings, rolling mill	7.50 to 8.00
Cast iron borings, chemical	9.50 to 10.00
Blast furnace borings and turnings	6.75 to 7.25
Forged scrap and bundled skeleton	8.50 to 9.00
Street car axles	13.50 to 14.00
Street car wheels	11.00 to 12.50
Rails for rerolling	11.50 to 12.00

Cleveland

More Inquiry for Foundry and Malleable Pig Iron—Scrap Marked Up

CLEVELAND, Nov. 12.—With good railroad transportation facilities for moving iron ore to the interior furnaces, a smaller percentage of ore has been placed on Lake Erie docks this year than usual. The amount on docks Nov. 1 was 8,097,488 gross tons as compared with 9,586,234 tons on Nov. 1 last year and with 7,019,518 tons Oct. 1. Receipts at Lake Erie ports during October were 6,120,669 tons as compared with 4,632,542 tons during October last year. Receipts at Lake Erie ports for the season until Nov. 1 were 39,697,744 tons as compared with 28,542,052 tons during the corresponding period last year. Shipments from Lake Erie docks up to Oct. 1 were 30,393,069 tons as compared with 19,032,476 tons up to Oct. 1, 1922.

Pig Iron.—Considerable inquiry has developed during the past few days for foundry and malleable iron for the first quarter and there has been some increase in demand for these grades for early shipment. Pending inquiries from Cleveland and the northern Ohio territory aggregate close to 15,000 tons ranging from 500 ton lots to one for 4000 tons. A few inquiries have also come out for the first half, but producers are not inclined to quote beyond the first quarter. So far few of the first quarter inquiries have resulted in sales. These inquiries seem to indicate that many consumers feel that prices have about touched bottom and sellers are looking for a moderate volume of buying. About a month ago, considerable first quarter inquiry came out, but at that time prices further declined as a result of the weakness in the Buffalo market and buying was postponed. Early shipment sales which improved during the week were mostly in small lots, although some fair-sized orders were placed in the Michigan, Indiana and western Ohio territories, considerable of this business coming from stove manufacturers. The lake furnace and Valley price situation still seems to be dominated by the Buffalo market and under this influence prices have further declined 50c. a ton. Foundry and malleable iron are now commonly quoted at $22 by lake and Valley furnaces, although small lot sales are reported in the Valley district at $22.50. For Cleveland delivery the price quoted by local furnaces is unchanged at $23 at furnace. Buffalo iron is quoted at $21 and there are reports that this price has been named by one Valley producer. Buffalo furnaces are making little effort to sell iron in Cleveland territory, as local producers would probably go below any prices that might be named in Buffalo. Steel making iron is inactive. We note the sale of 150 tons of Alabama foundry iron at $19, although some producers are asking $20. Carload sales of low phosphorus iron are reported at $30 but a good inquiry would probably bring out a lower price.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	23.50
Southern fdy., sil. 1.75 to 2.25	$25.00 to 25.50
Malleable	23.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	30.00

Bolts, Nuts and Rivets.—The bolt and nut market is quiet and weak. Some manufacturers are attempting to stimulate buying by making price concessions. However, those having contracts at regular prices are getting specifications against their contracts. Leading manufacturers are operating their plants at about 75 per cent of the capacity. Some rivet makers are also naming low prices, quotations at 2.70c. and lower having appeared. New demand is light.

Semi-Finished Steel.—There is no demand for sheet bars and specifications for these are coming out slowly owing to the curtailment in sheet production. Makers are holding firmly to $42.50 for sheet bars. A local inquiry for forging billets is reported to have brought out a price of $45, delivered.

Finished Iron and Steel.—The demand improved somewhat during the week and while buying is still only for early requirements, the size of orders has increased. In steel bars, some orders are now coming out for one to two carloads and in many cases buyers are asking for deliveries in two or three weeks. The market is firm at 2.40c. Plates are moving slowly, are not firm, and quotations of 2.40c. have appeared in this territory, although small lot sales are being made at 2.50c. Some new demand has come from the railroads. The Ann Arbor Railroad is inquiring for 3000 tons of rails and another rail inquiry is for 500 tons. Following recent rail buying, fair demand has sprung up for track material. The Wheeling & Lake Erie has placed car repair work with the Canton Car Co., requiring 1000 tons more of steel, mostly plates. Another inquiry has come out for a lake boat, making four live inquiries for large vessels that are now pending with lake shipyards. There is a lull in new inquiry in the building field although there is considerable work on which bids have been taken pending. Hot-rolled strip steel continues weak, with 2.75c. freely quoted for wide strip. Bands, except in very narrow widths and narrow hot-rolled strip, are quoted at 3c.

Sheets.—The sheet market continues weak. Black sheets are particularly soft and on these 3.75c. is being shaded. On galvanized sheets 4.75c. has appeared. Some of the mills are offering surplus stocks at low prices. On these, 3.25c. has been quoted on black and 2.75c. on blue annealed sheets. The demand for automobile body sheets is holding up well, but car builders have not yet come into the market for the first quarter.

Alloy Steel.—There has been some good volume demand recently from the automotive industry and mills are comfortably filled with orders, one Ohio maker being on a 100 per cent production. Two pending local inquiries aggregate 2200 tons. Prices are firm.

Reinforcing Bars.—There is a fair demand for reinforcing bars in small lots, much of this being for highway bridge work. The only sizable inquiry is for 350 tons for a county bridge in Fremont, Ohio. The 2000 tons for the Baldwin Reservoir, Cleveland, will probably go to a Youngstown mill, but this steel will not be required until spring.

Warehouse Business.—Jobbers report some improvement in the demand for sheets on which there are still irregularities in warehouse prices. One jobber has reduced cold-rolled strip $3 a ton.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.06c.; cold rolled rounds, 3.96c.; hexagons and squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Coke.—The foundry coke market is slow with prices unchanged at $5 to $6.50 for standard Connellsville foundry coke. Wise County producers are renewing first quarter contracts for foundry coke at $7.

Old Material.—Sentiment in the scrap trade has improved and prices have advanced about 50c. a ton on most grades and this in spite of no improvement in the demand. In the Valley district, heavy melting steel has advanced 50c. to $16 and as high as $16.50 has been paid by a dealer for Warren delivery to fill an order that according to unconfirmed reports was placed at $17. Borings and turnings have advanced 75c. and the latter have sold locally at $10.75.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$14.25 to $14.75
Rails for rolling	16.25 to 16.75
Rails under 3 ft	16.25 to 16.75
Low phosphorus melting	17.00 to 17.50
Cast borings	10.75 to 11.00
Machine shop turnings	10.25 to 10.50
Mixed borings and short turnings	10.50 to 10.75
Compressed sheet steel	12.00 to 12.50
Railroad wrought	12.50 to 12.75
Railroad malleable	19.00 to 19.25
Light bundled sheet stampings	9.00 to 9.25
Steel axle turnings	11.50 to 11.75
No. 1 cast	20.00 to 21.00
No. 1 busheling	9.25 to 9.50
Drop forge flashings	9.50 to 9.75
Railroad grate bars	15.50 to 16.00
Stove plate	15.50 to 16.00
Pipes and flues	9.00 to 9.50

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling.....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3.15c.
Bands, base, per lb.....3c. to 3.15c.
Strips, base, per lb.....3c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.63

Cold-Finished Steels

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.25c. to 4.50c.
Bars, S. A. E. Series, No. 2300.....6.75c. to 7.00c.
Bars, S. A. E. Series, No. 3100.....5.75c. to 6.00c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads..60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts.....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....50 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.25c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts.....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ¼ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers.....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$ 4.80	$ 4.80
⅜-in.	5.50	6.00
⅝-in.	6.50	7.00
⅞-in.	9.00	9.50
1-in.	11.00	11.50
1⅛-in.	15.00	15.00
1¼-in.	19.50	20.00
1⅜-in.	28.50	28.50
1½-in.	37.00	37.50
1¾-in.	53.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs.....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb...$2.70 to $2.85
Small rivets.....70 to 65 and 10 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$3.15
Spikes, 1/2 in., 7/16 in. and 3/8 in., per 100 lb.....$3.15 to 3.50
Spikes, 5/16 in.....3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.....3.50
Track bolts, ⅝ in. and larger, base, per 100 lb..4.00 to 4.25
Track bolts, ½ in. and ⅜ in., base, per 100 lb..5.00 to 5.50
Tie plates, per 100 lb.....2.55 to 2.60
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	29½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

¼	41	24½	2 to 3	61	50½
⅜ to ⅝	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	23	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
2½ to 3⅝ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	36	3 and 3¼ in.	36
1¼ and 1½ in.	37	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	32½	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	16	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	35
2¼ in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00
8-lb. coating I. C.	11.30
12-lb. coating I. C.	12.70
15-lb. coating I. C.	13.95
20-lb. coating I. C.	$14.90
25-lb. coating I. C.	16.20
30-lb. coating I. C.	17.35
35-lb. coating I. C.	18.35
40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.90c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent	$40.00
Spiegeleisen, domestic, 16 to 19 per cent	39.00
Ferrosilicon, 50 per cent, delivered	$80.00 to 82.50
Ferrosilicon, Bessemer, 10 per cent	41.50
Ferrosilicon, Bessemer, 11 per cent	44.00
Ferrosilicon, Bessemer, 12 per cent	48.50
Ferrosilicon, Bessemer, 13 per cent	52.10
Ferrosilicon, Bessemer, 14 per cent	57.10
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent $41.50.	
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois		37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton	6.00 to 7.00	
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Rails, ⅞-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ⅝-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅞-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.50 to 5.75
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.50 to 4.75
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.25 to 8.50
3400 (Nickel Chromium)	7.25 to 7.50
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.25 to 5.50
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	4.10 to 4.25
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.75 to 5.00
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq., there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.51	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215
				Pacific Coast	$1.15
				Pac. Coast, ship plates	1.34
				Birmingham	0.58
				Memphis	0.55
				Jacksonville, all rail	0.70
				Jacksonville, rail and water	0.415
				New Orleans	0 67

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Numerous Awards Total 14,500 Tons and Fresh Inquiries Call for 22,200 Tons

In the fabricated steel field railroad bridge work is noteworthy. Awards covering 17 projects of various kinds call for upward of 14,500 tons and fresh proposals, few of unusual size, add 22,200 tons to the business under negotiation. The principal bookings are as follows:

New York Edison Co., sub-station on Forty-eighth Street, New York, 600 tons, to Hedden Iron Construction Co.

Public School No. 210, New York, 1300 tons, to Turner Construction Co.

Florida East Coast Railroad, bridges, 100 tons, to Virginia Bridge & Iron Co.

Highway bridge at Middlesex, N. J., 100 tons, to Phoenix Iron Co.

New York Central, bridge near Albany, N. Y., 250 tons, to American Bridge Co.

Boston & Maine Railroad, bridge at Gorham, N. H., 500 tons, to McClintic-Marshall Co.

Lancashire residence on Sixty-ninth Street, New York, 350 tons, to American Bridge Co.

Standard Oil Co., work at Cleveland, 500 tons, to Massillon Bridge Co.

Office building at 972 Broad Street, Newark, N. J., 250 tons, to Hay Foundry & Iron Works.

St. George Hotel, Brooklyn, addition, 800 tons, to A. E. Norton, Inc.

Paterno apartment building, West Eighty-sixth Street, New York, 800 tons, to Paterson Bridge Co.

Union Stock Yards, South Omaha, Neb., viaduct, 3100 tons, to Omaha Structural Steel Co.

Chicago, Burlington & Quincy, 20 girder spans and miscellaneous repairs, 738 tons, to American Bridge Co.

Arlington Hotel, Hot Springs, Ark., 156 tons, to Virginia Bridge & Iron Co.

Louisville & Nashville, bridge work, 500 tons additional, to the American Bridge Co.

Standard Sanitary Mfg. Co., Baltimore plant, 3700 tons, to Fort Pitt Bridge Works.

Pittsburgh Plate Glass Co., Creighton, Pa., plant extension, 600 tons, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New York Telephone Co., exchange on Seventy-third Street, New York, 750 tons.

Bridge over Raritan River at Perth Amboy, N. J., 6000 tons; bids close Nov. 22. (This work previously reported, former bids having been rejected.)

Atlantic Coast Line, bridge, 100 tons.

Homeopathic Hospital, Middletown, N. Y., 700 tons.

Erasmus High School, New York, 1200 tons.

Virginian Railway, bridge, 150 tons.

Chesapeake & Ohio Railroad, bridge, 150 tons.

Steinway & Sons, piano warehouse and salesrooms, Fifty-seventh Street, New York, 3000 tons. (This work previously reported, but now being refigured.)

Lefcourt office and loft building, Broadway at Thirty-sixth Street, New York, 5000 tons, may be awarded this week.

Gilbert loft building on West Thirty-fifth Street, New York, 1500 tons.

Union League Club building, Chicago, 5000 tons.

Purdue University building, Lafayette, Ind., 400 tons.

Pennsylvania Railroad, Fifty-sixth Street viaduct, Chicago, 350 tons.

Great Northern Railroad, I-beam spans, 400 tons, and truss and girder work, 1000 tons.

Stone & Webster, Boston, power house at Fall River, Mass., 3500 tons.

Belamose Corporation, Dividend, Conn., silk mill, 1000 tons.

Masonic Temple, Portsmouth, Ohio, 800 tons; bids being taken.

Third National Bank, Dayton, Ohio, 1050 tons; bids close Nov. 20.

Niagara Falls Hospital, Niagara Falls, N. Y., 150 tons.

RAILROAD EQUIPMENT BUYING

Orders Placed for Repairs to 800 Cars—Inquiries for 600 New Cars

Orders for repairs to 800 cars, inquiries for repairs to 3000 cars and inquiries for 600 new cars are the chief items in the railroad equipment field. The fresh developments are in part the following:

The Carnegie Steel Co. has awarded orders for the repair of 500 coke cars to the Koppel Car Repair Co. and the Greenville Steel Car Co.

It is expected that the Norfolk & Western Railroad will issue an inquiry next week for 4000 or 5000 new freight cars.

The Chesapeake & Ohio is in the market for repairs to 3000 freight cars.

The Wabash is formally in the market for 250 gondola cars of 70 tons' capacity.

The Chicago & Alton is inquiring for 250 40-ton box cars.

The Spokane, Portland & Seattle has ordered 50 flat cars from the American Car & Foundry Co.

The Gulf Coast Lines have bought 4 coaches, 2 partition coaches, 2 baggage and mail cars from the American Car & Foundry Co.

The Central Railroad of New Jersey has placed 50 coaches with the Standard Steel Car Co., 5 combination cars with the Pressed Steel Car Co. and 10 baggage cars with the American Car & Foundry Co.

The Illinois Traction Co. is inquiring for 100 box cars.

The Missouri Pacific will itself undertake the repair of 200 general service cars, 100 gondola cars and 25 to 50 passenger cars.

The Louisville, Henderson & St. Louis has placed 1 locomotive with the American Locomotive Co.

Tonnage Rate of Sheet and Tin Mill Workers Advanced

YOUNGSTOWN, Nov. 13.—Tonnage rates of sheet and tin mill workers in mills operating under the sliding wage scale agreement of the Amalgamated Association of Iron, Steel and Tin Workers advance 1½ per cent for the November-December period, to 48 per cent above base, as a result of the bimonthly settlement conducted today.

The average selling price of Nos. 25, 27 and 28-gage black sheets was revealed as $3.75 per 100 lb., on shipments for the 60 days ending Nov. 1. This compares with a $3.70 average two months before.

This is the highest wage rate for such employees since war time prosperity, and is 36 per cent above the lowest rate paid in 1921.

James H. Nutt of Youngstown represented the Western Sheet and Tin Plate Manufacturers' Association, and M. F. Tighe of Pittsburgh the employees.

Proposed Republic Extensions

YOUNGSTOWN, Nov. 13.—Extensions to its buttweld pipe mill capacity are being considered by the Republic Iron & Steel Co. Such additional capacity would involve some rearrangement of plant facilities at Youngstown.

The Youngstown Sheet & Tube Co. recently authorized two new buttweld pipe mills at its Chicago property, acquired from the Steel & Tube Co.

Welding Methods in Budd Plant

Methods of welding employed in the plant of the Edward G. Budd Mfg. Co., Philadelphia, will be described and motion pictures of the processes will be shown by Joseph W. Meadowcroft, general superintendent of welding of that company, at a meeting of the Philadelphia section, American Welding Society, at the Engineers' Club, Philadelphia, Monday evening, Nov. 19. This will be the first time that pictures of the Budd welding operations have been shown outside of the Budd plant. A. Schroeder of the Standard Electric Welding Co. is secretary of the Philadelphia section.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Nov.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
7.....	13.00	12.37½	43.37½	6.75	6.45	6.70	6.35
8.....	13.25	12.50	43.10	6.75	6.45	6.72½	6.37½
9.....	13.50	12.75	43.00	6.75	6.50	6.75	6.40
10.....	13.50	12.87½	....	6.75	6.50	6.75	6.40
12.....	13.50	13.00	43.45½	6.75	6.50	6.77½	6.42½
13.....	13.50	13.25	44.37½	6.85	6.55	6.80	6.45

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Nov. 13.

Prices of all the metals are higher and most of the markets are quite active. There has been heavy buying of copper, with electrolytic advancing every day. The tin market is more active and higher and there is a considerably firmer tendency in lead, with quotations slightly advanced. The zinc market is about 10 points higher than a week ago, with buying only moderate.

Copper.—Pronounced activity characterizes the copper market and the amount of buying and the advance in prices has been striking. The advance in prices has been based on actual sales which have been the largest in some time. The buying has been for both foreign and domestic consumers. Most of the European countries participated, particularly France and England, and the Far East was a buyer. Domestic sales have been both for early and for first quarter delivery. The rise in quotations has been over 1¼c. per lb. in the last week and electrolytic today is quoted at a minimum of 13.50c., delivered, with some sellers asking ⅛c. to ½c. higher. General statistics recently made public show that October was one of the largest months this year so far as deliveries into consumption were concerned. Production, however, continues unchecked and is still regarded as the key to the future of the market. Lake copper is quoted at 13.50c. to 13.62½c., delivered, and is also in stronger demand.

Tin.—The week has been a fairly active one at advancing prices. On Nov. 5, 7 and 8 it is estimated that at least 1000 tons of Straits tin was sold, with both consumers and dealers the buyers. It appears as if consumers' stocks are getting low and that they are forced to make purchases. It is not at all improbable that they may be obliged to buy actively in the next two months and that the December position may become tight. The statistical position is favorable to this and very few London firms are offering the metal liberally. On Friday, Nov. 9, about 300 tons changed hands at 45c. and on Saturday, Nov. 10, a good business was done with consumers the leading buyers. Yesterday, Monday, about 500 tons changed hands, both consumers and dealers participating, and today has been fairly active. Spot Straits tin today is quoted at 44.37½c., New York, and the London market is considerably higher at an advance of about £4 per ton over yesterday. Spot standard today was quoted at £221, future standard at £221 and spot Straits at £222, all about £13 per ton higher than a week ago. On the New York Metal Exchange, between Nov. 5 and 9, about 275 tons were sold. Conditions in the market point to a repetition of the heavy buying movement of a year ago which started in September and lasted until March, the main difference being that the beginning is two months later. Arrivals thus far this month have been 3450 tons, with 4689 tons reported afloat.

Lead.—The American Smelting & Refining Co. today increased its quotation from 6.75c. to 6.85c., New York. A firmer tone characterizes the market both here and in the West, where higher prices have prevailed for several days, the quotation at St. Louis now being 6.55c., with business done recently around 6.50c. Demand continues excellent and consumption is heavy.

Zinc.—Despite unfavorable statistics which show that stocks increased 2894 tons in October and that production was nearly 10,000 tons in excess of domestic shipments, the market is firmer and prices are higher, prime Western being quoted today at 6.45c., St. Louis, or 6.80c., New York. Actual buying of the metal has been only fair, but there is an improvement in sentiment based partly on a more active demand and a better outlook in the brass trade.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 29c. to 32c.

Antimony.—The market continues to advance and wholesale lots of Chinese metal are quoted at 9.25c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., duty paid, New York, with only a few sellers able to obtain the metal from the principals.

Old Metals.—Business is active and values are advancing. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	10.00
Heavy machine composition	10.25
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	8.75
No. 1 yellow red brass turnings	6.75
Lead, heavy	6.25
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.25
Sheet aluminum	16.25

Chicago

Nov. 13.—All of the metals are more active. Considerable tonnages of copper have changed hands, some of them being for future deliveries. Tin is stronger than had been expected in view of heavy tonnages scheduled for arrival this month, which would ordinarily be regarded as an adverse factor. Lead is not freely offered and producers are not pressed to dispose of their supplies. The situation in zinc is not so favorable. Antimony continues to gather strength in the absence of foreign offerings. Copper, tin and antimony have advanced, while lead and zinc remain stationary. Business in the old metals has materially improved, with prices generally higher. We quote in carload lots: Lake copper, 13.50c.; tin, 43.50c.; lead, 6.50c.; spelter, 6.40c.; antimony, 11c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.25c.; red brass, 8.50c.; yellow brass, 6.50c.; lead pipe, 5.50c.; zinc, 4.25c.; pewter, No. 1, 23c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

Ford Motor Co. Planning to Increase Production

The Ford Motor Co. is at present urging a speed-up program for all parts and accessories manufacturers which will permit of their increasing their production during the first half of 1924 to 8000 or 9000 cars per day. The continued demand for motor cars is pointed to as justifying the increased production. The Ford sales department is so far behind in orders that delivery of cars, particularly of the closed type, requires from one to four weeks, in spite of the fact that the company is working two 8-hour shifts.

The Ford company has not set any definite production figure but it is getting all lines of assembling in order, so it will be in a position to keep step with the sales department, and present indications are it will need the above mentioned number of cars per day to fill the orders.

C. D. Carey, assistant to the president, Verona Steel Castings Co., Verona, Pa., will be the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association, Monday evening, Nov. 19, at the General Forbes Hotel. His subject is, "The Trend of Specifications and Inspection in the Casting Industry."

PERSONAL

Leo F. Caproni, who recently became assistant sales manager of the Palmer Steel Co., Inc., designer, fabricator and director of steel structures, Springfield, Mass., has been continuously identified with different departments of the fabricating steel business since his graduation in 1911 from the engineering course at Dartmouth College. He has successively been with the Lally Column Co., manufacturer of concrete filled pipe columns, the National Bridge Works where his work included contracting and engineering after learning details of the business, the Bethlehem Steel Co., where he was engaged in the selling department of the New York office, and the Hay Foundry & Iron Works, New York, where he was assistant contracting engineer.



LEO F. CAPRONI

Lewis S. West, vice-president and general manager Merchants Dispatch Transportation Co., East Rochester, N. Y., has been elected a director of the Genesee Valley Trust Co., that city.

Harbor Mitchell, who resigned recently as vice-president and general manager of the American Foundry & Construction Co., Pittsburgh, has been appointed assistant to Mr. Floersheim of B. Floersheim & Co., piping engineers and contractors, Pittsburgh. Mr. Mitchell is a graduate in mechanical engineering from West Virginia University and has had 15 years' experience in the selling and manufacture of piping systems.

Lee M. Clegg has been made sales manager of the Steel Products Co., Cleveland and Detroit. He is a graduate of Case School of Applied Science, Cleveland, and has been with the company since 1919 in the efficiency department, and during the past several months has been assistant sales manager under J. A. Krider, secretary-treasurer.

W. E. Schmid, mechanical engineer Combustion Engineering Corporation, has been assigned to the branch office in Paris, the Société Anonyme des Foyers Automatiques.

Thomas P. Anthony has been appointed chief engineer of the United States Cast Iron Pipe & Foundry Co., Burlington, N. J. P. T. Laws was appointed Southern manager, with offices at 1002 American Trust & Savings Bank Building, Birmingham, Ala.

J. W. McQueen, president Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., spent several days in St. Louis last week, and on Thursday was host to 14 foundrymen of the district at a luncheon at the Missouri Athletic Association.

W. J. Mackenzie, metallurgist Interstate Iron & Steel Co., Chicago, will address a combined meeting of the Cincinnati Engineers' Club and the American Society for Steel Treating on Thursday evening, Nov. 15, at the Chamber of Commerce. The meeting will be preceded by a dinner.

Frederick W. Henrici, assistant engineer of the erecting department American Bridge Co., Pittsburgh, was the speaker at a joint meeting of the civil section, Engineers Society of Western Pennsylvania, and the Pittsburgh section, American Society of Civil Engineers, at the William Penn Hotel, Pittsburgh, on Tuesday evening, Nov. 13. He described the erection of the Southern Railroad bridge over the Ohio River at Cincinnati.

J. V. W. Reynders and F. F. Sharpless, national vice-president and secretary respectively of the American Institute of Mining & Metallurgical Engineers, will be principal speakers at the subscription dinner to be given by the Ohio section of the Institute at the Hotel Winton, Cleveland, Nov. 16.

E. E. Helm has resigned as industrial secretary of the Akron, Ohio, Chamber of Commerce, to become Detroit branch manager of the Bridgeport Brass Co., Bridgeport, Conn.

Charles N. Ring, formerly identified with the Ohio Steel Foundry Co., Lima, Ohio, has been appointed manager of the Allied Steel Castings Co., West Harvey, Ill.

J. G. Penwell, plant superintendent General American Tank Car Corporation, East Chicago, Ind., has been promoted to manager to succeed O. J. Parks, transferred to the Chicago offices as head of the sales department.

E. P. Mathewson of New York, president American Institute of Mining and Metallurgical Engineers, has been elected representative fellow of McGill University, Montreal, for countries outside of Canada and Newfoundland. He will serve for three years and becomes a member of the McGill Corporation. Mr. Mathewson was born in Montreal in 1864 and received from McGill the degree of bachelor of science in mining in 1885.

Stanley A. Richardson has returned to the faculty of the department of engineering, Lewis Institute, Chicago, and has resumed charge of the courses offered in metallography and ferrous metallurgy.

Harry J. Rothrock has been appointed assistant foundry superintendent of the Deemer Steel Casting Co. of New Castle, Del. During the last four years he has been with the Taylor Wharton Iron & Steel Co., and was superintendent of the steel foundry department at the Easton, Pa., plant during the last two years.

George S. Brush, who resigned recently as general manager of the Houston Electric Railway Co., Houston, Tex., has been made assistant to the president of the Ballard Oil Equipment Co., Boston.

Thomas H. Wickenden of the development and research department International Nickel Co. was guest of the Hartford chapter, American Society for Steel Treating, on Tuesday evening, Nov. 13, at the Hartford Engineers' Club, Hartford, Conn. He spoke on alloy steels in automotive construction.

Wilson Oliver has been appointed manager of the Pittsburgh branch, Oliver Brothers, Inc., New York, to succeed O. A. Lanchantin, who has resigned to become sales manager of the Eastern Steel Products Corporation, Spring City, Pa. Mr. Oliver is a son of the late Thomas E. Oliver, founder and for 30 years president of the Oliver Brothers, Inc. He has been identified with the company since 1913 and before that for several years was associated with a wholesale house. Mr. Oliver enlisted in the Essex troop of New Jersey at the outbreak of the war and had actual service overseas.

T. Holland Nelson, formerly steel works manager with Henry Disston & Sons, Inc., and finally in charge of its metallurgical research, has resigned to take charge of the works at Titusville, Pa., of the Cyclops Steel Co. Mr. Nelson is a native of Sheffield, Eng., was educated at Sheffield University, and was for several years employed by Thos. Firth & Sons, Ltd., Sheffield, finally becoming assistant to Harry Brearley, British metallurgist and inventor of stainless steel. Mr. Nelson came to the United States in 1911 and joined the Simonds Mfg. Co., later transferring to Henry Disston & Sons. He returned to England, enlisted in the British Army at the outset of war and was detailed to the manufacture of munitions. He was connected with the firm of Peter Stubs, Ltd., and left that company as managing director in 1920 to return to the United States.

Dean Mortimer Elwyn Cooley of the University of Michigan has been invited to a dinner to be given in his honor on Nov. 23 at the Hotel Statler, Detroit, by several engineering societies jointly. The engineering societies and Dean Cooley's host of associates and friends are taking this means of expressing their appreciation of his service to the engineering profession

as well as their admiration of his lifelong success and many attainments.

G. B. Armstrong, formerly Michigan representative of the Globe Automatic Sprinkler Co., and later vice-president of the Acme Co., has been chosen vice-president and sales manager of the Viking Automatic Sprinkler Co., with headquarters in Hastings, Mich.

Clarence F. Williams, Cadillac, Mich., has been made president of the Acme Motor Truck Co., that city, succeeding Walter A. Kysor, who recently resigned. Mr. Williams is actively interested in the Cadillac Metal Parts Co., is president of the Simplex Wire Wheel Co., and is an officer of the Cadillac State Bank.

D. De Vries, director R. S. Stokvis & Zonen, Rotterdam, will arrive in New York on the Nieu Amsterdam, Nov. 17. Mr. De Vries has been absent from America four years and plans to visit the many connections of his company while here.

OBITUARY

THOMAS ADAMSON FERNLEY, secretary-treasurer of the National Supply and Machinery Dealers' Association, died on Nov. 6 at Germantown Hospital, Philadelphia. He had been ill since September, of Bright's disease, and for several weeks his condition had been serious. Mr. Fernley was 39 years old and had been for several years secretary of various trade associations affiliated with his father, T. James Fernley, and his brother, George Fernley of the National Hardware Association. Prior to his entrance into association work Mr. Fernley was associated with his father in the wholesale hardware business. He was a grandson of George P. Adamson of Baeder, Adamson & Co., Philadelphia. His wife and two children, Thomas A., Jr., and Harriette M. Fernley survive.



THOMAS A. FERNLEY

CYRUS G. HENRY, blast furnace superintendent, E. & G. Brooke Iron Co., Birdsboro, Pa., died suddenly at his home in that city on Oct. 31, in his fifty-seventh year. He was born in Kutztown, Pa., but moved to Birdsboro early in life and attended the schools there, working later at the flour mill of the Birdsboro Milling Co. In 1897 he was employed by the Brooke company as clerk at No. 3 blast furnace and in 1900 became superintendent, which position he held until the time of his death. He was a very able and conscientious man and a most useful citizen, interested in all the activities of the town in which he lived.

CHARLES O. BROWN, president, Star Furnace Co., Jackson, Ohio, died suddenly on the morning of Nov. 8, from a heart stroke. He had lived in Jackson County practically all his life, having been born at Howard Furnace in 1856. His father built the Star furnace in 1866. Mr. Brown had been in responsible charge of the furnace company for the past 20 years, though his brother, Lewis V. Brown, who died last February, had held the title of president, to which Mr. Brown succeeded at that time.

CORNELIUS V. SIMPKINS, secretary and chief stockholder in the Union Stove Works, Peekskill, N. Y., which he entered 50 years ago as a molder, died on Nov. 9, at the home of his son in Peekskill, aged 86.

WILLIAM D. PACKARD, who with his brother, J. W. Packard, was the originator of the Packard automobile, died at his home in Warren, Ohio, on Nov. 11, aged 62 years. He had been an invalid for a long time and was blind during the last 10 years.

FRENCH MARKET UNSETTLED

Reparations Fuel Deliveries Low Demand Light and Prices Weak—Foreign Competition Felt

PARIS, FRANCE, Nov. 2.—The French market continues unsettled. Inquiry is generally weaker, which is unusual at this time of year. Yet producers are now informed that the prices of coke will be maintained at 212 fr. for November and very likely for December. Nothing certain is as yet known on the resumption of indemnity fuel deliveries, and according to a statement of the Minister for Public Works, the shipments of coke from the Ruhr will not exceed 3000 tons a day for some time to come. Consequently, iron and steel production will not be increased (it was lower in September). A weakness in prices is appearing in some products. There are at least three factors claimed to be responsible for this situation: Diminution of the demand in the domestic and foreign markets; prospects of inflation in England, which would produce a marked decline of the pound; and the arrival on the domestic market of part of the products seized on the Ruhr.

Coke.—During October 126,355 tons of Ruhr coke was received, or a daily average of 4200 tons. From the latest information received, the monthly production of manufactured coke in France (including British, Dutch and American smalls) is now aggregating 120,000 tons, or about the equivalent of both the Nord and Pas-de-Calas mines.

Pig Iron.—Although French foundries seem but little inclined to buy Ruhr pig iron, even at 402 and 405 fr. per metric ton, owing to the uncertainty prevailing as to its quality, purchases in home grades are quite uninteresting and prices are lower. The average for No. 3 P. L. chill-cast foundry is between 406 and 415 fr. per ton, and 5 fr. less for the P. R., according to region and qualities. In some cases prices would have been 405 and 410 fr., but these evidently were exceptional quotations. Hematite is worth 425 to 435 fr. per ton at works. There have been no transactions in Cleveland cast-iron and East Coast mixed numbers because of the rapid decrease of prices in this country. Belgians are asking, f.o.b. Antwerp, 435 and 440 fr. (Belgian currency) for chill-cast. Luxemburg furnaces quote 440 to 445 fr. and Lorraine 440 fr. Very few offerings are noted in Bessemer. Lorraine sellers now accept orders around 390 and 400 fr. (French).

Semi-Finished Products.—The production for September will show a considerable decrease from August, about 60,000 tons, it is estimated. Steel works are now booking any orders offered, and although prices are nominally the same, numerous and large concessions are being made. In the domestic market, the following prices are quoted per 100 kg., f.o.b. East or Lorraine Works:

	Fr. per 100 Kg.
Ingots	47 to 49
Blooms	51 to 53
Billets	54 to 56
Largets	58 to 60

Belgian, Lorraine and Luxemburg works are quoting about the same prices for export:

	Fr. per Metric Ton Belgian Currency
Ingots	500 to 510
Blooms	520 to 530
Billets	540 to 560
Largets	570 to 590

Finished Material.—Many plants are still well booked ahead, so that concessions and the decrease in prices are less acute in this market. Low prices are quoted but for large orders only. The average in the East for beams is 60 and 62 fr. per 100 kg., and merchant steels about 62 and 65 fr. Wire rods bring 80 and 82 fr. for 6 to 8 weeks' delivery. Beams are quoted at 675 and 680 fr. and bars at 700 fr., f.o.b. Antwerp.

Sheets.—Inquiry is fairly active for large flats, heavy and medium sheets. In light gages, British competition is keen and domestic trade slow. Concessions are being made in prices. Large flats are quoted at 64 and 67 fr.; heavy sheets at 67 to 69 fr.; medium sheets, 83 to 89 fr.; light sheets, 93 to 98 fr. per 100 kg.

Plans of New Companies

The O'Neil Mfg. Co., 715-19 Palisade Avenue, West New York, N. J., will manufacture radio loud speakers for the Audiphone Co. of America, 39 Cortlandt Street, New York. L. R. O'Neil heads the company.

The Reliable Auto Radiator Works, 281 Central Avenue, Newark, N. J., has been organized to operate an automobile repair shop. William Berman heads the company.

The Nova Motors Corporation, New York, has been organized with capital stock of $100,000 to manufacture automotive products. The company is in the formative stage and will not be ready to take up operations for a while. Address is in care of A. W. Rinke, 165 Broadway.

The Brooks Boat Co., Inc., Saginaw, Mich., incorporated with $40,000 capital, paid in, has purchased the boat department of the Brooks Mfg. Co., Saginaw, and will manufacture craft up to 65-ft. cruisers, with complete equipment. It has taken over a large inventory of iron, brass and copper but will be in the market for these products from time to time. Plant has been purchased and with a little remodeling, it will be ready for operation. E. S. Palmerton is president and C. W. Forsyth, secretary-treasurer.

The Max Lehman Metal Co., care of J. Raymond Tiffany, 77 River Street, Hoboken, N. J., has been incorporated with $50,000 capital stock and will deal in scrap metals.

The Porter Engine Development Co., New York, has been incorporated with capital stock of $100,000 to manufacture engines for automotive service. The incorporators are J. D. Jones, F. A. Huck, and A. R. Kellegrew. Present address is in care of F. R. Porter, 2 Rector Street.

The Pressteel Engineering Co., 392 Fifth Avenue, New York, recently incorporated with capital stock of $200,000, will manufacture built-up sectional steel cabinets. The company is an outgrowth of the Universal Steel Cabinet Co., Inc., Brooklyn. It is expected that operations will begin within two weeks in a portion of the Curtis plant at Long Island City. Edward Chandler is president, Alvin N. Doe, vice-president, and Gilbert B. Tompkins, treasurer.

The F. D. Koehler Co., Staten Island, N. Y., has been incorporated with $30,000 capital stock to manufacture automobile accessories and equipment, but for the present will confine its activities to the distribution of gasoline and oil. Address is in care of Bernard Pollak, 63 Park Row, New York.

The Torrid Heat Corporation, Brooklyn, incorporated with capital stock of $50,000, will act as distributor of oil heating equipment. Incorporators are M. Bleakney, R. C. Scott, and G. Andrews. Address care of W. H. Orr, 350 Fulton Street, Brooklyn.

The New York-Worthington Burner Corporation, New York, recently incorporated with $25,000 capital stock, will act as distributor for the Worthington Oil Burner Co., Kansas City, Mo. No manufacturing is contemplated. Address care of Hunt, Hill & Betts, 120 Broadway.

The Technola Show Case Co., 11 Rock Street, Brooklyn, has been incorporated with $50,000 capital stock to manufacture show cases and office fixtures. Operations will be conducted on a small scale. The incorporators are A. N. Chipkin, G. D. Stefano, and C. Schwartz.

The Handon Boiler Corporation, New York, has been organized to act as manufacturers' agent in the distribution of boilers, tanks, etc. Organization matters are not fully completed. Address care of J. A. McNamara, 165 Broadway, New York.

Brady & Gough, 45 Warren Street, New York, has been organized by Arthur A. Brady and Robert A. Gough, formerly with the Hansen & York Co., to deal in hardware.

The Newark Transformer Co., 71 Hamilton Street, Newark, N. J., has been organized to manufacture transformers, specializing in the smaller units up to and including 50 kw. The company has a plant equipped for this purpose. D. J. Norton is president.

The Evansville Tool Works, Evansville, Ind., recently organized with $200,000 capital stock, is a reorganization of the company by that name manufacturing edge tools, hammers and blacksmith tools. Frank Lohoff is president; Irving S. Kemp, vice-president, and J. M. Stricker, secretary.

The Johnson Fuel Oil Burner Co., 349 Fairfield Avenue, Bridgeport, Conn., has been organized with $50,000 capital stock to manufacture burners, which will be made in San Francisco. The company will also do business as combustion engineer. R. D. Campbell is one of the heads.

The W. J. Collins Foundry Co., Inc., Box 205, Milford, Mass., has been organized to manufacture iron products, but definite plans are not yet known. W. J. Collins is head.

The Elbe Brass Works, Apple Street and Baltimore & Ohio Railroad, has been organized to manufacture brass valves. It now occupies a three-story building and has sufficient equipment for present needs. Henry Elbe is president.

The American Wire Form Co., 265-73 Grant Avenue, Jersey City, N. J., has been organized to acquire the American Wire Form Co., a New York company, and will manufacture wire baskets and machinery, window and skylight guards. It has plant and equipment. M. B. Sheldon is one of the principals.

The Scientific Apparatus Corporation, Milton, Pa., recently organized, will concentrate on the manufacture of Microscopes. The company is now in rented quarters but expects to get a building of its own. Good sized bookings are now on hand. J. C. Lindner is secretary.

The Kingsley Die Casting Co. Anderson, Ind., recently organized, will take over the business of the Forse Machine Co. and will continue operations in the buildings acquired. Some expansion will be made to accommodate additional die-casting machines and other equipment. The directors are: J. C. English, W. H. Forse, and E. M. Kingsley.

Uniflow Pump & Manufacturing Co. has been incorporated at Columbus, Ohio, with a capital stock of $100,000 to manufacture water systems. Harry T. Wagner, is president; J. Arthur Snier, vice-president and general manager; John Westendorf, treasurer.

The Pike Laboratories, Ltd., Newaygo, Mich., has been organized to manufacture fender lights. Equipment has been placed for present needs. W. J. Pike is chairman of the board.

The Commercial Steel Co., Youngstown, Ohio, has been incorporated with 1000 shares, no par value stock, to manufacture iron and steel products. Plans have not yet been completed. Address care of McKain & Ohl, 1106 Mahoning Bank Building, Youngstown.

The Hartmann Auto Safety Light Corporation, New York, has been organized to manufacture automobile accessories. Awards have been placed for manufacture. Address care of Max L. Solinsky, 51 Chambers Street, secretary.

The New York Implement Co., Watertown, N. Y., was recently organized with capital of $50,000 and will act as jobber in agricultural implements. William H. Gilman is one of the principals.

The Excel Roofing & Sheet Metal Works, Inc., 15 Park Row, New York, was recently organized to install and deal in roofing products. James A. Levner is one of the principals.

The General Metal Products Co., Inc., North West End and McKinley Avenues, Lancaster, Pa., recently incorporated with capital stock of $25,000, will manufacture brass, bronze and aluminum castings and automobile specialties. A plant is now being built and all contracts have been placed. John E. McGovern is one of the heads.

The Goodyear-Zeppelin Corporation, New York, will be organized, following negotiations between the Zeppelin Co., of Germany and the Goodyear Tire & Rubber Co., New York, to construct lighter-than-air craft of the Zeppelin type. Within a few weeks an experienced technical staff will be at work in Akron, Ohio, to outline the project. Details are not yet available.

The Holmes Vapor Carburetor Motor Corporation, New York, has been incorporated with capital stock of $100,000, and purposes to manufacture automobiles. It has joined interests with the Sanford Motor Truck Co., South Norwalk, Conn., which manufactures a similar line. The Holmes organization also has a plant in Denver, which manufactures a 2½-ton chassis and turns out a six-wheel transportation truck. Its products are consumed principally in the Middle West. Direct operations of the Eastern concern will consist mainly in the assembling of parts, but negotiations for plant, equipment or manufacture will not be considered for a few weeks. Edward R. Holmes, Hotel Claman, 255 West Forty-third Street, heads the company.

The Oil Field Equipment Co., incorporated with capital stock of $50,000, to manufacture oil well machinery, will represent manufacturers of these lines in export fields. The company will not be active for several weeks. Thomas E. Ward, 30 Church Street, heads the company.

The White Showers, Inc., 6451-6471 Dubois Street, Detroit, has been incorporated with capital stock of $25,000 to manufacture irrigation equipment. A factory, now being built, is to be occupied within a few weeks. In making its product, the company will require pipe, valves and fittings, in conjunction with special fittings which will be made under contract. R. R. White is president.

Machinery Markets and News of the Works

AN INCREASE IN INQUIRY

Machine Tools in Better Demand Though Sales Show Little, if Any, Gain

A. O. Smith Corporation, Milwaukee, Puts Out List of 48 Machines for Prices—Some Railroad Buying

From all sections of the country a better inquiry for machine tools is reported, but sales have made no appreciable gain. Some of the current inquiry may be in anticipation of 1924 requirements, but, whatever the cause, it has created a slightly more hopeful feeling among tool builders.

The A. O. Smith Corporation, Milwaukee, has sent out a list of 48 machines for prices, this being the outstanding inquiry of the week. The Saco-Lowell Shops, Boston, is inquiring for a fairly large list of equipment. Not much business has come from Michigan automobile companies, which have been consistent buyers for some time.

The most promising of railroad developments is the appropriation by the Santa Fe of $3,400,000 for shop extensions at San Bernardino, Cal. Of this sum $900,000 is for a machine shop and $850,000 for a boiler shop, while the outlay for machinery and tools for these shops will be $900,000. Inquiries for the machines have not yet been issued. The Burlington road has distributed formal orders for fully 90 per cent of the tools on its list which included 25 engine lathes. The Illinois Central has bought a few machines. The Denver & Rio Grande Western has bought a 90-in. wheel quartering machine. The Baltimore & Ohio Railroad has added three tools to the list it recently issued.

Japanese business is developing very slowly, and it is not now expected that many orders will be placed until after the first of the year.

New York

NEW YORK, Nov. 13.

MORE inquiries are being received, but the volume of business being placed shows no betterment. It is believed that the greater number of inquiries indicates probable requirements of machine-tool users after the end of the year. There have been no developments in the expected buying of tools by Eastern railroads. The Denver & Rio Grande Western Railroad has ordered in the East a 90-in. wheel quartering machine. The Norma Co. of America, Long Island City, N. Y., which is building a plant at Stamford, Conn., for the manufacture of Hoffman Bearings, is expected to issue soon a list of its machine-tool requirements.

Bids will be received by the Superintendent of Lighthouses, Staten Island, N. Y., until Nov. 19, for approximately 40 tons 1⅝-in. stud link mooring chain, as per specifications on file.

Electric power equipment, conveying, folding and other machinery will be installed in the three-story plant, 100 x 150 ft., to be erected at 764-66 Fourth Avenue, Brooklyn, by E. J. Trum, Inc., 55 Third Street, manufacturer of paper boxes and containers, estimated to cost $125,000. William Higginson, 15 Park Row, New York, is architect.

The Columbia Machine Works & Malleable Iron Co., 269 Chestnut Street, Brooklyn, will commence the construction of a one-story foundry and machine shop, 75 x 490 ft., to cost $180,000 with equipment. Ward & Bender, 120 Broadway, New York, are engineers.

The Sociedade Anonyma Brasital, Santo do Itu, Sao Paulo, Brazil, has been granted permission by the State department, Sao Paulo, to construct and operate a hydro-electric generating plant at its textile mill, to cost about $200,000 with machinery. M. A. Cremer, assistant trade commissioner, United States Bureau of Foreign and Domestic Commerce, Rio de Janeiro, Brazil, has information regarding the project.

Thomas A. Digan, Inc., 656 Third Avenue, Brooklyn, operating a steamship supply business, will erect a two-story cold storage plant, 50 x 100 ft., for which bids will be taken at once. It will cost about $75,000. David M. Ach, 1 Madison Avenue, New York, is architect.

The Union Stove Works, Peekskill, N. Y., have tentative plans for the rebuilding of their plant destroyed by fire Nov. 3, with loss estimated at $400,000 including equipment. Headquarters of the company are at 70 Beekman Street, New York.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 27, for 6000 ft. of copper wire cloth, for the Brooklyn Navy Yard, schedule 1553.

Bids are being asked by the chief storekeeper, Victorian Railways Commission, Melbourne, Australia, until Dec. 19, for one precision lathe, with necessary tools and accessories, size to handle work up to 18-in. in diameter and 54-in. long. Specifications on file at the offices of the Bureau of Foreign and Domestic Commerce, 734 Customhouse, New York; 1801 Customhouse, Boston; and Chamber of Commerce Building, Cincinnati.

Manual training equipment will be installed in the high school addition to be erected at Mount Kisco, N. Y., estimated to cost $200,000, for which plans will be drawn by Ernest Sibley, Bluff Road, Palisades, N. Y.

The Albany Perforated Wrapping Paper Co., Albany, N. Y., operating under the name of the A. P. W. Paper Co., has acquired property at Sheet Harbor, near Halifax, N. S., and plans the erection of a new pulp mill to cost appproximately $250,000 with machinery, including electric power equipment.

A. Rosati, 207 South Street, Jamaica, N. Y., has plans for a one-story machine shop, 40 x 87 ft., on South Street, to cost about $40,000 with equipment. W. Halliday, 28 Union Hall Square, is architect.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has plans in preparation for a one-story power house on West Twelfth Street to cost about $75,000.

The John Polachek Bronze & Iron Co., 480 Hancock Street, Long Island City, has awarded a general contract to Legano Brothers, 233 West Forty-third Street, New York, for two two-story additions, 85 x 150 ft. and 60 x 135 ft., respectively, including improvements in present plant, to cost about $160,000. M. L. Kaufman, 469 Seventh Avenue, New York, is engineer.

R. Liddlelow, secretary, State Electricity Commission, Victoria, Melbourne, Australia, will receive bids until Dec. 15 for four 1000 kva. single phase transformers and spare parts, specification No. 23/145, for the Morwell Power Scheme; until Jan. 3, for aluminum steel-cored cable and accessories, specification No. 24/1; and until Jan. 19, for transformers, switchgear and accessory equipment for Station "B," specification No. 24/2. Copies of tender form

The Crane Market

Activity in electric overhead traveling cranes continues fair with several large inquiries pending, but the locomotive crane field is extremely quiet at present. The inquiry reported in preparation for some time by the New York Central & Hudson River Railroad for two 10-ton, 70-ft. span, gantry cranes for the West Shore Railroad, has not yet materialized. The Brooklyn Eastern District Terminal Co., Brooklyn, N. Y., has been receiving bids on a 25-ton gantry crane of special construction. The Phoenix Utility Co., 71 Broadway, New York, has not yet closed on the 25-ton, stationary, deep-well hoist, inquired for recently. The city of Fort Wayne, Ind., through Charles Brossman, consulting engineer, Merchants Bank Building, Indianapolis, or A. W. Grosvenor, 122 East Washington Street, Fort Wayne, is receiving bids on a 100-ton hoist for a movable dam on the Maumee River at Fort Wayne, bids opening in about thirty days. The Milwaukee Department of Public Works is receiving bids until Nov. 19 on a 5-ton hand power crane for the Riverside pumping station.

In the Pittsburgh district the steel companies are conspicuous among those who have asked prices on cranes and the feeling is that if the orders do not come out during the remainder of the year, they will in the form part of 1924. In the pending business are six cranes for the foundry of the new Baltimore plant of the Standard Sanitary Mfg. Co., Pittsburgh; a 10-ton crane for the Steubenville works of the Wierton Steel Co., Wierton, W. Va.; a 5-ton, 27-ft. span, 3-motor crane for the Dillon Brothers Machine Co., Wheeling, W. Va., a revival of an old inquiry; a 5-ton, 50-ft. 6-in. span, 3-motor crane for the Guibert Steel Co., Pittsburgh, and a gantry crane for the Pittsburgh works of the A. M. Byers Co., Pittsburgh. Agar Cross & Co., 11 Broadway, New York, recently in the market for 68 chain hoists for shipment to South America, report award of the business to a German builder.

Among recent purchases are:

Lima Corporation, Lima, Ohio, two 30-ton trolleys with 10-ton auxiliaries, from the Shaw Electric Crane Co.

Spang, Chalfant & Co., Pittsburgh, a 5-ton, 2-hook trolley from the Shaw Electric Crane Co.

Southern Pacific Co., 165 Broadway, New York, 7½-ton electric crane from the Shaw Electric Crane Co.

Westinghouse Electric & Mfg. Co., Philadelphia, two 5-ton, 40-ft. span electric traveling cranes from an unnamed builder.

John A. Roebling's Sons Co., Trenton, N. J., a 2½-ton, 41-ft. span electric traveling crane from an unnamed builder.

Carnegie Steel Co., for Baltimore, Md., an 8-ton, 28-ft. span hand power crane from the Chisholm-Moore Mfg. Co.

Atlantic Steel Casting Co., Philadelphia, a 10-ton trolley from an unnamed builder.

American Chain Co., Bridgeport, Conn., a 5-ton, 47-ft. span electric traveling crane from the Shepard Electric Crane & Hoist Co.

Wabash Railroad Co. Decatur, Ill., a 25-ton, 50-ft. boom, locomotive crane with 1½-cu. yd. Blaw-Knox bucket, from the Industrial Works.

Pennsylvania Railroad, Philadelphia, 33 jib cranes for freight handling from the McMyler Interstate Co.

Riverside Ice Co., New York, a 15-ton locomotive crane from the McMyler Interstate Co.

M. & S. Coal Co., Akron, Ohio, two steam shovels from the McMyler Interstate Co.

Metals Refining Co., Hammond, Ind., a 5-ton, 33-ft. 8-in. span, 3-motor cage-operated crane from the Milwaukee Electric Crane & Mfg. Co.

Chicago Bearing Metals Co., Chicago, 40 overhead turntables for a monorail from the Whiting Corporation.

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and specifications available at the offices of the Bureau of Foreign and Domestic Commerce, 734 Customhouse, New York, and Room 830, 76 West Monroe Street, Chicago.

The New York Edison Co., 130 East Fifteenth Street, New York, has plans for a four-story power house, 45 x 81 ft., at 37-39 Jane Street, to cost $140,000. William Whitehall, 709 Sixth Avenue, is architect.

The Board of Directors, Rockaway Beach Hospital, Rockaway Beach, L. I., has authorized plans for a one-story power house and laundry to cost $42,000. Resler & Hesselbach, 41 East Forty-second Street, New York, are consulting engineers.

The Radiotive Corporation, 5317 Twenty-first Avenue, Brooklyn, manufacturer of radio headsets and other wireless equipment, will erect a three-story addition, 90 x 100 ft., to cost $65,000. Magnuson & Kleinert, 52 Vanderbilt Avenue, New York, are architects.

Manual training equipment will be installed in the two and one-half story senior high school to be erected on the Tuckahoe Road, Yonkers, N. Y., to cost about $735,000, for which a general contract will soon be let. G. Howard Chamberlain, 18 South Broadway, Yonkers, is architect.

Cranes, elevating equipment and other material-handling apparatus will be installed in the five-story building, 100 x 100 ft., to be erected by the Shupe Terminal Corporation, Lincoln Highway, Kearny, N. J., to cost about $500,000. Leo Feinen and George Bial, 3697 Boulevard, Jersey City, N. J., are architects. William F. Shupe is president.

The Western Electric Co., Inc., 195 Broadway, New York, has awarded a general contract to the Turner Construction Co., 244 Madison Avenue, for the initial unit at its proposed plant on Central Avenue, Kearny, N. J.

The Alexander Hamilton Garage Co., Inc., Paterson, N. J., has awarded a general contract to the John W. Ferguson Co., Market Street, for a four-story automobile service and repair building, totaling about 100,000 sq. ft., with machine shop, estimated to cost $110,000.

The Board of Directors, Peddie Institute, Hightstown, N. J., is considering the construction of a power house to cost about $50,000, including equipment. R. W. Swetland is head master.

The Public Service Corporation, Public Service Terminal, Newark, is disposing of a preferred stock issue of $11,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and systems. Contract has been awarded to the Westinghouse Electric & Mfg. Co., East Pittsburgh, for eight transformers and accessory equipment, four to be installed at the Essex power station, and the other four at the Marion station. Awards for additional apparatus will be made in the near future.

The Steffens-Amberg Co., 262 Morris Avenue, Newark, manufacturer of saddlery hardware and other metal products, is having plans drawn for a four-story addition, 75 x 100 ft., to be used primarily as a forge shop. It will cost about $42,000. Alfred Peters, 828 Broad Street, is architect.

The Griffin Auxiliary Carburetor Co., New York, has been incorporated with capital stock of $25,000, to manufacture carburetors for automotive service. Plans have not been completed, but manufacturing will be let out on contract and the company will operate an assembling plant. Address care of E. A. McShane, 49 Wall Street.

Barclay & Co. have awarded the John W. Ferguson Co., New York, contract for constructing a power house at Morsemere, N. J.

New England

BOSTON, Nov. 12.

THE machine tool market is slightly more active, but sales for the most part are confined to single machines. The purchase of a 42-in. car wheel borer, a 20-in. and a 16-in. lathe, a 28-in. shaper and a bolt cutter by the Rutland Railroad is the one notable exception the past week. Competition for business is exceptionally keen in this territory. List prices on new tools remain unchanged, but some shading has been done on recent business. Prices often quoted on good conditioned used tools are so far under those made on new equipment that there is little opportunity for the manufacturer of the latter or his representative to interest buyers. That prices on used equipment are lower here than in some other sections of the country is attested by the frequent inquiries from Middle and Far West dealers.

The sale of tools to the Pacific Mills, Boston, for its repair shop, Lyman, S. C., reported last week, involved about 25 tools, including one 36-in. x 24-ft., one 24-in. x 24-ft. and one 16-in. x 16-ft. lathe, one 3-ft. radial drill, one plain milling machine with cone drive, one cutter and reamer grinder, one back geared high-speed crank shaper, one bolt cutter, one floor grinder, one double emery grinder, one 36 x 6-in. power grindstone, one cutting-off machine, one sensitive drill, two pipe machines, one forge, one hand-power swaging machine, one stripping gage, one 12-in. planer, one 26-in. x 8-ft. planer, one sliding top saw table, and various saws for wood working.

The Saco-Lowell Shops, Boston, are inquiring for a fairly large list of equipment, some of which presumably will be purchased this year, and the remainder in 1924. Other manufacturing interests are inquiring for new equipment for 1924 budget purposes. The demand for transmission has materially increased, most inquiries coming from textile mills, following the textile show recently held in Boston.

The plant formerly owned by the Mason Regulator Co., Hyde Park, Boston, has been sold to trustees of the Englander Spring Bed Co., New York, for manufacturing purposes. It contains about 50,000 sq. ft. floor space.

Landers, Frary & Clark, New Britain, cutlery, etc., have awarded contract to the Torrington Building Co., Torrington, Conn. for a six-story addition, work on which will start this month.

Plans have been accepted for the George Sykes manual training school, Rockville, Conn., to cost approximately $300,000 without equipment, money for which will be appropriated this month. The school committee is making up a list of equipment required, including metal and wood working machinery.

The plant of the Oliver Mann & Sons Co., New Boston, Mass., pails, was destroyed by fire last week. Oliver Mann, president, states that a new plant will be erected, work to begin at once.

Bids will be taken this week by the Carr Fastener Co., 31 Ames Street, Cambridge, Mass., for an addition, to contain 16,000 sq. ft.

Check, boiler and basement valves and other equipment are required by the Rinaldi Tile Co., Inc., 263 Atlantic Avenue, Boston, for a three-story, 48 x 105 ft. plant to be erected on Carleton Street, Cambridge, Mass.

Fire recently destroyed the plant of the American Japanning Co., Bedford Road, Woburn, Mass. A new plant will be erected as soon as insurance losses are adjusted. Ovens and other equipment will be required.

The Fuller Gates Co., Hartford, Conn., was recently organized with $50,000 capital stock to manufacture electrical wiring devices and is about ready to begin operations. It will be in the market soon for materials. Fred P. Gates is vice-president.

Manual training equipment will be installed in the new high school to be erected at Franklin, Mass., estimated to cost $200,000. Ritchie, Parsons & Taylor, 15 Ashburton Place, Boston, are architects.

The Warren Foundry, Warren, R. I., has preliminary plans for enlargements, including improvements in the present foundry.

Contract has been awarded by the Stanley Rule & Level Division of the Stanley Works, New Britain, Conn., to the Aberthaw Construction Co., Boston, for a seven-story manufacturing unit, 60 x 140 ft., and a three-story structure, 60 x 200 ft., to cost approximately $175,000.

Manual training equipment will be installed in the new three-story and basement junior high school to be erected at Fall River, Mass., for which bids have been received on a general contract. It will cost approximately $650,000. Nathaniel C. Chase, 47 Borden Building, is architect.

Plans are being drawn for a one-story power house, 60 x 150 ft., at the plant of the Donnelly Brick Co., Berlin, Conn., estimated to cost $42,000. M. J. Unkelbach, Main Street, New Britain, Conn., is architect.

The Textile Finishing Machinery Co., 171 Westminster Street, Providence, has awarded a general contract to the J. A. Maguire Construction Co., Providence, for two additions, one-story, 75 x 120 ft. and two-stories 60 x 110 ft., respectively, to cost $85,000. The latter will be equipped as a roll shop.

The Connley Electric Welding Co., 307 South Water Street, Providence, has filed plans for a new one-story plant on Public Street.

The Municipal Water Department, Middletown, Conn., will build a new pumping plant on Highland Avenue to cost about $42,000.

Manual training equipment will be installed in the new three-story high school to be erected at Stoneham, Mass., estimated to cost $250,000, for which plans are being drawn by Ritchie, Parsons & Taylor, 15 Ashburton Place, Boston, architects.

The Bennet Wire Co., 154 Water Street, Norwalk, Conn., has awarded a contract to Fred M. Hawkins, Norwalk, for a one-story addition.

The Common Council, Willimantic, Conn., is arranging an appropriation for the construction of a municipal ice plant.

The Waterbury Farrel Foundry & Machine Co., Bank Street, Waterbury, Conn., will commence the erection of a one-story addition to its power house, 46 x 52 ft. Westcott & Mapes, New Haven, Conn., are engineers.

Ovens, power equipment, conveying and other machinery will be installed in the three-story plant to be erected at Providence, by the Atlantic Biscuit Co., care of the McCormick Co., 41 Park Row, New York, architect and engineer.

The Board of Education, Waterbury, Conn., is arranging an appropriation for the installation of a manual training department at the Maloney School.

The M. Backes Sons Mfg. Co., Wallingford, Conn., manufacturer of percussion caps, explosives, etc., has awarded a general contract to the Loucks & Clark Co., Wallingford, for a one-story and basement addition, 30 x 130 ft.

Philadelphia

PHILADELPHIA, Nov. 12.

BIDS will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 27, for three engine lathes for the Philadelphia Navy Yard, schedule 1567.

Francis B. Beddall, 223 North Sixteenth Street, Philadelphia, operating a machine and welding works, has taken title to property at 762-66 North Uber Street, for the erection of a new machine shop, for which plans will be drawn at once.

The J. G. Brill Co., Sixty-second and Woodland Streets, Philadelphia, manufacturer of railroad and traction cars, trucks, etc., has formed a subsidiary, the Automotive Car Division, for the manufacture of gasoline-driven cars. The new organization has acquired the railroad motor coach division of the Service Motors, Inc., Wabash, Ind., including production rights for the gasoline-driven cars heretofore made by the Service company. Operations will commence at an early date, to include improvements in the works and later expansion. C. O. Guernsey, formerly vice-president of the acquired company, will be chief engineer of the new organization.

The Packard Motor Car Co., 319 Broad Street, Philadelphia, has engaged Philip S. Tyre, 1509 Arch Street, architect, to prepare plans for its four or five story service, repair and headquarters, 200 x 265 ft., at Broad Street and Allegheny Avenue, to cost approximately $600,000.

Fire, Nov. 2, destroyed a portion of the plant of the Federal Steel Foundry Co., foot of Reaney Street, Chester, Pa., with loss estimated at $23,000. The company is a subsidiary of the William Cramp & Sons Ship & Engine Building Co., Philadelphia.

The Remington-Burnelli Aircraft Corporation, 25 West Forty-fifth Street, New York, is having plans drawn for the first unit of its proposed plant on Magazine Lane, Philadelphia, totaling about 15,000 sq. ft., of floor area, and will break ground within the next 60 days. Other units will be built later.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, will make enlargements in its steam power plant in the Port Richmond section, including the installation of additional equipment, to cost approximately $600,000.

The American Meter Co., Seventeenth and Clearfield Streets, Philadelphia, manufacturer of gas meters, etc., has awarded contract to the A. Raymond Raff Co., 1635 Thompson Street, for an addition in the rear of 3110 North Seventeenth Street, to cost about $21,000.

A machine and mechanical department will be installed in the new building to be erected by the Bell Telephone Co., Chester, Pa., estimated to cost $50,000.

R. Van Horn, 4929 Catherine Street, Philadelphia, and associates, have organized the Wrench Creek, Sugar Creek and Sandy Creek Township Power Corporations, to install and operate plants and systems in the respective territories. The Greenfield Township Power Co. will also be formed by the same interests to operate in the vicinity for which named.

The Congoleum Co., Trainer, near Chester, Pa., has acquired about 20 acres in the vicinity of its works for about $50,000, and plans the erection of a new paper mill, to cost more than $200,000 with machinery.

The Rowland Shovel Co., Central Avenue and Ashbourne Street, Cheltenham, Pa., operated by the Ames Shovel & Tool Co., Boston, is having plans drawn for rebuilding the portion of its plant and power house recently destroyed by fire. L. Rose, Jr., is general manager.

The Vulcanite Portland Cement Co., Land Title Building, Philadelphia, with plant at Vulcanite, N. J., is disposing of a bond issue of $600,000, a large part of the proceeds to be used for the installation of additional equipment, on which work has been commenced. It is expected to provide new machinery to effect a raving of about $100,000 per annum in operation. John B. Lober is president.

The Johnson Bronze Co., New Castle, Pa., manufacturer of bronze bushings, etc., has awarded a general contract to the Truscon Steel Co., Youngstown, Ohio, for an addition to manufacture bushings under a special process. Equipment will be installed for about 75 operatives.

The Quality Tool Corporation, New Wilmington, Pa., recently organized by local interests, is planning the establishment of a factory to manufacture tools and mechanical equipment.

The Klein Motor Co., Easton, Pa., care of Lohr & Kennard, 315 Brodhead Street, architects, is taking bids on a general contract for a two-story service and repair building, 140 x 140 ft., on Butler Street, estimated to cost $70,000 with equipment.

The Pennsylvania Engineering Works, New Castle, Pa., manufacturers of iron and steel castings, etc. has tentative plans for extensions and the installation of additional equipment. Arrangements are being made for an increase in capital from $1,000,000 to $1,800,000.

The Jordan Coal Co., Scranton, Pa., has secured a lease of anthracite coal properties near Pottsville, Pa., and plans the construction of a coal breaker to cost approximately $200,000. Electric power and other equipment will also be installed. P. R. Jordan is head.

The Erie Railroad Co., 50 Church Street, New York, is said to have tentative plans under consideration for extensions in its shops at Susquehanna, Pa., with the installation of additional equipment.

The Watts Water Power Co., and the Juniata Water Power Co., Juniata, Pa., recently organized by Col. S. W. Fleming and Farley Gannett, and associates, Harrisburg, Pa., are planning the construction of a power plant in the vicinity of Millerstown. Pa.

Manual training equipment will be installed in the new West End junior high school to be erected at Lancaster, Pa., for which foundations will be laid at once, estimated to cost $556,000, with equipment.

Officials of the Middletown & Swatara Consolidated Water Co., Middletown, Pa., are arranging for a reorganization of the company under the name of the Middletown & Royalton Water Co., to include the issue of bonds for $225,000, a portion of the proceeds to be used for the installation of a new pumping plant and other equipment.

The Panther Valley Mining Co., Weatherly, Pa., operating coal properties in the Quakake Valley section, has tentative plans for the installation of a tipple and other colliery buildings. Pumping machinery and other operating equipment will also be installed.

Buffalo

BUFFALO, NOV. 12.

AN appropriation of about $400,000 is being arranged by the Atlas Crucible Steel Corporation, Dunkirk, N. Y., for extensions and additional equipment.

The Niagara Falls Power Co., Niagara Falls, N. Y., will install a 70,000-hp. turbine-generator at its hydroelectric power plant, with auxiliary machinery, supplementing a similar unit now being installed, and will make other extensions. The two turbines were constructed by the William Cramp & Sons Ship & Engine Building Co., Philadelphia.

The Common Council, Herkimer, N. Y., is planning the installation of additional equipment at the steam-operated municipal electric plant, to cost about $75,000.

The Pratt & Letchworth Co., 189 Tonawanda Street, Buffalo, manufacturer of iron and steel castings, has awarded a general contract to the Hunkin-Conkey Construction Co., Cleveland, for two one-story additions, 70 x 210 ft., and 50 x 120 ft., to cost $80,000.

The Board of Trustees, St. Joseph's Hospital, Syracuse, N. Y., has authorized plans for a new power house to cost approximately $150,000 including equipment. Goggin & Goggin, University Building, are architects.

The City Council, Canandaigua, N. Y., will hold in abeyance plans for the proposed municipal electric plant, estimated to cost $100,000 with machinery, and will secure service from the Rochester Gas & Electric Corporation.

Fisher & Payne, Carter Alley, Geneva, N. Y., manufacturers of automobile bodies, are planning the erection of new works on West Hamilton Street.

The C. H. Lovejoy Chaplet Co., Inc., Hoosick Falls, N. Y., plans the installation of a number of automatic screw machines.

Manual training equipment will be installed in the new high school to be erected at Nunda, N. Y., estimated to cost $150,000, for which plans are being prepared by Randall & Vedder, S. A. & K. Building, Syracuse, N. Y., architects.

The City Council, Gouverneur, N. Y., is arranging an appropriation of about $100,000 for the construction of a municipal electric light and power plant.

The Wickwire-Spencer Steel Corporation, River Road, Buffalo, has awarded contract to the W. G. Hudson Corporation, 50 Church Street, New York, for the construction of a new briquetting plant, to cost $80,000.

The Northern New York Utilities, Inc., Watertown, N. Y., and its affiliated interest, the Power Corporation of New York, have acquired the Rome Gas, Electric Light & Power Co., Rome, N. Y., heretofore controlled by the National Gas, Electric Light & Power Co., Philadelphia. The new owner plans extensions and will merge the property with its present system.

The Tonawanda Iron Corporation, North Tonawanda, N. Y., will install hoisting, conveying and other machinery on its new dock, for which a contract has been awarded to the Empire Engineering Co., River Road. It is estimated to cost $200,000.

The Flint Cold Storage Co., Flint, N. Y., has tentative plans for a new ice and coal storage plant, estimated to cost $150,000 with equipment. T. D. Whitney, Flint, is president.

Manual training equipment will be installed in the proposed two-story and basement high school to be erected at Sherbourne, N. Y., estimated to cost $130,000, for which foundations will be laid at once. J. Mills Platt, Cutler Building, Rochester, N. Y., is architect.

The Rochester Boiler & Tank Co., 217 North Water Street, Rochester, N. Y., has tentative plans for enlargements and the installation of additional equipment. D. F. Murray is president.

The Precision Casting Co., Syracuse, N. Y., is in the market for a punch press, preferably Bliss No. 18, 19 or 20, with dial feed and 3 or 3½-in. stroke of slide.

Pittsburgh

PITTSBURGH, NOV. 12.

CHEERFULNESS in the local machine tool trade is sustained more by the large amount of business that has been quoted against than by the number of orders recently placed. Revival of a crane inquiry from the Dillon Brothers Machine Co., Wheeling, W. Va., which is to build a new forge plant, encourages expectations of purchases of tools and the Guibert Steel Co., Diamond Bank Building, Pittsburgh, which built a fabricating plant the past year, is expected to buy tools before long. The National Tube Co., Frick Building, Pittsburgh, has an inquiry out for a shaper, lathe and drill press for its Riverside works, Benwood (Wheeling, W. Va.), and also is understood to be making plans for new construction at its Christy Park works, McKeesport, Pa. The Pennsylvania Railroad has not yet closed against the several tools it inquired for a few weeks ago for its Mingo Junction, Ohio, car repair shops.

The Riter-Conley Co., Oliver Building, Pittsburgh, recently bought a planing and upsetting machine of special design from the Birdsboro Foundry & Machine Co. The Riter-Conley Co. does the fabricating of large outside diameter lockbar pipe and the purchase of this machine was necessary in connection with the order for the Bull Run water pipe line for Portland, Ore., recently placed through T. A. Gillespie, New York.

Tentative plans are being considered by the Corrado Coal & Coke Co., Dawson, Pa., for rebuilding the portion of the tipple and power house recently destroyed by fire. The plant was recently purchased from the W. J. Rainey Coal & Coke Co.

The Pittsburgh Auto Equipment Co., 5933 Baum Boulevard, Pittsburgh, is taking bids for a five-story and basement works, 60 x 115 ft., to cost $85,000. The Hunting-Davis Co., Century Building, is architect.

Fire, Nov. 4, destroyed a portion of the general repair shop, 50 x 200 ft., at the locomotive works of the Pennsylvania Railroad Co., Pitcairn, Pa., with loss estimated at $25,000. It is planned to rebuild.

Electric power equipment, conveying apparatus, presses, etc., will be installed in the addition, 35 x 127 ft., to be erected by the Potomac Pottery Co., Inc., Keyser, W. Va., manufacturer of sanitary ware, for which a general contract has been let to the T. P. Lilles Co., Keyser. Frederick C. Buford is president.

The Virginian Power Co., Charleston, W. Va., is arranging an extension rogram to cost about $2,000,000. Plans include the construction of a new hydroelectric power house at the mouth of Cabin Creek and the installation of additional steam power equipment at other stations, with coal-handling and storage equipment and auxiliary apparatus.

The G. M. Johnson Mfg. Co., Jeannette, Pa., manufacturer of mining machinery, mine safety apparatus, etc., has tentative plans for a new one-story building, 40 x 140 ft., to replace the portion of its plant recently destroyed by fire with loss of about $55,000.

R. W. Russell, St. Marys, W. Va., has inquiries out for one 300 to 350-hp. gas-operated engine, with one 200-kw. alternator, and auxiliary equipment; also for two 40-hp. gas engines.

Bids will be received by the city clerk, Keyser, W. Va., until Dec. 12, for centrifugal pumping machinery, booster pumping plant, water tank and tower, and other auxiliary equipment for a waterworks plant. The J. N. Chester Engineers, Inc., Union Bank Building, Pittsburgh, is engineer. E. V. Romig is mayor.

The Pittsburgh & West Virginia Railway Co., Wabash Building, Pittsburgh, has completed plans for a two-story steam-operated power plant, 48 x 100 ft., at Rook, near Pittsburgh. Crecelius & Phillips, Hanna Building, Cleveland, are engineers.

Manual training departments will be installed in the two-story and basement high school to be erected at Indiana, Pa., estimated to cost $350,000, for which bids will be received on a general contract until Dec. 1. Thayer & Johnson, 39 North Jefferson Street, New Castle, Pa., are architects.

The West Penn-West Virginia Water Power Co., Pittsburgh, a subsidiary of the West Penn Power Co., West Penn Building, has plans for a new power house in Wharton Township, Fayette County.

Fire, Nov. 6, caused by an explosion, destroyed the plant, power house and equipment of the Raleigh Wyoming Coal Co., Glen Rogers, Wyoming County, W. Va., with loss of $350,000.

Machine shops and manual training departments will be installed in the new Lincoln junior high school and Douglas junior high school, to be erected at Huntington, W. Va., by the Huntington Independent District Board of Education, estimated to cost $375,000. R. N. Bates, 416 Eleventh Street, is architect for the former, and W. F. Diehl, Robson-Pritchard Building, architect for the other. Bids will be received on general contracts until Nov. 26.

The Park Way Welding Co., 100 West Park Way, Northside, Pittsburgh, is planning for the installation of a rotary shear, bending rolls and other equipment.

T. N. Gummert, Tarentum, Pa., is organizing a company to build a local glass manufacturing plant. The initial unit is expected to cost about $1,000,000 including power house.

The Faris Construction Co., Sutton, W. Va., has inquiries out for an air compressor. J. W. Johnson is president.

The Willetts Clay Co., Fairmont, W. Va., manufacturer of glass pots and kindred specialties, has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss of $200,000 including machinery.

Hoisting, conveying and other material-handling machinery will be installed in the proposed freight house to be erected by the Pittsburgh Railways Co., Pittsburgh, estimated to cost $450,000.

The Pittsburgh & Lake Erie Railroad Co., Terminal Building, Pittsburgh, has awarded a general contract to W. F. Trimble & Son, 1719 Penn Avenue, for the construction of a one-story engine house, with repair facilities, 35 x 135 ft., at McKees Rocks, Pa., to cost about $35,000. A. R. Raymer is chief engineer.

Detroit

DETROIT, Nov. 12.

BIDS are being asked by the Mueller Metals Co., Port Huron, Mich., manufacturer of castings and forgings, for a one-story forge shop, 50 x 150 ft., at St. Clair, Mich., to cost about $30,000. Walter H. Wyeth, 314 Sperry Building, Port Huron, is architect. Oscar B. Mueller is president.

The Detroit Concrete Receptacle Co., 4225-27 Michigan Avenue, Detroit, has engaged Stratton, Snyder & Bauer, 1103 Union Trust Building, architects, to prepare plans for its new one-story plant on the Woodward Heights Boulevard, estimated to cost $250,000, including machinery. Bids will be asked early next year.

Fire, Nov. 3, destroyed a portion of the plant of the Soo Handle & Enameling Co., Saulte Ste. Marie, Mich., with loss estimated at $30,000, including equipment. It is planned to rebuild.

The Valley Paper Co., Press Building, Kalamazoo, Mich., has authorized plans for a new mill, with power house and water filtration plant, to cost approximately $500,000 with machinery. Billingham & Cobb, Press Building, are architects.

The Kalamazoo Ice & Fuel Co., Kalamazoo, Mich., has commenced the construction of a new coal-handling plant, 150 x 160 ft. Electric power and mechanical handling machinery will be installed .

The Borg & Beck Co., 920 South Michigan Avenue, Chicago, manufacturer of automobile clutches, etc., has acquired the plant and business of the Automotive Parts Co., Detroit, with branches at Toledo, Ohio, and Grand Rapids, Mich. Extensions are planned. George W. Borg is head.

The Michigan College of Mines, Houghton, Mich., has plans in preparation for the erection of a four-story and basement metallurgical building, 120 x 120 ft., to cost about $350,000 with equipment. Lynn W. Fry, Ann Arbor, Mich., is architect.

The Cadillac Motor Car Co., 2060 Clark Street, Detroit, is taking bids for superstructure work for its new foundry buildings, to cost about $1,200,000 with equipment. The Austin Co., Penobscot Building, is architect.

The Kawneer Mfg. Co., Niles, Mich., manufacturer of metal store fronts, metal sash, etc., has awarded a general contract to Robert L. Reisinger & Co., Milwaukee, for its three-story and basement addition, 50 x 100 ft., estimated to cost $75,000.

A machine and repair shop will be installed in the three-story and basement automobile service building, 75 x 122 ft., to be erected by E. G. Davith and E. W. Cork, Marquette, Mich., for which a general contract has been let to the Wisconsin Engineering & Construction Co., Wausau, Wis., estimated to cost $80,000.

The foundry of the Bostick Stove Co., Lapeer, Mich., maker of castings, was completely destroyed by fire on Oct. 26. Construction of a new building has been started and the company plans to be in production again by Dec. 1.

The Williamston Clay Products Co., Williamston, Mich., recently organized, is arranging for the erection of a plant to manufacture tile and kindred products. It will include a power house. J. E. Meyer and George F. Skelton head the company.

Cleveland

CLEVELAND, Nov. 12.

WITH an increase in inquiries, the local machine tool market shows some improvement and as a result there is a better feeling among the trade. Dealers are doing a fair volume of business in single machines and one lot of 7 or 8 machines will probably be placed by a local manufacturer this week. The New York Central Railroad has an inquiry out for a turret lathe, but has not yet made purchases against its recent list. There seems to be a lull in buying by automobile companies and no orders of any size are reported from Detroit car builders. Inquiry for automatic screw machines in small lots shows considerable increase. A Cleveland manufacturer has taken an order from a Chicago company for three automatic machines.

A typographical error in these columns last week, made it appear that the United Ejector Co., Boston, had purchased 60 turret lathes from a Cleveland manufacturer. The order was for six turret lathes, and the correct name of the company is the United Injector Co.

The Globe Brass Mfg. Co., 2925 East Fifty-fifth Street, Cleveland, will enlarge its plant by the erection of a building providing 1500 sq. ft. of floor space to be used for machine shop and foundry purposes.

The Timken Roller Bearing Co., Canton, Ohio, is preparing to expend $750,000 for extensions and equipment. Plans provide for the erection of several two-story factory buildings, the largest of which will be 200 x 300 ft.

The Ohio Iron Works Co., Cleveland, has been organized with a capital stock of $25,000 to fabricate steel and ornamental iron work and has leased a plant at 4300 Perkins Avenue. James Morgan, formerly general superintendent of the Variety Iron Works Co., Cleveland, is president and Albert E. Smith, formerly general superintendent of the King Bridge Co., Cleveland, is vice-president.

The Cleveland Railway Co. is planning the erection of six substations in Cleveland and the suburbs, to cost approximately $35,000.

The Ransom & Randolph Co., Toledo, Ohio, manufacturers of dental supplies, has placed contract for a three-story reinforcing concrete factory, 80 x 190 ft.

The Ohio Valley Clay Products Co., which recently incorporated with a capital stock of $360,000, will shortly begin the erection of a plant at Port Homer, near Steubenville for the manufacture of sewer pipe and building material. It will be four-stories 160 x 200 ft.

The Federal Collieries Co., Uhrichsville, Ohio, will short-

ly begin the erection of a plant to make sewer pipe at an estimated cost of $200,000.

The Metropolitan Steel Co., which recently acquired a plant in Mineral Ridge, Ohio, expects to place it in operation for the manufacture of refrigerators about Jan. 1.

The Toledo-Chevrolet Motor Co., Toledo, Ohio, has awarded contract to the Gettins-Kopike Co., Toledo, for a one-story addition, 130 x 200 ft., to cost about $95,000. Mills, Rhines, Bellman & Nordhoff, Ohio Building, Toledo, are architects.

The National Ice Co., Mansfield, Ohio, will commence the erection of a new one-story ice-manufacturing plant to cost about $50,000, for which a building contract has been let to Snell & Wolff, Mansfield.

The Humphrey Mfg. Co., 201 East Fifth Street, Mansfield, Ohio, is considering the erection of a new one-story foundry. W. G. Moore is president.

The Detroit, Toledo & Ironton Railroad Co., Detroit, operated by the Henry Ford interests, has tentative plans for the construction of new locomotive and car repair shops at Lima, Ohio, in connection with a large terminal yard.

Chicago

CHICAGO, Nov. 12.

THE chief development in the market is an appreciable expansion in inquiry from industrial sources. The A. O. Smith Corporation, Milwaukee, has put out a list of 48 items. The Pullman Co., Chicago, is in the market for a 2-in. forging machine and a number of other tools. In addition, smaller industrial inquiries are increasingly numerous. The Burlington has distributed formal orders for approximately 90 per cent of the items on its list. The Illinois Central has purchased a 2½-in. bolt cutter, an 18-in. lathe, a 20-in. upright drill, a coach wheel lathe, and a motor-driven hammer.

The Sante Fe has appropriated $3,400,000 for shop extensions, new machinery and other equipment at San Bernardino, Cal. Of this sum, over $900,000 is for a machine shop, 90 x 637 ft., which will replace the present structure, more than doubling the capacity. The boiler and tank shop will be replaced with a new boiler shop, 164 x 675 ft., at a cost of $850,000. The outlay for machinery and tools will be over $900,000. Construction will begin on the various units as soon as contracts can be let. Inquiries for the machine tools have not yet been issued, but action has already been taken toward the purchase of cranes. One of the electric cranes to be bought will be 300 tons capacity.

The Consolidated Machine Tool Corporation contemplates giving up its store and show rooms at 547 West Washington Boulevard, Chicago, in which event it will probably lease office space elsewhere in the Chicago machinery district. Two other prominent machine tool houses are also considering the abandonment of their stores. If such action is taken it will mark a radical change in merchandising methods at Chicago. In New York, practically all machine tool merchants limit themselves to office space, but in this city, the practice for years has been to maintain stores where machine tools are exhibited for inspection by prospective customers.

A. O. Smith Corporation List

One 12-in. x 6-ft. engine lathe.
One 16-in. x 6-ft. engine lathe.
One 18-in. x 6-ft. engine lathe.
One 20-in. x 10-ft. engine lathe.
One 24-in. x 12-ft. engine lathe.
One 26-in. x 12-ft. engine lathe.
One 30-in. x 26-ft. engine lathe.
One 36-in. x 16-ft. engine lathe.
One 36-in. x 28-ft. engine lathe.
One 48-in. x 24-ft. engine lathe.
One No. 2B Kearney & Trecker, or equivalent, milling machine.
One No. [illegible] Kearney & Trecker, or equivalent, milling machine.
One No. 3B Kearney & Trecker, or equivalent, milling machine.
One No. 4 Cincinnati, or equivalent, milling machine.
One No. 5 Cincinnati, or equivalent, milling machine.
One 36 x 36-in. x 12-ft. planer.
One 42 x 42-in. x 12-ft. planer.
One 60 x 60-in. x 18-ft. planer.
One 72 x 72-in. x 20-ft. planer.
One 72 x 72-in. x 36-ft. planer.
One 8 x 32-in. grinding machine.
One 12 x 48-in. grinding machine.
One No. 106 Rivett, or equal, grinding machine.
One No. 70 Heald, or equal, grinding machine.
One No. 2 Brown & Sharpe, or equal, surface grinding machine.
One Ransom, or equal, wet grinder, with 24 x 1½-in. wheel.
One U. S. Electric Tool Co., or equal, floor grinder, with 20 x 2-in. wheel.
One No. 31 Lucas, or equal, horizontal boring mill.
One No. 32 Lucas, or equal, horizontal boring mill.
One No. 33 Lucas, or equal, horizontal boring mill.
One No. 4 Gisholt, or equal, horizontal boring mill.
One 4-ft. plain radial drill.
One 4-ft. universal radial drill.
One 5-ft. plain radial drill.
One 5-ft. universal radial drill.
One 15-in. slotter.
One 22-in. slotter.
One 20-in. shaper.
One 24-in. shaper.
One 20-in. upright drilling machine.
One 24-in. upright drilling machine.
One 30 or 32-in. upright drilling machine.
One 36-in. sliding head upright drilling machine.
One No. 33 Kempsmith milling machine, or equivalent.
One ½-in. sensitive drill with 12-in. overhang.
One ¾-in. sensitive drill with 16-in. overhang.
One 400-ton hydraulic press with 96 in. between strain bars and 8 ft. long inclusive.
One straightening press to take 4 to 5-in. rods.

The Whiting Corporation, Chicago, has taken the following orders for foundry equipment: No. 10 cupola for the Southern Wheel Co., Birmingham; No. 10 cupola for the Leonard & Baker Stove Co., Taunton Mass.; an 18 x 60-in. and a 33 x 60-in. tumbler for the Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.; two 36 x 60-in. tumbling barrels for the Marshall Furnace Co., Marshall, Mich.; a 36 x 60-in. tumbler for the Auto Specialties Mfg. Co., St. Joseph Mich.; a 3000-lb. pneumatic elevator for the Bostwick Stove Co., Lapere, Mich.

The Wonder Truck & Tractor Co., recently incorporated, with general offices in the Security Building, St. Louis, and plant at 917 East Broadway, Alton, Ill., will manufacture light-four gasoline-driven tractors and road builders. The plant is fully equipped for the present. Officers are William Savidge, president; William M. Edinger, vice-president; R. H. Dalby, secretary; Lucas Haefner, treasurer, and Charles F. Meier, general manager.

The Hi-Lo Products Co., Monadnock Block, Chicago, recently incorporated, is not a manufacturing organization, but will confine its activities to the merchandising of the products of the Hi-Lo Fan Co. of the same address. Officers are F. M. Schieble, president and treasurer; W. Phinny, vice-president, and Philip McGuire, secretary.

The Crane Co., Chicago, plans to erect several additional units at its works at Kedzie Boulevard and Pershing Road. The first building will probably be another foundry unit, to cost $1,000,000, plans for which are said to have been drawn by Holabird & Roche, architects, Chicago. Plans for other additions are still in the formative stage.

The Wolverine Bumper & Specialty Co., Grand Rapids, Mich., has awarded contracts for the construction of a plant at Broadway and Alpine Streets, to cost $42,000.

George Donnersberger, president Streator Car Co., 80 East Jackson Boulevard, Chicago, has purchased the plant and property formerly occupied by the N. K. Fairbank Co. at Eighteenth Street and Wentworth Avenue.

O. D. Jennings & Co., manufacturers of coin machines, 515 South Peoria Street, Chicago, have purchased at auction the two-story and basement factory of the Garbell Typewriter Corporation, 4309-39 Lake Street, and will occupy it for manufacturing purposes.

The Garden City Auto Works, 3150 Archer Avenue, Chicago, is having plans prepared for a one-story rear addition, [illegible] x 84 ft., to cost $20,000.

The Robbins Mfg. Co., manufacturer of window and door screens, 1801 North Central Park Avenue, Chicago, has had plans prepared for a two-story addition, 50 x 60 ft., to cost $50,000.

The Iowa Railway & Light Co. has awarded contracts for an addition to its power plant at Cedar Rapids, Iowa, to cost $365,000. It will be 45 x 100 ft. and the equipment will include a 10,000-kw. steam turbine.

The Federal Stamping Co. will complete a new plant at Holland, Mich., by Jan. 1.

The Maytag Co., North Fourth Avenue, Newton, Iowa, manufacturer of electric washing machines, agricultural implements, etc., is considering preliminary plans for an addition to cost $200,000. The larger part of the structure will be equipped as a foundry for aluminum casting production. L. B. Maytag is president.

A machine shop and manual training department will be installed in the three-story junior and senior high school to be erected at Wymore, Neb., estimated to cost $200,000, for which foundations will soon be laid. Fiske & McGinnis, Bankers' Life Building, Lincoln, Neb., are architects.

The Crookston Lumber Co., Kelliher, Minn., has tentative plans for rebuilding the portion of its mechanical shop department, recently destroyed by fire with loss of $60,000.

The Tinners' Machine Works, 30 South Clinton Street, Chicago, is planning for the installation of a number of punch presses.

The West Side Ice Co., 839 North Hoyne Avenue, Chicago, has plans for a one and two-story ice-manufacturing plant, 100 x 125 ft. C. G. McClellan, 7441 Cottage Grove Avenue, is architect.

The Northwestern Davenport Cement Block Co., Davenport, Iowa, is having plans drawn for a two-story factory 72 x 75 ft., on West Locust Street. A. H. Ebeling, 818 Mahl Building, is architect.

The Michaelman Steel Co., Quincy, Ill., has awarded contract to Buerkin & Buerkin, 721 Main Street, for a three and four-story addition, estimated to cost $50,000.

The Ford Motor Co., Highland Park, Detroit, has awarded a general contract to the Villadsen Brothers Co., Dooly Building, Salt Lake City, Utah, for its new local assembling plant on Third Street, South, two-stories, 165 x 250 ft., estimated to cost $250,000.

Matthew Fitzpatrick, Union National Bank Building, Rochester, Minn., is organizing a company to build an ice and cold storage plant, to cost $200,000 with equipment.

Milwaukee

MILWAUKEE, Nov. 12.

IN general, demand for machine tools is limited to urgent needs and considerable shopping is being done to get equipment at the lowest cost possible. In many instances a used tool is taken in preference to new as a matter of first-cost economy. There is a moderate call for special types of tools for special production as well as tool room purposes, but in view of the slack demand for standard types, business is hardly satisfactory. Local shops have received little railroad business so far, but indications are that the distribution of orders will eventually affect this market favorably.

The Vilter Mfg. Co., 935 Clinton Street, Milwaukee, manufacturer of ice and refrigerating machinery, Corliss engines, etc., has placed contracts for a one-story brick and steel pipe shop, 90 x 124 ft., which will require some equipment of a miscellaneous character. Emil O. Vilter is president and general manager.

L. M. Turner, formerly president Turner Mfg. Co., Port Washington, Wis., gas engines and tractors, in bankruptcy, has arranged to resume the production of gas engines through the E. & W. Mfg. Co., Cedarburg, Wis., manufacturer of contractors' equipment, trailers, etc. The Badger-Packard Machinery Co., Milwaukee, which purchased the Turner assets at receiver's sale, has disposed of the gas engine patterns, fixtures, etc., to Mr. Turner, who is now connected with the E. & W. Mfg. Co. Additional equipment required by the Cedarburg concern for the new line has been acquired from the Badger-Packard holdings of Turner machinery.

The Swanson Toy Blocks Units of Chicago, organized with $250,000 in Illinois as a common trust estate, has leased the building at Oconto, Wis., erected several years ago for the Montana Tractor Co., and is retooling it for the production of wood and metal toy blocks, toys, novelties, ornaments, etc. Operations will begin Dec. 1. G. A. Swanson is president and general manager.

W. H. Ludwig, 501 South Central Avenue, Marshfield, Wis., has engaged W. L. Alban, architect, St. Paul, Minn., to design a two-story garage and service building, 50 x 120 ft., to be built early next spring. Only the first story and basement will be erected for the present. The cost is estimated at $25,000.

The Riverside Fibre & Paper Co., Appleton, Wis., which is spending about $450,000 in enlarging its mills and power plant, has decided to add a complete filtration plant costing about $50,000. Pumps, traveling screens, etc., are now being purchased.

The Shelimar Products Co., Milwaukee, has let the general contract to the Austin Co., 208 South LaSalle Street, Chicago, for a new printing plant, 82 x 148 ft., to cost about $75,000. Printing machinery has been placed with the Claybourn Process Corporation, Milwaukee. K. L. Sheilaberger is president and general manager.

The Atlantic & Pacific Products Co., subsidiary of the A. & P. Stores system, will enlarge its milk condensing plant at West Bend, Wis., at a cost of $75,000, by a one-story addition, 100 x 172 ft., and a power house extension, 30 x 90 ft. Additional generating equipment, boilers, special machinery and other equipment will be required. H. M. Clark is local manager.

The Milwaukee department of public works is asking bids until Nov. 19 for furnishing and installing in the new Riverside pumping station a complete two-pipe low pressure steam supply and vacuum return system of steam heating. At the same time bids will be taken for a 20-ton auto truck scale for a second time, original tenders being unsatisfactory. R. E. Stoelting is commissioner.

The American Brass Co., Kenosha, Wis., subsidiary of the Anaconda Copper Co., will proceed with plans for the construction of an addition, [illegible] one story, to be equipped as a wire drawing mill. The extension was projected about a year ago and is now being revived. The cost of the work is estimated at $250,000.

The Scovill Mfg. Co., Waterbury, Conn., is reported to be planning to transfer its vacuum cleaner manufacturing department to the plant of the Hamilton-Beach Mfg. Co. of Racine, Wis., which recently was sold to Scovill interests. The transfer, it is stated, will not involve appreciable enlargement of the Racine works, nor the purchase of much additional equipment.

The Call Mining Co., Platteville, Wis., has been incorporated with an authorized capital of $100,000 to engage in lead, zinc and spelter mining in the southwestern Wisconsin field. The incorporators are E. E. Bruns, N. J. Gibbons and I. J. Torson. It is understood an idle mining property has been taken over and will be rehabilitated and equipped, but no definite details are available at present.

Cincinnati

CINCINNATI, Nov. 12.

WHILE orders for machine tools have not been plentiful the past week, inquiries continue in good volume, though large lists are not in evidence. The Baltimore & Ohio Railroad has added three tools to its list issued several weeks ago. The Fairbanks, Morse Co. is in the market for tools for its Indianapolis plant, and many other inquiries for one and two machines are being figured on. The Packard Motor Car Co. has been a purchaser of gear hobbers during the week. The Burlington has also placed an order for 25 lathes, a local manufacturer getting part of the business. A nearby lathe manufacturer reports the receipt of an order for seven tools. The American Steel & Wire Co. also purchased equipment in this market. Local dealers report a fair demand for small tools, and used machinery is also showing an improved tone.

While little Japanese business had been placed as yet, indications are that large orders from this source will be forthcoming soon after the first of the year. An inquiry from China for a number of lathes has been received.

The Bourne-Fuller Co., Cleveland, is preparing plans for an addition, of steel construction, 90 x 240 ft., to its Cincinnati warehouse. A 90-ft. span electric traveling crane will be installed.

The Sawbrook Steel Castings Co., Cincinnati, recently incorporated, will erect a local plant with a capacity of about 150 tons of steel castings per month, using a 1½-ton electric furnace. Construction work and the purchase of equipment will start immediately. The officers are E. S. Sawtelle, president; A. E. Anderson, vice-president, and E. L. Brooks, secretary-treasurer. The address of the company is Station P., Cincinnati.

The Anderson Body Co., Sidney, Ohio, recently incorporated, will manufacture closed bodies for automobiles, later on engaging in the manufacture of mill work, though the automobile body department will be continued as the principal product. The plant will have a capacity of 50 bodies per day. It has been completely equipped and no extensions are contemplated at present. W. P. Anderson is vice-president and general manager.

The municipal power and water works plant at Mt. Sterling, Ohio, was destroyed by fire Nov. 5, entailing a loss of $50,000. It will be rebuilt as soon as possible.

The Standard Sanitary Mfg. Co., Louisville, Ky., is having plans prepared for an addition to its Louisville plant to cost $1,500,000. It will be used as a brass foundry and manufacturing building. Work of clearing the site is expected to begin immediately, and construction work will start about Jan. 1.

The Elam Paper Co., Marion, Ind., is planning to move to Dayton, Ohio, and has selected a site on which it will erect a one-story manufacturing building. It manufactures writing papers. Virgil Schaeffer, Dayton attorney, is handling the affairs of the company in Dayton.

The Uniflow Pump & Mfg. Co., Dayton, recently incorporated, will manufacture water systems. The company has not yet selected a site for a plant which it proposes to erect. Harry G. Wagner is president of the company. J. A. Snider, vice-president, and John Westendorf, treasurer.

The Art Brick & Construction Co., Zanesville, Ohio, recently organized, has plans for a new two-story plant at Licking View for the manufacture of concrete bricks and blocks, estimated to cost $45,000. Guy H. Blackburn, general manager, is in charge.

The Board of Trustees, Ohio University, Athens, Ohio, has tentative plans for a two-story and basement manual training and engineering building to cost approximately $200,000.

The Gulf States

BIRMINGHAM, Nov. 12.

INQUIRIES are being made by the Homewood Timber Co., Mobile, Ala., for a logging locomotive.

H. W. Dexter, P. O. Box 665, Jacksonville, Fla., machinery dealer, has inquiries out for a 100-hp., slide-valve, stationary engine, standard-gage car trucks for logging car service and one 60 or 75 Scotch marine boiler and auxiliary equipment.

The Pierce Oil Corporation, 25 Broad Street, New York, is arranging an appropriation of $4,000,000 for extensions and improvements in its oil properties, including refineries at Texas City and Forth Worth, Tex., where additional machinery will be installed. It is expected to commence work early next year. Frank Coverdale is chairman of the board.

The Common Council, Saint Francisville, La., is planning to rebuild the municipal power plant and pumping station recently damaged by fire with loss of $25,000, including equipment.

The Decatur Cornice & Roofing Co., Decatur, Ala., will rebuild by day labor the portion of its plant recently destroyed by fire with loss of $55,000. Additional equipment will be installed. Henry R. Davis is secretary.

The Missouri-Kansas-Texas Railroad, St. Louis, has awarded a general contract to H. D. McCoy, Clebourne, Tex., for an addition to its car shops at Denison, Tex., estimated to cost $200,000, including equipment. Other units will be erected later.

The Perfection Plow Co., 3 Hampton Building, Tampa, Fla., recently organized, will defer the establishment of a local plant, and arrangements will be made for the manufacture of equipment in outside shops. J. O. Andress is general manager.

The Compress Buckle Co., Memphis, Tenn., recently organized, has tentative plans for a new plant at Attalla, Ala., to manufacture steel cotton tie buckles and other equipment, estimated to cost $200,000 with machinery.

The Texas-Tapico Rubber Co., 408 West Weatherford Street, Fort Worth, Tex., has leased two local buildings, 60 x 300 ft. and 60 x 200 ft., for the manufacture of hard rubber products, automobile tires, etc. The company was organized recently with W. H. Beard, president, and J. M. Dunning, secretary and treasurer. E. C. Miller will be plant superintendent.

The Galveston, Harrisburg & San Antonio Railway Co., San Antonio, Tex., operated by the Southern Pacific Railroad Co., will commence extensions at its local shops to cost about $80,000, including equipment.

The Gulf Concrete Pipe Co., Houston, Tex., is arranging for the erection of a new two-story plant to cost $25,000. N. A. Eppes is president.

The Continental Turpentine & Rosin Corporation, Laurel, Miss., is planning to rebuild the portion of its power house recently destroyed by fire. Additional equipment will be installed.

The Western Public Service Co., Navasota, Tex., is planning for extensions in its power plant and ice-manufacturing works to cost $40,000. New equipment will be installed. Paul Freeman is division superintendent in charge.

The Louisiana Oxygen Co., Washington Avenue and Rendon Street, New Orleans, has work nearing completion on a new plant to cost $200,000, including machinery.

The Anniston Ice & Coal Co., Anniston, Ala., recently organized, is planning the erection of a new ice-manufacturing plant to cost $50,000, with machinery. C. A. Hamilton is vice-president.

The Board of Works, Port Arthur, Tex., is planning to install additional pumping machinery at the municipal stations in the Port Arthur Heights section, Shreveport Avenue and on Nineteenth Street. They will have a combined capacity of about 135,000 gal. per minute and will be electrically operated.

The Rushton Corporation, Fairfield, Ala., contemplates the construction of a new ice-manufacturing and refrigerating plant to cost $150,000, including machinery.

The Brown Welding & Machine Co., Breckenridge, Tex., has acquired property at 310 East Third Street, Tulsa, Okla., for the establishment of a branch plant. Cleveland Johnson will be local manager.

The Florida Homes & Investment Association, P. O. Box 128, Tavares, Fla., has inquiries out for pumping machinery for deep-well, sand removal and other service. J. M. Gillespie is vice-president.

A machine shop will be installed in the new automobile service building to be erected by Harlee & Harrison, Bradentown, Fla., to be 100 x 170 ft., estimated to cost $42,000. A site has been acquired at Broad and Walnut Streets. Johnson & Fonda, Bradentown, are architects.

Baltimore

BALTIMORE, Nov. 12.

PLANS are being drawn for a one-story foundry, 100 x 230 ft., at the Maryland State Penitentiary, Baltimore, Claude B. Sweezey, warden, estimated to cost $75,000, for which an appropriation will be secured from the Legislature. A monorail conveying system will be installed. Theodore W. Pietsch, American Building, is architect.

The Black & Decker Mfg. Co., Baltimore, has announced a new price of $58 on its ½-in. special portable electric drill. The company's electric valve grinder has been reduced also, the new price being $34.

The Wagner Screen & Weatherstrip Co., 2703 Violet Avenue, Baltimore, has plans for a two-story addition, 50 x 100 ft. G. W. Wagner is head.

The Common Council, Ringgold, Ga., is planning the construction of a municipal electric light and power plant. A waterworks, with electrically operated pumping station, is also being considered.

The Bainbridge Brick Co., Bainbridge, Ga., has inquiries out for a clamshell bucket, about ½ or ¾-yd. capacity; also for stiff-leg derrick attachments and fittings, with bull wheel.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 4, for a quantity of miscellaneous twist drills, schedule 1563, and miscellaneous taps, dies, etc., for Eastern and Western yards, schedule 1565; until Nov. 20, for 50,000 ft. of antenna wire for the Washington Navy Yard, schedule 1546; until Nov. 27, for 12,000 lb. of shaft sleeves, for the Portsmouth, N. H., Navy Yard, schedule 1561; 6 water and gasoline pumps, and 3 electric motors, for the Hampton Roads, Va., Navy Yard, schedule 1548; and 4 electric ovens and spare parts for Eastern yards, schedule 1547; until Nov. 20, for 944 lb. of turbine blade shrouding for the Mare Island Navy Yard, schedule 1560.

The Ford Motor Co., Highland Park, Detroit, has concluded arrangements for the purchase of 10 acres in the Newton Park district, Norfolk, Va., as a site for a new assembling plant, for which plans will be prepared at an early date. It is expected to cost more than $350,000, with machinery.

The Edgerton Concrete Products Co., 202 Planters Bank Building, Wilson, N. C., has plans for new works to manufacture cement tile and concrete building products. Inquiries will be made at once for drain tile and roofing tile machinery, electric motors, transmission equipment and auxiliary apparatus.

The Foreman-Derickson Veneering Co., Elizabeth, N. C., is taking bids on a general contract for a new one-story plant in the Knobbs Creek section, 100 x 200 ft., with extension, 50 x 80 ft., estimated to cost $50,000.

The Bureau of Foreign & Domestic Commerce, Washington, has information of a company at Prague, Czechoslovakia, desiring to purchase American machinery and tools for the manufacture of screws, bolts, etc., No. 8074; also, of a concern at Quito, Ecuador, for machinery to manufacture aluminum ware, No. 8072; from Monterey, Mex., for paper-clip manufacturing machinery, No. 8071; from London, England, for an ice-manufacturing machine, 10 to 20 tons daily capacity, No. 8069; from Santa Clara, Cuba,

for machinery to manufacture matches. No. 8022; and from Christiania, Norway, for a cold storage plant, No. 8031.

The Victory Mfg. Co., P. O. Box V, Rockingham, N. C., recently organized by F. I. Mason and W. A. Williams, has inquiries out for machine shop equipment, including lathes, drill press, combination punch and shear, milling machine, hack saw and other equipment. Also for complete foundry equipment for installation in a local building. The company will manufacture cutters and cutting machines.

The Southern Appalachian Power Co., W. N. Garret, president, Asheville, N. C., has been granted permission by the Federal Power Commission, to build a hydroelectric generating plant on the Hiawassee River, near Murphy, N. C., with ultimate capacity of 50,000 hp. It will cost more than $400,000, with transmission equipment.

Bids will be received by the Quartermaster Department, Marine Barracks, Parris Island, S. C., until Nov. 22, for miscellaneous equipment, including 6 gross power hack saw blades; 9100 hexagon machine bolts; 300 lb. hexagon nuts; 1500 ft. wire hoisting rope; 1000 round-head stove bolts; 400 lb. wrought iron washers; 45 lb. of steel balls, etc., all as per lists on file.

The Fowler Stove & Roofing Co., Inc., Norfolk, Va., has awarded a contract to J. H. Pierce, Norfolk, for rebuilding the portion of its plant recently destroyed by fire. Additional equipment will be installed.

The Common Council, Durham, N. C., is considering the construction of a municipal electric light and power plant. R. W. Rigsbee is city manager.

The White Furniture Co., Mebrane, N. C., has tentative plans for a new steam-operated power plant, with direct-connected engine and generator. It is also proposed to electrify the furniture factory in all departments later, with the installation of motors, control equipment, etc. W. E. White is president.

Information has been received by the Bureau of Foreign and Domestic Commerce, Washington, regarding the proposed electrification of a railroad system in Japan, involving about $50,000,000. Power equipment, electrical apparatus, couplers, air brakes, etc., will be required. Full information on request, Reference No. 108,951.

The American Battery Co., Inc., Norfolk, Va., has acquired 15 acres between Norfolk and Ocean View, and is having plans drawn for a factory to manufacture non-liquid electric batteries. It will have an initial output of about 2000 batteries per day. Reuben T. Lipscombe is president.

The Norfolk Southern Railroad Co., Norfolk, Va., has inquiries out for two steam hammers, 800 and 1100 lb. capacity respectively; one motor-driven grinding machine; 25-in. lathe; tool-room lathe; side-head boring machine and other tools.

The Board of Directors, Cumberland Fair Association, Cumberland, Md., has preliminary plans for a cold storage plant in the vicinity of the new fair grounds, near Amcelle, Md., to cost close to $100,000.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a twin-cylinder hoisting engine, with lifting capacity of about 3 tons; also for a centrifugal pump, 500 to 800 gal. per min. capacity, direct-connected to motor; duplex pump, suitable for pulp mill; one 7½-hp. back-geared motor, with starting equipment and auxiliary apparatus, and a quantity of spring brass wire.

A machine shop and manual training departments will be installed in the new Parker District high school to be erected at Greenville, S. C.; to cost abot $300,000, for which plans are being drawn by J. E. Sirrine & Co., Greenville, architects.

The Carolina Power & Light Co., Raleigh, N. C., has purchased the Franklin Light & Power Co., Franklinton, N. C., and will make extensions and install additional equipment. The Yadkin River Co., a subsidiary of the Carolina company, has acquired the Carolina Electric Co., Maxton, N. C., and will expand the property.

The Southern Machinery Co., Quitman, Ga., will commence the erection of a new machine shop, 60 x 100 ft., with extension, 50 x 80 ft., to be equipped with a number of heavy duty lathes, planer, shapers, drill presses, bolt cutters and other tools. A crane will be installed. F. C. Underwood is president and manager.

J. R. Feldman, 209 Broad Street, Martinsville, Va., has inquiries out for machinery for grinding mica; also for stamping, with motors and other electrical equipment.

The Benson Hardware Co., Andalusia, Ala., is in the market for 25 patterns for solid cast-iron pulleys, size 2-in. to 12-in. face and 6 to 24 in. in diameter.

The Mobile Pulley & Machine Works, Mobile, Ala., is inquiring for a 60- or 72-in. vertical boring mill and turning mill, having two swivel heads and of the Bullard, Betts or Niles make.

Indiana

INDIANAPOLIS, Nov. 12.

PRELIMINARY plans are being arranged by the Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, for additions to its shops at the Harwood yards, Evansville, Ind., including terminal yard improvements, to cost approximately $1,000,000. Considerable additional machinery will be installed.

The Common Council, Farmersburg, Ind., is planning for the installation of electrically operated pumping machinery in connection with a new waterworks plant, estimate to cost $40,000.

The Aladdin Mfg., Co., Muncie, Ind., manufacturer of electrical appliances, has acquired the plant and business of the Highlands Mfg. Co., manufacturer of kindred products, operating under a receivership for about two years. The new owner has construction in progress on new buildings and purposes to consolidate the works at this location and install additional equipment. George N. Spencer is president and William F. Spencer vice-president.

The Wayne Tank & Pump Co., Fort Wayne, Ind., manufacturer of gasoline pumps and oil storage systems, etc., will commence the erection of an addition to cost $50,000 with equipment.

A machine and repair shop will be installed in the one-story and basement automobile service works, 60 x 150 ft., to be erected by the Schiefer Automobile Co., 715-17 Barr Street, Fort Wayne, Ind., to cost about $75,000. Pohlmeyer & Pohlmeyer, Central Building, are architects.

The Damascus Crucible Steel Casting Co. New Brighton, Pa., has construction in progress on a branch plant at Hammond, Ind. The New Brighton works will be maintained as heretofore.

Manual training shops will be installed in the two-story and basement high school to be erected at Fellows and Ewing Streets, South Bend, Ind., estimated to cost $600,000 with equipment, for which bids are being asked on a general contract. Austin & Shambleau, 11 North Fayette Street, are architects.

The Remy Electric Co., Anderson, Ind., a division of the General Motors Corporation, manufacturer of automobile lighting and starting equipment, etc., has acquired the former factory of the Arvac Mfg. Co., manufacturer of universal joints, etc., and will remodel it for a branch plant. Facilities will be installed for about 600 operatives. Irving J. Reuter is general manager.

The Samuel Bingham's Son Mfg. Co., 636 Sherman Street, Chicago, manufacturer of printing press rollers, etc., will commence the erection of a new branch plant at 631 South Alabama Street, Indianapolis, to cost $50,000 exclusive of machinery. The present branch at 151 Kentucky Avenue will be vacated when the new factory is ready for occupancy. Guy R. Brooks is Indianapolis manager.

The Beatty Machine & Mfg. Co., Hammond, Ind., is inquiring for an Ingersoll-Rand air compressor, class P R E-2 Duplex or equivalent, with four-stage clearance regulators and of capacity 1500 to 2000 cu. ft. per min.

The Central South

ST. LOUIS, Nov. 12.

A MACHINE and repair shop will be installed on the third floor of the new service and headquarters building of the Oakland Automobile Co., Kansas City, Mo., to be three-stories, 64 x 245 ft., estimated to cost $115,000. J. G. Brecklein, Kansas City, is architect.

Bids will be received by H. C. Strohm, city clerk, Waterville, Kan., until Nov. 21, for motor-driven pumping machinery and auxiliary equipment for a new municipal waterworks. Black & Veatch, Mutual Building, Kansas City, Mo., are engineers.

The Oklahoma Iron Works, Inc., Tulsa, Okla., has arranged a joint bond issue with its affiliated organization, the International Supply Co., for $1,000,000, a portion of the proceeds to be used for extensions and improvements. The company manufactures oil well machinery and supplies.

The Louisville Taxicab & Transfer Co., Second and Walnut Streets, Louisville, is considering the construction of a three-story service and repair building, 140 x 200 ft., to cost $200,000, with equipment.

Manual training equipment will be installed in the new high school to be erected at Sedalia, Mo., estimated to cost $150,000, for which bids will be received on a general contract until Nov. 30. William B. Ittner, Board of Education Building, St. Louis, is architect.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

	Per Lb.
Blue Annealed	
No. 10	4.20c. to 4.59c.
No. 12	4.25c. to 4.64c.
No. 14	4.30c. to 4.69c.
No. 16	4.40c. to 4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.85c.	4.85c.
No. 26	4.40c. to 4.90c.	4.90c.
No. 28	4.50c. to 5.00c.	5.00c.
No. 30	4.70c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized — Per Lb.

No. 14	4.60c. to 5.10c.
No. 16	4.75c. to 5.25c.
Nos. 18 and 20	4.90c. to 5.40c.
Nos. 22 and 24	5.05c. to 5.55c.
No. 26	5.20c. to 5.70c.
No. 27	5.35c. to 5.85c.
No. 28	5.50c. to 6.00c.
No. 30	5.95c. to 6.45c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel Black	Galv.	*Wrought Iron* Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17½c. to 18½c.
High brass wire	18 c. to 19 c.
Brass rods	15¼c. to 16¼c.
Brass tube, brazed	25½c. to 27 c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 19¾c. to 20¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14 x 20 Prime	Seconds
		80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	$10.70	IC	7.00	6.75
IX	13.95	12.55	IX	8.25	8.00
IXX	15.55	13.75	IXX	9.50	9.25
IXXX	17.10	15.30	IXXX	10.75	10.50
IXXXX	18.85	16.80	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	45c.
Bar	50c. to 55c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8c. to 8½c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	32c.
No. 1 solder	30c.
Refined solder	26c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	10c. to 11c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market is firm and demand more active. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.50
Copper, light bottoms	8.75
Brass, heavy	5.75
Brass, light	5.00
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	7.75
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.00

THE IRON AGE

New York, November 22, 1923

ESTABLISHED 1855

VOL. 112, No. 21

Manufacture of Post Office Equipment

Naval Gun Factory at Washington Makes Tools for Production Work and Then Does That Work—Experiments with Non-Corrosive Metals



SIGNING of the treaty limiting naval armament, with the coincident stoppage of important construction work, resulted in the naval establishments being confronted with the serious problem of reducing personnel to a point commensurate with the reduced activities remaining under the provisions of the treaty. This deflation required intensive reorganization of departments in the manufacturing establishments and involved consolidations and similar moves for maintaining efficient operating conditions.

To carry on the necessary remaining naval work there was required a nucleus force of skilled mechanics whom, by reason of their many years of experience in the manufacturing and fabrication of ordnance material and special navy material, manifestly it would be difficult to replace in periods of national emergency. While the treaty did not necessitate abandonment of all lines of naval construction, the work which could be continued was not of such status as to permit it to be carried along without delay. Substitution for the activities which were stopped by the treaty called for obtaining material for new lines of work and the perfecting of plans for carrying on the work ahead of the original building program. This condition presented a problem in profitably employing the necessary nucleus of skilled workmen in the meantime.

As government manufacturing plants are forbidden by law to enter commercial fields and to take on work of a purely commercial character, it was necessary to limit consideration of profitably using naval plants to the requirements of other federal departments. Investigation showed that a considerable amount of supplies for the federal departments could be manufactured in plants such as the naval gun establishment at Washington as economically as when previously obtained from commercial sources. And manufacture of such material in a government plant, that otherwise would be operating on a limited scale, would result in cutting down unit overhead expense and bring about a saving to the federal treasury, even more than might be evident at first glance.

Fig. 1—(Upper Left) Match Plate Pattern Equipment Permitting Independent Operation of Two Separate Molding Floors Before Pouring Castings

Fig. 2—(Lower Right) Another View of Match Plate Pattern Equipment

(Oval) A Day's Result of Spraying of Letter Boxes Ready to Be Placed in Baking Oven



Fig. 3—After Cooling, Castings Are Gaged and Inspected for Precision Before Shipping

Convinced of the potentiality of cooperation between federal departments, the Post Office Department placed with the naval gun plant at Washington a manufacturing order for the production of the letter boxes required as a supply for one year. Previous to placing this order, the Post Office Department decided to redesign and standardize the several types of letter and mail boxes. This was to eliminate, as far as possible, features which tended greatly to increase production costs, and also to make possible the fabrication of the boxes by use of production methods with machinery to a larger extent than was possible with previous designs.

In connection with the manufacture of the box of new design, the Post Office Department also planned to have produced, as the property of the Government, all of the necessary stamping and forming tools for the manufacture of parts. These tools have been made to fit the average commercial equipment and are to be furnished to contractors who may receive subsequent contracts for boxes. In carrying out these plans the naval gun plant was authorized to design and manufacture the necessary tools for use in manufacturing detailed parts for the boxes, with a view to economical production methods.

Design of the letter boxes having provided standardization and interchangeability so far as possible, the tools were designed and made with the object of effecting the greatest latitude of interchangeability of tools between the several types of boxes, together with the necessary accuracy to permit maximum economy in assembly of the parts produced.

In addition to the establishment of mechanical standards in the manufacture of letter boxes, the department has been confronted for some years with the problem of preventing deterioration of mail box equipment in service, due primarily to corrosion. In many sections of the country, such as along the seacoast and in manufacturing centers, salt air, acid fumes, etc., cause rapid deterioration of steel equipment. This necessitates large expenditures for upkeep and replacement. Hence the department desired to conduct practical tests under service conditions of mail box equipment made from material more resistent to corrosion than ordinary steel. The department previously had been utilizing copper-bearing steel for this purpose, as it was recognized that this material is slightly superior to steel containing no copper, but this in itself has not proved entirely satisfactory.

With the cooperation of producers of other classes of metal, it was arranged to make experimental lots of standard letter boxes from brass, zinc and monel metal, and there is under consideration other material more resistent to corrosion than steel. The naval gun plant made of these metals a number of boxes which will be sent out into service in localities where serious deterioration of steel boxes previously has taken place. This will provide a practical test under service conditions, and determine whether the higher cost involved in the initial production of the boxes, when made from the more expensive metals, is justified in view of the additional service obtained. In addition to the work in connection with the manufacture of boxes from special metals, all of the small steel boxes manufactured by the naval gun plant were treated by the Parker rust-proof process and also were painted, in the belief that this treatment would enhance their resistance to corrosion.

In this manufacture of letter boxes plans were made for dividing the project so as to facilitate production, effect economies and produce boxes of the several classes at the rate desired by the Post Office Department. While under ordinary conditions the manufacture of boxes all of one kind as a lot would have been the easier method, the needs of the department required boxes of the several types to be produced coincidently. This necessitated a program of work which would provide an adequate number of boxes to meet the needs of the service for each type of boxes. With this in view, the

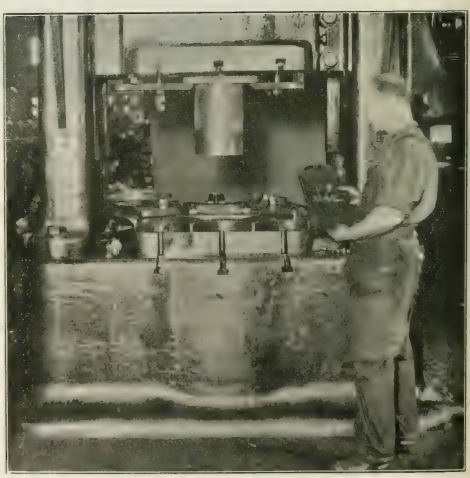


Fig. 4—A 500-Ton, Single Action Press Embossing and Forming Sides of Letter Box, with Blank in Position for Operation



Fig. 5—Showing Process of Sub-Assemblies Together With Final Assembly

projects for the several classes were divided into lots which would permit efficient production. Consequently a program was arranged to carry each operation on a given type of box so as to preclude loss of time of equipment and personnel.

The following general plan of operation was adopted in the handling of the work:

1—Design of tools.
2—Procurement of sheet steel and other commercial raw materials by purchase.
3—Manufacture of tools.
4—Production of the necessary patterns for manufacture of castings.
5—Cutting of sheet metal required in forming up parts in quantity by special shears and equipment formerly used in the manufacture of ammunition containers.
6—Manufacture of castings required for pull-down hinge fittings, etc.
7—Forming of corner moldings for package boxes and combination boxes, with special dies, using forge-shop equipment.
8—Stamping, forming and punching sheet metal details in heavy presses designed, and ordinarily used, for the manufacture of ordnance material. In these operations the special tools and equipment belonging to the Post Office Department were utilized.
9—Production of sub-assemblies from detailed parts, such as hinge assemblies on fronts, punching additional holes for final assembly, etc.
10—Parkerizing and painting such sub-assemblies as could not be handled in the finally assembled box.
11—Final assembly of boxes from sub-assemblies and details.
12—Mechanical inspection of assembled boxes.
13—*Painting of boxes.*—In this work small boxes were painted by the spraying method, one coating of red lead being applied and air-dried, after which a coating of baking enamel was applied and the box baked for setting the enamel. In the case of package boxes and combination boxes one coat of air-drying red lead and one coat of air-drying standard paint were applied.
14—Final inspection of boxes was by a commissioned officer of the United States Navy and by Post Office inspectors.
15—Crating of boxes for shipment.
16—Shipment of boxes to various points as designated by the Post Office Department.

Productive patterns were made for use in the manufacture of all castings, including pull-down parts covering the letter aperture, operating levers and feet. These patterns, when mounted on a split pattern, jar and squeeze, ram, pattern-draw molding machine, permitted production of castings at a minimum cost. Figs. 1 and 2 show the match plate pattern equipment, which allows the operation of two separate molding floors, each operating independently of the other until final assembly before pouring castings. After cooling, the castings are gaged and inspected for precision as shown in Fig. 3, thus assuring the minimum difficulty in assembly previous to shipping from the foundry. The tools were designed primarily so as to be applicable to any similar project, and for use on any or all of the various metals which have been mentioned.

Embossing and Forming

Blanking, embossing and forming of the metal members of the boxes was accomplished by the use of the power presses of the naval gun plant machinery equipment. Until recently these presses were used in the manufacture of various sheet metal parts of torpedoes for naval use. It is of interest to observe that they range from 150-ton to 750-ton capacity.

In Fig. 4 is shown a 500-ton, single action press in operation embossing and forming sides of the letter box, with the blank in position for operation and the resultant product in the hands of the operator. The back and front members, together with detail parts, are being produced by a similar method on double action presses. Fig. 5 shows the process of the sub-assemblies, together with the final assembly. The routing of this material along with the operations is followed in sequence, to maintain a constant flow of

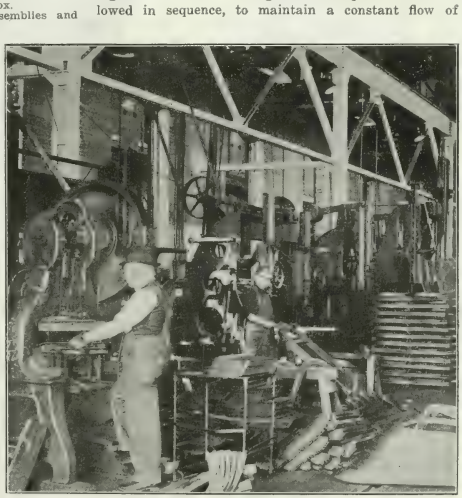


Fig. 6—Corner Molding of Package Box Under Welding Process by Use of Acetylene Torch

material for each succeeding operation and preclude as far as possible all lost motion and duplication of effort.

Manufacture of the package boxes presented certain operations that were somewhat difficult, due to their design and size. These are made on machines similar to those used for making smaller letter boxes, the operation being identical except as to dimension and shapes. One 300-ton press operates a gang punch, capable of punching simultaneously any number or size of holes—from two to 18 in number and ⅛ in. to 1½ in. in diameter. Fig. 6 shows the corner molding of a package box under the welding process by use of the acetylene torch. These corner molding members previously have been formed and bent hot by use of a die in a forge shop, later trimmed to the correct dimension and then ready for welding prior to assembly.

Corner molding is riveted to side members by means of a pneumatic power-operated riveting machine. The corner molding functions in a dual capacity by (1) forming the main construction member of the box and (2) extending below the body of the box to the ground line and thus forming four supports or feet upon which the box rests when installed. Fig. 7 shows the final assembly of package boxes, after which they are ready for red leading and final painting.

Fig. 8 shows No. 2 letter boxes being painted by compressed air spray operated under 40-lb. pressure. By this method one employee is capable of red-leading, or applying the final coating of chrome green enamel, to 220 boxes in a day of 8 hr. The boxes are then baked in an enameling oven at a temperature of 180 deg. Fahr. for a period of 4 hr. One illustration on page 1369 shows the result of a day's spraying ready to be placed in the baking oven. It is interesting to note that otherwise idle mold and core-drying equipment in the foundry is being utilized for baking these enameled boxes.

Reports received up to the present from the service regarding the boxes produced at the naval gun plant have been to the effect that the steel boxes compare favorably with any boxes previously produced. Enough time has not expired to give an opinion with regard to the justification of the use of higher-priced metals in the fabrication of the smaller sized boxes.



Fig. 7—(In Circle) Final Assembly of Package Boxes for Red Leading and Painting

Fig. 8—(Above) No. 2 Letter Boxes Being Painted by Compressed Air Spray Under 40-Lb. Pressure

Standard Sanitary Mfg. Co. Starts Construction of New Baltimore Plant

Standard Sanitary Mfg. Co., Pittsburgh, recently broke ground for its new Baltimore plant, which will represent completed an investment of around $4,000,000. The plant, which will be located on a 48-acre site about one-half mile back from the waterfront, is to be a modern duplication of the present Pittsburgh district units of the company and will embrace a large foundry, an enameling department, a warehouse and a machine shop. Initial construction has been so mapped out that additions may be made to all of the buildings and there is space for the installation of a brass foundry and a pottery department, which the company figures ultimately will be necessary at this plant, the primary purpose of which is to better supply the New England and Atlantic Coast trade. There are rail connections to the site with all roads entering Baltimore and since there is only a short haul to the waterfront, it is probable the company will make a good many shipments by water. This plant is the largest item of an extensive building program of the company, which includes new warehouses in Indianapolis and Birmingham, Ala., beside the extension of its Louisville, Ky., plant.

The merger of the American Steam Pump Co., and the Advance Pump & Compressor Co., both of Battle Creek, Mich., has been agreed upon subject to the approval of the stockholders of the respective organizations.

Ohio Foundrymen Meet in Toledo

Association Considers Important Subjects and Re-elects Officers—Plant Visitations and Entertainment Features

WITH an attendance of over 150, including members of the Michigan and Indiana State associations, the annual meeting of the Ohio State Foundrymen's Association was held Nov. 15 and 16 at the Toledo Yacht Club, where the visitors were entertained at luncheon the opening day as guests of the Toledo Founders' Association and where a banquet and entertainment were provided in the evening.

The meeting was opened with an address of welcome by B. F. Brough, mayor of Toledo, who was introduced by C. C. Smith, Toledo Steel Castings Co., general chairman of the Toledo committee. An interesting program of papers was presented and some of these were followed by considerable discussion. Arthur J. Tuscany in his annual report as secretary-manager spoke of the marked progress that had been made by the association in the past year. During that period, 33 new members were taken in, four members were lost and the total present membership is 204. He spoke in praise of the work done by the consulting cost accountant during the year and stated that 60 members are now using the cost system.

A paper on "Patterns, the Starting Point of Profit and Loss," was read by Dan M. Avey, managing editor of the *Foundry*, Cleveland. He referred to the waste due to inferior pattern equipment and favored educational work among customers regarding proper pattern equipment. He also emphasized the need of close cooperation between the pattern shop and the foundry. In some of the large foundries where the two departments formerly did not work closely together, a marked change has appeared in the past few years and the speaker declared that jobbing foundries could profit by bringing about the same cooperation of the two departments. However, he said there is a third factor to be considered, this factor being the customer who must be taught to provide proper pattern equipment. The speaker referred to a practice followed by some foundries in having clauses in their contracts giving specifications for their pattern equipment and suggested that the foundries go further back and include pattern specifications in their forms used for making estimates.

W. M. Todd, district manager of the Western Adjustment Co., Toledo, read a paper on "Your Insurance Contracts and the Adjustment of Losses," and also referred to Mr. Avey's discussion, declaring that the bone of contention of insurance adjusters is in obsolete patterns and that it would be a great help to adjusters in case of fire if there were no obsolete patterns to dispute over. Mr. Todd urged foundrymen to become well acquainted with the terms of their insurance contracts, stating that by so doing they might save themselves from considerable financial loss in case of fire.

"Technical Control in the Brass Foundries" was the subject of a paper by Fred L. Wolf, technical superintendent of the Ohio Brass Co., Mansfield, Ohio, who declared that users of alloys are becoming more critical and emphasized the importance of technical control throughout a foundry and also urged a carrying on of research work in all departments. Referring to some tests in his company's plant, he said that it had been found that a reduction of 100 deg. in the pouring temperature made a difference of 13,000 lb. in the tensile strength of the metal tested. The speaker also considered the core department from the technical standpoint and pointed out the advantages of technical control in that department. He said that in their plant standard mixtures had been adopted for different cores as well as various combinations to produce the same results. Core losses formerly amounting to 40 per cent had been reduced to less than 8 per cent last year.

"Foundry Costs, Ferrous and Non-ferrous," was discussed at some length by E. T. Runge, E. T. Runge Cost Co., Cleveland, who circulated a questionnaire among the foundrymen asking them to make an estimate of the cost of making 100 lb. of gray iron based on certain stated prices for material and labor. Replies to this questionnaire showed a range of from 4.80c. to 11c. per lb., or a difference of almost 6.20c. per lb. A similar questionnaire on the cost of making brass castings showed a difference of 9c. per lb. in the estimates.

T. E. Jones outlined courses for the training of foremen and of conference leaders that are being offered to the manufacturers of Ohio by the Trades and Industries Division of the Ohio State Board of Vocational Education, with which it is affiliated. He pointed out that the modern foreman lacks the background of training. In the foreman's course the plan he suggested was to pick out 15 from 25 or more foremen in a plant and give them a course of training for two weeks and during the same time he would select from the 15, five or six of the most competent men and give them an intensive course of instruction with a view of having them supervise or conduct the work after the outside agency has given it up. It is the aim in the foremen's course to train the men in proper methods of instruction and show them how and what to teach. The course for the training of conference leaders is designed to prepare executives to conduct conferences on departmental administration.

During a round table discussion, suggestions were made that the foundrymen might be able to arrange for a clearing house of credit information in order to keep each other posted regarding the credit of their customers, and also that some plan of mutual fire insurance might be worked out that would reduce their premiums. These matters were referred to the board of directors. Addition to the uniform trade customs was proposed. One provides that when a quotation on castings is made it is for acceptance within 30 days and the pattern equipment is to be furnished immediately. In case a quotation is for more than one class of work at different prices, the quotation, if accepted, must be accepted for all the work quoted on. A minimum charge was also proposed for any order. These additions to the uniform trade customs were referred to the board of directors, for further discussion and later action.

J. H. Bruce, Bowler Foundry Co., Cleveland; George Altens, Altens Foundry & Machinery Co., Lancaster; Henry Loudenslager, Loudenslager Foundry Co., Columbus; I. W. Warden, Wellston Mfg. Co., Wellston, Ohio, and A. H. Kramer, Advance Foundry Co., Dayton, Ohio, were elected directors for a three year term. All the old officers were re-elected. They are: President, Frank W. Huber, American Rolling Mill Co., Middletown, Ohio; vice-president, J. H. Bruce, Bowler Foundry Co., Cleveland; treasurer, Walter Seelbach, Walworth Run Foundry Co., Cleveland, and secretary and manager, Arthur J. Tuscany.

At the banquet Thursday evening John R. Cowell, president of the Toledo Chamber of Commerce, was the principal speaker. J. Edgar Lee, president Michigan Foundrymen's Association, also spoke. Following the speaking a very entertaining program was provided through the courtesy of a number of leading pig iron distributors.

Friday morning the foundrymen inspected the plant of the Willys-Overland Co., which entertained the visitors at luncheon, and later as guests of Pickands, Mather & Co., they visited the plant of the Toledo Furnace Co.

Manufacture of Scrap-Yard Machinery

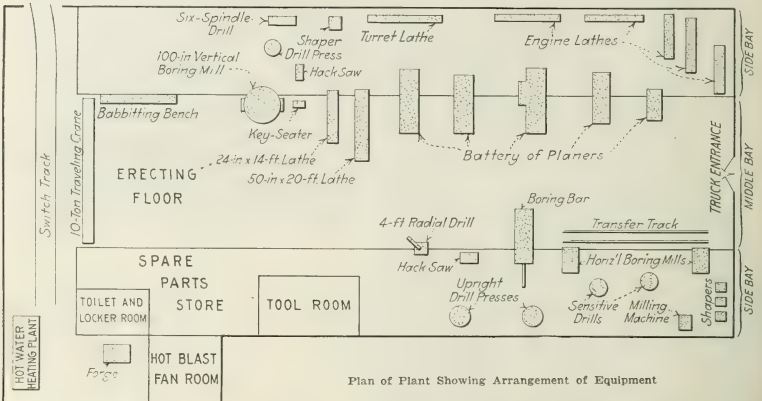
Milwaukee Plant Designed and Equipped for Exclusive Production of Alligator Shears—Sequence of Operations Well Planned

BY GILBERT L. LACHER

QUANTITY production owes much to metal-working machinery. Machine tools made it possible for the automobile industry, in hardly a quarter of a century, to put its product within reach of most American purses. Throughout all branches of manufacture, metal-working machines have both reduced cost of production and accelerated rate of consumption. In fact, so rapidly are our natural resources being converted into goods for the use of mankind that their exhaustion has become a recognized danger. Conservation is now widely urged and increasingly practised, and one of the most potent agencies operating to that end is the reclamation of waste materials for re-use in industry.

In reclaiming materials, metal-working machinery plays as prominent a rôle as in increasing their consumption. Out of approximately 6000 alligator shears in use in this country, fully 95 per cent are employed in iron and steel scrap yards for cutting up material into suitable lengths for rerolling and remelting. This type of machinery has been made largely in shops where the main output has consisted of other products. The fact that a recently constructed Milwaukee plant is engaged exclusively in the production of alligator shears is convincing testimony to the growing size and importance of the scrap business. The new factory of Doelger & Kirsten, Milwaukee, built less than two years ago to take care of expanding trade, was designed and equipped for manufacture on a production basis.

Having a capacity of 850 machines a year, this plant is laid out to permit uninterrupted progress of fabrication from the time castings are received at one end of the building until completely assembled shears are loaded on railroad cars at the other end. There are three parallel bays, the roof of the middle bay projecting above the side bays in the form of a cupola in which generous window space has been provided. Continuous sash in the outside walls is further insurance of excellent natural lighting. Briefly, the middle bay is used for machining the larger parts of the shears and for final assembling, while the side bays are employed on the smaller parts. A standing principle of the plant's operations is always to have an ample supply of small parts on hand, so that assembly operations are never delayed.

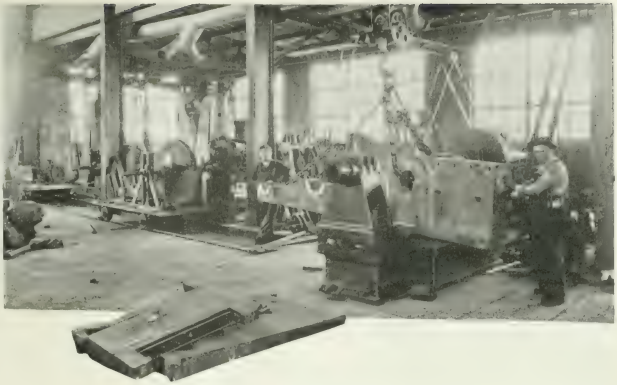


Plan of Plant Showing Arrangement of Equipment

Shears are manufactured in a variety of cutting capacities, ranging from 1½ to 7-in. square cold soft steel. Most of the machines made, including those used in scrap yards, are of the continuous-operating type. Automatic machines controlled by clutches are also manufactured, to be used principally by forge shops and chain works, where it is desirable to stop and start a machine at intervals rather than to shear large quantities of material without interruption, as is the practice in old material yards.

All parts of the shears are cast or forged steel, except the flywheels, which are made of cast iron. The castings and forgings, delivered in the central bay by motor truck are unloaded by a 10-ton 40-ft. span Milwaukee Electric Crane & Mfg. Co. overhead motor-driven crane, which travels the length of the plant.

The first machining operation is the boring of the jaw and frame castings. To insure an accurate fit, the two parts are bored together. Most of this work is done on two Newton horizontal boring mills located on one side of the central bay near a door where motor trucks enter with the rough castings. Extending between the mills is a track carrying two special cars equipped with jigs, which are used for transferring work from one mill to the other. After the first mill has machined the bore for the pin connecting jaw and frame, a transfer is made to the second mill, which



At the Left the Jaw and Base of a No. 2 Alligator Shear, Set Up on a Transfer Car, Are Being Bored by a Horizontal Mill. At the right may be seen the base of a No. 4 shear being placed on a large horizontal boring bar

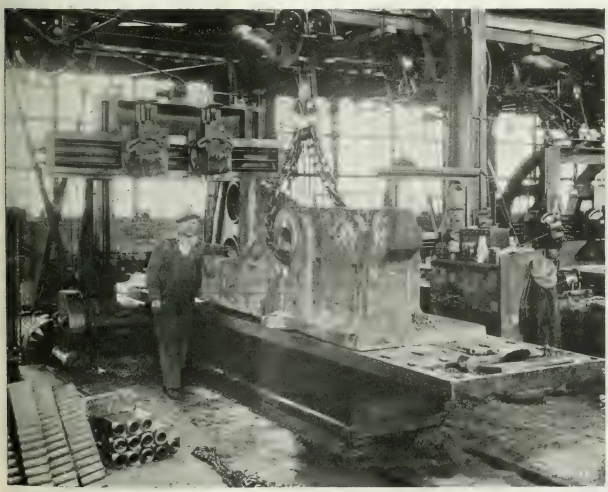
machines a bore in the rear end of the jaw for a pin joining the jaw and a connecting rod attached to the crankshaft. On the same side of the central bay, just beyond the Newton mills, is a No. 6 Barrett boring bar, which is used to bore the heavier sizes of shears.

The second operation is the planing of the bearing surfaces on the sides of the jaw and frame. This is done on a battery of five planers situated on the opposite side of the central bay. An important operation performed on the planers is the facing of the rubbing block on the frame and the rubbing pad on the jaw of the shear. This work must be accurate because the rubbing pad and block serve to keep jaw and frame in alinement during shearing. The rubbing block is attached to a rubbing post on the frame, while the rubbing pad is a steel stud cast on the jaw.

Beyond the battery of planers is a 100-in. Niles-Bement-Pond Co. vertical boring mill on which the shear gears are faced. This mill is used also to face the hub of the flywheel. Drilling oil holes and seats for grease cups is done by a 4-ft. radial drill, also located on one side of the middle bay. This machine likewise finishes out the bolt holes in the castings.

The main pins for the larger shears are turned on two large lathes, one of them a 50-in. x 20-ft. Fifield and the other a 24-in. x 14-ft. New Haven machine. Keyways are put in pins, crankshafts and countershafts by a keyseating machine. Various accessories are machined on smaller tools in the side bays. Here small pins and crankshafts are turned, connecting arms are planed, shaped and drilled, pinions are cut, take-up shoes for the main pin bearing are machined and flywheels are balanced.

Blades for the shears are bought sharpened and heat treated. No tolerance is permitted in the thickness of the blades, as it is a cardinal rule of the company's manufacturing practice that there be no shimming between blades and jaw or frame. Pulleys are



A 7½-Ton Shear Base Being Placed on a Planer



Battery of Planers Arranged on One Side of the Middle Bay

pressed steel and require no machining. Countershafts require no work other than sawing to length and putting the keyways in. Crankshafts must be turned down at the ends.

The main pins connecting jaw and frame are of 0.45 per cent carbon forged steel. The pins are of two types—one the ordinary plain pin and the other tapered and graduated to permit its easy removal from the housings. The forgings are bought rough-turned within about ⅛ in. of the finished diameter at the large end of the pin. The largest pin used has a diameter of 15 in. at the large end and is graduated down in steps to 12½ in. at the small end, that being the diameter of the threads on which two nuts are screwed after the pin has been inserted in the housings. The nuts have a diameter of 15 in., the same as that of the head on the other end of the pin. One nut acts as a lock on the other, and when they are pulled tight keyways in both of them must coincide with a keyway in the pin, so that a key may be inserted. This requirement makes accurate machining and tapping imperative. Wear in the bearing in the housing is corrected by take-up shoes fastened underneath the end nuts and the head on the other end of the pin.

Assembling operations are performed at the shipping end of the central bay. All shears are erected and tested before being shipped. The larger machines, because of their size, must be dismantled again before they are loaded on cars. Loading is done by overhead crane, and cars are switched into the plant on a spur from the Chicago, Milwaukee & St. Paul Railroad. Erection alone takes from 15 or 20 hr. up to 40 or 50 hr. for the largest machines. The major machining operations on the shear parts also take considerable time. Ten hours are required on the horizontal boring mills, while the planing of jaw and frame takes from 14 to 16 hr.

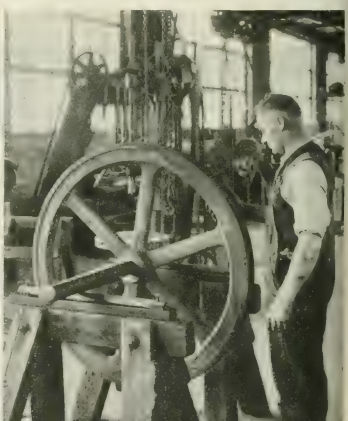
An important operation before assembling is the babbitting of the pin bearings. For this purpose a babbitting bench has been provided at one side of the erecting floor. To hold the babbitt constituting the bearing for the main pin, flanges are provided on the bore of the jaw and frame. Next to the erecting floor in one of the side bays is a stores department, where spare parts used in assembling are kept.

Of brick and fabricated steel construction, the plant measures 90 x 205 ft. over all. The middle bay is 45 ft. wide, and the side bays approximately 20 ft. each. The building is heated by a warm blast system. Coils from a hot-water heater are arranged in a hot-air chamber from which the heated air is blown through pipes by motor-driven fan. The pipes are hung from the columns separating the middle and side bays and have openings at intervals for the ejection of heated air. Owing to the traveling crane, the piping could not be hung across the middle bay; accordingly a concrete conduit was laid under the floor to connect the hot air chamber with pipes serving the farther side of the building.

In addition to its production work, the company also handles shear repairs. Likewise it carries a large stock of blades as well as other spare parts, not only at its Milwaukee plant, but also at large distributing centers in other sections of the country.

The Cecil R. Lambert Co., Inc., Detroit, manufacturing engineer, has just completed the conveyor chain for the new Studebaker closed body plant at South Bend, Ind. The chain is nine miles in length, or four and one-half miles of actual conveyor system. The conveyor is equipped with steel lugs which fasten on the material placed on the conveyor and carries it to its destination, thereby eliminating racks with a saving of man power and floor space.

The Lindell Die Co., Lansing, Mich., has been operating at capacity for some time past and is anticipating a continuance at this rate after the first of the year. Forging operations will start in the company's new forge plant about the first of December.



Balancing a Flywheel—One of the Operations Performed in the Side Bays

Side-Blast Cupola in Operation at Chicago

Schuermann System, Installed for First Time in America, Is Described by Dr. S. G. Werner, Head of German Foundry Association—Other Developments in German Foundry Practice Discussed

THE Schuermann side-blast cupola, the first American installation of which was recently completed at the Sacramento Square plant of the Griffin Wheel Co. at Chicago, was the main topic of an address on "Modern Practice in Gray Iron Foundries in Germany," delivered by Dr. Siegfried G. Werner, Duesseldorf, Germany, at Chicago, Nov. 10. The meeting took place at the City Club in that city under the auspices of the Chicago Foundrymen's Club, following a public demonstration of the cupola during the day to which all interested foundrymen were invited.

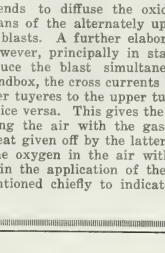
The first melt was taken from this cupola on Oct. 12, and tappings have been taken practically every other day since. While the operations thus far have been of an experimental nature, results achieved indicate a saving of 20 per cent in fuel consumption and several points in the sulphur content of the melt over what has been possible with the common type of cupola. Whereas in ordinary practice the amount of coke used is fully 10 per cent of the charge, coke consumption has been reduced to 8 per cent through the use of the Schuermann installation.

The Schuermann system was described in an illustrated article, translated from *Die Giesserei*, which was published in THE IRON AGE, Oct. 19, 1922, page 991. In his address at Chicago, Dr. Werner, who holds the patents on the cupola and incidentally is president of the German Iron Foundries Association, gave a more complete exposition of its construction and operation, laying emphasis on its outstanding features. Invented by E. Schuermann, Dresden, Germany, now a man of 71, the cupola, in Dr. Werner's opinion, constitutes the first important forward step in melting practice since cupolas were introduced in iron foundries.

The prime distinguishing characteristic of the cupola is the side blast. The windbox encompassing the combustion zone is divided in half and the blast is driven alternately through a double row of tuyeres on one side while the gases are drawn out through a similar row of tuyeres on the other side. At given intervals, usually ranging from 5 to 15 min. according to the rate of melting desired, the direction of the blast is reversed. The cupola described in THE IRON AGE, Oct. 19, 1922, and the one recently installed at the Griffin Wheel Co. plant both utilize the waste gases to preheat the blast but, according to Dr. Werner, the principle of the side blast may also be used advantageously without the preheating chambers. Even though the heat of the gases is not conserved, the side blast still makes for fuel economy through restriction of the melting zone to the section of the cupola through which the cross currents of air pass.

Various modifications of the side blast just described have been successfully tried both with and without the preheating chambers. One of them calls for a double alternation of the blast as follows: First the blast is introduced through the lower tuyeres on one side of the windbox while the gases are ejected from the upper tuyeres on the other side; then the blast is passed through the upper tuyeres while the gases find exit through the lower tuyeres on the opposite side. The operation is then repeated, using that half of the windbox which had previously been utilized for the withdrawal of gases (through alternate rows of tuyeres) for the injection of the blast. The advantage claimed for this scheme is that, instead of carrying the blast straight across the combustion zone in two distinct currents, it tends to diffuse the oxidizing action of the air by means of the alternately upward and downward diagonal blasts. A further elaboration of this scheme, used, however, principally in starting the cupola, is to introduce the blast simultaneously from both sides of the windbox, the cross currents being alternately from the lower tuyeres to the upper tuyeres diagonally opposite and vice versa. This gives the blast a weaving motion, mixing the air with the gases of combustion so that the heat given off by the latter promotes the reaction of the oxygen in the air with the coke. These variations in the application of the side blast principle were mentioned chiefly to indicate the

DR. SIEGFRIED G. WERNER, who addressed the Chicago Foundrymen's Club on Nov. 10, has been president of the German Iron Foundries Association for the past 11 years, and from 1915 to 1919 was also president of the German Steel Foundries Association. He is likewise a member of the executive board of the German Iron and Steel Institute, and a member of the chamber of commerce of Duesseldorf. He was born at Bremen in 1878 and, after obtaining an engineering degree at college, came to the United States for practical training in the steel mills and incidentally for the purpose of learning English, which he now speaks fluently. He was for four years in the employ of the American Steel & Wire Co., and during that time rose from wire drawer to chief engineer in charge of the rebuilding of the Newburgh plant at Cleveland, after inventing a link for binding woven wire. Dr. Werner is the main stockholder in four foundries in the section of Germany occupied by the French. The Stahlwerk Werner at Erkrath, near Duesseldorf, is equipped with electric furnaces for the manufacture of thin-walled steel castings. The Wernerhuette at Heerdt, near Duesseldorf, is a gray iron foundry; the Eisen und Stahlwerk Werner at Duelken, near Krefeld, is a machine shop and iron foundry, the foundry being used for the manufacture of machinery castings. The Stahlwerk Oberhausen at Oberhausen is an acid open-hearth steel foundry. He also controls the Stahlwerk Hamburg, now under erection at Hamburg. He is the donor of the Siegfried Werner medal, bestowed upon a foundryman each year for the most noteworthy technical or economic development.



DR. S. G. WERNER

wide possibilities for the further development of the Schuermann system.

The Installation at Griffin Plant

The speaker's remarks, however, were chiefly focused on the type of cupola with preheating chambers which was installed in the Griffin Wheel Co. plant. There are two preheating chambers, which at the Griffin plant happen to be located on the same side of the cupola as contrasted with the installation described previously in THE IRON AGE where they were arranged on opposite sides. Both chambers are connected at the top with a smoke stack and a pipe leading to a blast fan. A reversing valve alternately connects one chamber with the stack and the other with the fan so that when the waste gases from the cupola are passing through one chamber the blast is being driven through the other. At the Griffin plant a motor-driven suction fan has also been provided so that, concurrently with losses through dissipation at the top of the stack.

Particular stress was placed by Dr. Werner on the more complete combustion which, it is claimed, has been made possible by the side-blast principle. Practically no carbon monoxide is present in the cupola or in the preheating chambers, the carbon monoxide being oxidized into carbon dioxide as rapidly as it is generated. In fact, to reduce further the possibility of the generation of carbon monoxide, the cupola at the Griffin plant embodies a slight modification of the original Schuermann design. A small flue connecting the two halves of the windbox on either side of the cupola permits the passage of sufficient preheated air to oxidize any carbon monoxide issuing from the cupola to the preheating chamber.

The most striking feature of the Schuermann method is the saving of fuel which, for average foundry practice, is fully 25 per cent, according to Dr. Werner. Moreover, the sulphur content of the melt is diminished



The Preheating Chambers Are Located Back of the Cupola, Being Connected With the Cupola by the Windbox to Be Noted to the Right of the Workman. At his rear to the left is a forehearth, rarely used in this country but standard on fully 30 per cent of the cupolas in Germany

the driving of the blast through a chamber to the cupola, the gases are mechanically exhausted through the opposite chamber. The chambers contain a large number of vertical flues constructed of brick so that a maximum of brick surface has been provided for the alternate absorption of heat from the gases of combustion and radiation of heat to the incoming blast. The effectiveness of the preheating is indicated by the fact that whereas the blast enters the cupola at an average of 800 deg. C., gases leave the stack at the low temperature of 150 deg. C. (1475 and 300 deg. Fahr.)

While there is sufficient radiation from the melting zone to warm up the down-coming charge, there is never a flame at the top of the cupola. In fact, one can hold his hand over the top of the charge without discomfort. The low temperature at the top of the cupola, Dr. Werner pointed out, will facilitate the use of center charging machines.

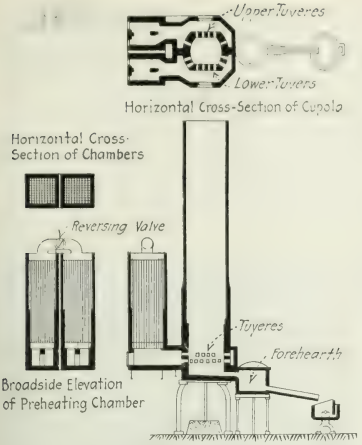
Advantages Summarized

In summarizing the advantages of the Schuermann system, the speaker made the following claims for it: A material saving in fuel consumption, a reduction in the sulphur content of the iron, longer life for the cupola lining, greater flexibility in the rate of melting, hotter iron at the tap hole and the elimination of heat at least 25 per cent. Inasmuch as the melting zone is kept much lower than is usual with a common type of cupola, it is possible to line the stack with iron bricks down to a comparatively short distance above the tuyeres. Experience in the various foundries in Europe using side-blast cupolas indicates that the Schuermann principle allows a much wider variation in the melting rate during melting periods; one large foundry, for instance, starts with an output of six tons in the first hour, runs the cupola up to 15 tons in the next hour, and then slackens to five tons per hour as the end of the melting period approaches. Yet, notwithstanding the sharp changes in the rate of melting, the composition of the molten iron remains constant. The life of the cupola lining in installations abroad, he asserted, has been found to be more than four times as long as in an older type of cupola. The Schuermann cupola is covered by United States patents.

New Foundry Developments in Germany

Digressing from his main topic Dr. Werner enumerated a number of other recent developments in German foundry practice.

Pearlitic Cast Iron: A new product which has recently made its appearance in his country is styled "pearlitic cast iron." This iron has a finer grain struc-



Vertical and Horizontal Cross Sections Through the Schuermann Cupola and Preheating Chambers

ture and a higher bending deformation than ordinary cast iron, and is commended particularly for its greater wearing qualities. By way of illustration the speaker exhibited a number of diagrams and photomicrographs, showing the grain of "pearlitic cast iron," and the importance of high temperature of the molten iron when pouring. [This was described and discussed in THE IRON AGE, Aug. 16, Sept. 6 and Sept. 27, 1923.]

New Acid-Resistant Iron: As another feature of modern European iron foundry practice, Dr. Werner referred to the different inventions of Mr. Walter, of Nuremberg, Germany. Mr. Walter has developed an entirely new way of producing acid-resistant castings. The patent rights of this method are in the hands of the Krupp company, at Essen, and it is supposed that one or several large foundries in the United States will very soon be using the new method. In making his acid-resistant castings, Mr. Walter makes use of the reaction which takes place between silicon and iron when these materials are heated together to a temperature of about 1150 deg. C. (2100 deg. Fahr.) The reaction which then takes place is accomplished by the development of a very high temperature—more than 3000 deg. C.; the reaction is exothermic. The fluid mixture of silicon and iron, containing 40 per cent of silicon, is entirely homogeneous. It consists of iron silicides. The grain structure is very fine, and there are no graphite particles showing the break. With all the other methods used heretofore for making acid-resistant iron castings, the ferrosilicon is added to the molten iron, but in that case it is impossible for the silicon to go into solution, because the melting point of silicon is higher than the melting temperature of the iron. By Mr. Walter's method, the most complicated castings can be made without the slightest difficulty.

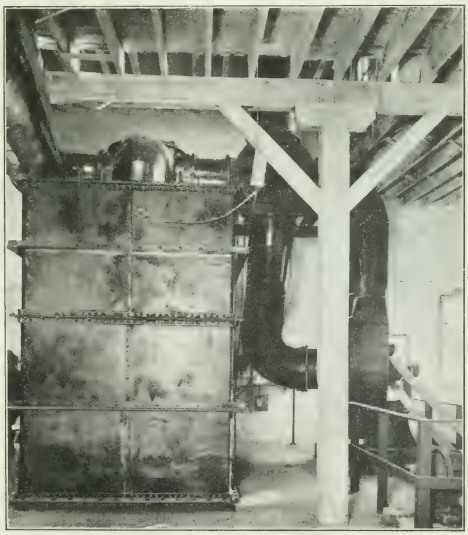
Boron in Cast Iron and Steel: Mr. Walter has given much of his attention also to the addition of boron to cast iron and cast steel. His work in this line has been covered by a large number of patents, and, though it has not been possible to put all of his ideas into practical use, the results which have been obtained by the addition of boron to molten cast iron and cast steel seem to be of the greatest importance. It appears that Mr. Walter has discovered entirely new ways of influencing the formation of the structure in iron and steel. At the same time, boron will enable foundrymen to make cast iron which can be hardened in a very simple manner. In steel foundry practice, boron may aid in obtaining a fine grain structure without annealing.

Synthetic Pig Iron from the Cupola: Recently Mr. Walter has devoted much of his attention to the production of synthetic pig iron out of the cupola; he has had remarkable success at one of the larger foundries in Germany, and it is probable that this new way of producing pig iron will become of interest for the foundries in the United States also.

Concluding, Dr. Werner gave a description of the new Fiat electric melting furnace that has been designed by Cavalliere Massera, of the Fiat Works in Torino, Italy. The first furnace of this type in Germany will be installed at one of the works of Dr. Werner, and he expects that the entire cost of the installation will be repaid within six months by the savings which the Fiat furnace will show in comparison with other familiar furnaces.

The address was illustrated with a number of photographs, tables and curves.

An election will be held in Marquette, Mich., Dec. 3 to decide whether the city will issue $325,000 of bonds for an auxiliary generating plant and for the construction of a hydroelectric plant.



The Chambers Are Connected at the Top to the Smoke Stack and the Blast Fan. A reversing valve is situated in a central position directly above the chambers. The pipe leading to the left connects with the blast fan; the pipe passing to the right connects with the stack. A connection with an exhaust fan (visible at the right) has been cut into the connection between the chambers and the smoke stack. A hand-operated valve located at this point enables one to operate the chambers with or without the use of the suction fan which, obviously, promotes the escape of the gases from chamber to stack

TARIFF PROBLEMS

Commission Uncertain in Regard to Making Investigation Abroad—Attorney General Renders Decision

WASHINGTON, Nov. 20.—No determination has been arrived at by the Tariff Commission as to when it will begin investigation abroad of pig iron costs under the application of Eastern merchant blast furnace interests. The inquiry, instituted under the flexible provision of the tariff act, has been completed in the United States. The commission also is undecided as to when it will proceed to make a general investigation of the steel situation abroad. Its original purpose was to carry on the two inquiries simultaneously and it may yet do this. Conditions in Europe, however, are so disturbed and economic factors so changeable through the fluctuation of exchange and other elements, that there is a question in the minds of members of the commission as to the constructive results that might arise from such an inquiry under prevailing conditions.

Producers in the iron and steel trade have urged the commission to proceed with the general inquiry, despite existing European conditions. Apparently it is their desire that this be done as a matter of obtaining information as to the iron and steel situation from a market and other points of view rather than from a tariff standpoint. It is conceded that there is a general lack of specific information of costs of production of both iron and steel in foreign manufacturing countries, and that information of this character would be helpful at this time to Americans. The general steel inquiry, if instituted, would be done upon the initiative of the commission as distinguished from the inquiry regarding pig iron specifically, under the flexible provision upon application of eastern pig iron makers.

Several Resignations

Paul M. Tyler has resigned as chief of the Metals division of the commission, and F. Morton Leonard is acting chief pending selection of a permanent head by the commission. John L. Bray also has left the services of the commission as non-ferrous expert to accept the chair of metallurgy in Purdue University and has been succeeded by Myron R. Walker, formerly associated with H. Koppers in Pittsburgh. Mr. Walker is a graduate of the Michigan College of Mines, Houghton, Mich., and has had 20 years' experience in mining and metallurgical work in the United States, Canada, South America and Central America.

The inquiry into the cost of Swiss files under the flexible provision, having been completed in the United States, now is under way in Europe by Paul M. Hermes, cutlery expert of the commission.

Hearing on Magnesite

The commission has set Dec. 5 as the date to begin hearing upon the application of a group of four Austrian producers for a reduction in duties on magnesite. Meanwhile investigation into the magnesite situation has been under way in the United States. Reports from the trade tend strongly to uphold the claim that American magnesite is in every respect equal to foreign magnesite. The application of foreign makers made the assertion that their product is superior to American magnesite. Among those who are expected to appear at the magnesite hearing on behalf of domestic makers are Nelson B. Franklin of the Northwestern Magnesite Co., maker of dead burned magnesite; C. S. Maltby, San Francisco, producer of both dead burned and caustic magnesite, and a representative of the Sierra Magnesite Co.

An Important Decision

Interest in some of the stringent provisions of the Fordney-McCumber tariff act has been heightened by a decision of Attorney General Harry M. Daugherty which was announced last week. Acting upon the request of Secretary of the Treasury Andrew W. Mellon for a ruling, the Attorney General upheld the right to invoke provisions of Section 510, which prohibit importations into the United States when the manufacturer or producer of the imported products refuses to give the appraising officer information as to the cost of production. The opinion grew out of the refusal of the Singer Mfg. Co., Ltd., Clydebank, Scotland, to give an appraising officer figures as to the cost of production of imported sewing machines. The appraising officer had asked for the information so that the imports might properly be appraised as neither the foreign value, export value, nor the United States value of the merchandise was ascertainable.

Secretary Mellon asked the Attorney General to advise the Treasury Department whether the term "cost of production" is embraced in the term "market value" provided for in Section 510 and whether the Secretary of the Treasury, in making regulations under Section 484 (g), would be justified in the failure of a manufacturer or producer to furnish the verified statement in invoking the provisions of Section 510.

Citing Section 402, providing that if neither the foreign, United States nor export value can be ascertained, the cost of production must be ascertained, the Attorney General pointed out that if the latter is refused the prohibitive provision of Section 510 may be invoked. It also provides that the Secretary of the Treasury may instruct the collectors to withhold delivery of the merchandise and that if failure to give information continues for one year from the date of such instructions, the collector is authorized to sell the merchandise at public auction as in the case of forfeited merchandise.

"In order that the cost of production may satisfactorily be obtained," said the Attorney General, "the proper customs officer may inspect the books and records of the manufacturer or producer. Should this privilege be denied him, however, the provisions of Section 510 of the tariff act may be invoked."

Bookings of Steel Castings in October

WASHINGTON, Nov. 19.—The Department of Commerce announces that October bookings of steel castings, based on reports from principal manufacturers, and representing over two-thirds of the commercial-castings capacity of the United States, amounted to 37,446 net tons, as against 47,574 tons in September. The following table shows the bookings of commercial steel castings for the past 10 months by 65 identical companies, with a monthly capacity of 96,900 tons, of which 38,300 tons are usually devoted to railway specialties and 58,600 tons to miscellaneous castings:

	Total		Railway Specialties		Miscellaneous Castings	
Month, 1923	Tons	Per Cent of Capacity	Tons	Per Cent of Capacity	Tons	Per Cent of Capacity
January	100,605	103.8	47,879	125.0	52,726	90.0
February ...	90,152	93.0	39,845	104.0	50,307	85.8
March	143,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,788	101.3	50,705	86.5
June	84,878	87.6	42,773	111.7	42,105	71.9
July*	52,066	53.7	16,741	43.7	35,325	60.3
August	50,515	52.1	18,332	47.9	32,183	54.9
September ...	47,574	49.1	21,685	56.6	25,889	44.2
October	37,446	38.6	9,840	25.7	27,606	47.1

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

New Glycerin-Water Quenching Medium

In connection with an investigation by the Bureau of Standards of steels for the manufacture of precision gages, an effort has been made to find a quenching medium intermediate between oil and water. During the past month, quenching curves were taken of specimens cooled in water solutions of glycerin. Such solutions fill the gap effectively, so far as the cooling rates at high temperatures are concerned.

BRONZE-STEEL WELDS

Variations in Microstructure with Rods of Different Compositions—Peculiar Behavior of Phosphorus

BY GEORGE F. COMSTOCK*

IN the course of some work on bronze welding rods for metallic-electrode arc-welding, the deposits of bronze made in this way on steel were examined with the microscope. The structures found in some instances were rather peculiar, and are of sufficient interest to warrant a brief description with some illustrations.

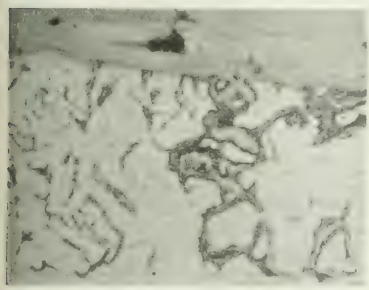


Fig. 1

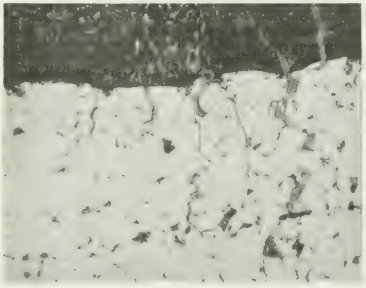


Fig. 4

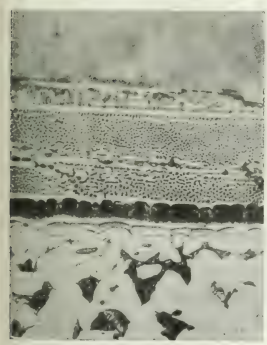


Fig. 2

Fig. 1—Boundary Between Deposited Bronze Without Phosphorus (above) and Steel (below), Etched with Picric Acid and Magnified 400 Dia., Showing no Alloying but Bronze-Filled Cracks in the Steel

Fig. 2—Boundary Between Deposited Bronze with Phosphorus (above) and Steel (below), Etched with Picric Acid and Magnified 1000 Dia., Showing Phosphide Eutectic and Layer of Dark-Etching Constituent, Possibly Troostite, Between Bronze and Steel

Fig. 3—Thicker Alloy Layer in Specimen Similar to Fig. 2 but Magnified 400 Dia., with More of the Dark Constituent, and Some Particles of Alloy in the Bronze

Fig. 4—Same Specimen as Fig. 3, Etched and Magnified in Same Way, Showing Bronze-Filled Cracks in the Alloy and the Steel Base

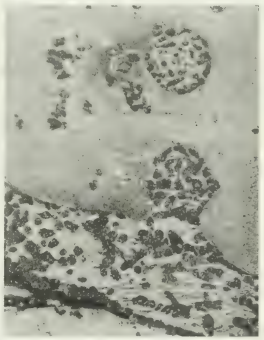


Fig. 3

The steel used in this work was ordinary rolled soft steel such as is made for plates and sheets. The bronze was in the form of thin cast rods, and contained about 10 per cent tin, the balance being copper except for 1 per cent of phosphorus which was present in some of the rods. These rods served both as electrodes and as sources of metal to be deposited in welding. The welding was done in the research department of the United States Light & Heat Corporation.

The microscopic examinations were made of the boundaries between the deposited bronze and the various pieces of steel to see what kind of a union was formed and what were the prospects for its stability and permanence. When bronze without phosphorus was used, the boundary between steel and bronze was sharp, no alloying whatever being apparent. Irregular cracks however occurred in the steel, extending downward from the weld, and these were filled with the bronze, thus forming a certain amount of interlocking between the two layers of metal. As a matter of fact, it was found to be impossible to split the two layers apart, in spite of the apparent lack of alloying. Fig. 1 shows a typical boundary between steel and the deposited bronze without phosphorus, with one of the irregular bronze-filled cracks in the steel.

When the welding was done in the same way but using bronze containing 1 per cent of phosphorus to increase its fluidity and hardness, there was a distinct layer of alloys between the bronze and the steel. The alloy present in greatest amount appeared to be the iron phosphide eutectic, as illustrated in Fig. 2, where the typical globular structure of this eutectic is prominent. Between the eutectic and the steel however there are rows of two other constituents, one etching very dark with picric acid, and one consisting of elongated light-etching grains. The nature of these substances is not known, but it may be that the darker one is troostite. In Fig. 3, where the steel base appears only in the lower left corner, a broader band of phosphide eutectic is seen, with globules of the dark-etching constituent scattered through it instead of lying only next to the steel. Particles of eutectic and the dark constituent are also shown scattered through the deposited bronze above the alloy layer. Fig. 4 is another view of the same weld, showing chiefly the steel base, with a thick layer of the dark constituent above it, and several bronze-filled cracks extending through this layer and the steel. These cracks are smaller than those shown in Fig. 1, but are probably of an exactly similar nature.

In spite of the layer of eutectic, which might be

*Metallurgical engineer, Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

expected to be brittle, between the bronze and steel, the two metals in these specimens, as in the case noted above, could not be separated from each other mechanically. It seems remarkable that during the extremely brief period of fusion in this process of welding there should be time for the reaction between the phosphorus of the bronze and the iron in the steel, to form such a distinct layer of eutectic with the other constituents that have been described. Apparently the affinity of phosphorus for iron is considerably greater at high temperatures than its affinity for copper.

The writer desires to express his appreciation to E. Bauer of the United States Light & Heat Corporation at Niagara Falls for preparing the welded specimens, and to A. B. Wilson for help with the metallographic work.

Proposed Freight Rate Index

WASHINGTON, Nov. 20.—Study of freight rates aimed at the construction of a freight rate index showing the movement of rates on all important commodities from 1900 to the present time has been undertaken by the Research Council of the National Transportation Institute. This work has been taken up along with a broad survey of transportation subjects.

At present the staff of the Research Council is engaged in the preparation of index numbers for freight rates on wheat, flour, cotton and coal. Within a few weeks the investigation will be extended to cover at least 40 commodities. This index number is designed to include the freight rate on each commodity through each step of its movement from point of production to the ultimate destination of the manufactured product. It is proposed to show not merely the changes in rates per ton over the last 23 years, but also to apportion the total freight bill of the nation to the various commodities. It will afford a basis of comparison between the total amount of freight paid and the price which the consumer pays for the finished commodity and the price which the producer received for the raw material. There is involved in this problem the apportionment of freight rates on various kinds of material used in the process of manufacture and in the assembling of the finished product. The index will furnish a basis of exact information, it is stated, upon which to base conclusions as to the relative burden of freight rates which each industry bears of the total freight bill.

Dry Abrasive for Sandblasting

Handling abrasives in sandblasting is discussed in a monograph prepared by D. L. Harris, assistant sales manager W. W. Sly Mfg. Co., Cleveland, as follows:

It is very important that sandblast abrasives be perfectly dry so that they will flow without clogging. Drying devices, such as stoves, V-shaped hoppers with gas burners along the sides, or steam coils under screens or perforated plates, are used in many instances where it is impractical to store the sand in extraordinarily dry bins. The operation of such sand driers is based upon the familiar fact that wet sand is adhesive and clingy, but that when perfectly dry, it runs almost without friction. As the sand near the hot metal is dried, the surface tension in the wet sand is destroyed and it drops in a dry state to a storage container, ready for use.

Metallic abrasives are more difficult to handle. They must be kept dry, as the slightest dampness will cause oxidation and the forming of a mass of lumps of considerable hardness. Such a condition would entirely prevent the use of the materials as abrasive for sandblast purposes.

Compressed air which furnishes the force for expelling abrasive at high velocities through the sandblast nozzle always contains more or less moisture. Water separators are used successfully for removing this moisture but it is impossible to make the air perfectly dry. Interruptions of several hours in the operation of sandblast equipment may cause a caking of the abrasive due to the accumulation of moisture from the compressed air, which is more pronounced with metallic shot or grit than with sand, however.

A sandblast equipment with pneumatic elevation and separating system overcomes the difficulty to a degree not realized by many users of this design. The pneumatic elevation lifts and returns the spent abrasive to the sandblast tank by means of the air used for ventilation of the equipment. This operation, found generally in combination with a pneumatic separator, by its very nature, mixes and separates all grains of the abrasive, and removes moisture so that the abrasive is kept in prime condition.

Since caking is more pronounced with metallic abrasives, the pneumatic handling for elevation and dust separation offers a valuable remedy to what otherwise must be an expensive and exasperating condition.

Tests of High-Speed Steels

Two series of tests on high-speed steels have been completed by the Bureau of Standards and a third has been outlined. The program for this work includes performance comparisons of commercial high speed steels in cutting carbon, nickel, chrome-nickel, chrome-vanadium, and chrome-molybdenum steels, heat-treated in various ways. The lathe tools are now being prepared, and several manufacturers of structural steel have promised to supply sufficient material for the required test logs. It is hoped to carry out the work in such a manner as to throw some light on the ease of machining various alloy steels, heat-treated to show equal hardness.

A set of high-speed steels of special composition is also being prepared in the high frequency induction furnace, as it is planned to test steels having quite different chemical composition from present commercial types, to determine the effects of added elements to the usual chrome-tungsten-vanadium steels.

In order to supplement tests already carried out on "flaky" high-speed steels, thermal analyses were made of 12 samples, intentionally flaked by repeated quenching. No marked differences in the thermal arrests were observed except in one case. Samples quenched three times from either 1260 or 1350 deg. C. showed no evidence of the Ac_1 transformation on reheating, whereas steel which was first quenched from either of these temperatures once, twice, or five times clearly showed this transformation at about 423 deg. C.

Power Show in New York

The power show to be held at Grand Central Palace, New York, Dec. 3-8, will have a showing of the latest devices used in measuring the flow of fluids and gases. The instruments which in most cases will be shown at work include portable CO^2 and temperature indicators.

In the flow meter group one manufacturer will demonstrate the effect of pipe fittings on fluid flow by circulating water at various rates through a section of glass pipe. In another exhibit water pumped through a venturi meter will be measured by three instruments, two recording and one an indicating manometer.

Fuel oil burners complete with controls and pumps will be displayed by several companies. One exhibitor will show a burner in action spraying water in a glass case. A boiler setting will also be displayed illustrating the method of bricking and connecting the burner and installing the air register.

Pulverized fuel equipment also may be seen.

Exports of agricultural implements from the United States during the first nine months of 1923 amounted to $40,001,188, compared with $19,051,718 for the first nine months of 1922. The figure for nine months this year is 30 per cent greater than the total for the entire calendar year 1922 and is only 6 per cent under the total for the calendar year 1913. Exports in September were valued at $5,522,863.

William H. Barr Proposes New Alliance*

President of National Founders' Association Says Manufacturers, Farmers, Bankers and Railroad Executives Should Act in Harmony

THERE is manifest in all industrial centers a steadily increasing acceptance of the principle of open shop operation, and it is equally true that these gains have shown a corresponding weakening influence in the ranks of organized labor. I believe that this statement may be uniformly accepted and applied to most industries except the mines, the building trades and the railroads.

Unfortunately, Governor Pinchot's recent adjustment of the difficulties in the anthracite fields only served to strengthen the union control of the mines and to increase the price of coal for domestic consumption. The settlement was as unwarranted as it was uneconomic.

IN order that we may properly apply ourselves to any political task, we should as citizens banish the often implied idea that our Government is something remote, distant and unapproachable. It is a common thing to hear our neighbors speak about "the Government" as if it were something powerful, possibly composed of superhuman men who did things in an autocratic manner. On the contrary, we should form the habit of speaking of "our Government" and of "my Government" and more thoroughly realize that we are an integral part of it.

That extravagant building costs directly governing ever increasing rentals are brought about by the brigandage of the building trades unions is recognized by all and denied by none. Apparently the only answer to this problem is the absolute necessity for the adoption of the open shop policy of employment in this troubled industry.

The possibility of cheaper railway transportation is again jeopardized by recent demands on the part of the brotherhoods for an increase in wages, which if granted would put them back on the unjustified and profligate scale of governmental wartime operation.

Plans of Radicals

It is generally understood that immediately following the convening of Congress there will be a drive to amend the Esch-Cummins railroad law and to substitute for this form of legislation the untried theories of radical men antagonistic to the private operation of railroads. We believe that railroad officials are fully competent to oppose these proposals before Congress, and we doubt that congressmen will go so far astray as to disturb the present form of operation which is working out with a measure of satisfaction. The foundry industry is directly concerned in the problems facing the railroad executives, and we must not remain silent under radical attacks, which if successful would destroy railroad efficiency and disturb our entire economic situation.

Help for the Farmer

The need for unskilled labor suggests consideration of the economic condition of the farmer to which a great deal of attention is being given by President Coolidge and the Congress. This is as it should be. But should it be left only to the Government to recognize his needs? Every citizen is vitally concerned with the prosperity of the farmer. It is only temporarily reassuring to note that in the last few months there has been a decided improvement in conditions and that farm crops this year will sell for approximately one billion dollars more than last year. Is there then any real solution of the recurring difficulties of the farmer? If so, it must be found in general cooperation looking to improvement in his economic situation rather than in any artificial legislation which Congress may create. The experience of the farmer has been that legislation does very little good at the moment and may do much harm in the future. To help the farmer by imposing unsound conditions on railroads or industries is neither rational nor effective. But if industry, the railroads, the bankers, and the farmers, cooperating with the Government, will plan and work together they will arrive at a condition of mutual assistance which will be of general benefit. During the period of depression now ending, many farmers, in certain sections, irritated by their necessities brought about by purely economic conditions, grasped the hand of radical politicians and by sending them to Congress thought they were helping agriculture. It was, on the contrary, a selfish attempt by these radicals to build up political preference among the discontented farmers.

THE present tendency to legislate rather than to enforce is painfully apparent. Many public officials seem to believe that a new law is more desirable than an earnest effort to enforce an old one. How will any man keep up with ten thousand new laws annually? Why not have a breathing space in this kind of legislation? Every time a public official desires a new law there should be an inquiry to discover whether or not there are existing laws covering the point he has in mind and, if possible, to check the inspiration of his demand.

Restriction of Production by Unionism

The problem is aggravated by socialistic closed shop unionism prevailing in certain industries, where by compelling abnormal wages and limiting production they have set a fantastic standard of production cost which has limited the farmer's buying power. The standard of militant unionism is not that of fair work for fair pay; it is, instead, the enforcement of demands through intimidation. The net result is artificially to advance the price of many things which the farmer

*Abstract of address delivered at annual convention of the National Founders' Association, New York, Nov. 21.

must buy, and to rate his own competitive labor at an absolute minimum. The standard of labor valuation set up, when possible, by the unions is an unwarranted discrimination against the farmer. The price of wheat and cotton and cattle is fixed by the law of supply and demand. The price of clothing or shoes or coal reflects the artificial price resulting from imposed union conditions. The industrial worker assumes no risk and receives his money immediately. The farmer on the other hand must work and often wait for months, having, in addition, the hazards of nature to compete with before he can be assured that there will be any return for the labor expended. Abnormal union wages, short hours and retarded production have demoralized agricultural labor. Further, the farmer cannot collect a fair valuation on his own labor, or that of his family, much less a reasonable depreciation on his property investment. Too often, when he sells his product, he realizes only on the labor for which he has actually paid cash, and his own work becomes a real liability.

NO man has a right to criticize the action of any Government official, who has not participated in their selection and election. The vote is the great gift of our form of Government. It is through the vote that the character of policies and the quality of legislation are determined. Every citizen should know something of political methods, and should not, because he is a party man or because of his own indifference, delegate to self-appointed bosses the right to select candidates, frequently unqualified, and yield the power to elect them.

The Farmer and the Manufacturer

The farmer therefore has a natural alliance with the manufacturer who with him is striving for lower costs by combatting artificial union labor prices and restricted production.

Perhaps we in industry are partly responsible because we have not gone to the farmer with our problems or invited him to bring his problems to us. It is time for us to invite a mutual alinement against the common enemy of artificial conditions and insincere advisers. The manufacturer, the farmer, the banker and the railroad executive should form an alliance. Their interests are identical. They should first understand each other, and then cooperate. In this cooperation will be a solution of the farmer's problem, and through the solution there will be a helpful condition created so far as other citizens are concerned.

Our duty as an association lies along this as well as other paths. Let it be said of us that our accomplishments are guided always by optimism, honesty and equity. In no other way is it possible to maintain our accepted standing as a dominant factor in American industrial life.

THE policy of governmental economy has been splendidly illustrated during the past two or three years, reductions having been made in many governmental appropriations and economies effected that do not operate against efficiency. The Bureau of the Budget is doing excellent work and local political considerations must not be permitted to interfere with its recommendations.

SUPERPOWER IN OHIO

Large Interconnecting Plants Under Way—Utilizing Coal at Mines the Trend

Important progress has been made in Ohio this year in developing large steam power central electric generating stations and in extending interconnecting high tension transmission lines, providing a network of lines that supply current for power and lighting for a large share of the industrial centers of the State. With these interlinking lines power produced on the Ohio River is now linked with that made on the shore of Lake Erie. While other important developments are going on in other parts of the country in utilizing the available water supply for the production of current in hydro-electric plants, Ohio appears to be leading other States in the building of steam power central stations.

Not only are the transmission lines of the large electric utilities companies in Ohio being interlocked with each other but they are also interconnected with similar lines in western Pennsylvania and West Virginia and shortly will be interconnected with other power lines in Indiana. With interconnection a plant does not have to be built of a capacity to carry its peak. Continuity of service also is the better assured by the interconnecting lines.

The plans as mapped out and partly consummated provide for the erection of plants at certain strategic points where there is both water and fuel, these plants to supplement existing power plants.

Earlier this year companies engaging in superpower development in Ohio started a building program of steam power generating plants and transmission lines involving an expenditure of $100,000,000 and it is stated that this entire amount will be expended by March 1, 1924. At present the network of power transmission lines cover practically all of northern and eastern Ohio and a portion of the southwestern part of the State. Power generated at Windsor on the West Virginia side of the Ohio River is carried through Canton as far north as Akron, where the transmission lines from the Ohio River connect with similar lines from the plant of the Cleveland Electric Illuminating Co. in Cleveland. The latter company's plant has a capacity of 265,000 kw.

The American Gas & Electric Co. has under construction a 250,000 kw. plant at Philo near Zanesville, Ohio, and the Ohio-Pennsylvania Electric Co. will shortly begin the erection of a plant of approximately 100,000 kw. at Toronto on the Ohio River north of Steubenville. Indicating the extent of the territory covered by some of these power service corporations, the American Gas & Electric Co. now has transmission lines extending through Canton, Newark, Steubenville, East Liverpool, Coshocton, New Philadelphia and forty smaller places.

The Ohio Public Service Co. is completing a 132,000 volt transmission line extending from Lorain to Mansfield, Massillon, Alliance and Warren, a distance of 155 miles. Current for this system will be supplied by power plants at Lorain, Warren and Mansfield. The generating capacity of this system will be more than 500,000 hp. This company is affiliated with the Toledo Edison Co., reaching out from Toledo, both being subsidiaries of the Cities Service Co. The Columbia Gas & Electric Co. has lines reaching north of Cincinnati to Hamilton and Dayton and these will be extended on to Columbus. Some of the present lines carry current at 22,000 and 66,000 volts. A standard tower for carrying 132,000 volts transmission lines that has been adopted by the Ohio Public Service Co. is 79 ft. in height and these are placed six to the mile.

High-Pressure Steam Boilers

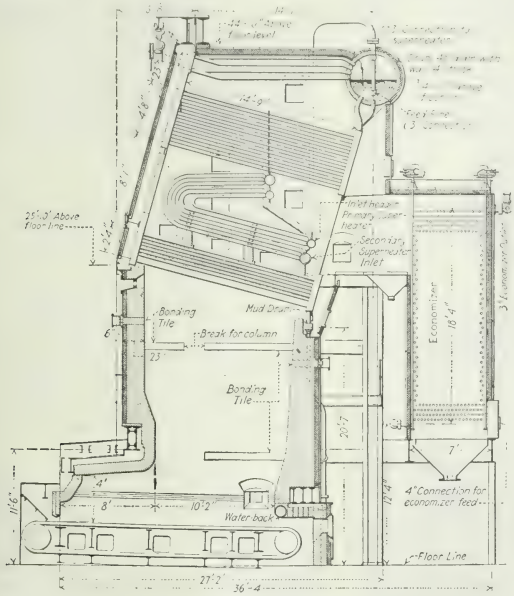
Designed for 1200-Lb. Pressure and 725 Deg. Superheat, with Intermediate Superheating Between High-Pressure Turbine and Main Turbine Units Operating at 300-Lb. Pressure

BY D. S. JACOBUS*

JACOB PERKINS was a pioneer in the use of high-pressure steam. In 1822, over 100 years ago, he made an apparatus in which water was heated under a high pressure in a generator kept full of water by a force pump. Only a very small quantity of the highly heated water was allowed to escape at a time into a tube, where it flashed into steam and passed on to an engine. His generator of 1824 is described in "History and Progress of the Steam Engine," by Elijah Galloway, published in London in 1830:

> The boilers, or steam generators, are very thick cast iron bars, 5 in. square, with circular holes perforated longitudinally through them of 1½ in. diameter. They are arranged in three tiers and are of sufficient length to lie across the furnace, and to pass through the opposite walls, where their extremities are connected together so as to form one continuous vessel. By the operation of the forcing pump, water is continually injected into the two upper tiers of generators, so as to keep them always full, and under the pressure of the heavily loaded valve. The lowest tier of generators contain no water, but are kept at a temperature of about 1000 deg. Fahr.
>
> At each stroke of the engine a certain quantity of water, heated to about 700 deg. or 800 deg. Fahr., is discharged into the valve box communicating with the lowest tier, wherein the water flashes into steam; the steam thus formed passes successively through every pipe in the lowermost range, which is exposed to the strongest action of the fire, before it enters, by a short tube, the safety chamber for the supply to the engine, to which it is conveyed by a pipe. There is a loaded valve to relieve the pressure, should the chamber become overcharged with steam.

Heating the water to 700 or 800 deg. Fahr. would involve operating at the critical pressure of, say, 3000 lb. per sq. in.



Boiler Designed for a Working Pressure of 1200 Lb. per Sq. In. The tubes are 2 in. in diameter, to facilitate cleaning. The steam drum, 48 in. in diameter and of 4-in. forged seamless steel walls, is specially reinforced at the manhole. Superheater temperature is 725 deg. Fahr., above which it is undesirable to go, because of danger of softening the steel

A series boiler was constructed by the Babcock & Wilcox Co. This consisted of a boiler with 2-in. tubes, having a steam and water drum, and a combined boiler and economizer with 1-in. tubes in which the heating surface was 3.7 times the heating surface of the other boiler. The unit was comparatively small, having 187 sq. ft. of tube surface of the boiler with the steam and water drum exposed to the hot gases, 51 sq. ft. of superheater surface and 685 sq. ft. of boiler and economized surface in the section made of 1-in. tubes, or 923 sq. ft. of heating surface in all. The boiler was fired with oil fuel with a mechanical atomizing burner and operated at 600-lb. gage pressure.

A connection, fitted with a valve and run from the steam and water drum to the lowermost part of the series boiler, was left open in starting up the boiler, so as to provide a local circulation. The unit was

*Advisory engineer, Babcock & Wilcox Co., New York. This is abstract of a paper read before the Buffalo convention of the Association of Iron and Steel Electrical Engineers.

run at times at over 500 per cent of rating, based on the total boiler and economizer surface, and all parts were found to operate in an entirely satisfactory way. The boiler with 2-in. tubes having the steam and water drum was operated in the high capacity tests at about 1500 per cent of rating.

We are building boilers for 1200-lb. working pressure, with wrought steel economizers, for power plant service, of the general form shown, which is illustrative only, as certain features of the tube arrangement may be changed. In developing this boiler we had before us the results secured with the use of 1-in. tubes in a great number of White-Forster marine boilers for destroyer service and the results of the experiments with the series boiler.

In this new boiler the steam generating tubes are 2 in. in diameter, which is a convenient size for internal cleaning, whereas it is difficult, if not impossible, properly to clean tubes of 1 in. diameter and smaller. The steam and water drum, 48 in. internal diameter of forged seamless steel construction, provides a reserve water capacity, making it easy to operate the boiler under all sets of conditions, such as in starting up and under variable loads, and making it unnecessary to provide pumps having 100 per cent reliability, such as would be necessary for a series boiler. The tubes are arranged so that they can be thoroughly cleaned on the outside from between the diagonal lanes.

Feed water from the economizer passes directly into the boiler, which makes it necessary to build the economizer for a somewhat higher pressure than the boiler. The economizer is made up of 2-in. seamless steel tubes expanded into forged steel boxes. The boxes are spaced apart to allow the removal and replacement of the economizer tubes from between the boxes with the tubes at an angle, which allows the tubes to be removed and replaced with a relatively narrow aisle width. The ends of the horizontal circulating tubes of the boiler are bent so that they enter the drum in circumferential lines which are twice as far apart as the distance between the horizontal circulating tubes where they enter the headers. This greatly increases the efficiency of the ligaments between the tube holes. There are two circulating tubes running from the top of each uptake header to the steam and water drum. The boilers are built to meet the requirements of the A. S. M. E. boiler code. The maximum allowable stress in the drum is taken at 11,000 lb. per sq. in., thereby corresponding to the figure specified in the code.

Boilers built for 1200-lb. working pressure will be supplied with individual steam turbines. It is the idea eventually to generate all of the steam for a power plant with high-pressure units of this sort and, after passing the steam through several of the high-pressure turbines, to pass their exhaust steam to a main steam turbine. The steam supplied to the high-pressure turbines is superheated to a total temperature of 725 deg. Fahr. by primary superheaters. The exhaust steam from each individual high-pressure turbine is returned to a secondary superheater placed within the high-pressure boiler setting, at a pressure of 300 lb. above the atmosphere, and is re-superheated to a temperature of 725 deg. Fahr. and supplied to the main steam turbine. The individual high-pressure turbines therefore serve to reduce the pressure of the steam from the initial 1200 lb. to that used at the main steam turbine.

With an economical main turbine operated with the exhaust steam from the high pressure turbines the amount of power generated by the high-pressure turbines would be 20 to 25 per cent of that generated by the main turbine. Should the main turbine be run at a lower pressure than 300 lb. and at a lower temperature than 725 deg. Fahr. the gain through using the high-pressure would be increased and might reach 30 per cent or more.

There is a possibility, therefore, of revamping present power stations and considerably increasing their efficiency through using the high-pressure units with individual steam turbines and exhausting the steam into the present steam mains. To warrant the additional investment necessary for installing the high-pressure boilers in an old plant it would be necessary to have a very steady load, or what is known as a "base load condition." The investment would not be warranted under present conditions for a widely fluctuating load.

The effect of temperature on the lowering of the elastic limit of steel has been referred to by engineers as something that might give trouble in a high-pressure steam boiler. At a temperature of about 750 deg. Fahr. the elastic limit may drop to half that obtained at room temperature and it is important that the effect of this falling off be understood. The temperature of saturated steam corresponding to 1200 lb. pressure is somewhat less than 570 deg. Fahr. At this temperature the strength of the steel is higher than at room temperature and the elastic limit is about the same or only slightly lower, so there need be no apprehension with respect to the boiler proper. The only part affected through being brought to a temperature that would cause any material difference in the strength or the elastic limit of the steel is the superheater. Of all parts of a boiler the superheater is the safest, so far as its liability to injure anyone or to cause property damage is concerned, as the worst that might happen in case the superheater became overheated would be to burn out or blow out some of the tubes, and this would not ordinarily result in any damage other than to the superheater itself.

In the latest boilers for high-pressure and high-temperature superheated steam built by the Babcock & Wilcox Co., the superheater is placed above a series of tubes in a drop-leg and below the main body of tubes of the boiler. A superheater properly arranged in this position in a properly designed boiler gives a more constant degree of superheat at different ratings than if placed in the ordinary position above the boiler tubes, and permits a higher degree of superheat to be obtained with a given amount of superheating surface. For the temperature of superheated steam now employed the superheat obtained with a superheater of this sort is near enough constant for use without an attemperating device.

There is little gain in economy in increasing the steam pressure to a higher point than 350 lb. per sq. in. without interstage heating of the steam. That is, the steam from one stage of the turbine must be withdrawn from the turbine, re-superheated and returned to the following stage of the turbine. Interstage heating necessarily involves additional complication and added expense, and the possible difficulties in operation due to the additional complication have an important bearing on the use of the higher steam pressures.

Discussion

H. H. Chandler, steam engineer Carnegie Steel Co., Duquesne, Pa., pointed out that a cross compound engine operating at 60 per cent boiler efficiency with 150 lb. steam pressure and with 26 in. vacuum obtains a net thermal efficiency of 7.4 per cent. Similarly a compound turbine unit using 300 lb. steam pressure and 28 in. vacuum, with boiler operating at 70 per cent efficiency, gives a net thermal efficiency of 16.6 per cent. The new super-pressure boiler used as pointed out in the paper would produce a net thermal efficiency of 21.8 per cent. Comparing this with the cross compound unit, the consumption of B.t.u. per kwhr. is cut down from 46,000 to 15,000.

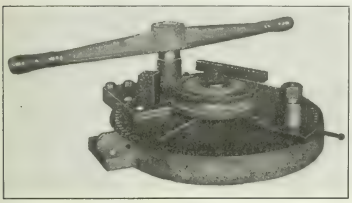
Dr. D. S. Jacobus stated that air heaters for boilers will pay in connection with high efficiency units, and are bound to appear in the future. They must be used with a large and economical boiler or with an economizer, because the weight of the products of combustion, which would heat the air, is twice as great as the weight of the air to be heated.

With specific reference to manholes in the 1200-lb. pressure boiler, Dr. Jacobus stated that these are made with particular care, the metal being so thickened at this point that there is greater strength here than in the other portions of the boiler. The thickness at this point, in the accepted design, reaches more than double the normal thickness of steel used in the steam drum.

Machine for Bending Pipe and Tubes

A new machine for the cold bending of pipe or tubing of brass, copper or steel, which is claimed to operate without crimping or flattening, and which may be unloaded quickly, has been placed on the market by the Pedrick Tool & Machine Co., 3640 North Lawrence St., Philadelphia. The machine may be bolted to a stand, bench or stanchion. It is designed to handle any length of pipe, and the largest of the various sizes will take material up to 4 in. in diameter. Short pieces may be cut to length, threaded if necessary and bent to suit requirements.

The simplicity of the machine may be noted from the illustration. A face plate having gear teeth cut on its periphery is made to revolve in an outer casing. The hand-lever attached to the pinion that meshes with the face plate is said to increase the power in a ratio that requires little manual effort for operation. Attached



Machine for Bending Pipe and Thin Tubing

to the outer casing, so that it does not move with the face plate, is a flat steel piece having a number of holes for locating the resistance stud. The upright stud fastened to the face plate is radially adjustable by a set screw, and a roller is provided on this stud to reduce the friction of carrying the pipe around the form.

At the center of the machine there is another stud over which are slipped the grooved rolls of the correct size for the diameter of the material being bent, and of the proper radius for the shape desired. The degree or angle of the bend is determined by the arc through which the face plate is moved, and since this may be controlled to an exact point, any number of identical shapes may be easily made.

Hearing of Bethlehem Merger Continued at Boston by Commission

Hearings on the merger of the Bethlehem, Lackawanna, Midvale and Cambria steel properties instituted by the Federal Trade Commission in Boston, beginning Oct. 1, were adjourned Nov. 15 till Tuesday, Nov. 22, when they will be continued in Buffalo. Among those who testified during the last of the hearings were:

Warren W. Loomis, general purchasing agent Stone & Webster, Boston, engineers; Arthur C. Harvey, president and treasurer Arthur C. Harvey & Co., Allston, Boston, iron and steel jobbers; Frank E. Colesworthy, purchasing agent Crompton & Knowles Loom Works, Worcester, Mass.; C. N. Fitts, treasurer New England Structural Co., Everett and Boston; John E. Johnson, vice-president Laconia Car Co., Laconia, N. H.; Charles Loughead, vice-president and general manager New England Drawn Steel Co., Mansfield, Mass.; William E. Clark, Bancroft & Martin, Boston and Portland, Me., rolling mill; Henry M. Jones, Mcgquire & Jones Co., Portland, Me., structural steel; Louis P. Tower, president and treasurer James H. Tower Iron Works, Providence, R. I., and W. H. Fitzell, Berlin Construction Co., Berlin, Conn.

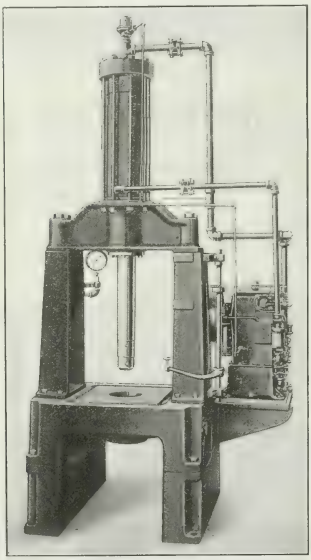
Much of the testimony submitted by the witnesses above named was along the lines of that given by other users of steel mill products, namely that prior to the merger of the companies purchases were made from all; that prior to the merger the Lackawanna Steel Co. perhaps was the leader in the matter of deliveries; that since the merger the Bethlehem Steel Corporation has improved its deliveries; that prices made by the Bethlehem Steel Corporation are satisfactory, and that Judge Gary and Charles M. Schwab are the two leading individuals in the steel industry.

New Self-Contained Hydraulic Press

A new line of self-contained, two-column hydraulic presses, in sizes ranging from 15 to 50 tons capacity, has been placed on the market by the Oilgear Co., Milwaukee.

The machines may be used for broaching, assembling, forming, straightening and other work where pressing action is required. One of the features claimed for the press is that the ram may be run against the work to any predetermined pressure and held at that pressure indefinitely, without pulsations. Other features emphasized by the maker include sensitive control, smooth and positive motion to the ram, elimination of accumulator and operating valves, the constant speed source of power and speed of operation.

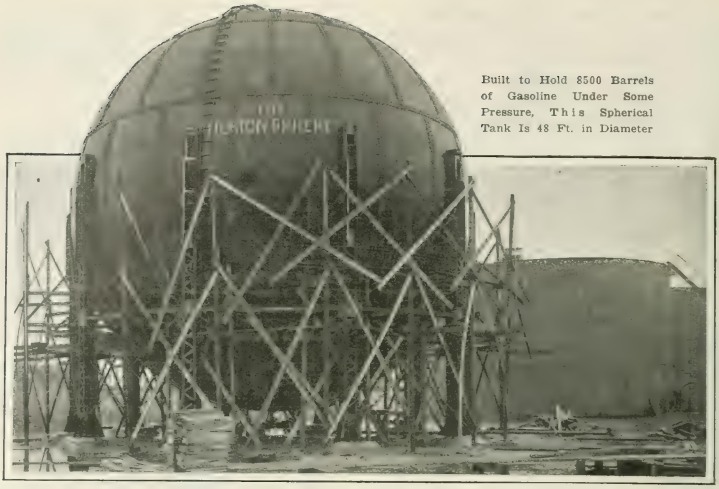
The unit illustrated is of 15 ton capacity, equipped with the company's type W variable delivery pump. The presses may be equipped with the platen either 14 or 30 in. from the floor, and with the width between the columns and the stroke of the ram dimensioned to suit requirements. The pump has a maximum delivery



Sensitive Control Is a Feature

of 3060 cu. in. per min. of oil and a pressure of 1000 lb. per sq. in. maximum.

Various pump control mechanisms are available, such as plain hand control as shown in the illustration, foot-treadle, or semi-automatic control. In all cases a single-acting lever gives instant control of the rapid advance and return of the ram, and also to the pressing speeds, regardless of the resistance offered by the work. A differential quick advance to the ram is available with either hand lever or foot treadle control, which will permit the ram to be advanced to the work at double the pressing speed. The pump is protected so that the ram may be run against a positive stop without injury.



Built to Hold 8500 Barrels of Gasoline Under Some Pressure, This Spherical Tank Is 48 Ft. in Diameter

Spherical Tank Built for Oil Storage

Designed to Withstand Leakage and Prevent Evaporation Under Heavy Internal Pressure—Rigid Construction

BY WILLIAM C. MC CLURE

At points in the Gulf, Mid-continent and Wyoming oil fields are being erected a number of large elevated spherical steel tanks, 48 ft. in diameter, designed to hold approximately 8500 barrels of gasoline. This new type of tank, invented and built by the Chicago Bridge & Iron Works, has been named the "Hortonsphere." It has been designed to withstand leakage, evaporation and an internal pressure as high as 15 or 20 lb. per sq. in. All pressures, owing to the form of the tank, must be exerted equally at every point of the interior of the shell.

It is well known that the ordinary, flat bottom, cylindrical tank tends to become distorted under pressure, which is evidenced by the bulging of the bottom in the center, accompanied by rising of the perimeter above its foundation. The old style of tank, therefore, is unsuited to the storage of a volatile liquid such as natural gasoline, a certain percentage of which, before weathering, will boil under ordinary conditions of temperature and pressure.

It has been found, however, that by storing these low boiling point products in tanks of a spherical form of rigid construction, and as gas tight as human ingenuity can make them, the evaporation losses are reduced to a very low percentage. Additional protection against pressure due to rise of temperature is obtained by thorough surface insulation, while the liberal application of a coating of white paint, outside



Fig. 1—With a Diameter of Approximately 11 Ft., the Dished Head at Bottom of the Tank Receives the Ends of Sixteen Accurately Curved Shell Plates Forming the Lower Course or Ring. All are butt-strapped with double riveting. The top of the tank is built this same way

of the insulating material, tends further to minimize absorption of the heat rays of the sun.

The tank proper, including the interior balcony girder, weighs about 140 tons; its charge of gasoline, when filled, an additional 1250 tons. This weight is supported by ten massive posts, built up from 15-in. channel sections, which are riveted above to the plates of the center ring of the tank and anchored through their bottom plates to the foundation piers. The posts are connected horizontally, midway of their height, by means of laced channel struts, with diagonal bracing of a pair of 1-in. square tower rods both above and below each strut.

The shell of the sphere consists of dished head plates with an approximate diameter of 11 ft., above and below, joined by five rings of accurately curved shell plates. All seams are heavily butt strapped; all of the spheres at present under construction are provided with butt straps, but it has been demonstrated that equally satisfactory results can be obtained from lap welded joints and this form of construction will be used to a considerable extent in future work of this character.

Additional rigidity of construction has been secured by the use of an interior balcony girder resting on twenty brackets fastened to the center shell plates, the girder and shell plates also being continuously riveted together around the center circumference of the shell.

It may seem surprising, considering the volatile nature of gasoline in question, that it has proved entirely possible to render these tanks gas tight by calking instead of welding. The calking is all done on the outside of the tank, the butt straps being beveled for this purpose.

The photographs accompanying this article were taken during preliminary fitting and erection of a Hortonsphere, before shipping from the Greenville, Pa., plant of the Chicago Bridge & Iron Works. In Fig. 3 the lower head plate, first and second rings and part of the center or belt ring are shown, the holes for the tower post connections appearing in the alternate plates of the center shell ring. The horizontal rows of holes, showing in this same ring, are for connection of the inside balcony girder. Fig. 4 is a general view of the interior taken from an elevation.



Fig. 2—(Right) After the Second Ring Has Been Built On, the Tank Resembles a Huge Porridge Bowl

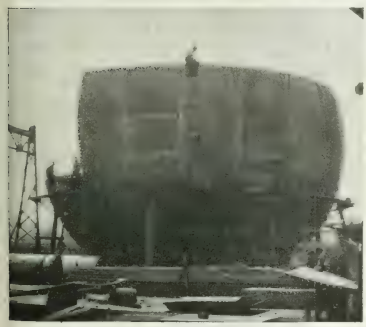


Fig. 3—(Below) Part of the Center or Belt Ring Has Been Attached. This shows the horizontal rows of rivet holes for the inside "balcony" girder, designed to stiffen the tank against distortion. The vertical bands of rivet holes are for attachment to the ten tower posts

While the natural gasoline industry in its various phases has shown a wonderful growth during the past fifteen years from the standpoint of increased volume of product, its development along technical lines is a remarkable tribute to the American genius for invention. It is the belief and expectation of the builders that these spherical tanks, by reason of their special construction, may assist in the solution of numerous problems in blending, weathering and economical storage of the lighter petroleum products, with the possible assistance of refrigeration further to reduce losses due to evaporation.

The American Rolling Mill Co. has placed a contract with Arthur G. McKee & Co., Cleveland, for the installation of a McKee patented revolving distributor on its "East" blast furnace at South Columbus, Ohio, its "West" furnace having been equipped with a distributor some years ago. This will make a total of 142 blast furnaces equipped with the McKee revolving top.

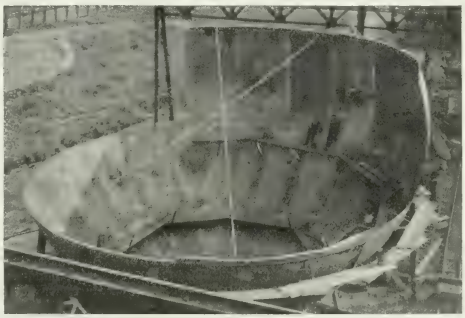
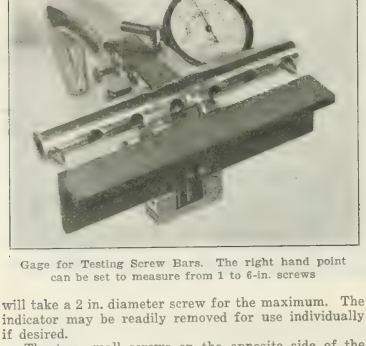


Fig. 4—General Interior View. In addition to the rivet holes shown in Fig. 3, this shows also some of the double brackets set to receive the inside balcony girder

Portable Screw Bar Gage

The thread gage illustrated, which was designed originally for a milling machine manufacturer who required a portable gage for testing screw bars after they were assembled in the machine, and to be used also on the bench, is being made to special order by the Federal Products Corporation, Providence.

The gage has a range of 6 in. and the right-hand point is interchangeable so that it can be set to measure 1, 2, 3, 4, 5 and 6 in. screws. The table may be adjusted by the small screw in the center of the base so that it



Gage for Testing Screw Bars. The right hand point can be set to measure from 1 to 6-in. screws

will take a 2 in. diameter screw for the maximum. The indicator may be readily removed for use individually if desired.

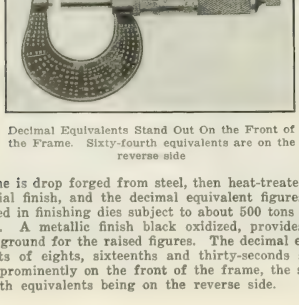
The two small screws on the opposite side of the indicator, on the side of the base, are for adjusting the tension of the indicator spring in one case, and for adjusting the range of the indicator hand in the other. The latter is provided so that the indicator hand will not snap back several revolutions of the dial when the screw being tested is removed from the table. The two screws at the top are check screws for the adjusting screw.

The body of the gage and the handle are of aluminum and the table is of steel, hardened and ground.

Micrometer with Decimal Equivalents

Micrometers in 1-in. size having decimal equivalents on the frame as shown in the accompanying illustration, are being offered by the Reed Small Tool Works, Worcester.

The deep throated concave form of frame, the two-part thimble, the stationary anvil and rigid threaded lock joint have been retained in the new tool. The



Decimal Equivalents Stand Out On the Front of the Frame. Sixty-fourth equivalents are on the reverse side

frame is drop forged from steel, then heat-treated for special finish, and the decimal equivalent figures are raised in finishing dies subject to about 500 tons pressure. A metallic finish black oxidized, provides the background for the raised figures. The decimal equivalents of eights, sixteenths and thirty-seconds stand out prominently on the front of the frame, the sixty-fourth equivalents being on the reverse side.

Unfilled Sheet Tonnage Reduced

Independent sheet manufacturers reporting to the National Association of Sheet and Tin Plate manufacturers evidently had a good many specifications against old orders in October, as the monthly report of the organization shows that shipments were almost 45,000 tons in excess of sales. The month made a rather poor showing as compared with September on sales, and with both production and shipments running well in excess of incoming orders, unfilled orders suffered a substantial reduction, as of Oct. 31, standing at 307,540 tons, as against 343,096 tons a month before. Net obligations, arrived at by deducting unshipped and unsold stocks from unfilled tonnage, as of Oct. 31, were 200,656 tons, as compared with 228,783 tons at the end of September. The obligations of the mills reporting, therefore, represent less than one month's production at the October rate of operation.

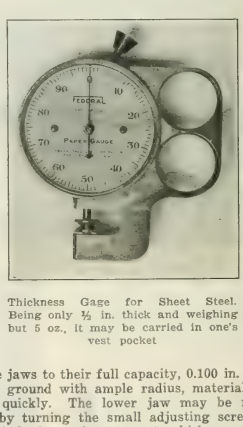
October figures, in net tons, compare with those of September and August as follows:

	October	September	August
Capacity	424,000	377,000	420,000
Per cent reporting	69.5	68.8	69.5
Sales	185,110	223,556	116,659
Production	225,714	185,577	234,112
Shipments	230,820	205,772	234,486
Unfilled tonnage	307,540	343,096	316,972
Unshipped tonnage	71,907	84,338	102,354
Unsold stock	34,982	29,975	32,252

Pocket Thickness Gage

The pocket thickness gage illustrated, which is being marketed by the Federal Products Corporation, Providence, although designed primarily for measuring paper, is well adapted for measuring sheet steel and other sheet material. Weighing but 5 oz. and being only ½ in. thick, the gage may be carried conveniently in one's vest pocket.

Pressing the small button on the top of the gage



Thickness Gage for Sheet Steel. Being only ½ in. thick and weighing but 5 oz., it may be carried in one's vest pocket

opens the jaws to their full capacity, 0.100 in. As both jaws are ground with ample radius, material may be inserted quickly. The lower jaw may be raised or lowered by turning the small adjusting screw in the bottom of the lower jaw support, which permits quick resetting of the hand at 0 in case of wear.

The College of Commerce, University of Maryland, Baltimore, has established two classes for foremen and other minor executives of industrial plants. The course is under the provisions of the Smith-Hughes act and is directed by George S. Sanders. About 40 men have enrolled. The course deals primarily with the problems of the foremen and other minor executives in the efficient training and handling of employees.

CHINESE MARKET QUIETER

Wire Shorts Considered Too High British Plate Cuttings and American Nails Bought

SHANGHAI, CHINA, Oct. 15.—Demand for iron and steel products has subsided following the recent activity but there is still a fair volume of business pending. Recent orders involve small lots, but are in such considerable number as to indicate that the market is in need of new supplies. There is a fair inquiry for tubes and wire nails, but the demand for galvanized sheets has declined, compared with August and September. Activity in iron and steel products is not the same, by any means, as last month. Vladivostok has been inactive recently, but from Harbin are coming various orders for steel products, principally railroad materials. A good business has been done in this line with the United States.

China copper mints are buying electrolytic copper, but on a small scale. Copper coins have improved in value, and it is expected that there will soon be a better demand for electrolytic copper from the mints. Compared with two months ago, copper coins are almost 15 per cent more valuable and with copper quoted lower on the New York market there should be a fair profit for the mints in China. Unfortunately, these organizations have poor resources, and are not able to make purchases. Only the Hupeh mint is functioning at present, the others in Changsha, Anking and Kaifong having stopped work. The output of the Hupeh mint is not known, but is estimated at present at half the usual capacity.

Stocks of electrolytic copper in Shanghai are estimated at about 100 to 200 tons, while those in Hankow are about 500 tons. These supplies are sufficient for about three months, but this must be a reserve until the quantity contracted for is delivered. Consignments are coming through slowly. Copper coins in 1919 were quoted at 135 to a Mexican dollar, in 1920 the average was 140 to a Mexican dollar, in the following year it was 150 and for the ten months of this year the average was 180 coppers to the Mexican dollar. During 1919-1921 the price of electrolytic copper on the Shanghai market was $28 to $29 per picul, while today it is about $30 per picul, so that compared with the price of copper, the rate for coins is considerably lower. The big output of copper coins from the mints of China in the past two years has served to reduce the value of the coins to a low figure but it is quite likely that an increase in value will follow the enforced closure of the mints.

So far the Japanese catastrophe has not affected the copper market. That substantial quantities of electrolytic copper will be needed by Japan for rehabilitation purposes is a reasonable conjecture.

Lead stocks are heavy in that country as a result of large arrivals from Australia, and buying is light. Quotations are about 14.80 yen per 100-lb.

Wire shorts are only moderately active in the Shanghai market at present prices, which Chinese buyers consider too high. Recent inquiries for medium gage sheets have specified shipment in from two to three weeks and were without result. The advance in American prices of 20c. per 100-lb. on black and galvanized sheets has so far had no effect on the local market. A reduction in the price of American plates, shapes, bars and wire products may very likely stimulate buying.

Shaoshing district has not started heavy buying of tinplate as the farmers in that district are still busy on their farms. The can-making industry there will be in full operation shortly and then a heavier demand for tinplate is expected. Some buying of Hongkong tin is still noted, but the high prices ruling are interfering with the expected flow of orders. Standard tinplate is quoted at £203 per ton, while the Hongkong market is about $75 per picul, dealers asking a tael more. Stocks of Hongkong tin in Shanghai are small.

There has been a fair volume of purchasing in Shanghai of cut nails and an order for steel hoops has gone to the United States. China is buying plate cuttings from Great Britain.

Tin Plate Production and Consumption in France

WASHINGTON, Nov. 20.—While the production of tin plate in the United States has almost tripled since 1900 and while that of Great Britain has increased 40 per cent, French production has remained practically stationary, says a report received by the Department of Commerce from Commercial Attaché Chester Lloyd Jones, Paris. Between 1910 and 1913, French production of tin plate actually showed a decline. This is declared to be difficult to explain because the French tin plate industry has not lacked a generous tariff protection and consumption of tin plate in France has increased. In 1913 imports were less than 20,000 metric tons annually, but in the boom year of 1920 there were 75,592 metric tons imported, the total falling to only 13,484 tons in 1921. At present imports are between two and three times those of of 1913. In the last year before the war, it was estimated that about one-third of the national consumption of tin plate was imported, about 17,000 tons out of 19,500 tons coming from Great Britain.

At present it appears that an even larger percentage is imported from abroad, Great Britain continuing to be the only important source of supply. It is stated that the manufacture of tin plate in France is to some degree hindered by the high cost of coal as compared with the fuel costs in the United States and Great Britain. About 10 establishments now are making tin plate in France and it is planned by the Acieries de Longey to establish a tin plate mill in its rebuilt shops at Sedan. French tin plate imports from 1913 through the first seven months of 1923 totaled only 14,413 metric tons. Imports for the first seven months of this year amounted to 30,866 tons of which 25,414 tons came from Great Britain and 5095 from the Saar. None came from the United States.

The strong position of Great Britain in supplying tin plate demands of France is declared to be due principally to the nearness of the French market and long familiarity with its needs. Great Britain also enjoys the minimum tariff rate, it is pointed out, while the United States does not. The advantage is only two francs per 100 kilos, equivalent to approximately 12c. per 220 lb. The commercial attaché expresses the view that American tin plate makers should pay greater attention to the possibilities of increasing their share of the French demands.

Assigned Car Case Postponed

WASHINGTON, Nov. 20.—The Interstate Commerce Commission has further postponed from Dec. 1 to Jan. 1 the effective date in the assigned car case. Iron and steel manufacturers owning private cars are hopeful that meanwhile the commission will modify its original order restricting the use of privately owned cars under certain conditions.

Coke Production Decreases

WASHINGTON, Nov. 19.—Production of by-product coke in October amounted to 3,039,000 net tons, 13,000 tons less than in September, while production of beehive coke for October is estimated at 1,290,000 tons, a decrease of 83,000 tons, and a new low record for the year, according to the Geological Survey. Of the 70 by-product coke plants now in existence, 65 were operated in October.

BRITISH IRON AND STEEL TRADE

Exports in October Larger—Imports Lower—Pig Iron and Steel Production Less

WASHINGTON, Nov. 20.—Exports or iron and steel from the United Kingdom in October were 388,599 gross tons, the largest month of the year (except in May, with a total of 424,509 tons) and 10 per cent greater than the monthly average of 353,500 tons for the first nine months of 1923, according to a cablegram received by the Department of Commerce from Commercial Attaché Walter S. Tower, London. The greatest increases in exports over previous months were in tin plate, with 51,400 tons, galvanized sheets, with 57,800 tons, and sheets and plates, with 50,500 tons.

Total imports for October were 106,262 tons, an amount approximating the figures given for the second quarter of 1923 (115,400 tons for April, 82,200 tons for May and 105,100 tons for June). This was about 5 per cent lower than the monthly average of 112,300 tons for the first nine months.

The table shows the principal British iron and steel imports and exports for September and October.

Pig Iron and Ingot Production

Pig iron production of all grades in October was 592,600 tons. While this figure shows recovery from the previous month, it is more than 5 per cent under the monthly average of 624,200 tons for the nine-month period. Steel ingot and casting output for October was 702,100 tons, a slight increase over September but 2 per cent short of the January to September monthly average of 715,300 tons. There were 188 blast furnaces and 306 open-hearth furnaces operating on Oct. 31.

	Imports Gross Tons		Exports Gross Tons	
	Sept.	Oct.	Sept.	Oct.
Pig iron and ferroalloys..	5,401	4,231	59,297	66,490
Ingots, blooms, billets, slabs, etc.	51,572	46,984	3,040	1,668
Tin plate	....	....	38,725	51,398
Galvanized sheets	....	....	44,056	57,835
Plates and sheets	7,868	7,807	38,315	50,475
Structural steel	5,609	7,152	7,671	7,799
Steel bars, rods, angles, etc.	13,866	9,704	24,040	37,805
Iron bars, rods, angles, etc.	13,424	12,144	3,936	3,997
Rails	481	1,008	36,364	22,962
Other railroad material..	676	861	22,056	15,346
Cast tubes, pipe and fitting	1,874	1,364	7,770	7,160
Wrought tubes, pipe and fittings	2,892	2,337	9,991	14,803
Hoops and strips	1,404	1,776	5,617	7,894
Bolts and nuts, including screws for metals	313	306	2,184	2,201
Nails, tacks, rivets, washers	221	438	1,484	1,458
Wire	3,169	2,955	5,805	6,449
Wire cable and rope	....	....	2,713	2,601
Wire nails, including staples	4,029	4,189	228	380
Wire manufactures, n. e. s.	1,038	392	2,818	2,923
Iron and steel castings	373	506	252	835
Iron and steel forgings	69	180	76	138

STEEL PLANTS BUSY

Works in Southern Ohio and Northern Kentucky Active—Furnace Improvements

CINCINNATI, Nov. 19.—Operations of steel mills in the southern Ohio and northern Kentucky district, as regards open-hearth furnace activity, are holding well to 75 per cent of capacity. The American Rolling Mill Co. has all its sheet mills at Middletown, Zanesville and Ashland in operation, while the Newport Rolling Mill Co. has been maintaining a rate between 75 and 80 per cent. At Portsmouth, the Whitaker-Glessner works of the Wheeling Steel Corporation is running at about 80 per cent. Expectations are that these operations will be maintained during the remainder of the year.

The bar mill of the American Rolling Mill Co. at Ashland, now under construction, is expected to be in operation late in December. The rest of the plant, due to delays in receiving machinery, will hardly be completed before early in the new year.

Four merchant and three steel works furnaces are in blast in the district. At Jackson, Jisco and Globe silvery furnaces are in operation, while at Ironton, Belfont stack is expected to resume today. Norton furnace at Ashland is now blowing on Bessemer for use at the plant of the Ashland Steel Co. and the Norton Iron Works. The American Rolling Mill Co. is operating one Columbus and one Ashland furnace, while the Whitaker-Glessner Portsmouth furnace is also operating.

Extensive improvements have recently been completed at the Jisco furnace of the Jackson Iron & Steel Co. A new lining has been put in, a pig-breaking machine has been installed, and the cast house has been elevated and extended. The water storage system has also been much enlarged, so that no matter how dry the season, the water supply will always be sufficient for the furnace's needs.

Installation of a pig-casting machine has been completed at the Belfont Iron Works at Ironton, and machine cast iron is now available for the trade. It is claimed that a new design of pig will readily lend itself to storage in foundry yards, conserving space.

Extensive improvements have also been completed at the Sarah furnace of the Kelly Nail & Iron Co., Ironton. The hearth has been enlarged, and other changes made which will greatly increase its output.

The Marting Iron & Steel Co. is understood to be contemplating extensive changes at the Ironton blast furnace. These will have the effect of greatly increasing the output, and will give a more efficient operation, with a considerable reduction in costs.

A plan has been worked out at the blast furnaces of the steel companies operating in the district by which the 8-hr. day will shortly be installed. All merchant furnaces operating have inaugurated the three-shift plan of operation, and before the end of the present year all blast furnaces and steel plants in the district will be 8-hr. shifts. The three steel companies operating put the three-shift plan into effect in their mills several years ago.

Developing Iron Mines in California and Across the Border

SAN DIEGO, Nov. 19.—Work of developing the iron ore deposits recently discovered in San Diego County and across the international border in Lower California will be well under way before the end of the year, according to Capt. J. A. Tregelles, discoverer of the deposits. It is reported that an Eastern syndicate and Captain Tregelles, Dr. B. F. Stanwood and Dr. M. C. Harding of San Diego plan active work on the three groups of claims they control. One of these groups is between Lakeside and Flinn Springs, in San Diego County, one near Riverview Farms, El Monte, and another in Mexico, near Tecate, which is across the border from the American town of the same name.

The syndicate has completed its surveys of the extensive claims across the border from Tecate. The surveyor who did this work reports that the Tecate deposits are much larger than those of Ensenada, 90 miles below the border in Mexico, and on the West Coast of the Lower California Peninsula.

Exploitation permits have been applied for and work of developing the claims in Mexican territory will go forward at the same time that the Lakeside and El Monte claims are being proved.

Inland-Acme Consolidation Off

In a letter sent to all stockholders of the Acme Steel Goods Co., Chicago, it was announced that the proposed consolidation of that company with the Inland Steel Co., Chicago, has been indefinitely postponed. It was also stated that "after the auditors have gone over the Acme and Inland books, it was deemed advisable by directors of both companies to run each organization separately and not consolidate at this time."

SCRAP BUNDLING MACHINE

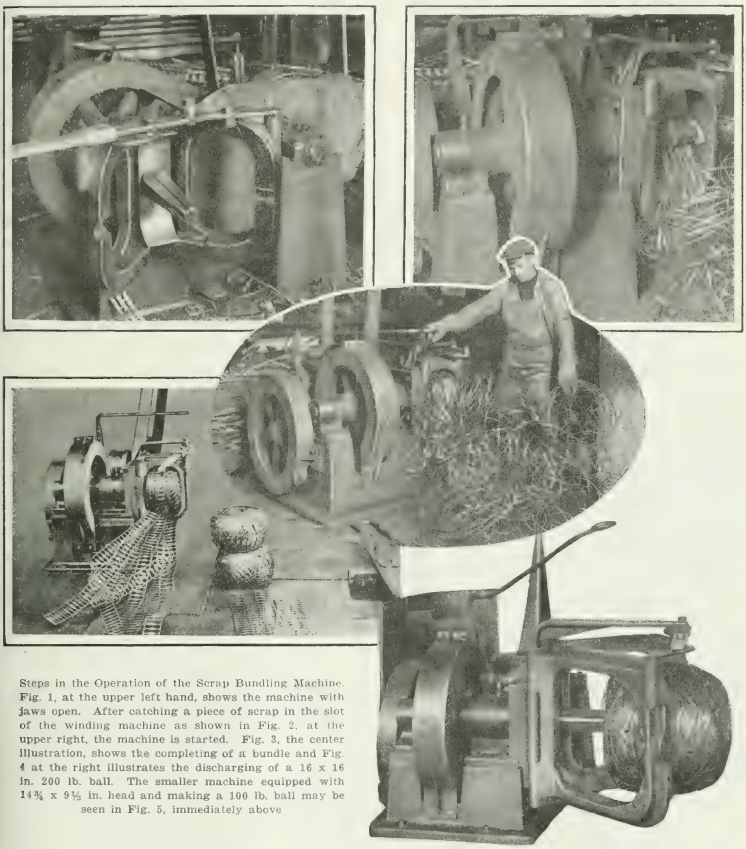
Adapted for Steel or Brass in Long or Short Strips or Coils—Features Outlined

The rotary baling machine illustrated was developed for handling large quantities of tangled and jagged-edge metal scrap, which in loose form often caused serious injury to operators and required extensive storage space. The machine was first patented about ten years ago, the patents being taken over later by the Stanley Works, New Britain, Conn., which after making a few improvements has placed the machine on the market.

Among the claims for the machine are that the bundles are in such shape that they can be rolled to a pile or in a chute or piled on the flat side or handled with a magnet; that more money may be obtained for the bundled scrap; and that the expense of handling the scrap so bundled is lessened. If the scrap need not be sold as soon as made, the bundles may be stored in comparatively small space and disposed of in carload lots or held for better market conditions. The machine is rapid in operation, due to the method of starting and discharging scrap, and time is saved in not having to load all the scrap in any confined space. The machine pulls the scrap about its arbor with its own power. The head does not have to be confined to any particular shape but can be varied so that it will make a tapered bundle that will fit crucibles.

The machine is available in two types, either belt or motor driven, and various sizes of heads may be used according to requirements. The standard heads are 14¾ x 9½ in. and 16 x 16 in. It has been found, however, that a ball of scrap 14¾ in. in diameter and 9½ in. long, weighing approximately 100 lb., is the most satisfactory. The 16 x 16 in. head makes a ball of about 200 lb. Although designed primarily for steel or brass in the form of long or short strips or coils, small pieces of skeleton scrap may be wrapped into the ball by shoveling them on top of the long material, which acts as a binder.

The operation of the machine may be noted from the illustrations, Fig. 1 shows the jaws in the open position, the tapered arbor and the slot for holding



Steps in the Operation of the Scrap Bundling Machine. Fig. 1, at the upper left hand, shows the machine with jaws open. After catching a piece of scrap in the slot of the winding machine as shown in Fig. 2, at the upper right, the machine is started. Fig. 3, the center illustration, shows the completing of a bundle and Fig. 4 at the right illustrates the discharging of a 16 x 16 in. 200 lb. ball. The smaller machine equipped with 14¾ x 9½ in. head and making a 100 lb. ball may be seen in Fig. 5, immediately above

the starting strip of metal. After catching a piece of scrap in the slot of the winding shaft as shown in Fig. 2 the machine is started by pulling the lever operating the clutch, and the material is drawn in and wound into a ball. Fig. 3 shows the winding of a ball nearly completed. It may be noted that the operating lever is located over the head of the machine and extends beyond, and may be conveniently reached should the machine have to be stopped quickly. After enough scrap has been wound to make a complete ball, the machine is stopped and the loose ends tied to prevent unwinding. This operation also pushes the ball toward the end of the arbor, from which it is removed and taken to the scrap pile. Fig. 4 shows the discharging of a 16 x 16 in., 200 lb. bundle.

The smaller machine is shown in Fig. 5. This unit is equipped with a 14¾ x 9½ in. head and will make a 100 lb. ball out of stock up to 16 ft. long, 5 in. wide and 0.0165 in. thick. It will also handle scrap in pieces of any length and up to 10 in. wide and 0.171 in. thick.

Among the construction features it may be mentioned that the head, which is subject to wear, is a steel casting, and the winding shaft is of tool steel, hardened. The main winding shaft bearings are bronze bushed and those which support the back gear shaft are of babbitt. Gears, where necessary, are of cast steel and the pinions are of machine steel with cut teeth. Heavy gear guards are provided.

In the motor driven machine, the motor, which is of 7½ hp. 1200 r.p.m., is located above the clutch pulley shaft, an arrangement intended to minimize the floor space required, which is about 42 in. square for this machine.

CLAIMS BROAD POWERS

Government Files Brief in Claire Furnace Co. Case in Supreme Court of United States

WASHINGTON, Nov. 20.—Contending that Congress can constitutionally authorize an administrative body to collect information respecting any subject over which it has legislative jurisdiction, the Government has filed a brief with the Supreme Court in the Claire Furnace Co. case which has been set for argument on Dec. 3. The brief was prepared by Solicitor General James M. Beck of the Department of Justice, Chief Counsel W. H. Fuller and Attorney Adrien F. Busick of the Federal Trade Commission.

The proceedings have gone to the highest court upon appeal of the Government after the lower courts had granted permanent injunctions against the Federal Trade Commission restraining it from demanding information from 22 iron and steel companies as to quantities of iron and steel, capacity of plants, prices at which sales were made, prices named in contracts of sale and the cost of manufacturing. The Supreme Court of the District of Columbia and the Court of Appeals of the District of Columbia and the Federal courts in New Jersey and Pennsylvania held that manufacturing is not interstate commerce and therefore the commission was without authority to compel the submission of the required data which the commission demanded by resolution of Dec. 15, 1919, following Congressional action of August of that year asking that commission what it could do touching the high cost of living. The commission proceeded under sections 6, 9 and 10 of the Trade Commission act.

The commission maintains that Congress has power to compel witnesses to appear and testify concerning, and to produce books, papers, etc., relating to any subject over which it has legislative jurisdiction. This power, the brief says, exists not as an aid in detecting breaches of existing law, but as an auxiliary to the exercise of the legislative function.

In the lower courts, the iron and steel companies contended that Congress was without power to fix prices in any save quasi public businesses, and that this being true, Congress could not require information respecting prices.

"To this we reply that this court will not assume in advance that if the information should disclose high prices and very large profits, Congress has not sufficient wisdom and constructive ability to find some remedy for the situation short of fixing prices," says the Government brief. "Congress is entitled to an opportunity to exercise its function within its best judgment and then, if it transcend its powers, this court will declare its action invalid.

"Further, appellees' (iron and steel companies) contention assumes that if there are high prices and large profits, they are due to natural causes and not to artificial burdens or restrictions which it may be within the jurisdiction of Congress to remove. One of the purposes of the inquiry was to ascertain not only what prices obtained but what were the causes. When Congress is in possession of this information, it may exercise its judgment with respect to the remedy with the knowledge that the constitutionality of its action must be passed upon by this court."

The brief declares that the only questions for the courts to determine, where the power is challenged, are whether the inquiry is with respect to subject matter committed to the jurisdiction of Congress, whether the information demanded is relevant to the subject matter and whether constitutional guaranties of the citizens are invaded. The brief endeavors to reply affirmatively to these points.

Taking up the question as to jurisdiction of Congress over interstate commerce, the brief says that the purchase and sale of commodities between persons negotiating from different States, followed by transportation of commodities to other States, has always been held to be interstate commerce. To hold that Congress may require information respecting the interstate commerce of corporations but may not demand it as regards their commerce wholly within a State, the brief says, is to say that the legislature must proceed blindly in a field where the constitution itself requires that it shall proceed with greatest care; that is, in the field of intrastate commerce, where only such regulation may be resorted to as is necessary to carry out the power conferred to regulate interstate commerce. It is argued that the information called for by the questionnaires sent to the iron and steel companies by the commission concerns interstate commerce itself or matters so closely related to such commerce as to be necessary to an intelligent report upon conditions existing in such commerce and may be lawfully required. It is impossible, it is asserted, to segregate the required data between the interstate and intrastate commerce.

A Protest Against the British Columbia Steel Plant Project

In view of the fact that a bill is to be presented before the legislature of British Columbia, now in session, authorizing the guaranteeing of one-third of the $12,000,000 bond issue of the Coast Range Steel Corporation, the executive committee of the British Columbia division of the Canadian Institute of Mining and Metallurgy has written to the Hon. John Oliver, protesting against the passage of the bill, on the grounds that:

"Any proposition requiring guarantees covering the entire capital must be inherently unsound.

"If a proposition is economically attractive, capital usually is available for it without government guarantees.

"Under such conditions, capital requires reasonable proof of the attraction, and a government cannot give financial assistance upon less assurance of security than would be required by a private investor.

"The character of the liability proposed by Coast Range Steel, Ltd., is not such as to warrant its being incurred by the Provincial Government at this time, and especially in view of the fact that iron and steel industries in Eastern Canada, where natural conditions are at least as favorable as in British Columbia and market conditions eminently more so, have often failed to show a profit despite government assistance."

Wholesale Prices in October

Reports to the Bureau of Labor Statistics show a slight reduction (nearly 1 per cent) in the average price of all commodities in October as compared with September. Of the nine groups of items listed fuels, metals, clothing and the miscellaneous item showed a drop, these being slight in every instance. Increases occurred in foods and chemicals and drugs, while house furnishing goods, building materials and farm products remain stationary. Of the 404 commodities or series of quotations covered, 136 showed increases, 104 showed decreases and 164 remained stationary. Details in the accompanying table, showing the groups of commodities, indicate that in only two groups has there been a decrease since last year, these being fuels, which were excessively high a year ago because of the coal strike, and building materials.

(1913 average is 100)	Peak of 1920	October, 1922	September, 1923	October, 1923	Advance in One Year Per Cent
Farm products	247	138	144	144	4.3
Foods	248	140	147	148	5.7
Cloths and clothing	346	188	202	199	5.9
Fuel and lighting	281	226	176	172	*23.9
Metals and metal products	203	135	144	142	5.2
Building materials	300	183	182	182	*0.5
Chemicals and drugs	213	124	128	129	4.0
House furnishings	275	176	183	183	4.0
Miscellaneous	208	120	121	120	0.0
All commodities	247	154	154	153	*0.7

*Reduction.

For the past seventeen months the general level of "all commodities" has not been above 159 nor below 150. During that period it has hovered around the same level as was reached early in 1917, on the climb of prices toward the war-peak.

Living Cost Rising

Figures of the National Industrial Conference Board show living cost at 64.1 per cent above July, 1914, based upon the budget of the average wage earner. This compares with 63.4 per cent excess in September. The increase is due to a rise of 0.7 per cent in food prices and 0.6 per cent in clothing prices. Much of this increase is attributed to steady advance in wage rates, whereby among others readjustment in the metal trades fixed wages for certain skilled labor on a new range of $125 to $150 per week.

Philadelphia Steel Club Elects Officers

The Steel Club of Philadelphia, composed of the district sales managers of steel companies, has elected as its new president Harry G. Uphouse of the Donner Steel Co. H. B. Gaylord, Carpenter Steel Co., is vice-president elect, and Walter L. Fotterall, Republic Iron & Steel Co., secretary and treasurer elect. The board of directors is composed of these officers and W. B. Kennedy, Bethlehem Steel Co., and Paul M. King, Worth Steel Co. J. B. De Wolfe, district sales manager of the Trumbull Steel Co., won the club's annual golf tournament and the cup donated by William L. Hoffman, former district sales manager of the Brier Hill Steel Co.

E. James Lowry, metallurgist, Hickman, Williams & Co., Inc., Cincinnati, was the guest of the evening at the meeting of the New England Foundrymen's Association, Nov. 14, at the Exchange Club, Boston. Approximately 80 attended the meeting, which was presided over by George A. Ray, Taylor & Fenn Co., Hartford, Conn., president. The Truscon Steel Co., W. T. Mohan, 147 Summer St., was admitted to membership.

A competitive examination will be held throughout the country on Jan. 9, 1924, to fill a vacancy in the work of Junior Metallurgist in the Bureau of Mines, Department of the Interior, for duty at Reno, Nev. Application blanks may be obtained from the United States Civil Service Commission, Washington.

A. T. Simonds Urges Conservative Policy with Limited Buying

A. T. Simonds, president Simonds Mfg. Co., Fitchburg, Mass., was a speaker at a convention held in Springfield, Mass., last week of New England purchasing agents. Mr. Simonds is a student of economics, and is connected with the Harvard School of Business Administration and the American Chamber of Economics, New York. He said in part:

"The United States has 5.8 per cent of the world's population and 47 per cent of the world's gold, which creates a false credit structure, and sooner or later this country will be affected by conditions in Europe, no matter how high we build our tariff walls or restrict immigration."

Mr. Simonds cited the conditions in Great Britain, where, he said, 1,200,000 have been without employment for three years because of the absolute turnabout of policy of business there as a result of the war. He advocates a policy of "short" buying, or taking care of immediate requirements only as "we are facing and have been since November, 1918, a steady decrease in prices, sometimes rising for a moment, but generally on the decline. Fixed capital cannot be profitably employed since the war, but working capital always can be employed at profit."

He suggested keeping plants and the purchase of materials down to absolute necessities, and labor employed steadily in production rather than having large plants working full capacity part of the time and closed in whole or part the rest of the year. He stated he would rather have a small fixed capital represented by the plant and a big working capital to make money with than to reverse the order.

Revival of Activity of Anshan Iron and Steel Works

WASHINGTON, Nov. 20.—The South Manchuria Railway Co. has allocated 11,000,000 yen for the revived activity at the Anshan Iron and Steel Works in South Manchuria to be expended during the fiscal years 1924 and 1925, according to the Manchuria *Daily News*, says a report received by the Department of Commerce from Consul General C. E. Gauss, Mukden, China. During 1924 between 6,000,000 and 7,000,000 yen is to be applied toward carrying out the preparatory work for an annual production of 200,000 tons of pig iron at this plant. It is understood that for some time this plant has been working at low capacity with reduced staffs.

Car Loadings Heaviest in History

Figures of the American Railway Association show car loadings for the week ended Nov. 3 at 1,035,776, this being the twentieth week, in the 24 latest weeks, in which more than 1,000,000 cars have been loaded. The total for the year to date aggregates 42,655,661 cars, compared with 36,199,995 cars in 1922 and 33,699,128 in 1921, each to the corresponding date.

Freight traffic in the first nine months of the year amounted to 343,796,799,000 net ton miles. This is an increase of 2.8 per cent over the previous high record, which was made in the corresponding period of 1920. It is an increase of 31 per cent over the first nine months of last year, most of this increase being due to the coal strike of 1922.

The Detroit Section of the Society of Automotive Engineers is inaugurating a series of meetings devoted to production subjects presented by factory men. These meetings will not interfere with the regular engineering meetings which will take place the first Thursday of each month, but will be an additional series held the third Thursday of each month. The first was held in the General Motors building, Nov. 15, when the subject was "Gears—Is It Necessary to Grind?" Papers were presented by L. A. Danse, Cadillac Motor Car Co., and O. Shafer, Studebaker Corporation, J. Brodie, Packard Motor Co.

COPPER AND BRASS RESEARCH

Officers and Directors of Association to Promote Use of Copper

At the third annual meeting of the Copper and Brass Research Association, held Nov. 15 at the association's offices, 25 Broadway, New York, the following were elected directors for the ensuing year, the first eight mentioned comprising the executive committee.

R. L. Agassiz, president Calumet & Hecla Consolidated Copper Co.; Edward H. Binns, president C. G. Hussey & Co.; Stephen Birch, president Kennecott Copper Corporation; F. S. Chase, president Chase Metal Works; Walter Douglas, president Phelps Dodge Corporation; Charles Hayden, vice-president, Chino, Nevada Consolidated, Ray Consolidated, and Utah Copper companies; C. F. Kelley, president Anaconda Copper Mining Co.; H. J. Rowland, secretary and sales manager Rome Brass & Copper Co.

J. W. Allen, treasurer Greene Cananea and Inspiration Consolidated Copper companies; Henry F. Bassett, president Taunton-New Bedford Copper Co.; H. C. Bellinger, vice-president Chile Exploration Co.; J. Parke Channing, vice-president Miami Copper Co.; Joseph Clendenin, Braden Copper Co.; Carl F. Dietz, president Bridgeport Brass Co.

B. Goldsmith, president National Brass & Copper Co.; E. O. Goss, president Scovill Mfg. Co.; Robert H. Gross, president East Butte Copper Mining Co.; U. T. Hungerford, president U. T. Hungerford Brass & Copper Co.; C. V. Jenkins, treasurer Chino and Utah Copper companies, secretary-treasurer, Nevada Consolidated Copper Co., assistant treasurer, Ray Consolidated Copper Co.; Wm. Loeb, vice-president American Smelting & Refining Co.; H. B. Faull, auditor Calumet & Arizona Mining and New Cornelia Copper companies; Dr. R. M. Raymond, United Verde Extension Mining Co.; A. B. Seelig, manager Michigan Copper & Brass Co.; W. Parsons Todd, manager of sales, Copper Range Co.

After the annual meeting the directors elected the following officers:

President, R. L. Agassiz; vice presidents, C. F. Kelley, F. S. Chase, Walter Douglas, H. J. Rowland and U. T. Hungerford; treasurer, Stephen Birch; secretary, George A. Sloan; manager, William A. Willis.

In commenting upon the work of the association, which is an unincorporated, voluntary organization composed of the principal brass and copper companies, R. L. Agassiz, president of the association, said:

"Copper consumption in this country for the first three-quarters of 1923 (and this includes brass, in which form is consumed about one-half of all the copper used in this country) was greater than consumption for the entire year of 1922. The outlook for 1924 is favorable by virtue of the prospect of continued activity in the three largest brass and copper-consuming industries, i.e., electrical, automotive and building construction.

"Copper consumption in the United States at the present time is about 70 per cent of the world's production. Our survey of channels of consumption indicates that the ultimate or potential demand for copper and brass in this country has by no means been reached."

The following are now members of the Copper and Brass Research Association:

American Smelting & Refining Co., Anaconda Copper Mining Co., Arizona Commercial Mining Co., Braden Copper Co., Bridgeport Brass Co., Calumet & Arizona Mining Co., Calumet & Hecla Consolidated Copper Co., Chile Exploration Co., Chino Copper Co., Chase Metal Works, Copper Range Co., T. E. Conklin Brass & Copper Co., Dallas Brass & Copper Co., Engels Copper Co., The East Butte Copper Mining Co., Granby Consolidated Mining, Smelting & Power Co., Ltd., Greene Cananea Copper Co., U. T. Hungerford Brass & Copper Co., C. G. Hussey & Co., Inspiration Consolidated Copper Co., Kennecott Copper Corporation, Merchant & Evans Co., Michigan Copper & Brass Co., Miami Copper Co., Mother Lode Coalition Mines Co., National Brass & Copper Co., Nevada Consolidated Copper Co., New Cornelia Copper Co., New England Brass Co., Old Dominion Co., J. M. & L. A. Osborn Co., Phelps Dodge Corporation, Ray Consolidated Copper Co., Richards & Co., Inc., Rome Brass & Copper Co., Scovill Mfg. Co., Shattuck Arizona Copper Co., Taunton-New Bedford Copper Co., United Verde Extension Mining Co., Utah Copper Co.

Management Association Elects Officers

At a meeting of the American Management Association held at the Bankers Club, New York, Nov. 14, Sam A. Lewisohn, vice-president Miami Copper Co., was elected president. Charles R. Hook, vice-president American Rolling Mill Co., John A. Stevenson, vice-president Equitable Life Assurance Society, and Fred W. Tasney, vice-president Prudential Insurance Co. of America, are vice-presidents of the association. L. F. Musil, comptroller Cities Service Co., will be treasurer, and H. B. Bergen, manager personnel department Henry L. Doherty & Co. will be assistant treasurer. W. J. Donald, 20 Vesey Street, New York, continues as managing director and secretary.

Among the directors are: J. M. Larkin, assistant to president Bethlehem Steel Corporation; Elisha Lee, vice-president Pennsylvania Railroad Co.; D. W. K. Peacock, personnel director White Motor Co.; Arthur H. Young, manager of industrial relations International Harvester Co.; W. W. Kincaid, president Spirella Co., Inc.; C. R. Dooley, manager personnel and training Standard Oil Co. of New Jersey, and C. S. Ching, supervisor of industrial relations United States Rubber Co.

To Study Corrosion, Heat and Electrical-Resistant Alloys

At the invitation of the secretary-treasurer of the American Society for Testing Materials, an informal conference was held at the society's headquarters in Philadelphia on Oct. 24 to discuss the manner in which the society might most usefully and profitably study the subject of corrosion-resistant, heat-resistant and electrical-resistant alloys. It was generally agreed that the time is not opportune for the preparation of standard specifications for such alloys, because new alloys and new uses are being developed to such a degree that the framing of standards would probably retard progress in the art. However, the society can perform a very useful function by gathering together the principal available data regarding the properties and uses of these alloys, and the conference has suggested to the executive committee the formation of a special committee, which might be attached to the committee on papers in an advisory capacity, to be charged with the preparation of such data for presentation at the 1924 annual meeting, possibly in the form of a symposium.

Further tests of these alloys to supplement existing data is a matter for future consideration. The development of the subject on a permanent basis through the organization of one or more standing committees will be determined largely by the outcome of the symposium. The secretary-treasurer will welcome any suggestions relating to the arrangement of this symposium. Those present at the meeting were: W. H. Bassett, W. M. Corse, L. O. Hart, A. A. Hassan, P. E. McKinney, P. D. Merica, H. M. Williams, and C. L. Warwick, the secretary-treasurer.

Steel Treaters May Select Boston for 1924 National Gathering

W. S. Bidle, treasurer; Frank Gilligan, past president, and W. H. Eiseman, secretary American Society for Steel Treating; H. F. Handy, Saco-Lowell Shops, Boston, chairman of the local chapter's committee, and John Davis, together with W. Irving Bullard, director Chamber of Commerce, and Charles J. Cox, representing Mayor Curley, Boston, were the guests last week of H. H. Harris, president General Alloys Co., at a dinner given at the Engineers' Club, Boston.

The purpose of the gathering was to arrange, if possible, the holding of the next annual convention and international steel exposition of the society in Boston. Tentative plans fix the time for the exposition as either the last week in September or the first week in October, 1924, in Mechanics Building, if a decision to select Boston is made.

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ESTABLISHED 1855

THE IRON AGE

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 329 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.00; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Results of Conservative Feeling

LAST May a sort of wave of conservative feeling spread rapidly through business circles. This was distinctly a feeling rather than a conclusion. All the statistical facts were favorable. There seemed to be something in the air, and men asked each other what was the matter. So-called "warnings" were issued enjoining caution lest business be overdone to the point of causing a reaction.

During the summer there was some outspoken criticism of this conservative talk. It was asserted that business was all right, but was likely to be damaged rather than befriended by such advice. The specific point in the argument was that by preparing for a business reaction it was possible to bring on one that otherwise would not occur.

There is now the definite record that for six months industrial activity in the United States has held up at a very high level in the face of what has been everywhere recognized as a very conservative feeling. It is too early to pass final judgment, but this fact is, at any rate, an impressive one.

Warnings are always good if there is foundation for the warning and there is no exaggeration, no straining of the point. As an academic question every one probably will agree that warnings against inflation are good, but there will be differences of opinion as to what constitutes inflation.

In 1908 we had "sunshine clubs" which preached that all that was needed was "confidence" and that if every one would simply become confident business would be good. The movement was not a success and it was generally concluded that confidence could not be built up in that way. Yet it is argued that confidence can be destroyed by talk. That scarcely speaks well for confidence.

We have had cases in the past when warnings, or anticipation of trouble, have proved very beneficial. There was, for instance, the panic that was predicted for 1913. The twenty-year cycle had many votaries at that time: 1873-1893-1913. There were many causes, including the change of administration at Washington, that to some minds were sufficient to produce a panic. There is no doubt that many did prepare against a panic in the summer of 1913. No panic occurred. If no panic had been expected one might have come, since the element of surprise looms large in panics. Eventually there was an industrial depression, but that is quite different.

While final judgment cannot be given at this time, recent developments, as well as lack of developments, have given indication that the conservative feeling in business circles in the past six months has been beneficial rather than otherwise. Almost every one will admit that today we are better off in a business way than we expected to be.

Bonus Fundamentally Wrong

IN his annual address as president of the National Founders' Association, William H. Barr discusses cogently problems which are demanding the attention of business men of the country today. Many timid politicians would like to sidetrack all subjects which do not give them a chance to make political capital in a Presidential year, and if public sentiment is to be aroused against anything that is unsound in the economic policy of the country, business men must be counted on to do even more than their share. The National Founders' Association is fortunate in its leadership.

On the important question, "Will the Sixty-eighth Congress reduce our taxation?" Mr. Barr expresses the opinion that it will, provided there is no bonus legislation and provided there is the strict economy in Government operation which President Coolidge and the members of his Cabinet are urging. Mr. Barr points out objections usually urged to the bonus: that it will be a burden upon every man, woman and child in the country, including, of course, the soldiers themselves; that it will be a deterrent to prosperity, and that by indirection it would limit the amount available for the wounded and helpless. He might have added, as was said so forcefully by the late Presi-

rent Harding, that it is folly to provide for a bonus without at the same time providing a means for raising the money to pay the bonus. All of these objections are very much to the point, but greater emphasis should be put on the fact that the bonus is fundamentally wrong because it attempts to pay by so-called "adjusted compensation" the men whose services cannot be counted in dollars and cents. There is a disposition in some quarters to avoid going to the heart of this subject; but it is encouraging that many of the soldiers themselves, who rendered service of the highest kind in France, are opposed to any form of so-called compensation. They also realize that the men who saw service abroad and even those whose activities were confined to the camps of this country, had broadening experience for which they cannot pay, experience which will make them bigger men throughout life.

President Barr is right. Taxes will be reduced if the bonus bill fails and there is reasonable economy in other ways at Washington. He is also right in saying that the business men of the country have no right to dodge their responsibility.

Use or Abuse of Wealth

SEVERAL columns of comment, much of it in the form of letters to the editor appearing in THE IRON AGE recently, prompted by the article by Dr. W. R. Ingalls on "Distribution of Wealth in the United States" testify to the popular interest in this general subject. Dr. Ingalls fully refuted the claim that "2 per cent own 65 per cent of the wealth" and showed that the proportion is under 30 per cent, and probably about 20 per cent.

One correspondent doubted the benefit of the analysis, on the ground that establishing any percentage, even though much lower than 65, would aid those who want to "soak the rich." To this Dr. Ingalls replied, in substance, that it is our plain duty and our first duty to get the facts and then see what to do about it.

It is of interest to know who owns the wealth or how the wealth is distributed, because we expect conduct to be based upon beliefs or assumptions regarding the matter. As was said in our introduction to Dr. Ingalls' article, "In the next twelve months the changes will be rung on the issue of unequal distribution of wealth, in the effort to array the house of 'have not' against the house of 'have.'"

The situation we face is not one of a new discovery having been made, that wealth is not equally distributed, that some have more than others. Whatever the condition, it is one that has long existed. There is less disposition now than formerly to claim that wealth is becoming more centralized. We do not hear now so often as in 1896 the assertion, "The rich are growing richer and the poor are growing poorer" and the talk of a decade later of "swollen fortunes" is not so prevalent.

What is before us is simply a fresh effort to stir up feeling, to make political capital, on an old subject. What conduct will result from these efforts? It is very fitting to consider what conduct has resulted in the past. Every one, on whatever "side" he may wish to place himself, should be ready to recognize plainly and frankly that long ago American thought adopted the principle that the use to which wealth is put is a prime factor. Never in this country would there have been tolerated the use of any large amount of wealth in riotous living, in personal aggrandizement or any ostentatious display or in extravagance of any sort. In other words, common thought has recognized that the wealth must be well used, for the benefit of society. Let it be recognized that there is no important new thing to be said on this point, no new doctrine to be enunciated.

The real question is one of administration or efficiency. If anyone intends to argue, as no doubt many do, that there should be a "wider distribution of wealth," it is neither a matter of distributing dollars for a fresh class of people to spend extravagantly, nor of distributing locomotives, dynamos or machine tools, but of distributing shares of stock. This ought to simplify the matter. Shares are already being distributed. The more thrifty acquire them and the most thrifty accumulate them. The test is a continuous one, whether corporations with widely distributed ownership or corporations with limited ownership have the greater success, and the determining factor for success is service to the public. Service is what the public wants.

The Decline in British Electric Steel

A GLOOMY picture of the electric steel industry of Great Britain is drawn by the London *Ironmonger*. It is a surprise to read that of the 60 electric furnaces existing in Sheffield a few years ago only one in ten has been operating regularly this year. About the same number have run intermittently, several have been dismantled and sold and others are for sale. Only a few companies are making tool steel in the electric furnace and the older or crucible method "now dominates the field." Those who less than ten years ago said that the day for crucible melting of high grade steels had passed "have been completely discredited," though it is conceded that the electric furnace is an ideal instrument for stainless steel and iron, for steel castings and for certain special alloy steels.

Perhaps it was too much to expect that the ancient citadel of British tool steel could be taken by the electric furnace, for there is no question that the crucible is a satisfactory vehicle for producing the highest grades. In the less conservative atmosphere of the American industry, however, the electric furnace is still in the lead for the production of high grade steels. Most of the tool steel is electrically made and in the steel foundry, particularly small ones, the swing has been steadily to the electric furnace. Thus the American electric steel industry continues to increase each year in output and capacity. The rea-

sons for the contrary experience in Great Britain are not entirely clear.

Stabilizing Commodity Prices

FIGURES of the Bureau of Labor Statistics show the October wholesale price of "all commodities" as 153, compared with 100 as the 1913 average. Not since May, 1922, has the figure been below 150, nor has it been above 159. The maximum in 17 months has been 6 per cent above the minimum and 2.9 per cent above the mean. In the calendar year 1914 the maximum of 102 was more than 5 per cent above the minimum of 97 and was 3.9 per cent above the mean. Even in 1913, a year of unusual stability of prices, the maximum was 3 per cent above the minimum and 2 per cent above the mean.

We think of certain prices as being far out of bounds, and so they seem in comparison with prewar figures. The general line-up differs materially from that of ten years ago, some prices being much further above the old figure than others. Thus, October shows cloths and clothing almost exactly twice the 1913 figure, while in chemicals and drugs the increase is only 29 per cent. Metals, farm products and foods are between 40 and 50 per cent above 1913, and all of these are below the general average of all commodities. It is the clothing, fuel, building materials and house furnishings groups that are disproportionately above the average.

As most of the commodity prices considered are wholesale prices, little affected by the labor monopolies that have been conspicuous for profiteering, we may be justified in regarding them as measurably stabilized—at least until some major business crisis pulls them down. Their fluctuations in more than a year have been less than the 1914 fluctuations and only slightly greater than those of 1913. As they have gone up and down and then up again during 17 months, and are now not far from the average of that period, we may expect them for some little time to move very narrowly about this average.

IRON ore has been coming into the United States in greater volume this year than at any time in the last decade under peace-time conditions. To Oct. 1 over 255,200 gross tons per month had been imported, or more than three times as much as in the first nine months of 1922. The largest previous average was 216,230 tons per month in 1913. Freight rates are so high on ore from Lake Superior to Eastern furnaces that the latter have had to turn to foreign ore. Imports from Sweden are the largest factor in this year's movement, whereas ordinarily Cuban ores have led. To Oct. 1 the total from Sweden was 674,000 tons and from Cuba 602,000 tons.

THE turning of the people of Continental Europe, in their despair, to dictatorships when attempts at popular government have failed is bound to produce some serious thoughts. When we were in the war, it was represented that we were going to make the world safe for democracy, but instead of that we have a condition in which for these troubled countries government by tyranny has become the only thing possible.

Columbia Steel Corporation's New Blast Furnace and Rolling Mills

The Columbia Steel Corporation put in operation on Oct. 16 its two new 75-ton open-hearth steel furnaces at Pittsburg, Cal., and in the same week the recently completed rod mill was started. Manufacture of nails was begun early this month. The new sheet mill buildings are completed and it is expected that sheet manufacture will begin early in January.

Good progress has been made also in the construction work the company has under way in Utah, in connection with the building of a blast furnace and coke ovens. The first unit of the coal mine at Columbia, Utah, has been developed to the point of production and pending completion of the coke ovens at Ironton, Utah, the output of the mine is being sold in the market. The railroad to the coal mine was completed Aug. 1 and houses are now being built at the mine townsite. The Union Pacific Railroad has completed its line to the company's iron properties at Iron Springs, Utah, and shipments of iron ore for commercial purposes are being made until required for stock at the blast furnace. Construction of the coke ovens and blast furnace at Ironton, Utah, is well along and it is expected they will be ready for operation in the early spring of 1924.

Active Building in Detroit

The cost of new building construction in Detroit during the first ten months of the year totaled $110,888,291, which is approximately $15,000,000 in excess of the total expenditure for the year 1922. The building trades estimate that a total of from $125,000,000 to $130,000,000 will be the city's total for 1923 construction work. The record for October, as announced by the Detroit department of Building and Safety Engineering, shows a considerable gain in building activities, as compared with September, and a striking increase over October, 1922. A total of 3426 permits was issued last month, aggregating in cost $12,485,880. This is 676 more permits and approximately $3,900,000 in cost than during October, 1922, and approximately $3,000,000 more than for last September.

The Iron Age and Its Readers

Dr. Richard Moldenke's article, "How Germany Must Work Out Her Problems," which was a feature of THE IRON AGE of Nov. 15, prompts a reference to the high standard maintained by the news service our readers have had from Europe. In the war years our London cables were the dependence of the steel trade of this country for information on the course of markets abroad. In the five years since the armistice our European representatives have covered market and plant developments in Great Britain and on the Continent in a way that has met with appreciative response from our readers.

Dr. Moldenke's noteworthy letter in our last issue brought together the results of close contact in recent months with the situation in Germany. Written in October, it anticipated action by the German authorities which became a matter of cable record only last week.

Trumbull Steel Co.'s Sales of Sheets to Japanese Government

YOUNGSTOWN, Nov. 20.—President Jonathan Warner states that the Trumbull Steel Co., which is working off a large order of sheets for the Japanese Government, accepted this business at the prevailing market, and in some cases, at prices higher than current levels. The Trumbull company was favored with a sizable order because of its ability to roll diversified sizes and to deliver sheets to Japan in tin mill sizes. All Japanese tonnage was booked at the prevailing quotations of the American Sheet & Tin Plate Co. for domestic sheet tonnage, he states.

The high rate of operations being maintained by the Trumbull company continues to be the outstanding feature of the independent iron and steel situation in the Mahoning Valley. Mr. Warner states his company is operating virtually at a capacity rate and that tin and strip buying is good.

The company has made an average monthly addition to surplus this year in excess of $200,000.

Mill Operations in the Mahoning Valley

YOUNGSTOWN, Nov. 20.—Production has been curtailed the past month by the Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. Some of the pipe tonnage being rolled by the Sheet & Tube company, which would ordinarily be made at the East Youngstown properties, is now being diverted to the Chicago plants. In this way the Sheet & Tube company secures the advantage of freight rate differentials in shipments to the Southwest and the West from Chicago as compared with the Mahoning Valley.

Owing to delay in securing minor equipment, initial operations at the new plant in Warren of the American Puddled Iron Co., originally scheduled for October, have been delayed until after the first of next year.

Slight Change in Employment

WASHINGTON, Nov. 20.—The iron and steel industry increased employment by only 0.03 per cent during October over September, according to the United States Employment Service, Department of Labor. A decrease of 0.18 per cent was made in employment in the 1428 reporting firms. The Survey says, however, that rather than a decline in employment during October, undoubtedly there would have been an increase had it not been for the temporary closing of many of the larger textile mills throughout the New England district. This, together with a curtailment of 2.36 per cent in operations in railroad repairs shops, was held to be responsible for the slight downward trend. A decrease of 0.28 per cent was made in employment in October in non-ferrous metal and metal products.

Repairing Ruptured Pipe by Welding

The rupturing or breaking of pipe in the power system of an industrial plant is often the cause of a shutdown and concurrent interruption of production. Such breaks may be repaired by oxy-acetylene welding, and the following method has been found satisfactory.

When a break occurs at a certain point in a pipe, it is usually feasible to assume that the pipe is weakest at that particular point. In repairing the break by oxy-acetylene welding, it should be kept in mind that the metal immediately in the vicinity of the break is probably weak also, and for this reason it is best to remove it for a short distance back from the break.

If the break is a longitudinal rupture, as is usually the case, it may be repaired as follows: With an oxy-acetylene cutting blowpipe cut away the ruptured and weakened metal, leaving a rectangular hole in the pipe. Then a rectangular patch of the same thickness and form may be obtained by cutting it from a stock or scrap length of the same size and class of pipe, or it may be readily formed from a piece of sheet steel of the same thickness as the pipe wall. If this thickness is ¼ in. or more, the edges of both the hole and the patch should be beveled to a 45 deg. angle with the cutting blowpipe so that when the piece is inserted a 90 deg. vee will be formed, thus permitting the welder to obtain full penetration of the joint when he butt-welds the patch in place.

A piece of rod welded to the patch will serve as a handle by which it can be held in place during welding and is readily cut off with the blowpipe after the welding is completed. This type of repair may be completed in an hour or two.

Effect of the Character of Steel Upon the Results Obtained in Carburizing

Samples of various "normal" and "abnormal" steels, submitted to the Bureau of Standards by manufacturers, have been carburized and examined microscopically. The structural characteristics of these carburized steels confirm the contention that there is a difference in the "carburizing properties" of steels which show but little difference in their composition as ordinarily determined. These differences consist in variations in the average depth of penetration, as well as in the character of the pearlite. The real significance of the differences, so far as commercial practice is concerned, is still a matter of surmise. The work is being continued, and special attention will be given to the "carburizing behavior" of a set of irons containing unusual impurities such as oxides, nitrogen, etc.

Canadian Scrap Reactive

TORONTO, ONT., Nov. 20.—Iron and steel scrap sales during the past week or ten days have been confined to small tonnages for immediate delivery. Consumers are buying in small tonnages and are interested only in such material as is required for immediate needs. Steel plants are entering the market from time to time for heavy melting steel and turnings, but on the whole the movement of these commodities is comparatively slow. The recent decline in the price of pig iron has been reflected in scrap prices and as a result the dealers have reduced their buying price on No. 1 machinery cast $2 per net ton, in both Toronto and Montreal districts. While other lines of scrap are unchanged for the present, local dealers say that further softening is to be expected. Buying between dealers continues slow, but some movement is reported at prices below market levels.

Dealers' buying prices are as follows:

	Toronto	Montreal
	Gross Tons	
Steel turnings	$10.00	$7.00
Machine shop turnings	10.00	7.00
Wrought pipe	8.00	8.00
Rails	13.00	13.00
No. 1 wrought scrap	14.00	14.00
Heavy melting steel	12.00	11.50
Steel axles	15.00	18.00
Axles, wrought iron	18.00	20.00
	Net Tons	
Standard car wheels	$15.00	$16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	18.00	18.00

The Detroit Purchasing Agents' Association will hold a meeting Nov. 24 at which Prof. W. V. Bingham, director of the division of cooperative research of the Carnegie Institute of Technology will deliver an address on the "Intelligence of Business Success." In addition, W. L. Steffens, civil engineer of the Cary Co., Lockland, Ohio, will speak on "Heat Conservation" and C. H. Walker, general sales manager of the same company, will delineate "Fifty Years of Progress in the Roofing Industry."

John S. Pendleton, 52 Vanderbilt Avenue, New York, has been appointed Eastern sales agent by the Columbia Steel Co., Elyria, Ohio, manufacturer of cold-rolled strip steel. Mr. Pendleton also represents the Falcon Steel Co., Niles, Ohio; the Falcon Tin Plate Co., Canton, Ohio; the Franklin Steel Works, Franklin, Pa., and the Standard Gage Steel Co., Beaver Falls, Pa.

Iron and Steel Markets

OVER 600,000 TONS

Great Pig Iron Buying Movement at Still Lower Prices

Rail and Tin Plate Mills Well Booked for First Half—Large New Car Program

The increased demand for pig iron which was the market feature a week ago has broadened into one of the largest buying movements in many months. The week's total is put at 600,000 to 650,000 tons, much of this iron going at prices under last week's low level. Several producers, after acting on the old Carnegie formula that the way to lift the market is to get under it, have now raised their prices by 50 cents to $1 a ton, but such advances have not been established and the price situation is yet to be clarified.

In a total of nearly 450,000 tons booked by Northern and 200,000 tons by Southern furnaces, the largest lot was 50,000 tons bought at Buffalo by the American Radiator Co. At Chicago some foundries bought for the first half of 1924, but almost all the iron taken is for delivery up to April 1.

While the buying has been very heavy, the movement has been carried on in a conservative way and some important melters have not yet entered the market. Buffalo sellers have been aggressive and have sold at distant points. Speculative buying seems to be confined to Pittsburgh. Steel making grades have formed a small part of the great total of the week.

The finished steel market, in contrast with the activity in pig iron, continues to show the effect of restricted buying. Operations are at a less rate, being scaled down rather more in the Chicago district than elsewhere, and apart from tin plate bookings, which have been heavy, new business is not quite up to the October rate.

However, a better view is taken of prospects for 1924, as the total of railroad cars being planned for grows and the building and automobile outlook continues favorable.

Inquiries and steel company estimates now put prospective railroad car business at 94,000. Included are 10,000 to 11,000 cars for the Southern Pacific, 6000 for the Norfolk & Western, 3000 for the Pacific Fruit Express and an unnamed number for the Pennsylvania Railroad.

Eastern mills are interested in an inquiry the Chesapeake & Ohio has made for 14,000 tons of plates, 8000 tons of shapes and 860 tons of bars, for the 2000 cars to be built for its account.

After booking orders for 6,000,000 base boxes of tin plate for the American Can Co. and 1,500,000 boxes for the Continental Can Co., tin plate mills are assured of full activity through the first half of 1924.

It now appears that most of the rail mills are booked practically full to July, 1924. The Pennsylvania rail orders are 94,000 tons each to the Steel Corporation and the Bethlehem Steel Co. and 12,000 tons to the Inland Steel Co. The Baltimore & Ohio has bought 10,000 tons of tie plates.

Some of the pending foreign rail business—18,000 tons for Chile, 12,000 tons for Japan and 7000 tons for Brazil—is likely to be placed here.

Awards of fabricated steel for 15 projects did not exceed 11,000 tons, but 41,500 tons of new work has appeared. Of this 10,000 tons is for the new Palmer House, Chicago, and 20,100 tons is for the Ford Motor Co., in addition to 10,800 tons already pending.

Fabricated steel bookings in October were the smallest in 20 months—120,000 tons, against 132,500 tons in September. The year 1923 promises to be somewhat better than 1922 and both will rank next to 1915 and 1916.

Japanese inquiry in Great Britain for black sheets has fallen off, but the mills are sold out until June. Japan's purchases of black sheets in the United States amount to 70,000 tons.

THE IRON AGE finished steel composite price remains at 2.775c. per lb., after 29 weeks of stabilized prices for the leading products. One year ago it had held close to 2.44c. for eleven weeks.

For the twelfth successive week THE IRON AGE pig iron composite price has fallen, being now $20.77 per gross ton, against $20.94 last week and $27.61 one year ago.

Pittsburgh

Price Concessions Encourage Pig Iron Buying —Improvement in Steel Expected

PITTSBURGH, Nov. 20.—While the past week has seen further declines in pig iron prices of from 50c. to $1 a ton, carrying the market back to about the levels of March, 1922, the new level has aroused such a large demand that it now looks as if a turn had come. Sales for the week have been fully 50,000 tons of the various grades, and although all of this tonnage does not represent buying by consumers, a goodly part of the total is thus accounted for, and speculative purchases are helpful to the immediate situation in that they mean a wider distribution of supplies and the virtual elimination of the danger from large stocks concentrated in a few hands.

Although the decline in pig iron prices from the high point of the year, which now averages about $10 a ton, has not been an influential factor in the steel market, the more common tendency among merchant producers of pig iron is to charge the decline to steel company selling of pig iron because of the tapering demand for steel. While present pig iron prices show a loss to the average producer, they provide a slight

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Nov. 20, 1923	Nov. 13, 1923	Oct. 23, 1923	Nov. 21, 1922
No. 2X, Philadelphia	$22.61	$22.61	$23.76	$20.11
No. 2, Valley furnace†	*21.00*	22.00	23.00	27.50
No. 2, Southern, Cin'ti	23.05	23.05	24.05	27.05
No. 2, Birmingham, Ala†..	19.00	19.00	20.00	23.00
No. 2 foundry, Chicago*	**23.00**	22.00	23.00	26.00
Basic, del'd, eastern Pa.	22.75	23.00	24.00	27.00
Basic, Valley furnace	*20.00*	20.50	23.00	27.50
Valley Bessemer, del. P'gh	23.26	24.76	26.76	28.27
Malleable, Chicago*	**23.00**	22.50	25.00	30.00
Malleable, Valley	*19.00*	20.00	22.50	29.00
Gray forge, Pittsburgh	22.26	23.26	24.76	28.77
L. S. charcoal, Chicago	28.15	28.15	30.01	36.15
Ferromanganese, furnace	*107.50*	110.00	110.00	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	38.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	38.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	38.00
Forging billets, base, P'gh	45.00	45.00	47.50	45.00
O.-h. billets, Phila	45.17	45.17	45.17	43.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.35	2.40	2.40	2.00
Light rails at mill	2.25	2.25	2.25	2.00

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.275
Iron bars, Chicago	2.40	2.40	2.40	2.50
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.34
Steel hoops, Pittsburgh	*3.00*	3.15	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Nov. 20, 1923	Nov. 13, 1923	Oct. 23, 1923	Nov. 21, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	*4.85*	5.00	5.00	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$18.00**	$17.50	$17.50	$24.50
Carwheels, Philadelphia	17.50	17.50	19.00	20.00
Heavy steel scrap, P'gh	**16.50**	16.00	15.00	20.50
Heavy steel scrap, Phila.	**15.50**	15.00	15.00	16.00
Heavy steel scrap, Ch'go	14.00	14.00	13.75	17.00
No. 1 cast, Pittsburgh	18.50	18.50	18.50	23.00
No. 1 cast, Philadelphia	19.00	19.00	19.00	20.00
No. 1 cast, Ch'go (net ton)	**18.50**	18.00	18.50	20.50
No. 1 RR. wrot. Phila	**17.50**	17.00	17.00	19.00
No. 1 RR. wrot. Ch'go (net)	12.50	12.50	12.50	15.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$7.25
Foundry coke, prompt	4.75	4.75	4.75	8.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.50	13.50	13.12½	14.12½
Electrolytic copper, refinery	*12.75*	13.25	12.50	13.62½
Zinc, St. Louis	*6.30*	6.45	6.32½	7.20
Zinc, New York	*6.65*	6.80	6.67½	7.55
Lead, St. Louis	**6.70**	6.55	6.55	6.90
Lead, New York	**6.95**	6.85	6.85	7.25
Tin (Straits), New York	*44.25*	44.37½	41.25	36.50
Antimony (Asiatic), N. Y.	9.25	9.25	8.00	6.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 20, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Nov. 13, 1923,	2.775c.
Oct. 23, 1923,	2.775c.
Nov. 21, 1922,	2.446c.
10-year pre-war average,	1.689c.

Composite Price, Nov. 20, 1923, Pig Iron, $20.77 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 13, 1923,	$20.94
Oct. 23, 1923,	22.96
Nov. 21, 1922,	27.61
10-year pre-war average,	15.72

margin of profit to the self-contained steel companies, several of which are short of steel business. The fact that the pig iron market has developed so much activity and seemingly has struck bottom, together with the stronger tendency in the scrap market, strengthens expectations of an early revival in steel business.

Evidence that steel consumers and distributors have abandoned the hand-to-mouth buying policy is lacking, although in most directions actual requirement purchases for the past week show some increase as compared with the previous seven days. The trade here still places greatest reliance in a business recovery on railroad buying, although it is now believed that the demand from this source will run greater in the direction of rails and track accessories, bridges and terminals, than in new rolling stock, with which most roads now appear to be amply supplied. The outlook is for a good structural business for next spring, and the automotive industry is expected some time in the near future to adopt a more liberal buying policy. In all cases, however, the question of prices is an important one with consuming interests, which seem to be waiting upon lower prices before going ahead.

Considerable irregularity and weakness is evident in the sheet market, with price cutting no longer on the part of the few as was the case a few weeks back. Cold-finished steel bars, hot-rolled flats, bolts, nuts and rivets and spikes also reflect in price the need of orders on the part of producers. It is commented upon frequently that the liquidation of steel stocks by consumers and distributors has been pretty drastic, and that the situation in this respect is fraught with danger from a supply standpoint, particularly as a strike of the soft coal miners looms up as an April 1 possibility. It is also pointed out that the working down of inventories is voluntary, and has not been forced by financial consideration. Correction of the conditions created by the overproduction of copper and crude oil also is viewed as a helpful factor in the situation, and if there

has been any overproduction of iron and steel it also is being amended by a lower rate of producing capacity. Steel corporation steel work operations still are above 80 per cent in this district, but the independent average ranges somewhere between 60 and 70 per cent. There has been a drop in the number of active blast furnaces in this and nearby districts from 126 in mid-summer to 95 today out of a total of 141 furnaces.

Pig Iron.—The past week stands out as one of the most active, if indeed not the most active of any this year. While speculative buying accounts for a very substantial part of the business closed, known sales to consumers reach a total of 25,000 tons. Low prices have been made in effecting the business, but the common feeling is that the situation has been bettered by the interest created by the lower prices. The largest demand has been in foundry iron, but there has been a goodly representation of other grades in this week's transactions. A large sanitary ware manufacturing company has closed for approximately 10,000 tons of iron, paying $21 Valley furnace for No. 2, and No. 2X iron for its nearby plants and $18.50, Birmingham, for the base grade for its southern plants. All of this iron is for November and December delivery. A large rolling mill and machinery company has bought 7000 tons of iron for delivery beginning immediately and extending into the first quarter from a western Pennsylvania steel company, the transaction including 3000 tons of foundry iron at $21, furnace, 3000 tons of Bessemer at $23, and 1000 tons of low phosphorus iron at $27. A Johnstown radiator company with plants also at Newcastle, Pa., and Trenton, N. J., has bought 1500 tons of foundry iron for each of the three plants at a delivered price of $21.50 at Johnstown and Newcastle, which means $21 at seller's furnaces. A local maker of steel castings has closed for 1500 tons of Bessemer at $22.50, Valley furnace, base, and there was also a sale to a Wheeling melter at the same price. Sales of malleable iron to consumers have been made as low as $19, Valley furnace, and speculative sales aggregating more than 10,000 tons at from $19 to $19.50 also are noted. There have been scattering sales of foundry iron as high as $21.50 for the base grade, of Bessemer iron at $23.50 and some holders of basic iron still are naming $22 on this grade. Merchant producers, generally, are disinclined to take on business for first quarter delivery at today's prices, believing that more profitable prices are ahead. Basic iron has receded to $20, Valley furnace, on a sale of 2000 tons to a Valley melter.

(Note—Through an error in transmission, the price of No. 2 foundry of last week was carried at $20; the correct price was $22. In the table captioned, "A comparison of prices," the price of Valley Bessemer iron delivered at Pittsburgh was given last week as $26.26; the correct price was $24.76.)

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$20.00 to $21.00
Bessemer	22.50 to 23.50
Gray forge	20.50 to 21.00
No. 2 foundry	21.00 to 21.50
No. 3 foundry	20.50 to 21.00
Malleable	19.00 to 20.00
Low phosphorus, copper free	30.00

Ferroalloys.—Although both domestic and British makers of ferromanganese continue to quote $110, Atlantic seaboard, recent offerings of resale material down to as low as $107.50 have been regarded as legitimate competition, and the price has been met by some makers. It is understood that several good-sized tonnages were disposed of at that figure. The campaign for 1924 contracts in 50 per cent ferrosilicon is getting under way to some extent, although the larger producers have not yet announced prices. A price of $79, delivered, is said to have been quoted by one maker and the more common impression is that the 1924 market will open near that price. Current demand for this material is very light. Prices are given on page 1417.

Semi-Finished Steel.—Demands are light, as is rather to be expected in view of the fact that buying of finished products is so generally on a hand-to-mouth basis, but there is not much selling pressure, and prices hold at the recent levels. Some makers still are talking $42.50 on billets and slabs, as well as on sheet bars, but the most recent business in billets has been at $40 and it is believed other tonnages are available at that figure. The skelp market is slightly easier, being quotable at 2.35c. to 2.40c., as against 2.40c., the former quotation. There is so little demand for skelp that prices are purely nominal. Demand for wire rods runs entirely to small lots for early delivery, but most makers are able to get enough of such orders to maintain a fairly full operating schedule and are not disposed to augment their bookings at the expense of prices. Prices are given on page 1417.

Wire Products.—Buyers still are confining their purchases closely to actual requirements, and while orders, both numerically and in size, show some increase over the past two weeks, the mills are not accumulating much backlog business and most of them are pretty well abreast of their obligations. The outlook is not very brilliant for a high rate of mill operation on orders in December. This prospect probably explains the fact that most mills in the past week advised the trade that woven fence prices would be guaranteed against a decline up to June 1, 1924. Announcement some time ago of a spring dating on fence orders failed to stimulate buying to any appreciable extent, presumably because of expectations of lower prices. Since manufacturers do not have storage capacity to take care of much production, the idea of a price guarantee is to get the dealers and jobbers to take out their tonnages before the spring demand develops. It is stated that this guarantee may be withdrawn any time without notice. There is still some shading of regular prices on coated nails, but there is pretty close observance of quoted prices of other products. Prices are given on page 1416.

Steel Rails.—Activity still is lacking in billet light rails, but makers still are quoting 2.25c., base, uniformly and appear content to pass up business rather than cut that price. The soft coal situation still is unsatisfactory both from the sales and price standpoints to the mine operators and they are curtailing production; the need of new rails is declining accordingly. Prices at which rerolled rails are selling, it is claimed, are too far below costs to allow makers of billet rails to compete.

We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Mills generally have sufficient live business in pipe to permit a relatively high rate of operation, but new business is light in all classes of goods. Considerable pressure still is being exerted by distributors of standard pipe for deliveries for the rounding out of stocks and there also is a pretty strong demand for shipment of galvanized pipe, which it is believed is wanted for the completion of buildings started late in the summer or early fall. With the decrease in crude oil production in California, it is believed the oil market is due for a turn and there are hopes of a revival in the demand for oil well pipe soon after the first of the new year. Boiler tubes are slow of sale and most makers are nearing the end of their orders, since shipments for some time have been running substantially in excess of incoming business. Shading of prices is not uncommon in boiler tubes and is reported on a recent order for some 10-in. line pipe for California delivery, but in other respects the market appears fairly firm at quotations. Discounts are given on page 1416.

Sheets.—There has been no definite improvement in business and the number of mills that are departing from the regular market prices has grown considerably in the past week or so. It is a matter of some concern to the larger independent units that so much of the passing business is going to the smaller producers, most of whom are naming prices at which orders can be secured. The leading interest claims to be getting a fairly good run of quick shipment orders for small tonnages at the full quotations, but this is not the case with the independent mills observing the Steel Corporation prices. Buyers are encouraged to pursue a cautious purchasing policy by the fairly well established fact that prices above those now quoted by the

Steel Corporation are unlikely in the near future, while on current requirements they are able to secure supplies for an increased number of sources at substantial concessions. Present minimum quotations of 3.75c., base, for black, 4.85c., base, for galvanized, and 2.90c., base, on blue annealed are not always as low as some mills are willing to go to get desirable orders. Concessions on tin mill black plate are not being made to any considerable extent and on automobile body sheets there is relatively good observance of the regular price. The American Sheet & Tin Plate Co. is operating about 80 per cent of its sheet mills, which compares with the independent average of about 60 per cent. Prices are given on page 1416.

Tin Plate.—Orders entered lately by the American Sheet & Tin Plate Co. will take care of all the possible production over the first half of 1924 and since there are bound to be some interruptions to mills' operations, it is probably a safe prediction that its present obligations will extend into the third quarter of the year. The requirements of the largest can company in the country, which for the first half of the year amount to close to 1,000,000 boxes a month, are included in the orders of that company. Independent companies are not as well off in respect to bookings as the leading interest, but indications are that they will have all the business they can take care of during the first half of next year. If contracts are not yet coming to them freely, it is because consumers have not yet completed their estimates of their 1924 requirements. The price is a fixture at $5.50 per base box, Pittsburgh, for the first quarter.

Cold-Finished Steel Bars and Shafting.—This line is dull and easy. While the common quotation of all makers in this district is 3c., base, it is admitted that sales of any considerable size are not readily made at that figure, particularly in the Detroit district, where competition for orders by Middle Western mills is pretty sharp. Based on sales, the market is quotable from 2.90c. to 3c., base, according to the size of the order. Ground shafting holds at the recently established base of 3.40c., f.o.b. mill, for carload lots or more.

Hot-Rolled Flats.—While some makers still are naming a price of 3.15c., base, on hoops, bands and strips, sales at that price, even on hoops of the ordinary gages and widths are so infrequent that the market to all intents and purposes is fairly down to 3c., base. This implies 2.85c. for hot-rolled strips for cold rolling and for rim stock and on wide strips, for which a number of mills want orders, even less than that is being accepted. The cotton tie season is over. The crop turned out smaller than early estimates, but there are no signs that rollings exceeded the requirements or that there will be a considerable carryover either by the mills or warehouses into next year. Prices are given on page 1416.

Track Supplies.—Pending business in spikes, bolts and other track accessories is said to be heavy, but actual orders are small. Most makers of small spikes have cut base price to 3.25c., as against 3.50c., the former base, but even at the new level orders are moderate. On standard spikes, orders are lost as frequently as they are obtained at 3.15c., base. Quoted prices on track bolts are not readily obtained. Prices are given on page 1416.

Bolts, Nuts and Rivets.—Quoted prices on bolts and nuts still are asking rather than selling prices. Competition for orders still is sharp and prices are more of buyers' than of sellers' making. The rivet market is quotable at $2.75, base, for heavy rivets, but concessions still are being made on attractive orders and the prevailing quotation on small rivets is 70 per cent off list. Prices and discounts are given on page 1416.

Structural Material.—Local mills are not yielding from 2.50c., Pittsburgh, on large structural shapes, although demands are very light in keeping with awards to local fabricating shops. Cases are known where the Chicago base has been named by nearby mills in territory where Chicago mills have a freight advantage. Prices are given on page 1416.

Plates.—Local mills are not getting many orders of any considerable size, but are adhering pretty firmly to 2.50c. base, Pittsburgh, on such business as is coming out of this territory. About 2000 tons of steel, mostly plates, is involved in 20 barges, bids for which have been asked by the Louisville office, U. S. Engineers, to close Nov. 23, and there are about 400 tons of steel for five barges being asked for by the Mobile office, U. S. Engineers, bids on which close Dec. 1. Prices are given on page 1416.

Cold-Rolled Strips.—Makers still are quoting 5c. base, and the need of orders has not yet become urgent enough for much shading of that figure.

Iron and Steel Bars.—Mills in this district still are holding to 2.40c. base, Pittsburgh, but are getting only a moderate amount of business and are losing some orders in a competitive territory East and West. Iron bars also are holding at recent prices, although the demand is limited.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.85c. base, in carload lots or more, f.o.b. Pittsburgh.

Coke and Coal.—The price of furnace coke remains for the fifth consecutive week at from $3.75 to $4 per net ton at oven. Offerings are very limited but so also is the demand, and curtailment of production which has been going on steadily for several weeks has served only to steady and not to strengthen prices. Spot foundry coke ranges from $4.75 to $5.50 with supplies and demand about equal. The coal market still is very sluggish and easy. Ending of the lake shipping season has reduced the demand for screened coal, and created some shortage of slack grade, the price of which has stiffened slightly. Demand is light for this grade, but so little is available that there is no longer much tonnage to be had at less than $1.10 and small sales have been made at as high as $1.25. Mine run steam coal ranges from $1.35 to $1.50 in the Connellsville district up to $1.90 to $2 for Panhandle coal. Mine run coking coal is quoted from $1.75 to $2.25, and gas coal commands $2.25.

Old Material.—The market here continues to gather strength, due not so much to active consumer buying as to the fact that dealers find it hard to secure supplies at prices that will permit a profit on mill bids and are disposed to refrain from selling. Weirton Steel Co. and the Pittsburgh Crucible Steel Co. were recent buyers of heavy melting steel, paying $16.50, while Edgewater Steel Co. went as high as $17 for a few hundred tons of this grade. The market on this grade is, therefore, quotable from $16.50 to $17, but dealers today would hardly accept the lower figure, except on such material as they had lined up and have much higher ideas as to the value of their yard stocks. The market also is firmer on compressed sheets, one user of which has raised his bid to $15, as against $14.50, recently. Efforts of dealers to cover against short sales are responsible for a firmer market in some of the lighter grades. Heavy breakable cast is stronger, but cast iron wheels find only a limited outlet and the price is easier.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$16.50 to	$17.00
No. 1 cast, cupola size	18.50 to	19.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va. and Franklin, Pa.	18.00 to	18.50
Compressed sheet steel	14.50 to	15.00
Bundled sheets, sides and ends	13.00 to	13.50
Railroad knuckles and couplers	18.50 to	19.00
Railroad coil and leaf springs	18.50 to	19.00
Low phosphorus blooms and billet ends	20.50 to	21.00
Low phosphorus plate and other material	19.00 to	19.50
Railroad malleable	17.50 to	18.00
Steel car axles	18.00 to	18.50
Cast iron wheels	17.00 to	17.50
Rolled steel wheels	18.50 to	19.00
Machine shop turnings	12.00 to	12.50
Sheet bar crops	18.50 to	19.00
Heavy steel axle turnings	14.00 to	14.50
Short shoveling turnings	13.00 to	13.50
Heavy breakable cast	16.50 to	17.00
Stove plate	14.00 to	14.50
Cast iron borings	13.00 to	13.50
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	16.50 to	17.00

Chicago

Pig Iron Sales Amount to 150,000 Tons—Inquiry for Many Cars

CHICAGO, Nov. 20.—The iron and steel market situation is a study in contrasts. After a long period of declining prices and hand-to-mouth buying pig iron contracting has been unusually heavy, sales for the week amounting to fully 150,000 tons. These commitments cover not only the remainder of the year, but in many cases extend over first quarter and first half. Under the stimulus of demand prices have advanced from 50c. to $1 a ton.

Buying of finished steel, on the other hand, shows little, if any, improvement, and with the end of the year drawing near, consumers may continue to hold back in order to keep their inventories down to a minimum.

Slow demand has found further reflection in curtailed mill operations. The Illinois Steel Co. has blown out one furnace each at Gary and at South Chicago, thereby reducing the number of its active stacks to 19 out of 27 steel works furnaces. The company's steel output has declined to 75 per cent of ingot capacity. Notwithstanding losses in output local mill prices remain firm on plates, shapes and bars. Hoops and bands, as well as sheets, continue to show weakness, but on the whole the market is remarkably steady. Mills find particular encouragement in the appearance of definite inquiries for a large number of freight cars. The Southern Pacific has entered the market for 6500 and the St. Louis Southwestern for 1000. Blue prints and specifications for 3000 refrigerator cars for the Pacific Fruit Express have been completed and inquiries will be issued in a day or two. Before the close of the current week the Southern Pacific is expected to issue additional inquiries for 3500 cars.

Ferroalloys.—A local buyer is inquiring for 300 to 500 tons of ferromanganese for first quarter delivery. No orders have been reported during the week; hence the price situation is uncertain. There has been no activity in either spiegeleisen or 50 per cent ferrosilicon.

> We quote 80 per cent ferromanganese, $115.38 to $117.56; delivered; 50 per cent ferrosilicon, $82, delivered; spiegeleisen, 18 to 22 per cent, $43.80, delivered.

Pig Iron.—The past week has seen the heaviest buying for many months. Bookings by local sellers exceed 150,000 tons for the seven-day period and sales during the coming week promise to be correspondingly heavy. Much of the tonnage bought is for first quarter and first half, indicating that melters are anxious to contract ahead at present prices. Under the stimulus of demand the market has stiffened and on prompt deliveries the lowest going price is $23, base local furnace, while for first quarter $23.50, furnace, is the minimum. Producers are not particularly anxious to take business for second quarter shipment at this time, but have booked some orders at $24, base furnace. That Southern furnaces are also heavily committed is indicated by the fact that two of the largest producers have withdrawn from the market. Apparently the lowest available price on Southern iron today is $19.50, Birmingham, or $25.51, delivered Chicago. The Canadian furnace has also withdrawn from the market. There is still a large tonnage of iron on inquiry which has not yet been placed. A Milwaukee melter, for instance, is in the market for 10,000 to 12,000 tons of malleable, representing requirements for the entire coming year. A strong buying movement is under way and factors which worked for extreme weakness ten days ago are no longer operative. The increasingly heavy offerings of steel works furnaces, as well as those of outside stacks in Buffalo, Canada and the South, have created a highly competitive situation in which all advantage lay with the buyer. So much tonnage has been absorbed in the past week, however, that the market is now on a firm footing. Buying of charcoal has also been on a liberal scale. A northern Indiana melter has closed for 1000 tons of charcoal. Inquiries for low phosphorus have been limited to a few carload lots. Prices range from $29.50 to $30, Valley furnace.

> Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.
>
> | | |
> |---|---|
> | Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.. | $28.15 |
> | Northern coke, No. 1 sil. 2.25 to 2.75 | $23.50 to 24.00 |
> | Northern coke, foundry, No. 2, sil 1.75 to 2.25 | 23.00 to 23.50 |
> | Malleable, not over 2.25 sil | 23.00 to 23.50 |
> | Basic | 23.00 to 23.50 |
> | High phosphorus | 23.00 to 23.50 |
> | Southern No. 2 | 25.51 |
> | Low phos., sil. 1 to 2 per cent, copper free | 34.29 to 34.79 |
> | Silvery, sil. 8 per cent | 37.29 |

Plates.—Mills are encouraged by the appearance of inquiries from the Southern Pacific and the St. Louis Southwestern for a total of 7500 cars. Before the close of the week, formal inquiries for 3500 additional cars for the Southern Pacific and 3000 cars for the Pacific Fruit Express will probably be in the hands of car builders. This will bring the total of new inquiries up to 14,000 cars, involving 140,000 tons of steel, largely plates. Plate bookings during the week have been light. A mill east of here took an order for 300 tons from a local buyer at a price of 2.50c., delivered, or $2 a ton under the price of Chicago mills. Local producers, however, have been holding firmly to their quotations and there are no indications that they will deviate from that policy. Recent oil storage tank orders have been small. The Standard Oil Co. has placed 13 tanks involving 600 tons for erection at Casper, Wyo., with the Graver Corporation, but has further orders to place for that location. The Sinclair Refining Co. has awarded a number of acid tanks for East Chicago, requiring 240 tons, to the Graver Corporation.

> The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Sheets.—A local mill has booked additional Japanese orders for black sheets, amounting to about 2000 tons. January delivery is called for. Domestic demand for sheets shows a little more life, although the price situation is still weak. On galvanized sheets, 4.85c. Pittsburgh is rather commonly quoted by the smaller producers, but on black 3.65c., base Pittsburgh, is still an exceptional figure. Blue annealed remains steady at 3c., base Pittsburgh.

> Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.85c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
>
> Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has booked 375 tons for Thornton, Ill., and 75 tons for Hammond, Ind. Detroit takes bids today on 2421 tons of 12-in., class C, 1881 tons of 8-in., class B, and 100 tons of 24-in., class C, water pipe. Prices still show considerable variation, according to deliveries desired. The lowest figure recently reported was $46.90, base Birmingham, which covered extended delivery.

> We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $59.20 to $60.20; 6-in. and above, $55.20 to $56.20; class A and gas pipe, $5 extra.

Reinforcing Bars.—Few lettings exceeding 100 tons each were reported during the week, but considerable new work is coming up for figures. Fully 1000 tons of bars are still to be bought for Illinois road work, on which general contracts have been placed. Close to 2000 tons additional will be required in seven bridges and 169 miles of road work to be awarded to general contractors at Springfield, Ill., Nov. 22. An assembly plant for the Ford Motor Co. at Kansas City, Mo., will require approximately 500 tons. The superstructure

for the Milwaukee Journal Building, Milwaukee, involving about 400 tons, is expected to be placed shortly. Prices on concrete bars have generally advanced to 3c., Chicago warehouse.

Lettings include:

Lunch Ice Cream Co., Milwaukee, garage, 100 tons to Corrugated Bar Co.

Apartment building, Battle Creek, Mich., 150 tons to Kalman Steel Co.

Seven-story apartment hotel for A. C. Lee, Detroit, Mich., 115 tons to McRae Steel Co.

Metallurgy building for the School of Mines, Houghton, Mich., 110 tons to Corrugated Bar Co.

Pending business includes:

Illinois State highway work, 1000 tons.

Seven bridges and 169 miles of concrete highway for the State of Illinois: bids on general contract to be taken at Springfield, Ill., Nov. 22, 2000 tons.

Curtis Automobile Co. garage, Milwaukee, 170 tons.

Ford Motor Co. assembly plant, Kansas City, Mo., 500 tons.

Two high school buildings, Appleton, Wis., 150 tons.

Shrine Temple, Fort Wayne, Ind., 200 tons, bids on general contract rejected and plans to be revised.

Sanitary district, Chicago, McCormick Highway, 700 tons, bids on general contract rejected and new figures asked.

Rails and Track Supplies.—Outside of miscellaneous orders for 6000 tons of rails, no additional business in standard sections has been taken by local mills. New commitments in track supplies have also been small, but an unusually large inquiry for tie plates, angle bars, spikes and bolts is expected to appear shortly.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.75c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mills.

Jobbers quote standard spikes out of warehouse at 3.90c. base, and track bolts, 4.90c. base.

Bolts and Nuts.—Demand shows no improvement and the price situation is soft. On large machine bolts 60 and 10 and 10 off, f.o.b. Chicago, is not an uncommon discount. On large rivets as low as $2.65, f.o.b. Pittsburgh, has been done.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Structural Material.—Fabricating awards for the week involved a relatively small tonnage, but business in prospect is most promising. Locally, preliminary figures have been taken on the Union League Club building, involving 5300 tons, and bids are expected to be asked early in December on the Chicago Tribune Building, requiring 5000 tons, and the new Palmer House, taking 10,000 tons. The building program of the Ford Motor Co. alone is a large one. At St. Paul it has asked for new figures on an assembly plant, which, according to revised plans, will require 6000 tons. Other projects on which it has asked bids include additional units for its steel plant at River Rouge, Mich., involving 10,000 tons, a press shop and forge shop at River Rouge, 9700 tons, and an assembly plant at Kansas City, 400 tons. An assembly plant at Philadelphia, requiring 4500 tons, on which figures have been taken, remains unlet. The Northern Pacific has received bids on miscellaneous bridges, involving 1700 tons.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—While expectation of lower prices may have held back buying of soft steel bars, probably a more important present influence to that end is a common desire to enter the new year with low inventories. Current orders are of a desultory character and cover immediate needs almost exclusively. Local prices on mild steel bars remain firm. Demand for bar iron shows no improvement and mills are operating intermittently or on a sharply curtailed basis. Practically the same situation holds true of rails and steel bars, but prices of both commodities remain unchanged.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars and shafting is 3.50c. for rounds, and 4.00c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base, hoops 4.5c., bands, 3.50c.

Wire Products.—While no material increase in mill bookings is looked for in November and December, sentiment is improved to the extent that prospects for first quarter business are regarded as good and present prices are expected to remain unchanged. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1416.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Warehouse Prices.—Local jobbers have reduced their prices on small rivets and on bolts and nuts. Small rivets in keg lots are now quoted at 60 per cent off and in less than keg lots at 55 off. The new bolt and nut quotations are given under the bolt and nut paragraph. Local warehouses report that business from the city is keeping up, while orders from country points are falling off. The open winter has permitted building operations to go forward without interruption, thereby sustaining demand for building materials. Bookings, however, are well diversified, coming from miscellaneous sources.

Old Material.—Prices are higher on some grades of scrap, but this is accounted for by the fact that new supplies are not coming out fast enough to satisfy short sales. While consumers are showing some interest in low phosphorous grades and in cast and malleable iron scrap, market activity is largely confined to the dealers. Consumption, in fact, is showing a material decline. Open-hearth operations of the steel mills are being curtailed and bar iron mills are either idle or running at a very low rate. Demand for iron mill grades is so light that prices are little more than nominal except on materials which can be diverted to other uses. There is practically no market for No. 2 bushelling. Railroad offerings include the Rock Island, 5000 tons; the Santa Fé, 2000 tons, and the Chesapeake & Ohio, 5700 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$19.50 to	$20.00
Cast iron car wheels	18.00 to	18.50
Relaying rails, 56 and 60 lb.	26.00 to	27.00
Relaying rails, 65 lb. and heavier	32.00 to	35.00
Forged steel car wheels	17.50 to	18.00
Railroad tires, charging box size	17.50 to	18.00
Railroad leaf springs, cut apart	18.00 to	18.50
Rails for rerolling	15.50 to	16.00
Steel rails, less than 3 ft.	16.50 to	17.00
Heavy melting steel	14.00 to	14.50
Frogs, switches and guards cut apart	14.00 to	14.50
Shoveling steel	13.50 to	14.00
Drop forge flashings	9.50 to	10.00
Hydraulic compressed sheets	11.00 to	11.50
Axle turnings	11.00 to	11.50
Steel angle bars	16.00 to	16.50
Per Net Ton		
Iron angle and splice bars	17.50 to	18.00
Iron arch bars and transoms	17.50 to	18.00
Iron car axles	24.00 to	24.50
Steel car axles	15.50 to	16.00
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.00 to	7.50
Cut forge	12.50 to	13.00
Pipes and flues	8.00 to	8.50
No. 1 railroad wrought	12.50 to	13.00
No. 2 railroad wrought	12.50 to	13.00
Steel knuckles and couplers	16.00 to	16.50
Coil springs	17.50 to	18.00
No. 1 machinery cast	18.50 to	19.00
No. 1 railroad cast	17.50 to	18.00
No. 1 agricultural cast	17.50 to	18.00
Low phos. punchings	14.00 to	14.50
Locomotive tires, smooth	15.50 to	16.00
Machine shop turnings	6.00 to	6.50
Cast borings	9.00 to	9.50
Short shoveling turnings	9.00 to	9.50
Stove plates	15.50 to	16.00
Grate bars	14.50 to	15.00
Brake shoes	16.00 to	16.50
Railroad malleable	17.00 to	17.50
Agricultural malleable	16.50 to	17.00

New York

Heavy Buying of Pig Iron—Many Inquiries Pending—Large Tin Plate Purchases

NEW YORK, Nov. 20.—Buying of pig iron developed into a broad movement about the middle of last week and sales through New York offices for the past 10 days have amounted to about 100,000 tons, while about 25,000 tons is still pending. The principal transaction was the purchase of 50,000 tons by the American Radiator Co., which was closed today. Most of the buying last week was for rather small tonnages, the largest being 2500 tons, but the total amounted to about 35,000 tons. It is evident that important consumers are convinced that the market has struck bottom and among those represented this week are the following, the tonnages either having been placed or about to be: American Locomotive Co., 8000 to 9000 tons; Gould Coupler Co., 2000 tons; Eastern Malleable Iron Co., 5000 tons; American Brake Shoe & Foundry Co., 3500 tons; Worthing Pump & Machinery Corporation, 3500 tons; Miles-Bement-Pond Co., 300 tons; Ingersoll-Rand Co., 1000 tons; William H. Crane Co., 1000 tons; General Electric Co., 1800 tons. Buying is for the remainder of this year and the first quarter of next, and neither buyers nor sellers have been disposed to go beyond April. The buying has been done in most cases at low prices, with $19 as the minimum at Buffalo, and $21 as the minimum in eastern Pennsylvania. Following the buying sellers have advanced quotations and one company in eastern Pennsylvania is now asking $23, while $20 with 50c. differentials is more general in Buffalo, and it is doubtful whether iron could be purchased at less than $20. Some sellers are predicting that $21 will be the prevailing Buffalo price in a few days. While the buying has been widespread, it has been done carefully and some shrewd buyers are not yet included in the list of those who have placed orders. Whether the new prices now being asked can be maintained remains to be determined. Certain it is that the market is in a much better condition from the standpoint of furnaces than it has been for a number of months.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$23.77 to $24.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.27 to 24.27
East. Pa. No. 2, sil. 1.75 to 2.25..	23.27 to 24.27
Buffalo, sil. 1.75 to 2.25	23.91 to 24.91
No. 2X Virginia, sil. 2.25 to 2.75..	29.94
No. 2 Virginia, sil. 1.75 to 2.25...	29.44

Ferroalloys.—There are substantial inquiries for ferromanganese from several consumers aggregating probably 1000 tons for delivery as soon as possible this year. There have been sales of carload lots of British alloy at $110, seaboard, and there are reports that the domestic alloy is available at a concession from this price, or as low as $107.50. There are predictions that, if the pig iron market becomes active and advances, the ferromanganese market will also become stronger and higher. Buying of spiegeleisen is confined to carload lots at prevailing quotations and the market is quiet. There have been no developments in the ferrosilicon or ferrochromium markets, purchases being of a hand-to-mouth nature at prevailing quotations.

Cast-Iron Pipe.—Makers report slightly better business than is usual at this season and generally expect to operate with a good tonnage ahead until spring demand begins. Inquiries and purchases by large gas and water companies are features of the present market. To purchasers willing to accept delivery through the winter months, concessions of from $1 to $1.50 are still offered. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $62.10 to $63.60; 4-in. and 5-in., $67.10 to $68.60; 3-in., $77.10 to $78.60, with $5 additional for Class A and gas pipe. The upward trend of the soil pipe market is acting as a spur to business that might otherwise have been slow to develop. The gradual stiffening in prices has resulted in a disappearance of the 50¾ per cent off list for heavy pipe and recent buying has in most cases filled makers up for the next 40 to 60 days. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 30¾ and 35¾ per cent off list; heavy, 40¾ and 45¾ per cent off list.

Warehouse Business.—While a fairly large volume of orders is generally reported, they are small in tonnage, as a rule, and the total is light. Weakness continues in sheet prices, and there are recurrent rumors of shading on bars. There is evidently a conviction on the part of buyers from mills that considerably better than current quotations could be obtained on any sizable order. A spread of 25c. per 100 lb. still obtains on cold-rolled shafting, some warehouses in New Jersey having refused to follow the recent increase. Except for weak spots on some products the market continues unchanged. We quote prices on page 1436.

Finished Iron and Steel.—Since the announcement by the American Sheet & Tin Plate Co. of its price of $5.50 per base box for tin plate for the first half of 1924, contracts have been coming in freely to both this interest and independents. The American Can Co. has placed 5,400,000 base boxes with the leading interest and additional orders placed with two or three independent mills bring the total close to 6,000,000 boxes. Other users of tin plate have made reservations or have signed contracts, so that the tin plate mills are now assured of full rollings for the first half. The outlook for pipe is also encouraging, particularly for merchant pipe, demand for which has been stimulated by continued activity in building construction. The depressed situation in the oil industry precludes estimates of the demand for oil country pipe for first quarter or first half. In plates, shapes and bars there is no improvement, and although the demand for steel for buildings continues fairly good, especially in the New York territory, it is not sufficient to give the mills full rollings. Plates are so dull that there seems no hope of a revival this year. Orders are badly needed by makers of cold finished steel. In structural steel the largest new inquiries cover five new school buildings for New York, totaling 6000 tons. The New York Telephone Co. building, requiring 18,000 tons, is being refigured and may be let soon. A new office building at Broadway and Fortieth Street, not yet out for steel figures, will require 7000 tons, while an office building in Newark, also in preliminary stages, will take 2000 tons. Aside from the inquiry of the Southern Pacific Railroad for 11,000 cars, railroad equipment business pending is not up to expectations. Prices of plates, shapes and bars are unchanged at 2.40c. to 2.50c. for the former two and 2.40c., Pittsburgh, for the bars. There is continued weakness of prices on sheets, cold finished steel and hot rolled bands.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—The market still exhibits a slight tendency toward weakness, and prices are substantially unchanged. Standard foundry coke ranges from $5 to $6.25 per ton and standard furnace from $3.75 to $4.25 per ton, with medium sulphur quoted at $3.25 to $3.50. By-product coke is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—There is a considerably better tone to the market this week and slightly higher quotations are ruling on some grades. Heavy melting steel ranges from $14.50 to $15 per ton, eastern Pennsylvania, and specification pipe, borings and turnings, cast borings and machine shop turnings are all slightly firmer than for some time. Borings and turnings are being purchased at $11 to $11.50, delivered to eastern Pennsylvania consumers, and turnings are firmer at $11.50 per ton delivered. Cast borings are now quotable at $12

per ton, delivered eastern Pennsylvania, and pipe is generally quoted at $14.50 per ton, delivered. Stove plate is firm, $15.50 per ton being reported paid for delivery to an eastern Pennsylvania consumer, and $15.50 to $16, delivered to New Jersey foundries. Not only is the domestic market showing signs of recovery, but a fair volume of export inquiry is reported. In most cases, however, offers are too low to permit of business.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$11.00 to $11.50
Steel rails, short lengths, or equivalent	11.50 to 12.00
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	15.00 to 16.00
Iron car axles	22.50 to 23.00
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track	11.50 to 12.00
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	8.00 to 8.50
Machine-shop turnings	7.50 to 8.00
Mixed borings and turnings	7.00 to 7.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.00 to 10.50
Stove plate	12.50 to 13.00
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	14.00 to 15.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

Birmingham

More Activity in Pig Iron—Sales Under $19 Are Reported

BIRMINGHAM, ALA., Nov. 20.—About 200,000 tons of pig iron has been sold by Southern furnace interests here the last few days and the asking price advanced to $21 for No. 2 foundry.

Soil pipe improvement also is reported at $55, standard, with sales into first two months of next year. Pressure pipe companies are selling smaller sizes into second quarter of next year.

There is general improvement in the market. The Sloss-Sheffield Steel & Iron Co. will blow in its fourth furnace shortly.

A turn for the better is noted in the Southern iron market. Sales have been made of large tonnages for delivery in first quarter at $20 for No. 2 foundry and under, with one company withdrawing for less than $21 for next year delivery. The competition in the Middle West is keener as quotations are lowered by Northern furnaces. The quotations in Birmingham are weak, with $20 given as average price for No. 2 foundry. Reports have it that differentials and freight rates make it possible for some Alabama iron to be sold under $19 per ton. Local melters are still buying in small lots, to meet immediate needs. There is a little more iron being shipped and melted in the immediate territory than is being manufactured and more iron is being taken from the yards. The surplus stock of iron will show a little reduction if the make during the rest of the month does not exceed the melt and shipments. The local iron melters are doing well, everything considered, with prospects of improvement with the soil pipe makers. The pressure pipe people are assured of active operation through the winter, lettings being noted every week and specifications in sight from various directions. The Alabama Co. will blow out one of its two Gadsden furnaces for repairs.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$19.00 to $20.00
Basic	20.00 to 21.00
Charcoal, warm blast	33.00

Finished Material.—The steady shipment of steel bars, wire, nails, rods, etc., is still on. No little export business on wire and nails has come into the Birmingham district, and there are prospects of a continuation of this business for some time. The plants of the Tennessee Coal, Iron & Railroad Co., the Gulf States Steel Co. and the American Steel & Wire Co. have been producing steadily, the Gulf States having four open-hearth furnaces in operation and its entire finishing mills. Steel bars are quoted 2.60c.

Coke.—The coke market in the Birmingham district is far from being active. The production has been curtailed by blowing out of some beehive ovens and the repairing of by-product ovens. Coke quotations are weak, ranging from $5.50 to $7 for by-product foundry coke. Woodward and one or two others are making repairs to a few ovens. The surplus stock of coke in this district is not very extensive.

Old Material.—There is very little market for scrap iron and steel, not much of the old material moving. The quotations are still uncertain, weak and sagging. Heavy melting steel has but little demand and the borings and turnings command more attention. Dealers are still sticking to a policy of maintaining large stocks of old material and are meeting any and all demand.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$18.00 to $19.00
Heavy melting steel	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.00 to 10.00

Buffalo

Pig Iron Sales in Few Days Amount to a Very Large Tonnage

BUFFALO, Nov. 20.—The American Radiator Co. has purchased 50,000 tons of foundry iron for Buffalo plants for delivery over the next four months. The deal was made today. The buying movement, which had its inception last week, continues, and while not including all producers, a number of sales have been made that go to make a large volume. One firm today announced its base price as $21.50 after closing details of the Radiator company purchase. Sales made before the Radiator transaction probably amounted to 50,000 tons. Some tonnages were closed at $19 to $19.50 for silicon 1.75 to 2.25 and in most instances differentials were waived. The present asking price of most sellers for malleable and foundry iron, silicon 1.75 to 2.25, is $20, and the 50c. differential is asked. Practically all sales are for first quarter delivery; prices have not yet been named for second quarter. The unusually large placement will likely serve to maintain the present basis of furnace operation which was threatened with curtailment through the winter.

We quote f.o.b., gross ton, Buffalo as follows:

No. 1 foundry, sil. 2.75 to 3.25	$20.00 to $20.50
No. 2 foundry, sil. 2.25 to 2.75	19.50 to 20.00
No. 2 plain, sil. 1.75 to 2.25	19.50 to 20.00
Basic	20.50 to 21.00
Malleable	20.50 to 21.00
Lake Superior charcoal	28.28

Finished Iron and Steel.—The general trend of new business is quiet and except for unusual activity in the placing of first half tin plate business other finished material is moving slowly. The usual order is for material for immediate use and every effort to keep down stock piles is made on account of the inventory factor. Some shading of prices on black sheets is being done and the price, 3.85c., quoted by a number of sellers, has been cut by one mill on a few desirable tonnages. One mill is quoting 2.40c. on shapes, while the mills usually represented in this territory are asking 2.50c. Prices on bands have weakened and 3c. is

the current quotation. Production of cold-finished material in the past few months has exceeded demand and sharp competition has brought out prices as low as 3c., Pittsburgh.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.50c.; black sheets, No. 24 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Consumers are credited with giving consideration to prospective stocking up on heavy melting steel and a few other commodities. This feeling is engendered through the low prices and the stagnant condition of the market. Stronger prices elsewhere are not reflected here, but there are no transactions that would make a market. One mill has sent out feelers for heavy melting steel in lots of 1000 tons and the like, but is willing to pay only $14.50 per ton, and dealers are not inclined to release first grade steel at this figure.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$14.50 to $15.50
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	15.50 to 16.50
Machine shop turnings	8.50 to 9.00
Cast iron borings	11.50 to 12.00
No. 1 busheling	12.50 to 13.00
Stove plate	16.00 to 16.50
Grate bars	15.50 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	18.00 to 19.00
Hydraulic compressed	12.50 to 13.00
Railroad malleable	17.00 to 18.00

St. Louis

Heaviest Buying in Several Years—Prices Are Still Low

ST. LOUIS, Nov. 20.—After months of almost continuous inactivity, the pig iron market burst forth this week with a flood of sales, the heaviest in several years. Sales to melters in the district aggregated about 30,000 tons of foundry iron about equally divided between Northern and Southern make. The Northern make was sold on a basis of $22, Chicago, while the Southern product was sold at $18.50 to $19. The stove interests here and in Belleville were heavy purchasers, taking care of their requirements for first quarter. One stove castings concern in Belleville bought 2500 tons, the largest single purchase, and there were 15 or 20 orders for 1000 to 2000 tons. The St. Louis Coke & Iron Co. sold 5000 tons in lots of carloads to 150 tons. The sales noted were for first quarter delivery, but there were several private understandings that iron would not be shipped until second quarter. The heavy buying was due to a feeling that the market had about reached level. That this feeling was so deep rooted is due to the talk made here last week by J. W. McQueen, president of Sloss-Sheffield Steel & Iron Co., Birmingham, who told a gathering of foundrymen that the makers could not produce iron any cheaper than at present, and that their furnaces would close down rather than make a lower price than $18.50. Besides that, there is a need for iron. One Southern maker sold a sufficient quantity during the week to withdraw from the market. There has been no upturn in prices in sympathy with the heavy buying. In fact, one St. Louis melter reports the purchase of 1200 tons of Northern iron in Chicago at $21.50. The latter price, with freight added, would be on a par with Southern iron at $18.50, Birmingham, freight added. The St. Louis Coke & Iron Co. reports the sale of 300 to 400 tons for prompt shipment.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and $1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$23.66 to 24.16
Northern malleable, sil. 1.75 to 2.25	23.66 to 24.16
Basic	23.66 to 24.16
Southern fdy., sil. 1.75 to 2.25 (rail)	23.67 to 24.17

Finished Iron and Steel.—The only order of consequence placed here in several weeks went to the Rail Joint Co. It was for 75,000 angle bars for 85 and 90-lb. rails for the Missouri Pacific Railroad, involving about 2500 tons. No other inquiries of consequence are pending. Neither manufacturers nor jobbers are in the market for any material, and likely will not be, except for a few fill-in items, until after the first of the year.

Coke.—The market for coke remains dull. There is very little demand for foundry grades, and the warm weather has cut off buying of domestic coke. Dealers are well stocked and consumers are not buying.

Old Material.—Prices of old material are unchanged. The market is showing some strength, but it is due entirely to the activities of dealers. Consumers are buying very little, but dealers are confident that prices will increase when buying is resumed and they are willing to buy material to lay down in their yards. Dealers are competing keenly for offerings by railroads. New lists during the week follow: Wabash Railroad, 2500 tons; M. K. T., 2000 tons; Rock Island, 5000 tons; Santa Fé, 2000 tons, and Pennsylvania, 500 tons, the latter old locomotives.

	Per Gross Ton
Iron rails	$15.00 to $15.50
Rails for rolling	14.00 to 14.50
Steel rails, less than 3 ft.	16.50 to 17.00
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70. and over	32.50 to 33.50
Cast iron car wheels	17.00 to 17.50
Heavy melting steel	13.00 to 13.50
Heavy shoveling steel	12.00 to 13.00
Frogs, switches and guards cut apart	13.50 to 1400
	Per Net Ton
Heavy axles and tire turnings	11.00 to 11.50
Steel angle bars	12.25 to 12.75
Steel car axles	15.00 to 15.50
Iron car axles	22.50 to 23.00
Wrought iron bars and transoms	12.00 to 17.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Railroad springs	14.50 to 15.00
Cast iron borings	9.00 to 9.50
No. 1 busheling	12.25 to 12.75
No. 1 railroad cast	17.00 to 17.50
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Champion bundled sheets	7.00 to 7.50

Boston

Heavy Sales of Pig Iron Made in New England at Concessions

BOSTON, Nov. 20.—Sales of pig iron in New England were heavy the past week, aggregating 20,000 to 25,000 tons, for nearby and first quarter 1924 delivery. One Buffalo furnace took more than 10,000 tons. A textile machinery maker bought 1500 tons No. 2X and No. 1X, another an equal amount of No. 2X, and a stove maker 1000 tons No. 2X, all first quarter. Other sales involved 500 tons and less. A Massachusetts heater maker this week will close on 4000 tons or more No. 2 plain iron. No. 2X and No. 1X, Buffalo, in 100 ton lots and larger sold at $20, furnace, or $24.91 delivered, and at least one round tonnage of No. 2X at $19.50, furnace. On the other hand, No. 1X, in car lots, sold as high as $22, furnace, or $26.91 delivered. Buffalo furnaces are now maintaining differentials, but are still on a $20, furnace, base. New York State iron sold in a small way at prices slightly under the Buffalo furnace equivalent. No. 2X eastern Pennsylvania iron sold at $21, furnace base, or $25.15 delivered or with differentials, at $22, furnace base, without differentials, while at least one furnace on the latter base sold at $25.15 delivered. One eastern Pennsylvania furnace has advanced from $22 to $22.50 base with differentials. Only one Alabama furnace is quoting in this territory and has taken some business on a $20, furnace, base. The Virginia iron market is purely nominal, prices quoted for it being far out of line with other irons.

We quote delivered prices on the basic of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$25.15 to $26.14
East. Penn., sil. 1.75 to 2.25	24.65 to 25.65
Buffalo, sil. 2.25 to 2.75	24.91 to 25.41
Buffalo, sil. 1.75 to 2.25	24.51 to 24.91
Virginia, sil. 2.25 to 2.75	30.92 to 32.42
Virginia, sil. 1.75 to 2.25	30.92 to 31.92
Alabama, sil. 2.25 to 2.75	30.10
Alabama, sil. 1.75 to 2.25	29.60

Structural Steel.—A goodly number of small structural steel contracts are being closed by fabricators in this territory, jobs requiring less than 100 tons, but large tonnages are in limited supply. Bids are in on 250 tons for a State bridge at Wilbraham, Mass. Dec. 3 is the date on which bids will close for a Fall River, Mass., power house requiring 3000 tons and not 3500 tons, previously reported. Stone & Webster are the engineers. That company has awarded 200 tons light iron work for a Weymouth plant to Babcock-Davis Corporation, Boston. The market on structural steel is generally 2.40c., base Pittsburgh.

Cast Iron Pipe.—R. D. Wood & Co., Philadelphia, were the low bidders on 3000 tons of 6-in. to 16-in. pipe wanted by Boston for second quarter, 1924 delivery, bids for which were opened last week. Fall River, Mass., has awarded 600 to 700 tons of 6-in. to 16-in. pipe, 1924 requirements, to the Warren Foundry & Pipe Co. No other round tonnages are in the open market, but the aggregate of small tonnages required by municipalities and towns for next spring work is large. The market on small lots of pipe is well maintained, but on large lots is soft in spots, although concessions are comparatively small.

Coke.—Less activity is noted in the coke market. Connellsville foundry coke is offered in this territory at attractive prices, but New England foundries are well covered for the remainder of 1923, as well as first half of 1924. Specifications against 1923 contracts are less frequent, yet the aggregate volume of shipments by the New England Coal & Coke Co. and the Providence Gas Co. is larger than it was a year ago. Both companies are doing current business on a basis of $12.50 a ton delivered in New England. The market for domestic coke is unsettled and this fact may have some influence on the December contract price for by-product foundry fuel.

Old Material.—Dealings in old material are even less active, but sentiment in the market is more optimistic because of improvement noted at other centers. Heavy melting steel is up 50c. at $10 to $10.50 on cars shipping point without expansion in transactions. On the other hand, dealers having filled orders for machine shop turnings at $7 to $7.50 on cars, the market has slipped back 50c., and forged scrap and bundled skeleton are easier for the same reason. Small transactions in chemical borings at unchanged prices are reported, and there are few inquiries for railroad wrought. A car here and there constitutes the cast iron scrap market. A New England brake shoe manufacturer having withdrawn from the market, stove plate is lower. Prices on and conditions governing other old materials remain unchanged.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.75
No. 2 machinery cast	20.00 to 20.50
Stove plates	14.50 to 15.00
Railroad malleable	19.00 to 20.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.00 to $10.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	11.00 to 11.50
Wrought pipe (1-in. in diam., over 2 ft. long)	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Cast iron borings, rolling mill	7.50 to 8.00
Cast iron borings, chemical	9.50 to 10.00
Blast furnace borings and turnings	6.75 to 7.25
Forged scrap and bundled skeleton	7.00 to 7.50
Street car axles	13.50 to 14.00
Street car wheels	11.50 to 12.50
Rails for rerolling	11.50 to 12.00

Quotations on Belgian Rails

Recent efforts of New York importers to bring in European rails failed by several dollars to get quotations down to the present necessary level of $44, duty paid, Atlantic port. The Belgian $46 c.i.f. New York price mentioned in these columns last week was, considering duty and cost of rail haul, over $3 higher than the corresponding American mill quotation, and it was for rails of about 60 lb. section and not for heavier open-hearth sections difficult to obtain in Europe.

Cincinnati

Pig Iron Buying Active in Both Northern and Southern Grades

CINCINNATI, Nov. 20.—About 30,000 tons of pig iron was sold in the Cincinnati territory last week, making the most active week in many months. Inquiries outstanding aggregate about 15,000 tons. The buying was confined almost entirely to foundry and malleable grades, there being little activity in basic, Bessemer or silveries. Most of the business in Northern iron was booked on a $22, Ironton basis, though some sales were made at $22.50. Buffalo iron was sold in the northern part of Ohio, eastern Indiana, and southern Michigan and it was reported that some of this iron also went to southern Ohio melters. There was also considerable activity in Southern irons. One agency reports sales aggregating 10,000 tons at $19 to $19.50 for rest of this year and first quarter, while another furnace booked a small tonnage for first quarter at $19. Both of these furnaces have withdrawn for the time being. Nineteen dollars can still be done on this year's business, but most of the Southern furnaces are now quoting $20 to $21 on first quarter contracts. The present situation is undoubtedly firmer, but whether prices will advance depends, according to well posted buyers and sellers, on whether the buying movement will be sustained. The buying of the past week was fairly widespread, and the tonnages were not large, ranging from 1500 tons, the largest reported, down to carloads. The attitude of the buyer seems to be that prices are now attractive enough for him to come for part of his requirements, but apparently he is not placing all the tonnage he expects to melt in the first quarter.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	23.55
Ohio silvery, 8 per cent	24.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.27
Basic Northern	24.27
Malleable	24.27

Finished Materials.—There has been little improvement in buying of finished materials, though the monthly requirements of railroads in this territory are heavier for November than was the case for October. Bids were taken by two important roads for plates and shapes during the past week, and it is reported that a cut of $2 per ton had been made by at least two mills. On general business, however, the price of 2.50c on plates and shapes is being well maintained, and most of the orders are being booked on this basis. A slight improvement in the demand for bars is reported, and reports of 2.35c being quoted are hard to confirm, as sales were recorded during the week at 2.40c. A slight improvement in the demand for wire products is noted, but orders usually are for carload lots for immediate shipment. A lively movement in rail and track accessories, such as track bolts, spikes, switch stands and frogs and switches, developed last week, and some good-sized orders were booked. In light rails, however, the demand is limited. Forgings are in fair demand. Bolts and nuts are not in demand, and prices extremely weak. Steel pipe is strong and active.

Sheets.—Reports are current that 3.75c for black and 4.90c for galvanized sheets have been quoted for first quarter delivery, but these are not confirmed. Some orders have been placed at these prices for shipment early in January, it is reported, however, the idea being apparently to avoid having these tonnages show on this year's inventory. First quarter contracting is going along at a fair rate, but little activity is reported in prompt shipment materials. Tin plate is in good demand, and prices are firm at 5.50c per base box.

Structural Material.—There is little new business of consequence coming out, although a number of projects will likely be awarded this week. A number of buildings are in prospect, and will likely come out before the first of the year.

Reinforcing Bars.—An active demand for reinforc-

ing bars is noted. The Southern Railway took bids Nov. 20 on two office buildings, one at Birmingham and one at Charlotte, which will require about 1500 tons of bars. Other projects up include a large total tonnage. It is expected that the bars for the Tanners' Research Laboratory, University of Cincinnati, will be awarded this week. A northern Ohio mill is understood to be low bidder. Road work in Kentucky and Ohio let during the past week calls for approximately 600 tons of bars, which will likely be awarded this week. Prices show no change, the range being from 2.20c for rerolled bars to 2.40c for bars rolled from new billets.

Semi-finished Materials.—Some small sales of sheet bars were reported at the $42.50 price, and mills in the district report that this is as low as the market has gone. The range on billets runs from $40 to $42.50.

Warehouse Materials.—Business generally is rather light, and small lots for immediate delivery form about the only activity. There has been some demand for blue annealed sheets during the week, however, and a number of fair-sized orders were booked. Reinforcing bars were in fair demand, as were small angles. Wire products are inactive. Prices are unchanged from previous weeks, and in this connection it is noted that with the exception of sheets, no changes have been made in warehouse quotations in Cincinnati since April 6.

Cincinnati jobbers quote: Iron and steel bars, 3.59c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base; cement coated nails, $3.30 per keg.

Coke.—There is little activity in coke, though more orders were placed compared with the previous week. Production of beehive and by-product fuel is being considerably curtailed in nearby fields. Prices generally are as last quoted as follows:

Connellsville furnace, $3.75; foundry, $5; New River foundry, $10 to $11; Wise County furnace, $5.25; Foundry, $5.75; by-product Foundry, $9, Connellsville basis.

Old Material.—Dealers are again apparently making the market, as in this district the consumer is not buying in any quantities. Prices on some grades are up a little, however, for shipment to other districts. Heavy melting steel and railroad cast are 15c. higher, while borings and turnings are up $1. Other grades remain as last quoted.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$9.50 to	$10.00
Iron rails	13.00 to	13.50
Relaying rails, 50 lb. and up	27.00 to	27.50
Rails for rolling	13.00 to	13.50
Heavy melting steel	12.15 to	12.65
Steel rails for melting	12.50 to	13.00
Car wheels	12.50 to	13.00
	Per Net Ton	
No. 1 railroad wrought	11.00 to	11.50
Cast borings	8.50 to	9.00
Steel turnings	8.00 to	8.50
Railroad cast	12.65 to	14.15
No. 1 machinery cast	16.50 to	17.00
Burnt scrap	10.50 to	11.00
Iron axles	20.50 to	21.00
Locomotive tires (smooth inside)	12.50 to	13.00
Pipes and flues	6.50 to	8.00

Detroit Scrap Market

DETROIT, Nov. 20.—The market on old material is very inactive and apparently waiting for mills and furnaces to anticipate their needs for the first quarter of next year, as dealers are showing little interest in piling waste material. Melters generally are showing more interest in the pig iron market and considerable buying developed in the last few days of the past week, which may react on the scrap market.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$11.50 to $12.50
Shoveling steel	11.50 to 12.50
No. 1 machinery cast	16.00 to 17.00
Cast borings	8.50 to 9.25
Automobile cast scrap	22.00 to 23.00
Stove plate	15.00 to 16.00
Hydraulic compressed	9.50 to 10.50
Short turnings	8.75 to 9.25
Long turnings	7.00 to 7.85
Flushings	8.25 to 9.25

Cleveland

Heavy Buying Movement in Pig Iron—Prices Recede $1—Large Tonnage Pending

CLEVELAND, Nov. 20.—A heavy buying movement has developed in the pig iron market under the influence of further price concessions and there are indications that the bottom of the market has been reached. In fact, some producers are refusing to meet the minimum quotations now appearing and are talking of a slight price advance. The buying did not get under full sway until late in the week and during the past day or two a large volume of inquiries has come out. One seller has widely scattered inquiries for 100,000 tons and another for 40,000 tons. Inquiries are largely for December-March or first quarter shipment but some are for the first half. They are coming from automobile foundries and about all other classes of consumers except the agricultural implement manufacturers, although a 1500-ton inquiry has come from an implement maker. Both large and small consumers are in the market and among the numerous inquiries are six or more for 3000 tons each and one for 15,000 tons, the latter being for both foundry and malleable iron. Most producers are declining to quote for delivery beyond the first quarter. Local prices have declined $1 a ton or to $22 at furnace for Cleveland delivery and to $21 to $21.50 for outside shipment. However, a 1000-ton lot of foundry iron for outside delivery has been taken by a Cleveland furnace at $20.90. In the Valley district, prices on foundry and malleable grades range from $20 to $21. Buffalo iron is being offered to consumers in this territory at $19.50, or equivalent to $22.15 delivered in Cleveland, but local producers declare that they will not meet this price. In Michigan $22 appears to be the minimum quotation and in Detroit sales are being made at $22.50, furnace, for local delivery. Considerable business has been booked in the northern Ohio territory, including 2000 tons of malleable iron purchased by a Cleveland consumer and 1000 tons of foundry iron and 1000 tons of malleable iron taken by Warren, Ohio, consumers. Several small lot sales of low phosphorus iron are reported at $29 to $30. The market on this grade is weak. We note the sale of two lots of Southern foundry iron, one of 800 tons and the other of 400 tons to northern Ohio consumers at $19.50 for the first quarter. The range on Southern iron is from $19 to $20 although one producer has advanced to $21.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	22.50
Southern fdy., sil. 1.75 to 2.25	$25.00 to 25 50
Malleable	22.50
Ohio silvery, 8 per cent	35.53
Standard low phos., Valley furnace	29.00 to 30.00

Iron Ore.—Iron ore shipments are being rapidly cleaned up and boats are going out of commission as they reach lower lake ports with cargoes. Very little ore will be shipped after this week. Consumption of Lake Superior ore in October amounted to 4,800,571 gross tons, showing little reduction from September, when 4,813,942 tons were consumed. In October, 1922, the consumption was 4,012,007 tons. Interior furnaces in the Central district consumed 2,405,806 tons last month as compared with 2,459,880 tons in September, a decrease of 54,074 tons. Lake front furnaces including Canadian furnaces showed a gain, consuming 2,038,893 tons in October as compared with 1,994,703 tons in September. Eastern furnaces consumed 223,381 tons or a decline of 5341 for the month. On Nov. 1 there was 41,042,399 tons of ore at furnaces and Lake Erie docks as compared with 44,181,124 tons on the same date a year ago. Stocks at furnaces Nov. 1 were 32,944,911 tons as compared with 30,430,328 tons on Oct. 1.

Semi-Finished Steel.—There is no new demand for sheet bars, rerolling billets and slabs, but a leading local producer still has sufficient orders to keep its

plant operating at full capacity. Forging billets are moving in small lots. Sheet bars continue firm at $42.50.

Finished Iron and Steel.—Mills are getting a fair volume of small orders, but consumers are buying only for immediate requirements and show a tendency to keep their stocks as low as possible at inventory time. However, orders booked by some mills this month show considerable gain over the corresponding period of October. Prices are firm at 2.40c. on steel bars and 2.50c. for structural material. Some irregularity is still in evidence in plates on which 2.40c. quotations are being made by some Ohio mills, but usually for shipment to points where they must meet the competition of Chicago mills. An Ohio tank shop has placed 250 tons for tank work with a Youngstown mill and quotations have been made on several lots for pending locomotive work. No inquiries developed during the week for round lots of steel for specific work. In the building field inquiry has become very light and contractors are delaying the placing of several thousand tons of steel for work for which bids have recently been taken. Hot-rolled steel is moving slowly and prices are not firm. Bands and heavy hoops are quoted at 3c. and wide strip as low as 2.75c. Cold finished steel bars are weak and the regular 3c. price is being shaded on desirable orders.

> Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, $4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Bolts, Nuts and Rivets.—Consumers and jobbers are curtailing their stocks of bolts and nuts with the approach of inventory time and new orders and specifications are very light. Price irregularities continue. The demand for rivets is slow and prices are weak with 2.65c. to 2.70c. quoted by some makers for large lots.

Coke.—Prices on foundry coke are unchanged at $5 to $6.50 for standard Connellsville makes. The demand is slow.

Old Material.—Prices have further advanced about 25c. a ton on most grades and the market is somewhat more active. A West Virginia steel company during the week purchased a round tonnage of scrap, paying $16 for heavy melting steel, $13.50 for turnings and $14.50 for compressed steel. Local mills are not buying scrap nor is there any demand from Youngstown consumers. Sales of heavy melting steel are reported to dealers at $16.25 to $16.50 for Warren delivery but the Youngstown prices range from $15.75 to $16.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$14.75 to $15.00
Rails for rolling	16.50 to 17.00
Rails under 3 ft.	16.25 to 16.75
Low phosphorus melting	17.00 to 17.50
Cast borings	10.75 to 11.00
Machine shop turnings	10.25 to 10.50
Mixed borings and short turnings	10.50 to 10.75
Compressed sheet steel	12.25 to 12.75
Railroad wrought	12.50 to 13.00
Railroad malleable	19.00 to 19.25
Light bundled sheet stamp.	9.25
Steel axle turnings	11.00 to 11.50
No. 1 cast	20.00 to 21.00
No. 1 busheling	9.50 to 10.25
Drop forge flashings	9.75 to 10.00
Railroad grate bars	15.75 to 16.00
Stove plate	15.75 to 16.00
Pipes and flues	9.50 to 10.00

Sheets.—The demand shows a slight improvement and some of the independent mills seem less inclined to shade regular quotations than a few weeks ago. However, black sheets are still freely offered at 3.75c. Mill stocks that have been offered at price concessions have become less a factor in the market, although galvanized sheets on stock lists are offered at 4.85c. While blue annealed sheets are fairly firm, a 2.90c. quotation has appeared on these. There is little activity in automobile body sheets. Buyers have not yet sent out first quarter inquiries.

Reinforcing Bars.—The demand has fallen off and keen competition is bringing out low prices. On soft steel bars a 2.30c. price has been quoted by a jobber who evidently is anxious to reduce a stock purchased at lower than present mill prices. On rail steel bars 2.15c., delivered Cleveland, has been quoted, but the usual range is 2.10c. to 2.25c. Plans for the West Twenty-fifth Street bridge, Cleveland, have been revised and the amount of reinforcing bars required has been increased to 550 tons.

San Francisco

Dullness Is Pronounced, but Business More Active in Los Angeles

SAN FRANCISCO, Nov. 20.—The local market for steel and iron products is experiencing a somewhat prolonged period of quiet, in fact, the inactivity is more marked than for a long time past. While there is comparatively little change in conditions during the last two weeks, it is probably safe to say the dullness is slightly intensified. On the other hand there are some importers and dealers, more optimistic than others, who content themselves by saying that the market maintains a waiting attitude with a very moderate trade movement and a tendency toward a lower standard of values. Judging by present indications, however, the closing quarter of the year will have an exceptionally small business volume, probably the smallest for any similar period in several years past. Advices from Los Angeles say the outlook for new business there is more favorable now than at any time during the present year. Both mills and foundries are reported busy with orders and some of them are working overtime.

Pig Iron.—Some surprise is being expressed that consumers have been able to keep themselves going without buying additional material for a long time. It was generally known that supplies accumulated during the liberal buying of the early part of the year would last for three months or so, but it was confidently expected that buying orders for material would be booked early in the last quarter. As a matter of fact, there is very little outside of the small hand to mouth purchasing thus far with one-half of the last quarter already gone. Importers are showing some hesitancy in giving out prices and there is more than the usual variation. While some quote $34 and possibly $35 per ton, there are others who say $33 is a full figure. This refers, of course, to strictly first class material and must not be construed to apply to several small lots recently sold in this market which would not grade up to standard analysis. As far as can be learned, there are only two small lots of foreign iron on the way and both are already sold. All importers and traders agree that business in the southern part of the State is active and several sales have been effected in Los Angeles at slightly better prices than could have been obtained in this city.

Coke.—There have been no developments in the market and importers say that outside of the usual requirements for the railroads there is practically no inquiry. Prices are not being quoted but only a few small lots are available and, if wanted, buyers would doubtless have to pay the same figures as a month ago, around $21 for foreign and proportionately higher for domestic. Foreign tonnage afloat is slightly greater than two weeks ago, but the increase is said to be destined to the southern part of the State. There was an inquiry from Seattle but no business resulted.

Finished Iron and Steel.—Business is described as fair and there is no delay in getting orders promptly filled. Prices remain about the same as for the past month, although there is some disposition to shade the asking rates. Bars are now quoted at 3.70c. to 3.75c. and structural steel at 3.85c. in carload lots with a slightly increased demand for bars during the past ten days. The trade looks for a very moderate business from now to the end of the year.

Old Material.—With slackened work in both mills and foundries, the demand for all grades of scrap is necessarily limited. Prices are a little lower and the downward trend is unmistakable. At present $13.50 to

$14.50 is the quotable range, but several recent sales at fractionally lower figures are reported. Reports from Los Angeles say business there is active and prices are from 50c. to $1 per ton lower than in this part of the State.

Philadelphia

Eastern Melters Buy Pig Iron Freely—Asking Prices Are Advanced

PHILADELPHIA, Nov. 20.—A buying movement in pig iron of considerable proportions developed early last week, and up to today Eastern consumers had placed orders for 80,000 to 100,000 tons of iron with furnaces in this district for delivery over the next four months. The demand for iron developed almost over night, although it was not unexpected, as iron prices had reached a point so low as to encourage far-sighted consumers to cover for first quarter. Most of the business was on the basis of $21, f.o.b. eastern Pennsylvania furnace, but the principal producers are now comfortably situated and there has been a stiffening of prices, $22, furnace, being named by some interests and $23 by others. At least two producers have practically withdrawn from the market for the present. The recovery in pig iron has been accompanied by a slight betterment in scrap, although in the latter there has been no important buying except one lot of 10,000 tons of heavy melting steel by a plate mill.

The steel market, while still exceedingly dull, has felt the influence of improved sentiment. There is, for one thing, a better volume of inquiry, mostly for small lots. Some of the larger consumers who have not been specifying freely on their fourth quarter contracts have indicated that they will specify in full before the end of the year, but they do not wish to carry any more stock than is necessary over the inventory period.

Tin plate contracts have been signed up freely, fully 50 per cent of the tin plate normally required by consumers in this territory for first half already being on the books, while the remainder will be closed shortly.

The distribution of 200,000 tons of rails by the Pennsylvania Railroad has finally been effected, the Steel Corporation getting 94,000 tons, the Bethlehem Steel Corporation the same quantity, and the Inland Steel Co. 12,000 tons.

Pig Iron.—The improvement in the pig iron market, noted in this column a week ago, developed into a large buying movement before the end of last week. Sales of all grades by eastern Pennsylvania furnaces easily totaled 80,000 tons, while some estimates place the total at 100,000 tons. This, of course, included sales to consumers in New England and New York territories, many of the largest foundry iron consumers covering their full requirements for December and first quarter. One producer sold 30,000 tons in a week, two others booked 20,000 tons each, and a fourth took 10,000 tons, while smaller bookings were made by other interests. On most of this tonnage, prices averaged $21, furnace, for No. 2 plain, but in one instance business was closed at $20.75 for No. 2 plain and at $21 for No. 2X. One of the principal sellers is now well filled up for December and first quarter, is quoting $23, base, and is considering only carload lots from regular customers. Three other interests are quoting $22, base, at furnace, but it is not yet certain that this price will be strictly observed on large tonnage. It is certain, however, that there will be less competition for business at the low levels of last week, and already there have been a few sales of carload lots on the $23 base. Sales of the past week included two lots of basic totaling 5000 tons, which went at about $21.50 furnace. There are large stocks of iron at eastern Pennsylvania furnaces, but much of this is off grade, due to the fact that the furnaces recently have been buying coke in the spot market, and this spot coke has resulted in the production of a good deal of high sulphur iron. The Virginia furnaces did not share in last week's buying movement. One or two furnaces in that district are quoting $25 to $26, furnace, which, with high freight rates, puts them at a decided disadvantage. Four hundred and forty tons of iron from British India came in last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.64 to	$24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.64 to	24.63
East. Pa. No. 1X	23.76 to	25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to	30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to	30.67
Basic delivered eastern Pa.	22.75 to	23.00
Gray forge	23.00 to	24.00
Malleable	23.00 to	24.00
Standard low phos. (f.o.b. furnace)	28.00 to	30.00
Copper bearing low phos. (f.o.b. furnace)		28.00

Semi-finished Steel.—With no sales of importance, billets remain unchanged in price, $40, Pittsburgh, for open-hearth rerolling quality, and $45 for forging quality.

Plates.—Eastern plate mills are still suffering severely from lack of orders. Operations are at a low rate. The price situation is unchanged, quotations ranging from 2.40c. to 2.50c., Pittsburgh, according to the mill and the character and size of the specification. The Chesapeake & Ohio railroad, which a few weeks ago inquired for 2000 steel freight cars, is now asking for prices on the steel, with the possibility that the steel may be furnished to a car shop. The inquiry calls for 14,000 tons of plates, 8000 tons of shapes and 860 tons of bars.

Structural Shapes.—New building projects in this district are few. Inquiries for steel for construction cover mostly small jobs, 100 tons or under. Prices are unchanged at 2.40c. to 2.50c., Pittsburgh.

Iron Ore.—Last week's importations of foreign iron ore were as follows: From French Africa, 14,950 tons; from Sweden, 5587 tons; from Germany, 550 tons.

Old Material.—On the dealers' side of the market, there is a considerable degree of strength, because of their firm belief that prices are due for a rise. The sale of 10,000 tons of heavy melting steel to an Eastern plate mill at $15.50, delivered, with a rise of 50c. a ton on No. 1 railroad wrought and on heavy breakable cast for steel plants, are the outward evidences of a slight betterment. The lack of new tonnage in finished steel at Eastern mills is, of course, a factor which may work against any sharp rise in prices. One thousand tons of scrap from Cuba arrived at this port last week.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel		$15.50
Scrap rails		15.50
Steel rails for rolling	$16.50 to	17.00
No. 1 low phos., heavy 0.04 and under	20.00 to	21.00
Couplers and knuckles	17.50 to	18.00
Cast-iron car wheels	17.50 to	18.50
Rolled steel wheels	17.50 to	18.00
No. 1 railroad wrought	17.50 to	18.00
No. 1 yard wrought	15.50 to	16.00
No. 1 forge fire	12.00 to	12.50
Bundled sheets (for steel works)	12.00 to	12.50
Mixed borings and turnings (for blast furnace use)	10.50 to	11.00
Machine shop turnings (for steel works use)	12.00 to	12.50
Machine shop turnings (for rolling mill use)	12.50 to	13.00
Heavy axle turnings (or equivalent)	13.00 to	13.50
Cast borings (for steel works and rolling mills)		12.00
Cast borings (for chemical plants)	15.00 to	16.00
No. 1 cast	19.00 to	19.50
Heavy breakable cast (for steel plants)	16.50 to	17.00
Railroad grate bars	16.00 to	16.50
Stove plate (for steel plant use)	16.00 to	16.50
Railroad malleable	17.00 to	17.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to	15.00
Shafting	20.00 to	21.00
Steel axles	18.50 to	19.50

Bars.—Inquiry for steel bars is light and mills are hungry for orders, but prices are fairly firm at 2.40c., Pittsburgh. On concrete reinforcing bars, some lower quotations are appearing, but are generally attributed to rerolling mills. Bar iron also is dull, with prices unchanged at 2.35c., Pittsburgh.

Warehouse Business.—Local steel jobbers continue to book a fair volume of business. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.17c.; iron bars (except bands), 3.17c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c., tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.19c.; black sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼ in., 5.09c.; ⅜ in., 5.09c.; spring steel, 5c.; round cold rolled steel, 4.55c.; squares and hexagons, cold-rolled steel, 4.80c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

British Iron and Steel Market

Japanese Buying Fewer Black Sheets—Improvement in Steel Continues—Ruhr Negotiations Broken Down

(*By Cable*)

LONDON, ENGLAND, Nov 20.

Pig iron continued firm, with good demand from both domestic and export markets. Additional furnaces are being restarted.

It is expected that the boilermakers' dispute will end soon. An agreement reached has been submitted to a ballot, with recommendation for acceptance. Hence it is anticipated that work will be resumed next week.

Hematite is strong with upward demand.

Steel is firm with improved demand from domestic and export markets. Many orders are expected to be released on resumption of work by the boilermakers.

Home Trade Association price control has been revived. English plates are fixed at £9 15s. (1.89c. per lb.); sections at £9 10s. (1.84c. per lb.); both delivered. Scotch plates and sections are fixed at those same prices, delivered in Clyde area only.

Continental markets are erratic, owing to fluctuation of exchange rates, but French prices generally are unaltered. India and Japan have bought fair quantities of merchant bars. Works are well sold out.

In France the Société Metallurgique de Senelle-Maubeuge has secured an Argentine order for 6000 tons of rails. De Wendel et Cie. have relighted the sixth furnace at Patural. The Société Lorraine des Acieries de Rombas has relighted a furnace previously blown out for repairs. Lorraine plants are complaining of a shortage of trucks.

In Germany negotiations between the French authorities and the Ruhr industrialists have broken down. The outlook is still gloomier.

Tin plate is still strong on continued demand. Option contracts for January-March are being sold on 23⅜s. ($5.07) basis IC, f.o.b. A portion of the oil plate order has been placed, but no details are disclosed. Wasters are in keen request. Stocks of all kinds have diminished. Buyers of CW 20 x 14's are paying 21s. ($4.56) f.o.b.

Galvanized sheets are steady, but demand is slow.

Japanese inquiry for black sheets has fallen off but the works are sold out until June. Prices, while firm, are unchanged.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.34 per £1, as follows:

Durham coke, delivered	£1	17½s.	to £1	18s.	$8.14 to $8.25
Bilbao Rubio ore†		1	4		5.21
Cleveland No. 1 foundry		5	7½		23.33
Cleveland No. 3 foundry		5	0		21.70
Cleveland No. 4 foundry		4	19		21.48
Cleveland No. 4 forge		4	17½	to 4 18	21.16 to 21.27
Cleveland basic		4	12½	to 4 15	20.67 to 20.82
East Coast mixed		5	0	to 5 0½	21.70 to 21.81
East Coast hematite		4	19	to 5 0	21.48 to 21.70
Ferromanganese		17	0		73.78
Ferromanganese*		17	0		73.78
Rails, 60 lb. and up		N	10	to N 10	26.89 to 41.22
Fishplates		7	15	to 8 5	33.64 to 35.81
Sheet and tin plate bars, Welsh		9	2½		39.60
Tin plates, base box		1	3⅜	to 1 3⅝	5.09 to 5.13

	C. per Lb.
Ship plates	1.78 to 1.85
Boiler plates	2.42 to 2.52
Tees	1.89 to 1.94
Channels	1.74 to 1.84
Beams	1.76 to 1.79
Round bars, ⅝ to 3 in.	1.99 to 2.08
Galvanized sheets, 24 g.	3.68 to 3.73
Black sheets, 24 gage	2.73
Black sheets, Japanese specifications	2.95
Steel hoops	2.33 & 2.42*
Cold rolled steel strip, 20 gage	3.34
Cotton ties, Indian specifications	2.91

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(*Nominal*)

Foundry pig iron:				
Belgium	£5	5s.	to £5 10s.	$22.79 to $23.87
France	5		to 5 10	22.79 to 23.87
Luxemburg	5	5	to 5 10	22.79 to 23.87
Billets (nominal):				
Belgium	7	0		30.38
France	7	0		30.38

	C. per Lb.
Merchant bars:	
Belgium	1.50
Luxemburg	1.50
France	1.50
Joists (beams):	
Belgium	1.48
Luxemburg	1.48
France	1.48
Angles:	
Belgium	1.55 to 1.60
¼-in. plates:	
Belgium	1.62
Germany	1.62
⅜-in. plates:	
Luxemburg	1.62
Belgium	1.62

Pig Iron Prices in Canada Still Declining

TORONTO, ONT., Nov. 19.—The limited demand that now exists for pig iron in the Canadian market together with the softening process that features the market in the United States has been reflected in a further drop of $1 per ton in Canadian prices effective both in Toronto and Montreal. The reduction which recently went into effect brings the prices of No. 1 (2.25 to 2.75 silicon) down to $28.30; malleable, $28.30; No. 2 (1.75 to 2.25 silicon), $27.30, Toronto, while Montreal quotations are No. 1 and malleable, $30.20, and No. 2, $29.20, freight charges to the latter district making up the spread in price. Despite the fact that prices have been on the decline for some time past, the demand has not improved and melters are showing no interest in their requirements outside of small tonnages for immediate use. Two or three of the larger melters in the Montreal district and a few in Ontario have placed contracts for last quarter needs, but in the majority of cases melters are satisfied to buy on a hand to mouth basis, and it is expected that this will continue until after the turn of the year. The low price quoted in Buffalo has resulted in a few shipments of iron from that district into Ontario, but in most cases Canadian producers are meeting outside competition and are taking care of home consumers.

Proposed Bounty for Ontario Ore

TORONTO, Nov. 19.—The Provincial Government of Ontario will introduce legislation during the coming session for the provision of a bounty for the development of Ontario's iron ore resources along the northern shore of Lake Superior. The legislation, it is understood, will be contingent upon a similar bounty from the Dominion Government. It is understood that the report of the special committee appointed by the late Ontario Government to investigate the iron ore situation in the province is now almost completed and that it will find that the development of the huge latent iron ore deposits of the province is entirely practicable, but that as the ores are of such character as to need benefication, operations will have to be conducted on a large scale which will necessitate a bounty for a term of years, to put the new industry on its feet. Considerable sums have already been spent by private interests in experimenting with Ontario ores.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....3c.
Cotton ties, per bundle of 45 lb.....$1.63

Cold-Finished Steels

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads..60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.25c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	U. S. S.		Per 1000 S. A. E.	U. S. S.
½-in.	$4.80	$4.80	½-in.	$15.00	$15.00
⅝-in.	5.50	6.00	⅝-in.	19.50	20.00
¾-in.	6.50	7.00	¾-in.	28.50	28.50
⅞-in.	9.00	9.50	⅞-in.	37.00	37.50
1-in.	11.00	11.50	1-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. $2.65 to $2.85
Small rivets .....70 to 65 and 10 off list

Track Equipment

Spikes, ⅞ in. and larger, base, per 100 lb.....	$3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb.....	$3.15 to 3.25
Spikes, ⅜ in.....	3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.....	3.50
Track bolts, ¾ in. and larger, base, per 100 lb..	4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..	5.00 to 5.50
Tie plates, per 100 lb.....	2.55 to 2.60
Angle bars, base, per 100 lb.....	2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46¼	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2½ in.	2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn		*Hot Rolled*	
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	2-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1¼-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.90c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.85 to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$107.50 to $110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	107.50 to 110.00
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr. per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent	$40.00
Spiegeleisen, domestic, 16 to 19 per cent	39.00
Ferrosilicon, 50 per cent, delivered	$80.00 to 82.50

Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $48.50; 13 per cent, $52.10; 14 per cent, $57.10.

Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois		37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton	6.00 to 7.00	

Silica Brick:	
Pennsylvania	42.00
Chicago	49.00
Birmingham	50.00
Ground silica clay, per net ton	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	50.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c. to 2.40c.
Skelp, sheared, per lb.	2.35c. to 2.40c.
Skelp, universal, per lb.	2.35c. to 2.40c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅞-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in. and smaller, base per 100 lb.	$3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1¾% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.27
Boston, export	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast	$1.15
Pac. Coast, ship plates	1.34
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 13 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

Over 21,000 Tons of Fresh Inquiries, Not Including Some 30,000 Tons for Ford Motor Co.

Fabricated steel awards for 15 projects totaled 11,000 tons. Including 10,000 tons for the new Palmer House, Chicago, and 20,100 tons of 30,900 tons pending for the Ford Motor Co., new work under consideration calls for 41,500 tons. Awards include:

James Munroe High School, New York, 2800 tons, to Jones & Laughlin Steel Corporation.

City of Philadelphia, tunnel in Fairmount Park, 360 tons, to unnamed fabricator.

Masonic Temple, Springfield, Mass., 950 tons, will be awarded to Lehigh Structural Steel Co. or Bethlehem Fabricators, Inc.

Storehouse, Long Island City, William S. Kenny, general contractor, 150 tons, to Levering & Garrigues Co.

Western Sugar Refinery, char house, San Francisco, 816 tons, to Pacific Rolling Mill Co.

Pacific Steamship Co., pier shed, 600 tons, to Hofuis Steel & Equipment Co.

Yonkers Building, Des Moines, Iowa, 450 tons, to Pittsburgh-Des Moines Steel Co.

Eagle Iron Works plant, Des Moines, Iowa, 300 tons, to Pittsburgh Des Moines Steel Co.

Pennsylvania Railroad System, superstructure over subway, Fifty-sixth Street, Chicago, 358 tons, to American Bridge Co.

Central Steel & Wire Co., warehouse and office building, Chicago, 263 tons, to A. Bolters Sons.

Nebraska Power Co., central sub-station, Omaha, Neb., 228 tons, to Omaha Structural Steel Co.

Pennsylvania Railroad System, Richmond, Ind., 92-ft. half through plate girder span, 108 tons, to Fort Pitt Bridge Works.

U. S. Engineer Office, Louisville, nine steel derricks for barges, 350 tons, to Lakeside Bridge & Steel Co.

Walbridge building, Buffalo, 1000 tons, to Bancroft-Jones Corporation.

Standard Oil Co., Cleveland, crane runways, 550 tons, to Massillon Bridge & Structural Co.

Hillside Bridge, Cleveland, 200 tons, to American Bridge Co.

Republic Iron & Steel Co., Youngstown, extension to open-hearth plant, 700 tons, to the McClintic Marshall Co.

Ford Motor Co., Detroit, sub-station No. 15, 350 tons, and office building, 120 tons, to McClintic-Marshall Co.

Lehigh Coal & Navigation Co., concentrator plant at Seek, Pa., 175 tons, to Bethlehem Construction Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New York, five public schools: James Madison High School, 1500 tons; school No. 99, 1500 tons; two other schools of 1200 tons each and one of 600 tons; total, 6000 tons.

Hoffman manufacturing building, Newark, N. J., 400 tons.

Hebrew Orphan Asylum, New York, 100 tons.

Apartment building, Broadway and Eighty-third Street, New York, 1000 tons.

Seacoast building, Asbury Park, N. J., 100 tons.

Apartment building at 72 West Sixty-eight Street, New York, 300 tons.

Presto lunch building, Newark, N. J., 200 tons.

New Palmer House, Chicago, 10,000 tons, bids to be asked soon.

Northern Pacific Railroad, miscellaneous bridges, 1700 tons; bids taken.

Ford Motor Co., press and forge shops, River Rouge, 9700 tons; additional units for steel plant, River Rouge, 10,000 tons; assembling plant, St. Paul, Minn., bids asked on revised plans calling for 6300 tons; assembling plant, Kansas City, Mo., 400 tons.

Highway bridge, Wilbraham, Mass., 250 tons.

Memorial Hospital, Niagara Falls, N. Y., 250 tons.

Philadelphia Electric Co., turbine supports, 100 tons.

RAILROAD EQUIPMENT BUYING

Prospective Car Business Put at 94,000—Actual New Inquiries About 10,000

Inquiries and early expectations now put prospective car business as totaling 94,000 cars. Included are 10,000 to 11,000 for the Southern Pacific, 6000 for the Norfolk & Western, an unnamed number for the Pennsylvania Railroad and 3000 for the Pacific Fruit Express.

On Nov. 1 of all freight cars 6.6 per cent were in need of repair, against 6.9 per cent on Oct. 15. From Jan. 1 to Nov. 1 a total of 155,872 new freight cars were installed in service. There were also placed in service during the first ten months this year 3371 new locomotives. The railroads on Nov. 1 had 48,571 new freight cars and 942 new locomotives on order. Fewer locomotives were in need of repair on Nov. 1 than there have been in years. The number was 15.8 per cent, against 16.4 per cent on Oct. 15.

The Southern Pacific has entered the market for 6555 cars as follows: 2975 50-ton single sheathed box cars, 950 flat cars, 295 12,500-gal. oil tank cars, 75 8-wheel caboose cars, 500 50-ton single sheathed automobile cars, 250 40-ton stock cars, 600 drop bottom gondola general service cars of 50-tons capacity, 500 tight-bottom gondola cars of 50 tons capacity, and 500 logging cars of 40-tons capacity. The same road is expected to issue inquiries for 3500 additional cars before the close of the week.

The Union Pacific has completed drawings and specifications for 3000 refrigerator cars for the Pacific Fruit Express and formal inquiries will be sent out shortly.

The St. Louis Southwestern is inquiring for 1000 box cars.

The Western Pacific is in the market for 200 automobile box cars.

The Alabama & Vicksburg Railroad is in the market for 200 box cars, 100 gondolas and 100 flat cars.

The Southern Railway has inquired for 1000 box cars and 1000 steel center constructions.

The Fruit Growers' Express is asking for prices on 100 steel underframes for freight cars.

The Ann Arbor Railroad wants prices on 500 box cars.

The distribution of the coke cars for repair by the Carnegie Steel Co., mentioned a week ago, was as follows: Koppel Car Repair Co., 248; Greenville Steel Car Co., 200; Federal Shipbuilding Co., 50.

Brazilian Manganese Exports, 1923

Manganese ore exports from Brazil during the first half of the current year totalled 160,265 gross tons, compared with 156,253 tons during the corresponding half of 1922.

The Ford Motor company has established a temporary assembly plant in Kobe, Japan, to operate during the rebuilding of the plant at Yokohama, which was destroyed at the time of the earthquake. Orders for trucks at the rate of 400 to 500 per month continue to come in and the last of the order for 1000 Ford one-ton truck chassis, ordered by the city of Tokio, was forwarded Oct. 31.

The plant of the Garden City Foundry Co., 3176 Archer Avenue, Chicago, has been purchased by the Mortimer Foundry Co., Chicago. The latter company has moved into the former Garden City plant, having given up the lease to its former location.

H. A. Frommelt, the Falk Corporation, Milwaukee, will deliver an address on apprenticeship training in foundries and industrial education for foundry workers, before the Quad City Foundrymen's Association at the LeClaire Hotel, Moline, Ill., Nov. 26.

The Jones & Laughlin Steel Corporation, Pittsburgh, has awarded a contract to the Minter Homes Co., Greenville, S. C., for the erection of 100 houses at Woodlawn, Beaver County, adjacent to its plant at Aliquippa, for operatives at this mill.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Nov.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
14	13 62½	13.25	43 37½	6.90	6.55	6.80	6.15
15	13 62½	13 12½	43 00	6.90	6.55	6.75	6.30
16.....	13.50	13.00	42.87½	6.90	6.60	6.70	6.25
17.....	13.50	13.00	....	6.90	6.60	6.67½	6.32½
19.....	13.50	12.75	43.50	6.90	6.65	6.65	6.30
20.....	13.50	12.75	44.25	6.95	6.70	6.65	6.30

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Nov. 20.

The sharp declines in the foreign exchanges have had a deterrent influence on most of the markets. Buying of copper has almost ceased and prices are lower. The tin market continues moderately active, with prices changed but little. Demand for lead is good and the market is slightly higher. Zinc has declined and demand is still light.

Copper.—The activity which was so pronounced a week ago ceased suddenly about the middle of last week and prices have declined quite sharply since. The uncertainty as to the attitude between France and England and particularly the decline in the pound sterling, with the resultant effect upon export sales of copper, were the principal causes. Buying has almost ceased both for foreign and domestic account and prices have gradually sagged until electrolytic copper today is quoted at a minimum of 13c., delivered. So little business is being done that this price is almost nominal, large producers being out of the market at less than 13.50c., delivered, and the light demand being satisfied by custom smelters and second hands. In small lots probably 13c., delivered, could be slightly shaded. Sales were so heavy up to the break in the market that both buyers and sellers are waiting for developments. Lake copper is quoted, largely nominal, at 13.50c., delivered.

Tin.—Buying of Straits tin has been in fairly large volume, with business done nearly every day, except yesterday, when the violent fluctuations in the pound sterling made transactions practically impossible. From Tuesday, Nov. 13, to yesterday, Nov. 19, inclusive, approximately 1000 tons changed hands, with dealers and consumers participating, the latter being good buyers and manifesting more interest than for some time. Were it not for the setback in exchange and in the London market, it is probable that the buying would have expanded, as consumers are apparently ready to make larger purchases, for it is evident that they must come into the market more extensively. The statistical position in general is growing stronger and there are those who believe that prices may advance in the near future. The market today was moderately active with spot Straits tin quoted at 44.25c., New York. Quotations in London were only slightly changed from those of a week ago with spot standard quoted today at £221 5s., future standard at £221 15s. and spot Straits at £221 15s. Arrivals thus far this month have been 3950 tons, with 4199 tons reported afloat.

Lead.—This market is quiet and firm. Prices of independent producers are advancing with sales made at 6.70c. to 6.75c., St. Louis, and 6.95c. to 7c, New York. The quotation of the leading interest is unchanged at 6.85c., New York, with independents apparently taking most of the business. Demand continues satisfactory and consumption heavy.

Zinc.—The zinc market has been affected by the fall in exchange and in prices on the London market, these factors being more predominant than the domestic situation, which continues dull. Buying is on a small scale. Prime Western for November-December delivery is quoted at 6.30c., St. Louis, or 6.65c., New York.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 29c. to 32c.

Antimony.—After a decline during the week to 9c., New York, duty paid, for wholesale lots of Chinese metal, the market has again turned strong with 9.25c. asked and paid for spot and early delivery.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., duty paid, New York, with some sellers unable to obtain the metal from their principals. The Ford Motor Co. is inquiring for 150 tons of ingots.

Old Metals.—The tone of the market is not as good though prices hold fairly well. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	12.00
Copper, light and bottoms	10.50
Heavy machine composition	10.75
Brass, heavy	8.00
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow red brass turnings	7.25
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

CHICAGO, Nov. 20.—The general tone of the market is improved and copper, tin and lead have again advanced. A considerable number of copper users who had consistently postponed their purchases have finally been forced into the market and have bought rather freely. Tin is closely held both here and abroad, and tends to advance with every indication of demand. The statistical position of lead is good and prices are firm, although buying is not particularly heavy. The zinc situation is not so favorable from a statistical standpoint, but prices show no recession. Old metal prices remain unchanged, but advances are looked for. We quote in carload lots: Lake copper, 13.75c.; tin, 44.50c.; lead, 6.65c.; spelter, 6.40c.; antimony, 11c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.25c.; red brass, 8.50c.; yellow brass, 6.50c.; lead pipe, 5.50c.; zinc, 4.25c.; pewter, No. 1, 23c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

Chain Belt Co. on Pacific Coast

Chain Belt Co., Milwaukee, manufacturer of Rex chain, transmission machinery and conveying equipment, formerly represented on the Pacific Coast by Meese & Gottfried Co., San Francisco, has established direct factory branches and warehouses in Portland and Seattle. Arrangements have also been made with the Washington Machinery Depot, Tacoma, Wash., to carry a stock of Rex chain and transmission machinery. Other stocks are to be placed in important centers in the Pacific Northwest.

The northwest territory, with headquarters at Portland, will be in charge of Allen C. Sullivan, a graduate of the University of Washington. Mr. Sullivan was formerly connected with the Allis-Chalmers Mfg. Co., and more recently with Smith & Watson Iron Works of Portland as chief engineer. Just previous to his association with the Chain Belt Co. he was engaged in special sawmill work as consulting engineer. Don C. Catton, formerly with Meese & Gottfried Co. and later engaged in the machinery supply business on his own account will be the special sales representative for the Portland office.

The Seattle and British Columbia territory will be handled by William F. Nichols out of the Seattle office. Mr. Nichols for the past 11 years has been connected with the Meese & Gottfried Co.

The Portland office of the Chain Belt Co. is located at 67 and 69 First Street, Portland, and the Seattle office at 1040 Sixth Avenue South, Seattle.

TEST BARS FOR CASTINGS

Differences Between Metal in the Piece and That in the Test Bar

MANCHESTER, ENGLAND, Nov. 3.—In view of the recent acute controversy on the subject of test bars in this country and in America, much interest attached to the lecture which was delivered to the Institute of British Foundrymen here today by J. S. Glen Primrose, a member of the American Society for Testing Materials.

Mr. Primrose, who used lantern slides and exhibited specimens, said that cast iron test bars in many cases bore no relation to the size and section of the important places in the casting. The transverse bending test constituted merely a test of the metal in the bar itself and took no consideration of the similarity or difference in the constitution between the test pieces and what they were intended to represent. The round section was better than the square as it eliminated the harmful effects of cross grain crystallization at the corners.

Cross Section of Test Bar

The rule hitherto followed of making the load requirements vary for different lengths of test bars in cast iron, with a mathematical formula connecting the two, was not satisfactory. For example the class of metal which would be called upon to withstand 30 cwt. on a 36-in. span, when asked to give 90 cwt. on a 12-in. span with the same 1 x 2 in. section, was really given a more exacting test and one more difficult to meet without taking extraordinary precautions in the casting conditions of the smaller bar.

For non-ferrous metal castings the circular test bar was almost universal. The plain 1-in. diameter bar has found general acceptance here. The American practice of skimming the surface to get a smooth circumference before tension testing gives a higher value when the bar is sound.

With regard to compression tests the speaker emphasized the length of a specimen as of importance, for cast iron failed finally by shearing at an angle of approximately 45 deg. in the direction of loading. The length should be at least 1¼ times the diameter for a round specimen. A compression test bar which had been considerably bent without fracture was shown.

Suitable machines for performing all kinds of tests were described in detail by Mr. Primrose, some of them for the first time as they were of recent design.

Discussion

At the conclusion of the lecture several questions were asked. Mr. Rowe expressed the opinion that in hardness testing much more satisfactory results were obtained with a large bar. The value of impact testing of cast iron was not sufficiently realized and engineers too often regarded tensile and transverse tests as sufficient. The effect of phosphorus was not clearly shown in the transverse test. Cast iron work had often to have a strong resistance to shock. With regard to the round test bar these were not always dead true and an oval test bar did not give accurate results, but this could be got over by slight machining.

In answer to another questioner, Mr. Primrose gave the opinion that three test bars were better than one sized bar tested with different loads. He said that cast iron testing was still a virgin field. He agreed with those who contended that hardness tests only indicate the hardness at one spot. Tensile tests were only valuable when shackles with spherical seats were used.

New Edition of Mr. Butler's "Fifty Years of Iron and Steel"

Joseph G. Butler, Jr., has just issued the seventh edition of his valuable book, "Fifty Years of Iron and Steel." Mr. Butler, who will celebrate his eighty-third birthday on Dec. 21, is still suffering from the injuries received several years ago when he was struck by a truck, but his interest is as keen as ever in the iron business with which he has been so long connected. Mr. Butler in an author's note says:

"Since the last edition of this work was exhausted, so many requests have been received for it that it has been thought necessary to have it reprinted. Practically no change has been made since the book was last printed except the addition of a short chapter on the beginning and development of the open-hearth steel process in America and one or two illustrations. The author expects that this will be the final edition, and takes the opportunity to express his appreciation of the public approval, generously given in hundreds of letters from all parts of the world, chiefly from men engaged in the iron and steel industries. Having been actively interested in these industries for 66 years, it has been a pleasure for him to contribute something to their literature in the form of even this brief and imperfect sketch of their remarkable progress during that period."

Friendly Receivership for Stevenson Gear Co.

On Monday, Nov. 12, F. E. Moskovics, who for a number of years past has been vice-president of Nordyke-Marmon Co., was appointed receiver for the Stevenson Gear Co., Indianapolis. The Stevenson company manufactures the Stevenson multiple gear shaper, notable for its speed of production.

The receivership is a friendly one, concurred in by the controlling stock interests, creditors and the management. Under the jurisdiction of the court the receiver is empowered to enter negotiations for the sale of the rights of the tool and operate the business generally. In the meantime, he has been empowered to operate the business as a going concern for 60 days.

The shop is now being operated as a jobbing shop, doing contract gear work with orders ahead to carry it for some time, and is accepting contracts for the immediate future. It is now operating two shifts and the records made by the Stevenson multiple gear shaper in the regular conduct of business are encouraging.

Charles Proteus Steinmetz

At an address at the public memorial meeting for Dr. Steinmetz, Oct. 31, E. W. Rice, Jr., honorary chairman of the board, General Electric Co., closed with the following words:

"He was a prolific inventor, a skilled mathematician, a trained engineer and an inspiring teacher. Our generation has produced men who have equalled or excelled him in some one of these fields, but no one has arisen who, to such a superlative degree, combined the qualities of inventor, mathematician, engineer and teacher.

"He possessed a marvelous insight into scientific phenomena and unequalled ability to explain in simple language the most difficult and abstruse problems. Countless electrical engineers now occupying positions of great importance in our company and elsewhere in the world gladly give testimony of their debt to him.

"He was patient, sympathetic, cheerful, and ever willing to share his great gifts with all those who sought his counsel.

"He loved children and they loved him. A neighbor and his wife were mourning his loss in the presence of their children, when the father exclaimed, with deep emotion, 'and he was my friend.' His little son of seven years looked up from his play and said: 'He was my friend, too, daddy.'

"We, his fellow citizens, friends and associates, join the great world in mourning his loss, but may our grief be tempered by the memory of his great achievements which make his name the synonym of high service to humanity."

PERSONAL

Roy H. Davis, general manager Firth-Sterling Steel Co., Pittsburgh, has returned from a trip to Sheffield, England, where he has been investigating new developments in the manufacture and application of stainless steel. J. Wortley Fawcett and Eric Holmstrom of Thos. Firth & Sons, Ltd., Sheffield, returned with Mr. Davis in the interest of the latter company's business in this country.

D. O. Williams has resigned as president and general manager of the Plymouth Stamped Metal Co., Plymouth, Ohio, and has been succeeded by George James, who has purchased his interest in the company.

J. D. W. Snowden has become affiliated with the Morse-Rogers Steel Co., Cleveland, as sales manager of a newly established copper product department. He has long been associated with the iron and steel industry in Cleveland and was for several years assistant district sales manager of the Cleveland office of the Cambria-Midvale Steel Co.

H. C. Stalnaker, for a number of years manager of the Cleveland office, Stalnaker Steel Co., Pittsburgh, has sold his interest in the company to his brothers, H. D. and J. B. Stalnaker, and has organized the H. C. Stalnaker Co., Cleveland, to deal in iron and steel scrap.

D. I. Wheeler, for the past eight years manager of the Cleveland office for the Morse Chain Co., Ithaca, N. Y., has been appointed sales engineer for the Ramsey Chain Co., Inc., Albany, N. Y., manufacturer of a compensating joint silent chain. Mr. Wheeler will make his headquarters at the main office and factory at Albany.

H. L. Unland, engineer for 13 years with the General Electric Co., 11 of which were spent in the power and mining department, leaves the company Dec. 1 to become electrical engineer with the Victor Talking Machine Co. at Camden, N. J. He is a graduate of the Engineering College of the University of Nebraska, class of 1910. Following graduation he joined the General Electric Co., taking charge of the water rate test, later becoming connected with the power and mining department. Later he specialized in electric welding and is the author of many articles on this subject.

E. M. Herr, president Westinghouse Electric & Mfg. Co., has been elected president of the Electrical Manufacturers Club, an organization composed of executives and leading officials of the electrical manufacturing companies of the country.

Frank Evans, for the past 12 years superintendent in charge of patterns and castings for the Hupp Motor Car Corporation, Detroit, has severed his connection with the company. He has not announced plans for the future.

Noah G. Spangler, general manager Jackson Iron & Steel Co., Jackson, Ohio, for the past seven years, has resigned.

Oscar E. Bulkeley, superintendent of electric and water plants for the city of Lansing, Mich., has been elected president of the Lansing Engineer's Club.

Emil Kronquist, Crystal Falls, Mich., prominent as a geologist, has joined the Ford Motor Co. in that capacity. He will be engaged in special work for the Ford company in connection with its mining interests.

George H. Robins, for four years associated with William J. Breen & Co., Boston, is now with the sales department of the New England Coal & Coke Co., Boston.

Alexander G. Black has been appointed superintendent of the open-hearth department, Vandergrift, Pa., works, American Sheet & Tin Plate Co. He comes from the Keystone Steel & Wire Co., Peoria, Ill., where he was superintendent of open-hearth furnaces for several years. Mr. Black is a graduate of Lehigh University, class of 1912.

Louis J. Campbell, son of President James A. Campbell of the Youngstown Sheet & Tube Co., this week submitted to the amputation of his left leg below the knee. The operation was performed in New York.

Richard B. Mellon, elected to the board of directors of the Crucible Steel Co. of America at the annual meeting of stockholders, is a brother of Andrew W. Mellon, Secretary of the Treasury, and succeeded him in a number of directorships, which he relinquished upon accepting the cabinet appointment.

William Klingenhoefer, formerly with the American Foundry & Construction Co., Pittsburgh, has become associated with the Latrobe Tool Co., Latrobe, Pa., as sales manager.

E. R. Kelso, for several years connected with the Ellwood Works of the National Tube Co., and for the past year chief engineer Weldless Tube Co., Wooster, Ohio, has accepted a position with the Mackintosh-Hemphill Co., Pittsburgh.

John S. Pendleton, 52 Vanderbilt Avenue, New York, has been appointed Eastern sales agent by the Columbia Steel Co., Elyria, Ohio, manufacturer of cold-rolled strip steel. Mr. Pendleton also represents the Falcon Steel Co., Niles, Ohio; the Falcon Tin Plate Co., Canton, Ohio; the Franklin Steel Works, Franklin, Pa., and the Standard Gage Steel Co., Beaver Falls, Pa.

James A. Farrell, president United States Steel Corporation, has accepted an invitation to address the Cleveland Foreign Trade Conference to be held Dec. 12, under the auspices of the Cleveland Chamber of Commerce. Mr. Farrell is chairman of the National Foreign Trade Council.

OBITUARY

HUGO SCHERER, who died at his home in Detroit recently, was one of the city's prominent citizens and one who played an active part in its industrial and business development of the past 40 years. Mr. Scherer was originally a manufacturer of carriage accessories and with the introduction of the motor car began to manufacture hardware and other accessories for the automotive industry. At the time of his death he was president of the Detroit Forging Co., and was a director in several large financial institutions in Detroit.

W. H. STOCKHAM, president Stockham Pipe & Fittings Co., died at his home in Birmingham, Ala., on Nov. 16, after a long illness. He was a man of wealth and was most liberal toward religious and charitable organizations. He was born at Lafayette, Ind., in 1861, was graduated from the University of Illinois in 1885 and received his training in iron and steel in the vicinity of Chicago. He is survived by his wife and three sons, two of whom are officials of the Pipe & Fittings Co.

OSCAR G. SPRINGFIELD, a partner in the firm of W. B. Arnold & Co., Waterville, Me., with which he had been associated 50 years, died on Oct. 25.

AMOS PECK MACK, president, Mack & Co., makers of edged tools, died in Rochester, N. Y., on Nov. 6, after a long illness.

M. TAYLOR PYNE, JR., president Steel Equipment Corporation, Avenel, N. J., and son of the late Moses Taylor Pyne of Princeton, N. J., died at his home, 8 East Sixty-first Street, New York, on Nov. 17, aged 39 years.

Sales of mechanical stokers in October were 88 in number and 32,576 in horsepower, as reported to the Department of Commerce by 15 establishments. This is less than half the total horsepower of the average of the nine preceding months in 1923. The maximum was in May, with 194 stokers and 100,513 hp.

EXPORT INQUIRY ACTIVE

Growing Interest in Machine-Tools—Manchurian Railroad Asks for Rails—Ruhr Stocks

NEW YORK, Nov. 20.—While export activity in iron and steel continues chiefly from Japan with a fair demand for second grades of material from Chinese markets, a rising interest in machine tools is evident from Japan and inquiry from Russia is also among the features of the present market. However, while most exporters to Japan are figuring on lists of machine tools, with the exception of a few lots previously reported, no large orders as yet are known to have been placed.

Although the Japanese government has purchased its first large tonnage of steel direct from the maker, there still seems to be a question as to whether or not this method will be continued. Purchases of material are being made for the Metropolitan Reconstruction Board, which is empowered to buy and sell goods, as well as to plan and supervise rebuilding in the devastated area. The purpose of this first purchase is to prevent profiteering on emergency requirements by reselling at cost to individual consumers. Details of transactions will probably be handled through the office of the commercial attache to the Japanese Embassy, 165 Broadway, New York.

There is still a fair demand for light-gage black sheets from Japan, but not of the proportions of a few weeks ago, although one current inquiry is for a total of 4000 tons. Altogether about 70,000 tons of black sheets have been bought by Japan. Some interest is apparent in wire nails and there are a number of small lots of light rails current.

One rail order recently awarded to a mill in the United States was handled by the New York office of Takata & Co., and called for 9½ miles of 60-lb. sections. About the largest current inquiry for rails for the Far East is the tender of the South Manchuria Railway Co., calling for 70 miles (about 11,000 tons) of 100-lb. rails and accessories, bids opening Nov. 20.

On Nov. 27 the tender on 18,000 tons of rails recently issued by the Chilean State Railways will be opened at the main office in Chile. Brazil has inquired for 7000 tons.

Considerable uncertainty as to the ultimate method of disposal that will be adopted by the French government on the tonnage of iron and steel seized in the Ruhr seems to prevail. One rumor, which is believed to be without foundation, states that disposal will probably be handled by an organization in Duesseldorf. As far as is known there are only 350,000 tons of finished products to be offered. The 150,000 tons of scrap and the semi-finished material, it is reported, are being absorbed by the French and Belgian iron and steel industries.

Ogygen in Copper

The effect of oxygen, up to concentration of 0.36 per cent, in the properties of pure copper, is described in a paper, "Investigation of the Effects of Impurities in Copper; Part I.—The Effect of Oxygen in Copper," by Dr. D. Hanson, C. B. Marryat and Grace W. Ford, presented at the annual fall meeting of the Institute of Metals, Manchester, England, Sept. 12, 1923. The investigation deals with the casting of the metal, cold rolling, hot rolling, density of chill-castings and rolled bars, tensile tests at ordinary and at elevated temperatures, hardness tests, fatigue tests, notched-bar impact tests, electrical conductivity, microstructure of castings, microstructures of the alloys in various conditions, and determination of the solubility of oxygen in solid copper.

The results indicate that oxygen has a relatively small effect on the properties of copper, and is neither seriously deleterious nor remarkably beneficial. The mechanical properties are not much affected by small quantities of oxygen, and copper containing as much as 0.1 per cent differs very slightly from pure copper. The electrical conductivity, which is usually profoundly affected by the addition of small quantities of an impurity to a pure metal, does not fall rapidly, and values exceeding 100 per cent of the International Standard are obtained in all annealed materials containing less than 0.1 per cent of oxygen. The relatively small effect of oxygen is without doubt due to the fact that the solubility of the oxide in solid copper is extremely low, so low in fact that for all practical purposes oxygen may be regarded as insoluble in solid copper. The oxygen-bearing metals must, therefore, be considered as a heterogeneous mixture of pure copper and finely divided particles of cuprous oxide, and within the range of composition investigated the percentage of copper greatly exceeds that of cuprous oxide. The materials consist essentially of a soft ductile copper matrix, in which harder particles of cuprous oxide are distributed, and the properties of the series are such as would be expected from such a mechanical mixture.

These conclusions, however, are applicable strictly only to pure copper containing oxygen and free from other impurities. The effect of the simultaneous presence of other impurities may be very appreciable, and requires special investigation.

Eugene W. Smith, the Crane Co., Chicago, will deliver an address before the Detroit Foundrymen's Association, Dec. 20, on the vibratory test for bond and silica in molding sand.

Structural Steel Sales in October

WASHINGTON, Nov. 20.—The Department of Commerce announces October sales of fabricated structural steel, based on figures received from the principal fabricators of the country. Total sales of 107,797 tons were reported by firms with a capacity of 224,060 tons per month. Shipments of firms reporting this item represented 80 per cent of capacity.

Tonnage booked each month by 177 identical firms, with a capacity of 230,675 tons per month, is shown below, together with the per cent of shop capacity represented by these bookings. For comparative purposes, the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month.

1922	Actual Tonnage Booked	Per Cent of Capacity	Computed Total Bookings
October	133,637	58	145,000
November	112,367	49	122,500
December	138,737	60	150,000
1923			
January	173,294	75	187,500
February	184,887	80	200,000
March	220,400	96	240,000
April	186,117	81	202,500
May	131,875	57	142,500
June	118,117	51	127,500
July	117,563	51	127,500
August	134,431*	59	147,500
September	121,045**	53	132,500
October	107,797***	48	120,000

*Reported by 176 firms with a capacity of 229,475 tons.
**Reported by 173 firms with a capacity of 228,425 tons.
***Reported by 156 firms with a capacity of 224,060 tons.

The Pittsburg Boiler & Machine Co., founder and engineer, Pittsburg, Kan., has completed arrangements for the acquisition of the Salt Lake Iron & Steel Co. plant at Salt Lake City, Utah. The Salt Lake corporation was organized in 1906 with capital of $300,000. It is the intention of the Pittsburg company to engage extensively in the manufacture of coal mining equipment and other machinery, and also in the reconditioning of locomotives, in which line the company has been engaged for several years.

Inquiry into the freight rate structure of the United States is opposed by the Interstate Commerce Commission. Announcement to this effect was made by the Commission last Wednesday in the form of letters requesting that such an inquiry be undertaken by it. Among the requests was one from J. F. Callbreath, Jr., secretary of the American Mining Congress, who asked for an enlargement of the general grain inquiry so as to embrace all basic commodities.

BOOK REVIEWS

Kent's Mechanical Engineers' Handbook. By the late William Kent. Tenth edition, rewritten by a staff of editors, headed by Robert T. Kent. Pages 2247, 4½ x 7 in.; numerous line cuts. Published by John Wiley & Sons, 1923, New York. Price, flexible binding, $6 net; leather, $7 net.

Not only was the entire text of this book revised and largely rewritten, but so complete was the revision that only about 200 pages of the ninth edition, which was published in 1914, remained. Great advances in the mechanic arts, occurring during and since the war, have been responsible for this almost complete overturn of the previous work. The total amount of material covered in the new volume exceeds that in the old by 56 per cent.

There is a considerable amount of new information on heat and heat insulation, fuels and combustion, air compressors, condensing equipment, power transmission and electrical engineering. New material is offered in the section on machine design, as well as under the heading of railroad engineering, with special reference to locomotive design and to train resistance. Fans and blowers, hydraulic turbines, pumps and pumping engines, steam engines and steam turbines, oil engines, gas producers, hoisting and conveying equipment, refrigeration and ice-making, and heating and ventilation have been subjects of extensive alteration and practical rewriting, due to the inclusion of great amounts of new information. Gas turbines, automobiles, aeronautics, reinforced concrete, safety engineering, malleable castings, and fusion welding and cutting are among the new topics covered for the first time in this edition.

As has always been the case with "Kent," the book is preeminently based on practical considerations, with only enough of the theory to explain the practice. First-hand information has been sought wherever available and references are freely given to original sources of information. It thus becomes the work, not of the 36 men who have edited this edition, but of a much wider group with vastly more varied experience, covering subjects of almost inconceivable variety.

Now as always the book will be of great value to designing and consulting engineers in all fields of mechanical engineering. It is said to contain all the data necessary for the design of practically every commercially manufactured article, and these data are the last word in every case. A complete index covering 123 pages and 14,565 titles makes the information easily accessible; this is supplemented by more than 600 cross references scattered through the book.

Walzen und Walzen-Kalibrieren. By Wilhelm Tafel. Pages 303, 6 x 9 in.; illustrations 186; second edition. Published by Fr. Wilh. Ruhfus, Königshof 23, Dortmund, Germany, and obtainable from G. E. Stechert & Co., 151 West Twenty-fifth Street, New York. Price, $1.60.

This book, the title of which proclaims it to be an introduction into the processes in rolling and the work of the roll designer, is the combined second and third edition of a book published about two years ago. The author makes no effort to show a collection of ready made roll designs. Instead he endeavors to give a clear understanding of the rolling processes and consequent considerations and calculations in the design of roll passes, based on the principles of rolling, as developed by the author and his predecessors.

In the introduction to the second edition the author states that it was his intention to create a technical work that would not complicate the simple but make the complicated appear simple and easy to understand. He refers to the fact that only a comparatively few years ago the designing of roll passes was a sort of black art, known only to the initiated, completed behind closed doors and like alchemy passed on from each designer to his successor.

There is practically no literature on the design of roll passes in the English language except a few treatises, such as by Nicholson, Cuthill, Spencer, Hirst, etc., although a number of works on the subject have been published in German, such as P. Ritter von Tunner, Fink, Kirchberg, Dehez and some in French, as Brovot and Geuze, and several papers have been presented in various societies.

As a whole this literature, although containing valuable practical data, did not produce a system whereby the correct design of roll passes could be developed or proved by theoretical calculations. Even that excellent book: "The Making, Shaping and Treating of Steel," published by the Carnegie Steel Co. states: "The best way to explain roll design is by an example, for it is as yet an art acquired mainly by experience. While subject to natural laws, the scientific aspects of the subject have not been fully developed and the roll designer has few rules to learn."

It is probably the comparatively recent development of electrical mill drives with the consequent possibilities of controlling, measuring and recording the power consumed in rolling, which led to the endeavor to find a more scientific basis for roll pass design.

In this the author has succeeded and developed some fundamental rules for the design of roll passes, not only regarding their proper shape and size with reference to permissible reductions, but also their position in the rolls in relation to roll axes and roll diameters, etc., without going to the extreme of claiming cut and dried formulas for the different sections to be rolled.

Although previous publications by German and French authors, as noted above and the "Taschenbuch für Eisenhüttenleute" are frequently referred to in the new book, it is claimed that it did not originate in or is based on a study of that literature, but principally on actual investigations and experimental work of the author.

This new edition contains some additional matter pertaining to the rolling process in general and particularly regarding the lateral spreading of steel in rolling. The rolling of wire rods is treated extensively with a separate chapter on repeaters and formulas for the calculation of the sizes of loops.

The book by W. Tafel, who is a professor of steel works machinery and the science of rolling at the technical university of Breslau, Germany, must be considered a successful attempt at deducting comparatively simple and reliable formulas, from theoretical calculations to replace empirical formulas and rule of thumb measures previously used. Although not every rolling mill man will agree without reservations with every statement made in the book, the theories are correctly developed and sufficient actual rolling results and experiments are cited to prove them. It will, therefore, be of great help to those who understand the German technical terms, not only the roll designer, but the rolling mill engineer, and the roller himself as well, the book being written so that the man without a college education can use it to advantage.

Considering the value of a publication of this kind, which would, without doubt, fill a decided gap in the English technical literature, it is proposed to translate Professor Tafel's book into the English language.

Welding Encyclopedia. Third edition. Compiled and edited by W. B. Mackenzie and H. S. Card. Pages 437, 6 x 9 in.; 600 illustrations. Published by the Welding Engineer, 608 South Dearborn Street, Chicago. Price, $5.

This volume, the first edition of which was published in 1921 and which follows the arrangement of the previous editions, is offered as a reference and instruction book on the theory and practice of the welding processes.

Definitions and discussions make up the encyclopedia section of 154 pages or more than one-third of the volume, the subject matter being arranged alphabetically. Successive sections are devoted to electric arc, resistance, oxy-acetylene, and thermit welding. Chapters are included on the welding of boilers, pipe, tanks and rail joints, and a section is devoted to the rules and regulations of Federal, State and insurance interests. A brief general explanation of the principles involved in the heat treatment of steel is given.

A new feature is a chapter on the training of operators, the course for oxy-acetylene welders being based

upon the recent report of the American Bureau of Welding. This is followed by a set of exercises and examinations. The volume carries an advertising section of 75 pages.

Fundamentals of Welding. By James W. Owens. Pages 659 + xii, 6 x 9 in.; 279 illustrations and 28 tables. Published by the Penton Publishing Co., Cleveland. Price, $10.

This volume, which is a comprehensive review of gas, arc and thermit welding and offered as a text book for governmental engineering departments, colleges and technical schools, may be said to be a substantial contribution to the literature of welding. The scientific and clear presentation of the subjects treated, together with the abundance of illustration, are noteworthy.

Its author was associated from the beginning with the special research work of the Bureau of Construction and Repair of the United States Navy, conducted at the navy yard at Norfolk, and he was in charge of it for several years. He has carried out some rather extensive welding jobs, one of them being battle towing targets, and the present liberal use of welding on naval vessels is attributed to his research and investigations.

Starting with a classification of methods of welding and the nomenclature of joints and welds, a chapter is devoted to the preparation of the joint, and the finish of a job by machining, grinding, caulking or other methods. A chapter on the gas weld includes a description and use of equipment, and succeeding chapters are devoted to the arc weld, thermit weld and gas and arc cutting. The metallography of the weld is taken up at length and illustrated with photomicrographs. The subject of residual stresses, an important problem in welding, is thoroughly discussed.

Several pages are devoted to the speed and cost of welding, and chapters are given to the choice of methods, the question of design and the subject of inspection and tests. The production and distribution of oxygen, hydrogen and acetylene are outlined and chapters are devoted to arc welding generators and transformers, welding and cutting machines, welding rods, electrodes and fluxes, protectors and safety precautions and standard specifications for welding rods.

The necessity and methods training of engineers and mechanics is emphasized and the gas welding and cutting course and arc welding course as administered at the Norfolk navy yard are outlined. Several pages are devoted to practical applications of fusion welding.

NEW TRADE PUBLICATIONS

Heating and Cooling Air.—Aerofin Corporation, 750 Frelinghuysen Avenue, Newark, N. J. Twenty-eight-page pamphlet dealing with heating surfaces consisting of seamless copper or brass tubing, about which is wound a thin narrow helical extended surface of the same material soldered to the tubing. The heat transmitting surfaces thus formed are made up by assembly in tube plates and attached to headers. The surfaces thus provided may be used either for heating air through the intervention of steam or for cooling through the use of water. The pamphlet gives tables of capacities based on varying sets of conditions ranging up to a maximum of 50 lb. steam pressure.

Duplex Cone Fans.—Howard & Morse, 45 Fulton Street, New York. Twenty-four-page catalog of Blackman and duplex fans for ventilating and other air manipulating purposes. Dimensions and clearances are given in tabular form, together with data covering weights, pressures exerted, horsepower required, etc. The fans are made both for belt drive and for direct drive.

Artistic Metal Work.—Howard & Morse, 45 Fulton Street, New York. Thirty-two-page catalog devoted to metal work in iron, steel, brass, copper, bronze and monel metal. This includes elevator grills, window guards, summer houses, bank railings and cages, skylight covers, fire-escape inclosures and grill work of all descriptions. Among the smaller items covered in the catalog are wire racks or lockers, baskets, etc.

Pulleys.—W. A. Jones Foundry & Machine Co., 4401 West Roosevelt Road, Chicago. Forty-eight-page catalog of pulleys made of cast iron, steel, wood and paper and covering solid, split, single arm, double arm, flanged, tight and loose, step cone, taper cone, ring oiling, and ball bearing pulleys, as well as flywheels. Tables of dimensions and prices are given in considerable extent, with diagrams indicating dimensions and clearances. The flywheels covered are of cast iron.

Lemley Friction Clutch.—W. A. Jones Foundry & Machine Co., 4401 West Roosevelt Road, Chicago. Fifty-six-page catalog covering standard sleeve clutches, friction clutch cut-off couplings, friction clutch pulleys and gasoline engine clutch pulleys. Dimensions are given in detail, as well as list prices and specifications, including both the entire equipment and parts. The friction clutch is of the disk type, featured by simplicity, accessibility and durability, with universal adjustment.

Underfeed Stokers.—Westinghouse Electric & Mfg. Co., South Philadelphia, Pa. Fourteen-page catalog covering a new model of mechanical stoker which embodies positive control of the contour of the fuel bed at all rates of combustion. The agitating element is mounted across the lower end of the stoker, adjacent to the retorts, providing a means of maintaining minimum combustible losses to the refuse.

Graphic Watt Meters.—Esterline-Angus Co., Indianapolis. Four-page folder dealing with the use of graphic watt meters for controlling employment time, overcoming friction load, control of current use at night, and studying maximum electrical demand. It is pointed out that the use of these instruments will provide the records from which losses can be traced and without which the losses cannot well be abolished.

Electro-Plating and Finishing.—B. Mercil & Sons Plating Co., 1907 Fulton Street, Chicago. Sixteen-page folder devoted to equipment for plating with nickel, brass and copper—burnished and not burnished—for black oxidizing and for giving a chocolate finish resembling statuary bronze. The job is done mechanically, both in plating and in burnishing and finishing. All sorts of small parts can be handled, illustrations in large numbers appearing in the folder.

Cutless Bearings and Sealing Rings.—B. F. Goodrich Rubber Co., Akron, Ohio. 20-page catalog devoted to bearings to resist the action of gritty water, whether this comes from sand or other content in the water. The inner surface of the bearing consists of grooved rubber. Water acts as a lubricant, while the spiral groove takes care of any grit or sand which might otherwise injure the bearing surface. Tests of this bearing have been made under water and in a great variety of ways, showing that it will stand up in long service both for pump bearings and for outboard bearings on motor boats, etc.

Laboratory Testing Apparatus.—Howard & Morse, 1197 DeKalb Avenue, Brooklyn, N. Y. 16-page catalog devoted to laboratory appliances for industrial and professional service. Various types of apparatus are covered, made in accordance with specifications of the American Society of Civil Engineers, the Association of Portland Cement Manufacturers and American Society for Testing Materials. These include penetrometers, vicat needles, briquette molds, agitators, viscosity float, ductility machines and extractors.

Marine Diesel Engines.—Burmeister & Wain, Ltd., Copenhagen, Denmark. (H. C. Hallings, United States representative, 27 Whitehall Street, New York.) 16-page catalog devoted to the internal combustion engine on shipboard. Engines of this type have been applied to 112 ships of more than 2000 gross tons each, the aggregate tonnage being 649,282. Comparison is made between two ships of approximately equal size, one using coal and a steam engine while the other uses Diesel engine with fuel oil. The fuel consumption per day is given as 19 tons of coal against 4.6 tons of fuel oil. For a voyage of 5000 nautical miles the ship with Diesel engine works out a cargo capacity of 4239 tons against 2763 tons for the steamer.

Olivite Acid Pumps.—Oliver-Sherwood Co., San Francisco. 16-page catalog devoted to pumps for handling acids and other corrosive solutions, and designed particularly for durability—both mechanical and chemical. High mechanical and hydraulic efficiency are incorporated in the design, while the acid proofing of the pump, known as Olivite, is a substance having a rubber base with great resistance to wear and to chemical deterioration.

New Companies

The Vactuphone Engineering Corporation 123 Liberty Street, New York, has been incorporated with $20,000 capital stock to engage in manufacturing radio machinery and equipment. The incorporators are L. Isaacs, I. Sickle and W. Scadron. Immediate operations will not be extensive.

The Stevens-Duryea Motors Inc., New York, has taken over the business of a manufacturer of automobiles which has been in clerks' hands for two years. The new management plans to resume operations at the plant in Chicopee, Mass. R. W. Stanley, general manager, R. R. Owen and J. O. Tryon are the incorporators. H. B. Leary, 55 Broadway is representative.

The Stone-Brook-Elk Corporation, New York, has been incorporated with capital stock of $200,000 and will manufacture automobile equipment and accessories. The company is still in the formative state. The incorporators are A. A. Beaudry and R. Steinbacher. Temporary address is care of E. M. Hawkins, 256 Broadway.

The New York Metal Store Fronts Co., 200 Lewis Street, New York, recently organized, will manufacture copper-covered moldings for store fronts. The company has equipped its plant and is now in production. A. Katz heads the company.

The Starburn Products, Inc., 600 West Forty-third Street, New York, has been organized by Kenneth Burns of Joblez Burns & Sons, manufacturers of special machinery, to manufacture metal sprays and specialties. Plans for operation have not yet been perfected.

F. A. D. Andrea, Inc., 1581 Jerome Avenue, New York, has been incorporated with capital stock of $25,000 to manufacture radio products. Thirteen thousand sq. ft. of floor space has been rented at 1532 Inwood Avenue, and equipment is now being installed. Within a short time it is expected that 200 hands will be employed. R. M. Kline heads the company.

The Porter Engine Development, Inc., 2 Rector Street, New York, recently incorporated with $100,000 capital stock will develop a new make of rotary valve engine. According to present plans, manufacturers will be licensed for production. F. R. Porter heads the company.

Frank H. Schubert, district manager, Wheeler Condenser & Engineering Co., and William G. Christy, secretary of the St. Louis Section, American Society of Mechanical Engineers, and formerly with the St. Louis Boat & Engineering Co., St. Louis, have organized the Schubert-Christy Construction & Machinery Co., with offices in the Railway Exchange Building, St. Louis. In addition to representing manufacturers of power plant equipment, the company will render general construction engineering service, specializing in the design and construction of water cooling equipment.

The Adams & Durkee Steel Co., Inc., Boston, has been organized with W. E. Adams as president and W. B. Durkee, treasurer. The company will take over the warehouse formerly occupied by the Arthur Balfour Steel Co., 287 Atlantic Avenue, also the stock of that company, as well as its United States agency for Arthur Balfour & Co., Ltd., Sheffield, England, with the exception of Ohio. In addition to such high speed steels and water and oil hardening tool steels, the firm will carry a complete line of domestic finished steels such as cold-rolled strip, flat wires, drill rods, music wire, spring wires and finer grades of steel in general. The company also will act as New England agent for the Thompson Wire Co., Boston, cold rolled strip steel, etc. Mr. Adams was associated with Edgar T. Ward's Sons Co., Boston 22 years, the last six as director and sales manager for New England. Mr. Durkee has been engaged in the steel business approximately 15 years, the last six conducting business under his own name at 141 Milk Street.

The Rubberstone Rubber Mfg. Co., Kansas City, Mo., has been incorporated with capital stock of $125,000 to manufacture rubber products, having taken over the plant and business of the A. J. Stephens Rubber Co., that city, recent sold at receiver's sale. The business will be resumed along the same lines. A. J. Stephens will have charge of sales.

The Kline Spring Co., Babbett Road, Euclid, Ohio, recently organized, will manufacture wire springs and specialties, being equipped to handle coiling in all sizes up to ½-in. round. Present quarters are not permanent but the company will remain there for about a year. Allen B. Kline is president.

The Nulite System, Inc., 823 Land Title Building, Philadelphia, has been incorporated with capital stock of $2,500,000, Delaware laws, to exploit the Wilkins patent for repairing incandescent lamps. Present plans provide for opening a plant in Philadelphia, commencing Feb. 1, which will have a capacity for repairing 20,000 globes per day. The company will either rent a plant or purchase outright. No building is contemplated. H. Haskins is secretary.

The American De Gama Process & Machinery Corporation, 347 Madison Avenue, New York, organized under Delaware laws with capital stock of $300,000, will establish manufacturing units in several centers throughout the country for briquetting turnings, specializing principally on copper and brass. Twelve machines are now being built in Europe, the first one of which will be set up somewhere in the East about Jan. 1. Factory site has not yet been determined but Jersey City, N. J., and Philadelphia seem most favorable. Numerous inquiries have been received concerning both the machines and the process. D. V. De Gama is president.

The White Pelican Iron Works, Inc., Klamath Falls, Ore., recently organized to manufacture iron and steel products, will engage in the general manufacture of plates, tanks, and structural iron works, steel stacks and burners. The shop will be equipped with 8-ft. bending rolls, punches, gears and complete locomotive repairing equipment. Ground has been purchased for a shop 48 x 150 ft. Bars, beams, pipes and tubes will be carried in stock. T. N. Monks of the Portland Boiler Works is president.

Machinery is being installed at the plant of the Westfield Grinding Wheel Co., Elm Street, Westfield, Mass. Production is scheduled to start late this month. The company recently incorporated under Massachusetts laws with capital of $150,000. George L. Gaylord, for 27 years associated with the Vitrified Wheel Co., most of the time as president and manager, is president and treasurer of the company. William C. Doering is vice-president and Richard N. Gaylord, secretary. Mr. Doering also was with the Vitrified Wheel Co. many years, latterly as general foreman, and Richard N. Gaylord for about three years.

Trade Changes

The J. G. Brill Co. has purchased the railroad motor Coach Division of Service Motors, Inc., Wabash, Ind. A new division of the Brill Company has been organized as the automotive car division, with C. O. Guernsey, formerly vice-president of the Service Motors, Inc., as chief engineer.

The Cadillac Machinery Co., Detroit, has been appointed exclusive sales agent for the Grand Rapids Grinding Machine division of the Gallmeyer & Livingston Co., Grand Rapids, to cover the Detroit territory, comprising the eastern half of Michigan.

The E. H. Welker Co., 222 West Larned Street, Detroit, has been appointed Detroit representative of the George Oldham & Son Co., Baltimore, manufacturer of pneumatic tools.

The Federal Machinery Sales Co., 12 North Jefferson Street, Chicago, has acquired the exclusive agency in Chicago and Milwaukee territories for the engine lathes manufactured by the Bradford Machine Tool Co., Cincinnati.

The Stocker-Rumely-Wachs Co., 117 North Jefferson Street, Chicago, has been appointed exclusive sales agent in Chicago, Milwaukee and Grand Rapids, Mich., territories for the Greaves-Klusman Tool Co., Cincinnati, manufacturer of engine lathes, effective Dec. 15. It has also obtained the exclusive sale in Chicago territory for the line of power squaring shears and heavy power presses manufactured by the D. H. Stoll Co., Buffalo.

The business of W. Stuart Miller, 435-36 Royal Exchange, Manchester, Eng., will be carried on under the style of W. Stuart Miller, Ltd. Pensonnel remains as before.

The Merchant & Evans Co., Philadelphia, has opened a branch warehouse in Detroit, located at the corner of Junction and Federal Avenues. Offices will be located at 403 Real Estate Exchange Building with J. C. McIlroy as manager.

General offices of the Edgar T. Ward's Sons Co. have been moved to 400 Frelinghuysen Avenue, Newark, N. J.

Title of Lippincott, Mills & Co., Inc., 17 Battery Place, New York, has been changed to William H. Mills & Co., Inc.

The Dominion Bridge Co., Ltd., has changed its address to 217 Bay Street, Toronto, Ont.

The address of The Lion Oil & Refining Co., Kansas City, Mo., has been changed to Eldorado, Ark., Box Y.

Machinery Markets and News of the Works

INQUIRIES MORE PLENTIFUL

No Appreciable Increase in Machine Tool Orders, However

A Good Deal of Pending Business, It Is Believed, Will Go Over Until After First of Year

While inquiries for machine tools are more numerous, orders are not gaining appreciably, and it is a general belief that many of the pending inquiries are "feelers" that betoken possible buying after Jan. 1 rather than this year.

A fair degree of activity at Chicago and Cleveland is reported, Chicago dealers having before them more inquiries than at any time this year. The Illinois Steel Co. is said to have closed for considerable additional equipment for its steel car wheel plant at Gary, Ind. The Remy Electric Co., Anderson, Ind., has bought five engine lathes. There is fair interest in sheet metal working machinery of various types in that section of the country.

Railroad buying is less active. The Pennsylvania Railroad has ordered a number of tools for its Columbus, Ohio, shops, and has issued inquiries for tools needed at its St. Louis and Mingo Junction shops. The New York Central has postponed until Nov. 29 the opening of bids for the 25 or more tools it inquired for two or three weeks ago.

A Cincinnati builder of tools is reported to have booked substantial orders from Russia, Brazil and Mexico. Little Japanese business has developed so far.

New York

NEW YORK, Nov. 20.

INQUIRIES are more plentiful, but orders show no appreciable gain. Considerable business is pending, including the inquiry of the New York Central Railroad for about 25 machines, but sellers are at a loss in determining just how much buying may be expected before the end of the year. As is usual when demand for new tools is light, business in used tools is quite brisk. Large machines in particular are in good demand and there has been a ready sale for planers, boring mills, bending rolls, etc., and in fact some dealers have been seeking machines of this type that are for sale in order to satisfy inquiry already in hand. The Pennsylvania Railroad has bought a 6-ft. radial drill and the American Steel & Wire Co. has bought a 7-ft. radial drill. The McClintic-Marshall Co. ordered a 42-in. rotary planer. The Pelton Water Wheel Co., San Francisco, has ordered a 7-spindle floor borer from an Eastern builder.

Carr Brothers, Inc., 65 Broadway, New York, have issued an inquiry for type O. M. portable electrically-driven grinder with 8 x 1½ x 7/8-in. wheel, weight 132 lb., for 2-hp. motor, to run on 220-volt, three-phase, 50-cycle current. The machine is for export.

Contract has been awarded by the Continental Can Co., Inc., 61 Broadway, New York, to the Barney-Ahlers Construction Corporation, 110 West Fortieth Street, for an addition to its plant at Jersey City, N. J., estimated to cost $500,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

The Reo Motor Car Co., 1709 Broadway, New York, is taking bids on a general contract for a four-story service and repair plant, 100 x 175 ft., on West Fifty-fifth Street, to cost about $200,000. Parker & Shaffer, 280 Madison Avenue, are engineers.

The Pan-American Petroleum & Transport Co., 120 Broadway, New York, will commence the construction of a new oil storage and distributing plant at the United States naval base, Pearl Harbor, T. H., to cost about $550,000. Contract has been let to the M. W. Kellogg Co., 90 West Street, for pumping machinery, compressors, motors and piping system, for $342,000; to the United States Steel Products Co., 30 Church Street, for superstructure of building, $96,000; and to the Armstrong Cork Co., Pittsburgh, for insulation for storage tanks, $40,000. Other awards will soon be made.

The Industrial Machinery Division, Room 815, Bureau of Foreign and Domestic Commerce, Washington, has information of a project now being developed in the State of Parana, Brazil, covering the construction of an oil and fertilizer plant, for which catalogs of American equipment have been requested from A. T. Haeberle, United States Consul, Sao Paulo, Brazil. The installation will consist of an ammonia ice-manufacturing plant with capacity of 50 tons per day; ice-crusher and transporter, with maximum capacity of 50 tons in two hours; oil-extracting plant, with output of 10 tons per day; glue manufacturing plant, with capacity of one to two tons per day; can manufacturing plant, both large and small sized containers; canning and cooking equipment, including steam-jacketed cookers, vacuum canning machine, filling machinery, etc., and small cooperage plant. Catalogs and information sent to the Industrial Machinery Division will be reforwarded to the consulate office at Rio de Janeiro, Brazil.

The former foundry of the E. W. Bliss Co., Plymouth Street, Brooklyn, 100 x 137 ft., has been purchased by Kirkman & Son, 215 Water Street, for soap and kindred manufacture, and will be remodeled for an addition.

Fire, Nov. 15, destroyed a portion of the three-story plant of the George Cooper Mfg. Co., 362-64 Jefferson Street, Brooklyn, manufacturer of children's vehicles and parts, with loss estimated at $60,000. It is planned to rebuild.

Louis Bossert & Son, 1335 Grand Street, Brooklyn, manufacturers of portable houses, etc., will make extensions in their four-story plant, 100 x 100 ft., to cost about $25,000. Carl L. Otto, 15 Park Row, New York, is architect.

E. S. Walsh, commissioner of Canals and Waterways, Capitol Building, Albany, N. Y., has received a low bid from the McCann Building Co., Sheridan Avenue and Dove Street, Albany, for a power house at Vischers Ferry, at $143,567, exclusive of equipment, for which bids will be asked later. A similar power station is also being built at Palmyra, N. Y., Lock 29, State Barge Canal, to cost $100,000.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Dec. 11 for 7000 ft. steel conduit pipe for the Brooklyn and Mare Island navy yards, schedule 1591.

Fire, Nov. 12, destroyed a portion of the five-story building at West Forty-fourth Street and Tenth Avenue, New York, occupied jointly by the Gramercy Brass & Iron Works, and the Iron Specialty Mfg. Co., with loss estimated at $90,000 including equipment. It is planned to rebuild.

Work will commence on a new power plant at the works of the American Linoleum Mfg. Co., Linoleumville, Staten Island, to cost about $100,000 including equipment.

The Radio Corporation of America, Woolworth Building, New York, through its affiliated organization, the Federal Telegraph Co. of California, San Francisco, is perfecting plans for a group of radio stations in China to cost $13,000,000 and to be completed in 24 months. The central plant at Shanghai will be of 1,000,000 watt capacity, with seven steel towers, each 1000 ft. high, and power plant. Other stations will be at Pekin, Canton and Harbin. R. P. Schwerin, president of the Federal company, will be in charge.

The Crane Market

Although current business in overhead traveling cranes and locomotive cranes is slack, evidence of future activity, probably after the first of next year, continues to accumulate. There are a number of pending orders on overhead cranes, but buyers continue to delay award of the business. In addition there are projects planned or under construction that will undoubtedly result in fair inquiries for material handling equipment. The probability of future inquiry is reported to be particularly strong in the locomotive crane field, where current business is exceedingly light. Among pending inquiries in overhead cranes is one from the J. G. White Engineering Corporation, 43 Exchange Place, New York, calling for a 40-ton, 42-ft. 9½-in. span, 4-motor, overhead traveling crane for shipment to Manila, P. I. The Tottenville Copper Co., Tottenville, Staten Island, New York, has been receiving bids on a 15-ton, 72-ft. span, electric traveling crane, and Fox Brothers & Co., 126 Lafayette Street, New York, are obtaining prices on an 8-ton, 51-ft. 2-in. span, 3-motor, overhead traveling crane for shipment to Texas.

Much crane business is being figured against in the Pittsburgh district, but actual awards are few. Belief is strong that much steel company business will be placed before long, as the slowing down in steel orders will release labor for employment on necessary plant improvements. In addition to six cranes asked for by the Standard Sanitary Mfg. Co., for its new Baltimore plant, referred to a week ago, there will be one for the machine shop, bringing the total to seven. These cranes, all of 5 tons capacity, 47-ft. span, are slightly special, specifications calling for high-speed, quick-stopping and rigidity of structure. The Columbus Railway, Light & Power Co., Columbus, Ohio, is asking for three 35-ton electric traveling cranes for the new power plant that it will build near Columbus.

Among recent purchases are:

General Electric Co., Schenectady, N. Y., two 10-ton, 35-ft. span overhead traveling cranes for Schenectady, from Alfred Box & Co.

Heddon Iron Construction Co., Newark, N. J., a 5-ton, 40-ft. span, hand power crane, from the New Jersey Foundry & Machine Co., and two 3-ton and one 5-ton electric trolleys for single I-beam cranes, from the Shepard Electric Crane & Hoist Co.

Albany Pumping Station, Albany, N. Y., a 5-ton, 27-ft. span, hand power crane, from the New Jersey Foundry & Machine Co.

Federal Shipbuilding Co., Kearny, N. J., three 2-ton, single I-beam underhung hand power cranes, from the Chisholm-Moore Mfg. Co.

Michigan Central Railroad, Detroit, Mich., a 10-ton electric pillar crane, from the Whiting Corporation.

American Sheet & Tin Plate Co., a 10-ton, 70-ft. span, double trolley magnet and bucket crane for Vandergrift, Pa., from an Ohio crane builder.

Atchison, Topeka & Santa Fe Railroad, a 7½-ton electric traveling crane for the San Bernardino, Cal., shops, from the Shaw Electric Crane Co.

Northeastern Power Co., Milwaukee, Wis., a 20-ton hand power crane, from the Whiting Corporation.

Michigan Stamping Co., Detroit, Mich., a 10-ton electric traveling crane, from the Whiting Corporation.

United States Lead Co., a 5-ton, 52-ft. span electric traveling crane for its St. Paul plant from H. D. Conkey & Co.

W. T. Rawleigh Co., Freeport, Ill., a 10-ton, 38-ft. span, double girder, power house crane from H. D. Conkey & Co.

The Westinghouse Co., Weaver Street, Schenectady, N. Y., manufacturer of threshing machines and engines, has plans for a new factory at Shortsville, N. Y.

The Consolidated Gas Co., 130 East Fifteenth Street, New York, is arranging for a stock issue of $30,000,000, a portion of the proceeds to be used for expansion in plants and distributing system, and the installation of additional steam power equipment, generating apparatus and auxiliary machinery.

The New York Central Railroad Co., New York, has tentative plans for the electrification of its system south of Spuyten Duyvil. The project will be carried out in connection with relocation of lines and elimination of grade crossings, with estimated cost of $20,000,000. Additional generating and other power equipment will be installed.

The Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, has information regarding four concessions granted for the construction and operation of electric light and power plants in the Province of Cordoba, Argentina, for which equipment will be purchased, including names of interested concerns, File No. 109537.

The Rollet Numbering Machine Co., 688-704 Jamaica Avenue, Brooklyn, has filed plans for a one-story addition to its present two-story factory.

The Waldorf Garage Co., New York, has leased the six-story and basement building at 142-56 East Thirty-first Street, and will remodel the structure for a service, machine repair and garage plant, with capacity of 700 cars.

The Independent Electric Supply Co., 59 Warren Street, New York, has leased the five-story and basement building at 52-54 Murray Street for a new plant and headquarters.

The Logan Construction Co., 15 Park Row, New York, has inquiries out for a belt-driven air compressor, four air drills for stone work, and a portable concrete mixer.

The Hawaiian Contracting Co., Honolulu, T. H., has taken a contract for the construction of a deep water port at Kaumalapau Island, Land of Lanai, T. H., to cost about $500,000. Warehouses will be built, with the installation of cranes, loading and unloading machinery, conveying equipment, etc., for which bids will be asked at an early date.

The Little Wonder America Co., Brooklyn, has leased a portion of the building at 256 St. James Place, and will install precision machinery for the manufacture of clocks and clock mechanisms.

The plant of the Magna Metal Corporation, Doremus Avenue, Newark, has been acquired by Joseph T. Castles, 1113 Clinton Avenue, Irvington, for $85,000, and will be converted for another line of industrial manufacture.

Electric power equipment, mechanical drying machinery, conveying equipment and other machinery will be installed in the one-story addition to be erected at the plant of the Nairn Linoleum Co., Belgrove Drive, Kearny, N. J., 170 x 375 ft., estimated to cost $110,000.

Fire, Nov. 13, destroyed a portion of the plant of Diffany & Co., 436 Mulberry Street, Newark, manufacturers of metal goods, with loss estimated at $60,000. The structure was owned by the Manufacturers' Can Co. and leased to the Diffany organization. It is planned to replace the plant. Henry Diffany heads the company.

The Thermophor Mfg. Corporation, 143 Chambers Street, New York, has been incorporated with capital stock of $100,000 to manufacture heating equipment and devices, including metal ware for domestic and general use. The latter products are made of copper and nickel and the company is desirous of getting in touch with manufacturers equipped to produce these in large quantities. H. R. Bernard heads the company.

New England

BOSTON, Nov. 19.

THE purchase of $40,000 to $50,000 new equipment, largely production, by the American Bosch Magneto Corporation, North Main Street, Springfield, Mass. was the outstanding feature of the machine tool market the past week. The Saco-Lowell Shops, Boston, textile machinery, is buying some of the inexpensive equipment on its list, and the United Shoe Machinery Corporation, Beverly, Mass., planer equipment. Otherwise transactions continue few and far between, mostly in individual tools, and in some instances at price concessions or highly favorable terms to the buyer. No new inquiries exceeding three tools are reported, except from Western sources. In most cases these concern used equipment and are on an exchange basis.

The Marsden Steel Co., New Haven, Conn., recently organized with a capital of $100,000, will take over and expand the plant and business of the Marsden Co., 207 Orange Street, heretofore conducted as a partnership. It will specialize in the manufacture of iron and steel products for building construction, and expects to open branch offices in other cities. William R. Marsden is president and manager; C. E. Smith, vice-president and sales manager; and William E. Prindle, secretary and treasurer.

J. H. Sutherland & Co., Washington Street, Lynn, Mass., manufacturers of pattern-making machines, will increase the capacity of their works with the installation of additional equipment.

The Whitin Machine Works, Whitinsville, Mass., has acquired the property of the Whitinsville Cotton Mills, on a 400-acre tract and will take possession April 1. The structures will be remodeled for the manufacture of machinery and parts, and additional equipment installed.

The United Illuminating Co., Bridgeport, Conn., has engaged Westcott & Mapes, Inc., New Haven, Conn., engineer, to prepare plans for a new unit at its generating plant. It will consist of a steam power department, electric turbine room and switching department, doubling the present output, and will cost approximately $400,000 with machinery.

L. S. Crosby, 61 Dent Street, West Roxbury, Boston, operating a machine shop, plans the installation of a power hammer.

The Crown Mfg. Co., Providence, R. I., recently organized, will operate a plant at 37 Weybosset Street, for the manufacture of plated metal specialties, including jewelry novelties, etc. Morris L. Goldstein heads the company.

The Thomas Plow Co., Brunswick, Me., manufacturer of tractor-plows and other equipment, is planning for enlargements and the installation of additional equipment in machine shop and ironworking and woodworking departments.

The Columbia Cornice & Skylight Co., 268 Elm Street, Cambridge, Mass., has filed plans for a new one-story plant.

The Putnam Foundry Co., Putnam, Conn., has commenced the erection of a new one-story addition, 100 x 160 ft.

The Fuller & Thurber Co., 414 Albany Street, Boston, operating a woodworking plant, is planning for the installation of shafting, pulleys and other transmission equipment.

The Worthington Pump & Machinery Co., 265 Third Street, Cambridge, Mass., has awarded a general contract to the Canter Construction Co., Boston, for a one-story addition at its local plant, for which foundations will be laid at once.

The E. A. Eddy Machinery Co., Providence, R. I., is in the market for the following power presses: No. 404-A double-crank Bliss toggle press, No. 17 Toledo deep gap punching press, No. 6-A and 6½ Toledo open-back power presses.

Philadelphia

PHILADELPHIA, Nov. 19.

CONTRACT has been let by the Philadelphia & Reading Railroad Co., Philadelphia, to the Guarantee Construction Co., 140 Cedar Street, New York, for coal and ash bunkers, and handling equipment at its new power house, now in course of erection at Port Richmond, at a price of $35,000. Other contracts for machinery will be awarded soon. The company will double the capacity of its ore-handling plant at this point and has work in progress on a new coal-dumping plant to cost approximately $1,500,000 with machinery. It will be steam and electrically-operated, with capacity for handling 40 cars an hour; the different units will consist of dumping machine, power house, mechanical trimming plant, thawing house, car and boat haulage machines.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 4, for two upright drills for the Philadelphia and Boston navy yards, respectively, schedule 1582.

The Gulf Refining Co., Widener Building, Philadelphia, has plans for a new five-story oil storage and distributing plant on the Schuylkill River, near Penrose Avenue, estimated to cost $300,000 with equipment.

Fire, Nov. 13, destroyed a portion of the plant of the Cho-kr Mfg. Co., 3420 Market Street, Philadelphia, manufacturer of toys, etc., with loss estimated at $75,000, including equipment. It is planned to rebuild.

The Baldwin Locomotive Works, Broad and Spring Garden Streets, Philadelphia, is perfecting plans for the removal of its engine tender shop to the plant at Eddystone, Pa., where the department will be considerably increased. The other shops and mechanical departments will be retained at Philadelphia. The new Eddystone shop will cost $600,000.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, will commence the construction of a new power house at Cumberland Street and the Delaware River, to cost about $50,000.

The Consumers' Ice Co., 25 Fair Street, Trenton, N. J., will build a new branch ice-manufacturing plant at Morrisville, Pa. The machinery will be arranged for oil fuel operation. A storage plant with capacity of 2000 tons will also be built. The new works will cost $100,000 including equipment. D. Clinton Cook is head.

Two of the mechanical drying departments at the plant of the Certain-Teed Products Co., East State Street, Trenton, were destroyed by fire Nov. 15, with loss, unestimated, including equipment. It is planned to rebuild.

Manual training departments will be installed in the new two and three-story high school to be erected at Greensburg, Pa., estimated to cost $250,000, for which bids are being received on a general contract until Nov. 26. Maurice E. Kressley & Co., 10 North Fourth Street, Harrisburg, Pa., are architects.

The Pennsylvania Wire & Steel Co., Stroudsburg, Pa., is planning for the removal of its Buffalo plant to this location, and will provide facilities for additional equipment. The local works were recently established.

The Pennsylvania Power & Light Co., Allentown, Pa., will commence the construction of a new power house at Bethlehem, Pa.

The American Nickeloid Co., Peru, Ind., manufacturer of plated ware, has awarded contract to the Austin Co., Philadelphia, for a new branch plant at Walnutport, Pa., 70 x 100 ft., estimated to cost $25,000.

The Standard Heater Co., Williamsport, Pa., has contracted with the Lycoming Motors Corporation, with local foundry and plant, for its entire supply of stove and heater castings. The Lycoming company will devote a portion of its plant to this work and has preliminary plans for expansion.

Frank M. Waring, Tyrone, Pa., and associates, are perfecting plans for a hydroelectric generating plant on the Susquehanna River, near Clarks Ferry, vicinity of Duncannon, Pa., to cost $300,000 with transmission system.

Manual training equipment will be installed in the new high school to be erected at Easton, Pa., estimated to cost $900,000, for which bids will be asked on a general contract before the end of the month. W. M. Michler, Drake Building, is architect.

M. S. Kemmerer & Co., Sandy Run, Pa., will build a new mechanical coal washery at its anthracite properties. Electric power and other equipment will be installed.

Baltimore

BALTIMORE, Nov. 19.

WORK will start in the near future on the first unit of the Baltimore plant of the Standard Sanitary Mfg. Co., Pittsburgh, at Fifth Avenue and Seventeenth Street, where a 48-acre tract has been acquired. The buildings will comprise 350,000 sq. ft. of floor space and will include a 171 x 350 ft. warehouse; 154 x 345 ft. enamel shop; 102 x 197 ft. cleaning house; 97 x 589 ft. foundry; 100 x 250 ft. machine shop; 107 x 132 ft. power house, and 110 x 120 ft. enamel powder mill. The cost is estimated at about $3,000,000.

The Rennous-Kleinle Division of the Pittsburgh Plate Glass Co., 3221 Frederick Avenue, Baltimore, will build a four-story brick and steel addition, comprising about 50,000 sq. ft. of floor space, at a cost of $200,000.

The American Cellulose & Chemical Mfg. Co., Ltd., 15 East Twenty-sixth Street, New York, is perfecting plans for a new unit at its plant at Amcelle, Md., to cost $500,000 with equipment. The installation will include condensers, filter presses, refrigerating machinery, tanks and containers, electric power and pumping apparatus, blenders, mixing machines, etc. A. J. Fitch is general manager.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 11, for a quantity of hacksaw blades for Eastern and Western yards, schedule 1573; for 5955 machinists' hammers, for the Norfolk, San Diego, Mare Island and Puget Sound navy yards, schedule 1580; until Dec. 4, for 4730 pliers for the Portsmouth, Philadelphia, Brooklyn, Hampton Roads and other navy yards, schedule 1570, and until Dec. 11, for 404 carbon steel reamers, for the Norfolk, Mare Island and Puget Sound navy yards, schedule 1577.

The City Council, Savannah, Ga., is considering plans for the construction of a municipal electric light and power plant estimated to cost $1,500,000, including transmission system. Lawrence Manning is engineer.

The Bedford Hardwood Co., Bedford, Va., recently organized, has commenced the erection of a new plant. Inquiries will soon be made for equipment, including lathes, saws and other woodworking machinery, and electrical equipment. W. R. Dooley is president, and J. M. Stephens, secretary and treasurer.

E. P. Lindsay, 312 King Street, Portsmouth, Va., contractor, is in the market for a rock crusher machine, second-hand, in good condition, also a steam shovel.

The Hawkins Hardware Co., Harrisonburg, Va., has acquired the local plant and business of the Valley Hardware Co., and will take possession on Jan. 1. The new owner will consolidate the properties and occupy the four-story building of the Valley company. Extensions and the installation of additional equipment are planned.

R. H. Deaderick, Winston-Salem, N. C., has inquiries out for machinery for talc mining and grinding, including electric power equipment.

Manual training equipment will be installed in the new two-story junior high school to be erected at Durham, N. C., estimated to cost $200,000, for which bids are being asked on a general contract until Dec. 15. Milburn, Heister & Co., Durham, are architects.

The City Council, Durham, N. C., is arranging an appropriation of $1,500,000 for its hydroelectric generating plant on the Flat River, for municipal light and power service. W. M. Pratt is engineer. R. W. Rigsbee is city manager.

The Bureau of Foreign and Domestic Commerce, Washington, has information of a company at Barcelona, Spain, in the market for American stone-crushing machinery, concrete mixers and concrete chuting plants, No. 8113; also of a concern at Puerto Arenas, Chile, desiring to purchase machinery for the manufacture of hairpins and kindred metal goods, No. 8115.

The Ice Delivery Co., Norfolk, Va., is considering plans for five new ice and refrigerating plants in different sections of the city, with storage and distributing facilities, estimated to cost $250,000, with equipment. J. C. Prince is chairman of the board of directors.

The American Glass Works, Inc., West Broad and Meadow Streets, Richmond, Va., has inquiries out for a 100 hp. oil-operated engine and auxiliary equipment.

Bids will be received by the Purchase and Issue Subdivision, United States Veterans' Bureau, Washington, until Nov. 27, for miscellaneous equipment, including drills, hammers, mandrels, mallets and other tools; wheel buffs, grinding wheels, files, etc., circular VR-44.

Manual training equipment will be installed in the new high school to be erected at Raleigh, N. C., estimated to cost $300,000, for which bids will soon be asked on a general contract. C. Gordon Sayre, Raleigh and Anderson, S. C., is architect.

The Lyk Glass Corporation, Baltimore, has acquired the former plant of the Drop Forge Mfg. Co., in the Carroll Park section, for the establishment of a new plant. It is proposed to remodel the structure and install electric power and other equipment.

Electric pumping machinery will be installed by the Board of City Commissioners, North Wilkesboro, N. C., in connection with extensions and improvements in the municipal waterworks, for which a bond issue of $85,000, has been voted.

The Davis-Zirkle Lumber Co., Zirkle, Ga., has inquiries out for a 50-ton industrial locomotive.

The Wilmington Wood Products Co., Wilmington, N. C., is perfecting plans for a new factory in the Love Grove section, to cost about $80,000 including electric power and other machinery.

Manual training equipment will be installed in a number of the new schools to be erected at Baltimore, Md., by the Board of Education, for which an appropriation of $5,000,000 to $6,000,000 is available. A total of eleven structures will be built and architects will be selected at once to prepare plans. The board will receive bids at the office of the city register, City Hall, until Nov. 28 for equipment, tools and supplies for present schools, as per specifications on file at the office of John H. Roche, secretary, to be addressed to the Board of Awards, City Hall.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for one upright boiler, about 44 x 102 in., with 20 ft. stack; also for a 5 to 6 ft. band saw mill, without carriage.

The Elk River Clay Products Co., North East, Md., recently organized with a capital of $210,000, has acquired about 90 acres and will soon commence the erection of a new plant. It will include a power house and machine shop and is estimated to cost $80,000.

The Baltimore Tube Co., Inc., Baltimore, in inquiring for a roll grinder to handle chilled rolls from 12- to 24-in. in diameter. Also a roughing mill for brass and copper works, either new or second hand, complete with shoe plates and pinion, for rolls 22- x 36-in.

The New Bern Machine Shop & Foundry Co., New Bern, N. C., recently organized, has taken over the plant of the New Bern Iron Works & Supply Co., that city, and will operate a machine shop and foundry. Structural steel, shafting, flats and rounds, will be required. E. H. Williams in manager.

Pittsburgh

PITTSBURGH, Nov. 19.

THE Westinghouse Electric & Mfg. Co. is placing orders against its quarterly list. Besides a number of smaller tools, it has closed for two Bullard boring mills, a Pels punch and shear and a Becker milling machine. This constitutes the chief activity of the past week, although there has been a fair business from dealers' stocks. Agents and representatives of machine tool builders generally have found the past week quiet, but look upon this condition as merely seasonal and believe that with the completion of inventories more buying will develop.

Plans have been prepared for the erection of a one-story addition, 42 x 90 ft., at the plant of the Reznor Mfg. Co., Mercer, Pa., manufacturer of gas stoves, etc., to cost $30,000 with equipment.

The Advance Welding Co., Coraopolis, Pa., is planning the installation of additional welding and other equipment at its plant.

Electric pumping machinery, filters, steel stand pipe and other equipment will be installed by the City Council, McKeesport, Pa., in connection with proposed extensions in the municipal waterworks, for which bonds of $233,000 have been authorized. It is expected to take bids and award contracts before the close of the year.

The Pittsburgh & Lake Erie Railroad Co., Pittsburgh, is planning to rebuild the power house at its shops at McKees Rocks, partially destroyed by fire Nov. 13, with loss approximating $25,000 including equipment.

The Hale Coal Co., Houtzdale, Pa., is planning the installation of hoisting equipment and other machinery.

The American Die & Forge Co., Swissvale, Pa., has acquired the local plant of the Benner Tool Co., manufacturer of axes and edge tools, and will occupy the property for new works. It was secured for $137,000.

The Tidewater Coal & Coke Co., Vivian, W. Va., is planning the construction of a new steel tipple to replace a structure recently destroyed by fire. It will be equipped for a daily capacity of about 900 tons.

The Catholic School Board, Wheeling, W. Va., has engaged F. F. Faris, 1117 Chapline Street, architect, to prepare plans for a two-story and basement manual training school, 100 x 170 ft., at Elm Grove, estimated to cost $175,000, to replace a structure recently destroyed by fire.

The Keister Milling Co., Huntington, W. Va., has tentative plans under advisement for the installation of a cold storage plant. W. D. Keister is president and general manager.

The West Virginia Coal & Coke Co., Norton, W. Va., is planning the construction of a new steel tipple at Junior, W. Va., to replace a structure recently destroyed by fire. Additional machinery will be installed.

The La Go Coal Co., Iaeger, W. Va., recently organized with a capital of $100,000, is planning the installation of electric power and other machinery in the Tug River fields. T. B. and Carmie B. Lane, both of Iaeger, head the company.

The West Virginia Power Co., Charleston, W. Va., a subsidiary of the Virginian Power Co., same address, has preliminary plans for a new hydroelectric generating station in the valley of the New River, near the mouth of the Bluestone River, estimated to cost $500,000 with transmission system. In connection with its proposed generating plant at the mouth of Cabin Creek, the Virginian Power Co., will install a steam power station, with capacity of 1700 hp. boilers and auxiliary equipment, to be extended during 1924 with additional machinery to cost approximately $500,000.

The Holly Elk Coal Co., Clarksburg, W. Va., recently formed with a capital of $350,000, will install a complete mining plant on 1500 acres on the Elk River, near Centralia, W. Va., with electric power, hoisting and other equipment estimated to cost $100,000. A. C. McIntyre is president and George W. Lynch, treasurer, both of Clarksburg.

The Erie Steam Shovel Co., Erie, Pa., has plans for a one-story addition to cost $45,000, including equipment. The Osborn Engineering Co., 7016 Euclid Avenue, Cleveland, is architect and engineer.

Electric pumping machinery will be installed by the City Council, Charlottesville, W. Va., in connection with extensions and improvements in the municipal waterworks, for which bonds for $500,000 have been voted. B. A. Bennett is city engineer.

The A. M. Byers Co., 235 Water Street, Pittsburgh, manufacturer of wrought iron pipe, etc., has work in progress on a new pipe mill which will be ready for service at an early date.

The Carrier Chemical Co., Dunbar, W. Va., recently organized, will commence the erection of a new plant on a local tract of 7½ acres of land, lately purchased, with electric power and other machinery installation estimated to cost $65,000. M. T. Davis, Jr., is president, and C. F. Carrier, vice-president and general manager.

The Pure Oil Co., Pure Oil Building, Columbus, Ohio, has tentative plans for rebuilding the portion of its plant in the Cabin Creek section, near Charleston, W. Va., recently destroyed by fire with loss estimated at $100,000, including equipment.

The Cap Smokeless Coal Co., Charleston, W. Va., recently organized, is planning for extensions in the plant of the New River Coal Mining Co., lately acquired, including the installation of electric power and other machinery.

The Pennsylvania Engineering Works, New Castle, Pa., is inquiring for a multiple punch of 12-in. throat depth, with approximately 120 in. between housings and of design similar to Long & Allstatter No. D.

Chicago

CHICAGO, Nov. 19.

MACHINE tool inquiries from industrial sources are more numerous than at any time this year. While the volume of pending business is encouraging, the actual placing of orders will be deferred in many instances until after the first of next year. The Fullman Co., Chicago, which has just placed an order for a forging machine, is not expected to take immediate action on the remainder of its list, which includes a 30 x 30-in. x 12-ft., and two 36 x 36-in. x 12-ft. planers, five shapers and a number of other items. The A. O. Smith Corporation, Milwaukee, has placed an order for a 48-in. duplex milling machine, but purchases against its list published in this column a week ago, may not be made for some weeks.

Notwithstanding the general propensity to postpone buying as the inventory period approaches, some good-sized orders are being placed. The Illinois Steel Co. is understood to have closed for considerable additional equipment for its steel car wheel plant at Gary, including three special car wheel boring machines and three special wheel turning machines. The Remy Electric Co., Anderson, Ind., has ordered five engine lathes. There is a great deal of inquiry for sheet metal machinery, including punches and shears, power presses, power brakes and squaring shears, and scattered orders for single machines are being placed every week.

Current inquiries from the railroads are principally for one or two machines. The Illinois Central has issued inquiries for a slotter and a 24-in. x 10-ft. engine lathe. The Santa Fe is in the market for an automatic self-feed knife grinder, length 36 in., American No. 1131, or equivalent. The Chicago & North Western is inquiring for a portable crank pin truing machine, capacity 10 x 18 in. The Minnesota Steel Co. has taken figures on a No. 2 universal Cincinnati, or equivalent, milling machine.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: No. 1 cupola for the Insulating Products Co., Chicago, and four coke-fired brass furnaces for the Koehler & Latimer Co., Philadelphia.

The Meyercord Co., Inc., 133 West Washington Street, Chicago, manufacturer of decalcomania transfers and advertising signs, has awarded a general contract to Fred G. Bear, 19 South LaSalle Street, for a three-story reinforced concrete factory, 100 x 154 ft., at 5339 West Lake Street, to cost $200,000.

J. Wallace & Co., 1401 West Jackson Boulevard, Chicago, manufacturers of machinery have awarded contracts for a one-story saw-tooth factory, 112 x 150 ft., at West Adams Street and California Avenue, to cost $60,000.

The Goodman Mfg. Co., 4834 South Halsted Street, Chicago, manufacturer of mining machinery, has awarded a general contract to Jacob Rodatz, 209 South LaSalle Street, for a one-story mill construction factory, 60 x 140 ft., at 722-28 West Fiftieth Street, to cost $17,000.

The C. Stecher Co., 2301 North Knox Avenue, Chicago, has awarded contracts for a one-story machine shop, 72 x 104 ft., at 2452-58 Greenview Avenue, to cost $25,000.

The Radium Dial Co., which leased space in the former high school building at Ottawa, Ill., about a year ago, has purchased the structure and is remodeling it at a cost of between $15,000 and $25,000. The entire building will be used by the company.

The Asbestos Products Co., 2100 Fullerton Avenue, Chicago, is erecting a two-story addition, 50 x 150 ft., at a cost of $75,000. The building will be of mill construction with sprinkler system. Plans were prepared by Frank D. Chase, Inc., engineer and architect, Chicago.

The Iowa Light, Heat & Power Co., Rockwell City, Iowa, is planning the construction of a new electric power plant to replace its local station recently destroyed by fire.

The Common Council, Trenton, Ill., is planning the installation of electric pumping machinery at its new waterworks plant, for which plans are being prepared by W. A. Fuller & Co., 1917 Railway Exchange Building, St. Louis, engineers.

The Northern States Power Co., Minneapolis, Minn., has plans for a new four-story power house at 1075 First Avenue estimated to cost $90,000, including a portion of the equipment.

The Gustafson & Scott Mfg. Co., 4325 Wabansia Avenue, Chicago, manufacturer of cutlery, etc., will take bids for a new one-story plant on Lowell Avenue, 125 x 125 ft., estimated to cost $65,000. C. E. Frazier, 30 North Dearborn Street, is architect.

The Common Council, Columbia, Ill., is planning for the installation of electric pumping machinery at the new municipal waterworks, estimated to cost $50,000, for which plans are being prepared by W. A. Fuller & Co., Railway Exchange Building, St. Louis, engineers.

Buffalo

BUFFALO, Nov. 19.

WORK has commenced on an addition to the plant of the United States Gypsum Co., Oakfield, N. Y., 44 x 600 ft., for the manufacture of gypsum wall board and kindred products, estimated to cost $85,000 with machinery. Headquarters are at 205 West Monroe Street, Chicago.

The Diefendorf Gear Corporation, 324 Pearl Street, Syracuse, N. Y., is planning for enlargements and the installation of additional equipment. W. H. Diefendorf is head.

Electric pumping machinery will be installed by the Board of Public Utilities, Jamestown, N. Y., in connection with extensions and improvements in the municipal waterworks, for which bonds for $280,000 have been voted.

The Elba Cold Storage Co., care of C. K. Porter & Sons, 73 West Eagle Street, Buffalo, architects, will take bids at once for a two-story ice and cold storage plant, 100 x 140 ft., at Elba, N. Y., to cost $120,000 including machinery.

Electric pumping machinery will be installed in the addition to be built to the municipal waterworks by the City Council, Fredonia, N. Y., estimated to cost $200,000.

The Hull Steel Foundry Co., Ltd., Hull, Que., has plans for a branch works at Ogdensburg N. Y., 100 x 600 ft., consisting of foundry, machine shop, pattern shop and other departments, to cost $500,000 with machinery. A. H. Coplan is president.

The Dunkirk Axe & Tool Co., Dunkirk, N. Y., recently organized with a capital of $100,000, will take over and expand the local plant and business of the Romer Axe & Tool Co., Lion Street. It is purposed to install additional equipment at an early date. J. C. and M. E. Romer head the new company.

The Watertown Radio Service Co., 112 Park Street, Watertown, N. Y., is planning for the installation of equipment to manufacture wireless apparatus and electrical specialties.

The Borgenson Tool Co., Grape and Water Streets, Syracuse, N. Y., is planning for the installation of a number of machine tools and other equipment, including cutting tools.

The Hood Foundry, Front Street, Corning, N. Y., is planning to rebuild the portion of its plant destroyed by fire Nov. 5, including machine shop and foundry. Additional equipment will be installed. A. G. Hood is head.

The Batavia Iron Works, Inc., Batavia, N. Y., has been formed under State laws with capital of 3000 shares of stock, no par value, to take over and operate the former plant of the Batavia Car Works. It will be arranged for general iron working, locomotive repairs, etc. J. E. Fer-

guson and F. W. Allen, officials of the Ferguson-Allen Co., Buffalo, with similar works, head the new organization.

The Vetter Optical Co., Inc., Buffalo, is planning for the installation of machinery for lens manufacture on a floor of the building at 1271 East Ferry Street, including precision grinding equipment, etc. F. J. Vetter is head.

Milwaukee

MILWAUKEE, Nov. 19.

HESITANCY in machine-tool buying is becoming more pronounced, and while inquiry is moderately active, most prospective buyers are taking estimates under consideration for a longer time than usual. A slackening in orders from foundries and machine shops probably is accountable for this condition. The letdown in new business is not general, however. Most shops have enough business to operate at capacity until inventory time, but will not carry over much unfilled business into the new year unless there is better buying between now and Jan. 1.

The Chicago, Milwaukee & St. Paul Railway Co. on Nov. 15 laid off 2500 craftsmen in its West Milwaukee locomotive and car shops, explaining that it finally has caught up with demand for new freight cars. About 50 per cent of normal force is retained for repair work. The shutdown is general throughout the Milwaukee system, similar reductions in forces having been made at Green Bay, Wis., Minneapolis, Dubuque, Miles City, Deer Lodge, Tacoma and Austin.

The Rhinelander Boat Works, Rhinelander, Wis., has incorporated the Rhinelander Boat Co. with a capital stock of $50,000. It will erect an addition to double its capacity and besides building hunters' skiffs and pleasure craft intends to enter the power boat field and will also make a line of sportsmen's wood and metal specialties. William Cleveland is president and general manager.

The Service Auto Co., Ford dealer at Clintonville, Wis., contemplates the erection of a $50,000 sales and service building, 50 x 120 ft., part three stories and basement. Foundations will be laid during the winter. A. O. Haase is principal owner of the business.

The Advertisers Mfg. Co., Ripon, Wis., manufacturer of metal advertising signs, posts, etc., is purchasing some additional equipment, having arranged to enlarge its floor space by 5000 ft.

The village of Athens, Wis., Marathon County, has engaged W. G. Kirchhoffer, consulting engineer, 22 North Carroll Street, Madison, Wis., to design a complete municipal waterworks and sewerage system, to cost from $85,000 to $100,000. Plans will be ready for approval about Jan. 1, and bids will be taken about March 1. John Chefak is village clerk.

The Sunbeam Co., Milwaukee, has been incorporated with an initial capitalization of $10,000 to manufacture automobile accessories, equipment and hardware specialties. The incorporators are Frank C. Lewis, William M. Baumheckel and Kennedy L. Laffer, 535 Summit Avenue, Milwaukee.

Bartelson & Ness, Minot, S. D., are low bidders at $227,800 and $228,800, respectively, for two junior high and vocational schools at Appleton, Wis., designed by Perkins, Fellows & Hamilton, 814 Tower Court, Chicago. Aggregate low bids exceed the appropriation by $80,000, but it is planned to proceed with the work. Paul V. Cary, 803 College Avenue, is chairman of the building committee.

The Cream City Granite & Marble Works, 421-431 North Avenue, Milwaukee, has awarded contracts for an addition costing about $40,000, with additional grinding and polishing machinery, saws, hoists and cranes and motors.

The Steel Products Corporation, Sheboygan, Wis., has filed articles of incorporation. The capital stock is $100,000 and the incorporators are Fred Zschetzsche, A. L. Stuedeman and W. B. Collins, attorney, all of Sheboygan. Plans have not been revealed but are said to contemplate taking over a local foundry and machine shop for development.

The Wausau Parts Mfg. Co., Wausau, Wis., has been organized with $50,000 capital stock by W. C. Landon, W. F. Schofield and Karl Mathie, leading business men of the city, and will establish a plan to manufacture automotive parts, units and specialties, metal goods and kindred products.

The Oshkosh Mfg. Co., Oshkosh, Wis., is in the market for a punch and shear, capacity up to ½ x 2-in. mild steel, punching capacity, ½ x ¾-in.

Central South

ST. LOUIS, Nov. 19.

CONTRACT has been let to the Gamble Construction Co., 620 Chestnut Street, St. Louis, by the Green Foundry Co., 3003 North Broadway, for a new one and two-story foundry on Kingshighway Boulevard, estimated to cost $100,000, including equipment.

The Choctaw Portland Cement Co., Hartshorne, Okla., has tentative plans for a new works in the vicinity of Tulsa, Okla., to cost more than $200,000. It is purposed to remove the present mill to the new location and install additional equipment.

The Edgar Lumber Co., Wesson, near El Dorado, Ark., has preliminary plans for rebuilding the portion of its mill and power house destroyed by fire Nov. 9, with loss estimated at $150,000 including equipment.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has awarded contract to the J. F. Russell Co., M. E. Taylor Building, Louisville, for a five-story addition to its local plant at Sixth and Shipp Streets, to cost about $45,000. D. X. Murphy & Brother, Louisville Trust Building, are architects.

The Plough Chemical Co., Memphis, Tenn., has tentative plans for a new fertilizer works, including laboratory, machine shop, box factory and other departments, to cost about $400,000 with machinery. The project will mature early in January. Abraham Plough is president.

The Bartlesville Gas & Electric Co., Bartlesville, Okla., is disposing of a bond issue of $246,000, a portion of the proceeds to be used for extensions.

The Moore Brothers Electric Co., 215 West Douglas Street, Wichita, Kan., is planning for the installation of a lathe and other equipment.

The Warren Steel Casting Co., 3400 Maury Avenue, St. Louis, is having revised plans drawn for a new one-story foundry 60 x 200 ft., to cost $75,000. Oliver J. Popp, Odd Fellows Building, is architect. C. E. Hayden is president.

The Carroll County Utility Co., Eureka Springs, Ark., is completing negotiations for the purchase of the plant of the Harrison Electric Co., Harrison, Ark. It is proposed to build an addition and make improvements in the present station to cost about $160,000, with equipment. P. G. Walker is general manager.

The Baker Car Co., Lexington, Ky., recently formed to manufacture industrial cars and trucks, has awarded a general contract to the Blaw-Knox Co., Pittsburgh, for a one-story plant, 60 x 320 ft., with adjoining one-story structure, 26 x 30 ft. W. G. Baker is general manager.

The Common Council, Kansas City, Kan., is arranging a bond issue for extensions and improvements in the city electric plant, as follows: Additional 12,000 kva. turbo-generator, and auxiliary machinery, $375,000; 600 hp. boiler units, with miscellaneous apparatus, $150,000; additional transmission lines $200,000.

A special election has been called at Hannibal, Mo., Nov. 20, to approve a bond issue of $400,000 for extensions and improvements in the municipal waterworks, to include the installation of additional pumping machinery, motors and auxiliary equipment. D. H. Henry, 304 South Dearborn Street, Chicago, is engineer.

The Porter Provision Co., Bowling Green, Ky., is arranging for the installation of a cold storage plant in connection with a new packing factory, estimated to cost $50,000.

Frank L. Knox, Harrison, Ark., has tentative plans for the establishment of a local plant to manufacture turned wood products. Inquiries will be made at once for woodworking, electric power and other equipment, including several tools.

Manual training equipment will be installed in the new school to be constructed at Albany, Mo., to cost about $100,000. H. D. Pampel, Finance Building, Kansas City, Mo., is architect.

The St. Joseph Railway, Light & Power Co., St. Joseph, Mo., has preliminary plans for a new electric generating plant, to cost about $2,000,000 with machinery and transmission system. Surveys are being made for a power site.

R. N. Allen, care of the John E. Brown College, Siloam Springs, Ark., has inquiries out for power plant equipment, including two steam-turbo generators, 50 and 75 hp., and auxiliary equipment.

The Tennessee Electric Power Co., Chattanooga, Tenn., is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and improvements in power plants, and for the acquisition of additional properties.

The Common Council, Canton, Okla., is planning the installation of electrically operated pumping machinery at the

proposed municipal waterworks, for which a bond issue has been approved. V. V. Long & Co., 1300 Colcord Building, Oklahoma City, Okla., are engineers.

The Common Council, Watertown, Tenn., is planning for the installation of electrically operated pumping machinery at the proposed municipal waterworks, estimated to cost $50,000.

The Barking Coal Co., Barking, near Delma, Ky., recently organized, is considering the installation of electric power and other equipment at its local properties. J. D. Wheeler heads the company.

The Non-Acid Fertilizer Co., Gordonsburg, Tenn., recently organized with a capital of $400,000, is planning the construction of a new plant on local phosphate rock properties, to cost about $100,000, including equipment. John W. Fry is president, and J. C. Lowman, secretary.

The R. M. Kelly, Jr., Co., dealer in iron and steel products, Urban Building, Louisville, Ky., is inquiring for a belt-driven power bending brake to bend 3-16-in. steel plates 10 ft. long.

Cincinnati

CINCINNATI, Nov. 19.

INQUIRIES are more numerous and sales, in some lines at least, are improving. It is reported that a local manufacturer has booked substantial orders for machine tools for export to Russia, Brazil and Mexico. Little Japanese business is offering as yet, and action has not been taken on the Chinese inquiry mentioned last week.

The New York Central has postponed until Nov. 29 opening of bids on the large list recently issued. The Pennsylvania Railroad, in addition to buying a number of tools for its Columbus shops, has issued inquiries for its St. Louis and Mingo Junction plants. The Navy Department and the U. S. Shipping Board have inquiries out for engine lathes. The General Electric Co. is also in the market for equipment. Detroit and Chicago territories continue to furnish a goodly number of orders, particularly the former. Some local manufacturers expect to see a fairly good buying movement before the end of the year, as a number of corporations and railroads have indicated that they will spend the balance of their appropriations for this year, rather than turn it back into the general treasury. Prices generally are holding very firm.

The Hooven-Owens-Rentschler Co., Hamilton, Ohio, has plans completed for a pattern storage building, work on which will commence shortly.

The U. S. Engineers' Office, Louisville, Ky., will open bids Dec. 15, for furnishing and delivering operating machinery for locks and dams Nos. 44 and 45, Ohio River. Further information may be had on application.

The U. S. Engineers' Office, Huntington, W. Va., will receive bids until Dec. 10 for furnishing and delivering steel hull maneuver boat for Dam No. 32, Ohio River.

The Union Gas & Electric Co., Cincinnati, has completed plans for the erection of a power generating plant to cost about $20,000,000. A site has not yet been selected, but it will either be at Cincinnati or adjacent to the company's coal properties in West Virginia. W. W. Freeman is president.

The Paper Service Co., Cincinnati, has awarded contract for a manufacturing building, 79 x 125 ft., one-story of reinforced concrete, to the Ferro-Concrete Construction Co. Paper making machinery will be installed. The plant will be built in Arlington Heights, suburb of Cincinnati, where the offices and works of the company are located.

The City Council, Hamilton, Ohio, has passed an ordinance authorizing the sale of the municipal electric light plant to the Union Gas & Electric Co., Cincinnati, for $500,000. The latter company will contract to furnish power to the city at the present rate for 25 years. The sale of the plant will mean that the construction of the proposed new plant, the engineering work on which has practically been completed, will be abandoned.

The Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, is inquiring for a used No. 33 Lucas precision horizontal boring, drilling and milling machine with one plain supplementary 4-in. boring bar 7 ft. 8 in. long.

The Ohio Public Service Co., Alliance, Ohio, is disposing of a bond issue of $2,400,000, a portion of the proceeds to be used for extensions in power plants and system and the installation of additional equipment. T. O. Kennedy is vice-president.

The W. F. Robertson Steel & Iron Co., Elm and Commerce Streets, Cincinnati, has tentative plans for the construction of new works at Marietta, Ohio. W. F. Robertson is head.

Cleveland

CLEVELAND, Nov. 19.

INQUIRIES showed an increase during the week, several being for three or four machines. In some cases these are regarded as market feelers covering prospective business that may not be placed before January. The volume of sales is light. No business of any size is coming from automobile companies. Builders of turret lathes report a fair volume of inquiry for single machines. The National Screw & Mfg. Co., Cleveland, during the week purchased four or five lathes and has inquiries pending for a 36-in. and 30-in. planing machine; the General Phonograph Mfg. Co., Elyria, purchased a press and tapping machine and the Timken Roller Bearing Co., Canton, a large straightening machine. The Cleveland Hardware Co. has purchased 12 board drop hammers. The New York Central Railroad, which has a list pending, has sent out a supplemental list inquiring for three or four punching and shearing machines.

The J. B. Foote Foundry Co., Fredericktown, Ohio, will build an addition 30 x 100 ft. to be used as a cleaning department.

The Deckard-Mitchell Engineering Co., Cleveland, has purchased a factory in Shelby, Ohio, formerly occupied by the Shelby Tractor & Truck Co. and will equip it for the manufacture of automobile parts. H. C. Deckard, president, was formerly the plant manager of the Reliance Electric & Engineering Co., Cleveland, and has been connected with various automobile companies. C. M. Mitchell, who is associated with the company, has also been affiliated with motor car companies.

The Akron Barrow Co. is moving from Akron, Ohio, to 3140 East Sixty-fifth Street, Cleveland. It has been engaged in business in Akron for 30 years.

The Humphrey Mfg. Co., Mansfield, Ohio, is planning the erection of a factory building.

The Minerva Mfg. Co., Minerva, Ohio, will erect a three-story factory, 40 x 90 ft.

The Youngstown Boiler & Tank Co., Youngstown, Ohio, is planning the erection of two buildings, 40 x 400 ft. and 30 x 200 ft., respectively.

Indiana

INDIANAPOLIS, Nov. 19.

PLANS are being considered by the Edwards Valve Co., 145th Street, East Chicago, Ind., for the erection of an addition. W. W. Crawford is president and general manager.

The Wabash Valley Refining Co., Terre Haute, Ind., will commence the construction of the initial unit of its plant to manufacture lubricating oils, to cost about $45,000 with equipment. It will be located on the site of the former works of the Ball Brothers Glass Co.

The Indiana Glass Co., Dunkirk, Ind., is planning the construction of a new plant to cost in excess of $100,000, including machinery. Frank Murray is president.

Bids will be received by the Board of Marion County Commissioners, Marion, Ind., until Dec. 11, for two refrigerating plants to be installed at county institutions. Plans and specifications on file at the office of the auditor of Marion County.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Vincennes, Ind., estimated to cost $225,000, for which bids will be asked on a general contract early next year. John P. Bayard, 231½ Main Street, is architect.

The Union City Body Co., Union City, Ind., manufacturer of automobile bodies, has acquired a site and is arranging for the erection of a new plant. C. C. Koontz is secretary and treasurer.

S. B. Harting, Elwood, Ind., has acquired the plant and equipment of the Elwood Castings Co. at a bankruptcy sale. The new owner has plans under consideration for the organization of a company to improve and operate the works.

Detroit

DETROIT, Nov. 19.

PLANS are being drawn by the Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., for a one-story addition, 100 x 200 ft., to its paper mill on the River Road, to cost about $55,000. Billingham & Cobb, Press Building, are architects.

The Trippensee Body Co., 5685 Twelfth Street, Detroit, manufacturer of automobile bodies, has awarded a contract to P. J. Winter, Penobscot Building, for a one-story addition.

Fire, Nov. 7, destroyed a portion of the handle manufacturing plant of the D. A. Stratton Co., Atlantic Mine, near Houghton, Mich., with loss estimated at $150,000, including machinery. It is planned to rebuild.

The Cadillac Motor Car Co., 2060 Clark Avenue, Detroit, has awarded contract to the A. A. Albrecht Co., Penobscot Building, for three one-story foundry additions to cost about $400,000 with equipment.

The State Highway Department, Lansing, Mich., will have plans drawn for the construction of a central automobile service and repair works, with garage, at East Lansing, for motor trucks and cars used by the department. It will cost in excess of $150,000, including equipment and has been authorized by the State administrative board.

The Capitol Brass Co., 2306 Franklin Street, Detroit, will commence the erection of a new three-story plant, 60 x 150 ft., estimated to cost $100,000 with equipment. Raseman & Freier, Penobscot Building, Detroit, are architects.

The Pampa Lumber Co., Houghton, Mich., has tentative plans for rebuilding the portion of its mill and power house destroyed by fire Nov. 11, with loss estimated at $45,000, including equipment.

The Dunn Sulphite & Paper Co., Detroit, has taken title to property on the St. Clair River, Port Huron, Mich., as a site for a new pulp and paper mill, with power house, machine shop and other buildings, estimated to cost $500,000 including machinery.

The Stiner Piston Ring Co., 535 Larned Street, Detroit, has tentative plans for extensions and the installation of additional equipment. It is said that a plant site will likely be acquired at another location for the expansion.

The Wiley Battery Shop, Addison, Mich., is planning the installation of equipment for a new repair works, including a press, bench tools, etc.

Manual training equipment will be installed in the new three-story junior high school to be erected at Ironwood, Mich., estimated to cost $700,000, for which bids will be received on a general contract until Dec. 18. Croft & Boerner, 1006 Marquette Avenue, Minneapolis, Minn., are architects.

Gulf States

BIRMINGHAM, Nov. 19.

WORK will commence on an addition to the power plant of the Houston Light & Power Co., Houston, Tex., to cost about $100,000, including equipment.

The Transcontinental Oil Co., Forth Worth, Tex., has construction in progress on a new unit at its local refinery for the production of lubricating oils, and plans the early installation of machinery. A new gasoline plant is also being built and other extensions will be made. The company has an appropriation of about $1,500,000, for expansion.

The Mississippi Power & Light Co., Jackson, Miss., recently formed to take over local electric power properties, as well as plants and systems at Vicksburg, Columbus and Greenville, Miss., is disposing of a bond issue of $1,200,000, a portion of the proceeds to be used for extensions and the installation of additional equipment. H. C. Couch is president.

The Anniston Ice & Coal Co., Eighth and Atlanta Avenues, Anniston, Ala., recently formed, has plans for a new ice-manufacturing plant, 85 x 110 ft. A. L. Scarbrough is president and general manager.

The Oak City Furniture Co., Tuscaloosa, Ala., lately organized, is having plans drawn for a new factory, 100 x 100 ft. Electric power equipment will be installed. M. C. Rumley is president, and J. M. Nunally, general manager.

K. H. Smith, Austin, Tex., is organizing a company to build and operate an electric light and power plant in the vicinity of Elgin, Tex., to cost about $50,000. It is also proposed to build an ice-manufacturing plant.

The Ford Motor Co., Highland Park, Mich., has tentative plans under advisement for a new assembling plant at Dallas, Tex., on a tract of 20 acres. It will be one-story, 300 x 800 ft., estimated to cost $350,000 with machinery, supplementing the present plant at Henry and Williams Streets. A. J. Langford is southern manager.

The Alabama Polytechnic Institute, Auburn, Ala., is planning the construction of a new college of engineering, with electrical and mechanical departments, machine shop, laboratories, etc., for which a fund of $300,000 is available. Warren, Knight & Davis, Auburn, are architects.

The Decatur Cornice & Roofing Co., Decatur, Ala., has issued a list of equipment to be installed at its new plant, to replace the works recently destroyed by fire, including an electric traveling crane, one hand-operated crane, electric hoists, high speed drills, lathe, drill press, bolt and pipe threading machine, power hack saw, power punches, and other equipment. Both new and rebuilt tools will be considered. Henry R. Davis is secretary in charge.

The Tampa Sand & Shell Co., P. O. Box 921, Tampa, Fla., has inquiries out for one hoisting machine with 3 friction drums, about 30 hp. capacity; also, one 12 ft. bull-wheel, with derrick fittings, for a 55 ft. boom.

An electric power plant will be constructed by the Cowikee Mills, Inc., Eufaula, Ala., at its new textile mill at Union Springs, Ala., estimated to cost about $300,000. The entire machinery installation will approximate $150,000. Donald Comer is president.

The Hanlon Gasoline Co., Breckenridge, Tex., operated by Chestnutt & Smith, Inc., Tulsa, Okla., has preliminary plans for a new gasoline refinery with capacity of 50,000 gal. per day. It will also make extensions in its local oil refinery and install additional machinery. The entire project will cost about $2,000,000. Purchase has been made of the two local gasoline refineries and other properties of the Hi-Power Gasoline Co.

The Bessemer Galvanizing Works, 2321 Jefferson County Bank Building, Bessemer, Ala., has plans for the construction of a one-story works, 100 x 120 ft. The installation will include a 5-ton electric traveling crane and electric hoist with capacity of about 3 tons. The plant will cost about $35,000. William M. Clark is manager and construction engineer.

W. H. Dexter, P. O. Box 665, Jacksonville, Fla., machinery dealer, has inquiries out for a 60-in. veneer lathe, also for two fast-feed planers and matchers.

The Common Council, Malone, Tex., is planning for the installation of electric pumping machinery in connection with a new waterworks plant, for which a bond issue is being arranged. The local Chamber of Commerce is interested in the project.

In connection with its proposed new plant at Attalla, Ala., the Compress Buckle Co., Memphis, Tenn., is planning the establishment of a new department to manufacture wire rivets, coat hangers and kindred steel wire products. The company has contracted with the Gulf States Steel Co., Birmingham, for a minimum supply of 600 tons of wire per annum.

The Montgomery Sand & Gravel Co., Montgomery, Ala., recently formed, is planning the development of properties in the vicinity of Mount Meigs, Montgomery County. A power house will be built. All machinery will be electrically-operated, including hoisting, conveying and other apparatus. The installation will cost about $150,000. H. G. Ireland is president and C. B. Ireland, general manager.

The Bessemer Galvanizing Works, Bessemer, Ala., in its new plant will galvanize large tanks up to 8 ft. in diameter, structural material up to 56 ft. long and other materials such as castings and pipe. It was erroneously stated in these columns previously that bolts, nails, etc., would be galvanized. W. M. Clark is manager.

Pacific Coast

SAN FRANCISCO, Nov. 14.

PLANS are being arranged by the Samson Tire & Rubber Corporation, Compton, Cal., for enlargements totaling about 50,000 sq. ft. of floor space. It is proposed to install machinery to double the present output. Adolph Schleischer is president.

The Pacific Pipe Co., Main and Folsom Streets, San Francisco, desires prices on nipple machines and is in the market for one or more.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, manufacturer of enameled iron sanitary ware, has awarded a general contract to Cahill Brothers, 110 Sutter Street, San Francisco, for its five-story and basement works and distributing plant, 100 x 180 ft., at Ninth

and Brannan Streets, to cost about $285,000. Weeks & Day, 315 Montgomery Street, San Francisco, are the architects.

The American Crushed Rock Co., 622 American Bank Building, Los Angeles, is planning the construction of a new plant on a 170-acre tract in the San Antonio Wash, Claremont, Cal. The initial machinery installation will provide for a daily output of about 50 cars and is estimated to cost $150,000. Most of the equipment will be electrically-operated.

The Ditlefson Machine Works, Seattle, Wash., has acquired property in the South Lake Union District, and has preliminary plans for the erection of a new factory.

The San Joaquin Portland Cement Co., Three Rivers, Cal., is perfecting plans for a new cement mill with initial capacity of 3500 bbl. per day, estimated to cost $1,000,000 with machinery. A power plant and machine shop will be built. G. F. Hamburg and F. A. Parker, both officials of the Old Mission Portland Cement Co., 608 Crocker Building, San Francisco, head the company.

The Vanderuff Petroleum Co., Inc., San Francisco, is planning the construction of a new refinery in the vicinity of Devil's Den, Lost Hills section, to cost $60,000. It will have an initial output of 250 bbl. per day. W. S. Hillyer is superintendent.

The Tacoma Gas & Fuel Co., Tacoma, Wash., is planning the construction of a steam-operated power plant in connection with a new artificial gas manufacturing plant, estimated to cost $250,000 with machinery.

The Western Oxygen Co., Los Angeles, manufacturer of industrial oxygen products, is taking bids for a new plant on Fifty-eighth Street. Oliver G. Bowen, Van Nuys Building, is engineer.

Ernest C. Hillman, 2317 East Sixteenth Street, Los Angeles, will commence the construction of a new machine shop, 60 x 102 ft., at 749-51 Kohler Street, to cost $14,000 exclusive of equipment.

The Turlock Irrigation District, Turlock, Cal., has approved a bond issue of $500,000, the entire fund to be used for extensions in the electrical plant and system, including power substations and machinery, transmission lines, etc.

Canada

TORONTO, Nov. 19.

THE machine tool trade is finding a plentiful supply of inquiries, but sales are small in comparison. The demand as a whole, however, is good and while the majority of sales is for one or two tools, practically all industrial activities are covered. Inquiries are out for some fairly good sized lists, but it is not expected that much of this business will be closed until after the first of the year. The Canadian railroads are conservative buyers for car shops, chiefly for replacements. The automotive industry is also a good customer and an active demand is reported for tools in small numbers for garages and repair shops. The woodworking industry is showing renewed interest and orders for sawmill and lumber mill machinery are increasing.

The Dickey Woodworking Mills, Stewiacke, N. S., is in the market for machinery and tools for a planing mill.

The township of Teck is preparing to install an electric lighting plant at Swastika, Ont. M. Campbell, Kirkland Lake, Ont., is clerk.

J. Diffen, Welland, Ont., and R. W. Wright, Dunkirk, N. Y., will establish a plant at Port Colborne, Ont., for the manufacture of brick, etc., and are asking for equipment.

The Canadian de Vains Process Co., Montreal, is in the market for special machinery for the manufacture of cellulose pulp, paper products and by-products. L. G. Bell, 107 St. James Street, is purchasing agent.

The Swift Canadian Co., Ltd., will start work at once on the erection of three packing plants at Sapperton, B. C., to cost $250,000.

The Beaver Truck Corporation, Ltd., Hamilton, Ont., has awarded the general contract to John Patterson for foundation work in connection with a $150,000 factory to be erected on Queen Street East, Brampton, Ont.

C. Alfred Maguire, chairman of the Board of Control, Toronto, Ont., will receive bids until Jan. 15 for one air compressor and one 3,000,000 Imperial gal. centrifugal sludge pump and motor.

The North Shore Power Co., Baptiste Power Building, Three Rivers, Que., is having plans prepared for a hydro-electric power house and mills on River Batiscan, to develop 5000 hp. The present power plant will be demolished and the new one erected on the site. J. C. Smith, Montreal, is engineer.

The Ottawa River Power Co., Ltd., Montreal, has awarded the general contract for a dam and power house at Calumet Island Falls, near Bryson, Que., to Fraser, Brace, Ltd., 83 Craig Street West, Montreal, at $2,000,000. William Kennedy & Sons, Ltd., Montreal, and Dr. L. A. Herdt are engineers. William Kennedy, Jr., will buy the hydro machinery and Dr. L. A. Herdt will buy the electrical machinery and equipment.

The Hull Steel Foundries, Ltd., Hull, Que., has purchased the Skilling, Whitney & Barnes Co. property at Ogdensburg, for the manufacture of steel grates, fireboxes, and locomotive parts.

The J. C. Wilson Mfg. Co. Box 308, Belleville, Ont., is in the market for a 10-ft. boring mill. A second-hand machine in good order will be considered.

The T. E. Bissell Co., Ingersoll, Ont., manufacturer of agricultural implements, etc., is in the market for metal-working machinery, lathes, drills and special equipment for a machine shop.

The Canada Steamships, Ltd., Victoria Square, Montreal, will purchase equipment for a coal handling plant at Fort William, Ont.

Compagnie de Poinconneuse Automatique de Fiches, Ltd., Ottawa, Ont., is asking for machinery and tools for the manufacture of self-feeding gang punching machines. G. E. Robert, 301 King Edward Avenue, Ottawa, is purchasing agent.

L. N. Haurd, 129 Commerciale Street, Levis, Que., proposes to install an electric power development plant of 17,000-hp. capacity on the Megiscane River, Temiscaminque County, and also the erection of newsprint and pulp mill to cost $2,000,000.

The Walsh Electric Co., 456 Church Street, Toronto, has purchased a site at 255 Church Street, for manufacturing purposes. The present building will be razed and a new four- or five-story factory will be erected.

The Kaustine Co., Ltd., Dundas, Ont., manufacturers of sanitary closets, etc., has let the general contract to F. G. Haskings & Co., for a factory addition.

The Yellow Cab Co., Ltd., Montreal, a subsidiary of the Yellow Cab Mfg. Co., Chicago, Ill., recently incorporated here, proposes to erect a Canadian manufacturing plant to manufacture and repair taxicabs, etc. The high cost of importing cabs from the United States is the reason given for the locating of a plant in the Dominion. The Montreal sales office of the company is at 120 St. James Street.

The Town Council, Port Colborne, Ont., contemplates the construction of a waterworks plant to cost $90,000, to include storage basin, pump house, two 750-gal. motor-driven pumps, one 1500-gal. gasoline driven pump; three pressure filter units, a 2,000,000-gal. elevated tank, etc. E. H. Darling, Home Bank Building, Hamilton, Ont., is engineer.

Belleville, Ont., proposes to erect a pumphouse and to install a gasoline driven fire pump of about 3,000,000-gal. capacity, estimated to cost $35,000. Gore, Nasmith & Storrie, Confederation Life Building, Toronto, are engineers.

Western Canada

J. Overlin, Portland, Ore., contemplates the erection of plant on Granville Island, Vancouver, B. C., for the manufacture of motor trucks, automobiles, etc.

J. H. Scott, Marpole, Point Grey, Vancouver, B. C., proposes to erect a factory for the manufacture of fertilizers, etc.

Equipment for Australian Railroads

WASHINGTON, Nov. 20.—The Industrial Machinery Division, Department of Commerce, has announced that the Victorian Government Railways, Melbourne, Australia, are inviting bids on the following machinery and equipment:

One spring coiling machine and all necessary equipment, including a set of electrical motive apparatus.

One taper rolling machine, including electrical motive apparatus.

One combination turret lathe, including leading screws and nuts and taper turning attachment.

One gear cutting machine.

One automatic cross cut saw.

One cross grooving and trenching machine.

One planing and thicknessing machine, including side cutters.

Tenders close at Melbourne on Jan. 9, 1924.

A copy of specifications covering the equipment may be consulted by interested manufacturers at the Boston and New York district offices and at the Cincinnati cooperative office of the Bureau of Foreign and Domestic Commerce.

STEEL AND INDUSTRIAL STOCKS

The range of active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	41⅛	42⅝	Int. Har.	74½	76⅝
Allis-Chal. pf...	91	91	Jones & L'lin pf.	107⅝	108
Am. B. S. & Fdy.	72⅜	75⅜	Lima Loco.	63½	68¼
Am. B. S. & F. pf.	104	104	Midvale Steel ..	20½	21
Am. Can	70⅛	70⅞	Nat.-Acme	7	7½
Am. Can pf.....	108⅝	109¼	Nat. En. & Stm.	37⅝	41⅞
Am. Car & Fdy.	159	164	N. Y. Air Brake.	87	88½
Am. C. & F. pf..	121½	121½	Nova Scotia Stl..	14½	14½
Am. Locomotive ..	74⅝	77⅜	Otis Steel	7¾	8¼
Am. Loco. pf....	118¼	118¼	Otis Steel pf....	46½	48
Am. Radiator ..	82	86	Pressed Steel Car	50	52
Am. Steel Hdres.	57⅛	58⅛	Pressed Steel pf.	86	87
Am. Stl. Fd. pf..	100½	101½	Replogle Steel ..	99	101
Bald. Loco.	122⅝	127⅝	Republic	45½	48
Bald. Loco. pf....	113	113	Republic pf.	90	90
Bethl. Steel	48⅝	51⅜	Sloss-Sheffield ..	48	51¼
Beth. Stl. 7% pf.	89	89⅜	Sloss-Sheffield pf.	79	80½
Beth. Stl. 8% pf.	102	102	Steel of Canada	69	69
Br. Em. Steel...	41⅜	43½	Superior Stl. 1 pf	98⅜	98⅜
Br. Em. Stl. 2 pf.	124½	133½	Un. Alloy Steel..	31	31
Chic. Pneu. Tool	80	81¼	U. S. Pipe	36⅜	40⅜
Colo. Fuel	22¾	23⅝	U. S. Pipe pf.....	83	84
Crucible Steel ..	63	66	U. S. Steel.....	91¾	95⅛
Crucible Stl. pf..	90½	91⅝	U. S. Steel pf...	118⅝	120⅛
Deere pf.	62	63	Vanadium Steel..	28⅝	31¼
Gen. Electric ..	178¼	182½	Va. I., C. & Coke	53	54
Gt. No. Ore Cert.	30	32	Whouse Air Br..	80⅜	81
Gulf States Steel	78	81⅞	Y'gstown S. & T.	64¼	66

Wheeling Steel Corporation Report

Report of the Wheeling Steel Corporation for the quarter ended Sept. 30, showed net profit of $1,214,142 after depreciation, interest, etc., equivalent after regular dividends on preferred stock to $1.58 a share earned on $39,402,786, outstanding common stock. Net profits for the first nine months of 1923 were $4,006,467 or $5.68 a share on the common stock after preferred dividend requirements. The income account for the quarter and nine months ended Sept. 30 follows:

	Sept. Quarter	9 months ended Sept. 30.
Total income	$2,283,203	$7,112,221
Depr. and exh. of min..	717,665	2,274,421
Interest	351,396	831,333
Net profit	$1,214,142	$4,006,467

Dominion Alloy Steel Corporation Plans

The Dominion Alloy Steel Corporation, Ltd., Sarnia, Ont., is offering $3,000,000, worth of 8 per cent cumulative convertible preferred stock as a part of the financing of this new organization. The company was formed for the purpose of erecting a modern plant at Sarnia, for the manufacture of alloy, high carbon and special quality steel, the plant to include both open-hearth and electric furnaces, rolling mills, heat treating plant, machine shops and testing laboratories. The company has acquired a manufacturing site of 250 acres on the St. Clair River, adjoining the city of Sarnia. Authorized capital consists of $7,500,000 in 8 per cent cumulative convertible preferred stock, par value $10, and $7,500,000 in common stock, par value $10. William B. Boyd, Toronto, Ont., formerly electrical engineer, Illinois Steel Co., Chicago, and at one time chief electrical engineer of the Dominion Iron & Steel Co., Sydney, N. S., is president, and the directorate includes C. Harold Wills, Marysville, Mich., president C. H. Wills Motor Co., Marysville, Mich.; George A. Simpson, Hamilton, Ont., formerly sales manager and special representative of the Steel Co. of Canada, Ltd., Hamilton, and J. J. Mahon, Newark, N. J. consulting steel metallurgist, formerly chief engineer of the Crucible Steel Co. of America.

Industrial Finance

President Wylie R. Reynolds of the Reynolds Spring Co. states that although business during the last quarter of the current year is "normally slow" it will be the best quarter of the year, "exceeding the third quarter, when net income after taxes and charges amounted to $112,000." Net earnings for the first nine months of 1923, before Federal taxes and depreciation, were $330,285., as compared with $241,300 for the corresponding period in 1922. Total assets of the company on Sept. 30, 1923, amounted to $3,120,973, of which $1,346,429 represents total current assets. This compares with total current liabilities of $21,847. Net surplus at the end of September was $444,043.

Net earnings of the Sloss-Sheffield Steel & Iron Co. for October amounted to $153,004 for stock, compared with $125,394 in September. Earnings over the ten months were $2,306,282, equal after preferred dividend requirements to $19.15 per share on 100,000 common shares.

The Acade Malleable Iron Co., Springfield and Worcester, Mass., has sold $550,000 7 per cent first mortgage sinking fund bonds dated Nov. 1, last, and maturing in 1943 at par and accrued interest. Money derived from the sale will be used in connection with the acquisition of properties. H. P. Blumenauer, Worcester, is president and general manager.

The board of directors of the International Oxygen Co., Newark, N. J., at the meeting on Nov. 10, declared a dividend of $3 per share on all outstanding stock, payable on or about Dec. 15.

The balance sheet of the Bock Bearing Co., Toledo, Ohio, as of Oct. 1, showed current assets, less all reserves, of $477,337, including cash of $34,302, against which stand total liabilities of $198,657. The company has no bonds or long-time notes. At a recent meeting a new directorate was elected, vesting control of the company in the hands of preferred stockholders, as stated in THE IRON AGE of Nov. 8, page 1287.

Stockholders of the Pittsburgh Steel Co., Pittsburgh, have approved an increase in capital from $14,000,000 to $19,000,000.

The United States Hammered Piston Ring Co., Bath, N. Y., has arranged for a change of name to the Royal Piston Ring Co.

The Packard Motor Car Co., Detroit, shows net profit for the year ended Aug. 31, of $7,081,879 after expenses, interest, taxes, etc., equivalent after preferred dividends to $2.54 a share (par $10) earned on the $23,770,200 common stock. Figures for 1922 showed a net profit of $2,115,828 or 90 cents a share on outstanding $11,885,100 common stock. Sales for this year totaled $55,670,464, or an increase of nearly 50 per cent over 1922.

Gross business of the Hayes Wheel Co. for the ten months ending Oct. 31 totaled $15,716,000, compared with $12,968,000 for the entire year 1922. Net earnings will not be disclosed until the end of the year, but are reported unofficially to be at the rate of $9 or $10 a share on common stock.

Sales of the Studebaker corporation for the first nine months of 1923 totaled 122,586 cars as compared with 90,252 for the corresponding period in 1922. Net sales amounted to $139,021,191, an increase of $30,532,435 over last year's corresponding nine months. The actual number of cars produced during this period was 124,155. Net profits from sales, after deductions for taxes, reserves and expenses, amounted to $18,226,254 for the period, against $15,640,374 for that period in 1922, an increase of $2,585,880.

The United States Cast Iron Pipe & Foundry Co. has declared a dividend of ½ per cent on common stock and an equal amount as an extra disbursement on preferred, bringing total payments on the latter to $7.50 in 1923. It is understood that the extra payment was declared for the purpose of testing the right to distribute more than 7 per cent on the senior stock in one year.

Expansion of the Chevrolet Motor Co.

The Chevrolet Motor Co., division of General Motors Corporation, has increased its manufacturing facilities so that a production of approximately 2500 cars per day can be maintained. During the past three years, each of the seven older plants manufacturing or assembling Chevrolet cars, trucks and parts has been enlarged and five new plants have been added. In 1921, 77,605 vehicles were produced. In 1922, 242,373 Chevrolet cars and trucks were sold in the United States and exported and production this year will approach the half million mark. The main plant at Flint has been increased to a total floor space of 1,335,000 sq. ft. and the St. Louis assembly plant now contains 1,127,800 sq. ft. of manufacturing space. The Oakland assembly plant has been increased to almost half a million feet, and the Tarrytown assembly plant is 50 per cent in excess of this unit. The large General Motors plant at Janesville, Wis., has been converted to the assembling of Chevrolet cars and this factory contains approximately 500,000 sq. ft., and in addition, new plants have been erected at Buffalo and Cincinnati, totaling together over a half-million sq. ft.

The other plants, engaged in the production of Chevrolet axles, gears, forgings, transmissions and small parts, in Detroit, Toledo and Bay City, bring the grand total of floor space devoted to the manufacture and assembly of Chevrolet cars, trucks and parts up to 5,427,393 sq. ft. The number of employees in the 12 plants devoted to the manufacture of Chevrolet products now totals 22,675 and is being increased from time to time.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

	Blue Annealed Per Lb.	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
No. 10	4.20c. to 4.59c.		
No. 12	4.25c. to 4.64c.		
No. 14	4.30c. to 4.69c.		
No. 16	4.40c. to 4.79c.		
Box Annealed—Black			
Nos. 18 to 20		4.30c. to 4.70c.	
Nos. 22 and 24		4.35c. to 4.85c.	5.10c.
No. 26		4.40c. to 4.90c.	5.15c.
No. 28		4.50c. to 5.00c.	5.25c.
No. 30		4.70c. to 5.20c.	....

No. 28 and lighter, 36 in. wide, 20c. higher.

	Galvanized Per Lb.
No. 14	4.60c. to 5.10c.
No. 16	4.75c. to 5.25c.
Nos. 18 and 20	4.90c. to 5.40c.
Nos. 22 and 24	5.05c. to 5.55c.
No. 26	5.20c. to 5.70c.
No. 27	5.35c. to 5.85c.
No. 28	5.50c. to 6.00c.
No. 30	5.95c. to 6.45c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel Black	Galv.	*Wrought Iron* Black	Galv.
⅛ in. Butt.. —41	—24	⅛ in. Butt.. — 4	+19
¼ in. Butt.. —46	—32	¾ in. Butt.. —11	+ 9
1-3 in. Butt.. —48	—34	1-1½ in. Butt —14	+ 6
2½-6 in. Lap. —44	—30	2 in. Lap.... — 5	+14
7-8 in. Lap.. —41	—11	2½-6 in. Lap — 9	+ 9
9-12 in. Lap. —34	— 6	7-12 in. Lap. — 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 27¼c.
Brass tube, seamless	22¼c. to 23¼c.
Copper tube, seamless	23½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 20c. to 21c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14 x 20 Prime	Seconds
			80 lb.. $6.55	$6.30
			90 lb.. 6.65	6.40
			100 lb.. 6.75	6.50
IC..	$12.55	$10.70	IC.. 7.00	6.75
IX..	13.95	12.55	IX.. 8.25	8.00
IXX..	15.55	13.75	IXX.. 9.50	9.25
IXXX..	17.10	15.30	IXXX.. 10.75	10.50
IXXXX..	18.85	16.80	IXXXX.. 12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	45c.
Bar	50c. to 55c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8c. to 8½c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	32c.
No. 1 solder	30c.
Refined solder	26c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	11c. to 12c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals

Prices continue fairly firm but demand is quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light bottoms	9.00
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	8.00
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.25
Sheet aluminum	15.25

THE IRON AGE

New York, November 29, 1923

ESTABLISHED 1855 VOL. 112, No. 22

Help Wanted by Technical College Man

His Case of Misapplied Studies and Unwise Selection of Jobs —Of Prime Importance Is Need in Engineering Schools of Capable Adviser to Graduate and Student

BY GEORGE P. BOWMAN

MR. BOWMAN is manager of the executive and technical departments of the National Employment Exchange, 30 Church Street, New York. Mr. Bowman interviews, every year, it is estimated, about 12,000 men in executive, engineering and technical classifications—ranging from the college graduate of about twenty-two years of age to the man of fifty years and upward. "Out of any 100 men," he says, "there would not be more than one who would want to follow pure engineering after he had been out of school two years or more." This indicates to Mr. Bowman that most college men want to make money, that the majority of them are not of the highly altruistic self-sacrificing class who care to follow the sciences. They have, he adds, the thought of being able to work toward "an obscure and idealistic horizon," but at the same time there is the idea of a tangible demand for service that will enable one to make a musical sound when he has his hands in his pockets.

TO sell a college education to a man and not to offer him concurrently proper practical expert guidance and advice, based upon a thorough knowledge of various fields of employment to which he may attach himself, is as wise as for a "character analyst" or "vocational counsellor" to tell a young man that he should become a chemist or a production man, but then not tell him which particular branch of chemistry (or his chances of success based upon the past and prevailing rates of pay for unusually competent chemists) or what branch of production work. It is a fallacy to speak of chemistry or production as a field to work in, for no man really can be a chemist in the entirety any more than he can be a mechanical, civil, electrical or chemical engineer in the entirety.

A tremendous amount of misdirected effort could be saved and failure would be avoided if, starting with the freshman class in college and continuing to graduation, the idea could be hammered into students that two main paths are open for them on graduation: (1) the pursuit of the purely technical or specialization side of the courses; that is, the technical man's going into any position where he could immediately use his education; (2) the acquisition of a business education in an organization in which some years later could be utilized the information obtained in the course taken at college. One thing should be particularly impressed upon those taking the engineering courses and that is—*the drafting room dodger seldom becomes anything in engineering executive work.*

The fields of endeavor that can be chosen upon leaving college are so thoroughly specialized today, or so tending toward specialization, and the demand changes so frequently that it is bewildering in the extreme for any man to know what to do or how to do it when he comes out of school.

The First Job After Graduation

Misconceived and misdirected effort in selecting a college course and the position after graduation can be illustrated particularly well in the case of civil engineers. Almost invariably on leaving college they take up work entirely outside of the civil engineering profession and obtain positions no better than could be obtained in work, where at least they would have the opportunity some day, if not immediately of using their particular engineering education.

The outside positions that are available to civil engineers are only desirable from the standpoint that they do allow of open air work. And in practically all cases this was the reason that the civil engineering course was taken up. But on sober thinking and becoming conscious of the wish to get married, these outside men find it necessary to get into positions that have higher financial attraction than most outside jobs hold. There is an awakening at this point when another position is sought of a more confining character. The primary experience obtained in outside work is seldom transferable or of a character that can be commercialized, which undesirable feature might have been avoided had the young man been counselled properly before entering college and on graduating from it.

Apparently no great stress is laid during college days to make the young men realize that their value to any organization will depend upon the organization's ability to replace them. If, on leaving college, the graduate is employed in a class of work where he immediately uses his college education as a means of

THE engineering graduate needs reminding that the college education does not necessarily have to be used in its entirety.

earning the salary paid him, it is probable that he can easily be replaced, but where he is taken on to be trained and where he does not immedately use his education, he becomes more valuable each day to that organization.

In choosing a vocation the far-seeing young man selects a class of business where the experience can be transferred preferably to a countless number of businesses. The more specialized the line of business is, the smaller the market he can go to with his services, the less the amount of competition for his services and less the certainty that salary will be in inverse proportion to the supply of men. When positions are scarce the young man just out of college loses his sense of proportion, or else the one who paid his tuition does, and instead of investing a little more incidental to searching for a position of a desirable character, there is a frantic, although successful, effort to connect with a position. About one or two years later there is a frantic effort to get out of it and obtain a positon at a higher starting salary than paid the new graduate. The ability to get it depends on the market for the particular class of experience absorbed. "Try and get it" applies here.

Need of Employment Counsellor in College

There are quite a number of positions that are nearly always available for college men, no matter how few jobs there may be in other lines, that are in the nature of traps. This fact explains the constant turnover that makes such positions always available at a good starting rate. Common sense advice might save these young men many lost years of practically valueless experience, viewed from a trading standpoint, which probably is the only standpoint to be considered when the improbability of "hitting it" on the first or second job is concerned.

A few of the universities have some one employed as a placement man. He serves at a salary in proportion to what is paid the ordinary college instructor, but the advice is not likely to be broad gaged enough to meet a condition that requires a man of the highest type obtainable in the personnel or employment profession. The colleges need men who will spend considerable time in reviewing the experience of their graduates and in keeping abreast of the trend of development in science, art and industry in general, so that they may be able to offer well

SHOOTING at the stars as practiced by most men means evading hard work and the "bottom steps."

formulated and thorough suggestions based on facts as to the branches of occupation for which it might be well to take special training.

It would seem that no more important function could be incorporated into a college curriculum than to have as part of it the offering of advice to those who will accept it on the subject of the course they are taking up. This could include what particular businesses or professions can be trained for and what opportunities and special requirements are necessary. Then the matter of taking up an education is not left in the hands of parents or friends who advise the young man to take up electrical engineering because "it is the coming thing" or chemistry "because of the wonderful opportunities in that field, etc."

It might be explained to the young man with the idea of taking up chemistry that Charles M. Schwab studied chemistry but did not take it up with the idea of becoming a chemist, but to have a metallurgical chemist's knowledge to use in connection with the manufacture of steel.

Examples such as this of successful men who have used their education as a lever toward success in business could be used to great advantage in instilling in men's minds at the beginning of their college years that their *college education does not necessarily have to be used in its entirety*, that it is not incumbent that they do use it as a main issue because considerable money and effort has been used in obtaining it, but that education should be used as a lever to pry open the door marked "Success."

Vacation Studies of Stenography and Typewriting

In this connection it is pointed out that one of the most valuable things a young man can do is to take up the study of stenography and typewriting during his vacation periods and if possible obtain some experience in that line before he is graduated. Thus

IT takes the ordinary man so long to find a distinct goal to strive for that he has a weak heart before he really gets in the running.

some engineering executive or an executive of any kind could have the services of a college trained man in handling the important details of his position as soon as the young man was capable of handling that detail. This in practically all cases would eventualize in the young man's obtaining an insight into executive and routine business matters. It would give him the opportunity to absorb or create responsibilities more important in a few years than he would have obtained in the ordinary paths pursued by college men in a great many years, if at all.

In a position where he could absorb business as imparted to him by capable supervisors or executives, he not only would have the advantage of obtaining business building ideas but, more important, would have the opportunity of bringing himself to the attention of the executives who would be in a position to enable him to use his education in a far more responsible way than he could probably obtain through any other channel. Under any circumstances such a procedure would create very quickly and with some certainty the opportunity that most ambitious men desire and work for—to bring their personality and ability to the attention of the heads of a business. If this suggestion be followed, it is especially imperative that the young man attach himself to a business of unquestionably high standing as regards efficiency and financial strength.

As far as the salary paid a competent stenographer or secretary of today is concerned, it is consistent with what is paid the average technical man two or three years out of college of conservatively ordinary intelligence and ability. In the writer's opinion, everything being equal, there is infinitely greater probability of a successful career's resulting in this way than in the paths ordinarily followed by the majority of college graduates. The reason that technical men are so poorly paid is due to one predominating inclination—they all try to crowd in the front door and leave the side entrance unused.

It should be explained here to college men who may read this article that it will be found by those entering business as stenographers that as their knowledge of business procedure and of their particular jobs increases, they will gradually reduce or eliminate the purely mechanical end of the actual taking of dictation. In practically every case the executives for whom they are working will be more than glad to allow them to handle the details with-

out dictation. If this is not accomplished by the ordinary man inside of two years as secretary to an executive, he is probably weak in the fundamental ability essential to commercial success and is fitted for the more purely technical side of engineering or work of a nature where the problems are mechanical or scientific. However, there would be few cases of this kind—almost non-existent.

Exaggerated Attractiveness of Selling Positions

It might also be explained, for the information of thousands of young men who come out of college and who misdirect their efforts and look for new fields to place themselves in, that salesmanship, which generally is the first thing they think of, is not the best paying profession in the world. It is one of the poorest, when the mass of salesmen who are merely ekeing out a living—the majority not even a good living—is taken into consideraton. Only the successful salesmen in special lines are making considerable money in the sales field, and they earn it too. These special lines could be explained in college by its employment counsellor.

It is well to explain to men, in college or out of it, desirous of entering the sales field either as sales engineers or commercial salesmen, that the good jobs and success go to the man who is willing to do the things that inconvenience him. Most of the successful sales executives of today are men who have traveled under inconvenient and uncomfortable conditions for years before they worked their way into a metropolitan district permanently, either as salesmen or sales executives.

One factor that the college man does not analyze and which should be emphasized and reemphasized continually is that a man's chances of success are measured greatly by his ability to overcome the mental laziness that everyone has to fight to a certain extent. This generally applied means the effort to be pleasing to everyone whether of high or low standing; to pre-consider the other fellow's viewpoint and

DRAFTING room dodgers seldom become anything in engineering executive work.

strive to please in order to obtain the object sought. This requires mental alertness and may be exemplified by the salesman who comes in to talk boilers but spends some time talking baseball or trout fishing. It is necessary constantly and with continued cold calculation to sell one's self at all times, in all places and without cessation.

Mental alertness is lacking in most men and yet a certain amount of it can be inculcated into a man at least to the extent of getting him to calculate plans to obtain a position. Such elements as failure to take off the hat on entering an office, before speaking to the individual interviewed, is met frequently in employment work and on the part of men who have been well educated as far as college work is concerned. The type of mentality that this refers to is the one that will unconsciously or with forethought take the hat off on meeting the principal, but does not deem it necessary to take the hat off on meeting the subordinates. This trend not to consider what are relatively important details may jeopardize the success of more important matters. It is especially prevalent among technical men, who really know better and are capable of acting on suggestions to the great benefit of themselves if they are instructed. In other words they do not play "safe" in a world where what is unimportant to one man is a vital factor to another.

There may be some excuse, especially in engineering fields, for the average college man's not being able to sell himself as far as cold calculation is concerned, because some men are mentally unable to consider anything from a sales standpoint, but there is

ONE predominating inclination of engineering graduates is to crowd in at the front door and leave the side entrance unused.

no excuse for the college man's not realizing, whether he be out of school one year or twenty years, that in applying for a position he should be personally neat, of unlimited unostentatious courtesy in action and manner, and prepared to give a complete idea of what he has accomplished and what his qualifications are without making it necessary to probe it out of him. This, however, is not the function of a man outside of college to mention.

It is the duty of the college to instruct, train, suggest and guard its students in finding a position, in pointing out where and what to apply for and what to avoid, in view of existing personal characteristics. It should also inform as to what positions have penalties attached which will prove very severe if those positions be left because found unsatisfactory or unholdable.

Too Much Shooting at Stars

It cannot be overemphasized that a college cannot instruct a man, nor anyone else, as to how to succeed by pointing to the successful men who have graduated from college or who have succeeded without the aid of a college education. The successful man can hardly tell of the successful handling of the countless details attributable to his success—he tells the main factors. One successful man probably could tell another successful man how he succeeded and each would broadly comprehend the reason for each other's success. The practical and finely interwoven common sense and personality factors upon which success was obtained can hardly be included in an autobiography or sketch, and even if within the power of the ordinary human being to comprehend them, it is infinitely difficult to apply them by the individual to his personal problems.

It is easy to tell of principles but another matter to explain how to apply the principles correctly so that one of undeveloped or unequal intelligence may grasp the idea so comprehendingly as to be able on his own initiative to meet the new problems he will come in contact with.

Some men do not succeed because they can learn only through physical suffering or physical and mental suffering combined. Life is not long enough for this type of man to succeed by absorbing punishment that would create cumulatively a sufficient mental crisis to enable him to see that his inability to absorb knowledge from other men was the real reason for his failure. Others can only see the star which they are striving to emulate but do not conceive of the difference between themselves in their composition and are disinclined to conform to the elements that make up the star. It is a question whether considerable harm is not

GOOD jobs and success go to the man who is willing to do the thing that inconveniences him.

done by preaching to shoot at the stars. It is natural for a man to shoot high but hard to watch his step while doing it. "Shooting at the stars" as practised by most men means evading hard work and the "bottom steps."

It might be well to have a thoroughly hard-headed employment specialist on hand to interview the representatives of various organizations who go gunning for college men during the open season on them, which is just prior to graduation. Not describable or measurable is the viewpoint and outlook on life that surges

through and becomes part of the ego of the ordinary college man when he finds himself, his knowledge and what he feels he represents actually being sought for before he even has a chance to look for a job. It is very difficult, following this, to talk to him sometimes for two or three years following graduation on the basis of the value of judgment when willingness is displayed to "take less money" if someone will show him where his life work is.

Inability to choose a course of study or position intelligently under present conditions is not the fault of the young man by any means. It is distinctly up to the colleges and universities until they make a considerably greater financial outlay for the best advice obtainable to be at all times available to the prospective student, the student and the graduate. The colleges should not place the entire responsibility upon inexperienced youths, 17 to 18 years of age, to select college courses on the basis of idealistic, incomplete and inaccurate data. Neither should he be left to the mercy of many organizations' representatives, just before graduation, no matter how big the organization may be. He should have a friend with complete information in his possession to guide him during the early stages of the rough and rugged road.

Those who would not listen when graduating should be offered a place to come to where they can get a practical, friendly, unbiased viewpoint later on. It is easy for the idealist to tell a young fellow to pick out a goal and work for it. Any young man that can pick out, intelligently and with full knowledge of what the requirements are, a clearly defined goal for himself is almost certain of success. It takes the ordinary man so long to find a distinct goal to strive for that he has a weak heart before he really gets in the running.

If the men who have been out of school a year or three years could go back to the college from which they were graduated and there take counsel with a man of considerable sales force and experience, up-to date in knowledge of present and apparent future developments in the industrial world, the young men might possibly readjust themselves and start anew with common sense advice to work from. Through this it would be possible for the colleges gradually to accumulate from its own graduates thoroughly tested information as to the desirability or undesirability of entering certain fields of endeavor and what value the experience obtained was from a trading standpoint. To use any but thoroughly proved, up-to-date, first hand information in advising young men is more likely to be detrimental than helpful.

Technically educated men in general are probably, of all college trained men, least able to sell themselves when seeking a position. Perhaps this is due to the necessity, in engineering, of considering all propositons from every angle, which has a tendency toward the suppression of verbal competency and the tendency in selling to listen to the other fellow's viewpoint. Thus the technical man finds himself convinced by the other man instead of he himself doing the convincing. It might be creative of considerable good to compel all engineering students to take a course in public speaking at their colleges. They are extremely difficult to interview for positions, due to the necessity of digging the vital information out of them and forcing the interviewer to judge their ability from what might be termed potential qualifications.

The responsibility for choosing an education and commercializing it should not be left as in the past entirely up to the student. To a great extent it should be put up to the universities or colleges to see that the most expert advice obtainable is at the young man's disposal. Perhaps all this may suggest something regarding the present day question of testing men for college and eliminating and excluding those who are not capable of grasping what is handed out. That is a question which cannot be discussed here, although the answer to it in principle is incorporated in what has been mentioned in this article.

If the advice suggested were made available to the young college men, then for the hundreds of successful men we now have we would have thousands in the future and proportionately predominant would be the standing of our country as a world leader.



Henry Marion Howe Gold Medal

First Award by the Steel Treaters

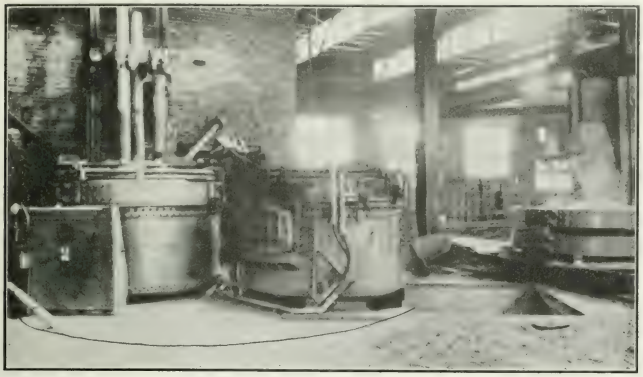


THE board of directors of the American Society for Steel Treating about a year ago established the Henry Marion Howe medal with the understanding that it was to be awarded each year to the author of the paper which shall be judged to be of the highest merit during the year. It was stipulated that all papers, in order to be considered, must be published originally in the *Transactions* of the society during the 12 months ended with Aug. 1 of each year in which the medal is awarded; that the competition for the medal shall be open to all, with the award made by the board itself. One of the causes for the establishing of this medal was a realization of the fact that any worker needs special incentive to develop and prepare for publication new and useful ideas and that one of the best incentives to this type of work is something that brings to an author recognition and honor. The medal is of gold.

The first presentation ever made of this medal was bestowed upon Emanuel J. Janitzky, metallurgist Illinois Steel Co., South Chicago, at the annual banquet of the society at Pittsburgh, Oct. 11, in recognition of a paper entitled, "The Influence of Mass in Heat Treatment," presented before the society at its 1922 convention. The first medal, struck in bronze from the die from which the gold medal is made, was presented at the same banquet to Mrs. Henry M. Howe, widow of Dr. Howe, who has been recognized as an inspiration and co-worker to the distinguished metallurgist. The 1923 presentation of the medal will be made at the annual convention in 1924.

A German patent for spraying resistance contacts with copper has been reported to the Department of Commerce by Trade Commissioner A. J. Gray. It is said that the sprayed surface has a fine copper coating which insures absolute conductivity and that the work is quickly done. It is claimed that the copper coating may be applied not only to silicon carbide rods but to carbon and graphite electrodes for batteries and dynamo and motor brushes.

One Electric Furnace Is Ready for Pouring While the Other Is Operating. Both are located on a turntable



MULTIPLE ELECTRIC MELTING

Two Furnaces on a Turntable With One Transformer and Set of Electrodes

At the annual meeting of the National Founders' Association at the Hotel Astor, New York. Nov. 21, Enrique Touceda, consulting engineer American Malleable Castings Association, Albany, N. Y., delivered an address on general foundry developments. One of the interesting subjects which he touched upon is found in the following extract from his address which describes a new method of handling electric furnaces developed by a Pittsburgh company, William Swindell & Brothers, and operated by a large iron and steel foundry in Western Pennsylvania:

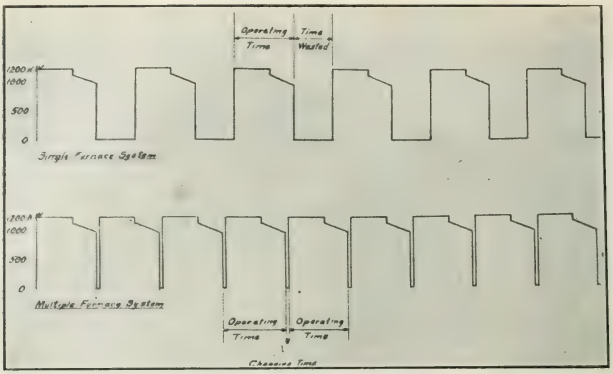
The use of the electric furnace in the gray iron foundry is receiving increased recognition, particularly in duplexing. One of the neatest arrangements that has come to the attention of the speaker is built in Pittsburgh and is called the "multiple electric melting system." Two 1½ to 3-ton furnaces are mounted upon a revolving platform by which means the same transformer and set of electrodes can be used for each furnace alternately. If a cold charge is used, the procedure is to charge both furnaces and, when the metal is ready to tap from the active one, the electrodes are raised, the table revolved and the other furnace placed in position under the electrodes and the melting started coincident with the tapping of the first furnace; that is, no time is lost between melting periods, for one furnace is melting while the other is being tapped. Each furnace can be operated independently, while the other is undergoing repairs and the continuous operation of single sub-station insures a high load factor, lower power cost and a saving in electrode consumption. The illustrations represent the installation.

It is the speaker's thought that it might prove advantageous to make the furnace perform the dual function of furnace and transfer ladle, that is, three or four small furnaces could be mounted each on trucks on a track that would pass under the electrodes and down to the molding floors, and when ready to tap could be run down opposite the floor where the molten metal is intended to be used. Time is not available for a discussion of the advisability of using or not using an electric furnace installation for gray iron foundry purposes as this would in any case be contingent upon the character of work, the cost of current and whether the intention was to duplex or to melt cold stock, etc.

On the one hand it is possible in this way to secure



The Two Electric Furnaces on a Turntable at One End of the Main Foundry



Contrasting Curves of Power Consumption Between Single and Multiple Furnace Systems

better temperature control, more accurate composition and, in the speaker's opinion, lower foundry losses to a substantial extent. On the other hand it is obvious that no troubles can be eliminated that are incident to general molding practice, as no method of melting can do away with losses that arise from weak or wet sand, shifted cores or copes, crushes, cope drops, core blows, incorrect heading or gating, etc.

IS IT RESTRAINT OF TRADE?

Employees and Employers Arrayed Against Government in Important Case

WASHINGTON, Nov. 27.—Involving the right of employers to enter into agreement with employees relating to wages, argument was made in the United States Supreme Court last week in the appeal of the National Association of Window Glass Manufacturers and the National Window Glass Workers to have set aside the decision of the Federal District Court of northern Ohio which held them guilty of restraining interstate commerce in violation of the Sherman anti-trust law. Appearing for the National Association of Window Glass Manufacturers, Attorney John W. Davis declared that for the first time the courts were asked to hold an agreement between employers and employees on wages and working conditions a violation of law. It was held by the lower courts that the agreement curtailed the production of hand-blown glass and restricted its distribution in interstate trade and commerce. Mr. Davis maintained that there could be no restraint of trade in the hand-blown window glass industry when 77 per cent of the entire output of window glass was controlled by the machine-made glass industry.

Discussing the opinion of the Federal District Court, Mr. Davis declared that there was no evidence to support some of the principal findings. He said that as a result there was not a single fire lighted in any hand-blown glass plant in the country. Solicitor General James M. Beck of the United States declared that the agreement between the employers and the employees imposed upon the public additional cost of maintaining the industry. Chief Justice Taft asserted that it seemed difficult for the hand-blown glass makers to restrain a market when they represented only about 30 per cent of the entire production.

The attorneys for the employers and employees, the latter organized labor men, claim that the decision of the lower court affects the right of labor collectively to grant or withhold its services in accordance with what it conceives to be its own best interests, as well as the power of the employer of labor freely to enter into contracts of employment and to operate his plant as and when he pleases. To hold that a contract of employment between a manufacturer and the members of a labor union, in the form of a customary wage scale agreement, is illegal and to issue a permanent injunction, as was done, enjoining the manufacturer and labor union from carrying out the contract or from entering into any other contract of a similar nature in so far as such contract may limit the period within which the men shall work, it was declared, is a judicial act of such far-reaching importance that its propriety should be determined at the earliest moment.

The attorneys for the National Association of Window Glass Manufacturers pointed out that the wage agreement deals solely with manufacture and not with interstate commerce. Its effect upon commerce, if any, they said, are purely indirect and incidental. If manufacture itself is not commerce, as the attorneys said it has been held it is not, they claimed that it will hardly be pretended that wage agreements, notwithstanding their effect upon the current supply of labor, fall within the category. They also made the interesting point that the declaration that Section 6 of the Clayton act that "the labor of a human being is not a commodity or article of commerce" means, "if it means anything, that Congress deliberately designed to put labor contracts beyond the reach of law.

Strong argument in favor of the agreement also was made by attorneys for the National Window Glass Workers.

"We submit that the laborer has an inalienable right to fix the number of hours per day, the number of days per week, and the number of weeks per year that he will work and in so doing to say for whom he will work," it was argued. To declare a wage scale an act in restraint of trade, it was maintained, is to render impotent the provisions of the Clayton act and in effect results in preventing the practical operation of the union.

Solicitor General Beck and Robert P. Reeder declared that no more complete or indefensible monopoly was ever established in any anti-trust case and it refers to the action of the wage committee as being arbitrary and that it could not be overridden by a referendum of members of the union. The so-called restraint, it was declared, has been imposed against the wishes of many of the manufacturers and of a large majority of the workers. Both employer and employee, it was charged, were denied any freedom of action.

NEW SWITCH PLANER

Machine for Production Work on Heavy Switches —Massive Construction—Convenient Control

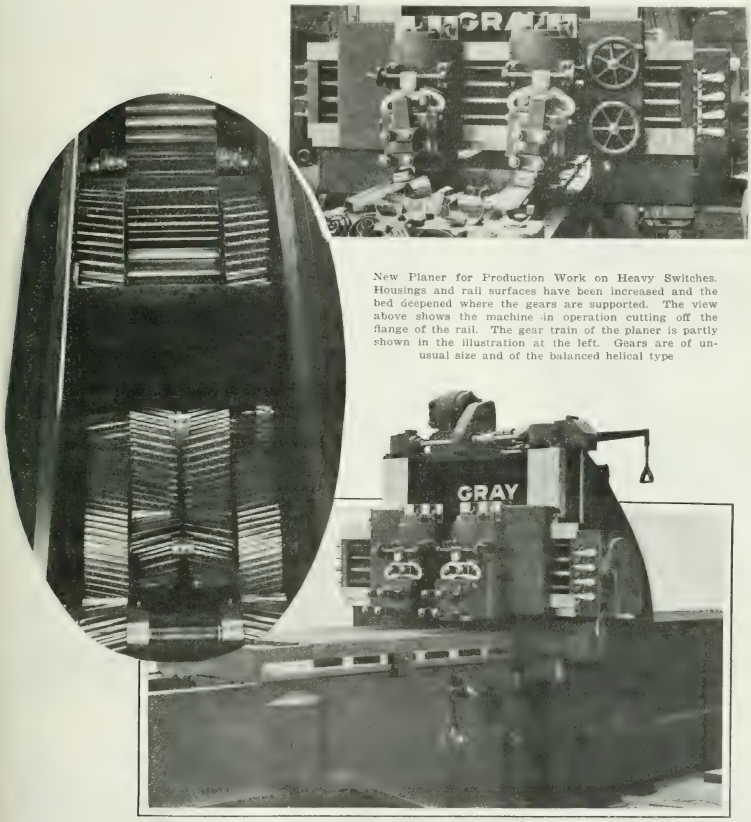
The trend of roadway construction for railroads being toward heavier rails with corresponding heavier switches, the problem of the switch builder is becoming more difficult. To meet the need for equipment to handle the tremendous cuts and heavy feeds required to get production on modern switches, the G. A. Gray Co., Cincinnati, has placed on the market the new design of switch planer shown in the accompanying illustrations.

As an example of the performance of the machine it is claimed that in a recent test, the flanges of two 100-lb. R. B. rails, of 0.70 per cent carbon, open-hearth steel were cut through in five strokes of the planer. The width of the cut varies from zero to 3 in. and the feed is about ⅛ in. The test was made at a cutting speed of 25 ft. per min., although the range of speeds available is from 25 to 50 ft. per min.

In this machine the housings and rail surfaces have been greatly increased, and the bed made deep so as to provide rigidity at the point where the gears are supported and where the heavy strain of cutting must be sustained.

Switch work is practically confined to two major operations; either feeding the two heads toward each other in order to take simultaneous cuts on the sides of two rail heads, or the operation in which both tools feed directly down into the flange of the rail, cutting off the flange. In the case of head planing the operator depresses the highest and the lowest clutch lever shown at the right-hand end of the rail in the illustrations, thereby throwing both traverse and manual feed levers into engagement with the crossfeed screws. By turning a single crank at the end of the rail the operator easily gets the desired amount of feed, both heads moving toward each other. When the cut has been completed, a single pull on the traverse lever, which is directly underneath and near to the manual feed lever, starts the traverse motor and moves the heads quickly apart, to be ready for the next cut.

To change over to the second operation, flange



New Planer for Production Work on Heavy Switches. Housings and rail surfaces have been increased and the bed deepened where the gears are supported. The view above shows the machine in operation cutting off the flange of the rail. The gear train of the planer is partly shown in the illustration at the left. Gears are of unusual size and of the balanced helical type

cutting, the second and third levers are depressed, the others being released by touching buttons provided for the purpose. The manual feed lever will then give a feed of both tools down toward the rail, while a single motion of the traverse lever brings both slides quickly back to the starting position. Changing from one operation to the other is instantaneous and great effort is not required of the operator who, with only two control levers to manipulate, may keep his eyes on the tools and work. If desired, either head can be independently controlled.

The heads are unusually heavy and rigid. The tool apron is provided with an abutment or shoulder at the lower end, so that the up-thrust of the cutting tool is not borne by the pin on which the apron swings, but by the pressure of this shoulder against the tool box. The company's "twin-purpose taper gibs," are provided for the slides and heads. A turn of the handle in one direction adjusts the gib to the operating position, and a turn in the other direction locks the two parts together throughout the entire length of the gib.

The gear train in the planer is shown in the insert illustration. The gears, which are of unusual size, are of steel throughout, the pinions being cut from steel forgings. From the drive shaft pinions to the bull pinion the gearing is of the balanced helical type.

At the first reduction, for instance, a driven gear is mounted on each end of the pinion hub, an arrangement intended to balance the torsional effect. The gears being keyed to the pinion hubs, the torsional strain is transmitted through the large hubs instead of through the shafts. In this way the shafts, which are pinned to the gears and rotate with them, are subjected only to shearing strain. The result, it is claimed, is a very rigid design.

The gears run in a bath of oil. The bed is cast solid on the bottom, forming an oil tank and at the same time tieing together the bed walls. The bed has four walls, two on each side of the gears. This double wall is tied together by heavy crosswise webs so that the bearings mounted in the walls are rigidly supported and the entire bed is very stiff between the housings and throughout the gear space, to absorb vibration.

The machine is equipped with an automatic oiling system. Oil is pumped to each V and to the drive shaft bearings. The oil-roller pockets usually provided in the V's have been eliminated, so that a chip falling into the V is pushed along in a wave of oil, falling on the strainer plate at the end of the bed. The bed is of double length so that the table is supported at all times, a feature intended to eliminate dripping of oil to the floor and to increase the wearing surfaces of the V's. At each end of the bed a strainer plate and settling basin are provided. The lubrication of the top brace parts is by means of centralized oilers. The motor ball bearings run in grease, and the traverse gears driven by the motor are inclosed in an oil-tight case and run in oil.

Although the rail position is not often changed in switch shops, it may be readily raised or lowered on this planer by pulling down the stirrup at the operator's end of the rail; then pushing the traverse lever into the running position. Prior to machining, the rail is clamped on the outside and inside edges of each housing.

Apprentices Paid While Attending Technical School

Sheet metal union apprentices to the number of 65 have begun a four-year training course at Carnegie Institute of Technology, Pittsburgh, and will be paid their regular wages by their employers for the time spent in school.

By the terms of an agreement between the Pittsburgh local union and the employers, every apprentice "must and shall attend sheet metal classes at the Carnegie Institute of Technology the last four years of his apprenticeship, or until he has finished the course for sheet metal apprentices." Also the employer shall send the apprentice to the institute one day each week from Oct. 1 to May 1. "The apprentice shall be allowed his regular wage for days while attending school."

A special course for the apprenticeship training has been outlined, the subjects including shop work, pattern drafting and mathematics. The 65 apprentice students have been separated into four classes, each group attending the institute one full day each week. Each apprentice pays his own tuition fee.

As a reward for high scholarship in their studies, special terms have been written into the agreement by means of which it has been made possible for a studious apprentice to receive increased wages. "As a reward of merit," says the agreement, "any apprentice receiving grade A marks at the end of any school year shall receive two months' credit on his next eight months' period, thus reducing that period to six months." As all of the apprentices are paid a definite scale of wages that is automatically increased every eight months, the scholarship plan gives each an opportunity to secure his next regular increase two months earlier each year.

A joint committee consisting of three members of the contractors association and three union officials has been selected to act in an advisory capacity between apprentice and school, to adjust all differences that may arise, to terminate the apprenticeship and services of the apprentice if necessary, and to pass upon the admission of the apprentice applicant to journeymanship.

Independent Equipment Corporation Acquires Goodwin Car & Mfg. Co.

The Independent Equipment Corporation, with offices in the McCormick Building, Chicago, organized for the purpose of repairing freight car equipment, leasing and repairing tank cars and manufacturing miscellaneous car parts, has purchased the plant of the Goodwin Car & Mfg. Co. The plant is located at Clearing, Ill., covers 25 acres and is equipped with buildings, trackage and machinery for carrying on this class of work. Additional machinery and facilities have been arranged for to equip the shops for all kinds of railroad freight car repairs.

Those associated with the corporation are: M. P. Kraffmiller, president; J. E. Tesseyman, vice-president and general manager; R. R. Weaver, vice-president and engineer; J. E. Dittus, secretary; A. E. Higgins, treasurer, and W. R. Mybeck, purchasing agent, bringing together an organization of men who have devoted 15 to 25 years in the development of the freight car industry. The company reports a sufficient volume of business already contracted for to assure steady operation for the remainder of the year.

Truscon Steel Co. Extensions

Directors of the Truscon Steel Co., Youngstown, at a meeting last week authorized extensions to the plant on Albert Street in Youngstown aggregating 100,000 sq. ft. of floor space, 2½ acres, bringing the total under roof at the plant to 16 acres. The company's own construction force will carry forward the extensions, which will involve an outlay of $400,000.

President Julius Kahn states that the manufacturing capacity will be increased about 15 per cent, and the working forces proportionately enlarged. He says indications are that 1924 business will be heavy and the enlarged capacity is being added in order that the company may be in better position to meet requirements.

Standard buildings manufactured by the Truscon company itself will be erected in the enlargement program. It is planned to have the additional capacity ready for use by May 1, 1924.

NEW LINE OF SHAPERS

Gear Box Inside of Column—Automatic Visible Lubrication—Other Improved Features

A new line of shapers, which will be known as the Climax and will be available in seven sizes, is being placed on the market by the Cincinnati Shaper Co., Cincinnati. Several improved features of design have been incorporated and the sizes will include 16, 20, 24, 28 and 32 in., in the heavy-duty type, and 20 and 24 in. in the standard type.

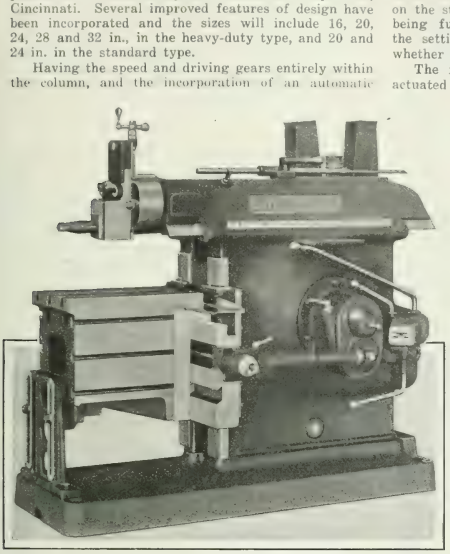
Having the speed and driving gears entirely within the column, and the incorporation of an automatic visible lubricating system are features. Levers for starting, for speed control, feed engagement and variation, for ram adjustment and for stroke adjustment are easily reached without leaving the operator's working position. Direct reading indicators for speed, feed and length of stroke are provided.

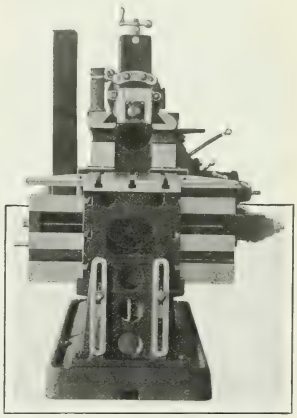
Other features are the helical-type main crank gear which is of semi-steel, one piece, the cam-actuated feeding motion, and the improved design of tool slide. All gears except the main crank gear are of chrome-nickel steel and heat treated.

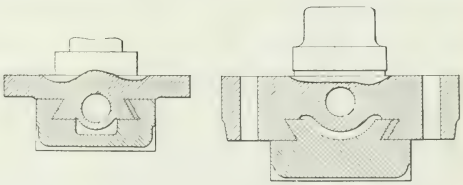
The drive is of single-pulley type with friction clutch and brake, the pulley shaft being mounted on Timken roller bearings, which is intended to provide a bearing that will carry overloads caused by unnecessarily tight belts. For motor drive the motor may be mounted directly on pads provided on the back of the tool, and the proper range of cutting speeds can be obtained by a motor making 1800 r.p.m. The speed gears, placed within the column at the rear, run in oil and slide on integral multiple key shafts, supported at both ends, making a compact and rigid arrangement. The gear chamber forms the reservoir for the oil used for lubricating both the drive gears and the balance of the machine. Eight selective changes of speed are provided, from 11 to 138 cutting strokes a minute on the 16 in. shapers to 8 to 102 cutting strokes on the 32 in. machines. These changes are obtained by two conveniently located levers. The length of stroke is maintained without the usual clamping nut on the stroke-adjusting shaft, the purpose of the nut being fulfilled automatically. The indicator shows the setting for the length of stroke irrespective of whether the machine is running or not.

The feature of the feeding motion is that it is actuated by cams and not by an eccentric and ratchet. This is said to provide a gradual feed, and to confine the entire feed under any conditions wholly within the return stroke. Another feature of the general feed arrangement is the placing of the feed mechanism at the side of the column, where it does not encroach upon the operator's working space. Eleven feeds, ranging from 0.010 to 0.170 in. are provided and feed variation is conveniently accomplished by means of a lever, mounted on a direct reading dial, indicating the feed in thousandths. The feed engagement lever has the three positions, "stop," "right-hand," and "left-hand," indicating the direction of the table movement. A friction safety device is provided to protect the mechanism from injury caused by permitting the table to feed to the end of the rail.

The ram is of "V" type, and adjustment is made by means of a full length taper gib, controlled by a single screw. A guard forming a part of the ram is provided to prevent dirt from working its way into the bearings. The "V" type ram is said to have been adopted after a series of cutting tests with square







Placing of the Gear Box Inside the Column and Having the Main Crank Gear of Helical Type Are Features. Other changes include having the feeding motion actuated by cams instead of by eccentric and ratchet. The tool slide is made as shown in right-hand line cut illustration, which is said to provide greater strength

and "V" type ram shapers. It is claimed that there is little preference between the two types, with respect to cutting action, both being satisfactory when properly adjusted. The determining factor claimed in favor of the "V" type, however, is that it makes it possible to have both sides of the ram ways in the column cast solid with it, and to provide complete adjustment to the ram ways by means of a single screw, thereby taking care of play in either a sidewise or a vertical direction.

The movement of the ram clamp lever is limited in its open position, so that no damage will result to the adjusting screw should the operator accidentally fail to clamp it before starting a cut.

The tool slide, instead of being made as shown in left-hand line-cut is made as shown at the right, which is said to give greater strength and prevent breaking of the slide at the sides. The tool post is unusually large, and is provided with a screw with a head the same size as on the vise, permitting the use of the long wrench in tightening large tools.

An outstanding feature of the column is the heavily ribbed, dish-formed side which is intended to resist deflection from the thrust on the crank bearing. The separate crank gear bearing permits a solid crank gear and makes possible a replaceable bushing as in other bearings.

The crank gear, being of semi-steel, and of helical type, is said to assure long life, and finish cuts free from gear tooth chatter marks. The tooth proportions adopted are intended to eliminate undercut in the pinion, provide full contact in action, and at the same time give equal strength in the teeth of the gear and pinion which are of different materials. The crank gear journal is long and of two diameters, the purpose of the enlarged portion being to provide additional strength and bearing surface at the point of greatest strain; while the length of the smaller portion maintains the alinement. A special feature is the close proximity of the crank gear bearing to the rocker arm. In addition, the gear portion of the wheel is made to overhang the bearing, bringing the driving load farther within the bearing. The crank pin, which is of drop-forged steel, hardened and ground, is held in the dove-tail slide of the crank gear by a taper gib.

The rocker arm is of a closed type of semi-steel, and is fulcrumed at the bottom and connected to the ram by a link, the fulcrum and link pins being hardened and ground. The sliding block is of gray iron, having a hardened and ground steel taper gib on its driving side to compensate for wear. The combination of a hardened steel crank pin bearing in the gray-iron sliding block, and a hardened steel crank block gib bearing against the semi-steel rocker arm is intended to provide ideal bearing conditions.

The cross rail is square locked to the column, a type of clamping considered as best suited to resist direct thrust of the cut. Side alinement is maintained by a taper gib, and felt wipers are provided to remove dust from the face of the column while adjustment is being made. The vertical screw is stationary and of one piece. The thrust of the revolving nut is taken by a ball bearing. The screw does not project below the floor level.

The T-slots in the apron, for holding work when necessary, do not run across the entire width, but leave reinforcing ribs at the center and sides, a construction intended to provide increased stiffness for that member. A slot is placed across the face of the apron for alinement of fixtures. The table is of a practically complete box section, having but small openings in the front and bottom. The table support is of improved design, the sliding action taking place at the bottom of the table instead of at the shaper base. With this type of support it is said that parallel action is not dependent upon the exact alinement of the base. The base is of box section, at the point of greatest stress, and is closed at the top, serving to catch oil dripping inside of the column.

Particular attention has been given to the matter of lubrication, and the thorough protection of all bearings. The lubricating system consists of a plunger type pump in the gear case, which delivers oil to the sight feed distributing station located on the top of the column, near the belt guards. The pump takes oil through a large bell-mouthed inlet, at a high level, assuring a low velocity in the oil approaching the pump, thus permitting sediment to settle before being drawn into the pipe circuit. The level of the oil in the gear case is visible through a glass gage. A surplus of oil is furnished to the distributing station, and in the return of this surplus to the pump, it floods the main gear bearing and feed mechanism. Wicks in the distributing station feed the pipes leading to all parts of the machine, including the ram, ram link and rocker arm, the wick method being intended as additional assurance of clean oil. Both the overflow oil and drip from the wicks are visible in the distributing station. The supply of oil for the wicks is drained immediately upon stopping the machine.

Favorable Results from New By-Product Coke Ovens

What is believed to be a world's record for coke production per oven per day has been made at the new by-product coke plant of the Weirton Steel Co., Weirton, W. Va. This plant, consisting of 37 Koppers Becker type ovens, has been operating continuously on a coking time of less than 11 hr. and 30 min., carbonizing more than 1060 tons of coal per day or approximately 29 tons per oven per day, and at the same time with excellent by-product recovery.

The total coke produced averages more than 775 tons per day and the by-product yields per ton of coal carbonized have averaged 13.5 gal. of tar, 24 lb. of ammonium sulphate and 4 gal. of light oils. The total gas yield is approximately 11,400 cu, ft. of 555 B. t. u. debenzolized gas per ton of coal carbonized, of which 65 per cent. is surplus gas available for use in the steel plant.

The coal used is straight high volatile from the Pittsburgh district, no Pocohontas or other low volatile coals being used. With this coke the furnace produced an average of 610 tons of pig iron per day without using any scrap and with a lower coke consumption per ton than when using beehive coke.

This establishes a world's record in pig iron production for one furnace when using straight Lake ores and coke made from 100 per cent high volatile coal in by-product ovens.

Operations of Ohio Foundries

The Ohio State Foundrymen's Association reports that October operations in the ferrous foundries show a slight decline compared with September. October is on the basis of 68.14 per cent of normal capacity. September operations were on the basis of 71.51 per cent. October, 1922, was on the basis of 61 per cent.

The normal melt figure of foundries reporting is 31,477 tons. Against this possible production there was produced 21,458 tons, as the industry during October operated at 68.14 per cent of capacity.

Non-ferrous operations show a tapering off when compared with September. October figures show that this branch of the industry operated at 55 per cent of capacity. For September the figure stood at 60 per cent. The general tone of prospects in the non-ferrous department is toward improvement.

The revised heating boiler section of the boiler code of the American Society of Mechanical Engineers has been issued in a pamphlet form of 32 pages, priced at 80 cents a copy, obtainable from the society, 29 West Thirty-ninth Street, New York. The steel plate section of the code embraces an innovation in the form of special rules for the construction of low pressure boilers with welded joints.

A small pamphlet has been issued by the Garford Foundries Co., Elyria, Ohio, describing the Aero Metal, a new product "light, strong and non-corrosive."

"Human Engineering," Industry's Problem

Charles M. Schwab, in Address at Dinner Given in His Honor by Engineers' Club, Philadelphia, Says Confidence Between Capital and Labor Is Prime Essential

CHARLES M. SCHWAB was the guest of honor of the Engineers' Club, Philadelphia, at the Bellevue-Stratford Hotel, that city, Monday evening, Nov. 19, on the occasion of the presentation to him of a certificate of honorary membership in the club.

More than 400 men sat down to dinner to do honor to Mr. Schwab, while many ladies, including Mrs. Schwab, looked on from boxes in the balcony. At the speakers' table was a distinguished gathering. Alba B. Johnson, former president of the Baldwin Locomotive Works, Philadelphia, was toastmaster and extolled Mr. Schwab and his life work as a steel worker, engineer, shipbuilder and captain of industry. Mayor J. Hampton Moore of Philadelphia welcomed Mr. Schwab to Philadelphia. Other speakers were: Dr. Robert H. Fernald, president, Engineers' Club; Julian Kennedy and Admiral A. H. Scales of the United States Navy, commandant of the Philadelphia Navy Yard.

Others who sat at the speakers' table were: E. T. Stotesbury, Cyrus H. K. Curtis, C. N. Lauer, Col. M. Gray Zalinski of the United States Army, Dr. Lewis M. Haupt, William F. James, Samuel T. Bodine, Agnew T. Dice, Samuel Rea, Gulliaem Aertsen, Alva C. Dinkey, S. M. Vauclain, Joseph A. Steinmetz, Joseph B. McCall, A. L. Carhart and E. B. Temple.

Dr. Fernald, who introduced Mr. Johnson as toastmaster, referred to the fact that only 19 men have ever been accorded honorary membership in the Engineers' Club, and of these only five are living: Thomas A. Edison, General George W. Goethals, Edgar Fahs Smith, Herbert Hoover and Dr. Lewis M. Haupt.

Mr. Johnson's Tribute

Alba B. Johnson took occasion to review some of the details of Mr. Schwab's early life, commenting on the fact that Mr. Schwab as a boy drove a stage coach from Loretto to Cresson, Pa., a circumstance which in political life, Mr. Johnson said, would have made him a candidate for President. Mr. Johnson called attention to some of the high spots of Mr. Schwab's life, his entrance into the service of the Edgar Thomson Steel Works as a stake driver, his appointment as chief engineer and assistant manager before his twentieth birthday, his various steps up to the presidency of Carnegie Steel Co., which he reached at the age of 35, and his election to the presidency of the United States Steel Corporation in 1901, when he was only 39. His achievements in organizing and developing the Bethlehem Steel Corporation, his success in building ships during the war and his private charities and benevolence were all commented upon by Mr. Johnson in the highest laudation.

Mayor Moore told of his experiences as a newspaper reporter in covering the great Homestead steel strike, and said that this strike might never have occurred if a man of Mr. Schwab's genius in human relations in industry had been at the helm. Mayor Moore also told of his conversations with Lloyd George during the recent visit of the former British premier, when the latter paid high tribute to Mr. Schwab and to the great assistance Mr. Schwab and his company rendered to the Allies in the prosecution of the war against Germany.

Admiral Scales told of the high regard in which Mr. Schwab is held in the United States Navy, and stated that the Bethlehem Shipbuilding Corporation holds the record of having built an American destroyer in the shortest time.

It was left to Julian Kennedy to tell of some of Mr. Schwab's early days at the Edgar Thomson Works when he and Mr. Schwab were young engineers. He recalled many maxims of Andrew Carnegie's business success, which, he said, had guided Mr. Schwab and many other leaders of the iron and steel industry to success.

Mr. Schwab's Address

Mr. Schwab delivered an address in his characteristically engaging manner, and was somewhat more serious than when delivering his customary remarks at the close of the banquets of the American Iron and Steel Institute. While there were many personal references to Julian Kennedy and others with whom he worked in his younger days, the chief note of his talk was "human engineering," which he described as the fundamental problem of all industry.

"The people who labor," he said, "are human beings, full of sentiment, hopes and aspirations and therefore the fundamental problem of all industry is to so relate the human elements that the whole process will go forward without hitch or trouble.

"When I was placed at the head of the Emergency Fleet Corporation I knew that what I had to deal with primarily was a human problem and I set about it in that way. I wanted to put new life, new spirit and enthusiasm into the men who were doing the job and get them to work as they had never worked before. Hence I paid little attention to the mechanical and material end of the business. I devoted my time to human engineering and for whatever results were attained all credit is due the men who went to work and did the job.

"I am an optimist and I foresee for America the greatest prosperity in her history. This is indeed to be the workshop of the world. There are many men in this country devoting their attention to the problem of human engineering and its solution is going to carry us forward to greater things. Don't mind if we are called a material people; I am proud of being a son of a material country, because this country has worked for and will work for the material advancement of the world.

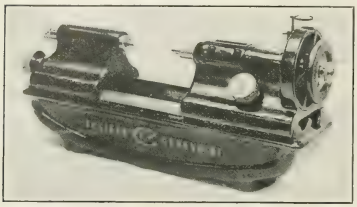
"Confidence between capital and labor is a prime essential, and a sincere effort is being made to give every man the benefit of the improvements which his efforts make possible. There are striking illustrations of this everywhere, and nothing but common good can come from them. Always remember that in this country the real aristocrats are not the rich, but those who do something; men who build and construct and help to advance the world and their fellow men. This is an aristocracy to be proud of."

A general conference on uniform cost accounting methods, recently held at Chicago, has been made the subject of a report by the Fabricated Production Department of the Chamber of Commerce of the United States. The report reproduces the leading addresses presented by three trade organization executives representing widely varied industries, namely, malleable castings, tents and awnings, and milk. These industries, according to E. W. McCullough, manager of the department, have been notably successful in their cooperative cost work. Initial copies of the report may be had without charge upon request to the Fabricated Production Department, Chamber of Commerce, Mills Building, Washington.

Bench Micrometers Accurate to Better Than 0.00005 In.

The Societe Genevoise d'Instruments de Physique, Geneva, Switzerland, for which the R. Y. Ferner Co., Washington, is the American agent, has added to its line a series of bench micrometers which are said to be accurate to better than 0.00005 in.

A bed with accurate ways forms the base of the machine and the headstock, which contains the micrometer screw, may be set at any point along the ways. The zero anvil consists of one of the company's test comparator tubes mounted in the tailstock, the tube



Bench Micrometer. The headstock contains the micrometer screw and the tailstock the zero anvil, which consists of a test comparator tube. Three sizes are available

being adjustable by a slow motion device to obtain the final adjustment before taking readings.

Only an occasional setting of the headstock is said to be necessary, since the micrometer screw has motion of 2 in. The contact spindle does not rotate but is advanced as a nut on the screw of the micrometer. The micrometer head is protected from injury by a shield, which covers all graduations except the sections opposite the vernier index. Division of the head is in 1/20,000 in. and the vernier index permits of readings to 0.000005 in., which is useful when carrying out measurements by comparison with a gage or master piece. An adjustable glass is provided for reading the graduations and a fiber handle employed for rotating the head, to prevent conduction of heat from the hand.

The test comparator tube used as the zero anvil serves also as a pressure indicator, the contact plunger being pressed toward the left against a helical spring, when in use, until a pointer, moving over a scale graduated in 1/1000 mm., reaches the zero at the center of the scale. The multiplication system is of knife-edge type, the two knife edges, whose edges are in the same plane, bearing against a plate which carries the pointer. The fixed knife edge can be adjusted very accurately to give the multiplication desired, and because the two lie in the same plane it is said that no error is introduced which might be due to the angle through which the pointer-carrying plate is rotated.

The micrometers are available in three sizes, having a capacity of 0 to 4 in., 0 to 8 in., and 0 to 16 in. respectively. A 4-in. end-measuring rod is furnished with the smallest machine for establishing the position of the headstock at the 4-in. point, from which measurements between 2 and 4 in. may be made by runs of the screw. Measurements from 0 to 2 in. may be made by setting the headstock at the 2-in. point and establishing the zero reading with the screw extended to make contact with the zero anvil, the last fine adjustment being made by moving the anvil by means of the knurled head shown at the left of the instrument.

On the 8-in. machine the position of the headstock for the interval 2 to 4 in. and 6 to 8 in. may be established with 4- and 8-in. end-measuring rods and with the movable spindle entirely withdrawn within the head. For the interval 4 to 6 in. the headstock is set at approximately the 6-in. point and a zero reading taken against the 4-in. rod with the spindle fully extended.

For the 16-in. machine 4-, 8-, 12-, and 16-in. end-measuring rods are provided for similar standardization of the settings. The adjustments of the headstock are made by means of the large milled head shown on the face of it. The window in the top of the headstock is over a 2-in. scale for reading the multiples of turns of the micrometer head. These instruments are available standardized for 62 or 68 deg. Fahr. for the inch units, and are available also graduated in metric units. Special supports for the end-measuring rods or for various shapes of pieces can be provided.

Engineers Will Work for Reorganization of Interior Department

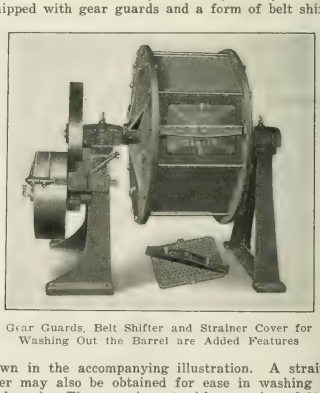
WASHINGTON, Nov. 26.—Fearing failure of the Brown plan of Government reorganization, devised by the Joint Committee of the House and Senate, and sponsored by the late President Harding, engineering and allied bodies numbering more than 200,000 members will conduct a countrywide movement to make over the Department of the Interior. The engineers, it is announced, have definitely decided to press for the adoption of that part of the Brown plan which affects that department. A bill to accomplish this end will be introduced at the coming session of Congress.

The effort will be directed by the American Engineering Council of the Federated American Engineering Societies, which will summon a National Conference on Public Works to meet in Washington on Wednesday, Jan. 9, 1924. This conference will be one of a series of events lasting a week and will be attended by delegates from more than 200 National, State and local societies representing engineers, architects, constructors, manufacturers, chemists, geologists, economists and business men.

The opening event of the week will be a meeting on Monday of the Committee on Procedure of the Council, followed on Tuesday by deliberations of the Executive Board. On Thursday and Friday the full membership of the American Engineering Council will convene for its annual sessions, facing an agenda presenting a wide range of social, industrial and scientific questions. A successor to President Mortimer E. Cooley of Ann Arbor, Mich., will be elected.

Improvements to Burnishing Barrels

The burnishing and "cutting down" barrels made by the Abbott Ball Co., Hartford, Conn., are now equipped with gear guards and a form of belt shifter



Gear Guards, Belt Shifter and Strainer Cover for Washing Out the Barrel are Added Features

shown in the accompanying illustration. A strainer cover may also be obtained for ease in washing out the barrels. The cover is cast with a number of ½-in. holes in it and is fitted on the inside with a piece of wire cloth of the proper mesh not to allow the smallest balls being used to pass through. The cover is used in place of the regular cover when rinsing out or draining the liquid from the barrel.

"Let Railroads Alone," Plea of Founders

National Association Adopts Resolution Favoring Non-Interference—Mellon Tax Plan Approved

President Barr Explains That Twenty National Bodies and Thirty-Nine State Associations Are Working Together to Prevent New Legislation That Would Hamper Railroads—Many Other Interesting Topics Discussed

THE National Founders' Association at its twenty-seventh annual convention at the Hotel Astor, New York, on Wednesday and Thursday, Nov. 21 and 22, went on record as favoring the proposals of Secretary of Treasury Mellon for a reduction in income taxes; favored letting the railroads of the country work out their resuscitation without further governmental interference, and listened to an excellent program of addresses on national and international problems, together with technical discussions of foundry practice, personnel work in manufacturing plants, and a practical apprentice training plan.

William H. Barr, Lumen Bearing Co., Buffalo, was again elected president, and the work he has done in behalf of the association and industry in general was warmly commended. Charles L. Taylor, Taylor & Fenn Co., Hartford, Conn., was reelected vice-president, and J. M. Taylor, Chicago, continues as secretary. District committees were appointed as given in another column.

The annual address of President Barr, brimful of practical suggestions on current political, industrial and economic problems, was printed in large part in THE IRON AGE of Nov. 22, p. 1383. Secretary Taylor, in his report, commented upon the favorable results of the distribution of President Barr's weekly letter, which is sent not only to the press but to public officials, educators, etc., and is used as the basis for many editorials and articles presenting to the public facts relating to the "open shop" and other matters in which the association is interested. Effective as this means of publicity has been its insignificance, in volume at least, was pointed out by Mr. Taylor in stating that a recent survey showed that the unions in the United States distribute each month 4,300,000 pieces of literature at a yearly cost of $6,000,000, that the so-called radical groups—communists, socialists, etc.—distribute 2,000,000 copies per month at a cost of $3,000,000 yearly, and that there is in addition to this a great mass of socialistic and unionistic literature in the public press and the general magazines.

Pointing out the value of the *Open Shop Review*, which is published jointly with the National Metal Trades' Association, in combating the propaganda efforts of socialists and unionists, Mr. Taylor suggested that employees be furnished systematically with general reading matter on the labor question. "The *Review*," said Mr. Taylor, "publishes any kind of a story that makes for a loyal workman, whether on individual effort, individual rewards, thrift, production, etc., and with this we point out the weakness and fallacies of the theories favoring restriction of output and the organizations that favor them, so that when the organizer arrives his stories are apt to be discounted."

Commissioner McClintock's Report

A. E. McClintock, commissioner of the association, dealt in his annual report largely with the need for development of apprentices and the human factor in industry. He said in part:

"At the time of our last annual meeting, the association was assisting in combating strikes in the shops of five members, from which 155 molders were on strike. During the year, the administrative council authorized that support be given to six members, located in five towns, from whose shops 292 molders went on strike. The principal issue in the six struck shops given support this year was union recognition, or closed union shop. All of the above-mentioned cases are now off our books, with the exception of two shops which are receiving some modified assistance, and this will probably be dispensed with in another four or five weeks. In every instance, all strikes have been combated to a successful conclusion, open shops definitely established or maintained, and there has been no adjustment or compromise with the union in any shape or fashion. It has been unconditional victory, and new shop organizations built up.

Condition of International Molders' Union

"The receipts and disbursements of the National treasury of the molders' union for the twelve months ended Sept. 30, 1923, were as follows:

Income		$661,853.00
Disbursements		
Strike benefits	$238,680.00	
Management and other expenses	286,101.00	524,781.00
Gain for year		$137,072.00

Average paid membership based on dues received—35,000, as compared to 29,000 for previous year.

Apprentices

"The need for apprentices in the foundry industry is conceded generally. The old methods of training apprentices are, in my opinion, a thing of the past, and will not return. The present generation of boys coming out of our elementary and high schools will not go into the foundry under an old apprentice system which purports to teach the trade, but which, in fact, turns them loose in the shop to do odd jobs, shovel sand, and shift for themselves generally. As an educational function it is near zero, and as a job they consider better opportunities elsewhere.

"I am aware that the general opinion among foundrymen is that American boys, or boys with an American school education, cannot be induced to take up the trade of molding, but with this opinion I disagree for the simple reason that it is being done, and done successfully.

"To induce a boy to go into the foundry with the promise to teach him the trade and to have made no definite preparations to teach that trade, but

practically to turn him loose to his own resources, is to his mind being engaged under false pretenses. Apprentices in large numbers will never be trained until the advantages to the employer are commensurate with the cost. So long as apprentice training is considered expensive in any industry, training in that industry will lag. Economic necessity and self interest will in the long run be the determining factor. While the old apprentice system has been declining, the introduction of molding machines, mass production, specialization, and use of semi-skilled workers have enabled the foundry industry to carry on, but we are rapidly reaching, if we have not already reached, a point where skilled journeymen molders are not to be had in the open market. Self interest will induce apprentice training, but many firms will delay action and by so doing pay the penalty of procrastination.

Industrial Relations

"Lack of interest, proper cooperation, and absence of loyalty on the part of employees are common throughout all industry, and the foundry is no exception. To arouse interest in the individual workman, stimulate cooperation, and increase individual production, is a problem which confronts management generally.

"I am not interested in impractical idealism and view an industry as an establishment designed to render a service and return a profit, and not run as a charitable institution or an old peoples' home; but, with that viewpoint in mind, I am forced to the conclusion that the degree of cooperation and loyalty on the part of the individual workman, which management seeks to obtain, will not be had until management itself undertakes in definite ways to indicate to the workman that it is interested in him as an individual employee, and not merely as a part of an organization of unknown or unnamed units.

"The human factor in industry is now regarded as important as are processes, products, purchasing or selling, and in most cases the efficiency of the human element represents the difference between profit and loss.

"Morale in a company organization or an army is an intangible thing. In a college we call it the college spirit. We all admit it is a most powerful element in binding people together for a common purpose. The spirit of mutual interest, or mutual understanding between people is not new, but on the contrary goes back to about the beginning of things. Our more modern industry, while stressing processes and products, has not continued to lay the same degree of emphasis on people or the human element in industry, with the result that a class conscious feeling has developed. As I view it, the experiments thus far made are along the lines of putting back into company organizations that old time spirit and understanding that existed in the small establishments of other days.

"From the viewpoint of self interest or enlightened selfishness, management in individual plants has demonstrated to my satisfaction that hard headed, practical methods are now in operation that are winning the loyalty and cooperation of workmen and again rejuvenating industry with a morale, where the company means more to the men than a pay envelope. A company that has within it the brains and energy to successfully direct the business can develop a business-like method of assisting the individual worker with his personal problems, to the end that more and better product may be had and a larger reward may come to all those participating in the enterprise. The bringing about of better industrial relations must come from the top of the organization down. It will never come from the bottom."

Slight Loss in Membership

The membership of the association numbers 578, a net loss of 17 during the year, according to the report of H. J. Boggis, Cleveland, chairman of the membership committee. There were 30 resignations during the year, of which all but two were due to selling out of the business or financial difficulties. Thirteen new members were added.

L. W. Olson, Ohio Brass Co., Mansfield, Ohio, chairman of the committee on industrial education, said that this committee is hard at work studying the best plans in effect at various manufacturing plants. The committee has met frequently, has traveled considerably and is progressing toward the recommendation of plans, which it is believed will solve problems having to do with apprenticeship training, personnel work, etc.

Personnel Work by Ohio Brass Co.

What has been done in Mr. Olson's own plant, that of the Ohio Brass Co., was interestingly told by Dr. H. H. Myers, its personnel superintendent, who gave up a medical practice to devote himself to the healing of industrial rather than physical ills. Dr. Myers explained that his interest in the personnel problem of manufacturing companies was aroused during his five years of medical practice in Mansfield, Ohio, where he became acquainted with the inside problems of nearly all of the city's leading industries through the intimate contacts he had in his office and in the homes of workmen. He saw an opportunity for service in this field and associated himself with the Ohio Brass Co. nearly five years ago, during which time the bonds of understanding between the management and the employees of that plant have been considerably strengthened. Dr. Myers' experience for the work he has undertaken was gained not only as a practicing physician, but also in his work for the United States Public Health Service during the war.

"When a manufacturer," said Dr. Myers, "decides to build a plant, he can go out in the open market and buy steel and bricks and equipment, but he cannot buy men. The organization to man that plant has to be created and developed to obtain the greatest possible efficiency from the plant and equipment. I conceive personnel work to be that work which develops healthy, contented workers. Some manufacturers don't care a rap about it and there are others who do. Those who don't are the greatest stumbling blocks in industry today. Their attitude is founded on selfishness and ignorance."

The question for every manufacturer to decide, Dr. Myers said, is, "Can a well man do better work than a sick man?" Another question is, "Can a man who is perplexed by personal problems do as much work?" and still another, "Would you prefer to have a loyal man rather than a disloyal one?"

In reply to his first question Dr. Myers recommended that every plant large enough to possess one should have a plant dispensary, in charge of a physician, if possible, but at any rate with at least a nurse in charge, or under the care of a physician who makes periodical visits. A properly conducted dispensary, he said, would pay handsome dividends in money and satisfaction.

The personal problems of workers are just as real to them as the problems of management are to the executive, Dr. Myers said. The man who is badly in need of $10 is just as much disturbed mentally and physically as the management which faces the problem of raising $100,000 or $1,000,000 for the carrying on of the business.

Dr. Myers related two typical experiences in the Ohio Brass Co.'s plant which illustrated his points. In one instance, a good workman came in one day to quit his job, explaining that he must go back to the town where he had formerly lived because his furniture, in storage there, had been attached for a bill of about $160 which he could not pay. The company con-

Officers and District Committees, 1923—1924
Elected by National Founders' Association

President
William H. Barr,
Lumen Bearing Co. ..... Buffalo

Vice President
Charles L. Taylor,
Taylor & Boyd Co. ..... Hartford, Conn.

Secretary
J. M. Taylor, ... Chicago

Treasurer
Chicago Trust Co. ..... Chicago

DISTRICT COMMITTEES

First

New England States.

F. M. Weymouth,
Hunt-Spiller Mfg. Corporation ..... Boston
Charles Berger,
Eastern Malleable Iron Co. ..... Naugatuck, Conn.
Robert E. Newcomb,
Deane Works, Worthington Pump & Machinery Corporation ..... Holyoke, Mass.
Thomas Officer,
Sullivan Machinery Co. ..... Claremont, N. H.
Walter Perry,
Farrel Foundry & Machine Co. ..... Ansonia, Conn.

Second

New York and that part of New Jersey North of a line drawn from Lambertville to Point Pleasant.

W. H. Thomas,
Straight-Line Engine Co. ..... Syracuse, N. Y.
Walter S. Smith,
E. W. Bliss Co. ..... Brooklyn
J. E. McKelvey,
American Wood Working Machinery Co., ... Rochester, N. Y.
Frank Myers,
Poughkeepsie Foundry & Machine Co., ... Poughkeepsie, N. Y.
D. F. O'Brien,
A. P. Smith Mfg. Co. ..... East Orange, N. J.

Third

Pennsylvania, Delaware, Maryland, District of Columbia, and that part of New Jersey South of a line drawn from Lambertville to Point Pleasant and including those two towns.

F. B. McBrier,
Erie Steam Shovel Co. ..... Erie, Pa.
O. R. Read,
Read Machinery Co. ..... York, Pa.
Frank J. Eppele,
Trenton Malleable Iron Co. ..... Trenton, N. J.
C. S. Koch,
Fort Pitt Steel Casting Co. ..... McKeesport, Pa.
Thomas W. Pangborn,
Pangborn Corporation ..... Hagerstown, Md.

Fourth

Lower Peninsula of Michigan, Ohio, Kentucky, Indiana and West Virginia

H. A. Becker,
Lakey Foundry & Machine Co. ... Muskegon, Mich.
William Greenbaum,
Acme-Palmers & DeMooy Foundry Co. ... Cleveland
S. W. Utley,
Detroit Steel Casting Co. ..... Detroit
R. J. Redmond,
Buckeye Foundry Co. ..... Cincinnati
H. L. Arnold,
Terre Haute Malleable Iron Co. .. Terre Haute, Ind.

Fifth

Illinois, Missouri, Kansas, Nebraska and Iowa.

Horace R. Culling,
Carondelet Foundry Co. ..... St. Louis
C. E. White,
Deere & Co. ..... Moline, Ill.
H. E. Muchnic,
Locomotive Finished Material Co. . Atchison, Kan.
H. N. Strait,
H. N. Strait Mfg. Co. ..... Kansas City, Kan.
Warren Jones,
W. A. Jones Foundry & Machine Co. ..... Chicago

Sixth

Wisconsin, Minnesota, Upper Peninsula of Michigan, North Dakota, South Dakota, and the Province of Manitoba in Canada.

E. A. Peterson,
Valley Iron Works ..... Appleton, Wis.
E. H. Neese,
Beloit Iron Works ..... Beloit, Wis.
M. H. Pettit,
Simmons Co. ..... Kenosha, Wis.
Frederic Crosby,
American Hoist & Derrick Co. ..... St. Paul, Minn.
Emil Vilter,
Vilter Mfg. Co. ..... Milwaukee, Wis.

Seventh

Provinces of Ontario and Quebec in the Dominion of Canada.

A. R. Goldie,
The Goldie & McCulloch Co., Ltd. ..... Galt, Ont.

Eighth

Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas and Tennessee.

George M. Morrow, Jr.,
Birmingham Machine & Foundry Co., ... Birmingham, Ala.
W. Henderson,
W. K. Henderson Iron Works & Supply Co., ... Shreveport, La.
W. A. Griswold,
Gray & Dudley Hardware Co. ..... Nashville, Tenn.
W. D. Tynes,
Hardie-Tynes Mfg. Co. ..... Birmingham, Ala.
W. C. Trout,
Lufkin Foundry & Machine Co. ..... Lufkin, Tex.

Honorary Member of Administrative Council

O. P. Briggs ..... Minneapolis

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sulted its own lawyer, found that the proceedings were entirely illegal, the man was restored to his job without the loss of a day's time, his furniture remained in his possession, and the service which the company's personnel department had performed in this instance has created a bond between the company and that man which has made him one of its most loyal workers. In another case a workman was threatened with the loss of his home because a note which he had indorsed for a friend had not been paid and the holder of the note held the indorser to account. The company gave the man such assistance as was required in the circumstances, saved his home from attachment, and again proved that the company was the man's friend as well as his employer. The service in this case was the more greatly appreciated because the workman was a foreigner who spoke little English and who was not familiar with the legal technicalities involved in the indorsement of his friend's note.

Dr. Myers said that every man in the company's employ is known well enough so that the company can quickly determine whether he is entitled to a line of credit. If he is a loyal workman whose good standing in the community is known the company stands ready to help him in any reasonable way if he should get into difficulties, financial or otherwise. Unexpected illness in his family, doctor bills beyond his immediate ability to pay, or other things may disturb him mentally, and if he can be relieved of these worries, he becomes a more efficient worker.

In summing up, Dr. Myers predicted the dawn of a day when plants will make men as well as money.

The Spreading of Radical Doctrine

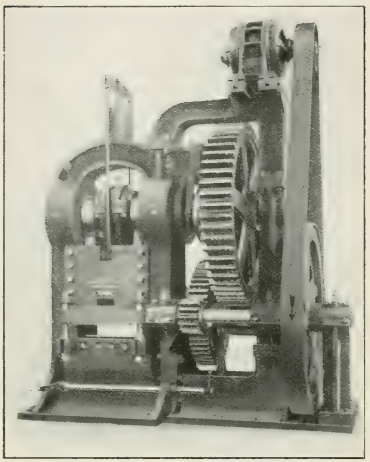
Another side of the industrial picture was presented by Fred R. Marvin, associate editor New York *Commercial*, who has made an intensive study of the campaigns of radicals of all types during the last 30 years. Mr. Marvin traced the growth of communistic doctrine from the day of the Order of the Illuminati,

(*Continued on page* 1489)

Improves Line of Guillotine Bar Shears

A redesigned line of shears of the guillotine type has been placed on the market by the Long & Allstatter Co., Hamilton, Ohio. The general aim of the new design has been to provide a machine as compact and as free from flexure as possible, for production shearing of square, round or flat bars. Seven sizes, with a range of capacity for mild steel bars from 1½ in. square or 2 in. round to 7 in. square or 7½ in. round, are available.

The main frame or housing is a one-piece box type casting. In the four larger sizes, for bars from 3½ to 7 in. square, the housing is an annealed steel



Guillotine Shear for 5½-In. Square Mild Steel Bars. Unusual endurance of cutting edges of blades is attributed to rigidity which maintains blades in alinement

casting, a semi-steel mixture being employed for the housings of the smaller machines. Unusual endurance of the cutting edges of the blades is attributed to maintaining the blades in alinement, which is said to be due in turn to this rigid construction. The length of the slide and its bearings have been given special consideration, the steel slides being long, operating in bronze-lined bearings and are counterbalanced by air, or springs or weights that operate below the level of the floor.

The gears, which are of steel and have cut teeth, have been placed at the side of the machine, an arrangement said to permit of better construction and giving unobstructed working room around the back, side and front of the machine. The shaft bearings are extra large and are located so that the gearing is not overhung, providing, it is said, a rigid gear assembly which distributes the tooth load across the entire face of the gear. It is claimed also that the bearings benefit by this design, as there is no uneven or cocking action to the shafts in their respective quarters.

The clutch is a special steel casting, high in carbon. The driving jaws are cast separate and are bolted to the gear in order to permit economical replacement of the gear or the jaws. The clutch is fitted to a square portion on the crank shaft, eliminating feathers. An improved automatic stop for operating the clutch, which brings the slide to rest with the blades completely open, is provided with a safety locking feature so that the clutch will engage the driving jaws only when the operating treadle is completely down. The machine can be stopped after each stroke or can be run continually as desired.

The fly wheels are sufficiently heavy so as to relieve the motor, or other driving member, from the high peak load, to which this type of machinery is subjected when cutting off its work. The machines are self-contained, the bearings and other parts being supported by one common base, which is intended to assure alinement of the entire equipment under all conditions. The type H shear illustrated shows the general construction of the three largest sizes. The treadle is adjustable across the front. The type H machine has a capacity of 760 tons pressure, a 6½-in. stroke and makes 16 strokes a minute. The blade length is 26 in. and width between housings 30 in. The floor space required is 142 x 109 in.

Hearing at Buffalo of Bethlehem-Midvale Merger Case

BUFFALO, NOV. 26.—Inquiry by the Federal Trade Commission on the Bethlehem-Midvale merger is being continued here under Examiner George McCorkley. The first Buffalo hearing opened last Thursday. B. B. Bane, E. C. Alvord and R. A. Barnes represent the commission in the examination of witnesses. Most of the testimony taken the first three days of the hearing was by Rochester fabricators, who testified as to competitive conditions prior to and since the merger. It is expected the hearings here will last about ten days and will be then transferred to New York. About 25 witnesses from Buffalo and vicinity will be called.

The first witness was Walter L. Heughes, president of the Heughes Construction Co., Rochester. The greater part of Mr. Heughes' testimony was concerned with his company's purchase of shapes and plates and conditions surrounding his ability to buy and price conditions prior to and since the merger. Before October, 1922, he said he was solicited by the Jones & Laughlin, the Carnegie Steel, Bethlehem Steel, Lackawanna Steel, Central Iron & Steel and Midvale Steel companies and others. His company always bought from the company quoting the lowest prices, when delivery was satisfactory.

Harmon Hershey, president Genesee Bridge Co., Rochester, testified at the hearing Friday. He said that since the consolidation of Bethlehem and Midvale companies he has been forced to pay a higher price on extras for bars, shapes and sheets, but that quick deliveries were usually put forward as a justification for these extras. Cross examination by Hoyt A. Moore and W. W. Robinson, representing the Bethlehem Corporation, developed the information that deliveries have been more satisfactory since the consolidation than before.

At the Friday hearing counsel for the Bethlehem interests declared the Government examiners were not trying to bring out all the facts.

Newton Steel Company Extends Power Plant

The Newton Steel Co., Newton Falls, Ohio, is enlarging its steam plant by the addition of a new model Westinghouse underfeed stoker which is equipped with steam operated dump grate and non-clinkering extension sidewall tuyeres. A complete set of line shafting, with hangers, couplings, sprockets, and chains with chain guards are included. An Enberg steam engine with flywheel, throttling governor and sub-base for mounting has been purchased and will be direct connected through a coupling to the stoker line shafting. This engine is suitable for operating on steam pressures of 120 to 150 lb. gage at the inlet valve and with 10 to 15 lb. back pressure at the exhaust. Pittsburgh coal of about 13,500 B.t.u. will be used under this new 513-hp. Stirling boiler.

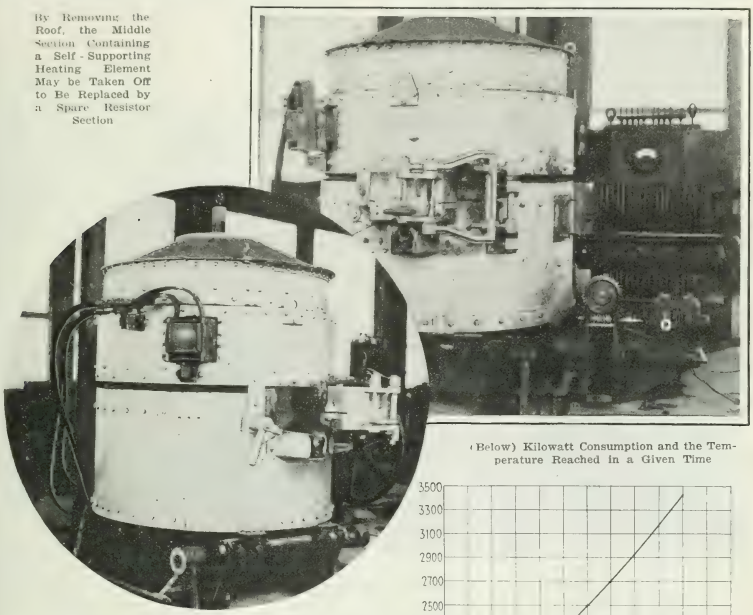
An attractively illustrated booklet on charcoal iron boiler tubes has been recently issued by the Parkesburg Iron Co., Parkesburg, Pa. It is entitled "Parkesburg Tubes."

RADIANT DOME FURNACE

New Resistor Type of Electric Melting Unit for Non-Ferrous Metals

BY T. F. BAILY

THE furnace requirements of the H. H. Miller Industries Co., Canton, Ohio, are unusually severe, as their product requires a wide range of metals, running from yellow brass, bronze and red brass to alloys containing 50 per cent nickel. This company has been a user of the resistance type furnace for years with success, but the slow rate of heating up of the older type was particularly objectionable under their conditions and the range of temperature hardly adequate for melting high nickel alloys.



By Removing the Roof, the Middle Section Containing a Self-Supporting Heating Element May be Taken Off to Be Replaced by a Spare Resistor Section

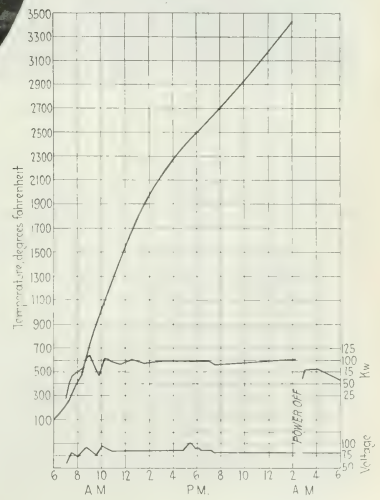
The requirements laid down for the new installation were more rapid heating up, higher melting rate and higher temperature range. They also desired to have some convenient means for readily renewing the heating element so as to avoid the long delays in repairs formerly experienced when the resistor trough needed to be replaced. They also wished to eliminate the piers for the trough supports used in the old type of resistance furnace, to obtain a larger furnace chamber capacity, which would be particularly desirable when charging light scrap or turnings.

As they occasionally desired to refine metal, it was desirable to have a basic hearth, so that the furnace here described was provided with a magnesite bottom similar to that used in steel melting furnaces. This bottom was baked in place with a temperature of above 3400 deg. Fahr., temperatures being taken by Segar cones placed on the hearth.

Although at the present time only 100 kw. are available from their power-house, the furnace itself has a rating of 150 kw. capacity and a melting rate of 1000 lb. per hr., with a maximum hearth capacity of 2000 lb. Their present requirements are for a maximum size heat of 1000 lb. and this size of charge of red brass is melted in less than 1½ hr. from pour to pour, with a power consumption of 100 kw. per hr. or 300 kwhr. per ton. At full electrical input of 150 kw. per hr., this furnace has a melting rate of more than 1000 lb. per hr. and a current consumption of approximately 250 kwhr. per ton.

From the heating upcurve, it will be noted that the furnace came from a cold condition to 2500 deg. Fahr. in 11 hr. with an average current input of approximately 80 kw. per hr., or 880 kwhr. for the period, and reached a temperature of 3400 deg. Fahr. in 19 hr. from cold with an average input of approximately 85 kw. per hr., or 1615 kwhr. for the entire period.

(Below) Kilowatt Consumption and the Temperature Reached in a Given Time



The furnace itself is made in three parts. The base,

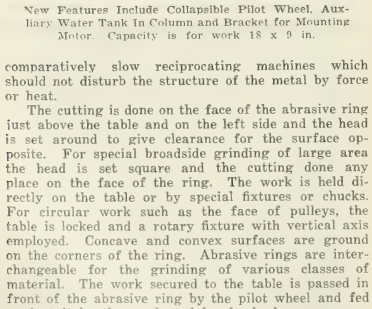
which contains the magnesite hearth, comes to the top of the door line. The middle section contains the self-supporting heating element, electrodes and terminals. The roof rests directly upon this middle section. When a new resistor ring is required, the roof is removed and the old resistor section taken off and a spare resistor section already prepared is placed in the furnace, the same as though it were a spare roof. To obviate the difficulty experienced in making sound resistor troughs, the new type resistor container is made of special shaped brick sections, which are readily molded and baked without danger of cracking.

The furnace is supplied with a rocker type tilting arrangement so that the center of gravity remains in the same plane throughout the pour and, as the furnace moves forward, the front lowers and the rear of the furnace raises, the nose of the furnace describing almost the same arc as the stream of metal flowing from the furnace. The tilting of the furnace is done by means of a 2-hp. motor operating through a double worm reduction, the final worm wheel being keyed to the rear shaft which supports the rear rocker arms.

The operation of this furnace has demonstrated that the former limitations of the resistance type furnace as to melting rate, power consumption and temperature limitations, have been overcome, together with the elimination of long delay in repairs when a resistor trough required renewal.

18-In. Knee-Type Ring Wheel Grinder

An 18-in. knee-type ring-wheel grinding machine for work 18 in. long by 9 in. high has been placed upon the market by the Graham Mfg. Co., Providence, R. I. In general construction the new grinder is similar to the company's 12-in. machine described in THE IRON AGE of Sept. 29, 1921. These machines are for producing commercial flat surfaces rapidly, surfaces which are required to be straight from end to end and across, but not with the exactness of Johansson gages or surfaces made by the process of



New Features Include Collapsible Pilot Wheel, Auxiliary Water Tank In Column and Bracket for Mounting Motor. Capacity is for work 18 x 9 in.

comparatively slow reciprocating machines which should not disturb the structure of the metal by force or heat.

The cutting is done on the face of the abrasive ring just above the table and on the left side and the head is set around to give clearance for the surface opposite. For special broadside grinding of large area the head is set square and the cutting done any place on the face of the ring. The work is held directly on the table or by special fixtures or chucks. For circular work such as the face of pulleys, the table is locked and a rotary fixture with vertical axis employed. Concave and convex surfaces are ground on the corners of the ring. Abrasive rings are interchangeable for the grinding of various classes of material. The work secured to the table is passed in front of the abrasive ring by the pilot wheel and fed against it by the graduated hand wheel.

New features include a collapsible pilot wheel which permits the grinding of long pieces without interference from the handles, and an auxiliary tank in the column of the machine, which increases the water capacity. A centrifugal pump is used and water is applied to the work by a nozzle. Various types of drive may be applied, including direct drive from a motor mounted on a bracket at the rear of the machine and driving through a flexible coupling. Another arrangement is having the motor mounted on a bracket behind the machine and near the floor.

In the 18-in. machine the height to the center of the spindle is 42 in. The abrasive ring is 18 in. in outside diameter, 4 in. deep and has a 14-in. hole. The speed is 800 to 850 r.p.m. The finished top of the table is 13 x 44 in. and has four T-slots, 36 in. long. The end travel of the table is 24 in. and the cross travel 3½ in. The top will raise 1½ in. below center of spindle and lower 10 in. below center. From 15 to 20 hp. is required to drive the machine, although 10 hp. is sufficient for some classes of work. The weight with countershaft or motor bracket is approximately 3000 lb.

October Refractories Statistics

Monthly report of the Refractories Manufacturers Association for October discloses conditions in that industry very similar to those for several months. Shipment of both clay and silica brick, particularly the former, showed an increase over the previous month, but there were decreases in new business and, as production gained more than shipments, there was a substantial increase in stocks and a rather heavy decrease in unfilled orders.

The figures in 9-in. equivalents for October compare with those for September (figures in parentheses being the percentage of monthly economical producing capacity of those reporting) as follows:

Silica Brick

	October	September
Capacity reporting	22,565,500	22,565,500
Stock first of month	34,473,914(153)	34,356,792(152)
Production	10,024,736(44)	8,232,857(36)
Shipments	9,288,134(41)	8,115,735(36)
Stock, end of month	35,210,516(156)	34,473,914(153)
New orders	7,133,579(32)	7,163,593(32)
Cancellations	55,936(0)	64,868(0)
Net new business	7,077,643(31)	7,098,725(31)
Unfilled orders	23,974,974(106)	26,185,465(116)

Clay Fire Brick

	October	September
Capacity reporting	74,212,811	74,563,060
Stock first of month	164,324,610(220)	159,683,354(214)
Production	57,774,841(77)	52,927,965(71)
Shipments	53,316,214(71)	48,089,182(64)
Stock, end of month	168,782,237(226)	164,522,637(220)
New orders	45,870,737(61)	46,048,291(62)
Cancellations	602,722(1)	108,351(0)
Net new business	45,268,105(60)	45,939,850(62)
Unfilled orders	60,735,806(81)	69,440,968(93)

In the explanation of the great difference between the stock on hand at Oct. 31, and the unfilled orders on books at same date, it is stated that the stock on hand includes large quantities of shapes made up in advance of the receipt of actual orders and is in no sense "free stock"—that is, it could not be made to apply on new orders. The actual free stock of 9-in. straights on Oct. 31, was approximately as follows: Clay fire brick, all grades, 41,000,000 (55 per cent of the monthly producing capacity of those reporting); silica brick, 9,600,000 (43 per cent).

United Alloy Steel Corporation, Canton, Ohio, is making improvements to its steel works, which involve an outlay of about $1,500,000. New soaking pits are under construction and also a receiving or preliminary warming pit. A new gas producer is being built, also a new stripper, and plans call for a new power and boiler house and the rebuilding of two continuous furnaces serving the 12-in. mill. The S. R. Smythe Co., Pittsburgh, is supervising the work.

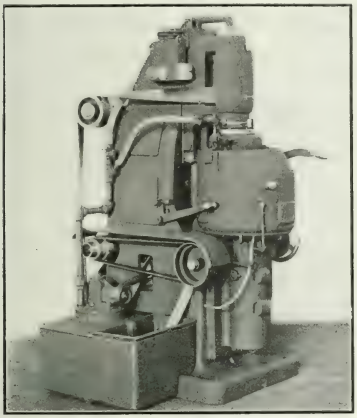
ROTARY SURFACE GRINDER

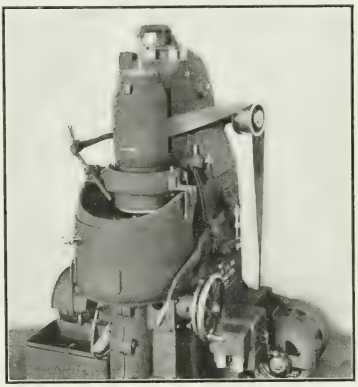
Improved Walker Machine for Flat Work Up to 12 In. Diameter, 7 In. High

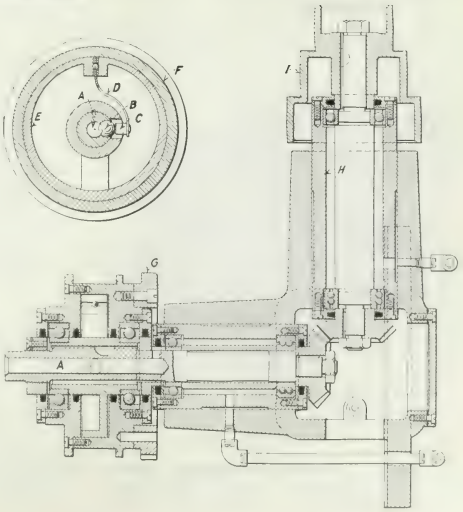
The single-stroke rotary surface grinding machine illustrated herewith is an improved type which has been brought out by the O. S. Walker Co., Inc., Worcester. It has a capacity for work up to 12 in. diameter and 7 in. high under a new wheel, and is intended for general utility purposes, particularly on flat pieces such as cutters, dies and saw blades.

A single movement of the lever at the right of the machine accomplishes its full operation. As the lever is pushed down, which is accomplished with little effort because of the counterweighting of the wheel head, the rotating chuck is set in motion and magnetized, and the wheel brought to the work. Removal of stock continues until the downward movement is arrested by a fixed stop. The grinding operation completed, lifting the operating lever raises the wheel slide, automatically stops the motion of the chuck spindle, breaks the electric current through the chuck and for an instant closes the circuit in the opposite direction, thereby demagnetizing the chuck face to permit the removal of the work. Work can be put on or removed only when the wheelslide is at the upper limit of its travel, and when the slide is in this position a fixed guard attached to the water pan fully protects the operator from contact with the wheel.

The thickness of finished work is determined by the position of the magnetic chuck. The handwheel at the right of the chuck bracket permits of precision adjustment of the chuck to compensate for wear of the wheel, or to procure the desired thickness of finished work.







Rotary Surface Grinder for General Utility Purposes. A single movement of the lever at the right of the machine accomplishes its full operation. As the lever is pushed down the chuck is set in motion and magnetized and the wheel brought up to the work. Grinding continues until arrested by a fixed stop. Lifting the operating lever raises wheel slide, stops the chuck and demagnetizes it for removal of work

The Upper Left-Hand Illustration Shows the Auxiliary Lever for Controlling Chuck Spindle and Water Lubrication System. The right-hand illustration shows the front and operating side with splash guard lowered. The position of operating lever and the chuck adjusting hand wheel may be noted. The line drawing at the right gives the detail of the friction-clutch mechanism, which controls rotation of chuck spindle

With the position determined by the first piece ground, further work of the same kind can be finished to precisely the same thickness by lowering the wheel slide to the limit permitted by the fixed stop. Where a large number of pieces are to be ground the chuck is raised from time to time as the wheel wears down.

A feature of the machine is the method employed for delivering water to the work. One stream enters from above through the hollow wheel spindle and another strikes the chuck face diagonally from the side, which is useful in cleaning the face in preparation for the next load. The machine is of massive design and is equipped with ball bearings practically throughout. The column weighs 1700 lb., the wheelhead complete 300 lb., and the chuck, its supporting member and the water pan together weigh 750 lb.

The drive is from a shaft at the rear of the machine, which is driven in the motor type machine by a silent chain, and in the belt-drive from a one-speed countershaft. The wheel head is balanced by a lead counterweight within the column, its sheave being carried on ball bearings. The slide has two flat bearings 24 in. long. The direction of travel is controlled by a dovetail construction having a taper gib for taking up wear. Both upper and lower spindle ends are carried on radial thrust ball bearings. Compression springs located in the upper spindle housing are intended to overcome the combined weight of the spindle and the parts which rotate with it, and also maintain the necessary thrust of the spindle in its lower bearings to assure accurate grinding. The grinding wheel is centered in a cast-iron ring and clamped to it by a bronze ring held by four screws. A cup-shaped wheel is used.

The chuck spindle is carried in a sleeve, which is 5⅜-in. in diameter and has a bearing 15 in. in length. Its upper end rests in a taper bearing, while the lower is carried in a radial ball bearing. The position of the supporting member on the column is determined by a large stud projecting from the face of the column. The end of the stud terminates in a ball which engages with a straight hole drilled in the back of the supporting member near the top of the casting. Another stud projects from the face of the column near the bottom in line with the upper stud. Two thrust screws having their bearing on opposite sides of the lower stud provide means for the adjustment of the chuck with reference to the grinding wheel. The chuck bracket is attached to the column by three opposing screw supports, constituing a three-point bearing, which combines with the thrust screws to permit of adjustment of the chuck for grinding either concave or convex surfaces.

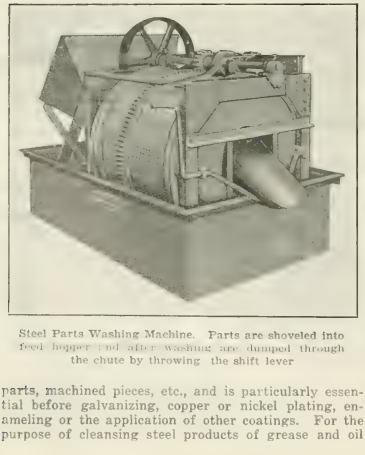
Control of the chuck is through the clutch mechanism shown in the line drawing illustration. The movement downward of the main operating lever, or the auxiliary control lever, operates a pushrod in the clutchshaft at *A*, which acts on the ball *B* and through it on the pin *C* and the spring *D* to engage the friction ring *E* and the clutch-case *F*, which is keyed to the shaft. Thus power is transmitted through bevel gears to the back-shaft *H* on which is mounted the cone pulley *I*, from which the drive is by belt through the cone pulley on the chuck bracket at the front of the machine and in turn through a spiral gear to the chuck spindle.

With the standard Walker chuck employed the number and shape of the poles in the top plate may be arranged to meet any special condition. The arrangement of guards protects the chuck and its electrical connections against the entrance of water. The electric current is carried to the interior of the chuck through contact rings on the under side of the body, and the lead wires are protected by a flexible metal conduit passing inside the column and up to the demagnetizing switch near the top. A bulb on the column level with the eye glows when the current is passing through the chuck.

The grinding wheel runs at 4200 ft. per min. and the chuck has three speeds, 30, 50 and 75 r.p.m. The adjustable stop of the wheel slide provides for a travel of either 3 or 5 in. as desired. The floor space required for the motor-driven machine is 4 ft. 2 in. by 4 ft. 5 in., for the belt-driven type 3 ft. 6 in. by 4 ft. 9 in. The motor-driven machine weighs 4200 lb., the belt-driven 4000 lb.

Mechanical Removal of Grease from Finished Steel Parts

The removal of grease and oil from finished steel parts before their assembly is a problem which must be met by many manufacturers of stampings, drawn parts, machined pieces, etc., and is particularly essential before galvanizing, copper or nickel plating, enameling or the application of other coatings. For the purpose of cleansing steel products of grease and oil in as thorough and economical a manner as possible, the Meaker Galvanizing Co., Chicago, has devised a mechanical washer of compact construction, measuring 80 in. long by 54 in wide by 54 in. high.



Steel Parts Washing Machine. Parts are shoveled into feed hopper and after washing are dumped through the chute by throwing the shift lever

It is claimed that in this unit one man can wash from 5 to 10 tons of small parts per single turn day. The cleansing agent is an alkali solution heated by steam. Parts to be cleaned are shoveled into a feed hopper which guides them into the washing drum. After being subjected to treatment in the drum for a few minutes, the contents are emptied through a discharge chute by throwing a shift lever. The drum is rotated by a ½-hp. motor. Power is transmitted direct from the motor by belt to a drive shaft running at 40 r.p.m., which actuates a heavy pinion gear driving the barrel. The gear reduction brings the rotations of the drum down to six per minute, a speed which protects parts from injury. Even light weight thin steel castings, it is said, are not damaged in the washing process.

Through the agitation of the solution in the barrel, the removal of grease in more effectively accomplished in two minutes, it is asserted, than through two hours treatment in an inert hot alkali solution. The principle of the machine is the same as that of a cylinder type of household clothes washer. The machine is offered complete with pulley and clutch control, steel tank equipped with steam coils and feed and discharge chutes. The entire unit weights 1700 lb.

Car loadings for the week ended Nov. 10, at 1,036,-067, make the twenty-first week of this year with more than 1,000.000 cars each. For the 45 weeks to date, the total is 43,691,728 cars, this being the largest number ever loaded during the corresponding period of any year.

Welding All-Steel Automobile Bodies*

Equipment Employed by a Philadelphia Maker, Handling 500 Tons of Steel Daily for One Product—Apprenticeship Training a Factor

BY JOSEPH W. MEADOWCROFT†

EDWARD G. BUDD MFG. CO. started to manufacture all-steel automobile bodies July 1, 1912, and is the only concern in the world which manufactures an automobile body of all-steel construction. In the process of manufacture at the Budd plant there is more light sheet steel used and more welding done than in the manufacture of any other sheet steel commodity in the world.

The welding department employs more than 3000 men, practically all of whom have been trained at the Budd plant. All methods of welding—Thermit excepted—are used. The steel consumed in one day's production amounts to approximately 1,000,000 lb. The daily consumption of copper is about 200 lb.

Approximately 360 standard type electric spot welding machines and 150 special machines make approximately 18,000,000 spots per day. This not only includes the spot welds made on electric welding machines, but also those made on jigs. Our electric welding jig operators and our electric welding machine operators total about 1000 men.

Our press capacity for one day's production amounts to approximately 600,000 strokes on standard presses, with 400 tons pressure on the larger single action presses and 1100 tons pressure on the larger double action presses.

Our daily shipments amount to about eighty carloads, containing approximately 2200 complete bodies assembled and 1750 complete bodies unassembled.

In assembling the bodies in welding jigs considerable time and money is saved in the handling, as the parts are assembled in the form of units in jigs and about 150 to 175 spot welds are placed in these units after which they are placed on conveyors for final operations. As the stampings are interchangeable, we are able to produce large quantities of bodies and body parts very economically.

Very often there are a number of welding operations which must be done while the body is in motion on the conveyor. This adds another feature of economy in getting the highest efficiency from a welding standpoint. By having transformers attached to the conveyors, parts can be welded in place while other operations are in process—such as acetylene gas welding, filing, drilling, straightening, polishing, inspecting, etc., without any direct interference with the welding.

We are now employing 350 acetylene gas welders, and it is my prophecy for the distant future that we will use approximately 450 acetylene gas welding operators. All of these will be trained in the training department of the Budd company. This department is operated directly under the welding department's supervision.

Apprentice Training

Young men are instructed in a comparatively short time to weld sheet steel in every position, on any part of a body, in any productive department of the plant. After each man has finished his training he is placed in one of the assembly departments and is kept directly under a foreman of welding who sees that he is furnished with the necessary materials—gas, wire, etc. This foreman is responsible for the quality and quantity of the work turned out by the apprentice. From that time on the apprentice is encouraged by his foreman and instructed in the practical use of welding from a production standpoint. It is this assistance and encouragement that helps make him a good reliable oxy-acetylene welding operator and a faithful employee.

The welding foreman teaches the operator how to use judgment in making his welds when joints vary so that, regardless of the variations, they are welded in such a manner as to carry with them the proper strength and still be finished without any hold-up of production.

Operators are advanced from time to time in accordance with their ability to do higher class work. As all operators are paid according to the class of work they are doing, there is always a goal to work for. After many years of experience, I feel that by using this particular method, it affords an incentive for the men to work and this in turn obtains the best results.

Three Welding Methods Used

Many parts of the interior of the bodies are oxy-acetylene welded together. On each open type body there are 70 to 80 in. of acetylene gas welding, while on a closed body there are 115 to 125 in. of oxy-acetylene welding. This involves the following equipment and material: 350 oxy-acetylene welders, 350 acetylene regulators, 370 oxygen regulators, 350 welding torches, 820 lb. of welding wire daily, 14,000 cu. ft. of oxygen daily, 3000 lb. of carbide daily. We weld approximately 220,000 in. per day or an average of 91 ft. per day per productive man.

Arc welding is used on the interior of the bodies where no finish is required. Many pieces are tacked together very successfully with this method without the aid of clamps, still holding the pieces in their proper alinement.

Arc welding is also used on various parts of the doors and bodies where a quick weld is necessary to prevent warping or buckling. It eliminates a very large amount of finishing where this method can be used, but the field is comparatively small at this time due to the light gages of metal used in the construction of the all-steel body and due also to the fact that seam welding (resistance or spot welding) is more productive and more economical.

To carry out our various arc welding operations the following equipment and material is involved: Six 600-amp. d.c. stationary synchronous motor generator sets; 20 200-amp. auxiliary line panels; 3 200-amp. a.c. portable panels; 70 lb. wire daily.

By using the three methods of welding and by using each method where it is best fitted—both from an economical as well as a productive standpoint—it is a difficult problem to compete with resistance welding as it does not take the same amount of time to train an electric spot welding operator as it does an autogenous welder; nevertheless, with our vast amount of welding machines, we are continually training men as operators so that good welds are made at all times. An average of 1000 to 1100 spot welds are placed in each body and it is necessary to keep men trained in this branch to keep up with the production. Specially built foot treadles and jib cranes are attached to standard spot welding machines so that operators can produce quick, strong and economical welds.

Design Own Copper Dies

Copper dies are designed under the supervision of the welding department, held up to certain standards

*From a paper read before the Philadelphia section of the American Welding Society at the Engineers' Club, Philadelphia, Nov. 19.

†General superintendent of welding, Edward G. Budd Mfg. Co., Philadelphia.

for shape, and size of material, and produced in quantities in our tool department. A stock of each copper die is kept in the tool booth in each assembly department, so that a quick exchange can be made at any time, however, only a small supply of each die is kept in stock. This means that we only carry a small inventory on copper, regardless of the amount of spot welding done. The operators are compelled to keep the die points to the proper diameter to correspond with metal thickness, thereby giving us welds which are 50 to 60 per cent stronger than the use of rivets would afford. The special automatic switches and water cooled dies and die holders make spot welding a very simple operation.

The welded body is practically a one-piece body and gives results which are obtained only with the welded construction. As a recommendation, I would suggest that all manufacturers, regardless of the commodities they produce, investigate the welding art through the American Welding Society and get the advice of experts as to the desirability of designing and welding their products.

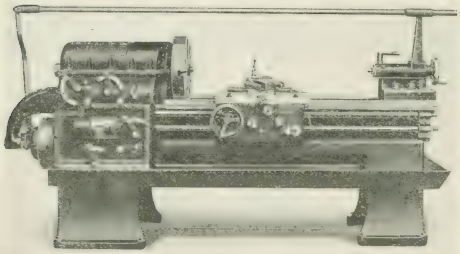
Lathe with Drive Mechanism Below Spindle

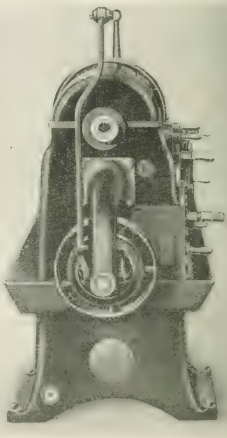
Locating the main drive mechanism directly under the spindle, in the space between the bed walls, a departure from ordinary practice, is an outstanding feature of the low drive lathe illustrated, which has been placed on the market by the Walcott Lathe Co., Jackson, Mich. This arrangement is claimed to provide unusual balance and to minimize vibration.

Other features include a one-piece casting for the headstock, bed and gear box. This contains the spindle driving mechanism which provides 12 speeds. Rigidity is assured and all parts are oil tight. Gears and shafts are flooded with oil by means of a geared pump and all gears being in a single housing obviates overhanging gear boxes. A three-point bearing is provided for the bed to minimize twisting strains.

Three levers are employed to obtain 42 feeds and three levers for the 12 speeds. A lever is also provided for reversing the feed and another for changing from rod to screw feed. Gears are of high-carbon steel, heat treated, and bronze bearings are employed throughout. The lathe feeds in inches per minute regardless of the spindle speed, instead of in thousandths per revolution. The feed mechanism is driven from a constant speed shaft, giving 42 feeds from 0.4 to 22.4 in. per minute of travel of the carriage. The tool has a capacity of 504 thread changes, cutting 175 different threads, covering all standard and many odd threads as well.

The lathe is available in sizes from 10 to 30 in.





The Drive Mechanism Is Located Below the Spindle, Which Is Intended to Provide Unusual Balance and Minimize Vibration. All gears being contained in a single housing, overhanging gear boxes are eliminated

For the protection of paymasters against bandits, a committee of three has just been named by the Associated Industries of Massachusetts to study the method of paying employees by check or transferring to local banks the credit against which employees can operate checking accounts. The committee is composed of Frederick Fosdick, president Fitchburg Steam Engine Co., Fitchburg, Mass.; Clarence S. Luitwieler, treasurer American Stay Co., Boston; and Charles L. Newcomb, manager, Worthington Pump & Machinery Corporation, Holyoke, Mass.

Scrapping Naval Vessels

Reports from the Brooklyn Navy Yard show that, in the first five days of actual work on the South Dakota and Indiana, all the armor was removed, comprising 770 tons which had been placed on the barbettes; 89 cuts were made in the ships clear across, and the third decks on both ships were broken out, ready for loading. This was accomplished with a force of only 22 men, under direction of Lieut. G. J. Shaw, including crane men, riggers and cutters. This work was carried out far more rapidly, and with much less difficulty, than the experts who figured on the job for various companies had estimated.

Bids will be opened at the Navy Department, Washington, Nov. 30, for the last six battleships scheduled for sale to be scrapped under the Treaty Limiting Naval Armament. These are the Michigan, Minnesota and Kansas, at the Philadelphia Navy Yard; the Vermont and Nebraska, at the Mare Island (Cal.) Navy Yard, and the Delaware, at the Navy Yard, Boston.

A valuable contribution to cost literature has been issued by the National Association of Cost Accountants in a book entitled "Departmental and Standard Costs," by William S. Kemp, treasurer Holtzer-Cabot Electric Co. The author outlines the system now being successfully used by the organization with which he is connected, with forms, charts, entries, diagrams, etc. The work is obtained at $4 from the association, which is located at 130 West Forty-second Street, New York.

Discusses Gear Grinding

Machines employed in grinding gears and machines developed for the testing of gears being produced on a commercial basis, were described by R. S. Drummond, vice-president Gear Grinding Machine Co., Detroit, in an address on "Grinding of Gear Teeth," given before the Cincinnati section of the American Society of Mechanical Engineers, Nov. 22. The subject was treated historically, from the time when grinding wheels were used for reclaiming gears, down to the present, when gears weighing one ton and having a 20-in. face, have been ground.

In the general discussion following the address it was stated that on hand-operated grinding machines the output is generally one-third greater than on power feed machines. The reason for this was said to be that some gears on the spindle full being ground are not distorted after heat treating as much as others, and the operator is able to pass the wheel more quickly over these by hand than would be done by the power feed. Regarding design of gear teeth, Mr. Drummond said that as the tendency of gear teeth in case hardening is to thin out at the top and spread out at the bottom, it was necessary to leave more material for finishing at the top. This point was illustrated by a lantern slide, showing this tendency as observed in a test of approximately 10,000 gears made by a large automobile company.

There was no demand for a helical gear grinder, according to Mr. Drummond, as the manufacture of helical gears is hardly a production operation. In his opinion cast iron and cast steel gears can be much improved by grinding. He exhibited a new design of over-length tooth, which gave a two-tooth contact, and was practically noiseless in operation. The advantage of form wheel grinding over grinding by the generative process was held to be the rapid production given by using the form wheel. Standard wheels are used in the process, and wheels are dressed once during each setting. The tendency of economizing downward is to use smaller wheels, as a fundamental principle of grinding was the smaller the wheel used the higher the production.

Sale of Johnson Foundry Property at Spuyten Duyvil

Prior to the sale by public auction on Dec. 5 and following days of the equipment and supplies in the 29 buildings and yards comprising the foundries, storerooms and offices of Isaac G. Johnson & Co., Spuyten Duyvil, New York, arrangements have been made to allow for an inspection up to the time of the sale from 9 a. m. to 4 p. m. daily. A long list of material and equipment will be included in the sale and catalogs may be obtained on the premises or information may be obtained by applying to Jacques Cohen, auctioneer, at Spuyten Duyvil or 45 John Street, New York. The old steel casting property had to give way to public uses and as announced some weeks ago in these columns the Johnson company decided to go out of business. The sale is being conducted under the direction of the Superintendent of Public Works of the State of New York.

Coal Consumption Indicates Improvement in Business

Business recovered during October from the setback recorded for September, as indicated by the survey of industrial coal consumption by the National Association of Purchasing Agents. Its statistics covering the consumption of hard and soft coal for the United States and Canada show that business, as a whole, gained 7.79 per cent during October, as compared with September. For September it reported a falling off in business of 7.13 per cent as compared with August.

The stocks of hard and soft coal in commercial consumers' bins on Nov. 1 were approximateley 605,000 tons less than on Oct. 1. Based on the rate of consumption in October, the stocks on Nov. 1 were sufficient to meet the industrial requirements of the United States and Canada for 52 days on the average.

The average daily consumption of coal during October, based on 27 work days in that month, was 1,711,741 tons. The average daily consumption during September, based on 25 work days, was 1,588,000 tons.

British Pig Iron and Steel in October

LONDON, ENGLAND, Nov. 13 (*By Cable*).—The pig iron production in October was 592,600 gross tons, comparing with 558,600 tons in September and with 714,200 tons in May, the year's highest. The output of steel ingots and castings in October was 702,100 tons, also larger than the September output of 695,100 tons. The year's highest was 821,000 tons in May.

Comparative production figures for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	639,000
1920, per month	669,500	755,600
1921, per month	217,600	302,100
1922, per month	408,300	486,000
January, 1923	567,900	634,300
February	543,400	707,100
March	633,600	802,500
April	652,200	749,400
May	714,200	821,000
June	692,900	767,700
July	655,100	624,200
August	599,800	582,700
September	558,600	695,100
October	592,600	702,100

The pig iron average to Nov. 1, this year, is 621,030 tons per month with 708,600 tons per month the average steel output.

Low Pig Iron Prices in Canada

TORONTO, ONT., Nov. 26.—A drop in price again features the Canadian pig iron market. This last decline in price amounted to $1.25 per ton in both Toronto and Montreal districts and makes a new low level. Not since the close of the Great War has pig iron sold as low as it is today, and, while local blast furnace representatives hardly expect any further softening to take place, they point out that this market is governed by conditions in the United States, and that the dropping in prices which has been a feature of this market for the past six weeks is almost entirely in keeping with conditions across the border. It might also be pointed out that the prevailing demand for iron is light, this being another factor in bringing prices to lower levels. At the present time melters are buying iron only in small tonnages and despite the fact that prices have been steadily falling there are still some consumers who look for even further reductions. While it has been noticed that some rather extensive contracts for pig iron were placed with United States producers during the past couple of weeks, this improved demand has not made its way into Canada, and consumers as a whole continue to confine their buying to hand-to-mouth needs.

In the iron and steel industry as a whole, business appears fairly good. Prevailing prices on pig iron are as follows: No. 1 (2.25 to 2.75 silicon) $27.05; malleable, $27.05; No. 2 (1.75 to 2.25 silicon), $26.05, Toronto. No. 1 and malleable, $29.55; No. 2, $28.55; Montreal.

Mark Fenton, vice-president of the New Industries Co., Youngstown, Ohio, addressed the Engineers' Club of the Youngstown district Nov. 26 on "Distribution as a National Problem." A motion picture film, "Oxygen, the Wonder Worker," was exhibited.

That the automobile industry is optimistic as to the immediate future is expressed in the recent statement by Alfred P. Sloan, Jr., president General Motors Corporation, in the announcement that this company was scheduling materials with a view to producing 88,000 cars in the month of January.

MEETING OF JOBBERS

Situation Discussed at Luncheon of American Iron, Steel and Heavy Hardware Association

A change in steel prices, when it comes, will be upward and not downward, according to John A. Topping, chairman of the Republic Iron & Steel Co., who spoke at a luncheon meeting at the Harvard Club, New York on Nov. 23, of the American Iron, Steel and Heavy Hardware Association. Mr. Topping dwelt at length on the many favorable underlying conditions calculated to strengthen business. The situation, he said, was no less encouraging today than it was in November, 1922, except that the psychological influences were then better than they are now. He called business prosperity more or less a state of mind.

He enumerated as among the satisfactory basic conditions the fact of unstrained credit, better than average crops, a liquid condition of stocks, good railroad earnings, with all that this means for increased purchasing of rails and track materials, unsatisfied housing demand, continued automobile production, and a vigorous expansion of hydro-electric power plants. He could not, he added, properly criticize the cautious attitude of buyers. In fact he felt that it was fortunate that buyers have followed the practice, as the volume of the hand-to-mouth buying has been almost sufficient to run the mills to the capacity for which labor has been available. He believed that there was a general agreement as to the fairness or reasonableness of present prices.

He devoted himself in part to pointing out the changes over a number of years in steel demand, which had required the scrapping of considerable steel equipment. He referred particularly to the fact that 75 per cent of the Bessemer steel of the country has had to be scrapped and that it has been necessary to recapture the losses in the open-hearth development. Emphasizing also the problem of the steel manufacturer he told the jobbers that whereas they are in a position to turn over their capital three or four times a year, the steel manufacturer can only do so once in about 18 months. As one factor toward bringing about an increase in steel prices he said that we are going to see better buying in steel as we have in pig-iron.

Charles O. Hadley, of the Alan Wood Iron & Steel Co., Philadelphia, and A. I. Findley, editor of THE IRON AGE, also spoke, and John B. Carse of Ogden & Wallace, New York, president of the association presided at the luncheon. Mr. Carse reported that at the meeting of the executive committee it was clearly brought out that while as a whole the jobbers are not unreservedly optimistic, they may be described as conservative with optimism prevailing. The reports were unanimous that business is in a good condition, that financial matters are on a solid basis and that prospects are good for the coming year.

New Officers of Mining Engineers Nominated

William Kelly, Vulcan, Mich., mining engineer and industrialist, has been nominated as president of the American Institute of Mining and Metallurgical Engineers for 1924. As vice-presidents and directors, Everette L. DeGolyer, geologist, New York, and Charles W. Merrill, metallurgist, San Francisco, were named. Directors were selected as follows: R. V. Norris, engineer, Wilkes-Barre, Pa.; George Otis Smith, Washington, director of the U. S. Geological Survey; P. B. Butler, mine operator, Joplin, Mo.; B. D. Quarrie, general manager, Otis Steel Co., Cleveland, and L. D. Ricketts, engineer, Warren, Ariz.

The annual meeting of the institute will be held in New York Feb. 18 to 21. Dr. Albert Sauveur, professor of metallurgy, Harvard University, has been appointed to deliver the Henry M. Howe lecture.

William Kelly, the presidential nominee, is a leading figure in the mining industry. He was born in New York in 1854, receiving a bachelor of arts degree from Yale in 1874, and of mining engineer from Columbia in 1877. He has been identified with mining enterprises in Ohio, Pennsylvania and Michigan, and with education, banking and State administration in Michigan. He is a member of the Institution of Mining and Metallurgy of London and of other organizations.

National Conference on Immigration to Be Held in New York

Many leading industrialists, public officials, leaders in business and trade organizations, and authorities on social service will meet in a National Immigration Conference at the Hotel Astor, New York, on Dec. 13 and 14, the first session of its kind ever held.

Some of the major questions for discussion are summarized as follows:

"Shall the per centum act, which expires by limitation on June 30, 1924, be retained by extending the period of its operation?

"Shall the act be retained with amendments in respect to administration features?

"Shall it be retained with amendments in respect to percentage restriction?

"Shall it be superseded by new legislation, and if so, by what kind?

"Shall special legislation be enacted to assure better selection, distribution and assimilation of alien immigrants?

"Shall an investigatory commission be appointed by the President under Congressional resolution to investigate and report?"

Engineering Library Establishes Broad Lending Privilege

Engineering books may now be borrowed from the United Engineering Society's library in New York. Not only will the list of books obtainable in this way be enlarged, covering any book published in recent years, but the distance of the member of the engineering societies which support the library will be no deterrent. The probability is that the borrower will pay the carriage charges, and also a nominal fee of perhaps five cents per day for the period in which the book is in his possession. It is believed that the loan service will be greatly appreciated by distant members and it is certainly calculated to bring them in close touch with one of the important branches of the engineering societies' activities.

A triple convention of the Southern Supply and Machinery Dealers Association, the National Supply and Machinery Dealers Association and the American Supply and Machinery Manufacturers Association will be held in Cleveland, May 19, 20, 21, 1924, with headquarters for all three at the Hotel Cleveland.

COMING MEETINGS

December

American Society of Mechanical Engineers. Dec. 3, 4, 5 and 6. Annual meeting in New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Exposition of Power and Mechanical Engineering. Dec. 3 to 8, inclusive. Second annual exposition. Grand Central Palace, New York. Headquarters Grand Central Palace, New York.

American Institute of Chemical Engineers. Dec. 5, 6, 7 and 8. Winter meeting in Washington, D. C. J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y., secretary.

National Immigration Conference. Dec. 13 and 14. Hotel Astor, New York. Magnus W. Alexander, 10 East Thirty-ninth Street, New York, managing director.

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York
F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Tin Plate and Rails

BY the casual observer no two steel mill products would be less likely to be grouped together than rails and tin plate, yet at the moment they have something in common that suggests strongly the difference between consumption and employment of steel.

Surveying prospects for the first half of the new year one finds that two classes of finishing mills, rail mills and tin plate mills, have substantial assurance of a good operation. All other lines must take longer or shorter chances. Some or all may do well, but that is for the future to determine.

The rail mills are quite well sold for the first half of the new year. In tin plate the leading interest is practically filled, while the independents, if not actually booked, have substantial assurance. It is already settled that the rails and the tin plate, in practically full tonnage, will be accepted by buyers and paid for.

This is no accident, no chance juxtaposition. In each case there is actual ultimate consumption, proceeding day by day. Tin plate is cut up to make cans, which contain commodities of ordinary everyday consumption. The tin plate disappears. Rails are different only in the respect that the individual rail does not have an evanescent life. Over 50,000,000 tons of rails are in use in the United States. They are all wearing out. Each day, in proportion to the volume of traffic, some rails get to the point where they had better be replaced. Year by year approximately so many worn rails are taken up and so many new rails are laid.

Incidentally, tin plate and rails have another thing in common, in that their tonnages are not greatly dissimilar. That condition is relatively new. When in 1906 we made 4,000,000 tons of rails and only one-seventh as much tin plate it required vision to see that the tonnages would come together; but now we have it that the tin plate mills may turn out 70 or 75 per cent as much product as the rail mills.

The other steel mill products, in general, are put into employment rather than into destructive consumption. Nails, pipe, structural shapes, plates, etc., go chiefly into articles of utility, wells, bridges, buildings, machinery, tools, etc. The demand varies widely, according to whether we choose to build or have funds for new structures and implements or whether we feel like continuing to employ the old ones, whether we need increased facilities or can get along with those we have. Every day we wear out rails and throw away used tin plate containers.

A Great Building Year Ahead

WITH due allowance for the lessened demand for construction work in some places, which has been commented upon in the past four months, the building outlook for 1924 is admittedly good. Contractors and architects agree that a large amount of work is in sight, in spite of high labor cost, which is only fractionally offset thus far by the decline that has come in the price of material. It is in the larger cities that most has been heard of the laying aside of work in the past season because estimates were too high.

In hundreds of thriving communities, without regard to section, there is still a shortage of houses, in spite of their large construction programs of the past two years. The smaller cities and the towns have not been handicapped in their building operations to anything like the degree noticed in New York and some other large centers. They have paid high wages, but not the highest, and they have known little of the strangling bonus. In many of these smaller cities rents are so high on older houses that new houses can be built at present costs and still compete on an investment basis. Families can as well afford to build homes or buy houses built for sale as to pay the rents demanded of them. Owners of new houses feel assured that, should a reaction set in and rentals go down, the older houses built years ago when labor and materials were much cheaper would be first to feel the pinch. Therefore residence building will continue on a large scale, according to the confident opinion of well-informed observers.

A survey by the *Building Age* confirms these estimates from the building trades. Reports through chambers of commerce giving detailed

estimates of the building requirements of their communities show that in 441 cities and towns of less than 25,000 inhabitants the shortage amounts to 519,110 residences valued at $2,631,617,000 and 14,069 apartments valued at $545,777,000.

In 287 cities of 25,000 population and over there are required 150,523 residences, which would cost $1,034,162,000, and 15,376 apartments valued at $1,174,742,000.

Thus the money value of the present housing shortage is put at $3,177,394,000 for cities and towns of under 25,000 and at $2,208,904,000 for cities of more than 25,000 population. Adding schools, hotels, store and office buildings, factories and other classes, the total for the smaller cities is put at 560,857, valued at $4,869,700,000, and for the larger cities at 188,077, valued at $2,977,605,000.

The probabilities for next year have been computed and the *Building Age's* canvass indicates that 1924 will be from 25 to 50 per cent above the normal $3,000,000,000 construction year. It is expected to rank along with 1922 and 1923, which have been the two greatest construction years the country has known.

To Promote Manufactured Exports

ONE way to promote exports of manufactured articles is to split the manufacturing and arrange to do a part in the consuming country. If in this way the market is expanded, the net amount of home manufacture may not be decreased while the profit actually may be increased. The best opportunity for the transfer of manufacturing probably lies in agricultural countries of low labor costs, with the needed raw materials available or easily obtainable. Rough foundry and machining work could be done in the consuming country, leaving for the United States the fabrication of the difficult and expensive parts of the machinery.

China, for example, needs only American encouragement to go into the casting of, say, textile machinery frames and into the rough machining of them ready to take the highly finished and highly accurate parts from America. Railroad freights, ocean transportation and duties at points of delivery are material cost factors worth eliminating and there is the great advantage of a resultant total cost much reduced from the present one without necessarily cutting into unit profit; instead there is the possibility, as stated, of an actual increase of volume and profit.

Initiative must come chiefly from the American manufacturer, who will be required doubtless to finance and for a time to oversee the foreign assembler. The practicability of the scheme might well be discussed by THE IRON AGE'S readers, especially by those abroad, and perhaps a way may be shown in more than one line for the actual fruition of the split manufacturing scheme.

A NOTEWORTHY factor in the decline of American steel exports this year is the lessened demand for black steel sheets. The chief reason has been the absence of buying by the Japanese. To Oct. 1, 1922, total black sheet exports were over 197,890 tons, and to Oct. 1, this year, only 77,416 tons. Last year Japan was credited with over 156,120 tons of the total, or about 79 per cent; this year Japan has taken to Oct. 1 only 23,470 tons, or about 30 per cent. Evidently Japan has been turning to British makers, as up to Oct. 1 nearly 95 per cent of the British exports of black sheets had gone to Japan, or 123,000 tons out of 129,600 tons. In the same period in 1922 only 77 per cent of the total, or 40,900 tons out of 52,900 tons, was taken by the Japanese. British makers apparently gave better terms in the period of peak demand last spring and early summer when sheet mills here were under no necessity to seek foreign business at concessions.

Work and Efficiency

MUCH of the discussion of current questions seems almost purposely to avoid going to the root, particularly discussion of tax reduction, soldier bonus, Government ownership of railroads, and tax-exempt securities. Yet the expressed or implied desire in all cases is that the country should be "prosperous."

Perhaps one of the difficulties is that while the average man is apt to employ the word "prosperity" he actually appraises it by the measure of his own private gain. In this manner "prosperity" might connote rising prices to those who carry stocks of commodities and falling prices to those who sell for forward delivery.

If we have a boiler plant of fixed performance, the best engine is the one that will deliver the most power for the steam furnished. Thus the gage of prosperity is the amount of useful work done, the effort expended multiplied by the efficiency. Why not directly apply the formula to these public questions?

Tax reduction talk is criticized on the ground that too many promises are made, that perhaps it will not produce so much prosperity as claimed. If the argument is simply that it will "give employment" the point is well taken. We are in miserable position if the giving of employment has to be encouraged. It should come naturally. The question should be, Will it, for instance, encourage water-power utilization, whereby more power will be furnished with less human effort?

Those who talk of the soldier bonus producing prosperity should be caught up short with the question, Will it cause men to work harder or more efficiently? For only on that road lies general prosperity.

Much of the talk about tax-exempt securities runs along the line of the Government being defrauded of revenue and of investment being impeded. Now, the Government gets all the revenue it needs and if it gets too much taxes are reduced. The buying of tax-exempt bonds represents investment. The question, Which does the most good, the investments made by municipalities, counties and States or the investments that would otherwise be made privately? Yet usually the discussion is simply of the whole mass of "tax-exempt securities." No inquiry is made as to what proportion of the capital goes into unnecessary public buildings, for instance, and into absolutely necessary highways.

With curious persistency the trite subject of "housing shortage" bobs up in nearly all these discussions, as if we should be nearly through when we made up that shortage. Give every man a house, an automobile and a suit of clothes and there would be nothing left to do but wear them out. We have no standard of living, but if we had we should try to improve it tomorrow and then again the next day. We do not want a fixed number of houses. We want the men who build houses to work as hard and efficiently as other men do. As soon as we have the proper number of houses we should tear down the poorer and build better.

The New Council of Defense

REFERRING to an editorial published in THE IRON AGE of Nov. 8 on "Mobilizing Great Industries," a gentleman who rendered distinguished service at Washington during the war writes as follows:

Your editorial following the Pershing review of Mr. Clarkson's book was very thoughtful and suggestive. I think it would be well for you to look into the new Supreme Council of National Defense recently announced with many trumpets by the War Department and see if you can find any industrialists sitting on it. When will these people learn that the military mind cannot handle the industrial side of modern warfare?

The new organization has been described in Washington news articles as the most efficient ever effected, and it undoubtedly has in its membership men of great ability, including General Pershing. But the council is composed entirely of Army and Navy officials and there is not a single representative of the great industries of the country, which, according to a recent statement made by an eminent general, comprise seven-eighths of all there is to modern war.

A list of subjects recently presented for the consideration of the new council shows that a number are closely connected with great industries—as coal and fuel oil; and although iron and steel are not mentioned, it seems incredible that all of the leading industries will not in due time have a proper representation not only in the matters taken up for research but in personnel.

CORRESPONDENCE

The Scope of the American Society for Steel Treating

To the Editor:—I am quite in agreement with much that Mr. Thum suggests in your issue of Oct. 25 concerning the expansion of the American Society for Steel Treating. The society has had an unusual growth. Not only is this true but it has been apparent to all those interested that the effectiveness of the society has greatly increased. This fact is attested in the steady and marked improvement in the technical product, both in the local meetings and in the quality of papers published in the transactions.

It would seem that the explanation of this success is quite obvious. There was undoubtedly a great call for a national organization which would devote its activities to the study of heat treatment of steel both from the theoretical and practical standpoints. Since its organization the society has been fortunate in having executives and officers who are recognized in their particular fields and they have put into its management a virility which has meant success.

The investigation of subjects on the heat treatment of nonferrous alloys can be considered by the society without any impropriety or without making specific provision involving marked change in activities at this time. An excellent paper appeared in recent months on duralumin. Here is a matter which is entirely up to the preference of the author. If he feels that one society will have advantages over another in publishing his data he will naturally incline that way.

An attempt to revamp the name of the society to include wider activities might lead to difficulties. If "American Society for Metal Treating," be suggested, objection will at once arise, because rolling is one form of metal treatment. Nor would it be entirely clear to say "American Society for Heat Treating." This could be taken to include annealing of glass!

As it now stands, the manufacture of steel can consistently come in for a share of the society's attention. Steel treating need not necessarily be restricted to heat treatment.

The society is young and until it becomes much more apparent to every one that its functions should be materially altered, it would seem best to strengthen in its present field and await developments and conditions which make the change more imperative than it appears to be at the present time.

C. E. MACQUIGG.

Flushing, L. I., Nov. 24.

The Iron Age and Its Readers

One of the delightful experiences in handling THE IRON AGE mail is to find how many of its readers have been devoted to it for years. The other day we were favored with a letter from an old friend, Major A. J. Ennis, of Philadelphia, who was not content to write merely about iron ore but quoted the famous words of Shakespeare:

> Those friends thou hast, and their adoption tried,
> Grapple them to thy soul with hooks of steel,

and then added, "Hence THE IRON AGE!"

Larger Business Than Expected

Chairman John A. Topping, of the Republic Iron & Steel Co., is quoted as follows in the *Wall Street Journal* of Nov. 26:

"I feel very much encouraged over the outlook. A decided improvement is evident, which is not confined to the activity in pig iron. There is growing strength in other lines. Volume of business, the season being considered, is better than was expected. I can see no reason why there should not be normal business next year."

Testing Society Enrolls 500 New Members in Ten Months

Every record of the American Society for Testing Materials for new members was broken with the election of the five-hundredth new member recently. The present membership is 3400. The standing committees have been the means of securing 173 of these 500 new members, about one in every three.

The Massachusetts department of labor and industries in its October survey of employment and earnings in manufacturing establishments says that 41 foundries and machine shops reported business as normal, and 21 less than normal.

German Industry Gradually Suspending

Keen Struggle for Continued Operation—Mills Turn to Near East for Export—New Law for Supervision of Syndicates—Methods of Gold Payment

BERLIN, GERMANY, Nov. 12.—Conditions in the iron and engineering industry show no improvement. Orders on hand have been reduced to such an extent that it has been impossible for most firms to keep their men employed. The business depression in several foreign countries is also influencing the volume of foreign orders. The abolition of export control has therefore effected little change in conditions. Among the export control offices which have been closed are those for foundry products, iron and steel, railroad carriages, optical and other instruments, and metal products. Because of the slackness in business the raw material shortage is not felt to any extent.

Foreign arrivals of coal and iron, especially from Great Britain, continued fairly large in October as a result of the absence of Ruhr deliveries. Demand for Upper Silesian iron and steel products is diminishing. The high freight rates now charged in gold marks are evidently causing many customers to await the resumption of deliveries from the Ruhr. Although gold mark prices of some of the raw materials have been reduced, business continues slack. Manufacturing costs have increased to such an extent that some firms even with sufficient orders on hand are forced to decrease production because of scarcity of working capital.

Currency troubles are also hampering business, and there seem to be no prospects of an early improvement. Many companies are working less than half the normal number of hours, but the decrease in orders has lately forced a number of works to dismiss workmen, and some of the smaller plants have suspended altogether.

Situation in the Ruhr

Conditions in the Ruhr have not improved. Here and there the French are still confiscating rolled material and scrap, and the trade in iron and steel products is irregular. Export trade is quiet, as the works cannot yet guarantee delivery. Negotiations between the French authorities and representatives of the Rhenish coal and iron industry have resulted in several agreements with the large works. After the Otto Wolff interests signed an agreement, a preliminary arrangement was also accepted by the Krupp works. In spite of this, however, the company is dismissing a large number of its workers. Several large works have closed entirely and others are operating only a few hours daily.

The speedy restarting of the works in the Ruhr is of great importance, as the huge sums Germany has still to send to these districts for unemployment pay are a heavy drag on its resources, nearly 90 per cent of the workmen being reported out of employment in some parts of the district.

Conditions in the Siegerland iron and steel industry have grown steadily worse and employment at the tin plate mills has never been as low as at present. The rolling mills have only a fair volume of orders in bar iron and sheets. The Solingen hardware and cutlery industry is also depressed and several associations of manufacturers have made considerable reductions in prices. Sales of agricultural machinery have decreased, with prices above foreign quotations and export orders diminishing. Employment in the Remscheid tool industry is also at a low ebb and the number of firms forced to suspend production is increasing. Only the manufacturers of files and specialities have a few orders.

As there are no exact figures for German iron and steel production, it is interesting to notice the changes in foreign trade during the first half of this year. As a result of the separation of the Ruhr district with its great iron works, and the reduced production of iron and steel, the imports of iron ore decreased. Supplies from Sweden were 1,380,000 tons and from France 970,000 tons less than the first half of last year. Imports of pig iron increased by 57,000 tons, rails by 30,000 tons, and sheets by 46,000 tons, while imports of girders were 26,000 tons and scrap 115,000 tons smaller. Of the imports Polish Upper Silesia supplied 26 per cent, Great Britain 9.5 per cent, the Saar district 8.5 per cent, Alsace Lorraine 7 per cent, and France 3 per cent.

Law to Encourage Free Competition

The iron, steel and engineering industries in Germany are among the best organized in the country. Works either belong to one of the great interests, or are combined in strong manufacturers associations or syndicates. The autocratic way in which some of these organizations have been fixing prices and conditions of sales has stirred the opposition of a large section of trade and industry. At times the price policy of the syndicates, especially those in the industries producing raw and semi-finished materials, has been detrimental to the general welfare.

The new bill, dealing with the supervision of syndicates, which has been passed by the Reichstag, is therefore of considerable importance. A special court, the Kartellgericht, is established in connection with the Reichswirtschaftsgericht (Federal Economic Court), and the Minister for Economic Affairs has been given additional powers. Public interest is regarded as being involved when without economic reasons production or sales are restricted, an embargo is established on purchases, prices are unduly increased or kept at a high level, or when with quotations in gold marks, surcharges are made to cover risks. These provisions are applicable to all trusts, interessengemeinschaften, syndicates, conventions and similar bodies.

The new law is intended to abolish the possiblity of unfair prices and conditions being enforced by syndicates, companies or private firms and to give greater scope to free competition. Any firm which considers itself unduly hampered in its activities especially in production or in the fixing of prices may give immediate notice of the termination of its membership in the syndicate, and the Kartellgericht settles on application any differences arising. The Kartellgericht may also permit customers who have made business contracts with a single firm under unfair conditions, to withdraw from them.

The next few months will undoubtedly see strong competition in German industry, and it is significant that the great leaders of industry are in sympathy with this law. As domestic demand is greatly reduced, the crisis in Germany will lead to a hard fight for domestic as well as foreign markets and the syndicates would hamper the activities of the large producers.

New Conditions Governing Quotations

The Association of German Industry has issued new conditions for quotations. Gold mark payments may be made in a non-depreciating way either by gold mark transfer, in gold mark bill or check, in foreign currency, in Rentenmark, in Government gold loan bonds, or rye loan bonds. With payments in paper marks the exchange rate on the day following the receipt of payment is to be used. In the machine-tool industry one-



THE devastation of Yokohama by earthquake and fire was almost complete. This photogr from Noge-yama, the foreign residential section above the city. The evidences of a st extreme right, between the bay and the canal, was the former foreign business qua The large white building in the center distance is the new telephone exchange building o which was erected to commemorate the opening of Yokohama as a port. Beyond the

third of the price is to be paid with the order and the rest on receipt of invoice. The pre-war gold mark prices have been exceeded, and for some light and medium machines they have been doubled. Prices on heavy machines have increased still more.

Developments in Austria and Czecho-Slovakia

The markets in the Near East and the Balkans have become of greater importance to the central European engineering industry. Germany being largely hampered by internal and external political and economic troubles, its competition is not very strong at present and Austria and Czecho-Slovakia are making the most of the opportunity. The industrialization of the eastern countries opens up great prospects. New industries have been introduced and many new factories are being built, causing a heavy demand for power plants, machine tools, small tools and other material. The textile industry is especially developing, and there is keen competition for the supply of machinery among western engineering firms.

Austria, and particularly its capital, Vienna, occupies a favorable position in trade with the Near East and the Balkans. A new company, in which the engineering firm of Kohorn and others in Vienna, several Austrian banks and the Metallum Company, Berlin, are interested, is taking over the foundry, the metal and engineering section of the former Austrian munition works, Wöllersdorf. It is starting immediately the production of textile machinery. The new undertaking will not only make the Austrian textile industry, which in the past has bought its machinery from Great Britain, Germany, and Czecho-Slovakia, independent from imports, but will also be a strong competitor in the Balkans, especially in Rumania. Another line in which demand is heavy is agricultural machinery. Turkey has lately placed orders and there is considerable competition among foreign firms. Building machinery and iron and steel materials are also in active demand.

FRENCH MARKET WEAK

Uncertain Political Situation—British Competition on Sheets—Japan Buys Structural Steel

PARIS, FRANCE, Nov. 16.—Buyers show great indecision because of the doubtful future in the political situation. Agreements with the Stinnes group are not yet concluded, so that the French position continues unchanged and consumers have to rely on domestic coke and on the supplies that can be obtained from the occupied district. However, deliveries have been larger of late. As a result of this indecision of both producers and consumers prices are declining.

The Belgian market, which in part has been leading the way shows no sign of revival and continues weak. There is some discussion as to how the low quotations can possibly continue with the general upward tendency that should follow the increase of salaries at mines. The perequation price of reparations coke will probably be advanced. As a compensation, export trade is favored by the new rise in the value of the pound sterling.

Coke.—The total supplies of reparation coke have been, for the whole month of October, 132,175 tons, or a daily average of 4264 tons. For the first thirteen days of November a total of 84,848 tons has been received. This improvement is attributed to a resumption of work in the Ruhr, to the increasing output of the occupied coke ovens and also to better transportation. It is presumed that the contracts for reparation coke will not be renewed for 1924 to the same extent as in 1923. The S. C. O. F. will probably be left in charge of the apportionment of German coke and of premiums at export, which are maintained at 30 fr. per ton of coke for November. Some of the plants in anticipation have already placed direct contracts with domestic and foreign traders, to the exclusion of Germans, however. As regards the distribution of coke, special regulations may be made for Lorraine works, which are entirely dependent upon the Ruhr for their coke supplies. The increase of wages at mines will bring about an increase in the price of coke of about 8 fr. per metric ton. As the price of German coke is to be increased accordingly on the terms of the agreement signed with the French Government, this coke will presumably be fixed at 134 fr. per ton.

Pig Iron.—Few inquiries are current and prices are declining. The average for No. 3, P. L., has been 405 to 415 fr., but orders were booked at 400 fr. The P. R. is generally quoted at 5 fr. lower. There is a question as to whether these prices will be maintained with the new coke price in effect. Some of the Ruhr tonnages of pig iron which has been delivered into France of late have not been satisfactory, which of course prevented further orders. Hematite prices are irregular. In the Eastern area, the ruling quotations are 425 to 435 fr., in the Center, North and Southeast, 440 to 445 fr. There are no transactions at present in British chill-cast grades, but a few orders have been placed for East Coast hematite at 460 and 470 fr. per metric ton, c.i.f. ports. Similar prices are quoted for export, f.o.b. Antwerp, by the usual competitors, Lorraine, Luxemburg and Belgian works, whose prices are 435 to 440 fr. for No. 3. Few tonnages are available of Bessemer iron, which is quoted at about 420 fr. (Belgian currency).

Ferroalloys.—The French Comptoir Electrométallurgique on Nov. 8, left unchanged the prices for ferro-



ntly received by the Foreign Traders Co., Inc., 17 Battery Place, New York, was taken llel with the canal are the remains of Motomachi, the great shopping center. To the tically all the buildings seen standing in the distance were seriously damaged by fire. ompleted. To the left of the exchange is the tower of the Yokohama Memorial Building, the bay, about 18 miles distant, lies Tokio.

silicon 25, 45 and 75 per cent grades. The scale for the 90 per cent is advanced to 30 fr. Ferrosilicon 95 per cent is quoted at 2.600 fr., the scale being 35 fr. Spiegeleisen 8 to 10 per cent Mn. is 530 to 550 fr. delivered; 10 to 12 per cent Mn., 550 to 575 fr., delivered; 18 to 20 per cent Mn., 675 to 700 fr., delivered. Ferromanganese, 76 to 80 per cent Mn., is quoted at 1,525 to 1,550 fr., delivered. This last item is moving upward through pressure of exchange.

Semi-Finished Products.—The market is unsteady, with very few tonnages offered and prices unstable. On the inland market, the following base prices have been quoted: Blooms, 50 fr. per 100 kg.; billets, 53 fr. per 100 kg., with some concessions noted. F.o.b. Antwerp, Bessemer grades are quoted as follows per metric ton in Belgian currency:

	Fr.
Ingots	510 to 515
Blooms	530 to 540
Billets	550 to 560
Largets	590 to 600

Rolled Steels.—No improvement is to be seen in the market, as a result of the concessions made on prices. Very little business is reported in rails; French railroads are not inclined to place orders. The de Wendel works has an order for 20,000 tons for Morocco. Beams are very quiet and are generally quoted at 55 to 62 fr., base, with the average transaction at 56 or 58 fr. Both buyers and sellers are careful on forward business. Some plants have booked orders for Japan. Export quotations f.o.b. Antwerp are 650 to 670 fr. (Belgian currency) for beams and 680 to 700 fr. for rolled material.

Sheets.—The market is somewhat irregular with fluctuations in prices. On the inland market, the following are current quotations on basic material, per 100 kg.:

	Fr.
Heavy sheets	66 to 69
Medium sheets	78 to 86
Light sheets	90 to 96

British sheet competition is again keen, plain sheets being quoted at 91 fr.

Wire Products.—The market is weak, a decline having occurred in wire in the past three weeks. Quotations are now 75 to 78 fr. per 100 kg.

BELGIAN MARKET IRREGULAR

German Competition on Sheets to Japan—Price Tendency Generally Downward—Nails, Wire, Pig Iron Weak

BRUSSELS, BELGIUM, Nov. 9.—The market shows a tendency toward irregularity. Inquiry is rather light, although works are well booked ahead and business for export is favorable as a result of exchange rates, especially with Japan. This irregular tendency is partly caused by a fear of seeing German sellers back in the world's market again, a rather peculiar attitude in view of recent political events which are not particularly favorable to German business. However, it is noteworthy that some of the plants in unoccupied Germany have booked a good many orders, principally in sheets.

Pig Iron.—Conditions are unchanged, with the price tendency downward. For export, Lorraine and Luxemburg are quoting similar prices or even lower than Belgium. Very little business in Bessemer grades is noted. The following prices are nominal: 435 to 440 fr. per ton for No. 3; ordinary Bessemer 420 to 425 fr. per metric ton. On Nov. 1, of 56 furnaces in Belgium 41 were in blast, 12 under repair and 3 out.

Steel.—Heavy inquiry is reported from Japan, buyers evidently wishing to place as many orders as possible before custom duties are again effective. Aside from this unusual inquiry the market is quiet. Most of the plants are largely supplied with orders. Prices range from 690 to 700 fr. for bars; 650 to 660 fr. for beams. Lorraine mills are quoting 690 to 700 fr. for bars and 650 to 675 fr. for beams, f. o. b. Antwerp. Luxemburg is quoting export prices of £7 17s 6d to £7 15s for beams. Belgian angles are quoted at 690 to 700 fr.; rods 875 to 900 fr.; bands 900 to 925 fr.; hoops 975 to 1000 fr., all f. o. b. Antwerp.

Semi-Finished Products.—Inquiry is fair and prices rather steady. Very little stock is in yards and considerable delay is noted in the quotations from works. The following basic Bessemer grades are quoted:

	Fr. Per Metric Ton
Ingots	510 to 520
Blooms	540 to 550
Billets	580 to 590
Largets	600 to 610

Sheets.—The market has been stationary for about two weeks and there has been but a slight variation in prices, although German competition is keen. Offers are made from Germany at £8 2s 6d for heavy sheets and £11 13s for medium sheets, shipment in two to three weeks. As a result of these prices, Japan has placed numerous orders in Germany. Free or f. o. b., the following Belgian prices are quoted on basic sheets:

	Fr. Per Metric Ton
*5 mm. and heavier	750
3 mm.	790
2 mm.	825 to 850
1.5 mm.	875 to 925
1.0 mm.	1075 to 1100
0.5 mm.	1250 to 1275

*Open-hearth 5 mm. and heavier 760 to 770 fr.

Nails and Wire.—Quotations have been lowered 5 fr. per 100 kg. on wire. The following base prices are quoted, delivered free or f.o.b. Antwerp: Plain wire, 1200 fr.; galvanized, 1450 fr.; Paris nails, 1250 fr.

Iron and Steel Markets

ABOVE A MILLION TONS

Remarkable Pig Iron Buying Movement Brings Price Advance

The Effect on Finished Steel—Operations Will Fall Off in December

Well over a million tons of pig iron has been put on the producers' books by the widespread buying of the past two weeks. The movement has now subsided, partly in view of the advance of $1 to $2 a ton in foundry iron prices, but more because most of the largest consumers are provided with iron for their first quarter's needs.

The effect on finished steel of this remarkable activity in the primary product is yet to be measured. Users of steel, as is well known, will go over into the new year without change in their policy of scant buying. But the aggregate of current orders for early delivery is far from inconsiderable and on the whole sentiment has grown more favorable.

The price situation in steel products is somewhat uneven. Over against the firmer stand of some sheet makers are further reports of concessions on plates, Pittsburgh mills having encountered more 2.40c. business in competitive territory, as against a 2.50c. price. Generally speaking, the mills will have shipped most of the low-priced orders on their books by the end of December—that is, bars below 2.40c. and plates and shapes below 2.50c. Thus the real test on prices is looked for in the first month or two of the new year.

It is expected that operations will fall off considerably in December. The Steel Corporation is now running at slightly over 80 per cent of capacity, while the average for independent companies is less than 70. By the year end the rate for the entire industry is likely to be about two-thirds.

Chicago producers continue to count hopefully on railroad contracts, though it is recognized that their volume depends on the still unsettled factor of price. The heavy rail bookings will mean large orders for track supplies. The New York Central, for example, has inquired for 30,000 tons of tie plates and nearly 15,000 tons of spikes and bolts.

The week's developments in railroad freight car buying are chiefly the purchase of 1400 by two Southern roads and the request for figures on 1000 by the Reading.

Activity in fabricated steel remains outstanding. Of upward of 27,000 tons booked, one-half was for public service stations, including 10,000 tons at Kearny, N. J. In new work, railroad bridges account for over one-half of the 23,000 tons.

One factor in the firmer market for sheets in the Central West and at Chicago is fresh Japanese buying. For the Nippon Government there is also an 18,000-ton sheet inquiry and a large rebuilding program calling for plates, structural shapes and bars is coming forward.

Automobile, stove, radiator, heating furnace, sanitary ware and malleable foundries were the heaviest buyers of pig iron in the past fortnight. Thus new construction was an important factor. Cleveland buying, put at 350,000 to 375,000 tons, was the largest ever done there in equal time. Pittsburgh is one center in which the second week saw more buying than the first.

While the movement was largely over before the furnace companies made their advances of 50c. on Bessemer, $1 on basic and $1 to $2 on foundry irons, moderate sales of foundry grades have been made at the new prices. It is yet to be seen how far the new level can be maintained.

The scrap market under the influence of the increased activity in pig iron shows a distinct upward tendency, with active buying in some centers.

Advances in both foundry and basic grades have raised THE IRON AGE pig iron composite price to $21.86, from $20.77 last week—the first advance since a minor one in August. One year ago the figure was $26.77.

Another week at 2.775c. per lb. extends the period of virtual stability of the finished steel composite price to 30 weeks. It was 2.439c. one year ago.

Pittsburgh

Pig Iron Sales Exceed 100,000 Tons—Steel Market Deadlocked on Prices

PITTSBURGH, Nov. 27.—Pig iron again in the past week has occupied the center of the stage here, and following sales now estimated to have been about 100,000 tons, producers have advanced their prices 50c. a ton on Bessemer, $1 a ton on basic and foundry grades, while malleable iron, which was sold last week as low as $19, now does not appear to be available at less than $22. While small sales are being made at the new levels, the effect of the advance has been to check buying because the low prices still are fresh in the minds of those who did not participate in the buying movement. The great bulk of the business was in foundry and malleable grades, steel making irons figuring only in a small way in the sales to consumers. The large consumers of foundry iron were able to cover their requirements over the remainder of the year and through the first quarter of 1924 at the low levels, and producers now will have to depend upon the smaller consumers for prices which will bring up their averages.

There seems to be a somewhat better feeling in the

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 27, 1923	Nov. 20, 1923	Oct. 30, 1923	Nov. 28, 1922
No. 2X, Philadelphia‡	**$24.14**	$23.64	$23.64	$28.14
No. 2, Valley furnace†	**22.00**	21.00	22.50	27.00
No. 2, Southern, Cin'ti†...	**25.05**	23.05	23.55	27.05
No. 2, Birmingham, Ala†	**21.00**	19.00	19.50	23.00
No. 2 foundry, Chicago*..	23.00	23.00	24.00	29.00
Basic, del'd, eastern Pa..	22.75	22.75	23.00	27.50
Basic, Valley furnace	**21.00**	20.00	22.00	26.00
Valley Bessemer, del. P'gh.	24.26	24.26	26.76	32.77
Malleable, Chicago*.....	23.00	23.00	24.00	29.00
Malleable, Valley	**22.00**	19.00	22.00	28.00
Gray forge, Pittsburgh...	**23.26**	23.26	24.26	28.27
L. S. charcoal, Chicago...	28.15	28.15	29.15	36.15
Ferromanganese, furnace..	107.50	107.50	110.00	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill..	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh..	40.00	40.00	40.00	37.00
O.-h. billets, Pittsburgh..	40.00	40.00	40.00	37.00
O.-h. sheet bars, P'gh....	42.50	42.50	42.50	37.00
Forging billets, base, P'gh.	45.00	45.00	47.50	45.00
O.-h. billets, Phila.....	45.17	45.17	45.17	43.17
Wire rods, Pittsburgh....	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb..	2.35	2.35	2.40	2.00
Light rails at mill.....	2.25	2.25	2.25	2.00

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia..	2.67	2.67	2.67	2.275
Iron bars, Chicago.....	2.40	2.40	2.40	2.50
Steel bars, Pittsburgh....	2.40	2.40	2.40	2.00
Steel bars, Chicago.....	2.50	2.50	2.50	2.10
Steel bars, New York....	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh...	2.50	2.50	2.50	1.95
Tank plates, Chicago....	2.60	2.60	2.60	2.30
Tank plates, New York..	2.74	2.74	2.74	2.34
Beams, Pittsburgh.....	2.50	2.50	2.50	2.00
Beams, Chicago.....	2.60	2.60	2.60	2.20
Beams, New York.....	2.74	2.74	2.74	2.34
Steel hoops, Pittsburgh...	3.00	3.00	3.15	2.75

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Nov. 27, 1923 Cents	Nov. 20, 1923 Cents	Oct. 30, 1923 Cents	Nov. 28, 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	4.85	4.85	5.00	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh....	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh....	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh..	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago.....	**$18.50**	$18.00	$17.50	$24.00
Carwheels, Philadelphia...	**18.50**	17.50	19.00	20.00
Heavy steel scrap, P'gh..	16.50	16.50	15.00	20.50
Heavy steel scrap, Phila..	15.50	15.50	15.00	16.00
Heavy steel scrap, Ch'go..	**14.50**	14.00	13.50	17.00
No. 1 cast, Pittsburgh....	**19.00**	18.50	18.50	22.50
No. 1 cast, Philadelphia..	**20.00**	19.00	19.00	20.00
No. 1 cast, Ch'go (net ton)	**19.00**	18.50	18.00	19.50
No. 1 RR. wrot. Phila....	**18.00**	17.50	17.00	19.00
No. 1 RR. wrot. Ch'go(net)	**13.00**	12.50	12.00	15.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	**$4.00**	$3.75	$3.75	$7.00
Foundry coke, prompt....	**5.00**	4.75	4.75	8.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York..	*13.25*	13.50	13.00	14.12½
Electrolytic copper, refinery	**12.87½**	12.75	12.25	13.62½
Zinc, St. Louis.....	**6.37½**	6.30	6.32½	7.02½
Zinc, New York.....	**6.72½**	6.65	6.67½	7.37½
Lead, St. Louis..	6.70	6.70	6.45	6.95
Lead, New York.....	**7.00**	6.95	6.75	7.30
Tin (Straits), New York..	**47.00**	44.25	41.50	36.37½
Antimony (Asiatic), N. Y.	*9.00*	9.25	8.50	6.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 27, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Nov. 20, 1923,	2.775c.
Oct. 30, 1923,	2.775c.
Nov. 28, 1922,	2.439c.
10-year pre-war average,	1.689c.

Composite Price, Nov. 27, 1923, Pig Iron, $21.86 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 20, 1923,	$20.77
Oct. 30, 1923,	22.27
Nov. 28, 1922,	26.77
10-year pre-war average,	15.72

steel market, but this appears to have been created by the strength of the securities market in New York, aided by the stronger tendency in pig iron, scrap and coke, rather than because of any decided enlargement in steel purchases. While orders for small lots of the various products for prompt delivery are somewhat more numerous than they have been, there is not much forward buying except possibly in strips by the automotive industry, which has begun to specify for January shipments. In this case, however, there has been more or less holding up of December tonnages. Makers of pipe and tin plate are comfortably provided with business for the remainder of the year, and the leading maker of the latter product is fully obligated to the third quarter of next year. In other finished products most manufacturers need business to sustain present operating schedule through December. The Carnegie Steel Co. is scheduled this week for 90 per cent of ingot capacity, or about 5 per cent above its recent rate, but independent steel work operations in this and nearby districts do not average higher than 65 per cent of sheet mills in operation this week, and 93 per cent of tin mills. The National Tube Co. is running practically full, a better labor supply having permitted this company to put on an additional buttweld furnace at Wheeling. The Jones & Laughlin Steel Corporation is operating about 65 per cent steel works capacity. At Johnstown the Bethlehem Steel Co. has only three of 11 blast furnaces in production.

The steel price situation still is pretty uneven and plates lately have been included among those products in which price concessions are being made. Pittsburgh mills are meeting lower prices in competitive territory more frequently than was the case recently, and 2.40c., base, now is mentioned as the price at which business can be placed. Not much car business is being closed.

The automotive industry seems to be on a "buyers' strike" on sheets and is exerting every means to force concessions. In a general way the steel market is deadlocked on prices, and maintenance of present levels seems to hinge on whether buyers' requirements become more important than the price.

Pig Iron.—The estimate a week ago that the buying movement had accounted for the transfer of 50,000 tons proves to have been very conservative in the light of fuller details. Almost that amount was taken by the Standard Sanitary Mfg. Co. alone. In addition to 10,000 tons reported a week ago as purchased by this company for its local and Louisville plant for November and December delivery it bought 3000 tons for that delivery and followed that with purchases of 35,000 tons for shipment over the first quarter of 1924. About one-third of the iron purchased was for Louisville, the bulk of which was placed with Alabama furnaces at $18.50, Birmingham, for the base grade for delivery over the remainder of this year, and at $19 to $20, Birmingham, for its first quarter tonnages. A round tonnage of southern Ohio iron also was taken for Louisville at $22, Ironton, for No. 2 grade. The Northern iron for local plants averaged about $21, Valley furnace, for both No. 2 and No. 2X grades. Other melters also have taken advantage of the prices to increase original purchases and sales to consumers aggregate about 70,000 tons. Sales to middlemen in the meantime have aggregated in excess of 30,000 tons, including 10,000 tons of basic iron by an independent steel company at $21, furnace, about 15,000 tons of malleable iron at from $19 to $19.50, and about 10,000 tons of foundry grade, chiefly from steel works furnaces at $21. Most producers now are quoting $22, furnace, for No. 2 foundry and some as much as $22.50 and $23, but sales at the new levels are small, and the $21 price has not entirely disappeared since some makers are protecting their regular customers at that figure. There are no public quotations on basic iron below $21 and $23 seems to be the minimum on Bessemer iron, although buyers claim to have been quoted $22.50 on this grade. Such sales of Bessemer as have been made have been at $23, Valley furnace, or Valley furnace base. There are several inquiries before the market, among them one for 800 tons of foundry iron for the Trafford, Pa., plant of the Westinghouse Electric & Mfg. Co., 1000 tons of Bessemer iron for the McConway & Torley Co., Pittsburgh, and 500 to 1000 tons of that grade for the Pittsburgh plant of American Steel Foundries. The Pittsburgh Steel Foundry is asking for 600 tons of basic, the Mesta Machine Co. for 1000 tons of Bessemer, the Elliott Co., Jeannette, for 1000 tons of foundry iron, and the Universal Steel Co., Bridgeville, Pa., for 500 to 1000 tons of low phosphorus iron. The latter grade now is available at $29, Valley furnace, or $30.76, delivered Pittsburgh. The A. M. Byers Co. will blow in its Mattie furnace, Girard, Ohio, between Dec. 10 and 15. The monthly meeting of the American Pig Iron Association was held at the William Penn Hotel here today, and reports made by merchant producers from various parts of the country indicated that the recent buying movement had embraced more than 1,000,000 tons. The Youngstown Sheet & Tube Co. reported sales of 150,000 tons from its Chicago and Youngstown furnaces.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	23.00
Gray forge	$21.50 to 22.00
No. 2 foundry	22.00 to 22.50
No. 3 foundry	21.50 to 22.00
Malleable	22.00
Low phosphorus, copper free	29.00

Ferroalloys.—A substantial tonnage of ferromanganese was closed recently, when this material was available at $107.50, sales being placed at 2500 to 3000 tons, mostly for shipment outside, rather than within this immediate district. While domestic producers still might take tonnages at that price, agents of British producers lately were advised that $110, Atlantic seaboard, is the minimum price. Most users of this material here have sufficient stocks to carry them over the remainder of the year and a little way into the new year; consequently they are not disposed to do much at the moment until the steel situation as to operating prospects are more clearly defined. A buying movement is expected to start in the next few weeks, but just now there is little sign of one. All indications are that the price for 50 per cent ferrosilicon for 1924 delivery will be about $80, delivered, although a quotation of $79 is reported and a Middle Western steel maker is understood to have covered at $75. Some low-priced offerings of ferrotungsten seem to have created caution among users of that material; the fact that this lot was available as low as 85c. per lb. contained, or 10c. to 25c. below other domestic and foreign producers encouraged ideas of a general decline. Tool steel grade of ferrovanadium is reported to be strengthened in price. There is little activity locally in spiegeleisen. Prices are given on page 1483.

Semi-Finished Steel.—The market still is holding with great firmness at $42.50, Pittsburgh or Youngstown, for sheet bars, but a like degree of strength is absent in billets, both rolling and of forging quality, and slabs. Sales are few and rarely involve much tonnage. We note one sale of 500 tons of sheet bars to a nearby sheet maker at $42.50, Pittsburgh. The largest piece of business of the past week was about 6000 tons of forging billets to an Eastern forging company by a local mill, which also took almost 1000 tons for a locomotive builder; competition for this business was very keen and it is believed that the price was less than $45, base, the regular quotation. Rolling billets can be had without much trouble at $40 and that price also is the ruling one on slabs. The skelp market is dull and prices largely untested. On such orders as are coming out for wire rods, which are entirely for prompt shipment, the prevailing price is $51, base. Prices are given on page 1483.

Wire Products.—Buyers still cling to a policy of merely meeting their actual requirements and while orders for quick delivery are fairly numerous and reach a fairly large total, they are not sufficient to provide manufacturers with the kind of rolling schedules they like. Old obligations are practically completed and buyers are more generally confronted with present quotations than they were a short time ago. This fact and the time of year no doubt explain the lack of confident forward buying. The lull, however, gives the mills a chance to build up their stocks, which for some time have been low. It is too early to state definitely the reaction to the recent announcement of a guarantee against a decline in woven fence prices to June 1, 1924. The object of this move was to stimulate orders for delivery promptly or at convenience of the mill. In the event of a decline, dealers were to be rebated to the extent of unsold floor stocks as of June 1, and not upon all of the tonnage shipped. Prices of wire products are closely observed in this territory; price cutting elsewhere seems to be largely in coated nails, which Middle Western makers are taking as low as $2.60 per count keg. Prices are given on page 1482.

Iron and Steel Bars.—There is no shading of the regular market base of 2.40c. on steel bars by local and Youngstown mills; competition seems to be rather one of delivery than of price, since the demands, though generally for small tonnages, are in all cases for very prompt shipment. Evidently, the Steel Corporation is pretty well up with its bar orders, as it recently secured one fair-sized tonnage on its ability to make the quickest delivery. Real activity also is lacking in reinforcing bars and warehouse interests are finding mill competition pretty keen on business that ordinarily would go to the former. Iron bars are steady, but not active.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Structural Material.—Mills in this district still are unyielding as to prices on strictly new business and consequently are not getting many orders, since there

is not the same firmness among mills in other producing centers. Structural lettings being seasonally light, demands upon the mills are in accord with that condition.

Plates.—The American Bridge Co. was low bidder on 16 of the 20 steel barges bids for which were opened by the Louisville office, U. S. Engineers, Nov. 23. Formal award is expected shortly; about 1900 tons of steel, mostly plates, will be required for these 16 barges. General demand for plates still runs chiefly to small tonnages for early delivery and on such business as is for delivery in this immediate territory, there has been no shading of the regular price of 2.50c., base, Pittsburgh. There is some meeting of competition from Chicago mills in competitive territory, a price of 2.60c., Chicago, having been made, equivalent to about 2.45c., Pittsburgh, in the cases noted. There is an impression that prices now ruling for railroad cars are the restrictive influence on orders, but among producers of rolled steel entering car construction, the tendency is to place the blame for most of the advance in prices at the doors of the makers of the patented parts. Both of the local car plants are nearing the end of their orders. Plate prices are given on page 1482.

Steel Rails.—The market in light rails, particularly those rolled from billets, still is a very limited one, due to the continued depression in the coal market. Billet rails are still priced at 2.25c., base, by the larger producers and there is denial that less is being done even on those inquiries of relatively attractive proportions.

> We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Conditions do not vary much from week to week. If demands for lapwelded goods were as heavy as those in buttweld pipe, the lot of makers would be very satisfactory.

Sheets.—The market is not particularly satisfactory to the larger producers, who by holding firmly to the regular prices find that they are losing much of the current business. Buyers are not anticipating their requirements to any extent, and, as there is not enough business to give all mills a share, competition for passing orders is rather sharp. The leading interest is maintaining its announced prices and the fact that recent price averages of several representative independent companies have been 3.80c. for black, 4.95c. for galvanized and 2.99c. for blue annealed makes it apparent that a fair portion of current orders taken by these companies have been at full quotations.

Tin Plate.—The leading interest is completely sold out for the first half of next year at least; independents have not fared as well, but their customers will not enter the new year with big stocks and the expectation is that orders and specifications will soon be forthcoming. The price of all makers is $5.50 per base box, Pittsburgh.

Cold-Finished Steel Bars and Shafting.—Conservative buying policy of the automotive industry tells heavily upon the demand for this line and prices are not overly firm. On small tonnages for prompt delivery 3c., base, is being obtained, but practically all makers are going as low as 2.90c. when conditions warrant and there have been sales of hexagons, carrying large extras, at well below that base price. Ground shafting still is quoted at 2.40c., base, f.o.b. mills, for carload lots.

Track Fastenings.—The Baltimore & Ohio Railroad order for tie plates, recently placed, involved 15,000 tons and was divided equally between two local mills and the Wheeling Steel Corporation. It is claimed that the regular price of $52 per net ton was not shaded. Activity still is lacking in spikes and other rail accessories and prices are very irregular, particularly on spikes. Prices are given on page 1482.

Hot-Rolled Flats.—There is a somewhat greater interest for delivery after Jan. 1, but supplies for shipment between now and the end of the year are not much sought. The regular price of 3c., base, finds fair observance except in the case of rim stock and wide strips. Prices are given on page 1482.

Cold-Rolled Strips.—Concessions from the regular price of 5c., base, are more frequent, especially for early delivery, as makers are not very well off on orders for shipment between now and the end of the year. The market now is quotable from 4.90c. to 5c. as against the 5c. recent quotation.

Bolts, Nuts and Rivets.—The situation in these products still is that there are more sellers than buyers and not much strength in prices because of the competition for orders. Prices are given on page 1482.

Coke and Coal.—Coke prices are up about 25c. a ton from recent levels on both furnace and foundry grades. Production has further declined and some producers have found it necessary to go into the open market to have enough tonnage of furnace coke to meet their contracts. None of this grade now is available at less than $4 per ton at oven, and on spot foundry coke $5 now is the minimum price. Negotiations for first quarter tonnages of furnace coke have been started in a small way, with producers quoting from $4.25 to $4.50 in most cases. These prices are 25c. to 50c. a ton above what merchant pig iron producers feel they should pay based on the prices at which they have taken pig iron business. The coal market exhibits marked firmness on slack grade, supply of which has dwindled because of the absence of orders for lump coal with the ending of the lake shipping season. This grade now is selling at $1.25 to $1.50. Mine run steam coal of the better sorts commands $1.90 to $2.25, mine run gas, $2.25, and mine run coking coal, $1.75 to $2.25.

Old Material.—The market still exhibits a strong undertone, but this condition finds explanation in a disinclination by dealers to sell rather than because of any general interest in the market on the part of consumers. Actually, dealers with short sales to cover are more concerned about supplies than mills or foundries and are paying much the higher prices to secure needed tonnages. Prices show very little variation from those of last week, but it is the testimony of buyers that it is harder to buy at quotations than it was recently. Scrap is not coming out very freely and dealers also are encouraged to take a firm price stand in the expectation of an early revival of buying. A fair-sized tonnage of heavy melting steel, railroad quality, has been sold for Vandergrift, Pa., delivery at $17.50. Dealers are reaching high for tonnages. Compressed sheets offered by the Westinghouse Electric & Mfg. Co. for December shipment were taken by a Pittsburgh dealer at $15, East Pittsburgh, equal to $15.63 at nearest consuming mill without profit to purchaser. Other kinds of material offered by this interest sold at East Pittsburgh at about the same prices as consumers are paying delivered. A local maker of spikes and tie plates recently disposed of 500 tons of material classified as heavy melting steel at $16, Pittsburgh, and later obtained $17.50 for 1500 tons. Buyers evidently are looking for a $20 market on heavy steel scrap, as these purchases must bring that price to show a profit.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$16.50 to $17.00
No. 1 cast, cupola size	19.00 to 19.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 18.50
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.00 to 13.50
Railroad knuckles and couplers	18.50 to 19.00
Railroad coil and leaf springs	18.50 to 19.00
Low phosphorus blooms and billet ends	20.50 to 21.00
Low phosphorus plate and other material	19.00 to 19.50
Railroad malleable	17.50 to 18.00
Steel car axles	18.00 to 18.50
Cast iron wheels	17.00 to 17.50
Rolled steel wheels	18.50 to 19.00
Machine shop turnings	12.00 to 12.50
Sheet bar crops	18.00 to 18.50
Heavy steel axle turnings	14.50 to 15.00
Short shoveling turnings	13.00 to 13.50
Heavy breakable cast	16.50 to 17.00
Stove plate	14.00 to 14.50
Cast iron borings	13.00 to 13.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.50 to 17.00

Chicago

Specifications of Steel Mills Heavier—Pig Iron Buying Subsides

CHICAGO, Nov. 27.—Specifications received by the leading local steel mills during the week were heavier than during the preceding two weeks, and compared favorably with the weekly average since last April. Specifications against rail contracts were notably improved, and the same can be said of soft steel bars for manufacturing consumers. New business also shows a slight gain, although a heavy buying movement is hardly expected to materialize until after the first of the year. The railroads continue to be conspicuous factors in the market. Out of 200,000 tons of rails ordered last week by the Pennsylvania 47,000 tons will be rolled here. Local mills also expect to share in about 45,000 tons of tie plates, spikes and bolts, to be bought by the New York Central. They likewise hope to book from 100,000 to 150,000 tons of plates, shapes and bars for railroad cars on which Western car builders are now figuring. The outlook for equipment buying is bright, with orders for fully 95,000 cars in prospect. Few important new car inquiries have appeared during the current week, however. Local mill prices on plates, shapes and bars remain unchanged and the sheet market appears to be growing firmer as Japanese buying increases. Mill operations are slightly better than a week ago. The steel output of the Illinois Steel Co. has increased to 80 per cent of ingot capacity, although its pig iron production remains unchanged. The Inland Steel Co. remains on a 75 per cent basis.

Pig Iron.—After two weeks of heavy buying in which Chicago district sales aggregated about 200,000 tons, market activity has subsided perceptibly, but this is not surprising, as a continuance of contracting in such great volume was hardly to be expected. Meanwhile prices are firm at the new levels and current sales still cover substantial tonnages and pending inquiries are fairly numerous. It is evident that there is still considerable iron to be bought not only for first quarter but also for the remainder of the year. The failure of some melters to cover their requirements is accounted for by lack of forward orders for their own products. As rapidly as their needs become definitely established, however, they are entering the market for iron. There is no longer any propensity to postpone buying in the expectation that prices will decline. Prominent among recent sales may be mentioned 5000 tons of malleable bought by a Milwaukee user for first half delivery, 1500 tons of foundry placed by a downstate melter for first quarter, 1000 tons of malleable ordered by a Wisconsin consumer for first quarter, and 1000 tons of foundry purchased by a Chicago plant for the same period. Typical current inquiries are 1600 tons of foundry for first quarter wanted by an Illinois agricultural implement manufacturer and 1000 tons of foundry for December and January shipment desired by a local melter. Southern prices have advanced during the week and the last sales reported were on the basis of $21, Birmingham. Charcoal furnaces are well booked and are expected to advance their prices. Silvery, on the other hand, has declined $1 a ton. A sale of a carload of low phosphorous in Indiana brought out a price of $30, Valley furnace.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal averaging sil. 1.50, delivered at Chicago..	$28.15
Northern coke, No. 1 sil. 2.25 to 2.75	$23.50 to 24.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	23.00 to 23.50
Malleable, not over 2.25 sil.	23.00 to 23.50
Basic	23.00 to 23.50
High phosphorus	23.00 to 23.50
Southern No. 2	27.01
Low phos., sil 1 to 2 per cent, copper free	34.79
Silvery, sil. 8 per cent	37.29

Ferroalloys.—Recent sales of ferromanganese have been negotiated at prices ranging from $106.50 to $107.50, seaboard. Prominent among purchases were lots of 200 and 300 tons. An inquiry for 1000 tons of spiegeleisen was withdrawn.

We quote 80 per cent ferromanganese, $114.88 to $115.88, delivered; 50 per cent ferrosilicon, $82, delivered; spiegeleisen, 18 to 22 per cent, $43.80, delivered.

Plates.—With Western car builders figuring on cars requiring 150,000 tons of plates, shapes and bars, mills regard the business outlook as favorable. For the entire country car building in early prospect is said to involve 95,000 cars, taking 1,000,000 tons of steel. Actual plate bookings thus far have been light, but local mill prices remain firm.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Sheets.—Japanese buying is an increasing important factor in the market. A local mill has booked an additional order for 2000 tons of black sheets for Japan and a new inquiry by the Nipponese Government calls for 18,000 tons. There is also considerable telegraphic inquiry for galvanized for that country. Although domestic buying still lags, it is appreciably heavier than for some time and mill prices are growing firmer. In fact, it would appear that 4.90c., base Pittsburgh, will soon be the minimum on galvanized sheets.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.85c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Cast Iron Pipe.—St. Paul takes bids Dec. 4 on 3000 tons of 6- to 16-in., inclusive, while Minneapolis receives tenders on the following day on 1500 tons of the same size. Bellwood, Ill., receives figures today on 500 tons of 6-, 8- and 10-in. water pipe. The National Cast Iron Pipe Co. will furnish 350 tons for Joliet, Ill. Detroit is expected to come to a decision on 4400 tons today.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $59.20 to $60.20; 6-in. and above, $55.20 to $56.20; class A and gas pipe, $5 extra.

Reinforcing Bars.—A heavy tonnage of concrete bars was placed during the week and a number of attractive new projects have come up for figures. At Milwaukee 600 tons for the superstructure of the Milwaukee Journal Building was placed with the Kalman Steel Co. Fully 1000 tons for Illinois road work was awarded during the week. The general contract for an office building for the Atchison, Topeka & Santa Fe at Topeka, Kan., involving 750 tons, has been awarded to the Swenson Construction Co., Kansas City, with the likelihood that the bars will be bought shortly.

Lettings include:

Superstructure for Milwaukee Journal Building, Milwaukee, Wis., 600 tons to Kalman Steel Co.

Illinois State highway work, 400 tons to Truscon Steel Co.

Illinois State highway work, 400 tons to Joseph T. Ryerson & Son.

Illinois State highway work, 200 tons to Concrete Steel Co.

Drill Hall for 122nd Field Artillery, Chicago, 200 tons to Concrete Engineering Co.

Plant addition for Goodman Mfg. Co., Chicago, 180 tons to American System of Reinforcing.

Curtis Automobile Co. garage, Milwaukee, 170 tons to Concrete Engineering Co.

Plant addition for the Meyercord Co., Chicago, 105 tons to American System of Reinforcing.

Pending business includes:

Atchison, Topeka & Santa Fe, office building, Topeka, Kan., 750 tons, general contract awarded to Swenson Construction Co., Kansas City, Mo.

Sanitary District, Chicago, Ninety-fifth Street sewer and pumping station, 600 tons.

Florsheim Shoe Co. plant, Chicago, 400 or 500 tons, Alfred S. Alschuler, architect.

Union League Club building, Chicago, 150 tons.

Rails and Track Supplies.—Out of the 200,000 tons of rails ordered by the Pennsylvania, 12,000 tons will be rolled by the Inland Steel Co. and 35,000 tons by the Gary mill. The New York Central has issued inquiries for over 40,000 tons of track supplies representing its requirements over the first six months of 1924. Included

are 100,000 kegs of spikes and bolts and 30,000 tons of tie plates. Miscellaneous inquiries for track supplies represent a fair tonnage and orders for spikes and bolts booked locally during the week involve 15,000 kegs. Specifications against rail contracts are heavier than for some time. Light rail orders for the week aggregate about 1000 tons. Iron tie plates are now available at from $51 to $52 a ton.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.
Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.55c. to 2.60c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.
Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Bolts and Nuts.—Although discounts are still weak as indicated by the fact that as low as 70 off f.o.b. Chicago has been done on large machine bolts, bolt makers are inclined to take a firmer attitude, having become convinced that their raw material costs will not go down.

Jobbers quote structural rivets, ½; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 50 and 5 per cent off; larger sizes, 50 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Structural Material.—Fabricating awards during the week have been light and competition on pending projects has been keen, particularly on the part of some of the smaller fabricators who are running out of work. As previously noted in this column, several large tonnages are up for figures besides a fair number of smaller jobbers. Plain material prices are unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Specifications for soft steel bars are heavier, but buying is still restricted, although some of the larger consumers are quietly closing for their needs over the rest of the year. It is evident, however, that users desire to keep their stocks down until inventories have been taken. Current purchases are confined largely to manufacturing consumers, there being little buying by jobbers. Considerable interest is manifested in a comprehensive program for the purchase of plates, shapes and bars by the Japanese Government which, up to the present time, has confined its buying to sheets. These inquiries are expected in December. Local mill prices on mild steel bars remain unchanged at 2.50c., Chicago. Demand for bar iron and rail steel bars shows no improvement and intermittent mill operation is the rule. Prices, however, are steady.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.
Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.30c. for rounds and 4.80c. for flats, squares and hexagons.
Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—A number of large inquiries for nails put out to test the market failed to break the present price level. Actual buying is still light, but mill prices on all wire products are firm. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1482.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Warehouse Prices.—Local jobbers have reduced cold-rolled steel bars and shafting $5 a ton. The new quotations are given under the paragraph on bars.

Coke.—Some revival of interest in foundry coke is to be noted, although there has been no such concentration of buying such as recently occurred in the pig iron market. In some instances, melters have contracted for their first half requirements subject to prices at time of delivery. Local by-product foundry coke is unchanged at $12.50 delivered Chicago switching district, while beehive has advanced to $5.50, Connellsville.

Old Material.—Prices are higher, principally because dealers are speculating on a general advance. Although one steel works recently closed for 5000 tons of heavy melting, another steel interest is making heavy rejections against old orders for that grade. On the whole, consumer purchases are scattered and small. Users are showing the most interest in cast and malleable grades, one inquiry for malleable being large. Railroad lists include the Burlington, 7300 tons; the Belt Railway of Chicago, 350 tons, and the Wabash, 250 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$19.50 to $20.00
Cast iron car wheels	18.50 to 19.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	18.00 to 18.50
Railroad tires, charging box size	18.00 to 18.50
Railroad leaf springs, cut apart	18.50 to 19.00
Rails for rerolling	15.75 to 16.25
Steel rails, less than 3 ft.	17.00 to 17.50
Heavy melting steel	14.50 to 15.00
Frogs, switches and guards cut apart	14.50 to 15.00
Shoveling steel	14.50 to 15.00
Drop forge flashings	10.00 to 10.50
Hydraulic compressed sheets	11.50 to 12.00
Axle turnings	11.50 to 12.00
Steel angle bars	16.50 to 17.00

Per Net Ton

Iron angle and splice bars	18.50 to 19.00
Iron arch bars and transoms	18.50 to 19.00
Iron car axles	24.50 to 25.00
Steel car axles	16.50 to 17.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Cut forge	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	13.00 to 13.50
Steel knuckles and couplers	16.00 to 16.50
Coil springs	18.00 to 18.50
No. 1 machinery cast	18.00 to 18.50
No. 1 railroad cast	18.00 to 18.50
No. 1 agricultural cast	18.00 to 18.50
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	15.50 to 16.00
Machine shop turnings	6.00 to 6.50
Cast borings	9.50 to 10.00
Short shoveling turnings	9.50 to 10.00
Stove plates	16.00 to 16.50
Grate bars	15.00 to 15.50
Brake shoes	16.50 to 17.00
Railroad malleable	17.50 to 18.00
Agricultural malleable	17.00 to 17.50

Sheet Market Irregular in Youngstown District

YOUNGSTOWN, Nov. 27.—The sheet market is still spotty, with production probably not above 55 per cent. Often mills which are scheduled at the beginning of the week, roll their orders and suspend Thursday or Friday. The smaller non-integrated interests are maintaining a more active production rate than the larger interests, with exception of the Trumbull Steel Co. This company has shared liberally in sheet orders for the Japanese Government, and the past week received its proportionate share of an 18,000 ton order.

Officials point out that its ability to roll sheets in tin mill sizes has been a large factor in its success in securing orders at this time, as much of the Japanese tonnage consists of No. 30 gage material. The Trumbull company has largely withdrawn from the manufacture of common and galvanized sheets, and its output is running to full-finished and specialty stock.

The company states specifically that all business recently entered was either at the going quoted prices of the American Sheet & Tin Plate Co., or at an advanced price, on specialized business.

There is no question, however, but that price cutting is going on the sheet industry, and that some of the larger makers, as well as the smaller, are deviating from the quoted levels.

The Department of Commerce, Washington, announces October shipments of steel-furniture stock goods based on reports received from 22 manufacturers. Shipments amounted to $1,365,600 in October, as against $1,273,259 in September, and $1,227,447 in October, 1922.

A bibliography on "Stainless Steel and Stainless Iron," giving a list of references to material in the Carnegie Library of Pittsburgh, has been issued in pamphlet form by the library. It has been compiled by Victor S. Polansky.

New York

Heavy Buying of Pig Iron—Fabricated Steel Inquiry Unusual

NEW YORK, Nov. 27.—Following the extremely heavy buying movement reported last week the buying continued actively through the remainder of last week and a fair tonnage was closed yesterday and today. The buying now seems to be over except for small tonnages. Prices have advanced from the minimum of $19 at Buffalo to $21, and some furnaces are asking $22, while in eastern Pennsylvania $22.50, or an advance of $1.50 from the minimum of last week is now the prevailing quotation, with several companies asking $23. Virginia furnaces did not share to a large extent in the buying movement, but they have sold some iron at prices ranging from $24 to $25, furnace. Tonnages closed, some of which were reported as pending last week, include the following: American Locomotive Co., 8000 tons; Eastern Malleable Iron Co., 5000 tons; Worthington Pump & Machinery Corporation, 3500 tons; Burnham Boiler Works, 5000 tons; Warren Foundry & Pipe Co., 10,000 tons; American Radiator Co., for its Bayonne plant, 10,000 tons; Gould Coupler Co., 2000 tons; Richmond Radiator Co., 1500 tons; Central Foundry Co., 13,000 tons, for its Northern plants. An inquiry from the New York Air Brake Co. for 2000 tons is still pending.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.27 to $25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.77 to 25.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.77 to 25.27
Buffalo, sil. 1.75 to 2.25	25.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94 to 30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 29.94

Ferroalloys.—Considerably more interest in ferromanganese is being manifested by consumers, and inquiries in both fairly large and small lots are more plentiful. Only a few orders have thus far developed. There have been sales of carload lots for early delivery to consumers needing the alloy for use this year and several hundred tons has been contracted for for first quarter delivery. A good deal of this business has been British alloy at $110, seaboard. It is understood, but not confirmed, that domestic sellers have advanced their minimum price to at least $109, seaboard basis, with one rumored to be now asking $110 to $115. There is an inquiry now in the market for 1000 tons of spiegeleisen and there have been sales of several 100-ton lots at $40, furnace. Demand for 50 per cent ferrosilicon is confined to small and carload lots at prevailing quotations. Contracts for 1924 consumption have not yet been negotiated and are not likely to be before Dec. 15.

Cast-Iron Pipe.—Inquiries continue, but the market is generally quiet, a result of the usual slackness at this season. While prompt shipment tonnages bring the higher prices quoted, users willing to accept shipment through the winter months are usually offered concessions of $2 and $3 per ton. We quote per net ton, f.o.b. New York in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. The soil pipe market continues fairly strong and makers are well-booked ahead, considering the fact that this is the beginning of the slack season. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 30¾ and 35¾ per cent off list; heavy, 40¾ and 45¾ per cent off list.

Warehouse Business.—In most cases November sales have registered a slight decline from October. Prices are generally unchanged with the exception of black and galvanized sheets, which show a decided stiffening tendency, sales at the minimum prices ruling for some time evidently being the exception rather than the rule. While competition is keen on all products, shading is not so prevalent as a few weeks ago. Iron and steel pipe warehouses report active business in steel pipe, with a fairly steady demand for steel pipe to be used on oil burning installations in merchant ships that are being changed from coal to oil burners. We quote prices on page 1504.

Finished Iron and Steel.—An amazing volume of structural steel work is being contracted for and inquired for, considering the continued quiet in all other forms of steel. Contracts for the week reported as closed in New York and immediate territory total more than 20,000 tons, of which 10,000 is for the power plant to be erected by the Public Servcie Corporation of New Jersey at Kearny, N. J. New work on which bids are now being made total more than 17,000 tons, including 12,000 tons of bridge material for four Eastern railroads. There have been no additional inquiries of importance for cars from the railroads. It is stated that much prospective buying by the railroads is being held up pending some definite word from Washington as to the probable attitude of Congress on railroad rate matters and the Esch-Cummins law. Whatever the cause may be, it is noticeable that a more optimistic opinion prevails in steel companies' sales offices as to probable developments in steel buying. Steel salesmen report that their customers are less inclined to expect reductions in steel prices for first quarter. The price situation is unchanged. Plates and shapes are available at 2.40c. to 2.50c., Pittsburgh; bars are fairly firm at 2.40c., Pittsburgh, while other products continue as in recent weeks. Cutting of prices by some warehouses on wire nails has had no corresponding effect on mill prices.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—The market is considerably firmer as producers anticipate restricted production during the holidays and prospect of a coal strike in the spring. Standard foundry coke is quotable at from $5.25 to $6.25 per ton and standard furnace at $4 to $4.50 per ton, the minimum quotation applying only to prompt shipment lots of a few carloads. Medium sulphur is also stronger at $3.50 to $3.75. By-product coke is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—The market is firm and steady and prices in some instances stronger, although as yet there is no evidence of a buying movement. Heavy melting steel is firm at $15 per ton, eastern Pennsylvania, with higher prices reported on purchases made by dealers and brokers in anticipation of an upward movement. Borings and turnings are firm at about $11 eastern Pennsylvania. Cast borings are quoted at $11.50 delivered to a Harrisburg consumer. Machine shop turnings are also firm. Stove plate to Harrisburg is bringing about $15.50 with $16 quoted for delivery to New Jersey foundries. Specification pipe is stronger at $14.50 to $15 delivered to eastern Pennsylvania consumers.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$11.00 to $11.50
Steel rails, short lengths, or equivalent	12.00 to 12.50
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	16.00 to 17.00
Iron car axles	23.00 to 23.50
No. 1 railroad wrought	13.50 to 14.00
Wrought iron track	12.00 to 12.50
Forge fire	8.50 to 9.00
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	8.00 to 8.50
Machine-shop turnings	7.50 to 8.00
Mixed borings and turnings	7.00 to 7.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.50 to 11.00
Stove plate	12.00 to 13.00
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	14.00 to 15.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

Cleveland

Pig Iron Sales of Two Weeks Make Very Large Total Price Policy Conservative

CLEVELAND, Nov. 27.—A very heavy tonnage of pig iron in foundry and malleable grades has been purchased during the buying movement that started about 10 days ago, and the crest of which was reached during the latter part of last week. Some producers declare that more iron has been booked in this buying period than in the same time of any previous buying movement. Sales by Cleveland producers and selling agencies in less than two weeks have aggregated from 350,000 to 375,000 tons. Some of the sellers now have their order books well filled for the first quarter. The buying movement has subsided considerably, especially in northern Ohio, Indiana and Michigan, although the market is still fairly active in some sections. It is estimated that 90 per cent of Cleveland consumers have purchased iron. Local sales include large lots taken by several foundries making automobile castings and by the Westinghouse Electric & Mfg. Co. Sales have been mostly for the first quarter, although in a few cases orders were booked for the entire first half. The buying movement has resulted in a price advance of $2 a ton from the recent $20 minimum in the Valley district, as producers in that district are now holding to $22. Some business has been taken at the advance, although the higher prices may have a tendency to check buying by consumers who have not already covered. In Buffalo producers are now quoting from $22 to $22.50. On a 1000-ton inquiry from the Pittsburgh district a Cleveland producer today quoted $23. However, lake furnaces are going slower in marking up prices than producers in some other districts. While these furnaces are firmer and are inclined to ask 50c. a ton more for their iron the $22 price quoted by lake furnaces before the buying movement started has not yet disappeared. This price at furnace is still being quoted by local producers for Cleveland delivery. The buying has been well distributed among all classes of consumers. Heavy tonnages have been taken by automobile and stove foundries, although the buying by the automobile industry has not been so large in proportion as that done by other consumers, considering the amount of iron used in the automobile field. While considerable of the iron bought was in the malleable grade, little business came from jobbing malleable foundries. Southern iron has also been fairly active and has advanced to $21. Sales include 4500 tons taken at that price by a sanitary interest for its Louisville plant. Some activity has also developed in silvery iron on which the price has slipped $1 a ton, although there has been no formal reduction in the silvery schedules. A Cleveland automobile foundry has purchased 1000 tons of silvery and another local consumer purchased 400 tons. Steel making iron is inactive, but a Pittsburgh broker is inquiring for 20,000 tons. Small lot sales of low phosphorus iron are reported at $29.50 and $31, the latter price for high silicon iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.00 to	$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	22.50 to	23.00
Southern fdy., sil. 1.75 to 2.25	26.50 to	27.00
Malleable	22.50 to	23.00
Ohio silvery, 8 per cent		34.52
Standard low phos., Valley furnace	29.50 to	30.00

Iron Ore.—Ore shipments by water during 1923 will reach 59,000,000 tons or 1,000,000 tons more than estimated a month ago, according to figures of November shipments already reported and estimates of this week's shipments, which will amount to only five or six carloads. The November movement, estimated at 4,000,000 tons at the beginning of the month, will reach close to 5,000,000 tons. The total movement until Nov. 1 was 54,088,561 tons. The Steel Corporation shipped its last cargo Saturday. Last cargoes for the season will leave upper lake ports Wednesday or Thursday.

High Speed Steel.—The market is quiet. Prices, which are not firm, range from 70c. to 75c. per lb. for 18 per cent tungsten high-speed steel.

Finished Iron and Steel.—New inquiry shows an improvement in both number and size, but there is little change in the tonnage actually booked, as buying is almost entirely in small lots, mostly in steel bars, for early requirements. Some of the inquiry is for the first quarter, although outside of some hot-rolled strip steel tonnage there are no reports of bookings for that delivery. The first quarter inquiries as a rule appear to be market feelers. The general attitude of buyers is to await price developments for the first quarter and in the meantime considerable prospective business is backing up and this is causing a more optimistic feeling among producers. Detroit reports indicate a bright outlook for the automobile industry during the first part of 1924 and considerable demand for steel is expected from that source shortly. While all the leading producers are holding firmly to 2.40c. for steel bars, a 2.30c. price has appeared in this territory, being credited to a small Buffalo mill, but apparently not much business has been placed at the concession. The irregularity in plates continues with 2.40c. being quoted in some cases by smaller mills outside of the Pittsburgh district. The Ann Arbor Railroad has placed 3000 tons of rails with Bethlehem Steel Corporation. The New York Central Railroad will receive bids Wednesday for 35,000 kegs of track bolts and 70,000 kegs of spikes. Considerable other railroad business in track material is pending. On standard spikes 3c. is being quoted. The demand for light rails has picked up somewhat. Makers are holding to 2.25c. for billet rails while rerolled rails range from 1.85c. to 1.90c. On hoops, prices range from 2.90c. to 3c., while there is a spread of from 2.75c. to 3c. on wide hot-rolled strip steel. Cold-finished steel bars are weak with a range of from 2.90c. to 3c. New structural inquiry is light. The general contract for the Brotherhood of Locomotive Engineers Bank Building, Cleveland, requiring 6300 tons of structural steel, has finally been placed with the George A. Fuller Co. The Ford Motor Co. work, involving 28,000 tons, is still pending. The placing of two jobs, the St. Vincent's Hospital, Erie, Pa., and the Niagara Falls Memorial Hospital, Niagara Falls, N. Y., each requiring 200 tons of steel, has been postponed.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Reinforcing Bars.—Softness has developed in soft steel reinforcing bars, on which quotations of 2.30c. have appeared. Rail steel bars are unchanged at 2.15c. to 2.25c. New inquiries include 200 tons for an addition to the plant of the P. A. Geier Co., Cleveland, and 250 tons for a building for the Private Investment Co. Plans have come out for an extension to the plant of the Richmond Bros. Co., Cleveland, which will require a fair tonnage.

Bolts, Nuts and Rivets.—Bolts and nuts are weak, with some makers adding an additional 5 to 10 per cent to regular discounts. With inventory season near, the demand is light. No rivet inquiries are coming out of sufficient size to test the market, but 2.75c. is the common quotation. Small rivets are exceedingly weak with 70 and 5 per cent off list and perhaps lower being quoted.

Semi-Finished Steel.—Some inquiry has developed for sheet bars and billets for early shipment, but no sales are reported. Hence no test of prices has developed.

Coke.—The foundry coke market is somewhat firmer, a few producers having advanced their price

25c. a ton. Standard Connellsville foundry coke is quoted from $5.25 to $6.25. Some producers have offered to take on first quarter business at an advance of about $1 a ton over current prices,

Sheets.—The market is somewhat firmer on black sheets, some Valley district mills that have been quoting 3.75c. having restored the 3.85c. price. Galvanized sheets are unchanged at 4.85c. to 5c., and blue annealed at 2.90c. to 3c. New demand is not active

Old Material.—Prices have further advanced 50c. or more a ton on most grades, although mills are not inclined to pay the higher prices. Some of the local consumers are holding up shipments. Turnings have stiffened considerably owing to recent local buying and this grade and cast borings are now quoted at the same price. A Lowellville mill consumer has purchased heavy melting steel at $16.25. This grade is quoted at $16.25 to $16.50 for Youngstown delivery. Local sales to dealers are reported at $15. Sales of compressed steel to Youngstown dealers were made during the week at $14.50.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$15.25 to $15.50
Rails for rolling	15.00 to 15.50
Rails under 3 ft.	16.50 to 17.00
Low phosphorus melting	17.25 to 17.75
Cast borings	11.00 to 11.25
Machine shop turnings	11.00 to 11.25
Mixed borings and short turnings	11.00 to 11.25
Compressed sheet steel	12.25 to 12.75
Railroad wrought	13.00 to 13.50
Railroad malleable	19.25 to 19.75
Light bundled sheet stampings	9.00 to 9.25
Steel axle turnings	11.50 to 12.00
No. 1 cast	20.00 to 21.00
No. 1 busheling	10.25 to 10.50
Drop forge flashings	10.50 to 10.75
Railroad grate bars	16.00 to 16.50
Stove plate	16.00 to 16.50
Pipes and flues	10.00 to 10.50

Buffalo

Buying of Pig Iron Continued—Quotations Are Marked Up

BUFFALO, Nov. 27.—While not in keeping with the unusual demand that characterized the pig iron market last week, buying is still going on and in the face of price advances by the two producers most active in the recent spurt. One of these producers has advanced twice in six days and is now quoting $21.50 for silicon 1.75 to 2.25, a 50c. differential on the next highest silicon and $1 differential on the two highest silicons. The other factor in the selling wave is asking $22 for silicon 1.75 to 2.25 and by this quotation indicating its inability to take further business. The exceptional selling here was entirely for first quarter delivery. No effort is made to book further ahead than for first quarter delivery nor has any consumer attempted to buy in advance of that time. It is understood that in several large sales immediate cash had a bearing on the price. In connection with the American Radiator purchase, the 50,000-ton lot for Buffalo plants was placed with one seller and a 6000-ton order was given another producer. The total buying activities of the radiator people in the week represented between 80,000 and 90,000 tons for all plants. Buying is pretty well scattered and with the exception of 7000-ton lots, the remaining sales that brought about the large total were for small quantities. Notwithstanding the many sales, there is reason to believe a number of consumers have not yet placed their first quarter requirements but the whole movement may be concluded this week.

We quote f.o.b. gross ton, Buffalo as follows:

No. 1 foundry, sil. 2.75 to 3.25	$22.00
No. 2 foundry, sil. 2.25 to 2.75	21.50
No. 2 plain, sil. 1.75 to 2.25	21.00
Basic	21.00
Malleable	21.00
Lake Superior Charcoal	28.28

Finished Iron and Steel.—The principal lines in finished material are in poor demand; more bar buyers appeared interested but greater sales have not developed. Sheets are not being bought to a large extent and all sellers are finding calls fewer and for smaller lots. An unverified report is to the effect that the 2.40c. price on bars which has held firm for many weeks, was shaded on a small transaction. Jobbers are pressing the mills hard for pipe and this product is the bright spot in point of demand. Shading of band prices has occurred in several transactions and a new low price of 2.90c. was brought out. It is too early to determine what effect the unusual buying of pig iron will have on the demand for finished lines. Such orders as were placed recently are for immediate shipment and only in quantities that indicate immediate consumption. Of course the inventory factor bears on this manner of buying. Warehouse business is on a satisfactory plane and the call for structural shapes has been unusually good.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—Mills are showing more interest in steel but not to the point of placing orders. Offers of $15 have been put forward, but no big sales have resulted. In a few instances, dealers are willing to pay a higher figure than consumers have offered. Other scrap lines are quiet. Extraordinary sales of pig iron will likely affect the demand for old material.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$14.50 to $15.50
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	15.50 to 16.50
Machine shop turnings	8.50 to 9.00
Cast iron borings	11.50 to 12.00
No. 1 busheling	12.50 to 13.00
Stove plate	16.00 to 16.50
Grate bars	15.50 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	18.00 to 19.00
Hydraulic compressed	12.50 to 13.00
Railroad malleable	17.00 to 18.00

St. Louis

Sales of Pig Iron Reach Large Total and Prices Are Marked Up

ST. LOUIS, Nov. 27.—Sales of pig iron in St. Louis have reached a total of between 70,000 and 80,000 tons for the last two weeks, it being one of the heaviest buying movements in the history of the trade here. There was a let-up in actual buying during the latter part of this week, but still there are heavy inquiries pending. The buying movement is due largely to the belief on the part of melters that the market had reached bottom. Some of the buying has been speculative in that melters are anticipating their requirements for first and second quarters without actually having the orders in hand and knowing exactly what 1924 would bring forth in the way of business. Some of the business this week was repeat orders, one Belleville stove maker buying 3200 tons after having made a substantial purchase the previous week. In the two weeks, the sales of the St. Louis Coke & Iron Co. amounted to between 25,000 and 30,000 tons for first half delivery, then they stopped selling and advanced their price $2 to $2.50 a ton to $26 to $27 f.o.b. Granite City. Their largest sale was 5000 tons to an Indiana melter, 1500 tons to a local melter, and seven 1000-ton sales to melters in the district. Following the sales, the market advanced, Southern iron going to $21, Birmingham, and Northern iron to $23 to $23.50, Chicago. Inquiries include two each of 5000 tons of basic from an East Side melter and there are scattering inquiries of up to 10,000 tons in lots of 200 tons and more. There is an inquiry before the market for 300 tons of ferromanganese, and sales of 100 and 50 tons respectively of spiegeleisen are reported.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $2.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 83 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$23.66 to $24.16
Northern malleable, sil. 1.75 to 2.25	23.66 to 24.16
Basic	23.66 to 24.16
Southern fdy., sil. 1.75 to 2.25 (rail)	26.17

Finished Iron and Steel.—The market for finished steel and iron continues dull. Neither jobbers nor manufacturers using steel products will do any buying except of material that is actually needed for at-once consumption before Jan. 1 because of the desire to keep down inventories. The railroads, too, have the same idea, and there are no inquiries of consequence pending from that source.

Coke.—The domestic coke market has a better outlook because of colder weather, but there can be no buying of consequence by dealers until greater quantities of their large stocks move into the bins of consumers. The market for foundry coke is a trifle stronger.

Old Material.—The market for old material continues to advance. Increases are in sympathy with the higher prices for pig iron coupled with better demand from consumers and reports of car orders soon to be placed, indicating still heavier demand. Foundry grades are in much better demand, although rolling mill grades still are dull. New railroad lists follow: Chicago, Burlington & Quincy, 7000 tons, and Wabash, 350 tons.

Per Gross Ton

Iron rails	$17.00 to $17.50
Rails for rolling	16.50 to 16.00
Steel rails, less than 3 ft.	17.00 to 17.50
Relaying rails, 60 lb. and under	25.00 to 28.00
Relaying rails, 70 and over	32.50 to 33.50
Cast iron car wheels	17.00 to 17.50
Heavy melting steel	13.50 to 14.00
Heavy shoveling steel	13.50 to 14.00
Frogs, switches and guards cut apart	14.50 to 15.00

Per Net Ton

Heavy axles and tire turnings	11.00 to 11.50
Steel angle bars	13.00 to 13.50
Steel car axles	16.00 to 16.50
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	18.00 to 18.25
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.00 to 12.25
Railroad springs	18.00 to 18.50
Cast iron borings	9.00 to 9.50
No. 1 loosheling	12.00 to 12.25
No. 1 railroad cast	17.00 to 17.50
No. 1 machinery cast	18.00 to 18.50
Railroad malleable	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Champion bundled sheets	7.00 to 7.50

Birmingham

Buying Continues in Decreased Volume as Prices Are Advanced

BIRMINGHAM, ALA., Nov. 27.—The buying movement has brought a more cheerful aspect to the Southern pig iron market, the sales in the past two weeks having been very numerous. The quotations at which the bulk of the iron had been selling recently were around $20 per ton, with No. 2 foundry a little under that price. An advance of from 50c. to $1 per ton has now been announced and the asking prices are between $20 and $21 per ton, with the buying still on though not so active as a week ago. The Sloss-Sheffield Steel & Iron Co. has blown in one of the city blast furnaces, always considered one of the signs of returning prosperity. It is further stated that this company is working off rapidly much of its surplus iron and if present conditions continue, a fifth furnace will be warranted by the middle of January. The Alabama Co. blows out one of its Gadsden furnaces for repairs, but no time is to be lost in placing the stack in shape so that resumption of operation can be brought about early in January. This company is selling a little into the first quarter of the coming year. The Woodward Iron Co. has participated in the buying movement also and with three furnaces going is having some repairs done about the Vanderbilt furnaces. The Middle West has bought Southern pig iron liberally while the home melters have been in the market for a reasonable supply to last for a few months. Spot business is still very active and daily shipment and melt are more iron than production, the surplus stock of iron being cut down slowly. The production in Alabama is about 213,000 tons per month, but half of this is basic iron and not to be counted on for the open market. The indications point to the surplus stock of iron, foundry being under 80,000 tons on Dec. 1. The estimate was made early last week that upward of 200,000 tons of iron had been sold during the month will be increased by 100,000 tons by Dec. 1.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

No. 1 foundry and 1 soft	$21.00
No. 2 foundry and 2 soft	20.00
Basic	21.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—The cast iron pipe market, both pressure and soil pipe, is taking on an impetus also and selling is steady, the pressure pipe makers announcing that in smaller sizes they have already started in on the second quarter of the coming year. Warning to customers to place orders during the winter in order to distribute the delivery, apprehension being expressed of a delivery problem, has had effect. Soil pipe makers have been receiving considerable business from California and the far West. An advance of five points to $55 for standard soil pipe has not stopped inquiries and buying. The Birmingham Machine & Foundry Co. now has both of its pipe foundries in operation and the warehouse has been practically emptied.

Finished Material.—The steel market is fairly active. Labor is plentiful with the steel industry, some plants having laid off a few men. The rail mill of the Tennessee Coal, Iron & Railroad Co. will have steady operation for several months on the turn of the year. Wire nails are being shipped in great quantity. Structural steel is in fair demand and fabricating plants are doing well under the circumstances. Car works are in need of business but reports have it that negotiations under way may call for steady work for months and need of much steel. Steel bars are quoted 2.60c.

Old Material.—Improvement in the pig iron market has not been of any assistance in the scrap iron and steel market, which is quiet. But little of any grade is moving and quotations have weakened. Chemical borings are down to $17. Heavy melting steel is slow and down as low as $14. No. 1 cast $17 and stove plate under $15.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$17.00
Heavy melting steel	14.00
Railroad wrought	$15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	17.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	14.00 to 15.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.00 to 10.00

Boston

Although Furnaces Have Advanced Pig Iron, the Market Is Still Unsettled

BOSTON, Nov. 27.—Most eastern Pennsylvania and Buffalo furnaces have advanced pig iron 50c. to $1 a ton, and belated buying by foundries is reported on the new price basis, although on a greatly reduced scale. The most active Buffalo furnace in this territory is on a $21, furnace, base with 50c. differentials for first quarter only. Two eastern Pennsylvania iron makers quote $23, furnace base, others $22.50 and still others $22, with 50c. differentials. Alabama iron is $1 a ton higher at $21, furnace, base. The market, however, is still unsettled. For instance, 2500 tons No. 1X Buffalo resale is offered at $21, furnace; another Buffalo furnace has accepted first quarter No. 2X tonnages at $20, furnace. Eastern Pennsylvania No. 1X resale is offered at $22.50, furnace, and one furnace offers No. 2 plain and No. 2X, first quarter, at $22, furnace. A Massachusetts heater maker has purchased a round tonnage of No. 2 plain, according to report from a furnace having an eastern Pennsylvania freight rate at a delivered price equivalent to less than $19.50, Buffalo furnace. Virginia furnaces did not participate to any extent in the recent buying flurry and have not changed prices. The most

important open inquiry now in the market is for 300 tons, 100 tons each of three kinds, from the Sullivan Machinery Co., Claremont, N. H.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75.....	$26.15 to $27.15
East. Penn., sil. 1.75 to 2.25.....	25.65 to 26.65
Buffalo, sil. 2.25 to 2.75.....	24.91 to 26.41
Buffalo, sil. 1.75 to 2.25.....	24.91 to 25.91
Virginia, sil. 2.25 to 2.75.....	30.92 to 32.42
Virginia, sil. 1.75 to 2.25.....	30.92 to 31.92
Alabama, sil. 2.25 to 2.75.....	31.10
Alabama, sil. 1.75 to 2.25.....	30.60

Cast Iron Pipe.—Waterbury, Conn., has awarded a round tonnage of 24-in. pipe for its force main requirements to the Warren Foundry & Pipe Co., deliveries to begin at once. Hartford, Conn., has called for bids on about 1000 lengths of 6-in. pipe to complete late fall work, and will close this week, if satisfactory deliveries can be made. Boston has awarded 3000 tons of 6-in. to 16-in. pipe to the United States Cast Iron Pipe & Foundry Co., second low bidder. There was a question on deliveries in this business. Less inclination is shown by pipe makers to shade prices, and the market is steadier on a basis of $67.10 delivered Boston common rate points for 6-in. and larger, with $5 differentials for gas and class A pipe.

Finished Material.—Demand for finished material is limited, but mill prices show no variation. Many manufacturers are working off stocks of bars and flats bought several months back from several sources when uneasiness was felt over supplies. Machine shops in general are less active. New York, New Haven & Hartford Railroad shops at New Haven and East Hartford, Conn., and Readville, Mass., have let more than 1000 shop men go until Jan. 3 or later. Three New England steam railroads and a large trolley system have purchased their 1924 rails. Tonnages involved are withheld, but in each case they are less than bought for 1923. McClintic-Marshall Co. is the low bidder on 250 tons of structural steel for a Wilbraham, Mass., bridge. The Osgood Bradley Car Co., Worcester, Mass., has an order for 50 steel passenger coaches from the Central Railroad of New Jersey, involving about $750,000.

Warehouse Business.—Warehouse prices on tees and zees have been reduced 38½c. per 100 lb. to $3.66½, and blue annealed sheets 10c. to $4.56½ base, while stock sizes diamond pattern plates are up 15c. at $5.90. Otherwise iron and steel prices remain as heretofore. The demand for mill products is active for this time of the year. Cut nails have been reduced 20c. per 100 lb.; crowbars are 50c. per 100 lb. higher, while a slight reduction has been made in iron wedges. Warehouse prices on iron and steel follow:

Soft steel bars, $2.51½ at 100 lb. base; flats, $4.40; regular concrete bars, $3.76½; deformed bars, stock lengths, $3.76½ to $3.89; structural steels, $3.51½; tire steel, $4.80 to $5.15; open-hearth spring steel, $6.50 to $10; crucible spring steel, $12; regular steel bands, $4.31½; bands over 6 in. wide, $5.05 to $5.30; hoop steel, $5.80 to $6.30; cold rolled steel, $4.35 to $4.85; refined iron, $3.51½; best refined, $4.75; Wayne iron, $5.50; Norway iron, $6.60 to $7.10.

Coke.—A perceptible falling off in the movement of by-product foundry coke from New England ovens to iron melters is noted, due to the fact that large consumers stocked up heavily in September and October. Coke producers in this territory are operating at capacity and because of continued mild weather have shaded prices on domestic sizes of fuel. With practically all foundries covered on first half 1924 requirements, and specifications against 1923 contracts coming in slowly, the foundry fuel situation is not as firm as it might be. Both the New England Coal & Coke Co. and the Providence Gas Co., however, continue to quote foundry coke at $12.50 a ton delivered.

Old Material.—Actual sales of old material to melters continue limited, but prices generally are stronger due to a return of optimism among dealers. Heavy melting steel is now $10.50 to $11.50 a ton on cars or 50c. to $1 higher than a week ago. Even with the improvement dealers are not anxious to ship into the eastern Pennsylvania territory, as freight rates are too high to allow profit. Cotton ties are more active at $8 on cars shipping point. A Portland, Me., rolling mill is in the market for shafting at $19 delivered, but little material is coming out at that figure. The demand for chemical borings, machine shop turnings and mixed borings and turnings is slightly more active and stronger as a result. The spread in machinery cast and pig iron prices is too narrow to be attractive to most foundries. Where foundries have bought material the past week, it has been largely from local yards at prices paid by large operators.

The following prices are for gross ton lots delivered New England consuming points:

No. 1 machinery cast.....	$22.00 to $23.00
No. 2 machinery cast.....	20.00 to 21.00
Stove plate.....	15.50 to 16.00
Railroad malleable.....	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel.....	$10.50 to $11.50
No. 1 railroad wrought.....	12.50 to 13.00
No. 1 yard wrought.....	11.00 to 11.50
Wrought pipe (1-in. diam., over 2 ft. long).....	10.00 to 10.25
Machine shop turnings.....	7.00 to 7.50
Cast iron borings, rolling mill..	7.50 to 8.00
Cast iron borings, chemical.....	9.50 to 10.00
Blast furnace borings and turnings	7.00 to 7.25
Forged scrap and bundled skeleton	7.50 to 8.00
Shafting.....	17.50 to 18.00
Street car axles.....	17.50 to 18.00
Rails for rerolling.....	11.50 to 11.75

Cincinnati

Pig Iron Tonnage Booked Last Week Very Large—Some Prices Advanced

CINCINNATI, Nov. 27.—The aggregate tonnage of pig iron booked last week was the heaviest for a long time, and estimates run as high as 100,000 tons in the Cincinnati district alone. While a fair tonnage of Southern iron was placed, most of the tonnage booked was for Northern iron, it being reported that two southern Ohio furnaces had taken between them 70,000 tons for first quarter shipment. Buying was widespread, but it was noticeable that melters did not cover for their full estimated requirements for first quarter delivery. Some furnaces, particularly in the South, have been scaling down inquiries to about half of the tonnages wanted. The price situation is much stronger, and on Southern irons $21, Birmingham, today is the minimum price quoted. The market in southern Ohio has advanced from $21.50 to $22.50, and indications point to another advance before the end of the week. Contrasted with this price movement, prices of silvery and Bessemer ferrosilicon have been cut $1 per ton. Some good-sized sales were reported. A steel mill in this district is reported to have bought 15,000 tons of basic. A local melter bought 4000 tons of Northern iron, and a number of sales of 1000 to 1500 tons were made to melters in Ohio and Indiana. A Kentucky melter is reported to have placed orders for 9000 tons of Southern at prices ranging from $19 to $21 base. Silvery pig iron was also active, and two sales of 1000 tons each were reported at the new schedule. We also note a sale of 1000 tons of charcoal at $25, furnace. The peak of the buying movement has been passed, according to well informed sellers, but with the backlogs accumulated by furnaces, lower prices for some time to come are not expected.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent.....	33.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern.....	24.77
Malleable.....	24.77

Finished Materials.—The demand has shown a slight improvement during the past week, though orders are still light. However, in sympathy with the movement in pig iron, steel orders are expected to come out in larger tonnages. Railroad buying continues to be the chief source of orders. Fairly heavy tonnages were placed last week by the L. & N. and a number of other Southern roads. The Big Four purchased 125,000 rail

anchors for immediate delivery, and has sent out an inquiry for its requirements for next year. It has not yet issued its inquiries for track accessories. Bars have been in fair demand from agricultural implement manufacturers, though orders are not heavy. There has been a spurt in the buying of wire products, especially nails, and some good orders were placed for first quarter. It is reported that wire and nail prices are being shaded by some mills. Hoops and bands are in fair demand, with prices holding at 3c. Light rails, frogs and switches, and track bolts are moving fairly well, with prices showing no change. Bolts and nuts are in light demand and prices weak. Reports are heard of price shading of $2 per ton on plates and bars, but confirmation is lacking. It is known that most orders placed were at 2.50c. and 2.40c. respectively.

Sheets.—Orders are coming in well, and prices are inclined to be firmer, there being less talk of 3.75c. on black and 4.90c. on galvanized than for weeks. Tin plate is in active demand, and one inquiry for 50,000 base boxes for first quarter is up. It is reported that a slightly lower price than $5.50 per base box had been quoted on this order.

Structural Material.—The principal interest centered in the award of 20 barges by the U. S. Engineers' office at Louisville, Ky. The American Bridge Co. was low bidder on 16, Nashville Bridge Co. on two, and the Charles Hegewald Co. on two. Bids were taken Nov. 20 for the Third National Bank Building at Dayton, but no award has been made. The Kentucky Hotel, Louisville, general contract for which has been let to Rommell Bros., will require about 2200 tons of steel, but this has not been put on inquiry.

Reinforcing Bars.—General contract for the Tanners' Research Laboratory, Cincinnati, requiring 150 tons, has been let, but bars have not been placed. The Southern Railroad has not yet awarded contracts for office buildings at Birmingham and Charlotte, Va., requiring approximately 1200 tons. Reinforcing bar prices range from 2.20c. for rerolled to 2.35c. for new billet stock, with a number of mills quoting 2.45c. for bars out of stock.

Warehouse Business.—Local jobbers report a considerable spurt in the demand for reinforcing bars and structural angles. Bolts and nuts and wire products are showing improved demand. Sheets are moving fairly well.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base; cement coated nails, $3.30 per keg.

Coke.—The coke market is quiet, although some first quarter contracts have been made for foundry fuel at the same prices asked for spot shipment. Prices are generally held at last week's levels, though one by-product producer has announced a cut of $1 per ton on December foundry coke contracts. We quote:

Connellsville furnace, $3.75; foundry, $5.00 to $6.50; New River foundry, $10 to $11; Wise County furnace, $5.25; Foundry, $5.75 to $6.50; by-product Foundry, $8.00, Connellsville basis.

Old Material.—There is still little consumer buying of scrap, but dealers are bidding up prices and the whole list is at least 50c. higher than last week. Scrap is coming on the market in large quantities, but quick movement is asked. The feeling in the trade is much better and dealers are confident of further advancing prices and a large buying movement in the near future.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton
Bundled sheets	$10.00 to $10.50
Iron rails	13.50 to 14.00
Relaying rails, 50 lb. and up	27.50 to 28.00
Rails for rolling	13.50 to 14.00
Heavy melting steel	13.00 to 13.50
Steel rails for melting	13.00 to 13.50
Car wheels	13.00 to 13.50
	Per Net Ton
No. 1 railroad wrought	11.50 to 12.00
Cast borings	9.00 to 9.50
Steel turnings	8.50 to 9.00
Railroad cast	14.00 to 14.50
No. 1 machinery cast	17.00 to 17.50
Burnt scrap	11.00 to 11.50
Iron axles	21.00 to 21.50
Locomotive tires (smooth inside)	13.00 to 13.50
Pipes and flues	7.00 to 8.50

Philadelphia

Further Large Sales of Foundry Pig Iron Accompanied by Rising Prices

PHILADELPHIA, Nov. 27.—Eastern Pennsylvania furnaces have booked 100,000 tons or more of foundry pig iron in the past week, in addition to a similar tonnage the week before. One interest is so well sold up for first quarter that it is practically out of the market; others are comfortably well off. Prices have been advanced fully $1 a ton and small sales have been made at the higher levels now quoted. Strength in pig iron has been accompanied by a better demand for scrap, with some price advances. The steel situation, while showing little change, is generally regarded as better, this view being based largely on the increasing number of orders, small though they are. Steel makers continue to look to the railroads for the buying that is necessary to restore the market to activity. While a number of railroad inquiries are pending for freight cars, locomotives and steel for bridges, there seems little prospect of immediate action. The general belief is that many of the roads are awaiting the President's message to Congress and such evidences as may appear soon of possible congressional action, if any, on railroad matters. Purchasing departments of the railroads are said to be holding back many requisitions for material until some policy for future purchases is authorized by railroad executives.

Pig Iron.—The pig iron buying movement which started about two weeks ago continued through the past week and further large tonnages of foundry iron were sold by eastern Pennsylvania furnaces. One large company with furnaces at Buffalo and in eastern Pennsylvania has sold 120,000 tons this month; another eastern Pennsylvania furnace company has sold 40,000 to 50,000 tons in two weeks. Nearly all furnaces, in fact, have made substantial sales, some of them at prices above the minimum levels of two weeks ago. Many of last week's sales were made on a basis of $22, furnace, but today's minimum for all furnaces, with possibly one exception, is $23. One company is quoting a minimum of $23.50, but is practically out of the market. Sales of carload lots of No. 2 plain have been made at $23, No. 2X at $23.50, and a sale of 100 tons of No. 1X was made at $25, furnace. The furnaces are indifferent as to orders even at these prices, believing that it is better policy to await further developments and, if possible, make some sales at even higher levels to average up the low-priced tonnage they have placed on their books. Most of last week's business came from consumers in New England and the New York territory, with comparatively little from consumers in the Philadelphia district. Virginia furnaces have not yet shared in the improved condition of the market, as they must contend on the one hand with Alabama iron, which can be delivered in Virginia at less than Virginia furnaces are quoting, while on the other hand their high freight rates make it impossible for Virginia to compete with eastern Pennsylvania and Buffalo furnaces in Northern territory. A nearby forgings company bought 2000 tons of copper bearing low phosphorus iron, while another consumer bought 400 tons of copper free low phosphorus iron. The United States Cast Iron Pipe & Foundry Co., reported as being in the market for 100,000 to 150,000 tons of iron for first half, has issued no inquiry, and if such a purchase is made it will depend upon prices quoted.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.64 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.14 to 24.63
East. Pa. No. 1X	24.64 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	22.75 to 23.00
Gray forge	23.00 to 24.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	27.50 to 28.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Plates.—Orders for plates show a slight gain with some companies, but the volume of business being booked is still so far below the capacity of Eastern mills that the situation may be said to be virtually unchanged. There are no large tonnages to test the price situation. Most of the Eastern mills quote 2.40c., Pittsburgh, while, so far as reported, none of the Pittsburgh or Youngstown mills has gone below 2.50c.

Structural Material.—The Pennsylvania Railroad is inquiring for 5000 tons of steel for a bridge at Sunbury, Pa., and the Baltimore & Ohio and the Virginian roads are each inquiring for 2000 tons of bridge material. These are the only bright spots in a dull market. Philadelphia at present is lagging far behind other sections in the amount of new building work under consideration. Most of the local projects are very small. Prices are unchanged at 2.40c., Pittsburgh, from some Eastern mills, to 2.50c., quoted by Pittsburgh mills and one large Eastern producer.

Bars.—The bar market continues firm at 2.40c., Pittsburgh. Occasional recessions from this price reported by consumers are attributed to quotations by makers of rerolled bars. Bar iron is quiet and unchanged at 2.35c., Pittsburgh.

Sheets.—Most of the makers of blue annealed sheets are adhering firmly to 3c., Pittsburgh, though occasional quotations of 2.90c. have been reported. Black sheets at 3.75c. to 3.85c. and galvanized at 4.90c. to 5c., Pittsburgh, are in light demand but consumers are specifying fairly well on contracts.

Warehouse Business.—Prices for steel products out of stock are unchanged, and for local delivery are as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1¼ x ½ in., 3.75c.; round edge steel planished, 4.50c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅞-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—Influenced by a number of factors, the scrap market has gained further strength in the past week. The Eastern market has been affected to a degree by more activity and higher prices at Pittsburgh, while it is probable that the large sales of pig iron have had a stiffening effect upon the views of scrap dealers. Demand is better in the East, and in fact consumers are more anxious to buy than brokers and dealers are to sell. While No. 1 heavy melting steel is nominally quoted at $15.50 to $16, delivered, it is unlikely that any broker would have been willing to sell a tonnage today at the higher figure for fear that he might not be able to cover at a profit. There have been advances in several grades.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap rails	15.50 to 16.00
Steel rails for rolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	20.00 to 21.00
Couplers and knuckles	18.00 to 18.50
Cast-iron car wheels	18.50 to 19.00
Rolled steel wheels	18.00 to 18.50
No. 1 railroad wrought	18.00 to 18.50
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	12.50 to 13.00
Bundled sheets (for steel works)	12.50 to 13.00
Mixed borings and turnings (for blast furnace use)	10.50 to 11.00
Machine shop turnings (for steel works use)	12.50 to 13.00
Machine shop turnings (for rolling mill use)	13.00 to 13.50
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	12.50 to 13.00
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	16.50 to 17.00
Railroad grate bars	16.00 to 16.50
Stove plate (for steel plant use)	16.00 to 16.50
Railroad malleable	17.00 to 17.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to 15.50
Shafting	19.00 to 20.00
Steel axles	18.50 to 19.50

EXPORT TRADE QUIET

Japanese Buying Slackens—Sheet Prices Lower—Some Imports from Europe—Chinese Trade Declines

NEW YORK, Nov. 27.—Export trade with Japan has quieted down considerably in practically all lines. In some quarters this disinclination of dealers in Japan to stock up is attributed to the recent purchase by the Government of sheets and nails and to the fact that Continental prices, including some German sheets, are more attractive. Continued purchasing of sheets and structural material in light sections are reported in Belgium and France, buyers evidently being desirous of obtaining as much reasonably priced material as possible before the usual tariff on iron and steel is again in effect next spring.

In the meantime, quotations on light gage black sheets have declined somewhat from the recent $118 per ton, c.i.f. Japan, quotations. Lots of various sizes are being offered by exporters and others with mill contracts at $114 per ton and in some instances as low as $112 per ton, c.i.f. Japan, for black sheets, 13 to the bundle.

Somewhat the same situation prevails in nail purchases. Japanese dealers, anticipating Government competition and possibly expecting lower prices, are refraining from purchasing. None of the usual large tin plate buying is reported and the wire rod market, so active prior to and succeeding the earthquake, is again dull. No purchasing of structural steel is as yet noted in this country, present requirements evidently being satisfied from the Imperial Steel Works in Japan or from European markets. Rail purchases have been about the only feature of the market and in the past week, probably 2000 tons or more, chiefly light sections, have been placed with exporters. This total is exclusive of the South Manchuria Railway Co. tonnage.

A moderate trade in small lots of foreign bars, shapes and similar products, chiefly from Belgium, is reported by importers. Most of these sales are reported to be to warehouses in Atlantic coast cities. Any large business in imported materials would be practically impossible at present. The recent agreement reported consummated between the German industrialists and the French, it is believed, may release some material for export, but serious price competition is not expected by exporters.

Trade with China is not so active as a few weeks ago, in many cases Chinese ideas of price having once more dropped below the current quotations offered by American exporters. While there are inquiries for second-hand plates and similar materials, the Chinese firm offers are as a rule too low to permit of sales.

Youngstown Sheet & Tube Earnings

Net profits of the Youngstown Sheet & Tube Co. for the three months ending Sept. 30 were $3,341,346, which, after allowing for depreciation, interest, Federal taxes, etc., are equivalent to $3.13 a share on the 987,606 outstanding common shares, after preferred dividend disbursements. Total income for that period was $7,526,311, while $2,530,844 was charged off to depreciation, depletion and other charges. After all charges and dividends there was a surplus of $1,857,620. Total income for the nine months ending with September aggregated $26,414,647, while after all charges and allowances for depreciation, dividends, etc., there was a surplus of $9,878,734. Net profits for the nine-month period were $14,689,899, equal to $13.51 a share on the common stock.

Will Rebuild Perry Furnace

The blast furnace of the Perry Iron Co., Erie, Pa., will be entirely rebuilt, made a modern stack 10 ft. higher than the old stack and equipped with a skip hoist. Ore bins and trestle will also be provided. The furnace will be blown out for rebuilding about Dec. 15.

British Iron and Steel Market

Japanese Demand Slackens—Improvement in Steel Follows Boilermakers' Settlement—Ruhr Agreement Signed

(By Cable)

LONDON, ENGLAND, Nov. 27.

Iron and steel are firm on the resumption of work by the boilermakers after 30 weeks of idleness. The general outlook is improved considerably.

Pig iron is firm on continued demand from domestic and export buyers. For domestic consumption, especially, buying is forward. Three more Cleveland furnaces are now blowing.

Hematite is strong on heavy sales, mainly to home consumers, but some export business has been placed. Foreign ore is better. Bilbao Rubio has been done at 23½s. ($5.15). North African ore has been sold at 21½s. to 22s. ($4.71 to $4.82), both c.i.f. Tees.

Steel demand is improving, chiefly from Continental and colonial sources. Some orders have been placed. Makers are somewhat reserved owing to uncertainty as to costs.

Union Castle steamship line has awarded to Harland & Wolff, Ltd., Belfast, a contract for a 20,000-ton motor-driven liner.

Continental material is weak, but some fair business has been done. Joists (beams) have been sold at £7 8s. (1.45c. per lb.) f.o.b. Billets have been done at £6 7½s. ($27.92) f.o.b. A good line of sheet bars has been placed at £6 12½s. ($29.02) f.o.b.

In Germany an agreement has been signed by the occupation authorities and the Ruhr industrialists. Steps are being taken in an attempt to resume work.

In France the Société Anonyme des Laminoirs, Hauts Fourneaux, Forges, Fonderies et Usines de la Providence has secured an order for 3000 tons of rails and 3000 tons of sleepers (steel ties) for the Belgian Congo.

In Luxemburg the Acieries Reunies de Burbach-Eich-Dudelange has placed an order for 150,000 tons of British coke. Some furnaces have been relighted, including one at Belval of the Société Metallurgique des Terres Rouges.

In Belgium some coke ovens are restricting output owing to a shortage of railroad cars. In October, as in September, 39 furnaces were blowing. The output of raw steel (ingots) during October was 9000 tons in excess of the average monthly output of the year 1913.

Tin plate bars (sheet bars) have been reduced 3¾s.

Tin plate minimum price has been advanced 4½d. basis to 23½s. ($5.15) basis IC, f.o.b. The market is strong on continued buying. January to March position has been sold up to 23¾s. ($5.20) basis IC, f.o.b. Many makers are not keen sellers below this figure. There is moderate inquiry up to June. The recent oil plate order placed with Welsh makers has reached a substantial tonnage for shipment beyond January-March. Wasters are in keen demand. CW 20 x 14's changing hands up to 21½s. ($4.71) f.o.b.

Galvanized sheets are quiet but makers are well placed. Japanese demand is stagnant.

Black sheets are firm but moderately quiet. The Japanese Government order for about 4000 tons on thin specifications has been placed.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.38 per £1, as follows:

Durham coke, delivered	£1	18½s.	$8.43
Bilbao Rubio ore, f....	1	4	5.26
Cleveland No. 1 foundry	5	7½	23.54
Cleveland No. 2 foundry	5	0	21.90
Cleveland No. 4 foundry	4	19	21.68
Cleveland No. 4 forge..	4	18	21.46
Cleveland mixed			$21.90
East Coast mixed	5	0	to 5 2s. $21.90 to $22.26
East Coast hematite ..	4	19	to 5 0 21.68 to 21.90
Ferromanganese	15	5	74.10
Ferrosilicon	12	5	54.10
Billets, Bessemer* ...	6	15	to 6 17s. 6d. 29.93 to 30.66
Billets, basic	6	10	to 6 12 6 29.93 to 30.12
Sheet and tin plate bars			
Welsh	8	15s.	39.15
Tin plates, 1.4 box ..	1	1d.	to 1 0¾s. 4.15 to 4.20
			£ per Lb.
Ship plates	9	5	to 9 15 1.91 to 1.93
Boiler plates	12	10	to 12 15 2.54 to 2.64
Tees	9	5	to 9 10 1.91 to 1.99
Channels	9	0	to 9 10 1.76 to 1.86
Beams	8	15	to 9 0 1.71 to 1.81
Round bars, 4 to 8 in.	10		to 10 15 2.09 to 2.19
Galvd. sheets, No. 28	18	0	to 19 5 3.71 to 3.76
Black sheets, 24 gage	14	0	2.74
Black sheets, Japanese specifications	15	5	2.98
Steel hoops	12	0	& 13 10* 2.35 & 11*
Cold rolled steel strip			
20 gage	17	5	3.37
Cotton ties, Indian specifications	17	0	2.93

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:				
Belgium	£4 12s.	to £4 12s.	$20.15 to	$20.26
France	4 12	to 4 13½	20.15 to	20.26
Luxemburg	4 12	to 4 13½	20.15 to	20.26
Billets (nominal):			C. per Lb.	
Belgium	7 0		30.66	
France	7 0		30.66	
Merchant bars:				
Belgium	7 10	to 8 0	1.47 to	1.56
Luxemburg	7 10	to 8 0	1.47 to	1.56
France	7 10	to 8 0	1.47 to	1.56
Joists (beams):				
Belgium	7 5		1.42	
Luxemburg	7 5		1.42	
France	7 5		1.42	
Angles:				
Belgium	8 0	to 8 5	1.56 to	1.61
¼-in. plates:				
Belgium	8 5		1.61	
Germany	8 5		1.61	
⅜-in. plates:				
Luxemburg	8 5		1.61	
Belgium	8 5		1.61	

Moderate Improvement in Finished Materials at Youngstown

YOUNGSTOWN, Nov. 26.—Steel makers in the Youngstown district report there is more interest in their products than a few weeks ago and feel confident enlarged buying is on the way. They believe, however, it will require time to develop increased buying power, just as in the case of pig iron.

Demand for sheet bars and other semi-finished steel for current rolling needs is light, as rolling mill operations are largely reduced. Current light production, it is predicted, will be felt in heavier demand next year, possibly producing a steel shortage, with attendant higher prices.

Lively inquiry and buying of pig iron has had a correspondingly beneficial effect on the current steel market. District interests report they are booking heavier tonnages for immediate delivery, and are likewise receiving considerable business for delivery in the first quarter of next year.

Steel Production Increased in Youngstown

YOUNGSTOWN Nov. 27.—Steel production in the Mahoning Valley this week is on a larger scale due to resumption of five open-hearth furnaces at the Brier Hill plant of the Youngstown Sheet & Tube Co. The steel ingot output of the Sheet & Tube company is 72 per cent, as compared with a rate somewhat below 50 per cent for last week.

Of the 51 independent open-hearth furnaces in the Valley, 31 are melting, comparing with 26 the week before.

Steel Corporation subsidiaries in this territory are operating their open-hearth and Bessemer departments at a 90 per cent average. Due to changes and improvements which are being made at the Bessemer plant of the Republic Iron & Steel Co., its production of Bessemer iron is below normal. Steel output of the Republic company this week is estimated at 60 per cent.

Of the 120 sheet and jobbing mills in the Valley, 67 were scheduled for rolling this week.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....3c.

Cold-Finished Steels

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads..60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.25c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$4.80	$4.80
⅜-in.	5.50	6.00
½-in.	6.50	7.00
⅝-in.	9.00	9.50
¾-in.	11.00	11.50

	Per 1000	
	S. A. E.	U. S. S.
⅞-in.	$15.00	$15.00
1-in.	19.50	20.00
1⅛-in.	28.50	28.50
1¼-in.	37.00	37.50
1-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb., $2.65 to $2.85
Small rivets .....70 to 65 and 10 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....	$3.15
Spikes, ½ in., ⅞ in. and ⅝ in., per 100 lb.....$3.15 to	3.25
Spikes, ⅞ in..... 3.15 to	3.25
Spikes, boat and barge, base, per 100 lb.....	3.50
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to	4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to	5.50
Tie plates, per 100 lb..... 2.55 to	2.60
Angle bars, base, per 100 lb.....	2.75

Welded Pipe

Butt Weld

Steel			*Iron*		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	58	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1⅝ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2⅝ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....33 per cent off list
Carbon 0.30 to 0.40, base.....31 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	16	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	2-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1¼-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
		25-lb. coating I. C.	16.20
8-lb. coating I. C.	11.30	30-lb. coating I. C.	17.35
12-lb. coating I. C.	12.50	40-lb. coating I. C.	18.35
15-lb. coating I. C.	13.95	40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.90c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.85 to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$107.50 to $110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	107.50 to 110.00
Ferrosilicon, 50 per cent, delivered	80.00 to 82.50
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent	$40.00
Spiegeleisen, domestic, 16 to 19 per cent	39.00
Ferrosilicon, Bessemer, 10 per cent, $40.50; 11 per cent, $43; 12 per cent, $47.50; 13 per cent, $51.10; 14 per cent, $56.10.	
Silvery iron, 6 per cent, $29.00; 7 per cent, $30.00; 8 per cent, $31.50; 9 per cent, $33.50; 10 per cent, $35.50; 11 per cent, $38.00; 12 per cent, $40.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois		37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton	6.00 to	7.00
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c. to 2.40c.
Skelp, sheared, per lb.	2.35c. to 2.40c.
Skelp, universal, per lb.	2.35c. to 2.40c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ¼-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in. and smaller, base per 100 lb.	$3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (1½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200* (Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.26
Boston, export	0.255	Chicago	0.34	†Denver (pipe)	1.17

*Pacific Coast	$1.15
*Pac. Coast, ship plates	1.20
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

*Applies minimum carload 80,000 lb. †Minimum loading 4,600 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Bookings Exceed 26,000 Tons and Inquiries 23,000 Tons—Considerable Railroad Work

Railroad bridge and other railroad fabricated steel work make up over half of the 23,000 tons of new projects put before fabricators. Of awards, one-half of the upward of 27,000 tons placed was for public service corporations and about one-fourth was for public schools, highway bridges and other public work. Awards include:

Public Service Corporation of New Jersey, power plant at Kearney, N. J., 10,000 tons, to Bethlehem Steel Co.; 800 tons of plate fabrication of stacks on same job to Petroleum Iron Works.

Gilbert loft building, West Thirty-fifth Street, New York, 1000 tons, to McClintic-Marshall Co.

National Biscuit Co., New York, repair shop, 125 tons, to Hay Foundry & Iron Works.

Apartment building on Eighty-fifth Street, New York, 600 tons, to Harris Structural Steel Co.

New York Telephone Co., building on West Seventy-third Street, New York, 700 tons, to Eidlitz & Ross.

Steinway & Sons, piano warehouse and salesrooms, Fifty-seventh Street, New York, 2800 tons, to American Bridge Co.

New Departure Mfg. Co., Bristol, Conn., extension of plant, 250 tons, to Berlin Construction Co.

New York Central Railroad, 200 tons of bridge repairs, divided among Bethlehem Steel Co., McClintic-Marshall Co., Shoemaker-Satterthwait Bridge Co. and Fort Pitt Bridge Works.

Bell Telephone Co., building, Camden, N. J., 800 tons, to Phoenix Bridge Co.

Bell Telephone Co., buildings, Philadelphia, 925 tons, to McClintic-Marshall Co.

Highway bridge over Boston & Albany tracks at Wilbraham, Mass., 250 tons, McClintic-Marshall Co., low bidder, will probably be awarded the work.

Norma Co. of America, manufacturing plant at Stamford, Conn., 300 tons, to Porcupine Boiler Co.

Erasmus High School, New York, 3000 tons, to Bethlehem Fabricators, Inc.

Northwestern Power Co., Wisconsin, hydroelectric power plant and dam, 216 tons, to Worden-Allen Co.

Purdue University, power house and electrical engineering building, La Fayette, Ind., 361 tons, to Rochester Bridge Co.

State Highway Bridges in Minnesota, 573 tons, divided among Illinois Steel Bridge Co., Clinton Bridge Co. and others.

South Hills High School, Pittsburgh, 1000 tons, to Jones & Laughlin Steel Corporation.

Kentucky highway bridge work, 180 tons, to Brookville Bridge Co.

U. S. Engineers' Office, Louisville, Ky., 20 barges, approximately 2000 tons, American Bridge Co. low bidder on 16 barges, 1500 tons; Nashville Bridge Co. on 2 barges, approximately 240 tons, and Charles Hegewald Co., low bidder on 2 barges, approximately 230 tons.

Sibley Building, addition, Rochester, N. Y., 250 tons, to Genesee Bridge Co.

Jewish Temple, Cleveland, 300 tons, to T. H. Brooks & Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Baltimore & Ohio Railroad, bridge, at Parkersburg, W. Va., 2000 tons.

Virginian Railway, power house at Narrows, Va., 2000 tons.

Johns Hopkins Hospital, Baltimore, Md., addition, 200 tons.

Young Women's Christian Association, Trenton, N. J., building, 530 tons; previously reported, but now active again.

Power plant at Fall River, Mass., 3000 tons.

Ohio Edison Co., power station at Toronto, Ohio, 600 tons.

Pennsylvania Railroad, two bridges at Sunbury, Pa., 5000 tons.

American Locomotive Co., shop at Schenectady, N. Y., 1500 tons.

New York Central Railroad, bridge repairs, 3000 tons.

State of New Jersey, highway bridge at Point Pleasant, N. J., 200 tons.

Apartment building on West Forty-fifth Street, New York, 1000 tons.

Apartment building at 325 West Forty-fifth Street, New York, 400 tons.

Synagogue, Brooklyn, a few hundred tons.

Factory building on West Sixty-fifth Street, New York, 500 tons.

Loft building, 241 West Thirty-sixth Street, New York, 1000 tons.

Barber Asphalt Paving Co., Maurer, N. J. two tanks, 250 tons.

Carbon Steel Castings Co., Lancaster, Pa., foundry building, 275 tons, Frank D. Chase, Inc., Chicago, engineer.

Illinois Central, one 30-ft. skew I-beam span and stadium boulevard subway at Champaign, Ill., 100 tons.

Illinois Central, catenary bridges, Chicago, 250 tons.

Market Circle Realty Co., Indianapolis, theatre and office building, 450 tons, bids being taken.

Timken Roller Bearing Co., Canton, Ohio, factory addition, 200 tons.

P. A. Geier Co., Cleveland, plant extension, 100 tons.

Richmond Brothers Co., Cleveland, factory addition, 125 tons.

Lakewood High School, Cleveland, 125 tons. New bids taken.

RAILROAD EQUIPMENT BUYING

Purchases of 1449 Freight Cars and Definite Inquiries for 1018

The chief freight car purchases were 1000 for the Southern Railway and 400 for the Alabama & Vicksburg. Inquiries for 1000 cars for the Reading and early request for prices for 2000 cars for the Western Pacific are among the developments, which include:

The Southern Railway has placed 1000 box cars with the American Car & Foundry Co.

The Chesapeake & Ohio received bids yesterday on 2000 gondola cars and has placed 25 caboose cars with the Newport News Shipbuilding & Drydock Co.

The St. Louis Southwestern has decided not to buy 150 underframes nor to place repairs on 1000 box cars, but expects to purchase the 1000 new box cars mentioned last week.

No further inquiries have been received from the Southern Pacific and the expected inquiry for 3000 refrigerator cars for the Pacific Fruit Express has not yet actually been put out.

The Western Pacific is preparing specifications for 2000 refrigerator cars for the Western Refrigerator Line and will issue an inquiry shortly.

The Burlington has decided not to buy 1000 gondola car bodies.

The Philadelphia & Reading has entered the market for 1000 all steel hopper cars of 70-tons capacity.

The Sinclair Refining Co., Chicago, is inquiring for 18 small coke cars.

The Great Northern has ordered 100 underframes from the St. Paul Foundry Co.

The Anaconda Copper Mining Co. has placed 24 Ingoldsby type dump cars with the Koppel Industrial Car & Equipment Co.

The Chicago & Alton contemplates inquiring for passenger equipment, including coaches, diners, postal and baggage cars.

The Alabama & Vicksburg ordered 200 box and 100 flat cars from the Chickasaw Shipbuilding & Car Co. and 100 gondola cars from the American Car & Foundry Co.

The New York Central Railroad has ordered for the Pittsburgh & Lake Erie 18 70-ft. passenger coaches from the Standard Steel Car Co. and 18 of the same type from the American Car & Foundry Co.

The Canadian National Railways have ordered 6 steel combination passenger and baggage cars.

The Toronto, Hamilton & Buffalo Railroad has ordered 16 coaches and 6 smoking cars from the Canadian Car & Foundry Co.

The Central Railroad of New Jersey has ordered 50 steel passenger coaches from the Osgood Bradley Car Co.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Nov	Lake	Electro lytic*	New York	New York	St. Louis	New York	St. Louis
21	13.25	12.75	44.87½	6.90	6.70	6.80	6.65
23	13.25	12.75	44.50	6.90	6.70	6.87½	6.72½
26	13.25	12.62½	44.62½	7.00	6.80	6.90	6.80
27	13.25	12.50		7.00	6.80	6.90	6.80
28	13.25	12.50		7.00	6.80	6.87½	6.77½
27	13.25	12.50	46.50	7.00	6.70	6.87½	6.82½
28	13.25	12.87½	47.00	7.00	6.70	6.87½	6.87½

*Refinery quotation delivered price 1/2c higher

New York

NEW YORK, Nov. 27.

Only moderate activity characterizes the markets. After a sharp decline copper has again become more active, with the price tendency higher. Demand for tin is still very good and prices are rising sharply. There is still a good business in lead, with prices firm. A good consuming demand for zinc has appeared and quotations are higher.

Copper.—Since last week electrolytic copper fell as low as 12.75c., delivered, in the absence of demand from both foreign and domestic consumers. Yesterday, however, stimulated partly by rising prices in London, a more active domestic demand appeared and an upward tendency in prices set in. Inquiry is fairly active and a good business is being done with electrolytic copper quoted at 13.12½c. to 13.25c., delivered. Lake copper is largely nominal at 13.25c., delivered.

Tin.—The demand for Straits tin continues active, with a fairly large business done in the past week. The market is fast developing into a sellers', as contrasted with a buyers' market not so long ago. On Nov. 20 every London offering was accepted and sales totaled 400 to 500 tons. On Nov. 21, despite an erratic exchange situation, about 250 tons changed hands. On the following day the market was dull, with transactions involving 100 to 150 tons, but on Nov. 23 there were good sales estimated at 400 to 500 tons with as high as 44.75c. paid, and with one lot of spot bringing 44.87½c. Consumers in the Pittsburgh district were the chief buyers. Last Saturday consumers were eager to buy, but there were practically no sellers and a large business could have been done; as it was only about 100 to 150 tons changed hands. Yesterday the market came to a halt with only about 100 tons sold at prices ranging from 46.37½c. to 46.75c., due largely to an advance in London of over £8 per ton above Friday's value, coupled with a 3-point rise in sterling exchange. Today spot Straits tin is quoted at 47c., New York, with futures at 46.50c. and a fair business reported transacted. The London market today is about £10 per ton higher than a week ago at £231 15s. for spot standard, £232 10s. for future standard and £232 15s. for spot Straits. Shipments of Straits tin in November are estimated at 4500 tons, which, if true, will mean a shortage of tin in January and perhaps in December. It is believed that consumers are not fully covered and exciting markets for tin may develop in the near future. Arrivals thus far this month are 4180 tons, with 4019 tons reported afloat.

Lead.—This market is working gradually higher until it is difficult to buy the metal under 7c., New York, in the outside market. The leading interest still quotes 6.85c., New York, but is not believed to be booking many orders and with an advance in its quotations expected any day. The St. Louis market is also strong at 6.70c. to 6.75c.

Zinc.—A considerably better consuming demand developed about the middle of last week and prices have risen accordingly. Galvanizers have been better buyers than in some time and one producer reports more inquiry and orders in the last few days than in the whole month of November. Prime Western for December delivery is quoted at 6.37½c. to 6.40c., St. Louis, or 6.72½c. to 6.75c., New York. Quotations are advancing to a point where export business may again be possible.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Both shot and ingot nickel in the outside market are quoted at 29c. to 32c.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 9c., New York, duty paid, with the market not quite so active but steady.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 25c. to 26c. per lb., duty paid, New York, with some sellers unable to obtain the metal from their principals. Besides the Ford Motor Co., a large die casting company in Brooklyn is inquiring for a substantial quantity of ingots.

Old Metals.—Business is unsettled and values are off. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.75
Copper, light and bottoms	10.00
Heavy machine composition	10.50
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	8.75
No. 1 yellow red brass turnings	6.75
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

CHICAGO, Nov. 27.—Copper has declined and tin has advanced while the other metals remain unchanged. The recession in copper brought out considerable buying for all deliveries, in some instances purchases being for as remote as third quarter shipment. Orders were for both domestic and foreign deliveries. Heavy sales of tin in the Far East have stimulated market activities here. Lead buying is from hand-to-mouth, although the statistical position of the metal is such that it would not take much of a buying movement to stimulate a price advance. Zinc is exceedingly quiet. Antimony is still firm, although shipments are again coming in from China after a cessation of deliveries from that country for about three months. Among the old metals, tin grades have advanced. We quote in carload lots: Lake copper, 13.50c.; tin, 45.50c.; lead, 6.65c.; spelter, 6.40c.; antimony, 11c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.25c.; red brass, 8.50c.; yellow brass, 6.50c.; lead pipe, 5.50c.; zinc, 4.25c.; pewter, No. 1, 25c; tin foil, 32c; block tin, 36c.; all buying prices for less than carload lots.

Hearing in Proposed Rate Increase

PITTSBURGH, Nov. 27.—The proposed increase in the short haul freight rates on iron and steel products which would make a large percentage advance in rates to points within the greater Pittsburgh area was the subject of a hearing at the chamber of commerce covering all of last week before Examiner C. R. Seale of the Interstate Commerce Commission. Traffic managers of the steel companies and other interested parties protested against the increase, which was defended by railroad officials. A mass of testimony was submitted, which the examiner will have to go over before making a recommendation, and to give ample time for this examination Feb. 4 was named as a tentative date for the proposed increase.

Freyn, Brassert & Co., Chicago, have been appointed consulting engineers for the extension of dock and construction of the second blast furnace at the Indiana Harbor works of Youngstown Sheet & Tube Co. The same firm was in charge of construction of the first blast furnace at that plant, formerly owned and operated by the Steel & Tube Co. of America.

PERSONAL

Testimonial Dinner to Dean Cooley of University of Michigan

Mortimer Elwyn Cooley, dean of the engineering schools of University of Michigan, was singularly honored at the testimonial dinner given him at the Hotel Statler, Detroit, Friday evening, Nov. 23. Men who had known him at one stage or other in all his 68 years were gathered around him—his Annapolis roommate and shipmate of 50 years ago; the Supreme Court justice of New York, a boyhood friend; shipmates of the Yosemite during the Spanish American war in '98, and former students at Ann Arbor. Dr. Marion L. Burton, president of University of Michigan, was the speaker of the evening, while Dean Cooley's friends verbally mirrored his biography as the scientist and told of another Cooley they knew by long and intimate contact.



M. E. COOLEY

Louis J. Campbell, president and chairman of the board of directors of the Atlas Steel Corporation, Dunkirk, N. Y., who was operated on in New York for the amputation of his left leg, is on the road to recovery. Mr. Campbell rallied nicely and plans to resume his duties as executive head of the Atlas company.

C. A. Crumpton, who formerly operated a polishing and plating shop in Chicago, has joined the sales force of the General Abrasive Co., Niagara Falls, N. Y., manufacturers of artificial abrasives, as salesman and demonstrator.

E. C. Henn, who has been both vice-president and general superintendent of the National Acme Co., Cleveland, has resigned as general superintendent and has been succeeded in that capacity by his son, Oliver Henn, who was for several years superintendent of the company's plant at Windsor, Vt.

H. W. Yeomans has been elected president of the Bishop & Babcock Co., Cleveland, manufacturer of heating appliances and soda fountain equipment, filling the place left vacant by the resignation of F. R. Pleasanton. Edwin S. Griffiths has resigned as chairman of the board and W. B. Prince has been elected vice-president. Mr. Yeomans was formerly prominent in the management of the company, but for the past year has been engaged in business in Hartford, Conn.

E. H. Welker, for the past five years in charge of the Detroit district sales office and warehouse of the LeMoyne Steel Co., Pittsburgh, manufacturer of high speed and alloy steels, has been promoted to vice-president in charge of sales and transferred to the company's general offices, Park Building, Pittsburgh.

Charles M. Schwab has accepted the chairmanship of the New York City committee for the Harding Memorial campaign, which will raise funds to erect a mausoleum at Marion, Ohio, and carry out other plans.

W. B. Peirce, works manager Graham Bolt & Nut Co., Pittsburgh, will be the speaker at the bi-monthly meeting of the mechanical section, Engineers' Society of Western Pennsylvania, at the William Penn Hotel on Tuesday evening, Dec. 4. His subject is "Modern Methods of Bolt and Nut Manufacture."

C. E. Trommer, sales representative Rogers, Brown & Co., who was transferred to the St. Louis office last spring, has returned to the Chicago office and will again travel his former territory in northern Illinois, adding to it a portion of Indiana.

F. G. Anderson has resigned as sales manager for the New York district of the Morse Chain Co. to accept the position of New York sales manager of the Ramsey Chain Co., Albany, whose New York office is in the Liggett Building, Forty-second Street and Madison Avenue. Mr. Anderson graduated from Cornell University in 1906 and has been with the Morse Chain Co. 14 years.

George H. Lang has been appointed purchasing agent of the Phoenix Iron Co., Philadelphia. He has been connected with the purchasing department of that company for some years.

OBITUARY

JAMES WEIR MILLIGAN, who died last week in Calumet, Mich., aged 78 years, was connected with the Calumet & Hecla Mining Co. and had a wide reputation as mining engineer. He came to the United States from Scotland in 1870.

WILLIAM HENRY HINKLE, who died recently at Clifton Springs, N. Y., at the age of 77, was well known in Michigan, having retired from active business some 15 years ago when he was vice-president of the Charcoal Iron Co. of America.

RICHARD W. BAILEY, division contracting manager American Bridge Co., Pittsburgh, died at his home, Sewickley, Pa., Nov. 22. Mr. Bailey had been identified with the American Bridge Co. since its organization in 1900, and before that had been associated with the A. & P. Roberts Co., Philadelphia, which controlled the Pencoyd Iron Works, now the Pencoyd plant of the American Bridge Co. He served as sales agent in Philadelphia for the A. & P. Roberts Co. and, with its absorption by the American Bridge Co., became contracting manager there for the latter company. This position he held until 1910, when he was appointed division contracting manager in Pittsburgh. Mr. Bailey had been in poor health for more than a year and had been at his office only a few times since last July. He was born in Pottstown, Pa., 58 years ago. Besides his wife he is survived by one son, Ferdinand Bailey, who is associated with the Weiman & Ward Co., Pittsburgh.

CHARLES A. PECKHAM, formerly president Toledo Bridge & Crane Co., Toledo, Ohio, died recently, aged 54 years. He was a member of the Toledo Club, Toledo Chamber of Commerce and various other organizations. The Toledo Bridge & Crane Co. was taken over several years ago by the Austin Machinery Co.

GIBBON CONWAY SHACKLEFORD, aged 54 years, formerly chief engineer of the Republic Iron & Steel Co., Youngstown, Ohio, and later consulting engineer, died on Nov. 20 at a sanitarium in Cincinnati, where he had spent the past two years. He had been connected with the Republic company from May 15, 1906, until retirement. For seven years he was employed by Julian Kennedy, engineer in Pittsburgh, and then for three years by Walter Kennedy, brother of the latter. Subsequently Mr. Shackleford became engineer for the Crucible Steel Co., Pittsburgh, a position which he held three years. For a short time thereafter he was assistant to Thomas J. Bray, then chief engineer, now president, of the Republic Iron & Steel Co.

HARRY R. RILEY, member of the foundry firm of John J. Riley & Co., Brooklyn, died on Nov. 14, at his home, 506 First Street, that city.

MAYOR WALTER M. TAUSSIG of Yonkers, N. Y., vice-president American Chain Co., died by his own hand last week. Mr. Taussig was born in St. Louis in 1862. He was founder of the Challenge Cutlery Co. and the Dunn Edge-Tool Co., Bridgeport, Conn., organized in 1899, and remained in active control of both companies until 1916, when he became associated with the American Chain Co., first as treasurer and sales manager and later as second vice-president.

EXPORTS AND IMPORTS DECLINE

Outward Movement of Iron and Steel Products the Lowest Since February Inbound Tonnage Smallest of the Year

WASHINGTON, Nov. 27.—Reflecting a decline of 20,000 tons, exports of iron and steel products in October totaled 152,511 gross tons, valued at $19,244,049, as compared with 172,499 tons in September, valued at $19,871,060. Imports in October, amounting to 29,882 tons, valued at $1,825,093, showed a decline of 8729 tons under September, with a total of 36,611 tons, valued at $1,785,166. Exports of machinery in October were valued at $24,893,616 as against $25,555,407 in September. Imports of machinery in October were valued at $922,924, as compared with $518,860 in September. Exports of machine tools in October numbered 4413 valued at $783,777 as against 3744 valued at $513,461 in September.

Exports of iron and steel products in October of this year showed a substantial increase over the same month of last year when they aggregated 132,924 tons, valued at $14,526,702. For the ten months of this year iron and steel exports totaled 1,628,005 tons, valued at $190,863,598, as against 1,708,323 tons, valued at $157,923,871, for the corresponding period of 1922.

Attributed to the sharp falling off in imports of pig iron, the incoming shipments on iron and steel products in October of this year were at a low ebb when compared with October of last year with a total of 175,086 tons, valued at $51,100,057. For the ten months of this year, imports of iron and steel products totaled 681,226 tons, valued at $27,030,042, as against 476,967 tons, valued at $23,487,764, for the corresponding period of 1922.

Japan was the heaviest foreign buyer in October of black steel sheets, taking 4165 tons of the total of 7858 tons; of tin plate, taking 4115 tons of the total of 11,785 tons; of steel rails, taking 10,314 tons of the total of 21,122 tons; and of galvanized wire, taking 1637 tons of the total of 3771 tons, included in the listing under plain wire with a total of 6052 tons.

[The tabular data will be given in next week's issue, having been crowded out this week. EDITOR.]

SCRAP SPECIFICATIONS

Meeting in United States Bureau of Standards—Steel Committee Submits Six Basic Classifications of Iron and Steel

A meeting was held in the Bureau of Standards at Washington recently to consider uniform classification of iron and steel scrap. Among those who attended were:

George K. Burgess, director, Bureau of Standards.

G. Walter Sanborn, purchasing agent, United Engineering and Foundry Co.

G. C. McClure, purchasing agent, American Rolling Mill Co.

Russell Forbes, commodity secretary, National Association of Purchasing Agents.

W. W. MacMillen, purchasing agent, National Malleable Castings Co.

J. V. S. Bishop, Real Estate Trust Bldg., Philadelphia.

Geo. W. Starr, United Alloy Steel Corporation, Canton, Ohio.

Walter W. Lower, secretary-treasurer, National Association of Sheet and Tin Plate Manufacturers.

H. C. Stevens, general storekeeper, Wabash Railway, St. Louis.

Edwin W. Ely, Department of Commerce.

H. S. Rawdon, acting chief, Division of Metallurgy, Bureau of Standards.

Following a preliminary discussion of the situation and the need for uniform classification of scrap, G. C. McClure presented on behalf of the National Association Purchasing Agents classifications of six major divisions of scrap as follows:

1. Scrap for use in blast furnaces.
2. Scrap for use in basic open-hearth furnaces.
3. Scrap for use in acid open-hearth furnaces.
4. Scrap for use in electric furnaces.
5. Scrap for use in gray iron foundry practice.
6. Scrap for use in Bessemer converters.

These specifications were prepared under Mr. McClure's supervision by various members of the Iron and Steel Committee with the assistance of Associated Steel Works Purchasing Agents in the Pittsburgh district. The specifications for use in acid open-hearth furnaces were prepared by G. Walter Sanborn with the assistance of H. C. Wickline of the Union Steel Castings Co., Pittsburgh, and James B. Connally of the Mesta Machine Co., Homestead, Pa; and specifications for use in electric furnaces were prepared by W. W. MacMillen with the assistance of other fellow purchasers. Each specification in each division was separately considered by those present and changes were suggested for their improvement. It was the consensus of opinion that a seventh division should be made for scrap used in the manufacture of wrought iron.

At the close of the all-day session, it was suggested by the Director of the Bureau of Standards that the work of compiling tentative specifications should be continued under the leadership of Mr. McClure. At a later date a meeting will be held under the auspices of the Bureau of Standards for final consideration of the specifications before they are promulgated and issued by the bureau for the consideration of producing, buying and consuming interests.

The National Association of Waste Material Dealers has agreed to prepare and submit to Mr. McClure specifications for scrap used in the manufacture of wrought iron.

It is the plan of the National Iron and Steel Committee to continue its work on this subject with the cooperation and assistance of all interested trade groups, so that the specifications to be submitted at a later date to the Bureau of Standards, will be directly representative of producing, buying and consuming interests the country over.

More Interest in Scrap in Mahoning Valley

YOUNGSTOWN, Nov. 26.—Though the market on scrap metals still continues weak in a general way, more interest is being manifested by district melters now than at any time in the past two months. This is attributed chiefly to the larger buying of pig iron and its increase in price. The minimum price on heavy melting scrap is now $17 in the Mahoning Valley, with prices ranging up to $17.50, and dealers predicting another 50c. advance. Compressed sheets are held at $15 minimum, with an effort to boost the market.

In some cases, dealers have substantial stocks in their yards which they are inclined to hold for a higher market, believing that after the first of the year, scrap will be in larger demand due to increase in open-hearth operation.

An independent rolling mill interest in the upper Mahoning Valley, which has been maintaining production of its open-hearth department at a high level, has been a regular buyer in the scrap market lately. This factor has been responsible for activity in a market that would otherwise be dull.

Domestic sales of oak leather belting in October, reported by the Leather Belting Exchange and representing about 60 per cent of the total product, represent 447,264 lb. and $827,438, or an average of $1.85 per lb. This compares with September figures of 416,510 lb., $783,871, and an average of $1.88 per lb., and with figures for October, 1922, of 499,943 lb., $861,902, and an average of $1.72 per lb.

Little Fear of Radical Legislation

Congress Is Expected, However, to Do Much Talking and Passage of Constructive Measures May Be Prevented —Keen Interest in President's Message

WASHINGTON, Nov. 27. — Exceptional interest is being manifested in the first session of the Sixty-eighth Congress, which will assemble next Monday. Election of many so-called radicals has given it a makeup that has been the source of both apprehension and curiosity among business men of the country. They have preached all sorts of theories in their campaigns and said they will urge their application through legislation. A great part of these doctrines is either strongly anti-business or decidedly an appeal to class, such as the agricultural or organized labor communities, or both. Attempts are being made to consolidate the farm and labor blocs in Congress and to direct a drive against the other forces rated as being more conservative. But much of the talk of organizing blocs within blocs and seeking to gain the reins of Congress is talk only. At the outset there are many conflicting views within given blocs and never yet has there been anything like complete harmony among the blocs, but, on the contrary, there are wide differences of views among some of them which it is sought to consolidate, an example being the farm and labor blocs. The impression is encouraged by some agitators in Congress that the interests of these forces are unlike those of the so-called conservative forces or those whose attitude toward business is not hostile. As a matter of fact, it has been pointed out, the interest of the farming community and of the business community is much more nearly identical than that of the farm bloc and labor bloc, although the widely advertised divergencies do not exist in any case to the extent agitators would have the country believe, and they prevail principally in a political sense for political purposes.

Bloc Government

These are only high lights of curiosity shown over the next session of Congress. There is a desire to see how these attempts at bloc government will end. The belief is that they will result chiefly in almost interminable talk and agitation. The agitation is the source of disturbance. But as to actually radical legislation being enacted there is not a great deal of apprehension. It is becoming more evident that some of the radicals who have been elected already feel the weight of their responsibility and will not be so abrupt in legislative practice as they were in campaign action. Moreover, it is confidently thought much radical talk will be only of a political nature with the knowledge that the Administration will block attempted radical legislation.

The two really bad effects on the country, it is contended, will be the disturbance from radical harangues in Congress and the apparent power of the radicals to block constructive legislation, rather than the power to pass radical legislation.

The President's Message

Interest in the next Congress also is greatly heightened by the fact that since the Sixty-seventh Congress death has caused a change in the White House and President Coolidge will present his first message next week. Its actual character is not known, but is suggested from the political records of the new President. This, it is pointed out, means that he will oppose radical legislation and will not consciously do anything to disturb any legitimate interest, whether labor, agricultural or business.

The outstanding interest to the country at large undoubtedly relates to possible tax revision. President Coolidge, it is believed, will approve the program of Secretary Mellon. It has been cordially received by the people of the country generally as shown by voluminous correspondence coming to the White House and the Treasury Department. The soundness and simplicity of this program, it is claimed, have appealed to the country most strikingly, and even so-called radicals, who desire to increase rather than decrease surtaxes and add to instead of take from business many of its tax burdens, are finding difficulty in combating the Mellon program. While there is no assurance at all that the program will be adopted in its entirety—the contrary probably is true—there is at the same time a belief among Government officials that a portion of the program will find its way to the statute books. President Coolidge is said to be strongly in favor of tax reduction to aid business expansion and to relieve the small taxpayer as well, provision for which is made in the Mellon program. The great source of apprehension lies in prospective bonus legislation. The attitude of the President on this subject never has been made clear and a statement as to what he may recommend is speculative only. His record as Governor of Massachusetts in approving bonus legislation is not accepted as giving the slightest proof that he would take a similar attitude as President. The two circumstances and positions, it is pointed out, are not comparable. It is felt sure, however, that the President will urge every aid for disabled soldiers, sentiment for which is country-wide.

The Immigration Problem

Immigration will loom as a subject of considerable discussion, and affects a subject where the farm and labor blocs will differ. But President Coolidge is known to oppose relaxation of the present 3 per cent law and to approve of the ideas of Secretary of Labor Davis regarding a more selective system. The present law expires on June 30, but it is conceivable that it merely will be extended with addition of the Department of Labor program for selection of immigrants abroad. There is much pressure being brought to bear to relax the present law by means of fixing the basic year 1890 for immigration quotas and changing the per cent to 5, instead of 1910 with a per cent of 3. The former would mean more immigrants but would apply principally to the Nordic races.

Production of Malleable Castings

WASHINGTON, Nov. 27.—With 116 plants reporting, the production of malleable castings in October totaled 62,238 tons, according to a statement issued today by the Bureau of the Census. Total shipments of these plants amounted to 59,129 tons; bookings were 48,621 tons. The monthly capacity of these plants is 103,837 tons, and they operated at 59.9 per cent of capacity in October.

For 107 identical plants, production in October was 56,798 tons; shipments, 54,221 tons; orders booked, 43,978 tons; monthly capacity, 95,652 tons; operations were 59.4 per cent of capacity.

The bureau statement revised the number of plants to include five, which previously were shown as one. The 103 plants reporting for September produced 56,024 tons in that month.

The members of the Electric Hoist Manufacturers' Association report an increase of 38.97 per cent in the number of hoists ordered during October as compared with the previous month, and an increase of 42.73 per cent in the value of orders received. Shipments increased 6.20 per cent as compared with September.

"Let Railroads Alone," Plea of Founders

(*Continued from page* 1451)

organized in Germany in the latter part of the last century, up to present-day activities, which are largely directed, the speaker said, from Lenin's headquarters in Russia. He mentioned the Worker's Party as one of the instruments by which communistic doctrine is being spread throughout the United States. The council of this organization is composed of 12 men, not half of whom were born in this country, according to the speaker, and several of whom have served prison terms for sedition against the United States. Instructions from Lenin are brought to this country by courier. The propaganda is spread through many organizations, some of which are possibly ignorant of the manner in which they are being used for furthering the cause of communism. Mr. Marvin read a list of 25 colleges and universities where "liberal clubs" flourish and stated that addresses were being made to these clubs by men convicted of sedition. Such prominent educational centers as Harvard, Yale, Bryn Mawr, Vassar, Leland Stanford, Jr., and others equally well known were accused of harboring these liberal clubs. The farmers are being reached through the Farmer-Labor Party and the Non-Partisan League; workingmen and the general public by literature distributed in sundry ways, one of which is a publicity bureau maintained in Berlin. Mr. Marvin said that 611 publications of one kind or another are preaching unsafe doctrine, much of which is inspired by the communists. Of these publications only 73 are in the English language. Most of those printed in foreign tongues are published abroad and sent here. He showed copies of the *Labor Age*, the *World Tomorrow*, the *Young Comrade*, the *Young Worker*, the *Russian Review*, the *Christian Century*, the *Voice of Labor*, the *Survey* and the *Independent*, and said that all of them were printing articles which seek to promulgate the doctrines of communism.

The purpose of the communists is to create a mental attitude of distrust and unrest; to stir up class hatred and class consciousness; to instill in the minds of men, women and children a hatred for war and to work for unpreparedness, while Lenin has a standing army of 2,500,000 in Russia.

Mr. Marvin warned the members of the National Founders' Association that complacency regarding this problem would not solve it; public education to combat the evil effects of the "mind poison," as he called it, of the communists is required of those who would save this country from the danger of radical thinking.

Tells of European Conditions

Much that Mr. Marvin said about the dangers of communism was borne out by Magnus W. Alexander, managing director, National Industrial Conference Board, who, among other things, told of the growth of these ideas in Germany. Mr. Alexander spent three or four months in England, France and Germany, and what he saw and heard, as he told it, made one of the most interesting features of the convention. Mr. Alexander talked intimately of conditions abroad, particularly of the political relations of England, France and Germany, and expressed himself, in part, as follows:

Mr. Alexander's Views as to European Conditions

"Europe, in my opinion, is a cesspool of political intrigue. There is a real desire for peace in the heart of the individuals of every nation, but there seems no real desire for peace among the governments. These are maneuvering for political advantage and position, and the big powers are using the small powers in this game. Think of the recent war between Turkey and Greece; think of the recent conflict between Italy and Greece because of the Corfu incident, and you may soon have an opportunity to learn of a similar clash between two other of the smaller nations.

"If you could look behind the curtain and the scenery, as I had the opportunity to look, you would find that the real fight in Europe, in my judgment, is today not between Germany and France but between France and England for economic and political supremacy in Europe. Contrary to all traditions of England, she is today in a secondary position in Europe, hardly daring to raise her hand in opposition to any plans that M. Poincaré may propose or execute, backed, as he is, by a tremendous military power, not only in France with between 700,000 and 800,000 highly trained men splendidly armed and equipped, but also with armies in Czecho-Slovakia, in Jugo-Slavia and Rumania and Poland, where armies are maintained and officered largely by French effort. The records are clear as to what money is being spent for this purpose.

"I am not saying all this in criticism of M. Poincaré's or Mr. Baldwin's attitude in the matter. I am stating what I believe to be a matter of fact, in order to give you an understanding of the European condition. Secretary Hughes only a month ago at the Bar Association meeting in Canada said that the condition in Europe will not clear up until there is in Europe a real desire for peace. He spoke the truth even though he saw the conditions only from a distance.

"Not until the governments of Europe are ready for peace and willing to give up some of the advantages that they either enjoy or that they hope to gain by the present maneuvering, not until then will there be a condition in Europe that will allow Europe to come back on its feet and give these human beings in all nations, humans much like you and me, an opportunity to work for and make a decent living such as we all are entitled to. Not until then also will the situation in Europe have a helpful influence on our own conditions and on our business outlook. As was said before, a reviving Europe will have to come to us for a great many commodities and for much material, raw and finished until the European peoples will rebuild their own production and thereby increasingly become independent of our production."

Mr. Frank Sympathizes with France

Isaac W. Frank, United Engineering & Foundry Co., Pittsburgh, followed Mr. Alexander with a brief talk on his observations in Europe. He said that currency inflation in Germany in his opinion was the result of a plot of industrialists and monarchists to discredit the republican form of Government in an effort to re-establish the monarchy. By currency inflation the internal debt of the Government had been paid off and the debts of many industries had also been liquidated with depreciated money. "Germany is not ready to pay anything," was Mr. Frank's observation. He said that the people of France are prosperous but that the Government is "broke." He declared that his sympathies were entirely with France.

Mr. Wood's Observations

Walter Wood of R. G. Wood & Co., Philadelphia, makers of cast iron pipe, who attended the recent International Foundrymen's Congress in Paris, told of some of the features of that meeting. He said that eight nations were represented, Germans being conspicuously absent. During his stay abroad, Mr. Wood spent some time among the iron makers of England and discussed with them the importation of pig iron by the United States. He said that English iron makers have been averse to guaranteeing the analysis of their iron, as is freely done by American iron makers, and he told them that their practice must be changed if they are again to sell successfully in this country. They prefer to give approximate analyses, but this does not

meet the requirements of American foundrymen, who have become accustomed to the more exact analysis of American iron. He said it was a shock to the English iron makers to be told that they must live up to the analysis given in their bills of sale.

Educational Moving Pictures

Educational moving pictures were declared by Dr. Paul Smith to be one of the best methods of inculcating sane thinking on economic and industrial problems. Dr. Smith is vice-president of the American Motion Picture Corporation, an organization founded by men interested in the spreading of information that will combat the insidious propaganda of radicals of all groups. The president of the corporation is William H. Barr, president of the National Founders' Association. Dr. Smith explained the purposes of the corporation and the methods it will pursue in the distribution of films on educational subjects. These films will be shown not only in commercial moving picture theaters, but also in colleges, schools and churches. The headquarters of the company is at 71 West Twenty-third Street, New York. Toward the end of Thursday's session a motion was made by Lyman P. Hubbell, Fillmore Avenue, Foundry & Iron Works, Buffalo, that the administrative council be empowered to invest from $10,000 to $25,000, at its discretion, in the stock of the corporation.

Apprentice Training of Falk Corporation

The apprentice training system of the Falk Corporation, Milwaukee, was described as "a system that works" by Horace A. Frommelt, educational director of that corporation, who related the details of the Falk methods. He said that his company was lax in apprenticeship training until four or five years ago. The difficulties encountered in obtaining a sufficient number of experienced journeyman molders decided the company to train its own men. At present the Falk Corporation is training 145 apprentices, of whom 45 or 50 are in the foundry department. The entire plant employs less than 1000 men. Hence there is a fairly large proportion of apprentices in all departments.

Mr. Frommelt said that if foundrymen attempt to solve the labor shortage problem quickly through apprenticeship training, they are doomed to failure. Well trained men are not to be had without work. A good deal of time and troublesome detail will be involved in the process of developing good men from apprentices, but Mr. Frommelt said the results were well worth it if the work was properly conducted. He said that no one company in a manufacturing district should take upon itself the burden of training a majority of the apprentices in that district but that all manufacturers should cooperate for the common good. Even the smallest plants can take at least one apprentice and every plant should train a number proportionate to its total of journeymen workers.

The boys enrolled in the Falk apprenticeship classes are obtained from several sources: 1, those who come from the grade schools, who are given a four-year course; 2, those who come from high school, who are given a three-year course; 3, university apprentices, for whom there is a two-year course, and 4, cooperative apprentices, or those obtained from technical schools which employ a system of dividing time of students between the class room and the shop. There is a fifth class consisting of what are called special apprentices, made up partly of men who desire to switch from one class of work in the plant to another or those who desire to obtain an all-round mechanical training.

Every apprentice is given at first two or three months' work on the sand pile. This work, Mr. Frommelt said, is difficult and it tests the metal of those whose ambition is to become molders. They are told that the work will last only two or three months and if they come through that test they are regarded as good material for further instruction in foundry practice. After work on the sand pile they are taken to the "small floor" and then to the "large floor." Instruction is also given to them in the laboratory and inspection departments. In the four-year course about three years' work is in actual molding and core making. There is class work of about five hours a week on company time. The text books used in the class room are those of a well known correspondence school and study is carried on under the direction of the Falk Corporation's educational department. An award system is employed to reward apt pupils, three prizes being given each year to the three best students.

A Talk on Foundry Practice

Enrique Touceda, consulting engineer, American Malleable Castings Association, delivered an address, illustrated by stereopticon slides, on "Gray Iron Foundry Practice and a Remedy for Some of the Troubles Encountered." This paper, with some of the illustrations presented by Mr. Touceda, is given on page 1441 of this issue.

More Open Shops

One of the disappointments of the convention was the absence of James A. Emery, counsel, who was prevented from attendance by a case in court which demanded his presence. In his place Noel Sargent, manager open shop department, National Association of Manufacturers, talked interestingly of the present status of the union labor movement. In the railroad field the chief danger at present is not from the closed shop movement, he said, but in the political and legislative action that may be taken. In the coal industry a new element of trouble has been brought to the front by the statement of the United States Coal Commission in a recent report that a 30 per cent saving could be effected in some coal-producing districts by the installation of certain labor-saving equipment. This saving would amount to $200,000,000 if only used in half of the bituminous mining regions. Some of this labor-saving equipment, such as loading machines, has been installed in the non-union fields of West Virginia but Mr. Sargent predicted that attempts to install such machines in the union fields would be vigorously opposed by the unions. He predicted that a strike in the bituminous fields will occur next April 1.

The strength of the United Mine Workers has diminished in all of the coal-producing States but two, Pennsylvania and Michigan, and the latter has only one mine.

In the steel industry the attempts to bring about the closed shop have failed as they have also failed in the meat packing industry. Three years ago the printing industry was nearly 100 per cent closed shop, but today only a few of the larger cities are more than 50 per cent closed shop. The open shop is growing also in daily newspaper plants and open shop building conditions are more prevalent, though in Boston and Seattle there have been gains by the labor unionists. There have also been gains in unionizing the clothing workers.

Although there are 41,000,000 persons engaged in gainful occupations in the United States, it is misleading to use this figure in computing the extent to which workers are organized, said Mr. Sargent. A considerable proportion of the 41,000,000 workers are made up of lawyers, doctors, writers, business men and many other classes not rightfully regarded as "potential unionists." The National Association of Manufacturers, he said, estimates that in 1920 there were 17,500,000 potential unionists in the United States, of whom 4,900,000, or 28 per cent, were members of the American Federation of Labor or other labor organizations, while in 1923, it is estimated, only 20 per cent of potential unionists belong to labor organizations.

Mr. Sargent said that there has been a loss in the number of open shop associations, 55 that were active a few years ago now being dead. He gave as a reason that they had been over-successful in their efforts to establish open shop working conditions and felt there was no longer a need for their activities.

The total income of labor organizations per year, based on recent estimates, said Mr. Sargent, is $184,000,000 a year, while the total income of National, State and local associations interested in the open shop movement is only $6,000,000. The "check-off" system

of collection of union dues took 1.7 per cent of the wages of Indiana miners in 1921 to 13.1 per cent of the miners in the State of Washington in the same year. An average of 3 per cent of the income of members of the United Mine Workers is paid into the union treasury.

Resolutions Adopted

J. H. Schwacke, William Sellers & Co., Philadelphia, chairman of the resolutions committee, offered first a resolution appropriating $15,000 for the work of the publicity committee, also a resolution commending the work of the National Industrial Conference Board and contributing $5,000 to that board. He then read a resolution voicing the belief of the association that the railroads should not be hampered in their economic activity and disapproving interference, governmental or otherwise, with the working out by the railroads of their financial and material rehabilitation in their own way. President Barr commented that this resolution was offered to uphold the hand of President Coolidge. He said that business men favor leaving the railroads alone and added that 20 or more National associations and 39 State associations are working together to prevent, if possible, the enactment of legislation which will hamper the railroads. Another resolution commended the tax proposals of Secretary of the Treasury Mellon and stated the belief of the members of the association that the adoption of these proposals will release a great deal of capital now tied up in tax-free securities for the benefit of industry.

Election of officers and committeemen, which are printed in another column, completed the convention at noon on Thursday.

The Convention Dinner

The convention dinner Wednesday evening was up to the high standard of the association. After a number of entertainment features, including selections from grand opera and the Gloria Trumpeters, a symposium of opinions collected by Henry Harrison Lewis, editor of *Industrial Progress*, Washington, was shown by stereopticon.

The principal address of the convention was by J. Adam Bede, who held the close attention of his hearers for an hour. While the address was in large part of humorous character a serious purpose was evident throughout. The brilliant ex-Congressman made a comprehensive plea for a better and broader understanding of each other by different classes of the people in different sections of the country.

Plans of New Companies

The Electric Safety Razor Corporation of America, Inc., New York, has been organized with capital stock of $500,000 to manufacture safety razors. Preliminary plans are being worked out, but nothing has been definitely determined. It is likely that the company's plant will be located in the vicinity of New York. The incorporators are L. B. Haines, and A. N. and L. Cohen. Temporary address is in care of R. S. Isaacs, 51 Chambers Street.

The Brooklyn Gas & Electric Arc Lamps Co., 751 Flushing Avenue, Brooklyn, has been incorporated with capital stock of $20,000 to manufacture gas and electric lamps, but actual manufacturing will be a small factor, the company devoting its attention, for the present, principally to the distribution of these lines. The incorporators are H. J. Kendler and C. and I. Schwartz.

The Queens Engineering Automotive Corporation, 394-6 Steinway Avenue, Astoria, L. I., incorporated with capital stock of $25,000, will render general automotive service, including repair work, distribution of parts, etc. Incorporators are H. H. Eckay, J. W. Giaffone and C. J. Bush.

Gaskell & Son, Inc., 59 Freeman Street, Brooklyn, has been incorporated to manufacture iron bolts, washers, studs, etc., and taken over a business established in this line for some time. Incorporators are William and R. H. Gaskell.

The Sundh Machine Co., New York, has been organized with capital stock of $10,000 to manufacture machinery and tools. August Sundh, Hastings, N. Y., engineer and inventor, heads the company. The incorporators are A. and J. Smith, and D. C. Larson. Address in care of Mr. Horning, Kiddle & Margoson, 115 Broadway, New York.

Clark D. Pease, Inc., 507 West Fifty-sixth Street, New York, incorporated with capital stock of $25,000, will act as American representative for Joseph Lucas, Ltd., Birmingham, Eng., manufacturer of motor accessories. The new company will make, repair and distribute standard parts for the Rolls-Royce automobile. Mr. Pease is also representative for the Hispano-Suiza Co.

Summit Tractor Co., Akron, Ohio, recently organized to manufacture and deal in farm tractors, will operate an assembly plant and produce tractors under specifications. No further contracts will be awarded for about 90 days. R. M. Laird is general manager.

The Barker Factory, Norwalk, Conn., has been incorporated with $100,000, capital stock to manufacture gas engines, water engines and mechanical specialties. The company has purchased factory equipment and patent rights of a business established 23 years ago. Principal products are the Barker instantaneous gas water heater and a two-cycle gasoline marine and stationery engine. F. L. Tuttle, Jr., of 145 Nassau Street, New York, is president, and George T. Tuttle of Norwalk, Conn., is vice-president.

The Sprague-Sells Corporation, Hoopeston, Ill., has been incorporated with capital stock of $625,000 and will manufacture canning machinery, succeeding the Sprague Canning Machinery Co., Hoopeston. Operations will go forward along the same lines. Ogden S. Mills is president.

The Pacific Steam Motors Corporation, 1476 Pine Street, San Francisco, recently organized, will act as distributor for the Stanley Steam Car Co. Frank B. Duveneck is president.

The Perfectone Radio Corporation, 484 Broome Street, New York, recently organized with capital stock of $50,000, will manufacture radio speaking apparatus. All necessary raw materials have been secured for present needs and capacity output has been disposed of. P. E. Hand heads the company.

The Reading Automatic Machine Co., Third and Buttonwood Streets, Reading, Pa., has been incorporated with $50,000 capital stock to manufacture Reading automatic chucking machines, and it is likely that the work will be done by contract. The company is successor to the Vertomatic Mfg Co. and will also produce special sized tools and machinery. It is said that the company has developed a vertical chucking machine to perform five or six operations quickly and accurately. Louis J. LaRoche is one of the principals.

The Dunkirk Axe & Tool Co., Inc., was recently organized to manufacture axes, hatchets and other tools. It is the successor of the Romer Axe & Tool Co., Inc., which was previously formed from the Romer Axe Co. The principals in the new company have been in this line of manufacture for more than 40 years.

The General Metal Products Co., Inc., North West End and McKinley Avenues, Lancaster, Pa., has been organized for manufacturing brass, bronze and aluminum castings. A plant which is now under construction will have a capacity to handle several tons of metal per day. The company purposes to specialize in plate and pattern work, also in castings for the automobile industry, name plates, bronze tablets and other allied products. John C. McGovern is treasurer.

The Beisel Spring Wheel Corporation, 49 West Sixty-fourth Street, New York, recently organized to manufacture spring wheels for automotive use and for street and railroad cars, is now in a position to receive bids for manufacturing the various parts. All work will be done by contract. J. R. Beisel heads the company.

The Johnsonburg Machine Co., Johnsonburg, Pa., recently incorporated with $50,000 capital stock, will operate as machinist and founder in iron, bronze and lead castings, also in pattern making. The company has taken over the plant formerly owned by Burlingame. Robert R. Dempsey heads the company.

The Ness Brothers Mfg. Co., Broad and Philadelphia Streets, York, Pa., has been incorporated with $50,000 capital stock and will manufacture automobile and motor truck wheels, carriage and wagon wheels, farm wagon hubs, spokes, bent rims and felloes. This is the reorganization of a company which has supplied the carriage and wagon manufacturing trade for the past 30 years. In addition the company will deal in farm wagon axles, wagon springs, tire steel, etc. An extension is being made on the present plant.

The Liquidometer Co., 250 West Fifty-seventh Street, New York, recently incorporated with $35,000 capital stock, will manufacture gages. The company is still in the formative stage and is not in a position to make further announcement. M. C. Lachenbuch is secretary-treasurer.

The Benton Country Hardware Co., Muskogee, Okla.,

and Rogers, Del., has been organized with capital stock of $1,000,000 to manufacture hardware products, but for the time will act as wholesaler. Address is in care of the Corporation Service Co., Equitable Building, Wilmington, Del.

The American Heat Economy Bureau, Inc., 826-28 Wabash Building, Pittsburgh, has been incorporated with capital of $100,000, all paid, to take over an established business in the manufacture of the Steinbart pressure combustion system for blast furnace gas, also the Selas machine for coke oven gas and the new Huessner regenerative furnace control. K. Huessner is president.

The Champion Anti-Rattler Co., 366 South Main Street, Memphis, Tenn., has been incorporated under Delaware laws with capital stock of $50,000 to manufacture automotive equipment. Its operations are conducted in a plant at Chicago, where a branch office is maintained at 4443 Armitage Avenue. O. W. Lynch is one of the heads.

The Motor Maintenance Co., 42-48 South Twelfth Street, Minneapolis, has been incorporated with capital stock of $50,000 as a step in the reorganization of the Motor Maintenance Co. of South Dakota, making two branches, one the operating company, the other the holding company. Business will be continued as automotive engineer, Denby truck distributor and auto truck contractor. L. G. Wilcox heads the company.

The Northwestern Radio & Instrument Co., 213 West High Street, Lima, Ohio, incorporated with capital stock of $25,000, will manufacture radio accessories and will assemble equipment for small scale production. The company considers the installation of equipment in a sizable factory next summer. W. E. Hauenstein, formerly manager radio department of the Maus Piano Co., Lima, is secretary. M. B. West is president.

The Rainey Brothers Tool Co., Grove City, Pa., has been incorporated with $50,000 capital stock to manufacture tools, now having a plant in steady production on star drills, pneumatic chipping and drilling tools, mechanics' hand tools and special tools. W. E. Rainey is president; W. J. Rainey vice-president, and D. L. Rainey secretary-treasurer.

Trade Changes

Maydwell & Hartzell, Inc., recently incorporated to acquire the business of the Maydwell Co., San Francisco, have established themselves in a new building at 158-68 Eleventh Street, that city. C. A. Maydwell, one of the members, was formerly president of the Maydwell Co., representing hardware manufacturers for 30 years. The new company will represent manufacturers of hardware, electrical and automotive products.

Edgar I. Mills, exporter and importer of iron, steel and non-ferrous metals, with German export connections, has removed from 44 Beaver Street, to 280 Broadway, New York.

The Gagnier Stereotype Foundry, Detroit, has moved from 525 Howard Street to its new plant at 2423 McKinstry Avenue.

The Dixie Machinery Mfg. Co., St. Louis, manufacturer of grinding and crushing machinery for use on limestone, shale, asphalt rock, iron ore and coal, has appointed the Vrabeck-Kessler Co., 149 Broadway, New York, eastern district representative.

R. W. Romig, who has been in the scale business for many years as agent of the Howe Scale Co., Rutland, Vt., has established a business with offices at 1121 Bessemer Building, Pittsburgh. He will represent the Strait Scale Co., Kansas City, Kans., having charge of sales in the eastern division, excluding New York. Mr. Romig introduced the flexible or hinged girders for railroad track scales.

Jay C. Lathrop, Cincinnati district representative of the Conveyors Corporation of America, 326 West Madison Street, Chicago, has moved his office to 503 Neave Building, Cincinnati.

The V & O Press Co., Hudson, N. Y., manufacturer of presses, dies and sheet metal working machinery, announces the appointment of the Marshall & Huschart Machinery Co., 17 South Jefferson Street, Chicago, as exclusive agent for V & O products in the Chicago territory. L. F. Carlton, formerly selling agent for the V & O Press Co. continues as factory representative and will cooperate with the Marshall & Huschart company and other western agencies.

The Pattern & Engineering Co., 223 Royal Avenue, Williamsport, Pa., has moved into larger quarters, doubling present capacity. The new address is 129 West Willow Street.

Jacob Lanski, dealer in iron and steel scrap, has taken new offices at 966-68 Continental & Commercial Bank Building, Chicago.

The E. Keeler Co., Williamsport, Pa., announces the appointment of C. C. Loder as sales manager in the Pittsburgh territory, with headquarters in Room 609 Chamber of Commerce Building, Pittsburgh.

The Pawling & Harnischfeger Co, Milwaukee, manufacturer of excavators, cranes and machine tools, has appointed R. P. McCormick as eastern sales manager with headquarters at 50 Church Street, New York, and 605 Stephen Girard Building, Philadelphia.

The Marshall & Huschart Machinery Co., 17 South Jefferson Street, Chicago, has obtained the exclusive agency in Chicago, Milwaukee and western Michigan territories for the entire line of the V & O Press Co., Dry Harbor, Glendale Station, Long Island, N. Y.

Allen P. Stillman, Inc., the Metal Specialty Co. and the Universal Book Hanger Co. have formed a consolidation to be known as the Mechanical Metal Stamping Co., Inc., 805 Lexington Avenue, Brooklyn. Considerable new equipment has been installed, enabling the company to handle larger quantities and heavier material. Facilities have also been added to the tool and die department for manufacturing special machinery. Albert A. Allinger, president, is endeavoring now to establish a metal sign department for advertising displays.

The B. F. Sturtevant Co., Hyde Park, Boston, announces that, effective Nov. 19, its Philadelphia division is located at Thorne and Copewood Streets, Camden, N. J., in a modern, daylight building recently completed. In this new location the company will maintain a shop for manufacturing all kinds of sheet metal work required for the complete installation of fan systems, including heating, ventilating, drying, exhaust and conveying work. Guards for machines, pulleys and gears will also be manufactured. A stock of standard equipment such as electric propeller, monogram and planing mill fans, steel pressure blowers, turbo undergrate blowers, blast gates, etc., will be carried.

The Sawhill Moreland Co., Inc., iron and steel products, has moved from 2539 Oliver Building, Pittsburgh, to room 418 of the same building.

The Cleveland Duplex Machinery Co., Inc., Cleveland, will move to larger quarters in the Penton Building, West Third Street and Lakeside Avenue, that city, effective Dec. 1.

E. F. Pier, sales manager Mahr Mfg. Co., who is located at 527 Commercial Trust Building, Philadelphia, has had his territory extended to include Pennsylvania, with the exception of the northeastern portion, Maryland, Delaware and the southern part of New Jersey.

The Kirk-Latty Mfg. Co., Cleveland, announces the sale of its children's vehicle department to the Topliff-Ely Co., Washington, Pa. The disposal will enable the former company to increase materially its facilities for manufacturing and distributing its line of bolts, nuts, rivets, etc.

The Mercury Mfg. Co. announces the appointment of Edmund Herbert Jahnz as representative handling its tractors and trailers in Philadelphia and adjacent territory. Mr. Jahnz's office is at 2009 Marked Street.

The J. P. Devine Co., Buffalo, has concluded arrangements with Vickers-Petters, Ltd., Ipswich, England., for exclusive manufacture and sale of Vickers-Petter semi-diesel oil engines in the United States. Elaborate preparations are now under way for immediate production.

John Coltman, 208 South La Salle Street, Chicago, has added to his lines the American Forge & Machine Co., Canton, Ohio, which he will represent in Indiana, Illinois, Wisconsin, Iowa and Minnesota. He represents the Fitzsimons Co., Youngstown, Ohio, Cuyahoga Spring Co., Cleveland, and the Stulz-Sickles Co., Newark, N. J., on high-speed tool steel.

The Kinney-Rome Co., Chicago, manufacturer of metal beds and springs, will open a Detroit branch at 315 Woodbridge Street West, having taken a lease on 35,000 sq. ft. of manufacturing space in that building.

The Western Iron Stores Co. Milwaukee, has been appointed Wisconsin representative for the sale of all products manufactured by the R. K. LeBlond Machine Tool Co., Cincinnati, effective Jan. 1.

George W. Borg, owner of the Borg & Beck Co., Chicago, manufacturer of clutches, has purchased outright the assets and business of the Automotive Parts Co., Detroit, the transaction including Detroit headquarters and branches at Toledo, Ohio, and Grand Rapids, Mich.

The Betz-Pierce Co., Cleveland, has been appointed district sales agent for the Page Steel & Wire Co. for thirty counties in Ohio.

Business of Arcos, Ltd., book department, has been taken over by Kniga, Ltd., 68 Lincoln's Inn Fields, London, W. C. 2, which will take over the sole agency for all Russian universities, scientific and technical institutions, libraries, commercial organizations, etc., for purchasing books and periodicals in Great Britain, United States, Canada, Holland, Scandinavia, and for the sale of Russian books and periodicals.

Machinery Markets and News of the Works

MACHINE TOOL BUYING LAGS

Inquiries, However, Are More Numerous and Trade Is Encouraged

New York Central Adds to Its Recent List and Is Expected to Be Large Buyer Before End of Year

The New York Central Railroad has sent out an additional list of machine tools, which, added to its list of a few weeks ago, places it in the market for 35 to 40 machines. The new list is for its Western lines whereas the former list was for lines East. Other inquiries are expected from this road for 10 or a dozen other tools.

While general buying of machine tools shows no improvement, the number of inquiries is increasing and the trade is encouraged to believe that this is an indication of fairly good buying after the first of the year.

The more important purchasers of the past week were the New Departure Mfg. Co., Bristol, Conn., which bought complete forge shop equipment; the Firestone Tire & Rubber Co., Akron, Ohio, which bought six or eight machines, with others yet to be decided upon; the Pittsburgh Plate Glass Co., Pittsburgh, which took a planing machine, radial drill, and an 18-in. lathe for its Zanesville, Ohio, works; the General Motors Corporation, which purchased a number of tools for its various plants.

The Missouri Pacific Railroad purchased a 400-ton wheel press and a 48-in. car wheel borer; the Brown Car Wheel Works, Buffalo, N. Y., bought an axle lathe and a 300-ton wheel press and the Bethlehem Steel Co. bought two 44-in. boring mills. The Pullman Co., Pullman, Ill., contemplates buying an axle lathe, a car wheel borer and other railroad shop equipment. The Burlington road has distributed orders for a number of boring mills, which completes the purchases against its recent large list.

New York

NEW YORK, Nov. 27.

CONDITIONS in the machine-tool market are spotty. Salesmen find that some manufacturing plants are running on reduced schedules, while others are still very busy. Among all, however, there is a hesitancy in making commitments except under extreme necessity; hence tool sales are almost entirely for replacements and orders of more than one or two machines are unusual. The New Departure Mfg. Co., Bristol, Conn., a subsidiary of the General Motors Corporation, has purchased a fair-sized lot of forge shop equipment, principally hammers, but there has been no other buying in the New York territory of an outstanding character.

No action has been taken on the list of the New York Central, and the inquiries of the Baltimore & Ohio and Central Railroad of Georgia for several tools each are still pending. The latter road specified that prices were wanted for estimating purposes only, so if purchases are made they will probably come out of 1924 appropriations. The Missouri Pacific Railroad has bought a 400-ton wheel press and a 48-in. car wheel borer from an Eastern company. The Bethlehem Steel Corporation has bought two 44-in. boring mills and the Brown Car Wheel Works, Buffalo, N. Y., has bought an axle lathe and a 300-ton wheel press.

Bids will be received by the Bureau of Canals, State Department of Public Works, Albany, N. Y., until Dec. 18, for the construction of a power house at Lock 29, State Barge Canal, Palmyra, N. Y., as per plans on file. R. K. Fuller is commissioner of canals and waterways.

The Dayton Pump & Mfg. Co., Dayton, Ohio, has leased a portion of the building at 226 East Forty-second Street, New York, for an Eastern factory branch and distributing headquarters.

Bids will be asked at once by the Navy Purchasing Officer, South and Whitehall Streets, New York, for one electric-driven centrifugal pump, Y. & D. requisition 40; also for 72 high speed twist drills, Ord. Req. 60 and for 600 boiler tubes, Y. & D. req. 39.

J. I. Walsh, 3 West Eleventh Street, New York, has awarded contract to the H. Greenstein Contracting Co., 450 Sixth Avenue, for a two-story automobile service and repair building, 75 x 120 ft., at 325-30 West Street, to cost $80,000 including equipment.

Manual training equipment will be installed in the new three-story high school to be erected at North Plainfield, N. J., estimated to cost $225,000, for which bids will soon be asked on a general contract. J. T. Simpson, 31 Clinton Street, Newark, is architect.

J. F. Ballard, 111 Nineteenth Street, Watervliet, N. Y., plans the installation of a lathe and drill press for automobile repair and parts work.

The J. A. Manning Paper Co., Inc., 68 George Street, Troy, N. Y., affiliated with the Manning Abrasive Co., will commence the erection by day labor of a new two-story mill, 75 x 175 ft., at Green Island, Troy, to cost about $250,000 including equipment.

The Cia. Estrades de Ferro e Minas S. Jeronymo, Rio Grande do Sul, Brazil, has preliminary plans for a new power house at its coal mining properties, with initial capacity of 20,000 kw.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 18, for 5 electric grinders and 3 electric drills, for the South Brooklyn Navy Yard; also on the same contract for 10 electric grinders for the Mare Island Navy Yard and 8 electric drills for the Hampton Roads Navy Yard, schedule 1608; and for the South Brooklyn yard, until Dec. 18, for 5500 sq. ft. expanded metal lath, schedule 1601.

The Carana Mfg. Co., Amsterdam, N. Y., is contemplating the establishment of a plant to manufacture automobile equipment and accessories. H. Hanna is one of the heads of the company.

The Salem Power & Light Co., Salem, N. Y., is planning the installation of a generator and auxiliary equipment for hydroelectric power plant at East Greenwich, N. Y. J. P. O'Brien is president.

The Board of Railway Commissioners, Sydney, Australia, will place orders for steam turbo-generators, boilers and auxiliary power equipment for a number of new electric generating stations to be erected in connection with the electrification of the Sydney-Waterfall section of the suburban railroad system. Later the Bankstown division will be electrified.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding the construction of a proposed tin can and container manufacturing plant by an established oil refining company in Australia. Reference No. 107444.

D. MacMillan & Son, 1371 Atlantic Avenue, Brooklyn,

manufacturers of pneumatic carrier systems, are planning the installation of a splitting machine.

The Bronx-Chevrolet Sales Co., Inc., 361 East Fordham Road, New York, has leased a new building, 110 x 149 ft., to be erected on Tremont Avenue, at a cost of $250,000, for a new service and repair plant for the Chevrolet automobile. J. M. Felson, 1133 Broadway, is architect.

The Boyce-Veeder Corporation, 68 Hunters Point Avenue, Long Island City, manufacturer of fire extinguishers, etc., has acquired the plant at Farmingdale, L. I., heretofore held by the Gutta Percha & Rubber Mfg. Co., consisting of a main building, 100 x 250 ft., on 3½-acres and will remodel it for a new plant. A building at Long Island City recently acquired by the same company, will be used for distributing and warehouse service as soon as the new plant is ready.

The Stromberg Carburetor Co. of America, Inc., 37 Wall Street, New York, is perfecting plans for the establishment of a branch plant in Europe for the manufacture of carburetors and other motor devices. W. E. O'Neil, vice-president, is now abroad arranging for the works.

The Scala Packing Co., 713 Bleecker Street, Utica, N. Y., operating a meatpacking plant, is planning for the installation of a refrigerating plant in connection with a new factory.

The Van Ness Paper Box Co., 104 Gray Street, Paterson, N. J., is taking bids on a general contract for a one-story addition, 40 x 140 ft., to cost about $25,000, with electrical and other machinery. J. C. Van Vlandern, 140 Market Street, is architect.

The Weiner Body Co., Hoffman Place, Hillside, Newark, manufacturer of automobile bodies, has awarded contract to Cooper & Green, Newark, for a one-story addition.

An automobile manufacturing company, represented by Harry Teitleman, Grenloch, N. J., attorney, whose name is temporarily witheld, has acquired the plant of Bateman & Companies, Inc., at a public sale, consisting of 35 buildings on a 27-acre tract. The purchaser will remodel the structures for the manufacture of automobile bodies and other equipment, to give employment to about 500.

The Borough Council, Riverton, N. J., will install electric pumping machinery in connection with a proposed waterworks plant estimated to cost $60,000. Sherman & Sleeper, Camden, N. J., are engineers.

Bids will be received by the Passaic Valley Sewerage Commissioners, Chamber of Commerce Building, 24 Branford Place, Newark, until Dec. 4 for equipment for the Yantacaw pumping station, Clifton, N. J., including 3 motor-driven centrifugal pumps, each with capacity of 6,500,000 gal. per day; one gasoline-driven electric generating set, sufficient to drive either of the three pumping units; switchboard, automatic control and auxiliary equipment. Joseph H. Quigg is clerk.

E. I. du Pont de Nemours & Co., 256 Vanderpool Street, Newark, with headquarters at Wilmington, Del., have plans for a two-story shop, 40 x 80 ft.

Property of the Arrow Motor & Machine Co., 727 Frelinghuysen Avenue, Newark, consisting of buildings and machinery, will be offered at a public sale Dec. 4, by Alfred A. Stein, receiver.

The Public Service Electric Power Co., Public Service Terminal, Newark, has awarded contracts to the Buffalo Forge Co., Buffalo, and the B. F. Sturtevant Co., Hyde Park, Boston, each for 15 mechanical draft fans, forced and induced types, for its new electrical generating plant at Kearny, N. J.; also, to the Westinghouse Electric & Mfg. Co., East Pittsburgh, for central station equipment to cost about $400,000, a portion to be used at the Marion Station, Jersey City, N. J. The Public Service Co., an affiliated organization, has acquired property at Oakwood Avenue and Prince Street, Orange, N. J., 200 x 200 ft., and plans to build a power house later.

The Federal Engineering Co., 744-50 South Twelfth Street, Newark, has been organized to manufacture mechanical specialties, specializing for the present in oil and gasoline gages and piston rings. It is in the market for materials. Some of the parts are made by contract. James G. Hodge is sales manager.

The Newark Tube Co., 560 Ferry Street, Newark, recently incorporated, has acquired the business formerly conducted by the Newark Tube & Metal Works, putting $75,000 additional into the enterprise. No building is planned but the company will be in the market for materials required in making tubing. W. B. Franklin is president.

Manual training equipment will be installed in the new high and grade school to be erected on Main Street, Madison, N. J., estimated to cost $300,000, for which foundations will be laid at once.

New England

BOSTON, Nov. 27.

COMPARATIVE quiet prevails in the machine tool market. Aside from tentative plans for the addition of tools in 1924 by a few of the leading industries, dealers and machinery representatives have little to work on except small prospects. The Saco-Lowell Shops, Boston, textile machinery continue to make purchases in a small way. A textile goods manufacturer has bought a used plain No. 3 Le Blond milling machine, a new 32-in. band saw, a new 16-in. buzz planer and a used No. 4 Acme turret as well as a new 24-in. x 16 ft. lathe for a North Carolina subsidiary. A Danvers, Mass., manufacturer has purchased a used Brown & Sharpe Mfg. Co. No. 2 surface grinding and No. 1½ plain milling equipment; a Lynn plant a new 13-in. x 6 ft. South Bend lathe, a new high speed 14-in. drill and a used universal grinding machine; a maker of cans, 20-in. and 14-in. drill, small shaper and small lathe requirements; and a Portland, Me., concern multiple press equipment.

That a demand for used tools exists, notwithstanding quietness experienced by dealers, is attested by the large number of manufacturers attending auction sales recently held in this section and the prices paid for machinery.

Fire recently destroyed the mill unit of the Manchester Marble Co., East Dorset, Vt. It will be rebuilt and compressor equipment is required.

A one and two-story plant 200 x 600 ft. to cost approximately $200,000, is contemplated by the Merrimac Clay Products Co., 53 State Street, Boston, at Atkinson, N. H. Conveying equipment will be required.

E. A. Gillette & Sons, 286 Rutherford Avenue, Charlestown, Boston, carriage stock, have awarded contract for a one-story, 114 x 164 ft. plant on Tremont Street, Everett, Mass.

The Thomas Plow Co., Brunswick, Me., tractor plows, will double the capacity of its plant which now consists of a wood-working unit and a machine and iron working shop.

Refrigerating machinery is required by the city of Boston for a new plant to be erected on River Street, Mattapan.

Track hopper, elevator conveyor and other equipment is required for an addition to a coal plant at 262 Winter Street, Haverhill, Mass., for the Haverhill Coal Supply Co., Washington Square. George P. Carver, 261 Franklin Street, Boston, is engineer.

The Arctic Ice Machine Corporation, Canton, Ohio, is the architect for a one-story, 75 x 115 ft. ice making plant to be erected by the Waterbury Ice Corporation, 74 Watertown Avenue, Waterbury, Conn.

Work has started on a one-story, 50 x 100 ft. plant for the Lowell Needle Co., Putnam, Conn., phonograph needles, etc. Charles E. Dean, Putnam Hardware & Mill Supply Corporation is head of the new company.

The American Bosch Magneto Corporation, Springfield, Mass. has purchased the Star Rebound Controller Co., Cleveland, and will manufacture controllers at its Springfield plant.

Plans are being considered by the New England Motor Corporation, Newport, R. I., Edmund Baccan, head, for a one-story plant at Portsmouth, R. I., to manufacture automobile equipment, estimated to cost $35,000. Ground will be broken early in the spring.

The C. O. Deveau Machine Tool Co., Inc., Boston, recently organized, will take over and expand the plant and business of the company of the same name, with headquarters at 9 Sherman Street. Thomas E. P. Wilson is president, and Charles O. Deveau, treasurer.

The Center Garage Co., 101 Second Street, Fall River, Mass., will install a machine shop in its new two-story service building, 100 x 200 ft., estimated to cost $100,000.

The Remington Typewriter Co., 374 Broadway, New York, is completing negotiations for the purchase of a portion of the former plant of the Yost Typewriter Co., Bridgeport, Conn., now held by the Columbia Graphophone Co., for $200,000.

The Safety Car Heating & Lighting Co., Dixwell Avenue, Hamden, Conn., has awarded contract to the Sperry Engineering Co., New Haven, Conn., for a two-story addition.

The Cities Service Refining Co., Weymouth, Mass., operating a local oil refinery, a subsidiary of the Cities Service Co., 60 Wall Street, New York, is disposing of a

The Crane Market

WHILE the volume of inquiry for overhead traveling cranes continues fairly heavy, the number of orders during the past week in the New York district has been small. The locomotive crane market is extremely quiet both in the number of orders and new inquiries.

In the Pittsburgh district, a large number of crane inquiries is being figured on, but actual orders are few. The Republic Iron & Steel Co., Youngstown, last week placed the steel for an extension to its open-hearth department, to house a mixer. This is regarded as indicating an inquiry for a ladle crane to serve the mixer. The projected bar mill for the Southside works, Jones & Laughlin Steel Corporation, Pittsburgh, which involves a number of cranes, is believed to be a future development, as the company engineers are now viewing other installations to determine the type of mill desired.

Among recent purchases are:

Pittsburgh Screw & Bolt Co., Pittsburgh, 10-ton, 50-ft. 7-in. span, 3-motor, overhead crane from the Alliance Machine Co. and a 5-ton, 26-ft. span crane from the Cleveland Crane & Engineering Co.

Koppers Co., Pittsburgh, a 10-ton, 44-ft. 4-in. span hand power crane for Warren, Ohio, from the Shaw Electric Crane Co.

Dells Paper & Pulp Co., Eau Claire, Wis., a 20-ton, 1-motor, overhead traveling crane from the Whiting Corporation.

Cleveland, Cincinnati, Chicago & St. Louis Railroad, Cincinnati, a 120-ton, double trolley electric traveling crane from the Whiting Corporation.

West Virginia Pulp & Paper Co., 200 Fifth Avenue, New York, a 1½-ton, 21-ft. span, 2-motor, overhead traveling crane from the Reading Chain & Block Corporation, through Arthur Appleton, 29 Broadway, New York.

Kennebeck Water Co., Waterville, Me., a 5-ton, 30-ft. span, hand power crane from the Whiting Corporation.

Buick Motor Co., Flint, Mich., a 22½-ton bucket handling locomotive crane from the Industrial Works.

Wabash Railway Co., St. Louis, Mo., a 22½-ton. magnet and bucket operating locomotive crane from the Industrial Works.

The Wheeler Condenser & Engineering Co., Cartaret, N. J., is in the market for a 10-ton, 70 to 75-ft. span, used overhead traveling crane. F. L. Heughes & Co., Lyell Avenue, Rochester, N. Y., are inquiring for a 10 to 15-ton used overhead traveling crane of at least 50-ft. span.

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bond issue of $2,500,000, a portion of the proceeds to be used for extensions. Henry L. Doherty is president.

The J. E. Snyder & Son Co., Worcester, Mass., recently organized with a capital of $150,000, will take over the plant and business heretofore conducted under the name of J. E. Snyder & Son, specializing in the manufacture of surface grinders and other tools. L. M. Snyder is president of the new company, and Milton C. Snyder, treasurer.

The New Departure Mfg. Co., Bristol, Conn., manufacturer of ball bearings, etc., has awarded a general contract to the Torrington Building Co., Torrington, Conn., for a one-story addition, 125 x 600 ft., to its forge shop, doubling the capacity of this department. Lockwood, Greene & Co., 24 Federal Street, Boston, are architects and engineers.

The Shiner Products Co., Providence, R. I., recently formed, will operate a plant at 294 Eddy Street, for the manufacture of plated metal novelties and jewelry. John S. Mullen and Joseph M. Burke head the company.

The Boston & Maine Railroad Co., Worcester, Mass., will build a one-story power house on Millbrook Street, to cost $60,000.

The Warner Hammer Co., Cromwell, Conn., has awarded a general contract to Thomas Sellew, Cromwell, for the erection of a one-story forge shop.

The Belamose Corporation, 983 Main Street, Hartford, Conn., will commence the construction of a power house at its new silk mill at Rockey Hill, Conn., estimated to cost $400,000. McClintock & Craig, 33 Lyman Street, Springfield, Mass., are engineers.

The Lawrence Plywood Co., E. B. Varney, Fall River, Mass., president, recently organized under Maine laws, has plans for the erection of new mill in the vicinity of Carrabassett, Me., to manufacture plywood packing cases, to include a power house and machine shop, estimated to cost $150,000 with machinery.

Manual training equipment will be installed in the new high school to be erected by the Board of Education, Stratford, Conn. Bids will be asked about next June.

The Tilley Radio Corporation, 1163-71 Westminster Street, Providence, R. I., organized to manufacture and distribute radio products, is interested in hearing from companies equipped for such manufacture. H. A. Grimwood heads the company.

Philadelphia

PHILADELPHIA, Nov. 26.

THE Pennsylvania Equipment Co., Norwood Station, Pa., is in the market for two second-hand flat-bottom steel gondola cars and one second-hand outfit for operation of a 45-in. magnet on a locomotive crane. The latter should be about 7½ kw.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 11 for 18 forced draft blowers, fuel oil burners and spare parts for the Philadelphia Navy Yard, schedule 1612; until Dec. 18 for 25,000 ft. of aircraft cable, schedule 1628.

The Electric Development & Machine Co., 221 North Twenty-third Street, Philadelphia, has plans for a new factory at Holmesburg, Philadelphia, for which foundations will soon be laid.

The Remington-Burnelli Aircraft Corporation, 25 West Forty-fifth Street, New York, will defer until about April the erection of the first unit of its proposed plant on Magazine Lane, Philadelphia, for which site recently was purchased.

The Philadelphia Rust-Proof Co., Philadelphia, recently organized, will operate a process plant for sand-blasting and pickling of metal products for rust prevention, at Howard and Montgomery Avenues. L. F. Hirsch and M. G. Herbach head the company.

The Woodworker Shop, 1828 East Wishart Street, Philadelphia, is planning the installation of a bandsaw, molder, cutters and other equipment at its cabinet works.

Harry E. Miller, 5511 Market Street, Philadelphia, has plans for a one-story machine shop to cost about $12,000. John Howard Taylor, 4920 Warrington Street, is architect.

John J. Griffin & Co., 1513-23 Race Street, Philadelphia, manufacturers of recording meters and parts, have plans for an addition for general manufacturing and will soon commence foundations. Amos W. Barnes, 22 South Seventeenth Street, is architect.

The Board of Education, Atlantic City, N. J., has received an appropriation of $150,000 for the erection of a new wing at the city vocational school, for which plans will soon be prepared.

The Certain-Teed Products Co., East State Street, Trenton, will commence rebuilding the portion of the mechanical drying department of its plant, recently destroyed by fire with loss estimated at $75,000. Additional equipment will be installed.

The Landis Tool Co., Waynesboro, Pa., manufacturer of grinding machines, etc., plans to immediately rebuild its foundry at Greencastle, Pa., destroyed by fire Nov. 21 with loss estimated at $165,000 including machinery.

The Penn Central Light & Power Co., Altoona, Pa., is disposing of a bond issue of $10,300,000, a portion of the proceeds to be used for extensions and improvements in plants and system.

M. J. Powers, Broad and Cumberland Streets, Philadelphia, has awarded a general contract to the F. V. Warren Co., 132 South Seventeenth Street, for the erection of an automobile service and supply building at 3221-25 North Broad Street, to cost about $175,000 including equipment.

The United States Asbestos Co., Manheim, Pa., has acquired the plant and business of the Wait-Wild Asbestos Co., Framingham, Mass. The purchasing company will expand its Manheim works and remove the machinery from Framingham to this location.

Fire, Nov. 21, destroyed the plant of the Thomas Jackson & Son Co., Reading, Pa., manufacturer of oil well cable, etc., including power house and other buildings, with loss reported at $500,000 including machinery. It is planned to rebuild.

R. Lloyd, Durkas Building, Edwardsville, near Kingston, Pa., operating an electric battery and machine repair works, is planning for the installation of additional equipment, including a drill press, bench tools, etc.

The Forged Steel Products Co., Newport, Pa., manufacturer of pliers, etc., is arranging a fund of $70,000 for extensions and the installation of additional machinery.

The Pennsylvania Water & Power Co., Holtwood, Pa., is planning the construction of an addition to its hydroelectric generating plant at McCall's Ferry, Pa., to be equipped for a capacity of 40,000 kw. Additional transmission lines will also be erected.

Walter T. Matthew, Paoli, Pa., has plans for the erection of two-story automobile service and repair building, 90 x 120 ft., to cost about $60,000 including equipment. Philip S. Tyre, 1509 Arch Street, Philadelphia, is architect.

Joseph Stengel, West Coplay, Pa., will install a machine repair and parts department on the second floor of his two-story automobile service works, 50 x 100 ft., now in course of erection.

The Pennsylvania Brake Beam Co., Danville, Pa., is inquiring for a No. 1 Kane & Roach second-hand straightening machine.

The General Gas & Electric Corporation, 50 Pine Street, New York, operating the New Jersey Power & Light Co., Dover, the Pennsylvania Edison Co., Easton, Pa., and other properties in this section, has commenced the construction of a new generating plant at Holland, Pa., with an ultimate output of about 75,000 kw. The station will be operated in conjunction with a plant of approximately like capacity in course of erection at Middletown, Pa., to be under the direction of the Metropolitan Edison Co., Reading, Pa., another subsidiary. A super-power transmission system will be built from Gettysburg, Pa., to Dover, N. J.

Chicago

CHICAGO, Nov. 26.

MACHINE tool buying still lags, although inquiries continue. Consumers are showing unusual interest in sheet metal machinery and there is also a considerable demand for disk grinders. With the purchase of boring mills, the Burlington has finally completed the distribution of orders against its list. No other railroad buying is reported. The Chicago, Indianapolis & Louisville has put out an inquiry for a motor-driven 18-in. x 10-ft. tool room lathe. A car wheel borer and an axle lathe are among the various items that the Pullman Co. contemplates buying. Early action on its requirements, however, is not expected. Contrary to the report a week ago, the Illinois Steel Co. did not purchase special equipment for its steel car wheel plant at Gary.

The Whiting Corporation, Harvey, Ill., has taken an order for a 24 x 48-in. tumbling barrel for the Damascus Crucible Steel Co., New Brighton, Pa.

The Prime Mfg. Co., Milwaukee, Wis., has retained Frank D. Chase, Inc., Chicago, to design a brass foundry 60 x 120 ft., for construction in that city.

The Independent Equipment Corporation, 332 South Michigan Avenue, Chicago, has purchased from the Goodwin Car & Mfg. Co. the large manufacturing plant in the Clearing Industrial District at Sixty-seventh Street and Cicero Avenue. The property consists of 25 acres improved with four large buildings. After extensions and alterations, the works will be used for the repair of railroad freight cars.

The Union Asbestos & Rubber Co., 169 Quincy Street, Chicago, has purchased property on Fifty-fourth Avenue, in the Grant Land Association industrial district in Cicero, and will erect a one-story factory containing 25,000 ft. of floor space at a cost of $75,000 to $100,000.

The Egan Ice Co., 5929 East Ravenswood Avenue, Chicago, is taking bids through A. M. Ruttenberg, 54 West Randolph Street, for a one and two-story ice manufacturing plant, 138 x 163 ft., to cost $30,000.

The Asbestos Products Co., 2100 Fullerton Avenue, Chicago, is taking bids through Frank D. Chase, Inc., 645 North Michigan Avenue, on a two-story factory and warehouse, 50 x 130 ft., to cost $75,000.

The Duro Metal Products Co., 2649 North Kildare Avenue, Chicago, has awarded a contract for a one-story building, 125 x 222 ft., to cost $50,000.

The United Light & Railways Co., Davenport, Iowa, has purchased 91 acres on the Iowa side of the Mississippi River, a mile north of the plant of the Western States Portland Cement Co., and will immediately erect a power plant for the Peoples Power Co., a subsidiary. The initial unit will cost approximately $2,500,000, and the ultimate expenditure will reach $10,000,000 or $12,000,000.

The Universal Gypsum Co., Fort Dodge, Iowa, has authorized the immediate construction of a new plant on site at Rotan, Tex., to consist of a main unit with smaller buildings and power house. It is estimated to cost $250,000, with machinery. G. E. Williams is vice-president; C. T. Murphy is construction engineer in charge.

The Minnesota Power & Light Co., Duluth, Minn., formerly known as the Duluth Edison Electric Co., is disposing of a bond issue of $8,300,000, a portion of the proceeds to be used for extensions and additional equipment. C. E. Groesbeck is president.

The Eagle Iron Works, 301 East Court Street, Des Moines, Iowa, has awarded a general contract to Arthur H. Neumann & Co., Hubbell Building, for a two-story addition, 61 x 64 ft., estimated to cost $75,000. Wilfred D. Holtzman, Jr., Flynn Building, is architect.

The Free Sewing Machine Co., Rockford, Ill., is planning the installation of equipment in its addition, now in course of erection, to include a traveling crane, electric furnace and other large equipment.

The Leader Oil Co., Third Street Extension, Dubuque, Iowa, has tentative plans for an oil storage and distributing plant, three stories, 30 x 100 ft., estimated to cost $50,000 including equipment.

The Nebraska Gas & Electric Co., Norfolk, Neb., is planning the construction of a new power house at York, Neb.

The Sioux City Gas & Electric Co., Sioux City, Iowa, is planning the construction of a new generating plant, and improvements in present station, estimated to cost $3,000,000, with machinery.

The Lennox Furnace Co., Marshalltown, Iowa, has awarded a general contract to Otto Schwem, Marshalltown, for a two-story and basement addition, 72 x 145 ft., to cost $20,000, exclusive of equipment.

The Northern States Power Co., Minneapolis, Minn., is disposing of a note issue of $10,000,000, a portion of the proceeds to be used for additions in generating and system. J. J. O'Brien is vice-president.

The Brown Sebco Terminal Mfg. Co., 5616 Harper Avenue, Chicago, recently organized to manufacture terminals, is now manufacturing by contract and will be in the market soon for more terminals. J. D. Cameron is one of the principals.

Pittsburgh

PITTSBURGH, Nov. 26.

MACHINE tool business in this district has fallen off somewhat the past week, a condition which is partly ascribed to the time of year. Dealers and agents are inclined to believe that buyers are now holding orders back until after the new year so that year end financial statements may make a good showing. Sales of single tools, particularly from dealers' stocks which can be shipped out promptly, still are fairly numerous. It is believed that with its recent purchases the Westinghouse Electric & Mfg. Co. exhausted the appropriation for machine tools for the present quarter. The Pennsylvania Railroad is yet to close for the tools for its car repair shops at Mingo Junction, Ohio. These probably will go over to the new year, as that road is reported to have recently ordered a reduction in equipment and supply purchases for the remainder of the year. The National Tube Co. has not yet closed on some tools for its Christy Park Works, McKeesport, Pa.

A preferred stock issue of $4,000,000 is being sold by the West Penn Co., West Penn Building, Pittsburgh, the proceeds to be used for extensions in plants and system. A. M. Lynn is president.

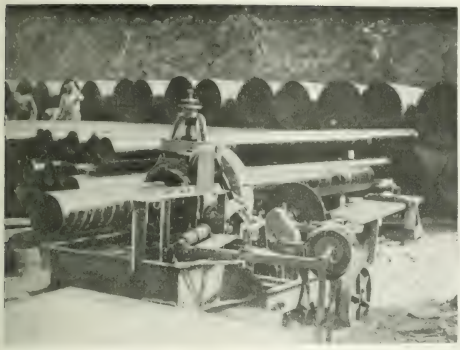
The Goodyear-Zeppelin Corporation, Akron, Ohio, recently organized by officials of the Goodyear Tire & Rubber Co., to establish a plant for the manufacture of Zeppelin aircraft, has awarded contract to the Aluminum Co. of America, Pittsburgh, for angles, channels, lattice parts, etc., for manufacture, to be assembled at the Akron works. The Aluminum company will give over a portion of its plant at New Kensington, Pa., to the new production.

H. P. Westcott, Pittsburgh Avenue, Erie, Pa., will commence the erection of a one-story machine shop, 65 x 100 ft., to cost about $40,000, including equipment.

The Preston County Light & Power Co., Morgantown, W. Va., is planning the construction of a new power plant estimated to cost $100,000, including equipment. H. C. Greer heads the company.

Alexander M. Robinson, P. O. Box 935, Welch, W. Va., machinery dealer, has inquiries out for a 300 hp. engine, gasoline-operated, Sterling, 8-cylinder type.

The Matoaka Water & Improvement Co., Matoaka, W. Va., plans for the installation of electric pumping machinery in connection with a new waterworks plant.



A PIPE covering machine was recently used in applying pipe covering made by the Paraffine Companies, Inc., San Francisco, on a 6-in. gas service main laid from San Rafael to Sausalito. This covering is to protect the steel pipe from rusting in the marsh lands. The machine is credited with wrapping as much as 700 ft. of pipe per hour with an accuracy and a tightness impossible by hand wrapping. The machine is on wheels and can be quickly and easily moved from place to place. A roll of Pabco medium weight pipe covering cut to the desired width and placed on a reel is run from the reel through a tank of hot asphalt kept at the desired temperature by a suitable burner. The covering is run through this bath and is wrapped around the pipe automatically. Gears with cams pull the pipe through the machine and at the same time turn the pipe, thus giving a spiral or helical wrap.

The Fordson Coal Co., operated by the Ford Motor Co., Highland Park, Detroit, has acquired 5500 acres of coal property in the vicinity of Twin Branch, W. Va., and plans the installation of electric power and mining machinery.

O. Bohm, Welch, W. Va., operating a building block manufacturing plant, is planning for the installation of a crushing machine.

The Johnsonburg Machine Co., Johnsonburg, Pa., manufacturer of steel and brass specialties, parts, etc., is planning the installation of machine tools and other equipment. R. E. Dempsey heads the company.

The West Virginia Water & Electric Co., Charleston, W. Va., is planning for extensions and the installation of additional equipment. Charles S. Dawson is general manager.

Manual training equipment will be installed in the new two-story high school to be erected at Lumberport, W. Va., estimated to cost $125,000, for which bids will soon be asked on a general contract. S. W. Ford, Latsetter Building, Clarksburg, W. Va., is architect.

The Gibralter Coal Co., 110 Hale Street, Charleston, W. Va., is planning the installation of electric power and other machinery at its properties in the Kanawha, W. Va., district.

The Pennsylvania Railroad Co., Union Station, Pittsburgh, will commence the construction of a machine shop and engine house at its Sharpburg, Pa., works.

Manual training equipment will be installed in the new four-story high school to be erected at Welch, W. Va., estimated to cost $175,000, for which a general contract has been let, with foundations to be laid at once.

The United States Engineer Office, Huntington, W. Va., will take bids until Dec. 19, for one Diesel engine with electric generator, as per specifications on file.

The Fesenmeier Packing Co., West Fourteenth Street, Huntington, W. Va., has plans for an addition to its ice and cold storage plant, estimated to cost $45,000. E. F. Glaser, 2841 Madison Road, Cincinnati, is architect and engineer.

Buffalo

BUFFALO, Nov. 26.

PLANS are being completed by the Kensington Davis Corporation, Buffalo, for a one-story foundry, 140 x 300 ft., at 144 Kensington Avenue. Charles J. Wolf is one of the heads of the company.

The Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive materials, is planning for the erection of an addition to cost about $65,000, including equipment.

The Ford Motor Co., Highland Park, Detroit, is preparing plans for a one-story assembling plant, 300 x 1000 ft., near Buffalo, to cost approximately $400,000 with machinery. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Hullman Furniture Co., 221-25 Washington Street, Binghamton, N. Y., is planning for the installation of lathes, finishing tools, bench tools and other equipment. I. J. Hullman is head.

The Common Council, Fredonia, N. Y., plans the installation of electric pumping machinery in connection with a proposed waterworks system, for which bonds for $200,000 have been voted. W. H. Shelton is city engineer.

The Rome Mfg. Co., Railroad Avenue, Rome, N. Y., manufacturer of die-pressed forgings, etc., has plans for two additions, one and two-stories, respectively, estimated to cost $200,000. One will be for general production and the other for warehouse and distribution service.

The Alert Products Co., Inc., Palmyra, N. Y., manufacturer of automobile pumps and kindred equipment, is planning for the installation of additional tools to replace equipment recently destroyed by fire.

The Iroquois Natural Gas Co., Iroquois Building, Buffalo, will commence the construction of a new steam power plant estimated to cost $75,000.

The F. Maier Co., 193 Fall Street, Seneca Falls, N. Y., is planning for the installation of equipment to manufacture tools, including lathes and parts.

The Northern New York Utilities, Inc., Watertown, N. Y., is planning the construction of a new electric power plant to cost about $160,000, including equipment.

The Onondaga Utilities Corporation, Syracuse, N. Y., E. Johnston, attorney, representative, recently organized with a capital of $500,000, is planning the construction of an electric power plant for service in Onondaga, Oswego and Madison counties. W. C. Pearce and C. E. Egan head the company.

The H. A. Smith Machinery Co., Water and Grape Streets, Syracuse, N. Y., is planning for the installation of additional equipment, including lathes, milling tools, etc.

The Saratoga County Paper Co., Ballston Spa, N. Y., has preliminary plans for the installation of additional machinery and electric power equipment at its boxboard mill. F. A. Talbot, Jr., is treasurer.

Thomas F. O'Neill, 25 Ferry Street, Binghamton, N. Y., is looking for miscellaneous machinists' and carpenters' hand tools, second hand.

Milwaukee

MILWAUKEE, Nov. 26.

NEW business in machine-tools is developing very slowly, considering the relatively moderate amount of inquiries. With one or two exceptions, none of the principal automotive shops is in the market. Some scattering sales are made from day to day, but volume is lacking. Milling machine makers have orders to keep them fairly busy, although in the majority of instances production schedules have declined further. The trend of demand is unusually irregular in all classes of tools, probably owing to the quiet state of trade in metal products generally.

Ben W. Twyman, who resigned recently as general manager Four-Cylinder Car Division, Nash Motors Co., Milwaukee, has organized a new company at Indianapolis, which is taking over the former plant of the LaFayette Motors Corporation, now of Milwaukee, and will engage in general auto-

motive engineering and production. Much equipment is being purchased, the majority of which will be new machinery.

The Individual Last Mfg. Co., Milwaukee, has been incorporated by Saul I. Rosefelt, 527 Fifty-second Street, and associates, to manufacture machinery for wood and metal lasts for the boot and shoe industry, and other special equipment. The capital consists of $50,000 preferred and 2000 shares of no-par common stock. Plans for operation have not been completed.

The Layton Park Foundry, established at 1901 Forest Home Avenue, in Milwaukee, several months ago, has now incorporated as the Layton Park Foundry Co., with a capital stock of $25,000. It is continuing extensive improvements in its property. The principal owners are John Fischer, John Matowski and Frank Fischer.

The Hardy Motor Car Co., Mondovi, Wis., contemplates the erection of a two-story garage and service building, 40 x 122 ft., early next spring. The cost, with equipment, is estimated at $45,000. Bids will not be taken until after Jan. 1. W. J. Hardy is president.

The village of Kimberly, Wis., has engaged Oppenhamer & Obel, architects, Wausau and Green Bay, Wis., to prepare plans and estimates for a combination high, graded and vocational school building to be built next spring. The appropriation is fixed at about $150,000. M. A. Kettenhofen is secretary of the Board of Education.

The Vilter Mfg. Co., 935 Clinton Street, Milwaukee, which is erecting a one-story pipe shop, 90 x 124 ft., is inquiring for an electric crane of 20-25 hp. capacity and some minor equipment needs. E. F. Goes is vice-president.

The Fox Motor Sales Co., 107 East Doty Street, Madison, Wis., has engaged Philip M. Homer, local architect, to design a new garage and service building, 72 x 165 ft., part two stories and basement. Contracts will be let about Feb. 1. The machine shop department will be approximately 5000 sq. ft.

The Wisconsin Foundry & Machine Co., Madison, Wis., is planning some improvements to gain additional capacity and increase efficiency. It has made an increase in its capital stock from $100,000 to $125,000, the present issues being $90,000 common and $35,000 preferred stock.

The Hastings Industrial Co., 306 West Madison Street, Chicago, has taken the contract to build and equip a vegetable canning factory costing about $50,000, for the Spring Green, Wis., Canning Co., W. P. McDonald, secretary.

C. G. Dahlke and F. L. Giese, of Neshkoro, Wis., have entered upon a $50,000 hydroelectric generating plant project and will purchase the equipment on or about Jan. 1. Foundations are being laid for the power house, to be completed next spring. The Jacobsen Engineering Co., Fawkes Building, Minneapolis, is in charge of construction.

The Advance Boiler & Tank Co., 3015 Walnut Street, Milwaukee, has taken additional floor space and is making some purchases of equipment.

L. F. Schoelkopf, Ford distributer at Madison, Wis., let the general contract to C. B. Fritz & Co., local, for a four-story addition, 43 x 89 ft., as extensions of the present four floor building used for sales, storage and service. Shop fixtures, light tools and other machinery are being purchased.

St. Louis

ST. LOUIS, Nov. 26.

WORK will soon commence on a new machine shop and distributing plant at Little Rock, Ark., by the N. O. Nelson Mfg. Co., Tenth and Chestnut Streets, St. Louis, manufacturer of pipe, plumbing equipment, etc., estimated to cost $85,000. Sanders & Ginnochio, Hall Building, Little Rock, are architects.

The Hammer Iron Works, Fort Smith, Ark., has purchased property at South Sixth and Parker Avenues, 50 x 150 ft., and contemplates the erection of a new plant. Joseph Hammer is president.

The Kansas City Power & Light Co., Kansas City, Mo., has awarded a general contract to the Edelman-Fleming Construction Co., New York Life Building, for a one-story service and repair building, 162 x 180 ft., for company motor trucks and cars, estimated to cost $90,000 with equipment.

G. W. Godlave, P. O. Box 240, Topeka, Kan., is planning the construction of a new ice-manufacturing plant at Osage City, Kan., estimated to cost $35,000.

Fire, Nov. 18, destroyed a portion of the plant of the National Lead Co., St. Francis, Mo., with loss estimated at $200,000 including equipment. Headquarters of the company are at 111 Broadway, New York. Rebuilding plans are under consideration.

The Public Service Co., Tulsa, Okla., will construct a one-story ice-manufacturing and refrigerating plant, 75 x 150 ft., to cost $150,000 with equipment.

The Niedringhaus Metal Wares Co., 5700 Natural Bridge Avenue, St. Louis, has awarded a general contract to the C. W. Wilcox Construction Co., 5302 Queens Street, for a two-story addition, to cost $50,000 with equipment.

The St. Louis Southwestern Railway Co., St. Louis, has acquired about 200 acres at Camden, Ark., for a new oil storage and distributing plant, to cost $200,000 including equipment.

The Eagle-Picher Lead Co., 208 South La Salle Street, Chicago, has acquired about 500 acres near Nockerville, Okla., and plans for the installation of electric power and other machinery for development and operation.

Bids will be received by the Board of Education, St. Louis, B. M. Milligan, commissioner of school buildings, until Dec. 4 for engines, generators, boilers, switchboard and auxiliary power equipment for installation at the new William Beaumont high school.

Bids will be received by Fred L. Shafer, city clerk, Greenfield, Mo., until Dec. 6, for three pumping engines and auxiliary equipment for the municipal waterworks. W. B. Rollins & Co., 521 Railway Exchange Building, Kansas City, Mo., are engineers.

The Ozark White Lime Co., Fayetteville, Ark., contemplates the construction of a new plant, with power house, estimated to cost $125,000.

The Dean Rubber Co., 14 Chestnut Street, Kansas City, Mo., will take bids early next year for a new plant to manufacture a general line of rubber products, estimated to cost $50,000 with machinery. W. J. Dean heads the company.

The Wellsville Fire Brick Co., Wellsville, Mo., is in the market for a 24-in. shaper.

The Common Council, Russell, Kan., plans for the installation of electric pumping machinery in connection with a proposed waterworks plant and system to cost about $95,000.

The Toombs-Fay Sash & Door Co., 666 East Pine Street, Springfield, Mo., has acquired a three-story building at 542 West Phelps Street, 90 x 100 ft., and will remodel, with the installation of machinery, to double approximately the present capacity.

The Wabash Railroad Co., Railway Exchange building, St. Louis, is planning for additions in its car and engine shops at Moberly, Mo., to cost $80,000. A. C. Cunningham is chief engineer.

The Prest-O-Lite Co., Inc., 30 East Forty-second Street, New York, will expend about $200,000 for its new branch plant at Tulsa, Okla.

Cincinnati

CINCINNATI, Nov. 26.

IF one were to judge the machine tool industry by the number of inquiries, it could be considered very active. However, most of these, while bona fide, will hardly develop into orders until after the first of the year. There has been some buying, and although the industry generally is not flooded with business, operations in shops are being maintained fairly well. There has been a scattering of railroad purchases and the automobile industry has been taking a number of tools, the General Motors Corporation accounting for a great deal of this activity. The steel interests have also been fair buyers the past few weeks and many tools have been sold to manufacturers of electrical products.

There is little of interest regarding the export situation and orders from this source, with the exception of Japan, South America and Australia are not looked for in volume.

The Union Gas & Electric Co., Cincinnati, has purchased 50 acres at the confluence of the Big Miami and Ohio Rivers as a site for a new power generating plant, mention of which was made last week. It will cost, with equipment, approximately $20,000,000. Plans are being completed preparatory to taking bids for erection.

The plant of the Miami Cycle & Mfg. Co., Middletown, Ohio, has been sold to the Miami Cabinet Co., a new company to manufacture wood and metal cabinets. Edgar S. Boren, one of the incorporators, and formerly vice-president and general manager of the Miami company, bid in the property and will have associated with him Omer Hartzell, Vincent J. Bramlage and Myron A. Seery of Middletown.

The Highway Iron Products Co., Ligonier, Ind., will move to Louisville and will erect a plant at Seventeenth and Magnolia Streets to cost $100,000. The first unit will be 80 x 250 ft., of brick and steel. Bridge iron and drainage ma-

ferrule for highway construction work will be manufactured. C. V. Joseph, Columbia Building, Louisville, is president.

The Ironton Stove & Mfg. Co., Ironton, Ohio, has started work on an addition to its plant. The increased facilities will enable the company to practically double its output of stoves and ranges.

The Modern Showcase & Fixture Co., Columbus, Ohio, has purchased the plant of the Ohio Tractor Co., in bankruptcy, on West Goodale Street, and will move into the new quarters about Jan. 1. Considerable new equipment will be installed. G. H. Schwartz is president.

Tentative plans are under consideration by Charles D. Jones & Co., Nashville, Tenn., for rebuilding their power plant and grain elevator partially destroyed by fire Nov. 18, with loss estimated at $500,000 including equipment. Charles D. Jones is head.

The Common Council, Paintsville, Ky., is planning the installation of electric pumping machinery in connection with extensions in the waterworks, estimated to cost $50,000.

The St. Francis Seminary, New Burlington, Ohio, will commence the construction of a power plant to cost about $70,000. Kunz & Beck, Carew Building, Cincinnati, are architects.

The Roane Iron Co., Rockwood, Tenn., will install additional equipment including electrical apparatus, with a 1500 kw. turbo-generator of Westinghouse type.

The Ohio River Edison Co., Toronto, Ohio, is disposing of a preferred stock issue of $3,000,000, the proceeds to be used in connection with the construction of a local generating plant to cost more than $5,000,000 with transmission system.

Cleveland

CLEVELAND, Nov. 26.

THE New York Central Railroad has sent out an additional list covering requirements for its lines West which now include 35 to 40 machines, in addition to the equipment for which the company has inquired for its Eastern lines. The new list includes a 30-in. x 12-in. slab milling machine, a keyway milling machine, 54-in. vertical milling machine and two 28-in. shapers. Other inquiries are looked for from the New York Central for six or eight 18- to 38-in. engine lathes, car wheel lathes and probably other equipment which it is expected will be placed before January. The Firestone Tire & Rubber Co. purchased 6 or 8 machines and is figuring on a few other tools. The Pittsburgh Plate Glass Co. purchased a planing machine, radial drill and 18-in. lathe for its Zanesville, Ohio, plant. There is a fair volume of inquiry for automatic screw machines. Business with local dealers is fair although orders are mostly for single tools.

Builders of heavy handling equipment report an increase in inquiries. Two projects that came up in 1920 involving $325,000 have been revised, one for a bridge crane for a steel plant and the other for coal handling equipment at tide water. Locomotive crane builders report an improvement in inquiries.

The P. A. Geier Co., Cleveland, will build an addition to its East 105th Street works, doubling the present floor space of both its plants. The extensions will include a four-story reinforcing concrete building, 68 x 240 ft., a one-story wing, 56 x 66 ft., and the addition of three stories to a one-story building. The additional space will be used for the manufacture of washing machines, vacuum cleaners and other electrical household appliances. The Geier company will require considerable additional equipment which will be purchased shortly.

The Ferro Machine & Foundry Co., Cleveland, will enlarge its plant by the erection of a one-story building, 100 x 200 ft. and another, 30 x 70 ft. The additional space will be used largely for cleaning room purposes. The general contract has been placed with the H. K. Ferguson Co., Cleveland.

The Cleveland Cutter & Reamer Co., 1619 Merwin Avenue, has under construction a new one-story, 40 x 100 ft. plant at 7406 Madison Avenue, and expects to move into its new quarters about Jan. 1.

The Cleveland Roofing Tile Co. has purchased a 3-acre site at Dunn Avenue and the Pennsylvania Railroad on which it will erect a new plant at an estimated cost of $80,000.

The Park Battery Co., 277 East 156th Street, has awarded contract for a two-story factory, 79 x 152 ft. The estimated cost is $75,000.

The Hearing Tool Co., Columbus, Ohio, will move to Millersburg, Ohio, where it will remodel the Smith & Schott factory building. It will manufacture steering wheels, spark plugs and other automobile parts. H. W. Unkle is vice-president and general manager.

The National Grinder Co., Cleveland, has been organized to place on the market a new cylindrical grinding machine. It has established a plant in the portion of the building occupied by the Ohio Ice Machine Co. at 1931 West Forty-seventh Street. It has a capital stock of $10,000. Charles Craig is president and Otto Schweitzer is treasurer.

The National Stove Co., Lorain, Ohio, a division of the American Stove Co., Cleveland, has placed contract with T. J. Hume, Lorain, for its extensions involving an estimated expenditure of $100,000. These will include a one-story factory, 65 x 195 ft.; a japanning building, 82 x 110 ft., and warehouse, 50 x 82 ft.

The Osborn Engineering Co., Cleveland, has prepared plans for a one-story addition to the plant of the Erie Steam Shovel Co., Erie, Pa. Bids will probably be taken early next year.

The Lambert Tire Co., Barberton, Ohio, has preliminary plans for an addition to cost $75,000. Work will commence early in the spring.

The New York, Chicago & St. Louis Railroad Co., Cleveland, will commence the erection of a one-story machine shop at its repair works at Conneaut, Ohio, to cost $40,000.

W. H. Millspaugh, Sandusky, Ohio, president Sandusky Foundry & Machine Co., has acquired the plant and property of the Erie Window Glass Co., West Sandusky, for a new industrial line of manufacture.

South Atlantic States

BALTIMORE, Nov. 26.

PLANS are being drawn for a one-story building, 150 x 250 ft., to manufacture commercial bodies for automobiles and wagons, for the Leonhardt Wagon Works, Inc., 417 East Saratoga Street, Baltimore, estimated to cost $45,000. J. L. Barr, Baltimore, is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 18, for miscellaneous hand tools for Eastern and Western navy yards, schedule 1606; also for one motor-generator set and six transformers for the Mare Island Navy Yard, schedule 1629; until Dec. 11, for 4800 ft. flexible copper hose for the South Brooklyn Navy Yard, schedule 1617; eight thrust and roller bearings for the Washington Navy Yard, schedule 1610, and until Dec. 18, for 6000 lb. of steel wool, for Eastern and Western yards, schedule 1611.

Manual training equipment will be installed in the two-story high school to be erected at Wilmington, Del. estimated to cost $500,000, for which plans are being drawn by Guilbert & Betelle, Chamber of Commerce Building, Newark, N. J., architects.

D. C. Elphinstone 408 Continental Building, Baltimore, machinery dealer, has inquiries out for a 15 to 20 ton 8-wheel locomotive crane; also for one horizontal tubular boiler, 72 in. in diameter, 18 ft. long, with brackets.

Bids will be received by the chief of air service, United States Army, Washington, until Dec. 4 for 25 oil pressure gages, circular QR 24-56, and for 26 airplane propellers, circular CAS 24-53.

The Bureau of Foreign and Domestic Commerce, Washington, has information of a company at Warsaw, Poland, desiring to purchase American machinery for an automobile manufacturing plant, No. 8187; also, of a company at Amritsar, India, in the market for canning and tin-can manufacturing machinery, No. 8199; for box manufacturing machinery, St. Pierre, France, No. 8186; for machinery for the manufacture of tiles, pipes, etc. Oporto, Portugal, No. 8183; and for one 3-phase generator 50 cycle, 225 volt, a.c., driven by a 350 hp. Diesel engine Teheran, Persia, No. 8145.

C. O. Wilder, Pelham, Ga., has inquiries out for a shingle bolting machine and saw.

The Big Vein Anthracite Collieries, Inc., Pulaski, Va., will install additional electric power and other machinery at its properties in the Brush Mountain district. Clyde E. Smith is general manager.

The North Carolina State College of Agriculture and Engineering, Raleigh, has plans for a new power house, with capacity of about 1000 hp. The installation will include a 250 kva. generator and auxiliary equipment. In addition, the plant will be equipped as a testing station for engineering students with the installation of steam and electric testing equipment. J. E. Sirrine & Co., Greenville, S. C., are engineers.

The Peerless Mfg. Co., Petersburgh, Va., recently organized, is planning the erection of a one-story factory, 90 x

139 ft., to manufacture mechanical pencils and kindred specialties. It will cost about $30,000 with equipment. Charles B. Mills is general manager. Philip N. Stern, Fredericksburg, Va., is architect.

Fire, Nov. 17, destroyed a portion of the car shops of the Central of Georgia Railroad Co., Savannah, Ga., with loss estimated at $750,000 including buildings and equipment. Rebuilding plans are under consideration.

Bids will be received by the North Carolina College for Women, Greensboro, N. C., until Dec. 4 for four 500 hp. watertube boilers, high pressure type, four multiple retort underfeed stokers and auxiliary equipment for the power house. Clyde R. Place, Grand Central Terminal, New York, is engineer. J. I. Foust is president.

Bids will be received by the general purchasing officer, Panama Canal, Washington, until Dec. 1 for 24 sets of twist drills; reamers; 17 sets of stocks and dies; machine taps; files; hand saws; drills; band saws; hacksaw blades, and other equipment, circular 2339; until Dec. 4 for 84 monkey wrenches; 156 Stillson wrenches; 24 side cutting pliers; 716 chisels; 120 screw-drivers; 5 pipe cutters, and other equipment, circular 1575.

The Hickory Paper Box Co., Hickory, N. C., has acquired a site and plans the construction of a new factory to cost $75,000, including equipment.

W. R. E. King, Cumberland, Md., is at the head of a project to construct a new glass manufacturing plant, replacing a works destroyed by fire some months ago. It will include a power house and will cost about $100,000 with machinery.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding the proposed construction of a steam power plant in a Canadian city, estimated to cost $900,000, with machinery. It is purposed to commence work in the spring, Reference No. 110934.

The Board of Town Commissioners, Laurinsburg, N. C., will take bids until Dec. 18 for equipment for a municipal waterworks, including motor-driven centrifugal pumps and accessory apparatus, steel water tower and tank, transmission line and other equipment, as per plans and specifications on file, or at the office of the Gilbert C. White Co., Durham, N. C., engineer. C. M. Fetter is clerk.

The Youghiogheny River Power Co. and the Youghiogheny Water & Electric Co. affiliated, allied with the Penn Public Service Co., Clearfield, Pa., have made application for permission to construct a hydroelectric power plant on the Youghiogheny River near Oakland, Md., with capacity of 100,000 hp., estimated to cost, with transmission system and auxiliary power stations, $25,000,000. Charles B. Hawley is consulting engineer.

The Hackley-Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for 100 steel end dump cars each from 1½ to 2 yds. capacity; for one revolving screen, 48 to 60 in. in diameter, 20 ft. long; one hydraulic wheel press, 100 to 150 tons capacity; two dragline machines, Bucyrus type, with 125 ft. and 150 ft. booms, respectively; one 24-in. belt bucket elevator; one 75-hp. motor, a.c.; and two gyratory crushers.

The Glover Mfg. Co., Rome, Ga., is in the market for a 32-40 in. band saw; 12-14 in. molder; 6 x 24 in., planer and matcher; 10-12 in. jointer; self-feed rip saw, and other tools for its wood-working plant.

The Regal Blue Marble Co., Regal, near Murphy, N. C., has plans for an addition and the installation of considerable new equipment.

The Pyramid Motor Co., Charlotte, N. C., is perfecting plans for a three-story automobile manufacturing plant, totaling about 75,000 sq. ft. of space, to cost $130,000. Fred Anderson is president.

The Telegraphone Mfg. & Sales Co., Southern Building, Washington, organized to manufacture mechanical recording devices, has made no definite plans for operation, but much of the work will be done by contract. H. P. O'Reilly is one of the heads.

Detroit

DETROIT, Nov. 26.

PLANS have been filed by the Beattie Machine Co., 1946 Baker Street, Detroit, for a one-story addition to cost $40,000 including equipment.

The Cadillac Motor Car Co., 2060 Clark Avenue, Detroit, has plans for six additions, five-stories and smaller, at Clark and Scotten Avenues, to cost approximately $2,000,000 with machinery. One structure will be used as a pattern shop, three for foundry service and the other two for general manufacture. The Austin Co., Penobscot Building, is architect.

The J. E. Barrett Co., 6545 Epworth Boulevard, Detroit, operating a machine shop, is planning the installation of a bolt threader and punch press.

The Ford Motor Co., Detroit, has awarded a general contract to the Bryant & Detwiler Co., Dime Bank Building, for two additions, one-story, 600 x 1220 ft., and two-stories, 100 x 130 ft. The latter will be used for the most part as a foundry and the other structure for general manufacture and assembling. The company has commenced operations in a new wire-manufacturing department for fine insulated copper wire, etc., and plans for extensions in this branch and the installations of additional equipment.

The Rich Steel Products Co., Battle Creek, Mich., manufacturer of structural steel specialties, has resumed operations after a recent fire. As soon as insurance adjustment has been made it will commence the erection of a new building to replace the structure recently destroyed with a loss of about $75,000.

The Buhl Metal Stamping Co., Scotten Avenue, Detroit, manufacturer of kitchen utensils, milk cans, etc., has secured options on about 15 acres at San Pedro Harbor, Los Angeles, and contemplates the construction of a new Pacific Coast plant, to cost approximately $500,000 with machinery. J. C. Buhl is one of the heads of the company.

The Crane Co., 836 South Michigan Avenue, Chicago, will build a two-story addition, 100 x 100 ft., to its factory branch at Grand Rapids, Mich., to cost about $35,000. W. J. Clark is company engineer.

The Wolverine Stone Co., 7976 Riopelle Street, Detroit, is planning for the installation of a power trip hammer, Beaudy or Bradley type.

The Bostick Stove Co., Lapeer, Mich., is planning the construction of a new foundry to replace the structure recently destroyed by fire with loss of $42,000 including equipment. The plant will be idle until the new foundry is available.

The Peerless Portland Cement Co., Union City, Mich., has acquired property at River Rouge and plans the construction of a new cement mill, estimated to cost $3,500,000, including machinery.

Manual training equipment will be installed in the three-story high school to be erected at Monroe, Mich., estimated to cost $175,000. The Warren, Holmes & Powers Co., Tussing Building, Lansing, Mich., is architect.

The National Standard Co., Niles, Mich., manufacturer of copper cables, jacks and wire products, has acquired the former plant of the Falor Rubber Co., Akron, Ohio, for a new branch works. Machinery will be installed for the production of welded wire for automobile tire manufacture.

Gulf States

BIRMINGHAM, Nov. 26.

PLANS are being perfected by the Theater Electric Light Co., 1413½ Elm Street, Dallas, Tex., L. G. Bissinger, secretary and treasurer, recently organized, for the installation of a power plant in a building at 208 North Akard Street. Generating sets and auxiliary machinery will be purchased.

The Cox Foundry Co., Bessemer, Ala., has acquired the plant and business of the City Foundry Co. The new owner will maintain operations at the present location, using the plant as a branch for the production of waterworks and kindred castings. The main Cox plant will continue in the manufacture of soil pipe and fittings. Charles H. Cox is president and general manager.

The City Ice Delivery Co., Fairfield, Ala., will commence the construction of an ice-manufacturing plant, estimated to cost $150,000 with equipment. Warren, Knight & Davis, Fairfield, are architects.

The Roe-Nichols Oil Co., Tulsa, Okla., has preliminary plans for the construction of a new oil refinery in the vicinity of Fort Worth, Tex., estimated to cost $100,000 with equipment.

Fire, Nov. 21, destroyed a portion of the sugar refinery of the Vida Sugar Refining Co., Loreauville, La., with loss estimated at $100,000 including equipment. The power house was destroyed. Rebuilding plans are under consideration.

The Checker Cab Co., Inc., New Orleans, has acquired about 25,000 sq. ft. on Poydras Street for the erection of a new service and repair works, estimated to cost $85,000 with equipment. Joseph Bustes is president.

The American Public Service Corporation, Marshall, Tex., has taken over the plant of the Gilmer Ice & Electric Co., Gilmer, Tex., recently acquired, and plans for extensions and the installation of additional equipment.

J. D. Young, Leesburg, Fla., and associates will commence the construction of a hydroelectric power plant at Moss Bluff, Tex., in January. It will have an initial capacity of about 700 hp., and later increased to 1200 hp. A transmission line, 22 miles long, will also be built.

George L. Colburn, Lake City, Fla., is at the head of a project to construct a cold storage and precooling plant, estimated to cost $90,000 with machinery. A company will be organized and plans prepared in the near future. Mr. Colburn is secretary of the local Rotary Club.

Fire, Nov. 16, destroyed a portion of the loading and distributing plant of the Humble Oil & Refining Co., Mildred, Tex., with loss estimated at $100,000 including equipment. It is planned to rebuild. Headquarters are at Houston, Tex.

The Valley Electric & Ice Co., San Benito, Tex., has work in progress on a new power plant. The company is said to have tentative plans for a new central power station in the Rio Grande Valley section.

The June Machinery Co., First and Franklin Streets, Waco, Tex., is planning the erection of a three-story addition to cost $75,000.

The Southern Railway, Thirteenth Street and Pennsylvania Avenue N. W., Washington, has tentative plans for new car repair works at its Findley Yards, Birmingham, to cost $300,000 with equipment. It will replace the portion of the works at Gadsden, Ala., recently destroyed by fire.

The Lukens Steel Co., Coatesville, Pa., will expend about $30,000 for the machinery installation at its new distributing plant at New Orleans, now in course of construction, including hoisting, conveying and other machinery. Considerable equipment will also be removed from the present local works to the new site. The plant will represent an investment of $300,000 and is expected to be ready for service in February. The company is considering the construction of a new water terminal in the same vicinity, estimated to cost $100,000.

The Llano Gold & Rare Metal Co., Llano, Tex., recently formed with a capital of $500,000, is planning the installation of equipment in properties in this section, including electric power, hoisting and other apparatus.

The Marsh Brothers Stave & Heading Co., Watertown, Fla., recently organized, will commence the construction of a new sawmill with capacity of about 20,000 ft. per day. The machinery will be electrically-operated.

The Buckeye Cotton Oil Mill, Jackson, Miss., is planning for extensions in its plant and the installation of additional equipment, estimated to cost $35,000.

The Southern Mfg. Co., Gardner and Tenth Streets, Gadsden, Ala., is planning the construction of a new building at its lumber finishing mills, to cost $85,000 with machinery.

The Chamber of Commerce, Panhandle, Tex., has closed arrangements with a company, whose name is temporarily withheld, for the construction of an oil refinery on donated site, estimated to cost $100,000.

The Deal Lumber Co., Buhl, Ala., is planning to rebuild its mill and power house recently destroyed by fire with loss of about $50,000, including equipment.

Indiana

INDIANAPOLIS, Nov. 26.

EXPANSION plans are being arranged by the Chandler & Taylor Co., South Addison Street, Indianapolis, manufacturer of steam engines and parts, including the installation of machinery to double the present capacity. The work will be carried out within the next three or four months, and closely following it is expected to make further enlargements in different departments. The company is increasing its capital from $100,000 to $400,000. W. M. Taylor is president.

W. J. Holliday & Co., 326 West Georgia Street, Indianapolis, are having plans drawn for a new steel fabricating plant at 600-700 West McCarty Street, estimated to cost $500,000 with equipment. J. C. Troyer is company architect. J. S. Holliday is president.

Thomas L. Green & Co., 202 Miley Avenue, Indianapolis, manufacturers of baking machinery, etc., have awarded a contract to the E. H. Pierson Construction Co., Indianapolis, for a one-story addition, 90 x 120 ft., estimated to cost $30,000 with equipment.

The Anderson Oil Engine Co., Anderson, Ind., is being organized to take over the plant of the Anderson Foundry & Machine Co., now in receivership. The new company plans for a stock issue of about $600,000.

The Fallansbee Brothers Co., Indianapolis, recently organized, will operate a sheet metal working plant at 325 South Missouri Street.

The Home Ice Co., Bedford, Ind., will commence the erection of a new one and two-story plant to cost about $55,000 including equipment. Sanford Standish is president.

Bids will be received by the City Council, Fort Wayne, Ind., until Dec. 10 for a 100-ton hoist for use in connection with a movable dam on the Maumee River. A. W. Greenever, 122 East Washington Street, city engineer, in charge.

The Marshall & Huschart Machinery Co. of Indiana, Inc., Illinois and South Streets, Indianapolis, has acquired the machinery at the former local plant of the Monroe Automobile Co., including machine tools, heat-treating and hardening equipment, small tools, etc., and will place it on the market.

The Board of Trustees, Purdue University, Lafayette, Ind., will commence the construction of a new power house to cost about $100,000 with machinery. Work will also be started on a new electrical building for laboratory and instruction service, to cost $105,000. Plans for a high power electric transmission laboratory will be held in abeyance.

Fire, Nov. 19, destroyed a portion of the plant and equipment of the Kokomo Aviation Corporation, Wilber Fagley Field, Kokomo, Ind., with loss estimated at $50,000. Fred Ruddell is president. Plans are being arranged for rebuilding.

The Twyman Remanufacturing Motor Co., Indianapolis, recently organized, has leased the former plant of the Lafayette Motors Corporation, Mars Hill section, and will install equipment for rebuilding and reassembling automobiles. Initial work will be confined to Buick and Nash cars, to be extended later to other automobiles. B. W. Twyman heads the company.

Canada

TORONTO, Nov. 26.

NOTWITHSTANDING that many interests are inquiring for machine tools the greater part of the sales is confined to one or two tools to a customer. Ontario builders point out, however, that activities at their plants average from 60 to 70 per cent capacity and the demand for their products has been greater this year than since the slump of 1920. Generally speaking, industrial concerns have been showing more interest in equipment of late and many have put their plants in shape for increased production for the coming year, but there are still a considerable number yet to place orders for equipment, both for replacement purposes and on new works account.

The town of Brockville, Ont., is contemplating the purchase of a gas engine to cost $13,000 for a hydroelectric station.

Bids have been received for the construction of a $50,000 extension to an electric sub-station for the Hollinger Consolidated Gold Mines, Ltd., Timmins, Ont.

The Dominion Oilcloth & Linoleum Co. has started work on the erection of a $90,000 factory on St. Catharine Street East, Montreal.

The Marine Welding & Boiler Co., Port Colborne, Ont., proposes to build a $10,000 machine shop and will require equipment. J. Sherk is manager.

The Kaustine Co., Ltd., Dundas, Ont., manufacturers of sanitary closets, etc., has started work on an addition and is in the market for 25 hp. and 30 hp., locomotive fire box type of boilers.

Courtaulds, Ltd., Montreal, is interested in the purchase of machinery for a silk factory to be erected at Cornwall, Ont. C. R. Tetley, 314 Beaver Hall Hill, Montreal, is purchasing agent. The plant will cost $75,000.

The McIntyre Porcupine Mines, Schumacher, Ont., is in the market for mining machinery. R. J. Innes is manager.

The National Welding Co., 563 St. Timothee Street, Montreal, will purchase shears, drills, etc.

The Dubuisson Mining Co., Amos, Que., W. Norris, purchasing agent, is in the market for complete mining equipment.

The Canadian Heating Apparatus Foundry, Montmagny, Que., proposes to purchase foundry equipment. C. A. Paquet is purchasing agent.

Savara & Lettre, 1581 St. James Street, Montreal, is in the market for a planer, lathe, etc.

J. Therrien, 576 Ontario Street East, Montreal, is asking for equipment for a machine shop, including reamer, small tools, etc.

The Emery Steel Co., Montreal, is asking for equipment for a foundry and machine shop. H. S. Ross, 90 St. James Street, is purchasing agent.

The Acton Machine Co., Acton, Ont., is in the market for metal working machinery to manufacture automobile specialties, etc. F. S. Blow is manager.

It is reported that the Hull Steel Foundries, Hull, Que., manufacturers of railroad equipment, will purchase machinery, furnaces, power hammers, etc., for $1,000,000 steel mill at Ogdensburg, N. Y. A. H. Copian is president.

The Cylinder Grinding & Auto Part Co., 146 Mountain Street, Montreal, is asking for a hack-saw, threading machine, etc.

Chapmans, Ltd., 330 Gerrard Street, East, Toronto, is asking for prices, etc., on ice-making machinery and equipment.

The Canada Wood Products Co., Ridgetown, Ont., is building an addition and is in the market for machinery to manufacture wood specialties.

W. B. Browne & Co., Norval, Ont., are in the market for a 15-in. Moore grinder; 5½ kw. generator, 125 volts or larger, also No. 3 or 4 Planiffer.

The North Shore Power Co., Three Rivers, Que., contemplates the construction of hydro-electric power plant to develop 5000 hp.

The Lee Puncture Proof Tire Co. of Canada, Ltd., Montreal, has been incorporated with $2,000,000 capital stock, It is a subsidiary of the Lee Puncture Proof Tire Co. of Conshohocken, Pa., and it is stated that the Canadian company plans the erection of works in the vicinity of Montreal to have a capacity of 250 tires and 500 tubes per day. The construction of the plant, equipment and working capital will be provided by an issue of common shares of no par value at $10 per share. Officers of the company include J. J. Carrick, Toronto, president; directors, Sir William Mackenzie, Toronto; A. A. Garthwaite, New York; J. R. Timmins, Montreal.

Western Canada

The factory and machinery owned by the Victoria Lumber & Mfg. Co., at Chemadnus, B. C., were destroyed by fire Nov. 18 with a loss of $500,000.

The Alberta Refineries, Edmonton, Alta., will erect an oil plant and will purchase producing and refining equipment. W. B. Stewart is interested.

The Hammond Cedar Mill Co., is preparing to build a $200,000 mill at Fort Coquitlam, B. C.

The Yellow Fir Lumber Co., Port Alberni, B. C., will build a sawmill at Great Central Lake and is in the market for machinery, boilers, etc.

Pacific Coast

SAN FRANCISCO, Nov. 21.

WORK will commence on a one-story locomotive erecting shop for the Southern Pacific Railroad Co., at Los Angeles, 80 x 500 ft., estimated to cost $600,000 with machinery. The installation will include one 200-ton and two 15-ton electric traveling cranes, hoisting machinery and other equipment. The engineering department, Room 9, Fifth Street and Central Avenue, is in charge.

The Paramount Motors Corporation of the Pacific, Inc., Azusa, Cal., has taken title to 15 acres as a site for a new plant to manufacture automobiles. It will include a parts department, assembling unit, machine shop, power house and other buildings, estimated to cost $1,000,000 with machinery. The local Chamber of Commerce is interested in the project. The company was recently incorporated under Delaware laws with capital of $15,000,000.

The Grinnell Co., 453 Mission Street, San Francisco, manufacturer of fire extinguishers, etc., with headquarters at Providence, R. I., has awarded contract to H. L. Peterson, 35 Montgomery Street, for a new one and two-story plant, 90 x 240 ft., to cost $90,000. The Austin Co., Santa Fe Building, is architect.

The Nevada-California Electric Corporation, Riverside, Cal., operating hydroelectric generating plants in the Bishop Creek section, Inyo County, is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for extensions. E. S. Kassler is president.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has an appropriation of $87,000 for extensions in its power house at C and Jessie Streets, and the installation of additional equipment.

The Myers Safety Switch Co., San Francisco, has awarded a general contract to John Spargo, Russ Building, for a new one-story plant on West Fifth Street. M. I. Schwartz, Nevada Bank Building, is architect.

The Duralite Co., Central Building, Seattle, recently organized to manufacture building blocks and kindred products, contemplates the erection of a plant estimated to cost $50,000 with machinery. Harry Shaw is president.

The Long Bell Lumber Co., Longview, Wash., will install electric power equipment and mill machinery at its new West Fir mill unit now in course of construction, to cost about $300,000.

The Samson Tire Co., Compton, Cal., has awarded contract to D. C. Arey, San Pedro, Los Angeles, for an addition to its plant. Electric power and other machinery will be installed.

The Guadalupe Portland Cement Co., San Francisco, recently organized with a capital of $3,000,000, has purchased 260 acres in the Almaden Mines section, San Jose, Cal., as a site for a new mill, estimated to cost $1,000,000 with machinery. The company is headed by Leo J. Pope and Boswell F. King, Humboldt Bank Building. The last noted represents the company.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High
Allis-Chalmers ..	41½	43¾
Allis-Chal. pf....	89	91
Am. B. S. & Fdy.	74	75¾
Am. B. S. & F. pf.	103	103⅞
American Can...	97¾	103½
Am. Can pf.....	108⅞	109⅛
Am. Car & Fdry.	160	162¾
Am. Car & F. pf.	121	122
American Loco..	73½	75¼
Am. Radiator...	84⅞	86¼
Am. Stl. Fdries.	37¾	39
Am. Stl. Fd. pf..	101½	101⅝
Baldwin Loco...	125½	129¼
Baldwin Loco. pf.	112½	113
Bethlehem Steel.	49	55¼
Beth. Stl. 7% pf.	89	93½
Beth. Stl. 8% pf.	104	106½
Cambria Iron...	40	40
Chic. Pneu. Tool	80	84½
Colo. Fuel.....	23	25¼
Crucible Steel...	64	67⅞
Crucible Stl. pf..	90¾	90¾
Gen. Electric...	178	184½
Gt. No. Ore Cert.	30⅝	32¾
Gulf States Steel	79½	85⅝
Gulf Sts. Stl. pf.	100¼	100¾
Int. Har.....	76	79
Int. Har. pf.....	106½	108¼
Jones & Laughlin.	107½	108
Lima Loco.....	65	66½
Midvale Steel...	27	29¼
Nat.-Acme	7½	10
Nat. En. & Stm.	39¾	41½
N. Y. Air Brake	37¾	42⅞
Otis Steel.....	7½	9¾
Otis Steel pf....	49½	54⅞
Pressed Stl. Car	53	55½
Pressed Steel pf.	83	83¼
Replogle Steel...	10	12⅝
Republic	45¼	49⅞
Republic pf.....	91½	92⅛
Sloss-Sheffield ..	49	54½
Sloss-Sheffield pf.	81¼	81¼
Steel of Canada.	66½	68
Superior Steel...	25	32
Transue-Wms....	33½	35¼
Un. Alloy Steel.	31	31½
U. S. Pipe.....	38⅞	51
U. S. Pipe pf....	83½	84⅞
U. S. Steel.....	92½	96¾
U. S. Steel pf...	118⅝	119⅛
Vanadium Steel.	28½	31⅝
Va. I. C. & Coke	54	54
Whouse Air Br.	81	81⅝
Ygstown S. & T.	65	69

Industrial Finances

The Home Trust Co., Derby, Conn., and Samuel Persky, New Haven, Conn., have been made temporary receivers for the Acme Tool Co., Derby. The receivership was asked by local creditors to protect themselves, they claimed, against other creditors.

Following extensive litigation, the plant of the Marlin Fire Arms Co., New Haven, Conn., will be sold at auction in February. The cause of the sale is a foreclosure on a $145,000 mortgage.

The American-British Mfg. Co., Bridgeport, Conn., has filed a voluntary petition in bankruptcy. The company is a wartime industry and made munitions. Its assets are cash, $36.66; bills, notes, etc., $239; personal property, $340.84; debts due $201,539; unliquidated claims, $321,909. Liabilities are not totaled.

The Crucible Steel Co. of America earned $1,000,000 more in September and October, 1923, than in the corresponding months of 1922, according to Chairman Wilkinson's statement to stockholders at the annual meeting. R. B. Mellon of Pittsburgh was elected director, succeeding Duane Armstrong, resigned.

Income account of the Central Steel Co. for the half year ended June 30 shows net income of $1,705,865, after charges and taxes. The balance sheet as of that date shows earned surplus of $4,019,938.

Eaton Axle & Spring Co. reports net income, after all charges but before Federal taxes, of $317,428 for the eight months ended Aug. 31.

Industrial News Item

The publication and advertising departments of the General Electric Co. will be combined on Dec. 1 with Martin P. Rice, as manager of the publicity department, in charge. Frank H. Gale, advertising manager, will become assistant to D. R. Bullen and manager of conventions and exhibits. C. H. Lang, who has been assistant to Mr. Rice as manager of the publication department, will continue as assistant manager of the newly created publicity department, and T. J. McManis, who has been manager of the department of publicity for the Edison Lamp Works of the General Electric Co., Harrison, N. J., will also become an assistant manager of the new department.

NEW TRADE PUBLICATIONS

Steel Tanks.—Youngstown Boiler & Tank Co., Youngstown, Ohio. Two pamphlets devoted to horizontal tanks for the storage of water and other liquids and to tanks of other shapes for similar purposes have been issued. Bulletin 500 relating specifically to the horizontal tanks has 40 pages, including a large amount of tabular matter covering sizes, capacities, weights, etc. This bulletin has in both front and back large folding sheets showing capacities, in gallons per inch of liquid depth, of tanks of varying diameters and lengths, these being company standards in both dimensions. For the varying diameters, capacities in gallons are given also per foot of length to permit calculation for odd lengths. The other pamphlet is a reprint of a series of advertisements which appeared in a list of national business papers. They are devoted, one after the other, to such topics as progress, thought, organization, unity, strength, skill, industry, toil, honesty, brawn, time, achievement and foundation.

Tool Steels.—K. Engelsted, 114 Liberty Street, New York. Catalog No. 25, 51 pages, illustrates various departments in the Soderfors steel works of the Stora Kopparbergs Bergslags Aktiebolag, Stockholm, Sweden, and describes Soderfors Dannemora high-speed steel, tool steels, tungsten steel, magnet and solid and hollow drill steel. Several pages are devoted to tables of weights, metric conversion factors, etc.

Air Hoists.—Hanna Engineering Works, Chicago. Catalog No. 14, 16 pages. Describes and illustrates single acting, and balanced, pendant, straight-lift hoists, balanced, pendant load-retaining straight-lift hoists, and several styles of bracketed hoists. Included also are balanced stationary and other styles of geared hoists. Component parts are described in detail and several installations of hoists and trolleys shown. Illustrations are accompanied by line sketches in blue and white, and dimensional data are given. Essential information is presented in an unusually clear manner.

Vacuum Cleaners.—United Electric Co., Canton, Ohio. Bulletin A, 20 pages. Contains data for engineers and architects and covers methods of piping, wiring diagrams and other information useful in laying out cleaning systems.

Micarta.—The Westinghouse Electric & Mfg. Co., East Pittsburgh. Booklet of 24 pages, entitled, "A Material of Endless Possibilities," containing information about micarta and the many uses to which it has been put, and indicating the possibilities for other applications. Some of the products for which micarta is already used are bushings, cord terminals, disks, fan blades, gears, gaskets, handles, insulators, knobs, pinions, pulleys, radio panels, switchboards, telephone apparatus and washers.

Oil Filters.—Bousman Mfg. Co., Grand Rapids, Mich. Circular describing the company's type S continuous oil filter. The principle employed is that of up-filtration through 18 in. of dry filtering mediums.

Woodworking Machinery.—J. A. Fay & Egan Co., Cincinnati. Catalog No. 114, 246 pages. Describes and illustrates a broad line of woodworking machinery, core box machines, sanders, planers and matchers, surfacers, mortisers and a wide variety of saws. Cutter head and other grinders are shown, as well as patternmakers and engine lathes. Full information as to capacity, construction, dimensions and attachments for the machines is given.

Electric Motors.—Reliance Electric & Engineering Co., Cleveland. Bulletin No. 2014, 32 pages. Devoted to features of construction of the company's type T heavy-duty motors for direct current, which is a general service unit designed for constant and adjustable speed duty and rated on 40 deg. C. basis. Illustrations are numerous and several pages are given to actual installations on various types of machinery. Tables of ratings and general outline dimensions are included.

Circuit Breakers.—Roller-Smith Co., New York. Bulletin No. 560. Describes type P circuit breaker which is of the fully inclosed free handle variety, designed for industrial use on circuits of 250 volts and less, D. C. and 550 volts or less A. C. The type E breaker is also described.

Switchboard Instruments.—Roller-Smith Co., New York. Bulletin No. 450. Describes and illustrates the company's A. C. switchboard instruments, including ammeters, voltmeters, wattmeters, power factor meters and other instruments.

Steam Plant Catalog.—C. J. Tagliabue Mfg. Co., Brooklyn, N. Y. 60-page catalog No. 640A of apparatus for steam plant use, including thermometers, recorders, flue gas recorders, hygromometers, gages of various sorts, etc. The catalog is also a price list and shows methods of connection, as well as various types of recording diagrams.

Sheet and Tin Mill Products.—The American Sheet & Tin Plate Co., Pittsburgh, issued a new, revised edition of the "Reference Book," that handy soft leather-bound vest pocket manual containing data and information about its products. The book includes numerous tables of weights and gages and much information that will prove useful to roofing and sheet metal workers. Requests for copies should be addressed to the nearest district sales office of the company.

Sieving, Grading and Conveying.—Howard & Morse, 42 Fulton Street, New York. 16-page catalog devoted to screens of various types, both stationary and revolving, for screening materials of different character, including coal, ore, sand, cement, etc. A great variety of meshes is illustrated in various gages of different metals.

New Books Received

Self-Taught Mechanical Drawing and Elementary Machine Design. By F. L. Sylvester, M.E., with additions by Erik Oberg, editor of *Machinery*. Third edition. Pages 345, 5¼ x 7½ in.; 236 illustrations. Published by Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price, $2.50.

American Society for Testing Materials. A. S. T. M. Tentative Standards for 1923. Pages 859, 6 x 9 in.; illustrated. Published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia. Price, $7 in paper; $8 in cloth binding.

The Metallurgy of Iron and Steel. By Bradley Stoughton. Third edition. Pages 519, 6 x 9 in.; 248 illustrations. Published by McGraw-Hill Book Co., Inc., 370-372 Seventh Avenue, New York. Price, $4.

Magnesium. Pages 177, 4½ x 7 in.; illustrated. Published by the American Magnesium Corp., Niagara Falls, N. Y. Price, $2.50.

Ports of Mobile and Pensacola. Port Series No. 3, of Board of Engineers for Rivers and Harbors, War Department. Pages 230, 6 x 9 in.; numerous illustrations and folded maps. Published by Superintendent of Documents, Government Printing Office, Washington. Price, 75 cents.

Mineral Resources of the United States, 1920. Part II, Nonmetals. By United States Geological Survey, R. W. Stone, geologist in charge. Pages 529, 6 x 9¼ in.; illustrated. Published by the Government Printing Office, Washington.

Hütte—Taschenbuch für Eisenhüttenleute. Compiled by Akademischer Verein Hütte, Berlin. Pages 982, 5 x 7½ in.; illustrations, 511. Published by Wilhelm Ernst & Sohn, 90 Wilhelmstrasse, Berlin, W. 66, Germany. Price, $3.04. (A reprinting of edition reviewed at length in THE IRON AGE, Dec. 7, 1922.)

The solution of three problems relating to cutter grinding are included in the November issue of *Grits and Grinds*, a publication of the Norton Co., Worcester. These cover the grinding of clearance on the teeth of a spiral milling cutter, the clearance on peripheral teeth of an inserted tooth cutter and the clearance on the side tooth of an inserted tooth milling cutter. Grinding the clearance on the peripheral teeth of a plain milling cutter was discussed in the October issue.

A test code for hydraulic power plants has been issued by the American Society of Mechanical Engineers in pamphlet form. It is the first of a series of 16 test codes to be issued through the year by the power test code committee of the society, as a result of work on the revision of the test codes of 1915. The 24 pages give information which should be collected in a test and devote considerable space to instruments and apparatus needed. The single price copy of the code is 80 cents.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.20c. to 4.59c.
No. 12	4.25c. to 4.64c.
No. 14	4.30c. to 4.69c.
No. 16	4.40c. to 4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.85c.	5.10c.
No. 26	4.40c. to 4.90c.	5.15c.
No. 28	4.50c. to 5.00c.	5.25c.
No. 30	4.70c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.10c.
No. 16	4.75c. to 5.25c.
Nos. 18 and 20	4.90c. to 5.40c.
Nos. 22 and 24	5.05c. to 5.55c.
No. 26	5.20c. to 5.70c.
No. 27	5.35c. to 5.85c.
No. 28	5.50c. to 6.00c.
No. 30	5.95c. to 6.45c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 27¼c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 21c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55 $6.30
		90 lb.	6.65 6.40
		100 lb.	6.75 6.50
IC	$12.55 $10.70	IC	7.00 6.75
IX	13.95 12.55	IX	8.25 8.00
IXX	15.55 13.75	IXX	9.50 9.25
IXXX	17.10 15.30	IXXX	10.75 10.50
IXXXX	18.85 16.80	IXXXX	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	47c.
Bar	55c. to 60c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8c. to 8½c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	33½c.
No. 1 solder	31½c.
Refined solder	27 c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	11c. to 12c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market is lower and business is very quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.25
Copper, light bottoms	8.75
Brass, heavy	5.75
Brass, light	5.00
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	7.75
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.25
Sheet aluminum	15.25

THE IRON AGE

New York, December 6, 1923

ESTABLISHED 1855 VOL. 112, No. 23



New Rod Mill for Wire and Cable Plant

Tonnage Unit of Combined Continuous and Looping Type Installed for Rolling Both Steel and Copper

SEVERAL causes have cooperated in expanding at the Kinkora plant at Roebling, N. J., 11 miles down the Delaware River from the main plant of the John A. Roebling's Sons Co. at Trenton, the equipment for turning out tonnage. Not the least of these is the labor situation, which is much easier to control in an industrial community, such as that at Roebling, than it is in the larger center. Again, the plant at Roebling contains the 12 open-hearth furnaces furnishing all of the steel for both the Kinkora works at that point and the main works in Trenton. It contains a blooming mill, a rod mill working on a high tonnage basis, and a full equipment of wire mills. The expansion has now added a new rod mill at that point, which is described in the following paragraphs.

Because of the various products to be rolled on this new mill, including both steel and copper rods, flats and strips, many problems had to be solved in connection with its design. The mill takes 4-in. billets, which have been reheated after leaving the blooming mill, and rolls them down into rods of 9/32 to 5/8 in. diameter or into flats or strips varying from 7/16 to 3 in. wide and from 1/16 to 1/8 in. thick. The mill has been designed for an annual output of about 40,000 tons. It had been under consideration for a long time, and about 18 months ago it was taken up in earnest with the idea of pushing it through to completion as soon as possible. It has now been in successful operation since the second week of August.

Designed for either gas or oil fuel, the continuous

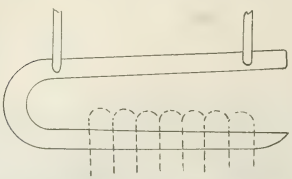


Under the Overhead Pipe Trestle Appears the Heating Furnace for the Rod Mill (in the Opening). The rolling stands are located in the taller steel building in background and extending well to left of the steel stack. The brick section at left houses the Unaflow steam engine which runs the mill. At extreme left appears the end of the loading shed

At Head of Page Is a General View of the New Rod Mill Building, with Loading Shed at Left, Rolling Mill with High Monitor in Center, Engine Room and Furnace Room at Right

type gravity discharge furnace, 50 ft. long, is using oil at present. Arrangements may be made, however, for the use of producer gas if at any time it may seem desirable. Air for combustion is pre-heated in a cast iron stove located between the furnace and the stack, where the heat is supplied by the outgoing gases from the furnace. A fan handles this air at a pressure of 5 to 7 oz. Billets are shoved into and through the furnace from the loading skids by means of hydraulic pushers.

All in all, the mill contains 12 stands of rolls. One of these is a 3-high roughing mill, 18 in., operated at



Diagrammatic Representation of Hook Suspended from Loading Crane to Handle Hot Coils of Wire Rod or Other Similar Material

a speed which reaches a maximum of 78 r.p.m. This takes the billets and reduces them in 7 passes to a size suitable for handling in the rod mill proper.

From the roughing mill the elongated billet is fed continuously into an intermediate 14-in. mill consisting of three stands. From here it is fed again continuously through two stands of 12-in. rolls and thence to the finishing mills, consisting of six stands, varying from 10 in. to 11 in. in diameter.

These six stands of the finishing mill constitute a looping mill, two of the passes being followed by automatic repeaters throwing the rod back in each case into the next pass. The six stands of this group are arranged in three lines, the first of which contains three sets of rolls with the same driving pulley, while there are two on the second and one on the third.

Pinion housings of the finishing mill are of the inclosed continuous oiling type, built by the Treadwell Engineering Co., New York, and fitted with Falk herringbone pinions. Gravity lubrication is used on the mill pinions and the main drive bearing; this system consists of pump, filter and tanks. Otherwise, the equipment was built in the plant of the Roebling company, where the entire layout was designed. The maximum speed of the finishing rolls is 450 r.p.m., which corresponds with a rod speed of about 1250 ft. per min. The finished rod, as it leaves the roll, is automatically reeled on one of three reels provided side by side for this purpose. Scrap bundlers and shears and the other usual auxiliaries in a mill of this type are provided.

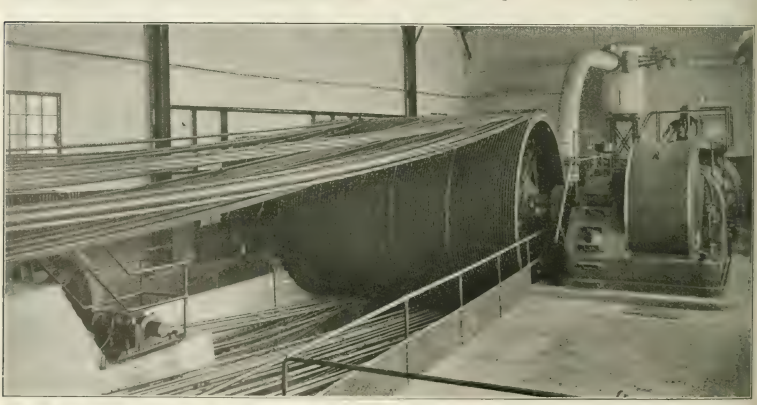
Special attention has been given to quick roll changing, both for changes in section and to replace rolls which become worn in service. Open top and straight side housings are provided, together with outside clamps for holding the roll bearings in place. In addition to the general overhead traveling crane commanding the entire mill building a small special crane is run over the finishing stands to facilitate changing rolls in two or more stands simultaneously.

Handling of the finished rods was one of the problems which gave concern. Methods in vogue are very costly in labor, consequently a special arrangement was provided in this mill, including a buggy or receiving car and crane system. The bundle, discharged from the reels on which it is wound up, is carried by floor conveyor system to an electrically operated buggy. When enough coils have accumulated in the buggy, each stacked on edge, an overhead crane (spanning the conveyor position and the railroad track carrying the outgoing cars) picks up a nest of bundles by means of a special boom or hook, and deposits them in the car in an orderly fashion.

Unaflow Engine Drive

Power for the mill is provided by a single-cylinder Unaflow engine built by the Mesta Machine Co., Pittsburgh, and having a cylinder 56 in. in diameter by 48-in. stroke of piston. The rope sheave shaft of this engine is direct connected to the 14-in. intermediate mill. The drives for the other mills are obtained from the sheave by manila ropes on the British principle, including stands both sides of the direct drive; the breaking down mill is toward the cylinder end of the engine, while all the other mills are clear beyond the engine. Steam is supplied at a pressure of 160 lb. per sq. in., while the engine is connected to a central condensing system through which a vacuum of 25 to 26 in. is secured.

The building, as shown in the general illustration of the mill, is of the usual steel frame construction, with corrugated steel sheets for roof and siding. A large amount of glass is used, however, on the sides, while ventilation is taken care of through the monitor roof. The main part of the building, housing the mill



Several Mill Drives Are Taken Off from This Broad Rope-Drive Pulley. The shaft of the pulley is directly operated from the Unaflow single-cylinder engine and is directly-connected to the 14-in. intermediate mill. Beyond the pulley, and hidden from view by it, is the drive for the roughing set, its ropes appearing as the group at left center of pulley. The drives nearer the observer are for the continuous and looping stands constituting the finishing end of the rod mill



From the Continuous Type Gravity Furnace at *A*, Heated Billets Are Passed Successively Through the 3-High Breaking Down Rolls, the Intermediate Set of Three Stands, the Two Preliminary Finishing Stands and the Six Looping Stands of the Finishing Train, Emerging as Wire Rod or as Flats or Strips. Rods are coiled on the reels in center foreground and carried away by the conveyor chain shown. At the left is the pulpit from which reels and conveyor are controlled. At extreme right, behind the windows, are the Unaflow engine and the rope drive actuating all the stands of rolls

proper, is 65 by 260 ft., and there is a lean-to on either side, that on one side containing the engine and furnace, while the one on the other side covers the conveyor and loading system and extends considerably beyond the end of the main structure. The construction of the entire mill, including the erection of the fabricated steel, which was purchased, was carried out by the company's own organization, and most of the mill equipment was built in the company's shops.

There are railroad tracks leading into the building at each end, for easy handling of material direct into the cars. The output of the mill is to go mostly to the Trenton plant, where it is to be finished into wire, cable, etc., for the market.

Mill scale is dumped direct into scale cars, being handled by means of a clam shell bucket and overhead crane. There is also a general settling basin for scale outside the building.

DENOUNCES GREED

Judge Gary Speaks at Civic Forum on Important Subjects—Opposes Bonus

Judge Elbert H. Gary, chairman United States Steel Corporation, in an address before the Civic Forum and League for Political Education at the Town Hall, New York, Nov. 30, reaffirmed his position in regard to a number of important subjects. "In many lines of business, at the present day," said Judge Gary, "if not to the extent which was formerly characteristic, there is, in conduct on the part of both the employer and employee, unfairness, greed, reckless and brutal disregard for the proprieties and decencies of human contact. If money is acquired by reason of these delinquencies it would be appropriate to hand the amount to those who have unjustly suffered.

"Prices just now in many respects and in many places are unconscionable, and they enter into the very high cost of living. If any one, producer, tradesman, or workman, after doing justice by those to whom he is responsible, can and will do anything to reduce the high cost of living, he will thereby give evidence of his gratitude for being permitted to live and work in this country of plenty and prosperity."

Judge Gary spoke strongly in opposition to the proposed soldiers' bonus, but he was strongly in favor of liberal appropriations to care for the injured soldiers. Referring to the agitation in favor of cancelling or reducing the debts of foreign countries to the United States, Judge Gary declared the proposition to be irrational and preposterous.

"It has been asserted by certain foreign nations," said Judge Gary, "that they are willing to pay their debts when their debtors pay them and not before. Did any one ever before hear such a condition insisted upon by any self-respecting, solvent individual or nation? Does any one of these foreign nations, through its courts, allow individual debtors to other individuals to postpone payment until these debtors have collected their claims against third parties? What would a foreign court say to such a defense to a suit brought upon a note given for borrowed money?"

Republic Iron & Steel Co. Improvements

Plant improvements under way at the Youngstown properties of the Republic Iron & Steel Co. include partial rebuilding of the Bessemer plant, changes to the billet and sheet bar mills, reconstruction of a blast furnace in the Haselton group and erection of an additional battery of by-product coke ovens. The new by-product coke oven addition is now being completed.

In the Bessemer department, a cupola is being dismantled and a mixer is being built in its place.

The billet and sheet bar mills of the plant are being replaced in parts with modern equipment. Electric drive will be substituted for hydraulic operation of these units.

Plans are being prepared for the addition of two buttweld tube mills at the Poland Avenue plant in Youngstown. The modernization of the Bessemer plant will enable the company to produce a larger tonnage of Bessemer iron, and supply semi-finished steel for the additional buttweld pipe capacity.

NEW FIRE CLAY BRICK

Uniformity in Size Claimed as Feature—Advantages for Blast Furnace Linings

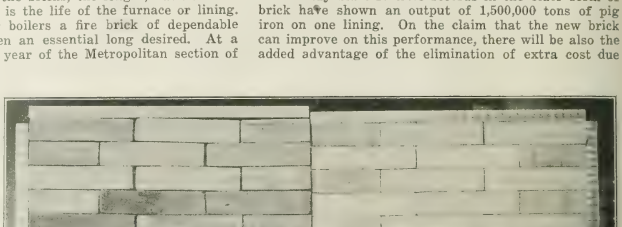
Engineers for a long time have desired a uniformity in size in refractory bricks for metallurgical use so that joints would reach smallest possible proportions. In blast furnace linings, in coke-ovens and in heating, heat-treating and other mill furnaces, the tighter the joint or the closer the bricks, the longer, has been the general contention, is the life of the furnace or lining. In fireboxes under boilers a fire brick of dependable uniformity has been an essential long desired. At a meeting early this year of the Metropolitan section of the American Society of Mechanical Engineers in New York, Edwin B. Ricketts, assistant to chief operating engineer of the New York Edison Co., speaking as one who has made a special study of boiler wall construction, emphasized "the major importance of uniform size, since lack of uniformity made thick joints necessary, these being the starting point for the destruction of the walls. The ideal was a brick-to-brick contact with only a thin wash of fire-clay to fill the pores." It is clearly evident that in a blast furnace the use of brick so uniform in size that the lining made with them would approach in continuity a solid mass of fire clay should insure much less liability to disintegration and hence a longer life.

A new fire clay brick, for metallurgical and other purposes, which, it is claimed, meets the ideals briefly outlined above, has been put on the market by the General Refractories Co. 117 South Sixteenth Street, Philadelphia. It is made by a new process, patented by the company and developed at its Olive Hill plant at Olive Hill, Ky. It is the result of extensive experiments conducted by the company over a period of years, the aim being to produce a brick so uniform as to reduce joints all possible.

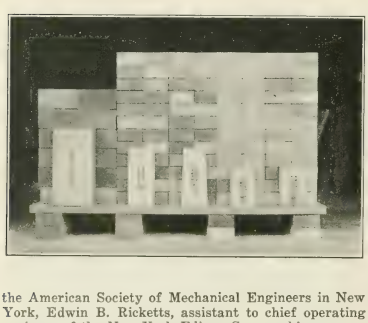
The new process is claimed to turn out a brick absolutely uniform in size and with no sacrifice of quality. Essential features are described as regulation in the mixture, grind and density. Some of the brick made by the new process are shown by the illustrations. In one of these there is a comparison between a uniform brick made by the new process and a pile of brick of the same dimensions not made by this process. Several piles of 3-in. thick brick made by this process, six high, showed a total variation of less than 1/16 in., or less than an average of 1/96 in. for each brick. The other illustration represents a stack of standard blast furnace sizes made by the new process. Plans are under way to equip other plants of the company.

Already blast furnace records in the older form of brick have shown an output of 1,500,000 tons of pig iron on one lining. On the claim that the new brick can improve on this performance, there will be also the added advantage of the elimination of extra cost due to cutting of brick to fit and of the saving of the large amount of bonding material usually used to fill up joints.

Wall Laid Up with $13\frac{1}{2}$ in. x 6 in. x 3 in. Straights (Right) Together with 9 in. x 6 in. x 3 in. Straights. The left half is brick of the same sizes not made by the new process



Standard Blast Furnace Shapes (Below) of Fire Clay Brick Made by New Process



Pension Plan of British Empire Steel Corporation

WASHINGTON, Dec. 3.—Providing payment to any male employee who has been 25 years in the service and has reached the age of 65 or more and who is retired either at his own request or that of his employing official, the British Empire Steel Corporation has instituted a pension fund, according to a report received by the Department of Commerce from Consul Charles M. Freeman, Sydney, Nova Scotia. Pensions will be made monthly at the rate of 1 per cent of the average monthly pay received by retired employees during the past 10 years of their service, multiplied by the number of years of their entire employment. Benefits are also provided for female employees who have been 25 years in the service and have reached the age of 55 or more and have retired at their own request or that of employing officials.

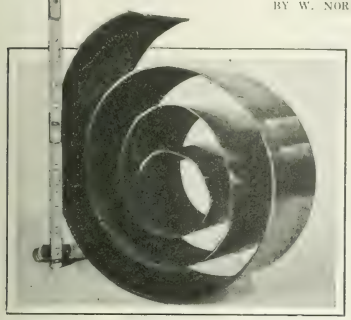
Any employee who has been in the service 15 years and has become permanently incapacitated also is to be pensioned. The board of directors furthermore may direct the pension committee to include employees whose length of service has not reached the limits or employees of those ineligible for other reasons. Employees who have been in the service 30 years and during the last 10 years received $83.33 monthly or $1,000 per year will get 1 per cent of the monthly wage, or 83c. multiplied by 30, or $24.90, but it is provided that no pension shall be more than $25. The plan differs from that of most other corporations by not providing for contributions from wages. Effective Dec. 3, it is the purpose of the corporation to apply it to remove a source of complaint, especially among miners.

The Ford Motor Co., having recently purchased a site of 45 acres at Norfolk, Va., has purchased an additional 10 acres as the site for an assembling plant. Proposed buildings include a three-story main building 300 x 800 ft. and several other units necessary to the production of 300 cars per day.

Molybdenum in Cast Steel and Iron Rolls

Heat Treatment and Wearing Qualities of Low Carbon—Alloy Iron Rolls—General Properties

BY W. NORMAN BRATTON*



ALLOY rolling mill rolls, both iron and steel, have become an important part of the regular equipment. Alloy rolls are not a new development; several types of cast steel and forged alloy rolls have been on the market for some time under various trade names. This article discusses one of the more recent developments in alloy roll metallurgy. The author has devoted much study to the alloy roll industry.

THE consumption of alloys in carbon steel rolls has increased remarkably within the past ten years. Alloying elements, commercially successful in rolls, were beyond the experimental stage in 1913. The wide usage of alloys in certain classes and compositions of rolls was established some years thereafter. Now alloys are generally recognized as prime factors in reducing rolling costs. One of the contributing causes for recent progress in this direction is the use of molybdenum, and the object of this article is to present some considerations bearing on the reasons why molybdenum is physically and commercially efficient.

In forged steel rolls, alloys are used in all compositions. In cast steel rolls, the field for alloys was almost entirely in high carbon steel rolls, previous to the introduction of molybdenum. Chromium is one of the elements in all alloy cast steel rolls produced in the United States. In addition to chromium are nickel, vanadium, and high percentage of manganese. Molybdenum is added to chromium either alone or in addition to one of the other elements just mentioned.

The combination of alloys best to serve a given purpose depends primarily upon the resistance to wear and breakage. Comparative tests take into account also the machining qualities and surface properties of the rolls. Unless there are peculiar circumstances, the type and class of roll which reduces rolling costs, by less wear and breakage, is the roll which is used. The actual machining time in dressing a roll is usually a small percentage of the final cost of the roll. Whether it machines hard or soft is often overbalanced by the number of times it must be taken out and put into the mill, transported to and from the roll shop, etc. The surface properties of rolls are adjusted by analyses and heat treatment with the exception of surface cracks, (fire cracks). These are difficult to control and seem to vary with the composition of alloys employed.

After the raw material and processes used in making rolls are as good as is commercially possible, alloys are the last means to increase the economic efficiency of rolls. Molybdenum was first tested in rolls during 1920. Since then compositions of varying analyses and uses have been developed. Molybdenum is now used in all the four classes of rolls, namely: Low-carbon steel, high-carbon steel, iron cast in sand molds (sand rolls), and iron cast in metal molds (chilled rolls).

Low-Carbon Steel Rolls

For the severe service in blooming mills and roughing mills, the low-carbon steel molybdenum roll was developed, yielding a high degree of strength, toughness, and wear. Before the molybdenum rolls were placed in service there was no preliminary way to determine the resistance to wear. On the basis of hardness and carbon contents comparable to other alloy steels, the density and grain size of the molybdenum castings proved favorable and were accepted as an index of the wearing properties in service, taking into account also the previous performance of molybdenum steels for tough-hardness and hot wear.

The manufacture of molybdenum steel is extremely simple. The molybdenum is added to the molten metal in the furnace before the slag comes to the top and remains in the steel without passing into the slag. Accordingly the molybdenum diffuses thoroughly through the molten metal for such a long time that there is no doubt about the intimate and uniform mixture of the alloy with the steel.

Heat Treatment

After the rolls are cast a plain anneal may be given, or for special requirements the rolls are cooled in air. This last treatment is a recent advance in the metallurgical practice of roll foundries. A complete treatment follows which is used in whole or in part or modified as preferred. Starting with the rolls as cast, an anneal is given at high temperature to break up the casting structure, then an anneal from a temperature slightly above the critical point for grain refinement. The rolls are next machined and after this they are heated to a temperature about 200 to 250 deg. Fahr. above the critical point and cooled in air, being allowed to cool until the temperature is equalized throughout the mass below a red heat. The last and final step is the drawing temperature to lower the hardness as desired and increase the toughness.

The air treatment for cast steel rolls has an effect up to a depth of six inches depending upon the size of the roll. Following this departure from annealing only, future refinements will be more drastic cooling means

*Sales metallurgist, Climax Molybdenum Co., New York.

and media so that small sizes of cast steel rolls may eventually be given liquid quenching and drawing treatments.

The wearing qualities are now definitely known. The figures in some cases are surprising, showing comparative ratios that are three and four to one. Extraordinary results in some instances are those, where the service was as much as 12 times the maximum previously obtained. The records below were obtained under five different classes of rolling conditions. Item six is a molybdenum cast steel roll versus a forged steel roll.

1.—12 days versus 4 days; dressing same.
2.—18,000 tons versus 7000 tons; dressing $\frac{1}{8}$ in. versus $\frac{1}{4}$ in.
3.—4 weeks versus 1 week; dressing same.
4.—Over 200 per cent better; no fire cracks.
5.—572,000 tons versus 180,000 tons; life of roll.
6.—500 tons versus 300 tons; dressing $\frac{3}{4}$ in. versus $\frac{1}{2}$ in.

Results such as these are positive evidence of increased service and consequent reduction in actual rolling costs.

An example of the strength and toughness of molybdenum steel rolls is found in the illustration where it was necessary to roll 9 in. x 9 in. ingots to 5 in. x 5 in. billets on a 16-in. mill. The 2-ft. rule shows the actual size and gives an idea of the small cross sectional area at the bottom of the pass which resists the heavy repeated working stresses and impacts.

Molybdenum has established itself as one of the alloys in high carbon steel rolls. Figures have been given to the writer on relative service of molybdenum to other high-carbon alloy compositions, but not for publication. Molybdenum is being used with economic success and satisfaction.

Alloy Iron Rolls

With cast iron rolls the toughness is negligible and the strength is much less than with steel rolls. The wear, smoothness, and hardness of surface of the roll are all important. Without toughness any undue treatment or other abnormal condition will cause breakage.

The alloy which will effect an economic improvement in iron rolls in wearing and finishing properties has a promising future. Molybdenum chilled rolls produce a better finish on sheets, and are especially useful to producers of high finished sheets. The variables in roll foundry practice more seriously affect chilled iron rolls than steel rolls. Alloys which affect the depth of chill so that it cannot be uniformly taken care of in foundry practice are not suitable for chilled rolls. Molybdenum is free from this objection. The molybdenum is in the iron throughout its manufacture and the chill is read from tests before tapping. When molybdenum is present the graphite is in the form of nodules instead of flakes. The strength of the iron is consequently increased.

General Properties of Rolls

The relative properties of the different classes of roll compositions may be given in the following order from characteristics which are most prominent in each class. Physical properties are based on tensile tests.

	First	*Second*	*Third*
Low-carbon steel..	Toughness	Strength	Wear
High-carbon steel..	Strength	Wear	Toughness
Sand rolls.....	Wear	Finish	Strength
Chilled rolls.....	Finish	Wear	Strength

For example, comparing the four classes, low-carbon steel rolls have the most toughness, less strength than high-carbon steel rolls, more strength than the iron rolls, and the least resistance to wear, etc., noting however, in continuing this general system of comparison in the other classes of roll compositions, that chilled rolls resist wear better than high-carbon steel rolls and better than sand rolls. As an arbitrary means of classification, the dividing line between low-carbon and high-carbon steel is taken at 0.25 per cent carbon below the eutectoid.

The arrangement above is to be taken only in a general way since there are specific instances where high-carbon steel molybdenum rolls are used as semi-finishing rolls intermediate between sand and chilled rolls, and high-carbon steel molybdenum rolls that show better wearing properties than sand rolls. The table will serve, however, to bring out the necessary properties that a combination of alloys must economically increase in each class of rolls, and the reasonable certainty that a major alloying element that has this accomplishment throughout the entire category of properties, will have the largest tonnage use.

A source of weakness in hot rolls made of steel are surface cracks, called fire cracks. These may be caused either by contraction and expansion of the surface layer of the steel roll or by compression and tension on the roll surface in working hot steel. Where sections are large and are given a heavy reduction of area in the rolling process surface cracks develop most rapidly. When the cracks deepen so the strength is affected it is necessary to cut more metal off the roll than is required to true up the worn surface. The alloy which will minimize this defect will have a favorable reception in the roll industry. Molybdenum decreases fire cracking.

Some Properties of Molybdenum

Alloys such as chromium, nickel, vanadium and molybdenum produce strength, toughness and resistance to wear. Nickel is a ferrite element, chromium and vanadium are carbide elements. Molybdenum is both a ferrite and carbide element. Molybdenum has a direct effect upon the ferrite as a toughening alloy and a direct effect upon the carbides as a strengthening and wear-resisting alloy.

The comparative efficiency of alloys in steel depends upon their intensity and commercial applicability. The intensity is defined as the cost of the quantity necessary to produce the desired effect. The commercial applicability is determined by the ease in manufacture and heat treatment, and the ease in fabrication.

The intensity of molybdenum is almost directly proportional to the molybdenum content up to 0.50 per cent. The effect of molybdenum is pronounced in percentage contents from 0.15 to 0.25 per cent. This is the range of molybdenum content in molybdenum automotive steels. On the other hand types of molybdenum steel are in commercial production wherein 0.70 to 0.90 per cent molybdenum is specified. The dual effect of molybdenum upon both the ferrite and carbide is especially valuable in combination with chromium alone or in combination with chromium and nickel, or chromium and vanadium. Molybdenum has its own individual effect and serves to accentuate the desirable properties of the other alloys with which it is combined.

The fractional percentages which are required to produce results can leave no doubt as to the intensity of molybdenum. A metallurgical digest of results in the numerous technical papers on molybdenum steels testifies to the advantages of molybdenum steel in ease of manufacture, heat treatment, and fabrication.

Selection of Alloys

The final alloy or alloys in rolls will be those that function best to increase economically the desired properties and give the least amount of trouble in manufacture and heat treatment. Alloys will never be a cure-all. However, when the conditions are right metallurgically and otherwise from start to finish of the roll a judicious selection of alloys and alloy compositions effects a reduction in rolling costs.

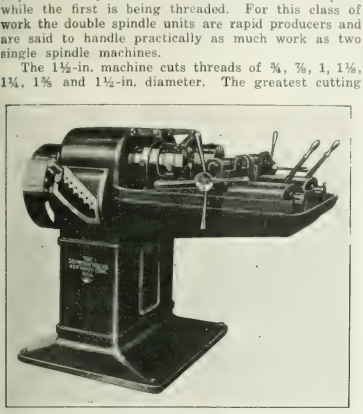
Analyses and treatments of alloy steel and alloy rolls have received a new impetus. It is true that molybdenum is a contribution in this progress backed by sound reasoning and splendid service. The data so far gathered from hundreds of molybdenum steel and iron rolls and repeat orders from many steel mills are definite evidence of the merit of molybdenum as an alloying element in rolls. With the experience that has been gained during the past three years it is only logical to expect further advances and a solution of problems which will benefit the industry as a whole.

Domestic production of the Ford Motor Co., for the week ended Nov. 20, was 40,226 cars and trucks while 1713 Fordson tractors were produced during the same period. Production at the Lincoln division totaled 134 cars.

Double-Spindle Threading Machine

The 1½-in. double-spindle threading machine illustrated is a recent addition to the line of the Geometric Tool Co., New Haven. In general design it is similar to the ¾-in. machine described in THE IRON AGE of March 3, 1921, and is intended also for work in which the threading time for both pieces is sufficient to permit the operator to chuck and start a second piece while the first is being threaded. For this class of work the double spindle units are rapid producers and are said to handle practically as much work as two single spindle machines.

The 1½-in. machine cuts threads of ¾, ⅞, 1, 1⅛, 1¼, 1⅜ and 1½-in. diameter. The greatest cutting



Two-Spindle Threading Machine for Use Where Threading Time Is Sufficient for Operator to Chuck and Start Second Piece While First Piece Is Being Finished

length at which the swinging gage can be set at one time is 9 in., but with resettings a length of 14 in. may be obtained. With a countershaft speed of 296 r.p.m. and the change-speed lever set at ¾ in., spindle speeds are 74 r.p.m.; when set at 1½ in., the spindle speed is 38 r.p.m.

The machine may be equipped with a 6 hp. motor drive. The net weight is 2165 lb., and the floor space required is 48 x 65 in. The countershaft driving pulley is 13½ x 5½ in., and the weight of the countershaft is 150 lb.

A New Abrasive Cut-off Wheel

Cut-off wheels having Redmanol, a phenol resin of the same family as Bakelite, as a bonding agent, have been placed upon the market by the Carborundum Co., Niagara Falls, N. Y. The Redmanol is said to give a wheel that combines strength, porosity, hardness, and resistance to heat; it does not soften or melt and the wheel is free cutting.

For cutting high-speed steel, Stellite and general steel alloys, an Aloxite Redmanol wheel is said to be used to advantage. In cut-off work it is general practice to use wheels 12 in. in diameter, and these wheels can be made as thin as $\frac{3}{32}$ in. Wheels 12 x $\frac{3}{32}$ or 12 x ⅛ are popular sizes.

Carborundum Redmanol wheels are also available, these being used for general cut-off work on materials of low tensile strength and for cutting carbons and brushes of graphite and copper. For these a wheel in 50 C grit, 4 grade is recommended. In both types, wheels of 8, 10, 12 and 14 in. diameter are available.

Performance records of the Aloxite Redmanol wheel have been compiled by the company. With a wheel 12 in. in diameter, $\frac{3}{32}$ in thick, in 50K grit, 8 grade, running at 4000 r.p.m. five cuts were made on a piece of Chesterfield metal ⅝ in. square. The wheel loss is claimed to have been $\frac{1}{32}$ in. and the average time per cut 8 sec. Diamond alloy tool steel ⅞ in. square was cut in 10 sec. per cut and the wheel loss after two cuts was $\frac{1}{32}$ in. Three cuts of Mohawk tool steel 1¼ x ¾ in. were said to average 9 sec. per cut, with a wheel loss of but $\frac{1}{32}$ in. A piece of Stellite $\frac{1}{16}$ x 2 in. is said to have been cut at the rate of 12 sec. per cut, with a wheel loss of $\frac{1}{16}$ in. after two cuts.

Old Firms in St. Louis

ST. LOUIS, Dec. 4.—The St. Louis Chamber of Commerce has been compiling a list of names of firms which have been doing business in St. Louis 50 years or more. The list has grown to more than 200. After the list is completed the firms will be honored at a banquet, when executives and leading citizens will gather to pay tribute to them. The list, as compiled, with the year the firm was established, includes the following:

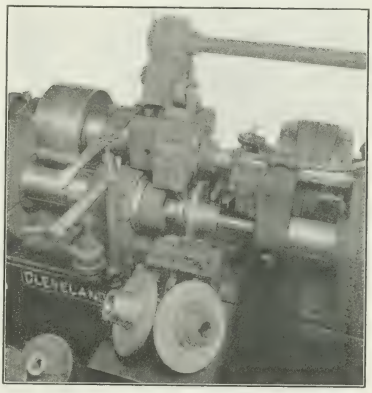
American Car & Foundry Co., 1862; Beck & Corbitt Iron Co., 1852; Bridge & Beach Mfg. Co., 1837, stoves; Buck Stove & Range Co., 1846; Campbell Iron Co., 1867; Charter Oak Stove & Range Co., 1847; Curtis & Co., Mfg. Co., 1854; Fulton Iron Works Co., 1852; Hemp & Co. Corporation (sheet metal); More-Jones Brass & Metal Co., 1874; Pauly Jail Building Co., 1856; Stupp Brothers Bridge & Iron Co., 1858; Joseph Wangler Bros. Boiler Works, Wrought Iron Range Co., 1864.

Device for Demagnetizing Chucks

The Thorn demagnetizer, a device recently placed on the market for use in shops and tool rooms, is operated directly from a electric light socket and a motor is not employed. It is built for 110 or 220 volt alternating current circuits. Portability and the small space occupied are features of the device. A. J. Littlejohn, Syracuse, N. Y., is the distributor.

Automobile Hubs Machined Automatically

An automatic machine for finishing automobile hub forgings and adaptable also for machining second operation work on arbors, such as bevel gears, bevel



Automatic Machine for Finishing Automobile Hub Forgings. The arrangement of work and cutters is shown above

gear housings, pinion gear shafts and transmission gears, has been placed on the market by the Cleveland Automatic Machine Co., Cleveland. The machine is similar in action to the automatic piston machine manufactured by this company.

The hub is mounted on an arbor as illustrated, one end of which is chucked by means of a hand-operated air chucking mechanism. The other end of

the arbor is supported by a roller bearing in the tool-stock spindle and is driven by a boss on the spindle hood engaging in the lug on the arbor. The tool operations follow rapidly, working simultaneously.

The overhanging arm, mounted on the tool stock spindle and supported rigidly in the rear, carries three cutters, one of which turns the flange diameter and the other two rough turn the small diameter and face one end. The overhead turning attachment mounted securely on the spindle head and operated longitudinally from a cam on the camshaft carries two cutters for rough turning the other small end. There are three cutters in blocks mounted on the rear cross slide which rough face the flange and rough form and face one end. Both ends are finish formed and the front of the flange is finished faced by four cutters mounted on the front cross slide. A hub is produced at each cycle of the camshaft.

The machine is driven from a single pulley with a clutch which automatically stops the machine when each hub is completed. The lever for starting as well as the air control lever are within easy reach of the operator. The machine is arranged either for belt or for motor drive. It is stated that one man can easily operate three machines and that each machine will produce twelve hubs per hour from forgings.

BALANCING HIGH-SPEED FANS

Importance of Correct Dynamic Balance Stressed —Static Balance Is Not Enough

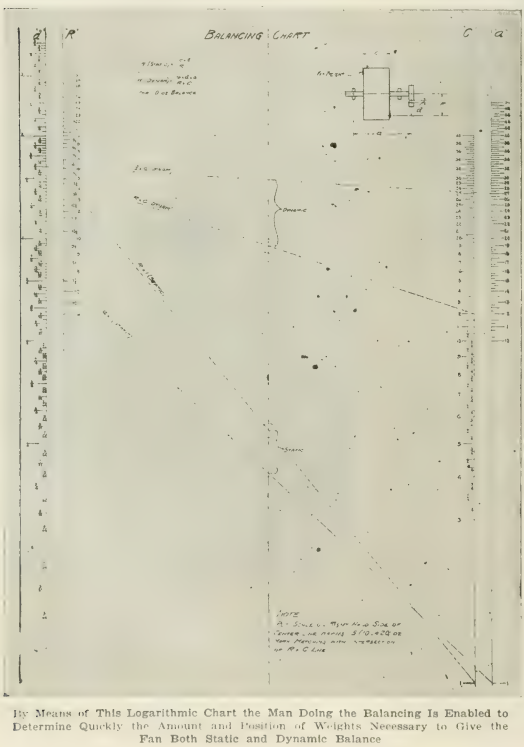
BY ARTHUR L. GREENE

OCCASIONAL troubles experienced with fan wheels, supposedly balanced perfectly, develop operating difficulties due to vibration. Although not always serious, this may become so, and can be removed only by rebalancing the fan in position, which at best is a difficult task for one without special experience. It is needless to dwell on the expense and loss of time commonly resulting from unbalanced fan wheels, to make no mention of the cost incurred in repairing damaged parts such as dislocated fan blades, worn-out bearings, etc.

Efficient results are now reported by the Buffalo Forge Co., Buffalo, in getting, so far as possible, both static and dynamic balance in high-speed, high efficiency fans.

What Are Static and Dynamic Balance?

Static balance is merely balancing an object in a stationary position by placement on a knife-edge or roller-bearing support. If it shows no tendency to roll, the body is in static balance. Dynamic balancing, however, is the adjusting of those forces which tend to take the body out of equilibrium when running, as differentiated from those forces acting on a body when at rest.



By Means of This Logarithmic Chart the Man Doing the Balancing Is Enabled to Determine Quickly the Amount and Position of Weights Necessary to Give the Fan Both Static and Dynamic Balance

Now the "running balance" as ordinarily obtained consists of nothing more scientific than arbitrary addition and subtraction of weights to counterbalance irregularities in the blades or hubs, making for uneven distribution of weight in the fan and thereby causing vibrations. While this method is far from scientific and is not based on formula or rules, it is possible to attain as true a balance by this system as with the use of the most complicated balancing machine. The difficulty arises, however, as might be suspected, in that the method is purely arbitrary and depends for its success, in just about equal proportions, on cut and try methods, and on possession by the operator of a "sixth sense."

This slow and laborious method depends too greatly on the human equation and always leaves the ultimate outcome of the test an unknown quantity. True dynamic balancing, however, represents utilization of a device to obtain a scientifically true running balance. Having a perfect static balance does not insure a perfect dynamic balance. And if the fan is not in dynamic balance a couple will be set up tending to cause the end of the shaft to travel around in circles, with consequent vibrations just as serious as if the fan were statically unbalanced.

At the Buffalo plant it has been the custom for many years to give all the P. M. X. fans (planing mill exhausters) "B" volume, and steel pressure blowers, a running balance in their own bearings. This operation is comparatively easy, because

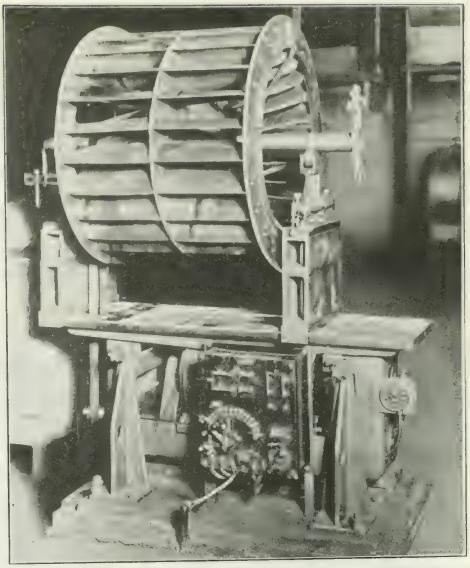
these fans are self-contained, having no separate pedestals to erect and line up. The speed is fairly moderate and the blast wheels have already been given static balance as assembled.

Something in the nature of a "bogey man" arose for the fan manufacturer, however, when high-speed fans for motor and turbine drive came into use. For various reasons it was found impracticable to perform the running balance in their own bearings, chief objections being that a great deal of power was required to run these outfits at full speed, that the independent bearings would require considerable time and expense to set up and that the many types and sizes of motors required would necessitate a large and varied testing installation.

Hence the Buffalo Forge Co. has installed two dynamic balancing machines. The object to be balanced is rotated at comparatively slow speed while vibrating supports allow the rotating object, when out of balance, to indicate this unbalance by exaggerated vibrations. By means of adjustments made in both the angular position and radial displacement of a known weight, attached to the shaft or mandrel and rotating with the object, a new centrifugal force is set up which exactly compensates for the force or forces tending to unbalance the rotating object, and brings the object into a state of rotating equilibrium.

By an adjustment of the balancing machine, the whole machine may be made to vibrate to the rotation of a statically unbalanced object. On the other hand, another adjustment of the machine will cause only one of the two bearings supporting the rotor to vibrate and will thus indicate the dynamic unbalance of the rotating object. Static unbalance can be detected much more accurately by a balancing machine than on the most carefully made knife-edge ways.

Having brought the object to a state of rotating equilibrium, either for static or dynamic unbalance, it is easy to determine the amount and position of weights which will permanently compensate for either unbalanced condition. Static unbalance is always corrected first, as a prerequisite to putting an object in correct dynamic balance. A simple logarithmic chart allows the workman who operates the machine to calculate the permanent weight or weights required as quickly as he could caliper and measure the diameter of a shaft.



Balancing Machine for Obtaining Dynamic Balance. Exaggerated vibration produced by unbalanced rotors is corrected by adjustment of the angular position and amount of rotating weight attached to the shaft, as shown at right above. This gives data for permanent correction to the rotor, the operator reading from the chart, as shown on page 1512, the necessary adjustment to be made

History of Electric Light

In an interesting booklet of 110 pages the Smithsonian Institution of Washington has issued a compendium of information regarding the development of incandescent, arc and vapor electric lighting, carrying the reader back to the time when a Greek philosopher 25 centuries ago discovered that amber when rubbed will attract light objects. There are many illustrations, especially of the early forms of lights and some of the generating apparatus, culminating with the 1923 patterns.

Particularly interesting is the story of the development of the incandescent light from Edison's first experimental lamp of 1878 and his first commercially successful carbon lamp of Oct. 21, 1879. It is estimated that in the United States today there are about 350,000,000 incandescent lamps, the number of which is increasing at the rate of about 10 per cent per year. The annual demand for new lamps and renewals is approximately 200,000,000 per year, exclusive of miniature lamps. The use of incandescent lamps in all the other countries of the world combined is about equivalent to that in the United States. The average candle power has increased from 16, which prevailed about 1905, to over 60. The average number of watts consumed, however, has remained practically stationary at about 55. This shows that the present lamp has about four times the efficiency of that of 18 years ago. The work was prepared by Henry Schroeder of Harrison,

Powdered Coal for Malleable Iron Melting Furnaces

The Dayton Malleable Iron Co. has decided to employ powdered coal in connection with its melting furnaces, of which are 14 at its plants at Buffalo, Dayton, Ohio, and Ironton, Ohio. The Fuller-Lehigh Co., Fullerton, Pa., is to provide the equipment and apparatus, and three complete plants will of course be required, including the usual distributing machinery, appliances and furnaces. The use of the powdered coal may be extended to the 84 annealing furnaces in the three plants, but attention will first be given to expediting the installation for the melting furnaces.

Steel Furniture Shipments

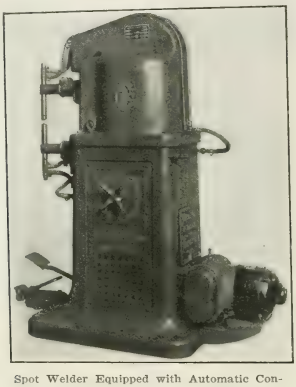
WASHINGTON, Nov. 27.—The Department of Commerce announces October shipments of steel-furniture stock goods, based on reports received from 22 manufacturers. Shipments amounted to $1,365,600 in October, as against $1,273,259 in September, and $1,227,447 in October, 1922.

Stresses in welded and riveted steel tanks under hydraulic pressure have been investigated by the Bureau of Standards and the results are available in Technologic Paper No. 243 for sale by the Superintendent of Documents, Washington, at 5 cents a copy.

Automatically Controlled Spot Welder

A spot welding machine equipped with automatic control, permitting of high-speed operation, is being marketed by the American Electric Fusion Corporation, Chicago. The range of the machine, which is illustrated herewith, includes production welding operations from the welding of fine wire to the joining of comparatively heavy sheet steel.

With the automatic control provided, the current is turned on and off, and the pressure applied, by the controlling mechanism. The current is applied to a certain definite spot only and in just the quantity and for the length of time necessary. Because of the intense heat and the rapidity with which it can be generated, it is claimed that thousands of welds an hour can be made on small, light stock.



Spot Welder Equipped with Automatic Control. One or a series of spots may be obtained by foot treadle, or operation may be continuous

The welder is driven by a Westinghouse type A. R. S. repulsion-induction type motor operating at a speed of approximately 1100 r.p.m. Mounted on the motor shaft is a quadruple thread worm, meshed with a worm gear, giving a primary reduction between the motor and the lower drive shaft of the gear housing of 1 to 10, which, with equal gears, drives the welder at the rate of 110 spots a minute. Two other gears of the lathe change type are provided, which permit a minimum speed of 80 spots and a maximum speed of 140 spots a minute. Other combinations of gears to suit the work in hand may be used. By substituing a double or a single thread worm and gear in place of the quadruple, a reduction down to 13 spots a minute may be obtained. If a quick change drive is desired, a quick shift attachment with nine steps may be used, giving a range of welding speeds from 20 to 120 spots a minute.

The foot treadle control for starting and stopping the welder is arranged so that one or a series of spots, depending on the kind of work, may be obtained. When the control is fully engaged, the operation is continuous.

Prospectus of World Power Conference

Prospectus of the world power conference to be held at the British Empire Exhibition, Wembley, London, June 30 to July 12, 1924, the first gathering of this kind ever held, has been issued by O. C. Merrill, Federal Power Commission, Washington, general chairman of the American committee. The conference is promoted by the Council of the British Electric and Allied Manufacturers' Association in cooperation with the technical and scientific institutions and industrial organizations of Great Britain and other countries.

The purpose of the conference and the personnel of the American committee were given in THE IRON AGE of Aug. 16, page 408. The outline of the program calls for five divisions under the following classifications: Power resources, power production, power transmission and distribution, utilization of power, and a general division, embracing a number of subjects which are likely to be of primary interest at the conference, but which do not lend themselves to classification in the other divisions.

Papers for submission to the conference will be printed and distributed by the British committee to the members of the several national committees sufficiently early to allow examination and study prior to the opening of the conference. These papers will not be read, but the sessions will be devoted to oral discussions of the subjects with which they deal.

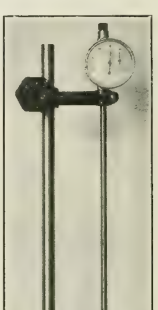
Smoke Abatement

Experimental work by the Bureau of Mines in the elimination of smoke from railroad, industrial, and domestic fuel consumption has shown that it is perfectly feasible to get rid of the greater part of the nuisance. A 32-page pamphlet just issued by the bureau shows by comparative photographs conditions before and after certain campaigns operated and, by diagram, methods of firing in various types of furnaces, by which the fuel is used economically and practically without smoke.

Special Dial Indicating Gage

The special indicating gage illustrated, which was built by the Federal Products Corporation, Providence, for a manufacturer of elevators, represents an unusual attempt in the manufacture of indicators.

The rack is 20 in. long from the bottom point to the bracket and is cut the entire length. The indicator hand makes 20 revolutions to the full stroke of the rack, and the necessity for close accuracy in cutting this rack to take care of the long travel is obvious.



Close Accuracy in Cutting the Rack Is Feature of Gage

A course of seven lectures for superintendents, foremen and others associated with industrial plants, has been mapped out by the Baltimore Safety Council, of which Paul F. Stricker is director. The first will be given on Dec. 14, by John A. Oartel, director of safety for the Carnegie Steel Co., Pittsburgh. His subject will be "Why Safety Work Pays." The other lectures are: Jan. 4, "The Design and Construction of Safeguards," F. S. Benedict, Norwich Wire Works, Providence; Jan. 18, "Safety as a Community Asset," A. S. Goldsbough, general secretary, Merchants and Manufacturers Association, Baltimore; Feb. 1, "Where You and I Fit in the Promotion of Safety Work," Frank E. Morris, Liberty Mutual Insurance Co., Boston; Feb. 15, "Organizing the Industry for Safety;" Feb. 29, "Plant Conditions, Arrangement, Order, Lighting, Sanitation," E. S. Chapin, Pennsylvania Railroad, Philadelphia; March 14, "The Foreman, the Keystone of Modern Industry."

Open-Side Planer With Three Ways

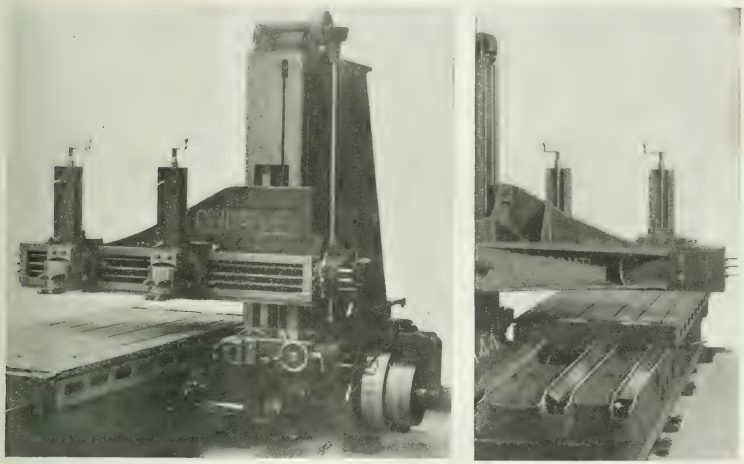
A special planer having a bed with three ways, two vees and one flat, as shown in the accompanying illustration, has been built recently by the Cincinnati Planer Co., Cincinnati. In this machine the box table has five T-slots for clamping purposes and is also equipped with a table clamp and inner guides to prevent lifting or tilting of the table out of the track. Forced lubrication is provided for all of the ways, a reversible pump forcing the oil into the ways directly under the tool. To prevent dirt from getting into the ways provision is made for straining the oil before it is recirculated.

The rail is of the extended type and is designed to take the strains when cutting at the extreme end. The knee is of the same outline as the rail and is bolted and doweled securely. For clamping against the column large T-slot blocks, which are the full length of the knee bearing, are employed, a construction intended to assure maximum stiffness of the knee and rail.

The heads, which are equipped with rapid power traverse in all directions, are unusually long so that they may be used to plane with the cutting edge of the tools some distance below the rail.

With this construction it is claimed that the slide will have full bearing on the harp at all times and that the down-feed screw is always in tension. The rail is equipped with power elevating device for raising and lowering, and a limit stop is provided to prevent the rail from being raised beyond its maximum height. The column is braced and ribbed on the inside in a manner intended to prevent distortion. In addition to being bolted and dowelled to the bed, a large tongue cast integral with the bed fits a groove in the column, which further provides against its moving.

Power rapid traverse is provided for the side head to permit it to be raised or lowered by the pulling of a lever to engage the traverse mechanism. The slide is equipped with a hand wheel which is claimed to be a more convenient means for hand adjustment of the side head slide, particularly when reaching to the extreme inside limit of its travel.



Special Planer Equipped With Bed Having Two Vee and One Flat Ways. The bed construction may be noted from right hand view

Brinell Numbers, for Non-Ferrous Metals, Which Are Comparable

With a view to drawing attention to the desirability of authors expressing Brinell numbers for non-ferrous metals in figures that may be comparable, Dr. H. W. Brownson, in a paper, "Brinell Hardness Numbers," presented at the annual fall meeting of the Institute of Metals in Manchester, England, Sept. 11, said that this is not a difficult matter, seeing that the desired result is obtained if balls and loads are used for which the ratio $\frac{L}{D^2}$ (the load in kilogrammes divided by the square of the ball diameter in millimeters) is constant. In the past this simple expedient appears to have been neglected by a large number of authors. Dr. Brownson quotes some 14 different values for $\frac{L}{D^2}$ to be found in the pages of the *Journal* of the Institute. Unfortunately the numbers found with one ratio for $\frac{L}{D^2}$ are not convertible to the numbers that would be given using a different ratio, since the differences in Brinell numbers not only vary with the value of $\frac{L}{D^2}$ but are also different for different metals, and again different for the same metal in various degrees of hardness.

A diagram is given showing some of these differences for copper, 97:3 copper-zinc and 70:30 brass. The only solution of the difficulty lies in agreeing upon some one ratio for $\frac{L}{D^2}$ to be invariably used for one class of alloys, and the author suggests that the choice for the large group of copper alloys with Brinell hardness numbers from about 40 to 200 should rest between the ratio as standardized in the United States and the ratio which is favored in some quarters in Great Britain.

The paper constitutes a plea to put Brinell numbers in line with other scientific data so far as their value for comparative purposes is concerned.

Czecho-Slovakia's Great Steel Works

Diversified List of Outputs of Finished Products of Witkowitz Plant—Installation Changes Effected Since the War —More Than 25,000 Men Employed

BY CAPT. GODFREY L. CARDEN

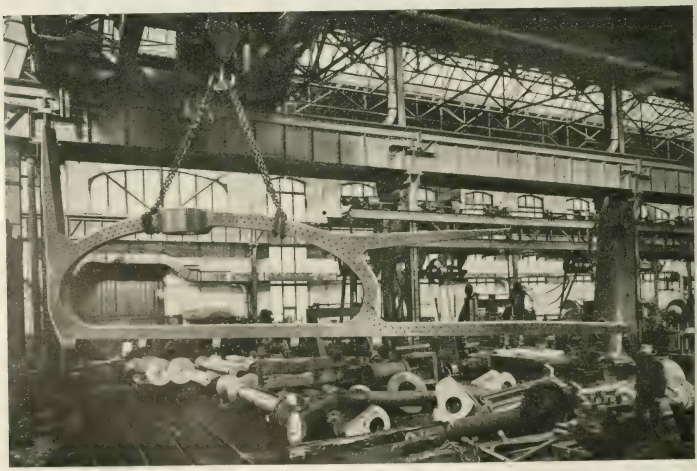
IN the past summer, I am informed, the Witkowitz works were working about 26,000 men. In February last, when I visited this plant, the number was 14,000. The Ruhr occupation accounts largely for the increase.

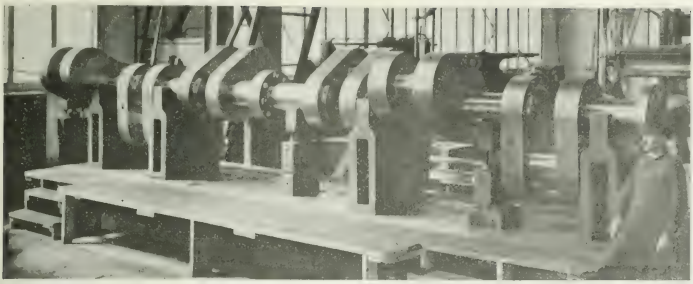
Witkowitz is one of the largest iron and steel plants in all Europe and one of the most modern in layout and equipment. The full name and address are Witkowitz Mines, Steel & Ironworks Corporation, Witkowitz, Moravia, Czecho-Slovakia. In the general scheme of



(Above) New Rolling Mill With 280-Mm. (11-In.) Continuous Roughing and Finishing Stands

(Below) Stern and Rudder Frame of a Single-Screw Steamship With Rivet Holes Ready for Attaching of the Side Plating of the Hull





Crank Shaft of Six Throws, Coupled at Center

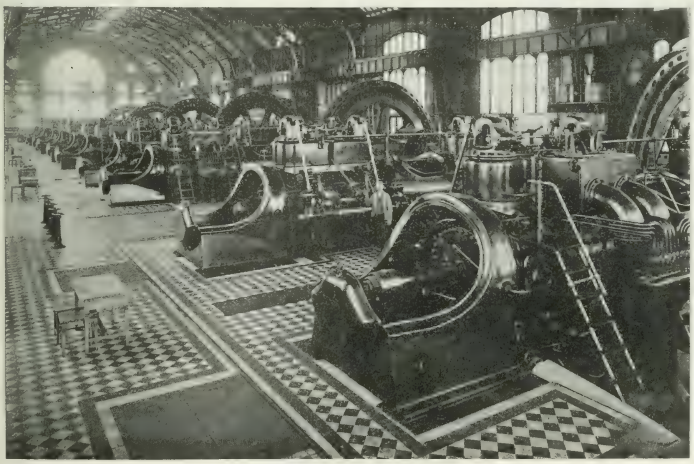
production the works resemble the Krupp works at Essen, but differed from Krupp before the war principally in the fact that gun construction was not undertaken. Heavy gun forgings were produced, but in the main these forgings were worked up by the Skoda works.

While Witkowitz was an Austrian establishment during the war, the Versailles Treaty has included it in Czecho-Slovakian territory. The armor plant, always an important part of its equipment, remains intact. While the Essen shops have undergone a marked change since the war, as described in a previous article in THE IRON AGE (March 15, 1923) the Witkowitz changes have been along the lines of expansion rather than the taking on of new production.

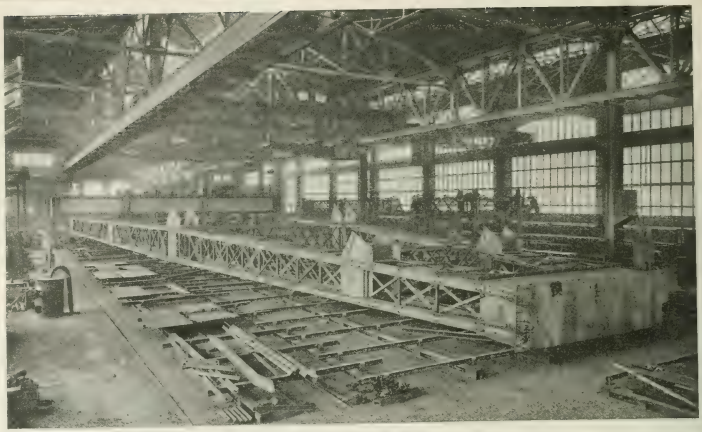
Now, as before the war, output embraces pig iron for castings and open-hearth steel, cast iron parts, steel castings for machinery and for shipbuilding, nickel steel of all kinds, wheels for locomotives and tenders, crucible steel ingots, boilers, bridges and construction work of all description, plates of largest size, including armor plate, plates and sheets from 2 mm. (No. 14 gage) upward, blooms, billets, slabs, skelp for tube manufacture, material for weldless tubes, rods, flat, broad and universal iron, cold rolled material, girders (I-beams) up to 500 mm. (19⅝ in.) height of web, railroad material of all kinds, solid drawn tubes, pipes, fireproof bricks and tiles, and complete plant installations for mines, foundries, coke and gas works.

My observations are based on a two-days' inspection, for which the first director, Dr. Ing. J. Puppe, whose writings on rolling mill practice are well known in the United States, accorded every facility. The works are the property of S. M. von Rothschild and Gebrüder Gutmann, of Vienna, and are in charge of General Director Dr. Techn. A. Sonnenschein. I hardly recognized the plant, which I had previously visited in August, 1909. The expansion has been very great and, in February, when work was slack, Dr. Puppe was taking advantage of the lull to tear down old structures and carry out new building programs. Since my previous visit I found that many new plants had been erected, mainly the following:

1. New steel works and rolling mill.
2. Mannesmann tube rolling mill.
3. Cold rolling mill.



Gas Engines in Central Power Station

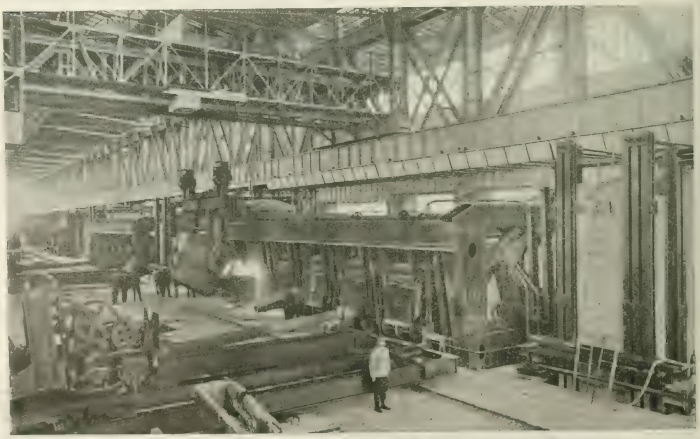


Fabricating a Bridge Tower

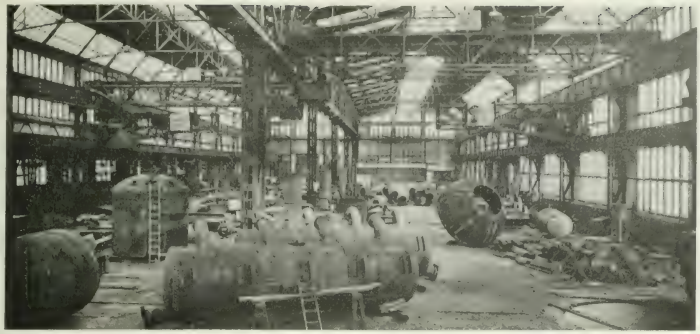
4. Electric power stations Nos. 3 and 4.
5. Foundry for heavy castings up to 100 tons.
6. Two mechanical shops for steel castings and forgings.
7. Railroad car wheel workshop at the engineering works.
8. Bridge building shops.
9. Boiler shops.
10. Press work department.
11. Coking plant of 86 ovens.
12. Benzol plant.
13. Dwight-Lloyd ore dust agglomerating plant.
14. Loading plant for ores.
15. Electric pumping plant at the Oder River.

In addition to the foregoing there was in course of construction a gas holder for the waste gases of the blast furnaces, with a normal capacity of 50,000 cu. m. (1,765,000 cu. ft.) and a maximum by telescoping of 100,000 cu. m. (3,530,000 cu. ft.). Further expansions are represented in the building of a fourth blast furnace at Sofienhütte and the development of the company's private railroad to a length of 147 km. (91 miles) of full gage track.

In 1909 the blast furnaces were divided into two groups—one at Witkowitz proper and a second at Sofienhütte. There were seven furnaces and 30 Cowper stoves, eight blowing engines driven by steam and three



Charging Floor in Open-Hearth Department, Showing Pouring of Liquid Metal into One of the Three 200-Ton Tilting Furnaces. The two charging machines shown have pivoted carriages, permitting the piel to be swung to any desired horizontal angle



Pressure Tank Work

by gas. Spathic and brown iron ores were obtained then as now from upper Hungary. Swedish magnetite and apatite were also brought in, lixiviated copper pyrites and manganese ore from Bosnia, Bukovina, Hungary, and other countries.

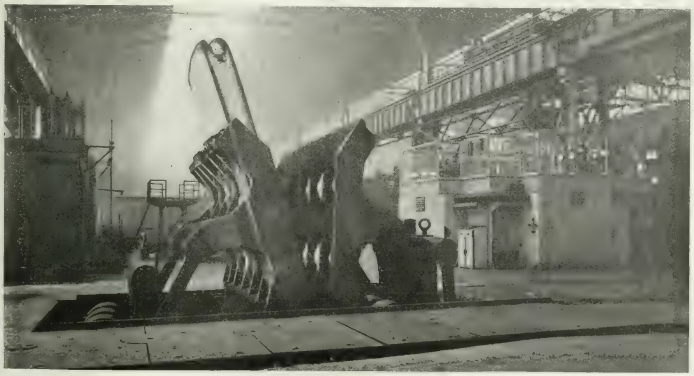
Large Dependence on Talbot Furnaces

During the war Witkowitz turned out as high as 1400 tons of projectiles and other material a day. This output was secured from 22 open-hearth furnace heats averaging 63 tons each. The peak was reached with 24 heats of 63 tons each, but this record was beaten in May last when one day's output was 29 heats of 63 tons each, or 1827 tons. This production was obtained from three (of the four) Talbot furnaces of 200 tons each, one Talbot mixer of 300 tons, one tilting furnace of 60 tons and three Siemens-Martin furnaces of 60 tons capacity.

During my visit the Talbot furnaces were working with 65 per cent of liquid basic pig iron and 35 per cent of scrap. With these charges the average daily output of one Talbot furnace covering a period of a month was 300 tons; the maximum was 315 tons. The composition of the charges was governed by the scrap market and the price of basic pig iron. For a time the plant was compelled to melt in the Talbot furnaces 80 per cent of scrap with only 20 per cent of liquid pig iron. The daily production of one Talbot furnace under this régime was 250 tons. During the war a Talbot mixer was operated, of about 300 tons capacity, but after the war this mixer, which did not differ in construction from the Talbot furnaces except that its walls were not so thick, was operated the same as the other tilting furnaces. The production of the 60-ton tilting furnace is 220 tons per day, and of each stationary furnace, 180 tons per day.

Dr. Puppe informed me that he found he could do with the Talbot furnace all that was required for steel making at Witkowitz; in fact, he did not hesitate to say that if he had to rebuild the works, or to build another steel plant working the same material as now, he would install only Talbot furnaces.

In addition to the new steel works, which were erected between 1911 and 1914, and enlarged in 1915, there are two other steel plants with seven Siemens-Martin furnaces, one with two and the other with five furnaces, of capacity ranging from 12 to 35 tons. The production of these plants includes steel castings, forgings for machinery and shipbuilding, crucible and special steels, axles, tires, locomotive wheels, car disk



Armor Plate Turn-Over Table, in the New Rolling Mill Department



Looping Mill Rolling Band Steel

wheels cast or forged, war material, boiler end plates and pressed plates.

Annual steel ingot capacity amounts to 450,000 tons in the new works and 150,000 tons in the two older plants, or a total of 600,000 tons. The slag can be put down at about 90,000 tons per year, the greater part of it being worked over in the phosphate mills and reduced to phosphate powder.

Witkowitz must export 70 per cent of its capacity in order to run full; Czecho-Slovakia cannot absorb, it is declared, more than 30 per cent. Before the war, when the works were in Austrian territory, the output was largely absorbed in the dual monarchy. Today it needs only the temporary suspension of German custom duties to enable the German works east of the Ruhr to take full advantage of Moravian steel.

The new steel works, erected since the beginning of the war, are located 2½ km. (1½ miles) west of the old plant; the total ground covered amounts to 160,000 square meters (39 acres.) In addition to the four Talbot furnaces and four 60-ton furnaces, there are two furnaces of 4 tons capacity each for the melting of ferromanganese. Hot metal is brought from the blast furnaces in ladle cars of 30 tons capacity to the charging floor of the open-hearth department, where the car is lifted by crane to a spout on the charging side of the furnace. Ore, lime, scrap, etc., are handled by four charging machines. The high-phosphorus slag flushed from the charging side of the furnace is carried away by a narrow-gage car. The tapping of the charge is made in four ladles of 65 tons capacity.

In addition to the four charging machines there are, on the charging side of the furnace, two 50-ton traveling cranes. The tapping side has three traveling ladle cranes of 80 tons each, and one traveling crane of 50 tons capacity, the track for which lies above the track of the three ladle cranes. This tapping pit has the highest roof in the steel works, the height being 30 m. (98 ft.) and length 278 m. (912 ft.).

Generating Gas

Producer gas for the furnaces is made in a central generating plant built for the new steel works. In addition, the furnaces receive gas from the coke plants located in Witkowitz and Mahrisch-Ostrau, through an underground pipe line 4 km. (2½ miles) long. The gas is stored in a newly installed gasometer of 5000 cu. m. (176,500 cu. ft.) capacity. The central gas producing plant consists of 27 producers of 2600 mm. (8½ ft.) diameter. Each has a gasifying capacity of 16 tons of pit coal in 24 hr. The coal is transported by two cranes.

In connection with each producer is a gas cleaner 3500 mm. (11½ ft.) in diameter. The main gas channel leading from under the cleaners is divided by partitions, so that each steel furnace can be supplied with gas from its own producer group, and arrangements have been made whereby the separate groups of furnaces can be joined up.

Steam for the gas producers is obtained from boilers supplied with the waste heat of the Talbot furnaces. These boilers have a heating surface of 650 sq. m. (7000 sq. ft.) and are fitted with superheaters and economizers. The supply here is such as to furnish hot water for the entire plant. The actual output per day per Talbot furnace is 310 tons steel and 5500 kg. (12,000 lb.) steam per hr. from each heating boiler. These boilers are constructed on the Garbe system.

Steam from the heating boiler is used for the steam consumption of the 39 gas producers in the new steel and rolling mill plant. The surplus steam of 18 atm. (265 lb. per sq. in.) that cannot be used in the gas producers will be taken by a turbine, now in erection, for electric power. As a result of experience, it is intended to equip all furnaces with waste-heat boilers. The production of steam from all furnaces of the new steel works will be great enough not only for the 39 gas producers, but also to generate electric power in a turbine. It is intended in this way to obtain 40 per cent of the electric power necessary for the drives of the rolling mills, cranes, etc., in the new works.

As a side line, the new steel works has a lime furnace with a working capacity of 90 to 100 tons of lime per 24 hr. There is also a dolomite plant equipped with two hauling furnaces, each of which produces 25 tons of burnt dolomite per day. There is also a basic and acid mill for quarry work.

Reheating Furnaces

Ingots are transported hot by a small track to five reheating furnaces under floor, which are installed in a separate building between the steel works and the rolling mills. There are three stripping cranes for charging the ingots into the gas-fired furnaces, where they remain 45 to 90 min. After being reheated, the ingot is placed on a tilting chair, as usual, and thence rolled through the blooming mill.

Rolling Mills

Probably as fine as any that can be found on the Continent, the new rolling mills have automatic recorders installed for practically every phase of work performed. These telltale graphs are scanned by the works manager periodically, so that he is able to determine accurately just what performance is going on. All rule of thumb and haphazard method is eliminated, every stage of the work being reduced to mathematical exactness.

The rolling mills comprise: One 1000-mm. (39⅜ in.) blooming, one 4.5-m. (177-in.) armor plate mill, one 3.2-m. (126-in.) coarse plate two-high mill, one 2.3-m. (90-in.) plate three-high mill, one 1.8-m. (71-in.)

(*Concluded on page* 1553)

MECHANICAL ENGINEERS MEET

Urge Federal Tax Reduction Demand for Engineering Activity in Politics

Endorsement of Secretary Mellon's tax reduction plan was unanimously voted by the council of the American Society of Mechanical Engineers at its meeting in New York, Dec. 3. W. S. Finlay, Jr., New York, vice-president of the American Water Works & Electric Co., speaking at length for the motion, emphasized among other things that "The average engineer's only capital is represented by his brains and his energy. Every year he draws down on this reserve fund of vitality, but an examination of the Treasury regulations fails to disclose any depreciation allowance on this account."

The society is holding its annual meeting this week. The first formal session, Monday evening, was given over chiefly to the presentation of the presidential address by John L. Harrington, consulting engineer, Kansas City. The election of officers for the ensuing year was announced, and a diploma and medal was presented to Past President John R. Freeman, Providence, in recognition, particularly of his contributions to the problems of fire prevention, and to Frederick A. Halsey for his wage payment studies dating from the eighteennineties. The list of officers has already been given in these columns. The new president is Fred R. Low, editor of *Power*.

Need of Engineer in Politics

Mr. Harrington in his address declared that "False social ideals are hampering industry and the dominance of the lawyer is retarding political development. Apparently it is expected that the native American, with his superior cultural education, will make his way by his wits without soiling his hands. Engineers know these conditions and know their detrimental effect upon men and upon the economic welfare of the country. It is their obligation to present the truth and to press for the reform of our educational system to conform to it.

"The employer is not to be blamed," he continued, "if he demands that the door be opened to foreign labor when he finds it impossible to satisfy his requirements at home. We have seen the building trades throttled, our housing needs unsatisfied, by the extravagant labor costs resulting from restriction in training and apprenticeship so severe that these crafts will almost die out with the present generation of workmen."

"Our country is still governed by the military and the legal professions, influenced somewhat by the business man," added Mr. Harrington. "Every president, except Harding, has been a general or a lawyer, while the latter not only occupies his peculiar field, the judiciary, but dominates in the legislatures and in the executive branches of the Government. These facts have materially retarded the progress of political development, for the lawyer lives by precedent. His eyes are always upon the past. It results that we progress slowly, that order and rule are deemed more important than service and progress. The engineer with his constructive, creative, scientific mind is sorely needed."

Prizes Awarded

Announcement of awards of prizes was made yesterday. Prof. John Airey, University of Michigan, received a life membership for a treatise on "Art of Milling." The society's junior prize went to S. S. Sanford, Detroit, for his paper on "Elasticity of Pipe Bends." One student prize was bestowed upon Charles F. Olmstead, Minneapolis, for a paper on "Oil Burning for Domestic Heating," and another to Herbert E. Doolittle, San Diego, Cal., for a paper on "The Integrating Gate," a device for gaging in open channels.

Graphical Study of Journal Lubrication

Two papers presented at the general session Dec. 4, although more or less of the nature of progress reports of the scientific investigations, were actively discussed.

One of these was by H. H. S. Howarth, general manager and chief engineer, Kingsbury Machine Works, Philadelphia, presented under the title of "A Graphical Study of Journal Lubrication." The hydrodynamic theory of lubrication, first developed by Osborne Reynolds and subsequently simplified by W. J. Harrison, forms the basis of the exposition. An attempt is made, in the paper, to express the theory in a way that will be easily applicable to the solution of practical problems. The paper visualizes the characteristics of the oil film and the pressures within it for a journal completely surrounded by its bearing. The influences of clearance and viscosity upon the journal friction were quantitatively shown by means of a chart that can be used for designing bearings. Examples solved by means of the chart were given. A few of the characteristics of the journal partially surrounded by the bearing were also shown by curves. It was stated that the study of partial bearings is not as yet completed.

There were eleven separate discussions of the paper, four of which were written. Questions regarding the lubrication of locomotive crankpins were asked by W. Elmer, Pennsylvania Railroad, Altoona, Pa. In reply to several criticisms that the paper was too scientific for use in solving lubrication problems in a practical way, Mr. Howarth pointed out that the paper covered only the beginning of an investigation which will at the end be compared with practical results as determined by means of testing machines.

"Stress Distribution in Rotating Gear Pinions as Determined by the Photoelastic Method" was a paper by Paul Heymans, Massachusetts Institute of Technology, and A. L. Kimball, Jr., research laboratory General Electric Co., Schenectady. The paper presented further results of the scientific study undertaken by the General Electric Co., for the development of better electric railway motor pinion and outlined the continuation of the work started and reported upon before the Society last year. The work described was performed at the Massachusetts Institute of Technology. Its object was to find out the effect of rotation of a pinion on maximum stress for different speeds of rotation. It was emphasized that the results given are from preliminary observations.

Mr. Kimball explained the photoelastic method and with the aid of lantern slides described the apparatus employed in the test. The maximum tensile stresses occurring at the root of the tooth in mesh have been measured for different speeds. From the table and chart of results shown it was to be noted that there is an increase in maximum stress due to rotation, amounting to nearly 100 per cent increase for a speed of 1250 r.p.m. Active discussion followed the presentation of the paper, centering for the most part on factors to be taken into account as the test proceeds.

Robert Sibley, vice-president of the society from San Francisco, presided at this session.

A paper on the bending and torsion of multi-throw crankshafts on many supports, by S. Timoshenko, research department Westinghouse Electric & Mfg. Co., East Pittsburgh, was read by title.

Increase in Dues Proposed

At the business meeting Dec. 4, a motion was carried to submit to the membership a proposed change in the constitution permitting an advance in dues to $20 for member, associate, and associate-member grades. The annual report of the council revealed that the present membership of the Society is in excess of 18,000. Several standards, read by title, were approved.

Other sessions held Dec. 4 included a joint session with the American Society of Refrigerating Engineers; a session under the auspices of the textile division and the fluid meters session, which was an open meeting for discussion of Part II of the report of the special committee on fluid meters. A public hearing on power test codes for stationary steam generating units and for locomotives was held.

The outstanding features of the machine shop practice management and other sessions to be held Dec. 5 and 6 will be reported in a forthcoming issue of THE IRON AGE.

Nominating Committee

A committee to nominate officers for 1925 was appointed in accordance with the rules, thus to give the committee plenty of time to ascertain sentiment in the

membership and to make a final selection calculated to provide the best timber available. The officers just elected were chosen by a nominating committee of a like period of existence. The committee will include William R. Webster, Bridgeport Brass Co., Bridgeport, Conn.; Kingsley L. Martin, New York; Charles Loeber, Richmond, Va.; R. G. Nye, Buffalo Steam Pump Co., North Tonawanda, N. Y.; William M. White, Allis-Chalmers Mfg. Co., Milwaukee; E. W. Burbank, Allis-Chalmers Mfg. Co., Dallas, Tex., and Bruce Lloyd, of Henry Lund & Co., San Francisco. The alternates are respectively as follows: R. Sanford Riley, Worcester; John H. Lawrence, New York; L. P. Hood, Washington; James Guthrie, Cleveland; W. S. Reed, Indianapolis, and Wynn Meredith of Sanderson & Porter, San Francisco.

EXPORT TRADE QUIET

Manchuria Buys 22,000 Tons of Rails—Japanese Merchants Buy in Europe—Russian Buying Rumored

NEW YORK, Dec. 4.—Inquiry from foreign markets is light. The few Japanese merchant orders that are current are, according to reports, being secured by Continental sellers. The Chinese market is quieter. Importers of iron and steel believe that it may be possible to sell Continental rails in the United States, in small quantities, as a result of delayed deliveries here, but European prices are still too high to permit of profitable transactions. The South Manchuria Railway Co., which has awarded the 70 miles of 100-lb. rails (about 11,000 tons) recently inquired for, to Suzuki & Co., New York, has placed a duplicate order with the Mitsubishi Shoji Kaisha, European office, which was divided between Belgium and France at a price delivered Japan, said to be about 10 per cent under the American quotation.

The only inquiry of any size reported current from Japan is for parts and materials for the construction of locomotives. Although anxious to import as much material as possible before March 31, 1924, when duties on iron, steel and other material are again imposed by the Imperial government, dealers are evidently confining their present purchases to a price basis, until the position and range of activities of the government as a competitor in iron and steel is completely known. In some quarters it is believed that there is a possibility of an extension of the period of free imports of certain commodities.

Rumors of extensive inquiries and purchases in the United States by Russia continue. It is stated by importers that no aluminum is being offered for export by French makers, and with German production at a low ebb, there is no immediate prospect of imports of the foreign product into this country.

CONDITIONS IN ENGLAND

Serious Effects of the War Still Felt—New Developments in Steel

Roy G. Davis, general manager Firth-Sterling Steel Co., Pittsburgh, who recently returned from a trip to Sheffield, England, when asked what he had observed in regard to industrial conditions in England, said:

"In Sheffield the steel manufacturers state that the steel requirements of the English shipbuilding industry are the backbone of the steel business. The Washington disarmament agreement has practically stopped the building of ships for naval purposes. However, there is at present considerable interest in the bidding for the construction of two battleships which are allowed by the Washington agreement.

"When the war ended, it left more than a necessary number of merchant ships and the acquisition of certain German vessels has more than supplied the after war requirements. Opinions were expressed that the manufacturing conditions in England would have been improved if the German merchant ships had been destroyed and shipping requirements supplied by the building of new ships.

"One large shipyard on the Clyde was visited where very little work was in progress; in fact, they were building only one medium sized merchant ship. These conditions prevail throughout the ship-building industry and this has naturally been a hard blow to the steel industry.

Many Out of Employment

"At the present time, in Sheffield, there are between 25,000 and 30,000 men out of employment. These men are receiving doles from the Government at the minimum rate of 25 shillings per week. Probably among the unemployed there are a number who are glad to continue in idleness at the Government's expense, but the large majority would be glad of an opportunity to work.

"The world war took a large number of young men in the formative period of their lives before they had obtained training or experience in productive work. During the five years since the ending of the war, they have not had the opportunity of getting this experience and idleness in the meantime has not helped toward proper development. One of the problems which England must face when business becomes better is the training and assimilation of these young men.

Most Heavily Taxed

"At the present time the English people are probably more heavily taxed than any other people in the world, but they seem to be meeting these conditions with optimism and approval of the efforts of their Government in reestablishing their credit and in paying their indebtedness. They are doing everything possible to economize and it is only after close observation one is able to note a difference in their living conditions as compared with what prevailed before the war.

"This influence of economy has had a marked effect on the development of their automobiles, which are of light weight, low horsepower, with high speed motors, giving about 50 per cent better economy than obtained with the average American cars. The motorcycle has developed along the same lines as the automobile; that is, toward light weight and economy of operation. For a week in the month of October, a motorcycle show was in progress in London and it was a surprise to note the large number of English manufacturers making motorcycles. However, indications point to more interest in automobiles and it would not be surprising to see a development of the automobile in England somewhat paralleling its development in the United States. A moderately priced and well made English car is now being placed on the market with results that indicate a potential market.

"In personal conversation, the Englishmen are in full sympathy with France and her troubles. Looking at the problem, however, from the broad viewpoint, they point out that other policies are necessary under the present conditions.

Stainless Steel for Turbine Blades

"Probably the most interesting development in the steel business is the progress which Sheffield has made in the development and application of stainless steel. New applications of this material are being continually made and stainless steel has proved itself to be the greatest development in steel since the discovery of high speed steel. It is being used more and more for general engineering purposes and has been adopted by practically all the turbine manufacturers in England and on the Continent for turbine blades. Large quan-

tities of it are being used not only for land turbines but also for marine turbines and the results which have been obtained are far and away better than any material which has been previously used.

"Stainless steel cutlery has supplanted the ordinary cutlery steel to a large extent and at the present time probably three-fourths of all cutlery manufactured in England is of stainless steel."

LUXEMBURG MARKET DEPRESSED

Profit Dwindles as British Coal Is Purchased—In October 27 Blast Furnaces Active

LUXEMBURG, Nov. 22.—Prices, which appeared to be a little firmer during the last few days of October, since the beginning of the month have declined slightly. It seems to be generally believed that the October firmness was a result of the increase in receipts of Belgian coal. Fear of encountering German competition in foreign markets has led some plants to quote low prices without, however, attracting the attention of buyers. This weakening of quotations has been reflected in the condition of the Luxemburg plants to such an extent that there is today practically no margin between cost and selling prices. Decline of the market seems to have ceased for the past few days and the last movement of exchange contributed to a slight revival of business. Fairly large orders have been placed but plants are so short of tonnage that this had no effect on prices. The rise of the pound sterling has an immediate unfavorable effect on costs, as most of the plants, unable to secure necessary supplies of coke from Belgium and the Ruhr, are forced to buy large tonnages from Great Britain. These purchases of foreign cokes will, however, permit an increase in production and one or two furnaces are to be blown in shortly.

Oct. 31 there were 27 furnaces in blast in Luxemburg. Production in October was as follows: Pig iron, 133,979 tons, of which 129,638 tons was basic. Steel ingots, 126,378 tons, of which 123,801 tons was Bessemer steel.

The following prices are quoted in Belgian currency and pounds sterling per metric ton:

	Fr.	
Cast iron, No. 3	430 to 435	$20.00 to $20.25
Ordinary Bessemer	420 to 425	19.50 to 19.75
Bessemer billets	620	28.80
Largets	650	30.25
	£ s. d.	
Beams	17 5s. to 17 7s. 6d.	31 46 to 32.02
Bars	7 12 6d. to 7 15	33.10 to 33.63

American Puddled Iron Co. Plans

YOUNGSTOWN, Dec. 4.—Active preparations are being made to begin operations in Warren at the new plant of the American Puddled Iron Co., subsidiary of the Youngstown Steel Co. It will produce mechanically puddled iron after a process developed through many years by E. L. Ford, a prominent Valley steel maker. The plant at Warren is located on a site of 418 acres and represents an expenditure of $2,100,000. It will have an initial capacity of 250 tons per day of muck bars, billets, slabs, blooms and sheet bars.

The Youngstown Steel Co. is now offering through underwriters $1,100,000 of 7 per cent convertible preferred stock, to provide funds for the American Puddled Iron Co. The financing will give the subsidiary concern a working capital of $600,000 with no debts. Mr. Ford is chairman of the board of directors, while R. C. Steese, formerly prominent in the Brier Hill Steel Co., is president and treasurer.

A lapweld mill in the tube mill complement at East Youngstown, Ohio, of the Youngstown Sheet & Tube Co., is being changed over into a buttweld unit. Increased demand for merchant pipe in the smaller sizes is responsible for the change, state officials. The Sheet & Tube company has also authorized two buttweld pipe mills for its Chicago property, while the Republic Iron & Steel Co. likewise plans an additional buttweld unit at its Youngstown property. The Sheet & Tube company is also installing a number of new threading machines at its pipe mill department in East Youngstown.

BIDS REJECTED

Navy Will Scrap Four Battleships—Makes Two Awards

WASHINGTON, Dec. 4.—Claiming that bids opened last Friday for the three battleships at Philadelphia and the one at Boston were too low, the Navy Department yesterday decided to scrap these ships itself and will cut the steel to size and sell it later. The ships at the Philadelphia yard are the Michigan, Minnesota and Kansas. The one at the Boston yard is the Delaware. Estimates of the Philadelphia yard, submitted by Capt. W. P. Robert, and of the Boston Navy Yard, submitted by Capt. C. M. Simmers, will, it was declared, based on the most recent price received by the Navy for armor and scrap steel, yield approximately $170,000 more for these vessels than if they were sold at the highest bids received.

The other two vessels for which bids were opened, the Vermont and Nebraska, were awarded to the highest bidders, Learner & Rosenthal, Oakland, Cal. These vessels are at the Mare Island, Cal., Navy Yard. The accepted bid for the Vermont was $41,110 and that for the Nebraska was $37,110. The awarding of contracts to scrap these six battleships disposes of all vessels that came under the treaty limiting naval armaments.

Weirton Steel Co. Made Record Production of Ingots Last Month

A world's record production of steel ingots from a plant of its size was made by the Weirton Steel Co., Weirton, W. Va., last month, when 50,431 gross tons were produced from seven open-hearth furnaces of a rated capacity of 100 tons. This showing compares with 49,300 gross tons, the best previous record, made by Weirton Steel Co. in March, 1922. Last month's output was made without any departure from the regular practice of this plant, except that the scrap charge was 2 per cent less than the amount hitherto used. Producer gas was the fuel. This plant has made more than 45,000 tons in a month several times in the past year.

All mills of this company were engaged at 90 per cent of capacity in November and it is not expected that operations will drop below 80 per cent during this month. The new sheet mill of the company, consisting of eight hot and four cold mills, which started early in October, now is running full.

"The Oxygen Lance in Blast Furnace and Steel Plants" is the title of an interesting booklet recently issued by the Linde Air Products Co., 30 East Forty-second Street, New York. It is evidently one of a series on the application of oxygen in major industries. It is brief, consisting of only 17 pages, and opens with a description of the oxygen lance itself, followed by the application of this lance to the blast furnace such as opening an iron notch, opening a slag notch, reopening frozen tuyeres, drilling salamanders, etc. This is succeeded by a description of the application of oxygen in steel plants, particularly in open-hearth furnaces where oxygen is used in opening the tap hole and also in opening frozen stoppers in steel ladles. The booklet closes with a short discussion on pipe layouts for furnace plants. There are several illustrations and the phraseology is of such a nature that it can be easily understood by the man in the mill.

Hearing in Bethlehem-Midvale Merger Case at Buffalo

BUFFALO, Dec. 4.—Hearings by the Federal Trade Commission on the Bethlehem-Midvale merger were resumed here yesterday after an adjournment taken last Wednesday. Examiner George McCorkle presided.

The same character of testimony that has marked previous sessions was developed at yesterday's session. The first witness was Morgan A. Dunne, secretary and treasurer of the Archbold-Brady Co., Syracuse. While Mr. Dunne's testimony was along the lines of preceding witness as to conditions prior to and since the merger, he would not commit himself to an expression as to the effect of the merger on his business. He did testify that unusual fluctuation in prices had occurred since July 1 this year.

On direct examination the witness stated that prior to the merger 90 per cent of his company's structural steel requirements was purchased from the Lackawanna Steel Co., but in 1921 a considerable portion of steel needs was purchased from the Bethlehem Steel Corporation. This change was made because the Lackawanna mills were not rendering sufficient service, he stated.

The hearings here will occupy another week, attorneys for the commission state.

Improvement of Nickel Plating on Steel

A program of nickel plating experiments is being undertaken by the Bureau of Standards with a view to finding the best possible process for making protective coatings on steel. A large number of specimens of steel are to be plated, and the procedure will be varied from the standard conditions in many different ways in order to test the effect on the product of these variations. After plating the specimens will be subjected to tests to determine their resistance to corrosion and to other adverse conditions that nickel plated ware is expected to meet. A few other tests will be made with nickel plating on brass and other metals in order to learn to what extent the results found for steel are generally applicable to other metals. From six months to a year will probably be required for the tests. The program is being carried out in cooperation with the advisory committee of the American Electroplaters' Society. Cold rolled steel is to be used for all the tests, as it is considered desirable to have them all made on one material and when completed, the deposits will be examined both directly and under the microscope. They will be tested for hardness, for their adhesion to the steel under such adverse conditions as bending, rolling, etc., and for the resistance they offer to corrosion under various conditions of exposure, both indoor and outdoor.

Appeal to Shareholders of Atlas Steel Corporation

In a letter to shareholders, directors of the Atlas Steel Corporation, Dunkirk, N. Y., urge them to take up their proportionate share of a $3,000,000 issue of 8 per cent cumulative stock, half of which is now being offered. It is declared that proceeds of the offering will put the company on a sound financial basis and enable it to continue operations.

"The directors and officers will do all in their power to save the corporation, but they cannot and will not do it without the support and participation of the stockholders," reads a letter issued on the subject, to shareholders. "If this attempt fails, the officers and directors will have performed their full duty toward all stockholders and there will be no escape from a liquidation of the corporation's affairs by its creditors, in which event, in the opinion of directors, the present outstanding stock will have no liquidation value."

Creditors have agreed to make long extensions of their claims in event the current financing proves successful.

It is pointed out that for the 12-month period ending Oct. 1, 1923, the company showed a net profit of $328,964, despite the handicap of insufficient working capital. Directors state officially it is their opinion that with a fair degree of general prosperity the corporation can work out of its present position and be successful.

Chairman Johnson to Introduce Immigration Bill in House

WASHINGTON, Dec. 4.—Indicating the efforts that will be made to enact immigration legislation at the session of Congress which was begun yesterday, Chairman Johnson of the House Committee on Immigration has prepared a measure which would change the basic year from 1910 as at present to 1890 and change the quota from 3 per cent to 2 per cent. The present law, unless extended, expires on June 30 of next year. The Johnson bill, which appears to have strong support in Congress, also would divide the immigrants into two classes, close blood relatives and other aliens. It is maintained by Mr. Johnson that the bill he has introduced will provide a system so that only desirable immigrants will be permitted to enter the United States. The measure would exempt parents and children of American citizens, students, ministers, and those in the learned professions. Husbands, wives and children of aliens with first papers would be admitted without regard to quota limitations upon application of the aliens. Immigrants proposing to come to the United States would be required to fill out a questionnaire obtained from American consuls along the lines recommended by Secretary of Labor Davis. Other members of Congress also are proposing immigration legislation.

Conference on Cast Iron Pipe Specifications

The subject of standard specifications for cast iron pipe was discussed at a meeting of a special committee of the American Engineering Standards Committee, Oct. 4, 1923, at the Engineering Societies Building, New York, as a result of which it was voted that the special committee should recommend "that the American Engineering Standards Committee call a representative conference on bell and spigot and flanged cast iron pipe and fittings, to consider the development of specifications covering dimensions and materials." This action resulted from a review of two sets of specifications for cast iron pipe submitted for the approval of the A. E. S. C., one by the American Gas Association and the other by the American Society for Testing Materials.

When the special committee examined into the advisability of giving to either or both of these specifications the status of American Standard, it was found that neither of the specifications seemed to satisfy completely the needs of all interests concerned in the establishment of such standards. After thorough discussion of all phases of the situation, the vote was taken to defer approval of the cast iron pipe standards already in the field, pending consideration of the subject by a conference fully representative of all having an interest in the subject. As a result of the committee's recommendations, the chairman of the A. E. S. C. was authorized, at its meeting on Oct. 11, to call the conference as outlined.

German Manganese and Chrome Ore Imports

German imports of manganese ore to Aug. 1 this year had been much less than a year ago. For the first seven months this year the total was 56,395 tons as compared with 170,801 tons to Aug. 1, 1922. Of the total this year 30,194 tons came from India and 13,385 tons from South Russia. Chrome ore imports into Germany this year to Aug. 1 had been only 3532 tons as compared with 16,189 tons for the same seven months last year.

J. H. Hopp, vice-president Charles C. Kawin Co., Chicago, will deliver an address before the Chicago Foundrymen's Club, Saturday evening, Dec. 8. The subject will be "Comparison of Physical and Chemical Control in the Reduction of Foundry Losses."

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES: Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

What Is Annealing?
What Is Tempering?

FOR over a year a group of committees from our large engineering societies have been discussing the nomenclature of heat treatment. They have been struggling with such questions as "What is annealing?" "What is tempering?" unfortunately without any prospect of reaching an agreement.

Nevertheless such an attempt is very much worth while. These questions are far from academic. Editors, of course, would be pleased to have precise definitions in their dictionaries, but makers and users of steel would be spared many annoying errors if each knew precisely what the others mean by the words they use.

Not so many years ago, when the softening of cold worked sheet or wire was about the only commercial heat treatment done (except the work of the blacksmith and the armor plate maker) one or two terms were all that were necessary for general conversation. More precise words and phrases used inside closely guarded shops became a local idiom or argot. But heat treatment is no longer a secret. Laboratory investigations and shop practices are published and discussed at length. The art has grown amazingly widespread. Nearly two million tons of alloy steel is being made annually in the United States, and its proper utilization depends upon closely controlled heat treatments, often quite complex. Some standardization of terms is therefore quite necessary, not only that specifications may be unambiguous, but that engineer, laboratorian and heat treater may not continually have to stop and say: "Normalized steel. Oh, yes! Now, what do you mean by 'normalized'?"

And the effort of these committees is timely. Some usages should be changed before they become more firmly fixed. For instance, aluminum foundrymen say they "temper" duralumin or alloy 17S when they heat it to 950 deg. Fahr. and cool it in boiling water. But this treatment (followed by short ageing) *hardens* the alloy; it is precisely equivalent to quenching a carbon steel from 1600 deg. Fahr. in brine. The same kind of internal changes are produced in each alloy and each is very much harder, stronger and less ductile than before. Yet the aluminum men have adopted a term for hardening which means a softening, toughening treatment to the steel man.

Apparently it is such questions as this that prevent joint action. Shall the definitions refer to the operation, or to the results to be obtained? Shall tempering refer to a mild heating followed by a moderately slow cooling, or shall it refer to some treatment — any treatment — that softens and toughens? If the former, the aluminum men are within the definition; if the latter, they could hardly miss it further.

One might almost doubt that it will be possible to bring such divergent views to a common meeting ground. If a sincere attempt fails, the next best thing is for some society with a powerful following to take the lead and publish its own definitions. As with the Automotive Engineers' system of numbering steel, they may not be perfect, but they will be very useful. If the work is based on sound premises, these definitions will acquire increasing vogue.

Remember the definition of steel. The late Dr. Henry Marion Howe spent a lifetime delving into the riddle, "What is steel?" He discovered thousands of facts; he kept informed of researches in all lands; he wrote volume after volume. When it came to defining steel, he used a long chapter of 13,000 words, classifying all the kinds of steel that have been made since the dawn of history. Unfortunately the result was a catalogue and not a definition. Yet Dr. Howe's own life work had established the necessary scientific facts to prove without question that steel is a malleable alloy of iron and iron carbide!

It is to be hoped, therefore, that the committees at work on nomenclature of heat treatment will not disband because unanimous agreement is lacking, or because it is impossible to be exhaustive in a definition compressed to a dozen words. They will do a great work if they give us some concise definitions for major operations, leaving something for adjectives to do in fixing the meaning more precisely.

THE recovery of the Belgian iron and steel industries since the war has been phenomenal. The pig iron output recently came up close to the pre-war rate and this has been done with fifteen fewer blast furnaces than in 1913, a good many

furnaces having been replaced with units of greater capacity. In steel even a better record has been made. In the last month for which there are official figures, more steel was produced than in any month since the war and the monthly average for either 1912 or 1913 has been exceeded. One authority describes the industry as "healthy, solid and flourishing." In exports also an interesting record has been made, their volume being considerably larger than before the war, the increase being due in part, to be sure, to the economic union with Luxemburg. The striking fact, however, is that Belgian exports have exceeded each month this year the total steel exports of the United States, though the little kingdom has a steel-making capacity hardly larger than is found in the Pittsburgh or the Chicago district.

Steel Exports at Low Ebb

WITH a record this year in pig iron and with steel production coming close to the record of 43,600,000 tons, it might be expected that our steel exports would at least equal those of normal peace times. However, thus far only a little more steel has been exported each month than in 1922, and the rate has been about 18,000 tons per month less than in the remarkably lean year 1921, at the same time lagging far behind 1913. The actual figures are 162,800 tons per month to Nov. 1 this year, as compared with 161,500 tons per month in 1922, with 181,000 tons per month in 1921, and with 241,000 tons per month in 1913.

Of further interest is a comparison with the British record in the same periods. For the first ten months of this year British exporters sent out more steel than in any year since the war, and indeed have fallen but 11 per cent short of the pre-war rate. To Nov. 1 this year, British exports have been 367,000 tons per month, exceeding by a comfortable margin the averages for the last three years—283,400 tons per month in 1922, 141,700 tons in 1921, and 270,900 tons in 1920. In 1913 British steel exports were 414,100 tons per month. While the British export rate thus has risen to about 88 per cent of the pre-war volume, our exports have fallen to about 67 per cent, with the proportion of the output exported the smallest in years.

As in 1913, domestic demand is the controlling factor here and the foreign market is secondary. While American exports have been declining, those of the British have been advancing. Even Belgium's record exceeds and that of France almost equals our own. The present domestic situation is favorable to an absorption of our greatly increased capacity, but the time is not far distant when a greater export business will be necessary. To secure this, however, lower costs will be essential, for the competition of European steel producers will increase rather than diminish.

THE 1923 imports of metallic tin at over 13,065,480 pounds per month to Oct. 1 already have exceeded the record of any year in the last ten. The figures are one index to the heavy demand for tin plate, although large quantities of tin are used in bearing metals, in solder, and in other ways. If the present rate is maintained for the last quarter, the year's imports will exceed those of the peak year 1917 by about 13,000,000 pounds. Besides heavier consumption, another factor in this increased movement is the shutting down of domestic refineries which had contributed about 1000 tons per month, or 26,880,000 pounds each year, to American consumption.

Inconsistency in the Scrap Market

THE course of the scrap market in the past two or three years — referring chiefly to the market price of melting steel scrap in the consuming centers—has been rather inconsistent with the accepted theory that as the steel industry grows older scrap becomes a more important commodity. It ought to fluctuate less and less as time passes, but the fluctuations in the past two or three years have been particularly wide.

From 1900 to 1910 the production of basic open-hearth steel ingots and castings was exactly sextupled, rising from 2,545,091 tons in 1900 to 15,292.329 tons in 1910. During that decade there was much concern lest the expansion in the use of the process should be hampered by a scarcity of scrap. The outcome of old material could not be expected to increase with anything like the same rapidity, while the Bessemer process, responsible for much works scrap, turned downward in point of tonnage after 1906.

Those early fears have proved groundless quite largely. Open-hearth steel can be made with little scrap, even with no scrap in a pinch, but the outcome of scrap relative to the current production of steel naturally tends to increase, because steel production does not have so great a percentage increase from year to year as formerly, and also perhaps because steel does not stay in service so long as formerly. At any rate, the automobile is a conspicuous case of a short life for steel.

That scrap is always going to be in requisition, will always have a consuming market, can be taken for granted. Scrap, and particularly heavy melting steel, is very easy to store. An important part of the cost of scrap, delivered, is made up of freight charges, which are not to be expected to fluctuate as commodity markets do. Considering all these factors, one should reasonably expect that market prices for scrap should fluctuate less than they used to do. If there had been steady market prices in the past two or three years it is certain that a very rational explanation for the steadiness would be presented and would everywhere be accepted.

The scrap market of late has not conformed to any such theory. One may ignore the statistical record of 1920, which was rather a weird year all around; but from the low point in 1921 to the high point in 1923 prices nearly tripled. In more recent history, the average decline in heavy melting steel scrap at Philadelphia, Pittsburgh and Chicago from the top last March to the recent low level was about $11 a ton, or between 40 and 45 per cent. Before the war the advances and declines were considerably less in point of percentage and of course much less still in point of dollars per ton.

The explanation of the inconsistency seems to be that users simply have not exercised in the case of scrap the judgment they bring to the forming of

policies in respect to other materials. When manufactured goods advance, men begin to think they may be going too high, and when they decline they finds an equalizing point. When scrap is advancing, everyone turns in to help it advance, and when it declines, everyone helps it to go lower. Not until something breaks is the market permitted to trend toward an equilibrium.

Paying Workers by Check

REPEATED hold-ups of paymasters carrying large sums of money have led to much discussion of the advisability of paying workers by check instead of in cash. Some firms have recently put the check system into effect, usually because they themselves have been victims of robberies of this character. Metropolitan Boston has suffered severely, and as a consequence President Clifford S. Anderson of the Associated Industries of Massachusetts has appointed a committee to make searching investigation of the check method.

Scattered over the country are plants in which employees have been paid by check for years. In these particular cases the system has proved satisfactory to the owners and presumably to the employees. But others have tried it and abandoned it. After the panic of 1907 the extreme scarcity of currency made paying by check a necessity, and many houses continued it after the emergency had passed. But finally most of them gave it up.

One of the reasons would not apply today. Then was the day of the open saloon, and it was found that a large per cent of the checks were cashed by saloonkeepers, as a matter of good business, because men stayed on and spent some of the cash they had received in exchange for the slip of paper. In some cities, where the saloons were controlled by commissions, rules were made which put a stop to this practice, but elsewhere such restriction could not be made. This condition, of course, is a thing of the past.

The storekeepers did not like the check system, for they felt obliged to accommodate their customers, which involved carrying large amounts of currency. The banks did not like it, for the additional bookkeeping required added to their payrolls. But the real reason for the return to the pay envelope and cash was because the workers themselves disliked to handle checks. To cash them was troublesome. Some of them did not like to take others into their confidence as to the amount of their earnings. The average industrial employee carries no checking account and is not in the same position as the salaried man.

In adopting the check system today the employer should consider carefully the means available to his employees for converting their pay checks into cash. If a bank has a branch close by the gates the problem is simplified. But men and women have little idle time as a rule during banking hours, and unless the visit to the bank can be made conveniently in the noon hour they are often compelled to resort to the storekeeper or landlord.

The automobile has made highway robbery easier and safer than it used to be, especially in remote districts. Where paymasters have to travel lonely stretches of country, payment by check may be well worth adopting. But in most cases the remedy lies in better precautions against robbery rather than in a change to the check system.

Upkeep of Equipment

MACHINERY is much better cared for than it used to be, in well-managed American shops and factories. The "repair crew" no longer exists in the old sense. The maintenance department now goes on the theory that "a stitch in time saves nine;" consequently so much of its work is along preventive lines that the real old-time repair job, the breakdown of a machine, is far less common. The cost of enforced idleness of equipment and operators has declined accordingly. It has been said that a maintenance department may become self-supporting, even if its labor is classed as "nonproductive."

Some machine breakdowns cannot be prevented, notably those which result from the carelessness or unskillfulness of the operator. But these are now a small minority. In the high class machine shops the operators themselves are usually good mechanics and able to keep their machines in the best running form, or at least to recognize trouble and report it. But in plants in which quantity production prevails, and most of the machines are of special type, operatives as a rule are not mechanics. They notice nothing until the machine goes wrong, or a working light goes out, or a belt begins to slip.

Inspection and the making of running repairs do not end here. Belts are watched closely in order that machinery may receive ample power but with no waste. Electric wiring is looked over where there is motor drive, that short-circuiting may not cause a shutdown. Lighting fixtures are inspected. Minor equipment, such as ladders and trucks, receives a looking-over at times. Where white paint is used to improve illumination it is kept white. Dirt is not permitted on window panes. The maintenance men should have an eye out for safety devices, too, not only to repair these if need be, but also to replace them if operators remove them to get higher production on piecework jobs.

An important factor in the system is fixing responsibility. A breakdown means an investigation. If the operator is to blame, that is one thing. If the maintenance men should have prevented the trouble, the case is quite different. They are held responsible not only for preventing the direct losses referred to, but also those which idle equipment adds by throwing production out of balance.

Source of Manganese Ore Imports This Year

Manganese ore imports into the United States by countries of origin, as reported by the Bureau of Foreign and Domestic Commerce, were as follows to Oct. 1, this year, in gross tons:

Brazil	74,098
Turkey in Europe	24,837
British West Africa	20,135
British India	13,352
Russia in Europe	11,670
Argentina	4,053
Turkey in Asia	3,005
England	1,106
Panama	400
Chile	384
Germany, China, etc.	130
Total	153,170

The large quantity coming from West Africa is interesting, as well as that from Turkey.

MAKES NEW RECORD

Production of Pig Iron in November by Furnace of Trumbull-Cliffs Company

A new high record for production of pig iron for one month was made last month by the furnace of the Trumbull-Cliffs Furnace Co., Warren, Ohio. This furnace, which has a rated capacity of 600 tons a day, or 18,000 tons a month, actually produced 25,303 tons, or a daily average of 840 tons. The previous record, also held by this furnace, was a daily average of 754 tons. This furnace, which is jointly owned by the Cleveland-Cliffs Iron Co. and the Trumbull Steel Co., supplies hot metal to the latter company, which came close to establishing a new high record production mark last month. In spite of an accident, which caused the suspension of one open-hearth furnace for several days, the plant, consisting of seven 100-ton furnaces, produced 49,098 gross tons of ingots, an average of 7372 tons.

The blast furnace also made a record for a day. The largest production during any one day was 915.85 tons. During four days in succession the output exceeded 900 tons. The iron was made from ore only, no scrap being used.

During November the total ore mix charged in the furnace was 47,765 tons. Of this 30.13 per cent was hard crushed ore, 8086 tons from the Republic mine and 6305 tons from the Cliff Shaft mine. Mesabi ores made up 37.38 per cent of the charge, 6514 tons coming from the McCook mine and 11,339 from the Boeing mine. The remainder of the charge, or 30.28 per cent, was old range non-Bessemer ore, and included 12,080 tons from the Stephenson mine and 2396 tons of manganiferous ore. Included in the charge was 2.18 per cent mill cinder, 98 tons of this being puddle cinder and 947 tons open-hearth cinder. The ore burden contained 52.6 per cent metallic iron, which theoretically should give a yield of about 56 per cent of pig iron. However, the actual pig iron yield was 52.7 per cent. Beehive coke was used for fuel and it required 1970 lb. of coke and 942 lb. of limestone per ton of iron. Flue dust made amounted to 233 lb. per ton of iron, 60 per cent of which was sintered and used. The remainder was recharged direct with the ore. No off grade iron was made during the month.

Bolt, Nut and Rivet Standardization

The American Engineering Standards Committee has just approved the personnel of the committee which is developing standards for bolt, nut and rivet proportions under the sponsorship of the Society of Automotive Engineers and the American Society of Mechanical Engineers. This working committee, which numbers a total of 43 members, 17 of whom represent producers, 24 consumers, and 2 general interests, is divided into 8 subcommittees, dealing with the following specific subjects:

Large and small rivets,
Wrench head bolts and nuts,
Slotted head products,
Track bolts and nuts,
Carriage bolts,
Special bolts and nuts for agricultural machinery,
Body dimensions and material,
Nomenclature.

The chairman of the sectional committee is Prof. A. E. Norton of the mechanical engineering department of Harvard University and the secretary, W. J. Outcalt, of the standards department of the General Motors Corporation, Detroit. There are twenty trade and technical societies and groups included in the organization of the committee.

Iron and Steel Production in Canada

In its report dealing with the production of pig iron in Canada for the month of October, the Dominion Bureau of Statistics states that the output was somewhat lower than that of the previous month at 73,598 long tons, compared with 75,216 tons in September. The average monthly production for the ten months ending with October was 76,000 tons and the total production during this period reached 758,194 tons, an increase of 142 per cent over the output for the same period in 1922, and an increase of 50 per cent over the production for the corresponding period in 1921, when the quantities produced were 312,877 tons and 506,730 tons respectively. The entire output of basic pig iron for the month under review amounted to 40,986 tons, or a decline of 11 per cent from that of September; this iron was made entirely for further use of companies reporting. Foundry iron made for sale remained about the same at 17,377 tons and malleable iron made for sale increased about 37 per cent, to a total of 15,235 tons. The number and location of active furnaces at the end of the month were unchanged.

The total production of steel ingots and castings in Canada during October amounted to 67,496 tons, or an increase in all grades amounting to 1,162 tons over the output in September, when 66,334 tons were reported.

Canadian Pig Iron Prices Advanced After Active Buying

TORONTO, ONT., Dec. 3.—The recent decline in the price of Canadian pig iron had the effect of bringing many of the larger melters into the market for iron covering requirements for the first quarter of 1924, and it is stated that Ontario furnace operators disposed of extensive tonnages of foundry and malleable iron at the low figure of $27.05 per ton, Toronto. As a result of the heavy demand for iron at the low price, producing interests have again revised prices, this time the increase amounts to $2 per ton above the former low level. The demand has now fallen off. Seven furnaces are blowing out of a total of twenty in the Dominion. Prevailing pig iron prices are as follows: No. 1 (2.25 to 2.75 silcion) $29.05; malleable, $29.05; No. 2 (1.75 to 2.25 silicon) $28.05; Toronto. Montreal prices are No. 1 and malleable, $31.90; No. 2, $30.90; Summerlee and Carron $30 to $32.

Wage Increases Halted

Under the above title the New York State Industrial Commissioner traces the wage increases reported over the middle six months of the year in a total of 1648 representative factories in the State. Of these 346 factories were devoted to metals, machinery and conveyances. The wage increases in this group were as follows:

April, 69 factories with 28,367 employees affected; May, 64 factories with 25,989 employees affected; June, 38 factories with 4384 employees affected; July, 27 factories with 3476 employees affected; August, 9 factories with 3790 employees affected, and September, 9 factories with 1528 employees affected. There has thus been a steady decrease from beginning to end of this period in the record of wage increases reported.

A. A. Alles, Jr., Fawcus Machine Co., Pittsburgh, was elected president of the Industrial Cost Association at a recent meeting of the directors in Pittsburgh. Mr. Alles took an active part in the founding of this organization and was its first secretary. R. B. Holmes, National Fireproofing Co., and George W. Sheridan, West Leechburg Steel Co., were elected vice-presidents, C. W. Garrison, Sutton Press, secretary-treasurer, and James P. McLean, Pittsburgh Forge & Iron Co., assistant secretary-treasurer. A. D. Lowdermilk, Standard Seamless Tube Co., was elected a director. The chairman of the Pittsburgh section is G. W. Dudgeon, Standard Underground Cable Co. National headquarters are to be transferred from New York to Pittsburgh.

NOVEMBER IRON OUTPUT

Decline from October 5110 Tons Per Day —Rate Lowest of the Year

Seventeen Furnaces Down or Banked and Three Blown In—Net Loss of Fourteen

The decline in pig iron output, which started in June, and has been uninterrupted since, was further emphasized in November. According to THE IRON AGE'S regular monthly statistics, the loss in daily rate in November was nearly twice that in October, or 5110 tons per day, compared with 2598 tons per day. For the first time this year the daily rate fell below 100,000 tons. The chief loss in output centered in the steel-making iron furnaces. With a net loss of 14 furnaces last month, the total loss since June has been 92.

Production of coke and anthracite pig iron for the 30 days in November amounted to 2,894,295 gross tons, or 96,476 tons per day, as compared with 3,125,512 tons or 101,586 tons per day for the 31 days in October. The November daily rate was the lowest for the year, and the total did not vary greatly from November, 1922. There were 17 furnaces blown out or banked and three blown in, a net loss of 14. In October the net loss was 10.

The total number of furnaces in blast on Dec. 1 was 231, as compared with 245 on Nov. 1. On July 1 there were 323 in blast, the peak for the year. The capacity of the 231 furnaces in blast Dec. 1 is estimated at 94,345 tons per day, as compared with 99,030 tons per day for the 245 furnaces operating on Nov. 1.

A sharp decline in ferromanganese output took place in November, with only 14,839 tons made. The spiegeleisen was the second highest of the year at 16,783 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from November, 1922, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
November, 1922	72,177	22,813	94,990
December	75,179	24,398	99,577
January, 1923	79,991	24,190	104,181
February	80,684	26,251	106,935
March	87,881	25,792	113,673
April	90,145	28,179	118,324
May	96,029	28,735	124,764
June	90,907	31,641	122,548
July	88,798	29,858	118,656
August	86,479	24,795	111,274
September	78,799	25,385	104,184
October	77,255	24,331	101,586
November	72,352	24,124	96,476

The figures for daily average production, beginning with January, 1917, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921	1922	1923
Jan.	101,643	77,799	106,525	97,264	77,945	53,063	104,181
Feb.	94,473	82,835	105,006	102,720	69,187	58,214	106,935
Mar	104,882	103,648	99,685	108,900	51,468	65,676	113,673
Apr.	111,165	109,607	82,607	91,327	39,768	69,070	118,324
May	110,238	111,175	68,002	96,312	39,394	74,409	124,764
June	109,002	110,793	70,495	101,451	35,494	78,701	122,280
July	107,820	110,354	78,340	98,931	27,889	77,592	118,656
Aug.	104,772	109,341	88,496	101,529	30,780	58,586	111,274
Sept.	104,465	113,942	82,932	104,310	32,850	67,791	104,184
Oct.	106,550	112,482	60,115	106,212	40,215	85,092	101,586
Nov.	106,859	111,802	79,745	97,830	47,183	94,990	96,476
Dec.	92,997	110,762	84,944	87,222	53,196	99,577	.....
Year	104,619	105,496	83,789	99,492	45,325	73,645	.....

Among the furnaces blown in during November were the following: The Belfont and Jisco furnaces in southern Ohio.

Among the furnaces blown out or banked during November were the following: Genesee furnace in New York; the Keystone and one Warwick furnace in Schuylkill Valley; No. 3 Shenango furnace in the Shenango Valley; C and D furnaces at the Cambria plant of the Bethlehem Steel Co. and the Dunbar furnace in western Pennsylvania; the Norton furnace in Kentucky; No. 2 Otis furnace of the Otis Steel Co. in northern Ohio; Nos. 2 and 3 South Chicago furnaces of the Illinois Steel Co. and Nos. 7 and 11 Gary furnaces in the Chicago district; No. 1 Gadsden furnace of the Alabama Co. in Alabama and the Clarksville, Standard and one Allen's Creek furnace in Tennessee.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for November and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	Nov. (30 days)	Oct. (31 days)	Sept. (30 days)	Aug. (31 days)
New York	193,621	219,857	208,737	246,347
New Jersey	18,509	19,473	18,293	19,449
Lehigh Valley	82,748	81,614	73,945	79,529
Schuylkill Valley	73,069	91,457	88,699	108,448
Lower Susquehanna and Lebanon Valleys	63,720	60,568	56,531	56,884
Pittsburgh district	595,876	652,970	659,963	713,314
Shenango Valley	99,228	117,656	127,781	117,133
Western Pa.	116,910	157,649	157,960	193,611
Maryland, Virginia and Kentucky	68,787	60,278	55,581	81,826
Wheeling district	136,349	141,593	147,771	159,418
Mahoning Valley	280,667	279,834	286,558	338,466
Central and Northern Ohio	265,198	282,009	273,885	287,641
Southern Ohio	24,619	36,083	37,416	46,779
Illinois and Indiana	535,362	595,457	587,323	631,225
Mich., Minn., Mo., Wis. and Colo.	111,291	117,128	113,460	121,172
Alabama	215,613	213,105	213,083	230,468
Tennessee	12,676	21,427	18,526	17,783
Total	2,894,295	3,149,158	3,125,512	3,449,493

Capacities in Blast Nov. 1

The following table shows the number of furnaces in blast Dec. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Nov. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Nov. 1 In Blast	Nov. 1 Capacity per Day	Dec. 1 In Blast	Dec. 1 Capacity per Day
New York:					
Buffalo	21	15	6,140	15	5,965
Ferromanganese	1	0	.....	0	.....
Other New York	5	2	400	1	130
New Jersey	4	2	625	2	615
Pennsylvania:					
Lehigh Valley	16	6	2,430	6	2,510
Spiegeleisen	2	2	210	2	250
Schuylkill Valley	15	9	2,750	7	2,370
Lower Susquehanna	9	5	1,525	5	1,610
Ferromanganese	1	1	65	1	70
Lebanon Valley	6	1	115	2	365
Ferromanganese	2	1	85	1	80
Pittsburgh district	55	43	19,350	43	19,355
Ferro and Spiegel	4	3	485	3	505
Shenango Valley	19	9	3,760	8	3,300
Western Pennsylvania	25	13	4,880	12	3,660
Ferro and Spiegel	2	2	300	0	.....
Maryland	5	3	960	3	1,045
Ferromanganese	1	1	100	1	80
Wheeling district	15	10	4,500	10	4,545
Ohio:					
Mahoning Valley	28	19	9,000	19	9,355
Central and Northern	26	18	9,000	17	8,555
Southern	3	3	1,030	5	1,190
Illinois and Indiana	42	35	18,950	31	17,010
Mich., Wis. and Minn.	12	8	3,295	8	3,340
Colorado and Missouri	6	1	410	1	400
The South:					
Virginia	18	4	700	4	565
Kentucky	7	2	400	1	305
Alabama	39	22	6,965	21	6,805
Ferromanganese	1	0	.....	0	.....
Tenn., Ga. and Texas	16	5	600	2	365
Total	418	245	99,030	231	94,345

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These

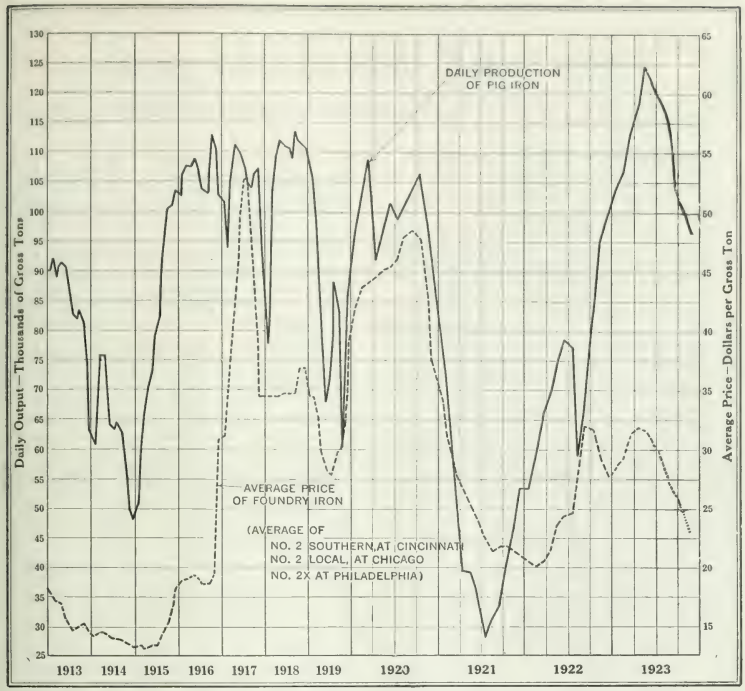


Diagram of Pig Iron Production and Price

last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production		Spiegeleisen and Ferromanganese			
			1922		1923	
	1922	1923	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	1,306,045	2,479,727	6,874	1,250	19,358	12,056
Feb.	1,311,170	2,259,154	3,610	4,930	21,282	3,657
Mar.	1,629,982	2,724,305	11,600	2,095	20,730	13,832
Apr.	1,707,902	2,704,360	14,998	4,211	20,808	7,440
May	1,879,180	2,976,892	15,432	4,902	19,568	9,533
June	1,876,033	2,727,208	18,273	4,817	19,717	18,289
6 mos.	9,710,312	15,871,646	70,787	22,185	121,564	64,807
July	1,931,138	2,752,738	18,873	7,176	26,493	12,876
Aug.	1,415,832	2,680,851	11,402	7,925	22,045	5,586
Sept.	1,615,696	2,363,967	10,681	4,235	23,206	4,478
Oct.	2,047,873	2,394,922	9,193	12,283	20,015	15,931
Nov.	2,165,295	2,170,567	13,232	4,192	14,839	16,783
Dec.	2,330,545	.....	17,007	10,591	.....	.....
Year	21,216,691	.....	151,175	68,587	.....	.....
11 mos.	.....	28,234,691	.....	.....	228,162	120,461

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1919—Gross Tons

	1919	1920	1921	1922	1923
Jan.	3,302,260	3,015,181	2,416,292	1,544,951	3,229,604
Feb.	2,940,168	2,978,879	1,937,257	1,629,991	2,994,187
Mar.	3,090,243	3,375,907	1,595,522	2,035,920	3,523,868
Apr.	2,478,218	2,739,797	1,193,041	2,072,114	3,549,736
May	2,108,056	2,985,582	1,221,221	2,306,679	3,867,694
June	2,114,863	3,043,840	1,064,833	2,361,028	3,676,445
½ year	16,033,808	18,138,986	9,428,166	12,050,683	20,841,534
July	2,428,541	3,067,043	864,555	2,405,385	3,678,334
Aug.	2,713,388	3,147,402	954,193	1,816,170	3,449,493
Sept.	2,487,965	3,129,323	985,529	2,033,720	3,125,512
Oct.	1,863,558	3,292,597	1,246,676	2,637,844	3,149,158
Nov.	2,392,350	2,934,908	1,415,481	2,849,703	2,894,295
Dec.	2,633,268	2,703,855	1,469,086	3,086,898	.....
Year*	30,582,878	36,414,114	16,543,686	26,880,383	.....
11 mos.	.....	.....	.....	.....	37,138,326

*These totals do not include charcoal pig iron. The 1922 production of this iron was 224,731 tons.

Production and Price Chart

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

An examination for junior mechanical engineer for aeronautical work, will be held throughout the country on Jan. 9, to fill vacancies in the engine test laboratory, Navy Yard, Washington, at entrance salaries ranging from $5.04 to $7.20 a day. Application blanks may be obtained from the United States Civil Service Commission, Washington, or at the post office or customhouse in any city.

Iron and Steel Markets

REDUCED PRODUCTION

Further Falling Off in Pig Iron and Steel

Carnegie Steel Co. Buying Lifts Steel Scrap—Railroad and Structural Demand

The main developments of the week are a decline in pig iron output, a further quieting down of pig iron buying, more indication that leading steel producers intend to continue present prices into the new year, and the appearance of the Carnegie Steel Co. as a buyer of steel scrap.

Since there had been no formal Carnegie buying of old materal for many months, this week's purchases, while put at but 15,000 tons, have caused no little stir. At Pittsburgh heavy melting steel scrap is held $2 a ton higher than a week ago, and the trade is trying to interpret the steel company's move, coming at this juncture in the finished steel price situation. For months the low prices of pig iron, scrap and coke have led buyers to look for a decline in rolled steel.

The stopping of more blast furnaces in the face of the heavy buying of pig iron in the last half of November means that much of the bargain iron sold is already stocked in furnace yards.

November pig iron output was 2,894,295 tons, or 96,476 tons a day, against 3,125,512 tons in October, or 101,586 tons a day, the falling off being 5110 tons a day. The net loss in active furnaces was 14. On Dec. 1 the capacity of the 231 stacks in blast was 94,345 tons a day, comparing with 99,030 tons a day for the 245 furnaces in blast one month previous.

Pig iron production is now at the rate of about 34½ million tons a year, nearly the same as that for November, 1922. At the peak in May of this year, the annual rate was over 45 million tons.

While the new car and locomotive programs of the railroads hinge on steel prices as well as on what Congress does or refrains from doing, 1924 is already counted on as a great year for trackwork. The Santa Fe is now asking for 100,000 tons of rails and nearly 25,000 tons of angle bars, tie plates, spikes and bolts.

Current equipment business takes on larger proportions with the purchase of 3500 cars, with active negotiations on an increased volume of repair work and with definite inquiries for upward of 3800 cars. This figure includes 3057 for the Southern Pacific lines, so that that system is now in the market for more than 9600.

With awards of 28,000 tons in fabricated steel, mostly for private enterprises and 20,000 tons of it in the East, building has had another active week. Fresh inquiries are about 10,000 tons; but the volume of railroad bridge and station work recently figured on, and public work, chiefly for school buildings—50,000 tons in New York alone in the next six months—point to continued demand on a good scale.

Steel works operations show some improvement in the Youngstown district, but are unchanged in Pittsburgh, Johnstown and Wheeling. Further curtailment will come in the next three weeks. Indications now are that the year's steel output will fall somewhat short of the record of 43,600,000 tons of ingots in 1917.

In merchant steel bars, consumers' inventories are quite low and will be kept so until after Jan. 1. In soft steel reinforcing bars quotations of 2.30c., Pittsburgh, are appearing. In the Southwest prices on such bars named by Southern mills indicate a marked concession from the usual Pittsburgh base.

Pig iron buying last week was much less than in the preceding two weeks, and this week there has been a decided decrease, with indications that there will not soon be much demand for the second quarter of next year. Exceptional are two lots of 5000 tons each of malleable, one for delivery through May and the other through the first half. Prices are called firmer, but on malleable at Pittsburgh there is wide variation. Charcoal and silvery irons have been marked up $1. Railroad and automobile activity will go far in deciding pig iron demand for second quarter.

The South Manchuria Railway has just added 22,000 tons of rails to its already unusual total for 1923. Half of the order came to the United States and the remainder was divided between French and Belgian mills, their delivered price being about 10 per cent under that of the American mill.

Efforts of the Ruhr works to resume operations, in accordance with the agreement signed with the French authorities, are hampered by shortage of funds and by disinclination of the workers to accept the 10-hr. day.

Pittsburgh

Producers of Finished Materials Firmer as to Prices—Sentiment Improves

PITTSBURGH, Dec. 4.—While the past week has seen no general or material increase in steel buying as compared with the recent past, it has brought definite signs of a firmer attitude with regard to prices on the part of producers. Evidently it is believed that buyers' necessities are daily becoming more important than the price and there has been a distinct stiffening in those products which recently stood out as the weak spots in the market. The sheet makers now accepting business at less than the Steel Corporation bases are fewer than they were recently. Also there has been a general withdrawal of prices below 3c., base, for cold-finished steel bars, and the exhaustion of low-priced bars and the failure of the bar market to ease off have prompted a firmer stand by makers of bolts, nuts and rivets. Although low prices have not entirely disappeared in hot-rolled flats, there is more general observance of the regular base of 3c. than there was recently. Local mills are firmer at 2.50c. for plates and shapes than they have been, probably because they are encountering less price competition from mills east and west of this district.

Sentiment is much more hopeful, a development to

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

	Dec. 4, 1923	Nov. 27, 1923	Nov. 6, 1923	Dec. 5, 1922
Pig Iron, Per Gross Ton:				
No. 2X, Philadelphia†	**$24.26**	$24.14	$22.64	$29.14
No. 2, Valley furnace†	22.00	22.00	22.50	25.50
No. 2, Southern, Cin'ti†	25.05	25.05	23.55	27.05
No. 2, Birmingham, Ala.†	21.00	21.00	19.50	23.00
No. 2 foundry, Chicago*	23.00	23.00	24.00	28.00
Basic, del'd, eastern Pa	22.75	22.75	23.00	27.50
Basic, Valley furnace	21.00	21.00	22.00	25.00
Valley Bessemer, del. P'gh	*24.26*	24.76	26.26	31.77
Malleable, Chicago*	23.00	23.00	24.00	28.00
Malleable, Valley	*20.00*	22.00	22.00	27.00
Gray forge, Pittsburgh	23.26	23.26	23.76	26.77
L. S. charcoal, Chicago	**29.15**	28.15	29.15	36.15
Ferromanganese, furnace	107.50	107.50	110.00	100.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. sheet bars, P'gh	42.50	42.50	42.50	36.50
Forging billets, base, P'gh.	45.00	45.00	45.00	45.00
O.-h. billets, Phila	45.17	45.17	45.17	43.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.35	2.35	2.40	2.00
Light rails at mill	2.25	2.25	2.15	2.15
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.275
Iron bars, Chicago	2.40	2.40	2.40	2.35
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	1.95
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.29
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.34
Steel hoops, Pittsburgh	3.00	3.00	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

	Dec. 4, 1923	Nov. 27, 1923	Nov. 6, 1923	Dec. 5, 1922
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh	4.85	4.85	5.00	4.35
Sheets, blue an'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$19.00**	$18.50	$17.50	$24.00
Carwheels, Philadelphia	**19.50**	18.50	17.50	20.00
Heavy steel scrap, P'gh	**18.50**	16.50	15.50	20.50
Heavy steel scrap, Phila	**16.00**	15.50	15.00	16.00
Heavy steel scrap, Ch'go	**15.00**	14.50	13.50	17.00
No. 1 cast, Pittsburgh	**19.50**	19.00	18.50	22.00
No. 1 cast, Philadelphia	20.00	20.00	19.00	20.00
No. 1 cast, Ch'go (net ton)	**19.50**	19.00	18.00	19.50
No. 1 RR. wrot., Phila	18.00	18.00	17.00	19.00
No. 1 RR. wrot., Ch'go (net)	**13.50**	13.00	12.00	15.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$3.75	$6.50
Foundry coke, prompt	5.00	5.00	4.75	7.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.00	14.12½
Electrolytic copper, refinery	12.87½	12.87½	12.37½	13.75
Zinc, St. Louis	*6.35*	6.37½	6.35	7.10
Zinc, New York	*6.70*	6.72½	6.75	7.45
Lead, St. Louis	**7.00**	6.70	6.45	6.95
Lead, New York	**7.10**	7.00	6.75	7.30
Tin (Straits), New York	**47.25**	47.00	41.87½	36.25
Antimony (Asiatic), N. Y.	*8.75*	9.00	9.00	6.40

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 4, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Nov. 27, 1923,	2.775c
Nov. 6, 1923,	2.775c.
Dec. 5, 1922,	2.439c.
10-year pre-war average,	1.689c.

Composite Price, Dec. 4, 1923, Pig Iron, $21.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 27, 1923,	$21.86
Nov. 6, 1923,	22.02
Dec. 5, 1922,	25.86
10-year pre-war average,	15.72

which the recent turn in the primary materials is an important contribution. Steel buyers long have argued that there was no justification for present steel prices in view of the business in scrap, pig iron and coke. Scrap prices have had a stiff advance since a week ago, largely as the result of the appearance of the Carnegie Steel Co. as buyer after an absence from the market for about three years.

Activity in pig iron has subsided, and the fact that some of the advances announced following the wave of buying have failed to stand the test of attractive inquiries makes it apparent that the selling movement was not effective in all cases in reducing available supplies. It is also clear that the sales will be largely supplied from stock piles, since there is no evidence yet that any blast furnaces now idle in this district will be started up in the near future. Many of the large users of iron seem to have been guided more by the fact that iron was cheap than by their known requirements.

Failure of the rush of buying to bring about preparations for putting in additional blast furnaces has served to somewhat temper the price ideas of coke producers, many of whom figured that $4.50 per net ton at ovens could be obtained for first quarter tonnages. Actually $4.40 has been the highest obtained, and in the past day or two $4.25 has become the prevailing price.

Steel works operations show some improvement in the Youngstown district, but are no better in Pittsburgh, Johnstown and Wheeling than they have been. The blast furnace record for this and nearby districts now shows 90 in production, one banked and 50 cold. At the beginning of the year, 101 furnaces were in production, and the peak point reached in early summer found 127 making iron.

Pig Iron.—Trading has dwindled to very moderate proportions in the past week and sales at the advanced prices except for very small tonnages of foundry iron have been rather difficult. So many of the larger consumers were able to fortify themselves against their requirements for some time to come that buying now is from the smaller consumers. The market on foundry iron is fairly well established at $22, Valley furnace, for the base grade, and some sales are reported to have been made as high as $22.50. There are no offerings of basic iron below $21, Valley furnace, and that price also is quoted at Johnstown, Pa., while some makers are talking $21.50 for first quarter tonnages. Prices on this grade are untested in the absence of important transactions. Actually a Pittsburgh district sheet maker is reported to have closed recently for 15,000 tons at $19.50 from a western Pennsylvania furnace having the same rate of freight into Pittsburgh as the Valley producers. Details of this sale are withheld by both parties involved in the transaction. Although known sales of Bessemer iron last week were at $23, Valley furnace, and the market appeared established at that figure, there have been sales in the past week at $22.25, Valley furnace, while at least one maker of this grade is openly quoting $22.50. A Paden City, W. Va., consumer of Bessemer iron has an inquiry out for 2000 tons on which it is claimed a price of $24.90, delivered, or $22, Valley furnace, has been quoted. Most makers are quoting $23, but with one producer $22.50, the quotable market is within range of those two prices. Not enough business is developing in low phosphorus iron to determine the real quotation, but makers are holding to their recent quotations. Malleable iron has developed fresh irregularity since a week ago. A Barberton, Ohio, consumer recently closed for 2000 tons at $20, Valley furnace, and there is more iron available at this price. On the other hand, $22 is a very common asking price and one sale of 2000 tons is noted at $22.50, Valley furnace. This transaction, however, went to the seller without competition. W. P. Snyder & Co. make the average price of Bessemer iron from Valley furnaces in November $23.032, against $25.20 in October, and of basic iron $20.81, against $23.25 in October.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	$22.50 to 23.00
Gray forge	21.50 to 22.00
No. 2 foundry	22.00 to 22.50
No. 3 foundry	21.50 to 22.00
Malleable	20.00 to 22.50
Low phosphorus, copper free	29.00

Ferroalloys.—Considerable business in ferromanganese has been closed in this district in the past week by domestic producers at $107.50, Atlantic seaboard. Sales are placed at 3000 tons, bringing the total bookings at that price to about 6000 tons for the past two weeks. Accumulation of this backlog of business has been followed by a withdrawal of the price and the naming of one of $109, or $1 a ton below that quoted and consistently adhered to by British producers. Not much British material is moving because of expectations by consumers that the British price might weaken. Jones & Laughlin Steel Corporation now is making its own ferromanganese, having recently put one of its Aliquippa furnaces on that product. It was a big purchaser of foreign manganese ore prior to the passage of the tariff law imposing a duty on both manganese ore and ferromanganese. No announcement yet has been made as to the 1924 price for 50 per cent ferrosilicon, but the common expectation is $80, delivered, east of the Mississippi. Prices are given on page 1547.

Bessemer Ferrosilicon and Silveries.—Effective Dec. 1, Jackson, Ohio, makers advanced prices $1 a ton, thus restoring the schedules, which had been in effect prior to Nov. 26. The new schedule quotes 6 per cent silvery iron at $30, furnace, and 10 per cent ferrosilicon at $41.50.

Semi-Finished Steel.—Some quickening of interest is reported, but thus far it has not found reflection in sales, which are of small lots for prompt delivery in most cases. One maker of wire rods reports the specification of a good-sized tonnage for the first quarter of 1924, but the more common condition is that users are merely covering their actual and immediate requirements. If there is any shading of $42.50, Pittsburgh or Youngstown, it is being carefully concealed, as all makers here and in Youngstown are quoting that price. The more common price on billets and slabs still is $40, although there are claims of sales at higher figures. On forging steel, $45, base, is the price for small lots, with the basis for large tonnages a matter of negotiation. Labor being fairly plenty, there is not the tendency to insist on the full differential over rolling billets. Prices are given on page 1547.

Iron and Steel Bars.—There has been no breaking through the 2.40c. base by local mills as yet, and all, notably the Carnegie Steel Co., are very firm at that figure. The real test of the market is ahead, however, as none of the mills has much unfilled business and important users, such as makers of cold-finished steel bars and bolts, nuts and rivets, are disposed to regard the price as too high in relation with those of their products. Hot-rolled bars at 2.40c., base, means 2.55c. base, on bars for cold finishing, since there is an extra of 15c. per 100 lb. for bars for that purpose. Current demands for hot-rolled bars are fairly numerous, but there is not much sign of forward buying. Iron bar prices also hold at recent levels, with demand light in keeping with the dwindling order books of car builders.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Wire Products.—Buying remains very steady, but it runs chiefly to small lots for prompt delivery. Forward buying still is lacking. Granting of the price guarantee against a decline to June 1, 1924, on woven wire fence has produced a fair number of orders. Most mills are building stocks, but have not made much progress in that direction on the smaller sizes of nails, current demands for which remain well up with production. There is little talk of price shading, except on coated nails, on which some mills are wont to give away part of their freight advantage in markets like the present one. Prices are given on page 1546.

Steel Rails.—Lack of activity still is without influence upon the price ideas of makers of billet light rails, all of whom still are holding to 2.25c., base. Rerolled rails have been quoted as much as $10 per ton below the price on billet rails.

We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Mills in this and nearby districts generally are well provided with orders for standard pipe, and while demand is not so insistent as it was a short time ago, this is regarded as a purely seasonal condition, brought about partly by the decline in building activities and also by the close proximity of inventory-taking time. New orders usually stipulate that if delivery cannot be made by Dec. 15, the shipment be deferred until after Jan. 1. Backlog orders for oil well pipe were pretty well reduced in November, but mills have not yet adopted an aggressive policy with regard to new business, believing that the turn in the oil situation will bring about a natural recovery in demand. Boiler tubes show little activity and the price situation is less firm than in pipe, in which concessions even on line pipe are reported to be disappearing. Discounts are given on page 1546.

Sheets.—The situation looks brighter from both a price and sales standpoint. The American Sheet & Tin Plate Co., notwithstanding that its prices are higher than several of the independent companies, reports a very satisfactory business, while a reduction in the number of independent mills accepting business at less than the price of the Steel Corporation subsidiary is taken to mean that general demand is better. There is no quotable change in the range of prices, but the market is firmer to the extent that the minimum prices are not available from as many sources as recently. The automotive industry is said to have reached a point where the supply is more important than the price. The American Sheet & Tin Plate Co. is operating about

80 per cent of its mills, while independent mill operations, which averaged about 70 per cent last month, are close to that rate today. Prices are given on page 1546.

Tin Plate.—Steel Corporation customers are specifying freely against early 1924 requirements, but this is not generally the case with those of the independents, who for the most part are delaying orders until they know thoroughly how they are going to stand at the end of the year. Current business does not amount to much. The American Sheet & Tin Plate Co. has about 94 per cent of its tin mills in operation and at least two of the local independent companies are doing as well or better. The price is $5.50 per base box, Pittsburgh, for standard cokes.

Cold-Finished Steel Bars and Shafting.—The past week has seen the disappearance of prices below 3c., base, for carload lots. Concessions from that level of from $2 to $5 recently made presumably were possible from the existence in the hands of makers of some low-priced hot-rolled bars that did not carry present extras. Such stocks now are believed to have become exhausted and with a price of 2.40c., base, for hot-rolled bars plus the extra of 15c. per 100 lb. for analysis and the new and higher card of size and other extras, the cost factor has become more dominant. Business has not improved much, but the trade is more hopeful. Ground shafting remains at 3.40c., base, f.o.b. mill for carload lots.

Hot-Rolled Flats.—Business shows some betterment, although orders are heavier for delivery after than before Jan. 1. There is rather more general observance of 3c., base, on hoops, bands and strips than there was recently, but concessions from that level have not entirely disappeared and where the tonnage is attractive, as it usually is in rim stock and wide strips, it is doubtful if the 3c., base, is yet common. Prices are given on page 1546.

Cold-Rolled Strips.—Most makers are holding to 5c., base, but business still is being lost at that figure, 4.90c. being quoted for quick deliveries and sometimes on very small tonnages.

Track Fastenings.—New York Central inquiry for 50,000 to 75,000 kegs of spikes brought out prices of 3c. per lb., Buffalo, 3.15c., Chicago, and 3c., Pittsburgh, on large ones and rather established the market at those levels on large lots. Other track accessories show no special change in price, but pending the closing of some of the big orders, up for bids, the real level is rather uncertain, since current business is not large enough to provide a test. Prices are given on page 1546.

Plates.—Although there has been no material increase in demand, there has been some decrease of competition and the market is firmer at 2.50c. base, Pittsburgh, than it was recently. Prices are given on page 1546.

Structural Material.—Most of the jobs that are being taken by fabricating shops here run to very small tonnages and demands upon the mills are correspondingly small. The warehouse project for the Rosenbaum Co., Pittsburgh, involving about 3000 tons of steel, again is active, but other important structural work in this territory still is dormant. The mills seem to be firmer at 2.50c. for large structural shapes than they were recently despite the lack of activity. Prices are given on page 1546.

Bolts, Nuts and Rivets.—Makers of these products have assumed a firmer stand and are less disposed to take business at the expense of prices. Low costing steel bars are pretty well used up and makers also are confronted with the possibility of no recession from today's price. There has been fresh affirmation of a quotation of 60 and 10 per cent off list for large machine bolts, and $2.90, base, per 100 lb. for heavy structural rivets now is the minimum price of practically all makers. There has been a slight revision in the quotation on hot-pressed nuts, which are now quoted at $4.50 off list as against recent price of $4.25 off list. Prices and discounts are given on page 1546.

Coke and Coal.—Little change has occurred in spot coke prices since a week ago. Supplies of spot furnace grade about equal the demand and business ranges from $5 to $5.50 per net ton at oven, and occasionally the minimum price is shaded. There has been no scramble on the part of pig iron producers to line up their first quarter coke requirements, and oven operators have found it hard to do business except by modifying their prices. Two first quarter contracts were closed at $4.40, but since then one involving 10,000 tons a month was placed at $4.25, and one large operator is freely quoting that price. A price of $6.60 has been named by one large producer of foundry coke for first half of 1924, but this company usually is 50c. to $1 a ton above others and $6 is more commonly quoted. Neither price has yet found much basis in sales. The coal market shows a decided strength in slack grade which has become very scarce with the subsidence of demand for lump coal. Steam slack now commands $1.50 per net ton at mines readily and on gas slack there have been sales as high as $1.75. Mine run steam coal ranges from $1.90 to $2.40 in the Panhandle district. Coking coal ranges from $1.75 to $2.25 and gas coal from $2.25 to $2.50.

Old Material.—Much excitement and a rather steep advance in prices of the steel works grades has attended the entrance of the Carnegie Steel Co. in the scrap market after an absence, as far as its own requirements were concerned, of almost three years. This company bought 15,000 tons of heavy melting steel at $19, delivered. This establishes the market for the time being at that level, although no other mills in this district have shown a disposition to follow this advance. Unless that interest continues in the market, it is thought the market will recede from lack of support, but just now dealers are disposed to hold more firmly than ever in the expectation of repeat orders. The market gained some strength from purchases from another Steel Corporation subsidiary, and the recent activity in pig iron caused such a spirited demand for blast furnace material from merchant furnaces that borings and turnings had shown independent strength.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$18.50 to $19.00
No. 1 cast, cupola size	19.50 to 20.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.50 to 19.00
Compressed sheet steel	16.50 to 17.00
Bundled sheets, sides and ends	15.00 to 15.50
Railroad knuckles and couplers	20.00 to 20.50
Railroad coil and leaf springs	20.00 to 20.50
Low phosphorus blooms and billet ends	21.50 to 22.00
Low phosphorus plate and other material	20.00 to 20.50
Railroad malleable	17.50 to 18.00
Steel car axles	19.00 to 19.50
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	20.00 to 20.50
Machine shop turnings	13.00 to 13.50
Sheet bar crops	19.00 to 19.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	14.00 to 14.50
Heavy breakable cast	17.00 to 17.50
Stove plate	14.00 to 14.50
Cast iron borings	14.50 to 15.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	18.50 to 19.00

Valley Scrap Market Is Not Unduly Excited

YOUNGSTOWN, Dec. 4.—While the purchase of heavy melting scrap at Pittsburgh by the Carnegie Steel Co. has exerted a sentimental effect on the Youngstown market, strengthening the price situation, the top of the market on heavy melting here is $18; in fact, it is not unlikely that dealers would consider business at $17.50 on a firm order. This opinion was expressed today by one of the larger dealers, supplying most of the Valley steel interests.

Melters are doing little scrap buying in this district at present, and consequently prices do not show the firmness exhibited in localities where buying is brisk. For instance, the market on compressed sheet steel is characterized as flat with the price range from $14.50 to $15 and business likely to move at the lower figure. It appears that Valley steel interests do not yet see enough new business in sight to justify scrap purchases on any sizable scale.

Chicago

Prospective Railroad Buying and Some Orders Feature the Market

CHICAGO, Dec. 4.—Prospective railroad buying holds the center of the stage. The Atchison, Topeka & Santa Fe has entered the market for 100,000 tons of rails and 25,000 tons of track supplies. The Southern Railway has placed orders for 2000 box cars in addition to the 1000 bought a week ago, and the Southern Pacific has finally asked for figures on 3057 refrigerator cars for the Pacific Fruit Express. The Southern Railway cars will be built at St. Louis, and Western mills will probably furnish the steel required. Not only is considerable new business in sight which will come directly or indirectly from the carriers, but specifications against rail contracts are heavier than had been expected.

Notwithstanding these signs of improvement, mill bookings still fall short of shipments and current demand from manufacturing and distributing buyers of steel is notably light. Steel stocks of industrial customers are exceedingly low, indicating that additional supplies must be purchased soon if manufacturing operations are to be maintained. While these buyers are apparently in no hurry to replenish their stocks, particularly just prior to inventory taking, they have not concealed their willingness to place substantial tonnage at concessions. One mill could have booked from 15,000 to 20,000 tons if it had been willing to sell at a small recession from its prices. Chicago producers, however, are holding firmly to their quotations, in spite of the efforts of users to break the market.

Mill operations show a slight recession. The Illinois Steel Co. is producing steel at the rate of 75 per cent of capacity, with the possibility that it may reach the 80 per cent rate of last week before the current week closes. Owing to repairs to its sheet bar mill, the operations of the Inland Steel Co. have temporarily declined to 70 per cent.

Ferroalloys.—Sales of ferromanganese in the past two weeks aggregated about 1500 tons. Most of this tonnage was placed at from $106.50 to $107.50, seaboard, although the most recent sale, a carload for Milwaukee delivery, brought $109, New Orleans. A few sales of spiegeleisen have been made at $39, furnace, or $47.58, delivered Chicago. Small tonnages of 50 per cent ferrosilicon have changed hands at as low as $81, delivered.

We quote 80 per cent ferromanganese, $114.88 to $116.56, delivered; 50 per cent ferrosilicon, $81, delivered; spiegeleisen, 18 to 22 per cent, $47.58, delivered.

Pig Iron.—Although a number of large sales have been made during the past week, the volume of buying has been gradually declining. Such a reaction after the unusual activity of the past three weeks was not unexpected. There is still considerable inquiry in the market and more will come out as soon as the manufacturing programs of foundries are more clearly defined. Car builders, for example, can hardly place their first quarter requirements until the railroad cars now on inquiry are ordered. Prices on Northern iron are steady and unchanged, but another buying spurt would probably force them upward again. Prominent among recent sales may be mentioned 5000 tons of malleable bought by a Milwaukee melter for first half, 2400 tons of malleable and foundry and 1200 tons of malleable ordered by two other Milwaukee users for first quarter, 1000 tons of foundry purchased by a Michigan melter for first quarter and 1000 tons of foundry placed by a Chicago buyer for first half. A local melter is inquiring for 3000 tons of foundry for first quarter and a Peoria user wants 2000 tons of basic for the same shipment. A local buyer is in the market for 500 to 750 tons of malleable for delivery at Galesburg during the next two or three months. Southern iron is firm at $21 base, Birmingham, and there have been a few small sales at that price. Charcoal has advanced $1 a ton to $26, base, furnace, and some business has been closed at the new price. A Minnesota melter wants 400 tons of charcoal. Silvery, which declined $1 last week, has advanced the same amount, so that it is back on its former price level. A Wisconsin melter is inquiring for 200 tons of silvery. A local buyer is in the market for 300 to 500 tons of 15 per cent Bessemer ferrosilicon for first quarter delivery. A St. Louis district melter wants 100 tons of 12 per cent Bessemer ferrosilicon. A local steel works furnace which has been an important seller of merchant iron no longer has any foundry iron to sell.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal averaging sil. 1.50, delivered at Chicago	$29.15
Northern coke, No. 1 sil. 2.25 to 2.75	$23.50 to 24.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	23.00 to 23.50
Malleable, not over 2.25 sil.	23.00 to 23.50
Basic	23.00 to 23.50
High phosphorus	23.00 to 23.50
Southern No. 2	27.01
Low phos., sil. 1 to 2 per cent, copper free	34.79
Silvery, sil. 8 per cent	37.29

Plates.—In the absence of orders for oil storage tanks and railroad cars, plate buying is at low ebb. Prospects for business are good, however, in view of the large number of cars now on inquiry. Meanwhile the local prices on plates are holding firm.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Sheets.—The local independent has taken 1500 tons additional in black sheets for Japan and, with previous bookings for that country together with domestic commitments, is comfortably obligated for some time to come. Sheet mills generally are in an improved condition so far as bookings are concerned and prices are gradually gathering strength. Those producers who offered sharp concessions in black and galvanized sheets are showing less inclination to take business under the Steel Corporation prices. While 3.75c., base, Pittsburgh, can still be done on black, the lowest going price on galvanized appears to be 4.90c., base, Pittsburgh, and that is rapidly disappearing.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Cast Iron Pipe.—Detroit has awarded 2400 tons of 12- and 24-in. to the Lynchburg Foundry Co. and 2000 tons of 8-in. DeLavaud centrifugal cast iron pipe to the United State Cast Iron Pipe & Foundry Co. The Public Service Co. of Northern Illinois, with general offices at Chicago, has taken bids on 2800 tons of 4-, 6-, 10- and 12-in. Prices are steady at $47, base, Birmingham, for 6-in. and larger, but higher quotations have disappeared except upon unimportant lettings.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $59.20; 6-in. and above, $55.20; class A and gas pipe, $5 extra.

Structural Material.—Fabricating awards were few during the past week, but a number of large projects are pending or about to come up for figures. Preliminary figures on the Union League Club Building, Chicago, exceeded the appropriation authorized by the membership and plans for the structure will be revised. Fabricators' stocks of plain material are very low and for that reason mills expect new structural awards to be immediately reflected in orders for steel. Plain material prices are unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Rails and Track Supplies.—The Atchison, Topeka & Santa Fé is inquiring for 100,000 tons of rails and approximately 25,000 tons of angle bars, tie plates, spikes and bolts. This inquiry, together with that of the New York Central for track supplies, promises to add mate-

rially to the bookings of local mill. The Minneapolis & St. Louis has placed 5000 tons of rails with a local producer. The Soo Line, which had entered the market for 3000 tons of rails, has decided to defer buying until after the first of next year. Miscellaneous orders for track supplies are fairly numerous and specifications against rail contracts are heavier than had been expected. Demand for light rails shows no improvement.

Standard Bessemer and open hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.55c. to 2.60c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Bolts and Nuts.—Finding that sharp concessions have failed to stimulate buying, manufacturers of bolts and nuts are taking a firmer attitude on prices. Costs, which have increased with curtailed operations, would not, it is said, permit them to continue selling at such low figures. Discounts now quoted are those published on page 1546 but are on an f.o.b. Chicago basis except on large rivets, which range from $2.65 to $2.75 f.o.b. Pittsburgh.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Wire Products.—Essentially the situation remains unchanged, although mills are encouraged because manufacturing consumers have commenced to buy ahead in a small way. There seems to be a general desire, however, to keep inventories down to the minimum and this is holding back buying. The recent announcement of a guarantee against a decline in woven wire fence prices to June 1 has brought out a fair volume of business, although not as much as had been expected. For mill prices, which remain firm, see finished iron and steel, f.o.b. Pittsburgh, page 1546.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Reinforcing Bars.—Concrete bar lettings exceeding 100 tons each were few during the week, but a number of important pending projects are expected to be placed shortly. The general contract has been awarded for the Board of Trade Building, Kansas City, involving 700 tons, which will be bought presently. Hotel Duluth, Duluth, Minn., will require 400 tons, which is also about to be placed. Local warehouse prices remain unchanged at 3c., Chicago.

Lettings include:

Builders Exchange Building, St. Paul, Minn., 300 tons to Kalman Steel Co.

Three parcel post stations, Detroit, Mich., 250 tons to Joseph T. Ryerson & Son.

Matteson apartment building, Chicago, 150 tons to Concrete Steel Co.

Sewage disposal plant, Huntington, Ind., 130 tons to Kalman Steel Co.

Pending work includes:

Board of Trade Building, Kansas City, Mo., 700 tons, general contract awarded to Pratt & Thompson, Kansas City.

Hotel Duluth, Duluth, Minn., 400 tons.

Blue Valley Creamery Co. plant, Chicago, 250 tons.

Bars.—The steel inventories of bar buyers are very low and will probably be kept at a minimum figure until stocktaking has been completed and they are ready to go ahead with their first quarter programs. At the same time, the very fact that their supplies are so scanty indicates that they must replenish soon if they hope to maintain operations at anywhere near their normal rates. Evidently the average bar consumer sees no incentive in buying ahead at a time when there appears to be no imminent danger of an advance and possibilities of a decline are still given serious consideration. In fact, a number of important buyers have shown a willingness to place substantial tonnage at concessions, but thus far have failed to interest the mills, which are holding firmly to 2.50c., Chicago, on soft steel bars. Demand for bar iron is also light, although prices remain unchanged. New business in rail steel bars has shown slight improvement, although mill operations are still intermittent. Hard steel bars, however, are firm at 2.30c., mill.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.30c. for rounds and 4.80c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.45c.; bands, 3.95c.

Old Material.—Outside of scattered purchases of small lots, consumer buying is an absent quantity and market activity is confined to the dealers. The latter continue to speculate on a sustained rise in prices and are buying railroad material for later delivery at figures which are appreciably higher than any user is willing to pay at the present time. So far as supplies for prompt shipment are concerned, some grades, notably car specialties, are not any too plentiful. The unwillingness of dealers to sell, except at advanced prices, of course, emphasizes the apparent shortage of certain materials. On the other hand, rejections by a local steel works have put some distress material on the market at concessions under ruling prices. On the whole, however, quotations must be regarded as higher than those published last week, although in many cases the advances have no foundation outside of speculative transactions among brokers. Railroad offerings include: Pennsylvania, Southwestern Region, 7500 tons; Pennsylvania, Northwestern Region, 3500 tons; Illinois Central, 1000 tons; Pere Marquette, 1000 tons; Monon, 500 tons; New York Central, Michigan Central, Big Four and Erie, blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$19.50 to $20.00
Cast iron car wheels	19.00 to 19.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	18.50 to 19.00
Railroad tires, charging box size	18.50 to 19.00
Railroad leaf springs, cut apart	19.00 to 19.50
Rails for rerolling	16.00 to 16.50
Steel rails, less than 3 ft.	17.50 to 18.00
Heavy melting steel	15.00 to 15.50
Frogs, switches and guards cut apart	15.00 to 15.50
Shoveling steel	14.50 to 15.00
Drop forge flashings	10.50 to 11.00
Hydraulic compressed sheets	12.00 to 12.50
Axle turnings	11.50 to 12.00
Steel angle bars	17.00 to 17.50
Per Net Ton	
Iron angle and splice bars	19.00 to 19.50
Iron arch bars and transoms	19.00 to 19.50
Iron car axles	25.00 to 25.50
Steel car axles	16.50 to 17.00
No. 1 busheling	11.00 to 11.50
No. 2 busheling	7.00 to 7.50
Cut forge	13.50 to 14.00
Pipes and flues	8.50 to 9.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.50 to 14.00
Steel knuckles and couplers	16.50 to 17.00
Coil springs	18.50 to 19.00
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	18.50 to 19.00
No. 1 agricultural cast	18.50 to 19.00
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	15.50 to 16.00
Machine shop turnings	6.00 to 6.50
Cast borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Stove plates	16.00 to 16.50
Grate bars	15.50 to 16.00
Brake shoes	17.00 to 17.50
Railroad malleable	18.00 to 18.50
Agricultural malleable	17.50 to 18.00

The Ford Motor Co. has purchased two lake freighters, the James Davidson and the L. M. Powers from the Tomlinson interests. These vessels are both 600-footers and will be taken over by the Ford company at the end of navigation this year. The Ford fleet will be augumented by two 600-ft. Diesel electric type freighters which are now under construction.

Employment in Detroit fell off 1297 during the week ended Nov. 20, according to the reports of the Employer's Association, which shows a total of 212,528 on the payrolls of the 79 representative firms reporting. A year ago the same concerns reported 179,340.

New York

Structural Awards Amount to 20,000 Tons—Schools Will Require 50,000 Tons

NEW YORK, Dec. 4.—Most of the district sales offices of steel companies report that the tonnage of finished steel booked in November, while not large, was slightly in excess of that taken in October. The steel trade continues to reflect an optimistic attitude and calls attention to the fact that except in plates, shapes and bars the situation as regards orders actually on the books or in sight is not unfavorable for good operation of mills in the first quarter. Structural work continues to occupy the center of the stage in local steel demand. The biggest job let is 12,000 tons for the new Pictorial Review Building on Ninth Avenue, which will be fabricated by the Levering & Garrigues Co. The latter company also will fabricate 4300 tons for a loft building on Seventh Avenue. The total awards for the week in New York and nearby territory exceed 20,000 tons. The New York City school building program for 1924 has been announced. Thirty-six schools are to be built and about six will be advertised each month for the first half of the new year. The total of steel requirements will be close to 50,000 tons. Railroad car work, mostly repairs, is slightly more active, but the largest new contract is for 1000 steel gondolas for the Baltimore & Ohio Railroad, which the Bethlehem Steel Co. will build. The price situation on all steel products is the same as a week ago.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Pig Iron.—A fairly large tonnage of pig iron was bought last week when one seller disposed of 13,000 tons, but the buying this week has been extremely light. The only inquiries of importance pending are from the New York Central, which is receiving bids on a total of 1200 tons of No. 2 and No. 2X, 600 for delivery at Frankfort, N. Y., and the other for delivery at Elkhart, Ind., and also 600 tons of charcoal. The A. P. Smith Co. is in the market for 600 tons of No. 2 and No. 2X for delivery at Bloomfield, N. J. The New York Air Brake Co., Watertown, N. Y., is reported to have closed on 2000 tons of foundry iron ranging from 2 to 3.50 per cent silicon. Melters are not disposed to contract for second quarter and furnaces are not at all anxious to quote for delivery after April 1. The probability of a strike of bituminous coal miners April 1 is a factor that is receiving attention to an increasing extent. Prices are fairly firm at $21 to $22, Buffalo, and $22.50 to $23, eastern Pennsylvania.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.27 to $25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.77 to 25.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.77 to 25.27
Buffalo, sil. 1.75 to 2.25	25.91 to 26.41
No. 2X Virginia, sil. 2.25 to 2.75	29.94 to 30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 29.94

Ferroalloys.—Fairly large sales of ferromanganese have been made for delivery next year, the total amounting to several thousand tons. The price range has evidently been between $107.50 and $110, seaboard basis. It is believed that considerable changed hands at between $107.50 and $109, seaboard basis, mostly domestic alloy. The British quotation is unchanged at $110, seaboard. The domestic quotation is reported to be not less than $109, seaboard basis. There are substantial inquiries still before the market, some for delivery before the first half. The spiegeleisen market is quiet with prices unchanged, $40, furnace, being asked and obtained for the higher grade alloy. Buying of 50 per cent ferrosilicon is confined to small lots and few of them at unchanged quotations.

Cast-Iron Pipe.—Demand continues good, particularly for small lots for prompt shipment from users, who are enabled by the present open weather to complete small installations that under normal weather conditions would have been delayed until next spring. To customers willing to accept winter delivery, concessions of $2 or more per ton continue. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Shipments of soil pipe are still going forward to jobbers and consumers here are also able to use pipe that under normal weather conditions for this season would probably be delayed until spring. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 30¾ and 35¾ per cent off list; heavy, 40¾ and 45¾ per cent off list.

Warehouse Business.—While there is a stiffening of prices on black and galvanized sheets, the low prices of 4.50c. for black and 5.50c. for galvanized still prevail, with some of the large sellers meeting competition at these prices. Blue annealed sheets have been reduced by the leading interest and leading independent warehouse in this district from 4.59c. to 4.34c. per lb., base, but, while not as prevalent, 4.20c. per lb., base, is still being done where competition enters into an order. The range of 25c. per 100 lb. on cold rolled shafting continues, 4.40c. to 4.65c. per lb. being the market on rounds. We quote prices on page 1570.

Coke.—Prices continue firm and unchanged. A northern New York consumer is reported to have closed on 2000 tons of standard foundry at $5.25. Standard foundry is quotable at $5.25 to $6.25 per ton and standard furnace at $4 to $4.50 per ton. Medium sulphur is fairly firm at $3.75 per ton. By-product coke is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—The market is decidedly strong, with heavy melting steel showing a marked upward tendency, largely as a result of activity among dealers and brokers. Thus far mills have shown but little inclination to advance their offers. As a result of activity in the trade, No. 1 heavy melting steel is quotable at from $16 to $16.50 per ton, eastern Pennsylvania, with most consumers still paying about $15.50 per ton delivered. Cast borings and machine shop turnings are quoted at $12 to $12.50 per ton delivered eastern Pennsylvania, with borings and turnings at $10.50 to $11. Specification pipe is strong at $15 per ton, eastern Pennsylvania, at which price considerable difficulty in obtaining tonnages is said to be experienced. In fact, a marked tendency is reported prevalent among collectors of scrap to hold material in anticipation of still higher prices. Stove plate is firm at $16, eastern Pennsylvania, and delivered to New Jersey consumers.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.00 to $12.50
Steel rails, short lengths, or equivalent	13.25 to 13.75
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	16.00 to 17.00
Iron car axles	23.00 to 23.50
No. 1 railroad wrought	13.50 to 14.00
Forge fire	8.50 to 9.00
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	8.50 to 9.00
Machine-shop turnings	8.50 to 9.00
Mixed borings and turnings	7.00 to 7.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.00 to 11.50
Stove plate	12.00 to 13.00
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	14.00 to 15.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

The development and possibilities of the application of gas in industrial furnaces is the subject of an address announced for a Providence, R. I., meeting of the American Society for Steel Treating, on the evening of Dec. 19, by H. O. Loebell, combustion engineer with the Combustion Utilities Corporation, New York. The meeting will be held at 98 Weybosset Street.

Cincinnati

Buying of Pig Iron Subsides—Price of Silvery Is Advanced

CINCINNATI, Dec. 4.—The pig iron buying movement has subsided and the market is again quiet. Last week's buying in this district was confined principally to silvery and charcoal iron, the low prices at which these were offered apparently being an incentive to users to place at least a goodly portion of their first quarter requirements. Charcoal and silvery furnaces, after accumulating a back log, have advanced prices $1 per ton. Foundry and malleable grades sold in fair volume during the early part of the week at $22.50 for southern Ohio foundry and malleable, and $21 the asking price for Southern iron. Sales of Southern iron were light during the week, the narrow differential between Northern and Alabama irons making the Northern brands a more attractive proposition. Sales in the South have been so heavy that only a few furnaces have a little iron to offer for December shipment. There is only limited interest in basic and Bessemer irons. Sales last week included 1500 tons of Buffalo iron to Indianapolis, two 500-ton lots of southern Ohio to nearby melters, and one 300-ton lot of Southern resale to a northern Ohio melter. An inquiry for 1000 tons of malleable for first half is current from Chattanooga, and one for 600 tons of foundry from central Ohio. Other scattered inquiries range from 100 to 400 tons. Jisco and Belfont furnaces in southern Ohio blew in last week, the former on silvery and the latter on foundry and malleable. Norton furnace at Ashland went out after a month's run on Bessemer.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern	24.77
Malleable	24.77

Sheets and Tin Plate.—Some mills are still quoting 3.75c. on black and 4.90c. on galvanized sheets for December and January delivery, but orders brought out are light, consisting of scattered carloads and less. Contracting for full first quarter is going along in fair shape at regularly established prices, and some producers are of the opinion that prices of sheets will show an advance about the first of February, due to expected heavy bookings by automobile manufacturers. Tin plate continues in good demand with prices very firm.

Reinforcing Bars.—A number of projects are up for bids, chief of which is a sewerage proposition in Cincinnati estimated to require about 300 tons. A number of projects, on which bids have been taken, have not been awarded. Prices continue to range from 2.20c. for rerolled bars to 2.35c. mill for bars from new billets.

Finished Materials.—The market generally is rather dull, orders being small and for immediate shipment. Prices generally are being held to the regularly established levels, but it is no secret that attractive tonnages of bars, shapes and plates, for immediate delivery, would bring out concessions from some mills. In fact, some tonnages of plates for December delivery are reported to have been booked by two of the smaller mills on the basis of 2.40c., Pittsburgh. Some sales of bars are also reported at 2.35c. A firmer tendency is noted in cold-finished materials. Some mills which had been taking business at 2.90c., advanced Saturday to 3c., after booking several nice orders. It is just possible that further advances to 3.15c. may be made within the next few days, as mills are reported to have come to the conclusion that this price will have to be secured in order to make sales profitable at this time. There is little activity in wire products, and reports of price cutting in nails apparently are due to the policy of some independents of equalizing the southern Ohio freight rate into the Cincinnati district. Bolts and nuts continue weak in price with little demand. Specialties continue to move, however, in fair volume, and there is fair interest being shown in light rails and track accessories, although no big orders have been booked.

Structural Material.—The past week was one of the quietest of the year, no lettings being reported and only one inquiry of consequence being received. This was a highway bridge in Kentucky, on which bids will be taken at Frankfort Dec. 10, involving approximately 180 tons.

Warehouse Business.—Numerous orders for small tonnages are being received by local jobbers, but a perceptible falling off is noted generally in the volume of business offering. Wire nails have been reduced 10c. per keg, and cold-finished materials have been cut $5 per ton. Prices of other products remain as last quoted.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Coke.—The coke market is quiet, although some sales for first quarter are being made of New River coke. Connellsville operators apparently are unwilling to sell at present prices for longer than January delivery. Furnace coke is inactive, and domestic is moving only in limited tonnages. We quote prices as follows:

Connellsville furnace, $4.00; foundry, $5.00; New River foundry, $10 to $11; Wise County furnace, $4.75; foundry, $5.75; by-product foundry, $8.00, Connellsville basis.

Old Material.—Dealers continue to make the market on old materials, the consumers in this territory showing little interest in the market. Buying is light. Higher prices offered by dealers have resulted in scrap being more firmly held by producers. Prices are unchanged from last week, though the tendency is to advance.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$10.00 to	$10.50
Iron rails	13.50 to	14.00
Relaying rails, 50 lb. and up	27.50 to	28.00
Rails for rolling	13.50 to	14.00
Heavy melting steel	13.00 to	13.50
Steel rails for melting	13.00 to	13.50
Car wheels	13.00 to	13.50
	Per Net Ton	
No. 1 railroad wrought	11.50 to	12.00
Cast borings	9.00 to	9.50
Steel turnings	8.50 to	9.00
Railroad cast	14.00 to	14.50
No. 1 machinery cast	17.00 to	17.50
Burnt scrap	11.00 to	11.50
Iron axles	21.00 to	21.50
Locomotive tires (smooth inside)	13.00 to	13.50
Pipes and flues	7.00 to	8.50

Boston

Pig Iron Prices Have Strengthened, but Business Is Very Light

BOSTON, Dec. 4—Eastern Pennsylvania and Buffalo pig iron prices have strengthened perceptibly the last few days, but business has dropped almost to the vanishing point. Eastern Pennsylvania is generally on a $26.65 delivered base with 50 cents differentials on No. 2X. One furnace asks $1 differentials on No. 2X. Another, taking an eastern Pennsylvania freight rate, heretofore on a $25.65 delivered base, has withdrawn from the market. A Buffalo furnace taking a large tonnage at $19.50 furnace base during the recent buying flurry advanced to $22 and then withdrew. Another iron maker in that district is up to $22.50 furnace base from $19.50. Early in the past week, a Buffalo steel mill took business in New England at $19.50 furnace, giving buyers a choice of No. 2 plain, No. 2X or No. 1X at that price, but today is on a $22 base. All Buffalo furnaces ask $1 differentials between No. 2X and No. 1X. Lake charcoal iron is $1 a ton higher at $26 furnace for base grades. Regular Virginia and Alabama irons are quoted on last week's basis, and small tonnages moving. With the possible exception of Vir-

ginia, most furnaces selling in New England are reported to have sufficient business on their books to insure activity well into first quarter, 1924. Based on normal business conditions, New England foundries generally will have to buy for late first quarter consumption, for while recent buying of iron was general, it was not heavy in individual cases.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$27.15 to $28.15
East. Penn., sil. 1.75 to 2.25	26.65
Buffalo, sil. 2.25 to 2.75	27.41 to 27.91
Buffalo, sil. 1.75 to 2.25	26.91 to 27.41
Virginia, sil. 2.25 to 2.75	30.92 to 32.42
Virginia, sil. 1.75 to 2.25	30.92 to 31.92
Alabama, sil. 2.25 to 2.75	31.10
Alabama, sil. 1.75 to 2.25	30.60

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. have announced by-product foundry coke is $12.50 delivered in New England, the same price at which fuel was billed out in November. Both companies have experienced a smaller demand for domestic fuel than anticipated because of mild weather, are operating ovens at capacity and are actively soliciting specifications against 1923 foundry coke contracts. Foundries generally have sufficient fuel on hand to carry them over the turn of the new year. The local market for foundry coke, therefore, is not as firm as it appears on the surface, although recent developments in the Connellsville region have somewhat strengthened the position of New England producers.

Old Materials.—A further general strengthening in prices, without much improvement in actual business, were the outstanding features in old materials the past week. Quotations on heavy melting steel continue to take an unusually wide spread, with the average up 50 cents this week. Small tonnages for shipment into the eastern Pennsylvania territory at $12 on cars shipping point represent the top of the market, but most dealers cannot quote better than $11 to $11.50. Machine shop turnings are 50 cents higher and the most active material in the market, although mixed borings and turnings are a close second. Small purchases of forged scrap and bundled skeleton have lifted prices 50 cents. Interest in wrought pipe is lacking and quotations unchanged. New England foundries are showing more interest in No. 1 machinery cast, but individual purchases usually are in car lots, inasmuch as most melters are still able to secure adequate supplies from their respective localities at attractive terms.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plate	15.50 to 16.00
Railroad malleable	18.50 to 19.00
Street car wheels	19.00 to 20.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $12.00
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	11.00 to 11.50
Wrought pipe (1-in. in diam., over 2 ft. long)	10.00 to 10.50
Machine shop turnings	7.50 to 8.00
Cast iron borings, chemical	9.50 to 10.00
Cast iron borings, rolling mill	7.50 to 8.50
Blast furnace borings and turnings	7.00 to 7.50
Forged scrap and bundled skeleton	8.00 to 8.50
Shafting	17.00 to 18.00
Rails for rolling	12.50 to 13.00

Dwight P. Robinson & Co., Inc., New York, has opened an office in Atlanta, Ga., in the Healey Building, with W. Rawson Collier in charge. Mr. Collier was for many years with the Georgia Railway & Power Co. He joined the Robinson company several months ago, going from the Poughkeepsie Gas & Electric Co. Among the company's recent activities in the South are a new wet-process cement plant for the Lehigh Portland Cement Co. at Birmingham, Ala.; extensions to the steel plant of the American Rolling Mill Co. at Ashland, Ky.; extensions to the power systems of the New Orleans Public Service, Inc., and the design and construction of the fifth sulphur mining plant built for the Freeport Sulphur Co. at Hoskins Mound, Tex. The company is also arranging to build a 300-room club-hotel at Palm Beach, Fla.

St. Louis

Limited Buying of Pig Iron Follows Activity of Preceding Two Months

ST. LOUIS, Dec. 4.—A pronounced calm pervades the pig iron market this week following the storm of orders that marked the previous fortnight in St. Louis. What little buying there was consisted of carloads for prompt shipment. The buying for next year's melt stopped about the middle of the week. Toward the latter part of the week, a few inquiries were sent out, including 2500 to 3000 tons of basic for a local steel plant; 2000 tons of basic for an Illinois melter; 2500 to 3000 tons of foundry iron for an Illinois melter and scattering inquiries for carloads up to 100 tons, amounting to 500 tons. The market remains at $23, Chicago, for Northern iron, and $21, Birmingham, for Southern make. However, a quotation of $22.50, Chicago, is reported to have been made to melters in this district by a leading Chicago interest. The St. Louis Coke & Chemical Co. is quoting $26, f.o.b. Granite City furnace.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$23.66 to $24.16
Northern malleable, sil. 1.75 to 2.25	23.66 to 24.16
Basic	23.66 to 24.16
Southern fdy., sil. 1.75 to 2.25 (rail)	26.17

Reinforcing Bars.—Considerable interest is being shown here in pending business, which includes:

William Beaumont public high school, St. Louis, 1,000 tons.
McBride Catholic boys' high school, 150 tons.
Grain elevator, Kansas City Southern Railway, Port Arthur, Tex., 300 to 400 tons.

Finished Iron and Steel.—The Wabash purchase of 800 kegs of standard track spikes is the only item of interest to report in railroad material. Warehouses and manufacturers of steel products are buying virtually nothing, nor will they be in the market until after the first of the year.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, ¾-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50; and tapped, $2.50 off list.

Old Material.—The market for old material continues to advance, due entirely to the activity of dealers who have faith in higher prices, which faith remains unshaken despite the decision of the steel plant most active in whatever buying has been going on to close down temporarily on Dec. 15. This concern started to buy for immediate delivery, but it became known during the week that the purchases were made to fill orders on hand before operations ceased. Consumers are buying very little. New railroad lists include: Chicago & Alton, 1000 tons; Chicago, Milwaukee & St. Paul, 1500 tons; Missouri Pacific, 1200 tons; Pennsylvania system: central region, 15,000 tons; northwestern region, 3500 tons; southwestern region, 7500 tons.

Per Gross Ton	
Iron rails	$15.00 to $15.50
Rails for rolling	17.00 to 17.50
Steel rails, less than 3 ft.	17.00 to 17.50
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 and over	32.50 to 33.50
Cast iron car wheels	17.00 to 17.50
Heavy melting steel	13.75 to 14.00
Heavy shoveling steel	13.75 to 14.00
Frogs, switches and guards cut apart	16.00 to 16.50
Railroad springs	17.50 to 18.00
Per Net Ton	
Heavy axles and tire turnings	12.00 to 12.50
Steel angle bars	13.00 to 13.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.00
Wrought iron bars and transoms	18.00 to 18.25
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.50 to 13.00
Cast iron borings	10.00 to 10.50
No. 1 busheling	13.00 to 13.25
No. 1 railroad cast	17.50 to 18.00
No. 1 machinery cast	18.50 to 19.00
Railroad malleable	15.50 to 16.00
Machine shop turnings	9.00 to 9.50
Champion bundled sheets	8.00 to 8.50

Buffalo

Fair Tonnage Placed Following the Recent Heavy Movement

BUFFALO, Dec. 4.—About 40,000 tons of new orders for pig iron have been taken on by producers at the tail end of the buying movement; a considerable portion of this tonnage was booked at upwards of $21 for silicon 1.75 to 2.25. Conflicting statements have been made as to the total amount of new business in the month of November, but THE IRON AGE is able to state that the total volume was less than 300,000 tons. Of course, all factors participated in this tonnage but the greatest portion was handled by three of five merchant furnaces. There is very little activity expected the rest of this month in sales, but shipping is brisk and melters are making every effort to get iron in. Two producers have reached the stage that they do not care to make further commitment and are quoting only on actual inquiries sent to them, and each inquiry is taken up as a separate individual proposition. With one producer all existing prices scheduled have been cancelled and no quotations are being sent out without application. No big inquiry is out. In connection with November sales, most of it was negotiated without the formality of inquiry being made.

We quote f.o.b., gross ton, Buffalo as follows:

No. 1 foundry, sil. 2.75 to 3.25	$22.00
No. 2 foundry, sil. 2.25 to 2.75	21.50
No. 2 plain, sil. 1.75 to 2.25	21.00
Basic	21.00
Malleable	21.00
Lake Superior charcoal	28.28

Finished Iron and Steel.—Demand has fallen off in all lines with a slight exception in sheets for first quarter delivery. One dealer has noticed improvement in this demand and prices are holding firm. A few jobbers have been buying bars in slightly larger quantities, but the whole market is quiet, and is expected to so remain until after the holiday season. Structural work is being rapidly brought to a close and no new jobs have been brought out with the exception of a new addition for the American Locomotive Co. at Schenectady where approximately 1000 tons of shapes will be required.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—Sales in other districts and livelier interest all around has strengthened this market. Although the two largest users of heavy melting steel have announced that they will not be interested in further propositions until after the first of the year, it is expected that lesser factors will place tonnages within the month.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$16.00
Low phos., 0.04 and under	$20.00 to 21.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	14.00 to 15.50
Machine shop turnings	10.00 to 11.00
Cast iron borings	12.50 to 13.00
No. 1 bushelling	14.00 to 15.00
Stove plate	17.00 to 17.25
Grate bars	16.00 to 16.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	18.00 to 19.00
Hydraulic compressed	14.00 to 14.50
Railroad malleable	18.00 to 18.50

Permits were issued in St. Louis during November for building construction to cost $4,571,525, of which $2,000,000 was issued after Nov. 26, when the Missouri Supreme Court declared the St. Louis zoning law unconstitutional, on the ground that it did not provide compensation for real estate values lost in restricted districts. Permits issued in November, 1922, were for work costing $2,850,789.

The Marshall & Huschart Machinery Co., 17 South Jefferson Street, Chicago, will shortly offer for sale the entire equipment of the Harroun Motor Co. plant at Wayne, near Detroit. The machinery, which is appraised at from $200,000 to $225,000, will be disposed of at private sale.

Birmingham

Pig Iron Buying Not Heavy, but Inquiries Are Numerous

BIRMINGHAM, ALA., Dec. 4.—The activity in the Southern pig iron market of two weeks ago is not continuing, spot business, however, aggregating well and furnace interests are not discouraged. Inquiries have been lively and there are indications that another impetus in the buying will start on the turn of the year, if not before. Quotations are around $20 to $21 per ton, No. 2 foundry, with two or three companies not urging the market at that price. The surplus stocks of iron are being cut into, deliveries being prompt where melters desire the product.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$21.00
Basic	21.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—Lettings continue coming in to the cast iron pipe makers, both pressure and soil pipe makers. One statement in pressure pipe circles is that there is no improvement in business. The bond situation, which has failed to improve as much as was expected, it is stated, is seriously hampering municipalities throughout the country in the sale of bonds for public improvement. The United States Cast Iron Pipe & Foundry Co., the National Cast Iron Pipe Co. and the American Cast Iron Pipe Co. are receiving lettings, as stated, week after week. The American Cast Iron Pipe Co. has received an order for 1158 tons from Shreveport, La., 289 tons from Honolulu, Hawaii, and 120 tons from Mobile, Ala. Pipe quotations show no change, 6-in. and over pressure pipe being $49 to $50 while standard soil pipe is quoted at $55. Building operations are steady and as a consequence the soil pipe industry is enjoying a better demand.

Finished Material.—Some of the steel mills of the district, on shapes, are lagging. Rods, wire and nails are in good demand and these mills are producing steadily. The Gulf States Steel Co. has four open-hearth furnaces in operation and the Tennessee company twice as many. Steel bars are still quoted at 2.60c.

Coke.—The Southern coke market is still quiet and production being curtailed. By-product foundry coke is selling at $5 per ton with beehive coke as high as $6 and $6.50. The demand is not showing signs of an early improvement.

Old Material.—No. 1 cast is in better demand but the scrap iron and steel market as a whole is still unsettled. Dealers have been receiving some inquiries and have been selling a little stock.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$15.00 to $17.00
Heavy melting steel	12.00 to 13.00
Railroad wrought	14.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails	16.00 to 17.00
No. 1 cast	17.00 to 18.00
Tram car wheels	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	14.00 to 15.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	8.00 to 9.00

Electrification of the first unit of the Ford railroad, the 13½-mile section of the Detroit, Toledo & Ironton, between the River Rouge Ford plant and Flat Rock, Mich., will be completed next May. Plans are being made for electrification of other sections which will be undertaken soon. At present a single track has been laid while the second track is about 40 per cent completed. Overhead trolleys to carry 23,000 volts alternating current to the locomotives will be ready to put in place when the tracks are finally completed. Eight turbo-generators, each delivering 62,500 hp. will eventually be installed in the River Rouge power house. This means 500,000 hp. will be available for the Ford industries and the D. T. & I.

Cleveland

Fair Tonnage of Pig Iron Sold—Malleable Taken for January-May Delivery

CLEVELAND, Dec. 4.—While the heavy pig iron buying movement has subsided, the market is still fairly active in foundry and malleable grades except in Cleveland and the immediate territory where nearly all consumers are now under contract. Some of the lake and Valley furnaces booked considerable iron during the week. Sales by one lake furnace company aggregated 25,000 tons, the largest lot being 4000 tons of foundry iron, and this producer now has scattered inquiries pending for 10,000 tons. Practically all the business booked is for the first quarter, as neither buyers nor sellers seem inclined to go beyond that period. Lake furnaces that were slower to mark up prices than producers in some other districts have advanced quotations 50c. per ton. One is now quoting foundry and malleable iron at $22.50 to $23 and the latter price at furnace is being quoted for Cleveland delivery, although the $22 Cleveland price for outside shipment has not disappeared. In the Valley district, quotations range from $22 to $22.50. Sales include a 5000-ton lot of malleable iron taken by a Buffalo furnace at $23 for January-May shipment. Some of the business placed during the week came from consumers who previously had bought but have added to their original purchases. Some of the automobile foundries have advised the trade that they expect to buy additional iron early in January as soon as automobile manufacturers begin to release specifications for castings. While consumers, as a rule, have not bought beyond their normal requirements, the question has arisen as to whether foundry business will develop in sufficient volume during the first quarter to assure the taking of the iron in the quantities contracted for. Some of the furnaces have their order books well filled, but others have not been willing to sell their entire output at the prices that have been prevailing. Steel making iron is inactive. Low prices have been named in the East or around $25 for low phosphorus iron for Western shipment. A Pittsburgh consumer is inquiring for 1500 tons of low phosphorus. Ohio silvery producers who recently shaded prices $1 a ton have restored the regular schedule. Southern furnaces are holding firmly to $21 for foundry iron. Perry furnace, Erie, Pa., will go out of blast tomorrow.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$23.00 to 23.50
Southern fdy., sil. 1.75 to 2.25	27.00
Malleable	23.00 to 23.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	29.00 to 30.00

Iron Ore.—The shipping season has now closed with one cargo shipped from Marquette this week. The total movement by water for the season was slightly over 59,036,704 tons. A table giving shipments by ports for 1923 appears in another column.

Bolts, Nuts and Rivets.—Bolt and nut makers have stiffened somewhat on prices and it is claimed that the regular discount of 60 and 10 per cent off list on large machine bolts is no longer being shaded. Some first quarter business has been taken at that price. Manufacturers are getting their low priced steel used up and with regular prices generally holding on steel bars, they feel that they are entitled to better prices. The same situation has caused rivet makers to stiffen on prices. The leading local manufacturer advanced rivets Nov. 28 to 2.90c. base and small rivets to 65, 10 and 5 per cent off list, and it is understood that other rivet makers will hold to these prices, but they have not yet been tested.

Reinforcing Bars.—The demand has slowed down and prices are irregular. On soft steel bars, quotations of 2.30c. are appearing. Prices on rail steel bars range from 2.10c. to 2.20c.

Semi-Finished Steel.—An Ohio consumer has purchased 5000 tons of sheet bars from a Valley mill for the first quarter at $42.50, which price is being firmly held. Sheet bar specifications show an improvement. There is no activity in billets and slabs.

Sheets.—A moderate volume of business is being placed in first quarter contracts, but current demand is light. Mills have taken a firmer price attitude and there is now little shading of regular prices, although black sheets may still be had at 3.75c. for December rolling and galvanized at 4.90c. out of stock.

Finished Iron and Steel.—There is an improvement in sentiment in the steel industry and some producers report a slight increase in orders and inquiries, but sales are almost wholly in small lots and the aggregate tonnage booked during the week was light. Consumers have allowed their stocks to become very low as inventory time approaches, many being no doubt influenced to some extent by a feeling that prices may go lower. Some producers express the opinion that unless there is more activity in steel bars before the end of the month, a buying spurt will develop in January in such volume that consumers will be disappointed in getting as early deliveries as they will need. A few inquiries for steel bars for the first quarter have come out, but little business has been placed for that delivery, although several of the mills are ready to take first quarter contracts at regular prices. Automobile companies are withholding first quarter purchases although they are expected to need considerable steel in January. Pittsburgh district mills are holding firmly to 2.40c. for steel bars and 2.50c. for plates and structural material. However, the irregularity in plates continues, attractive inquiries bringing out a 2.40c. price. While most of the steel bar business is being taken at the regular price, this is still being shaded from $1 to $2 a ton by one or more small mills and as low as 2.25c. is reported to have been the price made on 800 tons placed by an Ohio consumer. Cold-finished steel bars have firmed up and makers now appear to be holding closely to 3c. A lull exists in the building field. While considerable work is pending, contracts are being placed rather slowly and little new inquiry is coming out.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.10 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Coke.—Producers are renewing contracts for Wise County foundry coke at $6.75 for the first half. Connellsville coke is moving slowly with quotations unchanged at $5.25 to $6.50 for standard foundry grades.

Old Material.—The buying of heavy melting steel in Pittsburgh by the Carnegie Steel Co. has caused dealers to jump into the market and cover short sales and has resulted in price advances of from 50c. to $2 a ton. Local dealers have paid $16 to $16.50 delivered to Cleveland mills for heavy melting steel, $12.75 for machine shop turnings and $13.50 for shoveling turnings. However, mills have failed to become excited over the advancing market and the week brought out very little business from consumers. Local mills still have large stocks. Some feel that there may be a slight reaction from present prices.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.00 to $16.50
Rails for rolling	16.25 to 16.75
Rails under 3 ft.	16.75 to 17.00
Low phosphorus melting	18.00 to 18.50
Cast borings	13.00 to 13.25
Machine shop turnings	12.25 to 12.75
Mixed borings and short turnings	13.00 to 13.25
Compressed sheet steel	13.00 to 13.50
Railroad wrought	14.50 to 15.00
Railroad malleable	19.75 to 20.00
Light bundled sheet stampings	11.00 to 11.25
Steel axle turnings	13.50 to 14.00
No. 1 cast	20.50 to 21.50
No. 1 busheling	12.00 to 12.50
Drop forge flashings	12.00 to 12.50
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	12.00 to 12.25

Philadelphia

After Another Week of Fair Activity Pig Iron Market Turns Quiet

PHILADELPHIA, Dec. 4.—The tail-end of the first quarter buying movement in pig iron was practically wound up last week, so far as the large tonnages are concerned. Some of last week's business was taken at slightly below today's levels of prices on quotations of one or two weeks' standing. The market is quieter, but some of the smaller consumers are covering on the basis of $23, furnace, which all of the Eastern producers are now quoting. The real event of the week was the sharp rise in scrap prices, almost every item being affected. The market's strength was due largely to the purchase of a tonnage of heavy melting steel by the Carnegie Steel Co. at Pittsburgh at $19, delivered. In finished steel the situation shows no marked change, nor is any expected until after the first of the year. A slight increase in bookings in November over October has given rise to a moderate degree of optimism, but there is little of a tangible character upon which to base the sanguine hopes expressed by some in the steel trade.

Pig Iron.—Considerably more tonnage for first quarter shipment was taken by a few of the Eastern furnaces the middle of last week, but during the last two days of last week and the first two days of this week the market has been much quieter, which may indicate that the first quarter buying movement has virtually subsided so far as the large tonnages are concerned. Some of the smaller consumers are covering, and in the aggregate their orders have given two or three furnaces a fair volume. Current business is being taken by all of the Eastern companies at $23, furnace, with 50c. differentials for each higher grade of silicon. Less is now being heard of merchant furnaces going out of blast. The Brooke furnace will go in blast about Jan. 1 and is now taking contracts for first quarter. The past week's business did not include any basic iron, but 6000 to 8000 tons of gray forge was sold, one buyer of 6000 tons paying about $23.25, delivered, while another buyer of upward of 1000 tons paid $23, delivered. Fair-sized sales of low phosphorus iron have been made at unchanged prices. Makers of malleable iron are now quoting $23.50, furnace, or higher.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.76 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	22.75 to 23.00
Gray forge	23.00 to 23.50
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.50 to 28.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—There has been a good buying movement in ferromanganese during the past week, 6000 to 8000 tons for first quarter having been contracted for by a number of consumers. The lowest price reported is $106.50, furnace, but other sales ranged from this price up to $109. One producer is now quoting $108 to $109, furnace, while another has advanced its price to $115, furnace.

Coke.—Connellsville coke is slightly firmer, spot shipments not being so easily obtained at $4, some producers quoting $4.25. First quarter contracts have been made at $4.40 and $4.50. Foundry coke is quoted at $5 to $5.25, Connellsville.

Semi-Finished Steel.—While $40 for open-hearth rerolling billets and $45 for forging billets remain nominally the market quotations, contracts for first quarter or spot business in good-sized lots could probably be closed at concessions. There is not enough business to test prices.

Plates.—A slight increase in plate bookings in November over October is the most cheering news Eastern plate mills can offer. The plate market is still exceedingly quiet and the price situation is unchanged, Eastern mills quoting 2.40c. and Pittsburgh mills 2.50c., Pittsburgh.

Structural Material.—One or two Eastern shape mills which have held to 2.50c., Pittsburgh, on plain material have met in a few instances the 2.40c. quotations of two smaller Eastern mills. Very little tonnage is coming out in this district, building work being very quiet.

Bars.—Steel bar mills report no difficulty in getting 2.40c., Pittsburgh, on such orders as are being placed, notwithstanding frequent rumors of 2.30c. and 2.35c. quotations. Bar iron is not in demand and Eastern mills generally quote 2.35c., Pittsburgh.

Sheets.—Prices are firmer than a few weeks ago, but some shading of so-called regular prices is still reported, especially for shipments this month. For first quarter most of the mills are said to be holding firmly to 3c. for blue annealed, 3.85c. for black and 5c. for galvanized.

Warehouse Business.—Despite slight shading of prices by some of the warehouses in this district, most of the Philadelphia jobbers hold to the prices named below for local delivery.

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1¼ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅞-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—A purchase of heavy melting steel at $19 by the Carnegie Steel Co. has affected the scrap situation of the entire East. Coming after a prolonged period of inactivity and low prices, this purchase has had the effect of buoying the hopes of dealers for higher prices. Philadelphia brokers are freely offering $16, delivered, for No. 1 heavy melting steel, and one large company, it was reported today, was prepared to offer $16.50 for a large tonnage. Scrap brokers believe the eastern Pennsylvania market is headed for $18, and $17 was their idea today of a price at which it would be safe for them to sell. Almost all grades of scrap have moved upward and indications today were that there would be further advances before the end of the week. The sharpest advances have occurred in cast-iron car wheels, forge fire scrap, bundled sheets, machine shop turnings and heavy breakable cast.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $17.00
Scrap rails	16.00 to 17.00
Steel rails for rolling	17.00 to 18.00
No. 1 low phos. heavy 0.04 and under	21.00 to 22.00
Couplers and knuckles	19.00 to 20.00
Cast-iron car wheels	19.50 to 20.00
Rolled steel wheels	19.00 to 20.00
No. 1 railroad wrought	18.00 to 18.50
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	13.50 to 14.50
Bundled sheets (for steel works)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	11.50 to 12.00
Machine shop turnings (for steel works use)	13.00 to 13.50
Machine shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	13.00 to 13.50
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	17.50 to 18.00
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	16.50 to 17.00
Railroad malleable	17.00 to 17.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 15.50
Shafting	21.00 to 22.00
Steel axles	20.00 to 21.00

San Francisco

Gradual Improvement in Demand for Iron and Steel Products

SAN FRANCISCO, Nov. 27—The trade outlook for iron and steel business is gradually developing some improvement. While the betterment is still of very moderate proportions, it possesses some definite features which the trade feels assured will continue, particularly if the Eastern markets show tangible indications for advanced prices and sufficient business to maintain a higher standard of market values. The improvement in this market is based on two underlying causes, the chief one being a better buying inquiry coupled with an increased volume of orders for delivery during the next three or four months.

Pig Iron.—Sales for November were decidedly light but the past ten days or so have developed a fair measure of business, so that the record for the month will make a better showing than was expected. Business is still described as very dull but there has ben sufficient change to encourage sellers that the next three months will be considerably better than the last three. The quotable price is still $33 to $34 per ton and firmly held, with some indications that a slight advance may be expected if conditions in the East strengthen prices there. Imports have been light and among the arrivals by sea were several small lots from China. Several other small parcels are on the way from the Orient to arrive during the coming month. The inquiry in the southern part of the State continues good with every indication that business volume will continue to increase.

Coke.—There is not much trade movement and supplies, while not very extensive, are nevertheless ample for all requirements. Arrivals have been light but there is some en route due to arrive within the next 30 days. Prices are a trifle stronger and desirable stock is now held at $22 to $22.50 per ton.

Finished Steel and Iron.—With a moderate increase in orders, both mills and foundries are more actively engaged now than for some weeks. Prices show little change, but there is a hardening tendency noticeable on materials. Merchant bars are slightly higher now, selling at $3.75 and small lots at $4. The demand for structural steel shows improvement and while the last quoted figures are still current, it is doubtful if the most favored buyer could obtain any concession on asking figures. It is stated that there is sufficient work now in sight and being planned to keep the present inquiry well sustained for several months, not alone in the Los Angeles district but in the district around San Francisco bay.

Old Material.—Business is reported as slightly better, but buyers are giving out orders very sparingly, and the Los Angeles mills are said to be out of the market for the remainder of the year. Prices are held at $14 to $14.50, but it would have to be an extra good lot to bring the latter figure. November was the most quiet month in the past two years, but indications for December are more encouraging than since last spring.

A Carbon Monoxide Recorder

A CO recorder for use either as a separate instrument or as an adjunct to its CO_2 recorder has been placed upon the market by the Uehling Instrument Co., Paterson, N. J. The CO_2 instrument tells when there is too much air and the CO recorder indicates when there is too little. Using the two instruments together the fireman can make adjustments that will permit of saving fuel for a given boiler.

In the CO recorder there are two electrically-heated platinum tubes of small bore through which the gas sample flows continuously. If CO or other combustible gas is present it will burn within the first heated tube and increase the temperature of that tube more or less according to the amount of combustible present. The burnt gas then flows through the second platinum tube and out of it under a fixed suction.

The hotter the first tube becomes the more expanded will be the gas flowing through it and consequently less gas will enter the chamber connecting the two tubes as the first tube becomes hotter. The outlet suction does not vary, and hence a decreasing flow of gas through the first tube results in a greater partial vacuum in the connecting chamber. The varying suction in the connecting chamber becomes a measure of the heat units in the gas, and by connecting the chamber with a recording gage by means of tubing the quantity of combustible may be recorded at a distance.

The recorder is calibrated in percentage of CO. If hydrocarbons or hydrogen are present they will also be recorded in terms of CO or equivalent heat value. It is also feasible to calibrate the instrument in B.t.u. per cu. ft. of gas. An auxiliary indicator may be mounted on its boiler front to guide the fireman.

A leak is provided near the gas inlet which dilutes the gas with air by a definite small amount, assuring sufficient oxygen to complete combustion in the first tube. The suction regulator on the CO instrument is of simple design. It has a tube, open to the air, which extends into the water almost to the bottom of the water container. Part of the gas entering the instrument is by-passed through a pipe, bubbling up through the water in the container and escaping through a pipe at the top which leads to the outlet. This pipe communicates with an aspirator or main suction through a needle valve.

COMING MEETINGS

December

National Exposition of Power and Mechanical Engineering. Dec. 3 to 8, inclusive. Second annual exposition, Grand Central Palace, New York. Headquarters, Grand Central Palace, New York.

American Institute of Chemical Engineers. Dec. 5, 6, 7 and 8. Winter meeting in Washington, D. C. J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y., secretary.

National Immigration Conference. Dec. 13 and 14. Hotel Astor, New York. Magnus W. Alexander, 10 East Thirty-ninth Street, New York, managing director.

January

Society of Automotive Engineers. Jan. 22 to 25. Annual meeting, General Motors Building, Detroit. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

American Society for Steel Treating. Jan. 31 to Feb. 1. Winter sectional meeting, Rochester, N. Y. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

Passing upon a complaint of the Homer Furnace Co., operating a foundry at Coldwater, Mich., the Interstate Commerce Commission recently handed down a decision holding that the rate of pig iron from Toledo, Ohio, to Coldwater for the future may not exceed $2.24 per ton, subject to the 10 per cent general rate reduction of July 1, 1922.

The Pittsburgh *Gazette Times*, in a column quoting important news developments from its files of other years, recently noted that 40 years ago the Carnegie Steel Co. reduced wages at its Homestead plant from $1.40 to $1.20 per day of 10 hours. Today's rate for common labor at this and other Steel Corporation plants is $4.40 for a day of 10 hours.

British Iron and Steel Market

Japanese Demand Slight—Improvement in Steel Follows Boilermakers' Settlement—Ruhr Efforts to Resume Hampered by Lack of Funds

(By Cable)

LONDON, ENGLAND, Dec. 4.

Pig iron is firm on increasing domestic demand and Cleveland output is expanding. Foreign inquiry is rather quiet. Hematite is strong, with diminished supplies for first quarter delivery. It has been sold up to £5 2½s. ($22.24). Additional furnaces have been restarted. The total number of Cleveland furnaces now blowing is 44, comprising 14 on foundry and forge iron, 14 on hematite and 16 on basic iron.

Foreign ore is firmer on rising freight rates. Sellers of Bilbao Rubio ask 24s. to 24½s. ($5.21 to $5.32) c.i.f. Tees.

Steel is firm, with increased demand for ship plates, following on the releasing of contracts held up by the boilermakers' dispute. The demand is mainly for domestic requirements but there is some inquiry from Germany. Merchant steel is quiet, with prices unchanged.

Continental sterling quotations are weaker on exchanges but sales are only meager, owing to the uncertainty of the general position. Wire rods are being quoted at £9 5s. to £9 7½s. ($40.14 to $40.69) f.o.b. German plates have been offered by second-hand dealers at £10 (1.94c. per lb.) f.o.b. for 1 to 3 mm. (No. 20 to 12 gage) and £9 (1.74c. per lb.) f.o.b. for 3 to 5 mm. thickness (No. 12 to 6½ gage), all for shipment in 14 days.

On the Continent the Ruhr works are making efforts to resume operations, now that the general agreement has been signed with the French authorities. The workers generally are not yet agreeable to accept the 10-hr. day. The works in many cases are finding difficulty in starting up, owing to shortage of funds.

Tin plate is strong on continued all-round demand, with sellers over the minimum prices of 24s. ($5.21) basis IC f.ob. being done freely. Export sales are good, especially to the Continent, with Scandinavia in the lead. Germany is inquiring. A small oil plate order for January to March delivery has been placed in Wales on the basis of the schedule price. All kinds of wasters are in short supply. Basis prices again are being talked higher on increasing costs.

Galvanized sheets are quiet but prices are steady, the works being well placed. The South Durham Steel & Iron Co., Ltd., Stockton-on-Tees, is arranging to erect a plant to roll galvanized corrugated sheets.

Japanese demand for black sheets now is confined to small parcels and early shipments. The works are committed well forward. Prices are unchanged.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.34 per £1, as follows:

Durham coke, delivered	£1	18½s. to £1	19s.	$8.35 to $8.46
Bilbao Rubio ore†	1	4		5.21
Cleveland No. 1 foundry	7	7½		33.33
Cleveland No. 3 foundry	5	0		21.70
Cleveland No. 4 foundry	4	19		21.48
Cleveland No. 4 forge	4	18		21.27
Cleveland basic	5	0		21.70
East Coast mixed	5	1½ upward		22.03 upward
East Coast hematite	4	19	to 5 0	21.48 to 21.70
Ferromanganese	17	0		73.78
Ferromanganese*	17	0		73.78
Rails, 60 lb. and up	⅞	10	to 9 10	36.89 to 41.23
Billets	⅞	0	to 8 10	34.72 to 36.89
Sheet and tin plate bars, Welsh	⅞	18¾		38.79
Tin plates, base box	1	2½	to 1 4¼	5.10 to 5.26
				C. per Lb.
Ship plates	9	10	to 10 0	1.84 to 1.94
Boiler plates	12	10	to 13 10	2.52 to 2.82
Tees	9	15	to 10 5	1.89 to 1.99
Channels	9	0	to 9 10	1.74 to 1.84
Beams	⅞	15	to 9 5	1.70 to 1.79
Round bars, ¾ to 2 in.	10	5	to 10 15	1.99 to 2.08
Galvanized sheets, 24 g	£19	0s.	to £19 5s.	3.68 to 3.73
Black sheets, 24 gage	14	0		2.71
Black sheets, Japanese specifications	15	0		2.90
Steel hoops	12	0	& 12 10*	2.32 & 2.42*
Cold rolled steel strip, 20 gage	17	12½		3.42
Cotton ties, Indian specifications	15	0		2.91

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:				
Belgium	£1 12½s	to £1 15s	$20.07 to $20.61	
France	1 12½	to 1 15	20.07 to 20.61	
Luxemburg	1 12½	to 1 15	20.07 to 20.61	
Billets (nominal):				
Belgium	6 7½		27.67	
France	6 7½		27.67	
Merchant bars:			C. per Lb.	
Belgium	⅞ 10	to ⅞ 0	1.45 to 1.55	
Luxemburg	⅞ 10	to ⅞ 0	1.45 to 1.55	
Germany	⅞ 10	to ⅞ 0	1.45 to 1.55	
Joists (beams):				
Belgium	⅞ 0	to ⅞ 2½	1.36 to 1.38	
Luxemburg	⅞ 0	to ⅞ 2½	1.36 to 1.38	
Germany	⅞ 0	to ⅞ 2½	1.36 to 1.39	
Angles:				
Belgium	⅞ 0	to ⅞ 5	1.55 to 1.60	
¼-in. plates:				
Belgium	⅞ 0	to ⅞ 2½	1.55 to 1.57	
Germany	⅞ 0	to ⅞ 2½	1.55 to 1.57	
⅜-in. plates:				
Luxemburg	⅞ 0	to ⅞ 2½	1.55 to 1.57	
Belgium	⅞ 0	to ⅞ 2½	1.55 to 1.57	

More Active Pig Iron Market—Extensive Railroad Buying

LONDON, Nov. 15.—The shadow of the impending general election has so far had little adverse effect upon the markets. The recent rise in pig iron prices has brought in some very good buying, more especially on the part of home consumers, rather than for export, the former realizing that they cannot hope for cheaper values for some time to come. Purchases have been made for deliveries spread well over the first quarter, and in some cases the first half, of next year, and makers are now in a better position than they have been for some time past, as the stocks of Cleveland material, at any rate, have rapidly diminished. Some various substantial contracts for steel material have been placed recently, and this has led pig iron manufacturers to expand output, and so far two furnaces are being restarted, and it is probable that a third will be put into blast shortly. Hematite has joined in the improved demand, and here, too, sales have been made up to June, prices being very firm with an upward tendency.

In finished iron and steel the most interesting feature recently has been the publishing of programs by the various railroad companies, which will involve considerable sums of money as well as employment for some little time to come. The Southern Railway contemplates spending about £8,000,000 on electrification, and it is reported that all the work will be placed with British suppliers. The North Eastern Railway is spending about £4,000,000 on new locomotives and cars. Apart from these, some good orders for rails have been secured for colonial markets, while the Admiralty have placed contracts for structural material. Shipbuilding is still in the doldrums, due to the continuation of the boiler makers' dispute. Further conferences have been held from time to time, but the actual result is an adjournment mainly due to the obstinacy of both sides. This dispute is now in its twenty-ninth week and has caused complete paralysis to the ship yards in Scotland.

Export buying has not been particularly brisk, except in the case of specialties. Tin plates are booming and some makers have sold out to June. Galvanized sheets have been in strong demand mainly for the Far East, and the same is the case with black sheets. The orders in general for heavy materials are still lacking.

The Steinhart gas combustion system is to be applied to the steam boilers at the Lackawanna and Johnstown plants of the Bethlehem Steel Co. and to boilers at the plant of the Trumbull-Cliffs Furnace Co., Warren, Ohio.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....3c.

Cold-Finished Steels

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....4.90c. to 5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.60
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Bale ties, carloads, to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list

Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.25c. off list
Hot pressed nuts, tapped.....4.25c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
½ in. and smaller, U. S. S.....80 and 5 per cent off list
⅝ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....6c. to 6.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000			Per 1000	
	S. A. E.	U. S. S.		S. A. E.	U. S. S.
¼-in.	$4.80	$4.80	⅞-in.	$15.00	$15.00
⅜-in.	5.50	6.00	1-in.	19.50	20.00
⅜-in.	6.50	7.00	1¼-in.	28.50	28.50
7/16-in.	7.00	9.50	1⅜-in.	37.00	37.50
½-in.	11.00	11.50	1½-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.90
Small rivets .....65, 10 and 5 off list

Track Equipment

Spikes, ⅞ in. and larger, base, per 100 lb.....$3.00 to $3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb..... 3.15 to 3.25
Spikes, ⅞ in..... 3.15 to 3.25
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.50
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜.....+11	+39	
¼ to ⅜.....	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½.....	30	13
1 to 3.....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6.....	59	47½	2½	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	41½	7 to 12.....	26	11
11 and 12.....	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3.....	61	50½
¼ to ⅜.....	47	30½	¼ to ⅜.....+19	+54	
½	53	42½	½	21	7
¾	58	47½	¾	23	12
1 to 1½.....	60	49½	1 to 1½.....	20	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4.....	57	46½	2½ to 3.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1½ in.....+18	
2½ to 2¾ in.....	37	1⅝ to 1⅞ in.....+	8
3 in.....	40	2 to 2¼ in.....	3
3¼ to 3⅞ in.....	42½	2½ to 3 in.....	— 7
4 to 13 in.....	46	3¼ to 4½ in.....	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.....	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.....	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		

Hot Rolled

3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in.....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....33 per cent off list
Carbon 0.30 to 0.40, base.....31 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	2-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage...	15
2¼ in. O.D. 12 gage..	17	5⅝-in. O.D. 9 gage...	55
2¼-in. O.D. 11 gage..	18	5½-in. O.D. 9 gage...	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C....	$14.90
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.90c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.85 to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.35c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non Bessemer, 51½ per cent iron	5.65

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$107.50 to $110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Ferrosilicon, 50 per cent, delivered	80.00 to 82.50
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent	$40.00
Spiegeleisen, domestic, 16 to 19 per cent	39.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.	
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton	6.00 to 7.00	

Silica Brick:	
Pennsylvania	42.00
Chicago	49.00
Birmingham	50.00
Ground silica clay, per net ton	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	50.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$40.00
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c. to 2.40c.
Skelp, sheared, per lb.	2.35c. to 2.40c.
Skelp, universal, per lb.	2.35c. to 2.40c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅞-in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ½-in. and smaller, base, per 100 lb.	3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ⅞-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.26
Boston, export	0.255	Chicago	0.34	†Denver (pipe)	1.17

*Pacific Coast	$1.15
*Pac. Coast, ship plates	1.20
Birmingham	0.58
Memphis	0.54
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Awards Over 27,000 Tons, Mostly in the East—Prospects Good

Another good week in the volume of bookings in fabricated steel work called for upward of 27,000 tons, of which 20,000 was placed in the East, mostly for private enterprises. Fresh inquiries fell to less than 10,000 tons, but in the first half of 1924 fully 50,000 tons is expected in school buildings for New York. Awards include:

Pictorial Review building, Ninth Avenue at Thirty-third Street, New York City, 12,000 tons to Levering & Garrigues Co.

Barber Asphalt Paving Co., tanks at Maurer, N. J., 300 tons, to Phoenix Iron Works, Meadville, Pa.

Bellamose Corporation, factory building near Hartford, Conn., 700 tons, to American Bridge Co.

State of New Jersey, highway bridge at Point Pleasant, 200 tons, to Phoenix Bridge Co.

Adirondack Power Co., power plant addition in northern New York, 150 tons, to Blaw-Knox Co.

Loft building, West Thirty-fifth Street, New York, 1300 tons, to Hay Foundry & Iron Works.

Lefcourt-Marlborough Building, Broadway at Thirty-sixth Street, New York, 4500 tons; award expected this week, probably to Taylor-Fichter Steel Construction Co.

John A. McCarthy, garage, New York, 400 tons, to Hay Foundry & Iron Works.

S. & L. Building Co., apartment building at Broadway and Eighty-third Street, New York, 1150 tons, to Hay Foundry & Iron Works.

Seventh Avenue and Thirty-fifth Street Corporation, loft building at that address, New York, 4300 tons, to Levering & Garrigues Co.

Highway bridge over Missouri River, Wheeler, S. D., superstructure, 1070 tons, to American Bridge Co.; substructure, 292 tons, to Pittsburgh-Des Moines Steel Co.

Goodman Mfg. Co., addition to assembling building, Chicago, 328 tons, to Bethlehem Steel Co.

Fifty additional shaft sets for No. 4 shaft, Eureka Mine, Ramsey, Mich., Castile Mining Co., 120 tons, to American Bridge Co.

Chicago, Milwaukee & St. Paul bridge and through truss span, 174 tons, to American Bridge Co.

Timken Roller Bearing Co., Canton, Ohio, factory addition, 300 tons, to Canton Bridge Co.

Standard Seamless Tube Co., addition, Economic, Pa., 200 tons, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Bing & Bing, apartment building, Forty-fifth Street, New York, 1000 tons.

Pennsylvania Railroad, machine shop at Olean, N. Y., 150 tons.

New Jersey Zinc Co., building at Palmerton, Pa., 300 tons.

Bureau of Yards and Docks, Navy Department, tanks at Mare Island, Cal., 500 tons.

Turi Engineering Works, tanks to be erected at Peekskill, N. Y., 300 tons.

Loft Building, Thirty-seventh Street, New York, 1000 tons; also another loft building in the same district, 1000 tons.

Public schools Nos. 36, 71 and 121, New York, about 1300 tons each.

Apartment building, Park Avenue and Seventy-ninth Street, New York, 600 tons.

Bakery building in Queens borough, New York, 700 tons.

Mead-Morrison Mfg. Co., Chicago, ore bridge trestle, Youngstown, 150 tons.

Kentucky Highway Commission, bridge at Pineville, 180 tons, bids close Dec. 10.

The Lyon fair will hold its next meeting in Lyon, France, from March 3 to 17, 1924. American manufacturers, especially those who specialize in labor saving devices and machinery, are invited to participate. Emile Garden is official delegate of the fair for the United States, with headquarters at 50 Church Street, New York.

RAILROAD EQUIPMENT BUYING

Orders for 3500 Cars and Inquiries for 3757—Repair Business

Developments of the week in the railroad equipment market include orders by the Southern and the Baltimore & Ohio for 3000 cars and inquiries for upward of 3700 cars, mostly for refrigerator lines, besides noteworthy activity in repair business. The principal items are given below.

The railroads on Nov. 15 had the smallest number of freight cars in need of repair they have had in years. On that date they totaled 149,192, or 6½ per cent of the ownership. Of the total number, 116,534 were in need of heavy repair. The number of freight cars in need of repair on Nov. 15 was a decrease of 66,819 compared with the number on Jan. 1 this year, at which time there were 216,011.

The Baltimore & Ohio Railroad has ordered 1000 70-ton steel gondolas from the Bethlehem Steel Co. to be built at the Cambria works at Johnstown, Pa.

The Lehigh Valley Railroad has contracted with the American Car & Foundry Co. for the repair of 200 gondolas.

The Great Northern Railway will build in its own shops 500 stock cars for which it recently inquired among car builders.

The Missouri Pacific Railroad has placed an order with the Sheffield Car & Equipment Co. for the repair of 1000 box cars.

The Norfolk & Western Railroad is asking for bids on the repair of 1000 57½-ton hopper cars.

The Wabash Railroad is expected to place orders this week for 1750 box cars and 250 gondolas, for which it inquired some weeks ago.

The Southern Railway has placed 2000 steel center sill 40-ton box cars with the American Car & Foundry Co. in addition to 1000 placed with the same builder a week ago.

The Southern Pacific has finally put out an inquiry for 3057 refrigerator cars for the Pacific Fruit Express.

The Western Pacific is asking for figures on 500 refrigerator cars for the Western Refrigerator Line. The same road is in the market for 10 locomotives and 200 50-ton automobile cars.

The Baltimore & Ohio has decided not to buy 50 coaches and 4 dining cars.

The New York Central is inquiring for 500 flat car bodies and 500 stock car bodies.

The Universal Portland Cement Co. has decided not to buy 50 70-ton hopper cars.

The Southern Railway placed 1000 center constructions with the Virginia Bridge & Iron Works.

The Chesapeake & Ohio is inquiring for 25 steel underframes for caboose cars.

Detroit Scrap Market

DETROIT, Dec. 4.—The market on old material has shown a tendency to follow the turn of the pig iron market during the past week, the grades of scrap most in demand registering advances from $1 to $2 per ton. Dealers predominated in the bidding on the offering of one of the largest producers of approximately 3000 tons of turnings, borings, registered hydraulic compressed, flashings and heavy melting steel for December delivery.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast which are quoted on a net ton basis:

Heavy melting steel	$13.50 to $14.50
Shoveling Steel	13.50 to 14.50
Borings	10.00 to 11.00
Short turnings	10.00 to 11.00
Long turnings	9.00 to 9.50
No. 1 machinery cast	17.00 to 18.00
Automobile cast	23.50 to 24.00
Hydraulic compressed	11.00 to 11.50
Stove plate	15.00 to 16.00
No. 1 busheling	10.00 to 11.00
Sheet clippings	8.25 to 8.75
Flashings	10.50 to 11.00

A McKee patented revolving distributor is to be installed on No. 3 blast furnace of the Cambria plant, Johnstown, Pa., of the Bethlehem Steel Co. by Arthur G. McKee & Co. The new equipment includes all parts of the distributer proper and also a new cast steel gas seal.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Nov.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
28	13.25	12.87½	47.50	7.00	6.80	6.72½	6.57½
29	13.25	12.87½	47.25	7.00	6.80	6.72½	6.57½
Dec.							
1	13.25	12.87½	....	7.00	6.80	6.72½	6.57½
3	13.25	12.87½	47.25	7.10	6.90	6.70	6.35
4	13.25	12.87½	47.25	7.10	7.00	6.70	6.35

*Refinery quotation, delivered price 1c. higher.

New York

NEW YORK, Dec. 4.

Most of the markets are quiet but prices are steady to higher. Demand for copper is very light, but tin buying continues fairly active. The lead market is the strongest of all and demand for zinc has fallen off decidedly.

Copper.—The electrolytic copper market has turned decidedly dull the last week and there is an absence of both buying and inquiry. Under such circumstances prices have usually declined in the last few months, but this time quotations have remained steady at 13.12½c. to 13.25c., delivered, the whole week. Lake copper is largely nominal at 13.25c., delivered.

Copper Averages.—The average price of Lake copper for the month of November, based on daily quotations in THE IRON AGE, was 13.31c., New York. The average price of electrolytic copper was 12.76c., refinery, or 13.01c., delivered.

Tin.—The shortage of Straits tin for December which appeared possible a short time ago has been relieved by shipments from London. Already 300 tons has arrived and an equal amount is afloat. Yesterday some sellers became panicky in the absence of any sustained demand and one lot of December delivery sold as low as 46.75c. The week as a whole has been quiet compared with previous ones, total sales amounting to only 250 tons, of which 150 tons was sold on the Metal Exchange on Nov. 28. The quotation for spot Straits tin today at New York was 47.25c., with the market inactive. London prices today were about £5 per ton higher than a week ago, with spot Standard quoted at £236 15s., future standard at £237 12s. 6d. and spot Straits at £238 5s. Deliveries into consumption for the month of November were 6785 tons, with 1072 tons in stock and landing on Nov. 30. Imports for 11 months of this year have been 62,712 tons, of which 4180 tons was received in November. Arrivals thus far this month have been 675 tons, with 6095 tons reported afloat.

Lead.—The market is strong, demand is good and prices have advanced. The leading interest raised its quotation on Dec. 1 from 6.85c. to 7c., New York, the outside market having already reached that level several days before. Today as high as 7.10c., New York, was paid and yesterday the metal sold as high as 6.90c., St. Louis, which is equivalent to 7.25c., New York. It is apparent that sellers who previously had been trying to hold the market in check have parted with their metal and are no longer selling.

Zinc.—The market has turned extremely dull with almost no sales or inquiries. Prime Western for early delivery is quoted largely nominal at 6.35c., St. Louis, or 6.70c., New York. Prices here and in London are not conducive to export business.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Both shot and ingot nickel in the outside market are quoted at 29c. to 32c.

Antimony.—The market is easier with wholesale lots of Chinese metal for early delivery quoted at 8.75c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26 to 26.50c., delivered, duty paid, with some sellers unable to obtain the metal from foreign producers.

Old Metals.—Business is quiet and the market is generally unchanged. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.75
Copper, light and bottoms	10.00
Heavy machine composition	10.50
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	8.75
No. 1 yellow rod brass turnings	6.75
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	18.75

Chicago

CHICAGO, Dec. 4.—Tin and lead have advanced while the other metals remain unchanged. Tin is closely held and advances with every indication of interest on the part of the buyers. Lead has gone up as a result of an advance for the leading interest. In fact, independents are quoting even higher than the price of the foremost producer. While copper prices are unchanged, there has been considerable buying for first quarter as well as a fair volume for second quarter. Spelter is also considered a good buy at present prices and some first quarter business is being placed. Although antimony is offered more freely, it is stiffer in price than a week ago. Old metal prices remain unchanged. We quote in carload lots: Lake copper, 13.50c.; tin, 48.50c.; lead, 7c.; spelter, 6.40c.; antimony, 11c.; in less than carload lots. On old metals we quote copper wire crucible shapes and copper clips 10.50c.; copper bottoms, 9.25c.; red brass, 8.50c.; yellow brass, 6.50c.; lead pipe, 5.50c.; zinc, 4.25c.; pewter, No. 1, 25c.; tin foil, 32c.; block tin, 36c.; all buying prices for less than carload lots.

Production Well Sustained in Mahoning Valley

YOUNGSTOWN, Dec. 4.—Iron and steel production is well sustained this week in the Mahoning Valley, losses in one direction being more than offset by gains in others. For instance, the steel ingot production rate of the Youngstown Sheet & Tube Co. this week is 75 per cent, as compared with a recent low of 45 per cent. The company this week added one active open-hearth furnace at its Brier Hill plant, for a total of 11 active furnaces in the group at Youngstown and East Youngstown.

Rolling mill operating average is also higher, inasmuch as Sheet & Tube company has placed five mills at its Western reserve plant, Warren, on the active list. The Mahoning Valley Steel Co. has added four mills to its active complements at Niles, for a total of eight, its complete group.

On the other hand, the Trumbull Steel Co. has suspended two sheet mills, and has reduced the operations of its strip department to a 60 per cent basis.

The Sheet & Tube company has suspended its Tod blast furnace, in the Brier Hill plant, cutting the number of its active stacks in the Youngstown district to four, of nine. The company has an ample supply of iron, however, in its furnace yard.

On the other hand, the A. M. Byers Co., Pittsburgh, is preparing to blow in its Mattie blast furnace at Girard, Ohio, which has been inactive for repairs, and it is expected the stack will resume this month.

Of the 120 sheet and jobbing mills in the Mahoning Valley, 74 were scheduled at the beginning of the week, a gain of seven as compared with the week before, while 15 of 17 pipe mills are in commission.

Production of bench workers has been increased 22 per cent merely by raising the height of the stools 2 in., according to William R. Basset, president of Miller, Franklin, Basset & Co., Inc., New York, in a discussion of the effect of fatigue. Unnecessary noise has been found to be very tiring, he said.

PERSONAL

Mark Fenton, vice-president New Industries Co., Youngstown, Ohio, who is cooperating with the Youngstown Chamber of Commerce in securing new industries for that city, is on tour in the South addressing civic bodies on the subject of community cooperation in securing industrial enterprises. He is scheduled to speak this week at Orlando and Jacksonville, Fla., and points in Alabama and Georgia.

L. J. Campbell, president and chairman of the board of directors Atlas Steel Corporation, Dunkirk, N. Y., soon will be brought to the home of his father, James A. Campbell, Youngstown, Ohio, from New York, where he has been recovering from the amputation of his left leg. Mr. Campbell's complete recovery is expected, as he is improving rapidly.

J. S. Vanick has resigned as research metallurgist for the government fixed nitrogen research laboratory and as liaison officer for sections of the War Department at the Bureau of Standards to accept a position as research metallurgist in the new research and development department of the International Nickel Co., Bayonne, N. J.

R. C. Moore, chief engineer Charles A. Schieren Co., New York, is scheduled to deliver an address on "Leather Belting—Its Manufacture, Uses and Abuses," at the meeting of the machine shop section of the Providence Engineering Society at the society's rooms, Providence, R. I., on the evening of Dec. 11.

G. Bluemel, previously connected with the Ferguson Furnace Co. for eight years as chief engineer and vice-president, has become associated with Tate-Jones & Co., Inc., furnace engineers and builders, and will manage the New York sales district covering New York, New Jersey and New England, with headquarters at 50 Church Street, New York.

L. J. Hammond has been elected president of the Strong, Carlisle & Hammond Co., Cleveland, to fill the vacancy caused by the recent death of Edgar A. Strong. Mr. Hammond has been treasurer of the company and general manager. He will continue in the latter capacity and has been succeeded as treasurer by H. W. Strong, formerly secretary. T. W. Carlisle has been elected secretary.

Jay J. Seaver has been elected vice-president of Arthur G. McKee & Co., engineers, Cleveland, succeeding Donald D. Herr, who was killed recently in the Japanese earthquake. Mr. Seaver, who is a graduate of the University of Michigan, has been associated with the McKee company for ten years and has a wide acquaintance among blast furnace men.

A. J. Theisen, secretary Great Lakes Foundry Co., Port Huron, Mich., sailed from New York Dec. 5 to spend several months in Europe and on the African Continent.

John H. Marlotte, at present with the Charles A. Strelinger Co., Detroit, and formerly secretary J. R. Stone Tool & Supply Co., Detroit, has joined the sales force of Stocker-Rumely-Wachs Co., Chicago, and will cover a territory consisting of the southern Chicago suburbs, northwestern Indiana and western Michigan.

W. J. Adamson, formerly assistant general sales manager Trumbull Steel Co., Warren, Ohio, has assumed the duties of assistant to the vice-president, and F. H. Loomis will take over his former position. A. C. Adams of the home district sales department will succeed Mr. Loomis as home district sales manager. R. G. Carter will have charge of the office management of the general sales department.

J. C. Mears of the St. Louis office of Rogers, Brown & Co., has been transferred to Chicago, where he will continue to cover the States of Iowa and Nebraska, which have been added to the territory served by the Chicago office. S. B. Morrison of the Philadelphia office has been transferred to St. Louis as manager.

Barton R. Shover, consulting engineer, Pittsburgh, has been invited by the American committee of the World Power Conference, to be held in London, June 30 to July 12, to present a paper on "Power in the Steel Industry." He is well qualified to prepare such a paper by reason of his extensive experience in the steel industry as electrical engineer during the construction of the Gary, Ind., plant of the Illinois Steel Co.; as general manager of the Tata Iron & Steel Co., Jamshedpur, India; as general superintendent of the Brier Hill Steel Co., Youngstown, Ohio, and as consulting engineer for the Dominion Iron & Steel Co., Sydney, N. S., and for several other steel companies.

F. S. Auty, managing editor of *Chatter*, the monthly publication of the Machinery Club of Chicago, has been appointed advertising manager of Drying Systems, Inc., 11 South Desplaines Street, Chicago, manufacturer of equipment for baking enamels and Japans and for the drying of paint and varnishes on manufactured metal products.

Charles Deere Wiman, great-grandson of John Deere, has been appointed general manager of the Union Malleable Iron Works plant of Deere & Co., at East Moline, Ill. E. A. Gullberg, who has been acting manager and superintendent since the resignation of J. L. Simmons, will continue as general superintendent.

OBITUARY

CHARLES N. JAMES, Cambridge, Mass., who recently died in his fiftieth year, was associated for some time with the Dodge Haley Co., Boston, dealer in iron and steel. During the last part of his life Mr. James was actively engaged in the manufacture of automobile wheels.

HENRY PEARSON, vice-president Wason Mfg. Co., Springfield, Mass., car manufacturer, died suddenly Nov. 27 in his office. He was president of the company from 1906 to 1910, prior to its acquisition by the J. G. Brill Co. He was born in Stockport, England, Sept. 14, 1852.

ROBERT E. GASKELL, aged 68, president William Gaskell & Son, bolt and nut manufacturers, Brooklyn, died on Nov. 30 at his home in Oceanside, near Rockville Centre, L. I. Mr. Gaskell was born in Manchester, England. His father was William Gaskell, who, in 1865, founded the manufacturing firm in Brooklyn.

SAMUEL JAMES BURRELL PRIOR, head of the firm of tin plate merchants of that name at 47 King William Street, London, England, who recently had retired from active business, died on Nov. 28, at the age of 77.

FRANCIS E. MYERS, president, F. E. Myers & Bro. Co., pump manufacturer, Ashland, Ohio, died Dec. 3, aged 74 years.

Canadian Scrap Market

TORONTO, ONT., Dec. 3.—Melters continue to show but passing interest in the iron and steel scrap market and as a result the demand for most materials is almost at a standstill. Some trading is reported between dealers, but in most cases the movement is light, and buying is only reported at prices below the market. Steel plants are taking in odd lots of heavy melting steel and turnings, but in nearly all instances the demand is for spot delivery and no interest is reported in old material for first quarter. Iron and steel scrap prices are as follows:

	Toronto	Montreal
	Gross Tons	
Steel turnings	$10.00	$7.00
Machine shop turnings	10.00	7.00
Wrought pipe	8.00	8.00
Rails	12.00	13.50
No. 1 wrought scrap	14.00	14.00
Heavy melting steel	12.00	10.00
Steel axles	15.00	18.00
Axles wrought iron	18.00	20.00
	Net Tons	
Standard car wheels	15.00	14.00
Malleable scrap	15.00	12.00
Stove plate	15.00	14.00
No. 1 machinery cast	18.00	18.00

FOUNDRY CONVENTION OF 1924

American Foundrymen's Association Returns to a Fall Meeting

At a meeting of the board of directors of the American Foundrymen's Association, held in New York Nov. 20, it was unanimously voted to hold the next convention of the association and exhibit of foundry equipment in the fall of 1924, preferably in the month of October.

From 1911 to 1920 the annual meetings of the association were held in September or October of each year. Due to business conditions in 1921, the meeting was postponed, being held at Rochester in June of 1922. The last one was at Cleveland in May, 1923. There has been a feeling on the part of many that fall dates are more desirable and a number of good reasons have been given in support of the change.

It is pointed out that men who attend the conventions get new ideas from the papers and discussions, from contact with other foundrymen whom they meet, or at the exhibits, which can be advantageously applied to their operations. Members of the many technical committees receive inspiration and incentive to accomplish certain results, but with the coming of warm weather and summer vacations the application of methods and ideas advanced at a spring meeting is put to one side and too often forgotten altogether.

In the fall, managers, superintendents and foremen return from the conventions ready to put into practice immediately the things they have learned that will help them to improve output both in quality and quantity. It is believed that the exhibitors will also welcome a return to fall conventions, as it will give them a better opportunity of following up inquiries secured during convention week.

In considering location, the board of directors felt that the Central West was the logical place, as the Milwaukee convention in 1918 was the only one held west of Cleveland since the Chicago convention in 1914. The selection of a city was left to a special committee appointed by the president. The cities from which invitations have been received and which were given favorable consideration are Chicago, Detroit, Indianapolis, Kansas City and Milwaukee. The facilities these cities have to offer in hotel accommodations, meeting rooms and exhibition buildings will be investigated and a decision reached, announcement of which will probably be made some time in January. Members who have a preference as to location are invited to present their reasons to the secretary, C. E. Hoyt, 140 South Dearborn Street, Chicago, for the consideration of the committee.

NATIONAL ENGINEERING MUSEUM

Committee Organized to Interest Engineers and Leaders in Industry

The movement to establish a national museum of engineering and industry has taken on a new turn. The so-called four founder engineering societies—those of civil, electrical, mechanical and mining engineers—having decided that they were not constituted as societies to assume the responsibilities attendant on carrying out the project, an organizing committee of 25 has come into being with the plan of interesting individual members of the societies and leaders in industry in the museum movement. Briefly the effort is to secure a central place, say in Washington in connection with the Smithsonian Institution, where model and records of engineering developments may be exhibited, if not merely preserved, before many of them get lost or destroyed. It is believed that such a collection will be of great value to the investigator and that it is fitting that so great an industrial nation as the United States should possess a museum fully as comprehensive and educational as similar collections abroad.

The organizing committee is as follows:

Robert S. Brookings, president Institute of Economics, Washington, and regent Smithsonian Institution.
Irving T. Bush, president Bush Terminal Co., New York.
Robert W. de Forest, president Metropolitan Museum of Art, New York.
Frederic A. Delano, acting chairman of the committee, regent Smithsonian Institution, Washington.
Philip T. Dodge, president International Paper Co., New York.
Gano Dunn, president J. G. White Co., New York.
T. Coleman du Pont, financier, New York.
Howard Elliott, president Northern Pacific Railroad, New York.
Michael Friedsam, president B. Altman Co., New York.
Edwin M. Herr, president Westinghouse Electric & Mfg. Co., Pittsburgh.
Ira N. Hollis, president Worcester Polytechnic School, Worcester, Mass.
Edward N. Hurley, president Hurley Mfg. Co., Chicago.
Samuel Insull, president Commonwealth Edison Co., Chicago.
D. S. Jacobus, engineer Babcock & Wilcox Co., New York.
Thomas W. Lamont, J. P. Morgan & Co., New York.
Henry G. Leach, editor *The Forum*, New York.
William Barclay Parsons, engineer, New York.
Chas. Piez, president Link Belt Co., Chicago.
H. F. J. Porter (acting secretary), consulting engineer, New York.
George D. Pratt, president Pratt Institute, Brooklyn, N. Y.
George E. Roberts, vice-president National City Bank (acting treasurer), New York.
Julius Rosenwald, Sears, Roebuck & Co., Chicago.
Mortimer L. Schiff, Kuhn, Loeb & Co., New York.
Frederick D. Underwood, president Erie Railroad, New York.
Samuel M. Vauclain, president Baldwin Locomotive Works, Philadelphia.

President Grace Looks for Fair Average Year in 1924

President Eugene G. Grace of the Bethlehem Steel Co., in an interview a few days ago, took a cheerful view of business conditions.

The tide has turned for the better in the iron and steel industry of the country, according to Mr. Grace, at least so far as the business of the company is concerned. The low point in buying, he said, occurred a few months ago, and the volume of business has been gradually increasing since.

"A great many signs," said Mr. Grace, "indicate that 1924 will be a repetition of 1923 and that business conditions in the two years will prove similar." He pointed out that during the current year steel buying was heaviest in the spring, and he expects that a large demand for steel products would again be witnessed next spring.

In regard to the expected demand for steel products from the railroads, Mr. Grace said:

"We face about the same railroad buying program for equipment and maintenance, particularly track materials and cars. The railroads have made good money in 1923 and seem assured of another good year. Next year is going to be one of the biggest rail years we have ever had."

"The automotive industry is anything but pessimistic," said Mr. Grace. "Motor car makers anticipate that their output in 1924 will be about the same as in 1923. Building construction has held up and indications are it will continue to hold up. The farmer has more money now than he has had in many years. His equipment is depleted and obsolete and he must buy soon. Canning and allied industries are scheduled for 100 per cent operations.

"Foreign demand is gradually increasing. Finally, public sentiment is generally better than it was a year or so ago.

"Altogether, while I do not look for a boom in 1924, I think it will be a fair average business year."

FIGHTING PITTSBURGH PLUS

City of Chicago Joins Other Opponents, Including Three New England States, Against the Practice

CHICAGO, Dec. 1.—In a meeting here this week, the City Council of this city passed a resolution condemning the Pittsburgh basing point method as applied to the sale of finished steel, and authorized the mayor to have the city represented through its law department before the Federal Trade Commission in the suit now pending so that the interests of the city might be conserved and protected. The resolution was adopted unanimously, following which the mayor directed Francis X. Busch, corporation counsel, to appoint Leon A. Hornstein, assistant corporation counsel, as the city's representative at the hearings before the Federal Trade Commission at Washington this month.

Another important recent development having a bearing on the Pittsburgh basing point case is the alignment of three New England States, *i. e.* Maine, Massachusetts and Rhode Island, with the organization known as the Associated States Opposing Pittsburgh Plus. The addition of these States to the membership of the association raises the number of constituent commonwealths to 31. More significant is the fact that the admission of these Eastern States robs the organization of its sectional character. Heretofore protests against the Pittsburgh basing point practice had been confined to Western and Southern States.

The resolutions adopted by the Chicago council charged that the Pittsburgh plus practice tended to centralize the steel industry in the city of Pittsburgh at the expense of the rest of the country, that it gravely injured labor in the city of Chicago by the prevention of that continuous employment which results in the establishment in a city of striving industry, and that in times of business depression the practice curtails the operations of Chicago steel mills to the end that Pittsburgh mills may compete in Chicago, thus depriving many laboring men of employment and injuring business in Chicago and its environs. The resolutions further went on to say that Chicago is not permitted to obtain the industrial benefits which should accrue to it because of natural advantages as a low cost producing point for steel.

Cautious Optimism in Business

"What's Ahead for American Business?" is the title of the pamphlet which has been issued by P. F. McDonald & Co., Boston, for free distribution. The writer gives the opinions of many business men of prominence in regard to business conditions showing an attitude of cautious optimism. In the Digest of Forecasts P. F. McDonald, president of the company, says:

> We have been and still are passing through a period of adjustment, but this, it is universally conceded, is almost over and the fruits it will bear in the shape of increased efficiency of labor, sane purchasing and other normal principles will be well worth while and bespeaks a continued period of successful trading. Consequently we may look from now on and through the spring and summer of 1924 for a marked improvement in industry, spurred on by construction activity, railroad purchasing and a gradual rectification of European conditions.

Buyers Hesitate in Youngstown District

YOUNGSTOWN, Dec. 4.—Hesitancy as to the stability of current steel prices is still retarding buying, especially for forward commitments, in the opinion of James A. Campbell, president, Youngstown Sheet & Tube Co. He expects buying to materialize in a larger way, however, in the very near future, judging from the volume of inquiry before the trade.

Mr. Campbell believes buyers who are waiting for lower prices are likely to be disappointed, pointing out that for six months buyers of pig iron held down their actual purchases to hand-to-mouth requirements. When the iron buyers realized that the market could not be depressed to any greater degree, and saw that the stock of iron in furnace yards was fast dwindling, they came in for heavy tonnages.

The Sheet & Tube Co. has contracted for large tonnages of iron for next quarter delivery, involving in excess of 150,000 tons, from its furnaces in the Youngstown and Chicago districts.

In the semi-finished steel market, sheet bars are firmly held at $42.50, despite the efforts of non-integrated sheet rolling interests to dislodge this quotation. In billets and slabs, though, the situation is somewhat different, and the price situation is not so firm. Sheet rolling interests will soon begin signing contracts for first quarter requirements.

Makers of merchant bars in this district insist there is no shading of the 2.40c. current level, and that all forward business coming through is being booked at this figure.

Lake Superior Iron Ore Shipments by Water for the Year

CLEVELAND, Dec. 3.—Iron ore shipments by water from the Lake Superior district during 1923 were 59,036,704 gross tons. Shipments during November amounted to 4,938,249 tons. The movement for the season shows a gain of 16,423,475 tons or 38.52 per cent over 1922, when the movement was 42,613,229 tons. The 1923 movement was the largest since 1918, when water shipments amounted to 61,156,732 tons. The peak was reached with 64,734,198 tons in 1916, the 61,000,000-ton mark being passed in both the following years. In 1919 the movement dropped back to 47,177,395 tons, but it climbed to 58,527,226 tons in 1920, and in the lean year of 1921 it fell to 22,300,726 tons. It is estimated that the all rail shipments for the year will amount to from 1,500,000 to 2,000,000 tons.

The following table gives the season shipment by ports in gross ton and the corresponding figures for 1922.

	Season, 1923	Season, 1922
Escanaba	5,607,411	4,592,354
Marquette	2,789,285	1,976,220
Ashland	6,237,449	5,813,207
Superior	17,820,476	11,234,240
Duluth	20,163,619	13,044,771
Two Harbors	6,418,464	5,952,437
Total	59,036,704	42,613,229
1923 increase	16,423,475	

Cast-Iron Pipe Statistics for October

WASHINGTON, Dec. 1.—The Department of Commerce announces statistics on the production, shipments, orders and stock of cast-iron pipe for the month of October, 1923. The report includes returns from 12 establishments and is confined to bell and spigot pressure pipe exclusively. The principal items in tons are:

Produced during the month	88,696
Shipped during the month	88,000
Specified to be shipped from stock	17,431
Specified to be made	119,947
Not specified as to sizes	443

Reducing Hours in the South

BIRMINGHAM, ALA., Dec. 3.—The Tennessee Coal, Iron & Railroad Co. blast furnaces in the Birmingham district have eliminated the 12-hr. work day. Labor was shifted from plants of the steel corporation which have been lagging in activity lately. No complaint has been heard of as to the readjustment of hours or wages. It is expected other subsidiaries of the district will follow suit, though no announcements are made.

The United Engineering & Foundry Co., Pittsburgh, has definitely decided to abandon its Oak Street foundry, Youngstown, Ohio, and the property is being offered for sale. It has been idle for three years. The company will continue operation of its large Tod foundry in this city.

Czecho-Slovakia's Great Steel Works

(*Concluded from page 1520*)

plate three-high mill with a 1.8-m. two-high for rifling sheets, one 800 to 650-mm. (31½-in. to 25½-in.) universal two-high mill, one 475 to 420-mm. (18¾-in. to 16½-in.) universal three-high mill, two 875-mm. (35½-in.) reversing roller two-high mill, one 600-mm. (23⅝-in.) roughing three-high mill and, for the small shapes, four finishing mills of 452, 330 and 280-mm. (17¾-in., 13-in. and 11-in.) with three continuous roughing mills of the same diameters. In the cold rolling mill are installed 44 housings with from 260-mm. (10-in.) to 120-mm. (4¾-in.) rolls.

There are in all 17 rolling mills for hot rolling, all electrically driven. Seven of them are worked by reversing direct current motors at 1000 volts and the others by 3-phase current of 5000 volts and 50 cycles. There are two transformer stations in the new works. The first transforms and reduces the primary 3-phase current of 5000 volts, generated by the gas engines in the power plants, to continuous current of 1000 volts for the reversing mills by means of four Leonard-Ilgner sets, and the second transforms and reduces the same primary current to continuous current of 500 volts for cranes and 125 volts for lighting purposes.

Blooming Mill

The diameter of the rolls is 1000 mm. (39⅜ in.), the length of their body, 2700 mm. (106 in.) They can roll ingots weighing 4000 kg. (4 tons) each to a cross section of 170 mm. x 120 mm. (6¾ x 4¾ in.) and slabs to a width of 1000 mm. (39⅜ in.) Electric motors are used for manipulating the ingots and there is automatically shown on a dial the section under the rolls.

The blooming mill is operated directly by a continuous current motor, capable of a revolving moment of 205 meter-tons (662 ft. tons) under a maximum of 12,900 hp. Material worked out in the cogging mill is cut to desired length by two hydraulic ingot shears, placed side by side, whence the material is carried immediately over to the reverse train or transported for distribution to furnaces.

Armor Plate Mill

The armor plate mill has rolls with diameter of 1250 mm. (49 in.) and length of 4500 mm. (177 in.). Ingots can be rolled here up to 80 tons weight ordinarily and a maximum of 100 tons. These plates can be rolled to 4200 mm. (165 in.) width and to 20 m. (65 ft.) length. The rolls which are hydraulically balanced and worked by electricity, can be adjusted to 0.1 mm. (0.004 in.) and the adjustments shown on a circular point dial. Special attention is given to permitting the roll to expand freely and equally and, in case of a roll breaking, precaution is taken that the roll housings cannot part.

The cam-rolls are forged, with a half-circle diameter of 1600 mm. (63 in.) and have straight spur teeth set on a half round. The spindles are of forged steel; the upper hydraulically balanced and joined to the upper cam-roll by means of a cross link coupling of cast steel. Between the motor cam and the wheel installation is a socket coupling worked hydraulically, which prevents any axle inclination that might occur from the breaking of the coupling and thus affect the working of the engine. The lever installation in front of the rolling track, with an 80-ton lift capacity, serves to put ingots on the roll plate. Behind the track is a turning apparatus consisting of four pistons, cone shaped at the head, each of which gives a separate turning point to the plate. Plates can be moved through 180 deg.

Plates as rolled, both steel and iron, are finished partly in shops located in one end of the rolling mill proper, and partly in the Witkowitz shops. For iron plate rolling the roll diameter of the mills is 1000 mm. (39⅜ in.) and the revolutions 0 to 170 per min. Pieces weighing 4000 kg. (4 tons) can be handled, and plates turned out to 3000 mm. (118 in.) in width and 15 m. (49 ft.) in length. For heating these ingots before rolling, there are two furnaces using gas.

Electric Power Station

Fourteen years ago the Witkowitz central electric station, working Witkowitz gas engines, was probably the most efficient plant of its kind on the Continent. Nowhere had I seen such excellent gas engine work, with the possible exception of Resicza. Witkowitz built gas engines only for its own use and then, as now, its gas engines were run by men familiar with every essential of their construction. These engines are on the Otto system built under Witkowitz modification. They were operating 98 per cent of the working time, in other words, were running practically continuously, and such slowing down as was necessary did not exceed 2 per cent of the entire period.

The new electric power station No. 4 is operating with waste-heat boilers, whereby the efficiency factor of the gas consumption has been increased from 23 to 28 or 29 per cent. In this late development the cooling water of the gas engines is also used for hot water heating purposes, and because of this the efficiency factor has been increased further to over 30 per cent.

The highest current generation here was obtained in one of the four power plants in 1916 and 1917, six 2000-kw. engines developing the equivalent of 83,663,000 kwhr. As 1916 was a leap year, with 366 days, the theoretical amount obtainable was 8784 hr. x 12,000 kw. or 105,408,000 kwhr. The actual amount obtained was thus 79.6 per cent of that possible. The effective running time of the six engines was 47,048 hr., so on this basis the theoretical work possible amounted to 47,048 hr. x 2000 kw., or 94,096,000 kwhr. The load factor is, therefore, 83,663,000 ÷ 94,096,000, or 88.8 per cent.

History

The Witkowitz Iron Works were established in 1829 in northeastern Moravia. Coal was discovered in Moravia as far back as 1770. In 1782 it is said that there was an output of 1200 tons, while in 1907 the output amounted to 7,548,620 tons. The production of coke just before the war was slightly under 2,000,000 tons per annum.

The originator of the works was Archduke Rudolph, then Archbishop of Olmutz, who was also at the time owner of the Friedland Iron Works in Moravia. The Witkowitz Works were the first in Austrian territory to erect a coke furnace and to adopt the puddling process. Upon the death of the Archduke in 1831 the property passed into the hands of the Prince Archbishop, Count Chotek, who in turn leased it to a syndicate. In 1843 the banking house of Rothschild, located in Vienna, purchased the property.

Steady Growth

From the early founding of the works there has been continuous progress, development and enlargement of plant. The construction of the Kaiser Ferdinand Railroad established a connection between the Vienna district and Prussian Silesia and the East, and resulted in a further development of production at Witkowitz, chiefly in railroad material. It also afforded increased outlet facilities for the products and, with wider outlet, came a quickening in the growth of the works. The introduction of the Bessemer process made the production of steel on a large scale feasible and, up to the beginning of the World War, the growth of the plant had been uninterrupted.

The advance of the Russian Army at one time threatened Witkowitz; in fact, Russian advance forces reached within twenty miles of the plant. The heavy demands of the war caused still further expansion and, now that the plant has passed into the domain of Czecho-Slovakia, the war-time development will remain intact. Because of its location, this plant is bound to take advantage of the present German situation and, as in former years, will be the natural source of supply for that great territory to the eastward, when that region again becomes normal.

Iron and Steel Exports and Imports Decline

Drop of 20,000 Tons in Exports Places the Figure Lower Than in Any Month Since February—Imports Show the Smallest Tonnage of the Year

TABLES shown on this page and the next two give particulars of the outward and inward movement of iron and steel products, including machinery, for the month of October and for the first ten months of the year. Last week at page 1487 we published a general résumé of the situation, but were forced by pressure on our space to omit the tables.

Exports, January, 1922, to October, 1923, Inclusive
(In Gross Tons)

	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,212,732	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
Fiscal year 1921	4,168,619	129,541	82,549
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	145,640	1,791	9,353
September	129,475	5,203	6,810
October	132,924	1,553	8,364
November	127,782	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922	1,986,297	30,922	107,201
January, 1923	123,190	2,482	10,563
February	133,902	2,786	7,733
March	163,920	2,881	11,416
April	177,471	1,844	11,247
May	171,389	1,848	12,824
June	171,183	2,960	9,652
Fiscal year 1923	1,815,329	31,891	113,377
July	168,558	2,966	6,480
August	161,426	3,117	9,684
September	172,499	2,148	8,366
October	152,511	3,294	10,989
Ten months	1,628,005	26,270	98,956

*Calendar years.

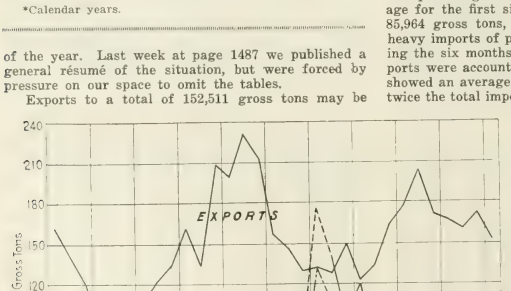
Exports to a total of 152,511 gross tons may be compared with 172,499 tons in September, with a monthly average of 151,361 tons in the fiscal year ended June 30 last, and with a monthly average of 165,525 tons for the calendar year 1922. Except for January and February, the October figure is the lowest yet in 1923. It is, however, higher than any of the five latest months of 1922 and represents a gain of about 20,000 tons over the corresponding month of last year. Despite the drop in tonnage from September, the value held up very well, the figures being $19,244,049 for October and $19,871,060 for September.

Imports of Iron and Steel in Gross Tons
(Monthly Average)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1901 to 1913, incl.	26,505	†14,132	....	....
1914 to 1918, incl.	23,351	4,645	3,281	‡47,155
1919 to 1921, incl.	23,901	5,708	3,710	37,115
1922	59,545	31,954	9,117	31,204
January, 1923	120,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	36,371	7,221	14,071
May	75,885	39,764	10,482	12,734
June	68,019	36,033	12,794	36,138
Six months average	85,964	49,706	8,980	13,535
July	53,464	19,760	12,381	23,824
August	45,439	14,564	7,334	23,026
September	36,611	8,353	9,744	25,175
October	29,882	9,349	9,372	16,842

*Not included in "total imports."
†Includes ferroalloys.
‡Average for three years, 1916 to 1918 only.

Imports in October amounted to only 29,882 tons, compared with 36,611 tons in September, 45,439 tons in August, and more than 50,000 tons in each of the thirteen preceding months. As a matter of fact, the average for the first six months of the year amounted to 85,964 gross tons, this average being swollen by the heavy imports of pig iron last winter and spring. During the six months nearly 60 per cent of the total imports were accounted for by the pig iron figure, which showed an average of 49,706 tons per month, or nearly twice the total import figure for all iron and steel prod-



Monthly Tonnages of Exports and Imports for 31 Months, Showing How the Heavy Pig Iron Imports of a Year Ago Pushed the Total Imports to a Figure Higher Than for Exports—for the First Time Since the Heavy Inward Movement of Twenty Years Ago. The course of imports of pig iron and ferroalloys, considered as one group, is shown for comparison. For one year this one item was greater than the entire imports either before or since

Machinery Exports
By Value

	October, 1922	October, 1923	Ten Months Ended October, 1922	Ten Months Ended October, 1923
Locomotives	$355,737	$305,139	$7,573,556	$3,530,235
Other Steam Engines	90,554	137,755	1,854,428	1,620,589
Boilers	229,102	145,678	1,067,001	1,128,445
Accessories and Parts	290,816	453,251	2,531,076	3,213,360
Automobile Engines	340,163	541,593	4,501,940	4,770,156
Other Internal Combustion Engines	374,539	.....	5,562,202	.....
Stationary	.....	274,182	.....	3,060,097
Marine	.....	179,141	.....	1,176,836
Aircraft	.....	7,860	.....	41,617
Other Internal Combustion Engines	.....	107,036	.....	570,396
Accessories and Parts for	265,290	288,567	2,291,421	2,803,650
Electric Locomotives	29,779	18,126	377,395	3,010,865
Other Electric Machinery and Apparatus	425,755	894,031	6,734,249	7,157,182
Excavating Machinery	77,511	207,409	1,160,544	1,252,991
Concrete Mixers	27,485	54,728	470,740	456,412
Road-Making Machinery	12,642	76,383	298,435	770,858
Elevators and Elevator Machinery	257,625	349,232	2,105,942	2,804,205
Mining and Quarrying Machinery	647,678	938,863	8,853,318	5,908,893
Oil Well Machinery	363,396	661,902	3,591,411	5,467,756
Pumps	503,660	890,654	4,944,770	6,140,528
Lathes	57,161	221,105	628,933	860,522
Boring and Drilling Machines	34,262	102,054	470,788	500,002
Planers, Shapers and Slotters	38,256	19,954	247,795	213,346
Bending and Power Presses	7,179	35,885	280,966	295,926
Gear Cutters	983	10,608	92,818	138,701
Milling Machines	69,389	73,198	312,924	385,138
Thread Cutting and Screw Machines	7,464	46,890	147,509	449,046
Punching and Shearing Machines	14,977	29,021	134,655	161,668
Power Hammers	10,386	8,491	106,485	131,813
Rolling Machines	786	.....	159,767	18,849
Sharpening and Grinding Machines	78,044	69,300	653,847	840,598
Other Metal Working Machinery and Parts of	370,408	408,325	4,603,611	3,929,974
Textile Machinery	579,217	726,787	12,146,945	7,724,775
Sewing Machines	866,502	916,410	5,592,616	7,469,678
Shoe Machinery	82,593	86,780	833,475	1,138,375
Flour-Mill and Gristmill Machinery	47,385	29,716	917,942	184,203
Sugar-mill Machinery	625,033	1,463,237	3,064,780	4,722,731
Paper and Pulp Mill Machinery	129,040	91,118	1,520,096	1,775,923
Sawmill Machinery	43,120	26,840	514,812	544,623
Other Woodworking Machinery	100,663	359,171	1,137,414	907,460
Refrigerating and Ice Making Machinery	112,211	204,271	1,519,032	1,916,357
Air Compressors	178,304	242,172	1,771,543	2,087,245
Typewriters	882,160	1,049,047	9,405,584	11,259,927
Power Laundry Machinery	51,255	77,332	552,413	823,071
Typesetting Machines	423,720	276,243	3,188,015	3,670,310
Printing Presses	365,227	430,383	2,992,754	3,735,258
Agricultural Machinery and Implements	1,650,776	3,224,780	19,398,206	43,165,968
All Other Machinery and Parts	8,068,527	8,382,747	71,551,486	135,791,349
Total	$19,189,666	$24,893,616	$195,934,578	$239,591,985

Machine Tool Exports

	October, 1923 Quantity	October, 1923 Value	September, 1923 Quantity	September, 1923 Value
Lathes	114	$221,105	62	$162,321
Boring and drilling machines	79	102,054	73	54,292
Planers, shapers and slotters	10	19,954	25	30,057
Bending and power presses	13	35,885	34	66,664
Gear cutters	7	10,608	68	11,144
Milling machines	54	73,198	17	23,065
Thread-cutting and screw machines	56	46,890	40	19,490
Punching and shearing machines	26	29,021	17	5,605
Power hammers	17	8,491	19	18,321
Rolling machines	...	.....	...	.....
Sharpening and grinding machines	189	69,300	469	114,779
Chucks, centering, lathe, drill and other metal-working tools	3,275	29,187	2,209	22,700
Pneumatic portable tools	573	38,084	714	44,922
Total	4,413	$783,777	3,744	$513,461

United States Exports of Iron and Steel
(In Gross Tons)

	October 1922	October 1923	Ten Months Ended October 1922	Ten Months Ended October 1923
Pig iron	15,3	5,291	24,320	26,370
Ferromanganese	5	1,075	1,075	3,281
Ferrosilicon	78	76	111	635
Scrap	4,510	5,186	59,813	54,460
Ingots, blooms, billets sheet bar, skelp	8,264	10,989	91,595	98,956
Bar iron*	.....	511	.....	11,825
Steel bars*	9,658	12,224	118,116	134,950
Alloy steel bars	292	96	3,698	2,038
Wire rods	1,186	2,453	37,696	26,372
Plates, iron and steel	4,303	10,022	81,286	102,624
Sheets, galvanized	1,520	5,020	86,259	89,581
Sheets, black steel	6,256	7,858	204,144	85,273
Sheets, black iron	452	1,384	9,971	12,737
Hoops, bands, strap steel	2,969	3,893	27,928	33,350
Tin plate, terne plate, etc.	6,324	11,785	66,226	92,209
Structural shapes, plain material	11,151	3,871	107,847	106,885
Structural material, fabricated	3,586	6,261	38,731	66,073
Steel rails	20,202	21,122	210,971	218,944
Rail fastenings, switches, frogs, etc.	3,747	3,044	30,730	33,056
Boiler tubes, welded pipe and fittings	15,000	14,604	148,526	157,889
Cast iron pipe and fittings	2,629	2,797	22,117	23,677
Plain wire	8,894	6,052	100,306	76,234
Barbed wire and woven wire fencing	6,711	4,055	63,222	62,252
Wire cloth and screening	128	146	1,273	1,727
Wire rope and cable	512	364	3,959	5,422
Wire nails	2,131	3,370	48,967	32,548
All other nails and tacks	531	806	7,173	7,554
Horseshoes	72	71	803	773
Bolts, nuts, rivets and washers, except track	1,833	1,825	15,158	16,059
Car wheels and axles	1,238	2,235	13,868	17,647
Iron castings	796	999	8,247	8,646
Steel castings	193	304	1,906	4,183
Forgings	114	168	1,840	2,622
Machine screws	16	.....	161	.....
Total	132,924	152,511	1,708,323	1,628,005

*Not reported separately, prior to Sept. 22, 1922.

Sources of American Imports of Iron Ore
(In Gross Tons)

	Oct., 1922	Oct., 1923	Ten Months Ended Oct., 1922	Ten Months Ended Oct., 1923
Spain	.....	23,790	19,356	214,890
Sweden	40,229	30,243	260,037	704,867
Canada	601	566	2,355	24,525
Cuba	44,000	45,203	276,489	647,379
Other countries	38,577	*136,640	228,977	841,925
Total	123,407	236,442	807,794	2,533,586

*Includes Chile, 98,100 tons; Algeria and Tunis, 26,850 tons; Newfoundland and Labrador, 8,500 tons; Germany, 3,190 tons.

Imports of Machinery
(By Value)

	October, 1922	October, 1923	Ten Months Ended October, 1922	Ten Months Ended October, 1923
Metal-working machine tools	$18,074	$39,406	$185,539	$332,926
Agricultural machinery and implements	146,127	15,206	2,273,679	643,541
Electrical machinery and apparatus	108,807	261,910	599,267	1,472,617
Other power generating machinery*	137,431	99,629	†137,431	1,755,817
Other machinery	134,126	289,351	2,239,925	2,197,851
Vehicles except Agricultural	182,700	317,051	1,215,532	2,440,043
Total	$727,265	$1,022,553	$6,651,373	$8,842,795

*Not reported separately previous to Sept. 22, 1922.
†Sept. 22 to Oct. 31.

Exports by Countries of Destination
(In Gross Tons)

	Oct., 1923	Ten Months Ended Oct., 1923
Plates		
Canada	5,417	83,578
South America	30	1,073
Japan	125	817
Cuba	78	858
Philippine Islands	2	570
Mexico	41	562
Galvanized Sheets		
Canada	1,364	28,297
Cuba	1,331	11,707
Chile	11	2,698
Argentina	93	4,326
Philippine Islands	771	6,234
Central America	318	3,412
Japan	1,062	4,304
Mexico	752	5,444
Colombia	267	3,993
Black Steel Sheets		
Japan	4,165	27,633
Canada	2,773	45,025
Argentina	18	1,907
Cuba	202	1,655
Philippine Islands	...	176
Tin Plate		
Canada	3,236	55,234
Japan	4,115	24,450
Argentina	347	5,071
Uruguay	37	3,033
China	1,400	7,395
British India	754	4,181
Chile	41	1,600
Cuba	476	4,023
Mexico	135	1,653
Hong Kong	...	2,071
Italy	...	2,266
Barbed Wire		
Cuba	438	8,314
Argentina	341	7,142
Australia	350	2,228
Mexico	346	3,385
British South Africa	259	5,029
Colombia	280	3,715
Brazil	1,003	8,114
Canada	20	4,542
West Indies	...	6,153
Steel Rails		
Canada	4,418	84,384
Japan	10,314	68,937
Cuba	3,189	42,537
Chile	...	5,248
Brazil	570	3,716
Philippine Islands	141	3,750
Chosen	...	2,401
Honduras	655	8,245
Kwang Tung	...	11,143
Argentina	.....	834
Mexico	227	3,024
Colombia	27	2,163
Galvanized Wire		
Japan	1,637	18,246
Argentina	158	11,270
Canada	1,234	12,840
Australia	924	6,282
Brazil	326	7,001
Mexico	639	3,528
Cuba	150	2,187
United Kingdom	223	1,927
Chile	54	4,053

Imports of Iron and Steel into the United States
(In Gross Tons)

	**Sept. 22 to Oct. 31, 1922	October 1923	Ten Months Ended October 1922	1923
Pig iron	120,779	9,349	229,950	346,166
Ferromanganese	11,229	8,802	83,240	82,452
Ferrosilicon	565	670	13,339	10,469
Scrap	28,677	3,046	88,792	154,416
Steel ingots, blooms, billets, slabs and steel bars	7,736	2,477	23,952	17,425
Rails and splice bars	2,394	2,881	24,260	25,403
Structural shapes	1,494	654	3,321	8,522
Boiler and other plates*	674	89	674	1,663
Sheets and saw plates	90	287	90	2,235
Bar iron	526	348	4,806	7,131
Tubular products*	306	407	306	3,695
Castings and forgings*	159	131	159	2,307
Nails and screws*	109	81	109	1,005
Tinplate	42	47	2,302	9,738
Bolts, nuts, rivets and washers*	31	22	31	177
Wire rods	27	295	1,328	3,317
Round iron and steel wire*	282	219	282	3,226
Flat wire and strip steel*	19	149	19	1,011
Wire rope and insulated wire, all kinds*	7	28	7	868
Total	175,086	29,882	476,967	681,226
Manganese ore	18,452	16,842	346,179	179,255
Iron ore	123,497	236,442	807,594	2,523,586
Magnesite	17,816	371	108,006	62,499

*Not reported separately previous to Sept. 22, 1922.
**Present tariff law became effective Sept. 22, 1922.

ucts in October. Again, despite the falling off in tonnage, the value remained up, for October imports at $1,825,093 recorded an increase over the September value of $1,785,166.

Exports of machinery showed a slight falling off from September, being $24,893,616 against $25,555,407. The figure for October, 1922, was $19,189,666. Included in the October figure were machine tools numbering 4413, valued at $783,777 compared with 3744 machines in September, valued at $513,461. Imports of machinery in October nearly doubled the September figure, being $1,022,553 against $518,860.

In the diagram will be found the record of imports and exports month by month from April, 1921, through the first ten months of 1923.

Compared with September, October showed marked reductions in exports of rails and both plain and fabricated structural materials, plain wire, wire rods and boiler tubes, welded pipe and fittings. There was a substantial increase in shipments of semi-finished steel, of plates and of tin plate.

Industrial Activity Maintained at Bridgeport

The Manufacturers' Association, Bridgeport, Conn., issues once a month a report of industrial activity in Bridgeport based on reports of 31 leading manufacturing plants. The Dec. 1 report, which covers conditions up to Nov. 24, shows there has been no serious let-down in activity as compared with earlier periods of 1923. In the week ended Nov. 24, there was a total of 15,771 employees at work in the 31 plants, the highest number employed during the year having been 18,399 in the week of April 7. The number of man hours for the week ended Nov. 24 was 735,435, the highest having been 930,741, also in the week of April 7.

Schools are being developed at the Rouge plant of the Ford Motor Co. along the same lines as those already in operation at the Highland Park plant. More than 300 have enrolled in the toolroom apprentice course which includes mathematics, mechanical drawing and shop practice. The Ford service school at Highland Park continues to attract pupils from all over the world. Among those who have enrolled recently are a group of 41 young men from India who have organized themselves as the Hindoostan Auto Club of America.

TRAINING FOUNDRY WORKERS

Quad City Foundrymen Association Considers Industrial Education

The Quad City Foundrymen's Association held a meeting at the Le Claire Hotel, Moline, Ill., Nov. 26, devoted to the training of foundry workers, the principal address being delivered by H. A. Frommelt, supervisor of training for the Falk Corporation, Milwaukee, Wis. Mr. Frommelt delivered a similar address before the National Founders' Association at its recent convention in New York and his talk was abstracted in THE IRON AGE of Nov. 29, p. 1490.

John Casto, superintendent Township High School, East Moline, responded for the public school, reviewing the work done by the public schools, and called attention to the fact that within the past six months the school authorities in East Moline called a meeting to which they invited representatives from the East Moline factories. At this time a program was mapped out for a more extensive program in industrial education. This program has now advanced to the point where they have installed over $3,000 worth of machinery and they intend to increase their activities just as fast as conditions warrant.

Mr. Casto pointed out that up until recently many of the educators were not interested in taking on industrial work, but during the last few years many have given this matter serious consideration and realize the importance of having the public schools cooperate with the industries in the continuation of the education of the boys who leave school for the industries.

The subject of vocational education in public schools was also discussed by J. F. Kolb, state supervisor of vocational education for Illinois. Mr. Kolb outlined the different methods of vocational education in the schools which were being sponsored by the State and which would upon adoption by any community receive a special financial aid for their operation from the State. Mr. Kolb cited several instances of the successful operation of these schools in Chicago, Joliet, Cicero and other industrial communities within the State.

Report of Ontario's Iron Ore Committee

TORONTO, ONT., Dec. 3.—The report of the Ontario Iron Ore Committee, of which Lloyd Harris was chairman, which was appointed by the late Government, is in the hands of Hon. Charles McCrea, Minister of Mines. The report finds that the magnetic iron ore deposits running 50 per cent and upwards in iron, though high in sulphur, can be commercially sintered and treated to produce a product suitable for the blast furnace; that some deposits of banded and other low grade magnetites favorably situated with respect to markets, lend themselves to commercial exploitation; that some siderite ores can be commercially sintered to produce a first class product; that positive evidence of the feasibility of treatment will probably be available this year in regard to magnetic concentration; that a market can be found in Ontario annually for approximately 750,000 tons of sintered ore; that the pig iron capacity of Ontario furnaces is sufficient to supply all the requirements of the province, and that concentration of other beneficiation is essential for the Ontario deposits. The committee points out that although there have been no important discoveries of iron ore of such class as to render it commercial without beneficiation, it must not be assumed that chances of finding such ore are by any means eliminated.

The Georgia Division of the Southern Metal Trades Association held a meeting at Columbus, Ga., Nov. 13, at which the principal subject of discussion was "Cost Keeping." Addresses were made by John G. S. Schofield, Thos. Perkins and others. Resolutions were adopted opposing the granting of a bonus to any able-bodied soldier of the late war. The delegates were tendered a luncheon by Golden's Foundry & Machine Co., after which the plant was visited.

Rigid Rules for Trade Associations

Decree of United States Court in Case of Tile Manufacturers Prohibits Many Activities

WASHINGTON, Dec. 4.—Looked upon by many who are interested in the subject as the charter of the Department of Justice for trade associations, the recent final consent decree of the United States District Court for Southern Ohio at Columbus, ordering the dissolution of the Tile Manufacturers' Credit Association, et al., has created distinct disappointment. It is held to be so restricted in its permissive features for trade association work that apprehension is felt that it will discourage such activity and that it may bring about greatly curtailed work of those associations now existing if it will not cause many to dissolve for fear of legal action by the department. Interest also is manifested as to whether or not it will reduce greatly cooperation between trade associations and Government bureaus, a matter which has given considerable impetus through the endeavors of such Government officials as Secretary of Commerce Hoover. It is the conviction of those who have read the decree that its rulings are so rigid as to deprive trade association of a vast amount of work that not only is harmless in a legal sense, but is of great value both for the industries they represent and in aiding Government departments to compile information. The decree incidentally would permit continued cooperation with the Government in handling certain kinds of information, but would not permit its distribution among the trades interested. While it permits information to be disseminated as to freight rates, even here it is provided that such rates "shall be the actual rates between points of shipment and delivery, and shall not be based on any fixed or basing point." This part of the decree is taken by some to be aimed at the practice used in the iron and steel and other industries in quoting prices at fixed production points.

Another example of the restricted character of the decree is that among the permissive activities it sanctions no reference is made to the collection of trade statistics. The law department of the National Association of Manufacturers urged upon the Department of Justice to include among the permissive activities in the tile case the collection of facts relating to capital employed, power used, wages and taxes paid, fuel consumed, machinery employed, production, sales, shipments and stocks on hand and prices obtained. But compiling even such fundamental information as this was not assented to by the department. The charge against the Tile Manufacturers' Credit Association, brought under the Sherman anti-trust law, was that it had been organized primarily to establish and maintain uniform prices.

Permissive Clauses

The permissive clauses of the decree include research; publicity; dealing with engineering and trade problems to advance manufacture; securing of arbitration of trade disputes; carrying on educational work pertinent to the industry through fellowships in schools and colleges and experimental and research work; instruction of mechanics and training of apprentices; maintaining a traffic bureau to present traffic questions before Federal and State commissions and to supply rate information to members, "but all rates furnished shall be the actual rates between points of shipment and delivery and shall not be based on any fixed or basing point"; improving sanitation, etc.; handling insurance; maintaining a credit bureau for the sole purpose of furnishing upon specific requests information as to the financial standing and the credit rating of those purchasing or attempting to purchase tiles; maintaining standardization of quality and of technical and scientific terms and the elimination of nonessential types, sizes, etc.

The decree also permits the giving of information to any Governmental agency as to production, shipments, stocks on hand and the prices of tiles, but restrains distribution of such information among members of the association, "except that information respecting sales may be collected annually and used to enable the assessment of the several expenses of the association, and for no other purpose." The decree provides that nothing in its provisions shall prohibit any defendant from doing any of the acts mentioned if done individually.

Acts Prohibited

The long list of acts prohibited as an association include the following:

Adoption or use of a uniform basic price list, or fixing and adopting list prices; maintaining uniform prices; establishing or maintaining individual prices that are uniform for all classes of purchasers or dealers and for all sales; establishing or maintaining of rules as to acceptance of orders at prices in effect prior to changes; establishing or maintaining uniform limitations on the proportionate amounts of the lower grades of tile sold; selling tiles f.o.b. factory with freight equalized with other factories making the same class of tiles; compiling and distributing freight rate books for use in making freight equalizations; establishing or maintaining uniform terms of sales or uniform conditions for acceptance of orders; refusing to combine less than carload shipments into carload shipments invoiced to one of the purchasers; refusing to sell to any persons or corporations because of any unpaid accounts; imposing limitations upon credit granted; restricting sales to dealers or contractors in tile or to establish uniform requirements for classification as dealers or contractors; establishing any system of cooperative purchasing of raw materials or supplies or of cooperative owning of sources of raw materials which shall eliminate or tend to eliminate competition in the purchase of materials; preparing and publishing any list or lists of dealers or of certified dealers; advising or communicating with one another as to proposed advances or decreases in prices or circulating among themselves in any way information relating to proposed advances or decreases in prices, or to prices charged or to be charged; discriminating in favor of or against any individual or corporation purchasing or attempting to purchase tiles.

C. S. Davis & Co., Chicago, dealers in tin plate, sheet steel and terne plate, have purchased 6478 sq. ft. of land adjoining the company's property at Iron and West Thirty-seventh Streets. The present building is to be raised to permit the operation of overhead cranes and a new building will be erected. The improved plant will contain approximately 21,500 sq. ft. of floor space, 18,000 of which will be on the first floor. Three five-ton cranes will serve the bays of the warehouse and unloading will be done by crane-trucks of 3000-lb. capacity. The entire plant will be built on a car-floor level, with a heavy reinforced concrete floor. The company is establishing a new department to handle sheet steel of all grades, roofing terne plate, long terne sheets, charcoal bright tin plate and black plate.

Statistics on the smelting and refining of non-ferrous metals for the year 1921 have been compiled by the Bureau of the Census. The pamphlet is obtainable from the Government Printing Office, Washington, at 5 cents a copy.

IRON FOUNDRY IMPROVEMENTS*

Twin Cupolas—Rough Cleaning Large Castings—Charging Room Floor Space

While many of the modern gray iron foundries are replete with both overhead and floor labor saving devices; are well designed for day and artificial illumination; well ventilated and sanitary, with splendid melting apparatus, the one feature in the case of many is lack of sufficient charging room floor space.

Charging Room Floor Space

This I believe has been taken care of better in the case of the large foundries in New England than elsewhere as far as my observation goes. I am speaking of this matter because it has appeared to me that this important part of the foundry has received less attention than any other. In one of the best that I have seen, the charging room is comfortable and clean; very well ventilated and so large that a month's supply of coke can be and is stored at one end.

It will interest you to learn how the coke proposition at this plant is handled. A railroad siding runs parallel with the rear wall of the charging room. A pit of appropriate dimensions has been built under the tracks, and from the bottom of this pit to a hopper on the roof of the charging room runs a skip hoist. As the coke arrives in the yard, a car is placed over the pit and the coke discharging from the car bottom is allowed to drop in the skip. The skip is raised and the coke dumped automatically into a hopper, from the bottom of which are tubes that run through the roof into the charging room. On trolley rails, running from the coke pile in the charging room to the cupolas, hangs a coke bucket, the bail of which is connected with a trolley carriage that rests on that part of the trolley rails to which an overhead suspended scale is connected during the loading of the bucket. The operator forks the coke into the bucket until the proper weight is obtained, pushes the bucket over to the charging door, releases the trip and dumps the coke into the cupola.

Twin Cupolas

It might interest you to know that at this foundry twin cupolas are used. These cupolas are 4½ ft. apart and built integral; with and between them is a rectangular hearth, its bottom being level with that of the cupolas. This assemblage is called a melting unit, of which there are two. Both cupolas in the unit are run at the same time, and under the conditions stated, the molten metal is obviously at the same level in the entire system. Through this design a very clean and hot iron is obtained, lower in sulphur than obtainable if the hourly capacity of metal was melted in one cupola, for reasons that immediately will occur to you.

The cupolas have two charging doors opposite each other, one for the coke and the other for the pig iron. The pig iron is not raised to the charging room floor by an elevator, but is placed in a side dumping car attached to a cable and is discharged directly into the cupola upon its arrival opposite the charging door, the door sill being protected by an inclined wearing and guiding plate. There are numerous advantages to the use of the incline over the elevator. The mixtures for the day are put up under cover and in the vicinity of where the incline starts. In this manner the pig iron screw and scrap can be placed on the charging cars and run up to the charging floor with less labor and more convenience than is possible where an elevator is used and where the mixture is spread all over the charging room floor.

Rough Cleaning Large Castings

At another foundry one of the things that appealed to me was the manner in which they had rigged up to rough clean their large castings as they came from the foundry floors. For this purpose a space about 20 x 20 ft. is inclosed by a galvanized covered wooden fence about 8 ft. high. On one of the sides are doors of such size as to permit the introduction of the casting that is to be cleaned. Protruding through appropriate openings on one side are two hose nozzles about 3 ft. apart, the nozzles being mounted on flexible connections that admit of their being pointed in any direction. Above the nozzles are small windows that enable the operator to see what he is doing from his position outside of the inclosure. Both on the inside and outside of the flexible joint a piece of loose canvas is tied around the nozzle and the edges tacked to the fence, to the end that water cannot spray on the operator. A stream of water at about 200 lb. pressure is played on the castings which are cleaned at a very low labor cost and with a prevention of the dust nuisance that invariably is an accompaniment of all other methods.

Cupola Blast Pressure and Tuyeres

Concerning cupola practice likewise I will be brief. Any blast pressure in excess of that required to penetrate to the center of the coke bed is detrimental, for it does not facilitate combustion; it can actually interfere with the attainment of the highest temperature desired, while it is hard on the linings. What is desired is only that amount of air in pounds that will burn the number of pounds of carbon in the coke used. Theoretically, one pound of carbon requires that amount of oxygen that is contained in 11.5 lb. of air, which will be equivalent to about 152 cu. ft. of air at 70 deg. Fahr. As coke contains ash and consequently does not consist wholly of carbon, a safe average for coke would be about 137 cu. ft. per lb. of coke.

Both the Whiting and Colliau cupolas have an upper and lower set of continuous tuyeres and the tuyere area has been figured correctly for the diameter used, but the height is not always adjusted for the foundry conditions to be met. The placing of the tuyeres higher than this requirement has no advantage as there is no combustion below the tuyeres, nor has this an influence in keeping the metal hot, while it invites excess sulphur absorption. I would also point out that those who have plugged their upper tuyeres have done so in ignorance of the principle involved. The ratio of distance from bottom of charging door to bottom of hearth to inside diameter, should in the larger cupolas be 3.5 to 1, or 4 to 1 in the smaller sizes.

Parallel lining gives best results. If a taper is used it should be one with no abrupt change from the larger to the smaller diameter, otherwise irregularity in the settling of the charge and the rearrangement occasioned means loss of heat and non-uniformity in composition; or, the following serious condition may result:

You have all heard of what is called foaming slag. This condition is usually attributed to the use of light coke or bad coke. Such a happening may have arisen at times from this source, but this has not been my experience. I have always traced this trouble either to an abrupt change in stack to hearth diameter, to failure to keep the region around the melting zone in proper repair, or to the charging of the stock in such a manner that one side of the charge is higher than the other and consequently settles unevenly. No cupola is correctly charged in which anything but coke can at any time come directly in front of or too near the tuyeres, and this can very easily obtain if the foregoing principles are violated. If the charging is such that iron instead of coke comes in front of the tuyeres, then the air blast will oxidize the iron with extreme rapidity which, being a base, will immediately attack the acid lining of the cupola to form a slag consisting of silicate of iron. This being formed directly in front of the tuyeres will get filled with air like a sponge, will clog the tuyeres and possibly foam out through the charging door if the case is a bad one.

*From an address by Enrique Touceda, consulting metallurgist American Malleable Castings Association, Albany, N. Y., delivered before the National Founders' Association in New York, Nov. 21.

Rud. K. Boggs, purchasing agent of the Andrews Steel Co. and Newport Rolling Mill Co., Newport, Ky., addressed the high school night classes on salesmanship, Nov. 19, at the Woodward High School, Cincinnati, on "The Purchasing Agent's Viewpoint of a Salesman."

Machinery Markets and News of the Works

FORD AGAIN A LARGE BUYER

Detroit Automobile Plant Purchases 17 Lathes and 8 Shapers

Eaton Axle & Spring Co. Also a Buyer—Business Generally Is Quiet, Though Many Inquiries Are Pending

The largest machine-tool buying of the past week is reported from Detroit, where the Ford Motor Co. placed orders for 17 engine lathes and 8 shapers. Ford is also reported to have ordered 75 special machines recently from a Cincinnati tool builder. The Eaton Axle & Spring Co., Cleveland, bought 9 motor-driven grinding machines.

Except for these orders, business in all sections is at low ebb, though many inquiries are pending, most of them probably in anticipation of 1924 requirements. If half of the business that is pending were to be closed this month, the machine-tool trade would end the year very satisfactorily, but buyers appear to be in no hurry to close and a majority of the inquiries will probably go over until after Jan. 1.

In the railroad field there is little activity, but it is expected that the pending orders of the New York Central for some 40 or 50 tools may be placed this month. The Norfolk & Western is reported to have placed orders for a number of tools, a hangover from its recent list. A number of railroad lists are in course of preparation and may be issued shortly after the first of the year.

November turned out to be a better month than was expected, sales with some companies having exceeded those of October, but conditions are spotty and not a few machine-tool companies have taken very little business.

The Board of Education of Chicago has issued an inquiry for 10 geared-head engine lathes, a shaper and a universal milling machine and some miscellaneous foundry equipment for the Tilden High School.

New York

NEW YORK, Dec. 4.

IF machine-tool sellers could close half of the inquiries that are pending they would finish the year with a very satisfactory volume of business. But prospective buyers are in no haste to close, and the assumption is that most of the pending inquiries are looking ahead to next year's requirements rather than for immediate needs. No large business is in sight except the lists of the New York Central Railroad, on which action is expected this month. The New Departure Mfg. Co., Bristol, Conn., which has recently bought some equipment, is also expected to be a buyer again this month or next, but its original requirements are said to have been materially cut down. Two orders have come to Eastern machine tool builders from Chicago, one for a 48-in. car wheel borer from the Chicago, Burlington & Quincy Railroad and the other for an 800-lb. steam hammer from the Illinois Steel Co.

Contract has been awarded by the Multi-Metal Co., 251 West Nineteenth Street, New York, to William Rossi, 805 East Tremont Avenue, for a one-story plant, 75 x 100 ft., on 139th Street, near the Southern Boulevard, for the manufacture of brass, bronze and other wire cloth products. Harry Tennenbaum, 530 Main Street, New Rochelle, N. Y., is architect.

The Sturtevant Tool Co., 1023 East 178th Street, New York, plans for the installation of a press, Bliss type No. 18.

The E. V. Stratton Motors, Inc., Washington Avenue, Albany, N. Y., will take bids on revised plans about Dec. 15 for a three-story service and repair building, 100 x 135 ft., on Broad Street, to cost $100,000 with equipment. The Ballinger Co., 100 East Forty-second Street, New York, is architect and engineer. E. V. Stratton is president.

The National Biscuit Co., 85 Ninth Avenue, New York, will commence the erection of a one-story machine and repair shop at 450-60 West Fifteenth Street, 110 x 175 ft., to cost $75,000. James B. Terrance, Rutherford, N. J., is architect.

Carr Brothers, 65 Broadway, New York, exporters, have inquiries out for one portable motor-driven grinder.

The New Zealand Government, Wellington, State Power Department, is perfecting plans for extensions in the Dominion power plants and systems, to include an addition to the generating plant at Hora-Hora; hydroelectric power station completion at Mangahao; hydroelectric generating plant at Arapuni; and an addition to the hydroelectric plant at Lake Coleridge, with two new generating units, each of 7500 kw. capacity.

The Superintendent of Lighthouses, Ketchican, Alaska, will receive bids until Jan. 21 for two internal-combustion engine-driven air compressors, and two oil engines for the Cape Spencer light station, Alaska.

The Pan-American Petroleum & Transport Co., 120 Broadway, New York, is organizing a new subsidiary to be known as the Pan-American Western Petroleum Co., to take over its refining plant and terminal at Los Angeles harbor, now operated in the name of the Pan-American Petroleum Co. A bond issue of $12,000,000 is being sold, of which about $5,000,000 will be used for extensions and additional equipment. E. L. Doheny is chairman of the board of directors.

Michael Fronn, 47 West Forty-second Street, New York, has plans for a two-story ice plant, 100 x 200 ft., at 4901-23 Second Avenue, to cost $100,000 with equipment. Charles Mayer, 31 Union Square, is architect.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a contracting company in Switzerland which will be in the market for American hoisting, digging, concrete-mixing and kindred machinery for a project to be carried out for the Swiss Federal Railway. Reference No. 112440.

The New York & Queens Electric Light & Power Co., Bridge Plaza, Long Island City, has purchased the plant and adjoining site of the Remington Typewriter Co. at Flushing, L. I., and will convert the property for a central repair works, storage and distributing plant.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, is concluding arrangements for the purchase of the electrical property and system of the Flatbush Gas Co., Flatbush and adjoining sections, for $4,500,000. The selling company has been considering extensions to cost about $3,000,000, and the Brooklyn Edison Co. proposes to carry out this expansion.

The Yellow Taxi Corporation, 155 East Forty-fourth street, New York, has leased two floors in the building at 231 East Forty-seventh Street, totaling 40,000 sq. ft. for a new service and repair works; also two floors in the building at 175th Street and the Grand Concourse, aggregating 22,000 sq. ft. to be equipped for similar purposes.

The Baltimore & Ohio Railroad Co., 2 Wall Street, New York, has preliminary plans for the electrification of its line and terminal property on Staten Island, to include the installation of electric power and transmission equipment, estimated to cost $13,000,000. The Long Island Railroad Co. will soon submit tentative plans to the Transit Commission for the similar electrification of its system in the city, and will commence work as soon as approval is received, estimated to cost $60,000,000 with electric power and other machinery.

Fire, Nov. 25, destroyed a one-story unit at the plant of the Illinois Glass Co., Bridgeton, N. J., with loss estimated at $250,000. It is planned to rebuild. Headquarters of the company are at Alton, Ill.

Fire, Nov. 29, destroyed a portion of the plant of the Bushwick Cork Co., 681 Hudson Boulevard, Bayonne, N. J., with loss estimated at $50,000 including equipment. Rebuilding plans are under consideration.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 18 for two boiler feed pumps for the aircraft naval station, Lakehurst, N. J., Schedule 1654.

The Raritan Hollow Tile Co., Keasbey, N. J., will commence rebuilding its plant destroyed by fire in October, with loss estimated at $100,000, including machinery. The installation will include a new machine room, mechanical drying department and power house. William G. Demarest, Plainfield, N. J., is president, and Robert Lyle, Red Bank, N. J., general manager.

The American Radio Phone & Mfg. Co., Newark, has leased a floor in the building at 28 Prospect Street to manufacture radio head-sets and other wireless equipment. Victor D. Lindeman is president, and George J. Janish, secretary.

Power equipment, transmission and conveying machinery will be installed in the two-story addition, 100 x 100 ft., to be erected at the plant of the Lackawanna Laundry Co., 31-33 High Street, Newark, estimated to cost $95,000. Neil J. Convery, 942 Broad Street, is architect.

The Port Newark Brick Co., Newark, will commence the erection of a plant on a 2½-acre tract at Port Newark, recently leased from the city. It will have a capacity of 190,000 brick per day. A machine shop and power house will be built and later a department for the production of cement tile. The plant is estimated to cost $250,000 with machinery. William E. Lehman, 738 Broad Street, is architect and engineer. William D. Decker, president of the Decker Building Material Co., Inc., 118 Clinton Avenue, is president.

The National Fireproofing Co., Fulton Building, Pittsburgh, is arranging to rebuild its plant at Perth Amboy, N. J., recently destroyed by fire with loss estimated at $400,000 including machinery. W. Guy Weaver is district manager.

New England

BOSTON, Dec. 3.

THE machine tool market has not recovered from the letdown experienced in Thanksgiving week. Current sales are largely confined to single tools, both new and used, which in the weekly aggregate involve a small expenditure. Collectively, November turned out a much better month than was anticipated by the trade. Estimates of sales in this district vary considerably, but average $200,000 to $250,000, not counting auction sales. Two sales approximated $100,000. The outlook for business this month is not generally considered bright, as most industries will take inventories in December or January.

Bids are in on a one-story, 22 x 75 ft. foundry addition contemplated by the Holtzer-Cabot Electric Co., 125 Amory Street, Jamaica Plain, Boston. S. D. Kelley, 46 Cornhill, Boston, is the architect.

Plans are in progress for two repair shops, two-stories, 60 x 120 ft., to be built on Foster Street, Worcester, by Harry Mandell, 33 Derby Street. Harry L. Meacham, 571 Main Street, Worcester, is the architect.

The Chism Mail Box Co., Southington, Conn., with a capital of $100,000, has incorporated to manufacture mail boxes. For the present its product will be manufactured by the Edwards Co., Cincinnati, but plans are in progress for acquiring a Southington plant. L. W. Chism, Hartford, is president.

Marcus Mason & Co., Inc., Worcester, Mass., grinding machinery, has purchased the Warren F. Fraser Co., Westboro, Mass., plant which it will shortly occupy. The latter company manufactured machine tools. The Marcus Mason company is an outgrowth of William L. Dines, Jr. & Co. Mr. Dines is superintendent of the plant.

Work is under way on four locomotive shops and engine house for the Central Vermont Railroad Co., St. Albans, Vt., with main machine shop, 90 x 100 ft. A 90-ft. turntable will also be installed. The plant will cost $200,000 with machinery. The Arnold Co., 105 South La Salle Street, Chicago, has the general contract. P. D. Fitzpatrick is chief engineer.

Manual training equipment will be installed in the high school to be erected at Rockland, Me., estimated to cost $100,000, for which bids will be asked on a general contract in February. Bunker & Savage, Augusta Trust Building, Augusta, Me., are architects.

The Blackstone Valley Gas & Electric Co., Pawtucket, R. I., will commence the erection of a power house, 56 x 80 ft., to cost $60,000. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

Bids will be asked this month by the Public Works Department, Taunton, Mass., for a municipal electric light and power plant, 30 x 50 ft., with extension 15 x 20 ft., to cost $200,000 with equipment. Jackson & Moreland, 387 Washington Street, Boston, are engineers.

The Enosburg Falls Water Corporation, Enosburg, Vt., plans the installation of electric pumping and power equipment in connection with extensions in its waterworks to cost $75,000. Lewis D. Thorpe, 200 Devonshire Street, Boston, is engineer.

The Baxter Paper Box Co., Freeport, Me., is remodeling the former local high school for a factory and will install machinery to manufacture paper boxes and containers.

The Waterbury Ice Corporation, Waterbury, Conn., has plans for a new plant estimated to cost $50,000.

The Hollingsworth & Whitney Co., 185 Devonshire Street, Boston, manufacturer of paper products, has plans for a new paper and pulp mill on the St. Croix River, St. Stephen, N. B., with machine shop and power house, estimated to cost $400,000 with equipment. The company is operating mills at Waterville and Gardiner, Me.

The New England Machine & Electric Co., Pawtucket, R. I., has awarded a general contract to the Rowley Construction Co., Pawtucket, for a one-story plant on Bayley Street, 73 x 120 ft., to cost about $22,000.

The Central Maine Power Co., Augusta, Me., is considering the construction of a hydroelectric generating plant on the Kennebec River, vicinity of Bingham, Me., with maximum output of about 60,000 hp., estimated to cost $5,000,000, with transmission system.

The General Electric Co., Schenectady, N. Y., has plans for two additions to its works at Bridgeport, Conn., each one story. One structure will be equipped as a machine shop extension and the other for general factory service.

The Acme Mfg. Co., Brewer, Me., manufacturer of pipe clamps, etc., has arranged for the removal of its plant to a one-story building, 52 x 100 ft., at Bangor, Me., where additional equipment will be provided.

Electric power equipment, elevating, conveying and other machinery will be installed in the four-story printing plant, 50 x 60 ft., to be erected by the Waterbury American, Inc., Waterbury, Conn., to cost $175,000. Lockwood, Greene & Co., 101 Park Avenue, New York, are engineers.

Philadelphia

PHILADELPHIA, Dec. 3.

CONTRACT has been let by the Electric Storage Battery Co., Rising Sun Avenue, Philadelphia, to the William Steele & Sons Co., 219 North Broad Street, for a one-story addition.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Merida, Mexico, in the market for wire fence, pipe fittings, tools and tin, from a concern at San Juan, Porto Rico, for plain and galvanized iron roofing, pipe fittings and kindred products.

Fire, Nov. 25, destroyed a portion of the plant of the Camden Forge Co., Camden, N. J., with loss estimated at $25,000 including equipment. It is planned to rebuild.

The Pennsylvania Railroad Co., Philadelphia, has plans for a one-story car shop, 186 x 228 ft., at Camden, N. J., to cost $45,000, to replace a portion of the plant destroyed by fire several weeks ago.

The Delaware County Electric Co., Chester, Pa., operated by the Philadelphia Electric Co., Philadelphia, has purchased property on Sixth Street as a site for a new power house.

The Lancaster Pulley Co., 401 East Chestnut Street, Lancaster, Pa., is having plans drawn for a two-story building at North Ann and Fulton Streets, 42 x 90 ft. Henry R. Herr is head.

W. A. Wilbur, Third and Seneca Streets, Bethlehem, Pa., is planning the installation of a drill press, bench tools and other equipment in the repair department at his automobile service works to replace equipment recently destroyed by fire.

The Pennsylvania Power & Light Co., Allentown, Pa., is perfecting plans for the construction of a hydroelectric generating plant at Hawley, Pa., with initial capacity of about 50,000 h.p.

The Crane Market

A FAIR volume of business is still pending in the New York district, but a strong inclination to delay award continues. Inquiry for hand power cranes is particularly quiet and few new inquiries on electric overhead cranes are noted. Sellers of locomotive cranes are looking forward to some business from the railroads next year. Among current inquiries is that of the J. G. White Engineering Co., 43 Exchange Place, New York, for a 40-ton overhead crane; the Brooklyn Eastern District Terminal Co., Brooklyn, N. Y., for a 25-ton gantry crane; the Tottenville Copper Co., Tottenville, Staten Island, New York, for a 5-ton, 72-ft. span electric crane; and the 14 overhead cranes for the Philadelphia plant of the General Electric Co., Schenectady, N. Y.; one 125-ton, double trolley crane for the Public Service Electric Co., Newark, N. J. The Chicago Board of Education is inquiring for a 1000-lb. electric hoist for the Tilden Technical High School, Sprague hoist or its equivalent being specified. The Merchants Shipbuilding Corporation, Chester, Pa., is offering for sale, the buyer to dismantle and remove, seven open portal tower electric cranes and three electric gantry cranes. The seller will aid with bids from local contractors for dismantling and loading.

Among recent purchases are: Stevens & Wood, 120 Broadway, New York, a 100-ton overhead traveling crane for the Ohio Edison Co., Toronto, Ohio, from the Morgan Engineering Co.

James Stewart & Co., New York, one 2½-cu. yd. and one 3-cu. yd. bucket handling cranes for the Standard Oil Co., Cleveland, Ohio, from the Cleveland Crane & Engineering Co.

General Electric Co., Schenectady, N. Y., a 15-ton overhead crane for Pittsfield, Mass., from the Niles-Bement-Pond Co.

Public Service Electric Co., Newark, N. J., a 125-ton, double trolley overhead traveling crane, one of two inquired for, from the Cleveland Crane & Engineering Co.

Republic Iron & Steel Co., Youngstown, Ohio, an electric jib crane from the Whiting Corporation.

Fairbanks, Morse & Co., Indianapolis plant, a 5-ton electric traveling crane from the Whiting Corporation.

Chicago Steel Foundry Co., Chicago, a 20-ton used locomotive crane from the L. A. Green Machinery Co., Pittsburgh.

Wayne Tank & Pump Co., Fort Wayne, Ind., twelve 1-ton hand power cranes from the Louden Machinery Co., Fairfield, Iowa.

The Harrisburg Gas Co., Harrisburg, Pa., has purchased 13 acres at Steelton, Pa., as a site for a new gas-generating and distributing plant, with steam power house, gas holder, etc., estimated to cost $1,000,000 with machinery. The initial unit, to be completed during 1924, will cost approximately $500,000. L. S. Williams is general manager.

The Keystone Cabinet Co., Littlestown, Pa., has construction in progress on a new plant, and plans for the early installation of electric power and other machinery.

The Floyd-Wells Co., First Avenue, Royersford, Pa., manufacturer of stoves, heaters, etc., has plans for a one-story addition, 90 x 170 ft., with extension, 20 x 25 ft. A. S. Kepner, 121 North Howard Street, Pottstown, Pa., is architect.

Bids will be received by the School District of Norristown Pa., Clarence I. Moore, secretary, until Dec. 11, for pumping machinery and other equipment for the Thomas J. Stewart high school, to be erected on West Marshall Street. Oliver R. Parry, 1524 Sansom Street, Philadelphia, is architect.

E. S. Bullock, First National Bank Building, Williamsport, Pa., will install electric power equipment, woodworking, conveying and other machinery at his two-story box-manufacturing plant, 100 x 115 ft., to cost approximately $100,000.

The Middletown & Royalton Water Co., Middletown, Pa., has been granted permission to install a water power electric plant on Swatara Creek.

The American Ice Co., City Centre Building, Philadelphia, will build a one-story addition to its ice-manufacturing plant at Michigan and Arctic Avenues, Atlantic City, N. J., 45 x 138 ft., to cost $75,000. C. Leslie Weir, 45 East Forty-second Street, New York, is architect and engineer.

Mead & Goodrich, Inc., 350-370 West Third Street, Williamsport, Pa., plan the erection of a three-story automobile service and repair building, 120 x 175 ft., estimated to cost $150,000 including equipment.

Buffalo

BUFFALO, Dec. 3.

PLANS are being perfected by the Precision Castings Co., Inc., Syracuse, N. Y., for expansion in its plant in the Fayetteville section and the installation of additional equipment.

The Tucker Rubber Corporation, Jackson Building, Buffalo, recently organized with a capital of $800,000 by officials of the Federal Rubber Co., Cudahy, Wis., has leased a portion of the former plant of the Madison Tire & Rubber Co. for the manufacture of mechanical rubber goods. It will take over this branch of the business of the parent company, which is affiliated with the Fisk Rubber Co., Chicopee Falls, Mass. Albert Y. Tucker is president and Arthur S. Cullum, secretary and treasurer.

Bids will be asked by the Rochester Refrigerating Co., 50 Meigs Street, Rochester, N. Y., in January, for the erection of a new eight-story plant, 75 x 130 ft., to cost more than $300,000 with equipment. Redfield Tomlinson is president.

The Corning Shale Brick Co., Corning, N. Y., recently organized to take over a portion of the plant and business of the Corning Brick, Terra Cotta & Tile Co., is planning to remodel the works and install additional power and other machinery. M. E. Gregory, head of the selling company, will retain and expand the terra cotta branch of the plant.

The Thomas Furniture Works, 312 Leopard Street, Dunkirk, N. Y., is planning the erection of a new factory to cost more than $65,000 including machinery.

James D. Meehan, Everson Building, Syracuse, N. Y., architect, is preparing plans for a one-story automobile service and repair building at 800 West Genesee Street, 105 x 250 ft., estimated to cost $75,000, for a company whose name will be announced later.

The Genesee Stone Products Co., Batavia, N. Y., is planning the installation of additional equipment, including conveying and hoisting apparatus, air drills, etc. J. W. Foster is superintendent.

Manual training equipment will be installed in the high school to be erected at LeRoy, N. Y., estimated to cost $225,000, for which bonds have been voted. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Common Council, Hamburg, N. Y., plans for the installation of electric pumping machinery and auxiliary equipment at the municipal waterworks.

The Corning Light & Power Co., Corning, N. Y., contemplates extensions in its plant and system to cost $50,000.

P. H. Serio, 158 Fox Street, Elmira, N. Y., is arranging for the establishment of a local plant to manufacture automobile equipment and accessories.

The United States Light & Heat Co., Highland Avenue, Niagara Falls, N. Y., manufacturer of electric batteries, etc., is planning for the installation of tools and other equipment at its machine shop.

The Wood-Flong Corporation, Stillwater, N. Y., is planning for the installation of a lathe and other tools in its machine shop. A number of beaters and auxiliary equipment will be installed in the paper manufacturing department. C. W. Townsend is general manager.

Pittsburgh

PITTSBURGH, Dec. 3.

ACTIVITY has been lacking in the local machine tool market the past week. Sales have been altogether of single tools and the caution usually observed at this time of the year in the matter of purchases is very marked. One good-sized order has been closed, however, by the Standard Engineering Co., Ellwood City, Pa., and the Pipe Machinery Co., Cleveland, for 38 2-in. and 3-in. threading machines for the Youngstown Sheet & Tube Co., for its Indiana Harbor plant. The Crucible Steel Co. of America is reported to have placed a bar mill for its Labelle works with the Morgan Construction Co., Worcester, Mass.

The building of the Phillips Mine & Mill Supply Co., Pittsburgh, housing the carpenter shop, sheet iron works

and blacksmith shop, recently was damaged by fire. Replacements will be necessary.

Plans are being drawn by the Litlude Battery Co., Morgantown, W. Va., S. J. Steele, president, for a one-story plant at Connellsville, Pa., 37 x 115 ft., to cost about $20,000 with machinery.

The Blair Strip Steel Co., New Castle, Pa., recently organized, has plans for local works for the production of cold rolled steel products, estimated to cost $70,000. George D. Blair, Sr. and Jr., and J. Norman Martin, all of New Castle head the company.

The Bessemer Gas Engine Co., Grove City, Pa., has acquired the rights of manufacture of the oil-operated engines of the Atlas Imperial Engine Co., Oakland, Cal., for all territory east of the Mississippi River, and plans for extensions.

The Otto Chemical Co., Sergeant, near Kane, Pa., is planning the installation of new retorts and other equipment to replace the portion of its plant destroyed by fire Nov. 26, with loss of about $20,000.

S. A. Scott & Co., Richlands, Va., S. A. Scott, president and general manager, have acquired 500 acres of coal property at Weston, W. Va., and will install an electric and mining plant. Electrically-operated coal-loaders will be required.

The Owens Bottle Co., Toledo, Ohio, has purchased 10 acres in the vicinity of its plant at Fairmont, W. Va., and will use a portion of the site for an addition, for which plans will soon be prepared.

The Eastern Sewer Pipe & Brick Co., Dean Buildng, Martinsburg, W. Va., organized with a capital of $350,000, has plans for a new works to cost $200,000 with machinery. A power house will be built. F. Vernon Aler is president and treasurer.

The National Plate Glass Co., Detroit, has awarded a general contract to the McClintic-Marshall Co., Pittsburgh, for an addition to its plant at Blairsville, Pa., estimated to cost $150,000 with equipment.

The Appalachian Power Co., Charleston, W. Va., is disposing of a bond issue of $826,000, a portion of the proceeds to be used for extensions and the installation of additional equipment. Work is in progress on an addition to the steam-operated power plant at Glen Lyn.

Manual training equipment will be installed in the three-story high school to be erected at Coraopolis, Pa., estimated to cost $200,000, for which plans are being drawn by Edward Stotz, Monongahela Bank Building, Pittsburgh, architect.

The West Penn Power Co., West Penn Building, Pittsburgh, will install additional equipment for an increase of 70,000 kva. generating capacity at its Springdale, Pa., power plant, in connection with enlargements.

The Westmoreland Coal Co., 224 South Third Street, Philadelphia, S. Pemberton Hutchison, president, is reported to be planning the installation of electric power and other machinery at its properties on the Spruce Fork of the Little River, Boone County, W. Va.

A manual training department will be installed in the two-story high school to be erected at Clearfield, Pa., estimated to cost $120,000, for which bids will soon be asked on a general contract. Howard & Hatcher, Deposit Bank Building, Du Bois, Pa., are architects.

The Savage Fire Brick Co., Meyersdale, Pa., is planning for extensions in its works at Hyndman and Williams, Pa., and the installation of additional equipment to cost $45,000. F. W. Minch is in charge.

The Pennsylvania Railroad Co., Pittsburgh, will install conveying and unloading machinery at its proposed coal dock at Sandusky, Ohio, estimated to cost $350,000.

Indiana

INDIANAPOLIS, Dec. 3.

BIDS will soon be asked by the Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, for the erection of a one-story addition to its plant at Kokomo, Ind., 150 x 575 ft. Elmer E. Dunlap, Harrison Building, Kokomo, is architect.

The Beatty Machine & Mfg. Co., Hammond, Ind., plans the installation of an air compressor, with capacity of about 1500 cu. ft. per min.

Bids will be received by the Board of County Commissioners, Court House, Indianapolis, Leo K. Fesler, auditor, until Dec. 11, for ovens, power equipment and complete baking machinery for installation in a new one-story plant for which erection bids will be received at the same time.

The Elan Paper Co., Marion, Ind., will break ground for a new mill at Dayton, Ohio, totaling about 75,000 sq. ft. of floor space. The present works will be removed and additional mill machinery installed.

The Crane Co. 836 South Michigan Avenue, Chicago, is having plans drawn for a one-story factory branch on Franklin Street, South Bend, Ind. W. Jerome Clark, company address, is architect.

Donald Test, Central Motor Parts Co., 409 North Capitol Avenue, and E. D. Porter, Jr., vice-president United States Bearings Co., 350 Century Building, Indianapolis, have plans under way for a six-story automobile service and repair building on Monument Circle, estimated to cost $200,000. Bass, Knowlton & Co., 312 North Meridian Street, are architects.

The Home Ice Co., Indianapolis, is contemplating the erection of a two-story ice-manufacturing plant to cost $50,000 with equipment.

The New York, Chicago & St. Louis Railroad, Nickel Plate Line, Cleveland, is having plans prepared for a new locomotive repair shop, machine shop and engine house at Fort Wayne, Ind.

The C. M. S. Mfg. Co., Inc., Mishawaka, Ind., has purchased two buildings from the Dodge Mfg. Corporation in that city, one 60 x 170 ft., and the other 48 x 150 ft. The company manufacturers special factory equipment, conveyors, factory trucks and other material hauling devices.

Detroit

DETROIT, Dec. 3.

BIDS are being taken for a one-story addition, 65 x 280 ft., to the plant of J. C. Widman & Co., 5289 Fourteenth Street, Detroit, manufacturer of automobile equipment, estimated to cost $35,000. Wright & Nice, Genesee Building, Flint, Mich., are architects. J. C. Widman is president.

The C. G. Spring Co., 2642 East Grand Boulevard, Chicago, manufacturer of automobile springs, etc., has acquired the plant of the Detroit Foundry Co., adjoining, totaling about 35,000 sq. ft. of floor space, for an extension to its forging department. Additional machinery will be installed.

The West Michigan Cold Storage Co., Grand Rapids, Mich., W. J. Breen, president, head of the Breen & Halladay Fuel Co., has tentative plans for a new ice and cold storage plant on the Lake Shore, estimated to cost $1,000,000 with machinery.

The Motor Wheel Corporation, Lansing, Mich., will commence the construction of an addition to cost abut $75,000, for the manufacture of gearing and transmissions. The present works will be removed to the new structure and additional equipment installed, the vacated space to be given over to the production of pressed steel wheels.

Manual training equipment will be installed in the new high school to be erected at Grand Rapids, Mich., estimated to cost about $750,000, for which bids will be asked on a general contract Dec. 15. H. H. Turner, Michigan Trust Building, is architect; W. W. Bradfield, Michigan Trust Building, is mechanical engineer.

The City Council, Adrian, Mich., is considering the installation of an electric pumping plant in connection with sewer and waterworks extensions to cost $595,000. The city engineer is in charge.

The Peerless Portland Cement Co., Union City, Mich., has engaged Albert Kahn, 1000 Marquette Building, Detroit, architect, to prepare plans for its proposed mill on a 14-acre tract at River Rouge. It will be one and two-stories, estimated to cost $3,500,000, including machinery and power house. The present Union City mill will be continued. A. F. Miller, Jackson, Mich., is consulting engineer.

Property of the Ryan-Bohn Foundry Co., Lansing, Mich., consisting of 50 acres and main building, 300 x 488 ft., with extension, 40 x 120 ft., will be sold at a public sale on the premises, Dec. 12, by James W. Wilford, receiver. All foundry and operating equipment, with traveling crane, will be included in the sale.

The Reo Automobile Co., Lansing, Mich., will commence the erection of a three-story addition to its local service and repair division, 60 x 150 ft., for which a general contract has been let to the H. G. Christman Co., Lansing.

The Steameter Corporation, Menominee, Mich., recently formed with a capital of $500,000, is contemplating the establishment of a local plant of automatic devices for automobiles, including a meter for automobile radiator water temperatures.

The Rich Steel Products company, Battle Creek, Mich., is again in production after its recent fire which destroyed the warehouse. It has plans for construction in the near future of a new building to replace this unit.

Stockholders of the Wales Stoker Co. have subscribed $10,000 in stock to establish a manufacturing plant at Hills-

dale, Mich. The Alamo Engine Co., of that city, manufacturer of gas engines, will produce the smoke consuming device of the new company. The officers are W. D. Rutherford, president; N. B. Wales, vice-president; W. J. Moore, secretary; William Prideau, treasurer.

The Wolverine Bumper & Specialty Co., Grand Rapids, Mich., has awarded contract for its new brick and steel plant to Hansen, Wharton & Co., Grand Rapids. It will cost $42,000 and the company is planning to be in operation shortly after the first of the year.

The General Motors Corporation, Detroit, will erect an assembling plant for Buick cars at Oakland, Cal., on a site adjacent to the Chevrolet works. Buick business in the Orient and Australia will be taken care of from this new unit.

The Hayes-Ruppel Mfg. Co., Grand Rapids, Mich., manufacturer of plumbing supplies, will move to Grand Haven, Mich., where it will occupy the former Hamilton Motor Co. plant.

The Gartland-Farrell Foundry Co., Sandusky, Mich., has broken ground for an addition, which will increase its floor space 67,000 sq. ft.

The O. L. Anderson Co., Inc., manufacturer of automotive sheet metal parts and copper tubs for washing machines is now settled in its own building at 1347 E. Fort Street. It has a fully equipped tool room and has added a medium sized Bliss toggle press of 150 tons pressure to its press department.

Cleveland

CLEVELAND, Dec. 3.

THE Ford Motor Co. has placed an order with a Cleveland machinery house for 23 machines, including 17 14- to 16-in. lathes and eight shapers, and the Eaton Axle & Spring Co. has purchased nine motor driven grinding machines. With this exception, sales during the week were confined mostly to single machines, for which a fair demand is reported. Dealers generally are doing a satisfactory volume of business for this time of the year, although a slowing down is expected this month and considerable inquiry coming out will probably not result in orders before January. With the exception of the Ford Motor Co., which has continued to buy equipment there is little activity in the Detroit automobile field. Business with some local machine tool manufacturers during November did not hold up in volume to that of October.

Used machinery continues to come out in considerable volume and among the new offerings are 500 machine tools in the plant of the H. J. Walker Co., Cleveland, formerly engaged in the manufacture of automobile motors.

The Henry Furnace Co., Cleveland, will erect a one-story addition, 40 x 100 ft., at 4301 East Forty-ninth Street. The Withington-Roberts-Wright Co., Cleveland, is the architect.

The Youngstown Boiler & Tank Co., Youngstown, Ohio, will shortly begin the erection of two extensions, 40 x 100 ft. and 30 x 200 ft., respectively. Equipment required will include electric cranes and punch presses.

The Dill Mfg. Co., 694 East Eighty-second Street, Cleveland, maker of automobile steering wheels, will erect a three-story addition 30 x 60 ft. and add two stories to the present one-story building.

The Jones Brothers Structural Steel Co., Ravenna, Ohio, has commenced the erection of extensions which will double the company's present capacity.

The plant of the Cleveland Rubber Mould Foundry & Machine Co., Warner Road, Cleveland, including a foundry, 110 x 350 ft., pattern shop and other buildings, has been sold to the Occo Realty Co., a subsidiary of the Ohio Confectionery Co., which contemplates adding a two-story brick building, 120 x 130 ft.

The Hickok Producing Co., Toledo, Ohio, has acquired a 30-acre site adjoining its present plant on which it will erect a new oil refinery at an estimated cost of $500,000. It is also reported that the Standard Oil Co. is planning extensions to its Toledo refinery.

The city of Lorain, Ohio, will shortly take bids for waterworks improvements, involving an expenditure of $90,000, and including filter beds, pipes, valves, etc., for 5,000,000 gal. daily capacity. Morris Knowles 662 Hanna Building, Cleveland, is the consulting engineer.

The city of Fostoria, Ohio, has completed plans for additions to its waterworks department, for which bids will be received early in 1924. Equipment required will include two 150 hp. boilers and a reciprocating steam pump. The estimated cost is $40,000. George Champe, 616 Nasby Building, Toledo, is the engineer.

Plans have been prepared for the new $200,000 sewer pipe factory to be erected in Uhrichsville, Ohio, by the Federal Collieries Co., 722 Leader-News Building, Cleveland. A power plant in which will be installed three 250 hp. boilers, mechanical stokers and a generator of about 500 kw. capacity is included.

The Ferro Machine & Foundry Co., whose Cleveland plant is near East Sixty-sixth Street and Hubbard Avenue, has recently awarded contract for a cleaning building 120 x 200 ft., one story, monitor type, to the H. K. Ferguson Co. for completion in 60 days. A. G. Simon is engineer for the Ferro company.

The Ohio Power Co., New Philadelphia, Ohio, has preliminary plans for a new power substation near the city limits, estimated to cost $1,000,000 with equipment.

Manual training equipment will be installed in the two-story junior high school to be erected at Willoughby, Ohio, estimated to cost $160,000, for which plans are being prepared by Franz C. Warner, Hippodrome Annex Building, Cleveland, architect.

The Sidney Brass Works Co., Sidney, Ohio, operating a machine shop and brass foundry, is planning for the installation of additional equipment.

The Lake Shore Electric Railway Co., Columbus Avenue, Sandusky, Ohio, is planning for a new power house to cost $55,000.

The Timken Roller Bearing company, Canton, Ohio, has planned an expansion program to enlarge its steel mill and roller bearing division at an estimated cost of $700,000 to $750,000.

Chicago

CHICAGO, Dec. 3.

WHILE inquiries for machine tools still greatly outnumber orders, buying showed some improvement as November closed, and a number of machine tool houses report sales for the month slightly heavier than those for October. It is notable, however, that the bulk of the business consisted of scattered orders for single tools. One of the most important recent transactions was the sale of two large motor-driven planers to the Studebaker Corporation, South Bend, Ind. A Chicago buyer has closed for two special heavy turret lathes and a heavy 12-spindle cluster drill. The city of Chicago has taken bids on a 20-in. shaper for one of its pumping stations. A local concern which is erecting a new shop, has put out an inquiry for $25,000 worth of machine tools.

New railroad inquiries are few. The Atchison, Topeka & Santa Fe has entered the market for a 20-in. x 10-ft. engine lathe. The New York Central list has aroused interest here to the extent that dealers hope to participate in the orders which are placed for the Elkhart, Ind., shops.

Prices remain substantially unchanged except for slight reductions on a line of emery grinders and small electric drills.

Outstanding among recent inquiries is one from the Chicago Board of Education for the following equipment for the Tilden Technical High School:

Ten geared-head 12-in. x 5-ft. engine lathes.
One 16-in. shaper.
One No. 1 or No. 2 universal milling machine.
Two Fridmore, or equal, 8-in. power squeezers with molding machine table, 14½ x 18 in., and 30 in. between strain rods.
One Sprague electric hoist, or equal, 1000 lb. capacity.
One Heintz, or equal, electric vulcanizer, arranged for 110-volt d. c. with 6 tube clamps.
Two Lowe, or equal, electric sifting machines, arranged for 110-volt d. c.
Two electric vibrating machines, arranged for 110-volt, 60-cycle a. c.
One No. 2 Whiting cupola, or equal.
One Roots positive pressure blower driven by 7½ hp. motor, arranged for 110-volt a. c. with variable speed control, 25 per cent speed regulation below normal.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: One No. 9½ cupola for Campbell, Wyant & Cannon, Muskegon, Mich.;

one No. 5 cupola for the Austin Co., engineer, Cleveland; one No. 3½ cupola for the Mississippi Foundry & Machine Co., Jackson, Miss.

The Alton File Co., 1015 East Broadway, Alton, Ill., recently incorporated with $30,000 capital stock, manufactures files and rasps and has a plant fully equipped. Officers are M. D. Barker, Springfield, Ill., president; J. J. Rubenstein, Alton, treasurer; and C. W. Beall, Alton, secretary.

The Haywood Bros. Co., Petersburg, Ill., recently incorporated with $40,000 capital stock, is the successor to Haywood Brothers, and produces the Haywood mile stretcher, a vaporizer for motor car engines, and a combination bumper and fender brace for Ford cars. These products are now being manufactured on contract, but the company contemplates building a plant within the next two years. The officers are: President, J. S. Hayward; vice-president, D. M. Altig; secretary, S. L. Shaw; treasurer, S. E. Watkins.

J. C. Mehan & Co., 6136 Broadway, Chicago, recently incorporated with $50,000 capital stock, are manufacturing a manifold heater under the trade name of Go-Kwik, together with time switch attachment. At present the company's operations are confined to the assembling of parts manufactured elsewhere. Officers are J. C. Mehan, president; R. D. Grant, vice-president; J. D. Tyler, treasurer; J. W. Ogren, secretary.

The Continental Can Co., New York, will take bids through Francisco & Jacobus, 39 South LaSalle Street, Chicago, on the general contract for a three-story reinforced concrete plant on West Grand Avenue, Chicago, to cost $500,000.

The Lincoln Products Co., manufacturer of shock absorbers, has purchased a tract, 125 x 400 ft., at the corner of Shubert Street and Kildare Avenue, Chicago, on which the Austin Co., Cleveland, is now erecting for it a one-story factory containing 27,500 sq. ft.

The Nugent Steel Foundry Co., 1800 West Thirty-first Street, Chicago, has awarded a general contract for a two-story pattern storage building, 41 x 121 ft., to cost $30,000.

C. C. Weinz, 74 West Washington Street, Chicago, has awarded contract for a four-story engraving plant, 93 x 100 ft., 914-20 North Franklin Street, Chicago, to cost $45,000.

The Gier unit of the Motor Wheel Corporation, Lansing, Mich., has awarded a contract for an addition, 100 x 380 ft., to cost $70,000.

The Caspers Tin Plate Co., 2259 Oakdale Avenue, Chicago, has purchased a three-story plant at the corner of Thirty-seventh Street and Jasper Avenue.

George and Arthur Zieber have purchased a site at 4623 West Harrison Street, Chicago, for the erection of a structural steel plant.

The Charles Stecher Co., Inc., manufacturer of automatic machinery, 2301 Knox Avenue, Chicago, has sold its one-story plant containing 15,000 sq. ft. of floor space, to the National Regulator Co., manufacturer of steam heating appliances, 208 South Jefferson Street, and has purchased property at Greene Avenue and Altgeld Street where it is erecting a new plant to cost $30,000.

The Pittsburg Boiler & Machine Co., Pittsburg, Kan., has purchased the Salt Lake Iron & Steel Co., Salt Lake City, Utah, and will continue to operate it under the same name. The Salt Lake plant, however, will be enlarged at an expenditure of approximately $500,000. W. H. Sagstetter, vice-president of the Pittsburg Boiler & Machine Co., will also be president of the Salt Lake Iron & Steel Co., with offices at Salt Lake. The Salt Lake plant has specialized in the manufacture of sugar beet and copper mining and smelting machinery, but will be equipped also to handle machinery for coal mining and for reconditioning railroad locomotives.

Joseph Crass has purchased the St. Clair Sheet Metal Works at B and First Streets, Belleville, Ill.

The Duro Metal Products Co., 360 East Grand Avenue, Chicago, has purchased a site, 125 x 400 ft., at Shubert and Kildare Avenues, and will erect a plant to cost $100,000.

A two-story factory, occupied by the Chicago Wheel Mfg. Co. and the Yaxlie Mfg. Co., 1101 West Monroe Street, Chicago, was recently damaged by fire.

The Illinois Central Railroad Co., Chicago, has preliminary plans for new locomotive shops, engine house and oil station at Sioux City, Iowa, to cost about $500,000 with equipment. The installation will include an 85 ft. turntable.

Work will commence on an addition to the municipal electric light and power plant at Denison, Iowa, to include the installation of additional equipment. Jacob Johnson is city clerk.

The Studebaker Sales Co., 427 North Franklin Street, Minneapolis, Minn., will take bids for a three-story service and repair building at Ninth and Franklin Streets, estimated to cost $100,000. M. E. Berry is vice-president and general manager. P. D. Bentley, 1005 Guardian Life Building, is architect.

The Northern States Power Co., Minneapolis, Minn., is disposing of a note issue of $10,000,000, a portion of the proceeds to be used for extensions and the construction of additional power plants. J. J. O'Brien is vice-president.

The Domestic and Foreign Commerce Department, Chicago Chamber of Commerce, 10 South La Salle Street, has received an inquiry from a company at The Hague, Holland, desiring to purchase American machinery for the manufacture of hacksaw blades, No. 2531; from a concern at Havana, Cuba, for machinery and tools, No. 2536; from a company at Torreon, Coahuila, Mex., for American machinery for the manufacture of drain tile, brick, etc., No. 2525; and from a company at Vryheid, Natal, South Africa, for electrically-operated refrigerating machinery, No. 2533.

The Iowa Railway & Light Co., Cedar Rapids, Iowa, will build an addition to its generating plant, with installation of a new 10,000 kw. capacity generator and auxiliary machinery, to develop a total output of 40,000 kw. It will cost about $365,000.

C. A. Kerber, 440 Chicago Street, Elgin, Ill., has inquiries out for a boring machine and a chain hoist.

The Nebraska Power Co., Omaha, Neb., has plans for a three-story generating plant at Twentieth and Howard Streets, estimated to cost $700,000 with machinery. J. T. Davidson is general manager.

Milwaukee

MILWAUKEE, Dec. 3.

BEYOND a scattering demand for machine tools for quick needs, which are filled out of stock, there is very little bulk to current sales. Inquiry continues active and appears to be growing broader, but in nearly every case is for equipment for next year's needs. There seems to be no question, but that the passing of the old year will witness a revival in sales, but the most expected of December is a freshening of inquiry and a casual demand. The outlook for new business among foundries and machine shops has improved appreciably.

The Simms Foundry Corporation, Racine, Wis., is increasing its authorized capitalization from $500,000 to $1,000,000 for financing enlargment of its production, principally pipe and pipeless furnaces for domestic and small industrial heating. The present capacity of 10,000 furnaces annually is to be doubled by the middle of 1924. Five acres have been purchased adjacent to its foundry on Layard Avenue for extensions. Details are not yet available. Horace R. Simms is president and general manager.

The Northwestern Fence & Wire Co. of Milwaukee has been incorporated with a capital stock of $50,000 to succeed the firm of same name established several months ago at 290 Third Street to wholesale and job fencing, wire work and kindred merchandise. It is now planned to engage in manufacturing as well. Steps will be taken early in the new year to provide a factory. W. G. Clark, J. L. Selbo and D. V. Holcombe are the principals.

The Cumberland, Wis., Auto Co., R. L. Kuenzli, proprietor, has plans for a new garage, sales and service building, two stories, 50 x 120 ft., to be erected early next spring at an estimated cost of $28,000.

The Steel Products Corporation, Sheboygan, Wis., which has been incorporated with $100,000 capital stock, will manufacture automobile equipment, principally a steel bumper for passenger cars. It is taking over the bumper business developed by the Jenkins Machine Co., Sheboygan, and will establish a new factory which requires a small list of machinery, including shears, hacksaws, drills, presses, etc. The Jenkins company will devote the space released by the transfer to enlarging its output of woodworking machinery. Fred Zschetzsche, 426 Grant Street, is president and general manager of the new corporation.

The Wausau Parts Mfg. Co. of Wausau, Wis., organized recently with $50,000 capital, has changed its name to the Wausau Motor Parts Co., as its principal business will be to manufacture automotive equipment, accessories and small units. A plant is now being equipped in leased quarters but a new building is planned next year. W. F. Scholfield is general manager.

The Prime Mfg. Co., 653 Clinton Street, Milwaukee, manufacturer of brass castings, railroad specialties, etc., expects to start work Feb. 1 on the erection of a new brass foundry, 60 x 120 ft. Plans for the building and specifications for the equipment are being prepared by Frank D. Chase, Inc., industrial engineer, Chicago. Orton L. Prime is president and general manager.

The Bayley Heating & Supply Co., 181-183 Sycamore Street, Milwaukee, has let the general contract to Klug & Smith, consulting engineers, Mack Block, for a two-story shop, office and warehouse building, 59 x 112 ft., at 2113-2115 St. Paul Avenue. Figures are being taken on miscellaneous pipe shop equipment and other requirements.

The DePere, Wis., board of water commissioners is asking bids until Dec. 11 for two air-lift pumps and one centrifugal pump and engine as part of a water supply enlargement project, including the reaming of present wells to 10-in. and casing with 8-in. Byers wrought iron pipe. The work is in charge of W. G. Kirchhoffer, consulting engineer, Madison, Wis. M. J. Maes is secretary of the board.

The Kurz Motor Car Co., 1107 College Avenue, Appleton, Wis., will build a two-story and basement addition, 45 x 87 ft., to its garage, sales and service building. It will cost about $25,000 complete.

The Milwaukee Board of School Directors has instructed Van Ryn & DeGelleke, 115 Grand Avenue, city school architects, to prepare plans for a boys' pre-vocational school, an elementary school and an addition to the Cass Street school, the combined cost being estimated at $750,000. Construction bids probably will not be taken until after Jan. 15. Frank M. Harbach is secretary and business manager of the board.

The Townsend Co., Janesville, Wis., has been incorporated with a nominal capital of 100 shares of common without par value and 50 shares of preferred at $100 par value, to manufacture tractors, gas engines, vehicles and mechanical devices. It will take over the business of R. C. Townsend, who a year ago purchased the principal assets of the bankrupt Townsend Mfg. Co. Enlargement of production is planned.

The Board of Education, Schlesingerville, Wis., has engaged Siewert & Fries, architects, 3601 North Avenue, Milwaukee, to make plans for remodeling and an addition to the high school building to provide vocational training departments. An expenditure of $75,000 is planned. A. J. Kletti is secretary.

The Curtis Automobile Co., 143 Eighth Street, Milwaukee, has let the general contract for its new headquarters at Broadway and Martin Streets to S. M. Siesel & Co., 160 Ogden Avenue, local. It will be 100 x 127 ft., three stories and basement, and cost $200,000. Equipment needs are being prepared and estimates will be taken soon. The Federal Engineering Co., 444 Milwaukee Street, is in charge.

The Eslien Sheet Metal Works, 1001 Thirtieth Street, Milwaukee, has plans by C. F. Behnke, local architect, for a three-story brick and concrete building, 60 x 120 ft., to replace the original factory destroyed by fire several months ago. It specializes in the manufacture of portable steel garages and other buildings of this size and will need considerable sheet metal-working machinery, riveting and welding units, shears, presses and other equipment. The total investment will be about $75,000.

South Atlantic States

BALTIMORE, Dec. 3.

THE Lafayette Mill & Lumber Co., Lafayette Avenue and Pennsylvania Railroad, Baltimore, will build a three-story brick plant at Mosher and Brice Streets, 95 x 100 ft., to cost $75,000.

The Reliable Furniture Mfg. Co., 303 President Street Baltimore, will build a two-story brick plant, 262 x 274 ft., at Ridge Road and Whittenmore Avenue, at a cost of $180,000.

The Porcelain Enamel & Mfg. Co., Baltimore, has acquired a site adjoining the plant of the Wolverine Enameling Co., a subsidiary, at Detroit. The property will be used for an extension to the Wolverine works and plans are now being prepared.

Contract has been awarded by the Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, to the Charles L. Stockhausen Co., Water Street, Baltimore, for a four-story and basement addition to its plant on Frederick Avenue, 60 x 140 ft., known as the Rennous-Kleinle Division, estimated to cost $150,000 with equipment. Wight & Lockhardt, Baltimore, are architects.

The Clermont Land Co., Liberty Trust Building, Roanoke, Va., J. Tracy Walker, treasurer, has inquiries out for tile-manufacturing machinery, power and other equipment for a plant estimated to cost $60,000.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 18, for tools for Eastern and Western yards, including 204 cutting punches, 1200 center punches, 108 machinists' dividers, 46 calipers, 148 spring calipers, 204 carbon steel countersinks, 276 countersinks and drills, 1132 setting dies, 261 hand drills, 2416 hacksaw frames, 938 hammers, 100 hand saws, 120 band saws, 24 combination set squares, 600 caliper rules, 90 steel measuring tapes, and other equipment, schedule 1606; also for miscellaneous steel wire rope, schedule 1645; and, until Dec. 28, for the Puget Sound navy yard, pumps and spare parts, schedule 1655.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, will build an addition to its power house at 112-16 Hopkins Place, 40 x 70 ft., to cost about $65,000.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, has inquiries out for one portable rock crusher on wheels, to handle large size material.

E. L. Vace, Tifton, Ga., is in the market for a four-side planer for lumber service.

The Bureau of Foreign and Domestic Commerce, Washington, has information of a company at Rio de Janeiro, Brazil, in the market for American mining machinery, including drills, air compressors, hauling machinery; crushing, sieving and classifying machines, No. 8248; also of a company at the same location desiring to purchase refrigerating machinery, No. 8246; of a concern at Caracas, Venezuela, in the market for harbor dredges, hydraulic and bucket, No. 8309; a company at Aleppo, Syria, desiring ice-manufacturing machinery, No. 8241; a company at Guaratuba, Brazil, in the market for ice-making machines, fertilizer-manufacturing machinery, and similar equipment, No. 8216; and a concern at Roudnice, Czechoslovakia, desiring to purchase machinery for the manufacture of corks and wooden stoppers, and corking machine, No. 8252.

The Victory Mfg. Co., Rockingham, N. C., recently organized, is perfecting plans for the establishment of a machine shop and foundry. F. I. Mason is president and general manager.

Cold storage and refrigerating plants will be installed in the three meat-packing buildings to be erected by Alouf Brothers, Roanoke, Va., estimated to cost $75,000, exclusive of machinery, to be occupied by Armour & Co., Swift & Co., and Morris & Co., all of Chicago.

The Electric Hose & Rubber Co., Twelfth Street, Wilmington, Del., is planning the installation of a boring lathe, about 24-in. swing.

The Hunter Machinery Co., Marion, N. C., machinery dealer, is in the market for a return tubular boiler, about 80 hp. capacity, with auxiliary equipment.

The American Glass Co., Broad and Meadow Streets, Richmond, Va., has inquiries out for a 100 hp. engine, oil-operated, and auxiliary equipment.

The Central of Georgia Railroad Co., Savannah, Ga., is considering other sites for rebuilding its local car shops recently destroyed by fire with loss of $750,000, and purposes to establish the works where land for expansion is available.

The Georgia Railway & Power Co., Atlanta, has issued preferred stock for $1,400,000, a portion of the proceeds to be used for extensions. The company has plans for two hydroelectric generating stations to be constructed and placed in operation in 1924 at Mathis and Tugaloo, Ga. An addition will also be built to the present hydroelectric plant at Bull Shine. Two new hydroelectric stations will be erected at Leeds and Burton, Ga. H. M. Atkinson is chairman of the board.

The Savannah & Atlanta Railway Co., Savannah, Ga., has tentative plans for the manufacture of cross arms and kindred timber material, and will be in the market for equipment, including a gang-boring machine, edge-chamfering machine, transmission equipment, etc. R. G. Cox is superintendent.

The Watson-Fitzgerald Co., Danville, Va., is in the market for electric motors, 3, 5, 20 and 25 hp. each, 60 cycle, 220 volts.

The Graniteville Mfg. Co., Graniteville, S. C., is desirous of getting in touch with manufacturers of wire coil springs, with view to purchase in quantity.

The United States Industrial Alcohol Co., 110 East Forty-second Street, New York, has preliminary plans under way for an addition to its plant at Curtis Bay, Baltimore, for the manufacture of fertilizer, estimated to cost $50,000.

R. P. Johnson, Wytheville, Va., machinery dealer, is in the market for a gyratory crusher, with capacity of 400 to 500 tons per day, with elevator, screens and auxiliary equipment.

The Fisheries Products Co., Wilmington, N. C., has acquired a portion of the former local plant of the Carolina Shipyards, and will remodel for a repair plant for company boats. Thomas B. Hayes heads the company.

The Republic Products Co., 2 East Redwood Street, Baltimore, has inquiries out for metal-working equipment, including punch presses, drill presses, small milling machines, dies, jigs, bench tools, etc.

Gulf States

BIRMINGHAM, Dec. 3.

FIRE, Nov. 22, destroyed a portion of the plant of the Washington Cotton Oil Co., Maple Avenue, Dallas, Tex., with loss estimated at $50,000 with equipment. It is planned to rebuild. Headquarters of the company are at Memphis, Tenn. W. L. Patton is local manager.

The Goethe Lumber Co., Manning, Fla., is in the market for a stationary steam engine and auxiliary equipment.

F. H. Jones, 200 Commerce Street, Fort Worth, Tex., has plans for a three-story automobile service and repair works estimated to cost $100,000, including equipment.

The National Petroleum Co., Dallas, Tex., has preliminary plans for the installation of a pipe line and pumping plants from the Postoak oilfields, Marlin, Tex., to the San Antonio & Aransas Pass Railway, estimated to cost $100,000. The Postoak Oil Co., Marlin, H. L. Pinkerton, president, is interested in the project.

The San Antonio Portland Cement Co., San Antonio, Tex., will commence the construction of additions to its mill, including the installation of additional equipment, estimated to cost $100,000. W. E. Simpson, National Bank of Commerce Building, is engineer.

The Wichita Falls Cotton Oil Co., Wichita Falls, Tex., is planning to rebuild the portion of its plant recently destroyed by fire with loss estimated at $17,000, including equipment.

J. M. Gillespie, P. O. Box 128, Tavares, Fla., has inquiries out for one electrically-operated deep-well pump, with windmill, steel tower, steel tank and auxiliary equipment.

Plans are being arranged for a cold storage and precooling plant at Lake City, Fla., to be used in connection with fruit shipments. George L. Colburn, secretary of the local Rotary Club, is inquiring for information and equipment. It is purposed to organize a company to operate the plant, which will have an initial capacity of about 4 cars daily.

The Deal Lumber Co., Buhl, Ala., is in the market for five high pressure boilers and auxiliary equipment.

Manual training equipment will be installed in the high school to be erected at Tuscaloosa, Ala., estimated to cost $250,000, for which bids will be taken on a general contract before the end of the month. D. O. Whilidin, Birmingham, is architect.

The Mission Ice Co., San Antonio, Tex., has tentative plans for a new plant estimated to cost $150,000, including machinery.

The Reese S. Allen Refinery, Amarillo, Tex., has preliminary plans for the installation of a pipe line from its plant to the Carson-Hutchinson oilfields, about 42 miles, with a series of pumping plants. It is estimated to cost $500,000.

John W. Kitchens, Heflin, Tex., has acquired the local electric power plant heretofore operated by R. M. Dobbins. Extensions will be made and additional equipment installed.

A bond issue of $50,000 has been voted at a special election at Lubbock, Tex., for extensions in the municipal electric power plant and the installation of additional equipment.

The Southwestern Gas, Light & Power Co., Fort Worth, Tex., recently organized with a capital of $700,000, to take over light and power properties at Breckenridge, South Bend and vicinity, has tentative plans for extensions in the different stations and the installation of considerable power equipment.

The Roth Brothers Auto Supply & Machine Co., 317 North Flores Street, San Antonio, Tex., has awarded a general contract to Edward W. Oeflinger, College Street, for a new two-story plant, 100 x 120 ft., for rebuilding motors and other electrical machinery, automobile parts, repairs, etc. It will cost about $45,000. Edward S. Green, Alamo Bank Building, is architect.

S. M. Regar, machinery and mill supplies, 212 South Franklin Street, Tampa, Fla., is in the market for a second-hand 50 kw., 110 volts, direct connected generator, with instrument board.

The Universal Polish Mfg. Co., 911 Camp Street, Dallas, Tex., is making inquiries for automatic filling and capping machines.

The Gulf Coast Lines, Brownsville, Tex., are perfecting plans for new repair and machine shops, with engine house, estimated to cost $100,000 with equipment.

The McEwan Shipbuilding & Repairing Co., Port Arthur, Tex., is said to have purchased dry dock property at Jacksonville, Fla., and contemplates the removal of its plant. Additional equipment will be installed. The entire project will involve about $500,000.

The Mexico Hardware Co., El Paso, Tex., will equip a small wire nail plant in Ciudad Juarez, Mex., across the Rio Grande from El Paso. It will have an initial daily capacity of about two tons of nails, but will be enlarged in the future. The Mexican duty on wire nails is 20 centavos per kilo, while on wire it is only 3½ centavos. S. R. Silva is president and general manager of the company.

The El Paso Cotton Mill Co., El Paso, Tex., has been incorporated with $500,000 capital stock and early next year will start work on a cotton mill to have an initial capacity of 5000 spindles. The equipment has not yet been purchased. J. Paul Henderson is vice-president and general manager.

The Universal Gypsum Co., G. E. Williams, vice-president, will start work soon on a 200-ton capacity plant at Rotan, Tex. The company is now operating plants at Dodge City, Iowa and Batavia, N. Y.

St. Louis

ST. LOUIS, Dec. 3.

A BOND issue of $50,000 has been approved at Bolivar, Mo., for the installation of a municipal electric light and power plant, for which bids will soon be called. Otis Jarman is city clerk.

Electric pumping machinery will be installed at the new waterworks to be constructed at Enid, Okla., estimated to cost $1,000,000, for which bids will be asked in the near future. J. D. Bomforo, Masonic Temple, is architect.

The Hammer Iron Works, South Sixth Street, Fort Smith, Ark., will install a 10-ton traveling crane at its proposed plant on site recently purchased, for which plans will be drawn at once. It will cost about $22,000. A hydraulic wheel press and other machinery will also be purchased.

The Northwest Arkansas Utilities Corporation, Fayetteville, Ark., has been organized with a capital of $500,000 to take over and consolidate the Fayetteville Gas & Electric Co.; Springdale Gas & Electric Co., Springdale, Ark.; and the Rogers Light & Power Co., Rogers, Ark. Plans are under way for extensions, including the installation of additional equipment. V. McDaniels, superintendent of the Fayetteville company, will act in the same capacity with the consolidated organization.

The Hanlon Gasoline Co., Tulsa, Okla., recently organized under Delaware laws with capital of $1,500,000, will take over the plant and properties of the Hi-Power Gasoline Co. The new company plans the construction of a new refining plant to cost approximately $300,000 with machinery. It will be closely affiliated with the Chestnutt & Smith Corporation, Tulsa, operating oil refineries in this vicinity.

The Common Council, Heavener, Okla., will install electric pumping machinery at its waterworks plant, estimated to cost $150,000, for which plans will be drawn by V. V. Long & Co., 1300 Colcord Building, Oklahoma City, Okla.

The Merchants Ice & Coal Co., St. Louis, has engaged A. B. Groves, St. Louis, architect, to prepare plans for a two-story ice-manufacturing and refrigerating plant at 4330 Finney Street, to cost $45,000 with machinery.

The Missouri Rubber Products Co., Springfield, Mo., is perfecting plans for new works, 100 x 300 ft., estimated to cost $200,000 including machinery. E. E. Love is construction engineer, in charge.

The Borough Council, Farmington, Mo., will install electric pumping machinery at its proposed waterworks and sewerage system, estimated to cost $100,000. C. A. Haskins, 517 Finance Building, Kansas City, Mo., is engineer.

The Dewey Portland Cement Co., 301 Mutual Building, Kansas City, Mo., will commence enlargements at its mill at Dewey, Okla., including the installation of additional equipment. F. E. Taylor is president.

The Common Council, Hooker, Okla., is planning for the installation of a municipal ice-manufacturing plant. L. C. Crutchfield is city clerk.

The Producers' Cold Storage Co. Chillicothe Mo., will build a new two-story cold storage and refrigerating plant at Trenton, Mo., to cost about $10,000.

The Atchison, Topeka & Santa Fe Railway Co., Railway Exchange Building, Chicago, plans enlargements in its shops at Emporia, Kan., with machine shops, power house and other structures, estimated to cost $500,000 with equipment. H. W. Wagner, Ninth and Jackson Streets, Topeka, Kan., is chief engineer.

The Inter-Southern Radio Corporation, 208 East High Street, Jefferson City, Mo., recently organized, will establish a plant for the manufacture of radio headsets and kindred wireless products. Bids for machinery will be received in January. Ernest L. Schneider is president and general manager.

Manual training equipment will be installed in the three-story and basement high school to be erected at Bristow, Okla., estimated to cost $135,000, including equipment. C. Lee Curran, 204 Groom Building, is architect. Bids will be asked on a general contract at an early date.

Cincinnati

CINCINNATI, Dec. 3.

WHILE there has been some let-up in buying, a fair number of orders for machine tools continue to be booked. These are generally for one and two machines, although some of the larger companies are reported to be quietly purchasing equipment without the formality of sending out general inquiries. Some export orders were booked the past week, mostly for South American countries. The Ford Motor Co. is reported to have placed several large orders recently, one for 75 special machines to be built by a Cincinnati manufacturer. The Westinghouse Electric & Mfg. Co. continues a good purchaser, closing for three lathes the past week.

The Norfolk & Western Railroad is reported to have purchased a number of tools, a hang-over from its recent list. The Cincinnati, Indiana & Louisville Railroad is inquiring for two engine lathes, and the Minneapolis & St. Louis for three engine lathes. It is said that lists are in preparation by the Norfolk & Western, Seaboard Air Line, Virginian and Sante Fe railroads, and will be issued after the first of the year. The New York Central has not closed on its recent list and has put out new inquiries for three 14-in. engine lathes.

The U. S. Engineers' Office, Louisville, Ky., will take bids until Dec. 29 for furnishing and delivering metal work for Dams Nos. 44 and 45, Ohio River. Further information on application.

The Hoppes Water Wheel Co., Springfield, Ohio, has been organized to take over the plant and business of the Trump Mfg. Co., manufacturer of water wheels. It will manufacture, in addition to water wheels, a new hydro-electric unit designed by John J. Hoppes, for use by small stream owners and for auxiliary light and power in large plans. Capt. John Lund, Washington, is financially interested in the new company, which will be headed by John J. Hoppes as president; Captain Lund, vice-president and general manager, and R. P. Henderson chief engineer.

The city of Dayton, Ohio, will shortly commence the erection of a garbage disposal plant to cost, with equipment, about $100,000. It is hoped to have the new plant in operation in June. H. E. Eichelberger is city manager and has charge of the work.

The Birmingham Machine Co., Marietta, Ohio, has moved into larger quarters at Third and Butler Streets. Some new equipment has been purchased. The company does a general machinery business, with particular attention paid to oil country work. George Birmingham is head of the company.

Bonds have been authorized by citizens at Union City, Tenn., for $125,000, the proceeds to be used for a municipal electric generating plant and city sewerage works, for which plans will soon be prepared. The Common Council is in charge.

The Perfection Brake Co., Barnard Street, Cincinnati, has filed plans for a new one-story factory at 2424 Spring Grove Avenue, to cost $19,000. Kruckemeyer & Strong, Cincinnati, are architects.

The Hamilton Metal Products Co., Hamilton, Ohio, will take bids for a two-story and basement addition, 60 x 200 ft., estimated to cost $50,000, with equipment. George Barkman, Reily Building, is architect.

Bids will be received by the city of Elizabethtown, Ky., until Dec. 17, for four centrifugal pumps, with motors and auxiliary equipment, for installation at the municipal waterworks. B. H. Klyce, Room 720, Fourth and First National Bank Building, Nashville, Tenn., is engineer.

The Crissey Tire & Rubber Co., Columbia, Tenn., has leased property on the Pulaski Turnpike and will have plans drawn for a new works. It is estimated to cost $60,000, with equipment.

Canada

TORONTO, Dec. 3.

WHILE demand was confined chiefly to small lots, total business in machinery and tools during November proved very satisfactory, according to local dealers. Inquiries are numerous and there is sufficient business pending to assure a steady trade for some time. The automotive industry continues to furnish a good demand for machine tools. The Ford Motor Co. of Canada has completed the erection of a new plant at Toronto and has installed some equipment, but is awaiting delivery on other tools which, when installed, will greatly facilitate production. The Ford company is also busy on the construction of its plant at Ford, Ont., where some $6,000,000 is being spent.

Small lists are appearing from time to time from the Canadian National and Canadian Pacific railroads for tools for shop replacements, but no large lists have been issued. An active demand is also reported for equipment for electrical development projects and considerable improvement has recently appeared for mining machinery.

The Excelsior Lumber & Shingle Co., Vancouver, B. C., is preparing to erect a sawmill to cost $50,000.

F. Leslie, 718 Somerset Street West, Ottawa, Ont., will purchase equipment for the manufacture of tinware, etc.

Bruce & Price, 159 Prince Street, Montreal, are interested in the purchase of foundry equipment.

The St. Laurent Quarry, St. Laurent, Que., is in the market for stone cutting machinery and equipment. C. Lapalliеur is manager.

R. De Montigny, 1396 St. Dominique Street, Montreal, will purchase machinery for the manufacture of cement blocks, etc.

F. H. Plant, Ltd., 111 Murray Street, Ottawa, Ont., is interested in the purchase of equipment for a machine shop.

The Canada Wood Specialty Co., Orillia, Ont., is preparing to erect a factory to cost $85,000.

The Riordon Co., 355 Beaver Hall Square, Montreal, is preparing to build a power house on the Gatineau River near Chelsea Falls, Que., for which the contract will soon be awarded. The Montreal Engineering Co., 164 St. James Street, Montreal, is engineer, in charge.

The International Fibre Board Co., whose plant at Penetanguishene, Ont., was destroyed by fire a short time ago, will erect a new factory at Midland, Ont.

The Chatham Malleable & Steel Mfg. Co., Chatham, Ont., manufacturer of stable fixtures, wagons, etc., is building an addition and will require equipment.

The Belanger Foundry Co., 1165 Carriere Street, Montreal, will purchase furnaces, melting pots, etc. J. Lamarre is manager.

The American La France Engine Co. of Canada, 195 Weston Road, Toronto, proposes to build an addition to its plant for the manufacture of motor trucks, etc.

The Mildmay Electric Co., Mildmay, Ont., will improve its electric lighting system and will purchase transformers, etc.

Toupin & Roi, 502 St. Catharine Street East, Montreal, will build an electric plant at St. Michael Des Saints, Que.

The Algonquin Power Co., Montreal, contemplates a water power development plant on the River Du Loup en Haute, near St. Paulin, Que., to cost $100,000. J. M. Robertson, Ltd., 20 St. Nicholas Street, Montreal, is engineer.

The Nova Scotia Power Commission, Tidewater, N. S., has signed a contract with the Albany Perforated Wrapping Co., Albany, N. Y., to furnish 4600 hp. electric energy to that company at West River, Sheet Harbor. To give this service the Nova Scotia Power Commission will erect a second generating station on East River with an ultimate capacity of 9000 hp.

Fire at the plant of the Canadian Iron Foundries, Ltd., Fort William, Ont., Nov. 29, damaged the cupola and furnace room to the extent of $10,000. The wheel-casting.

brake-shoe and gray iron departments will be unable to operate for about a month. Reconstruction will start at once.

Western Canada

The West Kootenay Power & Light Co., a subsidiary of the Consolidated Mining & Smelting Co., is doubling the capacity of its power development plant at Bonnington Falls, Nelson, B. C.

The mill of the United Shingle Co., Columbia Street, New Westminster, B. C., owned by J. A. McKerchar, 1050 Gilford Street, Vancouver, B. C., was destroyed by fire with a loss of $50,000. It will be rebuilt at once.

The Victoria Lumber Mfg. Co., Chemainus, B. C., is having plans prepared for the erection of a lumber mill to cost $60,000.

Pacific Coast

SAN FRANCISCO, Nov. 28.

A SITE has been purchased at Emeryville, Cal., by the Southern Aluminum Co., New Orleans, for a new plant to manufacture aluminum and other metal products, estimated to cost $85,000. W. C. Drolet, 485 Boulevard Way, Oakland, Cal., is Pacific Coast representative.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is planning for a new power house at Commercial and Montgomery Streets, estimated to cost $500,000, with machinery.

The Monrovia Ice Co., Monrovia, Cal., will build a new ice-manufacturing plant and storage, estimated to cost $40,000. Hamm & Grant, Inc., 607 Ferguson Building, Los Angeles, is engineer and will handle the erection.

The Arizona Power Co., Phoenix, Ariz., is disposing of a bond issue of $400,000, a portion of the proceeds to be used for extensions and additional equipment.

The Interlocking Cement Tile Co., 82 Ninth Street, Oakland, Cal., has purchased property at Clement Street and Forty-fifth Avenue, for a new plant. E. L. Chase is superintendent.

The Walton Lumber Co., Lowell, Wash., has plans for a new veneer mill, 120 x 850 ft., to cost $500,000, including electric power and other machinery.

The Puget Sound Light & Power Co., Seattle, is arranging an extension program to cost about $6,000,000, of which approximately $5,000,000 will be used for a new generating plant with transmission system. A. W. Leonard is president.

The Southern Sierras Power Co., Riverside, Cal., has acquired the property of the Holton Power Co., in the Imperial Valley. Plans are under consideration for extensions to cost $500,000, including additional transmission lines. F. O. Dolson is vice-president.

The Truscon Steel Co., Youngstown, Ohio, is planning for new branch works at Portland, Ore., for fabricating and other service. It will be one-story, 120 x 132 ft.

The Crown-Willamette Paper Co., Pittock Building, Portland, Ore., has plans for a new pulp and paper mill at Youngs River Falls, near Astoria, Ore., estimated to cost $350,000, with machinery. The installation will include a power house.

The Mackall-Paine Veneer Co., Vancouver, Wash., is planning the construction of a $50,000 power house.

Schiefer & Sons, Inc., San Diego, Cal., manufacturer of furniture, has purchased property at National City for a new one-story factory, 115 x 200 ft., with machine shop and power house, estimated to cost $100,000 including machinery.

C. T. Bolfing, Gilroy, Cal., former secretary of the local Chamber of Commerce, has plans for a new factory near the city limits to manufacture vitrified brick, etc., estimated to cost $30,000. The machinery will be electrically-operated.

The Northwest Copper & Sheet Metal Works, Inc., Portland, Ore., recently organized, has plans for a new one-story works, 100 x 100 ft. Louis E. Schmit, 410 Chamber of Commerce Building, represents the company, which is headed by Adolph Groeger. Edmund Bergholtz, Spalding Building, is architect.

The General Electric Co. has purchased at Los Angeles, Cal., five acres on the southwest corner of Santa Fe Avenue, and Fifty-second Street. A two-story reinforced concrete building on the property will be modified and converted into a service shop in which all kinds of electrical apparatus will be rebuilt and repaired. Later a large warehouse will be erected and eventually a factory.

The San Diego Smelter Co., abandoning its proposed location at Chula Vista, has closed for a 60-acre tract at San Ysidro, one mile from the Mexican border. Work on a group of buildings has been started and the company will expend $300,000 on its plant at once.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	41½	43½	Jones & Laugh'n.	108½	108½
Allis-Chal. pf. ..	91½	92	Lima Loco.	64⅞	67
Am. B.S. & F. pf.	103½	103½	Midvale Steel ..	28½	29¼
Am. Can	100⅛	105	Nat.-Acme	9⅜	10¼
Am. Can pf.....	109	109⅜	Nat. En. & Stm.	39⅞	42
Am. Car & Fdy.	160¾	162	N. Y. Air Brake.	41	42⅜
Am. Locomotive.	73⅛	75	Nova Scotia Stl..	14½	14⅞
Am. Loco. pf....	117	117¼	Otis Steel	9¼	10½
Am. Radiator ..	84¼	85⅛	Otis Steel pf....	55½	58
Am. Roll. Mill pf.	98⅝	99	Pressed Stl. Car.	53½	56
Am. Steel Fdries.	38¼	39	Pressed Steel pf.	83½	84½
Am. Stl. Fd. pf..	101⅝	101¾	Replogle Steel ..	12	14
Bald. Loco.	124¼	129⅞	Republic	48½	50⅝
Beth. Steel	55	55⅝	Republic pf.	92⅞	93
Beth. Stl. 7% pf.	92½	93½	Sloss-Sheffield ..	52½	55
Beth. Stl. 8% pf.	105½	105½	Sloss-Sheffld pf..	80⅜	80¾
Br. Em. Steel...	4¼	4¼	Steel of Canada.	72½	74½
Br. Em. Stl. 2 pf.	13¼	14	Superior Steel ..	30½	31½
Chic. Pneu. Tool	83⅛	85¼	Transue-Wms. ..	33	33
Colo. Fuel	23	25½	Un. Alloy Steel..	31	31⅛
Crucible Steel ..	64⅜	67½	U. S. Pipe.....	49½	59⅛
Crucible Stl. pf..	90⅜	90⅜	U. S. Pipe pf....	84	87
Deere pf.	61⅜	61⅜	U. S. Steel.....	94¼	96½
Gen. Electric ...	181	182¼	U. S. Steel pf....	118⅜	119
Gt. No. Ore Cert.	32	33⅜	Vanadium Steel.	30½	32¾
Gulf States Steel	81	85½	Va. I., C. & Coke	52	52
Inland	38½	39¼	Wh'ouse Air Br.	82¾	85
Int. Har.	77	77⅞	Y'gstown S. & T.	67	69

Declares Christmas Dividend

The Blaw-Knox Co., Pittsburgh, has declared an extra Christmas dividend of 2 per cent on its common stock, payable Dec. 24, to stock holders of record Dec. 14. This will make a total dividend disbursement on this stock for this year of 10 per cent. President A. C. Lehman reports that earnings for 1923 will be equal to about 28 per cent on the common stock after allowance for taxes and depreciation and the payment of the dividends on the preferred stock, of which a 7-per cent cumulative issue of $1,400,000 is outstanding at present. Outstanding common stock amounts to $3,750,000 (150,000 shares of a par value of $25). Indicated net earnings after taxes, depreciation and preferred dividend requirements for the year therefore are $1,050,000 or $7 per share, which would meet the stock dividend, at recent regular rate of 8 per cent for 3½ years.

Industrial Finances

The Wickwire Spencer Steel Corporation, including the American Wire Fabrics Corporation, reports net income of $699,504 for the nine months ended Sept. 30, 1923, equal to $9.10 per share on $7,681,700 of preferred stock outstanding, deduction having been made for depreciation, interest, etc. Dividends amounting to 18 per cent have accumulated on preferred stock. Sales over the period amounted to $21,938,425.

The third-quarter report of the American Rolling Mill Co., showed net sales amounting to $6,418,849, exclusive of the Ashland works, with cost of sales $5,143,288. Earnings applicable to interest, taxes and dividends for the third quarter totaled $1,022,501, equivalent to 14 per cent on the common stock after preferred dividends and interest on notes had been met. The company's sheet mills have been maintaining 100 per cent operation practically all through the year.

The Magee Realty Corporation, Taunton, Mass., has completed the financing of $575,000 7 per cent first mortgage twenty-year sinking fund bonds. The Magee Furnace Co., a close corporation, makes ranges, heaters, furnaces, boilers, etc. Several months ago, it acquired property and enlarged its foundry at about the same time placing this property under a separate corporation, the Realty company, which leases the property to the Magee Furnace Co. The latter is operating at capacity and has sufficient unfilled business on its books to insure continued operations well into 1924. Money derived from the sale of the above bonds will be used to pay for land acquired and to retire outstanding bank loans.

The Penn Seaboard Steel Corporation has paid off $1,439,000 7 per cent three year notes due Feb. 1, 1924, these representing 95 per cent of the issue. The other 5 per cent previously was paid off. The company is now clear of funded debt. On Aug. 31, last, it had current assets of $2,511,891 and current liabilities of $1,568,892.

Directors of the Superior Steel Co. have sent a letter to the stockholders in which plans are outlined for the sale of a block of unissued common stock to a syndicate for $30 a share. With the proceeds and with funds obtained by other financing, it is proposed to retire on Feb. 15, next, the company's outstanding preferred shares. A

meeting of the stockholders has been called for Dec. 11 at Richmond, Va., to act on the proposal.

Upon the recommendation of a committee of creditors, R. H. Long, Framingham, Mass., has employed Caswell & Wood, Boston, industrial engineers, to take charge of his companies for the purpose of conserving assets and accomplishing as prompt a liquidation of the indebtedness as circumstances permit. Companies involved are the R. H. Long Co., a holding company, R. H. Long Motors Co., automobile manufacturer, and R. H. Long Shoe Co. Of the three, the automobile company is by far the most important. It owns the largest Framingham plants as well as a Worcester, Mass., plant erected in 1922. Automobiles are manufactured under the trade name of Bay State.

For the year ending Sept. 30, the financial statement of the Canada Iron Foundries, Ltd., Montreal, Quebec, shows decided improvement with net earnings after all charges, including a 2 per cent dividend distribution on the preferred shares, shown at $51,761, equal to 3.2 per cent on the common stock outstanding. This compares with a deficit of $104,437 in 1922. Earnings stood at $348,518 as compared with $115,349 for last year. Commenting on the increased turnover during the year, the president points out that owing to competition from European companies enjoying the benefit of a low exchange, prices were low and much business had to be taken at a small margin of profit, as it was considered the best policy to keep in operation as fully as possible. Hence, while this enabled the company to keep costs down and left profits at the end of the year, such profits were not proportionate to the volume of business transacted.

The Paige-Detroit Motor Car Co., Detroit, is planning to increase its capital stock from $7,000,000 to $11,000,000.

The American Rolling Mill Co. reports net profits for the first nine months of 1923 of $3,008,460. After preferred and debenture stocks, there was a remainder equivalent to $2.46 per share on the $19,935,325 common stock of $25 per share.

Stockholders of the Hydraulic Steel Co., Cleveland, have been notified of the formation of a preferred stockholders' protective committee, consisting of Frederick W. Yates, New York, chairman; James A. Drain, Washington; Lyman Spitzer, Toledo; G. B. Johnson and R. A. Wilbur, Cleveland.

Plans of New Companies

The Essex Wire Cloth Co., New York, recently organized with $100,000 capital stock to manufacture expanded metal, wire cloth, etc., has secured property on Mill Street, Belleville, N. J., where operations are being planned. W. H. Bounce, A. Miller and H. B. Bunecke are the incorporators.

The Shoe Kleaner Services, Inc., 11 East Sixteenth Street, New York, has organized the Penny Shoe Kleaner of New Jersey to distribute and operate the machines manufactured by the former company. S. Grant is treasurer of the Shoe Kleaner Services, Inc.

The Collins Metal Corporation, New York, has been organized with capital of 1000 shares, no par value, to manufacture metal products. At first the company will deal in and eventually may manufacture on a small scale a product of limited demand. If manufacturing is undertaken it will be done in northern New York. Address care of W. S. Thomson, 36 West Forty-fourth Street.

Wallace P. Cohoe & Co., Inc., New York, has been organized to manufacture metal bottle caps. Incorporators are J. G. Schurman, B. F. Wilcox and Wallace P. Cohoe, 320 Broadway.

The Pan American Petroleum & Transport Co., 120 Broadway, New York, plans the organization of the Pan American Western Petroleum Co. with authorized capital of 1,500,000 shares of stock, no par value, held by the parent company and expected to net $10,500,000 to be used in the development of properties held in California. E. L. Doheny is chairman of directors.

The Standard Electric Incubator Co., Inc., 76 Greenwich Street, New York, recently organized, will manufacture electric incubators. Work is done by contract. J. T. Howey is general manager.

The Beacon Press Steel Co., Inc., 86 Page Street, Providence, R. I., recently organized, will manufacture light and medium pressed metal products. A safety device for power presses and high speed tapping machines is also made. George F. Cooper is president and treasurer.

The Alton File Co., Alton, Ill., recently organized with capital stock of $30,000, is now engaged in manufacturing files and rasps. M. D. Barker of Springfield, Ill., heads the company.

The Florin Foundry & Mfg. Co., Florin, Pa., has been incorporated with capital stock of $125,000, having purchased an eight-acre site, on which to build a plant. Foundry equipment will be installed. A. E. Koch, president Philadelphia Gas Range Co., Philadelphia, is one of the directors.

The Freeport Implement Co. has been organized by a syndicate of Freeport, Ill., to take over the business of the Stevenson Barn Equipment Co., Barton, Wis., which was organized in 1918 to manufacture steel stanchions.

The Harris-Luckett Hardware Co., San Angelo, Tex., has been organized with $60,000 capital stock to do a wholesale and retail business, covering the territory adjacent to San Angelo.

The New England Motors Corporation, Newport, R. I., has been organized with capital stock of $2,000,000 to manufacture automobiles. Its purpose is to build these with a new construction of motor, both 2- and 4-cycle combined. All work will be done in the company's plant. It is now in the market for materials. Roscoe F. Levens is president and general manager, and Edmund Baccari is secretary-treasurer.

The Inter-Southern Radio Corporation, Dallmeyer Building, Jefferson City, Mo., has been organized to manufacture electrical and radio equipment and parts. It is probable that manufacturing will be started in the early part of next year. The management is interested in obtaining information regarding material and equipment needed for these lines. Ernest L. Schneider is president and general manager.

The B. A. S. Co., Inc., Philadelphia, has been organized to invent, promote and develop commercial processes which will be turned over to subsidiary companies to be placed on a commercial basis. It is unlikely that the company itself will manufacture. Address care of Percy C. Madeira, Jr., Ballard, Spahr, Andrews & Madeira, 1035 Land Title Building, Philadelphia.

The Empire Miniature Lamp Corporation, care of Corn & Silverman, 20 Clinton Street, Newark, N. J., has been organized with $50,000 capital stock to manufacture electric lamps and kindred products. It has taken over the business formerly operated as the Empire Glass Bulb Co.

The Crouse & Pope Foundry Corporation, Auburn, N. Y., has been incorporated with capital stock of $100,000 to manufacture light and medium gray iron castings. It has taken over the No. 1 Gray Iron Foundry at Auburn, now being vacated by the International Harvester Co., together with a part of the equipment. The plant has a capacity of from 50 to 75 tons per day. William Crouse is president; William J. Henry, vice-president; Harry L. Pope, treasurer, and Earl G. Washburn, secretary.

The Auburn Metal Products, Auburn, Ind., was recently organized with capital stock of $15,000 to manufacture automobile parts for service and replacement work, having taken over plant and equipment of a company by the same name. P. A. Watson is president, E. E. Troops, vice-president and manager and L. R. Watson, treasurer. P. A. Watson will retain his position as factory manager for the Auburn Automobile Co.

The Atlantic Steel Castings Co., Chester, Pa., has been organized with capital of 35,000 shares, no par value, as a step in the reorganization of the Atlantic Steel Castings Co. of Pennsylvania. William A. Faison is one of the principals.

The Blair Strip Steel Co. has been financed at New Castle, Pa., with 1000 shares of preferred and a like amount of no par value stock, already subscribed, to manufacture cold rolled steel products. Definite plans are unknown but it is understood that a new plant will be made ready for operation next summer.

The Boyer Mfg. Co., 793 Military Avenue, Detroit, has been organized with $50,000 capital stock to manufacture electric appliances, specializing in an electric motor driven brush vacuum cleaner. The company has factory and equipment and is in production. S. J. Boyer is president.

C. G. Mahey, secretary-treasurer W. J. Early Sons Foundry Corporation, organized a short time ago to do a foundry business in the Pittsburgh district, states that building will not be undertaken before next spring. John N. Early is president and Lee H. Marshall, vice-president of the company. Headquarters are at 804 Sarah Street, S. S., Pittsburgh.

The Peerless Products Co., 42 Lawrence Street, Newark, N. J., recently organized, will manufacture automobile and exhaust whistles. Considerable amounts of sheet brass, brass tubing and castings, aluminum and malleable iron castings, bolts and nuts are required. It has a foundry at Kearny, N. J. Howard Schaarz is head.

The Oilheat Corporation, 39 Milwaukee Avenue West, Detroit, has been organized to act as distributor for the Oilver Oil Gas Burner Co. of St. Louis. J. W. Keenan heads the company.

The Rapid Heater Co., Grand Rapids, Mich., has been organized to manufacture several types of gas water heaters, having purchased the plant of the old Rapid Heater Co. Equipment is nearly complete, but the company will add a few machines. E. M. Newman is general manager.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.20c. to 4.34c.
No. 12	4.25c. to 4.39c.
No. 14	4.30c. to 4.44c.
No. 16	4.40c. to 4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.70c.	.....
Nos. 22 and 24	4.35c. to 4.85c.	5.10c.
No. 26	4.40c. to 4.90c.	5.15c.
No. 28	4.50c. to 5.00c.	5.25c.
No. 30	4.70c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.60c. to 5.10c.
No. 16	4.75c. to 5.25c.
Nos. 18 and 20	4.90c. to 5.40c.
Nos. 22 and 24	5.05c. to 5.55c.
No. 26	5.20c. to 5.70c.
No. 27	5.35c. to 5.85c.
No. 28	5.50c. to 6.00c.
No. 30	5.95c. to 6.45c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel			*Wrought Iron*		
	Black	Galv.		Black	Galv.
½ in. Butt	—41	—24	½ in. Butt	— 4	+19
¾ in. Butt	—46	—32	¾ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 27¼c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 21c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55 $6.30
		90 lb.	6.65 6.40
		100 lb.	6.75 6.50
IC.	$12.55 $10.70	IC	7.00 6.75
IX.	13.95 12.55	IX	8.25 8.00
IXX.	15.55 13.75	IXX	9.50 9.25
IXXX.	17.10 15.30	IXXX	10.75 10.50
IXXXX.	18.85 16.80	IXXXX	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	47c.
Bar	55c. to 60c.

Copper

Lake ingot	15⅜c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8c. to 8½c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	34¾c.
No. 1 solder	32¾c.
Refined solder	28¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	11c. to 12c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market is dull and business very quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.25
Copper, light bottoms	8.75
Brass, heavy	5.75
Brass, light	5.00
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	7.75
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.25
Sheet aluminum	15.25

THE IRON AGE

New York, December 13, 1923

ESTABLISHED 1855 VOL. 112, No. 24

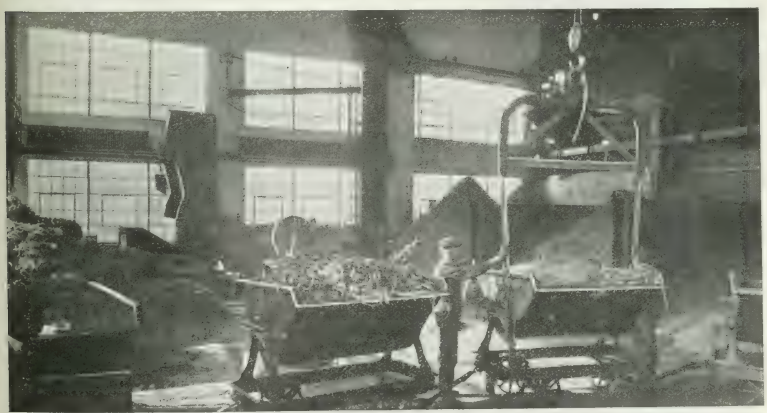
Salvaging Scrap in Cadillac Plant

New Building Erected by Automobile Company at Detroit for Special Purpose of Handling Various Grades of Old Material

THE Cadillac Motor Car Co., Detroit, recently established in connection with its new plant a scrap salvage department located in a separate building designed for this purpose and through which all iron and steel and non-ferrous scrap, produced in its various manufacturing departments, is handled. The erection of the salvage building reduces the cost and increases the efficiency of scrap handling and is a step in the company's policy of economic production, in that scrap, instead of being allowed to accumulate in the manufacturing departments, releases valuable space in the manufacturing building for production work.

The predominating feature of the scrap salvage department is the installation of equipment for breaking up and mechanically handling long turnings, the output of which averages 15 tons per day. These pass through a crusher which breaks up the bulky coils into small pieces or short shoveling turnings, making the material much more compact so that it is easier and cheaper to handle and twice as much can be loaded in a car. At the same time the market value of the scrap is increased, for after being broken into small pieces it is more suitable for use in the charging boxes of open-hearth furnaces and can also be melted in blast furnaces. Very few blast furnaces can use long turnings because of their bulky character. Another advantage of the crushing process is that the small pieces of scrap are safer to handle than the bulky coils. With a system of conveyors, the process of handling the turnings from the time they reach the crusher until they are loaded on waiting cars is continuous. The plant has a capacity for breaking up and delivering to cars 20 tons of turnings in 9 hr.

The scrap salvage department is located in a one



Scrap as Fast as It Is Accumulated Is Taken to the Scrap Salvage Department in Side-dump Trucks Hauled by Storage Battery Tractors. If desired the loaded hoppers are lifted from the trucks by means of the overhead crane as shown

story and basement brick and steel building 60 x 100 ft. and 50 ft. in height to the peak of the roof and is served by a 5-ton electric traveling crane with a runway 30 ft. above the floor. Turnings are hauled to the building from the various manufacturing departments in side dump trucks pulled by storage battery tractors. Usually a tractor draws two trailers each loaded with 500 lb. of turnings.

Oil Is Recovered

The long turnings are dumped in a pile on the concrete floor and left there half a day to allow the oil to drain off, the oil passing through a drain in the floor to the basement. After much of the oil has been recovered in this manner, the turnings are removed with a magnet on the overhead crane and dropped at the side of a hopper level with the floor and are shoveled into the hopper which feeds into the crushing machine located in the basement. In this crusher driven by a 40-hp. motor the long turnings are broken up into small pieces, few of these pieces being over 2 in. long. From the crusher the scrap passes over a short bucket conveyor to a bucket elevator, which carries it to near the top of the building and drops it into a steel bin of about 2 tons capacity.

From this bin the scrap goes to an oil extractor in which the remaining oil is removed. After the oil is extracted by the rapid revolution of the scrap, the scrap container in the extractor is lifted out by an air hoist attached to a jib crane and the contents are dumped into a riddle. Pieces of scrap that have passed through the crusher without being broken to small enough sizes are removed from the lower end of the riddle. The small pieces pass through the riddle to a bucket elevator in the basement, which carries the scrap up near the roof and discharges it into a horizontal conveyor, which delivers it to a chute that passes out through the side of the building and over a railroad siding, and the material is discharged through the chute into a car. If a car should not be on hand for loading, the scrap is turned into another chute that discharges it into a storage bin on the floor, and when a car is available the scrap is shoveled from this bin through the floor onto a conveyor in the basement and is again elevated and discharged into a car. The system is so arranged that when soda chips are handled, these, instead of going through the oil extractor, are delivered directly to the riddle.

The oil from the floor drain and from the oil separator passes through oil lines into a 500-gal. tank in the basement and through a wire screen strainer. From this tank it is pumped underground to the oil house a short distance away, filtered and placed in 500-gal. tanks, from which it is pumped back to the various manufacturing departments for use. A separate oil extractor of smaller sizes than are used for the turnings is provided for removing oil from brass chips. This oil passes into a separate tank, where it is metered to keep a record of the oil consumption, and is then discharged into the main tank. About 700 gal. of oil is salvaged per day.

FORM 2701
50M SETS 2-22 O P CO
COPY TO FOLLOW MATERIAL

SCRAP TRANSFER No 229823

DATE 9-11-23 Pressing Radiator
PART NAME Splash shield moulding LH PART NO. 54450

ORDER NO.	LOT	ON OPR. NO	EMPLOYEE NO.	FROM DEPT.	CHARGE DEPT.	QUANTITY
	402	3		J-22	✓	8

NATURE OF DEFECT: Cracked in forming — OPERATIONS COMPLETED: 8

SENT TO	KIND OF MATERIAL	TOTAL WEIGHT	WEIGHT EACH
C-27	S. Steel		

DEFECT DUE TO			x	MATERIAL	
DEFECTIVE MATERIAL RETURNED TO SUPPLIER		DEFECTIVE MATERIAL OUR FOUNDRIES		LABOR	
DEFECTIVE MATERIAL NOT RETURNED TO SUPPLIER	✓	EXPERIMENTAL		SCRAP VALUE EA.	
DEFECTIVE WORKMANSHIP		LOST		SCRAP PER LB.	
DEFECTIVE DESIGN		OVER PRODUCTION		LOSS ACCT	
CHANGE IN DESIGN		SERVICE STOCK		INSPECTION 2-32	
FOREMAN H. A. Hakum II.				INSPECTOR Franklin	

When Material Is Ordered to the Scrap Department, the Inspector Fills Out in Quadruplicate a Scrap Transfer Form. One copy goes to the planning department, another to the accounting department, a third to the scrap salvage department and the fourth is retained by the inspector

Other Grades of Scrap Sorted

Various grades of scrap other than turnings are sorted in the salvage department and placed in storage bins having a capacity of a carload or more and located along one side of the building. The scrap is allowed to accumulate in these bins until there is enough of one grade to make a full carload. Above each bin is a chute extending out to the side of the building and over the loading track. When a car is to be loaded the material is handled to the chute with the overhead crane.

Under the system adopted, handling in small lots in motor trucks is eliminated, all iron and steel scrap being shipped in full carloads except portions of certain grades that the company uses in its own foundry. After the oil is extracted, brass scrap is placed in steel barrels and sold.

A complete record of scrap that is ordinarily produced in manufacturing operations, such as borings and



Turnings Are Shoveled into a Hopper Under the Hood that Appears in the Foreground and Pass Through a Crusher in the Basement. From the crusher the broken scrap is delivered by a bucket conveyor and bucket elevator to the bin at the left and from this it is shoveled into the oil extractor that adjoins the bin. An air hoist lifts the scrap container from the extractor and dumps the scrap on to a riddle along the wall back of the extractor. The material reduced sufficiently in size passes through the riddle to the basement and up the bucket elevator adjoining the wall and then is received by a horizontal conveyor that delivers it into the hopper at the corner of the building, through which it is discharged through a chute into a railroad car on a siding outside

turnings, is not kept, but forms are provided for keeping a record of all material that is sent to the scrap salvage department because of defects that develop during manufacturing operations. An inspector fills out quadruplicate copies of a scrap transfer form for each lot of material he orders scrapped. One copy of this



The Elevator at the Left and the Bin Which Serve the Oil Extractor in the Foreground



On One Side of the Building Are Bins for Various Grades of Scrap Other than Turnings and Above Each Bin Is a Chute. This scrap is handled by means of the overhead crane and a lifting magnet and is dumped through the chute into railroad cars outside

goes to the planning department, one to the accounting department, one follows the scrap to the scrap salvage department and the fourth stays on the inspector's book. These scrap transfer tickets show the department from which the scrap came, the part name and number, quantity, nature of the defect, kind of material, number of operations performed on the piece before it was scrapped, as well as supplying other data.

Efficiency of Standardization in Germany

A striking example of the efficiency of national standardization as it has been developed in Germany is cited by Dr. A. P. Agnew, secretary of the American Engineering Standards Committee in the case of a rush order placed with German manufacturers for 200 locomotives for delivery to Russia. "Production of different parts was allotted to 17 different manufacturers to be produced strictly upon the plan of interchangeable parts, no one manufacturer making a complete locomotive. No serious practical difficulty was encountered in filling the order. The inspectors made a particularly striking test of the feasibility and accuracy of the plan by ordering a complete locomotive to be assembled from parts chosen at random from the parts furnished by the 17 manufacturers. It proved to be ready for service immediately after assembly without necessity of disassembling for readjustment."

The appearance of consulting engineering firms specializing in standardization work is an interesting development of the last few years. There are now five such firms in Germany. This work is closely connected with industrial or efficiency engineering, in which there is now great and growing interest in Germany. In general, it appears to be much more closely connected with the movement for industrial standardization than is the case in this country. The largest of these firms devotes about half of its time to standardization work, employing a staff of over 40. They have as their clients trade associations as well as individual firms.

One of their clients is the trade association representing the motor vehicle industry. In this work they perform many of the services that would be done by an ordinary headquarters standardization staff.

Of the companies which are their clients, some maintain their own standards bureaus, which take care of the greater part of the detailed work, leaving to the consulting firm only the more important and difficult questions. In other cases, the consulting firm does a large amount of the detailed work.

Another most interesting development is the work of consulting engineers on trade catalogs for companies. This is particularly significant, as it is carrying standardization a step farther than is usual, by introducing it into the sales organization and sales policy. In this, careful consideration is given to the question of limiting the number of types, ranges and sizes offered for sale, placing proper emphasis in the catalog on these particular items on which the company wishes to concentrate, and, in general, in featuring and often advertising the relation of the firm's products to the standardization movement.

More Horse Power

At the National Horse Show in New York a team weighing 3575 lb. moved a load requiring 2450 lb. tractive effort over a distance of 12 ft. in 6 sec. They developed sufficient power to start a truck load of 32,000 lb. on a level granite block pavement. This power would be sufficient to keep a load of 200,000 lb. moving on such a pavement after the start had been made. This record of 2450 lb. tractive effort exceeds the 2400 lb. record made at Ames, Iowa, last summer.

E. B. Bowman, advertising manager Carborundum Co., Niagara Falls, was the guest of the New England Foundrymen's Association at its December meeting held the 12th at the Exchange Club, Boston. Mr. Bowman's talk was on Niagara Falls power development, the manufacture of carborundum and the application of carborundum in grinding and foundry abrasives.

Properties of Steel Containing Tellurium

Experimental Heat of Cast Steel—Forging Qualities and Structure—Tellurium Present as a Telluride

BY DR. G. B. WATERHOUSE AND I. N. ZAVARINE

TELLURIUM is not one of the elements used for alloying purposes with steel, and references to its use or occurrence in this capacity are extremely scarce or non-existent. The authors, therefore, welcomed an opportunity to investigate a steel containing this element, and believe a short account of the results obtained will be of general interest. Tellurium is a silver white solid with metallic luster[1]. In the crystalline form it is very brittle and easily powdered. There has been some dispute regarding the atomic weight, but it is commonly accepted as 127.5 (O = 16). The melting point varies slightly according to different observers from 437 to 455 deg. C.,[2] and is usually given as 452 deg. C. The boiling point is given as 1390 deg. C., and if air is excluded it gives a golden yellow vapor. In the presence of air it burns with a blue flame tinged with green and gives white vapors of TeO_2. The specific gravity of the crystalline variety is 6.27. There is also an amorphous form with sp. gr. of 6.015, which changes to the crystalline variety on heating.

It is closely associated with selenium and in the periodic table is placed with oxygen, sulphur and selenium. In its chemical reactions it is similar to sulphur. For much of our knowledge regarding its chemistry we are indebted to the work of Dr. Victor Lenher of the University of Wisconsin and his students.[3] Tellurium is insoluble in water or hydrochloric acid, but is dissolved by nitric acid or concentrated sulphuric acid. It does not tarnish in moist air, and this property may be of commercial importance. At present the uses of the metal are very limited, and the production is small, the possible annual supply from the copper refineries being only about 125,000 lb.[4] Among the compounds the tellurides of gold have been known to metallurgists for many years, and it is of interest that a compound FeTe has been made, and its heat of formation determined. This telluride of iron will scratch glass, is rather tough and is not altered by dry air. It is formed by an exothermic reaction, and can be readily made at a low red heat.

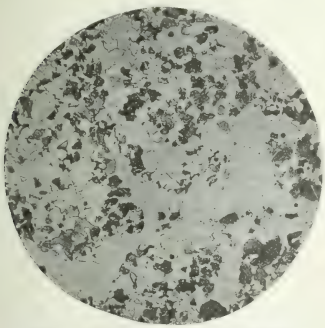


Fig. 1—Steel Containing Tellurium. × 200

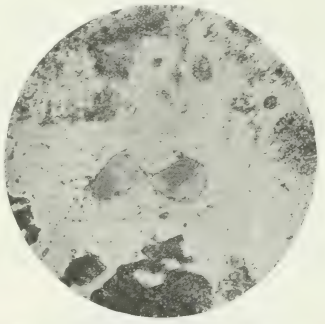


Fig. 2—Same as Fig. 1 at Higher Magnification or 1000 Diameters

Making of the Steel

The material investigated came from a 3-ton heat of steel made in the electric furnace of the Bonney-Floyd Co., Columbus, Ohio, according to their regular practice of making steel for steel castings. When about 1000 lb. of metal had been tapped into the ladle the addition of metallic tellurium was made without any stoppage of the pouring. In other words the tellurium was added to the ladle when the bottom was well covered with steel. The amount was 20 lb., and the results of analysis show that about 40 per cent was retained by the metal. Throughout the pouring a whitish yellow vapor was observed coming from the top of the metal and slag in the ladle, and from the stream of metal entering the molds. The tellurium was supplied by the United States Smelting, Refining & Mining Co.

Properties of Annealed Castings

The analysis of the steel was as follows:

	Per Cent		Per Cent
Carbon	0.24	Sulphur	0.039
Manganese	0.64	Silicon	0.32
Phosphorus	0.039	Tellurium	0.12

Two sample of the cast steel after annealing in the usual way gave the results shown below:

Yield point	45,000	42,850 lb. per sq. in.
Ultimate stress	70,000	71,750 lb. per sq. in.
Elongation in 2 in.	11.5	16.0 per cent
Reduction in area	13.5	18.5 per cent

Structure of Annealed Steel

These results show somewhat lower ductility than would be expected in a well-annealed steel casting with carbon 0.24 per cent, and an explanation was sought in the microstructure. Normal magnification shows the structure illustrated by Fig. 1, and the arrange-

*Professor of metallurgy and instructor in heat treatment, respectively, Massachusetts Institute of Technology.

ment of the pearlite is evidence of good annealing. Examination with higher magnification clearly shows the presence of a new non-metallic impurity closely associated with the well-known constituent generally called manganese sulphide. This is well shown in

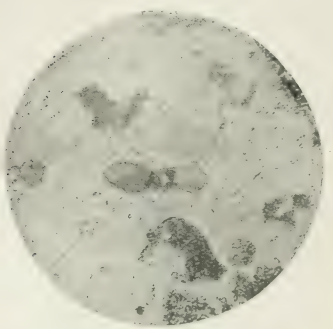


Fig 3 Manganese Sulphide and a Tellurium Compound, x 1000

Fig. 2 taken at 1000 diameters after etching with picric acid. In the two areas near the center of the picture may be seen the dove-gray manganese sulphide, and with it is also seen the new constituent which is much lighter in color. The authors believe this constituent is due to the tellurium, and provisionally at least it can be called telluride of iron. This new constituent is also clearly shown in Fig. 3, taken at 1000 dias. Reference may be made to a previous article by Professor Arnold and one of the authors,[4] where a steel was described and illustrated having manganese sulphide and sulphide of iron existing together in somewhat the same way as these two sonims, using Henry Hibbard's term for non-metallic impurities.

Properties and Structure of Forged Steel

It was thought advisable to see how the telluride would behave under mechanical work, and a piece of the

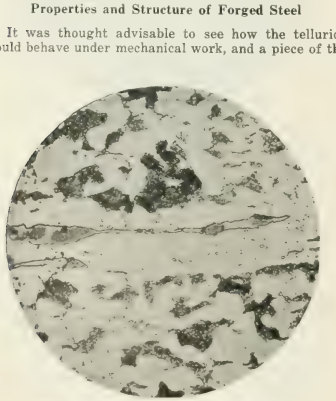


Fig 4 Forging Effect on Steel Containing Tellurium, x 1000

annealed casting was heated and forged under a light steam hammer, the amount of reduction being about 65 per cent. The steel forged well, giving no evidence of red shortness. There was enough material for four short test pieces, and they were tested after the following treatment:

No. 1—As forged.
No. 2—Heating uniformly to 1575 deg. Fahr., cooling in air.
No. 3—Heating as before, cooling slowly in furnace.
No. 4—Heating as before, quenching in oil and reheating to 1100 deg. Fahr. and cooling in air.

The results of the tensile tests are given below:

No.	Treatment	Yield Point Lb. per Sq. In.	Ult. Stress	Elon., Per Cent in 1 In.	Redn. of Area, Per Cent	Brinell No.
1	As forged	59,250	83,250	17.5	38.7	179
2	Heated 1575 deg. Fahr., cooled air	58,500	82,500	19.5	44.5	170
3	Heated 1575 deg. Fahr., cooled furnace	48,120	77,000	19.0	42.5	143
4	Heated 1575 deg. Fahr., quenched oil, drawn 1100 deg. Fahr. ...	65,000	88,500	21.0	48.1	179

On examination with the microscope the telluride was found to have been drawn out by the forging action fully as well if not better than the manganese sulphide, as is clearly shown in Figs. 4 and 5, both taken at 1000 diameters.

Summary

A careful examination of a steel containing 0.12 per cent tellurium shows the presence of a non-metallic constituent that is probably a telluride, closely associated with manganese sulphide. When the steel is forged this telluride does not break up but elongates

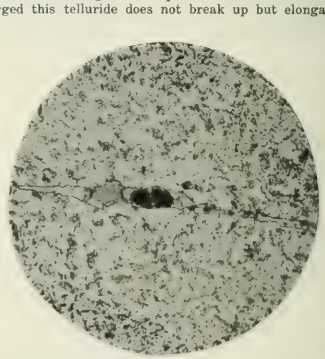


Fig. 5—Another Example of Effect of Forging This Steel, x 1000

fully as well if not better than manganese sulphide. The steel is lower in ductility than normal material without the tellurium.

The results would indicate that it might be well to investigate the influence of tellurium in regard to the free cutting or free machining properties of the steel, to see whether this element could be used instead of sulphur for that purpose. In conclusion the authors would express their indebtedness to Dr. G. H. Clevenger and F. S. Mulock of the United States Smelting, Refining & Mining Co. for the opportunity of investigating this interesting material.

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Motor-Operated Centrifugal Pumps

Steel Plant Water Supply Problems—Test Data and Cost Comparisons—Definite Motor Guarantees Essential

BY B. A. CORNWELL*

IN the steel industry, one of the most important factors in maintaining and increasing production is the efficiency and the reliability of the water supply system, which we feel should be electrically driven.

Centrifugal pumps are especially suited for handling large quantities of water quickly and in many plants this type of pump has already been adapted for supplying water under low heads for blast furnaces, condensers, cooling water systems, etc. A centrifugal pump consists primarily of a water wheel revolving in a case. The water enters at the center of the wheel and is discharged from the periphery through the discharge nozzles of the pump case. In this type of pump, the velocity imparted to the water by the impeller determines the head. We then deduce from this the following general laws governing the action of all centrifugal pumps:

1. The head varies as the square of the speed.
2. The quantity of water pumped varies directly as the speed.
3. The power required to drive the pump varies as the cube of the speed.

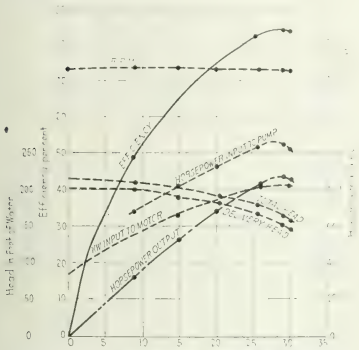


Fig. 1—Test of Allis-Chalmers Centrifugal Pump Gave Results Shown Above

Test Data on Allis-Chalmers Motor-Driven Centrifugal Pump. Rated capacity, 25,000,000 gal.; single-stage, double-suction type; suction and discharge nozzles each 24 in. diameter; slip ring induction motor of 1000 hp., 3 phase, 25 cycle, 750 r.p.m.

Delivering (Gal.)	Input to Pump (Hp.)	Total Head (Ft.)	Efficiency (Per Cent) Pump	Motor
10,000,000	700	210	52.5	91.8
15,000,000	825	205	64.5	92.6
20,000,000	910	196	74.0	93.0
25,000,000	995	183	81.0	93.2
30,000,000	1030	165	84.0	93.2

Performance and operation of typical centrifugal pumps as used in steel plants can best be seen by referring to the characteristic curves shown in Figs. 1 and 2, obtained from tests recently made on a 1000 hp., 6600-volt wound rotor induction motor driving a 25,000,000-gal. centrifugal pump. This pump is of the single stage double suction type with bottom suction, to operate against a total head of 165 ft.

Data and test results obtained are shown in the table. The motor driving this pump is designed for a temperature rise of 40 deg. Cent. (72 deg. Fahr.) with full load for 24 hr. and a temperature rise of 55 deg. Cent. (99 deg. Fahr.) with 25 per cent overload for 2 hr. immediately following a full load run of 24 hr.

As can be seen from these curves, with the discharge valve closed the efficiency is zero, since no useful work is being done. The horsepower required under this condition is consumed in friction and dissipates itself as heat, with the result that an electrically driven pump of this type cannot be operated with its discharge valve closed for more than 15 or 20 min. without overheating. As soon as the discharge valve is opened, the capacity increases as the efficiency increases, until it reaches a maximum of 30,000,000 gal. per day at an efficiency of 84 per cent. This particular pump has been in operation since 1918 and the results shown by this test indicate that it is still capable of delivering the same capacity as obtained five years ago and that this capacity is in excess of the guaranteed capacity.

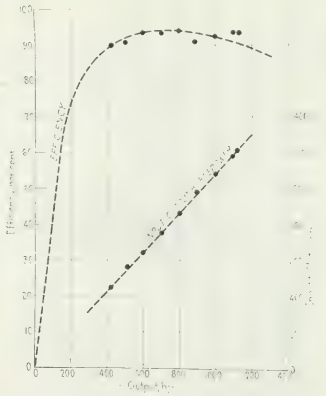


Fig. 2—Curves for 1000-Hp. 6600-Volt Motor Driving a 25,000,000-Gal. Centrifugal Pump. Maximum efficiency lies between 600 and 800 hp. output

Influence of Variation in Frequency

In making tests on a.c. motor driven pumps, we often find that there are certain changes in the a.c. motor characteristics due to changes in the frequency and voltage of the generating station. When there is a change from normal conditions there will be a loss in efficiency unless there is a corresponding change in the other variables to restore the original values. For instance, a drop in frequency means increased density of the field with lower efficiency and increased heating. If, however, there is a corresponding drop in voltage at the same time, the motor will operate under normal density, but with decrease in output proportional to the

*Electrical engineer Carnegie Steel Co., Youngstown, Ohio. This is an abstract of a paper read before the Buffalo convention of the Association of Iron and Steel Electrical Engineers.

decrease in the speed, which lowers with the frequency.

In comparing installation and other costs, assuming 1000 hp., and the turbine-driven installations with starters, condensers and auxiliaries, the author used a figure of $15,400 for an induction motor driving pump unit. With the synchronous motor, the figure was $15,800. With the steam turbine-driven pumping unit, the figure was $38,000. Buildings, wiring and piping were not included.

Operating cost for 30,000,000 gal. per day at 165 ft. head is given for the steam turbine-driven pump at 0.288c. per 1000 gal. By the motor-operated centrifugal pump, the figure is given as 0.238c. per 1000 gal.

Better Efficiency and Lower Costs

Investigations have shown that, in every case of the many instances where steam pumping equipments have been entirely replaced by electric driven pumping outfits, the efficiency and the operating costs have been greatly improved. A large number of steam driven city water pumping stations have been electrified, with the principal idea of getting better efficiency and more reliable service at less cost. However, in connection with the electrically driven pumping stations, steam driven pumps in many cases are necessary to insure a continuous supply of water in case of failure of the electric power.

It is generally conceded that, where electric power is available, there is no satisfactory comparison between the electric motor and gas or steam engine drive for centrifugal pumps. The first cost and cost of maintenance and attendance are considerably less; the simplicity and the reliability much superior and the power cost ranges from 25 to 50 per cent less, as has been demonstrated from tests.

Discussion

G. H. Cramer spoke particularly of a hard pump problem in the case of quenching cars of coke at the by-product ovens. A tank of 10,000 gal. capacity was emptied and had to be refilled on a 3-second cycle. This was particularly hard on the starting equipment for the pump. By using motors for this purpose, enough was saved in maintenance and repairs in a single year to pay for the installation of the motors. For this service, a Westinghouse engineer stated that self-starting, synchronous motors, designed for high speed and operating with thermostatic control, would be very useful.

R. G. Nye, Buffalo Steam Pump Co., pointed out that the difference between a motor designed for 50 deg. temperature rise and one designed for 40 deg. was a minor consideration, provided a definite guarantee was obtained as to what the motor would stand. It was brought out that the 40 deg. motors were definitely designed for an overload of 25 per cent maintained for 2 hr. without exceeding the temperature rating. When the temperature figure was raised to 50 deg., in most cases this was not accompanied by any definite guarantee as to overload capacity, either in percentage or time. Consequently, the condition became less satisfactory than before. It does not matter to the pump manufacturer which standard prevails, provided the definite overload capacity goes with the temperature standard. Without this guarantee it frequently becomes necessary to instal the next larger size motor.

Board to Facilitate Time Study Work

The time-study board illustrated, which is the invention of T. R. Hough and is intended to facilitate the work of time study observers, has been placed on the market by the Stein & Ellbogen Co., 31 North State Street, Chicago.

In addition to providing a convenient writing surface for holding the time study record blank, the board holds the watch in such position that the latter may be operated with the left hand as shown, the board resting on the left arm and leaving the right hand entirely free for recording the figures. The lock holder for the watch holds the watch securely in the position most convenient for operation and protects the watch against breakage. The inclination of the watch is intended to facilitate accurate reading and to prevent glare on the face of the watch.



Time Study Board. The watch may be operated with the left hand and the board held as shown

The movable clip permits shifting the record blank on the board, clip it at either the top or at the side, and always have it in the position most convenient. The board includes an envelope for the storage of schedules of standard speeds and feeds and other working data. With reasonable treatment it is said that the woodwork will not warp.

Wages of Foundry Employees in Ohio

Third-quarter wages of employees in 134 foundries reporting to the Ohio State Foundrymen's Association compare with those in the July report as follows: An increase per hr. for common labor of 0.028c., for pattern makers, 0.102c.; for core makers, 0.001c.; a decrease for brass molders of 0.020c. and for iron molders, 0.045c. The total of employees represented in the October report is 8163, living in 59 communities.

It was revealed in a recent survey made by the National Industrial Conference Board that American labor is receiving higher "real" wages today than at any time since 1913, not excepting the peak period of 1920. This may be attributed in part at least to the decline in cost of living, which in the survey made last July was 20.8 per cent below the peak prices of 1920.

Germany's Foreign Trade in Steel

Germany's exports of steel in August are reported by *Stahl und Eisen* to have been 132,789 metric tons, making the total to Sept. 1, this year, 1,241,052 tons as compared with 1,645,104 tons for the same 8 months last year. Imports were 221,112 tons in August, which brings the total to Sept. 1, this year, to 1,339,085 tons, compared with 1,424,483 tons to Sept. 1, 1922.

The H. P. Smith Co., Westfield, Mass., manufacturer of radiators and boilers, has awarded an increase approximating 10 per cent in wages of molders. The day wage scale is now $7.20, contrasted with $6.60 and extras which brought the total up to about $7 the past year. Piecework molders will receive a corresponding increase in pay. The company employs 300 molders, and plans to increase this number early next year.

Present Status of Pressed Metal Industry

History of Industry and Causes Retarding Expansion in Proportion to Possibilities—Application of Engineering to Sales a Basic Factor

A METHOD for the stabilization of the pressed metal industry, through the development of the function of engineering as applied to the sale of pressed metal products, was presented in a paper under the title of "Pressed Metal Engineering: Some Principles and Examples," by Douglas P. Cook, president Boston Pressed Metal Co., Worcester, at the machine shop practice session of the annual meeting of the American Society of Mechanical Engineers, held Dec. 6, in New York.

Mr. Cook's paper dealt more particularly with the problems of the so-called jobbing pressed metal industry. The fundamental causes and supplementary conditions affecting the status of the industry and handicapping the adoption of a policy of sales expansion into relatively undeveloped fields were vividly outlined. The importance of the engineering function and the key position of the sales engineer in extending the market for the products of the industry were emphatically brought out. In addition, Mr. Cook's paper was felt to present to those not in the industry a forceful sales talk on the possibilities of economies in the employment of pressed metal parts to their own devices.

At the outset it was pointed out that there was no mechanical field of equivalent scope and importance that so much needs and will so richly repay unsparing critical analysis of its present status and conditions as what has come to be known as the pressed metal industry.

Producing Groups Classified

"Broadly speaking," said Mr. Cook, "a thorough study of the application of press processes would cover three general producing groups, the so-called jobbing industry, comprising those plants that manufacture special pressed metal parts to order; the several distinct groups that have gradually evolved as a result of intense specialization of the press process, and the scattered field of independent manufacturers of other than purely press products, who often devise and employ the most unusual and striking exemplifications of the process. In addition there is the collateral field of pressed metal equipment, the field of raw material, the detailed study of technical methods of production in the industry itself, tool and machine design, and the collateral processes of annealing, heat-treating, machining and finishing. This, it was stated, is the general scope of the field of "pressed-metal engineering," a term not yet in general use, and a field that even today lies almost unexplored.

Of these producing groups, the so-called "jobbing" pressed metal industry was said to be made up of about 75 major plants and about 300 minor ones, if all be included who solicit press work whatever their principal line, with an annual volume of probably 40 to 50 million dollars. It is legitimate therefore, he said, to call this a major industry, for such it ranks in the importance of its service even though, because of its peculiar character, it is difficult, to determine its exact membership or annual turnover, with accuracy.

A major claim to interest in the pressed metal process was pointed out to lie in its wide diversity of application, with the result that no individual or particular group can be said to be abreast of its progress. The flexibility of application of the process, which has pervaded hundreds of industries in countless forms, while exceedingly valuable to industry at large, was emphasized as containing both advantages and disadvantages to the jobbing industry. The relatively rapid growth of the industry was stressed, this growth being said to be also uneven and almost uncontrolled. "It was left primarily to the jobbing industry alone," said Mr. Cook, "unaided by the usual benefits of organization or by the cooperation of collateral interests, to discover new fields and applications for the process, new outlets and markets for its products. It is the comparative failure of the industry as a whole adequately to solve this problem that has caused several existing conditions that must be remedied before the industry can fully come into its own."

Decentralized Growth of Industry Unfavorable

A fundamental cause contributing "to what might almost be termed the lethargy of the industry in seeking to extend and stabilize its market," was said to be "in reality—inherent in the peculiar empirical and individualistic method by which the industry reached its present stage." Other important causes given were the contemporaneous growth of the automotive industry, and the effect of the war on the industry.

"Tracing from early stages the actual growth of the mechanical knowledge, which developed, without concentration or orderly dissemination," said Mr. Cook: "we find that when a few original companies had accumulated knowledge and facility in handling the new process, practical mechanics, tool makers and foremen split off to form new companies. In these the same process would be repeated, slowly acquiring a store of practical knowledge that would in turn be split off and conveyed to another center of growth. Each remaining company continued on its way, increasing its own store of knowledge and experience, while the new companies, as rapidly as they were formed, entered new fields and developed new practices, based on their original accumulation of knowledge.

"Actually, of course, the operation of this simile was controlled and regulated to a degree by the normal interchange and adjustments of every-day business, but the deduction is inescapable that owing to this particular method of development there was a constant tendency toward the partitioning of new knowledge of the developing art, which resulted in a constant decentralizing of important, even indispensable, information.

"As a natural result of this tendency, the comparative progress of the various specialty companies was uneven and unbalanced. Some rapidly placed themselves in position to perform original redevelopment or redesigning work and to handle various unique problems of economical, interchangeable, quantity production, while some could not, and did not even pretend to achieve any one of these things."

It was also pointed out as worthy of note that the individuals forming new centers of growth were in many cases the practical or administrative mechanics of the relinquished organization, men untrained in the field of management, accounting, production control, and the modern principles of selling so that the growth of the new companies was sometimes slow and difficult until the necessary managing and sales experience had been accumulated or finally provided for by the addition of that type of personnel, after which rapid and comparatively safe progress became possible.

Another check on general growth was said to be that here and there able and efficient companies had pioneered into a new field, established themselves therein with a standard production and withdrew from the jobbing or specialty group, thereafter abandoning original or development work, except as it contributed alone to their own particular field of production.

In addition to these main inherent tendencies result-

ing in uneven and retarded progress, the confusion was still worse, it was said, because the effective growth of the industry has occurred mainly within the last 15 years, a period of intense effort resulting in a tremendous burst of redevelopment of processes, methods and equipment, occasioned by the demands of automotive design and production. The automotive industry, it was stated, absorbed an important proportion of the free and constantly expanding press capacity of the country and supplied in return the principal impetus for the rapid growth of methods and equipment. The effect upon both industries was said to be practically revolutionary. The pressed metal industry opened suddenly to the automotive engineer a limitless field, still but half explored.

"Upon the smaller pressed metal industry, the effect was still more impressive and important. The intense pressure of the automotive demand tended to prevent the creation or growth of any self consciousness and resulting cooperative spirit in the industry as such. It was too intensely occupied with its efforts to meet the immediate and broadening situation, with the inevitable result that its attention was almost exclusively centered upon the customer industry whose demands were most immediate and insistent, with only occasional and spasmodic efforts to apply to the needs of all other industries the knowledge and ability produced by having served the one to the full extent of its insistent demand."

Influence of War Period

"The war effort of the industry, a fascinating study in itself," said Mr. Cook, "only exaggerated and intensified these conditions, and the receding wave of its exigent demands lent force to the already logical pressure and economic certainty that the industry must now accept its opportunity to broaden its fields and markets by intensive effort into industries comparativly undeveloped."

It was given as his belief that if all potential customer industries had been assisted in their development proportionately to the automotive there would today be little difficulty for a jobbing industry double the size of the present to support itself. The same assertion would hold good, he said, if, in the near future, pressed metal might be introduced into all other possible customer industries in the same proportion of feasible application as it has into the automotive industry today.

"The road from the pressed metal industry to the automotive plant and back is broad and well traveled," said Mr. Cook. "Relatively the approaches to hundreds of other potential customer industries are but vague and unbroken foot paths. In this condition lies not only the great present opportunity of the industry, but a coming demand for a new type of highly trained engineer to do an indispensable work."

Supplementary Conditions Handicap Expansion

Supplementary to the major causes of the failure to expand the possibilities of the industry there are, he said, a number of general conditions that affect its status and seriously handicap its efforts to adopt the logical and seemingly imperative policy of sales expansion into relatively undeveloped industries.

Among the handicaps cited was the lack of popular or general recognition of the large contribution made by the industry to modern civilization, resulting in absence of consumer interest and support. Another was the failure of the industry to develop engineering standards or to publish adequate technical information for the assistance and guidance of possible customers.

It was stated that to a great extent the industry has been content to sit back and await customer inquiries, The losses caused by acceptances of customers' engineering were outlined, and in this connection Mr. Cook said: "Not informed as to all the possibilities of the situation, the customer may request quotations on some crude original design, which perhaps may take but a fraction of the advantages of design or function that would have been disclosed by proper analysis and expert consultation. Such inquiries also often contain the theoretical and useless specifications of tolerance, the attainment of which adds unnecessarily to production costs and the large total of actual loss entailed by the lack of proper sales engineering investigation. In such cases, too, the time and expense of preparing estimates and quotations is wasted.

"The time is here when the alert manufacturer will call as freely and promptly upon his pressed metal engineer to consult on problems of design and construction as for years he has called upon other branches of the engineering profession. Also the day is here when fewer companies care to quote blindly to a blueprint calling for limits of 0.0005 in. variation, nor on designs whose functions or specifications or use they have little or no knowledge.

Separating Engineering and Production Functions

"The expansion of sales engineering in the industry will in time remedy another and related handicap, the lack of definition and separation of the functions of engineering and of production. Originally there was no acknowledgment of the necessity of any engineering. A sample or sketch was submitted to the 'practical' man of the organization, who proceeded to make it. The usual customer regards the purchasing of pressed metal parts purely as a matter of competitive selection on a basis of price or first cost. If he knew the real facts, he would realize that apart from first cost there is great difference in the engineering service that he may receive, and that his selection should be guided by that fact and by the scrutiny of ultimate cost and economy." That the work of the pressed metal sales engineer is not only to be recognized but will be demanded and willingly remunerated by the customer as the primary essential to successful production was a belief expressed.

The question of ownership and removability of tools was also said to be a handicap. On this Mr. Cook stated: "It is demonstrable to a fair-minded customer that in paying a preliminary 'tool charge' or 'tool expense' or 'cost of tools' he is not thereby purchasing a physical asset, removable or transferable to his order. He is in effect purchasing primarily a service covering not alone the physical construction of the tools, but also the necessary preliminary work involved in redesign and redevelopment and the actual designing of the tools; and that his payment of such a charge is but his proper contribution for the services and toward the maintenance of an organization competent to perform the specialized character of work required."

Another hindrance to extensive redevelopment work mentioned was the difficulty of protecting exceptionally successful redevelopments, many of which represent nothing patentable either in process or result, but which nevertheless represent distinct and often valuable improvements over current practice.

Advocates Individual and Cooperative Research

That the greatest rewards of the next decade will accrue to those that develop with greatest intensity the waiting field of redevelopment, was emphasized, and it was pointed out that there has begun in the industry an intensive search for articles and parts that can be advantageously redeveloped. This work, it was indicated, will probably be carried on both cooperatively and individually by separate companies. It was brought out that a group in the industry, the Pressed Metal Trade Extension Council, has been supporting for some months a modest campaign of national advertising, aimed to draw out suggestions for possible redesign. The early results of this were said to have elicited hundreds of suggestions. Similar search by individual companies is already routine daily work, but on the whole it is spasmodic. Both the cooperative and individual research should be reinforced, said Mr. Cook, by persistent advertising, publishing specific economies obtained and emphasizing possibilities of further application.

Establishment of engineering standards for the industry was regarded as imperative, and also making available scientific investigation of qualities of materials most suitable for specific operations and results. Publicity to stimulate a broad consumer interest and demand was also emphasized as necessary.

(*Concluded on page* 1625)

Strip Mill Designed for Ease of Control

Arrangement of Thirteen Stands in Two Parallel Rows and Completeness of Motor Drive Are Features

THOROUGHLY representative of the latest thought in mills of its class, a new 20-16-in. strip mill recently has been completed and placed in operation by the West Leechburg Steel Co., Leechburg, Pa. It means not only that the company can now boast of a mill second to none in the country in point of efficiency and capacity but, as it supplements 12-in. and 9-in. units, it also means that the range of sizes produced by the company is widened.

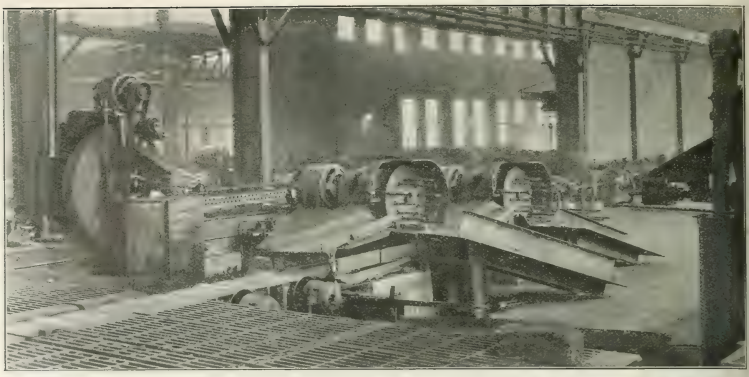
Hitherto, this company has not done much in the wider material, which finds heavy use by the automotive industry for underframes, brake drums and fenders; the new mill permits it to enter that field. The mill is designed to roll strips varying from about 18 in. to 6 in. in width and ¼ in. and lighter in thickness, in either coils or cut lengths. As the 9 in. mill rolls material as narrow as ¾ in. in width, the full range of sizes now is from 18 in. down to ¾ in. and in practically any thickness required. Electrically driven throughout, the new mill in early tests completed the cycle from the slab to the coiled strip in less than a minute. The mill buildings are spacious and the facilities for handling material entirely modern. As the rolling mills are largely automatic costs should run low.

The section of the building containing the mill proper is 660 ft. long. This permits of storage and loading space, as well as for the generator and motor room for driving the last four stands of rolls of the finishing mills. A removable roof over the portion of the room occupied by the direct-current motors allows them to be handled by the mill crane. Another section of the building contains the continuous gravity discharge type furnaces, billet and finished steel storage space, pickling shop, bundled room and shipping shed.

The two furnaces, built by Alexander Laughlin Co., Pittsburgh, are producer gas-fired and are served by



Control of All Electrical Apparatus Is Assembled On a Desk With Push Buttons and Rheostat Hand Wheels, While Meters Inform the Operator How the Motors Are Acting. In the oval, where this desk appears at *A*, is shown the group of drives for the roughing mill



Reels Can Be Operated Singly or Doubly. The use of the said permits directing the strips alternately to the two reels. At left is one of the shears, the other is mostly off the cut, at right

motor-driven below-floor type pushers of heavy, rugged construction. Cold slabs are conveyed by magnet crane from the adjacent storage yard and placed on the pushers at the rear of the furnace. The charging is done largely by one man seated at the motor control.

The 20-in. roughing mill contains seven stands of rolls in a continuous line. The first and fourth are horizontal edging stands; the sixth a vertical edger and the second, third, fifth and seventh stands are flattening passes. Located between the furnaces and the first pass of the roughing mill is a horizontal slab shear for cutting hot slabs. A steel rope transfer table, which shifts the hot bar from the last pass of the roughing mill to the first pass of the finishing mill, will if so desired deliver the piece upside down. It is operated by a 20-hp. 230-volt series motor.

The 16-in. finishing mill contains six stands of rolls, also in a continuous line, all of which are flat passes. The arrangement of the finishing mills is such that one strip of hot steel may be in two, three or four passes at the same time, the last four stands of mills being quite close together. As the hot strip leaves the final pass of the finishing mill it is conveyed by a roller runout table to the double hot bed for shearing or to the two winding reels, depending upon whether the steel is to be cut to lengths or coiled. The winding reels are at the end of the runout table delivering the steel from the finishing stands and can be operated singly or both at the same time. When both reels are used, the first strip coming through goes to the reel farthest from the finishing stand and the second is introduced to the first reel by the lowering of a skid.

If the steel is to be cut to length a motor-driven kick-off pushes the strip off the runout table to one side or the other, onto the double hot bed, to cool. Ratchet and shuffle bar conveyors deliver steel onto roller tables to be conveyed to finishing shears and thence to piling tables for final disposition.

The mill machinery, all of which was furnished by the Treadwell Engineering Co., Easton, Pa., and the Birdsboro Foundry & Machine Co., Birdsboro, Pa., involves many new features of construction. All mill housings are of steel. Gearing is all of cut steel inclosed in suitable covers to permit running in a lubricant. Mill roller tables are motor-driven and the gears are encased in a box-shaped section which is oil tight.



Partial View of the Roughing and Finishing Mills with Steel in Process. In left foreground is the roof of the motor room

All bearings are of babbitt shell and ring oiling type, except hot bed center runout table, which is of a special design, having each roller driven by a ½ hp. induction motor. Each roller and motor is provided with three ball bearings.

Both the mill proper and all auxiliary apparatus are motor driven. Numbers 1, 2, 3, 4, 5 and 7 stands are driven by one 1500-hp. 3-phase, 2200-volt a.c. motor through a Falk reduction gear set. The countershaft runs at 705 r.p.m. As the distance between passes is such that the hot strip is never in two of these passes simultaneously, no attempt is made to obtain speed adjustment or close speed regulation during the roughing passes. Flywheels are provided, however, with liquid-type automatic slip regulators, to relieve the motor of heavy load peaks.

Stand No. 6 is a vertical edger between stands 5 and 7 and is located close to the latter. For this reason its speed must be adjusted closely with respect to that of stand No. 7, and hence it is individually driven by a 100-hp., 230-volt, compound direct-current motor with an adjustable speed range from 400 to 800 r.p.m.

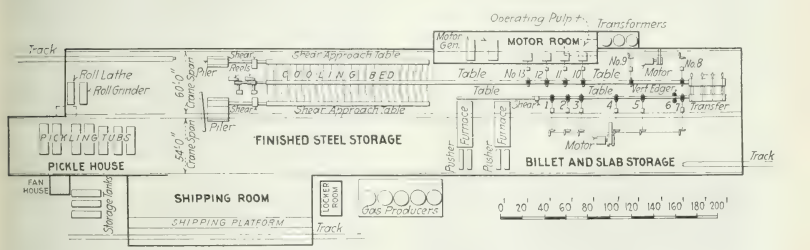
Stands Nos. 8 and 9 are geared to a shaft which is driven by a 1500-hp. induction motor with flywheels the arrangement of the roll stands in the two parallel rows, all within view from the control pulpit.

The Westinghouse Electric & Mfg. Co. furnished and installed the motor-generator sets, mill motors, switchboards and auxiliary apparatus. Three-phase power is supplied by the West Penn Power Co. at 22,000 volts, through transformers built by the Pittsburgh Transformer Co., having a capacity of 10,000 kva. at 2300 volts, secondary. Direct current generated at 250 volts is used on all direct current apparatus.

The buildings were erected by the Bollinger Andrews Construction Co., Pittsburgh. The foundations under mills and motors are unusually massive, and were installed by the Colonial Construction Co., Pittsburgh.

Melting of Sponge Iron

Experimental work on the production of foundry iron from sponge iron in the electric furnace, performed by the Seattle station of the Bureau of Mines, demonstrated that technically, at least, the process is a success, though large-scale tests are necessary to determine its commerical applicability. Such a process



General Layout of the New Strip Mill, Showing Conservation of Space and Building Cost by Running the Steel Back, in the Finishing Mill, Parallel to Its Course in the Roughing Mill

and a slip regulator, similar to the one which drives the first group of roughing stands.

By the time the strip reaches the intermediate stands Nos. 10 and 11 its length has become great enough so that it will pass through two or more of the succeeding stands simultaneously. This means that the speed of these successive stands must be increased in proportion to the elongation, and also that the relative speeds of the stands must be maintained very closely, to avoid either breaking the strip or excessive looping. For this reasons stands Nos. 10 and 11 are individually driven by direct-connected 1500-hp., 240-volt, 125 to 250 r.p.m. compound direct-current motors.

Finishing stands Nos. 12 and 13 are direct connected to 1800-hp., 240-volt, 165 to 350 r.p.m. compound motors. These motors are controlled without automatic speed regulation of any type, the exceedingly close speed regulation being obtained by careful design of the compensating windings and series coils, etc., of the motors and the generators which supply them with power. Two 2000-kw. motor-generator sets are used for supplying current to the d.c. mills and auxiliary motors.

The design of the d.c. finishing mill motors is of special interest, inasmuch as extremely close speed regulation is maintained, regardless of loads or set speeds. The speed regulation of these motors is inherent in their design and no external methods are needed to maintain the very necessary close speed regulation required in the last four continuous stands.

Control of all electrical apparatus is in a gallery centrally located, commanding a view of the entire mill. The control is assembled on a desk, with push buttons and rheostat hand wheels on the flat top, for regulation of the machines, and back of these on an inclined panel are the meters. The field switches are located at either side of the front desk. Ease of control is facilitated by would find application in melting iron in regions remote from blast furnaces, or where establishment of blast furnaces would be impracticable. Sponge iron was melted in batch runs and continuous runs, in various types of furnaces, and under both acid and basic conditions.

The type of furnace found best fitted for the continuous melting of sponge iron is a deep pit furnace with a single electrode and a conducting hearth. The main problems solved were: High recovery of iron, clean separation of the slag, obtaining metal of a high-carbon content, introduction to the metal of silicon and manganese from the slag to eliminate the necessity of using ferroalloys, and, finally, the removal of sulphur. In order to produce the best quality of gray iron, an auxiliary furnace would be necessary to adjust the final composition of the metal.

The Detroit-Ann Arbor section of the American Institute of Electrical Engineers held its monthly meeting, Dec. 7, in the Detroit Edison service building, 2000 Second Avenue, Detroit. Prof. Vladimir Karapetoff, of Cornell University, was the speaker of the evening, demonstrating Einstein's theory of relativity by means of a model which is regarded as a successful attempt to bring this theory to the level of general understanding.

For the fourth consecutive month, employment fell off in Cleveland in November, according to the report of the labor relations committee of the Cleveland Chamber of Commerce. During last month, 98 companies employing 500 or more persons laid off 2548 of their employees. Fifteen companies reported that their working forces would be decreased in December and 12 announced that further reductions would be made.

FERROMANGANESE SUPPLIES

Large Output This Year—Available Supply for 1923 Ample—Spiegeleisen Next to the Record—Ore Imports at Low Ebb

From returns already collected by THE IRON AGE, showing the output of American blast furnaces, it is probable that, while the production of ferromanganese and spiegeleisen in 1923 will not establish a record, the output for the year will rank in third place in the last 10 years. The largest output of both these alloys was in 1918, the last year of the war, and the record for any peace year in the last 10 years was in 1920. This year's production of ferromanganese will, without doubt, rank next to 1920 and 1918.

From present indications the ferromanganese output of the country for 1923 will be close to 240,000 gross tons, and that of spiegeleisen at least 130,000 tons. If spiegeleisen attains this volume this year it will be the largest output for any peace year in the last ten.

The following table gives the production of ferromanganese and spiegeleisen thus far this year compared with the record for certain previous years:

Ferromanganese and Spiegeleisen Output of the United States in Gross Tons

	Ferro-manganese	Spiegel-eisen	Total	Average per Month
To Nov. 1, 1923..	213,323	103,678	317,001	31,700
Total, 1922.....	151,175	68,587	219,762	18,313
Total, 1921.....	98,439	56,139	154,578	12,881
Total, 1920.....	282,681	103,448	386,129	32,177
Total, 1919.....	179,029	65,391	244,470	20,732
Total, 1918.....	345,306	249,002	594,308	49,525
Total, 1913.....	119,495	126,081	245,576	20,464
November, 1923..	14,839	16,783	31,622	.....

Until November this year the production of ferromanganese maintained an average monthly output of 21,330 tons, but there was a decided falling off in November, when the output was only 14,839 tons.

Available Supplies

The available supplies of ferromanganese thus far this year and for previous years as obtained from an analysis of the output, imports and exports are shown in the following table in gross tons:

Ferromanganese Output, Imports and Exports, and Available Supplies in Gross Tons per Month

	Output	Imports	Exports	Available Supplies
To Nov. 1, 1923...	21,332	8,245	362	29,215
1922	12,598	7,882	92	20,398
1921	8,203	755	57	8,901
1920	23,557	4,941	288	28,210
1919	14,923	2,752	255	17,420
1918	28,775	2,264	298	30,741
1917	21,486	3,703	*776	25,413
1916	17,365	7,577	...	.....
1915	12,021	4,605	...	.....
1913	9,958	10,672	...	.....
1911	6,207	6,688	...	12,895
5-yr. (1910-14)...	8,280	8,399	...	.....

*First half only.

The most interesting feature of the above table is that the importations of ferromanganese this year will establish a record for any year since 1913. At 8245 tons per month they are larger than in 1922, when the inflow was heavy, due to the imposition of a tariff late in the year, but rather below the record imports of 1913, when they were 10,672 tons per month, and when British ferromanganese constituted about 50 per cent of the total consumption of this alloy by the American steel industry. Thus far this year the same figures show that the available supplies of 29,215 tons per month are the largest for any normal year, and are close to the available supplies of 30,741 tons per month in 1918, the last year of the war.

Supplies of Manganese Ore

Probably the most interesting feature of an analysis of the manganese supply of the American industry this year is the phenomenally low rate of importation of manganese ore in 1923. To Nov. 1 this year only 179,255 tons had been imported, or 17,925 tons per month. The import statistics for the last 10 years are shown in the following table:

Manganese Ore Imports into the United States in Gross Tons

	Total	Average per Month
To Nov. 1, 1923.....	179,255	17,925
Total, 1922	374,451	31,204
Total, 1921	401,354	33,446
Total, 1920	606,937	50,578
Total, 1919	332,344	27,779
Total, 1918	491,303	40,942
Total, 1917	629,972	52,498
Total, 1916	576,324	48,027
Total, 1915	320,784	26,732
Total, 1914	283,294	23,608
Total, 1913	345,084	28,757

These data show that 1923 will establish a record for low imports of this important alloy in the last 11 years. The contrast between this year and previous years is a striking one. From these figures it is difficult to appreciate how so large an output of ferromanganese could be made this year with importations so low, but it is probably true that sufficient stocks of ore in the hands of ferromanganese producers have existed this year to account for the apparent discrepancy. The importations of 17,925 tons of ore per month this year contrast with the next lowest figure of 26,732 tons per month in 1915 and with the record of 50,578 tons per month in 1920.

British Ore Supplies

In strong contrast to the American receipts of manganese ore are those of the British as shown by the following table:

British Imports of Manganese Ore

	Total	Average per Month
To Nov. 1, 1923.....	454,265	45,426
Total, 1922	337,312	28,109
Total, 1921	172,856	14,405
Total, 1920	452,613	37,718
Total, 1919	265,800	22,150
Total, 1918	365,606	30,467
Total, 1917	331,264	27,605
Total, 1916	439,509	36,625
Total, 1915	377,324	31,443
Total, 1914	479,435	39,953
Total, 1913	601,177	50,098

These figures show that for the first 10 months of this year British manganese ore receipts had averaged 45,426 tons per month, which is next to the record receipts in the last 10 years, or 50,098 tons per month in 1913. The present rate of imports exceed any record during the war when steel output was considerably larger than at the present time.

Contrasting the situation in the two countries, it seems evident that British makers of ferromanganese have carried very few stocks from year to year, while American producers must have had, early in 1923, at least 300,000 tons of manganese ore in stock. It is hardly probable that this quantity, without which the present output of ferromanganese could not be made, should be coming from American mines.

Supplies and Needs in 1923

Not long after the United States entered the war it was officially estimated that the monthly needs of the steel industry were 28,000 tons of ferromanganese. This was based on the use of 80 per cent alloy and a steel output of about 43,000,000 gross tons. In THE IRON AGE of May 13, 1920, it was estimated that with a steel production of ingots and castings of 45,000,000 about 316,000 tons of ferromanganese would be theoretically necessary. The 1923 production of steel, based on official reports thus far this year, is at the rate of about 45,000,000 gross tons. Assuming that the ferromanganese output this year will approximate 240,000 tons and that the imports at the present rate will total roughly 99,000 tons, then the combined available supplies, exclusive of exports, will be 339,000 tons. With the theoretical needs of the steel industry calling for 316,000 tons of ferromanganese, the apparent available supplies for the year (approximately 339,000 tons) are ample. These conclusions are sustained by the present state of the market in which prices are easy and the alloy plentiful.

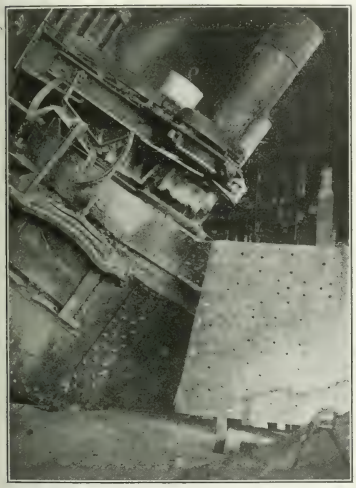
Soderberg Self-Baking Electrodes

Use in Carbide and Ferroalloy Furnaces in Europe—Advantages of Their Application to Electric Steel

BY FRANK HODSON*

THE student of steel making who in 1913 predicted there would be over 400 electric furnaces operating in the United States in 1923 was indeed endowed with the gift of prophecy. If there was any such student, which we are inclined to doubt, he was probably regarded as an unbalanced enthusiast.

Today a somewhat similar divergence of opinion exists in many quarters. Many observers, impressed



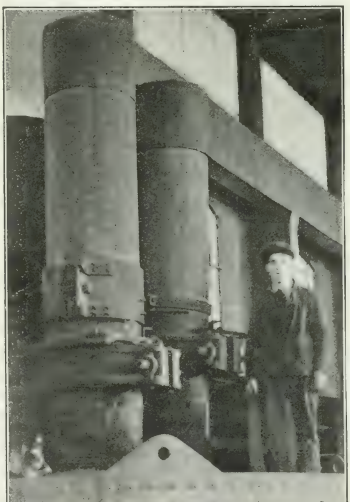
20-Inch Soderberg Electrode in a 3-Ton Heroult Furnace at Stavanger, Norway

by the magnitude of temporary obstacles and impatient for speedy results, consider that progress has reached its limit in certain directions. A minority recognizing the broad trend of the times, with the chain of results that will follow, preserve the faith that we are merely at the beginning of electric furnace developments of far-reaching scope. The writer is bold enough to predict that in a few years, with the coming of cheaper power, no modern steel works will be complete without the final finishing of metal in electric furnaces.

Several plants abroad are already using with considerable success a process consisting of blast furnace metal to metal mixers, metal mixers to Bessemer, and Bessemer to electric furnaces—eliminating entirely the open-hearth furnace. Cheap steel of high quality and uniformity can be produced by this process at a cost comparable with the cheapest production methods now in vogue. The amount and cost of electricity used is quite small and the introduction of the self-baking electrode, developed in Norway under the name Soderberg, not only will cheapen refining costs, but will render possible the design and operation of electric furnaces of very much larger capacity than any existing furnaces.

The Soderberg electrode is widely used in Europe in electrothermic industries. It has demonstrated its value in tilting electric steel furnaces and will also be a contributing factor toward cheaper electric steel. This method of forming the electrode in the same furnace in which it is used was at first frowned upon. With the improved understanding that has come from experience, the technical problem of the self-baking electrode has been solved. Numerous carbide and ferroalloy furnaces in Norway, Sweden, and Germany have been enjoying the savings which the continuous self-baking method makes possible, for several years past. The Mitsui Co. recently purchased the rights for Japan and is using Soderberg's in carbide furnaces, totaling more than 60,000 kw. capacity. In France, Italy, and South Africa, plants are now in operation using this method.

The experience gained in open furnaces of the carbide type has now been utilized for the benefit of the steel maker. In adapting the Soderberg electrode



Heroult Furnace Equipped With Soderberg Electrodes at Stavanger, Norway

to the tilting furnace, the overhead tamping room has been done away with and the joining up of the electrode is done outside the furnace. The method used is simple and efficient and has been used at Stavanger, Norway, and Remscheid, Germany, for over a year. Data on the Stavanger installation are now available. A description of the methods and results used in the two Soderberg-equipped steel furnaces at Remscheid

*President Electric Furnace Construction Co., Philadelphia.

will appear in *Stahl und Eisen* in December. Two installations in French and Italian furnaces are operating smoothly. The equipping of the 20-ton Greaves-Etchells furnaces at Domnarvet, Sweden, has been delayed by a strike.

For the moderate sized furnace the Soderberg electrode will assist the steel maker in his efforts to reduce costs. Lower first cost, lower consumption of electrode owing to absence of oxidation, and the regular operation rendered possible by freedom from breakages will result in cheaper steel.

For large furnaces the Soderberg system opens up an inviting field. The success of the 40-in. electrode has been demonstrated and diameters of 70 or even 100 in. are probable. This makes possible simple furnace designs using three, four, or more electrodes, the only limit in size being mechanical design and present day refractories. Such furnaces could either be fixed furnaces, built on open-hearth lines, or tilting furnaces. Satisfactory results have already been obtained at the Ford electric furnace plant at River Rouge, on blast furnace iron superheated in Greaves-Etchells electric furnaces. It is quite conceivable that, by use of the Soderberg electrode, electric furnaces of up to 500 tons capacity can be economically operated for superheating iron or steel. Such furnaces might consist of a row of Soderberg electrodes and could pour their superheated metal continuously.

It is not to be denied that there are some problems in connection with refractories whose solution would contribute greatly to electric furnace development. Already from certain quarters, where excellent research is under way, comes hopeful news. Nor is the writer unmindful of the large investments involved in present steel plants. Revolution is not predicted or desired. The measuring unit of progress must be the 5-year span rather than the single year. But the fact remains that the answer to the cry for cheaper steel and better steel is cheap power and the large economical electric furnace unit. Progress on a half dozen engineering sciences is converging to place these elements at the disposal of the steel maker.

Pittsburgh Base Abandoned by Chicago Maker of Cold Finished Steel Bars

CHICAGO, Dec. 8.—In an announcement made here this week, the LaSalle Steel Co., Chicago, manufacturer of cold-drawn steel bars and shafting, inaugurated a Chicago mill base on its products. It is now quoting cold-finished steel bars and shafting at 3c. base, f.o.b. Chicago district mill, instead of at 3c., base Pittsburgh. In commenting on the move, C. D. Kelly, vice-president of the company, said:

"We took this action believing that it was justifiable in every way and that the tonnage consumed and produced in this territory fully warranted the establishment of a Chicago base on our products. It is our belief that the increased sales possibilities of consumers throughout this district by reason of the enlarged territory in which they can compete with the Eastern manufacturers on an even footing, will react to their benefit and correspondingly to the benefit of the Chicago producers."

The plant of the LaSalle company at Hammond, Ind., has a capacity of 75,000 tons a year. Its output is used extensively in the automobile industry, as well as by manufacturers of agricultural implements and machinery. The establishment of a Chicago base gives the company an advantage of 40c. per ton at Detroit over Pittsburgh district competitors, the freight to Detroit from Chicago being that much lower than from Pittsburgh.

The inauguration of a Chicago base on cold-finished steel bars follows the establishment of a Chicago base on plates, shapes and bars two years ago. During most of that time, however, Chicago base prices on those products have averaged $2 a ton higher than Pittsburgh base quotations. The new Chicago base price on cold-finished steel, however, is exactly the same as that at Pittsburgh.

Synthetic Foundry Iron

The feasibility of producing a good grade of foundry iron from steel scrap in the electric furnace has been demonstrated in experimental work performed at the Northwest experiment station of the Bureau of Mines at Seattle, Wash. This development permits any manufacturing plant to use all its iron scrap on the spot in making castings equal to if not better than those from cupola iron. Improved methods of charging the 300-lb. experimental furnace used by the bureau gave more rapid carburization, and carbon contents as high as 5 per cent were reached. Several heats were made in a 1-ton commercial electric furnace of the Heroult type, at Hoquiam, Wash., and in a 1-ton indirect-arc, rocking furnace in a foundry at Detroit, Mich. In every case, these tests were successful in producing sound, strong gray iron from steel scrap and iron turnings.

Secretary Hoover's Comment on Increase of Iron and Steel Exports

WASHINGTON, Dec. 11.—Secretary Hoover in his annual report says:

"The iron and steel division has pointed out some of the weak spots in the conduct of American export trade and has recommended correctives. It has urged manufacturers to seek export trade when business at home is good. Promising markets were indicated. The attention of the industry was called to the disadvantages resulting from the necessity of transshipping goods in foreign bottoms in order to reach certain foreign ports. There was an extraordinary growth in the number of inquiries answered. A steel exporters' index was started and grew rapidly. The chief of the division, Luther Becker, made frequent visits to the leading centers. A world-wide investigation of the market for industrial structural steel buildings was carried out. Data involving the manufacture abroad of iron, steel, and copper wire were collected. An investigation was made in European countries to ascertain the character and extent of 'redevelopment' work in sheet and pressed metal. Other studies concerned wire rope, special steels, roofing materials, forgings, steel castings, sprocket chain, etc. The division has been instrumental in selecting proper foreign agencies for American manufacturers."

Contact has been established with 51 trade associations having to do with iron and steel and their products.

Brazil's Steel Industry

The Companhia Siderurgica Belgo Mineiro, of Sabara, Minas Geraes, Brazil, has been granted special concessions for a term of 40 years, says the London *Ironmonger*. The company has one blast furnace at work and intends to erect another, as well as an open-hearth furnace and two rolling mills. The Companhia Electro-Metallurgica, of Ribeirao Preto, in the State of Sao Paulo, reports a production for the first half of 1923 of 1382 tons of electric pig iron and 2561 tons of steel from Bessemer converter and electric furnaces.

Open-hearth plants of the steel works in the Cincinnati district are now employed at about 55 per cent of capacity. Finishing mills are running approximately 70 per cent. It is expected this rate of operations will be maintained during the remainder of the year. Three steel company blast furnaces are in operation, as are two silvery furnaces in Jackson County and one foundry iron producer at Ironton.



MICHAEL PUPIN

Pupin's Contribution to a Great Cause

In the conclusion of his autobiography, Pupin says:

"Ideal democracy, if attainable at all, will certainly be attainable in our country, whose traditions are gradually eliminating racial hatreds and suspicions and making them unknown human passions on this blessed continent. If I have contributed anything substantial to the progress of this splendid movement, whether as an immigrant or as an inventor, it has been most amply rewarded by the spirit of the letter (one written by President Harding in appreciation of Professor Pupin's work on the National Advisory Committee for Aeronautics) written by a man whom I had the honor of knowing personally and who to me always represented the ideal American."

From Immigrant to Inventor. By Michael Pupin (pronounced Pyupeen with accent on last syllable.) 396 pages, 6 x 9 in.; illustrated. Published by Charles Scribner's Sons. $4.

IF it is true, as someone has said, that the tests of a great book are great thought, great style and a great soul expressing itself through the book, then the autobiography of Michael Pupin, professor of electro-mechanics, Columbia University, "From Immigrant to Inventor," is such a book. Any intelligent reader of this fascinating adventure in democracy and science will be convinced of this fact. Readers of THE IRON AGE will be interested in the book because of Professor Pupin's research in the subject of the magnetization of iron and also on account of his inventions, which have so wonderfully influenced long distance telephoning and the radio.

In reading the book, one's mind constantly reverts to those excellent works, Riis' "Making of an American" and Bok's "The Americanization of Edward Bok." Helpful and thought-provoking as is the latter book, as we compare it with the Pupin story, we find ourselves saying, "Professor Pupin shows the humility of a truly great man." Through all of these books, the Americanization of these men, who have contributed so much to this, their adopted country, is perhaps the most important theme.

To understand the complex civilization in which we live, we must be students of history and the best way to know history is through the lives of leading men and women; and when that story comes to us through autobiography, then we have the intimate revelation of personality and soul. After one has finished reading the Pupin book, he is a friend of Serbia and Pupin becomes his personal friend. However, "the main object of my narrative was, and still is," writes Professor Pupin in the preface, "to describe the rise of idealism in American science, and particularly in physical sciences and the related industries." The author succeeds in achieving this purpose and he does much more.

As absorbing as a work of fiction, the book tells of the boyhood of the author spent in the town of Idvor, in Banat, a section over the border from Serbia which was restless under Magyar rule, but which had to wait for the World War before deliverance could come. Schooled in Idvor, Panchevo and Prague, the immigrant boy, 16 years old, came to America in 1874, and found work as a farmer, painter and, after working as a helper in the boiler room, was promoted to assistant shipping clerk in a cracker factory. The story of the helpfulness of "Jim," the head of the boiler room, who taught Pupin his first lessons in the phenomenon of heat and—what is more important—a sound optimistic philosophy of life and that of "Bilharz," who tutored him in preparation for college, are among the unforgettable parts of this wonderful tale. The life as a student at Columbia, where through industry, innate ability, ambition and a never failing optimism, he made an enviable record not only in science but in the classics, is described most graphically. Carrying his Columbia diploma and his naturalization papers in his pocket, in the summer of 1883, he went to Cambridge and later to Berlin, to study mathematics and physics. The books of Maxwell, Faraday and Le Grange he devoured and he became the pupil and friend of Tyndall and Helmholtz. His European summers were spent in Scotland, France and Idvor. Marrying the sister of Professor Jackson, the Orientalist of Columbia University, in London, this "American by choice" sailed with

Descriptive Powers of an Inventor

THE descriptive powers of this immigrant boy who became a great inventor are shown in many paragraphs of his book as, for example, in the following, giving his experiences as a boy attending a herd of cattle: "The light of the stars, the sound of the grazing oxen and the faint strokes of the distant church-bell were messages of caution which on those dark summer nights guided our vigilance over the precious herd. These messages appealed to us like the loving words of a friendly power, without whose aid we were helpless. They were the only signs of the world's existence which dominated our consciousness as, enveloped in the darkness of night and surrounded by countless burning stars, we guarded the safety of our oxen. The rest of the world had gone out of existence; it began to reappear in our consciousness when the early dawn announced what we boys felt to be the divine command, 'Let there be light,' and the sun heralded by long white streamers began to approach the Eastern sky, and the earth gradually appeared as if by an act of creation. Every one of those mornings of 50 years ago appeared to us herdsmen to be witnessing the creation of the world—a world at first of friendly sound and light messages which made us boys feel that a divine power was protecting us and our herd, and then a real terrestrial world, when the rising sun had separated the hostile mysteries of night from the friendly realities of day."

his American bride for his adopted country in 1889 and became a teacher of mathematical physics, at Columbia University, at first conducting his research in a temporary structure, which the students called a "cow-shed."

From that time until today, the story of research and epoch-making inventions is told with all the beauty of a classical poet and with all the modesty of a great soul.

Among the marked characteristics of the book, *loyalty* is prominent. Loyalty to Idvor; loyalty to his unselfish, far-seeing mother—who could neither read nor write, but who insisted that he go on with his studies after the father's death, so that he might find out the "eternal truth"; loyalty to his adopted country and loyalty to the ideals of science.

The book also shows *deep religious feeling*, in the broadest and best meaning of that word. This Greek Catholic finds much inspiration from the sermons of Henry Ward Beecher and he is perfectly at home, as our readers know, when he speaks in the Cathedral of St. John the Divine, as he did Oct. 25 last, in appreciation of Dr. Henry Marion Howe, in the service held under the auspices of the American Iron and Steel Institute and the American Institute of Mining and Metallurgical Engineers.

The autobiography proves the author's *intense patriotism*. When a well dressed Princeton student treats the immigrant boy cordially, a deep appreciation of democratic America is developed. He is devoted to the ideals of Franklin, Lincoln, Harriet Beecher Stowe (these were his three American friends, he said, when he was examined at Castle Garden), Alexander Hamilton, ex-President Wilson and the late President Harding. He early learned the words and the meaning of the great documents of United States history.

Another outstanding feature is the *idealism* of the book. This is particularly true when he tells of the development of the National Research Council which was given $5,000,000 by the Carnegie Corporation and $1,000,000 by the Rockefeller Foundation, to encourage scientific research. The author rejoices over the accomplishments of the organization and over the near completion of its beautiful building at Washington, facing the Mall, near the Lincoln Memorial. Three ideals of men of science are emphasized (1) intellectual and spiritual discipline, (2) the cultivation of the love of the beautiful and (3) the realization that things change, but laws are immutable, immortal.

TRIBUTE TO ENGINEERS

Secretary Hoover Tells of Their Unselfish Service to the Government

WASHINGTON, Dec. 11.—Reduction in the cost of distribution is an outstanding means of bringing down the cost of living, Secretary of Commerce Herbert Hoover told the Washington Society of Engineers at its annual dinner here on Wednesday evening of last week. The most fundamental of prospects in this direction, he declared, has been the steady accretion in the reduction of cost of distribution. Sooner or later, the Secretary asserted, this problem as well as problems of a related character which have such great bearing on industry and society generally, become problems of the engineer and progress can be made only with their cooperation and that of industry. The Department of Commerce three years ago, Mr. Hoover said, entered upon a system of cooperation with engineers, industry and business generally to aid in the solution of economic problems. The engineers, it was stated, had never failed to respond to request for help.

Studies made, the Secretary said, show that the greatest waste in unemployment is due to the troughs of unemployment, and seasonal and intermittent unemployment. The work the department had done in cooperation with industries and engineers in studying the business cycle was explained by the Secretary, who said that the problem was one of unemployment and the elimination of the boom together with wasteful speculation. The great advantage in ascertaining facts regarding production, stocks, consumption and such data was dwelt upon by Secretary Hoover, who emphasized the necessity of the business man knowing these things if he is to operate intelligently and safely. He declared that three industries went through practical bankruptcy in 1920 because they were oversupplied with stocks of raw materials, but had they possessed information as to stocks, production and consumption, they would have escaped embarrassment. The Secretary declared that one authority recently stated that stability in the business and industrial world this year was due more to the information placed in the hands of the business man than anything else.

It is now necessary, the Secretary said, to eliminate the intermittance of unemployment and this was declared to involve transportation, production, and other factors, all of which were said to be problems for engineers.

"We must rely more on the engineer than correction by legislation," said Secretary Hoover. He outlined work being done under the direction of the department to do away with seasonal unemployment in the building industry, and what has been done in an effort to bring industries in tune, such as the movement of coal before the peak load is placed on the railroads in the fall for carrying crops. This year by sheer propaganda, the Secretary said, and with the assistance of engineers a closer relation between production and stocks of coal was brought about and there has not been a shortage of as much as one car during the past three months as the result.

The Secretary made it plain that he felt that the Government does not adequately reward its techincal men for their services. He declared the annual turnover of technical employment in the Department of Commerce ranges from 30 to 40 per cent because of low salaries. He said that he knew of no body of men who have given such continuity of loyal service to the Government as the technical men. It was nothing short of amazing, the Secretary said, and they often remain despite offers of much higher pay by private industry because they believe in serving the Government.

Taking up the subject of standardization work done under the direction of the Bureau of Standards, Secretary Hoover expressed the view that the determining of constants had done as much as anything in advancing the progress of science. He dwelt upon the value to private industry of the work of standardization in eliminating unnecessary types and sizes and setting up accurate specifications for the purchase of materials by the Government and which have been adopted by engineers and private industry. This has resulted in a profound economy for consumers, the Secretary said, because of lowered costs in construction and administration. The Federal Specifications Board, which is determining specifications for materials bought by the Government, it was revealed by Secretary Hoover, has from 80 to 90 per cent of its work done.

The country's building activities continued their lead over last year through November, according to F. W. Dodge Corporation. Total contracts awarded during the month in the 36 Eastern States (including about seven-eighths of the country's total construction volume) amounted to $318,828,000. Although this was a 12 per cent drop from the October figure, in 27 of these States there was an increase of 19 per cent over last November. Of last month's record 50 per cent was for residential buildings; 14 per cent for industrial buildings; 11 per cent for public works and utilities; 10 per cent for business buildings, and 8 per cent for educational buildings.

POWER SHOW COMPREHENSIVE

Oil-Burning Systems and Pulverized Coal Apparatus Shown—Exhibits Well Attended

A notable feature of the second National Exposition of Power and Mechanical Engineering held at the Grand Central Palace, New York, Dec. 3 to 8, was its comprehensiveness. The exhibits were well attended by engineers, architects and operating officials, and satisfaction with the results was expressed by many of the exhibitors. Approximately 275 manufacturers had booths and the floor space occupied was nearly twice that of last year. Small models of apparatus, full size units, cut-away models showing interior construction, and units in operation were on view. In several cases, moving pictures were used to supplement exhibits.

Five boiler manufacturers had exhibits, and there were three makes of Diesel engines shown. The Climax Engineering Co. had several gasoline power units on view. There were several oil-burning systems shown and makers of pulverized coal apparatus were well represented. A number of companies exhibited hand and mechanically-operated stokers, most of them demonstrating from actual units. Several companies showed special grates and grate bars, and the exhibit of refractory brick, bonding cement and boiler arches was large.

In coal and ash handling machinery models of skip hoists, bucket elevators, ash gates, steam jet and other types of ash conveyors, coal conveyors and other items were shown. Material handling equipment was shown by the Gifford-Wood Co., and an impressive exhibit was that of the Otis Elevator Co., which showed a model of an escalator in operation, an automatic skip hoist controller for blast furnaces, and an automatic slow-down and stopping switch. Fireless steam locomotives were shown by the H. K. Porter Co.

Four makers of surface, jet and barometric condensers had booths, and models of cooling towers were shown. Feed water heaters were exhibited by four companies. The Wheel Condenser & Engineering Co., Carteret, N. J., had its new two-stage hotwell pump with stuffing boxes under pressure, on view. Boiler feed, condensation, vacuum and other types were shown by the Nash Engineering Co. The Bethlehem Shipbuilding Corporation, Ltd., exhibited the Bethlehem-Weir turbo feed pump. Other pump makers included the L. J. Wing Mfg. Co. and the M. T. Davidson Co. Turbine and other types of blowers, for furnaces, oil-burning and pulverized coal were shown.

The exhibits of valves were numerous. In addition to its line of valves the Walworth Mfg. Co. showed flanges, pipe bends, Stillson wrenches and chain tongs. The Crane Co. had a large exhibit of valves and fittings and the Chapman Valve Mfg. Co. showed cast steel gate valves for hand, hydraulic or electric operation. Jenkins Brothers were represented and the Lunkenheimer Co. exhibited a large variety of valves, boiler mountings and lubricators. Pressure-reducing cut-off and blow-off valves were shown by several companies. Hancock valves were shown by Manning, Maxwell & Moore, Inc. The Reading Iron Co. had a booth, and dropped forged fittings were shown by the Henry Vogt Machine Co. and by the Continental Valve & Equipment Co. In addition to Pratt & Cady iron and bronze valves, the Reading Steel Castings Co. exhibited cast steel flanges and fittings.

Steam traps, pump governors, combustion-control apparatus and damper regulators were shown by several companies, and pressure and temperature regulators were exhibited. Among other items were air preheaters, filters, grease extractors, steam separators, air filters for turbo-generator and other cooling systems, water softeners, heat resisting paints, Keystone and Dot lubricators. The Tide Water Oil Sales Corporation exhibited oils and greases. Several makes of tube cleaners and soot blowers were on view.

Condenser tubes were shown by the American Brass Co., Scovill Mfg. Co., Chase Metal Works, and the Bridgeport Brass Co. The International Nickel Co. exhibited monel metal, showing a broad line of products for which the metal is adapted.

Exhibits of testing instruments were numerous and impressive. Several types of CO and CO_2 recorders, indicating and recording thermometers, vacuum gages, water steam and air meters were shown. The Yarnell-Waring Co. showed its V-notch meter in operation and the Bailey Meter Co. demonstrated its boiler meter for recording the steam flow, and air flow and flue gas temperature on one chart. A coal meter was shown by the Bailey company and also a recording tachometer. A number of pressure gages were exhibited. The Dempsey Furnace Co. demonstrated its Constantator, which has 600 positions in which to set stoker speed, fan speed and damper to regulate steam pressures.

Several makers of belting were represented and the Leather Belting Exchange, representing 32 manufacturers, ran tests to show transmission capacity and shippage of various types of belting. A demonstration of how to make belts endless, the different ways of scarfing a joint, was a center of interest. Steel belt was shown by the Sandvik Steel, Inc.

Hanger boxes, ball and roller bearings were shown by several companies. An elaborate exhibit was that of the Boston Gear Works, which had several reduction units in operation, as well as showing several types of gearing and other transmission units. Clutches and pulleys were shown by the A. & F. Brown Co., and among the several exhibits of flexible couplings was that of the Falk Corporation, which demonstrated the new Falk-Bibby coupling. Lubricating oil storage equipment was shown by the Wayne Tank & Pump Co.

Grinding and polishing machines were in operation at the booth of the Production Machine Co., and a line of portable electric drills and floor grinders was shown by the James Clark Jr. Electric Co., Inc. Sawing machines were shown by the Peerless Machine Co. and the Racine Tool & Machine Co.

An educational feature was the exhibit of samples of various types of fuels, including foreign coal. A collection of models of locomotives from the engine which Sir Isaac Newton planned in 1680 down to those of the present was a center of interest. These are the work of Ernest Warther, Dover, Ohio, and are said to have taken more than 10 years to build. Educational motion pictures shown afternoons and evenings throughout the week included the manufacture of alloy steels, the building of locomotives and the story of steel.

Success of Vocational School in Production Gears

Students in the vocational school at Madison, Wis., are engaged in the production of 1000 gears for the Gisholt Machine Co., Madison, under an agreement with Joseph O. Johnson, director of machine shop. The Gisholt company agreed to furnish materials and purchase gears if 75 per cent passed inspection at limits of 0.0002 in. It is found that 90 per cent of the production has met approval, rejections so far being two in 100 gears. The gears are worked on a Gisholt turret lathe of standard shop size, the only machine of its kind installed in a vocational school in the United States. Because of the efficiency reached in the production of gears, the Gisholt company has decided to compensate the school, although the original agreement merely called for the furnishing of materials. The school is installing a Gisholt time recording system to accommodate this and other operations in the machine shop department.

Rockwood Stove Works to Be Enlarged

The Rockwood Stove Works, Rockwood, Tenn., which was organized seven years ago, will be enlarged to make hot-blast heaters and nickel castings. Output and equipment have been increased each year since its organization. Pig iron suited to stove works requirements is readily available from the local furnaces of the Roane Iron Co. A prominent manufacturer of Rockwood stated that stove works would find it highly profitable to locate there, where labor and raw materials are abundant.

TARIFF ON MAGNESITE

Foreign Producers Do Not Appear at Hearing, Which Proceeds Without Them

WASHINGTON, Dec. 11.—The hearing before the Tariff Commission on magnesite on Wednesday of last week took a curious turn when the foreign producers who had applied for a reduction in existing rates failed to make their appearance. Instead they had filed with the commission a petition asking that the hearing be indefinitely postponed, but gave no reason for their request. The commission, however, proceeded with the hearing and it is not known when the applicants for reduced rates will appear or whether they will insist on a hearing at all. The result of their action was that domestic producers and importing interests presented testimony before the commission. The importers, speaking mostly for reduced rates on caustic calcined magnesite, urged reduction in rates.

The principal argument for maintenance of existing tariff rates was made by Nelson Franklin, counsel for the Northwestern Magnesite Co. He challenged claims made in the applications for reduced rates, consisting of groups of Austrian and Czecho-Slovak producers, that the foreign magnesite is superior to the American product. On the contrary, Mr. Franklin said, the American magnesite is the equal in every way of the foreign product, as is shown by the favorable attitude of those iron and steel and other interests which are large users of dead-burned magnesite for refractory purposes. Mr. Franklin also asserted that the claims made in the applications that the present tariff rates had turned the American market over to domestic producers were without foundation. To prove this, he pointed out that the Northwestern Magnesite Co. had been able to sell but 22,000 tons of dead-burned magnesite this year as compared with imports of 45,000 tons. This, he declared, does not present the situation fully because previous to September of this year, 50,000 tons of foreign dead-burned magnesite was put on the American market.

Cost of Austrian Product

Having in mind the fact that investigations of the commission under the flexible provision call for recommendations in changes of rates only upon the basis of the difference in costs in the United States and abroad, Mr. Franklin said that no one in this country knows the cost of producing Austrian magnesite and he expressed the belief that neither the commission itself nor any other source would be able to determine the cost. The heavy importations as compared with sales of domestic magnesite, Mr. Franklin said, actually justified an increase in the tariff duty of 23/40c. per lb., equivalent to $11.50 per net ton, but he said that his company was not seeking an increase. Instead, he said, it is hoping to get into heavier production, thereby reducing overhead costs, and giving the tariff a fair chance. The company was unable to operate in 1921 and 1922, Mr. Franklin said, owing to foreign competition. On Feb. 23 of this year, it put on three out of its five smelters, but since June it has operated only one. The company considers that it has the last word in economical operation, Mr. Franklin said, but despite this has been able to sell but one-third of the domestic requirements.

Chairman Marvin of the commission said that an investigation would require considerable time and it must not be expected that it could be made in a short period.

Results of Investigation

The commission made public the result of its domestic investigation into the magnesite situation at the same time it held the hearing, but did not disclose domestic costs of production because of the absence of foreign costs. It is declared that the cost of magnesite delivered to the consumer is the determining factor in the competitive situation.

The following table gives the estimated cost f.o.b. cars at various consuming centers of dead-burned magnesite from the principal European shipping points for Austrian magnesite. These estimates are based on the average declared value of dead-burned imported to the United States during 12 months ending Sept. 30, 1923, from Trieste and Hamburg. The average declared value at Trieste was $11.48 and at Hamburg was $19.93 per ton, which values probably include a profit:

Point of Delivery	Sources— Trieste[1]	Hamburg[1]
Chicago	$37.68	$43.00
Pittsburgh	34.48	39.80
Atlantic ports	30.38	35.70

[1] Does not include foreign port charges or consulation; $0.50 per ton is included for handling at Atlantic ports.

Imports of Magnesite

Imports of dead-burned magnesite for the 12 months ending Sept. 30 of this year are given as 51,889 tons, of which 51,142 came from Austria, the value per ton for the total being $13.22. The average production since 1912 has been between 450,000 and 500,000 tons yearly and covers all kinds of magnesite. The dead-burned, however, constitutes the great bulk.

For each man-shift at the mines, an average of 1.8 tons of crude magnesite is produced, the report says, in dealing with labor costs in this country. The average wage rates in the California industry are from $4.25 to $5 per day, and in Washington from $4.50 to $5.50 per day of eight hours. The yearly average prices of magnesite per ton f.o.b. for 1923 are given as $13.70 for California crude, and $33 for Washington, $41 for Chester, Pa., or Baltimore for dead-burned and $66 for magnesite brick at works. Distribution of domestic consumption for the first nine months of 1923 is estimated at 7⅓ per cent for dead-burned; 27.7 per cent for caustic and 0.5 per cent for crude. Washington is said to have crude ore reserves of 22,900,000 net tons as against 1,422,000 net tons for California. At the average consumption for the last 12 years, 287,000 tons per year, these reserves would last for 85 years without imports. At the maximum consumption of 367,000 tons in 1920, these reserves would last 66 years. It is declared that domestic production before the war was insignificant. From 1916 to 1920, inclusive, domestic production was 85 per cent of consumption. In 1921 and 1922, most of the domestic plants, it is stated, were shut down and domestic production was 28 per cent of consumption. Since the present tariff act became effective, there has been some revival, it is pointed out, but production is still less than 50 per cent of present capacity.

"The entire domestic production is along the Pacific Coast," says the report. "The center of consumption for caustic is presumably near the center of population in Indiana; while the center of consumption for dead-burned is undoubtedly close to Pittsburgh on account of its use for lining steel furnaces.

"For the making of refractory brick no suitable substitute for dead-burned magnesite has been found, but for furnace bottoms and for minor repairs dolomite may be used. The presence of a certain amount of iron in dead-burned magnesite seems necessary; in the Austrian magnesite this occurs in the crude ore as mined, while in Washington iron is added, making a synthetic product of uniform quality claimed to be equal in every way to the imported product. In view of actual acceptance of large quantities of domestic dead-burned, the question of preference for foreign dead-burned probably can be eliminated."

The National Malleable Castings Co., Cleveland, has changed its name to the National Malleable & Steel Castings Co. in order to more clearly indicate the scope of the company's business, which includes steel castings as well as malleable iron castings. The company has plants in Cleveland, Indianapolis, Ind., Sharon, Pa., Toledo, Ohio, and Chicago.

The Alliance Machine Co., Alliance, Ohio, shipped to Spain recently a soaking pit charging crane and a stripper crane to be installed at the iron and steel works being built by the Compania Siderurgica del Mediterraneo at Sagunto. Frank C. Roberts & Co., Philadelphia, are engineers for the plant.

Japan's Iron and Steel Industry—II*

Slow Development of Steel Making Until the World War Stimulated Operations—Labor Problems in Their Infancy

BY DR. ING. E. KOTHNY

UP to the time Japan began to expand, and even a few years after that time, it met its small demand for pig iron and steel by home production in the ancient works, the main seat of which was in the southwestern part of the main island, today's government district Chugoku. The iron works made iron from magnetite sand on charcoal hearths by the Frishen process. In addition there were smaller iron works, some with charcoal blast furnaces, in

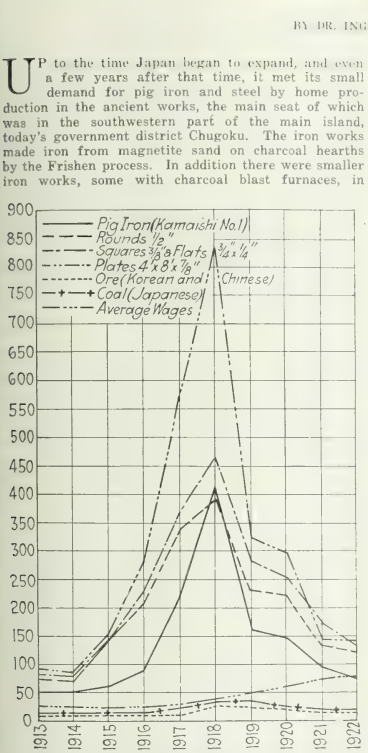


Fig. 3—Development of Prices of Pig Iron and Finished Steel, Ore and Coal Prices and Wage Rates, From 1913 to 1922 Inclusive. Prices are in yen (1 yen is about 50c.). Wages alone show a steady advance

the Provinces of Ou and Iwate. With the progress in the development of the industry the demand for pig iron and steel increased to such an extent that it could not be met by the old plants. Furthermore, these plants could not compete with foreign products and consequently went under, or at the best made a bare living. They were of local importance only.

First Modern Japanese Plants

Until the end of the nineties of the last century almost the entire steel consumption was covered by importation. Until that time no modern steel works had been started. Among the old plants the most important was the Kamaishi steelworks. The Japanese Government, however, soon recognized the advantage to the country of having its own steel industry. It, therefore, took the first steps for the development of this industry by building a modern blast furnace and steel plant and started toward the end of the nineties the Government steelworks Wakamatsu, also called Yawata† or steel plant Etsu, which in the course of the following year was extended and is today the largest and most modern steel plant of Japan. It was equipped for the production of shapes and merchant bars, ship plates, rails, wire and war material.

This attempt of the Government, however, found no response from Japanese business men. The returns of the Government steel plant were not sufficient proof to them that making iron and steel in Japan could be profitable. The steelworks had not shown a profit up to the first years of the war; on the contrary, repeated allowances had to be made by the Government to cover its deficit. The number of iron and steelworks founded in Japan up to the time of the World War was consequently very small. Only a few steel plants came into being, and these owed their existence to Government contracts for the army, the navy and the railroads.

In 1903 the Kobe steelworks, and in 1906 the Japan steelworks in Muroran (Hokkaido) were organized. Both plants built Siemens-Martin (open-hearth) steelworks, which were equipped for the manufacture of steel castings and steel forgings for the navy, the merchant marine, shipyards and the railroads. In 1906 the largest Japanese shipbuilder, the Kawasaki Dockyard Co., built its own steel plant, to cover its requirements of steel castings and forgings.

In 1912 the Japan Steel Tube Co. (Nippon Kokwan K.K.) began the construction of its works in Kawasaki, province Tokio, to make Japan independent of foreign countries in regard to the supply of rolled steel pipe. Besides this they built rolling mills for merchant bars and shapes, as well as boiler and ship plates. The steel plant Kamaishi, too, showed in the meantime further developments. Especially Japan's wars before the World War greatly influenced the steady development of this plant.

Profits Not Obtainable

To sum up, until shortly before the war only such plants had originated, besides the Government steel plant, as had profitable operations guaranteed or at least anticipated, either by assistance in the form of Government orders, or by supplying the home market or specializing in a particular line. Two reasons for the inability of the Government plant and other plants to operate at a profit, in competition with foreign products, are as follows:

1. The higher price of Japan's coke and ore resulted in higher cost of these materials per ton of pig iron than in other countries. Table IX gives a comparison of material costs in Germany, America and Japan, according to 1912 prices. In this tabulation the Japanese and German prices are converted into dollars at normal prewar rates.

2. In Japan, due to the insufficient education of the working men for their calling, the efficiency of a plant was lower than that of a plant of equal size

*Translated from *Stahl und Eisen* of June 14 and 21, 1923, by Paul Cebrat, Ferin & Marshall, New York. The first section, dealing with pig iron and its raw materials and with imports, appeared at page 1317 of our Nov. 15 issue.

†On page 463 of THE IRON AGE, Aug. 23, this plant will be found near the southwest end of Japan, on the map showing the locations of the seven blast furnace plants of China.

Table IX.—Average 1912 Prices (a)

Subject	Japan Price per Ton	Japan Cost per Ton of Pig Iron	Germany Price per Ton	Germany Cost per Ton of Pig Iron	United States* Price per Ton	United States* Cost per Ton of Pig Iron
Coke	$7.20	$7.20	$3.72	$3.72	$3.00e	$3.00
Ore	2.85b	5.70	1.20c	3.60	3.00d	6.00
Total		12.90		7.32		9.00
Price of pig iron		$22.57		$14.76		$14.00

Notes: (a) Based on normal exchange rate: 1 mark = 24c. and 1 yen = 50c.
(b) Chinese Haematite with 55 per cent Fe.
(c) Minette with 35 per cent Fe.
(d) Lake Superior non-Bessemer with 51.5 per cent Fe.
(e) Connellsville.
*Figures for the United States, not in the original article, have been added for comparison.

in Europe or America. Production cost was therefore higher than in other countries, in spite of lower wages. In many new installations many labor saving devices were omitted on account of the low wages, which had an unfavorable influence on production cost, in spite of the low wages.

In pig iron and ordinary merchant iron, therefore, Japan could not compete with the tonnage production of other countries. The cost of shipping and the import duty did not give the Japanese industry sufficient advantage for a healthy growth on a solid foundation. Before the war a steel industry capable of supplying the home demand could have developed only if foreign competition had been excluded, or at least made more difficult by a sufficiently high import duty. At that time the duty on pig iron was very low, only 1.67 yen (83c.) per ton. For merchant bars the duty was considerably higher, being 10 yen, ($4.98) per ton, equalling about 12 per cent of the value.

Table X.—Merchant Ship Building

Year	Registered Tons	Year	Registered Tons
1913	64,664	1918	489,924
1914	85,861	1919	611,833
1915	49,408	1920	456,642
1916	145,624	1921	227,425
1917	350,141	1922	83,419

Effect of the World War

An inducement to develop the steel industry did not exist before the war, which, with its effects and its lessons, was of great influence in the development of the Japanese steel industry. The elimination of imports from Germany which, according to Table VII (page 1319, Nov. 15) had amounted to almost one-third of Japan's imports of merchant iron, and the great difficulties of importing from America and England, resulted in the demand for pig iron and steel being satisfied only with the greatest difficulties. Japan soon perceived the splendid opportunity offered it by the war to improve considerably its merchant marine and to develop its industries, since the war opened large territories of the world for exportation.

Demand for pig iron and steel grew rapidly soon after the beginning of the war. Caused by the great difference between supply and demand, prices of pig iron and steel increased from day to day. Fig. 3 gives a picture of the development of pig iron and steel prices before, during and after the war. It shows that in the beginning, with nearly constant wages, coal and ore costs, the prices for pig iron and steel rose rapidly.

Production of pig iron and steel became extremely profitable. Plants already in operation were able to pay dividends of 100 per cent on the capital investment. It can readily be understood that this attracted Japanese merchants and financiers. The Government also recognized the advantage to the country, in case of war, to have its own well-developed steel industry, capable of supplying the home demand. It was therefore the aim of financiers and merchants, as well as of the Government, to reach this goal. The Government assisted in organizing a home steel industry by two measures:

1. In 1917 a law was enacted to promote the steel industry, with the following principal points:

A.—The law of expropriation of land was extended to apply to steel works and refining plants which had a yearly capacity of 35 tons or more.

B.—All Government-owned forests and other lands were made available to steel works by leasing or selling, except in special cases.

C.—All persons employed in the construction of steel plants were exempt from all taxes for ten years, beginning with the year following the starting of construction of the plant.

Table XI.—Production and Imports of Ferroalloys
(Quantities in Metric Tons)

Year	Spiegel Prod.	Spiegel Imports	Ferromanganese Prod.	Ferromanganese Imports	Ferrosilicon Prod.	Ferrosilicon Imports	Production Fe. Mn. Si	Fe-Wo	Fe-Cr	Other Alloys	Fe-Cr and Other Alloys Imports
1912	....	804	1,413	1,107	....	1,706	....	....	....	....	690
1913	....	1,814	2,313	4,047	....	1,097	....	....	....	....	673
1914	63	655	1,442	1,084	....	1,530	....	....	....	....	207
1915	....	579	2,879	2,654	....	1,971	....	....	....	....	1,071
1916	....	940	3,201	2,351	2,431	465	....	....	....	....	345
1917	1,707	1,227	7,339	603	6,994	376	306	153	314	....	535
1918	2,174	9	11,647	764	2,948	295	1,246	213	1,376	38	72
1919	2,067	....	10,831	2,519	930	447	150	103	920	72	339
1920	1,084	....	4,203	510	904	....	34	66	1,522	....	118
1921	453	....	4,515	707	....	....	....	25	1,536	141	270

Table XII.—Changes in Cost of Living and Wages
Per Cent Increase or Decrease Based on 1912 = 100

Subject	1912	1914	1917	1919	1920 First Half	1920 Second Half
Necessities of life—						
Cereals—Rice	100	76	95	225	247	183
Cereals—Average	100	36	108	211	247	168
Other food	100	101	116	190	237	229
Clothing	100	92	156	272	382	333
Other articles	100	99	151	262	318	257
Total average	100	96	145	238	292	245
Wages—						
Agricultural	100	104	117	236	236	281
Clothing trade	100	102	123	232	232	306
Food industry	100	103	126	233	233	272
Building trade	100	99	113	210	210	287
Carpenters	100	101	120	227	227	294
Other labor	100	100	121	226	226	301
Average	100	102	119	226	226	291

D.—Ore imported for such plants was admitted duty free.
E.—All materials used in the construction of such plants were allowed to enter free of duty.
F.—The product of iron ore mines organized in Korea was exempt from import duty in Japan.

2.—The Chino-Japanese mining agreement assured the ore and coal supply for a home steel industry.

Many New Plants Built

Stimulated by the large profits and the assistance given the steel industry by the Government, a great number of new enterprises was brought into existence during the war, existing plants were enlarged, and old plants that for a long time had ceased to operate, on account of their inability to compete, were brought into life again and modernized. Shipbuilders endeavored to produce their own steel; their consumption was large, since shipbuilding developed vigorously. Table X shows the extent of Japanese shipbuilding from 1913 to 1922.

The Kawasaki Dockyard Co., Kobe, which in 1906 had already started operations in its own steel plant, enlarged this by the addition of a rolling mill for merchant bars and shapes, and later built a second steel plant with a plate mill to fill the requirements for ship plates. The second great shipbuilding concern, the Mitsubishi Dockyard Co., made itself independent, regarding the supply of pig iron and steel, by constructing a blast furnace and steel plant in Kenjiho, Korea, which was equipped for the production of merchant bars and shapes as well as ship plates. To the shipyard in Nagasaki was added a steel foundry to supply the various yards of this concern with steel castings. The newly organized Asano Shipbuilding Co. built at the same time its own steel plant.

For the Imperial steelworks a large extension program was planned by which its capacity was to be increased to 750,000 tons of pig iron and steel annually. The old blast furnace and steel plant Kamaishi was further enlarged. New blast furnace plants, as the Hokkaido Seitetsu K.K. (Hokkaido or Wanishi Steel Co.), the Toyo Seitetsu K. K. (Orient Steel Co.), the Honkeiko Iron Works and the An-Shan blast furnace and steel plant were built. It is said that the latter exceeds in capacity the Imperial steelworks. It was planned to enlarge the An-Shan works to produce up to 1,000,000 tons of pig iron and rolled steel annually. The Kobe steelworks plant was enlarged by the construction of a new steel plant. The big Japanese concern Sumitomo, which is interested in nearly all branches of industry, also entered the field of producing steel. It constructed a steel plant, which was equipped for the production of steel castings and heavy forgings for merchant and warship builders, railroads and machinery builders.

Special Products

Some concerns also took up the manufacture of special steels. In some of the old plants, using the Frishen process on charcoal hearths, electric furnaces were installed, and new electric steel works were built which turned toward this new field. In spite of all these installations, today by far the largest part of special steel has yet to be imported. Exact data regarding the consumption and the importation of this material are not available, since the import of special steels is not listed separately in the statistics issued by the customs offices. Imports were made from England, Germany, Austria and Sweden.

Production of gray iron foundries also increased considerably during the war, though no statistics are available. From the total pig iron consumption and that used for conversion into steel it can be estimated that, in Japan's iron foundries, up to 400,000 tons of pig iron were made into iron castings. The larger foundries are usually connected with machine works or shipyards. Many of the plants constructed during war times are now lying idle or have been converted to other uses.

The production of ferroalloys increased in a similar manner. Table XI shows Japan's production and imports of ferroalloys from 1912 to 1921.

Prices, Profits and Expansion

With pig iron and steel prices during war times constantly rising, and the consequent large profits of the steel industry, the desire to organize new steel companies grew more and more. New steel companies grew like mushrooms after a rain. The end of the war, however, interrupted this feverish development. From Fig. 3 it can be seen that the end of the war was followed by a rapid decline of pig iron and steel prices.

This decrease, however, was not accompanied by a decline in coal and ore prices or wages. In spite of the war being ended, prices of food and other necessities of life increased, and instead of wages being reduced, they had to be raised again and again. Table XII illustrates the fluctuations in the cost of living and the different wages between 1912 to 1920, since when prices have not materially changed. Table XII indicates that, in a general way, the increase in wages corresponds with the increase in the cost of living. No improvement in living conditions was obtained by the Japanese workman with the higher wages.

In the construction of their works quite a number of newly organized plants had, as the main object in view, production as quickly as possible, so as to participate in the high prices in the shortest time. In consequence, construction procedure was not always systematic. Nor in all cases was the necessary attention paid to the mechanical equipment. In some instances old plants, which had been discarded in America, were purchased. Auxiliary departments, especially, were in many cases not equipped with the necessary mechanical devices, necessitating much manual labor.

When the Slump Came

Declining prices and continuously rising wages soon resulted in heavily curtailed or entirely disappearing profits. Most of the plants created only at the end of war times abandoned, therefore, the construction of proposed plants or stopped further building. Contemplated extensions of existing plants were postponed, and it is questionable whether they will ever be completed. Among those who were compelled to postpone their ambitious plans should be mentioned particularly the An-Shan iron and steel works of the South-Manchurian Railroad. The postponement of the completion of this plant has also another cause: up to the present no economic method has been worked out to treat the ores, which are the foundation of this project. As long as this question cannot be solved satisfactorily, the future of this enterprise is entirely problematical.

(To be concluded)

Locomotive Output More Than Double Same Period in 1922

The Department of Commerce, Washington, announces that total shipments of new locomotives from manufacturing plants in the United States during the 11 months of 1923 ended Nov. 30 were 2860, of which 2680 were for American railroads and 180 for foreign roads. This is more than double the number turned out in the same 11 months of 1922, when 862 domestic locomotives and 202 for foreign use were built and shipped by American locomotive shops.

Unfilled orders on Nov. 30 showed a reduction from those of Oct. 31. At the end of November, there were unfilled orders for 656 domestic locomotives and 35 for foreign use, a total of 691, while at the end of the preceding month the total of unfilled orders was 977. At the end of November, 1922, the locomotive shops had unfilled orders for 1619 locomotives, the last quarter of 1922 having been marked by more active buying than the last quarter of 1923.

Conveyor System in Continuous Motion

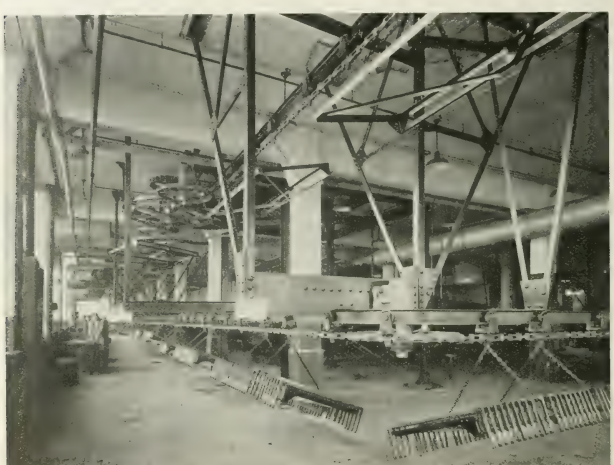
Handles Windshield Frames Into Tanks and Through Ovens Without Pause—Capacity 3000 Pieces in 9 Hr.

MARKED saving in labor, increase in production and improvement in the product has been effected at the plant of the Ternstedt Mfg. Co., Detroit, by the installation of a chain conveyor system for handling frames of automobile windshields during the enameling, baking and other operations. Features of this conveyor are its length, which is 1300 ft., and the numerous turns it makes in its winding course through the enameling department.

The conveyor consists of an I-beam runway on which run trolleys having roller bearings and placed on 4-ft. centers. Permanently attached to the trolleys and suspended by two chains are racks 7 ft. long and 4½ ft. wide, on which the work is placed. The conveyor makes 16 right-angle turns in its complete circuit through the enameling department, the chain passing around large sprocket wheels in making these turns. In addition it makes several upward and downward turns, at some points being near the floor and at others close to the ceiling, leaving a clear floor space below.

On reaching the enameling department, the frames are cleaned in a series of tanks located along one side of the room. After being washed and wiped they are placed on the racks, 30 pieces on each rack, the loading section of the conveyor being directly back of the cleaning tanks. The conveyor is in continuous operation, moving at a speed of approximately 18 in. per minute, and such hand operations as are required in the process, as going over the pieces with wire brushes after the first baking, are performed by one or more operators as the work passes their stations. The conveyor and enameling equipment have a capacity of approximately 3000 pieces in a 9-hr. day.

The conveyor first passes over a dip tank, in which the parts are submerged and given a lacquer coat, and then over a 70-ft. drain section. Then it enters the first oven, in which the lacquer coat is baked. After this operation the pieces are given a spray coat of enamel, the work being lifted from the rack for spraying. Then the pieces go to another oven for a second baking, which is followed by a second spray coating of enamel and the third or final baking. Then the frames pass to the inspection department, after which they are loaded for shipment. The emptied racks move around to the loading platform for reloading.

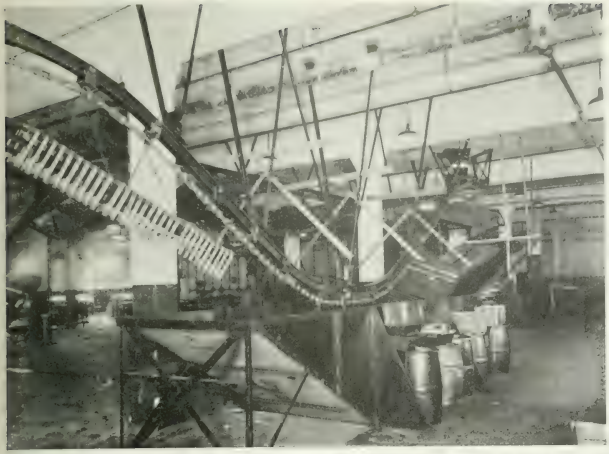


Taken Near the Loading Station, This View Shows the Design of the Conveyor and the Method of Handling the Windshield Frames. Near the ceiling appears a section of the conveyor with the racks empty. Note the prongs on the racks, to separate the pieces being carried

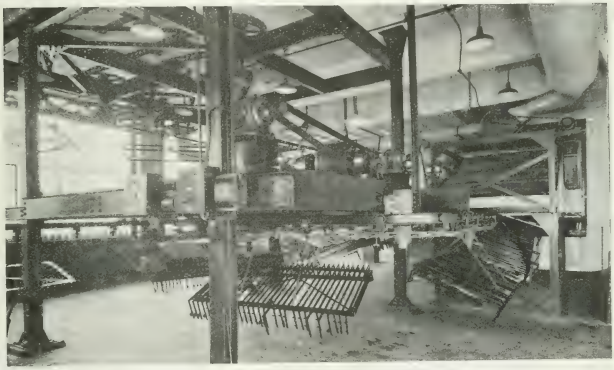
Baking is done in Maehler automatic gas-fired ovens, each of the three ovens being 90 ft. in length. The oven temperature is automatically controlled, being 250 deg. Fahr. at the oven entrance and 350 deg. at the outgoing end. At the conveyor speed used it takes 1 hr. for the work to pass through the oven. The conveyor is driven by a 20-hp. motor through a 400 to 1 reduction gear. An automatic takeup eliminates slack in the chain. The conveyor system was installed by the James F. Miller & Hurst Corporation, Detroit.

The company has found that with the use of the conveyor system it has secured a uniform coating of enamel as well as a uniform baking and color of the enameled parts, due to the even temperature of the oven and the method of handling the material on racks. The improvement in the finished product as compared with that made by the former method is estimated at 50 per cent.

Artificial ventilation is provided to assure clean atmosphere in the enameling department. A ventilating system supplies some 50,000 cu. ft. of air per minute.



Here the Frames Enter a Dipping Tank for the First or Looper Coat and Then Pass Over a 70-Ft. Draining Board on Their Way to the First Baking Oven



The 1300-Ft. Conveyor Is Driven by a 20-Hp. Motor Which, With Its Reduction Gear, Is Shown in the Foreground. Here the frames, after spraying, are entering one of the baking ovens



This Shows a Loop in the Conveyor and the Method of Making a Right Angle Turn by Means of Large Sprocket Wheels.

QUALITY OF GRAY IRON*

Recent Progress Made—High Tensile Castings—Pearlitic Cast Iron

As to the progress which has been made in gray iron quality, this perhaps can best be discussed by asking and making answer to certain questions. Has there been any real improvement in the product itself during the past 30 years? Are we at a standstill in this particular and, if not, in what direction can we look for betterment? Have improvements been made in uniformity of product? Have we kept pace with the demands of the engineer designer, forced upon him through the many special requirements for increased ultimate strength and decreased brittleness, such as those occasioned by the intricacies of the machines he is at times called upon to build, parts of which must be such as to stand up in service against high pressure and temperature without alteration in dimensions or contour, with freedom from leakage and a machineability such as to permit maximum production, or such as those involved in the making of castings for surface plates or straight edges that will remain perfectly true after they have been machined to dimensions, etc?

We perhaps can answer these questions and analyze the situation to better advantage if we take into account the mechanical properties by which the quality of a metal is usually measured, and the effect of heat treatment on these properties, through which procedure we can see more clearly where we stand. These mechanical properties ordinarily comprise tensile strength, elastic limit, reduction of area and elongation. Inasmuch as ordinarily the gray iron casting as cast possesses trivial, if any, ductility at all we are forced to ignore the last two items, for in the absence of ductility there can be no reduction of area or elongation. Also in the absence of ductility the elastic limit will practically coincide with the ultimate strength, so that in referring to the latter we are including the former. We find that the introduction of steel in the mixture has resulted in the production of a stronger casting, the average ultimate strength of which may be placed at about 33,000 lb.

High Tensile Cast Iron

A special gray iron product that will average around 50,000 lb. ultimate, possessing a measurable ductility, machineable at practical speed, and for which there is considerable demand is now being produced at a foundry in the South. In the case of 10 tensile test bars of this product tested by the Bureau of Standards, the lowest ultimate strength was 45,300 and the highest 56,500 lb.; the elongation in the case of four of the bars was one per cent, while the average Brinell was 290—results which are quite remarkable as compared with semi-steel.

That any specified gray iron product now can be made with a very fair degree of uniformity by even those not equipped with a chemical laboratory must be acknowledged, as dependable blast furnace analyses accompany each car of pig iron shipped. Actually, what we are safe in stating is that uniformity of product can be assured; that great progress has been made in ultimate strength in the case of such castings as are not required to be machined; that this would not obtain in the case of castings which have to be machined to accommodate present-day mass production; that through the use of ferroalloys or the straight additions of certain metals the possibility of making a product of high ultimate strength that will be easy to machine is remote; that, in the absence of heat treatment, no one has been able to impart to the slightest degree any ductility to gray iron, except to the trivial extent found in the very strong castings previously referred to. When heat treatment is applied today it is for the purpose of increasing the machineability of small castings; for the development of torsional or transverse ductility, and for the quick ageing of castings, to the end that even the slightest trace of internal strains will have been completely removed.

We might sum up the situation by stating:

That little if any improvement has been made in mechanical properties in the case of those castings that are required to be machined at a high rate of speed.

That considerable improvement in ultimate strength has been made when machineability is not a major requirement.

That no improvement has been made in ductility except slightly as indicated in the high tensile strength gray iron product previously referred to.

That, at the expense of ultimate strength, castings can be heat treated in order to make them more easily machined, and finally

That they can be heat treated in such a manner that the ultimate strength may be very slightly increased and some torsional ductility established in the case of thin sections.

Pearlitic Cast Iron

Before concluding my talk on gray iron I would call your attention to a character of product now being marketed in Germany under the name of "pearlitic cast iron" concerning which the speaker cannot talk authoritatively regarding commercial possibilities or mechanical properties. It is a comparatively new step and, in the thought that some of you may have heard of these castings and do not quite understand why the product has been given this name, a few words of explanation follow.

It is possible to have a casting in which all of the carbon is present as graphite; or, one in which all of the carbon is combined; or, the usual case where a comparatively small percentage of the total carbon is in the combined form and the balance in the form of graphite. When combined carbon is present, it is because during the solidification of the iron all of the carbon fails to separate out as graphite, with the result that the amount that does not separate unites chemically with a definite amount of iron to form a hard alloy, which in turn immediately mixes mechanically with more iron to form a tough and strong aggregate called pearlite.

To be somewhat more explicit, let us consider an iron that contains 0.25 per cent of combined carbon; which represents the amount of carbon that refused to separate out as graphite. Now, while this amount of carbon is in itself trivial, it happens that it will unite with 15 times its own weight of iron to form a very hard carbide of iron which, as soon as formed, will mix spontaneously with eight times its weight of iron to produce the aggregate referred to. In short, from this minute quantity of combined carbon there will be formed 30 per cent of the strong and tough mechanical mixture called pearlite. As about 0.85 per cent of combined carbon will yield 100 per cent of pearlite, the structural composition of a cast iron with this percentage of combined carbon will consist wholly of a ground mass of pearlite, throughout which will be distributed the balance of the carbon in flakes.

Pearlitic cast iron therefore is an iron in which the ground mass consists essentially of pearlite. The procedure used in the making of this product is to pour in a highly heated sand mold molten iron low in phosphorus, fairly low in carbon and in which the silicon content has been so adjusted that the fracture of the casting would be white if the molten metal had been poured in an ordinary green sand mold. When poured in a highly heated sand mold, however, the cooling of the iron is so retarded that time is available for considerable of the carbon to precipitate as graphite, with the result that instead of a white fracture being produced the fracture will be gray. Structurally, the ground mass will be wholly or almost wholly pearlitic; the particles of graphitic carbon will be rather small and of a nodular rather than a flaky form; the casting will be free from internal strains; while the metal will be tough and strong and accompanied with some slight ductility.

Concerning the actual mechanical properties I have been unable to secure reliable information. It is apparent that the method of manufacture would be costly in the absence of some continuous method whereby permanent sand lined molds are used or some scheme employed of which the speaker is in ignorance.

*From an address by Enrique Touceda, consulting metallurgist American Malleable Castings Association, Albany, N. Y., delivered before the National Founders' Association in New York, Nov. 21.

Germany Under Currency Stabilization

Unemployment Estimated at 2,500,000—Ruhr Agreements with French Onerous—Hugo Stinnes Reaches for Control in Czecho-Slovakia and Poland

BERLIN, GERMANY, Nov. 24. The fall of the Stresemann coalition cabinet has coincided with agreements between the Ruhr industrials and the French occupying authorities, permitting the resumption of work. The "rentenmark," a supposedly stable currency of one gold mark value, which first appeared Nov. 15, is Stresemann's most notable achievement. The retenmark is convertible into mortgage bonds, which are in turn secured on land and industrial property. It is doubtful whether the new currency will be really stable. As a result of the enormous recent rise in gold prices, which is a result of the Government's policy of artificially keeping down the dollar exchange, the rentenmark, being in law a goldmark, has in the home market only a fraction of the purchasing power of a pre-war gold mark; and has, therefore, already depreciated. The Stresemann anti-Cartels law has come into force and has resulted in the moderation of selling conditions by some of the large steel companies. Against others the authorities have instituted proceedings before the new Cartels Court. Official salaries and a part of wages are now largely paid in rentenmarks. The eight hour labor law no longer exists. This measure was enforced by a decree dating from the period of demobilization, which was last renewed up to Nov. 17, but has now lapsed. The Socialist party is pressing for its revival. Representatives of the iron and steel traders have resigned from the Steel Syndicate as a protest against the conditions imposed by the Syndicate's price commission.

The Ruhr industrials were compelled to come to terms with General Degoutte as a result of the Federal Government's inability to grant further subsidies for paying of wages and for unemployment pay. These payments ruined finances and would have killed the new rentenmark currency, the survival of which depends upon balancing the budget. Since the French occupation the Republic has advanced for pay and unemployment support 140,000,000,000,000,000,000 paper marks, at present exchange 140,000,000 gold marks; of which 90,000,000 were advanced through the Steel Financing Co., and 40,000,000 through the Coal Financing Co. Most of this money was advanced on "valorisation" (wertbestaendig) lines, which means that the debtors undertook to pay back in paper marks a sum equal in gold value to the gold value of the original paper mark loans. The industrials' debt is equal to nearly three-quarters of the whole present Federal debt of 191 quintillion paper marks. The Cabinet borrowed 100,000,000 rentenmarks from the new Rentenbank in order to prolong unemployment pay on the Ruhr; but the Rentenbank asserts that it will advance no more money for that purpose.

The agreement with Degoutte is very onerous for the industrials. The agreement was accepted by them in order to avert a hunger catastrophe, but it is doubtful whether it will succeed. The coal mining companies undertake to pay to France $15,000,000 for coal tax not paid up to Nov. 1, and to pay in future a coal tax of 10 fr. per ton, although the coal tax has been abolished elsewhere in Germany. The owners must deliver 18 per cent of their future net coal production to the Allies.

The stocks lying on the Ruhr Oct. 1 become the property of the Allies. The frontier between occupied and unoccupied Germany remains and French export licenses are required. This agreement was signed by or for the Stinnes Deutsch-Luxemburg company and the Gutehoffnung, Dortmund-Union and Harpener corporations; and binds, according to a French estimate, 80 per cent of the mines, factories and mills of the Ruhr. The chief difficulty in executing the agreement is that while the French agree that the deliveries shall be booked to reparations account, Berlin adheres to its resolution not to compensate the industrials. Berlin has also stopped compensating exporters to England for the 26 per cent of sale price which England compels native buyers from Germany to deduct under the Reparations Recovery Act. This will probably stop all export of German metal goods and machines to England, as the 26 per cent burden cannot be put on the British consumers' shoulders in shape of higher German export prices.

The continuing rise in German gold prices, which now far exceed prices in the world markets, make this transfer of the burden impossible. The higher German gold prices are, of course, not a reality. They result from the fact that while the Berlin Government keeps the official Bourse quotations for foreign exchanges far below the real value, German domestic prices conform not to the official exchange rates, but to the mark quotation abroad. This seriously damages export, as the exporter is obliged by law to sell 30 per cent of his foreign currency receipts to the Reichsbank at the low official exchange. Owing to its policy of depressing the exchanges, the Reichsbank now receives hardly any foreign currency and has of late been obliged to ration applicants for exchange to 1 and even ½ of 1 per cent of the amount demanded.

The condition in the steel and iron industry has grown steadily worse, but temporary improvement may result from the new Ruhr agreement. On Oct. 31, the last date for which precise data are available, 18.9 per cent of the steel workers were unemployed, and 51.39 per cent were working from 1 to 25 hours per week less than schedule. The number of unemployed in all Germany is probably close to 2,500,000. Because of this stagnation, November has witnessed a sharp decline in coal imports, but pending negotiations for British coal credits may lead to a slight recovery. Ore imports in September, the last month for which figures have appeared, recovered to 267,227 metric tons against 120,241 tons in August, but remain far behind the 917,811 tons, the monthly average in 1922. Iron and steel companies in unoccupied territory report operation on old orders, but great reserve is shown in placing new orders. Buyers fear that the Ruhr settlement may release large quantities of steel, with a resultant price decline. The gold-mark and shilling prices of the Steel and Pig-Iron Syndicates have not been changed.

South German firms report that a great many orders have been cancelled. At the artificial official mark exchange, foreign metals are cheaper than domestic products. The Essen *Bergwerks Zeitung* reports that at a time when British bars were delivered f.o.b. British port at £8 10s. German bars cost £11 8s. Many German firms prefer to give orders to the Saar, Lorraine, Luxemburg and Belgium. German Upper Silesia also reports a decline in orders for some materials, but pig iron demand continues. Inability to obtain foreign exchange threatens the supply of ore. Reports of the Hagen, Velbert, Solingen and Schmalkalden small irongoods and high grade steel districts are all unfavorable. Practically no foreign orders are being received. Here too, the artificially low dollar exchange held by the government has caused havoc.

The Elberfeld Eisen und Stahlwaren Industriebund, representing manufacturing, has petitioned the government demanding measures of relief. The ironware and steelware industry, says the petition, is essentially an export branch, 70 to 80 per cent of the output going to foreign markets. At present, export is threatened not only by French measures but by excessive production costs. The government is asked to bring down

rates for coal, iron and transport to peace schedules. Export control and the attendant fees, says the petition, must cease. In order to ensure a plentiful supply of raw materials, import duties should be abandoned. Finally credit for industry must be better organized and burdensome taxes, including the Industrial Tax, should be abandoned.

There is an abundance of scrap-iron as a result of the decline in melting, and agitation is strongly in favor of free export. The French authorities confiscated, without removing, large stores of scrap in the Ruhr, as retaliation for the non-payment of the coal-tax.

The General Electricity Co. (A. E. G.), in collaboration with its Austrian company, the A. E. G. Union, is founding an A. E. G. company in Czecho-Slovakia. The Enzinger Co. of Worms and the Union Maschinen A. G. of Mannheim have come to an agreement for cooperation through exchange of shares. Hugo Stinnes is reported to have acquired control of the Becker coke companies, which are near the Stinnes-controlled Bochum Cast Steel Co. Polish measures to prevent control of native works by Stinnes are under way under leadership of M. Korfanty, working with French financiers and with several Vienna banks.

BELGIAN MARKET STRONGER

No Change in Prices, but Exchange Reduces Cost in Dollars—Coke Receipts Still Limited

ANTWERP, BELGIUM, Nov. 24.—With present demand fair and a good backlog of orders, makers are no longer disposed to offer concessions to attract business. Increases of prices are considered practicable as the rate of exchange is higher than at the beginning of the month and prices offered from abroad result much better for Belgian exporters and makers. Furthermore, the political situation in Germany seems to be growing worse and fear of an early resumption of German iron and steel competition on a large scale has subsided. Greater confidence in prices has resulted and it is now generally expected that buyers will begin to place orders in hand and an increase in prices may occur at any time. It seems evident that the Belgian market, although not entirely guided by the rate of exchange, is largely affected by exchange fluctuations.

Activity in semi-finished products is satisfactory, although British demand is not so great as it has been in the past. However, no large quantities are available. Works are well booked on rolled material and are rolling all their production of ingots. The few producers with small lots available foresee a higher market than prevails at present and in consequence abstain from quoting. Production in Belgium, as well as in Luxemburg, is controlled by the coke receipts and production which is still limited. Increases of prices early this week have thus far been small, but the situation is such that the upward tendency may be greatly accentuated. Billets are no longer obtainable at less than 625 fr., or $29.10, while a fortnight ago the price was 580 fr. or, with the rate of exchange at that time, $29, but with today's rate as a comparison $27.

Following are prices per metric ton:

	Fr.	
Basic Bessemer ingots	525	$24.20
Blooms	560	26.05
Billets	625	29.10

French works have also advanced prices. Some sellers are offering billets at prices equal at today's exchange to $29.50 f.o.b. Antwerp. Hoops are quoted at 900 fr., or $41.85 per metric ton.

Prices for pig iron have changed but little. It is understood, however, that quotations will be increased shortly. Luxemburg works quote the same prices as Belgian producers, 430 to 435 fr. or about $20.10 delivered consumers' works, or f.o.b. Antwerp. French makers, however, have had to increase their prices in accordance with the rise of 20 fr. (about $1) per ton for French coke. Steel-making iron continues unchanged. No basic Bessemer is available. Production of hematite is small and prices are in accordance with British quotations and British exchange rates. Large quantities of British hematite are being imported and there is an active demand for this grade. Quotations on ordinary East Coast hematite are 108s. c.i.f. Antwerp, $23.55. Fairly large sales of British high manganese pig iron have also been made at about the same price. The British market is firmer and with the exchange at a high level customers are covering their requirements for the next three months.

Steel quotations have not yet changed in proportion to other prices. Quotations were higher last week but were reduced again so that they are at present at the same level as a fortnight ago, which is somewhat lower when expressed in foreign currency. Higher prices are expected, however. Beams are 650 fr. f.o.b. Antwerp and bar iron 700 fr. and higher, $32.55 as a minimum.

The production in Belgium for October with 39 furnaces in operation was as follows: 196,500 metric tons of pig iron; 210,000 metric tons of ingots and 211,000 tons of finished iron and steel. Compared with the figures for September there is an increase in production of about 20,000 tons of ingots and 2400 tons of pig iron. The production of finished steel was also increased by nearly 30,000 tons.

The production of coke amounted during October to 370,000 tons produced with about 200,000 tons of Belgian coal and 295,000 tons of foreign coal. This was about 17,000 tons more than in September and the largest monthly production of the year. Prices for industrial Belgian coke for December will probably range from 192.50 to 195 fr., or about $9.10.

Nominal prices for domestic consumption are given below. The quotations are per metric ton, f.o.b. makers' works. The price expressed in dollars is lower than a fortnight ago as a result of the higher rate of exchange, as base prices are unchanged.

	Fr.	
Commercial iron, No. 2	700	$32.55
Commercial iron, No. 3	725	33.70
Commercial iron, No. 4	775	36.00
Heavy sheets	750	34.90
Thin sheets	1,100	51.15
Bar iron, base	700	32.55
Rails	700	32.55
Heavy joists	650	30.25
Rods	900	42.35
Open-hearth steel: ordinary	700	32.55
Rounds	1,325	61.60
Squares	1,350	62.80
Spring steel	1,200	60.45
Galvanized wires, base	1,450	67.45
Wire nails, base	1,250	58.15

Truscon Steel Co. Shipping to Japan

YOUNGSTOWN, Dec. 10.—The Truscon Steel Co. is now shipping large tonnages of steel building products from its plant at Youngstown to Japan, states President Julius Kahn. Virtually all of this steel is required in reconstruction in Tokio, Yokohama and other sections devastated by the earthquake in September. The Youngstown plant is now filling orders which were on the books of its Japanese subsidiary at the time of the earthquake.

Partial production has commenced at the Japanese plant. Most of the machinery was damaged very little and manufacturing has been resumed in temporary buildings. The company is now shipping materials to rebuild the main factory structure of its plant in Japan, which was partially destroyed.

Plans are likewise being developed to enlarge the Japanese property, inasmuch as the company expects to receive large orders for reinforcing materials for some time.

Italian Iron Industry Depressed

The iron and steel market is depressed and production is stationary, Commercial Attache H. C. MacLean cables the Commerce Department. The demand for automobiles has declined except for low-priced cars, but the Fiat works are resuming their normal schedule on Dec. 1, after temporary reduction to a 40-hr. week.

Agents for American machine tools and other machinery report increased inquiries for American products, following the rise in German prices, which has reduced their competition.

JAPAN TO BUY IN SPRING

Luther Becker of the Department of Commerce Urges Manufacturers to Seek Japanese Trade Through Exporters or Directly

American manufacturers were urged by Luther Becker, chief of the Iron and Steel division of the Department of Commerce, in an address before the Cleveland Foreign Trade Convention on Dec. 12, to prepare their sales campaign far in advance in preparation for active buying of materials and engineering equipment under the permanent plan of reconstruction in the devastated regions of Japan. This buying is expected to start early next year and next spring should see unusual activity in the Japanese market, Mr. Becker said.

In speaking of the scope of reconstruction work, Mr. Becker said: "The Capital Restoration Board, empowered by the Japanese Government to devise and execute plans for the rehabilitation of Tokio, Yokohama and the intervening towns of the devastated area, will study the restoration possibilities of such public works as Government and municipal buildings, docks and harbor facilities, railroads, electric tramways, transformer stations, telegraph and telephone lines, roads, bridges, water works and sewer systems, all of which suffered considerable damage. Serious consideration will most likely be given to the extension of the capital city's elevated railroad in preference to the construction of the proposed subway. Damage to private enterprise in the earthquake area was serious, involving, among other industrial and engineering lines, shipbuilding, steel plates and tubes, electrical equipment and fixtures, steel and copper wire drawing, copper and brass products, wire and hemp rope, sheet galvanizing, enameled ware, metal-working machines, cement, chemicals and fertilizers, glass, cotton and wool, waste silk, paper and publishing and musical instruments. The burden of replacing these industries will fall largely on the individual, with such assistance as the Government is able to give. The reconstruction of Japan's large and important Naval arsenal and shipyard at Yokosuka will come under the supervision of the Naval board.

"Reports from the several committees working under the Capital Restoration Board, including that on city planning, are to be presented to a special session of the Diet, which was called for Dec. 10, to which publicity is to be given according to a promise made by the board. Final settlement, however, of the plans and of the budget to cover expenditures therefor will be carried over to the regular session of this body to convene 15 days later. Out of the deliberations and conclusions reached by the Diet will come a program which will provide for the restriction of industrial areas, the widening of streets, a building code specifying the type and size of buildings, kinds and quality of materials, more economical and efficient methods of construction, fire-prevention measures, etc."

In seeking business in Japan, Mr. Becker pointed out that the manufacturer could deal through the Japanese import houses represented in New York, San Francisco, Seattle and other seaboard centers, through the few American export companies that are firmly established in Japanese trade, or through their own representatives, where possible, companies of dissimilar lines pooling their interests to maintain an office and representative in Japan.

FRENCH MARKET IMPROVES

Ruhr Agreements Produce More Confidence—Rolling Mills Active—Structural Steel for Japan

PARIS, FRANCE, Nov. 30.—A slight change has been noticed during the past two weeks. Following the failure of their price concession policy, producers, in a new endeavor to stimulate activity, increased quotations, pointing to the rise in coke prices of 8 fr. per ton, and higher prices of raw materials because of the exchange.

Improvement in sentiment, however, is the result of the conclusion of agreements with the Ruhr industrialists, which are likely to bring some increase in the coke deliveries and temporary tranquillity. Although the results of these agreements are still uncertain it is felt that it is a new step toward a solution and there is consequently renewed confidence.

Export business is not as satisfactory as during the past months. Some fairly satisfactory business has been concluded with South American markets and Japan. This resulted in the withdrawal of some firms from the market, or in some cases increases in prices.

Coke.—For the first 27 days of November Ruhr supplies of coke were 180,518 tons, or a daily average of 6700 tons. This is about half the pre-occupation figure. It is hoped that this level will be maintained or even increased as a result of the agreements just concluded. The equalization price of metallurgical coke is at 220 fr. for December. Belgian coke is raised 1.50 fr. per ton to 194 fr. for December. British grades are firm and dearer because of the exchange rates on the pound sterling which yesterday was again at 81.18 fr. The A. R. B. E. D. (Luxemburg) has just placed an order for 150,000 tons of coke in England.

Pig Iron.—The pig iron output for October increased and it is believed was maintained in November. Prices are generally firmer, although some producers are still offering slight concessions. The ruling quotations are 400 to 410 fr. and even 415 fr. in exceptional cases. In hematite, the situation is also improved at 425 to 450 fr., f.o.b. works, depending upon the district, the lowest quotations prevailing in the Southwest. For export, Lorraine and Luxemburg find an obstacle to low quotations in the rise of coke and are asking f.o.b. Antwerp 435 to 440 fr. (Belgian).

Ferroalloys.—Low production is causing higher prices, especially in ferrosilicon. As far as ferromanganese is concerned, prices are strongly upward because of the high exchange on the pound sterling; the minimum price is 1,550 fr. for the 76 to 80 per cent Mn. Spiegeleisen, 18 to 20 per cent, is 700 fr. delivered.

Semi-Finished Products.—The market is unstable and prices differ with various plants. Orders are generally scarce, which explains the variation of prices. Domestic and export quotations are as follows per metric ton for basic material:

	F.o.b. Antwerp Fr.	Domestic Fr.
*Ingots	520 to 530	450 to 470
Blooms	540 to 560	490 to 510
Billets	570 to 580	520 to 550
Largets	590 to 600	.....

*Open-hearth, 25 to 30 fr. higher.

Rolled Products.—This market is extremely firm, with orders more numerous and deliveries of 6, 8 and even 10 weeks. In rails, small transactions are recorded. Very few inquiries are noted in beams with prices ranging from 56 to 59 fr. (Sarre and Lorraine). Demand has increased for merchant grades and orders for small shapes have been so numerous that plants are now refusing to quote deliveries for new contracts. The minimum price for large orders is 58 fr. with 63 fr. the maximum. An order for 36,000 tons for Japan has been booked by the Schneider works and one firm in the West region. F.o.b. Antwerp, beams are 650 fr. and bars 700 fr. (Belgian currency).

Sheets.—Large flats and structural sheets are in active demand. Other grades are declining. Large flats are quoted at 62 to 65 fr. per 100 kg.; heavy sheets at 66 to 69 fr.; medium sheets at 75 to 80 fr.; light sheets at 90 to 92 fr. per 100 kg. at works East Lorraine.

French Pig Iron and Steel Output for October

On Nov. 1, of 219 existing blast furnaces, 116 were in blast compared with 111 on Oct. 1, an increase of 3 in the East and 2 in Lorraine; 56 ready for operation against 60 Oct. 1, and 47 under construction or repair, against 48 Oct. 1.

The production of pig iron was 514,230 tons compared with 481,874 tons in September. The steel ingot output was 476,696 tons, against 446,480 tons in September, and included 286,336 tons of basic Bessemer steel and 179,935 tons of open-hearth.

CORPORATION CLOSES CASE

Ends Its Direct Testimony in Basing Point Hearing—Economists Will Testify

WASHINGTON, Dec. 11.—The last chapter in the hearings in the Pittsburgh-plus case was begun here yesterday when the United States Steel Corporation concluded its direct evidence. The Federal Trade Commission through Attorney H. K. Steinhauer then began the presentation of rebuttal evidence. Middle Western States through their legislatures are represented by their attorneys general or other counsel, while the City of Chicago is represented by Assistant Corporation Counsel Leon Hornstein in opposition to the Pittsburgh-plus practice.

It is also the purpose to protest against the plan through evidence by three economists from universities of the country, including William Z. Ripley, of Harvard; Frank Fetter, of Princeton, and John R. Common, of the University of Wisconsin.

The Steel Corporation testimony of yesterday was begun by evidence given by C. S. French, of the *American Metal Market*, who recited the method of marketing non-ferrous metals, including spelter, tin and copper. He stated that copper and spelter are quoted on an f.o.b. basis at the smelters, while tin, an imported product, is generally quoted f.o.b. New York, inasmuch as most of the incoming shipments passed through that port. Statistical statements also were presented by A. V. Winter, of the Illinois Steel Co., and C. K. Winslow, of the Steel Corporation.

"Grotesque" Prices

Testimony was given today by Dr. Fetter. Replying to a question by Mr. Steinhauer, he stated that steel producers in the Pittsburgh district would, under the natural economic law, benefit from what he called the "marginal principle" when shipping to the Chicago territory by getting the Pittsburgh base price plus the full freight rate, granting that Chicago mills were not able to meet the demand. When and how long the Pittsburgh mills could continue to do this under the natural laws, he said, depended upon the reaching of the saturation point of demand at the place of delivery. After this point had been passed, he declared, it ought not to be possible to get the Pittsburgh base price plus the full freight. The result, it was said, would be that the Pittsburgh base would be somewhat lower and the Pittsburgh area pushed out, while the Chicago area in full directions would be pushed in.

Dr. Fetter said that, assuming the Pittsburgh plus plan now is in actual operation, it is a discriminatory practice resulting in the establishment of prices that are "grotesque" to the extent that there is interference with the law of supply and demand. He said that the discriminatory effect of the Pittsburgh plus plan is a terraced discrimination, whereas the law of supply and demand requires that prices be adjusted to production. Dealing with a hypothetical question, he asserted that a series of discriminatory prices inevitably demonstrates the lack of competition, although a discriminatory price may be said to meet competition at a particular point, while evading that competition at a number of other points.

The attorneys for the Steel Corporation are C. S. Severance and W. W. Corlett, while the attorney for the commission is H. K. Steinhauer. It is expected that the present proceeding will last throughout the present week and the greater part of next week.

The Hearing at Buffalo

BUFFALO, Dec. 10.—To expedite hearings before the Federal Trade Commission on the Bethlehem-Midvale merger, Examiner George McCorkle held evening sessions last week.

Buffalo fabricators furnished most of the testimony. Examination of several witnesses was along the same lines that marked earlier examinations and nothing new has been brought out.

John J. Sullivan, manager of the Henry N. Allen Forging Corporation, Auburn, N. Y., testified that since Jan. 1 this year there was more competition along other lines than on bar tonnages. After examination touching on the various steel concerns from which witness made purchases, Mr. Sullivan said that in the purchases of forgings deliveries were the most important consideration in determining whether he bought from one concern or another. William C. Hoffman, secretary and treasurer, Erie Steel Construction Co., Erie, Pa., said he had no complaint to make of prices or deliveries since October, 1922.

George S. Kellogg, president Kellogg Steel Corporation, Buffalo, testified Thursday and Friday. More than 700 exhibits dealing with purchases by the Kellogg company from a number of steel mills were introduced. Mr. Kellogg said a wider variation in prices existed since the war than prior to 1917. Stewart M. Carroll and Harry H. Elmer, the former purchasing agent and the latter general manager of the Malleable Iron & Steel Co., Syracuse, testified as to purchases of drop forgings and large size flats. George R. Feine, president August Feine & Sons Co.) Buffalo, testified that the falling off in demand this year had not brought about reductions in prices such as he could expect.

LITTLE EXPORT BUYING

France and Belgium Booking Small Orders and Possibly 12,000 Tons of Rails for Chile

NEW YORK, Dec. 11.—But little activity is noted in any foreign markets. South American business continues chiefly for small lots. The Chinese market is dull, the principal inquiry being for wire shorts, which are difficult to obtain in any quantities, and second-hand material. On both grades Chinese price ideas are, as a rule, low. Usually $26 per ton, c.i.f. Chinese port, is about the best offer made by merchants on second-hand material, which, in the face of an upward movement in the domestic scrap market, almost precludes any business.

The Japanese market is extremely quiet, no action by the Government yet being noted and the few small orders being placed by merchants apparently going to Belgium or France at lower than the prices quoted by American mills. Some slight activity in purchases of sulphate of ammonia has recently appeared.

Any possibility of importing rails from Europe is considerably discounted by importers, who have in the past made offers to railroads in the United States. It is reported that the rail tender of the Chilean State Railways, which called for about 12,000 tons of 100-lb. rails, will probably be awarded to a Belgian mill.

North African iron ore, low in phosphorus, continues firm at 11c. per unit, c.i.f. port. Caucasian manganese ore is more active than recently and the price shows an increase to 40c. per unit for the ordinary and 42c. for the washed. An importer who represents mines of the Caucasus has closed on 30,000 tons of manganese ore, for delivery over the first half of 1924 to two furnaces in eastern Pennsylvania, 15,000 tons to each consumer.

Arrangements have been made between the Westinghouse Electric & Mfg. Co. and Japanese electrical interests for the formation of a Japanese electric manufacturing company, according to statements from Gen. Guy E. Tripp, chairman of the Westinghouse Electric & Mfg. Co., and L. A. Osborne, president of the Westinghouse International Co., now in Japan. The new company is to be known as the Mitsubishi Denki Kabushiki Kaisha (Mitsubishi Electric Manufacturing Co.). The Westinghouse company has subscribed for stock in the new company. A third interest will be held by Takata & Co., importers and exporters, with New York office at 30 Church Street, New York, who represent the Westinghouse International Co. in Japan.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, states that it has not purchased 38 pipe-threading machines, as recently reported in THE IRON AGE. It has purchased four from the Pipe Machinery Co., Cleveland, but has not placed the order for the remainder.

TONIC FOR BUSINESS

President Coolidge's Views on Economic Problems Generally Commended

WASHINGTON, Dec. 11.—Striking out courageously, President Coolidge in his message to Congress proposed a legislative program that it is fair to say has received a favorable reaction from the country. To business generally it came as a tonic. Despite criticism that has been made of it from the various blocs in Congress, it is accepted generally as carrying some features that even the so-called Progressives have been unable to condemn entirely. This is especially true of the taxation program, which is a full indorsement of recommendations made by Secretary Mellon. This program would mean a reduction in taxes from the highest to the lowest taxpayer and consequently it has carried a wide appeal to the country. Whatever Congress may do, it is believed that if it actually does enact any legislation of importance, instead of finding itself in a deadlock, as seems likely in many instances at least, it will have to accept the soundness of a portion of the taxation program. There already has developed much antagonism among so-called Progressives to reducing the surtaxes and an effort to restore excess profits taxes, but the proposed reduction in normal taxes along the lines suggested by the Administration does not promise to meet a great deal of opposition, although if legislation is enacted, it may modify the Administration program to some extent.

The opposition of the President to a bonus for legislation was outspoken and met with the expected criticism in Congress. There is such strong support for a bonus in the House that it is sufficient to override a veto of the President, but there is doubt as to how the Senate would vote.

The President also has been criticised by members of the farm bloc for confining proposed aid to the agricultural community to that which can be furnished by present agencies like the War Finance Corporation, but without further use of public funds or price fixing. His proposal to prohibit tax-exempt securities apparently has met with no great protest. Continued restriction of immigration along the lines the President suggested also has been proposed in bills introduced, and it is conceivable that such legislation will be enacted. His opposition to tariff tinkering is thought to indicate that nothing will be seriously attempted to change tariff duties by legislation, although the farm bloc may make a drive for political effect to increase duties on wheat and perhaps other agricultural products.

Secretary Mellon's Views on Railroad Buying and Taxes

WASHINGTON, Dec. 11.—In looking forward to 1924 it appears that the factors which have been most influential in the revival that has taken place are likely to remain effective, at least in considerable degree, is the opinion of Secretary of Treasury Mellon as expressed in his annual report. He says:

It may be that the country will not build as many dwelling houses or freight cars as in 1923, but there is reason to believe that much construction work is under consideration and with stable conditions will go forward. The attitude and circumstances of the railroads will be an important factor in the situation. They are large consumers ordinarily of iron, steel, and all construction materials, and they have not made up in one year the accumulated deficit in construction since the beginning of the war. The country has benefited in marked degree during the past year, not only from the direct effects of their liberal expenditure upon the employment situation but from the results in improved transportation service. There is one unsatisfactory feature about the large capital outlays upon the railroads in the past year, and that is that they have been almost wholly provided by borrowing and are represented by bond issues. It is evident that the railroads can not be permanently financed in this manner. Unless a proportion of the new capital is provided in the form of proprietary investment, the credit of the companies will suffer, interest rates upon their offerings will have to be advanced, and in the end further borrowing will become impracticable. The public is interested in maintaining the credit and the service of the roads, and especially interested now that their expenditures shall be in 1924, as in 1923, a strong supporting element in the general employment and business situation. The companies have been operating this year under conditions more than ordinarily favorable to earnings, owing to the heavy volume of traffic, but they have not prospered alike in all sections of the country.

Dealing with the increasing burden of local taxation, the Secretary of Treasury says that these taxes are affecting land values unfavorably and in this causing a state of discontent which does not always place the blame where it belongs. One cause of these high local taxes, he says, is to be found in the borrowing of local branches of Government, stimulated by the ready market for tax-exempt securities, resulting from the high surtaxes upon incomes. The statistics of local indebtedness show that the interest burden is becoming a very serious one in local budgets.

Mr. Mellon strongly recommends reduction in taxes along the precise lines he set forth in a recent letter to Chairman Green of the House Committee on Ways and Means, and which has been detailed in THE IRON AGE. At the same time, he opposes bonus legislation.

Annual Oakite Sales Conference

The seventh annual sales conference of the Oakley Chemical Co., held in New York, Dec. 3, 4 and 5, brought to its offices at 22 Thames Street the 70 members of its field organization. In the three days seven sessions amounting to a total of 20 hours were devoted to papers and discussions on the selling methods of the company and to its handling of the cleaning problems of various industries. Four of the papers related to the metal working industries and one to power plant equipment. Tuesday night, Dec. 4, was given up to entertainment and Wednesday night to the annual banquet. C. F. Radley, editor of the Oakite News Service, was the toastmaster. Among the features were the presentation of prizes for the best story written by a salesman on "My Most Difficult Sale" and the awarding of handsomely engrossed testimonials to the salesmen who during the year succeeded in selling every prospect in a town in their territory. Inspirational addresses were made by David C. Ball, president of the company; Daniel C. Smith, vice-president; David S. Ball, assistant manager, and Fred A. Aston, senior district manager.

Institute of Weights and Measures

At the annual meeting of the American Institute of Weights and Measures, held Dec. 6 at the Engineering Societies Building, New York, the president, W. R. Ingalls, announced the election by letter ballot of the following as members of the council of the Institute for the ensuing three years: George N. Bond, specialist in precision measurement; Robert H. Irons, president, Central Iron & Steel Co.; H. J. Horn, John A. Roebling's Sons Co.; H. N. Covell, works manager, Lidgerwood Mfg. Co.; A. R. Erskine, president, Studebaker Corporation; J. B. Ennis, vice-president, American Locomotive Co.; Herbert E. Cushman, treasurer and general manager, Morse Twist Drill & Machine Co.

Year's Car Loadings May Reach 50,000,000

On the basis of the loading of revenue freight through Nov. 24, the American Railway Association estimates that the total loadings for the year will exceed 50,000,000 cars. This is the largest number in history and exceeds by 2½ per cent the estimate for the year which was made early last spring. For the most recent 38 weeks, beginning March 10 and ending Nov. 24, the average has been more than 1,000,000 cars per week. In 21 weeks the figure exceeded 1,000,000.

NOVEMBER STEEL OUTPUT

Production Rate 11,644 Tons a Day Below That of October

The output of steel ingots in the United States in November declined nearly 9 per cent from that in October and compares with a falling off in the previous month of less than 1 per cent from September. The statistics of the American Iron and Steel Institute indicate a daily rate last month of 119,762 gross tons, as compared with a daily average of 131,406 tons in October, the decrease being 11,644 tons a day. In October the decline from September was only 1241 tons per day.

The November output of companies which made 95.35 per cent of the country's total in 1922 was 2,969,012 tons which, assuming that the 4.65 per cent not reporting produced the same percentage of the total as in 1922, points to a total November output of 3,113,804 tons.

The table below gives the production by months for 1923 of the different kinds of steel, together with estimated daily rate for all companies. Following it is a table showing the production by months in 1922:

Monthly Production of Steel Ingots, January, 1923, to October, 1923, Reported for 1923 by Companies Which Made 95.35 Per Cent of the Steel Ingot Production in 1922

Months 1923	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies, Gross Tons
Jan.	2,906,892	728,270	9,467	3,822,369	141,569
Feb.	2,613,564	669,903	10,797	3,454,918	143,955
March	3,046,309	799,525	12,841	4,046,854	149,883
April	2,974,579	772,485	13,933	3,944,412	157,776
May	3,136,558	847,418	16,719	4,195,800	155,400
June	2,821,239	737,845	15,483	3,748,890	144,188
July	2,658,449	680,884	11,496	3,514,241	140,570
Aug.	2,796,370	701,059	9,326	3,677,771	136,214
Sept.	2,539,653*	613,709	8,602	3,316,166*	132,647*
Oct.	2,724,371	649,452	9,163	3,547,266	131,406
Nov.	2,343,364	616,335	9,309	3,113,804	119,762
11 mo.	30,561,352	7,816,885	127,136	40,383,191	141,200

*Revised

Monthly Production of Steel Ingots, January, 1922, to December, 1922, Reported by Companies Which Made 84.15 Per Cent of the Steel Ingot Production in 1922

Months 1922	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies, Gross Tons
Jan.	1,260,809	331,851	822	1,593,857	72,764
Feb.	1,395,835	348,571	616	2,071,772	86,324
March	1,918,870	451,386	795	2,814,667	104,247
April	1,997,465	445,939	1,109	2,902,240	116,090
May	2,214,774	494,893	1,474	3,218,794	119,215
June	2,143,708	487,851	2,918	3,127,775	120,299
July	2,020,572	464,047	2,485	2,952,806	118,112
Aug.	1,807,310	464,379	2,893	2,629,256	97,380
Sept.	1,911,147	460,127	2,505	2,818,261	108,395
Oct.	2,352,207	518,010	2,198	3,410,265	131,164
Nov.	2,360,903	525,945	2,449	3,430,309	131,935
Dec.	2,241,104	536,214	2,572	3,300,416	132,017
Total	23,624,404	5,469,213	22,836	34,568,418	111,511

Eyesight Conservation in Industry

Twenty-nine thousand employees of the Ford Motor Co. have defective vision, according to a report made by that company to the Eye Sight Conservation Council of America, which is conducting a survey of eyesight conditions among the nation's industries.

The present number of employees of the Ford Motor Co. at Detroit is 65,000. Of this number, 60,000 have received eye examinations, and of these 31,000 were found to have normal vision, and 29,000 defective vision. Although very high, it is thought that the percentage of defective vision would still be higher if more complete eye examinations were made. It is not considered necessary to do this except in special cases.

The company first started tests for sight in 1912. Employees with poor vision are placed on jobs where there is no risk of injury or other conditions that would make his eyesight worse. A careful job analysis has been made throughout the plant for the purpose of determining what jobs are suitable for those with poor eyesight.

The E. I. du Pont de Nemours & Co., Wilmington, Del., reported the adoption of a system of eye conservation, eye examinations having been started at the Wilmington plant five years ago. At the dye works eye protection is promoted by a works safety committee and penalties are imposed for failure to comply with the rules issued. The eye accident reduction rate for the period during which the eye protection campaign has been functioning is reported to be 66 2-3 per cent. There were only three lost time eye accidents during the first six months of 1923.

Modern equipment is used to provide proper lighting, and full advantage is taken of daylight wherever possible. When thought of advantage, walls and ceilings are painted to improve light conditions.

Steel Corporation's Orders Decline

Unfilled business on the books of the United States Steel Corporation, as of Nov. 30, amounted to 4,368,584 tons, or 304,241 tons less than reported for Oct. 31. During October, unfilled orders fell off 362,925 tons; in September, 378,913 tons; in August, 496,100 tons; in July, 475,498 tons; in June, 595,090 tons; in May, 307,158 tons and in April, 114,823 tons; while in March they increased 119,343 tons; in February, 373,213 tons and in January, 165,073 tons. A year ago the unfilled tonnage was 6,840,242, or 2,471,658 tons more than on Nov. 30 last. Following is the unfilled tonnage as reported by months since January, 1920:

	1923	1922	1921	1920
Jan. 31	6,910,776	4,241,678	7,573,164	9,285,441
Feb. 28	7,283,989	4,141,069	6,933,867	9,502,081
March 31	7,405,332	4,494,148	6,284,765	9,892,075
April 30	7,288,509	5,096,913	5,845,224	10,359,747
May 31	6,981,351	5,254,223	5,482,487	10,940,465
June 30	6,386,261	5,635,531	5,117,868	10,978,817
July 31	5,910,763	5,776,161	4,830,324	11,118,468
Aug. 31	5,414,663	5,950,105	4,531,926	10,805,038
Sept. 30	5,035,750	6,691,607	4,560,670	10,374,804
Oct. 31	4,672,825	6,902,287	4,286,329	9,836,852
Nov. 30	4,368,584	6,840,242	4,250,542	9,021,481
Dec. 31	.....	6,745,703	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, at 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Vickers, Ltd., and International Combustion Engineering Corporation Combine

George E. Learnard, president International Combustion Engineering Corporation, New York, who has just returned from England, announces that negotiations which have been going on for several months between Vickers Ltd. and International Combustion Engineering Corporation for the joining of these two interests in the manufacture of power plant equipment have been successfully concluded. A new company will be immediately registered in England under the name Vickers & International Combustion Engineering Ltd. with an initial capital of £500,000. All of the stock is owned in equal shares by the two companies.

The plant of the new company is situated at Barrow-in-Furness, England, and it will commence immediately the manufacture in its own works of boilers especially adapted for the burning of coal in pulverized form, superheaters, economizers, Raymond impact pulverizers, dryers, air heaters and other auxiliary equipment.

The new company will specialize in the designing, building and equipping of complete power plants, all units of which can be manufactured by the new company and by other companies affiliated with Vickers Ltd. or International Combustion Engineering Corporation.

The directors of the new company are: Sir Trevor Dawson, London, England, deputy chairman and managing director of Vickers Ltd., chairman of new company; George R. T. Taylor, managing director Taylor Brothers Ltd., Leeds and Manchester, England (a Vickers subsidiary), managing director of new company; George E. Learnard, president International Combustion Engineering Corporation; Wilfred R. Wood, vice-president International Combustion Engineering Corporation.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* — PRINTED IN U. S. A. — George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 416 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Why the Foundries Bought Pig Iron

COMMENT on the recent buying movement in pig iron has taken a considerable range. In some of the financial columns of the daily press it has been pointed to as the prelude to a revival in business, following many weeks of abstemious buying and of contracting business in a number of lines of trade.

Over against such opinion has been the view that as pig iron had been declining for seven months under heavy production and continued accumulation of stocks, the time came when some sellers were willing to take less than their cost in order to lighten their load; that consumers, recognizing that bargains were going, took on iron for at least part of their probable wants in the first quarter of 1924, believing that with such low-priced pig iron the prices they were likely to get for their own products would show at least a fair profit.

Again it has been pointed out that the buying was not speculative; that while the prices were low enough to be attractive, consumers had real business in hand and had to have pig iron.

It is probably the fact that more than one factor entered into the simultaneous decisions of so many users of foundry iron to buy pig iron for delivery in the first quarter of the new year. The pig iron offered was bargain iron, and it was also true that for a good many foundrymen it was time to buy. They might have gone on for some time further, buying sparingly in view of the long drawn out decline. But while some furnacemen had explained that the pig iron price was at their cost line when the market was several dollars a ton higher, enough was known of the costs of furnaces well situated, and owning at least some of their raw materials, to justify the claim that at last the cost line of some of the fittest producers had been reached. What was likely, if buyers continued to hold off, was a more drastic reduction of output and a little later a rush to cover, when it appeared that production was well below the rate of consumption.

The statistics of pig iron production and stocks had been running for months in favor of the buyer. In May of this year the country was producing pig iron at the rate of 45,000,000 tons a year (although 39,400,000 tons in 1916 is the best year's record) and merchant pig iron was a much larger percentage of the total than it had been at any time in the year previous. As between steel-working and merchant pig iron the situation in May of this year and in May of 1922 was this:

	Daily Output Steel-Making Iron, Gross Tons	Daily Output Merchant Iron, Gross Tons
May, 1923.....	96,000	28,700
May, 1922.....	60,600	13,800

Thus, while steel-making iron was produced last May at a rate 60 per cent greater than in May, 1922, the increase in merchant pig iron production was more than 100 per cent. It was well known that foundry operations had not expanded in the year to the same extent as those of industries using finished steel. Hence the months of careful buying of pig iron by foundries, after the production peak in May, were due to the full knowledge by foundry operators that their raw material was in oversupply and to the further fact that the iron the foundries had bought under the somewhat feverish conditions of last spring would carry them further toward the end of the year than they thought when they bought it.

A million tons of pig iron is by no means enough to carry our foundries through a three months' operation, even on the present scale of production of iron castings. After the way in which they kept out of the market between April and November, the presumption is that many of them will yet need a good deal of iron for the first quarter of 1924 even if they make no increase upon the rate at which they are producing today.

INDIA'S iron and steel industry is comparatively new, but good progress has been made in its development, particularly in finished steel products for export. According to the latest official figures exports had practically doubled to August this year. In 1913 India's outer trade in steel amounted to 8700 gross tons per month and in 1922 to 8300 tons per month. But for the first seven months of this year exports were about 17,000 tons per month, with the May and June fig-

ures at 22,300 tons and 20,500 tons respectively. India's steel plants enjoy such advantages in costs and location as will make their competition with the larger steel-producing countries increasingly felt in the future.

Record World Tin Plate Demand

WHILE steel exports from the United States this year have been at a low rate, the movement of tin plate has been a good deal larger than in 1912, 1913 or 1922. This is undoubtedly a contributing cause of the steadiness of the tin plate market. In 1913 our exports of that product were 6100 gross tons per month; to Nov. 1, this year, they have been over 50 per cent larger at 9220 tons per month, a figure exceeded only in the halcyon post-war years, 1919 and 1920, when other nations were unable to export. But the rising tide in foreign demand is not confined to American tin plates—British sales have mounted to a volume unequaled in the last ten years. For the first ten months of this year the British exports were 45,400 tons per month, against 41,200 tons per month in 1913. Last October they were 51,400 tons. A record is being established, therefore, in the world demand for tin plate as judged by the combined British and American exports. The actual average is 54,620 tons per month to Nov. 1, as the exports of the two nations, against 47,300 tons per month in 1913. In other words, the world demand for tin plate is about 7000 tons per month larger now than before the war. It is also greater than for any year in the last decade.

Cycles in the Iron Trade

IN the annual statistical report of the American Iron and Steel Association for 1886, the late James M. Swank drew attention to the great ups and downs of the iron trade. At another time Mr. Swank used the expression "feast or famine," while Andrew Carnegie's "prince or pauper" reference is quite celebrated.

Just before the war there was the popular impression that the steel trade had been growing steadier, over a period of years. Statistical comparisons, covering both rates of production at various times as well as market prices, did not fully confirm the popular view, but gave it some support.

The history of the past eight or ten years presents no direct evidence that the industry has become more stabilized. There have been very remarkable swings in both prices and production. This, however, is no test. A greater disturbance occurred in the period than had ever occurred before. There was not only the war, but the peculiar conditions after the war, when men did not know just where to find themselves. They had lost the normal for comparison and were unable to set up a new normal. That there have been great fluctuations in recent years does not, therefore, prove that the general swing over a long period is not toward a condition of less instability.

It is to be assumed that men profit by experience. The greater experience they have had, the longer the history of great ups and downs in iron and steel, the more men are going to avoid being carried away, the more likely they are to regard the existing condition as one that is to be succeeded by the reverse condition.

The result of such mental attitudes is that a stabilizing or damping influence is exercised. When prices advance sharply men are less disposed than formerly to regard the new level as permanent, and the same with declines. Among sellers there is less disposition to push prices up and less disposition to allow them to sag. Plainly the tendency of the industry toward consolidation makes it more likely that extremes will be avoided.

Perhaps it would be entirely true to assert that this tendency toward more stable conditions in steel has been exemplified in the past year. Steel prices were not advanced early in the year as far as they could have been, while on the other hand the expectation of declines in the summer and fall was so strong that the common remark lately has been that the steel market is much better than was expected.

Taxation and Enterprise

SECRETARY MELLON'S plan for reduction of Federal taxes and revision of the system has met with a widespread and enthusiastic commendation that has rarely been accorded the recommendation of any Government official in the history of the country. In his report to Congress the Secretary of the Treasury sets forth plainly the reasons why the proposed changes should be made.

Society has so constituted itself to supply its material needs that its work is done on a large scale, requiring directing heads and the subdivision of labor. Thus progress is made. The entrepreneur and capitalist put better tools in the hands of workmen; thereby the workmen accomplish more and all benefit.

It cannot be argued that there is merely so much capital in the country and that the capital will find investment, no matter what the Government does. This is not true, in the first place, but even if it were true it is easily seen that taxation has much to do with the placing of capital. To consider the matter only from one angle, but the most important one, there are the tax-exempt securities, chiefly of States and municipalities, which Secretary Mellon reports amount to about $11,000,000,000. They exist and they have to be owned by somebody.

Does it matter who owns these securities? It certainly does. They represent improvements that would be made in any event. The State or the municipality has its own ideas as to what improvements should be made, and has engineers to carry out the ideas. The owners of the securities involved have nothing to say about it. They may just as well be private citizens—even widows—of limited means. If they invest their small capital otherwise they cannot initiate, plan and direct. The diminishing number and amount of large taxable incomes year by year show how these tax-free bonds have moved into the hands of men having large wealth, who show by that

fact that they have ability to initiate, plan and direct. The number of taxable incomes over $300,000 has decreased year by year at a remarkable rate, except for 1920, and the total of such incomes has decreased except in 1919 and 1920, which showed increases. Both number and total were smallest for 1921.

These men of capital, fitted to plan and direct, to initiate and to carry through enterprises which would be of great economic benefit to the country, placing better tools in the hands of workmen and giving the country better goods and better service, have become the owners of tax-exempt securities, in connection with which their ability does not count, and the capital is thus removed from productive enterprise.

To reduce the surtaxes is to bring out more capital for development, for productive enterprises. Thus to increase the prosperity of the country is the plain duty of a wise government. Thereby, as Secretary Mellon suggests, the amount received in taxes may even increase. It is like a landlord improving the property so that the tenant's income will increase and a reduced percentage of his income will still make a higher rent.

Bonuses to the Ex-Soldiers

ALREADY the so-called soldier bonus is looming up as a leading issue in this session of Congress. From the bill the last Congress passed granting the bonus we were saved only by the President's veto. Up to a few weeks ago it seemed likely that the present Congress would again be strong for it, and with a new President would take a chance respecting him. But Secretary Mellon with his proposal for tax reduction has introduced a new feature that is highly embarrassing to the politicians by virtue of the popular reaction it has produced.

It has been represented that the last Congress acted as it did out of fear of the American Legion; also that if it were shown by the referendum some of the veterans are trying to bring about that a majority of them are opposed to the measure Congress would lose all fear of the American Legion and would protect the taxpayers.

The above idea is plausible, and not long ago we might have believed it. The result of the recent election in the State of New York, however, affords food for more thought on this subject. In that election a large vote was cast on a number of constitutional amendments and the people evidently exercised discrimination, for some they voted down (including one bad one) and others they enacted. We deduce therefrom that the voters of New York knew what they were doing, or (better said) they gave some thought to it.

Among the amendments enacted was one authorizing the issuance of $45,000,000 of bonds to raise money for the payment of a State bonus to former soldiers. It is clear from this action that a majority of the voters of New York State want to give a bonus, just as the people of other States have done. Certainly they were cringing under no lash in the hands of the veterans, as a legislature of politicians might be supposed to do. It is a reasonable inference, therefore, that Congress itself is strong for the bonus, not out of fear of the American Legion, but rather out of sensing that a majority of the voters want to give it.

In making this diagnosis we are in no way intimating that the voters ought to want to give these bonuses. On the contrary, the desire is reprehensible. The levity with which the people of the State of New York voted a great sum of money as a bonus to a few, which must come out of the taxpayers, is shocking. It is to be feared that there is a similar unconcern among us nationally.

We have been saved so far from the perpetration of this economic crime by the efforts of such leaders as Senator Smoot, Secretary Mellon and the lamented President, but they have expressed their opposition on the grounds that the treasury did not have the means and that there should be no bonus unless Congress provided for it by new taxation. They have not come out, nor has anyone else, speaking with the voice of authority, with a declaration that the bonus should not be granted for the simple reason that it is bad. What ought to be said further is that it is vicious to take money from some people in order to give it to a few; that the contention of some of the veterans for "adjusted compensation" has no merit; that if a mechanic drafted into the military service lost the chance for inflated wages that were enjoyed by the mechanics who escaped, the unfairness was in the stay-at-homes getting too much, not in the soldiers getting too little.

The war did not enrich this nation as a whole, but rather did it act oppositely. It did, to be sure, produce economic unbalances, whereby certain classes of wage earners profited greatly at the expense of capitalists and other classes of wage earners. That some wage earners in rendering patriotic service lost their opportunity to participate in such profiteering is no sound reason that *ex post facto* they should be granted a sop. The war profits of corporations were largely taken away from them immediately through excess profit taxes. What was not taken away and what looked like profit was largely no such thing, but was investment in excess plant that was destined to be thrown away. A sop to the ex-soldiers can come from nowhere but out of what the taxpayers of the country are currently earning. It can do nothing but produce the economic evil of taking a portion of the produce earned by some people and giving it to others who have not earned it, which is not to minimize the gratitude that the country owes to its soldiers, although it might be mentioned that there are millions of other men who served patriotically even if not in uniforms.

Whether the money for the bonus be found by direct taxation or by bond issues the principle is the same and so will be the results. The majority of the people of the country do not understand this. It is the duty of their political leaders to instruct them. That is what leaders are for, or it ought to be. Is it not true, too, that a large part of the press is derelict?

It is a foolish adage that the voice of the people is the voice of God. Instead of the voice of the people being the voice of God there are many

popular voices, which are quickly changeable. Secretary Mellon has shrewdly presented the people something that they can understand. In submitting to them the question whether they prefer to save money in their direct taxes, or to continue to pay high taxes and give the money to the ex-soldiers, he has developed a clear-cut issue. With such a one even the people of New York might have voted differently last November. We hope, however, that in the debates in Congress there will be some great leaders who will make it clear that there ought not to be a soldier bonus, simply because it would be wrong.

THE vicissitudes of promoting legislation are well illustrated in the efforts of several years to secure among the States steam boiler inspection statutes conforming to the boiler code of the American Society of Mechanical Engineers. Progress has been made, but seemingly adoption by some States is no promise whatever that the way is made easy to get prompt and favorable consideration in other States. Experiences of the past year bring into relief not only the need of perseverance but the call for forbearance. In Indiana, after smoothing out a number of legislative tangles, the engineer sponsors of country-wide harmonious boiler laws were chagrined to discover that a bill that finally passed both houses failed of the legal signing by the governor of the State because the clerk overlooked certifying the bill before final adjournment. In Kansas, because a bill provided for making an appeal to the apparently odious industrial court, any prospect of consideration was doomed. In Iowa, the use of the name engineer was sufficient to cause the withdrawal of the bill. Clearly a sense of humor as well as enthusiasm is required in one who would be coadjutor to the legislator.

CORRESPONDENCE

Electric Furnace for Melting Brass

To the Editor: We read with interest Mr. Leonard W. Egan's article on Electric Furnaces, in the Nov. 8 issue of THE IRON AGE.

In his discussion of the muffled arc furnace as developed by the General Electric Co. he stated that, for red brass of 80 per cent copper, 20 per cent zinc, the consumption on daylight melting is 470 kwhr. per ton. We have been operating a furnace of that type for three years and it might be interesting to note that we averaged 613 kwhr. per ton on a run of 1,305,530 lb. On another occasion we averaged 617 kwhr. on a run of 986,552 lb. We melted metal of the following composition: copper, 77 per cent; tin, 3 per cent; lead, 10 per cent, and zinc, 10 per cent.

This melting was done with the best practice known to the General Electric Co. and ourselves, and also under the partial supervision of the General Electric Co. In spite of the aforementioned, and the fact that we were melting an alloy of lower copper content, we were unable to approach Mr. Egan's figure of 470 kwhr. per ton. Hence it would be of interest to know how he obtained these results.

He also claims one of the advantages of the furnace to be the freedom of agitation of the bath. Anyone with experience in melting leaded alloys realizes the possibility—in fact, it is past the possibility stage; it is a reality—of the lead segregating to the bottom of the bath. The bath must be continuously rabbled in order to get uniform metal. So really freedom of the bath from agitation is a disadvantage and not an advantage.

F. L. WOLF,
Technical Superintendent.
WILLIAM ROMANOFF,
Metallurgist.

Ohio Brass Co.,
Mansfield, Ohio,
Dec. 4.

Permanent-Mold Casting of Aluminum Alloys

A study of the state of the art in the production of aluminum castings by the permanent-mold process has been made by the Department of the Interior at the Pittsburgh experiment station of the Bureau of Mines. Experimental work undertaken some time ago on the gating of aluminum alloy pistons on casting in permanent molds has been completed. It has been shown that the occurrence of blow-holes and related defects can be controlled by proper gating and pouring practice.

BRITISH FOREIGN TRADE

October Exports Second Largest for the Year · Imports Declining

Exports of iron and steel from Great Britain in October at 401,475 gross tons were second only to the 435,630 tons of May. They were about 57,000 larger than the September exports. October imports were 117,372 tons or one of the smallest for the year thus far and about 10,500 tons less than those for September. These data all include scrap iron and steel. Comparative data for both exports and imports are as follows:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Aver. per month, first quarter, 1923...	358,208	128,032
Aver. per month, second quarter, 1923..	402,471	126,042
July, 1923	314,522	128,486
August, 1923	330,431	121,906
September, 1923	344,358	127,893
Aver. per month, third quarter, 1923...	329,770	126,095
October, 1923	401,475	117,372
Average per month, 1922	295,980	83,215
Average per month, 1921	144,885	152,734
Average per month, 1920	274,881	128,685
Average per month, 1919	138,519	50,401
Average per month, 1913	420,757	195,264

More detailed data of the exports are as follows:

Principal British Exports, Gross Tons per Month

	1913	1922	October 1922	October 1923
Pig iron	32,700	66,159	119,288	54,829
Ferroalloys			10,571	11,661
Steel rails	42,200	21,300	17,146	21,839
Steel plates	11,200	6,700	6,551	22,380
Galvanized sheets	63,500	43,600	39,457	57,835
Steel bars, rods, etc...	20,900	19,100	22,107	37,075
Tin plates	41,200	37,400	35,125	51,398
Black plates and sheets	11,700	18,700	21,335	27,895

Exports of scrap iron and steel in October were 12,876 tons, or 10,305 tons per month for the first 10 months of this year, as compared with 12,880 tons per month in 1922. In 1913 there were 9600 tons per month.

Data as to importations of importance are as follows in tons per month:

	1913	1922	Jan.-Oct., 1923
Iron ore	620,000	289,400	493,177
Manganese ore	50,100	28,109	45,426
Pig iron and ferroalloys	18,000	12,800	9,755

The Boston section A. S. M. E. inspected the Watertown Arsenal, Watertown, Mass., shops from 3 until 4 p. m., Dec. 12, and the laboratories from 4 until 6 p. m. In the evening T. C. Dickson, commanding officer, spoke on X-ray examination of metals; Dr. F. C. Langenberg on Investigation of the Influences of Temperature on the Charpy Impact Value of a Group of Steels of Varying Composition; and E. P. Gilligan on Ordnance Department Metal Specifications.

Iron and Steel Markets

SOME FORWARD BUYING

Largely From Automobile Trade

Current Orders Below Shipments—Structural and Railroad Buying Noteworthy

First quarter buying in steel has appeared. It comes largely from the automobile trade, but not from all motor car makers. Some still show doubts of price stability, and low prices evidently were obtained in transactions covering automobile parts.

Sheets, ordinary and alloy steel bars, and forgings were placed in Detroit in liberal quantities that add to the expectations of large automobile production in the early months of 1924. In Cleveland the forward sales of bars totaled between 4000 and 5000 tons with 15,000 tons likely to be settled by the end of the week.

Bookings of steel in general are up to the volume of the corresponding period of November, though still below shipments. Mill operations, if anything, have increased. The Steel Corporation's schedule appears to call for somewhat over 84 per cent of ingot capacity, against 81 or 82 a week ago, but indications are that the industry as a whole is not over 70 per cent.

Some of the sheet sales are for less than three months, but few deliveries are wanted until after inventory taking. The result is that there are mills asking 2.85c. on orders for next year which will enter immediate business at 2.75c. Prices of automobile body sheets are holding firm after efforts to depress them $5 a ton. Inquiries for sheet bars are considerable and with the Steel Corporation regarded as a likely buyer on the large scale it was in 1922, the sheet bar price of $42.50 is considered fully as firm as finished steel.

Pressure for output notably marks the tin plate situation, with some mills now having eight months' work in sight.

With the order of 2000 cars for the Wabash and other car purchases amounting to 500, following the placing of 5000 in the preceding two weeks, the basis of satisfactory negotiations appears to be definitely broadening for the settlement of the large amount of railroad equipment still pending.

New York's unusual winter building activity accounts for most of the week's structural steel awards, 15,600 tons out of a total for the country of about 24,000 tons. Likewise more than half of the new projects reported, totaling 23,000 tons, are from New York. A decided gain in inquiry is reported from the Central West.

Price stabilization in cold-finished steel bars has been interfered with somewhat by a Chicago producer's adopting a Chicago instead of a Pittsburgh base. One immediate result has been a $6 reduction in Chicago warehouse prices for shafting.

November steel ingot statistics show, at 3,113,804 tons, or 119,762 tons a day, a decline in production of 9 per cent from the October daily rate, which was down 1 per cent from that of September. In pig iron the corresponding reductions in output were 5 and 2½ per cent, respectively.

The pig iron market has lapsed into profound dullness and neither buyers nor sellers are disposed to enter into contracts for delivery after April 1. The uncertainty as to the price of coke for the second quarter of the new year and the threat of a strike of bituminous miners April 1 will probably continue to retard the buying of pig iron except for immediate requirements. Bessemer iron is stronger in the Pittsburgh district.

Further purchases of heavy melting scrap have been made by the Steel Corporation, and the old material market is stronger in nearly all centers, with numerous price advances.

Contracts for 50 per cent ferrosilicon for 1924 are being taken at $75 per ton, delivered, $1 to $1.50 being added or subtracted as the case may be for each per cent variation. Last year the contract price was $82.50 to $87.50, delivered, with no differential.

A cast-iron pipe shop in France has again taken business in competition with American companies, the city of Pasadena, Cal., having awarded 1000 tons to the French company.

Japanese demand for thin galvanized sheets has dwindled both in the United States and Great Britain.

For 21 successive weeks THE IRON AGE finished steel composite price has stood unchanged at 2.775c. per lb., following 11 weeks at 2.789c. One year ago it was 2.439c.; two years ago, 2.135c.

No change having occurred, THE IRON AGE pig iron composite price remains at $21.88. One year ago it was $25.71; two years ago, $19.46.

Pittsburgh

Steel Prices Firm, Although Plant Operations Are Decreasing

PITTSBURGH, Dec. 11.—The impressive thing about the steel market is its firmness in the face of a demand so moderate that plant operations are decreasing. The end of the year is so near that very little material is wanted and the desire to keep down inventories is strong. While there has been some buying for delivery after Jan. 1, it has not been of that large and confident character that inspires real cheerfulness. The market, however, has withstood repeated efforts on the part of buyers to secure plates, shapes and bars at less than quotations, and the past week has seen a further thinning of the ranks of sheet manufacturers accepting business at below the Steel Corporation schedules. Price stabilization effort in cold-finished steel bars and shafting has been somewhat interfered with by the action of a Chicago producer in adopting a Chicago instead of a Pittsburgh base.

Some fresh signs of irregularity and weakness have cropped out in strips, but, as against this, is a further decrease in the number of bolt, nut and rivet manufacturers willing to go below quoted prices to secure orders. There are no suggestions of price cutting in pipe or wire goods, and the maintenance of tin plate prices

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Dec. 11 1923	Dec. 4 1923	Nov. 13 1923	Dec. 12 1922
No. 2X Philadelphia	$24.96	$24.96	$22.61	$23.50
No. 2, Valley furnace	22.00	22.00	22.00	26.00
No. 2, Southern, Cin'ti	25.05	25.05	23.05	26.55
No. 2, Birmingham, Ala.	21.00	21.00	19.00	23.50
No. 2 foundry, Chicago*	23.00	23.00	22.50	28.00
Basic, del'd, eastern Pa.	23.25	22.75	22.00	25.50
Basic, Valley furnace	21.00	21.00	20.50	25.00
Valley Bessemer, del. P'gh	24.76	24.26	23.76	28.25
Malleable, Chicago*	23.00	23.00	22.50	28.00
Malleable, Valley	20.00	20.00	20.00	26.00
Gray forge, Pittsburgh	23.26	23.26	23.26	26.75
L. S. charcoal, Chicago	29.15	29.15	28.15	36.15
Ferromanganese, furnace	107.50	107.50	110.00	100.00

Rails, Billets, Etc., Per Gross Ton				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. sheet bars, P'gh	42.50	42.50	42.50	36.50
Forging billets, base, P'gh.	45.00	45.00	45.00	45.00
O.-h. billets, Phila.	45.17	45.17	45.17	43.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.35	2.35	2.40	2.00
Light rails at mill	2.25	2.25	2.25	2.15

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.275
Iron bars, Chicago	2.40	2.40	2.40	2.35
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	1.95
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.29
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.34
Steel hoops, Pittsburgh	3.00	3.00	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, *Per Lb to Large Buyers:*	Dec. 11 1923 Cents	Dec. 4 1923 Cents	Nov. 13 1923 Cents	Dec. 12 1922 Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh	4.90	4.85	4.60	4.35
Sheets, blue annealed, No. 10	3.00	3.00	3.00	2.75
Wire nails, Pittsburgh	3.00	3.00	3.00	2.75
Plain wire, Pittsburgh	2.75	2.75	2.75	2.40
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$19.50	$19.00	$17.50	$24.00
Carwheels, Philadelphia	19.50	19.50	17.50	20.00
Heavy steel scrap, P'gh.	18.50	18.50	16.00	20.00
Heavy steel scrap, Phila.	16.50	16.00	15.00	16.00
Heavy steel scrap, Ch'go.	16.00	15.00	14.00	17.00
No. 1 cast, Pittsburgh	19.50	19.50	18.50	22.50
No. 1 cast, Philadelphia	20.00	20.00	19.00	20.00
No. 1 cast, Ch'go (net ton)	19.50	19.50	18.00	19.50
No. 1 RR. wrot. Phila.	18.50	18.00	17.00	19.00
No. 1 RR. wrot. Ch'go(net)	15.00	13.50	12.50	15.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$3.75	$6.50
Foundry coke, prompt	4.75	5.00	4.75	7.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.50	14.12½
Electrolytic copper, Straits	12.87½	12.87½	13.25	13.75
Zinc, St. Louis	6.25	6.35	6.45	7.22½
Zinc, New York	6.60	6.70	6.80	7.57½
Lead, St. Louis	7.37½	7.00	6.55	6.95
Lead, New York	7.62½	7.10	6.85	7.27½
Tin (Straits), New York	46.50	47.25	44.37½	37.25
Antimony (Asiatic), N. Y.	8.65	8.75	9.25	6.35

Composite Price, Dec. 11, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Dec. 4, 1923,	2.775c.
	Nov. 13, 1923,	2.775c.
	Dec. 12, 1922,	2.439c.
These products constitute 88 per cent of the United States output of finished steel	10-year pre-war average,	1.689c.

Composite Price, Dec. 11, 1923, Pig Iron, $21.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Dec. 4, 1923,	$21.88
	Nov. 13, 1923,	20.94
	Dec. 12, 1922,	25.71
	10-year pre-war average,	15.72

right along has been an accepted fact. In explanation for the market's strength, there is, of course, a belief that stocks in consumers' and jobbers' hands are very moderate and this is taken to indicate freer buying after the turn of the new year if for no other reason than the restoration of ordinary reserve supplies. With the scrap market showing a stronger tendency, one avenue of low steel costs is blocked, and another reason for the stand of the manufacturers is that they doubt that such a price cut as might be made would prove any stimulus to buying. Railroad buying is confidently expected and it is figured that the automobile makers cannot much longer delay purchases if they expect to meet the spring demand easily and promptly. It is also believed that the oil industry has turned the corner and will be a factor in the steel market before the new year is far advanced. The recent marking up of steel scrap has been sustained by further Steel Corporation purchases, as well as by a few of the independent companies.

Pig iron trading has become extremely quiet, but there no longer seems to be much pressure to sell and prices are steady. The coke market still reflects an absence of resumptions among furnaces now idle, and some hesitancy by the owners of furnaces in production about buying ahead.

Steel Corporation plants in this and nearby districts continue to operate at a high rate, but this is partly explained in the case of the Carnegie Steel Co., which is running about 90 per cent of ingot capacity, by the fact that it is producing sheet bars on a heavy scale for its associated company, the American Sheet & Tin Plate Co. The latter, being very well supplied with orders and specifications in tin plate for early 1924

delivery, is running practically full at its tin plate mills, and has sufficient business to keep about 85 per cent of its sheet mills going. Independent steel works operations range from 50 to 65 per cent, with a general average around 60 per cent.

Pig Iron.—Trading reflects the well covered condition of melters and an absence of selling pressure among producers. The Sharon Steel Hoop Co. recently closed for 4000 tons of basic iron from another Youngstown steel company at $21, furnace. The Follansbee Bros. Co. is in the market for 5000 to 6000 tons of this grade for first quarter shipments. This business probably will be placed with a nearby producer having a decided freight advantage over Valley furnaces. Only small lot tonnages of foundry grade lately have been placed, but in all cases the business was at $22, furnace, for the base grade. Bessemer iron is stronger, not because of a large demand but because of a withdrawal of recent low prices. This grade now is held at $23 by all producers and sales by Valley furnaces have been at $23. Some malleable iron still is available at $20, but the more common quotation is $22 and some makers are asking $22.50. No sales of this grade recently have been noted. Low phosphorus iron also is inactive, with the Valley makers quoting $29 to $30.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	23.00
Gray forge	$21.50 to 22.00
No. 2 foundry	22.00 to 22.50
No. 3 foundry	21.50 to 22.00
Malleable	20.00 to 22.50
Low phosphorus, copper free	29.00 to 30.00

Ferroalloys.—The interesting development of the week is the announcement of 1924 prices for ferrosilicon of the higher silicon contents. For 50 per cent material the price is $75, delivered East of the Mississippi River, and $130 for 75 per cent grade. These prices are $7.50 and $10 per ton, respectively, below the 1923 contract prices. On 50 per cent material, buyers are said to have responded fairly well. That grade this year is being offered as 49 to 51 per cent, with $1 a ton up or down, according to the percentage of silicon above or below 50 per cent. Ferromanganese is firmly held by agents of British producers at $110, c.i.f. Atlantic seaboard, duty paid, but with domestic producers quoting $1 a ton less and having sold much tonnage at $107.50, there is very little activity in British material. A Pittsburgh district steel maker using only the British product recently was able to pick up about 400 tons of resale material at $107. It is said that a large brokerage interest is quoting $107.50, seaboard, with the option of shipping either domestic or British alloy. Short selling is suspected in this case. Small sales in this district are claimed by American makers at $109. Prices are given on page 1623.

Semi-Finished Steel.—So far the Carnegie Steel Co. is the only maker of sheet bars that has named first quarter prices, its price being $42.50, but independent makers are holding at that price and are expected to name that figure on first quarter contracts. Current activities in all forms of semi-finished steel are limited, because orders for finished material for delivery over the remainder of the year are light, and orders for shipment after Jan. 1 are not yet of a size to encourage usual buying of billets, slabs and sheet bars. Although some mills are talking $42.50 for all of these forms, billets and slabs still can be bought at $40. Forging billets are priced at $45, but that price is not readily obtained and is being shaded on attractive inquiries. There is some first quarter contracting for rods at the present base, but specifications are not large except for January shipments. Skelp prices are indeterminate because there is so little demand. Prices are given on page 1623.

Wire Products.—Manufacturing consumers are showing much more interest in the market and a good many contracts for first quarter tonnages have been received by local mills from that direction. Jobbers, however, continue to defer purchases until the completion of inventory taking. Jobbers' stocks of nails are said to be fairly large, but not very well balanced as to sizes. There are no suggestions of price cutting, except in some of the specialties, in which the extras are large enough to permit a profit at lower prices. Prices are given on page 1622.

Iron and Steel Bars.—Demand for steel bars is very limited and large consumers, such as the makers of cold-finished steel bars and shafting and of bolts, nuts and rivets, are not yet showing real interest in first quarter requirements. This condition, however, is creating no anxiety among makers and there is no shading of the regular price. Iron bar prices also are holding at recent levels despite light demand.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Steel Rails.—Light billet rails still are quoted at 2.25c., base, but the sales still are very limited, not only because actual requirements of consumers are small, but because prices of rerolled rails are so much more attractive.

We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Demand for standard pipe holds up well, and shipments are little, if any, in excess of incoming business. This is not the case with oil well pipe and line pipe, demand for which still reflects the uncertainty in the oil industry. That industry seems to have turned the corner as to overproduction, but until the surplus is reduced, drilling campaigns probably will be mapped out in conservative fashion. The trade looks for improvement in the oil situation before the new year is very far along, and as stocks of pipe in the oil districts are light, the mills will feel the betterment in the shape of orders more promptly than would be the case if oil field jobbers were heavily stocked. Boiler tubes are still dull and price concessions are more frequent, if anything, than they have been. Discounts are given on page 1622.

Sheets.—Business often before has been better than it is just now, but important producers are encouraged by frequent orders from those who have been holding back in expectation of lower prices and also by increased evidence of interest in future supplies on the part of the automotive industry, manifest in visits of representatives of important consuming interests for information. The question of prices, particularly on automobile sheets, is not entirely settled with buyers, but it is a fact that recent low prices are disappearing. Few, if any, of the independent mills, now will take black sheets below 3.75c., base, or galvanized sheets below 4.90c., base. One large company was able to buy automobile sheets at 5.10c., base, but this was for run of mill material; the companies making full finished auto body stock to specifications are not going below 5.35c., base, (22 gage). Sheet mill operations are holding at the recent average of about 75 per cent, the American Sheet & Tin Plate Co. running about 80 per cent and the independents about 70 per cent. Prices are given on page 1622.

Tin Plate.—Steel Corporation tin plate customers are specifying freely against early 1924 tonnages, and lately orders and specifications have been coming to independent mills in good fashion. The American Sheet & Tin Plate Co. has about 95 per cent of its tin mills in operation, and the independents are doing almost as well; industry as a whole is averaging close to 90 per cent. The price is unquestioned at $5.50 per base box, Pittsburgh, for standard cokes.

Cold-Finished Steel Bars.—Announcement of the LaSalle Steel Co., Chicago, of a price of 3c., base, Chicago, is disturbing to local producers quoting that price f.o.b., Pittsburgh, since the Chicago mill has a decided freight advantage into some heavy consuming territory. Mills here which want to compete in Chicago would have to absorb $6.80 a ton in freight, while in Indiana points the freight advantage is about $3 a ton. The difference in the freight rate to Detroit is a matter of 1½c. per 100 lb. in favor of Chicago, or 30c. a ton. Mills here still are quoting 3c., base, Pittsburgh, but the market is unsettled by the stand of the

Chicago company. Ground shafting is quoted at 3.40c., base, f.o.b. mills in carload lots or more.

Hot-Rolled Flats.—Competition for business still is sufficiently sharp to keep prices in buyers' favor. This is particularly true in strips, which have sold as low as 2.60c., base, and still can be bought from some mills at 2.75c. Several makers, including the Steel Corporation, still are quoting 3c., base, on hoops, bands and strips, but little tonnage of the latter can be secured at that figure, and there are some demands for revisions of contracts made at 3c.

Cold-Rolled Strips.—The market now is quotable down to 4.75c., base, and even that price has been shaded on particularly attractive business. At the same time, there are some makers who are still holding to 5c. and claim to be making sales at that figure.

Structural Material.—Some mills report an increase in both orders and specifications, but it would be exaggeration to call the market even fairly active. Efforts to shade prices, however, are not successful. Prices are given on page 1622.

Bolts, Nuts and Rivets.—More makers of bolts and nuts have withdrawn the extra discounts recently made to secure orders and while the market is not particularly active, it is much firmer than it has been before for some time. Sales of rivets are reported at the recently established base of $2.90 per 100 lb. Prices and discounts are given on page 1622.

Plates.—Activity still is lacking, but mills here are holding very firmly to the 2.50c., base, Pittsburgh. Prices are given on page 1622.

Track Supplies.—New business is small but considerable tonnage has been figured on, which is expected to be placed within the next few weeks. Small spikes, finding heaviest use in coal mines, are slow of sale because of the slow and unsatisfactory coal situation. Prices are given on page 1622.

Coke and Coal.—The beehive oven coke market is hesitant and not particularly firm. Few, if any, blast furnaces now on the idle list will be lighted during the first quarter of 1924, unless there is a very substantial rise in prices, and that seems unlikely in view of the fact that so many consumers of iron are well covered into the new year and supplies of iron available for the market still are so large. Fuel requirements of active stacks running on beehive oven coke do not amount to much in this and nearby districts and there is talk that some of these furnaces soon will suspend. Such first quarter contract business as has been closed has been at $4.25 to $4.40 per net ton at ovens. The prevailing price on spot tonnages still is $4. Foundry coke ranges from $4.75 to $5.50 for spot, and from $5.50 to $6.50 on first half contract. The coal market still shows considerable strength in slack grade, which has recently sold as high as $1.65 for steam and $1.75 for gas, this for Pittsburgh coal. Slack grade in the Fairmont district ranges from $1.40 to $1.50. Mine run steam coal ranges from $1.90 to $2.40 for Pittsburgh coal and from $1.40 to $1.75, Connellsville coal. Gas coal holds at $2.25 for mine run, but coking grade is weak at $1.75 to $2.15.

Old Material.—The recent advance in heavy melting steel scrap has been sustained by further Steel Corporation purchases. The Carnegie Steel Co. has practically duplicated its first purchase as to quantity and price for Munhall, while there has been a purchase of 5000 tons by the National Tube Co. at $18.50 for delivery at Lorain, Ohio. While a Canton, Ohio, consumer has paid $19 for this grade and a local mill went to $19.50 for 5000 tons, independent steel companies generally remain out of the market and show no inclination to follow the prices made by these transactions. The effect of the Steel Corporation purchases is really more pronounced in outside markets than it is here. It is sensed in Youngstown that the National Tube Co. purchase for Lorain will check the flow of material to that center, and while the mills there remain passive, dealers are bidding $18.50 to $18.75 for supplies in an effort to cover short sales. Railroad material also is bringing high prices for the same reason, the melting steel in the Pennsylvania Railroad December list bringing $19.50 per gross ton. The scrap trade as a whole is much confused as to what the Steel Corporation purchases presage. It is pointed out that when the Carnegie Steel Co. was operating at a much higher rate than at present it was not a purchaser of scrap; prices were high in the spring and at that time this company put on idle blast furnaces and made pig iron, but it would not pay to do so today, unless there was an assurance of a continued run on the furnace, since scrap is at about the same price as the cost of making the pig iron. It is commented upon that other steel works' grades are not being strengthened much by the rise in heavy melting steel. Compressed sheets, for example, which ordinarily are within $2 a ton of heavy melting grades, have not sold above $16.50, efforts to secure more having failed, while the sale of that price involved material that ordinarily fetches the top of the market. Railroad specialties also have failed to advance. Blast furnace material is very scarce and very firm.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$18.50 to $19.00
No. 1 cast, cupola size	19.50 to 20.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.50 to 19.00
Compressed sheet steel	15.50 to 16.50
Bundled sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	20.00 to 20.50
Railroad coil and leaf springs	20.00 to 20.50
Low phosphorus blooms and billet ends	21.50 to 22.00
Low phosphorus plate and other material	20.00 to 20.50
Railroad malleable	17.50 to 18.00
Steel car axles	19.00 to 19.50
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	20.00 to 20.50
Machine shop turnings	13.50 to 14.00
Sheet bar crops	19.00 to 19.50
Heavy steel axle turnings	16.00 to 16.50
Short shoveling turnings	14.50 to 15.00
Heavy breakable cast	17.00 to 17.50
Stove plate	14.00 to 14.50
Cast iron borings	14.50 to 15.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	18.50 to 19.00

Heavy Production of Iron and Steel in Alabama

BIRMINGHAM, Dec. 10.—The production figures for November show that Alabama produced 2000 more tons than in October, though the totals of the country showed a decrease. Effort is being made in various directions in this district to get record production and splendid reports are being made, the iron output being obtained with 21 blast furnaces in November against 22 in October. The Tennessee Coal, Iron & Railroad Co. reported six records broken in November, as follows: Ishkooda No. 14 ore mines, 11,861 tons against 11,732 tons in August, 1923; total of all Ishkooda ore mines, 70,731 tons against 67,431 tons in October, 1923; Blocton No. 10 coal mine, 15,884 tons against 15,327 in May, 1923; Bessemer No. 4 blast furnace 9,052 tons, against 8,858 in October, 1915; Ensley steel rail mill, 50,658 tons against 49,325 in March, 1923; Fairfield tie plate mill, 6,760 tons against 6,675 in October, 1923. The compilation of production figures as to pig iron show a larger amount of iron manufactured in the 11 months of the year than during all 12 months for 1922 and the total for this year promises to be second to the record output for the State, which was accomplished in 1917 when 2,953,705 tons was reported, about 2,787,000 tons being estimated for this year.

Production of pig iron in Alabama is not to be interrupted in the least during this month. The Woodward Iron Co. is blowing out one of the furnaces at Woodward for repairs but one of the Vanderbilt furnaces is having the torch applied now so that the make of that company is not disturbed. The Alabama Co. has already started the work of repairing the blast furnace at Gadsden, recently blown out for repiars.

The annual Christmas dinner and entertainment of the Pittsburgh Foundrymen's Association will be held at the General Forbes Hotel, Monday evening, Dec. 17.

Chicago

Santa Fe Expected to Place Large Rail Order Soon—Wabash Buys Cars

CHICAGO, Dec. 11.—Prospective railroad buying is the feature of the finished steel market. The Santa Fe is expected to place orders shortly for 100,000 tons of rails and 25,000 tons of track supplies, and the New York Central will probably close against its inquiry for 40,000 tons of fastenings before the end of the current week. The Wabash has purchased 2000 freight cars, requiring 20,000 tons of steel, which is expected to be placed with local mills.

Outside of this activity in rails and cars, there have been no developments in the market worthy of particular note. Inquiries from miscellaneous consumers of steel are more numerous, but new bookings of the mills still fall short of shipments. Restricted buying will probably continue to be the rule until inventory taking has been completed.

Finished steel prices remain unchanged except for a reduction of $3 a ton in track spikes and bolts. Steel works and blast furnace operations are substantially the same as last week.

As a result of the abandonment of the Pittsburgh base by a Chicago district cold-rolled steel mill, local warehouses have reduced cold-finished steel bars and shafting $6 a ton to 4c. per lb. for rounds and 4.50c. for flats, squares and hexagons.

Pig Iron.—The week has been lacking in both sales and inquiries. The only large transaction reported was the purchase of 2500 tons of Northern foundry for first half by a Milwaukee melter. The one important new inquiry comes from a Chicago user and calls for 3000 tons of foundry for first quarter. Southern iron appears to be steady at $21 base, Birmingham, although it is possible that if an attractive tonnage were submitted to the furnaces, a better price could be obtained. Recent sales of Southern in this territory have been few and small, the largest reported being a 300-ton lot. A Milwaukee melter has closed for 200 tons of 7 per cent silvery at $1 a ton under the new schedule, but two 150-ton sales in Michigan were at the full prices. A Chicago melter has purchased 100 tons of low phosphorus at $34, delivered. A considerable portion of the tonnage, however, was copper bearing material which ordinarily sells for less than copper free iron. The latter appears to be steady at $30, Valley furnace, or $34.79, delivered Chicago.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal averaging sil. 1.50, delivered at Chicago..	$29.15
Northern coke, No. 1 sil. 2.25 to 2.75	$25.50 to $24.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	23.00 to 23.50
Malleable, not over 2.25 sil.	23.00 to 23.50
Basic	23.00 to 23.50
High phosphorus	23.00 to 23.50
Southern No. 2	27.01
Low phos., sil. 1 to 2 per cent, copper free	34.79
Silvery, sil. 8 per cent	37.29

Ferroalloys.—Most users of 50 per cent ferrosilicon have contracted for their 1924 needs at $75, delivered. Some business in 75 per cent ferrosilicon has been closed at $140, delivered. A few carloads of spiegeleisen have been sold at $39, furnace, or $47.58, Chicago. No sales of ferromanganese are reported, but the lowest going quotation is said to be $110 f.o.b. New Orleans.

We quote 80 per cent ferromanganese, $117.56, delivered. 50 per cent ferrosilicon, $75, delivered. spiegeleisen, 18 to 22 per cent, $47.58, delivered.

Plates.—Demand has improved, although actual mill bookings are still light. The Wabash has ordered 2000 freight cars, requiring about 20,000 tons of steel, which will probably be furnished by local mills. Inquiries from boilermakers and other miscellaneous users of plates are more numerous. Prices remain unchanged at 2.60c. Chicago.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Sheets.—The market is steadily growing firmer as those mills which have been selling at concessions accumulate heavier bookings. While there is still no quotable change in the range of prices on black sheets, few producers are willing to sell galvanized at less than the Steel Corporation price. Japanese commitments bulk larger than had been anticipated and domestic orders are coming in more freely.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Cast Iron Pipe.—St. Paul has placed 1750 tons of 6-, 8- and 12-in. water pipe with the National Cast Iron Pipe Co., 950 tons of 16-in. with the Glamorgan Cast Iron Pipe Co., and 350 tons of 20-in. with the American Cast Iron Pipe Co. Minneapolis has awarded 1500 tons to the American Cast Iron Pipe Co. Dayton, Ohio, takes bids today on 1200 tons of 4- to 20-in. and 75 tons of fittings. Demand from private companies is heavy. The Public Service Co. of Northern Illinois is expected to close on 2800 tons this week. The Grand Rapids Gas Co. is in the market for 1400 tons of 4- to 16-in. gas pipe, and the Detroit City Gas Co. is inquiring for 12,000 tons of 4- to 24-in. gas pipe. Prices are fairly steady.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $59.20; 6-in. and above, $55.20; class A and gas pipe, $5 extra.

Structural Material.—While building prospects are still regarded as good, fabricating awards and inquiries reported during the week were strikingly few. Prominent among new projects on which bids have been asked is a dock at Claiborne Avenue landing, New Orleans, requiring 1700 tons. That the general construction outlook is still favorable is indicated by the fact that permits issued in Chicago in November were practically equal in terms of frontage and investment with those granted in October, and were nearly one-third larger than those for November, 1922. Plain material prices remain steady at 2.60c. Chicago.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Rails and Track Supplies.—The Santa Fe, which entered the market for 100,000 tons of rails and 25,000 tons of track supplies last week, is expected to place orders this week. Miscellaneous rail orders taken by local producers in the last seven days total 10,000 tons. Early action is looked for on the large inquiry of the New York Central for fastenings, which developed lower prices than had previously been quoted. Standard spikes are available at 3.10c. mill, and track bolts at 4.10c. mill.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; iron tie plates, 2.55c. to 2.60c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base and track bolts, 4.75c. base.

Bolts and Nuts.—Notwithstanding the firmer stand of bolt makers on prices, specifications are heavier, and a fair number of first quarter contracts have been closed. For one important bolt manufacturer specifications thus far this month have equaled capacity production. Ruling discounts are those on page 1622, except that they are on f.o.b. Chicago basis.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Bars.—Consumers and distributors of merchant and reinforcing bars are sounding out the market for their forward needs, but are slow in placing orders. Some of the automotive interests, notably the Ford company, are increasing their production schedules and are taking a proportionately heavier tonnage of steel. The Ford

organization, now manufacturing close to 7,500 cars a day, plans to raise its daily output to 10,000 cars. Soft steel bars are unchanged at 2.50c. Chicago. Demand for bar iron, while still unsatisfactory, shows some measure of improvement. One mill has accumulated enough tonnage to insure single turn operations throughout the remainder of the month. Hard steel bar mills, also on a single turn basis, have bookings of from two to four weeks ahead.

Mill prices are: Mild steel bars, 2.50c. Chicago, common bar iron, 2.40c. Chicago, rail steel, 2.50c. Chicago mill.

Jobbers quote 2.60c for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3c for rounds and 3.50c for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c base, heaps 1.15c, bands 3.90c.

Wire Products.—Forward contracting fails to develop in any volume, but as inventory taking will soon be completed jobbers and manufacturing consumers are expected to pay more attention to their first quarter needs. Meanwhile most orders are small, calling for prompt deliveries, and mills continue to build up their stocks. Mill prices, which are unchanged, are shown on page 1622.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Old Material.—A leading local mill has placed 10,000 tons of heavy melting at $16 per gross ton delivered. This price now appears to be the bottom of the market, as dealers are paying $16.50 to fill old orders. An iron mill has closed for a fair tonnage of No. 1 busheling and No. 1 wrought at $12 and $15 per net ton respectively. A round tonnage of malleable has been purchased by a consumer at $20.50 per gross ton delivered and gray iron foundries have bought cast grades more freely. While consumer buying has revived, it is notable that a number of important users who have bought have no immediate need for additional supplies, but are apparently placing orders to take advantage of low current prices. If scrap continues to advance, there will be less incentive to buy ahead, particularly in view of the fact that the present rate of consumption does not seem to warrant a sustained rise in prices. Railroad lists include: Santa Fe, 3000 tons; Northern Pacific, 2000 tons; Great Northern, 2500 tons; Southern, 15,000 tons; Chicago & Eastern Illinois, 1700 tons; Chicago Great Western, Chicago & Alton and Baltimore & Ohio, Chicago Terminal, 500 tons each.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$19.50 to $20.00
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	19.00 to 19.50
Railroad tires, charging box size	19.00 to 19.50
Railroad leaf springs, cut apart	19.50 to 20.00
Rails for rerolling	16.50 to 17.00
Steel rails, less than 3 ft.	18.50 to 19.00
Heavy melting steel	15.50 to 16.50
Frogs, switches and guards cut apart	15.50 to 16.50
Shoveling steel	15.75 to 16.25
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheets	12.50 to 13.00
Axle turnings	12.50 to 13.00
Steel angle bars	17.50 to 18.00

Per Net Ton

Iron angle and splice bars	20.00 to 20.50
Iron arch bars and transoms	20.00 to 20.50
Iron car axles	26.00 to 26.50
Steel car axles	17.00 to 17.50
No. 1 busheling	12.00 to 12.50
No. 2 busheling	7.50 to 8.00
Cut forge	14.50 to 15.00
Pipes and flues	9.50 to 10.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	14.50 to 15.00
Steel knuckles and couplers	17.50 to 18.00
Coil springs	18.00 to 18.50
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	18.50 to 19.00
No. 1 agricultural cast	18.50 to 19.00
Low phos. punchings	15.50 to 16.00
Locomotive tires, smooth	16.50 to 17.00
Machine shop turnings	8.00 to 8.50
Cast borings	10.75 to 11.25
Short shoveling turnings	10.75 to 11.25
Stove plates	17.00 to 17.50
Grate bars	16.50 to 17.00
Brake shoes	17.50 to 18.00
Railroad malleable	18.00 to 18.50
Agricultural malleable	18.00 to 18.50

Warehouse Prices.—Local jobbers have reduced standard track spikes and bolts $3 a ton in conformity with the decline in mill prices. The new quotations will be found under the paragraph on rails and track supplies. Structural and boiler rivets have been reduced $5 a ton, the new prices being shown under the paragraph on bolts and nuts. Forging billets have been reduced $8 a ton, the new price on 0.50 to 0.25 carbon billets being $3 per 100-lb. and on 0.35 to 0.40 carbon, $3.05 per 100-lb.

Reinforcing Bars.—Buying has contracted appreciably, although a number of attractive projects have been added to the extensive list of pending jobs. The decline in business is attributable, in part, to the approach of the holidays and also, no doubt, to a belief among consumers that mill prices will decline. Local bar dealers in various parts of the West, who are in the habit of contracting for first quarter needs at this time, are delaying their purchases.

Lettings include:

Anders apartment buildings, Chicago, 200 tons to Barton Spiderweb System Co.

Blue Valley Creamery Co. plant, Chicago, 230 tons to Barton Spiderweb System Co.

Pending business includes:

Beaumont High School building, St. Louis, Mo., 550 tons.

Junior High School, South Bend, Ind., 200 tons, bids on general contract taken.

Foundations for Ford Motor Co. plant, St. Paul, Minn., 175 tons, new bids being taken.

Wayne Medical Building, Fort Wayne, Ind., 175 tons, revised figures being taken.

High school, Sedalia, Mo., 150 tons.

Federal Reserve Bank building, Little Rock, Ark., tons.

Sheet Market at Youngstown Shows Some Improvement

YOUNGSTOWN, Dec. 11.—Though sheet mill schedules in the Mahoning Valley are still substantially below normal, representing at present from 60 to 65 per cent of capacity, conditions in this branch of the industry are appreciably better than they were a month ago. In fact, inquiry has broadened perceptibly, and it is expected that during the first quarter of 1924 there will be a marked improvement in demand, especially for the high grade sheets.

Consumers who have been in the market to any extent are well covered over the remainder of this year, and interest, of course, therefore centers on what the new year will bring forth.

Some of the larger independents claim to observe less price cutting on the part of smaller makers than has heretofore existed. Doubtless, however, the non-integrated rollers, many of whom have been accepting tonnage at little or no profit in order to keep their mills active, will still be willing to cut under the market for some time, in order to prevent their plants from becoming idle.

More interest in the full-finished sheet market is being evidenced by the automobile industry and by builders of automobile bodies.

Youngstown Scrap Market

YOUNGSTOWN, Dec. 11.—In spite of the fact that there is little buying of scrap by melting interests, prices are sentimentally stronger, at least, than a week ago. The market has been given strength by the purchases by the Carnegie Steel Co., of heavy melting steel at $19. Whereas $18 represented the market peak last week on this grade, dealers say it has moved up in the meantime to $18.50, but regard the range as from $18 to $18.50. This is, however, fully $1 up from recent levels.

In this district, the market on compressed sheet steel is from $15.50 to $16; machine shop turnings, $12.50 to $13, and cast iron borings, $13.50 to $14.

Dealers are engaged in buying against anticipated first quarter, 1924, requirements, but admit they are somewhat hazy as to the extent of these needs.

New York

Structural Awards Heavy—Pig Iron Dull—Old Material Stronger

NEW YORK, Dec. 11.—The pig iron market has become extremely dull, with both sales and inquiries few in number and for limited tonnages. The A. P. Smith Co. bought 600 tons of No. 2 and No. 2X for delivery at Bloomfield, N. J., and the New York Central, which was in the market for 600 tons of foundry iron and 600 tons of charcoal, is understood to have placed at least a part of the tonnage. An interesting feature of the purchase of the A. P. Smith Co. was that it inquired for second quarter delivery, but found prices for that delivery higher than for first quarter and placed its order for the latter. Furnaces are slow to quote for delivery after April 1, and when they do so, name a price considerably higher than for first quarter. Prices are untested, but range from $21.50 to $22, Buffalo, and $22.50 to $23, eastern Pennsylvania. In the latter district $23 is the prevailing price, but it has been shaded on desirable business. The tendency toward greater strength on the part of the coke market is one influence tending to restrain furnaces from selling for delivery after April 1.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.27 to $25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.77 to 25.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.77 to 25.27
Buffalo, sil. 1.75 to 2.25	26.41 to 26.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94 to 30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 29.94

Ferroalloys.—A moderately good business in ferromanganese for delivery next year is evidently being consummated, but just how much is difficult to gage. Domestic producers are apparently taking most of the business at a concession under the British price of $110, seaboard. A fair amount of inquiry continues before the market. Some business has been done in spiegeleisen and there are inquiries still under negotiation amounting to several hundred tons. Prices are unchanged. Contracts for 1924 are being negotiated for 50 per cent ferrosilicon and some have been closed on a basis of $75 per ton, delivered, where the content is 50 per cent ferrosilicon, the arrangement being that $1 for each percentage above or below 50 per cent will be added or subtracted. In some cases $1.50 for each per cent is the differential. Contracts are also being made for consumers' needs of ferrochromium next year, but the price is not yet announced.

Cast-Iron Pipe.—The market is quiet except for prompt shipment tonnages, which bring the established schedule of prices. Concessions still rule on tonnages which consumers are willing to accept through the winter months. The Consolidated Gas Co., New York, is reported to have closed on several thousand tons of pipe for next year's requirements. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Demand for soil pipe is light, the usual dullness at this season having set in. A resumption of activity is expected early next year, as stocks of jobbers here in the East are no more than normal in most instances and with some are rather low. Discounts cover a fairly wide range. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 29½ to 35¾ per cent off list; heavy, 39½ to 45¾ per cent off list.

Warehouse Business.—Light demand is generally reported, the only products particularly active being materials such as structural steel, pipe, etc., that enter into building construction that still continues as a result of the open weather. Black and galvanized sheets are stronger and it is doubtful that less than 4.60c. per lb. base on black and 5.60c. per lb. base on galvanized could now be done. Blue annealed sheets are also firmer, the recent decrease of 25c. per 100 lb. having exercised a stabilizing effect on the market. While there are still isolated instances of sales at less than the 4.34c. per lb. base, sellers quoting below this base can offer only a few gages. As a whole, the market is quiet and no increase in activity is expected until after the first of the year. We quote prices on page 1638.

Finished Iron and Steel.—Letting of contracts for winter construction goes on at a rapid rate. Awards of structural steel in the East, reported to THE IRON AGE for the past week, total close to 20,000 tons and altogether 25,000 or 30,000 tons of work is still pending, most of this having been reported by specific jobs in recent issues. One of the large new jobs, on which bids are now being taken, is a building for the Bank of America, New York, which will require 4000 tons. A local fabricator was awarded the contract for fabrication of 8500 tons of steel for an office building at Broadway and Fortieth Street, New York. Activity in structural steel is the only outstanding factor in the local steel market. Other products are very quiet and the general attitude of manufacturing consumers is to wait until after the turn of the year. In plates, shapes and bars practically no first quarter contracts are being placed. While no greater price weakness in these products is noted, some other products are being sold at concessions. One company has offered wire nails to a considerable number of jobbers at 2.90c. per lb., Pittsburgh, but other makers continue to quote 3c. There is very little railroad inquiry or buying. The Southern Railway is inquiring for 10,000 to 15,000 tons of tie plates.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—A stable ratio between production and consumption has evidently been maintained and prices continue unchanged. Standard foundry coke is firm at $5.25 to $6.25 per ton and standard furnace at $4 to $4.50 per ton. By-product is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—While the market is distinctly stronger, part of this strength is the result of buying by dealers and brokers in anticipation of further advances in prices. As high as $17 per ton, eastern Pennsylvania is reported being paid by brokers, but in general the quotation on heavy melting steel being shipped by sellers with mill contracts is $16.50 for railroad grade. Machine shop turnings are strong at $13.50 to $14 per ton, delivered eastern Pennsylvania, and a heavy demand for borings and turnings is reported, $11 to $11.50 per ton, delivered eastern Pennsylvania, generally being paid. Forge fire is also stronger, bringing $13.50 to $14, delivered. Specification pipe is going forward to one eastern Pennsylvania consumer at $15.50 per ton, and stove plate is unchanged at $16 to a Harrisburg consumer and to foundries in New Jersey.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.50 to $13.00
Steel rails, short lengths, or equivalent	13.25 to 13.75
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	16.00 to 17.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	9.00 to 9.50
Machine-shop turnings	10.00 to 10.50
Mixed borings and turnings	8.00 to 8.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.50 to 12.00
Stove plate	12.00 to 13.00
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	14.00 to 15.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

The Shenango Furnace Co. has started to dismantle No. 4 stack, which has been inactive for many months. The furnace is of an obsolete type.

Cincinnati

Pig Iron Buying Confined to Small Lots at Unchanged Prices

CINCINNATI, Dec. 11.—Small lot buying characterized the pig iron market last week, tonnages ranging generally from carloads to 200 tons, with an occasional order being placed for 300 and 400 tons. The largest sale reported was of 1000 tons of malleable to a Tennessee melter for first quarter, the tonnage being divided between two furnaces at $22.50, Ironton, basis. One sale of 400 and another of 300 tons of silvery at the new schedule were reported to Michigan melters, as were similar sales of charcoal iron on a $26, furnace, basis. Activity in Southern iron was confined entirely to carload lots, and the price of $21, Birmingham, is being maintained by furnaces which have iron to offer. Home melters are showing interest in second and third quarters, and an inquiry is out for 1200 tons for this delivery. The L. & N. Railroad is inquiring for 700 tons and an Indiana melter for 1000. A Detroit melter wants 2000 tons for first quarter. Etna furnace of the Marting Iron & Steel Co. resumed operations last week, after having been banked for repairs.

Based on freight rates of $1.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern	24.77
Malleable	24.77

Sheets and Tin Plate.—Demand for sheets is better, and prices are stronger. This means principally that there are not as many mills shading the regularly established prices. Some mills have gone $4 below the market on galvanized, making 4.80c., but 3.75c. is the lowest reported on black sheets. Blue annealed continues fairly firm at 3c. Tin plate continues in excellent demand, with no reports of less than $5.50 per base box being heard.

Reinforcing Bars.—No important lettings were reported, the majority of the orders running less than 100 tons. Prices seem to be firmer, and one mill which had been quoting 2.40c. is now up to 2.50c. The low point on rerolled bars is 2.20c., mill.

Tool Steel.—Demand is made up of small inquiries, though the number of buyers shows no signs of diminishing. Conditions are fair. Prices are well maintained, the range on 18 per cent tungsten high speed steel being from 75c. to 95c. per lb.

Warehouse Business.—Local jobbers report the month to date showing up better than the same period in November. Orders are more numerous, but tonnages are lacking. Buying generally is of the hand to mouth variety. Prices continue firm, however, and no changes are contemplated.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Structural Activity.—A number of projects are about ready to break. One of these includes a manufacturing building, 140 x 490 ft., six stories, on which bids will be taken about Jan. 1. Another, a mill building, 300 x 500 ft., is scheduled for bids about the same time. Action has not been taken on the Third National Bank building at Dayton, and the Kentucky Hotel, Louisville, which will require about 2200 tons, will hardly be up for bids this year, although the general contract has been awarded. The Standard Sanitary Mfg. Co. took bids on a kiln building at Kokomo, Ind., 450 tons, on which an Indianapolis fabricator is low bidder and will probably be awarded the contract.

Finished Materials.—Demand for finished materials, though slightly improved, continues light. Carload orders for bars, shapes and plates are the principal activity, though occasionally an inquiry for 1000 tons of plates from tank builders is figured. Such an inquiry was in the market last week, and it is reported that the consumer was able to better the 2.50c. price by at least $2 per ton. Wire products are only in fair demand, carload orders predominating. To date there has been little contracting for first quarter, although some orders for cold-finished materials have been placed at 3c. for January shipment. Bolts and nuts are in a little better demand, and prices are inclined to be firmer. Track accessories are also in fair demand, though the railroads buying in this territory have not as yet placed orders for their next year's quotas.

Coke.—The coke market is spotty, most of the sales being for first quarter. Prices are generally firm at last week's levels. We quote:

Connellsville furnace, $4.00 to $4.25; foundry, $5.00 to $6.00; New River foundry, $10.00 to $11.00; Wise County furnace, $4.75 to $5.25; foundry, $5.75 to $7.00; by-product foundry, $8.00, Connellsville basis.

Old Material.—Locally the scrap market is quiet, but activity of dealers elsewhere has resulted in a general advance of 50c. per ton. Stove plate is in good demand locally. We note a sale of 2000 tons of heavy melting steel to a northern Ohio mill at $18.50, delivered, or 50c. below the price paid for a large tonnage in Pittsburgh the previous week.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$10.50	to $11.00
Iron rails	14.00	to 14.50
Relaying rails, 50 lb. and up	28.00	to 28.50
Rails for rolling	14.00	to 14.50
Heavy melting steel	13.50	to 14.00
Steel rails for melting	13.50	to 14.00
Car wheels	13.50	to 14.00
	Per Net Ton	
No. 1 railroad wrought	12.00	to 12.50
Cast borings	9.50	to 10.00
Steel turnings	9.00	to 9.50
Railroad cast	14.50	to 15.00
No. 1 machinery cast	17.50	to 18.00
Burnt scrap	11.50	to 12.00
Iron axles	21.50	to 22.00
Locomotive tires (smooth inside)	13.50	to 14.00
Pipes and flues	8.50	to 9.00

Buffalo

Pig Iron Sold in Small Lots—Several Companies Out of the Market

BUFFALO, Dec. 11.—Only small sales have been made since the buying movement was brought to a close and there is very little inquiry engaging attention. Three producers are virtually sold out for the first quarter and are continuing the practice of scanning inquiries carefully and individually before making quotations. One interest has not entirely sold its first quarter production and expects to take on a fair tonnage at the stronger prices that have been made possible since the rush of November business. The selling policy of each furnace is indicated in the quotations they are making on request; for example, one producer has sufficient business sold to warrant asking $23 for silicon 1.75 to 2.25 whereas a furnace that did not enter the selling movement is asking $21.50 for the same grade of iron. Two producers are asking $22.50 but since the first of this month have not taken very much new business. The whole trend of talk with melters is optimistic and confidence in 1924 is general. The 50c. differential is still in effect.

We quote f.o.b., gross ton, Buffalo as follows:

No. 1 foundry, sil. 2.75 to 3.25	$22.50
No. 2 foundry, sil. 2.25 to 2.75	22.00
No. 2 plain, sil. 1.75 to 2.25	21.50
Basic	21.00
Malleable	21.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Some shading of prices on sheets for prompt shipment has been done and in several instances tonnages of black sheets have been taken at $3.75 and galvanized at $4.90. For first quarter sheet delivery, however, prices have remained firm. Considerable tin plate business has been taken by one branch office and it is generally assumed first half requirements have been filled. Bar and shape business, while generally slow, shows up better in recent days and several jobbers have come into the market.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.65c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—Heavy melting steel has strengthened in this market and small tonnages have been purchased by one mill at $18. While the general tone is stronger, there has been no big selling movement and the remainder of the month is expected to be quiet.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	18.00 to 18.50
Machine shop turnings	10.00 to 11.00
Cast iron borings	12.50 to 13.00
No. 1 busheling	14.00 to 15.00
Stove plate	17.00 to 17.25
Grate bars	16.00 to 16.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	18.00 to 19.00
Hydraulic compressed	14.00 to 14.50
Railroad malleable	18.00 to 18.50

St. Louis

Basic Sale of 5000 to 10,000 Tons Made—Dealers Bid Up Old Material Prices

ST. LOUIS, Dec. 11.—A few sales of pig iron were made during the last week, but they were mostly for prompt shipment. A St. Louis melter bought 5000 to 10,000 tons of basic, and a sale of 2000 tons of foundry was made by the St. Louis Coke & Iron Co. to an East Side melter. Other business was largely for carloads. It is believed now that there will be very little buying until after the first of the year, recent heavy purchases having taken care of the requirements of melters. A Peoria concern wants several thousand tons of basic, a Louisville melter is in the market for 750 tons of foundry iron for first quarter, a Chattanooga firm wants 1000 tons of malleable and a Kansas City melter wants 200 to 500 tons of foundry iron. The market is still at $2, Birmingham, for Southern make, and $23 to $23.50, Chicago, for Northern iron. The St. Louis Coke & Iron Co. sales were made on the basis of $26.50, Granite City furnace.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.24 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$25.16 to $25.66
Northern malleable, sil. 1.75 to 2.25	25.16 to 25.66
Basic	25.16 to 25.66
Southern fdy., sil. 1.75 to 2.25 (rail)	26.17

Ferroalloys.—Contracts were closed during the last week by seven melters in the district of their 1924 requirements of 50 per cent ferrosilicon. These concerns used about 2500 tons of this material during 1923. An East Side melter bought 100 tons of Bessemer 12½ per cent ferrosilicon.

Finished Iron and Steel.—The business amounts to virtually nothing. Neither jobbers nor manufacturers will enter the market until after the first of the year. The few railroad inquiries are for less than carloads. The St. Joseph Lead Co., Bonne Terre, Mo., bought 700 mine cars involving 350 tons of plates and structurals, from the American Car & Foundry Co.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.75c.; tank rivets, ¾-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50, and tapped, $2.50 off list.

Coke.—A radiator corporation, with branches in this district and in the East, is in the market for 2000 tons of foundry coke and there are several 200-ton inquiries before the market. More seasonal weather has helped the movement of domestic coke from the yards to the consumers, but dealers are still pretty well supplied with this fuel.

Old Material.—Again this week, advances are recorded in nearly every item on the old material list, and still there is very little buying by consumers. Heavy railroad lists closed during the week and they were all sold at good prices. Dealers have been competing keenly for this material, and they are shooting up prices, confident that consumers will enter the market soon. The position of the dealers is strengthened by the fact that the railroads are far behind in their deliveries to dealer. One line which has just gotten out a new list of offerings has unfilled orders of material sold in September. In some quarters the belief is expressed that some of the lines, sensing the eagerness of the dealers to buy material, have oversold on many items. New railroad lists include: Kansas City Southern, 500 tons; St. Louis Southwestern, 1200 tons; Kansas City Terminal, 200 tons; Chicago & Eastern Illinois, 600 tons; Chicago & Alton, 500 tons.

	Per Gross Ton
Iron rails	$15.00 to $15.50
Rails for rolling	17.00 to 17.50
Steel rails, less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 and over	32.50 to 33.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	14.50 to 15.00
Heavy shoveling steel	14.50 to 15.00
Frogs, switches and guards cut apart	16.00 to 16.50
Railroad springs	18.50 to 19.00
Heavy axles and tire turnings	13.50 to 14.00
	Per Net Ton
Steel angle bars	14.00 to 14.50
Steel car axles	16.50 to 17.00
Iron car axles	24.50 to 25.00
Wrought iron bars and transoms	19.00 to 19.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
Cast iron borings	11.50 to 12.00
No. 1 busheling	13.50 to 14.00
No. 1 railroad cast	17.50 to 18.00
No. 1 machinery cast	18.50 to 19.00
Railroad malleable	15.50 to 16.00
Machine shop turnings	9.00 to 9.50
Champion bundled sheets	8.00 to 8.50

Birmingham

French Pipe Company Takes Orders in Competition with Southern Companies

BIRMINGHAM, Dec. 11.—American-made cast iron pipe felt the French competition again the past week, announcement being made that the city of Pasadena, Cal., had given a contract for 1000 tons to a French pipe maker at Pont-à-Mousson, France. The pipe bought by Pasadena is said to be light weight, high tensile iron, made according to German specifications, the dimensions of which follow the metric system. It is understood that the price paid for the foreign pipe averages about $50 per ton for all sizes, f.o.b. Pasadena, which is some $8 to $10 less than the pipe can be sold by American manufacturers. The light weight French pipe at Pasadena competed with American-made De-Lavaud pipe, as well as the standard sand cast product. Among the lettings reported the past week were 1154 tons for Kansas City, Mo., 240 tons for Dallas, Tex., and 348 tons for Birmingham, Ala., received by the American Cast Iron Pipe Co. Cast iron pipe prices, Birmingham, are:

4-in. water, $51; 6-in., $47; larger sizes, $46; 4-in. gas, $56; 6-in., $52; standard sanitary pipe, $55; heavy gage, $45.

Pig Iron.—Pig iron sales in the Birmingham district are tapering off some, but there is a strong feeling in the market and the surplus stock is being worked down a little. Prompt delivery is being maintained and melters of iron are being supplied as desired. Delivery of pig iron is being kept up as many of the smaller melters are pushing their production in order to get goods out before the holiday season starts in. Many of the iron-using industries of this section will take a week to 10 days off for the Yuletide, repairs to be given attention during that time. In many instances, stock on hand will be reduced to the minimum, so that inventories will not be too large. Some of the soil pipe con-

cents report less stock on hand than at this time last year and a few claim to have no stock at all in warehouses.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$21.00
Basic	21.00
Charcoal, warm blast	25.00

Finished Material.—The steel plants of the Birmingham district are well supplied with business and the steady operation will be continued for an indefinite period. Further export rail business is said to have been placed in this district and the activity of this department promises to be of an indefinite period. In several departments, effort for the largest possible production will be sought on the turn of the year.

Coal and Coke.—The Alabama coal operators are still in need of orders for steam coal, but even at that the production is around 345,000 tons a week. Statistics already show that Alabama will show an increased production of coal in 1923 as compared with 1922. The coke market shows no change, by-product foundry coke selling between $5 and $6 per ton and the beehive oven product a little above that price.

Old Material.—A little better feeling is noted in the scrap iron and steel market though contracts for any period into 1924 are being accepted. Small lots of old material have been sold recently and prompt delivery is being accomplished. There is plenty of stock on hand and dealers assert that they can get all the stock they want and will keep up with the demand.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$16.00
Heavy melting steel	12.00
Railroad wrought	14.00
Steel axles	17.00
Iron axles	20.00
Steel rails	13.00
No. 1 cast	18.50
Tram car wheels	15.50
Car wheels	15.00
Stove plate	14.00
Machine shop turnings	6.00
Cast iron borings	8.00

Boston

Pig Iron Market Grows Less Active as Inventory Time Draws Near

BOSTON, Dec. 11.—The New England melt of iron has fallen off this month and with inventory just ahead, business in pig iron is slowing down. Small pig iron tonnages constituted business in this territory the past week, no furnace representative reporting aggregate sales of more than 600 tons. Eastern and central Pennsylvania, Buffalo, Alabama and Virginia irons all figured in recent dealings. No. 2X eastern Pennsylvania sold at $27.15 delivered and No. 1X at $27.65; Buffalo No. 2X at $26.91 and No. 1X at $27.91; and Alabama at $30.60 base. Virginia No. 2X sold at $31.92 delivered, but is obtainable at $29.92 if round tonnages are taken. Not much buying is expected until after Jan. 1. After then it is figured New England foundries, under normal business conditions, will require 40,000 to 50,000 tons for first quarter melt.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$27.15 to	$28.15
East. Penn., sil. 1.75 to 2.25		26.65
Buffalo, sil. 2.25 to 2.75	27.41 to	27.91
Buffalo, sil. 1.75 to 2.25	26.91 to	27.41
Virginia, sil. 2.25 to 2.75	30.92 to	32.42
Virginia, sil. 1.75 to 2.25	30.92 to	31.92
Alabama, sil. 2.25 to 2.75		31.10
Alabama, sil. 1.75 to 2.25		30.60

Shapes and Plates.—Stone & Webster today will award approximately 2500 tons of structural steel for a Fall River, Mass., power plant. Bids for this steel took a wide range. The American Bridge Co. is awarded 1000 tons for a silk mill at Dividend, Conn., and is the low bidder on a Haverhill, Mass., bridge calling for about 200 tons of steel. Bids are asked on 1000 tons of steel for a Worcester, Mass., office building, and Springfield, Mass., will shortly call for bids on a large bridge. Shapes are offered at 2.40 cents to 2.50 cents Pittsburgh, and 2.35 cents on plates can be done.

Coke.—The status of the by-product foundry coke market has not changed perceptibly, except, perhaps, that rather heavy stocking of domestic fuel by New England coke makers indicates curtailed oven operations within the near future unless more seasonable weather is experienced before the turn of a new year. Foundry coke requirements are comparatively small, most iron melters having sufficient on hand to carry over Jan. 1. Both the New England Coal & Coke Co. and the Providence Gas Co. quote foundry coke $12.50 delivered in New England. The spread between that figure and the Connellsville foundry coke delivered price is smaller than noted in many weeks.

Old Material.—A further advance in prices for scrap used by steel mills averaging 50 cents a ton throughout the list has been made since the Carnegie Steel Co.'s recent purchase. The American Steel & Wire Co., Worcester, Mass., is credited with having bought a round tonnage of heavy melting steel at $15 delivered, but actual transactions otherwise have been small, mostly on a basis of $12 on cars shipping point, an advance of $1. Some dealers are holding at $13 a ton. Blast furnace borings and turnings are a little more active at $8.10 a ton on cars, or close to that price, and chemical borings at $10.25. On the other hand, comparatively little is being done in machine shop turnings and rolling mill borings, yet prices are firmer. More inquiry is noted for forged scrap, but the market is not active. One local firm is bidding as high as $10 for selected No. 1 material, but that price is exceptional, the general market on 30-in. bundles being around $9 a ton on cars. Additional car lot sales of No. 1 machinery cast to New England foundries at $22 to $22.75 and occasionally $23 are noted, but the market for No. 2 cast is stagnant and that for stove plate practically so. Railroad malleable delivered prices have been lifted 50 cents a ton, but dealers report no market for this material.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plates	15.50 to 16.00
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $13.00
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	11.00 to 11.50
Wrought pipe (3-in. to 18-in. diam., over 2 ft. long)	10.00 to 11.00
Machine shop turnings	8.00 to 8.50
Cast iron borings, chemical	10.00 to 10.50
Cast iron borings, rolling mill	7.50 to 8.50
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap and bundled skeleton	8.50 to 9.00
Shafting	17.00 to 18.00
Rails for rolling	13.00 to 13.50

Detroit Scrap Market

DETROIT, Dec. 11.—There has been considerable activity in the Detroit scrap market in the last week involving a number of small sales and the letting by the Michigan Central of 4000 tons of railroad waste material. The market has a firm note, heavy melting and shoveling steel and hydraulic compressed registering advances of 50c. per ton. The seasonal decline in melting is noticeable with the general feeling for first quarter business one of optimism.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to $15.00
Shoveling steel	13.50 to 14.50
Borings	10.00 to 11.00
Short turnings	10.00 to 11.00
Long turnings	9.50 to 10.00
No. 1 machinery cast	17.00 to 18.00
Automobile cast	23.50 to 24.00
Hydraulic compressed	11.50 to 12.00
Stove plate	15.00 to 16.00
No. 1 busheling	10.00 to 11.00
Sheet clippings	8.75 to 9.25
Flashings	10.50 to 11.00

Cleveland

Orders for Bars Booked—Heavy Buying of Sheets by Automobile Companies

CLEVELAND, Dec. 11.—Business is developing in first quarter contracts for steel bars and orders were booked during the week by local consumers for 4000 to 5000 tons, including one 2000-ton lot. All the business was taken at the regular 2.40c. price. In Detroit some of the leading automobile companies, including the Ford Motor Co., placed round tonnages for the first quarter in steel bars in both carbon and alloy steel, sheets and other mill products. However, some of the automobile companies, following a cautious policy, have not bought very far ahead. Leading automobile companies have placed contracts with parts makers for forging, axles and other parts in liberal quantities, indicating large production schedules for the first quarter. It is understood that a large percentage of the parts business has been taken at rather low prices. There is an improvement in the volume of inquiry for steel bars in lots of 100 tons and under. Locally, a manufacturer of automobile parts is expected to close this week for 15,000 tons of carbon and alloy steel bars. While the business booked for the first quarter has not yet reached the proportions of a general buying movement, the activity has resulted in an improvement in the general tone of the market. In the structural field, there is a decided gain in inquiry. Several buildings came out for figures during the week requiring 6000 tons of steel. The New York Central Railroad is reported to be working on plans for important bridge and grade crossing work which is expected out early in the year. The plate market has become slightly more active and prices have become a little firmer, although 2.40c. has not disappeared. Hoops are firm at a minimum of 3c., but a $2 a ton concession is being made in some cases from the 3c. price on bands.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Pig Iron.—Buying has further tapered off, and the total volume of sales during the week was very light. There are few foundries that did not purchase some iron during the buying movement, and a number are expected to make additional purchases, provided business opens up well in January. The market is firm, with a very little change in the price situation. While some attempt was made to boost local foundry iron to $23 at furnace for Cleveland delivery, the market has settled down to a $22.50 basis. One producer is holding to the same price for out-of-town shipment, although iron can still be had in Cleveland at $22 at furnace for outside delivery. Other Lake furnaces are holding to a minimum of $22.50. In the Valley district, quotations range from $22 to $22.50, although the latter price has become more common than a week ago. One producer during the week sold 5000 tons in foundry and malleable iron, including two 1000-ton lots in the former grade. A Cleveland foundry purchased 500 tons of foundry iron and a few small lot sales were made in the northern Ohio territory. The melt is holding up well, and some of the furnaces are shipping more iron than during November. Steel making iron is inactive. Southern foundry iron is firm at $21, Birmingham, but very quiet.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.00
Northern No. 2 fdy., sil. 1.75 to 2.25	23.00
Southern fdy., sil. 1.75 to 2.25	27.00
Malleable	23.00
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	29.00 to 30.00

Iron Ore.—Stocks of Lake Superior ore at Lake Erie docks were over 1,690,000 tons greater at the close of the season of navigation this year than they were at the same time a year ago. On Dec. 1 there was 8,756,505 gross tons of ore on Lake Erie docks as compared with 9,989,313 tons on the same day last year and with 8,097,488 tons on Oct. 1. Receipts at Lake Erie ports during November were 3,895,006 tons and for the season 43,599,050 tons, as compared with 31,713,645 tons during the corresponding period last year. Shipments from Lake Erie docks for the season up to Dec. 1 were 32,662,186 tons, as compared with 21,095,473 tons during the same period of 1922. Lake front furnaces at Lake Erie ports received 9,158,453 tons of ore during the season, as compared with 8,507,194 tons during 1922. Receipts at other than Lake Erie ports during the season were 14,656,472 tons, of which 6,988,427 tons was delivered at South Chicago, 3,982,161 tons at Gary and 1,621,688 tons at Indiana Harbor.

Semi-Finished Steel.—Considerable inquiry has come out for sheet bars for the first quarter, particularly from mills that have been booking large sheet tonnages from automobile manufacturers, but no sales are reported. Buyers insist that the ruling price of $42.50 is too high and are holding off in an attempt to secure concessions.

Bolts, Nuts and Rivets.—Bolt and nut prices are being firmly held at the regular quotations as a result of the firmer attitude recently adopted by manufacturers. Specifications and current orders are light. A small amount of contracting is being done for the first quarter. Rivets are firmly held at 2.90c., base, and some first quarter contracts have been taken at this price.

Reinforcing Bars.—New demand is fair. The Franklin Steel Works has taken 150 tons for plant addition for the P. A. Geier Co., Cleveland. Inquiry includes 500 tons of billet steel bars for a factory for the Libby-Owens Sheet Glass Co., Toledo. The Ohio Highway Commission has announced a road building program during 1924 of over $25,000,000 and this work will require a great deal of reinforcing steel. Rail steel bars have settled down to a common quotation of 2.10c.

Alloy Steels.—Leading Detroit automobile companies have in the past week or two placed round tonnages of alloy steels for the first quarter and are specifying fairly heavy on these contracts for January shipment. Mills specializing on alloy steels are rapidly filling to capacity for the first quarter and expect to be comfortably filled for the first half of the year. Producers announce the abandonment of the $10 gross ton size extra that has prevailed on square billets between 4 x 4 and 2½ x 2½ in. and the adoption of the net ton bar price on all billets smaller than 4 x 4 in., which price heretofore has applied only to sizes smaller than 2½ in. sq.

Sheets.—The automobile industry in Detroit has come in the market and during the week purchased a heavy tonnage of full finished sheets. Some contracted for the first quarter and others covered for their requirements for shorter periods. While pressure has been exerted to force automobile body sheets down $5 a ton, prices are holding firmly to 5.35c. in this territory. The demand for sheets in other grades has improved, but buyers lack confidence that present prices will be maintained and few are buying for the first quarter. Mills are in need of tonnage for December rolling and are freely quoting black sheets at 2.75c. for immediate specifications, but are holding pretty firmly to 2.85c. for the first quarter.

Coke.—A moderate volume of business has developed in foundry coke for the first half, with quotations ranging from $6.25 to $7 for standard Connellsville makes. This is about $1 a ton above the current prices for the more moderately priced grades, which are quoted down to $5.25 for prompt shipment.

Old Material.—Prices have further advanced 25c. to 50c. a ton in spite of a very limited demand. Local mills are not in the market, and there is not much activity in other Ohio districts. A Canton consumer is understood to have bought a fair tonnage of heavy melting steel during the week, and dealers are offering $17.50 to $17.75 for scrap to fill these orders. The re-

cent advance, instead of bringing out a more plentiful supply of scrap, seems to have caused dealers to hold almost more closely to their material, apparently thinking that a buying movement will develop that will cause further advance. On the other hand, there is some doubt whether prices will be maintained at present levels.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.50 to $17.00
Rails for rolling	16.75 to 17.25
Rails under 3 ft.	17.25 to 17.50
Low phosphorus melting	18.50 to 19.00
Cast borings	13.25 to 13.50
Machine shop turnings	12.50 to 13.00
Mixed borings and short turnings	13.25 to 13.75
Compressed sheet steel	13.25 to 13.75
Railroad wrought	15.00 to 16.00
Railroad malleable	19.75 to 20.25
Light bundled sheet stampings	11.25 to 11.50
Steel axle turnings	14.00 to 14.50
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.00 to 13.25
Drop forge flashings	12.75 to 13.00
Railroad grate bars	18.00 to 18.50
Stove plate	18.00 to 18.50
Pipes and flues	13.00 to 13.50

Philadelphia

Pig Iron and Steel Markets Quiet, With No Definite Trend Indicated

PHILADELPHIA, Dec. 11.—Reduced operations at most of the Eastern steel mills will mark the remaining working days of the year. One company will shut down most of its departments on Dec. 15, while others are running lightly on a hand-to-mouth basis with nothing to indicate that the remainder of December will be any better than the first 10 days have been. Naturally, interest is centered on prospects for renewed buying of steel in January. A spirit of optimism pervades the sales departments of steel companies as to a revival of activity that is remarkable in view of the lack of tangible factors to explain it. Steel consumers apparently are not as convinced as are sellers that there will be a substantial revival of buying and aside from tin plate there is little or no first quarter contracting. Two railroads have come into the market for their first quarter requirements of plates, shapes and bars, one inquiry calling for 2000 tons and another for 1000 tons, but the railroads in this district appear to be in no hurry to buy, as is evidenced by the continued holding off of the Chesapeake & Ohio on the 2000 cars it inquired for several weeks ago, and the same action by the Philadelphia & Reading on 1000 cars.

The pig iron market has turned very quiet, but moderate activity in scrap continues and prices on many grades are higher than a week ago.

Ferroalloys.—The ferromanganese market has strengthened slightly. One producer states that is minimum is now $109, furnace, while another, practically out of the market, is quoting $115. There has been no change in the British price, which remains at $110, seaboard.

Ore.—Users of manganese ore have pretty well used up their stocks and inquiries are now in the market for a total of about 50,000 tons. Recent sales of Caucasian ore to Eastern furnaces totaled 30,000 tons at 40c. to 42c. per unit, duty not paid. A German shipment of 1020 tons of iron ore was received at this port last week, also 728 tons of manganese ore from British India.

Pig Iron.—Total sales of foundry iron in the past week by local pig iron sales offices probably did not exceed 10,000 tons, if they were that much. In basic there was a transaction involving 3000 tons at a slight advance in price as compared with the last sale. Eastern Pennsylvania furnaces continue to quote $23, furnace, for No. 2 plain and $23.50, furnace, for No. 2 X, but occasional concessions are being made, particularly to equalize freight rates. Two Virginia cast iron pipe companies have recently contracted for a total of about 22,000 tons of foundry iron, one company having bought the most of its 12,000 tons from an Alabama furnace. A recent sale of 1500 tons of Virginia iron to one of these companies was on the basis of $24, furnace, for No. 2 plain.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.76 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.25 to 23.50
Gray forge	23.00 to 23.50
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.50 to 28.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Semi-Finished Steel.—Billets remain nominally at $40, Pittsburgh, for rerolling quality and $45 for forging quality. There are no sales of importance. About 200 tons of steel blooms from Belgium arrived here last week.

Plates.—A leading producer of plates in the East ran its sheared mills practically full last week, but this week is operating only its universal mill. All of the Eastern plate mills are running on a hand-to-mouth basis. One of the smaller mills attained a 50 per cent operation in November, but scarcely any of the other mills did that well and December operations will probably fall below those of last month. Orders for more than 50 tons are exceptional. With the demand at such a low point, there is no test of prices, which remain unchanged at 2.40c., Pittsburgh, generally quoted by Eastern mills, and 2.50c., Pittsburgh, usually named by the Pittsburgh mills.

Structural Steel.—The demand for structural shapes in this territory is extremely light. Building jobs are few and small. Quotations of 2.40c., Pittsburgh, are general on anything desirable, and even mills which held for some time to 2.50c. in the face of 2.40c. competition have been obliged to meet the lower price in exceptional cases.

Bars.—There is surprisingly little talk of anything under 2.40c., Pittsburgh, on steel bars in this territory in view of reports of 2.30c., Pittsburgh, having been quoted in other sections, especially on reinforcing bars. Consumers are not interested in contracting for first quarter. A few reservations for first quarter have been made by users of hot-rolled strips and bands, prices quoted ranging from 2.90c. to 3c., Pittsburgh. On cold-rolled strip, usual prices are 4.85c. to 4.90c., Pittsburgh.

Bolts, Nuts and Rivets.—Makers of bolts, nuts and rivets are ready to accept first quarter contracts, but consumers are showing little readiness to cover. Bolts for first quarter are quoted on the basis of 60 and 10 per cent off list for large machine bolts, this being 10 per cent higher than invoice prices of recent shipments.

Warehouse Business.—Local jobbers are doing a fair business. Prices are unchanged, for local delivery being as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1¼ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.52c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Coke.—At least four eastern Pennsylvania blast furnaces have contracted for all or part of their first quarter coke requirements. For January delivery only contracts were closed at $4.25, Connellsville, but $4.40 was the price fixed on supplies for the entire quarter. Prompt furnace coke is still available at $4, but the views of producers for first quarter have now strengthened, one leading producer quoting $5, Connellsville.

Old Material.—The sudden rise in the old material market has proved perplexing to buyers and sellers alike. The perplexing feature of it is that there has been no gain in finished material bookings, and some doubt is expressed as to whether prices of scrap will show further gains until there is a renewal of finished steel buying. A leading Eastern steel company is reported to have bought heavy melting steel at $17, delivered, while a small tonnage was sold to a mill in the Pittsburgh district at $18.50, delivered, which is 50c. below the price paid by the Carnegie Steel Co. on its recent purchase. An Eastern steel company paid $15 for turnings and bundled sheets and $17 for stove plate. Pipe has been sold at $16.50. English mills have inquired as to the possibility of buying steel scrap here, but the price quoted, $24, delivered at English port, is above the level of the market there and it is doubtful whether business will result. Italy is also in need of scrap and it is quite possible that some of the scrap reclaimed from U. S. Navy ships at Norfolk, Va., may be shipped to that country as the ocean freight rate is little more than the rail rate to our mills.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap rails	16.50 to 17.00
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Cast-iron car wheels	19.50 to 20.00
Rolled steel wheels	20.00 to 21.00
No. 1 railroad wrought	18.50 to 19.00
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	14.50 to 15.00
Bundled sheets (for steel works)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	11.50 to 12.00
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	14.00 to 15.00
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	17.50 to 18.00
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	18.00 to 18.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	21.00 to 22.00
Steel axles	20.00 to 21.00

British Iron and Steel Market

Politics and Holidays Become Factors—Japanese Demand Slackens—Two Rail Orders Placed—Ruhr Developments Uncertain

(By Cable)

LONDON, ENGLAND, Dec. 11.

Pig iron is firm but the tone is quieter, owing to the political disturbance, coupled with the near approach of the holidays. Recent heavy buying included sales covering the whole of next year. Cleveland makers are well placed, owing to the limited output. No further expansion yet is contemplated. Domestic trade prospects are brighter but export sales still are poor.

Hematite is firm and active but prompt supplies are scarce. Foreign ore is improving. Bilbao Rubio is being sold at 24s. ($5.23), c.i.f. Tees. West African ore brings 22½s. ($4.90).

Domestic buying of steel is improving, especially in the plate, bolt and rivet departments. Some rollers are well booked for many weeks and concessions are less easily obtainable. Merchant steel buying is quiet.

Continental business is affected by the Ruhr developments. Foreign buyers are postponing purchases, owing to the uncertainties of the future. Sterling quotations generally are unaltered.

Wire rods have been sold in the United Kingdom at £9 7½s. ($40.88), f.o.b. Hamburg. British consumers of semi-finished steel are inclined to buy if prices sufficiently attractive offer.

In France 116 blast furnaces were blowing Nov. 1. The Chemins de Fer de l'Est (Eastern Railroad) has placed an order for 16,000 tons of rails among the Société Metallurgique de Senelle-Maubeuge at Longwy, de Wendel et Cie. at Joeuf, the Société Anonyme des Acieries de Longwy at Mont-Saint-Martin, the Société Anonyme des Hauts-Fourneaux de la Chiers at Longwy Bas, the Compagnie des Forges de Chatillon, Commentry et Neuves-Maisons, the Société Anonyme des Laminoirs, Hauts-Fourneaux, Forges, Fonderies et Usines de la Providence and the Société Anonyme des Acieries de Micheville.

Franco-Belgian works have secured a South Manchurian Railroad order for 12,000 tons of rails.

Tin plate is strong on continued domestic and export demand. Some makers have sold up to 24½s. ($5.34) basis, IC, f.o.b. Second-hand have been sold on 23¾s. ($5.18) basis, IC, f.o.b. Works' order books are well filled for two or three months.

Galvanized sheets are easier on poor foreign demand. Makers have sold 24-gage corrugated in bundles at £18 15s. (3.65c. per lb.), f.o.b. Japanese demand for thin gages is stagnant. Other markets are not keen buyers, owing to the high prices quoted.

Black sheets are quieter. The Far East is inquiring for January-February shipment, but makers generally are unable to accept the orders, owing to full order books. Other markets are quiet.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.36 per £1, as follows:

Durham coke, delivered	£1 18½s	to £1 19s		$5 29 to	$5 50
Bilbao Rubio ore*	1 4			5.23	
Cleveland No. 1 foundry	5 7½			22 47	
Cleveland No. 3 foundry	5 0			21.80	
Cleveland No. 4 foundry	4 19			21.58	
Cleveland No. 4 forge	4 18			21.36	
Cleveland basic	5 0			21.80	
East Coast mixed	5 11½ upward			22.13 upward	
East Coast hematite	4 19	to 5 0		21.58 to	21.80
Ferromanganese	17 0			74.12	
Ferromanganese*	17 0			74.12	
Rails, 60 lb. and up	8 10	to 9 10		37.06 to	41.42
Billets	8 0	to 8 10		34.88 to	37.06
Sheet and tin plate bars, Welsh	8 18¾			38.97	
Tin plates, base box	1 3¾	to 1 4¼		5.18 to	5.29
				C. per Lb.	
Ship plates	9 10	to 10 0		1.85 to	1.95
Boiler plates	13 0	to 13 10		2.53 to	2.63
Tees	9 15	to 10 5		1.90 to	1.99
Channels	9 0	to 9 10		1.75 to	1.85
Beams	8 15	to 9 5		1.70 to	1.80
Round bars, ¾ to 2 in.	10 5	to 10 15		1.99 to	2.09
Galvanized sheets, 24 g.	18 15	to 19 0		3.65 to	3.70
Black sheets, 24 gage	14 0			2.72	
Black sheets, Japanese specifications	15 5			2.97	
Steel hoops	12 0	to 12 10*		2.34 &	2.43*
Cold rolled steel strip, 20 gage	17 12½			3.43	
Cotton ties, Indian specifications	15 0			2.92	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:				
Belgium	£4 15s	to £5 0s	$20.71 to	$21.80
France	4 15	to 5 0	20.71 to	21.80
Luxemburg	4 15	to 5 0	20.71 to	21.80
Billets (nominal)				
Belgium	6 7½		27.80	
France	6 7½		27.80	
Merchant bars:				
			C. per Lb.	
Belgium	7 10	to 8 0	1.46 to	1.56
Luxemburg	7 10	to 8 0	1.46 to	1.56
France	7 10	to 8 0	1.46 to	1.56
Joists (beams):				
Belgium	7 0	to 7 2½	1.36 to	1.39
Luxemburg	7 0	to 7 2½	1.36 to	1.39
France	7 0	to 7 2½	1.36 to	1.39
Angles:				
Belgium	8 0	to 8 5	1.56 to	1.61
¼-in. plates:				
Belgium	8 0	to 8 2½	1.56 to	1.58
Germany	8 0	to 8 2½	1.56 to	1.58
⅜-in. plates:				
Luxemburg	8 0	to 8 2½	1.56 to	1.58
Belgium	8 0	to 8 2½	1.56 to	1.58

Pilling & Co., pig iron, coke and coal merchants, Philadelphia, who have occupied offices in the Real Estate Trust Building, that city, for the past 15 years, will move this week to offices in the new Bankers' Trust Building.

FABRICATED STEEL BUSINESS

Building Activity in New York Accounts for Large Share of Current Lettings

Of structural steel building awards in the past week, given below, 15,600 tons of a total of nearly 24,000 tons is accounted for by work in New York City, which is having a winter building boom eclipsing that of any other city or section of the country. Pending jobs reported total nearly 23,000 tons, of which more than 13,000 tons is for jobs in New York. An office building, 8500 tons, and subway construction, 4400 tons, are the week's largest awards.

Lefecourt-Marlborough Building, Broadway and Thirty-sixth Street, New York, 4500 tons, definitely awarded to Taylor-Fichter Steel Construction Co., as predicted in last week's report.

Public School No. 99, New York, 1200 tons, to Hay Foundry & Iron Works.

Loft building on West Thirty-eighth Street, New York, 900 tons, to Hay Foundry & Iron Works.

Office building at Broadway and Fortieth Street, New York, 8500 tons, to Hay Foundry & Iron Works.

New York Edison Co., Sub-station, Horatio Street, New York, 500 tons, to Hedden Iron Construction Co.

Ohio Edison Co., power plant at Toronto, Ohio, 2000 tons, to McClintic-Marshall Co.

High school, Bridgeport, Conn., 300 tons, to Easton Structural Steel Co

Virginian Railway power plant at Narrows, Va., 2000 tons, to Virginia Bridge & Iron Works.

Route No. 52, New York subways, Queens Borough, 4400 tons, to American Bridge Co.

Standard Sanitary Mfg. Co., kiln building, Kokomo, Ind., 450 tons, Indianapolis fabricator low bidder.

Missouri River bridge, Mobridge, S. D., 1000 tons, to Minneapolis Steel & Machinery Co.

Carbon Steel Castings Co., foundry, Lancaster, Pa., 275 tons, to American Bridge Co.

Elks' Clubhouse, Omaha, Neb., 153 tons, to Omaha Structural Steel Co.

Yazoo & Mississippi Valley Railroad, passenger station at Baton Rouge, La., 112 tons, to Charles S. Schillo Co.

Manufacturing building, Phillipsdale, Mass., 200 tons, to Eastern Bridge & Structural Co.

Bourne Fuller Co., Cleveland, addition to a steel warehouse, 600 tons, to Massillon Bridge & Structural Co.

Richmond Brothers Co., Cleveland, addition, 150 tons, to Republic Structural Iron Co.

Three 80,000-bbl. oil tanks for a Los Angeles company, 900 tons, to Chicago Bridge & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Public School No. 36, New York, 400 tons.

Apartment building at 111 East Eightieth Street, New York, 400 tons

Apartment building at Kew Gardens, Long Island, 250 tons.

India House, Hanover Square, New York, addition, 150 tons.

Bank of America, Wall Street, New York, 4000 tons.

Bing & Bing, apartment building on East Fiftieth Street, New York, 600 tons.

Bank of Manhattan, Fresh Pond, Long Island, 100 tons.

Home Insurance Co., Baltimore, Md., office building, 500 tons.

Bellevue Hospital, New York, addition, 1000 tons.

Hillside Coal Co., coal breaker at Pittston, Pa., 700 tons.

Magoba loft building, West Thirty-sixth Street, New York, 1800 tons.

Dortoe Realty Co., loft building, West Thirty-eighth Street, New York, 1500 tons.

Sadowsky loft building, West Thirty-eighth Street, New York, 2000 tons.

Professional building, Sixtieth Street, New York, 400 tons.

Warehouse, Fifty-eighth Street, New York, 900 tons.

Board of Commissioners, Port of New Orleans, dock, Claiborne Avenue landing, 1700 tons.

Ford Motor Co., assembling plants at Omaha, Neb., and Memphis, Tenn., approximately 500 tons each.

Office building, Worcester, Mass., 1000 tons.

Tile Clubrooms, Milwaukee, 300 tons; bids being by the Rauff Co., 53 Patton Building, general contractor

Libbey-Owens Sheet Glass Co., Toledo, Ohio, addition, 1200 tons.

State-owned West Virginia, Charleston, State Capitol office building, 1000 tons.

United Savings & Loan Co., Cleveland, building, 1200 tons General contract placed with the Hunkin-Conkey Construction Co.

National Biscuit Co., plant in Cleveland, 200 tons.

Rapid Transit Land Co., Cleveland, office building, 140 tons. General contract placed with the A. A. Lane Construction Co.

Court House addition, Mansfield, Ohio, 200 tons.

Erie County Court House addition, Buffalo, 300 tons.

RAILROAD EQUIPMENT BUYING

Wabash Railroad Buys 2000 Cars and the Ann Arbor 500—No New Inquiries

Railroads are showing no haste to make freight car purchases nor to issue the inquiries for cars, which were expected to develop before the end of the year. The week's orders total only 2518 cars, of which the Wabash bought 2000 and the Ann Arbor Railroad 500.

The Wabash Railroad has placed orders for 2000 cars: 1750 composite box cars, which will be fabricated by the Pressed Steel Car Co., and 250 gondolas, to be built by the General American Car Co.

The Ann Arbor Railroad has placed an order for 500 box cars with the Standard Tank Car Co.

The Sinclair Refining Co. has purchased 18 standard gage coke cars from the Koppel Industrial Car & Equipment Co.

The Seaboard Air Line has ordered 4 combination baggage and mail cars from the American Car & Foundry Co.

The Alabama & Vicksburg has placed 5 coaches, 2 passenger and baggage and 1 baggage car with the American Car & Foundry Co.

The Central of Georgia has ordered 2 partition coaches and 4 straight coaches from the American Car & Foundry Co.

The Gulf, Mobile & Northern is inquiring for 2 baggage and mail cars, 2 partition coaches and 2 straight coaches.

Car Orders Come Slowly

YOUNGSTOWN, Dec. 11.—Although car builders in the Youngstown district are figuring on a number of substantial inquiries recently put forth, and forecast that within the next few weeks orders for from 25,000 to 30,000 railroad cars will be placed, current activity is somewhat limited. Placing of the business now before car makers will bring out a large volume of iron and steel tonnage.

Due to the temporarily declining volume of car business, the Standard Tank Car Co. at Masury, Ohio, has been placed on a single 8-hr. turn basis. Heretofore, it has been working two 9-hr. turns. Pending the development of a large amount of business now being figured, the company expects to be working at 40 per cent for a few weeks.

The business outlook for 1924-25 is one of the general topics for the annual meeting of the American Association for Labor Legislation to be held in Washington at the New Willard Hotel, Dec. 27, 28 and 29. This topic will be considered on Thursday morning, Dec. 27 and will be a joint session with the American Statistical Association and the American Economic Association.

The Pierce, Butler & Pierce Mfg. Corporation, New York, has acquired control of the Wolff Mfg. Co., Chicago, and will operate it as a unit of its organization in connection with its plumbing goods department. J. T. Duryea, president of the New York company, has been elected president of the Wolff company, succeeding Nels Gross, resigned.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c
Bands, base, per lb.....3c.
Strips, base, per lb.....2.75c. to 3c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....4.75c. to 5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads to jobbers.....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.50c. off list
Hot pressed nuts, tapped.....4.50c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$14.50	$14.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50

	Per 1000	
	S. A. E.	U. S. S.
⅝-in.	$15.00	$15.00
¾-in.	19.50	20.00
⅞-in.	28.50	28.50
1-in.	37.00	37.50
1-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.90
Small rivets .....65, 10 and 5 off list

Track Equipment

Spikes, ⅞ in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ⅞ in., ⅞ in. and ¾ in., per 100 lb.	3.15 to 3.25
Spikes, ⅝ in.	3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ¾ in and larger, base, per 100 lb.	4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.	5.00 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, base, per 100 lb.	2.75

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½ to 3	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2½ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes Cold Drawn	
1 in.	36
1¼ and 1½ in.	37
1¾ in.	41
2 and 2¼ in.	33
2½ and 2¾ in.	32
3 and 3¼ in.	38
3½ in. and 3¾ in.	39
4 in.	43

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....$3 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	2½-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.90c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.90c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$$6.15
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$$2.40 to $$10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$107.50 to $110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Ferrosilicon, 50 per cent, delivered	75.00
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained V	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent	$40.00
Spiegeleisen, domestic, 16 to 19 per cent	39.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.	
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50
Per 1000 f.o.b. works:	

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton	6.00 to 7.00	
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		48.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	10.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c. to 2.40c.
Skelp, sheared, per lb.	2.35c. to 2.40c.
Skelp, universal, per lb.	2.35c. to 2.40c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ½-in. and smaller, base, per 100 lb.	3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

SAE Series Numbers	Bars 100 lb.
2100*(1% Nickel, 10 to 20 per cent Carbon)	$3.50
2200 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.735
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.26
Boston, export	0.255	Chicago	0.34	†Denver (pipe)	1.17

*Pacific Coast	$1.15
*Pac. Coast, ship plates	1.20
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

CLAIRE FURNACE CASE

Supreme Court Will Decide Whether Information Must Be Given

WASHINGTON, Dec. 11.—Following completion of arguments, the Supreme Court of the United States has taken under advisement the case of the Claire Furnace Co. and other iron and steel producers against the Federal Trade Commission. The proceeding involves the authority of the commission to compel the filing by iron and steel makers of production, cost and sales reports covering materials produced for sale in interstate commerce.

Paul D. Cravath, appearing for the iron and steel manufacturers, argued that Congress has no power to inquire into the business of any of the appellees and that it has no authority to delegate the commission to do so except in respect of a reasonably suspected violation of Federal law. He said also that the sale of finished products and the purchase of raw materials are entirely separate from the manufacture or mining, and proper information in respect of sales or purchases can be secured separately. The commission, he declared, has no authority to require information as to intrastate sales.

Solicitor General Beck of the Department of Justice repeated the Government's contention that Congress can constitutionally authorize an administrative body to collect information regarding any subject over which it has legislative jurisdiction.

Coke Oven Gas for Cast Iron Pipe Plants in Alabama

BIRMINGHAM, ALA., Dec. 10.—Within a few weeks, all of the pressure pipe plants in the Birmingham city limits and suburbs will be using by-product coke oven gas as fuel, eliminating to a considerable extent coke. The Industrial Gas Corporation, a subsidiary of the Alabama By-Products Corporation, of which Morris Bush is executive, has laid mains from the by-product coke oven plant at Tarrant City to North Birmingham and Acipco, where the United States Cast Iron Pipe & Foundry Co., the American Cast Iron Pipe Co., the American Radiator Co., and others can get a bountiful supply of the by-product gas. The National Cast Iron Pipe Co. and the Vulcan Rivet Co., located at Tarrant City, have been getting this gas for some time.

Meeting of Engineers Well Attended

A good attendance marked the forty-fourth annual meeting of the American Society of Mechanical Engineers, held at the Engineering Societies Building, New York, Dec. 3 to 6. Although the number registered was not more than 2000, the actual attendance was estimated to be much greater.

Eighteen technical sessions were held at which 46 papers were read and discussed and there were more than 30 committee meetings. Social activities were a feature as heretofore, and an extensive program was provided for the ladies. Plants inspected included the American Machine & Foundry Co., Brooklyn, N. Y., at which the manufacture of automatic machines for the tobacco trade was seen, the plant being considered an excellent example of a factory building automatic machinery. A visit was made to the plant of the E. W. Bliss Co., Brooklyn, N. Y., to the Wright Aeronautical Corporation, Paterson, N. J., and to the Durant Motor Co., Star automobile factory, North Elizabeth, N. J. Reports of the machine shop, management and other sessions will be given in this and later issues.

The officers, whose nominations were given some months ago in these columns, are as follows: President, F. R. Low, editor *Power*. The new vice-presidents: George I. Rockwood, vice-president Rockwood Sprinkler Co., Worcester; Will J. Sando, consulting engineer, Milwaukee, and H. Birchard Taylor, vice-president William Cramp & Sons Ship & Engine Building Co., Philadelphia. Frank A. Scott, president Warner & Swasey Co., Cleveland; E. R. Fish, vice-president Heine Boiler Co., St. Louis; and Everett O. Eastwood, University of Washington, Seattle, will serve as managers.

The spring meeting will be held May 19 to 22 in Cleveland.

Mill Operations Reduced in the Mahoning Valley

YOUNGSTOWN, Dec. 11.—Mill operations in the Mahoning Valley this week continue to reflect the hand-to-mouth buying prevalent at this season of the year. Rolling mill operations average less than the week before, while plate mill production is entirely suspended.

Sheet mill schedules decline, with 68 of 120 sheet and jobbing mills scheduled Monday, comparing with 76 scheduled the week before. The Falcon Steel Co. has put four of its eight sheet mills at Niles on the inactive list, while the Sharon Steel Hoop Co. has likewise reduced the number of its active sheet units from nine to five.

Independent tin mill operations show a decline of six mills, as compared with the week before. Two fewer units are operating at the plant of the Trumbull Steel Co., while the Falcon Tin Plate Co. has taken four mills off the active list of its Canton property.

Puddling operations continue at a high rate, with all of the puddling furnaces at the Girard plant of the A. M. Byers Co. active, and the 44 puddle units of the Sheet & Tube company close to normal.

Open hearth capacity is being operated on the basis of 32 active units of 51 in the Valley. Sheet and tin plate production of the Steel Corporation subsidiaries in the Youngstown district continues at a rate close to normal.

Building Trades Wages in New York

Building trades unionists in New York will receive the same wage scale and bonus throughout 1924 as is paid this year, according to the decision reached Dec. 7 by the Building Trades Employers' Association. A short time ago, the old Building Trades Council requested that $1 per day be added to the 1923 scale, thereby increasing cost to owners and contractors $10,000,000 to $25,000,000. The decision of the employers is due in part to the report of the United States Bureau of Labor in September, which showed that the cost of living was 75.4 per cent above 1914. It was also pointed out that in no case was the increase in wages of trades below that figure, while in many cases wage increases were double the figure. There is slight prospect of a strike over any differences which may ensue.

Testing Society's Annual Meeting

The 1924 annual meeting of the American Society for Testing Materials will be held at the Chalfonte-Haddon Hall, Atlantic City, N. J., Monday, June 23, to Friday, June 27, or Saturday, June 28.

The executive committee has considered the possible advantages of beginning the annual meeting on Thursday, June 19, immediately following the adjournment of the meeting of the American Railway Association. The advantages that would accrue to a comparatively few members of the society are offset by the disadvantages incident to having our meeting extending over the week-end period. It is therefore considered advisable to meet as heretofore during the last full week in June.

Steel Treaters' Winter Sectional Meeting

The winter sectional meeting of the American Society for Steel Treating will be held at the Hotel Seneca, Rochester, N. Y., Jan. 31 and Feb. 1, 1924.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Dec.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
5	13.25	12.87½	47.00	7.30	7.00	6.60	6.50
6	13.25	12.87½	47.87½	7.40	7.10	6.60	6.50
7	13.25	12.87½	47.50	7.50	7.20	6.60	6.25
8	13.25	12.87½			7.20	6.60	6.25
10	13.25	12.87½	46.12½	7.50	7.20	6.60	6.25
11	13.25	12.87½	46.50	7.62½	7.37½	6.60	6.25

*Refinery quotation, delivered price Lake basis.

New York

NEW YORK, Dec. 11.

All the markets are quiet except lead which has advanced sharply with demand strong. A fair business is being done in copper at steady prices. The tin market has been moderately active and prices have fallen. The zinc market is quiet and a little lower.

Copper.—For the first time this year, when demand has been light or only fair, copper prices have remained practically stationary instead of falling. For over two weeks electrolytic copper has remained at 13.12½c., delivered, as the minimum price. One explanation for this firmness is that in November deliveries into consumption were larger than in October and production was smaller, resulting in a decrease in stocks. These facts have been the basis for a more confident tone. The present market is essentially one measured by demand for the first quarter and such business is considered fairly good, both from domestic and foreign sources. Electrolytic copper today is quoted at 13.12½c. to 13.25c., delivered, for first quarter, with some December metal pressing on the market at 13.12½c. Lake copper is quoted at 13.25c., delivered.

Tin.—The feature of the week in Straits tin was the break yesterday in the London market of about £8 per ton, ascribed by some to selling of the metal at Singapore. Some here are of the opinion that the slump was due to the election in England. At any rate, the effect was a decided decline in the New York market, with futures selling under 46c. and prompt around 46.12½c. On this decline consumers bought liberally yesterday with total sales amounting to at least 500 tons, two leading importers being the sellers. The latter part of last week the market was quiet but there were fair sales, consumers buying rather heavily the latter part of the week. This activity was ascribed by some to the covering of short sales. Today the market has been moderately active with spot Straits tin quoted today at 46.50c., New York. London prices today were £229 10s. for spot standard, £230 15s. for future standard and £231 10s. for spot Straits, all about £7 per ton less than a week ago.

Lead.—The lead market is very strong with prices rising rapidly. This condition is due to a good demand and a lack of offerings, with most producers sold up. The sending of Mexican lead to Europe, instead of importing it here, is also mentioned as another cause. On Dec. 5 the leading producer advanced its price to 7.25c., New York, and the outside market has continued to advance since. The actual market quotation is difficult to determine, reports of sellers being to the effect that sales have been made in St. Louis yesterday and today at a range of 7.25c. to 7.50c. and in New York at a range of 7.50c. to 7.75c.

Zinc.—There is a moderate demand for prime Western and producers have evidently sold enough so as not to press the metal on the market and dealers and operators are apparently inactive. Prices are slightly lower than a week ago with 6.25c., St. Louis, or 6.60c., New York, quoted for nearby, with 6.30c., St. Louis, and 6.65c., New York, the premium on futures.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Both shot and ingot nickel in the outside market are quoted at 29c. to 32c. per lb.

Antimony.—The market is easier and quiet with wholesale lots of Chinese metal for early delivery quoted at 8.60c. to 8.70c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26c. to 26.50c., delivered, duty paid, with some sellers unable to obtain the metal from foreign producers. Quotations of American producers are not made public.

Old Metals.—The tone of the market is improved and values are a little higher. Dealers' selling prices are as follows:

	Cents per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	11.75
Copper, light and bottoms	10.00
Heavy machine composition	10.75
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.00
Lead, heavy	6.75
Lead, tea	2.50
Zinc	5.00
Cast aluminum	17.50
Sheet aluminum	17.50

Chicago

CHICAGO, Dec. 11.—Lead has advanced sharply on a revival of demand, with supplies of the metal restricted. The price situation is very strong. Tin has receded from the high point reached the latter part of last week. There is evidently plenty of tin available for sale, although the metal is closely held. Copper is slightly stronger, while zinc is quiet and has declined. Antimony is more freely offered, although prices remain unchanged. Among the old metals certain grades of copper, brass and lead have advanced. We quote in carload lots: Lake copper, 13.50c.; tin, 48c.; lead, 7.30c.; spelter, 6.30c.; antimony, 11c., in less than carload lots. On old metals we quote copper wire crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 5.75c.; zinc, 4.25c.; pewter, No. 1, 25c.; tin foil, 32c.; block tin, 36c.; all buying prices for less than carload lots.

Present Status of Pressed Metal Industry

(*Concluded from page* 1580)

It was stated that generally speaking, most inquiries are received from prospects without personal solicitation, which would indicate, perhaps, that there is a general quest for possible improvements in various industries, as if it were a vague premonition of benefits to be obtained from this young industry. "It is in the fulfillment of this vague and widespread premonition," said Mr. Cook, "that the industry is to render its greatest service to industry at large, making broadly available its large store of useful knowledge, its facilities and the highly specialized skill accumulated. To accomplish this it must do its work through a hitherto almost unrecognized agent, the pressed metal engineer."

Of this coming type of pressed metal sales engineer and his specific work a few general suggestions were given, and it was said that the reception usually accorded the competent sales engineer is cordial, especially if equipped with samples of interesting work. The qualities of such an engineer were outlined and some helpful methods given. Rough free hand sketches were said to be useful in interviewing prospects. When a design had been decided upon, a simple distinct drawing or isometric sketch of the proposed redevelopment was stated to be of great assistance, and if properly utilized in the actual "selling," it is often sufficient to close the contract. It has, he said, an attraction far beyond that of the cold mechanical drawing or blueprint. The actual hand model was said to present the strongest appeal, which theoretical advantages became not only visible, but tangible and existent. The paper was followed by lantern slides showing numerous examples of redesign into pressed metal of single parts, simple assemblies and complete redevelopment of assembled devices. The illustrations were selected to present the matter from the viewpoint of the sales engineer rather than from the production expert.

PERSONAL

Frank Garratt, for the past eight years identified with industrial interests in Latrobe, Pa., has resigned as general superintendent of the Latrobe Electric Steel Co. For several years he was also general manager of the Hudson Reduction Co., manufacturer of metallic tungsten and ferrotungsten.

Gerald T. Haddock, formerly connected with the Roderick & Bascom Rope Co., St. Louis, has been appointed sales engineer for the Bayonne plant of the International Nickel Co.

Hollis T. Waldo has resigned his position with the Goulds Mfg. Co., and has opened an office as hydraulic engineer in Haverhill, Mass. He will also act as representative for the Goulds company in northern Massachusetts and southern New Hampshire.

Thomas H. Thorn has been appointed district manager of the Terminal Engineering Co., New York, with offices in Pittsburgh.

H. P. Duval has been appointed sales representative of H. D. Conkey & Co., Mendota, Ill., manufacturer of hand power and electric cranes and industrial cars, with headquarters in Kansas City, Mo. S. A. Gilliard has been appointed sales agent with headquarters at 405 Liberty Building, Buffalo.

George G. Hamilton, has resigned his position with the National Engine Hoisting Co. to become secretary-treasurer of the newly organized H. & O. Machinery & Engineering Co., Newark, N. J.

Carl G. Barth, consulting engineer, will leave soon for Japan as technical expert for the Tinius Olsen Testing Machine Co., Philadelphia, to be gone possibly for three years.

Ledlie I. Laughlin, member of the directorate, Jones & Laughlin Steel Corporation, has been appointed district sales manager at Buffalo to succeed C. S. Bradley, who was recently transferred to Pittsburgh and made manager of hot-rolled sales. Mr. Laughlin is a son of James B. Laughlin, former treasurer of the Jones & Laughlin Steel Co., and is a graduate of Princeton University, class of 1912. During the war he served overseas as captain of the 315th Infantry, 79th Division. Mr. Laughlin has recently been attached to the New York office. He will take charge of the Buffalo office about the middle of this month.

Charles W. Dunlap, vice-president Waukesha Steel Products Co., Waukesha, Wis., has moved to Atlanta, Ga., to engage in sales engineering activities.

A. M. Hirsch, formerly connected with the Vanadium Alloys Steel Co., and Le Moyne Steel Co., has been appointed manager of the Cincinnati branch office of the Ziv Steel & Wire Co., Chicago.

Hayden Ames, Cleveland, has been appointed general manager of the Haynes Automobile Co., Kokomo, Ind. S. E. Burke, Detroit, has been appointed sales manager.

F. A. J. Fitzgerald of the Fitzgerald Laboratories, Niagara Falls, N. Y., sails this week for Europe. He will visit Belfast and Dublin, Ireland, returning about the first week in February.

Edwin H. Steedman, president, Curtis & Co. Mfg. Co., St. Louis, and Mrs. Steedman, who have been in British East Africa for the last three months hunting big game, arrived in New York on Dec. 8, on the French liner, Paris, from Havre. They proceeded at once to their home in St. Louis.

William H. Blauvelt, consulting engineer, New York, will address a meeting of the metropolitan section of the American Society of Mechanical Engineers on Tuesday evening, Dec. 18, at the Engineering Societies Building, New York, on the processes of high and low temperature distillation of coal.

George E. Vanhagen, president Standard Forgings Co., Chicago, suffered a dislocated hip in the Twentieth Century wreck at Forsyth, N. Y., early Sunday morning, Dec. 9.

Obituary

ANTONIO C. PESSANO, prominent shipbuilder and engineer, and chairman of the board of directors of the Great Lakes Engineering Works, Detroit and Ashtabula, Ohio, died on Dec 5, at the Hotel Plaza, New York, where he had made his home for several years. He was born in Philadelphia, July 3, 1857, and received his early education in the Philadelphia High School and Franklin Institute of Technology. Mr. Pessano was called to Detroit in 1902 by a group of local capitalists who acquired the old S. F. Hodge Riverside Iron Works. With this plant as a nucleus, the Great Lakes Engineering Works was organized, Mr. Pessano becoming president and general manager. Shipyards were established at Ecorse, below St. Clair, and within a few years at Ashtabula. From these plants have been turned out many large craft, including some of the most modern steel freighters in the service on the Great Lakes. More than 100 ships for salt water service were built, including a fleet of steel ships for the United States Shipping Board during the war. The vigorous personality of Mr. Pessano contributed largely to this success. Confidence in his company, in the future of Detroit and America, was one of Mr. Pessano's strong characteristics. In 1920 the Great Lakes Engineering Works was liquidated and its properties were purchased by a new company of the same name, which Mr. Pessano formed from some of the interests which had been connected with the old company. He was made chairman of the board at that time. During his residence in Detroit, he was a member of the Detroit Engineering Society, American Society of Mechanical Engineers, National Association of Manufacturers, National Founders' Association, National Metal Trades Association, Employers' Association of Detroit and the Detroit Board of Commerce.

BENJAMIN FRANKLIN FOX, president Benjamin F. Fox & Sons, Inc., iron founders, 509 West Thirty-fourth Street, New York, died Dec. 9, at St. Luke's Hospital, that city, aged 57 years. He was for 12 years a member of the Republican State Committee. The foundry of which he was head was established by his father, a native of Yorkshire, and is one of the oldest in the city.

WILLIAM DE MOOY, a pioneer foundryman of Cleveland, died at his winter home in St. Petersburg, Fla., Dec. 5, age 83 years. He was employed for some time as foreman by the Taylor & Boggis Foundry Co., Cleveland, and in 1882 became a partner in the Palmer & De Mooy Foundry, later acquired by an incorporated company of which Mr. De Mooy was president for 12 years following the death of Mr. Palmer. After having been associated with this foundry nearly 40 years, he retired four years ago, when the plant was merged with the Acme Foundry Co., the name being changed to the Acme-Palmer & De Mooy Foundry Co.

JULIUS C. BIRGE, vice-president Ames Shovel & Tool Co., St. Louis, died at his home in that city on the evening of Dec. 8, after a month's illness of kidney trouble. He was born at Whitewater, Wis., in 1839, the first white child born in Walworth County. He spent several years in the far West as a young man, and wrote a book, "The Awakening of the Desert," in which he told of his experiences. He went to St. Louis in 1866, and established the St. Louis Shovel Co., which became the Ames Shovel & Tool Co. in 1902.

WILLIAM H. COOLEY, treasurer New York Car Wheel Co., Buffalo, died at his home, 64 Norwood Avenue, on Dec. 7, aged 53 years. He was born in South Deerfield, Mass., and in 1902 he became associated with his brother, Frederick B. Cooley, in the Aluminum Castings Co., Buffalo. Three years later the main office was moved to Cleveland and for ten years Mr. Cooley lived there. In 1915 he was appointed to the position he held at the time of his death.

Machinery Markets and News of the Works

YEAR-END BUSINESS QUIET

Machine Tool Sales This Month Are Scattered and Mostly Single Items

A Good Deal of Inquiry Pending, but Action Is Being Deferred Until After Jan. 1

Although machine-tool sellers are putting forth extra efforts to swell their 1923 business as much as possible, there is a good deal of resistance among prospective buyers, even where there is admittedly a need for the tools, to taking any action until after the first of the year. Sales so far this month are scattered and mostly in single-tool lots.

A little railroad buying is reported, orders having been placed by the Chicago, Milwaukee & St. Paul and the Lehigh Valley roads on inquiries of long standing. The New York, New Haven & Hartford has bought a 48-in. car-wheel borer and the Western Fruit Express has bought an axle lathe. The Union Pacific has inquired for a number of machines for its shops at Los Angeles.

A fresh spurt of railroad buying is expected early in the new year, for it is known that a number of roads are preparing lists which will probably be sent out for prices soon. Buying by the automobile companies, which has been a conspicuous feature of machine-tool business throughout the year, has slackened somewhat, but further activity is expected as soon as the plans of automobile makers for 1924 are further along.

The Pettibone-Mulliken Co., Chicago, manufacturer of frogs and switches, has bought four radial drills, three universal tool grinders, three shapers and eight engine lathes. A Chicago district automobile manufacturer has purchased several tools. The Standard Sanitary Mfg. Co., Pittsburgh, is tabulating bids recently received on a list of about 30 tools for its new Baltimore plant.

New York

NEW YORK, Dec. 11.

THE Lehigh Valley Railroad has placed orders for a number of machines, among them a locomotive rod milling machine, a 60-in. vertical milling machine and a 19-in. engine lathe. The inquiry for these tools had been pending since last June. The New York, New Haven & Hartford Railroad has ordered a 48-in. car-wheel borer and the Western Fruit Express has ordered an axle lathe. The Hallidie Machinery Co., a Pacific Coast distributer, has placed an order for an 800-lb. steam hammer with an Eastern company. Aside from these few orders the local machine-tool market is very quiet. Prospective buyers are postponing action in most instances until after the first of the year.

Plans have been filed by the Department of Plant and Structures, Municipal Building, New York, for a ten-story machine and repair works, 173 x 345 ft., at 278-90 Avenue C, estimated to cost $3,500,000, including machinery.

Bids will be asked early in January by Harry Cahn and Philip Wattenberg, 406 East 149th Street, New York, for a two-story automobile service and repair building, 100 x 175 ft., at Sixty-ninth Street and Avenue A, to cost about $300,000 with equipment. John De Hart, 1041 Fox Street, is architect.

The Saratoga County Paper Co., Inc., Ballston Spa, N. Y., has inquiries out for a motor, with rails, pulley and auxiliary equipment. F. J. Talbot is treasurer.

The Fox Foundry Works, F. Fox, president, New York, care of the Manida Building & Construction Co., Inc., Manida Street, has purchased property, 50 x 100 ft., in the Hunts Point section as a site for a six-story foundry for which plans will be drawn at once. Negotiations are also in progress for the acquisition of additional land.

J. Gerard, care of Nicholas Catania, 350 Broadway, New York, is having plans drawn for a four-story automobile service and repair building, 94 x 100 ft., at 136 East Twenty-fifth Street, to cost $250,000 with equipment. H. H. Murdock, 50 East Forty-second Street, is architect.

The Albany Hardware & Iron Co., Albany, N. Y., is planning for a new seven-story works and distributing plant on Broadway, 120 x 200 ft., to cost approximately $500,000 with equipment.

The Electric Bond & Share Co., 71 Broadway, New York, managing and operating electric properties, has purchased the plant and system of the Camaguey Electric Co., Havana, Cuba, for $3,000,000. Plans are under way for extensions and the installation of additional equipment.

Electric and steam power equipment and other machinery will be installed in the two-story refuse destructor for the Department of Works, city of New York, Municipal Building, to be located at Woodhaven, L. I., for which foundations will be laid at once. It will be 60 x 106 ft., estimated to cost $290,000. Joseph P. Powers, Rockaway Beach, L. I., is architect.

N. Coleman, Inc., 33 East Twelfth Street, New York, manufacturer of metal specialties, is taking bids for a new six-story works and distributing plant, 53 x 83 ft., at Hubert and Green Streets, estimated to cost $68,000. George Keister, 56 West Forty-fifth Street, is architect.

The Hawaiian Electric Co., Ltd., Honolulu, has arranged an appropriation of $1,250,000 for extensions and improvements in its power plant and system. A 12,500-kw. steam turbo-generator, two 850-hp. boilers and auxiliary equipment will be installed to increase the capacity to 35,000 kw. A new high-power substation will be constructed at Waikiki. Extensions will be made in the power distributing system at Honolulu to cost $150,000.

The Columbia Machine Works, 269 Chestnut Street, Brooklyn, has filed plans for a one-story addition at 3281-93 Atlantic Avenue. Louis Allmendinger, 20 Palmetto Street, is architect.

Charles N. Whinston & Brothers, 2 Columbus Circle, New York, architects, will prepare plans for a six-story and basement automobile service, machine and repair building, 75 x 90 ft., at 195-99 Washington Street, to cost $300,000, for a company whose name will be announced later.

The Sinclair Crude Oil Producing Co., a subsidiary of the Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, contemplates extensions in its storage and distributing plant at Glenrock, Wyo., estimated to cost $500,000.

The Electric Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, has information regarding a city in the State of Rio Grande do Sul, Brazil, which plans the construction of a municipal electric power house using American equipment, file No. 112053.

The New York Steel Exchange, Inc., Woolworth Building, New York, has inquiries out for a 25-ton locomotive for export, suitable for quarry work, to operate on a 66-in. gage track.

Officials of the International Combustion Engineering Corporation, 43 Broad Street, New York, and Vickers, Ltd., Leeds and Manchester, England, have formed the Vickers & International Combustion Engineering, Ltd., with capital of £500,000, to operate a plant at Barrow, Furness, England, for the manufacture of power-plant equipment, including special boilers for pulverized fuel, superheaters, economizers,

etc. Sir Trevor Dawson, managing director, Vickers, Ltd., will be chairman of the new company; George E. Learnard and Wilfred R. Wood, president and vice-president of the International Combustion Company, will be active officials.

The New York Auto Body Works, 207 Church Street, Poughkeepsie, N. Y., is having plans drawn for a one-story structure, 50 x 133 ft., for the manufacture of commercial automobile bodies, to cost $20,000 exclusive of equipment. L. L. Booth, 20 Cannon Street, is architect.

The Turl Engineering Works, 39 Cortlandt Street, New York, plan for the installation of steel tanks and other equipment at plant at Peekskill, N. Y.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a proposed sugar mill to be erected by a company in Brazil, estimated to cost $200,000, planning to use American machinery. Reference No. 113214.

The Standard Electric Novelty Co., 324 Lafayette Street, New York, manufacturer of electrical specialties, will take over four floors in the building at 19 Bond Street for a new plant.

The Centrifugal Pipe Corporation, recently formed under Delaware laws, will take over and expand the Centrifugal Cast Iron Pipe Co., 15 Exchange Place, Jersey City, N. J.

The Union County Park Commission, 286 East Broad Street, Elizabeth, N. J., will commence the erection of a two and two and one-half story L-shaped machine works for county automobiles and road machinery, 30 x 150 ft. and 30 x 118 ft., on Rahway Avenue. C. Godfrey Poggi, 275 Morris Avenue, is architect.

Fire, Dec. 6, destroyed a portion of the foundry of the A. & F. Brown Co., Elizabethport, N. J., manufacturer of shafting, pulleys, etc., Third Street and Clark Place, with loss estimated at $25,000. It is planned to rebuild.

The Common Council, Maple Shade, N. J., plans the installation of four triplex pumps and auxiliary equipment at its proposed waterworks. Remington & Vosbury, Courthouse Square Building, Camden, N. J., are architects and engineers.

Plans have been filed by the Weiner Auto Body Co., 516 Passaic Avenue, Newark, for a one-story plant, 50 x 140 ft., Hillside, to cost $27,000.

The Beisel Spring Wheel Corporation, 49 West Sixty-fourth Street, New York, recently organized to manufacture wheels, is now in position to receive bids for manufacturing various parts of its product. All work is to be done by contract. J. R. Beisel heads the company.

Manual training equipment will be installed in the new high school to be erected on North Avenue, New Rochelle, N. Y., estimated to cost $1,000,000, for which Guilbert & Betelle, Chamber of Commerce Building, Newark, architects, have been engaged to prepare plans.

The Coplay Cement Mfg. Co., Coplay, Pa., will make extensions in its Mill C, and install new kilns, power equipment and auxiliary machinery.

The Hard Vein Slate Co., Easton National Bank Building, Easton, Pa., recently organized, has acquired property in the vicinity of the former plant of the Northampton Hard Vein Slate Co., which it has succeeded, and will install quarrying and other machinery. William Tonkin is president, and Richard S. Whitesell, treasurer and general manager.

The Lancaster Iron Works, Inc., Lancaster, Pa., is planning for the installation of an open-side planer, 48 x 48 in., about 12 ft. long.

The Watts Water & Power Co. and the Juniata Water & Power Co., Juniata, Pa., are planning for the construction of a hydroelectric power plant on the Juniata River, near Losh's Run.

An ice and refrigerating plant, with power house, will be constructed by the Penn Cress Ice Cream Co., Front Street, Cresson, Pa., in connection with a new three-story factory to cost $150,000 including equipment. A. B. McCullough, 3225 Fifth Avenue, Altoona, Pa., is manager.

The Suffolk Anthracite Collieries Co., Archbald, Pa., has acquired the plant and properties of the Archbald Coal Co., and plans the installation of additional equipment.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, will build a new ice-manufacturing and caricing plant at Huntingdon, Pa., with daily capacity of 225 tons. An ice-storage plant will also be erected. The total cost will amount to about $900,000, including machinery, and will be ready for service early in the spring.

The National Radiator Co., New Castle, Pa., is planning to rebuild its foundry, partially destroyed by fire Dec. 7.

James A. Redington, 9 Spring Street, Pittston, Pa., is having plans prepared for a two-story automobile service and repair building, 60 x 100 ft., estimated to cost $70,000 with equipment.

The Pennsylvania Power & Light Co., Allentown, Pa., will commence the construction of a power house near Green Ridge, Pa., estimated to cost $200,000 with machinery and transmission lines.

The Muncy Valley Light Co., Eaglesmere, Pa., has been organized to install and operate a local plant and system. R. D. Kehrer, Eaglesmere, is treasurer.

The National Self-Carbonating Fountain Co., Bourse Building, Philadelphia, recently organized with capital stock of $300,000 under Delaware laws, will manufacture fountain equipment. Parts will be made by contract, and the company is looking for a manufacturer equipped for this line of work. R. I. Johns is one of the principals.

Philadelphia

PHILADELPHIA, Dec. 10.

CONTRACT has been let by the Electric Development & Machine Co., 221 North Twenty-third Street, Philadelphia, to Franklin M. Harris & Co., 1520 Parrish Street, for a new plant at Holmesburg.

C. M. Roswell, 62 Marlyn Road, Philadelphia, machinery dealer, is in the market for an air compressor, about 2200 cu. ft. capacity, direct connected to electric motor.

The plant and property of the Vim Motor Truck Co., Fox Street and Roberts Avenue, Philadelphia, totaling 25 acres, has been acquired at public sale by Ralph S. Croskey, Stephen Girard Building, attorney, acting for local industrial interests, name temporarily withheld, which purpose to occupy the plant for kindred manufacture.

The Fairmount Foundry & Machine Co., Fifteenth Street and Indiana Avenue, Philadelphia, is having plans drawn for a one-story foundry, for which bids will be asked in the spring.

The Philadelphia Rapid Transit Co., Seventh and Dauphin Streets, Philadelphia, is having plans drawn for new car repair shops, car barn and terminal, one and two stories.

The Southeast Coal Co., 1732 Commercial Trust Building, Philadelphia, is reported to be planning the installation of additional mining machinery and electric power equipment at its properties in Kentucky. Capital recently was increased to $800,000 for expansion.

The Philadelphia Suburban Gas & Electric Co., West Washington Square, Philadelphia, is disposing of a bond issue of $3,650,000, the proceeds to be used for power-plant construction and other improvements. Morris W. Stroud is president.

Holmes, Inc., 29 Chancery Lane, Trenton, N. J., is having plans drawn for a two-story electric battery and repair works, 55 x 105 ft., to cost about $60,000. F. D. Priory, 11 West State Street, is engineer.

New England

BOSTON, Dec. 11.

MACHINE tool business continues at a minimum. The most important transaction the past week was several thousand dollars worth of new and used equipment, but as it has a Jan. 1 dating, details are lacking. Another sale included a new 24-in. shaper and a used Cincinnati milling machine to the Simplex Wire & Cable Co., Cambridge, Mass., which is also about to close on a new 32-in. shaper. The market, however, is not without encouraging features. Local machine tool dealers expect to shortly close on several thousand dollars worth of equipment for Massachusetts metal workers with the understanding that bills are to have a forward dating. Numerous inquiries involving $4,000 to $5,000 equipment have developed, which are assured of closing shortly. Other inquiries for one, two and three machines, mostly used, contingent on users securing expected orders, are in the market.

The application of the Boston Elevated Railway to the Massachusetts Legislature for permission to borrow several million dollars has revived interest in a large list of tools for its new Everett repair shops. Officials of the company, however, state that actual purchase is several months distant. Interests contemplating the manufacture of a new magneto at Binghamton, N. Y., are in this market with a view to buying production equipment. Sales of machine parts are unusually good for this time of the year, while those of small tools run well ahead of those for December, 1922.

The Crane Market

The market on both electric overhead cranes and locomotive cranes is quiet, buyers showing a tendency to delay purchase until after the first of the year. Competition on current orders is keen, and as a rule the question of price is a leading consideration. Action is expected shortly on the list of cranes for the plant of the General Electric Co. at Philadelphia.

Crane business in the Pittsburgh district has been of fair volume, although the trade describes the market as quiet, probably because of the scarcity of new inquiries. Orders for nine cranes and two trolleys are reported and it is expected that the Standard Sanitary Mfg. Co. will close for the seven cranes for its new plant at Baltimore before Christmas. The Railway & Industrial Engineering Co., Greensburg, Pa., is in the market for a 5-ton, 30-ft. span, 3-motor, overhead crane.

Among recent purchases are:

Government of the Philippines, 17 Battery Place, New York, for Pier No. 7, Manila, P. I., nine 2-ton, 45-ft. span overhead traveling cranes from the Pawling & Harnischfeger Co. and nine 2-ton, 28-ft. span overhead cranes, all 3-motor, from the Shepard Electric Crane & Hoist Co. There is an additional list of gantry cranes not yet closed.

Viele, Blackwell & Buck, 49 Wall Street, New York, a 45-ton, 30-ft. span, 3-motor, power house crane for the Adirondack Light & Power Co., St. Johnsville, N. Y., from the Cleveland Crane & Engineering Co.

J. G. White Engineering Co., 43 Exchange Place, New York, a 40-ton, 42-ft. 9½-in. span, 4-motor, overhead traveling crane for Manila, P. I., from the Northern Engineering Works.

Lake Sand Corporation, Chicago, a 2½-cu. yd. grab bucket, electric trolley from the Northern Engineering Works.

Kentucky Utilities Co., Pineville, Ky., a 40-ton, 4-motor electric traveling crane from the Northern Engineering Works.

Semi-Steel Test Foundry, Chicago, a 7½-ton, 3-motor electric traveling crane from the Northern Engineering Works.

Ford, Bacon & Davis, engineers, 115 Broadway, New York, a 30-ton overhead traveling crane from the Whiting Corporation.

Metallurgic & Chemical Co., 42 Broadway, New York, a 10-ton, 3-motor overhead traveling crane for Matteawan, N. J., from the Whiting Corporation.

Pennsylvania Railroad, Philadelphia, a 15-ton, magnet operating locomotive crane from the Industrial Works.

Sprague Ice & Coal Co., Bridgeport, Conn., a used 10-ton Brownhoist locomotive crane from the Grey Steel Products Co., New York.

Bourne-Fuller Co., Cleveland, two 10-ton, double trolley, electric traveling cranes, 62-ft. and 65-ft. spans, from the Cleveland Crane & Engineering Co.

Yazoo & Mississippi Valley Railroad, a 15-ton pillar crane from the Whiting Corporation.

Atlanta & West Point Railroad, Atlanta, Ga., a locomotive hoist from the Whiting Corporation.

Georgia Railroad, Augusta, Ga., a locomotive hoist from the Whiting Corporation.

Youngstown Sheet & Tube Co., Youngstown, seven 10-ton, long span overhead cranes, three for Youngstown and four for Indiana Harbor, from the Morgan Engineering Co.

National Tube Co., Pittsburgh, a 10-ton electric trolley for the galvanizing department of the Republic works, from the Shaw Electric Crane Co.

American Sheet & Tin Plate Co., Pittsburgh, a 10-ton trolley for the Laughlin works, from the Alliance Machine Co.

Carnegie Steel Co., Pittsburgh, a 5-ton, floor-controlled crane for the McCutcheon works, from the Euclid Crane & Hoist Co.

Missouri Rolling Mill Co., St. Louis, a 5-ton crane from the Shaw Electric Crane Co.

Union Carbide Co., Niagara Falls, N. Y., a 3-ton crane from the Shaw Electric Crane Co.

Atchison, Topeka & Santa Fe Railroad, a 7½-ton crane from the Shaw Electric Crane Co.

New York Central Lines, for Collingwood, Ohio, a 10-ton electric crane from the Shaw Electric Crane Co.

Studebaker Corporation, South Bend, Ind., four 5-ton, two 10-ton and a 3-ton electric cranes from the Shaw Electric Crane Co.

Three electric cranes will be installed in the forge shop extension under construction for the New Departure Mfg. Co., Bristol, Conn., ball bearings, etc., in addition to other equipment. The building will be completed by March 15, and will increase the production of ball bearings at least 50 per cent. The company will install additional equipment in plant A, Bristol, and plant D, Meriden, Conn., to handle the increased output of the forge plant.

The New England High Carbon Wire Co., Millbury, Mass., metal products, recently incorporated under the laws of Massachusetts with a capital of $50,000, will occupy the plant formerly owned by the Millbury Rubber Co., and two small units to be erected shortly. It is planned to start operations next month. Carl Thure Lund, formerly with the American Steel & Wire Co., Worcester, Mass., is president and general manager.

The Manchester Marble Co., East Dorset, Vt., will rebuild its plant destroyed by fire in October and expects to be in operation by April 1. A finishing shop, 29 x 148 ft., and other units will be erected. Electricity will replace steam power heretofore used. Hand cranes are required, as well as pneumatic equipment.

Plans are in progress for a high school on White Street, East Boston, to cost $1,300,000, in which manual training equipment will be installed. Thomas P. Glynn, James J. Mahar and C. H. Blackall, school house department, City Hall Annex, room 1009, Boston, have supervision of the project. John M. Gray & Co., 175 High Street, Boston, are the architects.

The Elliott Addressing Machine Co., 143 Albany Street, Cambridge, Mass., has awarded contract for a five-story, 40 x 90 ft. addition. Plans private.

The C. F. Wooding Co., Wallingford, Conn., house furnishings, has broken ground for three one-story 45 x 125 ft. plant units for manufacturing, annealing and drop forging departments.

The Columbia Cornice & Skylight Co., 268 Elm Street, Cambridge, Mass., will arrange a list of sheet-metal equipment and machine shop apparatus for installation in a new plant, for which work has commenced, to cost about $23,000.

The International Silver Co., Meriden, Conn., has awarded a general contract to the C. F. Wooding Co., Wallingford, Conn., for three additions to its Wallingford works, each one-story, 45 x 125 ft., estimated to cost $60,000.

The Diamond Match Co., Biddeford, Me., will make extensions for the establishment of additional departments to manufacture sash, doors, and kindred products. Electrically-operated machinery will be installed.

The Montaup Electric Co., Fall River, Mass., recently formed by officials of the Fall River Electric Co.; Blackstone Valley Gas & Electric Co., Pawtucket, R. I.; and Edison Electric Illuminating Co., Brockton, Mass., is arranging for a stock issue of $4,500,000, the proceeds to be used for a new electric generating plant at Somerset, to cost $7,500,000 with transmission system. Waterfront property of 46 acres has been purchased.

W. H. Bates, Jr., 49 Gardner Street, Allston, Boston, plans for the purchase of a tilting melting furnace.

The Waterbury Farrell Foundry & Machine Co. Waterbury, Conn., has awarded a contract to the Immick Co., Meriden, Conn., for a two-story addition, 48 x 54 ft., estimated to cost $40,000.

Fire, Dec. 4, destroyed a portion of the three-story woodworking plant of the Banigan Mfg. Co., Elmsville, Conn., with loss estimated at $40,000 including equipment. It is planned to rebuild. John J. and Richard D. Banigan are heads.

Underhill Brothers, 110 Winthrop Avenue, Somerville, Mass., manufacturers of tools, will commence on a one-story addition, 50 x 50 ft.

The Plimpton Lift Truck Corporation, Stamford, Conn., has been organized with a capital of $100,000 to take over and expand the plant and business of the Plimpton Truck Co., manufacturer of industrial and factory trucks. The new company is headed by Bernard E. Scriven and William J. Young, 867 Main Street.

Landers, Frary & Clark, New Britain, Conn., manufacturers of electric heating and cooking equipment, have superstructure work under way on a six-story addition, 65 x 160 ft.

Chicago

CHICAGO, Dec. 10.

GENERALLY speaking, orders are scattered and are confined to single tools. The volume of business actually being placed, however is slightly better than a week ago, and dealers are hopeful that much of the inquiry now pending will soon develop into orders. In many cases, of course, prospective buyers purpose to delay action on their needs until after Jan. 1. No new railroad orders are reported, but the Union Pacific has issued a number of inquiries for a new shop at Los Angeles, and further additions to this list are expected.

The Pettibone-Mulliken Co., Chicago, manufacturer of frogs and switches, has closed for two 6-ft. radial drills, two 3½-ft. radial drills, three universal tool grinders, three 28-in. shapers and eight engine lathes. A Chicago district automobile manufacturer has placed orders for a 42-in. x 42-in. x 10-ft. planer, a 16-in. tool room lathe, a 20-in. shaper and a 7-in. shaper. The city of Chicago has purchased a 20-in. motor-driven shaper for a pumping station. The Chicago Board of Education has not yet closed against its list for the Tilden Technical High School.

Union Pacific List

Three 24-in. engine lathes.
Two 18-in. engine lathes.
Three 50-ton bushing presses.
One link grinder.
Three 34-in. upright drill presses.
Three sensitive drills.
Two 42-in. boring mills.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: One No. 6 cupola for the El Paso Foundry & Machine Co., El Paso, Tex.; one No. 10 cupola for the American Car & Foundry Co., New York; one 36 x 48-in. tumbler for the Milwaukee Gray Iron Foundry Co., Milwaukee, Wis.

The Stewart Storage Battery Co., previously located at Marshfield, Wis., has leased 10,000 sq. ft. of floor space on the third floor of the building at 361 West Superior Street, Chicago, where its manufacturing operations are now being conducted.

The Puritan Bed Spring Co., a new organization engaged in the manufacture of mattresses and bed springs, has leased a four-story and basement plant, containing 10,000 sq. ft. of floor space, at 1258 West Fifteenth Street, Chicago.

Ditto, Inc., manufacturer of duplicating machines, with offices at 530 South Dearborn Street, Chicago, has acquired additional manufacturing space on the second floor of a building at 14-16 North May Street.

Reda Brothers, a new company engaged in the automobile repair business, have purchased property, 100 x 125 ft., at the corner of Crawford and Fillmore Avenues, Chicago. The property is improved with a one-story factory, 42 x 75 ft., and a one-story boiler room, 24 x 40 ft.

William Gaertner & Co., manufacturers of scientific apparatus and precision instruments, 5345-49 Lake Park Avenue, Chicago, will move on Jan. 1 to a new plant, containing 40,000 sq. ft. of floor space, recently completed at Wrightwood and Racine Avenues, at a cost of $150,000.

The Ramapo Ajax Corporation, manufacturer of forgings, 2503 Blue Island Avenue, Chicago, has let a contract for a two-story shop, 29 x 76 ft., to cost $6,500.

J. Milhenning, Inc., jewelry manufacturer, 135 South State Street, Chicago, has awarded contract for a two-story factory, 43 x 120 ft., at 4626-34 Ravenswood Avenue, to cost $48,000.

The Carr, Ryder & Adams Co., manufacturer of interior woodwork, Dubuque, Iowa, plans to construct a five-story factory next spring, increasing its working force by 200 men.

The plant of the Culter & Proctor Stove Co., Peoria, Ill., was recently damaged by fire.

The Wistrand Mfg. Co., manufacturer of agricultural implements, Galva, Ill., has decided to abandon foundry operations and will add the space occupied by the foundry equipment to its general machine shop.

C. E. Niehoff & Co., 149 West Ohio Street, Chicago, recently incorporated with $5,000 capital stock, is manufacturing automotive electric service parts. Officers are Conrad E. Niehoff, president, and M. A. Niehoff, secretary and treasurer.

Fire recently damaged the plant of the Aluminum Mfg. Co., East Moline, Ill.

The National Gear Co., 213 North Morgan Street, Chicago, recently incorporated with $150,000 capital stock, has a completely equipped factory for the manufacture of ring gears and pinions for replacement parts in automobiles. Officers are George H. Daskal, president; D. H. Daskal, treasurer; B. J. Merkle, secretary; David Davis, vice-president; Abram Korff, vice-president.

The Central States Metal Sales Co., 53 West Jackson Boulevard, Chicago, recently incorporated with $5,000 capital stock, will confine itself for the present to the merchandising of iron and steel products. However, it expects to operate a rolling mill later, probably an 8-in. mill. Officers are J. E. Gratteau, president; Frank Siewenie, vice-president and treasurer, and W. E. Yahnker, secretary.

The Rockford Cabinet Co., Twelfth Street and Nineteenth Avenue, Rockford, Ill., has awarded a general contract to the Holmquist, Peterson Co., Swedish-American Bank Building, for a four-story and basement addition, 100 x 225 ft., for a veneering and assembling works, estimated to cost $230,000 with machinery. O. E. Landstrom is secretary.

The Rocky Mountain Marble Co., Carbondale, Colo., is planning for the installation of tools at its machine shop, including a traveling crane.

The Domestic and Foreign Commerce Department, Chicago Chamber of Commerce, 10 South La Salle Street, has received an inquiry from a company at Auckland, New Zealand, desiring to purchase American machinery for the manufacture of plaster wall board and kindred products, No. 2545.

The J. I. Case Threshing Machine Co., 210 East Seventh Street, Waterloo, Iowa, will build a one-story addition, 60 x 60 ft. Fred Bussey is local manager.

The Common Council, Eagle Grove, Iowa, has preliminary plans for a municipal electric power plant. J. K. Baker, city clerk, is in charge.

George Watson, care of Robert E. Watson, 119 South Third Street, Rockford, Ill., is having plans drawn for a one-story machine shop, 42 x 100 ft., on Walnut Street.

The Minnesota Power & Light Co., Duluth, Minn., recently organized to consolidate the Duluth-Edison Electric Co., General Light & Power Co. and the Great Northern Power Co., has preliminary plans for a new hydroelectric power plant in the northeastern part of Minnesota, estimated to cost $25,000,000 with transmission system.

Darling & Co., 4201 South Ashland Avenue, Chicago, are contemplating the erection of a new fertilizer manufacturing plant to replace their works recently partially destroyed by fire, estimated to cost $500,000 with machinery. S. J. Riley, company address, is architect. C. A. Alling is president.

Cleveland

CLEVELAND, Dec. 10.

THE volume of business and inquiry has tapered off with the approach of the end of the year and the trade is looking for a quiet period the remainder of December. There is a fair amount of business in prospect, but in most cases prospective purchasers will not place their orders before January. Sales during the week were virtually all in single machines. No action has been taken by the New York Central Railroad on its recent list and the trade has not been advised whether or not the business will be placed this month.

The Acetylene Stove Mfg. Co., Cleveland, will build a one-story factory, 60 x 160 ft., at East Fifty-ninth Street and Park Avenue at an estimated cost of $20,000. E. L. Davis is secretary-treasurer.

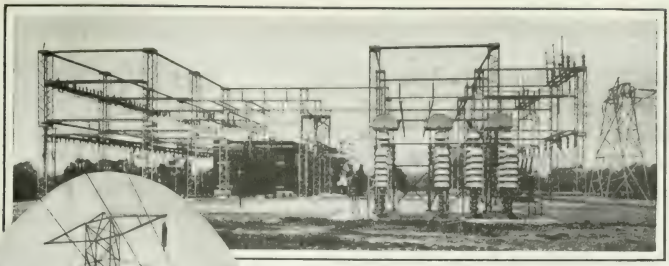
The United States Aluminum Co., 2810 Harvard Avenue, Cleveland, will erect a building, 100 x 300 ft., at an estimated cost of $40,000. It will be used for a smelting department.

The city of Fostoria, Ohio, has completed plans for a sewage disposal plant which will require two 2100-gal. per min. motor driven pumps. W. O. Bulger is city engineer and J. M. Chester, Union Bank Building, Pittsburgh, consulting engineer.

The Columbia-Elyria Power Co., Elyria, Ohio, which has been organized by the Elyria Iron & Steel Co. and the Columbia Steel Co. to build a joint power plant, has engaged B. R. Shorover, Oliver Building, Pittsburgh, as engineer. The plant will have a capacity of approximately 4000 kw. and will cost about $250,000.

The Libby-Owens Sheet Glass Co., Toledo, Ohio, is taking bids on its new plate glass plant, one-story, 187 x 1000 ft. Devore & Co., Nicholas Building, Toledo, are the architects and structural engineers.

The Chicago Pneumatic Tool Co. has completed preliminary plans for a $50,000 extension to its works at 1241 East Forty-ninth Street, Cleveland. The Austin Co., Cleveland, is the structural engineer.



In Recent Years Increasing Amounts of Steel Have Been Going Into Power Transmission Lines. Here is shown the Blue Bell substation of the Ohio Public Service Co. at Alliance, Ohio, where power is transformed from 132,000 volts to 22,000 volts. The standard towers, also shown, for carrying the 132,000-volt current are spaced six to the mile

The A. H. Robinson Co., 5103 Detroit Avenue, Cleveland, sheet metal worker, will erect a two-story and basement factory, 31 x 55 ft.

The Ashtabula Water & Supply Co., Ashtabula, Ohio, is planning extensions to its filtration plant involving an expenditure of $150,000. J. N. Chester, Union Bank Building, Pittsburgh, is consulting engineer.

The American Malleable Casting Co., Marion, Ohio, has taken bids on a two-story addition, 67 x 82 ft., Frank D. Chase, 645 North Michigan Avenue, Chicago, is the engineer.

The Stotter Metal Co., Hanna Building, Cleveland, has commenced the erection of a factory with 8000 sq. ft. of floor space at Bessemer Avenue and East Seventy-eighth Street for the manufacture of white metals. It is in the market for about 30 cast iron kettles of from 1000 to 3000 lb. capacity.

The Mahoning Valley Water Co., Struthers, Ohio, has awarded contract for a $20,000 filtration plant. The G. C. Burnip Construction Co., 223 East Broad Street, Columbus, Ohio, is the general contractor.

The city of Painesville, Ohio, will take bids about Jan. 1 for pumps and water mains involving an expenditure of $150,000. C. S. Fullerton is the city engineer.

The village of Barberton, Ohio, has completed plans and will take bids shortly for water works extensions, including pumping stations and filtration plant. H. W. Alcorn is the city engineer.

The Herbrand Co., Freemont, Ohio, has resumed the erection of extensions to its plant, the first unit of which was started in 1919. The building will be 60 x 740 ft.

The National Standard Co., Niles, Mich., which recently acquired the plant of the Falor Rubber Co., Akron, Ohio, is equipping it for the manufacture of welded wire used in the manufacture of automobile tires.

The city of Erie, Pa., will receive bids Jan. 23 through George C. Gensheimer, secretary of the waterworks commission, for a 20,000,000-gal. triple transmission flywheel and condensing pumping engine.

The East Ohio Mfg. Co., Warren, Ohio, has changed its name to the Thomas Steel Products Co. This company will shortly begin the manufacture of cold rolled strip steel. C. G. Thomas is president and C. H. Lewis, secretary.

The G. & C. Foundry Co., Sandusky, Ohio, will build an addition providing 6720 sq. ft. of floor space which will be used as a core room.

The Henry Furnace & Foundry Co., 825 Long Avenue, Cleveland, has purchased the former plant of the Folding Box Co. at East Fortieth Street and the Wheeling & Lake Erie Railroad and will shortly move to the new quarters.

The McKay Machine Co., Youngstown, has authorized extensions to its plant which will quadruple its shop space and treble its working force, involving an outlay in excess of $50,000. The company specializes in the manufacture of a machine for roller leveling sheets and is operating day and night shifts. The addition will have about 12,000 sq. ft. of floor space, and will be erected by the Truscon Steel Co., Youngstown.

Milwaukee

MILWAUKEE, Dec. 10.

A MORE hopeful view of the immediate future of machine-tool business is appearing in a more active inquiry. Orders are for current and future delivery, but consist mostly of single tools to scattering sources. The American Brass Co., Kenosha, Wis., is purchasing equipment for a new copper wire mill and has placed an order of considerable size for miscellaneous machinery with the Gisholt Machine Co., Madison, Wis. A large order for brewery equipment is being distributed among Milwaukee shops by the Cerveceria Modelo, S. A., Mexico City. This includes some rebuilt and used machinery.

The Wausau Motor Parts Co., Wausau, Wis., which has been incorporated with $50,000, represents a reorganization of the Menominee Piston Ring Co., of Menominee, Mich., the controlling interest in which has been acquired by a group of Wausau capital. The business has been transferred to a leased building in Wausau, and additional equipment is being purchased to make possible an output of 4000 to 5000 piston rings daily. Pistons for gas engines also will be manufactured and other engine replacement parts for the automotive trade are to be added to the line of production. S. E. Johnson, chief engineer, is treasurer of the new corporation. E. H. Viele is assistant secretary-treasurer and general manager.

Edward A. Juul, architect, Security Bank Building, Sheboygan, Wis., has been engaged by an unidentified local interest to design a public garage, sales and service building, 100 x 140 ft., four stories and basement, estimated to cost $100,000. Bids probably will not be taken before Feb. 15, as the project will not mature until spring.

The Cliffs-Smith Co., Sturgeon Bay, Wis., has been organized to manufacture and install a self-unloading apparatus for iron ore and coal carriers, developed by the Leathem D. Smith Dock Co., Sturgeon Bay. The Cleveland-Cliffs Iron Co. has contracted for installations in four steel steamers, two of which have been delivered at the Smith yards.

The American Brass Co., Kenosha, Wis., division Anaconda Copper Co., has placed the general contract with Paul Riesen's Sons Co., 1018 Humboldt Avenue, Milwaukee, for erecting a new copper wire mill, 220 x 540 ft., two stories, of brick and concrete. Orders are being placed for rolling and drawing mills, motors, and special machinery, considerable of which will be built to order by the Gisholt Machine Co., Madison, Wis. C. S. Judd, 570 Elizabeth Street, Kenosha, is vice-president and general manager.

The Wald Mfg. Co., 1801 Martin Avenue, Sheboygan, Wis., manufacturer of motorcycle, bicycle and automobile accessories and small parts, has practically concluded negotiations to transfer its entire business to Maysville, Ky., by Jan 1. Local capital is providing a suitable building. The Wald company is a Wisconsin corporation with $90,000 capital, and will be reincorporated in Kentucky with $125,000 capital. Ewald F. Pawsat is president, and Herman Pawsat is secretary-treasurer.

The C. W. Rood Engineering Co., Wisconsin Rapids, Wis., heretofore engaged in drainage contracting, is entering the field of manufacturing hoisting and excavating machinery. It has leased a factory and acquired the business and equipment of the Johnson & Sons machine shop, which is to be supplemented by a list of new tools, for which inquiry is being made. Members of the Johnson firm have become associated with the Rood company and will manage a custom machine and repair department.

The W. T. Raleigh Co., Freeport, Ill., has engaged J. R. & E. J. Law, architects, First Central Building, Madison, Wis., to design a combination garage warehouse and service building to cost $75,000.

The Board of Education, Kenosha, Wis., will take bids shortly after Jan. 1 for the construction of a new $1,000,000 high school, plans for which are being completed by John D. Chubb, architect, 109 North Dearborn Street, Chicago. It will be three stories and basement, 150 x 250 x 200 ft., with auditorium, two gymnasiums, science laboratories, manual training shops, etc. Ella F. Powers is secretary of the board.

George A. Van Velzer, Elkhorn, Wis., will build a $25,000 public garage and service building, 50 x 95 ft., two stories and basement. Contracts were let Dec. 5 and completion is specified Jan. 15.

The Koehring Co., Milwaukee, has deferred until at least July 1, 1924, the proposed erection of an addition, 120 x 360 ft., plans for which have been prepared by Van Ryn & DeGelleke, architects, 116 Grand Avenue. It is located at Thirty-first Street and Concordia Avenue and manufactures paving and concrete mixer units, contractors' hoists, etc.

The Specialty Mfg. Co., Rice Lake, Wis., has been incorporated with $10,000 capital and will establish a factory for the production of automotive accessories, car equipment, manual tools, etc. The incorporators include C. V. Beggs and O. L. Frederickson.

The Standard Motor Parts Co., recently incorporated at Racine, Wis., has changed its name to the General Parts Corporation, and will enlarge its scope to include production of metal products of all kinds.

The Wisconsin Foundry & Machine Co., Madison, Wis., is marketing a new issue of $35,000 of 8 per cent cumulative preferred stock to finance development of its business and production. It manufactures castings, metal products, machinery and supplies for mines, steam plants, creameries, stone quarries, automobile repair shops and similar purposes, and is also a jobber in electric motors, dynamos, power plant specialties, etc. G. W. Botham is president, and A. J. Buenzli, treasurer and general manager.

Trade Changes

The Atlantic Coast Shipbuilders' Association has moved its executive offices from 1701 Walnut Street, Philadelphia, to 1600 Walnut Street, same city.

The Blaw-Knox Co., Pittsburgh, announces that Charles K. Wehn will have charge of a special department devoted to Blaw-Knox standard steel buildings and structural steel in Illinois and adjoining states, with headquarters in the Peoples Gas Building, Chicago.

The Pawling & Harnischfeger Co., Milwaukee, manufacturers of excavators, cranes and machine tools, have appointed N. P. Farrar as district manager, with offices at 605 Stephen Girard Building, Philadelphia, and 50 Church Street, New York.

South Atlantic States

BALTIMORE, Dec. 10.

THE Board of Estimates, City Hall, Baltimore, has included in the ordinance of estimates for 1924 an item of $65,000 for erecting and equipping a repair plant for the Fire Department. It will be built at Key Highway and Fort Avenue and will replace the present shops on Market Place.

The Holtson Mfg. Corporation, 119 East York Street, Baltimore, recently incorporated with $10,000 capital stock, has acquired a plant which will be used for a general machine shop, gas engine repairing and the manufacture of oil burners. James B. Holtson is president.

A two-story service building to cost $57,000 will be built at Fort Avenue and Leadenhall Street, Baltimore, by the Consolidated Gas, Electric Light & Power Co., Lexington Building.

Bids will soon be asked by the General Elevator Co., 400 South Charles Street, Baltimore, for a one-story plant, 67 x 160 ft., to cost $60,000. W. S. Austin, 1002 Maryland Trust Building, is engineer.

Electric power equipment, refrigerating machinery, filter presses, engines and other equipment will be installed in the addition to be erected by the American Cellulose & Chemical Mfg. Co., Amcelle, to cost about $2,000,000, for which a general contract has been let to the Austin Co., Philadelphia. Within the next twelve months it is expected to build other extensions to cost $3,000,000. Dr. Camille Drayfus is president. New York offices are at 15 East Twenty-sixth Street.

The Oxford Roofing & Sheet Metal Co., Oxford, N. C., recently organized, has commenced the construction of a plant and is in the market for sheet-metal working equipment and operating machinery. L. E. Byrum is president, and J. J. Walters, secretary and treasurer.

Evans & Kramer, 232 West Broad Street, Richmond, Va., operating a machine works, are planning for the installation of a lathe, drill presses and other equipment.

The Cunningham Brick Co., Greensboro, N. C., plans a power house at its new works on 150 acres near Gordontown, N. C., estimated to cost $80,000 with machinery. I. H. Cunningham is president.

The Hamlet Ice Co., Hamlet, N. C., will commence the erection of an ice-manufacturing and cold storage plant to cost $100,000 including machinery.

The Bureau of Foreign and Domestic Commerce, Washington, has information of a project in South America for which American canning machinery to cost about $60,000 will be purchased. Reference No. 12928.

The Dorchester Lumber Co., Badham, S. C., has inquiries out for two electric generators and auxiliary equipment, from 50 to 60 kw. and 25 to 30 kw. capacity respectively.

The Southern Public Utilities Co., Piedmont, S. C., is disposing of a bond issue of $4,000,000, a portion of the proceeds to be used for extensions. It is building a new hydroelectric power plant at Mountain Island. E. C. Marshall is president.

The Shambow Shuttle Co., Woonsocket, R. I., has acquired the former plant of the Cyclone Motors Corporation, Greenville, N. C., and will remodel for new works, estimated to cost $250,000. It is planned to remove company headquarters to this location. J. C. Shambow is president.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, is in the market for an electric alternator, 125 kw. capacity, belted type, with exciter, switchboard and auxiliary apparatus.

In connection with a project for the construction of a pipe line, pumping plants, oil refinery, power house and other structures, estimated to cost $20,000,000, to be carried out by a Canadian corporation in Colombia, South America, in accordance with Government concession, recently granted, one of the officials is now in the United States for the purchase of a portion of the equipment. Full information, with the New York address of purchasing officer, is available at the office of the Bureau of Foreign and Domestic Commerce, Washington. Reference No. Colombia 35 xa.

D. P. Martin, Cobbtown, Ga., is in the market for an oil-operated engine, about 25 hp. capacity, with auxiliary equipment.

The City Table & Mantle Co., Fremont Avenue and Briscoe Street, Baltimore, has purchased the factory of the United States Lithographing Co., 425-29 Grindall Street, and will remodel it for new works.

Bids will be received by the general purchasing officer, Panama Canal, Washington, until Dec. 19 for two boiler feed pumps, 3000 ft. plow steel wire rope, two chain hoists, 2500 ft. brass condenser tubes and other miscellaneous equipment, circular 1579; until Dec. 17 for 200 tender-brake shoes, 500

steel drums, 12,500 lb. common wire nails, 200 lb. copper nails, cold rolled sheet copper, bronze and other kindred material, circular 1578.

The Bureau of Foreign and Domestic Commerce, Washington, has information of a company at Minieh, Egypt, in the market for American machinery for a cottonseed oil mill, No. 8376; also of a firm at Merida, Yucatan, desiring to purchase baking machinery, No. 8390.

The Southern Power Co., Charlotte, N. C., has tentative plans for a steam-operated electric generating plant in the vicinity of Lyman, S. C.

The Southern Iron & Equipment Co., 217 Grant Building, Atlanta, Ga., has inquiries out for a boring mill, motor-driven, 42 in., Bullard or King type; also for one bending roll, 10 to 12 ft.

M. P. Moller, Hagerstown, Md., operating a local plant for pipe organ manufacture, and head of the Crawford Automobile Co., has purchased the former plant of the Maryland Metal Products Co., previously acquired by the Poole Engineering & Machine Co., Baltimore, and later resold to Raymond J. Funkhouser, Hagerstown.. It will be remodeled by the Crawford company for the manufacture of taxicabs and parts.

W. H. Allen, Elizabethton, Tenn., has acquired property at Marion, Va., for a new brick manufacturing plant, to include power house, estimated to cost $55,000 with equipment. A company will be organized.

The City Council, Florence, S. C., plans the installation of electric pumping machinery in connection with waterworks and sewerage plants to cost $350,000. Bonds have been voted.

The Bedford Tire & Rubber Co., Bedford, Va., recently formed with a capital of $1,000,000, has plans for the initial unit, 80 x 300 ft., estimated to cost $125,000 with machinery. L. R. Gills is president, and J. J. Scott, secretary and treasurer.

The Susquehanna Power Co., Elkton, Md., is perfecting plans for a new hydroelectric generating plant at Conowingo, Md., on the Susquehanna River, with ultimate capacity of 500,000 hp., to cost $1,500,000 with machinery. A transmission system will be built through the Delaware and Maryland peninsula districts.

The United States Engineer Office, Old Federal Building, Wilmington, Del., will receive bids until Dec. 20 for two feed water heaters.

The Quartermaster, United States Marine Corps, Washington, will take bids until Dec. 28 for 200 machine bolts, 20,000 insulated staples, 200 clamps, 31,000 ft. wire, 200 batteries and other equipment, schedule 255.

The Mallory Machinery Corporation, 522 Light Street, Baltimore, is in the market for used equipment as follows: Two double-cylinder, double-drum and swinger steam hoists without boilers, cylinders 10 x 12 or larger; also two stiff-leg derricks, 40 or 50 ft. and boom 50 or 60 ft., with capacity of 40 to 50 tons.

St. Louis

ST. LOUIS, Dec. 10.

A BOND issue of $200,000 is being considered by the City Council, Fort Scott, Kan., for a municipal electric power plant. Roger Toles is engineer.

The Handy Motor Co., Linwood and Holmes Streets, Kansas City, Mo., Jefferson W. Handy, head, is considering plans for a two-story and basement service and repair building, 105 x 120 ft., to cost $100,000.

Bids will be received by the Board of Public Service, 208 City Hall, St. Louis, until Jan. 2 for a refrigerating plant for municipal service, including 8 and 15-ton compressors, brine tank and equipment, freezing tank, etc.

The Missouri Power & Light Co., Jefferson City, Mo., recently organized to take over and consolidate ten electric light and power companies, is disposing of a bond issue of $4,000,000, a portion of the proceeds to be used for expansion. Plans are being considered for a central steam-operated generating plant, with transmission system, to cost in excess of $2,000,000 with equipment. Clement Studebaker, Jr., connected with the Studebaker automobile interests, South Bend, Ind., is president.

The Taskee Iron & Ore Co., Wappapello, Mo., contemplates the construction of a new concentrating plant and washery in the vicinity of Taskee, Mo., estimated to cost $100,000 with machinery. All equipment will be electrically operated. H. E. Springer and I. W. Rodgers head the company.

Bids will be received by Frank Preston, city clerk, Holden, Mo., until Dec. 18 for four 250,000-gal. capacity centrifugal pumps, with motors; 10,000-gal. steel tank on 120-ft. tower, 100,000-gal. capacity, with auxiliary equipment, for extensions in the municipal waterworks. E. E. Harper, 3031 Park Avenue, Kansas City, Mo., is consulting engineer.

The Board of Education, Pine Bluff, Ark., plans a complete department for vocational and manual training at the proposed local junior high school, estimated to cost $280,000, for which plans will soon be available.

The Morse Engineering Co., 1626 Chemical Building, St. Louis, has inquiries out for a Diesel engine, about 100 hp. capacity; also for 50 to 75 hp. electric alternators.

The Common Council, Norborne, Mo., is having plans drawn for a municipal light and power plant and waterworks, estimated to cost $130,000 with equipment. J. P. Davis, 305 Central Trust Building, is consulting engineer.

The Marquette Cement Co., Cape Girardeau, Mo., has awarded a general contract to the McDonald Engineering Co., Chicago, for additions in its plant, including a three-story packing and loading works, estimated to cost $100,000 with equipment.

The Southwestern Light & Power Co., Oklahoma City, Okla., has arranged an appropriation of about $700,000 for extensions in its steam-operated electric generating plant, including the installation of a new 3300 kva. turbo-generator, boilers, cooling tower, switchboard and other equipment; also for extensions in transmission system to Quanah, Tex., and other points.

The Milton Oil Co., Sedalia, Mo., has inquiries out for a number of portable metal buildings, suitable for warehouse and kindred service. Eugene H. Milton is president.

The Polar Wave Ice & Fuel Co., 3626 Olive Street, St. Louis, has leased a two-story building to be erected on Penrose Avenue, 122 x 230 ft., for a new ice and refrigerating plant, to cost $175,000. H. G. Clymer, Wainwright Building, is architect.

The Common Council, Festus, Mo., plans the installation of electric pumping machinery at the proposed municipal waterworks and sewerage plant, for which bonds for $175,000 have been voted.

A manual training department will be installed in the two-story and basement addition to be erected at the school on Independence Avenue, Mount Washington, Mo., estimated to cost $210,000, for which foundations will be laid at once. The Board of Education is in charge.

The Producers' Cold Storage Co., Chillicothe, Mo., will take bids at once, to be opened early in January, for ice and refrigerating machinery for installation in its two-story and basement plant, 63 x 140 ft., at Trenton, Mo., to cost about $90,000. J. R. Sparks, Chillicothe, is architect. F. G. Peters is general manager.

Buffalo

BUFFALO, Dec. 10.

PLANS are being perfected by the Doehler Die Casting Co., Court and Ninth Streets, Brooklyn, N. Y., for a new plant at Batavia, N. Y.

The American La France Fire Engine Co., Elmira, N. Y., manufacturer of motor-driven fire equipment, has acquired property at San Francisco for a branch assembling plant, with repair department, estimated to cost $200,000 with equipment.

The Morrison Auto Sheet Metal Works, 26 East North Street, Buffalo, is taking bids on general contract for a five-story plant, 90 x 140 ft., to cost approximately $190,000. It is understood that the company will occupy a portion only of the building for the present. G. M. Wolfe, 1377 Main Street, is architect.

The Hadley Paper Corporation, Hadley, N. Y., plans the installation of additional equipment, including transmission apparatus. R. H. Redlin is general manager.

The Pennsylvania Railroad Co., Pennsylvania Terminal, New York, has plans for a one-story machine shop at Olean, N. Y., to cost $50,000.

Power equipment, conveying, hoisting and other machinery will be installed in the flour milling plant to be erected at Buffalo by the Russell-Miller Milling Co., Minneapolis, Minn., estimated to cost $750,000.

Bids on general contract have been called by the Rome Mfg. Co., Railroad Avenue, Rome, N. Y., manufacturer of forgings, etc., for its proposed additions, one and two-stories, estimated to cost $200,000. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects and engineers.

S. Adams & Sons, South George Street, Rome, N. Y., manufacturer of agricultural implements, etc., plan the installation of additional foundry equipment to replace a recent fire loss.

The Kensington-Davis Corporation, 144 Kensington Ave-

nue, Buffalo, has awarded a general contract to the Austin Co., Cleveland, for a one-story foundry, 140 x 305 ft., to cost approximately $125,000 with equipment.

The Adams Axle Co., Syracuse, N. Y., an interest of the Durant Motors, Inc., 1819 Broadway, New York, will operate a plant for the manufacture of automobile axles, taking over this branch of the parent company's business heretofore conducted at Findlay, Ohio.

The Kitts Steam Specialty Co., 56 East Second Street, Oswego, N. Y., manufacturer of power house equipment, has preliminary plans for additions and the installation of new equipment.

The American Auto Parts & Service Co., Buffalo, will build a one-story works, 45 x 105 ft., at 82 Broadway. Jacob Dworkin is one of the heads of the company.

Fire, Dec. 1, destroyed a portion of the four-story plant of the W. A. Case & Son Mfg. Co., 42-48 Washington Street, Buffalo, manufacturer of pipe, plumbing equipment, etc., at 31-33 Main Street, with loss estimated at $300,000, including equipment. It is planned to rebuild.

The Standard Oil Co. of New York, 26 Broadway, New York, plans for the construction of storage and distributing plants at Medina, Albion and other points on the New York State Barge Canal, to cost more than $250,000 with equipment.

The Fearless Dish Washer Co., Rochester, N. Y., is planning the installation of equipment at its plant, 175 Colvin Street, to replace machinery recently damaged by fire.

Cincinnati

CINCINNATI, Dec. 10.

ORDERS for machine tools continue at a fair rate and to date December shows hardly any slackening compared with the same period in November. Some railroad lists are reported to have been closed the past week, including one issued by the Chicago Milwaukee & St. Paul a few months ago, and on which a number of lathes were bought. Purchasing by the automotive industry has slackened somewhat, but a fair volume of orders is still coming from this source.

Buying from the general industrial field is fair, though orders are confined to one and two machines. Indications at present point to a large number of inquiries now pending being postponed until after the first of the year. Several railroad lists, in course of preparation, are expected to be out the last week of December, as the roads are said to be in need of the equipment and would have purchased sooner had not the appropriations already been expended.

The U. S. Engineers' Office, Louisville, Ky., will open bids Jan. 3 for furnishing, delivering and erecting gates for Lock No. 45, Ohio River.

The Standard Pulley & Mfg. Co., Cincinnati, has been organized with a capitalization of $100,000 and is practically a reorganization of the Standard Pulley Co. It will erect a machine shop at 1738 Powers Street, adjoining the foundry building now occupying part of the site. Considerable machine tool equipment will be purchased. J. F. Jewett, 1738 Powers Street, is one of the incorporators of the company.

The Lunkenheimer Co., valve manufacturer, Cincinnati, is having plans prepared for an addition, bids on which will be taken about Jan. 1. The building will probably be of steel construction, six stories, 140 x 490 ft.

The W. F. Robertson Steel & Iron Co., Cincinnati, which recently purchased the plant of the Hudson Sheet & Tinplate Co., Marietta, Ohio, has not as yet determined what disposition will be made of the property, though it is reported that the plant will be operated in connection with a large can manufacturing works to be erected there. Definite announcement of plans is expected before the first of the year.

The Eagle Waystop & Signal Co., Cincinnati, has been incorporated with a capitalization of $25,000 to take over the business formerly conducted by Henry Backer & Co., at 2016 Elm Street. The company, in addition to manufacturing tools, dies and fixtures, will manufacture a special stop signal lamp for automobiles.

The Troy Metals Products Co., Springfield, Ohio, will move its plant to Troy, Ohio, about Feb. 1, and has purchased the former plant of the McKinnon Dash Co. It manufactures automobile parts and accessories, besides doing general contract work.

The Cardiff Brick & Tile Co., Rockwood, Tenn., is planning for extensions and the installation of mechanical drying machinery, power equipment and other apparatus. S. N. Oakley is secretary.

Fire, Dec. 2, destroyed a portion of the plant of the Valley Cotton Oil Co., Memphis, Tenn., with loss estimated at $150,000 including machinery. It is planned to rebuild.

The Day-Evans Iron Works, Inc., Knoxville, Tenn., has commenced work on its proposed plant for the manufacture of mine cars, mine car wheels, etc., consisting of a one-story foundry, 75 x 160 ft.; one-story machine shop, 72 x 160 ft.; one-story forge shop, 25 x 48 ft.; core room, 36 x 48 ft., and other structures. A. W. Evans is general manager.

The Sawbrook Steel Castings Co., Elmwood Place, Cincinnati, has been incorporated with capital stock of $300,000. It expects to do a local business, producing about 150 tons per month and specializing on annular section work, such as gear blanks. Contracts will be placed shortly for building and equipment. E. S. Sawtelle is president; A. E. Anderson, vice-president, and E. L. Brooks, secretary-treasurer.

Detroit

DETROIT, Dec. 10.

FURTHER expansion of the Fisher Body interests has been announced by Charles T. Fisher, vice-president, which provides for the reconstruction and enlargement of the plate glass plant at Blairsville, Pa., and for the erection of another plant at Ottawa, Ill., larger than the one now in operation. These are both operated by the National Plate Glass Co., a subsidiary of the Fisher corporation, with headquarters in Detroit. Rebuilding of the Blairsville plant is under way and it is estimated that the new work will cost approximately $5,000,000. The Ottawa plant is estimated to cost about $10,000,000.

The Chatfield Foundry Co., Escanaba, Mich., has purchased the Nau Brass Foundry of Manistique, Mich., and will merge the two companies in the Chatfield plant, Mr. Nau will retain an interest in the consolidation.

The Conant-Donalson Co., Kalamazoo, Mich., which purchased the plant of the Acme Universal Joint Co., is planning to produce a line of tools after the first of the year in addition to its production of universal joints.

The Whyte Motor Products Co., a Chicago concern, has moved its plant to Muskegon Heights, Mich., having taken over 25,000 sq. ft. of floor space in the Michigan Washing Machine Co. building. It manufactures the Whyte motor-control for automobiles. Machinery is being moved from the Chicago plant and some additional equipment will probably be purchased in the near future. The company has been incorporated in Michigan with a capitalization of $1,000,000. The officers are L. T. Jamme, president; C. E. Mitchell, secretary; Joseph A. Jones, sales manager, all of Chicago. Benjamin J. Affleck, president Universal Portland Cement Co., is a member of the board of directors.

The Sauzedde-Buchanan Mfg. Co., Mt. Clemens, Mich., tool manufacturer, has leased a portion of the Sarns machine shop for increased production. It will soon begin the manufacture of the Sauzedde automobile wire wheel on a royalty basis.

The Ornamental Bronze Co., Big Rapids, Mich., has been organized by E. R. and E. F. Deady to manufacture bronze tablets, architectural bronze, etc. It is at present operating in a part of the Binney Machine Co.'s plant.

The Hugh Lyons Co., manufacturer of metal fixtures, Lansing, Mich., plans to erect a two-story factory, 60 x 200 ft.

The Atlas Drop Forge Co., Lansing, Mich., will increase its power plant within the next year by the addition of some boiler capacity, monorail coal conveyor and automatic stokers.

Plans have been filed by the Michigan Stamping Co., 11631 Mack Avenue, Detroit, for a five-story addition estimated to cost $750,000 including machinery. Albert Kahn, 1000 Marquette Building, is architect.

The Michigan Carton Co., Battle Creek, Mich., will commence the erection of a two-story addition, 170 x 270 ft., to cost about $35,000. M. J. Morehouse, 343 South Dearborn Street, Chicago, is architect.

R. C. Silver, 521 Free Press Building, Detroit, machinery dealer, has inquiries out for a punch, shears, band saw and other similar heavy duty tools.

The Aetna Portland Cement Co., Essexville, Mich., is planning for additions and the installation of new kilns, electric power equipment and other machinery, estimated to cost $225,000. Work will commence in the spring.

The Ford Motor Co., River Rouge, Detroit, has awarded a contract to the Bryant & Detwiler Co., Dime Bank Building, for the erection of an addition to its main motor works, to cost $150,000.

The Flat Rock Chuck Co., Flat Rock, Mich., is planning for the installation of nickel plating and other equipment.

The MacRay Concrete Products Co., 1126 Ravine Road, Kalamazoo, Mich., recently organized, will commence the erection of a plant, 50 x 85 ft., to cost $25,000 with machinery. William MacKinzie and Edward G. Raymond head the company.

The Reo Motor Car Co., Lansing, Mich., is completing arrangements for the purchase of the plant of the Duplex Truck Co., for about $200,000. It will extend the buildings and install additional equipment for assembling busses and other special cars. The Duplex company plans to continue operations on a smaller scale at its Charlotte, Mich., works.

The Michigan Electric & Mfg., Co., Lake Linden, Mich., has been incorporated with $75,000 capital stock to manufacture fractional horse power electric motors and similar products. Physical assets and the plant of the Calumet Motor Co. have been purchased. The company is in the market for materials for the manufacture of these products. F. C. Perry is president and general manager, and F. W. Vigelius, secretary treasurer.

Indiana

INDIANAPOLIS, Dec. 10.

CONTRACT has been let by the Overhead Door Co., Hartford City, Ind., to J. E. Clark, Hartford City, for the erection of a new plant to cost about $40,000.

The Greencastle Gas & Electric Co., Greencastle, Ind., is planning for the installation of a water-gas set and other equipment at its gas works.

The Premier Motors, Inc., Indianapolis, is installing additional equipment at its plant and proposes to double the output of taxicabs and other automobiles.

The Rybolt Heating Co., Indianapolis, has work under way on a new plant at 1414 North Capital Avenue, for the manufacture of heating equipment.

The Wayne Tank & Pump Co., Fort Wayne, Ind., has awarded a general contract to the Indiana Engineering & Construction Co., Central Building, for a one-story addition, 80 x 220 ft., to cost approximately $55,000.

The Consumers Power Co., Owensville, Ind., has acquired the plant and property of the Owensville Light Co., and plans for extensions and the installation of additional equipment.

The Standard Oil Co., of Indiana, Indianapolis, is planning for the installation of equipment at its refinery at Casper, Wyo., for a new unit for the production of asphalt products, including stills, pumping and mixing machinery, etc.

The Rochester Gas & Fuel Co., Rochester, Ind., will install a new water-gas set and other equipment.

Pittsburgh

PITTSBURGH, Dec. 10.

MACHINE tool business still is light in this district. Interest of the trade centers in the inquiry of the Standard Sanitary Mfg. Co., which now is tabulating bids on 30 tools for its new Baltimore plant. Awards against this list are expected soon. An outstanding power equipment order of the week has been one from the Carnegie Steel Co. for six steam-driven, 50,000-cu. ft.-per min. turbo blowers for its Carrie furnaces, Rankin, Pa., to the Ingersoll-Rand Co.

The Carnegie Steel Co., Pittsburgh, has put out an inquiry for 15 waste heat boilers, each with a capacity for developing 450-hp., to be installed in the open-hearth steel department of its Farrell plant.

Plans are being considered by the Acme Steel Construction Co., Homestead, Pa., for new works on property recently acquired in the Wickliffe industrial section, Youngstown, Ohio.

The Dayton Taxicab Co., Inc., East Pittsburgh, has leased the former plant of the Deidrick Glass Co., Monaca, Pa., for a new works. Remodeling and equipment installation will soon commence.

The Board of Water Commissioners, 701 French Street, Erie, Pa., G. C. Gensheimer, secretary, will soon take bids for a high duty pumping engine, triple expansion type, for the municipal waterworks.

H. M. Waugh, Bluefield, W. Va., has inquiries out for a number of industrial dump cars, each about 12 cu. yd. capacity.

The United States Auto Chain & Twin Hook Co., Grafton, W. Va., is concluding arrangements with the Chamber of Commerce, Oakland, Md., for a 10-acre site for a new plant to cost approximately $100,000 with equipment. It is proposed to remove the Grafton works to the new location.

H. E. Rutherford and S. F. Lucas, Tarentum, Pa., are organizing a company to construct a glass plant in this section, to cost close to $1,000,000 with machinery. It will include a power house.

Electric power equipment, conveying apparatus and other equipment will be installed in the two-story and basement printing plant to be erected by the Ohio Valley Publishing Co., Parkersburg, W. Va., for which T. T. Sansbury, Guarantee Building, is architect. R. L. McFarland is president and general manager.

The Gulf States

BIRMINGHAM, Dec. 10.

WORK will commence by the Houston Power Co., Newton, Ala., for a hydroelectric generating plant with initial capacity of 5000 hp., estimated to cost $500,000 with machinery and power dam.

The American Arsenic Co., Inc., 506 Lincoln Life Building, Birmingham, contemplates the erection of a reduction plant in the vicinity of Cragford, Ala., with by-products works for gold, lead and other metal recovery, estimated to cost $150,000 with machinery.

Fire, Dec. 3, destroyed a portion of the mill of the Gulf Paper Co., Mobile, Ala., at Crichton, Ala., with loss estimated at $200,000 with equipment. Rebuilding is being considered. J. M. Walsh is president, and G. H. Mackie, local manager.

The Port Arthur Ice & Refrigerating Co., Port Arthur, Tex., has plans for new works estimated to cost $325,000 with machinery. Stone & Webster, Inc., 147 Milk Street, Boston, is architect and engineer.

Broadbent & Groeting, Ocala, Fla., have inquiries out for a steam shovel, Erie or Bucyrus type, with ¾-yd. capacity clamshell bucket, with or without shovel attachment.

The Southern Cement Products Co., Menchaca Street, San Antonio, Tex., has acquired adjoining property and plans a one-story addition.

The Texas & Pacific Railway Co., Dallas, Tex., now being reorganized, has preliminary plans for new car and locomotive repair works at the local Belt Line junction and its right of way, to cost $1,000,000 with equipment. J. F. Lancaster is receiver for the road.

The York Engineering & Supply Co., 2201 Texas Avenue, Houston, ice and refrigerating equipment, oil well equipment, etc., contemplates a new four-story plant and distributing works, 100 x 150 ft., estimated to cost $85,000 with equipment.

The Humble Oil & Refining Co., Houston, Tex., plans to rebuild the portion of its works at Mildred, Tex., recently destroyed by fire with loss estimated at $100,000, including equipment.

Bids will be received by the Board of Commissioners of the Port of New Orleans, New Court Building, until Dec. 20, for steel rolling doors, about 28,000 sq. ft. Requisition E. D. 14360. Specifications at the office of the Supervisor of Purchases, 1 Canal Street. J. H. Walsh is general manager.

The Heinze Engineering Laboratories, Tampa, Fla., manufacturer of mechanical equipment, has tentative plans for the establishment of a branch factory at El Paso, Tex.

The Texas Boiler Works, 3214 Hickory Street, Dallas, Tex., plans the installation of electric welding equipment. H. H. Sharp is one of the heads of the company.

The City Council, Miami, Fla., is planning for extensions in the municipal electric light and power plant to double the present capacity. H. H. Hyman is superintendent.

The Southern Utilities Co., West Palm Beach, Fla., plans extensions in its local power plant, including the installation of additional boilers, turbines and auxiliary machinery.

The Florida East Coast Railway Co., St. Augustine, Fla., has tentative plans for repair shops, yard and terminal in the vicinity of Bowden, Fla., to cost $100,000. W. G. Brown, engineering department, St. Augustine, is engineer in charge.

Manual training equipment will be installed in the new high school to be erected at Tavares, Fla., estimated to cost $200,000, for which bids will soon be called on a general contract. Alan J. McDonough, Eustis, Fla., is architect.

The Chamber of Commerce, Rockdale, Tex., is interested in a project for a local oil manufacturing plant, to be operated by a compnay headed by C. W. Arlitt, Austin, Tex., to cost $75,000.

A. B. Hale, Tampa, Fla., is perfecting plans for the organization of a company to build an ice-manufacturing and cold storage plant at Orlando, Fla., to cost $80,000.

The Silicon Products Co., Tredegar, Ala., will establish a plant for the manufacture of silica brick and kindred products,

estimated to cost $90,000, including equipment. A reduction mill will also be built. Contracts for a portion of the equipment are being let. James & Breckler, Louisville, are chemical engineers. Charles L. Jackson is one of the heads of the company in charge.

Sutton, Steele & Steele, Inc., Forney Avenue, Dallas, Tex., manufacturer of machinery, is planning the installation of an electric generator and auxiliary equipment.

The Common Council, Oak Grove., La., is planning the installation of a municipal electric light and power plant. A new waterworks, with electrical pumping equipment, is also under consideration.

Bids will be received by H. L. Stark, chairman, Board of Regents, University of Texas, Orange, Tex., until Jan. 14 for the construction of a power house at the Medical College at Galveston, in connection with a new administration building, estimated to cost $300,000. The H. M. Greene Co., North Texas Building, Dallas, is architect.

The H. & H. Machine Works, First Avenue, Decatur, Ala., has tentative plans for a new plant. Negotiations are under way for the purchase of a site.

Pacific Coast

SAN FRANCISCO, Dec. 5.

BIDS will be received by the Bureau of Yards and Docks, Navy Department, Washington, until Jan. 16 for a fuel oil storage plant at the Mare Island Navy Yard, including four motor-driven centifugal pumps; one motor-driven agitating pump; air compressors; two 50,000-bbl. fuel oil tanks; tanks on steel towers and auxiliary equipment, specification 4717.

The Ward Heater Co., 1314 South Central Avenue, Los Angeles, manufacturer of gas furnaces and heaters, is having plans drawn for new works consisting of foundry, plating works, assembling shop and other buildings, estimated to cost $250,000 with machinery. Benjamin J. Bloser, Consolidated Realty Building, is architect.

The Hawley Pulp & Paper Co., Oregon City, Ore., has tentative plans for a new plant at Third and Main Streets, with power house, estimated to cost $1,000,000 with machinery.

The Board of Education, Venice, Cal., is planning for an addition to its mechanical arts school to cost about $50,000. Machine tools and other equipment will be installed.

The W. B. Bastian Mfg. Co., 2117 Violet Street, Los Angeles, manufacturer of water heaters, has preliminary plans for a branch plant at Emeryville, Cal., estimated to cost $85,000.

Coony & Winterbottom, 1400 Santa Fe Avenue, Los Angeles, manufacturers of pipe, plumbing equipment, etc., will commence the erection of a one and two-story plant, 95 x 145 ft., on Hunter Street, to cost $50,000 with equipment.

The Portland Pulp & Paper Co., Portland, Ore., Roy H. Mills, 815 Broadway Building, president, organized with a capital of $1,500,000, is planning for a new pulp and paper mill near Portland, to cost $750,000 with machinery. A power house will be erected. D. E. Fry is also interested in the new company.

The Central Oregon Sugar Co., Portland, Ore., has awarded a general contract to the Schwartz Engineering Co., Denver, Colo., for a new refinery at Prineville, Ore., with daily output of about 400 tons, estimated to cost $700,000 with machinery. A. C. Goodwin is president.

The Hoyt Heater Co., 2850 East Second Street, Los Angeles, manufacturer of automatic water heaters, is having plans drawn for a one-story factory, 70 x 200 ft., to cost $35,000. Walker & Eisen, Pacific Finance Building, are architects.

The Riddle Sheet Metal Works, 1067 Folsom Street, San Francisco, has awarded contract to Otto Johnson, San Francisco, for a two-story addition, estimated to cost $20,000. Plans are also being drawn for an extension to cost $15,000. Dodge A. Riedy, Pacific Building, is architect.

The Washington Irrigation & Development Co., Henry Building, Seattle, is planning for a hydroelectric generating plant on the Columbia River, near Priest Rapids, with capacity of 350,000 h.p., estimated to cost $5,000,000.

The Lyons-California Glace Fruit Co., Salem, Ore., is having plans drawn for a four-story ice-manufacturing and cold storage plant, estimated to cost $450,000 with machinery. A. C. Raas is local manager.

The Gypsum Tile Factory, Inc., Huntington Park, Cal., has plans for new works on Slauson Avenue, estimated to cost $50,000 with equipment. N. J. Martin heads the company.

The Pacific Wire Screen Co., Los Angeles, is having plans prepared for a one-story factory on East Fifteenth Street, 72 x 240 ft., to cost $65,000. Gordon La Barr, 4110 Moneta Avenue, is architect.

The National Ice & Cold Storage Co., Postal Telegraph Building, San Francisco, is negotiating for property at Hayward, Cal., as a site for a new ice-manufacturing and cold storage plant to cost approximately $80,000.

Canada

TORONTO, Dec. 10.

MACHINE-TOOL inquiries are numerous in most lines, and while individual sales are chiefly for small lots, buyers are fairly numerous and the aggregate orders reach a very good volume. Although no special industry can be singled out as the most active purchaser, the automotive industry is furnishing a good share of the demand and woodworking equipment for saw and lumber mills is also well up on the list.

The Canadian railroads have not ordered any large volume of equipment during the past two or three months, but it is thought that these interests will send out lists again soon after the first of the year.

E. Poulin, 133 Dupont Street, Québec, is asking for a small lathe.

J. H. Rattray, Wallace Block, Cobalt, Ont., is in the market for mining machinery.

A. Sirois, Rimouski, Que., is in the market for a drum saw and a self-feed rip saw for a lumber mill.

The John Lewis Peg & Box Co., Ship Harbor, N. S., whose factory was recently destroyed by fire, will rebuild without delay and is interested in woodworking equipment.

L. Pelletier, Rimouski, Que., will erect sawmill and is asking for equipment.

Goddard & Appleby, 664 Union Avenue, Montreal, is in the market for equipment for an automobile repair shop, including lathes, emery stand, etc.

The Canadian Bridge Co., Walkerville, Ont., has started work on an addition to its galvanizing plant to cost $8,000.

The Western University, London, Ont., will spend $50,000 on equipment for a laboratory. J. H. Moore, 489 Richmond Street is architect.

A. Urquhart, 1640 St. James Street, Montreal, is in the market for a small screw cutting lathe, 3 to 5 ft. bed.

P. Hurtulise, Bourget, Que., is buildinga forge shop and is interested in prices and information on equipment.

The A. B. Ormsby Co., Ltd., manufacturer of rolling steel doors, sheet metal products, etc., has purchased the factory at 133-166 Van Horne Street, Toronto, formerly occupied by the Sorenson Sheet Metal Co. The Ormsby company will transfer the machinery from its old plant on King and Dufferin Streets to the new premises in the near future.

The Board of Education, London, Ont., is in the market for equipment and tools for a manual training department. A. N. Udy is chairman of the board.

J. Lacasse Shoe Co., Montreal, is in the market for equipment for a shoe factory. Z. Lacasse, 1771 Ave. de Chateaubriand is purchasing agent.

Newcombe & Tingley, Halifax, N. S., is in the market for polishing and stone cutting tools and equipment for monumental works. H. W. Tingley is purchasing agent.

The Champlain Tire & Rubber Co., Belleville, Ont., has leased a factory for the manufacture of tires, tubes and miscellaneous rubber goods.

The Quebec Harbor Commission, Quebec, is perfecting plans for the construction of a six-story cold storage plant on the waterfront, totaling about 500,000 cu. ft. of refrigerating space, with power plant adjoining, to cost $600,000 with machinery.

The J. B. Watson Furniture Co., Kincardine, Ont., propose to build addition to cost $20,000.

The Ottawa Electric Co., Ltd., Ottawa, Ont., is building a machine shop and power house, as well as a garage to cost $25,000.

The St. Regis Paper Co. of Canada, Ltd., Montreal, has awarded a general contract in connection with a $100,000 hydroelectric power development at Godbout, Que., to the Canadian Comstock Co., Montreal. The contract includes installation of water wheels, generators, penstock, transmission lines, pumps, motors and electrical distributors.

Western Canada

The Victoria Lumber & Mfg. Co., Chemainus, B. C., will rebuild its factory recently destroyed by fire and is in market for equipment.

The Hammond Cedar Milling Co., Port Coquitlam, B. C., is building a lumber mill to cost $200,000 and is in the market for equipment. D. Hartnell is purchasing agent.

The United Shingle Mills, New Westminster, B. C., will rebuild shingle mill recently destroyed by fire and is asking for machinery and equipment for a new factory.

A company in which H. W. Kent of Portland, Ore., and B. A. Strawbridge of Seattle, Wash., are interested plan the erection of lumber mill, woodpulp and sulphite mill at Edmonds, Vancouver Island, B. C.

The United Grain Growers Ltd., Winnipeg, Man., is planning an addition to the elevator at Port Arthur, Ont., to cost $1,200,000.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	42½	45⅛	Inland	38	39½
Am. B. S. & Fdy.	75⅝	77⅛	Int. Har.	76½	78½
American Can ...	102	105⅝	Int. Har. pf....	107¼	108¼
Am. Can pf.....	109⅛	110¼	Jones & L'ghlin.	108	108
Am. Car & Fdry.	160½	168½	Lima Loco.	94⅝	97⅜
Am. Car & F. pf.	122½	122½	Midvale Steel ..	28⅛	29⅛
American Loco..	72½	74⅜	Nat.-Acme	8⅝	9
Am. Loco. pf....	117	117	Nat. En. & Stm.	39½	40⅝
Am. Radiator...	86	95	N. Y. Air Brake	40½	41⅞
Am. Radiator pf.	123	123	Nova Scotia Stl..	14½	14½
Am. Stl. Fdries.	38⅛	40⅞	Otis Steel	8⅝	9⅜
Am. Stl. Fd. pf..	101½	102	Otis Steel pf....	57	57½
Baldwin Loco...	124⅜	128	Pressed Steel Car	53½	55
Bald. Loco. pf...	111	111	Pressed Steel pf.	84	84
Bethlehem Steel.	52¾	54⅝	Replogle Steel ..	12¼	13¾
Beth. Stl. 7% pf.	92	93	Republic	47½	49
Br. Em. Steel...	4⅜	4⅜	Republic pf....	92	92½
Br. Em. Stl. 1 pf.	13¼	13½	Steel of Canada..	72	73½
Cambria Iron ...	39	39	Superior Steel ..	31½	31½
Chic. Pneu. Tool	83¼	84	Transue-Wms. ..	33⅜	34
Colo. Fuel	23½	24½	Un. Alloy Steel..	30⅜	31¹
Crucible Steel ...	66	68½	U. S. Pipe	54¼	59¼
Crucible Stl. pf..	90½	90¾	U. S. Pipe pf....	82	83
Deere pf.	61½	62	U. S. Steel.....	94⅛	95⅜
Gen. Electric ...	181	197	U. S. Steel pf...	118⅝	119
Gt. No. Ore Cert.	32	32⅜	Vanadium Steel.	29⅞	31½
Gulf States Steel	79½	83½	Whouse Air Br..	84⅞	85
Harbison-Walk...	114	115	Y'gstown S. & T.	68⅞	69½

Industrial Finances

Plant of the Barney & Smith Car Co., Dayton, Ohio, will again be offered for sale Dec. 14, at the request of a bidder who was unable to attend the sale Dec. 5, at which no bidders appeared.

Supplementing the recent announcement of the merging of the Advance Pump & Compressor Co., Battle Creek, Mich., with the American Steam Pump Co. of that city, President Richard R. Hicks, of the American company, called a meeting of the stockholders, at which a stock dividend of 68 per cent, or $340,000, was declared, in addition to deciding to increase the capital stock from $500,000 to $1,000,000. The merger adds 45,000 ft. of manufacturing space to the American plant, which now has a total of 205,000 sq. ft. Officers of the American Steam Pump Co., which are the same as before the merger are: Richard R. Hicks, president and treasurer; John W. Bailey, vice-president; Walter R. Munn, secretary, and M. C. Abbey, superintendent.

The Hanna Furnace Co. has declared a quarterly dividend of 2 per cent on the preferred stock, payable Dec. 15 to stock of record Dec. 5.

Directors of the Motor Wheel corporation, Lansing, Mich., have declared a dividend of 2 per cent in cash on the common stock payable Dec. 20 to stock of record Dec. 10.

Stockholders of the Atlas Steel Co. have been notified that liquidation of the corporation may be necessary unless the offering of $3,000,000 8 per cent cumulative preferred stock is supported. Notwithstanding the handicap of insufficient working capital, earnings of the company for the year ending Oct. 1, last, were $328,964.

The Hartford Electric Steel Corporation, Hartford, Conn., has filed a preliminary certificate of dissolution.

Judge Thomas, United States District Court, has named Louis L. Driggs and A. Lapides receivers for the Driggs Ordnance & Mfg. Co. The Cincinnati Body Co. claims $27,665.

NEW TRADE PUBLICATIONS

Concrete Flooring Preparations.—The Master Builders Co., Cleveland. Two pamphlets descriptive of two new products, "Colormix," a preparation for mixing with concrete to give a permanent color to concrete floors, and "Quickfix," a concrete floor patcher. "Colormix" is manufactured in seven colors, tile red, battleship gray, linoleum brown, nile green, buff, white and black. With "Quickfix" it is claimed that it makes old floors like new, the patch hardening within 48 hr.

Wrought Pipe.—The National Tube Co., Pittsburgh. Pamphlet entitled, "Seven Wonders of Wrought Pipe," relating various accidents which gave thorough tests of the strength, ductility and uniformity of National wrought pipe.

Paint.—Aluminum Co. of America, New Kensington, Pa. A pamphlet on the composition and characteristics and the special properties of aluminum paint.

Alloy for Dies.—The Cutler-Hammer Mfg. Co., Milwaukee, Wis. A pamphlet on "Kinite," a cast alloy of steel for use in making drawing, blanking or forming dies. Scores are illustrated. "Kompite" dies are also shown and discussed. The publication supersedes No. 2034.

Small Tools and Gages.—Pratt & Whitney Co., Hartford. Catalog No. 11, about 500 pages, 5 x 7¼ in. in size, contains sizes and prices of the company's small tools and gages. The catalog is divided into ten sections and includes an index. Material is conveniently arranged and illustrations are numerous. The section on taps includes an outline of the company's method of measuring the pitch diameter of screw threads. A section is devoted to dies and another to screw plates, the latter including one and two stock sets, and combination sets. The milling cutter section includes plain, side, inserted-blade milling cutters, gear cutters and many other types. A short section lists cutters for the company's machines. Many types of reamers are shown and sections are devoted to punches, drills and miscellaneous tools, respectively. The gages on which data and prices are given include the Hoke, Swedish type, standard measuring machine, super-micrometer, plug gages, and thread gages. Railroad gages are shown in a separate section. More than 50 pages are given to useful information, including tables.

Combined Barometer and Vacuum Recorder.—Uehling Instrument Co., Paterson, N. J. Bulletin 150, four pages. Describes and illustrates combined barometer and vacuum recorder for checking turbine and condenser performance. The illustrations include a sectional drawing and a full-sized reproduction of recorder chart. The instrument operates on the hydrostatic principle and diaphragms, tube springs and multiplying lever mechanisms have been eliminated.

Insulation.—Armstrong Cork & Insulation Co. Pittsburgh. In an attractive 64-page booklet, printed in two colors, has been gathered a large amount of data covering insulation problems where the temperatures involved are between 200 and 1500 deg. Fahr. The work is divided into sections dealing respectively with insulating materials, steam pipe covering, industrial equipment, stoves and ranges, engineering service, and definitions and tables. Special forms of insulating blocks are given particular attention, both by illustration and text matter.

New Books Received

History of the Union Pacific. By Nelson Trottman. Pages 412, 6 x 8¾ in., illustrated. Published by Ronald Press Co., 20 Vesey Street, New York. Price, $5.

Technical Writing. By T. A. Rickard. Pages 377, 5 x 7¼ in. Second edition, rewritten and enlarged. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, $2.

Power Plant Machinery. Vol. 1, Mechanism of Steam Engines. Second edition, revised and enlarged. By Walter H. James and Myron W. Dole. Pages 277, 6 x 9 in.; 244 figures and 81 problems. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, $3.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.40c. to 4.70c.	.....
Nos. 22 and 24	4.45c. to 4.85c.	5.10c.
No. 26	4.50c. to 4.90c.	5.15c.
No. 28	4.60c. to 5.00c.	5.25c.
No. 30	4.80c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.70c. to 5.10c.
No. 16	4.85c. to 5.25c.
Nos. 18 and 20	5.00c. to 5.40c.
Nos. 22 and 24	5.15c. to 5.55c.
No. 26	5.30c. to 5.70c.
No. 27	5.45c. to 5.85c.
No. 28	5.60c. to 6.00c.
No. 30	6.05c. to 6.45c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 27¼c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 21c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
			Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	$10.70	IC	7.00	6.75
IX	13.95	12.55	IX	8.25	8.00
IXX	15.55	13.75	IXX	9.50	9.25
IXXX	17.10	15.30	IXXX	10.75	10.50
IXXXX	18.85	16.80	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	50c.
Bar	58c. to 60c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¼c. to 8¾c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed	34¾c.
No. 1 solder	32¾c.
Refined solder	28¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	11c. to 12c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals

The market is a little more active and values are firm. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.25
Copper, light bottoms	9.00
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	8.00
Lead, heavy	6.25
Lead, tea	5.25
Zinc	4.00
Cast aluminum	15.75
Sheet aluminum	15.75

THE IRON AGE

New York, December 20, 1923

ESTABLISHED 1855 VOL. 112, No. 25

Machining Methods at Cash Register Plant*

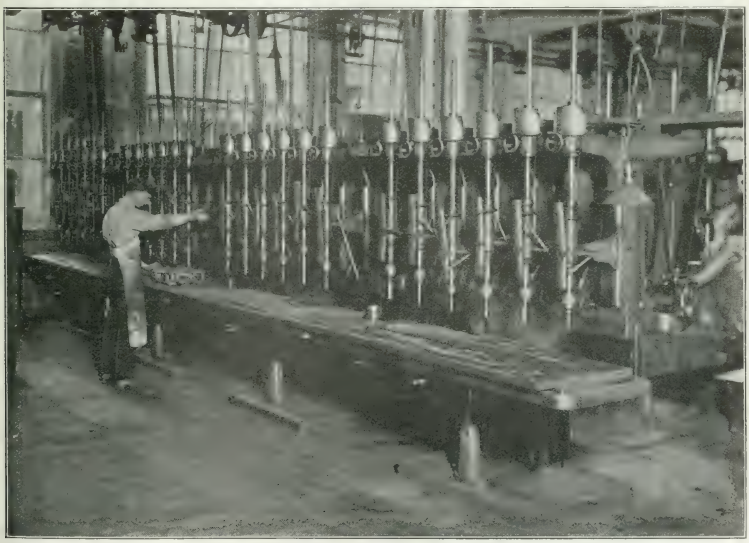
Special Equipment and Devices for Profiling, Drilling, Milling, Grinding and Press Work—Close Requirements in Respect to Castings

BY L. S. LOVE

MANY of the parts of the registers built by the National Cash Register Co. at Dayton, Ohio, are cast. Some of these castings are of gray iron, others of non-ferrous metals, such as bronze, brass, aluminum, type metal, die castings, etc., depending upon the particular service required of them. In all there are about 40 alloys used. These castings are all made in two foundries, one for iron and one for non-ferrous metals. The iron foundry with 43 molders takes care of 21 tons of iron per day, with an average weight of castings of 1.10 lb.

Patterns used in register work are all of metal. A wood pattern is first made, from which is cast a metal pattern; the wood pattern of course made sufficiently large to allow for two shrinkages, that of the metal pattern and an additional shrinkage in the casting itself. Also the wood pattern is made sufficiently large to permit the metal pattern to be machined all over, including all surfaces, angles, and drafts. This pro-

*Tool making as practiced in the National Cash Register plant was described in the issue of Sept. 13, the making and maintenance of some of the machinery was discussed in the issue of Aug. 30 and the notable amount and variety of automatic conveyors in use were the subject of numerous illustrations in the issue of Oct. 25.



As Many as 32 Spindles Are Used in a Row With Auxiliary Tables to Facilitate Sliding the Jig From One Machine to the Next, So That All Holes May Readily Be Drilled Through One Jig

duces a pattern which will make an accurate mold. All metal patterns are boarded. On such castings as will permit, special flasks are used in place of the ordinary square or rectangular flask. They conform roughly to the shape of the piece, thereby saving considerable sand and also in weight of mold to be handled by the operator from the molding machine to the floor.

A daily chemical analysis is made of pig iron used and also of the scrap from other days' pour, so that uniform analysis of iron can be maintained, to secure strength and machinability. This analysis is also used on alloys daily. Most of the castings are pickled, two men with the aid of hoists handling 22,000 lb. daily. This reduces chance of breakage and also, reducing scale, makes machining easier. Due to the patterns of machined finish and careful check on analysis, a uniform machining allowance is made on all castings of 0.040 in. This must take care of any warpage as well as removal of scale.

All castings are inspected, not only for appearance, but actually with inspection tools. The castings are placed in inspection jigs or on parallel plugs on a surface plate and checked by surface gages to hold machining bosses within the limit allowed. This allowance is imperative, regardless of size or shape of the casting. A profiling operation then machines the bosses, this job being easily handled due to uniform amount of metal to be removed.

Castings which are to be machined are loaded from the inspection bench in racks mounted on truck wheels, on which they are rolled to the machine department, and when machined are loaded back on the truck to be moved to the assembly floor or assembly stock, so that a counted lot of castings moves in a group from inspection to assembly.

Such castings as are to be japanned are dipped after leaving the inspection bench. Wire baskets are conveyed on overhead trolley to the vat, which is mounted on an air hoist. Elevating the vat has proved better than lowering the work, as it saves a break in the track and also generally makes less splash when the work enters the japan bath. Baskets are moved along over a draining trough to the drying oven. This foundry also handles castings up to 2 tons for use of the tool room, in construction of special tools or machines.

The care used in making patterns and watching analysis of iron daily has reduced the percentage of waste to an exceptionally low point. In 1921 the loss in the foundry amounted to 3.2 per cent and in 1922 to 3.5 per cent. One week this year the loss went as low as 2 per cent. Loss includes bad castings, breakage and warpage. And inspection is 100 per cent.

In the non-ferrous foundry 5000 lb. of bronze are cast daily. Here also the same accuracy is practiced as being absolutely necessary in making so many different alloys and metals. There are two kinds of die castings produced, one with a zinc base and one with a tin base.

Reference was made in the description of castings inspection to the loading of frames on trucks having shelves; that these trucks carried the frames to the various machine operations and then to the assembly department. These frames go first to the profilers on which the bosses or pads are surfaced. The method of setting the profiler head for depth or to secure proper height for the various pads is of interest. On each head is an adjusting screw set at a predetermined depth to permit sufficient vertical adjustment to accommodate varying heights of pads. Under these screws resting on blocks attached to the rail are movable step blocks with the number and heights of steps for the different bosses on the frame being machined. The machine head is raised or lowered until the screw rests on the step to give proper height to the particular boss being faced.

After the first piece is removed from the machine, following operation on the first side, it is placed in a testing fixture to check parallelism and relative height of the pads. During the run about every tenth piece is so checked to test for wear on the cutter.

One specially built machine is used in this class of work. The machine is a 30-in, gear-driven profiler designed by the National Cash Register Co., and built by the Pratt & Whitney Co., having since become part of the line offered by the latter. In this machine both spindles, which are independently adjustable on the rail, are used in conjunction with the step blocks for different heights of pads. One of the unusual features of this machine is the construction of table bearings, in which the sliding friction customary to this type of machine has been replaced by a rolling friction, making it possible for the operator to move easily as great a weight as 1800 lb.

The machine was built to surface the so-called class 2000 register base which is the largest casting in production at present in this plant. The base itself is not heavy, but requires an exceptionally heavy fixture.

In this fixture are incorporated support jacks, which are one of the company's standardized fixture parts. The casting is laid on registering pads in the fixture and is then supported under the points where cutting pressure is applied by wedge adjusting jacks. These are hardened pins of about ½ in. diameter adjustable vertically by means of sliding wedges under them, carried in the fixture base. The wedges are pushed in and clamped by wing nuts at their outer ends. The evolution of these jacks was shown in a previous article. In this manner proper support is secured for the casting without straining it.

Other profilers are used with both spindles working on similar jobs, and some are used on the customary run of profiler work, for instance, in form milling quadrant castings with the guide pin following a master form.

The drilling and reaming of many of the surface and side holes in these frames, some of which appear to be honeycombed with holes, is accomplished, when possible, in turret type multiple spindle drills. These machines were designed for this company's needs and have been in the plant for many years, some of them probably being among the earliest of this kind of machine built. The machines are entirely automatic in operation requiring only loading by the operator, all subsequent operations being controlled by cams. The machine stops automatically when finished, waiting for new casting. One man can care for three. One interesting feature on these drills is the fact that side holes are drilled at the same time surface holes are, even where the side holes are at an angle; the drive here being by universal joints. Blocks guiding the drills move to and from the work automatically.

Owing to the fact that much of the company's product comes through in comparatively small lots, it is necessary to use a large quantity of the ordinary type of high speed drill with suitable fixtures. On these it is not economical to use power or automatic feeds. Machines are so arranged that it is possible for an operator to progress along a line of these drills with special tables on a level, employing as many as 18, 24 or even on occasion 32 spindles on one casting.

An example of one frame is what is known as class 2000 printer back frame, which has 108 holes. Some of these holes are so close together that it is impossible to drill all in one jig, so that two are used. The work is placed in the first jig registering from pads on its base.

The construction of this jig is of interest as being exemplary of the company's standardization practice and the making of jigs which will wear long and hold their accuracy. The cover carrying the drill bushings is hinged. The hinge pins are 7/16 in. diameter, hardened, straight ground, bearing in hardened and ground bushings. The bushings have collars or end flanges, also hard, to take care of any end wear. The bottom of the cover is faced with hardened pads, which strike on hardened stop posts. All the clamps to hold the work are in the base of the fixture, so that they cannot spring the cover and affect the alinement of the drill bushings. The side location of the work is by means of plunger type of screws pushing it against a hardened plug, thereby avoiding the twisting effect of the screw turning directly against the work which causes inaccuracy. All important holes in this jig are double bushed, so that wear can easily be remedied by replacement of the second bush.

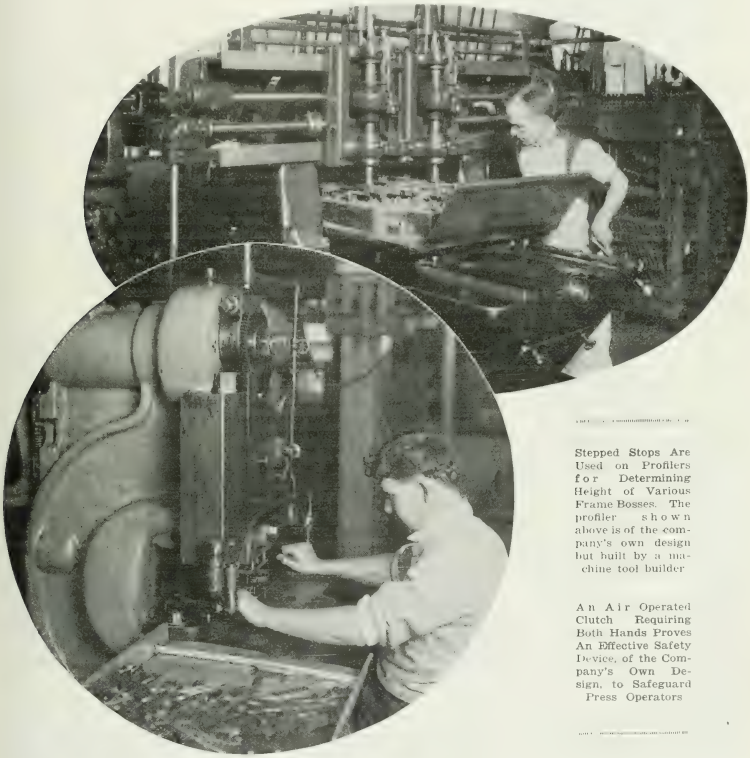
The second jig for this job registers the casting

from side holes drilled in the first jig. Large two sided jigs such as this one are provided with horns to assist the operator in rolling the jig over.

As the first casting going through comes from this drilling operation it is tested on a gage. This gage plate is equipped with hardened bushings. A set of plug gages is provided for testing all holes. They are relieved on the ends, or beveled, and bear only on one side at the front end so that by turning slightly the exact position of any inaccuracy in a hole may be determined. Drilled castings are so checked at frequent intervals during the run.

The question here naturally arises as to why the company after going to the expense of making costly jigs, goes to additional expense to make up a lot of costly gages to test work during production. This is done simply because they have found it profitable so to do. Regardless of good fixtures and care, inaccuracies are bound to occur at times, and it is less costly to test periodically during a run than to make up a lot of parts and find when they are drawn from stock that somewhere something slipped or went wrong causing the whole lot to be scrapped.

In the class 2000 base castings there are a number of holes to be drilled in the edges. This work is handled in a machine designed by the National Cash Register Co. but built outside the plant. The machine is a hinged arm-radial drill with direct motor drive using a vertical motor coupled direct to the drive shaft of the machine. The work is held in a jig mounted on a swiveling fixture, so that holes in all sides can be drilled in one set up. On the fixture are locating blocks with guide bushings for the drill. Immediately behind the drill spindle, mounted on the arm is a fixed locating pin with a beveled point. In the drilling operation, this beveled point seats in a hole in the bushing block, thereby automatically centering the drill over the guide bushing. This method materially assists the operator in quickly registering the position for the tool to drill each hole. A test gage has been provided to check accuracy of this operation.



Stepped Stops Are Used on Profilers for Determining Height of Various Frame Bosses. The profiler shown above is of the company's own design but built by a machine tool builder

An Air Operated Clutch Requiring Both Hands Proves An Effective Safety Device, of the Company's Own Design, to Safeguard Press Operators

The surface holes in this same base casting are drilled in a specially built fixed position multiple spindle drill. The machine is also used for reaming, and can be arranged to counterbore some of the holes. It is not used, however, for the latter operation, as it has been found that such holes as need counterboring can be done more rapidly in a hand feed machine. A test fixture of unusually large size is employed to check the accuracy of these drilled holes.

In one quadrant type casting known as class 2000 keyframe number 5, there are 30 different operations, one of these being the drilling of 78 holes. The piece when finished carries nine tumbler locks; for each lock

there are three tumblers. The drilling of these holes is handled in a special fixture, under the ordinary type of multiple spindle sensitive drill.

The company on small drills follows the practice of grinding drills by hand, claiming that a man doing this work day after day becomes so expert that he can secure more uniformity of lip length on drills than is possible by machine. Tending to prove the correctness of this is the fact that on many small holes, for dowels, etc., driving fits are secured without reaming.

Where there are so many holes in a casting, it is only natural that there should be considerable tapping to do. To facilitate tapping operations the company has developed a tapping attachment operating four taps and attached to an ordinary commercial tapping machine through a drill chuck. This multiple tapping attachment is satisfactorily operating in daily production.

In the frame department, in addition to the numerous drilling operations, there is considerable milling done. There are so many of these operations which are interesting, that it is only possible to mention a few of those which are typical or show high production or the overcoming of some very difficult obstacle.

In one case a shaft bearing casting having six ring type bearings is mounted across the table in a fixture on a Lincoln milling machine. The operation is gang straddle milling of the sides of the bearings and slabbing the ends of the frame. There being six lugs or bearings, thirteen cutters are employed for the operation. The cutters for this operation are ground and set up on the arbor in the toolroom, so that all the operator has to do to replace a set of dull cutters is to place the arbor full of sharp cutters in the machine and proceed with his work.

Form milling is largely resorted to, and work of this nature is handled with great accuracy considering that only one cut is taken to secure limits of plus or minus 0.001 in. One example is the milling of backs two at a time.

In the milling of keyguide slots in tie bars, 34 cutters are employed in the operation in a Lincoln miller and one operator cares for three machines. This company was probably one of the first in the country to use the jump feed and quick return on manufacturing milling operations. Double fixtures are used, one end being loaded while the other is being machined.

Class 700 segment frames call for a form milling operation. Three are machined in one set up in a Lincoln miller. Fixtures employed in this operation, as is also the case in several others, are adjustable for length by means of movable blocks so that different lengths of frames for various models may be handled in the same fixture, thereby saving in the fixture investment. In this operation also one man operates three machines.

Certain of these frame parts have a number of shaft bearings in a row. After all milling and other operations have been performed, and the castings are relieved of these strains, a line reaming operation is performed in a special machine. In some cases there are two lines of holes of different size to be reamed in the same machine.

A special indexing fixture developed is for milling two widths of slot in one quadrant. For doing this work the milling machine is also equipped with a special two arbor head mounted on the column of the machine similar to the mounting for an ordinary vertical attachment. This is driven by the machine spindle. Owing to the peculiar nature of this work and the liability for inaccuracies to creep in, each piece is checked in a special test gage as it comes from the machine.

Several special milling machines are required for some of the work in this department. One of these is equipped with an indexing mechanism mounted at the side of the machine. It is used for milling slots in side frame quadrants.

A milling machine designed and built in the National Cash Register Co. shops has six milling spindles at different angles for handling a piece of peculiar shape milling six surfaces at once. A gage is employed for checking this work. It has locating pins which are the same as those in the milling fixture and has a block on which is placed a dial indicator for testing the accuracy of the work.

Another interesting gage employed in this department is used for testing a class 700 upper back. The casting is registered from drilled holes, and the relation of the milled rib machined in one cut is checked with relation to these holes by means of a pointer gage. The limit is plus or minus 0.001 in. The gage is adjustable for length of piece to be tested.

In addition to the numerous tests and checks of accuracy during production, a final inspection is made by regular inspection department employees before work goes to the assembly department. These inspectors while working regularly in this particular department compose a branch of the main inspection department.

In what is known as the lathe department, which is a comparatively small portion of the plant, there are several fixtures of unusual interest. In one case it is necessary to hollow mill portions of a rather odd shaped casting known as a segment frame of the class 700 register. This casting would be an awkward one to swing on the spindle as the chuck required would be very bulky. It is therefore placed in a fixture mounted on the turret base of a turret lathe. This fixture is so arranged that it indexes as would the turret. The hollow mill is carried in the lathe spindle.

Air chucks are increasing output as much as 40 per cent. In one case a magazine feeding to an air chuck on the turret lathe spindle handles 850 pieces on a facing and reaming operation in 9 hr. These are bronze type segments of the class 800 register. The machine operation is performed on a boss which is at the radial center of the segment. Unloading and ejecting are also performed automatically.

A special driving chuck for arbor work has been developed. This permits work to be placed in the lathe or removed without stopping the spindle. In the body of the chuck are two driving pins extending beyond the face of the chuck and lathe center. These driving pins are controlled by a collar and can be withdrawn into the body of the chuck flush with its face by this collar which is actuated by a yoke lever mounted within convenient reach of the operator, this withdrawal permitting removal and replacement of work. Ten of these chucks are saving $2,500 a year on this class of work.

In this plant are two press shops. One is devoted to smaller work, the other to larger pieces, such as cabinet parts.

In press shop No. 1 there are 16,000 dies for work on 10,000 pieces, among which are dies for several unusual operations. Probably the most noteworthy examples of achievement in press work is the shaving die operation. There are dies used for truing cams which can be produced to an accuracy limit of 0.0002 in. The work is performed on what is known at this plant as a jogging press developed by the N. C. R. The cam which operates the press has an uneven surface of humps and hollows, which serves to vibrate or chatter as the die is closed, thus producing a clean sheared edge on the work.

An interesting example of the use of shaving dies is the cutting of two notches in the class 900 counter transfer bar. These notches must be accurate to plus 0.001 in. or minus 0.001 in. in relation to a pin in the transfer bar on which the bar rocks. This operation is now performed at a cost of 6 cents per hundred as against a former cost of 35 cents for a milling operation. Indicator frame racks are shaved to a point of accuracy which shuts out daylight against a locating gage.

An unusual operation was noted in the press department. This consists of piercing a number of rectangular holes in a quadrant shaped brass casting, used as the class 2000 keyframe guard.

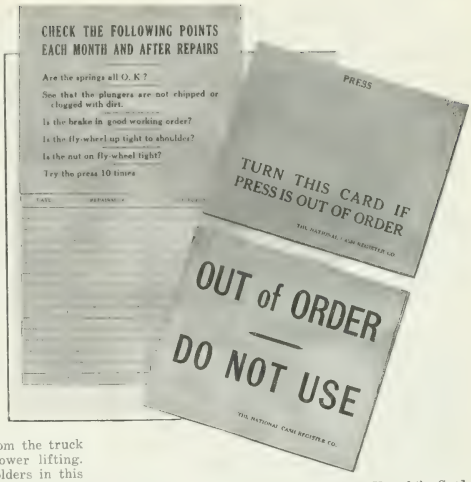
Swaging is resorted to in a number of instances. In one case a blank for a counter pinion was reduced from ⅛ in. thickness to 1/16 in., leaving a hub. The pinion is later trimmed.

Air is used for ejecting in a number of cases, the air

jet valve being controlled by the operator's foot, leaving both hands free to operate the press. Throughout the department it may be noted that operators are protected by air operated safety clutches controlling the presses. These were designed and built by the company. They are provided with two levers requiring two hands to operate.

In the press shop is a repair section for making minor repairs in a hurry rather than to call on the general machine department. When a press is faulty in operation a card hanging on it is turned out displaying a sign "Out of Order."

Press shop No. 2 which handles cabinet and external parts and also the larger internal parts made of sheet is laid out somewhat differently from press shop No. 1. Work in progress is stacked on platforms ready to be picked up by the industrial truck and carried to the press for forming. The truck is also used for carrying dies and bolsters to the press bed or to the die storage bins. The truck used is of the tier lift type, which will reach from the lowest to the highest storage shelf or can be set at any intermediate height, permitting the bolster and then the die to be pushed directly from the truck platform to position without any man power lifting. All bolster plates, die shoes and punch holders in this department are interchangeable. A complete record of die changes is kept as well as of work in progress, so that a new die may be delivered to the press as the last job on it is finishing.



Considerations of Safety Have Demanded the Use of the Card and Report Blank Shown Above. They are employed in connection with minor repairs made locally, without recourse to the general repair department

Under each of the large presses is a pit for easy access and adjustment of spring work, etc., when required on forming dies.

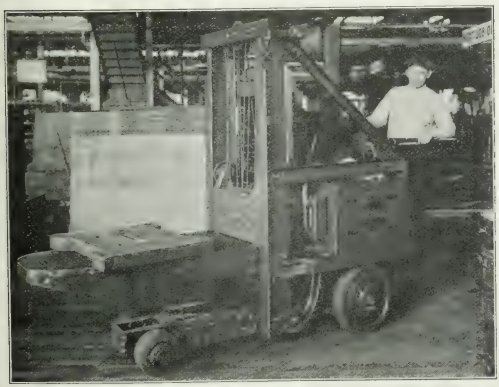
One very economical practice in this shop is in the making of field and armature laminations for use in the motors which the company makes to operate some of its registers. A strip of steel is run through the press which is equipped with a tandem die. From this strip are pierced, notched and blanked the armature laminations and the portion of the strip surrounding is then blanked for the field laminations. As the finished work drops through the press bed it stacks on upright rods, ready to be used for winding.

Immediately adjacent to press No. 2 is a section devoted to grinding. In this department are several special grinders performing some interesting operations.

One is a special roll grinder provided with hopper feed. These rolls are tubular, about ⅜ in. diameter and ¼ in. long. They are thrown into the hopper feeding into a vertical magazine. A sliding feed conveys them to an expanding mandrel in front of the wheel. All motions are cam operated. The machine turns out 830 per hour or about 100,000 per week.

A centerless grinder is used on shafts 15½ in. long by 9/16 in. at the rate of 4 per min. This type of machine is used on both rough and finish grinding. Another special grinder is used on taper pins, making them automatically from the wire. The wheel is controlled by a cam as is the cutting off slide.

One example of plain grinding is noteworthy in that the shaft is ground to an accuracy limit of 0.0008, in. in one pass over and back, taking 0.007 in. in one cut from a shaft 5/16 in. by 10½ in. at the rate of 110 pieces per hour. A tube 0.576 in. rough diameter by 11 in. long is reduced to 0.561 in. for finish or 0.016 in. in one pass at the rate of 9 per hour.



Tier Lift Trucks Save Much Hand Lifting of Heavy Bolsters and Dies

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Seven trustees have been named for the newly-created Economic Foundation in New York and charged with the duty of finding facts which bear on social, economic and industrial problems. Various interests will be represented, the object being to bring together a group of men, each of whom shall be expert in his line, thus giving a tone of impartiality to the voice of the group. Thomas W. Lamont of J. P. Morgan & Co. is chairman of trustees and labor is represented by John P. Frey of the American Federation of Labor. The system of election provides for perpetual representation of such interests as banking, manufacturing, organized labor, the legal profession, colleges, agriculture and economic and social reform movements.

ROLLS AND THEIR CARE

Importance of Avoiding Unequal Expansion and Contraction—Rational Use of Water Urged

Of all the forces known to man there are possibly no powers greater nor more irresistible than those of expansion and contraction. We have learned to control many of the once deemed uncontrollable influences, but these forces have remained among the unconquered, according to a writer in "United Effort."

Hot mill experts are so cognizant of the powers of expansion and contraction that their routine of operations is governed entirely by them. They have formulated a simple law which they try to follow religiously, i.e., avoid too sudden a change in temperature of the rolls. To be careless in this respect is to court disaster, for the one certain way to ruin a roll is to ignore this law, either knowingly or otherwise.

However, it is to cold mills that attention is directed. By a cold mill we mean to imply the thought of rolls running and operating in an inexpanded state. This condition is brought about generally by the judicious application of water, where and when necessary.

To heat and expand the surface of a roll beyond a certain normal rate puts the interior in such a state of tension that it must certainly burst apart, sooner or later. Conversely, to cool and contract the exterior of a roll too suddenly over an expanded interior will just as certainly open up cracks in the surface, which will tend materially to shorten its life, even if cooled uniformly around the roll. And heat or cold applied to one side of a roll will invariably lead to breakage.

Granting that a roll in an expanded state is in the most critical condition, recognized by hot and cold mill men alike, there is a call for great watchfulness on the part of the cold mill man, if he would endeavor to keep roll failure at a minimum. Let me reiterate and emphasize to the cold mill man the law of the hot mill; avoid too sudden a change in temperature of the rolls. This applies to all kinds of rolls, both iron and steel and their alloys.

Generally we find the greatest trouble at the roll necks, where small diameters are subjected to the sudden heating influence of friction. With the necks out of sight and lost, in the attention given to the bars being rolled, it is natural that they often escape notice until they are very hot. And at this time a great mistake is often made, water being turned on to the hot neck. A more perfect way to ruin the roll can hardly be found. If that neck is cooled suddenly on the outside, while the interior is hot and expanded, it will crack or strain the neck to such an extent that it can be expected to break at any moment, possibly at some time when there is not even a bar in the mill.

It takes time to slack the screws, stop rolling, tear down the splash boards, let the neck cool down, grease up and get back to proper gage. But it is better in many ways to do this than have a roll break and have to change on account of a broken neck. Too often, not only the one roll is ruined but, if the rolls happen to have interlocking tongues and grooves, the other rolls may be spoiled as well.

Heating of the necks generally caused by friction alone, while the bodies usually heat up in the pass or passes being used. Knowing that, if a sudden change in temperature is avoided, less roll trouble will be experienced, it is the practice to apply sufficient water to keep the roll cool. But to keep the roll bodies at a normal uniform temperature is not always easy. Some parts of the roll will not be rolled upon at the time and will not come in contact with the hot metal. No water should be directed upon this part of the roll, the passes being used alone getting the supply. But a copious supply here misdirected is wasted effort.

To be used to greatest advantage, water must hit the roll where it can follow around and remain longest in contact with the rolling surface. It is a mistake to direct water into the pass where the bar enters, for water can occasion more actual wearing of the groove than the bars themselves, strange as this may seem.

If during the rolling the pass has become extremely hot, due to some untoward circumstance, we have here the same necessity for caution as with the neck; it must not be cooled too quickly.

Ideally to keep a roll body at a normal uniform temperature, the aim should be as nearly as possible to have a copious flow of water, properly directed, only where and when the bar is in the rolls and at no other place nor any other time; in other words, synchronizing the application of the cooling agent with the heat.

There is seldom enough water properly directed on the working passes of rolls, the entire roll body generally being kept constantly in the flow. Less water can be used to better advantage if used ideally.

In blooming mills and some other types it is a simple matter to have a device to operate valves in the water supply line, so that when a piece is about to enter the rolls the water is turned on. It can also be arranged in many instances that a copious flow is fed on the rolls only on the pass being worked, either by water pipes on movable side guards or automatically controlled valves in the pipes on stationary fixtures.

Necks must be watched constantly, bearing in mind that suet is just as efficient today as ever.

Due cognizance should be taken of the fact that roll trouble is greater in winter than during the warm weather. Water can have the chill taken off with steam in the line, causing it to be less destructive and just as efficient. Rolls also can be kept in a warm place to great advantage. Hot steel should not be used to take the frost out of them.

Expansion and contraction are the natural enemies of rolls. Water correctly applied and judiciously used will in great measure prevent trouble. These remarks are not made for the sake of the rolls alone, for their cost is little compared to the actual loss occasioned by a mill delay.

Embrittlement of Malleable Iron During Galvanizing

WASHINGTON, Dec. 18.—Director G. K. Burgess of the Bureau of Standards in his annual report gives a summary of an investigation regarding galvanizing. The research has been completed and covers an investigation on the embrittlement of malleable cast iron during galvanizing. Following is a summary of the work given by Director Burgess in his annual report:

Recent investigations have shown that commercial malleable iron is often embrittled as a result of galvanizing by the "hot-dipping" method. The present study, however, has shown that this change results from quenching from certain temperatures in the blue-heat range and that the galvanizing plays no other part than the means of heating the iron. The low-shock resistance of such material after hot-dip galvanizing is often very striking. The present study of the problem showed that the magnitude of this deterioration varied with different samples of iron. The Izod impact test was used as a convenient means for measuring the resilience of the metal. The embrittlement was found to be limited to a fairly definite range of quenching temperatures. Aging after treatment did not appear to affect the results. The rate of cooling from the blue-heat range was important, however. If the malleable iron was slowly cooled instead of quenched from these temperatures, the impact resistance was not nearly so seriously impaired. It was also found that the upper limit of the "embrittlement zone" lay a few hundred degrees (C.) below the critical point. Quenching from temperatures in this upper safety zone increased the resilience of the iron and made it immune to the blue-heat deterioration. The information obtained did not solve the question of the fundamental cause of the embrittlement, but did point out a convenient and simple method for eliminating it.

A competitive examination for an assistant electrical engineer to fill a vacancy in the Quartermaster Corps of the Army, Philippine Islands, has been announced by the United States Civil Service Commissary, Washington, from which application blanks may be obtained until Jan. 15.

Foreign Trade for American Steel

President Farrell and Government Officials Address Conference in Cleveland—Demand from Japan an Important Factor

JAMES A. FARRELL, president of the United States Steel Corporation and chairman of the National Federal Trade Council, and seven division heads of the Department of Commerce were speakers, Dec. 12, at the third foreign trade conference that has taken place in Cleveland during the past year under the auspices of the Cleveland Chamber of Commerce. The meeting was of particular interest to manufacturers in view of the fact that the principal topic of discussion was conditions in Japan and the outlook for American trade in that country, growing out of the demands for material for restoration work necessitated by the earthquake. However, European conditions both in respect to the outlet for American goods in Europe and to European competition in Japan, were dwelt on to some extent.

Mr. Farrell said that American manufacturers must go ahead with the work of developing foreign markets and with existing conditions in Europe should turn their attention to opportunities in South America and the Orient. It is important, he declared, to make larger use of markets heretofore regarded as secondary and to sell goods in these to offset the decrease of exports to Europe. Even when Europe recovers there is no assurance that her interests will not be antagonistic to those of the United States. Permanent connections must be established in other markets and fields found for our surplus products to keep labor continuously employed. Heretofore the study of foreign trade has not been given the attention that it deserves. He said that German manufacturers now have the advantage over other producers because they have been able to eliminate overhead by paying off their indebtedness with the depreciated mark.

Distribution Problems Neglected

American manufacturers, Mr. Farrell declared, have developed the most wonderful production methods in the world, but they have neglected the problem of distribution, including transportation and financing. He urged the need of a strong American merchant marine. In this connection, he said that three years ago the Government adopted the policy of doing everything necessary to maintain a merchant fleet under private ownership and operation, the purpose being to transfer the Government owned fleet to private ownership. Although progress has been made along that line, the proportion of goods carried in American vessels has been constantly decreasing while the proportion of privately owned vessels has been increasing. The efforts of the shipping board to secure cargoes has led to rate cutting which has forced the withdrawal of American vessels engaged in overseas trade but has not forced foreign competitors to lay up their ships. A system which compels American ship owners to operate at a loss is not conducive to the upbuilding of an American merchant marine. In his opinion there should be some relation between the freight rate and the value of the commodity carried, so that carriers would not suffer a loss.

President Farrell spoke at a luncheon which was largely attended by members of the chamber. Morning and afternoon sessions were attended by Cleveland and other Ohio manufacturers directly interested in the problems for foreign trade.

Japanese Demand for Building Materials

Luther Becker, chief of the Iron and Steel Division, Department of Commerce, talked about the Japanese market for building materials. He said that the cost of Japanese restoration would probably be paid for by Japan by spreading the work over a long period, although the Government may be compelled to make foreign loans to pay for some of the material. The Japanese program of restoration would probably take 15 to 20 years to carry out. Japan has purchased 300,000 tons of steel since the earthquake for private and Government accounts. The demand during the next few months will be largely for the lighter materials such as sheets and nails. The Japanese demand for steel will be very heavy for many years, but it will probably be a year before the permanent construction work is started, as much time will be required in solving the engineering and legal problems necessary before the rebuilding of Tokio and Yokohama into modern cities can be started. Several modern steel and concrete buildings withstood the earthquake with slight damage and probably these types of buildings will be adopted, with wood types for residences. Supplies in enormous quantities will be required for permanent construction work and most of these will have to come from outside of Japan.

The speaker said that the iron and steel products that will be needed will include bars, structural shapes, sheets, strip steel, wire rods, nails and wire shafting and piling. American steel is in favor in Japan and particularly our black, galvanized and electric sheets, nails, gas and water pipes. The Japanese insist on quality in steel and American mills need not fear Japanese competition. A large foreign supply of builders' hardware will be required, although considerable is made locally. Some brass and copper products will also be needed. With the construction of better houses the speaker predicted a wider use of electrical appliances.

Mr. Becker said that the Japanese demand will probably start in the spring and urged American manufacturers to begin sales campaigns without delay. This is already being done by England and Germany. A few American consumers, he said, are well represented in Japan at present by their own organizations or Japanese import houses, and he urged others to have representatives in the field either their own men or by making connections with smaller Japanese importers. He suggested that American manufacturers in noncompetitive lines might pool their interests and send sales experts to Japan. The speaker declared that the financial condition of Japan is sound and that the Japanese plan to pay for reconstruction work out of their own resources.

The Machinery Outlook

W. H. Rastall, chief of the Industrial Machinery Division, Department of Commerce, discussed the Japanese market for miscellaneous machinery. He referred to the fact that sales of American machinery in Japan last year exceeded that in any other country except Canada. He regarded Latin America as probably the best field at present in which to center efforts for sales of American machinery, but declared that the Asiatic group, particularly Japan, is attractive. He pointed out that the Japanese have come to like American machinery. Previous to the war, Germany had furnished 45 per cent of the machinery for international trade, but Germany has almost disappeared as a factor. This business formerly taken by Germany is now available to other countries and it is apparent that during the next few years the bulk of the international machinery business will fall into the hands of British and American manufacturers. If no effort is made, much of this business will go to England because of price. The speaker urged American machinery man-

ufacturers to be properly represented in foreign markets so that buyers will be taught to give quality proper consideration, preventing them from buying solely on a price basis. Mr. Rastall said that it would be hard to estimate the amount of machinery that will be required in the various stages of rebuilding operations in Japan, but pneumatic tools and air compressors would be needed in the construction work. He regarded Japan as a market of tremendous importance for machinery manufacturers and declared that they should arrange to be represented there for an indefinite period rather than for the period during which reconstruction work is going on.

Get Salesmen in Japan

Arthur Hillyer, chief of the Commerce Intelligence Division, Department of Commerce, said that in selecting sales representatives in Japan the best plan would be to go there and pick out the best available material. Adaptability and service are more important than price and he urged on American manufacturers the importance of keeping spare parts of machinery on hand in Japan for replacements. Mr. Hillyer spoke in favor of such combinations of American and Japanese manufacturers as have been made by the General Electric Co. and within the past week or two by Westinghouse interests and Japanese electrical interests.

Alan T. Goldsmith, chief of the Western European Division, said that Germany is out of the competition for foreign markets at present and will not be a factor for at least a few months because of the collapse of the mark and that the same is true to a less extent of France because of the decline of the franc. Our most severe competition will come from England, which has long had a strong foothold in Japan. The United States has made remarkable progress in developing the Japanese trade, but the British are now trying to get back their pre-war position. He urged American firms to use American instead of European representatives.

Many Inhibitions of Acts by Association

Attorney General Daugherty Discusses Consent Decree as a Definite Code of Business Ethics

WASHINGTON, Dec. 18.—The consent decree entered on Thursday of last week by Federal Judge Knox at New York, dissolving the Cement Manufacturers' Protective Association, charged with operating in violation of the Sherman anti-trust law, has been significantly commented upon by the Department of Justice. It is far reaching in its efforts to be clarifying regarding the activities of trade associations throughout the United States. Expression of this view was made in a statement issued by Attorney General Harry M. Daugherty. He declared that an earnest effort had been made to meet the demands of the business interests of the country for a decree which would be equitable and fair in all respects.

The decree by Judge Knox embodies, Mr. Daugherty stated, the most comprehensive and definite code of business ethics which has been laid down in any case arising under the Sherman act during the period of 33 years that act has been on the statute books. There are several thousand trade associations in the United States, the principal functions of which are to collect and disseminate statistical data with respect to every detail of their business, it was pointed out. The membership of those associations comprise many thousand corporations engaged in practically every line of business. And the terms of Judge Knox's decree, said the Attorney General, will be of vital interest to every member of a trade association. He added:

"Just as the Standard Oil and Tobacco cases are recognized as landmarks in the law with respect to combinations brought about by consolidation, so will the cement case decree serve as a guiding principle by which trade associations and the members thereof must be governed in their future activities.

"The cement case has been the subject of a long and hard fought contest in the United States Court at New York for more than two years." An opinion was handed down by Judge Knox on Oct. 23, 1923, and the decree entered today (Dec. 13) is in conformity with the law and facts as laid down by that court."

The consent decree entered in the cement case is strikingly similar to the consent decree of the Federal District Court of southern Ohio at Columbus, ordering the dissolution of the Tile Manufacturers' Credit Association. While there is a difference of opinion among business interests themselves as to the effect of these two decisions, some prominent attorneys who have studied them declare that they are of a sweeping and restrictive character that deprives trade associations of a vast amount of construction work, including the gathering of vital statistics except at Government request only.

The decree of Judge Knox prohibits the following association activities, but does not apply to any of the defendant companies individually:

Reports by members to the association giving details of specific job contracts, showing name of dealer, name of contractor, description of work, quantity sold, the price, quantity delivered to date and balance to be shipped;

Reports by members to the association of changes in specific job contracts, i.e., increases, decreases and cancellations of quantities previously reported;

Daily reports by the association to its members summarizing the details of all specific job contracts filed with all members;

Reports by members requesting further information about contracts taken by other members;

Reports by checkers or inspectors giving the results of investigations of contracts about which information is desired;

Reports by the association to its members submitting checkers' reports on contracts under investigation;

Reports by members expressing satisfaction with checkers' reports or requesting further investigation and pointing out possible discrepancies;

Monthly reports by members to the association giving information in detail as to the status of all contracts;

Monthly reports by the association to its members giving information in detail as to the status of contracts of all members;

Quarterly reports by the association giving the status of all specific job contracts on file with members, showing names of dealers, names of contractors, description of work, quantity sold, the price, quantity delivered to date, quantity canceled, and balance to be shipped;

Reports by members to the association showing number of bags returned, the number accepted, and the number rejected;

Reports by the association to its members summarizing data concerning bags returned, accepted and rejected.

The decree also prohibits the association from canceling actual contracts which may exceed actual requirements of specific construction work or which are duplicate contracts held by other manufacturers for cement intended for the same construction work, and also prohibits collection and distribution among manufacturers of cement information with reference to such contracts.

The association was also enjoined from making, receiving or distributing reports of the following character:

Reports by members to the association giving the quantity of clinker burned, cement ground, cement shipped, clinker in stock, and cement in stock;

Reports by the association to its members showing as to each member the quantity of clinker burned, cement ground, cement shipped, clinker in stock and cement in stock;

Reports by members to the association giving total shipments during a specified period of time;

Reports by the association to its members showing shipments by each member during a specified previous period of time.

As in the tile case decision, the decree entered by Judge Knox prohibits the collection and distribution of freight rate books from any arbitrarily established freight basing point to the points of delivery throughout the territory comprising the market, but does not prohibit the furnishing of rates or rules of transportation showing actual rates between points of shipment and delivery, although there is an inhibition against basing rates on any points other than those of actual shipment and delivery.

Another permissive clause in the decision allows the maintenance of the Credit Bureau for the sole purpose of furnishing information as to the credit of persons buying or attempting to buy cement, but the decree does prohibit agreeing to refuse to make sales to particular customers or from agreeing upon other conditions excluding customers from being extended credit.

Interestingly enough, in view of the principles involved in the Pittsburgh base case now before the Federal Trade Commission, the decree of Judge Knox prohibits the establishing of mill base prices for cement and the selling of the product f.o.b. point of delivery exclusively. A similar provision was carried in the tile decree. Other practices prohibited follow:

To limit the quantities of cement to be shipped to a dealer within a specified period of time;

To prohibit the diversion or so-called misuse of cement sold on specific job contracts;

To establish and maintain a uniform differential in the price of cement sold to dealers and contractors;

To fix or suggest the amount of commission or profit dealers should be required to make in sales of cement;

To regulate or limit the amount of production of cement, and/or the amount of stock to be kept on hand;

To limit the time within which quotations on cement must be accepted and deliveries made, and to refuse to grant extensions in time of deliveries;

To make changes in prices effective as of the date quotations are written, to avoid "price tipping";

To guarantee prices against decline;

To make uniform charges for bin tests, and/or to require the purchaser to pay for such tests.

Poor Prospect for German Steel Industry

Commercial Attaché Herring Says Competition from the Teutons Not Likely to Be Serious in Near Future

WASHINGTON, Dec. 18.—Pending a settlement of the Ruhr question it is probable that the competitive ability of the German steel industry will be less than at any time in its history, THE IRON AGE was told by Commercial Attaché C. E. Herring, assigned to the Berlin office of the Department of Commerce. Mr. Herring recently returned to the United States for a brief period during which he is taking up official matters with the department.

The inability of the German steel industry to re-enter world markets on its former scale in the near future will be particularly marked, Mr. Herring said, if the French, in order to provide reparation funds or for other purposes, decide to enforce special export or import duties, coal taxes, or other forms of taxation in industry and if the existing customs barrier between occupied and unoccupied Germany is continued. The coal, coke and metallurgical production of the Ruhr and the finishing industries and food-providing regions of unoccupied Germany, the commercial attaché pointed out, constitute a natural economic unit whose sudden separation is likely to mean depression, higher production costs and general inefficiency.

Since passive resistance in the Ruhr was abandoned —at least up to about four weeks ago, when Mr. Herring left Germany—and presumably up to the present, he declared practically no progress had been made in restoring pig iron, steel and allied production. The machinery and other metal-finishing plants were in slightly better position, as in some cases limited supplies of semi-finished materials were still available.

"Failure to resume production and export immediately after passive resistance was given up," said Mr. Herring, "was caused by the almost complete paralysis of transport, the continuing embargoes, delay in reinstating the German railway personnel in the Ruhr and the consequent virtual cessation of coal and coke movement. Other obstacles were uncertainty as to the terms upon which the French would permit resumption of production by individual plants, as to how and when the coal and other taxes due were to be paid, how coal and coke deliveries on reparations account were to be resumed, and finally how great a degree of financial control the German industrialists would have over their plants under the final terms of the French.

"All these factors, for weeks after passive resistance was abandoned, combined to make permanent almost complete stagnation in heavy industry. For instance, on Nov. 1 it was estimated that, even with the reinstatement of German railroad workers, it would be at least three months before the intricate network of railroads in the Ruhr district would be able to transport the minimum necessary quantities of coal and coke, foodstuffs and essential raw materials. This estimate did not take into account any of the financial or political difficulties involved in restoring normal traffic, but considered simply the technical obstacles to be overcome. These were chiefly the great deterioration of rolling stock, particularly locomotives, the disorganization of the repair shops in the Ruhr, the damage to yard equipment, etc.

"Before the Ruhr occupation the German steel industry was in a rather precarious position. Like the rest of German industry, its activity, with practically no unemployment, was based largely on currency inflation, which gave a fictitious prosperity. The Ruhr occupation hastened the end of the long period of currency inflation and also, of course, resulted in an immediate decrease of production in the Ruhr and in embarrassment to the steel finishing industries of unoccupied Germany. With the bursting of the inflation bubble and the continued fuel shortage, German steel prices have tended to exceed world levels and there is little prospect of their reduction.

"At one time it was believed that the long cessation of steel exports from the Ruhr, due to the embargo and other incidents of the occupation, would result in heavy dumping when passive resistance was abandoned and in embarrassment to our own export trade. Long before passive resistance was given up it became apparent, however, that the great reduction in normal output, due to transport paralysis and other causes, and the volume of prior orders which could not be filled after the embargo became effective in January of this year, would greatly limit the stocks available for dumping abroad. The possibility of dumping and breaking world prices has been further discounted by the lien which the occupation authorities have maintained on finished steel stocks pending the settlement of tax, coal delivery and other questions."

LOWER TAXES DEMANDED

Business Men and Others Are Being Heard from at Washington

WASHINGTON, Dec. 18.—Widespread interest over the country in the taxation program of Congress is having the effect of the Ways and Means Committee to expedite plans for considering the program. Demand is becoming even more insistent from business and other taxpayers for reduction in their taxes and it has been spurred a great deal by the comprehensive program of the Treasury Department set forth by Secretary Mellon in a letter on Nov. 10 to Acting Chairman Green of the Ways and Means Committee. The reaction to the program has been remarkably favorable, and despite criticism from radicals in Congress and their efforts to frustrate the treasury program, the belief is growing that at least a portion of it will be adopted either in the exact form in which it was framed or in many of its essential features as they relate to reduction of normal taxes. The fight against reducing surtaxes, however, has considerable force back of it, while that to restore excess profits taxes is less formidable. The discouraging element continues to be the question of bonus legislation. Should it be enacted, as proponents of the bonus say it can be, even over a Presidential veto, it is the view of Administration officials that it would offset advantages that would arise from reduced taxes because it would entail a large sum for both the creation of a sinking fund, as is required by law, and the payment of interest. Treasury officials have insisted that reduction in taxes and enactment of a cash bonus bill would be an anomaly.

While the Ways and Means Committee will begin work at once on a taxation program, neither legislation in this direction nor plans for and against bonus legislation will be seriously taken up until shortly after the Christmas holidays, by which time it is expected that the Senate will have become organized.

With a view to expediting the work of the Ways and Means Committee in revising taxes, Secretary of the Treasury Mellon made public yesterday a letter to Acting Chairman Green setting forth the changes proposed in the tax program, as outlined in the Treasury bill just drafted, and the revenue act of 1921.

Large Shipment of Steel from Pittsburgh by River

The seventeenth and largest shipment of manufactured steel in barges down the Mississippi and Ohio Rivers from the works of the Jones & Laughlin Steel Corporation left Pittsburgh last week. The tow consisted of 15 steel barges, each containing about 800 tons, making a total of approximately 12,000 tons in the shipment. As there is a full stage of water the entire length of the Ohio and all the dams lowered, thus avoiding the delays incidental to passing through the locks, it is expected that the tow will get through to Cairo, Ill., the junction point of the Ohio with the Mississippi, a distance of nearly 1000 miles by river from Pittsburgh, in about six days. This is said to be less than the time by rail to the same destination.

The next similar movement from the Jones & Laughlin mills is scheduled to go out early in January, and it was stated by W. T. Mossman, who has general direction of this service, that it is the intention to operate throughout the winter, providing unusually severe weather conditions do not force suspension. Tows will be scheduled to depart regularly every month from now until June or July, when the low water conditions in the lower Ohio make it impossible to get loaded barges through to Cairo.

"All but five or six of the total of 52 dams and locks necessary to completely canalize the Ohio River from Pittsburgh to Cairo are now completed or under contract and rapidly nearing completion," Mr. Mossman says, "but unfortunately the few projects on which no work has begun are all on the stretch of bad river immediately above Cairo. In other words, full use of the Ohio as a trunk line freight highway connecting with the broad and deep Mississippi and affording a through route to the Gulf is impossible so long as even one of these projected dams in the lower Ohio remains unconstructed. If this waterways project was completed this country would have at its service an unequaled low-cost transportation facility, which properly used in conjunction, not in competition, with the railroads, would materially contribute toward the reduction of our national transportation expense and afford an added and very flexible distributing medium for the products of the mines, factories and farms in the vast territory drained by the great rivers in the Mississippi basin."

Agreement to Meet Short Supply of Men Declared Legal

WASHINGTON, Dec. 18.—The United States Supreme Court in a unanimous opinion delivered by Mr. Justice Holmes on Monday of last week, made brief comment in dismissing the case brought by the Department of Justice against the National Association of Window Glass Manufacturers, National Window Glass Workers, et al. The Department of Justice had obtained an injunction from the Federal District Court for the northern district of Ohio enjoining the glass manufacturers and workers, organized laborers, from carrying out wage agreements which provided for half time operation of the plants of the window glass manufacturers, producers of handmade glass. The action was brought under the Sherman act and charged restraint of trade in interstate commerce.

The dominant factor in this case, the court stated, is that in the last quarter of a century machine-made glass has been replacing handmade glass. The court declared that the defendants testified that the handmakers are able to keep on only by the sufferance of the others and by working longer hours.

Comment is made in the decision on the fact that there were not enough men to enable the hand blown plants to run continuously during the working season and that to work undermanned costs the same in fuel and overhead as to work fully manned, and therefore means a serious loss. "We see no combination in unreasonable restraint of trade in the arrangements made to meet the short supply of men," said the court.

The Ford Motor Co. has announced that construction work on the new assembling plant in Copenhagen, Denmark, is well under way and that the plant should be completed by the middle of next year. The site covers about 4½ acres and the estimated cost of the new plant is $650,000. The principal building will be 300 x 400 ft., two stories. This will be second only to the Manchester, England, plant in point of size of the Ford foreign plants.

The electric truck business is consistently growing, according to statistics collected by the Society for Electrical Development, Inc. In the first eleven months of this year 854 electric trucks have been sold. To the central stations of the country this means an off-peak load of approximately 5,200,000 kwhr. annually. In New York alone 438 electric trucks were sold during this period as compared with 326 during the first eleven months of 1922—an increase of 34 per cent. In Boston the sale of electric trucks has increased 76 per cent.

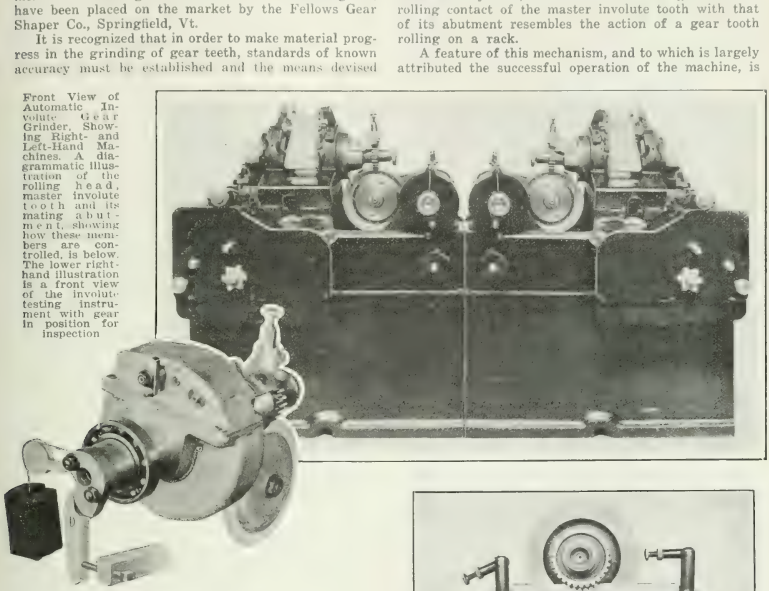
The slump in industrial buying is illustrated in the records of the sales of mechanical stokers. The total horsepower of stokers sold in November, according to statistics obtained throughout the year from 15 establishments by the Department of Commerce, was 16,241. This was substantially under the total number of October of 32,576 hp., and compares also with 60,486 hp. in September, and with 72,120 hp., the average of the first nine months.

AUTOMATIC GEAR GRINDER

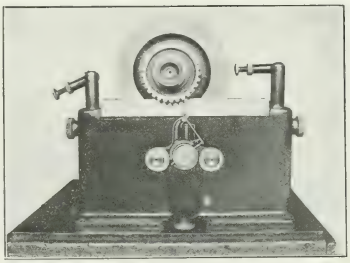
New Unit with Adjustable Involute Control Separate Instrument for Detecting Errors

A full automatic involute gear grinder incorporating unusual features, together with a measuring instrument for detecting minute errors in finished gears, have been placed on the market by the Fellows Gear Shaper Co., Springfield, Vt.

It is recognized that in order to make material progress in the grinding of gear teeth, standards of known accuracy must be established and the means devised for keeping the work within those standards. In addition to a satisfactory involute grinder, which is only part of the problem, accurate reference gages must be provided for every size of gear to be ground and also measuring instruments for detecting minute errors in the finished product. The units offered, together with the reference gages, are therefore intended to provide complete equipment for the grinding of gear teeth.



Front View of Automatic Involute Gear Grinder, Showing Right- and Left-Hand Machines. A diagrammatic illustration of the rolling head, master involute tooth and its mating abutment, showing how these members are controlled, is below. The lower right-hand illustration is a front view of the involute-testing instrument with gear in position for inspection



The grinder is entirely automatic in operation. After setting up the machine, the operator locates and clamps the gear on the work-spindle, and then pulls a lever. The machine then accomplishes the rolling action of the gear against the flat surface of the grinding wheel, indexes for each tooth, trues the flat face of the wheel, and stops automatically when the gear has been completed, whether one, two or more cuts are required.

It may be noted from the illustrations that the machine comprises a base carrying a grinding wheel head, which is adjustable for different gear diameters, and a slide carrying a member known as the "rolling head," the rolling action of which is controlled by a master involute tooth. Operating levers are at the front, and the base is made square to permit of setting machines end to end.

The principal member is the rolling head, which is of light weight, being made from a heat-treated aluminum alloy casting, and is carefully balanced to minimize the fly-wheel effect. It oscillates on ball-bearing supported trunnions mounted on the slide, the latter being moved backward and forward by a reduction-driven barrel cam. The rolling head contains the index mechanism and plate, and is designed so that indexing of the work may be accomplished without shock in 1/10 sec. On the outer end of the rolling head is the master tooth, which is a long involute gear tooth that makes contact with an adjustable abutment in the form of a long straight-sided rack tooth. The master involute tooth, which is ground on a special machine, can be made accurate to within 0.0001 in. Both the master involute tooth and its abutment, or master rack, are made of alloy steel, and are hardened and ground. The rolling contact of the master involute tooth with that of its abutment resembles the action of a gear tooth rolling on a rack.

A feature of this mechanism, and to which is largely attributed the successful operation of the machine, is the fine adjustment provided for the abutment, which controls the pressure angle of the involute tooth being ground. It is claimed that by this means it is possible to control the accuracy of the finished product and to bring it within very close tolerances of the reference gage standard adopted. In addition to providing for wear, this adjustment is said to permit of keeping the work under very close control.

The importance of retaining a constant pressure of the work against the grinding wheel has been recognized. With varying pressure the rolling action of the work against the wheel will not be positive and an inaccurately-shaped gear tooth will be produced. The rolling head being of light weight, and balanced and mounted on ball-bearing supported trunnions, comparatively little weight is required to move it. By this construction it is intended that any force applied by means of a weight will not be expended in overcoming friction but will exert positive and known pressure. The weighting is accomplished by fastening a wire cable to the rolling head, passing the cable over an idler, and on the free end attaching a weight. Re-

movable segments are provided so that the desired pressure of the master involute tooth against its abutment may be maintained. As there is no flexible mechanism between the operation of the master involute and its controlling abutment, control of the work against the grinding wheel is said to be positive.

The small diameter of the grinding wheel employed is emphasized as permitting of more compact design, reduction of vibration and greater uniformity in density of the abrasive wheel. The automatic wheel truing device is also a feature. Having determined the necessary amount of truing, the machine duplicates it automatically, a requirement, it is said, that few operators can be depended upon to fill. Wheel truing may be timed to occur after the gear has made one or more revolutions, as may be found desirable.

Recognition has been given by the makers to the general principle that in interchangeable manufacturing for accurate concentric work, the most vital bearing should be selected as a location point and the work located from this for all operations. For gear grinding, it is claimed, this practice is followed most effectively by making right- and left-hand machines for grinding both sides of the teeth. The machine is therefore made in pairs, as shown.

The use of removable rolling heads is also a feature intended to assure the production of concentric gears. It is claimed that by having the rolling heads interchangeable none of the vital members are affected in changing over from one gear to another. After removing the caps from the trunnions the entire rolling head and its auxiliary mechanism may be easily lifted out and replaced by another.

In grinding gears, a standard for angularity of involute is considered a prime necessity and it is emphasized that before progress can be made standards of accuracy must be established and reference gages made for each size of gear to be ground. Only in this way, it is claimed, is it possible to produce satisfactorily running gears. A ground gear may be perfect as to tooth spacing and true involute form, but if it is not conjugate to the same rack as a gear ground at a previous time on another machine, then it will not be satisfactory. Tolerances that fulfill the requirements of ordinary interchangeable work are not considered close enough, it being said that to be satisfactory involute curves must be kept within 0.0002 in. of an established standard.

Involute Measuring Instrument

The involute measuring machine for use in checking or comparing the gears ground with the established standard is shown in an accompanying illustration. It consists of two cylinders representing the base circle of the gear to be measured. Concentric with it, and held on an arbor, is the gear to be inspected. These cylinders are rolled on hardened and ground steel surfaces, and exactly in the same plane as these surfaces is a jewel contact point that bears against the involute surface of the tooth to be measured.

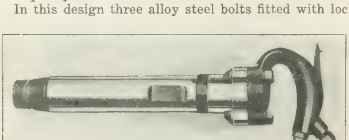
As the cylinders are rolled along the plane surfaces with the contact point bearing on the tooth, no movement of the indicator needle is visible if the curve is a perfect one. Any variations from the theoretically correct involute are by the multiplying lever and dial indicator measured in 0.0001 in.

Riveting Hammer with Improved Features

The Ingersoll-Rand Co., New York, is offering a pneumatic riveting hammer with improved features which include bolted construction for holding the handle to the barrel, heavy section valve with liberal bearing surface, and a poppet and piston type throttle valve.

Three styles, A, B and C, are available in a range of sizes from 5 to a 9 in. stroke. Each size is available with any one of three types of barrels and with either outside or inside trigger handles. The standard A type has a barrel machined to accommodate a rivet set clip only.

In this design three alloy steel bolts fitted with lock



Bolted Handle Construction, Heavy Section Valve and Combination Poppet and Piston Type Throttle Valve Are Features

washers hold the handle to the barrel, a construction intended to enable them to be taken apart anywhere for inspection or cleaning, with the aid of only a wrench. The throttle valve, except on inside trigger handles, is a combination of the piston and poppet types, and is said to have the nicety of control of the piston valve and the freedom from leakage of the poppet type. The throttle lever or trigger is made in one piece from heat-treated spring steel and has a long bearing in the handle. The valve is a strong sleeve made from special alloy steel, has liberal bearing surfaces and its walls are free from holes or ports. It operates in a valve box located in the head of the barrel. The valve box is constructed with a solid end, which permits taking it apart by the use of a piston, for the removal of the valve, without the use of a screw driver or similar tool. This gives a compression chamber in the valve box which cushions the piston on the return stroke and prevents it from striking the handle.

The handles are drop forgings of steel, shaped to fit the hand. Either outside or inside trigger handles may be provided, although the outside type is standard. The exhaust is through the side of the barrel near the handle and can be deflected in any direction merely by turning the deflector.

The hammers are said to have less "kick-back" than usual and consume less air. Largely because of the bolted handle construction they are said to be lighter in the handle end and consequently better balanced and easier to hold, especially when used in a horizontal or inverted position. The weight of the hammer, without set, ranges from 18½ to 24 lb., and the length, exclusive of set, 16½ to 21½ in.

May Build a Plant at Shadeland, Pa.

PITTSBURGH, Dec. 17.—Much interest has been aroused by a recent newspaper story stating that Pittsburgh and Canadian interests had taken options on 2000 acres of land in Shadeland, near Erie, Pa., on which was to be erected a steel plant. Apparently it will not be possible to satisfy the curious until after the turn of the new year, as J. A. Bradley, the Bradley Co., Jones Law Building, Pittsburgh, which firm has the contract for the construction of the new plant, says that the interested parties will not be in Pittsburgh until after the Yuletide holidays, and that actual work of building the plant will not begin until spring.

Mr. Bradley said that the company back of the project was already chartered under Pennsylvania laws with a capital of $50,000,000 and that those interested represented capital of $250,000,000, but refused to give the name of the company or the identity of those back of it. He did admit that the company would make steel direct from ore and at the outset would produce sheet bars, later adding billet, bar, sheet, rail, shape and plate mills.

A portable electric recording instrument has been developed by the Westinghouse Electric & Mfg. Co. It is known as type R and includes an electric self-winding clock for giving records at speeds up to 24 in. per hour. For slower speeds, up to 4 in. per hour, a hand wound clock can be used.

Economical Use of Fuel in Steel Plants

Discussion of Possible Savings Amounting to More Than $40,000,000 Annually—Good Design, Construction and Operation Demanded

BY H. E. SEIBERT*

AMONG present economic problems none is more important than that of fuel supply and demand, none that requires more attention from both industrial and domestic consumers, who in recent years have had to face shortages in supply and great increases in price. Only fifteen years ago some steel plants in the Pittsburgh district paid less than 10c. per M. cu. ft. for the ideal fuel—natural gas, the supply of which seemed to be inexhaustible and little more than $1.25 per ton for the best bituminous coal delivered at gas producer or boiler house bunkers. Today these plants cannot obtain natural gas at any price because the remaining supply must be conserved for domestic use, and they must pay $3.75 or more per ton for bituminous coal of inferior quality.

Plants outside the Pittsburgh district are affected more severely by the changed conditions, for their fuel costs considerably more. As these conditions were brought about in the last few years, it seems logical to assume that in the future a greater price will be exacted for coal of a still lower quality. The need for economy is therefore evident.

Consumption of bituminous coal for the years 1917 to 1921 was given by "Mineral Resources" of 1921 as in Table I.

Table I—Bituminous Coal Consumed in the United States

1917	552,000,000 net tons
1918	580,000,000 net tons
1919	446,000,000 net tons
1920	563,000,000 net tons
1921	407,000,000 net tons

For a good business year the rate of consumption is given as 550 million net tons, which probably will cover the consumption for 1923. This coal is distributed among the various consumers as shown by Table II.

Table II—Distribution of Coal Consumption

	Per Cent	Million Tons
Steel Plants	6.4	35.2
Bee-hive coke plants	6.5	35.8
By-product coke plants	8.7	48.0
Steel industry, total	21.6	119.0
Industries, other than steel and coke	25.0	137.5
Railroads	28.0	154.0
Electric power plants	5.7	31.4
Gas plants	0.9	4.8
Domestic consumers	10.0	55.0
Coal mines	2.0	11.0
Export	3.0	16.5
Seaborne	2.0	11.0
Foreign trade	1.0	5.5
Coast and lake steamers	0.8	4.3
Total	100.0	550.0

From the figures in Table II it will be seen that about 85 per cent of the total bituminous coal mined is used by four consumers: railroads, manufacturing plants, steel plants and domestic consumers. The yearly quantity involved is 466 million net tons. The steel industry alone consumes 21.6 per cent of the total bituminous coal mined, or 106 million gross tons per year. Economy effected in its fuel consuming equipment will therefore bear on a large proportion of the total coal mined. Thus a 10 per cent improvement in economy will net a saving in coal of 10 million tons per year, valued on a most conservative estimate at $40,000,000. The magnitude of the sum involved claims most serious thought of men responsible for the operation of steel plants.

Such a saving may be realized without undue difficulty, by improving the principal fuel consuming equipment. I shall endeavor to show this by presenting data in the form of heat balances and fuel rates for the principal primary and auxiliary fuel consuming equipment employed in steel plants. On the basis of these data, discussion will be presented on thermal efficiency, the principal heat losses, and on the means by which improvements may be effected.

Fuel Economy in Bee-Hive Ovens

Table II shows that we still use the bee-hive oven to a considerable extent: 36 million tons, or 43 per cent of the total coal coked, is carbonized by this old process, which wastes practically 30 per cent of its fuel input. Thus about 7 million tons of good fuel is lost annually in this method of coking. This quantity would be saved if all the coal coked were carbonized in modern by-product ovens, whose loss is about 10 per cent only. The value of the fuel is at least $30,000,000.

Most of the bee-hive ovens in operation today are not located in the vicinity of steel plants, but at or near the coal mines, in more or less isolated localities which offer little or no market for liquid or gaseous by-products. But this fact does not preclude piping gas—the most valuable by-product—to distant mills, where an additional 6 million tons of coal would be saved by the use of coke-oven gas, the surplus of which, on the basis of 6000 cu. ft. per ton of coal, would be sufficient to melt many tons of steel. Or the heat energy in the gas could be converted into electric current at the ovens and either distributed to the mills or tied in with public service power plants.

Fuel Economy in By-Product Coke Ovens

About 18 per cent of the heat in the coal is made available by the by-product coke plant in the form of liquid and gaseous by-products which are useful for steel melting and heating operations, for power generation, for municipal gas supply, or for distillation into other by-products, such as ammonium sulphate, benzol, toluol, etc. But only 57 per cent of the total coke produced at present is carbonized in efficient apparatus.

[Test data and heat balances applied to the operation of modern by-product ovens are then given by the author.]

Relation of the Blast Furnace to Fuel Economy

While the blast furnace is the largest consumer of fuel, it also is the producer of a valuable by-product—blast-furnace gas—in which is present 50 per cent or more of the heat value of the coke entering the furnace. In a good business year our production of pig iron amounts to 37 million gross tons. With a fuel rate of 2100 lb. per gross ton of iron, the coke required is 35 million tons, and the coal necessary to produce this coke is abolt 50 million tons.

Taking a net heat value of 12,800 B.t.u. per lb. of coke, and 50 per cent of this heat as available in the form of blast-furnace gas, we get, on the basis of 13,000 B.t.u. per lb. of coal, the fuel equivalent of 17.3 million tons of coal per year. Assuming a high figure for the fuel required for heating the blast (one-third) the remaining 11.5 million tons is available for general power purposes. This amount would generate nearly one-half of the electric power produced in this country, on the basis of present steam power plant requirement for coal.

Thus the blast furnace is a huge gas producer of high efficiency. The economy which may be derived from the use of blast-furnace gas depends upon the type of equipment. The factor of primary influence

*Combustion engineer Bethlehem Steel Co., Bethlehem, Pa. This is abstract of a paper read at Buffalo, before the Association of Iron and Steel Electrical Engineers.

is the hot blast stove, which may require 15 per cent or 50 per cent of the total gas, depending upon the amount of its heating surface, the type of burner equipment, the means of control, the fineness of gas cleaning and other details. Another important factor is the type of blowing and other power equipment. Thus, more power and more surplus gas will be available for the steel plant if gas engines be used for power and for blowing purposes.

Data were then given drawn from papers before the American Institute of Mining Engineers, in 1915 and 1917 and before the American Iron and Steel Institute in 1915—all relating to blast furnace practice with Mesabi ores.

Gas and Air Volume Constant

From the data given the volumes of gas and air per unit of carbon were found practically independent of the character of the furnace burden. The sum of $CO_2 + CO + CH_4$ varied within very narrow limits, notwithstanding the wide range in coke per ton of iron—1584 lb. to 5800 lb. While there was a great difference in the percentage of CO_2 and CO per cu. ft. of gas, due to different fuel rates, the sum of the carbonaceous gases remained practically constant. The quantity of heat present in the top gases, of course, increased with the increase in the furnace fuel rate. Thus, for the coke rate of 1584-lb. the calorific value of the dry gases was 47.3 per cent, while for the 5800-lb. coke rate the gases contained 66.9 per cent of the heat value of the coke. The air volume passing the tuyeres per unit of carbon also may be considered constant.

From the heat balances and from the data, it can be stated that for all heat calculations connected with the use of blast-furnace gas no appreciable error will have been made in assuming a gas volume of 70 cu. ft. at top of furnace, and air volume at the tuyeres of 52 cu. ft., per pound of coke charged into the burden. These figures which seem to hold for the given range in fuel rate, were applied in calculation on the power that can be produced from the gas of a modern blast furnace, based on careful tests of the auxiliary equipment and on monthly records of the operation of steam engine driven and gas engine driven plants.

Power at Varying Efficiencies

It was found that, with stoves and boilers at 80 per cent efficiency, the gas from a 500-ton furnace will permit generating steam at the rate of 5070 boiler hp., while at 50 per cent stove and boiler efficiency, the rate of steam production will be only 2540 hp. The lower extreme does not represent impractical operating conditions, as there are now in operation many good-sized plants whose average efficiency on stoves and boilers is less than 50 per cent. The upper extreme can be realized in practice if we design the stove and boiler equipment for the conditions of high efficiency, i. e., if we provide the proper amount of heating surface for the stoves, choose a good size and type of boiler, guard against excessive radiation losses, and if we provide these units with good burners and continuous control equipment.

Comparing the data developed, it was found that the gas engine plant should require but one-half the water necessary for operating the steam plant. It should also be noted that the gas engine plant is less dependent on the inlet water temperature, while a high vacuum demands cold water. These points have especial bearing in localities where water is scarce. The data show that the application of gas engines is favored by both fuel economy and water economy.

Installation Costs vs. Savings

One important question is that of installation cost. Now the investment required in a gas engine plant complete with gas cleaning and waste-heat steam plants is not much greater than that required for steam boilers and for steam blowing and power equipment. The gas plant will, therefore, effect a large saving in money as well as in fuel and in water.

Taking the yearly production of one blast furnace at 160,000 tons of pig iron, the saving which may be effected by a gas engine installation such as has been suggested is $1.55 per ton of iron. Expressed in terms of coal alone, the saving amounts to 28,800 gross tons per year, which, at $4 per ton, equals $115,000, or 72c. per ton of iron.

Conclusions

We can obtain a stove efficiency of 80 per cent and maintain it in practice. The same can be said of the boilers. But we cannot obtain or maintain these high efficiencies by simply connecting a gas flue with a piece of pipe and allowing the gas to roll into the stove or boiler, and then out of it into the atmosphere. High efficiency demands good equipment and the best of continuous control. We would not think of operating a steam engine without a governor, nor an electric generator without switchboard equipment, but we do operate, or try to operate, equally important equipment—stoves and boilers—without the equivalent of such devices. The sooner we realize the error of our methods the sooner will we be on the road to fuel economy.

Discussion

George R. McDermott, assistant chief engineer Illinois Steel Co., South Chicago, referred to the electric operation of the greater portion of his plant. There are 11 blast furnaces and electric power is derived from units driven by blast furnace gas as a fuel. It was found some time ago that there was a considerable excess of gas beyond that needed for the electric drive. Consequently, it was arranged to use some of this excess gas for the pipe mill reheating furnace, mixing it with producer gas in the proportion of 60 per cent producer gas and 40 per cent blast furnace gas. As this did not use all the surplus from the furnaces, six plate mill furnaces were similarly equipped for using mixed gas. As there was still a surplus, two open-hearth furnaces of the tilting type, of 200 tons capacity each, were arranged to burn a gas consisting of 50 per cent blast furnace gas and 50 per cent tar from the by-product coke ovens. The only change that has been noted in operation of these furnaces is that it takes a little longer to get out a heat.

Another use for the blast furnace gas is in connection with blowing the producers. It is mixed with the air, making a cycle of 6 min. on air and 2 min. on blast furnace gas, in place of using steam. This has resulted in no trouble from clinkering, the production of CO_2 going up to 35 per cent. Analysis of the gas shows a quality equal to that obtained by steam blowing. One advantage lies in the fact that the use of blast furnace gas avoids the water vapor inseparable from steam blowing and, consequently, helps the operation of the furnace using the gas.

Another speaker pointed out that the heat balances covered in the paper should be supplemented by economic balances, in order that the management may know how much it will cost to get the better heat balances shown. If the cost is too great for the benefit, it would be obviously of little value to incur the expense of installing the equipment to obtain this benefit.

Temperature Requirements of Hot Spot Manifolds

In a 44-page pamphlet of the Engineering Experiment Station of Purdue University have been gathered results of experiments with exhaust temperatures from gas and oil engines in an effort to effect good carburetion by the hot spot method. Considerations of approaching exhaustion of the natural petroleum resources of the country, together with the cost of operating the millions of gas engines now in use, have prompted the effort toward more economical operation. The hot spot manifold is expected to supply sufficient heat to produce even distribution and perfect combustion with the lowest possible mixture temperature.

The export of automobiles to Australia amounted to 18,504 for the first nine months of this year compared with 8055 for the same months of 1922 and 2231 for the corresponding period of 1921.

Professors Oppose Pittsburgh Basing

Economists Favor Making Mill Prices, Which They Declare Necessary to Establish a Real Market—Evidence Completed at Last

BY L. W. MOFFETT

WASHINGTON, Dec. 18. —Evidence in the Pittsburgh base hearing before Examiner J. W. Bennett of the Federal Trade Commission finally was completed last Saturday. The concluding testimony consisted of rebuttal evidence submitted by the commission under examination by its attorney, H. K. Steinhauer. It included statements by economists of Harvard and Princeton Universities and the University of Wisconsin, who appeared as representatives of legislatures of Middle Western States which some time ago adopted resolutions condemning the Pittsburgh plus practice, and instructed their attorneys general to submit evidence in opposition to the plan. The City of Chicago also filed a petition through Assistant Corporation Counsel Leon Hornstein in opposition to the system. The actual final evidence was in the nature of exhibits of freight rates, prices, etc., on steel put into the record by H. E. White, statistician of the commission. It is believed it will be at least six months before the commission decides the case.

The three university economists included Prof. Frank A. Fetter of Princeton, Prof. William Z. Ripley of Harvard and Prof. John R. Commons of the University of Wisconsin, who testified in the order named. Their testimony was largely of a similar character and showed that these economists were in favor of f.o.b. mill basing points.

History of Pittsburgh Base Case

Aug. 1, 1919—Application for complaint filed with Federal Trade Commission by Western Association of Rolled Steel Consumers, followed by application from numerous other organizations.

Dec. 2, 1919—Preliminary hearing begun at Washington before commission.

July 24, 1920—Commission denies application for complaint, Messrs. Murdock, Colver and Gaskill voting against its issuance, with Messrs. Thompson and Pollard voting for it.

Aug. 1, 1920—Rehearing asked for by H. G. Pickering, counsel for the Western Association of Rolled Steel Consumers.

Sept. 20, 1920—Rehearing granted. Those voting favorably were Messrs. Thompson, Colver and Pollard, and those opposed, Messrs. Murdock and Gaskill.

Nov. 15-17, 1920—Rehearing held.

Dec. 6-9, 1920—Arguments made and application taken under advisement.

Aug. 30, 1921—Complaint against the Steel Corporation issued, charging Pittsburgh base practice constitutes unfair method of competition under Federal Trade Commission act and price discrimination under the Clayton anti-trust law. Those voting for the complaint were Messrs. Thompson, Pollard and Nugent, and those opposed were Messrs. Gaskill and Murdock. Mr. Pollard's term has expired and he has been succeeded by Judge V. W. Van Fleet.

Jan. 30, 1922—Hearings begun at Milwaukee.

Mar. 1-Nov. 1, 1922—Hearings at various points over the country, during which commission concluded direct testimony.

Jan. 19-July 17, 1923—Steel Corporation submits testimony at various points over the country.

Dec. 10, 1923—Steel Corporation completes its direct testimony and rebuttal begun by commission.

Professor Commons' Definitions

Professor Commons declared that a mill base price is necessary to constitute a real market. A delivered price, he contended, means an assemblage of two commodities, freight and steel, while the mill price would include only steel. The Pittsburgh base practice, he said, has a peculiar combination in that it involves both commodities and it results in concealing the price at other points because the freight is not known to the consumer. He conceded upon cross examination by Attorney C. A. Severance for the United States Steel Corporation that the freight rates being published are readily ascertainable, but still maintained this would not clearly afford knowledge of the actual base prices where such prices differ.

Disagrees with Judge Gary

Professor Commons said that within the past 20 years the largest corporations have adopted a policy of "Live and let live," and the weaker competitors have been protected in a sense by following the prices of the dominant producers. But this policy, he said, does not represent a truly competitive policy, although it does away with destructive competition.

Based on a question by Attorney Steinhauer as to whether he agreed with Chairman Elbert H. Gary of the Steel Corporation that the Pittsburgh plus plan can be operated only upon the basis of the law of supply and demand, Dr. Commons stated that in his opinion the practice is not built upon this economic structure.

"Sometimes prices are controlled," said Professor Commons, "and when the element of control enters into supply and demand the natural economic law cannot be set up as a justification."

It is because of the Pittsburgh plus system, he said, in referring to an exhibit offered at a previous hearing by the Steel Corporation, that steel naturally moves from the East to the West instead of from the West to the East. Supply means a quantity of goods offered at a given price and demand is the same thing and involves goods taken at that price, it was stated. A mere statement of production, said Professor Commons, throws no light on demand. Had the price been different, it was pointed out, then production would also have been different.

Professor Ripley, author of the plan to consolidate railroads of the country, said that it had been commonly expected that the Pittsburgh plus practice would disappear, so far as the Chicago district was concerned, when the Steel Corporation established its plants at Gary, Ind. Dr. Ripley was stressing the fact that a production center such as the Chicago district is entitled to the advantage of its location but maintained that such an advantage is not now given to that district.

"If the present plan of the Pittsburgh plus system persists," he declared, "it must be because of interference with the law of supply and demand. It creates a discrimination which results in the perpetuation of an outgrown system and thwarts free play of the economic law of supply and demand."

With application of the freight differentials, he claimed that the Chicago district would be given access to Western markets that under freely operated economic laws would shut out Pittsburgh mills at consuming points tributary to and west of Chicago.

The fighting ground between Chicago and Pittsburgh mills, Mr. Ripley said, naturally should be at a point midway between the two districts where the

freight rates became equalized. He said he was in substantial agreement with Professor Fetter that the Pittsburgh plus practice violates the law of supply and demand and, like Dr. Fetter, conceded that the Pittsburgh plus case will govern until the so-called point of saturation is reached. But the inference was that the Chicago district, for instance, now is of such proportions as to be able to meet demands made upon it.

Dr. Ripley said that he agreed with that portion of a speech made in Duluth, Minn., by Judge Gary, in which the latter said that it is natural for a mill first to develop markets nearest the source of production; after that the mills would engage in sharp competition unless it is restrained by unnatural forces, in the view of Professor Ripley.

During the cross examination, Dr. Ripley declared that from an economic viewpoint a base price with active competition will work itself out in any market territory by natural activities of producers seeking other markets by making price concessions outside the territory bounded by transportation costs.

Replying to a question relating to market practices as directly applied to the Pittsburgh plus plan, Dr. Ripley said he was not qualified to testify as a market authority but could discuss the question only on the basis of economic theory.

Popular Conception Wrong

The popular conception of price competition between markets is often wrong, Professor Fetter stated during cross-examination. The general theory, he declared, that competition means actual bidding between all producers of the same kind of products is utterly impossible. He expressed the opinion that base prices are arrived at as the result of buying and selling and should be controlled by the existing freight rates. Under present rates, he declared, market districts are able to annex certain territory clearly defined. Sellers then quote lower prices in order to widen the territory and this results in a twilight zone outside of the original market delivery, Dr. Fetter stated. At the same time, he declared that the cross freights resulting from shipments between territories must be borne by the public in the long run, if not at once.

Attorneys for the Steel Corporation asked Dr. Fetter for his view as to what actually was a free competition market, and he replied that there was not such a thing because all markets are subject to human imperfection.

British Pig Iron and Steel in November

LONDON, ENGLAND, Dec. 13 (*By Cable.*)—November pig iron production was 597,600 gross tons, comparing with 592,600 tons in October and with 714,200 tons in May, the year's highest. The output of steel ingots and castings in November was 749,500 tons, also larger than for October. It was the fourth largest month of the year, being exceeded by March, May and June.

Comparative production figures for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	689,000
1920, per month	669,500	755,600
1921, per month	217,600	302,100
1922, per month	408,300	486,000
January, 1923	567,900	634,300
February	543,400	707,100
March	633,600	802,500
April	652,200	749,400
May	714,200	821,000
June	692,500	767,700
July	655,100	624,300
August	599,800	582,700
September	558,600	695,100
October	592,600	702,100
November	597,600	749,500

The pig iron average to Dec. 1, this year, is 618,900 tons per month and 712,300 tons per month was the average steel output.

Burning Fuel Oil in Railroad Locomotives

In a paper by J. M. Johnston, fuel agent, Missouri-Kansas-Texas Railroad, read Dec. 12 before the fourth annual meeting, American Petroleum Institute, at the Statler Hotel, St. Louis, the speaker referred to consideration of cost of coal and oil as follows:

Cost of Coal and Oil at Source

"Our experience shows that 3½ barrels of fuel oil, or 1088 lb., are equivalent to 2000 lb. of coal. The item of expense of coal and oil does not always depend upon whether the change from coal to oil should be made because the relative price of one ton of coal, f.o.b. the mine, or its equivalent of 3½ barrels of fuel oil, f.o.b. the refinery, is the same.

"In making investigations for some railroads I found that the cost of coal at the mine was less than the cost of its equivalent of fuel oil at the refinery, yet, in the final analysis, the adoption of fuel oil created a saving on account of other economies.

Cost of Transportation—Coal and Oil

"In computing freight haul on either coal or oil from origin to point of consumption, tariff rates must govern when moved over foreign lines and actual cost of moving over home rails. That an amount of fuel oil capable of doing the same work as its equivalent in coal can be transported cheaper is illustrated by the following.

"We will assume that a railroad consumes 1,000,000 tons of coal annually, and the average mile hauled on home rails is the same for coal as for oil. Equating 3½ barrels of oil to one ton of coal, this consumption is equivalent to 3,500,000 barrels of fuel oil, or 543,900 tons. The net weight of a modern empty tank car is practically the same as the net weight of a modern coal car. On the basis of a net load of 50 tons to the coal car, it will require 20,000 cars to handle 1,000,000 tons of coal, while 14,700 tank cars of 10,000 gallons will handle this equivalent of oil. Therefore, when using oil fuel, a saving will be effected in the hauling of 456,100 net tons of company fuel annually, elimination of this extra haul being a large factor in reducing transportation expense."

Conference for Indiana Foundrymen

The engineering extension service of Purdue University announces the second annual conference of Indiana foundrymen, which is to be held at Purdue University, Lafayette, Ind., on Jan. 17 and 18. This conference will be of interest to manufacturers using foundry products as well as foundrymen. Effort is being made to secure men of national reputation along foundry lines to lead in the discussion of foundry problems.

A similar meeting held last year resulted in the formation of the Indiana Foundrymen's Association, and the first annual meeting of this association will be held in connection with this conference, which is in charge of W. A. Knapp, assistant director of the Purdue engineering extension service.

Employment in November

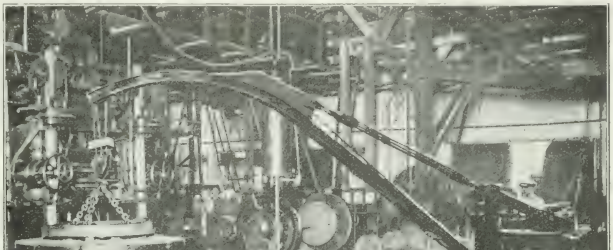
Seven of the 14 major industrial groups reporting to the Federal Employment Service at Washington showed increases in employment during November. Net declines in the 1428 firms reporting was one-half of 1 per cent of the total employed on Oct. 31. In the iron and steel and allied fields the decrease amounted to 2.85 per cent, in railroad repair shops the drop reached 2.35 per cent; and it was to these two factors—temporary curtailment of employment of most large railroad centers during November and brief suspension of activities in iron and steel and their finished products—which the survey holds responsible for the decrease. A slight lull in the activities of machine shops and foundries has created a surplus of semi-skilled workers in these lines, according to the survey, but the demand for unskilled labor is still greater than the supply.

Locomotive Crane for Industrial Use

The locomotive type crane illustrated, a recent addition to the line of the Baker R & L Co., Cleveland, is intended for duty such as lifting heavy members in erecting shops, picking up and carrying sheets, carrying and stacking pipe or bar stock, handling pig iron and scrap and similar uses.

A 12-ft. boom is standard but other lengths up to 19 ft. are available. The 19-ft. boom, which will reach over the top of a locomotive, may be employed in locomotive trimming work. It may be used to remove the front door or stack, hold an air pump in place while it is being bolted up and, equipped with the auxiliary boom, will work underneath the running board of a locomotive, handling side rods, springs, cross heads and other parts. With an 8-ft. boom and 60-in. wheel base the machine may be operated inside a standard box car.

Every motion of the crane is electrically driven and all controls are located on the dash directly in front of the operator. One motor propels the truck, another slews the crane and a third drives the main hoist. The machine has two-wheel drive and four-wheel steer. The rated capacity is 3000 lb. at 7-ft. radius, the travel speed with rated load being 3 miles per hr. and 4 miles per hr. without load. The hoisting speed of the hook, with rated load, is 7 ft. per min. and without load, 30 ft. per min. The slewing speed or time for 270 deg. travel at 7-ft. radius with rated load is 20 sec. and without load 15 sec. The weight of the unit equipped with 19-plate Ironclad battery is 7850 lb.



Locomotive Type Crane for Lifting and Transporting Heavy Parts. It is regularly equipped with a 12-ft. boom, but booms 8 ft. and 19 ft. long are also available, the 19-ft. boom being used in locomotive trimming work. All motions of the machine are electrically driven. One motor propels the truck, another slews the crane, and a third drives the main hoist

A feature of the machine is the main hoist, which is made up of two drums, both driven by the same motor through a pair of magnetically operated clutches. A solenoid brake prevents rotation except when power is applied and three limit switches are provided to control each operation. The machine has single reduction worm drive axle which is driven by a totally inclosed motor and equipped with duplex compensating suspension. The controller is of continuous torque drum type, with metal drum and reversible fingers. The automatic switch provided is of the quick break type with auxiliary carbon contacts. The brake is of external contracting type operating on the worm shaft and is interlocked with the automatic switch and controller.

The crane slews on ball thrust bearings and ball and bronze radial bearings. The slewing motor drives through a worm and spur gear reduction and is equipped with solenoid operating brake. Positive limit switches automatically control all motions of the crane.

The Inland Steel Co., Chicago, denies a report recently current to the effect that it had purchased the Hydraulic Steel Co., Cleveland.

Slight Decrease of Employment

WASHINGTON, Dec. 18.—A decrease in employment of 2.85 per cent was disclosed in iron and steel and other products in November, when compared with October, according to the monthly bulletin of the United States Employment Service, Department of Labor. Metal and metal products, other than iron and steel, showed an increase of 1.46 per cent; railroad repair shops showed a decrease of 1.38 per cent. The 1428 firms reporting showed a small reduction in the total number employed, amounting to 0.5 per cent, when compared with employment in October.

Commenting on the November decrease, Director General Francis I. Jones said: "Two of the outstanding factors responsible for this decrease were the temporary curtailment of employment in practically all large railroad centers during the month of November and the suspension for a short period of activities in the iron and steel and their finished products industry. It is encouraging to note that already large numbers of railroad shopmen have been returned to work, and that industrial employment conditions in the iron and steel industry are considered excellent notwithstanding the decrease noted."

Discussing the matter of seasonal occupations, Director General Jones pointed out that employment in seasonal occupations throughout the country continues on an exceptionally high scale for this period of the year.

Valuable Service of the Industrial Machinery Division

WASHINGTON, Dec. 18.—There has been a decided increase in the amount of routine work placed upon the Industrial Machinery Division of the Bureau of Foreign and Domestic Commerce, according to the annual report of Director Julius Klein, of the bureau. The chief of this division is Walter H. Rastall.

The total number of inquiries answered by the bureau with reference to machinery matters, during the fiscal year ended June 30, 1923, was 46,399.

A special survey has been made of the machinery dealers of the world by collecting reports showing the qualifications, facilities, and limitations of the dealers in all foreign cities. This material has been found of great value to machinery manufacturers visiting the division.

The division is arranging for the entire revision of the index showing the kinds of machinery produced by various American manufacturers, and it is expected that in the course of the next few months this index will be thoroughly revised and brought up to date.

MAKING FERROTUNGSTEN

French Experiments Using Scheelite and a Basic Lined Electric Furnace

An interesting account of experiments on the making of ferrotungsten, carried out in Russia by K. P. Grigorovitch in a small electric furnace specially built, appears in *Revue de Metallurgie* for March, 1923. Most work was done with scheelite from Japan containing WO_3 68.79, CaO 16.9, Mn 0.28, Fe 3.87, SiO_2 2.11, Mo 0.18, Sn traces, S 4.14, P 0.0 per cent. The first problem was the reduction of the high amount of sulphur, probably existing as FeS_2. Careful experiments showed that roasting at about 800 deg. C. was the best method, continued for about two hours, when the sulphur could be reduced to 0.7 per cent. This would produce a ferrotungsten that could be used satisfactorily for the manufacture of high-speed steel in the basic electric furnace, even if too high in sulphur for crucible practice.

A small tilting furnace was constructed, the bottom being made of crushed coke mixed with tar and a little resin rammed into place, and the walls of crushed magnesite mixed with tar. The use of basic instead of acid materials for the lining of the furnace is of essential importance. At the first glance it would seem that an acid lining should be used in order to diminish the loss of tungsten in the slag because WO_3 is acid in character. For this reason several experimenters use an acid lining. However with acid slags the loss of tungsten in the slags reaches 15 to 20 per cent or higher. Basic slags must be used because at the high furnace temperatures the WO_3 is reduced to WO and is basic in character.

The results of four experimental runs are then given. For the fourth the charge consisted of 24.6 kg. (54.2 lb.) calcined scheelite, 6.97 kg. (15.4 lb.) iron turnings, 4.30 kg. (9.5 lb.) charcoal, 4.51 kg. (9.94 lb.) sand and 0.41 kg. (0.9 lb.) lime. Special attention was paid to the complete reduction of the tungsten. Samples of slag were taken from time to time and lime or sand added as found necessary. Also reducing agents were added. Petroleum coke was found better than charcoal or ferrosilicon. The slag of the fourth test ran SiO_2 38.8, CaO 28.4, W 1.19, Fe 3.9, MgO 25.5 per cent.

The ferrotungsten formed in two layers, the upper one, containing only 49.8 per cent W, was fluid and poured readily from the furnace. The lower layer passed very quickly into a pasty state when the current was cut off, and contained about 75 per cent W. It could not be tapped from the furnace. In most cases this pasty mass is mechanically attached to the walls of the furnace. It is a question whether it is better to use power enough to fuse this pasty alloy and tap it from the furnace or to construct the furnace in such a way that it can be readily dismantled and the lump of alloy removed. G. B. W.

Effect of Severe Cold Rolling of Metals

As has been previously pointed out by the Bureau of Standards some rather striking and unexpected results have been obtained in connection with the bureau's study of the effect of severe cold rolling on metals. In brief, it has been found that when a metal is deformed by cold rolling it becomes harder, but if the cold deformation is continued without any intermediate annealing, the hardening process continues up to a maximum, after which a reversal occurs and the metal becomes progressively softer. The microstructural changes are also indicative. During the hardening the identity of the crystals can be detected readily, although they are distorted more and more by interior "slipping" within the crystals as the deformation increases. When all evidence of crystality, as judged by the appearance under the microscope, has disappeared, and the grains have been compressed into flat thin "scales," the hardening ceases and with still further deformation, softening occurs.

Additional work now in progress will include a study of the possible directional properties of the rolled sheets, that is, a determination of the hardness of the metal on sections perpendicular to the rolled surfaces as well as on the surface itself. The possible effect of the heat generated within the metal during the severe deformation and its relation to the hardening properties will also receive attention. The bureau plans to study the structural atomic changes of the very severely rolled metals by means of the X-ray crystallographic method as soon as the necessary apparatus is available for use.

Plans for Merging Belfont Iron Works and Kelly Nail & Iron Co.

Plans for the merger of the Belfont Iron Works Co. and the Kelly Nail & Iron Co., Ironton, Ohio, are now being worked out, following a meeting of the stockholders of both companies at Ironton Dec. 12. The stockholders will meet again Dec. 28 to discuss the terms of the merger, and if satisfactory, to ratify the deal. This merger has been contemplated for a long time, and it is said that plans following a successful termination of negotiations call for the erection of a rolling mill and open-hearth furnaces to supply the present wire and nail mills with rods. The Belfont Iron Works Co. is now operating the Belfont blast furnace, and has up-to-date wire and nail mills, the rods for which are being supplied by the Ashland Steel Co., at Ashland, Ky., in which the Belfont company is a stockholder. The Kelly company owns the Sarah furnace, and also has wire and nail mills at Ironton. Present capitalization of the Belfont Iron Works Co. is $2,000,000, while that of the Kelly Nail & Iron Co. is $1,600,000. S. G. Gilfillan is chairman of the board, and Coles Peebles president of the Belfont company, while I. P. Blanton is president of the Kelly company.

Advises Exporters to Go Slowly

W. H. Rastall, chief of the machinery division of the Department of Commerce, speaking at a meeting of the Cincinnati Chamber of Commerce, advised that exporters go slowly in the matter of granting credits to merchants in Mexico and Latin-American countries. He said there was an abundance of export business to be had in the world, and that business could be done in all countries, with the possible exception of Russia and China, with safety, provided there was a good assurance of credit for the goods before they left the United States.

Portland Cement a Record

Figures of the United States Geological Survey show the production of Portland cement in the first 11 months of this year to have been 126,969,000 bbl., which is more than 10 per cent above the 12 months' output of 1922, which was the highest record in the history of the industry. Shipments from the cement plants in the eleven months of this year likewise form a record, with 129,143,000 bbl., and are approximately 10 per cent above the twelve months' record shipments of last year.

From April to November inclusive the smallest production was over 11,000,000 bbl., while seven months in succession showed higher production than the highest month of any previous year. Each of the past nine months in succession has provided shipments exceeding 10,000,000 bbl.

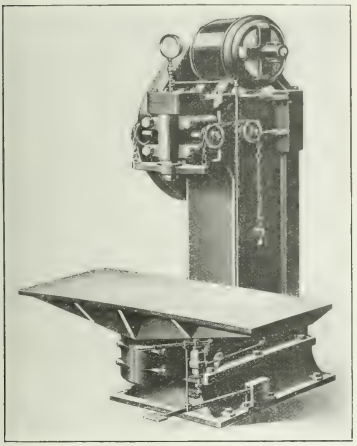
The Consolidated Machine Tool Corporation of America will sub-lease its store at the corner of West Washington Boulevard and Clinton Street, Chicago, and will rent office space elsewhere. For years it has been the custom of machine tool houses at Chicago to maintain showrooms in which machine tools are displayed for inspection by prospective customers. The Consolidated company is the first organization represented in that city to abandon a store in favor of an office.

New Straightening and Forcing Press

The hydraulic press illustrated, for use in bending, straightening or forcing operations has been placed on the market by the Watson-Stillman Co., New York. Two sizes are available, 30 and 50 tons, respectively. Although designed primarily for straightening cam shafts, crank shafts and automobile front axles, the press may be used for a variety of other work.

The machine is self-contained, requiring no auxiliary water or power supply, and is driven by a motor like any machine tool. It is quick acting and is under control of the operator, both as to speed and pressure, by means of a valve operated either by hand or foot lever. The pump is arranged so that the movement of the press ram through the idle portion of its stroke is rapid and the change from low to high pressure for the actual straightening operation is effected automatically.

An outstanding feature is the arrangement of the



Hydraulic Press for Straightening Crank Shafts, Cam Shafts, and Other Pieces. The entire table may be removed, leaving an open jaw forcing press for use in mandrel forcing, broaching, force fitting and assembling

table, which may be removed, leaving an open-jaw forcing press for other operations such as mandrel, forcing, broaching, force fitting and assembling.

Substantial construction is a feature and working parts are protected by removable dirt-proof guards. The frame is a steel casting with copper lined cylinder, bolted and keyed to the frame. The ram is of high carbon steel. The base is of cast iron and is built to serve as a reservoir for the pump. The pump body is bronze and the plungers are of hardened tool steel and are packed with hemp under bronze glands. The packings are easily accessible. The pump valves are made of Monel metal and are of the metallic seated type. The ram has a positive stop to prevent overstroke.

Hydraulic pressure is used only for the pressure or downward motion of the ram, the return being accomplished by means of a counterweight inside of the frame. The machine illustrated shows the press equipped with a slow-speed motor, with single reduction gearing to pump shaft. A high-speed motor may be used also, geared with compound gearing to the crank shaft. Spring type centers for holding the work to be straightened are available if required. These centers are adjustable for different lengths of work and also as to position on the table.

The following specifications are for the 30 and 50 ton machines, respectively; diameter of ram, 4½ and 5½ in.; stroke, 6 in.; gap, 10 and 12½ in. The speed of the ram is 120 and 98 in. per min. low pressure, and 28 and 24 in. high pressure. The distance from end of ram to table is 10 and 24 in. The table is 72 in. and 48 in. long, respectively. The weight of the larger press is 4750 lb.

Machine Adapted for Production Drilling

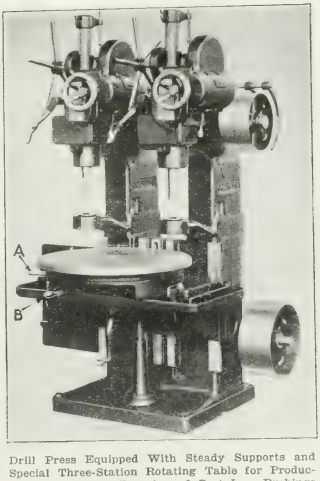
For the production drilling and reaming of cast iron bushings the Oakland Motor Car Co. is employing the special drill press illustrated herewith, which was built at the Colburn works of the Consolidated Machine Tool Corporation, Rochester.

The machine is made up of the Colburn standard two spindle No. 2 drill press equipped with steady supports and a special three-station rotating table. Two heads are mounted on a common column, which carries a bracket type of table extending the full length of the machine. The rotating table is clamped to the table of the machine and the three stations are for loading, drilling and reaming, respectively. The steady supports are provided for supporting the bar. The lever *A* is for releasing the indexing latch and the lever *B* is for clamping the table in position after it has been indexed. An automatic trip, together with spring type counterweights, returns the spindle automatically to the starting position after each operation.

A 5 hp. motor mounted on a bracket at the rear is geared to the jack shaft, and each head is driven by belt from this shaft. The heads are independent of each other and may be operated at different feeds and speeds.

The machine is intended as a production tool suitable for machining duplicate parts in quantities and is adapted for handling a large variety of work requiring a wide range of speeds and feeds. The patented transposing gear arrangement incorporated is claimed to permit of unusual flexibility and provide means for securing the correct speeds and feeds for the particular work in hand.

On work where two stations for drilling are required



Drill Press Equipped With Steady Supports and Special Three-Station Rotating Table for Production Drilling and Reaming of Cast Iron Bushings

a four-station rotating table may be used instead of three. The table would then be indexed 180 deg. to bring the work under the spindles.

Japan's Iron and Steel Industry—III*

Plant Extension During War Times—Production Figures Show Growth—Long Work-Day Beginning to Cause Uneasiness

BY DR. ING. E. KOTHNY

TABLE XIII gives a survey of the most important extensions contemplated during war times and how far these programs have been carried out to date. According to these figures the blast furnace plants in their present state are already sufficient to meet the maximum pig iron demand. The steel requirements, assuming a yield of 75 per cent of finished product from the ingot, can be met up to 70 per cent in the country. It is here presupposed that rolling mill capacity corresponds with ingot capacity. In the production of certain finished products, however, such as tin plate, wire and tubes, the capacity of existing Japanese plants is today less than 50 per cent of the market requirements.

Table XIII.—Plant Extensions—Proposed and Actually Completed

Name of Concern	Ultimate Capacity in Metric Tons—Pig Iron: Contemplated	Pig Iron: Completed to Date	Steel Ingots: Contemplated	Steel Ingots: Completed to Date
Toyo Seitetsu K. K.	150,000	150,000	60,000	.....
Honkeiko—Manchuria	90,000	90,000	.....	.....
An-Shan Steelworks—Manchuria	1,000,000	150,000	1,000,000	.....
Imperial Steelworks	750,000	450,000	750,000	600,000
Kamaishi Tessan	200,000	65,000	.....	25,000
Hokkaido Seitetsu K. K. & Nihon Seiko-jo K. K.	125,000	125,000	.....	80,000
Mitsubishi Seitetsu K. K.	100,000	100,000	250,000	50,000
Mitsubishi Shipbuilding Co.	.....	.....	35,000	35,000
Nihon Kokwan K. K.	.....	.....	150,000	150,000
Kobe Seiko-jo K. K.	.....	.....	50,000	50,000
Kawasaki Zosensho K. K.	.....	.....	150,000	150,000
Sumitomo Seiko-jo K. K.	.....	.....	90,000	90,000
Asano Seitetsu K. K.	Not Known	.....	Not Known	50,000
Osaka Seitetsu K. K.	Not Known	.....	50,000	50,000
Kyushu Seitetsu K. K.	Not Known	.....	50,000 building	50,000
Other works	.....	.....	50,000	50,000
Total	2,415,000	1,170,000	2,735,000	1,430,000
Previous maximum consumption	1,069,000		2,064,000*	

*Figured from the consumption of finished products, assuming a yield of 75 per cent from ingot to finished product.

Table XIV contains data regarding the ingot production of Japanese steel works from 1917 to 1921, which prove that, so far, the capacity of steel plants has not yet fully been utilized.

Table XV gives a survey of blast furnaces, open-hearth furnaces, Bessemer converters, crucible furnaces and electric furnaces in Japan, Korea and Manchuria.

Stagnation

To the crisis in prices a market crisis has been added, especially lately. The slight demand for merchant ships—in the first half of this year only 30,000 tons have been built—and the disarmament plans for the navy, together with general economic conditions of the country, have materially decreased the demand for steel, so that, on account of market conditions, operations had to be curtailed greatly. This, of course, again increased production costs and made the Japanese steel industry unable to compete with foreign countries. It is difficult for the Japanese steel industry today, as before the war, to compete with foreign producers on account of high coal and ore prices, to which now must be added the higher wages.

Particularly blast furnace plants have to suffer competition from Chinese and Indian furnace plants, which today are shipping pig iron to Japan at prewar prices. Especially Indian works are offering pig iron very cheap. Today's pig iron prices mean only losses for Japanese plants, which consequently do not attach great value to production, since with today's prices it is more profitable not to produce anything. According to the latest news the Toyo, Honkeiko and An-Shan works contemplate for the present stopping operations altogether.

Hence the Japanese steel industry just now is passing through a crisis. Many plants expended all their profits during prosperity, and did not pay enough attention to the creation of a reserve fund, so that some of them are in a grave condition. To surmount this crisis, it is necessary first to make a general price reduction in Japan, similar to that already done and still being done in England and America. This will make possible a lowering of coal and ore prices and a reduction in wages. Second, the plants must be improved technically. On account of the higher wages which, even with a reduction of the cost of all other commodities to prewar levels, never will go back to prewar scale, an endeavor must be made in the Japanese steel industry to substitute mechanical devices as far as possible.

Measures for Relief

How the industry will outlive the present crisis is difficult to predict. The iron industrialists are endeavoring to influence the Government to eliminate the losses, either by increasing the import duty or by granting a direct subsidy to the various works, and thus facilitate the transposition of the industry to new conditions. During the war, in 1916, the duty on finished products had been changed. In place of a duty schedule by weight, a schedule by value was introduced, which for merchant steel, plates, wire, etc., and other rolled products amounted to 15 per cent of the value.

Table XIV.—Steel Ingot Production in Metric Tons

Year	Open-Hearth and Bessemer	Electric Steel	Crucible Steel	Other Steel	Total
1917	757,787	3,439	11,476	430	773,132
1918	798,048	4,329	8,830	2,012	813,219
1919	820,301	3,670	6,608	516	831,095
1920	833,544	4,230	1,751	708	845,036
1921	835,905	5,021	2,516	169	843,611

Since it is of greatest importance to the Japanese Government to maintain the vitality of its steel industry, it is to be expected that something will be done. The Japanese steel industry may be compared with the former Austro-Hungarian steel industry. Since the latter could exist with a not-excessive protective tariff, it can be expected that the Japanese steel industry can exist without excessive import duties if mechanically perfected and working under normal living conditions as to prices of commodities and wages.

Labor Problems Increasing

In all other countries the labor question is today of primary importance, but Japan is yet an agrarian

*Translated from *Stahl und Eisen* of June 14 and 21, 1923, by Paul Cebrat, Perin and Marshall, New York. The first section, dealing with pig iron and its raw material and with imports, appeared at page 1317 of our Nov. 15 issue. The second, detailing the slow early growth of the steel industry prior to the World War, was published on page 1591 of our Dec. 13 issue. This instalment completes the series.

country. Industrialization has made great strides, particularly in the last few years, but has not yet been energetic enough to make Japan an industrial country. Table XVI represents the number of workers employed in Japanese industries from 1914 to 1919, according to the Annual Economic Report of 1921. It also contains data regarding wages, number of working days in the year and working hours per day.

Considering the total population of 73,000,000, it is evident that the working class, numbering 1,600,000, of which almost 50 per cent are female, has no great influence in public life. The universal equal right to vote is yet unknown and the voting privilege depends on holding certain properties, or rather relates to certain taxation. Women are entirely excluded from voting. Japan's working classes have, therefore, no representation of their own in public bodies.

The Japanese workman, sober, intelligent and willing, has a lower efficiency than the European or American workman, and does not know closed organizations. Labor unions are legally not recognized and membership in a labor organization was, until a short time ago, cause for dismissal. Union representatives now are tolerated only in very few plants. In spite of the persecutions which the members of unions had to suffer, the spreading of unionism could not be prevented. The repeated wage wars of recent years, caused by increases in the cost of living, and the example of successes of labor organizations in other countries, contributed to the idea of organization here gaining more and more ground. Nevertheless, the movement is yet in its infancy.

The relation between superior and workman is in general good; socially the workman is considered equal. If, on account of scarcity of work, labor has to be discharged, the workman usually receives a compensation related to the duration of his employment.

The management of the Kobe steelworks issued about the middle of August, 1922, a notice to its employees, according to which in case of discharge on account of scarcity of work the following amounts would be paid:

> It is stipulated by law that workmen to be discharged must receive 14 days' advance notice. If discharged without notice, wages for 14 days must be paid.
>
> Besides this legally fixed amount, the company allows workmen, discharged on account of scarcity of work, the following compensations:
>
> After having been employed by the Kobe steelworks up to 6 months, 20 to 25 days' wages; over 6 months to one year, 25 to 30 days' wages. After one year, up to and including 4 years of employment with the Kobe steelworks, the compensation increases for each year of service by 10 days' wages. For the fifth and sixth year 15 days' wages for each will be paid. For service during this time, an additional bonus of 15 days' wages. For each additional year of service up to and including 20 years, 20 days' wages will be paid, bonus 20 days' wages additional. After 20 years of service, 30 days' wages for each year and bonus 20 days' wages. The bonus is intended to take into account ambition or family conditions.
>
> According to these regulations for discharge a man after 15 years service would receive, including the legal 14 days, a compensation of 275 to 295 days' wages or approximately one year's earnings.

Other plants have authorized similar scales. These compensations have lately become of importance, particularly after the Government arsenals, which had to reduce their forces considerably on account of disarmament, paid similar and even higher compensations to workmen discharged. They have repeatedly been the cause of labor troubles. Some of the employees, particularly the workmen of the machine shops of the Kobe steelworks, were not satisfied even with that scale. They intended to strike one day as a demonstration, but the management closed the machine shops for 14 days.

In some works, as was the case only recently with the Sumitomo copper works, this compensation, after several years' service, amounted to a year's earnings. In most of the plants of larger size the workman pays every month a small portion of his wages into a savings bank, which is managed by the company for its salaried employees and the workmen.

With these savings and the compensation at the time of discharge the Japanese workman is able to bear easier the economic consequences of the discharge. The Japanese skilled workman, furthermore, endeavors to make himself proficient in more than one branch, so as to make it easier for him to find employment. All these circumstances contribute to the slow progress in organizing labor. But the ultimate reduction in wages, which must be accomplished, considering the necessary reduction in prices, will hardly be possible without struggles. How far these will influence the development of the unions can hardly be predicted.

Long Work Day

The work day in the steel industry is yet as a rule the 12-hr. day with alternating shifts. The workmen, however, are demanding an 8-hr. day, but this has been granted so far only in sporadic cases. The Kawasaki Dockyard Co., Kobe, a few months ago instituted the 8-hr. day. In other industries and in branches of the steel industry working only single shifts, the day turn is 9½ hr. Only the silk industry retains the 10-hr. day as a rule. In the steel industry Sunday is commonly a day of rest; in other industries, work usually goes on over Sundays. In this case two days of rest are granted the workmen in each month, as a rule the first and fifteenth. The number of work days per year is, therefore, greater

Table XV.—Summary of Furnaces

Capacity, Tons	Blast Furnaces, Number in Japan	Korea	Manchuria
300	1	..	..
270	2	..	..
250	1	..	..
230	2	..	..
215	1	..	..
150	1	2	..
130	..	..	2
120	2	..	..
100	3	..	..
80	1	..	..
50	2	..	..
35	1	..	..
30	2	..	..
25	4	..	..
20	11	..	2
18	1	..	..
15	3	..	..
12	1	..	..
10	1	..	..
7	2	..	..
5	14	..	..
Total	56	2	4

Capacity, Tons	Open-Hearth Furnaces, Number in Japan	Korea
60	4	..
50	8	2
40	1	..
25	52	..
15	13	..
10	7	..
8	7	..
7	3	..
6	2	..
5	6	..
4	1	..
3	1	..
Total	105	2

Capacity, Tons	Bessemer Converters Number
10	2
2.5	3
2	5
1.5	2
1	1
0.95	1
0.9	1
0.8	1
0.7	1
0.5	2
Total	18

Crucibles, Number	Electric Furnaces—Pig Iron and Ferroalloys	Steel
51	102	42

Total annual capacity open-hearth furnaces—1,500,000 tons.
Total annual capacity blast furnaces over 100 tons—1,650,000 tons
Total annual capacity all blast furnaces—1,250,000 tons.

Table XVI.—Number of Industrial Workers
Government Industries

Year	Number of Workers		Daily Wages, Yen		Working — Days per Year		Working — Hours per Day	
	Male	Female	Male	Female	Male	Female	Male	Female
1914	106,184	33,003	0.64	0.28	315	301	10.1	9.5
1915	128,675	37,167	0.70	0.31	314	301	10.8	9.9
1916	131,251	36,389	0.71	0.32	309	306	10.6	9.8
1917	118,300	31,376	0.78	0.34	307	295	10.5	9.2
1918	123,087	36,349	0.89	0.39	306	296	10.4	9.6
1919	122,484	41,037	1.10	0.54	314	302	10.3	9.5

Private Industries

Year	Number of Workers — Adults		Number of Workers — Juvenile		Average Daily Wages in Yen — Adults		Average Daily Wages in Yen — Juvenile		Working — Days per Year	Working — Hours per Day
	Male	Female	Male	Female	Male	Female	Male	Female		
1914	313,667	535,297	40,286	17,209	0.54	0.26	0.19	0.14	299	11
1915	350,967	559,823	39,240	11,631	0.56	0.26	0.22	0.16	289	11
1916	458,632	636,669	48,723	13,516	0.57	0.28	0.23	0.18	304	12
1917	567,844	713,120	58,236	17,315	0.67	0.33	0.29	0.21	304	11
1918	646,115	763,081	74,190	21,315	0.92	0.48	0.46	0.23	301	11
Of these latter, the machine industry, which includes iron and steel, shows:										
1918	272,610	18,296	23,567	3,701	1.14	0.48	0.43	0.33	306	10.5

than 300, in spite of the legal and religious holidays.

Since the representative of the Japanese Government at the labor conference in Washington in 1919 signed the agreement made at this conference, it is to be expected that in Japan, too, the 8-hr. day will some time be generally adopted. This agreement, however, has so far not been ratified by the Japanese Government. The present Government is of the opinion that, on account of changed conditions all over the world, it would not be advisable for Japan to ratify this agreement yet, since the majority of the other powers which signed the agreement in Washington have not yet concluded its ratification.

The age limit for juvenile workers is fixed at 12 years; for night work, workers below 15 years can not be employed at all.

Benefit Organizations

Sickness and accident insurance, regulated by law, has not yet been introduced, but a number of works have their own accident and sick benefit organizations. Where no such organization exists, the men receive in most cases during sickness half their wages.

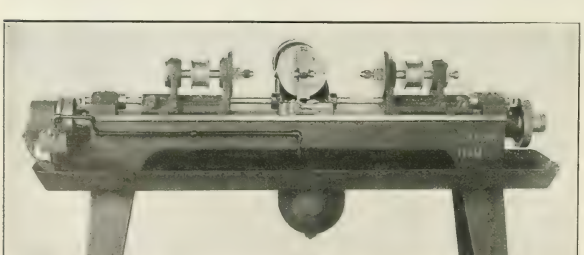
Employment agencies have been organized by the city governments of the larger cities. Government inspection of industries, which will supervise working places and industrial shops in regard to sanitary and safety equipment, is, like many other things, in the development stage.

It is to be expected that the Japanese steel industry will develop, as in the past, in an ascending curve. Even the present depression will be surmounted.

Charles M. Schwab, who heads the committee of business men which is enlisting special subscriptions to the Harding Memorial Fund, has announced a contribution of $25,000 received from the American Iron and Steel Institute.

Duplex Horizontal Drilling Machine

The Garvin Machine Co., New York, has brought out a duplex horizontal drill designated as the No. 0, which is arranged with cam feeds to the heads and an automatically-operated air chuck, for the rapid drilling of small parts.



Duplex Horizontal Drill With Cam to the Head and Automatically-Operated Air Chuck, for Rapid Drilling of Small Work. Two sets of change gears and cams are provided to give production of 11 or 16 pieces a minute

The general construction of the machine may be noted from the accompanying illustration. The heads work longitudinally along the bed by cam action and a spring in each head serves to keep the cam roller against the cam. The piping for the air operated chuck may be seen along the front of the machine, the air valve being at the left, as shown. The drilling spindles are mounted on ball bearings and may be operated at speeds up to 3000 r.p.m.

The machine is equipped with two sets of cams and change gears, one set giving a production of 11 pieces a minute and the other 16 pieces a minute. The machine may be adapted also to operations other than drilling.

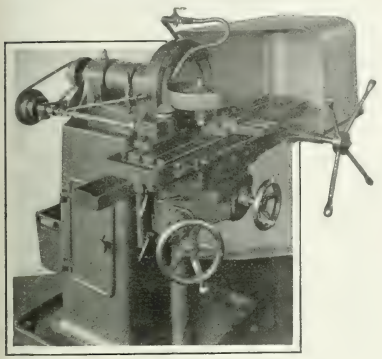
Freyn, Brassert & Co., engineers, Chicago, have been appointed consulting engineers in connection with the installation of a dock and ore-handling machinery, as well as the remodeling of one of the existing blast furnaces, at the plant of the Tonawanda Iron Corporation (American Radiator Co.), North Tonawanda, N. Y.

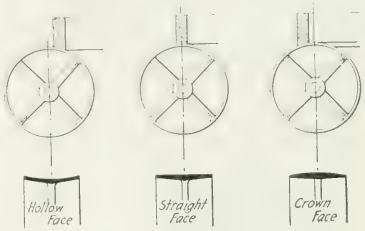
PULLEY GRINDING MACHINE

Finishes Straight or Crowned Pulleys from the Rough After Hole Has Been Chucked

The grinding machine illustrated, for finishing the face of a pulley from the rough after the hole has been chucked, has been placed on the market by the Graham Mfg. Co., Providence. The faces may be ground straight, crowned or hollow.

The capacity and limits of the machine are not definite. The arbor and splash pans accommodate pulleys up to 24 in. in diameter, and a width of face up to 6 in. is considered reasonable. The capacity is increased by lengthening the cross feed shaft and extending the splash guards. Although the field of the machine is in finishing pulleys of 4 to 20 in. in diameter, variety is indicated in the capacity to grind pulleys 6 x 6 in., and 30 x 6 in. of standard design. Light pulleys with small holes—for example, one of 16 x 2½ x ⅝ in. hole weighing 10 lb.—are said to be finished as readily as those of standard design. Segments, external cams and other irregular peripheral surfaces may also be ground. For incomplete circumferences or work without holes a general utility plate, which engages the driving burr is employed.





Grinding Machine for Finishing the Face of Pulleys From the Rough After the Hole Has Been Chucked. Segments, external cams and other irregular surfaces may also be ground. The outstanding feature is the driving burr which rotates the pulley being ground. The various settings of the pulley and abrasive ring for different faces are shown above

The grinding is done on the edge of a cup or ring wheel abrasive, which is mounted on a horizontal spindle. The pulley is held by a stationary vertical arbor and is free to revolve around, and up and down, upon it. It is rotated, as well as supported by a small cone-shaped driving burr located at the rim of the pulley and as nearly as possible under the down thrust of the abrasive ring. The pulley rotating mechanism and the vertical arbor are mounted upon a heavy table which can be moved in all directions. The driving burr receives its motion from a worm gear and worm, driven through cone clutch and universal joint mechanism from the rear end of the main spindle.

The construction of the machine may be noted from the illustration. The main elements are the column, the knee supporting the table in front, and the head, which is bolted on top of the column and carries the main spindle. A pressed steel chuck, or abrasive ring holder, is mounted on the front end of the spindle, as shown. The abrasive ring is 12 in. in outside diameter, 3 in. deep, and runs about 1500 r.p.m. The construction of the ring holder permits the ring to be set out as it wears off, by an adjustment nut, until about ⅝ in. is left. The entire chuck may be readily removed for changing abrasive rings. The spindle is mounted in taper roller bearings and end-play is said to be eliminated by mounting the rear bearing in a sliding sleeve, which by means of a spring exerts a pressure of 125 lb., keeping the front bearing tight in its seat.

The arrangement of the knee on the column which supports the table is similar to that of a milling machine, the method of raising and lowering the knee and the cross feed arrangement being similar also. The table is adjusted endwise by a pilot wheel, which is necessary in cases where the machine is used for straight flat work. The abrasive ring holder is surrounded by a cast-iron guard for wet grinding, and the knee supports a large hood and a trough that returns the water to the tank. Provision is made for attaching auxiliary splash guards.

In beginning operations the vertical pulley arbor and the driving burr are brought into proper relation with the abrasive ring. To produce an even crown, the middle of the face must be on the level with the center of the main spindle. The vertical arbor is located in front of the rim where the cutting takes place; for a crown, it is set a little nearer the center of the ring and grinding begins on the inside corner, but it will wear back until the whole face becomes concave. The various settings of the pulley and abrasive ring for hollow, straight and crown face, respectively, are shown in the line illustration. The abrasive ring has contact across the entire width of the pulley, regardless of the shape of the face. The speed of the face of the pulley being ground is from 50 to 250 ft. per min., depending upon the condition of the casting, and the hardness and grain of the abrasive ring, and finish required.

That the pulley may be put on and taken off without any obstruction, is emphasized as of great importance in high speed production. The rigidity of the arbor is also a feature claimed.

The outstanding feature of the machine is the driving burr, which is only 4 to 5 in. above the table and consequently rigid. It is said never to fail to rotate the pulley, is not in the way and does not require attention. The driving burr may be placed either inside or outside of the rim, but should be as nearly as possible under the down thrust of the abrasive ring.

The machine requires 10 hp. to drive it at a maximum capacity. The weight is 2000 lb. and the floor space occupied about 6 ft. x 6 ft.

T. Y. Olsen, vice-president of the Tinius Olsen Testing Machine Co., Philadelphia, was the speaker at the December meeting of the Cincinnati Chapter, American Society for Steel Treating, Dec. 13. His address dealt with the development of testing machinery and was illustrated with lantern slides. The speaker for the January meeting, to be held Jan. 19, will be Prof. H. M. Boylston, Case School of Applied Science, Cleveland, on the subject, "The Microscope as Applied to Heat Treating." At the February meeting, to be held Feb. 14, the speaker will be Prof. H. F. Moore, University of Illinois, and the subject, "The Fatigue of Metals."

Electrical Steel-Mill Development in 1923

Extension in Use of Motor Drive for Main Rolls—Largest Geared Drive Is 6250 Hp.—Highest Induction Motor Voltage Now 13,200

At the Buffalo annual convention of the Association of Iron and Steel Electrical Engineers the annual report of the electrical development committee was presented by the chairman, Walter C. Kennedy, operating engineer Worth Steel Co., Claymont, Del.

Pointing out that electrical developments naturally take some time to reach a stage of successful, practical use and that, consequently, each successive annual report has a certain amount of overlapping, due to the gradual introduction of various devices, this report is divided into a series of topics. These include the main drive, power house equipment, circuit breakers, electric heating, lightning arresters, static condensers and miscellaneous equipment. Of principal interest are the topics of main drive and electric heating. What the report has to say on these subjects is abstracted in the following paragraphs.

Main Drive Equipment

Since the first installation of this kind the list has been growing rapidly and this year is no exception. Among the interesting features three are of particular prominence—the larger number of motors replacing steam engines; the extent to which gears have been used; the use of direct current exclusively on several adjustable speed applications. Economy of operation is causing rapid replacement of steam-engine-driven equipment. The growth in this line has been phenomenal since the first electric drive for a reversing mill, ordered in 1917, was put in operation by the Lackawanna Steel Co. in 1921.

New Main-Drive Electric Power Installations

Item	Company	Hp.	Volts	R.p.m.	Mill	Connected
1	American Rolling Mill Co. (2)	2000	*6600	595	Rolling	Gear
2	American Rolling Mill Co. (2)	600	*2200	885	Rolling	Gear
3	American Rolling Mill Co. (2)	500	*2200	575	Rolling	Gear
4	American Rolling Mill Co. (4)	400	*2200	575	Rolling	Gear
5	American Rolling Mill Co. (10)	300	*2200	575	Rolling	Gear
6	Atlas Steel Corporation	700	240dc	135/360	10-in. Merchant	Direct
7	Bethlehem Steel Corporation	7000	700dc	0/120	40-in. Blooming	Gear
8	Bethlehem Steel Corporation	5000	†2200	750	10-in. Bar	.....
9	Buckeye Rolling Mill Co.	1000	*4000	720	18-in. Rail re-rolling	.....
10	Calumet Steel Co.	400	*4000	585	Slitting stand	Gear
11	Columbia Steel Co.	1500	*2200	360	Sheet	.....
12	Columbia Steel Co.	1800	2200	514	Rod	.....
13	Dilworth, Porter & Co.	700	*2200	390	18-in. Bar	Gear
14	Firth-Sterling Steel Co.	550	250dc	120/300	10-in. Merchant	Direct
15	Follansbee Brothers Co.	500	*2200	442	Cold Sheet	Gear
16	Ford Motor Co.	8000	13200	240	Blooming	Direct
17	Ford Motor Co.	4500	500dc	67½/110	14-in. Merchant	.....
18	Halcomb Steel Co.	624-200	*440	321/107	9-in. Merchant	.....
19	Halcomb Steel Co.	500–250	*440	130/65	14-in. Merchant	.....
20	Illinois Steel Co.	5000	†6600	370	132-in. Plate	Gear
21	Illinois Steel Co.	5000	†6600	370	90-in. Plate	Gear
22	Inland Steel Co.	6250	†2200	368	24-in. Cont. billet	Gear
23	Inland Steel Co.	1500	†2200	368	Sheet bar finish	Gear
24	Inland Steel Co.	4500	†2200	300/500	.....	.....
25	Inland Steel Co.	1500	1500dc	67½/110	14-in. Merchant	.....
26	Jones & Laughlin Steel Corporation	5750	†6600	94	18-in. Billet	.....
27	Jones & Laughlin Steel Corporation	5750	†6600	94	21-in. Billet	.....
28	Knoxville Iron Co.	800	*2200	900/720	9-in. Merchant	.....
29	Metal & Thermit Corporation	1300	*4000	360	Sheet	.....
30	Michigan Steel Co.	1500	†4600	300	Sheet	.....
31	National Stamping & Enameling Co.	3000	*2200	235	100-in. Plate	Gear
32	Newton Steel Co.	2000	*2200	234	Sheet	Gear
33	Newton Steel Co.	300	*2200	340	Cold sheet	Gear
34	Otis Steel Co.	6500	.....	0/120	40-in. Reversing blooming	Direct
35	Otis Steel Co.	1800	†6600	500	20-in. Strip	.....
36	Otis Steel Co. (3)	1500	600dc	280/420	20-in. Strip	.....
37	Otis Steel Co. (3)	1800	600dc	115/230	20-in. Strip	.....
38	Otis Steel Co.	2000	†6600	375	24-in. Sheet bar	.....
39	Otis Steel Co. (5)	375	230dc	430/860	Cold strip	Gear
40	Otis Steel Co.	350	†2200	242	Cold strip	Gear
41	Phoenix Iron Co.	3000	600dc	0/485	24-in. Structural	Gear
42	Phoenix Iron Co.	2500	*2200	500	22-in. Bar	Gear
43	Pittsburgh Crucible Steel Co.	2500	†6600	150	Billet	.....
44	Standard Underground Cable Co.	300	*2200	575	Rod	Gear
45	Takata & Co.	1000	*2200	293	Sheet	Gear
46	Timken Roller Bearing Co.	800	230dc	410/720	16-in. Roughing	Gear
47	United Alloy Steel Co.	360	230dc	300/600	Merchant	Direct
48	Youngstown Sheet & Tube Co.	2600	*2200	234	Sheet	Gear
49	Youngstown Sheet & Tube Co.	400	†220	375	Tube	.....
50	Youngstown Steel Co.	1200	*2200	505	29-in. Roughing	Gear
51	Youngstown Steel Co.	1500	*2200	705	24-in. Finishing	Gear
52	Washburn Wire Co.	1000	*2200	710	20-in. Blooming	Gear
	COPPER AND BRASS MILLS					
53	Am. Insulating Iron & Cable Co.	600	*440	360	.....	.....
54	Am. Insulating Iron & Cable Co.	600	*440	900	.....	.....
55	American Brass Co.	500	*2200	600	.....	.....
56	Taunton New Bedford Copper Co.	500	*2200	600	.....	.....
57	Western Cartridge Co.	600	*2200	514	.....	.....
58	Western Cartridge Co.	500	*2200	514	.....	.....
	FOREIGN					
59	Cia Siderurgica del Mediterraneo	5000	700dc	0/120	40-in. Blooming	Direct
60	Cia Siderurgica del Mediterraneo	3750	700dc	0/150	24-in. Structural	Direct
61	Cia Siderurgica del Mediterraneo	5000	†5250	735	36 x 111-in. Plate	Gear
62	Consolidated Rolling Mills, Mexico	300	‡3000	750	16-in. Merchant roughing	.....
63	Consolidated Rolling Mills, Mexico	500–250	‡3000	750/375	10-in. Merchant finishing	.....

NOTE: Numbers in parentheses after company names show number of drives.
*60-cycle current. †25-cycle current. ‡50-cycle current.

This rapid increase in the use of electric drive is attributed to three causes—increasing cost of coal and, therefore, steam; increasing availability of reliable purchased power; developments in gear drive. All these developments have been gradual, but it is now recognized that in many cases a steel plant can buy power cheaper than make it and can get it with sufficient reliability for steel mill service.

Regarding gear drive, purchased power is in nearly every case of 60 cycles. For main roll equipment, 60-cycle power means practically a gear reduction, and here is seen one great development in this art which has required several years to accomplish. At one time gear reduction on a main roll mill drive was a questionable point, but now this form of drive, through its development, has become so reliable that there is no further question as to its use for this service. In many cases the flywheel is directly mounted on the motor shaft and the gear reduction, therefore, has to stand severe shocks of rolling. Even these equipments have given good success and, therefore, the success of the gear drive has really helped to a large extent to increase the number of motor applications through the use of purchased 60-cycle power.

Items 7, 14, 20, 21, 23, 41, 42 and 52 replace steam engines. Operators are realizing more and more that they cannot afford to keep these old steam engines in operation. It is not uncommon, from saving of attendance, maintenance and repairs, to more than pay for the fixed charges on the electrical installation, leaving a saving in power consumed as sure profit.

Items 20, 21, 22, 31, 41 and 61 are of interest as being geared drives of large capacity. The 6250-hp. installation for the Inland Steel Co. will be the largest geared drive in this country. It was formerly the practice to connect the driving motor directly to the lay shaft on continuous mills. On late installations, however, most of the drives are geared.

Items 7, 41, 59 and 60 are drives of the Ilgner type, consisting of direct current motors supplied with power from flywheel motor-generator sets. The drives for the Cia Siderurgica del Mediterraneo at Sagunto, Spain, are only part of a large order including all electrical equipment complete for these mills, rotary converters, auxiliary motors, control and switching apparatus. The 24-in. structural mill drive for the Phoenix Iron Works is of the Ilgner type, although it will not be reversed in ordinary operation. This type of drive allows the operator to slow the mill down to enter a piece, and then finish at a high speed, thus increasing the tonnage materially. All previous installations of this type and size have made use of direct connected motors.

During this year the largest a. c. and single-unit d. c. motors for operating main rolls have been purchased by the Ford Motor Co., items 16 and 17. The former is an 8000-hp., 240-r.p.m., 13,200-volt, slip-ring induction motor, which will be used to drive an interrupted continuous blooming mill built by the Morgan Construction Co. Incidentally, this is the first steel mill induction motor operating at a voltage exceeding 6600. The single unit d. c. motor is rated 4500-hp., 67½ to 100 r.p.m., 500 volts, and will be used to drive a 14-in. merchant mill.

Direct current power for this motor is supplied by two 2000-kw., 250-volt synchronous motor generators, the two generators being connected in series to give 500 volts for the motor armature. The synchronous motor driving the 2000-kw. generator is rated 2800 kva., 8 pf., 13,200 volts. Excitation for the synchronous motor and d. c. motor fields is obtained from a third 2000-kw., 250-volt motor-generator, which also supplies some power for auxiliary motors. A fourth duplicate motor-generator is held as a spare.

The largest induction motor with Kraemer system of speed regulation was also purchased during the year by the Inland Steel Co., Indiana Harbor, Ind., item 24. This motor, which will drive a 14-in. merchant mill, is rated 4500 hp., 300 to 500 r.p.m., 2200 volts, 25 cycles.

Electrical equipment for driving the 30-in. reversing universal skelp mill at the plant of the Youngstown Sheet & Tube Co., which was reported last year, has been installed and is now in operation. This motor replaces a twin simple reversing engine and its performance so far indicates that, when the additional continuous reheating furnaces are completed, the tonnage records made by the engine will easily be exceeded. The roll motor is a double-unit motor, rated 4000 hp. continuously at 80 r.p.m. and 11,500 hp. maximum at 75 r.p.m. The maximum speed is 135 r.p.m. The flywheel set consists of a 2500-hp., 6600-volt, 25-cycle, 500-r.p.m. induction motor, two 1800-kw., 650-volt d. c. generators and a 78,000-lb. steel plate flywheel.

The equipment for the Halcomb Steel Co., items 18 and 19, is of interest in that it covers the first polyphase brush shifting a. c. motors for main roll drives. This type of motor has been developed and applied to other work, as was previously recorded in the 1922 report, but the above installation is the first one being applied to mill drives. Speed control is obtained by two sets of brushes whose relative position on the commutator is altered by means of a motor-operated brush shifting mechanism. This motor has characteristics practically identical with the double-range Scherbius equipment and fills a long-felt want for an adjustable-speed a. c. drive where the power required is too small to make Scherbius or Kraemer apparatus feasible on account of the high initial cost of very small installations.

As mentioned in last year's report, the tendency toward simplicity of apparatus is still very pronounced. Instead of using complicated arrangements or special a. c. motors for speed variation, the tendency still seems to be toward the installation of d. c. drives, of variable speed motors and motor-generator sets.

Electric Heating

The use of electric heating in the iron and steel industry is still continuing to show advancement and development along some novel lines. We have ordinarily considered that electric power for this service in the steel plant has been applied or is more adapted toward making steel in some form of the electric-arc furnace. However, some new applications along this line have come to the front during the past year.

An adaptation of electric heating on finishing rolls of sheet and tin plate mills has been described by Gordon Fox.* The purpose of such heat is to prevent roll breakage and, from all accounts from the results obtained, it has been successful. The principle is one which no doubt would be well adapted to other cases. The method is new, convenient and economical. The application and operation can be so governed as to offer considerable possibility for decrease in roll breakage.

Electric Steam Boilers.—There has also come to our attention this year an important and interesting application of electric heat for generating steam by electricity. The electric steam boiler or generator is not exactly new, having been used in various parts of Europe for several years, but its development in this country has been within only the last two years and the last year especially has seen large units heretofore not conceived possible or practical. The development in this country has so far exceeded that of any European practice and has occurred along such novel lines that boilers are now being produced which are to be found nowhere else in the world. The electric steam generation has been particularly adaptable where large amounts of power are produced or purchased and where the question of load factor is of prime importance. While ordinarily it would be assumed that they would be of particular service on purchased power, still the developments are now showing that their use is increasing even where electric power is generated at the plant, especially where it is economical or advantageous to keep the load factor constant.

At Berlin, N. H., the Brown Co. has recently installed one three-tank boiler, operating at 22,000 volts, 3-phase, 60-cycle. This boiler is rated at 1800 kw., or approximately 1800 bhp., producing 54,000 lb. of steam per hour. The Brown Co. generates its own power from a hydro-electric power station and trans-

*Paper abstracted on page 974, Oct. 11.

mits it to the mills at 22,000 volts, the boiler operating directly on this voltage without the necessity of transformers. The equipment is intended to operate only on Sundays and other holidays, so that an operation of approximately 60 days per year has justified its cost and use.

Another boiler being installed by the same company, rated at 8000 kw., 2200 volts, 2-phase, 60 cycles, is intended to operate during the week to absorb surplus power. Indications seem to be that there will be a wide field of use for these electric boilers where surplus power from fluctuating loads is available.

Electric Furnaces.—A new type of induction furnace has recently been developed and brought to such a state of perfection that it should be of interest. Known as the Ajax-Northrup high-frequency induction furnace, it differs in principle from the ordinary induction furnace in that no iron core is used. This furnace has an air transformer whose primary is the furnace coil and whose secondary is the melt or the conducting crucible containing the melt. Such a transformer is, of course, not effective with a current of 25 to 60 cycles, but is supplied with a frequency of several thousand cycles per second by means of a special high-frequency converter.

The converter consists of a special transformer with internal reactances and discharge gap with the necessary instruments, etc., which gives a frequency of approximately 15,000 cycles per second. The above furnace is of small capacity, approximately 20 kw., and, therefore, used mainly for laboratory or research work where high temperatures of 2000 to 2500 deg. C. (3632 to 4532 deg. Fahr.) are required. Many steel plants are finding this furnace of great service in their research or metallurgical laboratories for investigation of alloy steels or similar work.

Resistance furnaces still continue to improve and are being used regularly on vitreous enameling processes which require a higher temperature than that previously obtained with this type of furnace.

High-temperature heating elements for installation in modified fuel-fired furnaces are under development.

Discussion

In discussing this report, Gordon Fox, electrical engineer Freyn, Brassert & Co., Chicago, pointed out that in the heating of sheet mill rolls, the question of saving of roll breaking takes secondary place compared with the problem of getting the rolls into proper condition for their work.

Graphite for Steel Melting Crucibles

Tests of American Graphite in Competition with That from Ceylon and from Canada Indicate That Native Product Is Satisfactory

IN a preliminary report by R. T. Stull and G. A. Bole of the Bureau of Mines on an investigation, conducted by the bureau into the properties of American graphite for use in crucibles, are described the results of foundry tests on specially prepared steel-melting crucibles. Tests have been carried on to determine the effect of substituting Canadian and Alabama graphites for Ceylon graphite in varying proportions. The data indicated that Alabama graphite is superior to Canadian graphite and, further, that Alabama can be substituted for Ceylon graphite to a large measure without lowering the quality of the ware. These tests were made on No. 70 size brass melting crucibles and were carried out under foundry practice. An attempt was made to modify the nature of Alabama graphite by heat treatment so as to resemble Ceylon graphite. Little advantage from the treatment was reported.

Experimental work proceeded along two lines: A study of bond clays for steel-melting crucibles and for brass-melting crucibles. Twenty-one sets of standard-size crucibles were made up of a body containing Ceylon graphite as standard, bonded with 21 bond clays. These tests were carried out under foundry practice, as were the former tests. Three domestic clays proved to be superior to the standard Klingenberg clay, formerly used in brass-melting practice, while, in the steel-melting industry, 13 domestic clays gave service superior to Klingenberg clay.

Testing the Graphites

In the final phase of the investigation, the bond clay mix which gave the best service in the above tests was adopted as a standard. Using this bond clay mix, steel-melting crucibles were made up from bodies containing five domestic and two imported graphites. The graphites tested were from Alabama (A), Canadian (K), Ceylon (C), Madagascar (R), Montana (M), New York (N) and Texas (T). When available, Ceylon graphite has been preferred by the crucible makers, with Madagascar next in order.

The body mix used in making up the crucibles included the graphite to be tested (50 per cent), Missouri washed pot clay (27 per cent), Kentucky ball clay No. 4 (13 per cent) and sand (10 per cent).

The first tests were run at a large foundry in the Pittsburgh district which was melting tool steel. The pots used had been made up and stored for more than 18 months and were dried with special care. They were stored behind the furnaces prior to starting the tests and were later put well back on the melting floor and moved up toward the furnaces each day. This was plant practice. As all the crucibles tested spalled badly, the test was discontinued. In seeking to account for the spalling, it was thought that the difficulty must have been due to rehydration of the body after 18 months' storage.

The remaining pots were accordingly reburned to 700 deg. Cent. and new C and T sets made up and burned. This presumably gave the C and T sets a slight advantage over the others in the subsequent tests, as some graphite is burned out during the firing. The later tests did not seem, however, to substantiate this assumption. The crucibles were finally tested at a large manufacturing plant in the East, melting tool steel. The pots were shipped immediately after baking and put in the driers at a temperature of 110 deg. Fahr., where they remained one week.

All test pots were thicker walled by ¼ to ⅜ in. and thicker bottomed by ½ in. than the commercial pots. The tests were run in the ordinary type of producer-gas fired, regenerative furnace, in which the direction of the gas was reversed every 30 min. The furnace was in good repair. The flames played directly on the pots, thus producing severe spalling conditions for the cold pots when first set. The furnace was said to operate at 2800 to 3000 deg. Fahr.

Each set of six crucibles was set in one pit. In addition to the seven graphites mentioned, the commercial pots used at the plant were added to the test. The plant was getting a service of six to seven heats from crucibles—the practice was to run a set of pots six heats and to permit them to cool. If upon examination they were found to be in fair shape, they were set aside and used to replace pots that failed to stand six heats. If there was an accumulation during the week, they were set in the furnaces Saturday morning for an additional heat. The charge consisted substantially of Swedish and American iron and selected scrap, together with the alloy. To this charge was added brick dust for slagging and charcoal in appropriate amount.

The crucibles were charged with 100 lb. of metal and placed on the melting floor near the furnaces for 4 hr. before going into the pits. The six pots were

placed in the furnaces in about 1 minute and all drawn in about 2 minutes. The pots were recharged hot, being out of the furnaces between heats about 6 minutes. They were hand poured into ingot molds and recharged without using a collar. During this operation, the crucibles had fallen in temperature to a very dull red or black.

The life of the pots, together with the average time required for a melt and the cause of failure of those used in the steel foundry tests are shown in the table.

Observations During the Test

Analysis of the steel after the first melts showed that the T and A series carbonized the steel less than did series C. It was more difficult to melt the steel in all of the pots of the test series than in the commercial pots, due, in part, at least, to their low carbonizing effect. This condition was so pronounced that 4 oz. of charcoal were introduced with the charge during the subsequent tests, to bring the melting time to about the same as that of the commercial pots against which the tests were run. If this had not been done, a higher temperature would have been maintained in the furnaces to finish a melt in the customary time; on this account the melters stated that the pots were more refractory than those being used. The so-called "refractory" character of the crucibles under test was due in greater part to the bond clays used than to the graphites, as Ceylon graphite was used in the commercial pots as well as in one set of the pots under test. Series T, A and C were particularly refractory.

The chief metallurgist was well pleased with the low carbonizing effect of the pots, since it is possible to produce a steel of more nearly the desired analysis if the pot carbonizes the charge to a small extent. The crucibles resembled clay pots somewhat in this respect.

The K crucibles softened and were cut badly by flame. This condition was noted even before the charge was melted. At the end of a melt a decided fusion had started and upon removal from the pit, masses of slag and coke adhered to the bottoms and sides of the pots. The M series showed small cracks when set in the pits. These cracks later opened up, thus rendering them too dangerous for resetting.

Data on the Tests

Series	No. of Heats	Average Heats	Average Time Heat Hr.	Min.	Failure
T	All pots 7 4 pots 8	7.67	3	32	Cut deeply at wash line and worn thin generally
A	All pots 7 1 pot 8	7.17	3	36	Work fairly thin, some scaling.
C	All pots 7	7.0	3	56	Considerable scaling, thin at wash line, could not carry metal
R	All pots 7	7.0	3	39	Worn thin generally, too thin to carry metal
N	All pots 6	6.0	3	36	Walls too thin, body weak
K	All pots 1	1.0	4	11	Cut badly by flame, parts slagged away and softened, surface of walls pasty
M	All pots 1	1.0	4	18	Old and new cracks opened up

Summary

All factors being taken into consideration, the graphites gave service in the following order: T, A, C, R, N, M, K. Two of the series under test gave somewhat superior service to the commercial pots. The T and A series, in addition to a longer life than the commercial pots, have an advantage in that they carbonize the steel to a lesser degree.

It is realized that a larger number of pots in each series, and an extension of the tests to include several types of charge, would have given a truer average of service, but in so far as the tests are conclusive, they indicate that a superior steel-melting pot can be made from American graphites bonded with American clays.

Fifteen waste-heat boilers, each with a capacity for developing 450 hp., will be installed in connection with the open-hearth steel department of the Carnegie Steel Co., at its Farrell, Pa., works. Blast furnace gas will be fed the boilers and a large annual saving in coal consumption is expected. Power derived will be used for rolling mill operations.

SELLING STEEL ABROAD

World-Wide Distribution Policy Not Conducted by Manufacturers

WASHINGTON, Dec. 18.—With but few exceptions, American iron and steel manufacturers have not conducted a world-wide distribution policy, nor have they concentrated on any special field, says Director Julius Klein of the Bureau of Foreign and Domestic Commerce, Department of Commerce, in his annual report which has just been made public. This comment is made in connection with the activities of the Iron and Steel Division, of which Luther Becker is chief.

It is now generally conceded, Mr. Klein points out, that foreign trade is essential to balance domestic commerce. Moreover, he states that it is acknowledged that foreign markets must absorb a considerable part, perhaps as much as 15 per cent, of the country's steel production, which has been enlarged during and since the war until it represents a theoretical ingot capacity of 52,000,000 gross tons.

Dr. Klein at this point says: "Among the countries of the world the United States leads in the highly specialized production of its iron and steel industry. The result is mass production of quality goods at a unit cost which gives American manufacturers their opportunity in the markets of the world. Specialization in world-wide distribution, however, has not followed apace, and it is in this field that the United States loses its advantage, gained through quantity production, to its European competitors who have developed this phase of foreign commerce to a marked degree."

It was further stated by the director that recognizing from experience that the proper time to go after export trades is when business is good at home, the division used this fact to advantage during the past year. Certain markets of the world were pointed out in which there was no American representative whatever, and others where American trading interests are inadequately looked after.

"The attention of the industry was called to the advantages resulting from the necessity of transshipping goods in foreign bottoms in order to reach certain foreign ports," said Dr. Klein. "A plan was suggested whereby American representation in such markets could be effected to advantage. The existence of special lines of trade in certain markets where business has been completely absorbed by our competitors was brought to the attention of American exporters. The division's outline, prepared at the commencement of its activities, to guide the Government's foreign representatives in their search for useful information, was productive of excellent results. Much of the material submitted was used in the campaign to stimulate among American manufacturers a broader and increasing interest in the iron and steel trade of the world.

"That the iron and steel division has succeeded in its efforts to enlist a larger number of American manufacturers of iron and steel commodities of all descriptions is obvious from the extraordinary growth in inquiries on foreign trading matters received during the year. For the week ended Oct. 22, 1921, just 20 inquiries on iron and steel subjects were answered by the bureau in Washington and its seven district offices in the United States. In one of the last weeks of the fiscal year 1921-22—that ended May 27—the inquiries answered totaled 420. As the year 1922-23 progressed, inquiry increased rapidly, doubling the best record of the previous year in the week ended June 16, when 860 inquiries were received and answered."

Dr. Klein says that the exporters' index now comprises more than 300 American firms which are actively engaged in foreign trade. Much stress was laid on the effectiveness of personal contact, wherever feasible, between the inquirer and the divisional personnel. This was accomplished through frequent visits of the chief of the division to the leading exporting centers and interviews in the bureau with visiting exporters. Near the close of the year Maurice H. Bletz joined the staff of the division and rendered valuable service, particularly in answering inquiries relative to Latin American markets, where he had for seven years sold American iron and steel and other engineering products.

SANITARY PIPE REVIVES

Demand Increases as Year Closes—More Activity at Anniston Plants

BIRMINGHAM, ALA., Dec. 17.—Anniston, Ala., 60 miles east of Birmingham, is known as the largest cast iron sanitary pipe and fittings manufacturing center in the world, the 14 plants in the city being able to produce more soil pipe than any other place. Practically all of the iron melted at that place comes from Birmingham or the immediate Birmingham district, though there is a blast furnace in Anniston. As with the sanitary pipe business throughout the country, the year just coming to an end had its fat seasons and the lean. For three months there was spasmodic operation, lagging production and so on, but at no time in 1923 were all the plants in Anniston shut down nor was the idleness of long duration.

Gadsden, 50 miles northward from Birmingham and less than 35 miles from Anniston, boasts of its production of sanitary cast iron pipe and fittings, having several pipe shops there. North Birmingham and East Birmingham, in the city limits of Birmingham, and Bessemer, 12 miles south of Birmingham, have numerous pipe shops. These, too, had active operations during the year and some had dull periods, shutdowns intermittently, but all doing more or less.

Warehouses and yards in Anniston carry considerable sanitary pipe and fittings, but as the year comes to an end there is a recuperation and, on the whole, a favorable year will be rounded out. Prices in the last four weeks went up five points, standard sanitary pipe selling at $55, while the heavy grade brings $45. Recently there has been some selling. Anniston has an ample supply of labor, and though there were shutdowns and lagging operations, but little of the labor moved from the city. In other words, the labor remained with the work in Anniston and no complaint worthy of mention has been made as to shortage of labor there. The shops are working a large part of the time now and during the first week in November, when the pig iron market was active, the sanitary pipe makers bought freely, their policy having been for some time to buy frequently and in small lots, this interest being the one that was placing spot business. During the better part of the summer, as frequently stated in THE IRON AGE, the sanitary pipe trade was very quiet, while the pressure pipe plants, manufacturers of water and gas pipe, were operating to capacity the year through almost and are still getting contracts which promise to keep them busy for some time. When the advance in prices was announced reports started as to the activity of the sanitary pipe market from this point. The Birmingham Machine & Foundry Co., Birmingham, for instance, with two pipe shops, had one shut down and the other operating. During November the demand picked up to such extent that it became necessary to start the new shop. Both are now operating and all stock removed from warehouse.

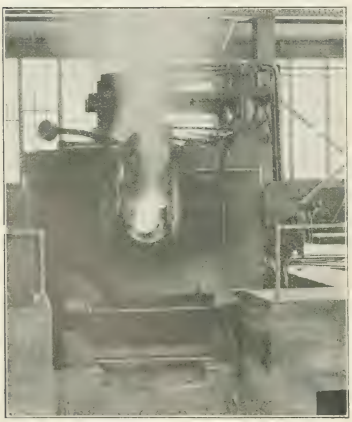
Anniston boasts of the Anniston Foundry Co., the Emory Foundry Co., Rudisill Soil Pipe Co., Alabama Pipe & Foundry Co., Standard Foundry Co., Union Foundry Co., Interstate Foundry Co., Central Foundry, Anniston Soil Pipe Co., Ornamental Pipe & Foundry Co., and others.

Alabama made sanitary pipe is shipped to all sections of the country and is exported. The McWane Cast Iron Pipe Co., Birmingham, has been shipping its product to Hawaii, while other countries have taken pipe from this district.

The indications are that there will be but little sanitary pipe on hand either in Anniston, Gadsden, Birmingham or Bessemer in a short while, and if expectations are realized on the turn of 1924, there will be need for speeding up.

Changes in the Heroult Electric Furnace

The Heroult electric furnace has recently been improved and changed from the old type, according to information obtained from the American Bridge Co.



New 7-Ton Heroult Furnace Is Mounted On Rockers and Its Three Electrodes Are Closer Together

The new furnace is mounted on rockers, thereby differing radically from the old counterweight type of furnace tilting on a pivot. The electrodes have been grouped closer together in order to save the walls. While the mast on the back of the furnace is lower than formerly designed, it has been given a greater electrode lift, thereby enabling the electrodes to be raised completely out of the furnace.

In case it is desirable to have the electrical equipment and transformer house off the charging platform, it has been arranged to have the transformers under the floor and carry flexible leads under the platform connecting to water cooled copper bus bar tubes that run up the side of the mast. The mast may be located on the side or rear of the furnace, depending on what method of charging is desired.

The transformer capacity has been increased on all furnaces so that a wide range of secondary voltages may be used in conjunction with dual voltage control, which permits the use of any two voltages during the course of operation.

Strength of Steel at High Temperatures

WASHINGTON, Dec. 18.—The strength retained by steel when heated to red heat, as in a fire, and the resistance which it offers to forging are being determined in a series of tests now under way at the Bureau of Standards. Measurements of tensile strength have been made at temperatures up to 1400 deg. Fahr., and measurements of compressive strength and forging resistance up to 2200 deg. These tests have shown that all steels suffer a marked loss of strength and rigidity at temperatures in the neighborhood of 900 deg., says a statement issued by the bureau.

The tests have been made with specially constructed apparatus on one of the smaller testing machines, which has been equipped for the purpose with an electric furnace in which the specimen can be subjected to heat and to tension, compression or drop hammer blows.

Experiments are now being made for the purpose of finding an alloy which will still retain a considerable portion of its strength at temperatures up to 1200 to 1600 deg.

MAY EXTEND LAW

No Other Legislation as to Immigration Will Probably Be Enacted by This Congress

WASHINGTON, Dec. 18.—Extension of the 3 per cent immigration law, which expires on June 30, 1924, is the only immigration legislation that can be taken up at the present session of Congress, according to statements made by leaders in Congress to Secretary of Labor Davis. It is the belief that there will be no difficulty in continuing the present law exactly as it now stands. The statement of leaders in Congress has been a source of disappointment to the Department of Labor, which had hoped that Congress would begin early consideration of its alien code bill which Secretary Davis and members of his staff are now drafting and which covers all phases of immigration and naturalization, including a provision for the enrollment.

"Our immigration laws have grown up by piecemeal and apparently we have no settled immigration policy," Mr. Davis said. "The proposed alien code bill, which I intend to have introduced in Congress, would provide for selective immigration, giving us the right to say what immigrants should be permitted to enter the country. I am opposed to Orientals coming to the United States as well as immigrants of all other races that cannot or will not assimilate with us."

Secretary Davis said that business men of the United States are squarely behind the Department of Labor in its effort to obtain and develop a policy of selective immigration. He pointed out that leaders in business have become alarmed in regard to the inferior class of Europeans and others, many of whom, it is declared, are not laborers but engage in different sorts of businesses in the United States and drive out native Americans by underselling or by other methods well known to all.

New Standard Samples of the Bureau of Standards

The Bureau of Standards is now prepared to issue the following new standard samples: Sample No. 55, ingot iron, $2 per 150g; Sample No. 56, phosphate rock, $2 per 75g, and Sample No. 62, manganese bronze, $3 per 150g. Samples may be paid for in advance, with order, or through parcel post C.O.D.

The analyses of these samples are as follows: Ingot iron, 0.013 C, 0.019 Mn, 0.003 P, 0.017 S and 0.001 Si; phosphate rock, 31.33 P_2O_5, 3.30 Fe_2O_3, 3.07 Al_2O_3, 44.83 CaO and 0.40 MgO; manganese bronze, 59.06 Cu, 35.06 Zn, 1.60 Mn, 1.13 Fe, 1.13 Al, 0.81 Sn, 0.57 Pb, 0.63 Ni and 0.02 Si.

In addition to these standards the following samples will be ready for distribution with provisional certificates on Jan. 1: No. 57, refined silicon, No. 58, 75 per cent ferrosilicon; No. 59, 50 per cent ferrosilicon; No. 60, low carbon ferrovanadium; No. 61, high carbon ferrovanadium, and renewal No. 4c cast iron.

Sample No. 63 phosphor bronze bearing metal is in the hands of the cooperating analysts and will be distributed about March 1.

Bethlehem-Midvale Merger Hearing Continues at Buffalo

BUFFALO, Dec. 18.—Hearings before the Federal Trade Commission on the Bethlehem-Midvale merger will likely be continued in Buffalo until after Jan. 1, according to indications today. An adjournment will be taken this week until after the holiday period.

Fabricators and jobbers were heard before Examiner McCorkle. To date the attorneys for the commission have called about 15 witnesses.

Among those who testified at recent sessions are: George S. Rogers, vice-president of Beals, McCarthy & Rogers, Buffalo; Bayliss O'Bannon, purchasing agent, Buffalo Steel Car Co., Buffalo, and Edward L. Cullen, secretary and treasurer of the Phoenix Iron Works, Meadville, Pa.

Tarnish Resisting Silver Sought by Government

WASHINGTON, Dec. 18.—The problem of making silverware more resistant to tarnishing is already fairly on the way to solution at the Bureau of Standards, according to a statement made today by Dr. George K. Burgess, the director. Alloys have been tested at this bureau which proved very much more resistant to tarnishing than the usual sterling silver, and the problems now to be worked on are chiefly those connected with the production and working of the better alloys.

This work was begun at the bureau early in 1917, was dropped during the war, and was resumed in 1922. A study has also been made of methods for detarnishing silver, and this has been embodied in a report sent to the Department of Agriculture last spring. In all this work the bureau has enjoyed the hearty cooperation of the leading silver manufacturers, who have prepared some of the specimens to be tested.

A paper by Dr. G. W. Vinal, entitled "Tarnishing and Detarnishing of Silver," is to be published in January. Among other things, it was found that sterling silver is much less resistant to tarnishing than pure silver is, and this appears to be due to the copper which is put in sterling silver to harden it. In preparing the tarnish resisting alloys other metals were put in in place of copper.

Coke Production Declines

WASHINGTON, Dec. 18.—The production of by-product coke continued to sag in November, and the total output—2,942,000 net tons—was 157,000 tons, or 5 per cent, less than that in October, says the Geological Survey. A considerable part of the decline was due to the smaller number of working days in November, and the average daily output increased 1223 tons, or 1.3 per cent. Of the 70 by-product plants now in existence, 65 were active and five were idle. The coke produced was 81.1 per cent of the total capacity of all plants. Production of beehive coke declined even more sharply than by-product, and present estimates place the total at 1,103,000 net tons. This was a decrease of 187,000 tons, or 14.5 per cent. The total output of both varieties of coke was 4,045,000 tons, a decrease of 344,000 tons, and the lowest figure recorded since October, 1922.

The Calorizing Co., Pittsburgh, has acquired exclusive sales rights for "Hybnickel," the heat-enduring alloy perfected by Victor Hybinette. The arrangements provide a single source for all that has been developed by the Calorizing Co. and Mr. Hybinette working independently. In addition, the production facilities of both organizations will be preserved. Hybnickel will now be known as calite. The original analysis calite will continue to be supplied to those who have become accustomed to it and for whose requirements it is best adapted. Mr. Hybinette will be associated in a consulting capacity with the Calorizing Co.

The William B. Pollock Co., blast furnace builder and fabricating interest of Youngstown, has incorporated under the laws of Illinois, in order to do business in that State. The articles of incorporation, filed at Springfield, Ill., provide for a capital stock of $600,000. The company is now rebuilding a blast furnace at South Chicago of the Youngstown Sheet & Tube Co. The latter interest has authorized construction of another blast furnace at South Chicago, but the contract for it will not be awarded until after Jan. 1.

PROPOSES GEARING DEFINITIONS

Committee of Gear Manufacturers Association Submits Report for Discussion

Constructive discussion of the gearing definitions given below is being sought by the nomenclature committee of the American Gear Manufacturers Association. This committee has been working for some time in cooperation with the various standards committees of the association on the simplification of the nomenclature of gearing.

Nomenclature reports prepared by the association's bevel and spiral bevel gear committee and by the spur gear committee have been submitted. It is planned to add the necessary classifications required by helical, worm gears, and racks as the work progresses.

The sectional committee of the American Engineering Standards Committee has had the matter actively in hand, acting under the sponsorship of the gear manufacturers association and the American Society of Mechanical Engineers. In the simplification and improving of the various gearing definitions, the nomenclature committee of the American Gear Manufacturers Association submitted the definitions given below at the meeting held at Lake Mohonk, N. Y., Oct. 25 to 27, as those accepted to date by the sectional committee.

These definitions were determined upon after considerable labor and consultation. They were not submitted as recommended practice at the meeting, because it was thought best that the members have time for study and criticism. The association's committee on nomenclature includes F. E. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., A. F. Cooke, Fawcus Machine Co., Pittsburgh, F. E. McMullen, Gleason Works, Rochester, J. C. O'Brien, Pittsburgh Gear & Machine Works, Pittsburgh, and C. R. Weiss, Link Belt Co., Philadelphia.

Communications may be sent to T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary of the association.

When a dimensional value is given to any of the following terms, it is understood that they are taken from dimensions based on theoretical conditions and proportions.

Addendum is the distance, normal to the pitch surface, from the pitch surface to the top of the tooth.

Arc of action: The arc of action is the angular distance a tooth travels from the point where it first makes contact with its mating tooth until it leaves contact. (Sometimes called angle of action.)

Active face is the length of the working surface of the teeth in the axial plane.

Arc of approach is the angular distance from the point where tooth contact begins to the pitch point.

Arc of recess is the angular distance from the pitch point to the point where tooth contact ceases.

Addendum angle is the angle between the pitch cone and the face cone in a plane containing the axis. (Also called the increment angle.)

Angular bevels are bevel gears which are to operate on shafts having an included angle other than 90 deg.

Backlash is play between teeth of mating gears.

Base circle is that circle from which a line is unwound to generate the involute curve.

Backing is the distance parallel to the axis from the crown to a shoulder or hub extension.

Back cone radius is the distance perpendicular to the pitch surface from the pitch line to the axis. (This distance is also called virtual pitch radius.)

Back cone is the cone generated by swinging the back cone radius about the axis of the gear.

Back angle is the angle included between the plane of the pitch circle and a plane tangent to the large end of the tooth. (Sometimes called the edge angle.)

Bottom land is the surface of the gear body between adjacent teeth.

Center distance is the shortest distance between the axes of mating gears.

Circular pitch is the distance on the circumference of the pitch circle between corresponding points of adjacent teeth.

Clearance is the shortest distance between the top of a tooth and the bottom of its mating space.

Circular thickness is the thickness of a tooth along the pitch line.

Chordal thickness is the length of chord subtended by the circular thickness arc.

Chordal addendum is the greatest perpendicular distance from the top of the tooth to the chord subtended by the circular thickness arc (Sometimes referred to as corrected addendum.)

Cone center is the apex of the pitch cone.

Cone distance is the shortest distance from cone center to any point on the pitch circle. (Sometimes called apex distance.)

Crown is the edge formed by the intersection of the face cone and the back cone.

Cone center to crown is the distance parallel to the axis from the cone center to the crown of gear.

Dedendum is the distance, normal to the pitch surface, from the pitch surface to the bottom of the tooth space.

Diametral pitch is the number of teeth divided by the pitch diameter in inches.

Dedendum angle is the angle between the pitch cone and the root cone in a plane containing the axis. (Also called the angle of decrement.)

Diameter increment for bevel gears is the amount added to the pitch diameter to obtain the outside diameter.

Face angle is the angle between a plane tangent to the top of a tooth and the axis.

Gear ratio is the number of teeth in gear divided by the number of teeth in pinion, or number of threads in worm.

Helical gear is one in which the teeth are formed along a helix. (Helical gears may run on parallel axes, in which case one gear has a right hand helix while its mating gear has a left hand helix. Helical gears may also run on axes which are not parallel. In these cases the helices of both gears may be of the same hand. Such gears are commonly miscalled "Spiral Gears.")

Helix angle: The helix angle of a helical gear is the angle between the helix at the pitch line and the axis of the gear.

Herringbone gear is a gear composed of two helical sections, one right hand and the other left hand.

Interchangeable gear system is one which permits gears of any tooth numbers of the same pitch to run together.

Interference means contact between mating teeth at some other point than along the line of action.

Line of action is the line along which all contact between mating teeth occurs. (On correct involute gears this line of action is the common tangent to the base circles of mating gears. This line is also called the path of contact.)

Long and short addendum teeth have a longer addendum on the teeth of one member than on those of the mating gear.

Normal circular pitch is the distance on the pitch surface along a helix perpendicular to the helix angle of a helical gear from one tooth to the corresponding point of the adjacent tooth. (It is commonly miscalled the normal pitch.)

Normal diametral pitch is that which corresponds to the normal circular pitch.

Normal pitch: The involute normal pitch is the normal distance between two successive and corresponding involute tooth surfaces. (It is equal to the circular pitch multiplied by the cosine of the pressure angle.)

Normal pressure angle is the angle included between a line perpendicular to a normal tooth profile at a point on the pitch surface and a plane tangent to the pitch surface at that point.

Outside diameter is the diameter of the greatest circle which contains the tops of the teeth.

Pitch angle is the angle between a plane tangent to the pitch cone and its axis.

Pitch circle is the circle formed by the intersection of the pitch surface and a plane perpendicular to the axis.

Pitch diameter is the diameter of the pitch circle.

Pitch point is the point of tangency of the pitch lines of two mating gears.

Pitch line element is a line, curved or straight, on the pitch surface, formed by the intersection of the tooth and pitch surfaces.

Pressure angle is the angle between the line of action and a line tangent to the pitch surface at the pitch point.

Root angle is the angle between a plane tangent to the bottom of the tooth space and the axis.

Straight bevel gear is a bevel gear whose pitch line element is a straight line.

Shaft angle is the included angle between the shaft upon which a pair of bevel gears operate.

Top land is the surface of the tooth which is farthest from its supporting body.

Tooth bearing is the area of the working surface of a tooth which has contact with its mating tooth.

Tooth top is a line in the top land joining the tooth faces.

Tooth bottom is a line in the bottom land joining the tooth flanks.

Tooth face is the surface between the pitch line and the top of the tooth.

Tooth flank is the surface between the pitch line and the bottom of the tooth space.

Tooth fillet is the fillet at the bottom of the tooth flank, joining the bottom of the tooth space.

Throat increment for worm gears is amount added to the throat diameter to obtain the outside diameter.

Undercut refers to that condition where part of the conjugate surface of the flank has been cut away.

Whole depth is the greatest depth of tooth space perpendicular to the pitch surface.

Working depth is equal to the sum of the addenda of mating gears. (It is also equal to the whole depth minus the clearance.)

TRUSTING THE PUBLIC

President Bedford of Standard Oil Co., and President Horner of Mahr Mfg. Co. Address Petroleum Institute

ST. LOUIS, Dec. 17.—The need of taking the public into their confidence, the adoption of a high code of business ethics and the adoption of a campaign of public information to escape a harmful Governmental regulation were among the subjects stressed at the session of the American Petroleum Institute, which was held at Hotel Statler, Dec. 11, 12 and 13.

A. C. Bedford, chairman of the board Standard Oil Co., said he believed the petroleum industry fundamentally deserves public confidence and that "the maximum of efficiency of service can be realized in so far as there is a minimum of Government interference with the business.

"Of course, the fact must be faced, and it is only fair to the public that we should make it clear to them that the oil industry is selling its products at prices less than the actual cost of production," continued Mr. Bedford. "Prices must move upward. No business can be maintained on this basis."

An earnest appeal for adoption of plans to obtain publicity for the oil industry was submitted by W. M. Horner, president Mahr Mfg. Co., Milwaukee, and this attracted considerable interest and favorable comment. A comprehensive campaign of education through the judicious use of printer's ink was advocated by Mr. Horner. "Maximum service and minimum waste will result to the public," he said, "by publishing institutional advertising copy in trade journals, a few well-selected periodicals and such leading dailies over the country as will create an interlocking circulation but a minimum of duplication."

"Quality—Service—Price," in the order named, should, he said, be the slogan of the industry in carrying out this unified, institutional educational advertising campaign for fuel oil.

The officers of the institute were re-elected as follows: President Thomas A. O'Donnell, chairman of board, California Petroleum Corporation; vice-presidents, R. D. Benson, chairman of board, the Tide Water Oil Co.; Henry L. Doherty, president, Henry L. Doherty & Co.; J. W. Van Dyke, president, Atlantic Refining Co.; treasurer, Harry P. Sinclair, chairman of board, Sinclair Consolidated Oil Corporation; secretary and counsel, R. L. Welch; assistant secretary and counsel, W. R. Boyd, Jr., and assistant treasurer, Lacey Walker.

Large Employee Vote Is Cast Under "The Bethlehem Plan"

Elections of employee representatives have been held recently at all the iron and steel and other manufacturing plants of the Bethlehem Steel Corporation, including the shipyards. The representatives chosen will take office on Jan. 1. It is noteworthy that at these elections no less than 87 per cent of the employees cast ballots. Employee representation has been in effect at Bethlehem plants for five years, but the recent election is the first in which there has been participation by the employees at the Midvale and Lackawanna plants which were acquired last year.

FEW ORDERS FROM JAPAN

Japanese Merchants Buy in Europe, but Larger Business Comes to United States—Oil Pipe Tonnage Placed

NEW YORK, Dec. 18.—While Japanese merchant orders placed with American mills continue small, reports of fairly heavy buying of small lots in Belgium and France continue. In the meantime, some of the larger orders from official sources and the larger companies seem to be, as a rule, coming to the United States. Chinese business is small and the few transactions noted are at low prices. Demand for second-hand material and wire shorts is about the only feature of this market.

An inquiry from Japan for oil can size tin plate, bids on which opened Dec. 17, specified 9500 boxes of 14 x 18 in. and 2800 boxes of 10 x 20 in., delivered Yokohama. Among recently opened railroad tenders is one for 100,000 tie plates from the South Manchuria Railway Co., opened Dec. 14, and a tender from Osaka municipality for a mile of 102-lb. girder rails. The tie plates are the second large lot purchased this year by the South Manchuria.

The 70 miles of 100-lb. rails recently purchased by this railroad in the United States, the order for which was duplicated and divided between a Belgian and a French mill, was awarded to the American maker on a January-February delivery basis. The 70 miles divided between Belgium and France is understood to have been placed with the Belgian mill at 82.16 yen per ton, c.i.f. Dairen, and with the French mill at 82 yen per ton.

The only large order from Japan reported in the past week was a total of 1500 tons of oil country pipe, purchased by the Nippon Oil Co. from Takata & Co. and placed with an American mill.

New Open-Hearth Furnace of Republic Iron & Steel Co.

The Republic Iron & Steel Co., Youngstown, is increasing its steel-making capacity by the addition of another open-hearth furnace to its complement at Lansingville, for a total of 15. The new unit will be of the same rated capacity as the other furnaces in the group, 85 tons per day, and will therefore increase the company's open-hearth capacity by about 30,000 tons per year. The new furnace will also increase the number of independent open hearths in the district to 52. It is being built at the easterly end of the open-hearth building.

Extensive repair work is under way at the company's Bessemer plant, designed to increase output and reduce production costs. One of the company's blast furnaces at Haselton is also being rebuilt and enlarged. An addition to its by-product coke oven battery, which will make it self-contained in the matter of coke supply, is nearing completion.

The Mahoning Valley Water Co., which supplies a number of steel properties and other industrial concerns in the Youngstown district with water supply, plans extensions to its facilities involving outlay of $300,000. The company will erect a new filtration plant, and will create several new reservoirs. The Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. are among its chief consuming interests.

BOOK REVIEWS

Commerce Yearbook, 1922. Compiled under the direction of the Bureau of Foreign and Domestic Commerce. Pages 691 + v. Washington, Government Printing Office, 1923. Price, 60c.

Issued more promptly than is customary in Government publications of so pretentious a scope, this book contains a vast amount of information covering general business conditions in the year 1922 and the early months of 1923, with particular reference to the revival of production, to sales, unfilled orders and stocks of manufactured commodities, to employment, immigration and wages, and to a considerable number of specific industries, as well as transportation, banking, agriculture and the foreign trade.

Among the individual industries covered are coal and coke, petroleum, electric light and power, iron and steel, non-ferrous metals, building materials, machinery and railroad equipment, lumber, electrical equipment, agricultural machinery, foodstuffs, textiles, leather, pulp and paper, automobiles, rubber and chemicals. Each of these key industries is treated in some detail, with price and production statistics drawn from recognized trade sources and illustrated by numerous diagrams showing general trends and recent conditions. In many cases, world production has been shown as a complement to the output of the United States and our proportion of the total given in some detail.

Under the heading of iron and steel, which occupies 14 pages in the book, quotations are made freely from THE IRON AGE, particularly with regard to production of steel and iron by the five leading nations, the monthly production of pig iron and steel ingots during 2½ years, index numbers of composite finished steel prices compared with wholesale prices of all commodities, prices at Pittsburgh of various grades of pig iron over a period of years, etc. In the summary on this industry, it is pointed out that, since the marked decline in 1921, the industry has had a steady recovery. Prices advanced consistently during 1922, though the year's average was lower than for 1921. Under the heading of exports of iron and steel, it is shown that the outward movement in 1922 was less than in 1921 and was less than two-thirds the tonnage in 1913.

All in all, the statistical review of the year as covered in this book is such as will be preserved for reference, largely because of the authoritative character of the figures presented, but also because of the great amount of material, the great diversity of topics and the widespread character of the figures, covering as they do most of the important nations of the world, both as to production and as to exports and imports. This is the first issue of the "yearbook."

Cost Control for Foundries. By Frank Everitt and Johnson Heywood. Edited by William R. Basset. Pages 226, 6 x 9¼ in.; illustrations, 72. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $3.

If there is any one line of industry needing good costing, especially to aid estimating, it is the foundry business; which commercial agencies show to be a specially bad credit risk, on account of the numerous and serious failures therein.

The authors, and the editor, have rendered a service to foundrymen by producing a work so free from accounting technicalities and so readily understandable by foremen and cost clerks. The typography of the text and the press-work are of McGraw-Hill excellence; but most of the forms, photoengravings of pen drawings, are almost illegible. There are few sins of commission; many, however, of omission, which should be remedied in deserved new editions.

Going into details instead of making a general criticism: Considering manufacturng expense to be made up of only melting and core costs (page 139) is unusual; perhaps not safe. In another edition a method of accounting for customers' so-called defectives might be given with advantage. The distinction between amount and percentage of overhead is not sharply enough drawn. The subject of the cost period might receive more attention, especially in view of the fact that advanced practice makes that of the melting department only 24 hr. A very important factor in overhead—rent—receives no mention. No solution is offered for the problem (page 128) of allocating core costs. No method of properly distributing crane expense (for instance where the same crane hauls flasks to and fro, molten iron in, and castings out) is given. Drawings, which in some foundries are a considerable expense item, are not taken care of. One very important item in foundries is that of burning on and welding defectives and crediting the restored pieces and charging the cost of restoring.

The advantages of distributing expense according to direct-labor hours instead of direct-labor cost are not stated; and in view of fluctuating wages and the varying purchasing power of the dollar, this should be of importance in preparing estimates on repeat jobs. Sufficient stress is not laid upon the desirability of keeping time on piece work—a matter in which foundrymen are especially lax and even obstinate. More attention might have been given to such matters as time recording where the same hand works part of the time on piecework, part by the hour.

That the physical inventory should be made only when the stock falls to a minimum is not always either feasible or desirable. That the inventory must increase with business expansion is not necessarily so—for instance, where the product has been standardized, the inventory is often less in both variety and amount. No provision is made for steel foundries that use a converter with the cupola. One of the attributes of a good and serviceable cost system is omitted—records that are untamperable, up to date, and regularly and frequently used.

Selling expense should be more minutely analyzed to show the comparative percentages of selling cost in various districts, on various products, and by different salesmen. While sales expense is analyzed, purchasing expense is not. ROBERT GRIMSHAW.

New Books Received

Frederick W. Taylor, Father of Scientific Management. By Frank Barkley Copley. In two volumes. Pages 465 and 472, 9 x 6½ in., illustrated. Published by Harper & Brothers, 49 East Thirty-third Street, New York. Price $10.

Business Fundamentals. By Alvin T. Simonds. Pages 221, 5 x 7½ in. Published by Ronald Press Co., 20 Vesey Street, New York. Price, $2.25.

Transactions American Society Heating and Ventilating Engineers. Volume 27. Pages 416, 6 x 9 in., illustrated. Published by the society, 29 West Thirty-ninth Street, New York.

Modern Gas Producers. By N. E. Rambush. Pages 545, 7 x 9½ in., illustrated. Published by Benn Brothers, Ltd., 8 Bouverie Street, London, E. C. 4. Price, 55s., net.

Structural Steel. Handbook No. 19 of Sizes, Extras, Code Words, etc. Pages 122, 6¾ x 8¾ in., illustrated. Published by A. Skelton & Co., Moorgate Station Chambers, Moorfields, London, E. C. 2. Price, 5s.

The Properties of Electrically Conducting Systems. By Charles A. Kraus. Pages 415, 6¼ x 9¼ in.; 70 figures. Published by Chemical Catalog Co., Inc., 19 East Twenty-fourth Street, New York. Price, $4.50.

Motor Fuels, Their Production and Technology. By Eugene H. Leslie. Pages 681, 6¼ x 9¼ in.; 166 figures, 121 tables. Published by Chemical Catalog Co., Inc., 19 East Twenty-fourth Street, New York. Price, $7.

Catalytic Action. By K. George Falk. Pages 172, 6¼ x 9¼ in. Published by Chemical Catalog Co., Inc., 19 East Twenty-fourth Street, New York. Price, $2.50.

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the Digest Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Treas.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Working and Spending

A REVIEW of business conditions by a financial writer last week began by referring to the advent of winter weather as a stimulant to retail trade. The public showed a good spending power.

Such emphasis upon the volume of spending, relative to the amount of work done, is not uncommon. It is true the reviewers refer also to the quantity of employment, and in 1920 they made much reference to inefficiency. Lately they have given less attention than is meet to the increase in efficiency. The amount of work done is, of course, affected by both factors, the amount of time put in as shown by employment statistics and the degree of efficiency in the use of that time.

It might be argued that spending is necessary, since unless money is spent there is no demand for goods and goods therefore do not need to be produced, hence spending makes work. That, however, is putting the cart before the horse.

It is a common error, in efforts to reason things out, to confuse cause and effect. Work produces spending power and spending produces work. The question is which is the more important of these two couples, in making for progress and prosperity. Recourse must be had to the attitude or conduct of the individual. The ordinary individual, and few but misers can be excluded from the category, spends his money in one way or another, and rather speedily. The spending may be indirect, as, for instance, through the purchase of bonds or shares of a corporation which engages in construction work.

The greater the quantity of efficient work that is done the greater will be the progress and prosperity. Spending in construction work, whereby power will be produced more cheaply, transportation will be improved, or goods will be produced more economically, is, of course, in an entirely different category from spending in retail stores. Even there, however, the long range economic benefit of things coming to be done better is more important than the employment temporarily given. It is better to build an additional highway than to have an earthquake necessitating the rebuilding of a highway, though the amount of employment given is the same.

This nation has been trying to study economics in recent years. Public spirited men desire to further the study and to encourage right thinking. It is doing good service to criticize the mental attitude that lays emphasis on spending rather than on working. Statistics of spending are useful as furnishing proof—more or less—of prosperity, but the spending should not be considered a cause of prosperity.

The various indexes of business are considered very valuable, and are studied carefully. As a matter of fact, however, their direct showing is chiefly of the volume of trade at the moment. The volume alone does not determine the amount of progress being made. The character of the work enters into the equation. If we all worked very hard producing food and clothing the car loadings might be heavy and the bank clearings large, but the next generation would be worse off than we. What we want, to put it in arithmetic, is that in time we shall have to work only three-fourths as hard, yet have the same comforts, or work just as hard and have one-third more comforts. To supplement the indexes showing the volume of business we need more inquiry into the nature of the work done, in respect to its putting us in better condition in future.

High Cost of Manganese in 1923

THERE have been two noteworthy developments in the manganese market in 1923. One is the heavy importation of ferromanganese despite the highest tariff in the history of the industry. Figures given last week in THE IRON AGE show that the import rate to Nov. 1, this year, of 8245 tons per month exceeds any since 1913, when the receipts of 10,672 tons per month represented about one-half the consumption of that alloy. Along with the large import movement this year has been a domestic production close to some of the war records.

The other development has been a domestic production of ferromanganese far in excess of what would be indicated by the year's ore receipts. Or, to use figures, the output of ferromanganese up to Nov. 1 represents an ore consumption in the ten months of 300,000 to 350,000 tons more than the manganese ore importations in that period, which have been the smallest in eleven years. It is estimated by domestic producers of

ferromanganese that substantially all the difference between ore imported and ore consumed is foreign ore that was on hand at furnaces at the beginning of the year—stocks that had been accumulated before the high duty on manganese ores went into effect.

The claim has been made that the manganese tariff of 1 cent per pound of contained manganese that became effective Sept. 22, 1922, has stimulated the domestic production of higher grade ores and that these ores have made up the apparent deficiency in ore imports. The fact is, however, that the leading producers of ferromanganese have not been buyers of domestic manganese ores in the period in question. Moreover, evidence has not been given as yet of the domestic production in the past year of ores of the requisite quality in appreciable amounts.

The operation of the high duty on manganese ore and the corresponding high duty on ferromanganese has been what was pointed out in these columns when these tariffs were under discussion. The predicted development of domestic manganese mines has not taken place, but the tariff has added to the cost of every ton of steel produced. More ferromanganese has been needed and consumed in 1923 than in any year in the last eleven, apart from the war peak, but at a higher cost to the steel industry than has ever been known under peace-time conditions.

Zeal Without Knowledge

THE final chapter is about to be written in the history of the Inter-Church World Movement of North America, for the organization thus officially known has asked permission from one of the courts in New York to dissolve the corporation. The newspaper account of this action says:

> The petition filed yesterday by the directors explains that the corporation was organized for the promotion of charitable and religious purposes. This purpose was to be accomplished by a spirit of cooperation and action between the churches of denominations in this country. The directors give as the reason for the desired dissolution of the corporation that it has been "discovered by the board that its objects could not be accomplished in the particular manner undertaken by the corporation."

There were various causes for the failure of the movement with which thousands of men of good intentions were connected, some directly and actively and many others as financial contributors only. One trouble was the lack of business arrangement; and the extravagance that prevailed was astounding. But the main trouble was that in many of its activities the organization was neither charitable nor religious. It was decidedly uncharitable in misjudging and misrepresenting business men, particularly the leaders of the iron and steel industry, and the position taken at the time of the steel strike of 1919 was absolutely inconsistent with any genuine religious purpose. The good men who were nominally responsible for the alleged investigation and report allowed themselves to be used by socialists and near-socialists who were perfectly happy in consorting with William Z. Foster and other dangerous agitators. In the voluminous report of the Inter-Church investigators, the operations of Foster were treated as not deserving condemnation and the determination of Foster and his ilk to get possession of the steel industry was belittled.

The whole story of this movement is a sad one. Some of the labor leaders who trained with Foster have seen the light and know now that the "boring from within" was not only dangerous to the union but destructive to democratic government. These labor leaders, of whom the most conspicuous is Samuel Gompers, have been fiercely denouncing Foster during the past year, but the leaders of the Inter-Church movement have not yet acknowledged that they were in error. It is well that an organization having such leaders should be dissolved with the passing of the old year. If the churches should ever again be united for charitable and religious purposes or for any other worthy object, may they have wiser leadership and adhere to their avowed purpose.

New Steps in Compensation

THE new British accident compensation act which will go into effect on Jan. 1 contains concessions to labor which involve no radical changes in principle and from a money standpoint seem moderate enough when compared with the standards of the compensation acts of the United States. There was a sharp fight in Parliament and the result is a compromise. The United States has followed Great Britain so closely in such legislation that whatever is done across the water has come to be regarded as handwriting on the wall. In this particular instance, however, there appears to be little that could not be adopted here without imposing new burdens upon industry.

The exception, perhaps, lies in the important change, from the American standpoint, of reducing to three days the waiting time before compensation begins. That is to say, any injury that keeps an employee away from his work for three days or longer must be paid for in compensation. For disability of less than three days he gets nothing. If his disability lasts for more than four weeks, compensation dates from the beginning, including the three days. Labor fought hard to get pay for even one day of idleness. Employers fought as hard for the seven-day period which has prevailed since 1906.

Probably 75 per cent of all accidents in industry permit of a return to work within seven days. When compensation was first established in Great Britain and the United States ten days was the usual waiting period. Now it has decreased almost everywhere to seven days and one State has got down to five days. The three days of the British act is a long step toward no days at all.

Compared with American practice the new British limits of award do not seem large, to say the least. The maximum compensation in case of death is increased from £300 to £600, the minimum from £150 to £200. Also, instead of basing the award wholly on previous earnings, regardless of the number of dependents, hereafter where a widow is left, or a child over 15 years, and there are younger children, additional provision is made for the latter until they have reached the age of 15.

Weekly payments for disability are increased 50 per cent, and somewhat more than that where wages average less than 25 shillings a week. Labor contended for a 66 2/3 per cent advance. The maximum weekly compensation is increased from £1 to 30 shillings, which roughly is $7.30. This is much less than is paid in many cases in the United States—by comparison almost trifling. Another change excludes from the provisions of the act all employees whose average wage is more than £350 a year, say $1,700. The old limit was £250. In the United States no employee is excluded from compensation. The injured man may be a laborer earning $3 a day or the general manager with a salary of $50,000. If the accident occurred in the course of and as a result of his employment he is entitled to compensation. But the law sets a limit beyond which an award may not go.

The British engineering press criticizes the changes made as to cases in which there shall be no compensation. The act of 1906 was intended to eliminate all defense on the ground of serious and wilful misconduct. Nevertheless, employers had considerable success in setting up as a defense that when a worker who was injured did something he was ordered not to do, he had gone outside the scope of his employment and therefore the accident did not arise "out of or in the course of his employment." Under American compensation acts this defense has not worked out well. The breaking of a rule has not generally been considered a sufficient reason for denying compensation, unless there were other circumstances, such as drunkenness.

The advocates of the new British act contended that the defense that a rule had been broken had wrought hardship in many cases to workers or their dependents, since, although breaking the rules, the workers did so in what they considered the best interest of their employers. As a consequence the new law particularly provides that an accident resulting in death or serious or permanent disablement shall be deemed to have arisen out of or in the course of the employment, notwithstanding that the workman at the time of the accident was acting in contravention of a regulation or of his employer's orders or without instructions, if his act was done for the purpose of or in connection with his employer's work or business. Critics of the law assert that this provision will result in wholesale litigation. In this country such has not been the experience.

IN view of the present good condition of business generally, the prediction made 10 months ago by Prof. E. W. Kemmerer of Princeton University is of interest. In an article written last February he predicted that the crest of the business cycle would be reached probably in the early part of 1924 or possibly in the latter part of 1924. "During the year 1923," he said, "or at least during the greater part of it, we shall be moving toward the crest of the 'business cycle wave,' but the crest will not be so high nor will the succeeding trough be so low as during the last business cycle."

Decisions on Trade Associations

ON another page is given the substance of the decree filed by Judge Knox in the United States District Court of Southern New York in what is known as the cement case. The defendants were members of the Cement Manufacturers' Protective Association.

A decree in an equity case brought by the Government under the Sherman act is intended to prevent continuance of the evils which the court found had been caused in the past. All-important to the understanding of the decree, moreover, is the court's finding which preceded it. In the cement case, in which the decree was filed on Dec. 13, over seven weeks after the giving of the court's opinion, the findings against the association were sweeping.

In substance, Judge Knox held that the statistical system involving about 40 forms, reports upon each contract let, provisions for checking, practices about quotations, etc., was in effect the continuation of arrangements in an earlier association and that the result was material limitation upon competition in interstate commerce. The decree is accordingly a series of prohibitions, declaring that the Cement Manufacturers' Protective Association is dissolved and that in the future the members shall not do the specific things they did in the past with unlawful effect.

In November, however, the Department of Justice participated in a decree which undertook to tell defendants what they could do without running afoul of the Sherman act. This was the consent decree in the tile case, mentioned in THE IRON AGE of Dec. 6. Even that decree cannot be applied broadly. It ended a case in which the Department of Justice alleged manufacturers had entered into association activities the principal function of which was to fix and maintain prices. The means used to this end were rather complex, and included statistical reports of one kind and another. When the Department of Justice came to consider the decree it would like, it may have set limitations imposed because of past misconduct rather than by reason of any decisions construing the anti-trust laws.

However that may be, the fact remains that the tile case was ended with a consent decree. That means the decree establishes no new legal principles. It was not the first of its kind, in attempting to set up what particular defendants might do in the future without offending the law. It had been preceded by the consent decree in the gypsum case, last January. Neither decree settled anything new, as a matter of law, for members of other industries.

In a decision handed down by the Supreme Court on Dec. 10, there was some interpretation of the Sherman act, and not in accordance with the views of the Department of Justice, either. Last January the department proceeded against the National Association of Window Glass Manufacturers and the union of handblowers. The attack was based on the wage scale contract agreed upon by representatives of the manufacturers and representatives of the union. It allowed each manufacturer only a limited amount of running time during the year, and the allow-

ance was enforced by the union.

Legality, the court said, turns upon the particular facts of a case. The dominant fact was that machines have come into use and make unnecessary the employment of highly trained blowers and gatherers. Machine production is at half the cost of hand-made glass. Machine production fixes the price of glass, and arrangements by the manufacturers and their employees could not have any effect. Besides, there were not enough workmen to man all the factories, probably because the hand industry is disappearing, and the purpose of the arrangement was to divide the available labor equally among the plants. The facts, consequently, in the opinion of the Supreme Court, showed "no combination in unreasonable restraint of trade in the arrangement made to suit the short supply of men."

It is upon the facts, it will be noticed, that the Supreme Court lays emphasis in each case. It is not to be overlooked, however, that various forms of activity interdicted in the case of the cement manufacturers are closely paralleled in the operations of other associations that as yet have not felt the weight of Government displeasure.

CORRESPONDENCE

How Can America Help Europe?

To the Editor: America ought to help Europe, not merely out of altruistic considerations but purely for self interest, if nothing else. It is foolish to imagine that we can erect a wall around ourselves and live prosperously and happily inside of it, washing our hands of the mess in Europe. Modern civilization and commerce are too complex to permit anything like that. Nations long ago ceased to be economically independent. The United States has not become unlinked from other countries, nor should it aspire to be if there is merit in the economic principle of the international division of labor, which we know there is. Certainly the American copper and petroleum producers and the wheat and cotton growers are under no illusions respecting independence from Europe.

Now, the United States has helped Europe a great deal. We went into the war at the expense of many thousands of lives and many billions of dollars. It is ungracious of us to assert that our armies saved the day, but there should be no dissent from the representation that Great Britain and France were able to carry on only by virtue of the goods that we supplied to them.

Following the Armistice we let the Allies have a great deal, their credits not becoming exhausted until about the middle of 1920, and it is certain that if that post-war assistance had been utilized wisely Europe would be now far better off. Even later we helped financially by our huge purchase of German marks, which was indirectly to the advantage of our Allies by enabling Germany to pay something on the account of reparations, which otherwise might have been impossible.

It would be untrue for any one to allege that America had not been financially most generous to Europe, and it would be difficult to prove that any further financial assistance would do any real good to Europe.

What, then, can America do now for Europe? Some people say that we should join the League of Nations and thereby help to dispel the specter of strife and war and by the promise of peace give Europe a chance to recuperate. Every one subscribes to the desirability of abolishing the nightmare of war, but it is doubtful whether the League of Nations would accomplish any such thing. In the meanwhile there has happened something far more effective for curbing warlike spirit, and that is the repudiation of debts.

Formerly governmental obligations were looked upon as something inviolable, and up to the Bolshevik revolution in Russia people cheerfully and confidently subscribed to foreign loans. We have learned, however, that a loan to a foreign country may be a very insecure thing. We were perhaps prepared for repudiation by the Bolsheviks, but the intimations that we are now getting from France give us a shock. If any country, other than Great Britain, is meditating future wars it will have to do a great deal of convincing before it can get any aid from abroad. As for the British I do not think that they want to go to war any more than we do.

Other people say that we ought to help Europe by giving our moral support and comfort and our intelligent advice respecting the arrangement of things. We have tried to do that, but the French government has been unwilling to let us except on terms that we thought would make us a cat's paw.

There is, of course, a great thing that we could do for Europe, which would be to arrange our own affairs so as to let the people of Europe work for us, which would be to our own advantage; but that is something that is too complicated economically for our people to see and they are not yet ready for it.

Thus, we seem to have exhausted thoughts as to how we might help Europe; but in the *Atlantic Monthly* for December Dr. Gustav Cassel, who is the most distinguished figure of the present time among European economists, offers one that is new and novel. Dr. Cassel argues that the French are trying, for selfish interests, to ruin Germany economically, which is adverse to the interests of the rest of the world. He refers to the French representations that France cannot pay her indebtedness to Great Britain and the United States except out of surplus of German reparations, which he alleges the French do not expect to get. He proceeds then to point out that the French contraction of indebtedness was in no way contingent upon anything else, which of course is the truth. Dr. Cassel concludes with the recommendation that the greatest help that America can give to Europe in straightening out its tangled affairs is to discard all sympathy for the present attitude of the French toward Germany and to press the French for arrangements for the payment of their debt to us. The latter is just what Senator Borah is now urging Secretary Hughes to do.

Dr. Cassel's paper to which I have referred is highly important and intensely interesting. It is impressive that leading economists of Europe and America take views respecting the economic situation in Germany that are practically identical. There is really no great need for an international investigation of Germany's capacity to pay except for official elucidation and political effect. The experts already know nearly enough what will be the answer.

In brief, the answer must be that Germany's capacity to pay is uncertain, but that a definite sum must be named that is reasonable. Nobody who is penalized will work wholeheartedly to free himself from an indefinite obligation or one that is impossible to meet. Germany's capacity to pay is uncertain because it depends upon the work and production that the German people are going to do and make and the extent to which they can curtail their living expenses. These are in turn dependent upon conditions that their conquerors are going to impose. All of these things are factors of the future, not of the past. A factor of the past is the amount of wealth that the Germans have transferred to foreign countries and the amount of business that the German people are doing extra-nationally, upon which the French have put so much emphasis. Without any doubt there has been, and is, a good deal of that; but economists find it difficult to conceive that it can loom very big in the picture as a whole. The commission to which the French have recently agreed, on which the United States is to be unofficially represented, can do useful work in exploring and bringing out the truth of that subject.

New York, Dec. 14. W. R. INGALLS.

ENGINEERING AND MANAGEMENT

Best Management Preceded by Good Mechanical Engineering—Preparation for Time Studies

That good mechanical engineering is essential to good management in the metal-working industries was emphasized by Robert T. Kent, consulting engineer, Montclair, N. J., in a paper on "The Mechanical Engineering of Management in the Metal-Working Trades," presented at the management session of the annual meeting of the American Society of Mechanical Engineers, held in New York Dec. 6. The best engineering principles, it was pointed out, must be applied to the design of the product, the arrangement of the plant, and the selection of equipment and methods.

Management was stated to have in the past ten years become symbolized by certain mechanisms, among these being time studies, routing or order-of-work schemes, stores systems and piece-work, premium or bonus plans for wage payment. These, it was said, may be quite necessary to the best management in the plant, but their presence does not necessarily indicate that good management exists. Many of the so-called failures of scientific management were attributed to the confusing of the idea of management with the carrying out of the idea.

As an example, time study and rate setting was cited, and it was indicated that frequently no attention was paid to the preliminaries that should precede the time study itself, nor to the other equally important phases of management which are necessary to the promulgation of its results.

"There is little use in making time studies on operations where the methods are wrong, or the machines in poor condition or improperly operated," said Mr. Kent. "Operation times from such studies are sure to lead to trouble later. To assure accuracy in time studies we must have the machines in perfect order, the cutting tools made to given standards, adequate power, and high class operation. The first three items are distinctly up to the engineer.

"Assuming that the time studies have been made under the proper conditions, their results will be of little value unless these conditions are reproduced throughout the shop. Here again the engineer must function before the mechanism of management may be successfully applied."

The sequence to be followed in the installation of scientific management, as laid down by F. W. Taylor, was quoted. This sequence was: *a*, Establish a stores system; *b*, perfect the product; *c*, put the shop equipment in proper condition; *d*, organize and train a maintenance department; *e*, develop the functional organization and the routing system; and *f*, make time studies and set rates.

"It is a sorry fact," said Mr. Kent, "that too often this sequence has been reversed, and that time studies have been started before adequate preparation for them has been made."

Having called attention to the amount and character of engineering work that must be done before even the best known mechanism of management, time-study, can have permanent value, Mr. Kent undertook to show how the effectiveness not only of this particular mechanism but of all others is affected by the engineering work that should precede their application.

As to the effect of engineering on the product, it was pointed out that after designing the product so that it is readily saleable in competition with that of other manufacturers, every change in design that simplifies the process of manufacture, simplifies the management of the plant. The problem of the mechanical engineer, it was stated, is first to ascertain whether or not the design can be improved from the standpoint of fewer parts, and secondly whether the design of the individual parts is such as to permit of the minimum number of machine operations. Consideration of the possibilitity of substituting purchased standard parts for parts made in the shop was also brought out.

Faulty plant arrangement as hampering good management was emphasized, and it was stated that a prolific field for the mechanical engineer was in the study of the plant layout, and the arrangement of its facilities in the most convenient form. The question of power was pointed out as bearing an intimate relation to production and management, the subject being said to include not only the power plant but also the power actually available at the cutting tools. Causes of inadequate power which were removed by the establishment of a proper routine of maintenance were given, and the prevention of equipment failures by having regular maintenance as part of the shop routine was emphasized. "It may be set down almost as an axiom," said Mr. Kent, "that shop maintenance is one of the fundamentals of good shop management."

Methods and Equipment

In connection with methods and equipment, it was stated that the function of the mechanical engineer in laying the foundation for good management is first to devise the best method to accomplish the desired end, and then to provide the equipment which will best carry out that method.

"In the case of a new shop, or a shop with ample funds for changing the existing equipment, the task," he said, "is comparatively simple. Where the engineer is limited to the equipment on hand his ingenuity may be severely taxed. Nevertheless he can accomplish much with a comparatively small expenditure of funds. If a change in method is proposed it must stand the test that the economies effected thereby will pay the cost of the change in a reasonable time, and the new method thereafter return a profit on the investment. The return on the investment need not necessarily result from a lower cost of doing the work. It may come from releasing equipment that can be put to more profitable use."

In dealing with equipment it was said that standardization is a powerful ally of production. Machines that are supposed to do the same work should be capable of the same standard of performance. Neglect of such small details as the shape of cutting tools and their proper hardening was emphasized as having a great effect on production.

In conclusion, Mr. Kent said that it had been brought home to him many times that the self-evident things are frequently the most neglected ones, and that before real management can be attempted there is much that must be done in the way of good old-fashioned mechanical engineering.

Judge Huggins Addresses Employers' Association of Eastern Massachusetts

Declaring that what is needed in this country more than anything else is common law of industry, William L. Huggins, former justice of the supreme court, Topeka, Kan., a guest of the Employers' Association of Eastern Massachusetts at its sixth annual meeting held Wednesday, Dec. 12, at the City Club, Boston, said we are slowly developing one. "But what we need," he said, "is statutes against picketing and other things—statutes to meet changed industrial conditions."

Judge Huggins told the members of the organization they had a great responsibility; that it was up to them to fight for the right of a man to work. "We must," he said, "build up in this country a respect of law, order and of constitution." Three great fundamentals have been developed during the past 700 years, according to Mr. Huggins—individuality, equality and property. "There is no room for debate on this fact among men who believe in American institutions. A powerful minority debates it, however, particularly through the legislative field. That organization denies liberty to labor. Labor is a man's personal property, but this organization says he has no right to personal property."

L. Ross Gottleib, National Industrial Conference Board, New York, also was a guest of the organization. Mr. Gottleib asserted that the standard of living in this country will be reduced before long if taxation continues to increase as it has in recent years. Stress was placed on the huge sums of money spent for education in this country and its relation to taxation. He

said that of New York's 1924 budget, 55 per cent will be spent for education. Mr. Gottleib declared he was not against education, but he believes education places one of the greatest burdens on the taxpayer.

At the business meeting prior to the dinner A. N. Murray, Murray Printing Co., Cambridge, Mass., was elected president to succeed George M. Gray, Peter Gray & Sons, Inc., Cambridge. Mr. Gray automatically becomes a member of the board of managers. Dr. R. S. Quinby, Hood Rubber Co., Watertown, N. Y., succeeds H. L. Baxter of that company as a member of the board. Otherwise officers and members of the board remain as heretofore.

Detroit Tool Manufacturers' Association

Don F. Kennedy, president and general manager of the Sterling Mfg. Co., was elected president of the Detroit Tool Manufacturers' Association at its first meeting, held at the Detroit Athletic Club, Dec. 11. The association started with a membership of some 30 of the larger tool manufacturers of Detroit, most of whom are engaged in the manufacture of tools, dies, jigs and fixtures for the automotive industry. The following other officers were also elected:—vice-president, E. P. Kramer, of F. Jos. Lamb Co.; secretary, N. A. Woodworth, of Ex-Cell-O Tool & Mfg. Co.; treasurer, O. H. Siewek, of Siewek & Snyder Tool Co. The officers with W. D. McKenzie, of Trio Tool Co., constitute the board of directors.

New York Steel Treaters

At the regular monthly meeting of the New York Chapter of the American Society for Steel Treating, Wednesday evening, Dec. 19, Stanley P. Rockwell, consulting metallurgist, Hartford, Conn., gave an address on "Measurement of Carbon Penetration in Carburized Steels."

For the January meeting a joint session with the New Jersey Chemical Society has been arranged for Monday evening, Jan. 14, at Stetter Restaurant, Newark, N. J.

National Association of Brass Manufacturers Meets in New York

The National Association of Brass Manufacturers held its annual convention at the Hotel Astor, New York, on Thursday, Dec. 13, electing John B. Brazier, Powhatan Brass & Iron Works, Ranson, W. Va., as its president, succeeding Karl Legner, Haines-Jones-Cadbury Co., Philadelphia. H. F. Albers, Globe Brass Mfg. Co., Cleveland, was elected first vice-president and R. L. Ottke, Standard Sanitary Mfg. Co., Pittsburgh, was elected second vice-president. William M. Webster, Chicago, continues as commissioner.

Retiring President Legner, in his introductory remarks, discussed the business situation in the plumbers' brass goods field. He said that business began showing a slight stagnation about last July or August, but that there are now signs of a revival that will come not later than spring. He based this prediction on expectations of continued building construction on a large scale. He discussed also the tax proposals of Secretary of the Treasury Mellon and the soldiers' bonus question, voicing the attitude of the association in favor of the former but opposed to the latter. The association framed a telegram to President Coolidge, of which a copy was sent to Secretary Mellon, approving the President's stand on these matters in his recent message to Congress.

A good deal of time was spent by the members in discussing the cooperative catalog which the association has published for some years, especially the giving of list prices on standard items of plumbers' goods. The views of all members were that nothing should be done which would violate the rulings of the Government and United States courts in the matter of uniformity of prices among competitors. Commissioner Webster said he had gone into the subject thoroughly, had consulted learned counsel, and gave it as his opinion that the printing of list prices in the association catalog was in no way a violation of any law, inasmuch as each manufacturer has his individual discounts which he quotes to the trade without regard to what competitive manufacturers may be quoting. The members were strongly in favor of continuing the publication of the cooperative catalog providing it can be done without subjecting the association to any Government criticism or complaint.

New Home of Detroit Engineers

The members of the Detroit Engineering Society on Dec. 15 celebrated the opening of their new home at 478 Alexandrine Avenue West, Detroit. The house, a large brick structure, which, with the property, is to cost nearly $60,000, is the first home the society has owned during the 28 years of its existence. The society was organized in 1895 as the Detroit Association of Graduate Engineers of the University of Michigan. In 1896 the by-laws were changed to broaden the scope of the organization, and membership was thrown open to graduates of all recognized engineering schools, and at the same time the name was changed to the Detroit Engineering Society. From an organization of half a dozen men, it has grown to an organization of 600 members. Officers of the organization are: L. E. Williams, president; Frank Burton and G. R. Thompson, vice-presidents; C. L. Snyder, secretary-treasurer; E. L. Brandt, managing secretary; O. H. Dawson and W. R. Kales, members of the executive committee.

General Meetings of Chamber of Commerce

Meetings of the Chamber of Commerce of the United States, national in interest, will be held in January in Philadelphia, Chicago, New Orleans and San Francisco. The first meeting will be held on Jan. 17 and 18 at Philadelphia, then at Chicago, Jan. 21 and 22; New Orleans, Jan. 24 and 25, and San Francisco, Jan. 29 and 30. The scheme is one of decentralization by establishing four general divisions in the country to enable a maximum number in different divisions to gather for the discussion of national topics, such as immigration and transportation. President Julius Barnes is expected to be present at all of the scheduled meetings.

The annual meeting will be held in Cleveland on May 5, 6, 7 and 8, though it had been hoped to use the new building of the chamber now in process of construction at Washington.

The Ohio State Teachers' Association, at its annual meeting to be held in Columbus Dec. 26 to 28, will consider whether an arrangement can be worked out with labor unions and employer organizations whereby the schools can better serve industry. The main address at this session will be delivered by W. E. Baker, employment manager of the Dayton Engineering & Laboratories Co., on "What Does Industry Expect of the Public School?"

COMING MEETINGS

January

Federated American Engineering Societies. Jan. 10 and 11. Annual meeting at Washington. L. W. Wallace, 719 Fifteenth Street, N. W., Washington, secretary.

American Society of Safety Engineers. Jan. 18. Annual meeting in New York.

Society of Automotive Engineers. Jan. 22 to 25. Annual meeting, General Motors Building, Detroit. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

American Society for Steel Treating. Jan. 31 to Feb. 1. Winter sectional meeting, Rochester, N. Y. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

Iron and Steel Markets

MORE DECEMBER BUYING

Chiefly in Automobile, Railroad and Structural Steels

Car, Locomotive and Tank Works Need Orders—Steel Works Schedules Maintained

Due to railroad, structural and automobile buying, December has been thus far a better month for the steel mills than was looked for, bookings being not far from the November rate. In the Central West there has been another week of activity in automobile steel.

Interest has centered in the contracts of the Ford Motor Co., which for the past week are put at close to 50,000 tons, including sheets. It is understood that its inquiries for 70,000 tons of bars have not yet developed concessions from the 2.40c. price. At Cleveland a manufacturer of automobile parts has bought 12,000 tons of carbon steel and 6000 tons of silicon-manganese steel. Some large orders have been given also for steel of special sections for tire bases and wheel rims.

In general steel works have held to the operating schedules of the previous week, the Steel Corporation continuing on an 84 per cent basis. Youngstown mills are running somewhat fuller. Two blast furnaces there are to resume this week and the Bethlehem Steel Co. has added two furnaces to the active list.

An unusual amount of structural work is being figured on for this season of the year, and the large tonnage already on the books of the mills, notably the leading Eastern structural interest, points to great activity in 1924.

More than 33,000 tons of fabricated steel has been put under contract in the past week, two of the largest awards being 6500 tons for an office building in Cleveland and 5000 tons for a bridge at Perth Amboy, N. J., both going to the Bethlehem Steel Co. Pending projects call for more than 25,000 tons.

At Chicago the chief feature of the week in railroad buying was the placing of 102,500 tons of rails and 25,000 tons of track supplies by the Santa Fe system. Of the rails, 70,000 tons went to the Colorado mill. In track supplies the New York Central order for 75,000 kegs of spikes is outstanding. It is expected that the Burlington, Great Northern and Illinois Central will add to the rail contracts they already have placed.

Orders just placed by the St. Louis Southwestern and the Chicago & Alton total 1250 box cars; but the Chesapeake & Ohio has withdrawn its inquiry for 2000 gondolas because of the high prices quoted on the equipment specialties. Car, locomotive and tank works are at the point at which orders are needed if present working forces are retained.

The week's buying of automobile body sheets has confirmed the impression that users have been carrying light stocks. Some of the makers of full-finished sheets are now sold up for the first quarter.

Sheet sales in November by independent mills reporting to the Pittsburgh association were 165,000 tons, or 20,000 tons less than in October. Production at 188,000 tons was 37,000 tons less than in October. Unfilled tonnage on Dec. 1 was 280,000 tons, or about a month's capacity of the reporting mills, against 307,000 tons on Nov. 1.

Plates and bars are still the products on which the leading steel companies can make the best deliveries and in which the accumulation of backlogs is still something of a problem.

Eastern makers of bar iron now quote 2.30c., Pittsburgh, a reduction of $1 a ton, while bolt, nut and rivet discounts for first quarter contracts are on the basis of 60 and 10 per cent off for large machine bolts.

The largest transaction in pig iron was the purchase of 6000 tons of basic by a West Virginia melter, but as a rule buying has been confined to small tonnages. Most furnaces are pretty well provided with contracts for first quarter production and sellers are viewing the present dullness complacently. While prices lack firmness in some centers, few concessions by furnaces are reported, but some selling of Buffalo iron by brokers has been below recent quotations. Many foundries are preparing to close in the holidays for one or two weeks.

Further heavy buying of melting steel scrap reported in the Pittsburgh district has strengthened the market there, while the general tendency in other centers is still upward.

England has bought basic pig iron in Germany at about $20, f.o.b. Hamburg, which with freight added would be less than $1 below the parity of British iron.

Japanese demand in England for black sheets keeps up and deliveries are now running through March.

THE IRON AGE finished steel composite price, remains unchanged, as does also the pig iron composite price.

Pittsburgh

Buyers of Steel More Inclined to Place Orders —Sentiment Increasingly Optimistic

PITTSBURGH, Dec. 18.—Resistance of buyers to steel prices gradually appears to be weakening, as is evident from the fact that the past week has registered a notable expansion in orders for almost all finished products. The automotive industry apparently has found the obtaining of supplies to be more important than the price and makers of automobile steels, particularly those producing full finished sheets, have all experienced a quickening in the demand. Some of the makers of the latter are now fully sold up for the first quarter of next year. An advance in the price of crude oil after a steady decline over several months has given pipe producers fresh hope. Independent makers of tin plate now appear to be as heavily committed as the leading interest, and the fact that low prices are disappearing in hot-rolled flats and cold-rolled strips makes it apparent that makers of these lines are better supplied with business than was the case recently. Real activity still is lacking in plates, shapes and bars, but there are indications that buyers are tiring of the effort to secure lower prices and are beginning to negotiate on today's basis.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 18, 1923	Dec. 11, 1923	Nov. 20, 1923	Dec. 13, 1922
No. 2X, Philadelphia†	$24.26	$24.26	$23.81	$28.76
No. 2, Valley furnace†	22.00	22.00	21.00	25.00
No. 2, Southern, Cin'ti†	25.05	25.05	23.05	27.05
No. 2, Birmingham, Ala.†	21.00	21.00	19.00	23.00
No. 2 foundry, Chicago*‡	23.00	23.00	23.00	28.00
Basic, del'd, eastern Pa	23.25	23.25	22.75	27.50
Basic, Valley furnace	21.00	21.00	20.00	24.25
Valley Bessemer, del. P'gh	24.76	24.76	24.26	29.27
Malleable, Chicago*	23.00	23.00	23.00	28.00
Malleable, Valley	20.00	20.00	19.00	26.00
Gray forge, Pittsburgh	23.26	23.26	22.26	26.27
L. S. charcoal, Chicago	29.15	29.15	28.15	33.15
Ferromanganese, furnace	109.00	107.50	107.50	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. sheet bars, P'gh	42.50	42.50	42.50	36.50
Forging billets, base, P'gh	45.00	45.00	45.00	41.50
O.-h. billets, Philadelphia	45.17	45.17	45.17	43.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.35	2.35	2.35	2.00
Light rails at mill	2.25	2.25	2.25	2.10

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.62	2.67	2.67	2.275
Iron bars, Chicago	2.40	2.40	2.40	2.35
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	1.95
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.29
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.34
Steel hoops, Pittsburgh	3.00	3.00	3.00	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Dec. 18, 1923	Dec. 11 1923	Nov. 20, 1923	Dec. 19, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh	4.90	4.90	4.85	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.00	$19.50	$18.00	$24.00
Carwheels, Philadelphia	19.50	19.50	17.50	20.00
Heavy steel scrap, P'gh	19.00	18.50	16.50	20.00
Heavy steel scrap, Phila	17.00	16.50	15.50	16.50
Heavy steel scrap, Ch'go	16.50	16.00	14.00	17.50
No. 1 cast, Pittsburgh	19.50	19.50	18.50	22.50
No. 1 cast, Philadelphia	20.00	20.00	19.00	20.00
No. 1 cast, Ch'go (net ton)	20.00	19.50	18.50	20.00
No. 1 RR. wrot, Phila	18.50	18.50	17.50	19.00
No. 1 RR. wrot, Ch'go (net)	15.50	15.00	12.50	15.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$3.75	$7.00
Foundry coke, prompt	4.75	4.75	4.75	8.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.50	14.50
Electrolytic copper, refinery	12.87½	12.87½	12.75	14.37½
Zinc, St. Louis	6.20	6.25	6.30	7.00
Zinc, New York	6.55	6.60	6.65	7.35
Lead, St. Louis	7.60	7.37½	6.70	6.87½
Lead, New York	7.75	7.62½	6.95	7.25
Tin (Straits), New York	47.25	46.50	44.25	38.12½
Antimony (Asiatic), N. Y.	9.00	8.65	9.25	6.20

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 18, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Dec. 11, 1923,	2.775c.
Nov. 20, 1923,	2.775c.
Dec. 19, 1922,	2.439c.
10-year pre-war average,	1.689c.

Composite Price, Dec. 18, 1923, Pig Iron, $21.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 11, 1923,	$21.88
Nov. 20, 1923,	20.77
Dec. 19, 1922,	25.42
10-year pre-war average,	15.72

Sentiment grows more cheerful as the year draws to a close and there is a pretty general belief that after the completion of inventories business will be on a steadily expanding scale. There is a note of conservatism, however, about new year forecasts. Close observers point out that buyers have not abandoned a policy of careful purchasing and the development of anything approaching a runaway market it is believed would bring a sudden halt in demand. Evidently the trade as a whole is shaping its plans for good business, but at steady prices over the fore part of the new year.

Increased strength is observed in the scrap market and the reason is not found alone in Steel Corporation purchases. Independent companies have paid $19 for heavy melting steel and are freely bidding that price for more tonnage. The spread between scrap and pig iron has grown so slim that there is now some talk of higher prices for the latter. Such business as has been done in the steel making grades of pig iron, however, suggests that prices are not especially rigid. A considerable tonnage of furnace coke for first quarter delivery has been closed, in most cases, at $4.40 per net ton at oven. The coal market still suffers from the fact that supplies are ample for all requirements. Talk is heard of a possible suspension in the union districts next April on the ground that the union leaders will make demands which the operators cannot grant. There are just as many, however, who believe that the present agreement will be renewed and all difficulties avoided.

There has been no special change in steel works activities in this district, but if there is a definite

tendency it is toward a higher rate. The Youngstown district as a whole is somewhat more fully engaged and late this week one merchant blast furnace, that of the A. M. Byers Co., Gerard, Ohio, and a steel works furnace, "D" furnace of the Youngstown Sheet & Tube Co., Youngstown, will go into blast.

Pig Iron.—It has been a quiet week and there is no occasion to change prices. A West Virginia sheet maker has closed for about 6000 tons of basic iron, the business being about equally divided between Wheeling and Youngstown steel makers. It is believed that the Youngstown iron sold at somewhat below $21, furnace. The market on that grade may be described as just steady at $21, although there have been quotations of $22 and of $22.60, the latter on an inquiry for 7500 tons for February and March delivery. The market is not very firm on Bessemer iron, for while such sales as have been reported, including one of 250 tons to Cleveland, have been at $23, Valley furnace, there is still one merchant furnace interest which would not turn down an attractive tonnage at $22.50. A fair amount of foundry iron, generally in small lots, has been sold at $22, Valley furnace, for the base grade. Some producers are quoting $22.50 and $23 for No. 2 foundry, but no sales of consequence have been made at those figures.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	23.00
Gray forge	$21.50 to 22.00
No. 2 foundry	22.00 to 22.50
No. 3 foundry	21.50 to 22.00
Malleable	20.00 to 22.50
Low phosphorus, copper free	29.00 to 30.00

Ferroalloys.—Drive for 1924 business in ferrosilicon of the higher content grades still is on and there has been a good response at $75 delivered East of the Mississippi River on 50 per cent and at least one good sized contract for 75 per cent material has been closed at $130. Ferrochromium contracts for 1924 are being taken at 11c. per lb. contained chromium for 4 to 6 per cent carbon material, and at 10c. for higher carbon alloy. In seeking new business, leading makers of spiegeleisen have gone as low as $38 furnace for 19 to 21 per cent material, a cut of $2 a ton from the recent level. A price of $109 seaboard for domestic ferromanganese has been established by fairly large sales. British material is not moving with much freedom, but is firmly held at $110 seaboard, and in view of a firmer manganese ore market, it is probable that this price will be maintained. Prices are given on page 1693.

Semi-Finished Steel.—Activity is lacking and so are new features. Business in finished products has not yet assumed such proportions with the nonintegrated that they have pressing needs of steel; indeed, most of them appear amply fortified against such business as is coming out. Negotiations for first quarter tonnages of sheet bars and billets and slabs are in progress, but they are not closing very rapidly in view of the general idea that advances from current levels are unlikely. At the same time sheet bars, for which there is a much heavier demand than for the other forms, are very firmly held at $42.50 Pittsburgh or Youngstown. Improved demand for steel from the automotive industry is expected to bring about more demand for forging billets. Activity is still absent in skelp and the rod market is quiet, although large users are said to be sending in their estimates of probable first quarter tonnage and some suspended business lately has been released. Rods are steady at $51, base, but the market is untested on skelp. Prices are given on page 1693.

Wire Products.—Jobbers are showing more interest in supplies for shipment after Jan. 1, and some of them are placing contracts, but as a general rule, the inventory period is keeping most of them out of the market and real activity from this source is not looked for until after the middle of next month. Manufacturing consumers are covering against first quarter requirements, but specifications do not run heavy beyond January shipments. Current nail orders are good and some manufacturers are finding it difficult to supply the demand and at the same time build up stocks against the spring requirements. Local mills disclaim encountering lower prices than they are quoting on nails and claim that observance of quotations is general on all of the leading products. Prices are given on page 1692.

Steel Rails.—Inquiry is reported to be somewhat better in light rails, but it is still admitted that sales are few and small and that they are likely to continue so until there is some betterment in the coal industry. Billet rails still are held at 2.25c. base, but that price is too far above that for rerolled sections for buyers to overlook the difference.

We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Iron and Steel Bars.—While no big orders for merchant steel bars are coming out, makers are encouraged to look for more activity by the fact that the regular price of 2.40c., base, is being obtained somewhat more easily than was true a week ago. Lack of new railroad business keeps down demand for iron bars, but recent prices are well maintained.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Tubular Goods.—The interesting development of the week is an advance in the price of Pennsylvania crude oil. This grade, which declined, starting last spring, from $4.25 per barrel to $2.40, has been advanced 25c. a barrel in the past week. With advances also noted in other producing sections and advices telling of a further decline in California production, the idea of an increased demand for oil country pipe after the turn of the new year gains adherents. Current demand for oil country pipe is light, although the South Penn Oil Co. recently put out an inquiry for 1500 tons of casing and tubing. Standard pipe orders and specifications still are flowing in freely. Outside of the suspension of a lapweld furnace by the Republic Iron & Steel Co., Youngstown, there has been no material change in the operating schedules of local and nearby mills. Boiler tubes still are dull and makers are not especially hopeful about the immediate future. There is some divergence of opinion as to whether the railroads will be buyers of locomotives in the near future. Much business in mechanical tubing lately has come from the automobile makers, one order taken by a local maker being for 2500 tons a month for the first quarter of 1924. There is some irregularity in boiler tube prices, but those for pipe are well maintained. Discounts are given on page 1692.

Sheets.—The market still is improving both in sentiment and in an actual way. Automobile builders, though still showing some disinclination to buy ahead at current prices, are heavier buyers than they have been and the fact that the bulk of the business is for early shipment confirms impressions that this industry was going along with pretty light stocks. There is much talk of increased production of automobiles in 1924, but a gain over this year's production will surprise close observers here, who expect that gains which may be made by some will be offset by others losing ground next year. In the commoner finishes, ordering shows a satisfactory increase over that for November and while December hardly will be comparable with this month last year, when independent manufacturers booked about 400,000 tons, it is expected to show up well by comparison with other years. There is no occasion to change the range of prices on black, galvanized or blue annealed sheets, but mills taking business at the lower prices are growing fewer daily and not much first quarter business is being accepted at these figures. The American Sheet & Tin Plate Co. is running about 80 per cent of its sheet mills and the independents about 68 per cent, making an average for the entire industry of about 70 per cent, or practically the same as a week ago. Prices are given on page 1692.

Tin Plate.—The tin plate market is pretty much a closed book as far as production plate for the first half of next year is concerned. The leading interest is booked solidly for that period and the leading inde-

pendent companies are in pretty much the same position. There should be no shortage of containers for the 1924 pack of perishable foods, since early naming of tin plate requirements means that makers of the latter will be able to produce much tonnage before hot weather cuts into mill activities. The price of all makers is $5.50 per base box Pittsburgh for standard cokes.

Cold-Finished Steel Bars and Shafting.—Local makers still are quoting 3c. base Pittsburgh, but are equalizing the freight to competitive territory, with the Chicago mill naming the same price f.o.b. Chicago. There has been no abandonment of the Pittsburgh base by mills in this district; they are meeting the condition created by the action of the Chicago mill until such time as the Chicago unit gets filled up. Except to Indianapolis, to which Chicago mills have a low commodity rate, as distinct from a class rate to other consuming points, it is said the difference in freight rates between Chicago and Pittsburgh is slight. Most Eastern mills, however, are barred from Chicago unless a freight of $6.80 a ton is to be absorbed. Business shows some improvement, but there is room for more. Ground shafting is unchanged at 3.40c. base, f.o.b. mill, for carload lots or more.

Hot-Rolled Flats.—While deviations from the regular base of 3c. have not entirely disappeared, they are not so frequent as they were recently and there really is good observance of that price on hoops and bands. A good many contracts for strips have been made at 3c. for first quarter shipment, but these are chiefly from the small tonnage consumers. Prices are given on page 1692.

Cold-Rolled Strips.—Leading producers are now firm at 5c. base Pittsburgh for first quarter tonnages and a number of contracts for that period are being entered at that price. Lower prices are disappearing, as those naming them have become pretty well filled up.

Structural Material.—The general situation shows little change other than that producers think they detect some abandonment of the idea of lower prices on the part of consumers. This tends to strengthen the position of the mills on the question of prices. An addition to the William Penn Hotel, Pittsburgh, is again being mentioned, and a new building for the Monongahela National Bank has been listed among new local building projects. Plain material prices are given on page 1692.

Plates.—Consuming industries, such as tank and car builders, are running out of orders, and this condition is reflected in very sparing demands for plates. On passing business, however, mills here report that it has been easier to get the quoted price than it was recently. Prices are given on page 1692.

Bolts, Nuts and Rivets.—Most makers appear to have lined up a satisfactory volume of first quarter contract business and are very firm at the revised prices recently established. Specifications against contracts are fairly free, but there is very little business calling for delivery over the remainder of the year. Prices and discounts are given on page 1692.

Track Supplies.—Actual orders still are moderate, but manufacturers do not believe that the railroads have covered their early 1924 requirements, and are looking forward to more active business after the turn of the year. Prices of spikes show some variation, but on large orders the market seems to be down pretty well to $3, base, per 100 lb., for large spikes. Prices are given on page 1692.

Coke and Coal.—It is now estimated that about 150,000 tons of furnace coke per month has been placed on the producers' books for delivery the first quarter of next year. There was one contract for an Eastern furnace for about 15,000 tons a month at $4.50 per net ton at oven, but generally $4.40 has been the top price paid and a considerable tonnage was entered at $4.25, and even as low as $4. The contract market appears to be quotable anywhere from $4 to $4.50. The spot furnace coke market holds right around $4, although there have been some instances where as low as $3.75 has been named to move loaded cars. Spot foundry coke still ranges from $4.75 to $5.50, while the contract spread is from $5.50 to $6.50. Coal prices hold at the week's levels, but supplies are plentiful and the market easy. We quote mine run steam coal from $1.50 to $1.75 for Connellsville district coal, $1.90 to $2.40 for Panhandle grade, $1.85 to $2 for coking coal, $2.25 for gas coal. Steam slack coal holds at $1.50 to $1.60 and gas slack at $1.75, these prices all being per net ton, f.o.b. mines.

Old Material.—The market has gained additional strength in the steel works grades since a week ago, and while sales of heavy melting steel have been made as low as $18.50, there have been sales also of this grade at $19 to independent mills, and today that price is being freely bid. It is doubtful whether any considerable tonnage today could be bought for less than that price. Indeed there is a report that the Carnegie Steel Co. closed today for 10,000 tons and paid $19.50, and also that the Steel Corporation bought a round tonnage of this grade for Chicago at $18.50. The market has gained strength on compressed sheets, which recently were inclined to lag. A Shenango Valley steel maker is reported to have paid $17 for the latter grade and that price also was paid by a Pittsburgh district independent, while a West Virginia sheet maker paid $17.50 for a tonnage of this material. This makes the quotable range on this grade from $17 to $17.50 and we continue the range $18.50 to $19 on heavy melting grade, based on actual sales in the past week. A steel maker in this district who was a buyer of heavy melting steel at $16 to $16.50 is not getting free deliveries on those purchases, and is seeking additional tonnages to make up the deficiency. Foundry grades are slow, but the market still is active and strong on blast furnace material. Norfolk & Western Railway will take bids to noon, Dec. 19, on 13,583 gross tons of iron and steel scrap.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$18.50 to $19.00
No. 1 cast, cupola size	19.50 to 20.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland Md.; Huntington, W. Va., and Franklin, Pa.	18.50 to 19.00
Compressed sheet steel	17.00 to 17.50
Bundled sheets, sides and ends	15.00 to 15.50
Railroad knuckles and couplers	20.00 to 20.50
Railroad coil and leaf springs	20.00 to 20.50
Low phosphorus blooms and billet ends	21.50 to 22.00
Low phosphorus plate and other material	20.00 to 20.50
Railroad malleable	17.50 to 18.00
Steel car axles	19.00 to 19.50
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	20.00 to 20.50
Machine shop turnings	14.00 to 14.50
Sheet bar crops	19.00 to 19.50
Heavy steel axle turnings	16.00 to 16.50
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	17.50 to 18.00
Stove plate	14.00 to 14.50
Cast iron borings	15.00 to 15.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	18.50 to 19.00

Two-Flow Ring-Circuit Water Tube Boiler

Amounting to a treatise on the subject of evaporation, this book of 268 pages, issued by the Kidwell Boiler Co., Milwaukee, contains a lucid explanation of the principles underlying correct boiler design and operation, and their application to boiler analysis. The book is profusely illustrated, several of the cuts having three colors to show the arrangement of types of boiler settings.

Everything pertaining to boilers and their operation appears to have been covered. Modern fuels are given particular attention, oil and gas being treated from the point of view of the necessary furnace volume for their proper combustion and the disposition of the products of combustion. In summing up the particular advantages of the Kidwell boiler, attention is drawn to its rapid natural water circulation, its capacity for heavy overload, its suitability for superheating, its great furnace volume and a number of other matters covered in considerable detail.

Chicago

Santa Fé Buys Rails—Important Car Buying Expected Soon

CHICAGO, Dec. 18.—The feature of the week's steel market was the purchase of 102,500 tons of rails and 25,000 tons of track supplies by the Santa Fe. The distribution of the fastenings was in proportion to the rails, the apportionment of which is published under the paragraph on rails and track supplies. Railroad car buying is also commanding attention as a prospective source of tonnage for the mills. The Southern Pacific is expected to close tomorrow for 10,000 cars, while the St. Louis Southwestern has divided an order for 1000 box cars between the American Car & Foundry Co. and the Mount Vernon Car Mfg. Co., and the Chicago & Alton has placed 250 box cars with the Pullman Co. The Chesapeake & Ohio, on the other hand, has decided not to buy the 2000 gondola cars on which it recently took figures.

Outside of buying by the railroads, the market is devoid of important developments. Mill bookings still fall short of shipments, but the business outlook has improved. Liberal inquiries for bars from the automotive interests and the jobbers are pending and construction prospects are favorable. In Chicago a number of large fabricating projects will come up for figures early in the New Year. Among them the Chicago Tribune Tower and the New Palmer House, each involving 11,000 tons, are prominent. Sheets and bolts and nuts, commodities which have been weak for a considerable period, are showing signs of strength. Plates, shapes and bars and wire products remain firm at unchanged prices. Consumers' stocks generally are exceedingly low and replenishment buying will soon become imperative.

Local mill operations are unchanged. The Illinois Steel Co. still has 19 active stacks out of 27 steel works blast furnaces, and is producing steel at the rate of 75 per cent of ingot capacity.

Ferroalloys.—A number of sales of spiegeleisen, aggregating 1500 tons, have been made for first quarter and first half deliveries at $37 furnace or $45.58 delivered. It is said that this quotation has now been withdrawn and that the best available price today is $2 higher. Practically all users of 50 per cent ferrosilicon have closed for their 1924 requirements at $75 delivered. Two carloads of 10 to 12 per cent Bessemer ferrosilicon for Michigan delivery brought out a price of $38, Niagara Falls. A local melter closed for 450 tons of 14 to 16 per cent ferrosilicon at approximately $47.50 delivered. In the absence of sales, ferromanganese remains nominally at $110 seaboard.

We quote 80 per cent ferromanganese, $117.56, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, $45.58 to $47.58, delivered.

Pig Iron.—The market is quiet as the holidays draw near, and outside of a fair volume of spot buying there is little activity to report. Among the few forward purchases was 500 tons of foundry for first quarter delivery, bought by a local melter. Small orders for prompt shipment have been fairly numerous, indicating that foundries, in their efforts to keep inventories down to the minimum, underestimated their December needs. One of the most favorable developments is the fact that melters are finally closing first quarter contracts for castings in good volume. Now that their forward needs are more clearly defined, they will no doubt find it necessary to come into the market for additional iron. Notwithstanding the large tonnage placed for first quarter in November, it is evident that there is still considerable iron to be bought for that delivery. The price situation appears to be weaker, although owing to the paucity of transactions, it has not undergone real test. In competitive territories such as the St. Louis district and Michigan, sales have been made at 50c. to 75c. under the market. In the Chicago district proper, malleable alone is unsteady, and in a few instances has been shaded to the extent of 50c. a ton. Although it is intimated that an attractive tonnage might be placed for first quarter at $23 base, Chicago furnace, a number of melters have failed to place their requirements at less than the regular price of $23.50, or 50c. over the price for prompt material. Southern foundry remains unchanged at $21, Birmingham, but sales in this territory have been confined to a few carload lots. Charcoal, low phosphorus and silvery are quiet.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal averaging sil. 1.50, delivered at Chicago	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	$23.50 to 24.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	23.00 to 23.50
Malleable, not over 2.25 sil.	23.00 to 23.50
Basic	23.00 to 23.50
High phosphorus	23.00 to 23.50
Southern No. 2	27.01
Low phos., sil. 1 to 2 per cent, copper free	34.79
Silvery, sil. 8 per cent	37.29

Plates.—Mills have quoted on the steel involved in cars recently placed and expect considerable additional tonnage to come up for consideration with the award of cars still pending. The Southern Pacific will probably close against its inquiry for 10,000 cars during the current week. Oil storage tank buying is at a low ebb. A Los Angeles contractor, however, is in the market for 2450 tons of plates for tanks to be erected in California.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—A considerable tonnage of soft steel bars, representing first quarter requirements of both jobbers and automotive interests, is pending, with the likelihood that orders will be placed soon. While prospects are regarded as favorable, actual buying to date has been light. Local prices remain unchanged at 2.50c. Chicago. Demand for bar iron shows no improvement. Business in hard steel bars is still unsatisfactory, although heavier orders are expected early in 1924, with a seasonal revival in fence post manufacture. Those bar iron and rail steel bar mills which are not operating intermittently find it difficult to sustain continuous production on a single turn basis.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.45c.; bands, 3.95c.

Structural Material.—Fabricating awards are more numerous and prospective tonnage scheduled to come up for bids early in the new year bulks large. The New Palmer House and the Chicago Tribune Tower, Chicago, will each require 11,000 tons. A new foundry building for the Crane Co. at Chicago will involve 7000 tons. Revised plans are being prepared for the Union League Club Building, Chicago, 5000 tons, on which preliminary figures were recently taken.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Rails and Track Supplies.—The Santa Fe has distributed rail orders as follows: 70,000 tons to Colorado Fuel & Iron Co., 17,850 tons to the Illinois Steel Co., 10,350 tons to Inland Steel Co., 4300 tons to the Bethlehem Steel Co. Out of 75,000 kegs of spikes placed by the New York Central, 20,000 kegs were ordered from the Illinois Steel Co. and the remainder was apportioned among the Inland Steel Co. and mills east of here. That road has not yet placed the other track supplies on which it recently took figures. Local rail mills are comfortably booked through the first half of next year, although some Western lines have not yet closed for their requirements. Among them are the

Northwestern, the Omaha, the Soo Line and Northern Pacific. It is also thought likely that the Burlington, the Great Northern and the Illinois Central may come into the market for additional tonnage.

Standard Bessemer and open hearth rails, $45; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; iron tie plates, $45 to 2.60c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts 4.75c. base.

Bolts and Nuts.—Discounts are firm and specifications are somewhat heavier. Automobile manufacturers are expanding their operations and are expected to be heavy buyers in the coming quarter, but purchases by farm implement makers average not more than 30 per cent of normal. Business, on the whole, is increasingly satisfactory, and one Western bolt and nut plant is operating full. Discounts are those on page 1692, but for this territory they are on an f.o.b. Chicago basis.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Wire Products.—Bookings of the mills are slightly heavier and while little contracting has been done, prospects for the first 60 days of next year are regarded as favorable. It is pointed out that stocks of both jobbers and retailers are low, and manufacturing users likewise have light inventories. Leading mills are still operating at about 80 per cent of capacity. For mill prices, which are unchanged, see page 1692.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Cast Iron.—Denver takes bids Dec. 19 on 1485 tons of 20- and 24-in. and 6500 tons of 36-, 42- and 48-in. water pipe. Spring Wells, Mich., receives tenders Dec. 26 on 600 tons of 6-in. class B water pipe. The Omaha Gas Co. is in the market for several hundred tons of gas pipe. The Council Bluffs Gas Co. has placed 500 tons of gas pipe with the National Cast Iron Pipe Co. Prices are steadily growing firmer and early advances are looked for. Growing scarcity of the smaller diameters possibly forecasts premiums on those sizes.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $59.20; 6-in. and above, $55.20; class A and gas pipe, $5 extra.

Sheets.—The market situation shows little change. A number of independent mills are still booking galvanized and black at concessions of $2 a ton under the Steel Corporation prices, but the amount of business going at the latter figures is increasing.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Reinforcing Bars.—Lettings are few and new projects are largely of a prospective nature on which action is not expected until some time after the first of the year. Although a dull market was looked for with the approach of the holiday season, it is to be noted that even small tonnages are bringing out rather sharp concessions in prices and the quotation of 3c., Chicago warehouse, is rapidly becoming a purely nominal figure. The weakness of the situation is illustrated by the fact that a job of less than 75 tons, in miscellaneous lengths, was taken directly by a producer at the mill price of 2.50c., Chicago.

Lettings include:

State road work near Galesburg and Monmouth, Ill., 150 tons, A. M. Castle & Co.

Plant for Capitol Brass Works, Detroit, Mich., 100 tons to McRae Steel Co.

Pending business includes:

Continental Can Co., plant at Chicago, 600 tons, Francisco & Jacobus, architects.

Municipal work for St. Paul, Minn., 112 tons.

Indiana State road work, 300 tons, bids on general contract to be received Dec. 18.

Illinois State road work, 300 tons, general contracts placed, but steel not yet bought.

Old Material.—No further consumer purchases of heavy melting have been made, but dealers find it necessary to pay advancing prices to fill their short orders. The possibility that the Steel Corporation, which recently bought liberally at Pittsburgh, may also enter the market here is causing holders of scrap to conserve their stocks in anticipation of still higher prices. This has given the market an appearance of scarcity, although actually available supplies are probably materially in excess of current demand. Consumer buying, while confined to small lots, covers most grades outside of heavy melting, and is more than sufficient to absorb all scrap on track. Railroad offerings include the Chesapeake & Ohio, 12,000 tons; the Rock Island, 6000 tons; the Chicago & Alton, 1500 tons, and the Soo Line, 600 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$20.00 to	$20.50
Cast iron car wheels	20.00 to	20.50
Relaying rails, 56 and 60 lb.	26.00 to	27.00
Relaying rails, 85 lb. and heavier	22.00 to	23.00
Forged steel car wheels	20.00 to	20.50
Railroad tires, charging box size	20.00 to	20.50
Railroad leaf springs, cut apart	20.50 to	21.00
Rails for rerolling	17.50 to	18.00
Steel rails, less than 3 ft.	19.50 to	20.00
Heavy melting steel	16.50 to	17.00
Frogs, switches and guards cut apart	16.50 to	17.00
Shoveling steel	16.00 to	16.50
Drop forge flashings	13.00 to	13.50
Hydraulic compressed sheets	13.50 to	14.00
Axle turnings	13.50 to	14.00
Steel angle bars	18.50 to	19.00
	Per Net Ton	
Iron angle and splice bars	21.00 to	21.50
Iron arch bars and transoms	21.00 to	21.50
Iron car axles	26.00 to	26.50
Steel car axles	17.50 to	18.00
No. 1 busheling	13.00 to	13.50
No. 2 busheling	8.00 to	8.50
Cut forge	15.00 to	15.50
Pipes and flues	10.50 to	11.00
No. 1 railroad wrought	15.50 to	16.00
No. 2 railroad wrought	15.00 to	15.50
Steel knuckles and couplers	18.50 to	19.00
Coil springs	20.00 to	20.50
No. 1 machinery cast	20.00 to	20.50
No. 1 railroad cast	19.00 to	19.50
No. 1 agricultural cast	19.00 to	19.50
Low phos. punchings	16.00 to	16.50
Locomotive tires, smooth	17.50 to	18.00
Machine shop turnings	9.00 to	9.50
Cast borings	11.25 to	11.75
Short shoveling turnings	11.25 to	11.75
Stove plates	18.00 to	18.50
Grate bars	16.50 to	17.00
Brake shoes	17.50 to	18.00
Railroad malleable	18.00 to	18.50
Agricultural malleable	18.00 to	18.50

Detroit Scrap Market

DETROIT, Dec. 18.—With the first week of the inventory period under way, most melters have asked for shipments to be deferred until after the first of the year. This applies to waste material as well as pig iron. Where these materials are contracted for, tentative production schedules for the first quarter of the year have been set by most of the automobile manufacturing companies, but definite tonnages have not been allotted the casting producers. This is especially true in the malleable industry. Prices, the same as quoted a week ago, follow.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel, net ton	$14.50 to $15.00
Shoveling steel	13.50 to 14.50
Borings	10.00 to 11.00
Short turnings	10.00 to 11.00
Long turnings	9.50 to 10.00
No. 1 machinery cast	17.00 to 18.00
Automobile cast	23.50 to 24.00
Hydraulic compressed	11.50 to 12.00
Stove plate	15.00 to 16.00
No. 1 busheling	10.00 to 11.00
Sheet clippings	8.75 to 9.25
Flashings	10.50 to 11.00

New York

Demand for Structural Steel Continues with Uncertainty in Other Lines

NEW YORK, Dec. 18.—Varying factors in the finished steel market leave the situation somewhat muddled as the year draws to a close. On the one hand, is a very large demand for structural steel, which has resulted in a decided stiffening in fabricated steel prices. Some of the local fabricating shops are filled for four to seven months and are less inclined to quote low prices in view of that fact. Last week's awards, as reported by local steel offices and fabricators, total close to 25,000 tons, and there is a good deal of work pending. In no other branch of the steel trade, however, is the situation so promising. Manufacturing consumers are in no hurry to cover for first quarter except possibly in tin plate, which is now pretty well sold for first quarter. Steel companies are resisting the efforts of customers to contract at lower than today's quotations. This has been particularly true in bars. Railroads are making no move to anticipate their 1924 car requirements, as it was confidently expected they would do before the end of the year. In fact, the Chesapeake & Ohio Railroad has definitely withdrawn its inquiry for 2000 cars, giving as a reason the high prices quoted on the specialties. Car builders, however, are anxious for business and willing to make concessions that may offset other high costs. Where material is needed for maintenance, the railroads are not backward, however, in placing orders. For example, the New York Central last week divided orders for 60,000 or more kegs of track spikes and a proportionately large tonnage of track bolts for 1924 shipment, four mills having taken the business. The demand for plates is only slightly improved, if any, and operations of Eastern plate mills over the remainder of the month will be low.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Pig Iron.—The only inquiry of any importance pending is that of the Worthington Pump & Machinery Corporation for about 2000 tons, of which 1450 is for delivery to Harrison, N. J., and the remainder to East Cambridge, Mass. Sales of small tonnages have been fairly numerous, and one company reports an aggregate of 1000 tons sold in Connecticut. Some of the selling has been for prompt shipment, but most of it for first quarter. Reports from salesmen who have been in New England the past week indicate that foundries connected with hardware companies are very busy, but those connected with machine tool concerns are working at a reduced rate. Prices show little, if any, change, with $22, Buffalo, as the usual price made by furnaces in that district, and $23 as the usual price in eastern Pennsylvania. Some Buffalo iron in the hands of brokers is being sold at $22 for No. 2X and $22.50 for No. 1X. Many foundries will close for the holidays, some for a week and some for two weeks.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.27 to $25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.77 to 25.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.77 to 25.27
Buffalo, sil. 1.75 to 2.25	26.41 to 26.91
No. 2X Virginia, sil. 2.25 to 2.75	29.94 to 30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 29.94

Ferroalloys.—There are several inquiries for ferromanganese before the market, including one for 1000 tons, another for 500 and the total aggregating over 2000 tons. One British representative reports the sale of at least 1000 tons the last week at the British price of $110, seaboard. Domestic producers are taking some business at a concession of at least $1 under this price. The spiegeleisen market is moderately active at unchanged quotations. Contracts for 1924 in 50 per cent ferrosilicon are reported as being satisfactorily negotiated at the new quotation announced last week of $75 per ton, delivered, for alloy containing 50 per cent ferrosilicon.

Cast-Iron Pipe.—As a result of the approaching holidays and the advanced season business is extremely light. A renewal of activity is expected early in January. In the meantime, makers are offering concessions to purchasers willing to accept winter delivery. One maker in this district reports a suspension of activity for inventory and repairs. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Makers of soil pipe are, as a rule, booked well into February. Present business is light. Most makers will probably close down between Christmas and New Year for inventory and repairs. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 29½ to 35¾ per cent off list; heavy, 39½ to 45¾ per cent off list.

Warehouse Business.—Business out of stock has declined to a very light demand for prompt delivery of small lots. Prices continue firm. The market on blue annealed sheets is fairly well established at 4.34c. per lb. base. Although sellers of black and galvanized sheets have made efforts to stiffen prices to a more profitable basis, the lower quotations continue in some cases. Galvanized sheets, however, are stronger than black, as stocks on hand are apparently not as large. Sales of wrought iron and steel pipe are small, this being the usual situation at this season. No increase in the volume of business is expected until after Jan. 1. We quote prices on page 1710.

Coke.—Prices continue firm and demand is fairly active, with some contracting for next year. Standard foundry coke is firm at 5.25 to $6.25 per ton and standard furnace at $4 to $4.50 per ton. By-product is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—Prices continue firm with a slight upward tendency on some grades. Heavy melting steel ranges from $16.50 to $17 per ton, eastern Pennsylvania, with occasional higher prices. Holders of steel show a strong inclination to await higher prices before selling. Specification pipe is firm at $16 for both Lebanon and Milton, Pa. Stove plate is fairly active, shipments going forward to Harrisburg and Phoenixville, Pa., and West Mahwah, N. J., at $16.50 per ton. Cast borings are generally quoted at $13.75 per ton delivered eastern Pennsylvania consumers, machine shop turnings at $14.50 per ton and borings and turnings at $12 or more. But little activity is expected until after Jan. 1, except for transactions between dealers.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.50 to $13.00
Steel rails, short lengths, or equivalent	13.25 to 13.75
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	16.00 to 17.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	10.00 to 10.50
Machine-shop turnings	10.50 to 11.00
Mixed borings and turnings	9.00 to 9.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.00 to 12.50
Stove plate	12.50 to 13.50
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	14.00 to 15.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

On Dec. 10 total steel ingot production, representing the combined output of the Bessemer and open-hearth departments of the Carnegie Steel Co., at Youngstown, exceeded the total production of these departments for any previous 12-month period. The company's Ohio Works, McDonald plant and Upper and Lower Union Works are operating at a capacity rate.

Cincinnati

Limited Sales of Pig Iron at Recent Prices—Scrap Advanced

CINCINNATI, Dec. 18.—With the exception of a sale of approximately 1500 tons of malleable to a central Ohio melter, the market activity last week was confined almost exclusively to one and two carload lots, charcoal and foundry iron sales predominating. Most of the iron sold was from the North, very little Southern iron coming out. The L. & N. Railroad bought 750 tons of Southern iron on a $21 Birmingham base. A car manufacturer took 500 tons of foundry, including about 200 tons of Virginia iron, at $24 furnace. Prices on all grades show little change from the previous week, the exception being in the case of the high silicon Southern irons, where a concession of 50c. per ton has been made. On the lower grades, however, the base price with regular differentials is being maintained. In southern Ohio $22.50 continues as the minimum, with one furnace now asking $24. Numbers of contracts are being made for ferrosilicon requirements and a sale of 200 tons of spiegeleisen has been made for first quarter delivery.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern	24.77
Malleable	24.77

Fluorspar.—A sale of 300 tons of fluorspar was made last week at the schedule. Some of the smaller mines have ceased operations for the winter months, and the larger producers will now be a factor in the market. Prices generally are strong, at $22 to $23.50, Illinois and Kentucky mines.

Sheets and Tin Plate.—Current business is light, but orders for shipment after Jan. 1 are coming through in good shape. A number of the larger consumers have asked that shipments be held up for a few days near the end of the year, so that inventories might be low. The price situation has strengthened to the extent that fewer mills are quoting low prices, but it is still possible to buy black and galvanized sheets for December shipment at from $2 to $4 below the regular price. Tin plate continues in good demand, with prices strong.

Structural Materials.—Third National Bank Building, Dayton, Ohio, involving 1050 tons, has been awarded to the American Bridge Co. This is the only award of importance. Steel for the Kentucky Hotel, Louisville, involving approximately 2200 tons, is on inquiry, though not the full tonnage as yet. The Coal Exchange Building, Huntington, W. Va., will probably be awarded shortly. This building will require about 800 tons, and bids were taken some time ago. No. 1 Office Building, State of West Virginia, to be built at Charleston, will require 1000 tons, on which bids will close Dec. 21.

Warehouse Business.—Local warehouses report that this month to date is showing more activity than was presented in the same period in November. Orders, while very numerous, are for small tonnages. No price changes have been made, but it is probable that a reduction in prices of cold-rolled steel will be made to meet the reduction of $6 per ton put into effect by Chicago jobbers.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Reinforcing Bars.—The municipal stadium at Terre Haute, Ind., contract for which will be let shortly, will require about 450 tons of bars, and these are expected to be awarded this week. The Kentucky Hotel, Louisville, Ky., will require about 120 tons. A number of other smaller projects are up for bids, and several small awards have been made, making a fair aggregate tonnage in all. Prices are holding at 2.20c. to 2.40c., mill, for rerolled and new steel bars respectively.

Finished Materials.—Demand for finished materials is light, one and two carload orders for prompt shipment predominating. While there has been a little contracting for first quarter materials, consumers generally have adopted a waiting policy, feeling that with the need for orders on the part of the mills they will not lose anything by waiting a few weeks before placing their business. For quick delivery 2.40c. is being done freely by a number of the smaller plate mills, but none of the larger companies has met this price. Shapes are holding fairly well at 2.50c. Some concessions on bars have been made on attractive orders, but this practice is by no means general. Action of the Chicago mill in quoting 3c., Chicagobase, on cold-rolled has been met by Pittsburgh district mills equalizing freight rates to points of shipment, which means in Cincinnati the equivalent of about 2.95c., Pittsburgh, with the regular freight added. There have been some sales of bolts and nuts, spikes, and other track material. Wire products are moving slowly.

Coke.—The coke market is exceptionally quiet, but prices are being held fairly well. Some Connellsville foundry coke for prompt shipment was offered today at $4.50 ovens, but the general asking price is $5. We quote:

Connellsville furnace, $4.00; foundry, $4.50 to $5.00; New River foundry, $10.00 to $11.00; Wise County furnace, $4.75 to $5.25; foundry, $5.75 to $7.00; by-product foundry, $8.00, Connellsville basis.

Old Material.—The local market is dull as far as sales are concerned, but dealers are still actively buying, and as a result the whole list is up at least 50c. Buying is expected to develop shortly on both steel and foundry grades, as some consumers are showing more interest in prices than for some time.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$11.00 to $11.50
Iron rails	14.50 to 15.00
Relaying rails, 50 lb. and up	28.50 to 29.00
Rails for rolling	14.50 to 15.00
Heavy melting steel	14.00 to 14.50
Steel rails for melting	14.00 to 14.50
Car wheels	14.00 to 14.50
Per Net Ton	
No. 1 railroad wrought	12.50 to 13.00
Cast borings	10.00 to 10.50
Steel turnings	9.50 to 10.00
Railroad cast	15.00 to 15.50
No. 1 machinery cast	18.00 to 18.50
Burnt scrap	12.00 to 12.50
Iron axles	22.50
Locomotive tires (smooth inside)	14.00 to 14.50
Pipes and flues	9.00 to 9.50

Canadian Scrap Market

TORONTO, ONT., Dec. 17.—While the Canadian iron and steel scrap market has been dull during the past week or ten days, selling interests are inclined to be more optimistic than in the past. It is stated that melters in general are short of scrap, and while these have been withholding contracts for first quarter requirements for some time, local dealers look for a general improvement in demand shortly after the turn of the year. The approaching holiday season and the fact that consumers are in the midst of inventories are features that are holding up business for the present, but despite this a certain amount of buying is reported on spot account. Steel plants and foundries are taking in small tonnage lots from time to time, but orders so far received specify delivery before the end of this year, and no contracts have been placed for first quarter. Prices are as follows:

Dealers' Buying Prices, Gross Tons

	Toronto	Montreal
Steel turnings	$10.00	$7.00
Machine shop turnings	10.00	7.00
Wrought pipe	8.00	8.00
Rails	12.00	13.50
No. 1 wrought scrap	14.00	14.00
Heavy melting steel	12.00	10.00
Steel axles	15.00	18.00
Axles, wrought iron	18.00	20.00
Net Tons		
Standard car wheels	15.00	14.00
Malleable scrap	15.00	12.00
Stove plate	15.00	14.00
No. 1 machinery cast	18.00	18.00

Boston

Pig Iron Business Dull—Some Resale Iron at Concessions

BOSTON, Dec. 18.—A further contraction in the New England melt of iron is noted, largely because of a slump in jobbing foundry work, and a still further shrinkage is scheduled for Christmas week, inasmuch as some of the largest foundries will be closed from Dec. 22 until Jan. 2. Local furnace representatives are receiving no open inquiries. Business is obtained only by solicitation. The position of the furnaces, therefore, is not so strong notwithstanding their sold up condition. For instance, eastern Pennsylvania iron is obtainable at $26.15 delivered base, with 50c. differentials, although $26.65 is commonly quoted. Buffalo No. 2X resale is offered at $26.91 and No. 1X at $27.91 to $28.41, or 50c. to $1 under regular furnace quotations. Two central Pennsylvania furnaces offer iron at $26.79 delivered base, with 50c. differentials, or a little less than the cheapest Buffalo available. A sale of 500 tons of Buffalo No. 2 plain, first quarter, to a Massachusetts melter at $27.91 delivered represents the largest recent transaction reported locally. A Cape Cod foundry bought 200 tons of Buffalo No. 2X resale at $26.91 delivered. Otherwise business has been in 100 ton lots or smaller and of less volume than the previous week.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$26.15 to $28.15
East. Penn., sil. 1.75 to 2.25	26.15 to 26.65
Buffalo, sil. 2.25 to 2.75	26.91 to 27.91
Buffalo, sil. 1.75 to 2.25	26.91 to 27.41
Virginia, sil. 2.25 to 2.75	30.92 to 32.42
Virginia, sil. 1.75 to 2.25	30.92 to 31.92
Alabama, sil. 2.25 to 2.75	31.10
Alabama, sil. 1.75 to 2.25	30.60

Finished Material.—Stone & Webster, Boston, have awarded 2500 tons of structural steel for a Fall River, Mass., power house to the American Bridge Co. No other large awards are expected this year. Warehouses and fabricators, carrying small but well assorted stocks, are buying plain material more freely for first quarter at 2.40c. Pittsburgh base. Occasionally that figure is shaded. Business in bars for first quarter shipment also is picking up, with 2.40c. base generally maintained on steel. Better than that is reported to have been done on iron bars, however. Consumers and warehouses are contracting for first quarter bolt and nut requirements, but such buying is without special feature.

Coke.—Unseasonably warm weather had made for accumulation of crushed cokes in this territory and prices have a downward tendency. The New England Coal & Coke Co. and the Providence Gas Co., however, continue to quote foundry coke on a basis of $12.50 delivered in New England. Specifications against 1923 foundry coke contracts hold up well, and at least one of the producers in this territory is securing shipping instructions from outside New England. For these reasons the company has under consideration plans for putting an additional oven battery on foundry coke production. Little interest is shown by New England foundries in Connellsville cokes.

Old Material.—Aside from a car of No. 1 and No. 2 machinery cast now and then, little material is being purchased by New England melters. There is, however, slightly more inquiry for eastern Pennsylvania shipment, especially for borings and turnings, which average 50c. to $1 a ton higher than a week ago. The demand for chemical borings appears to have died down, but prices hold firm. Forged scrap and bundled skeleton also are in better request, and as high as $10 has again been paid for specially selected forged material, with $9 to $9.50 the most common price paid. Inquiry for heavy melting steel is greater, yet actual transactions are limited, inasmuch as owners are still inclined to hold out for higher prices. On the other hand, little interest is shown in railroad and yard wrought and the market for such materials is largely nominal. Cotton ties, for Pennsylvania consumption, have changed hands within the past day or two at $8 and $8.50 on cars shipping point, which represents a slightly firmer basis.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plates	16.00 to 16.50
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.50 to $13.00
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	11.00 to 11.50
Wrought pipe (1-in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings	9.00 to 9.50
Cast iron borings, chemical	10.00 to 10.50
Cast iron borings, rolling mill	9.00 to 9.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	16.00 to 16.50
Rails for rolling	12.50 to 13.00

St. Louis

Some Improvement in Demand for Pig Iron at Unchanged Prices

ST. LOUIS, Dec. 18.—The St. Louis Coke & Iron Co. sold 5000 tons of basic pig iron to an East Side melter for first quarter delivery and 2000 tons of car wheel iron to an Illinois melter, also for first quarter delivery, during the last week. Other sales during the week included 200 tons of foundry iron to an Illinois machinery manufacturer and two lots of 300 tons each of charcoal iron to Texas melters. In addition there were sales of carloads up to 100 tons of small totals. Business generally showed an improvement over the previous week. New inquiries before the market include 1000 tons of malleable for a Tennessee melter, 100 tons of low silicon for a Quincy foundry, 700 tons foundry iron for the Louisville & Nashville Railroad and 1000 tons for a Texas melter for first quarter delivery. The Southern market is still at $21 Birmingham, an offer of $20.50 for 350 tons being turned down by a Birmingham maker. Northern iron is quoted at $23 to $23.50 Chicago.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and $1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$25.16 to $25.66
Northern malleable, sil. 1.75 to 2.25	25.16 to 25.66
Basic	25.16 to 25.66
Southern fdy., sil. 1.75 to 2.25 (rail)	26.17

Finished Iron and Steel.—Fabricators are inquiring for materials, and there is a better feeling in structural steel from this source. The Mississippi Valley Structural Steel Co. got the contract for 1100 tons for the Ford Motor Co. building at Kansas City, Mo. There are very few railroad inquiries, and warehouse business is extremely quiet.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, ¾-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—The market for coke is quiet. The weather has been more seasonal for the consumption of domestic grades, but not sufficiently so as to cause dealers to enter the market actively.

Old Material.—Prices of old material continue to mount, the advances this week ranging from 50c. to $1.50 per ton. There has been some buying by consumers, notably the purchase of 3000 tons of rerolling rails by a leading factor in the district at $18 per gross ton. Dealers have great faith in the market, and their ton. Dealers have great faith in the market, and their tons. Railroads desire to get material is boosting prices. Railroads desire to get material is boosting prices. Railroads continue to get out new lists, including Missouri, Kansis-Texas, 2000 tons; Frisco lines, 2000 tons; Rock

Island, 5000 tons; Wabash, 2000 tons; Southern Pacific, 7500 tons; Louisville & Nashville, 11,000 tons and Norfolk & Western, 20,000 tons. Some of the lines issuing new lists are as much as three months behind in deliveries on old lists. This situation is strengthening the position of the dealers, whose own stocks are low.

Per Gross Ton

Iron rails	$16.00 to $17.00
Rails for rolling	17.00 to 18.00
Steel rails, less than 3 ft.	19.00 to 20.00
Relaying rails, 60 lb. and under	32.00 to 35.00
Relaying rails, 70 and over	32.50 to 33.50
Cast iron car wheels	19.00 to 19.50
Heavy melting steel	16.00 to 16.50
Heavy shoveling steel	15.50 to 16.00
Frogs, switches and guards cut apart	16.50 to 17.00
Railroad springs	19.00 to 19.50
Heavy axles and tire turnings	13.50 to 14.00

Per Net Ton

Steel angle bars	15.00 to 15.50
Steel car axles	17.00 to 17.50
Iron car axles	25.00 to 25.50
Wrought iron bars and transoms	19.50 to 20.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.00 to 13.50
Cast iron borings	11.50 to 12.00
No. 1 busheling	14.00 to 14.50
No. 1 railroad cast	17.50 to 18.00
No. 1 machinery cast	18.00 to 18.50
Railroad malleable	16.00 to 16.50
Machine shop turnings	9.00 to 9.50
Champion bundled sheets	9.00 to 9.50

Birmingham

Production of Pig Iron Is Heavy, but Sales Are of Small Tonnages

BIRMINGHAM, ALA., Dec. 18.—While the buying of iron has been tapering off recently as compared to the activity last month, the Southern pig iron market is considered firm and inclined upward. The prospects are that before the end of the month the furnace interests will be asking $22 per ton for No. 2 foundry. Inquiries for iron for second quarter delivery are being received spasmodically, but the deals consummated are not numerous. The producers are not yet willing to accept prices or make concessions on prevailing quotations. The smaller melters are not reducing their operations. In some instances the lay-off for the holiday season will be very brief. Some of the larger consumers of pig iron will take a week to 10 days off, during which time there will be repairing done. The furnace operations are being maintained with the make holding up well. Surplus stock in Alabama has been going down steadily and not much over 80,000 tons of all kinds of iron is estimated on yards here. Smaller consumers, such as stove makers, will be back in the market on the turn of the year. Pig iron of the Birmingham district is being shipped to the Middle West mainly; that is, the iron going outside of the immediate territory. Cast iron pipe makers are the steadiest melters of iron, the sanitary pipe plants in particular. With few exceptions these industries have been operating during the last few weeks on very good schedule, and much of the warehouse stock has been shipped out. Quotations during the month have been around $21. Pig iron production in Alabama during the last month of the year will be equal to that of the month previous, and even October.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$21.00
Basic	21.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—Lettings still come in to Southern cast iron pipe makers for various sizes in pipe, both pressure and sanitary pipe, and steady operation is to be seen for an indefinite period to come. The American Cast Iron Pipe Co. reports orders from Kansas City, Mo., for 580 tons, West Monroe, La., for 373 tons, and Fort Worth, Tex., for 125 tons. This company has also divided tonnage in Minneapolis and St. Paul. The National Cast Iron Pipe Co. and the United States Cast Iron Pipe & Foundry Co. have steadily participated in the business and are getting their usual share.

4-in. water, $51; 6-in., $47; larger sizes, $46; 4-in. gas, $56; 6-in., $52; standard sanitary pipe, $55; heavy gage, $45.

Coke.—No change has taken place recently in the Southern coke market. Production is decreasing, upward of 75 by-product coke ovens and more than 150 beehive ovens ceasing operation. Quotations remain weak, at about $5 the ton on by-product coke.

Old Material.—A better tone is noted in the Southern scrap iron and steel market. Dealers are not selling into the future very strongly. Plenty of stock is on hand. Quotations remain the same as they were last week. Heavy melting steel lags, while steel axles cut into 3-ft. lengths are finding a little demand at $17.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$16.00
Heavy melting steel	12.00
Railroad wrought	14.00
Steel axles	17.00
Iron axles	20.00
Steel rails	13.00
No. 1 cast	18.00
Tram car wheels	15.50
Car wheels	15.00
Stove plate	14.00
Machine shop turnings	6.00
Cast iron borings	8.00

San Francisco

Business Generally Dull, but Improvement at Early Date Expected

SAN FRANCISCO, Dec. 12.—Present dullness and uncertainty as to the future seem to be the dominating features of the iron and steel industry in this part of the State for the time being, notwithstanding the fact that there are some good prospects for enlarged trade which may reasonably be counted upon to mature shortly after the close of the year. A close study of the situation shows a continuance of the small improvement noted two weeks ago, but it is confined more to increased inquiries rather than new orders. Purchasers are still backward in placing commitments except such small lots as are necessary for immediate requirements. The dullness of business is clearly shown by the decreased imports of pig iron by sea. During the months of September, October and November of this year the total imports were 2278 tons, while for the same months of last year the total was 7710 tons. Thus far in December there have been no arrivals. In the way of encouragement, traders point to a largely increased volume of railroad, bridge and station work on which figures have recently been given, coupled with public construction, mostly schoolhouses, which makes a much better showing than at this time last year.

Pig Iron.—There is not much change in general conditions, but the inquiries seem to indicate that the business outlook is more satisfactory than it was at this time last month. Importers report that sales for December thus far for future delivery are better than for the last two months. Prices are a trifle easier, the quotable range now being from $32 to $34 per ton, and several lots have recently changed hands within these figures for January delivery. While these lots were around 500 to 600 tons, they seem to be regarded as an indication that consumers have allowed their supplies to get down to a very low quantity and additional buying orders are looked for. There is some tonnage on the way, but none is expected to arrive before the middle of next month. The trading in pig iron has been gradually growing less for the last two months, so that the orders of the past ten days are regarded as an indication that the worst of the dullness is past. Reports from Los Angeles say that while activity is still marked there, it is a little more quiet than two weeks ago.

Finished Steel and Iron.—Both mills and foundries report business fair in volume, and while there is not enough to cause any accumulation of orders, it is sufficient to keep labor forces steadily employed for prompt filling of orders. Stocks of merchant bars in hands of consumers are reported low and prices are firmly held at $3.75, with no small lots selling under $4. The demand for structural steel continues good, with prices held steady. There has been some sale of wire and rods

for shipment to Japan, but this trade has not been up to expectations, the statement being made that the great bulk of this business has been placed with buyers on the Atlantic seaboard. Sales of reinforcing material are reported fairly large for this part of the State, with prices unchanged and firmly held.

Coke.—Buyers are slow in making any commitments outside of the usual routine business. Three cargoes of moderate tonnage are on the way, the first, expected to arrive about Dec. 20, is practically all spoken for. The second will arrive about Jan. 15, and the third some ten days later. The price is a trifle lower than two weeks ago, $21, being now a full figure. There is not much demand, but traders expect improvement early in the new year, probably in January.

Old Material.—Buyers are purchasing in small quantities, and although there has been some concession in prices, it failed to stimulate trade. The quotable range is now $13.50 to $14 for the San Francisco region and from 50c. to $1 lower in the Los Angeles field. The slackening down of the oil industry and the resultant decrease in demand for well equipment has had marked effect on the demand for old material. Receipts are ample for all requirements, and the quoted prices are rather easy. A cargo aggregating some 1200 tons is expected from the Mexican coast within the next week or so.

Buffalo

Furnaces Asking Somewhat Higher Prices—Sales Very Light

BUFFALO, Dec. 18.—Disinterest on the part of pig iron buyers, following the extraordinary buying in November, is further emphasized by holiday quietness. While the greater number of consumers bought first quarter requirements last month, surveys in the district show that considerable iron is to be bought, but that the placing of this will probably go over until the new year. The wide range of prices asked by Buffalo producers has been somewhat shortened; one furnace which did not share to a large extent in the recent buying activity was asking $21.50 as compared with another producer having a comfortable back log, asking $23, base. Recent quotations, however, show the minimum for silicon 1.75 to 2.25 to be $22, quoted by furnaces, but brokers are selling some No. 2X at $22 and No. 1X at $22.50. The practice of considering every inquiry separately before prices are given out is being continued by two sellers. One furnace quoting $22 for silicon 1.75 to 2.25 is asking differentials of $1 on higher silicons, but it is still possible to buy furnace iron on the 50c. differential scale. Total sales are less than 5000 tons. Small tonnages of malleable have been sold at $23, furnace.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$22.50 to $23.00
No. 2 foundry, sil. 2.25 to 2.75	22.00 to 22.50
No. 2 plain, sil. 1.75 to 2.25	21.50 to 22.00
Basic	22.00
Malleable	22.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Buying for immediate delivery is the only business in this market, and demand for bars, shapes and plates is dull. Of these three products, bars are livelier than the others, but prices on the three lines hold uniformly. Sheet prices are being shaded on orders that call for prompt shipment, and 3.80c. for black and 4.90c. for galvanized have been done where deliveries are to be made this month. On first quarter sheet business, however, the schedule is being observed. Bolt demand is slow, but this quietness is not attributed to the new list of discounts. The whole market is on the threshold of holiday inactivity.

We quote warehouse prices Buffalo as follows:

Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—Between 10,000 and 15,000 tons of heavy melting steel have been sold. Demand outside the district is better for all scrap. Some of the steel tonnages were for immediate delivery, the buyers finding that they had almost reduced their stocks to the point of exhaustion.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$17.50 to $18.00
Low phos. 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	18.00 to 18.50
Machine shop turnings	10.00 to 11.00
Cast iron borings	12.50 to 13.00
No. 1 busheling	14.00 to 15.00
Stove plate	17.00 to 17.25
Grate bars	16.00 to 16.50
Bundled sheet stampings	10.00 to 11.00
Hydraulic compressed	14.00 to 14.50
Railroad malleable	19.50 to 20.50
No. 1 machinery cast	19.50 to 20.50

Cleveland

Heavy Buying of Steel by Automobile Companies

CLEVELAND, Dec. 18.—Buying by the automobile industry reported under way last week has continued and during the past few days a heavy tonnage was placed in various steel products. Much additional business from the same source is under negotiation. Most of the automobile companies are buying for three months' requirements and are arranging their schedules for large production. The Ford Motor Co. is taking up purchases of one line of steel products at a time, and during the week placed close to 30,000 tons of steel. This is in addition to a round tonnage of alloy steel purchases previously reported and does not include sheets. A Cleveland manufacturer of automobile parts has purchased 12,000 tons of carbon and 6000 tons of silicon manganese steel covering its first half requirements. A leading Cleveland automobile company has placed orders directly for steel or for parts for 10,000 cars covering a schedule production for about four months and a great deal of business in forging and other parts is being placed with parts manufacturers. Large orders have also been placed for special sections for tire bases and rims for passenger car and truck wheels. The Ford Motor Co. has advised suppliers of material that its plant will be shut down for inventory only from Dec. 28 to Jan. 1. Outside of the automobile industry considerable business has been placed in first quarter contracts, largely for bars, and some of the contracts are for the first half. There is also an increase in the demand for small lot orders to fill in depleted stocks. Sentimentally the market shows a marked improvement and prices on some lines display firmer tendency. In structural steel, the outstanding award of the week was the placing of 6400 tons of steel for the Brotherhood of Locomotive Engineers bank and office building, Cleveland, to the Bethlehem Steel Co. An unusually large amount of structural work is being figured on for this season of the year. The plate market continues quiet, with no change in the recent price spread of 2.40c. to 2.50c. Hot-rolled strip steel is firmer, but a good tonnage would probably still bring out a 2.75c. price for wide sections. Hoop and band mills are trying to hold to 3c.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Pig Iron.—There is little activity, as most consumers are under contract, and those who have not yet bought are disposed to wait until the first of the year. However, some small lot sales are being made and the volume of business is fully as good as it was previous to the recent buying movement. One producer reports several sales during the week aggregating 3000 tons.

A number of new inquiries have come out, including one for 2000 tons of malleable iron and another for 500 tons of foundry iron. The promising outlook in the automobile field indicates further buying by automobile foundries. One maker of automobile equipment who had previously purchased a round tonnage of iron placed 500 tons additional during the week. In steel making grades, local producers have quoted on the inquiry for 7000 tons of basic iron from the Follansbee Bros. Co. and an inquiry for 5000 tons of basic iron has come from a Canton consumer. Prices are firm and show little change. The usual quotation on foundry iron by lake furnaces is $22.50, although one 500-ton lot was sold to a nearby consumer at $24. In Cleveland $22.50 at furnace is still quoted for foundry iron for local delivery, although one producer is asking $23. Valley quotations on foundry and malleable iron range from $22 to $22.50. Consumers generally are taking all their iron on contract and December shipments show a gain over November.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.00
Northern No. 2 fdy., sil. 1.75 to 2.25	23.00
Southern fdy., sil. 1.75 to 2.25	27.00
Malleable	23.00
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	$29.00 to $30.00

Sheets.—Considerable additional business in automobile body sheets was booked during the week. The Ford Motor Co., which inquired for 30,000 tons for the first quarter, is understood to have purchased a large part of that tonnage. While there are intimations that this company was able to secure concessions from the 5.35c. price, there is no definite confirmation of this. Although the sheet market is firmer, some of the mills are taking black sheets at 3.75c. for January rolling, and concessions of $2 a ton to 2.90c. are still being made on blue annealed sheets. Consumers, as a rule, are not inclined to buy for extended requirements, although some have placed first quarter contracts at regular prices.

Reinforcing Bars.—Bids will be taken Dec. 21 for 600 tons for the Buhl Building at Detroit. The Brotherhood of Locomotive Engineers' Building, Cleveland, will require 480 tons, which will probably be placed this week. Prices on soft steel reinforcing bars lack firmness, due probably to the competition of rerolled bars. Quotations as low as 2.30c. are not uncommon on the former, and a desirable order would probably bring out a 2.25c. price. Rail steel bars are unchanged at 2.10c.

Semi-Finished Steel—Consumers are holding back in placing sheet bars for the first quarter, not being satisfied that the regular $42.50 price will hold, but no concessions from this price are being made. A number of inquiries are pending. A leading local producer has taken several first quarter contracts, subject to prices prevailing at time of shipment.

Bolts, Nuts and Rivets.—A good volume of bolt and nut business has come out in first quarter contracts at regular prices, which are firmly held. Current orders are fair for this time of the year. Rivets are firm at 2.90c. Some consumers are placing rivet contracts for the first quarter.

Coke.—There is a fair volume of activity in foundry coke contracts for the first quarter and first half. Contract business is being placed at $6.50 for high grade Connellsville fuel and at $6.75 for Wise County coke. Quotations for Connellsville foundry coke for spot shipment range from $5 to $6.50.

Old Material.—The market became more active during the week and rather large tonnages of heavy melting steel, machine shop turnings and mixed borings and turnings were purchased by northern Ohio mills. One Cleveland consumer bought a round tonnage of heavy melting steel and another a small tonnage of turnings. Prices paid were $17.50 to $18 for heavy melting steel and $14 for machine shop turnings and mixed borings and turnings. The buying has subsided and not much activity is expected during the remainder of the year, as some of the mills will defer purchasing until January. The market is very firm and dealers have paid as high as $14.50 for mixed borings and turnings. Dealers also during the advancing market have been compelled to pay for other grades more than prices at which they have made sales. Prices are unchanged with the exception of an advance of 50c. a ton on old rails and flashings.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.50 to $17.00
Rails for rolling	17.25 to 17.75
Rails under 3 ft	17.50 to 17.75
Low phosphorus melting	18.50 to 19.00
Cast borings	13.25 to 13.50
Machine shop turnings	12.50 to 13.00
Mixed borings and short turnings	13.25 to 13.75
Compressed sheet steel	13.25 to 13.75
Railroad wrought	15.00 to 16.00
Railroad malleable	19.75 to 20.25
Light bundled sheet stampings	11.25 to 11.50
Steel axle turnings	14.00 to 14.50
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.00 to 13.25
Drop forge flashings	13.25 to 13.50
Railroad grate bars	18.00 to 18.50
Stove plate	18.00 to 18.50
Pipes and flues	13.00 to 13.50

Philadelphia

Activity in Steel and Pig Iron at Low Ebb—Steel Scrap Sold at $17.50

PHILADELPHIA, Dec. 18.—With inventory period at hand the eastern Pennsylvania steel and pig iron trade finds buying activity almost at the minimum for the year, and the general attitude is one of watchful waiting for what the new year may bring forth. The pig iron market is as dull as it was before the inception of the recent large buying movement, while finished steel consumers and jobbers are putting off salesmen with the excuse that they will wait until January before considering any further orders beyond the merest needs of the moment. Steel companies which have had on their books unfilled fourth quarter contracts with customers have generally been able to obtain specifications in full with the understanding that shipments are not to be made until after Jan. 1.

The scrap market is the only branch of the trade that shows any real activity. An Eastern steel company bought 12,000 tons of heavy melting steel at $17.50, the highest price obtained in this market since July last.

Pig Iron.—Eastern Pennsylvania furnaces generally have enough business on their books to carry them pretty well through the first quarter; hence there is no disquietude over the fact that business has dropped to almost nothing following the recent buying movement. Prices are well maintained at $23, base, for foundry grades, and on carload lots, which have made up the bulk of the limited sales of the past week, $23.50, base, has been obtained by some furnaces. No further demand for basic has developed beyond the 3000-ton sale reported a week ago. A fair demand for low phosphorus exists, but domestic furnaces are compelled to meet the competition of foreign iron, which is now being offered at $27.50 and $28, f.o.b. cars, Philadelphia. Domestic furnaces quote about the same prices, but have higher freight rates to some consuming points in the Philadelphia district. The Hokendauqua furnace of the Reading Iron Co. will remain in blast and has bought its coke supply for first quarter.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.76 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.25 to 23.50
Gray forge	23.00 to 23.50
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.50 to 28.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—One domestic producer of ferromanganese now holds firmly to $109, furnace, as its minimum quotation, while another is disinclined to sell below $115, having enough orders on hand to satisfy its immediate desires. English ferromanganese at $110, seaboard, is being neglected on account of the lower domestic prices.

Semi-Finished Steel.—A sale of 500 tons of forging billets at $45, Pittsburgh, is the first transaction of importance to test the market in some weeks. Rerolling billets are quoted at $40, Pittsburgh.

Plates.—Some of the Eastern plate mills will be shut down on Saturday, to remain idle until Jan. 2. Plate orders are being received in driblets not sufficient in the aggregate to give any of the mills a satisfactory operation. With few inquiries for more than a carload to 100 tons, there is no real test of prices. Nearly all mills quote 2.40c., Pittsburgh, on the small volume of current business.

Structural Material.—While the Philadelphia district is not furnishing much plain material tonnage to the mills, other districts have shown a notable improvement in business and the leading Eastern independent is in better position as to backlog than it has been in months. Prices show no marked weakness, the situation being about the same as in recent weeks, plain material being available at 2.35c. to 2.50c., Pittsburgh, according to the mill and the character and size of the specification.

Bars.—Steel bar makers are holding firmly to 2.40c., Pittsburgh, the only deviation from this price apparently being on reinforcing steel, which occasionally is sold at 2.30c. Eastern bar iron mills have announced a reduction of $1 a ton to 2.30c., Pittsburgh.

Bolts, Nuts and Rivets.—Discounts on bolts, nuts and rivets for first quarter contracts are now on the basis of 60 and 10 per cent off list on large machine bolts, cut threads, with the usual differentials on allied items.

Old Material.—A sale of 12,000 tons of heavy melting steel to an Eastern steel company at $17.50 delivered has advanced scrap prices another notch, several grades being 50c. or more higher than a week ago. Another sale in the Pittsburgh district at $19 delivered has had a strengthening effect also on this market. Interstate Commerce Commission Order No. 20 has superseded I. C. C. A59, putting into effect Dec. 26 an advance in freight rates on scrap from Boston rate points to points in the Pittsburgh district. The present rate of $5.53 will become $5.57 over the Pennsylvania Lines and $5.70 over other lines.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.00 to $17.50
Scrap rails	17.00 to 17.50
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Cast-iron car wheels	19.50 to 20.00
Rolled steel wheels	20.00 to 21.00
No. 1 railroad wrought	18.50 to 19.00
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	14.50 to 15.00
Bundled sheets (for steel works)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	12.00 to 13.00
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	15.00 to 15.50
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	14.00 to 15.00
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	18.00 to 18.50
Railroad grate bars	17.00 to 17.50
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	18.00 to 18.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	22.00 to 22.50
Steel axles	22.00 to 22.50

Sheets.—A leading Eastern maker of blue annealed sheets has booked a few first quarter contracts at 3c., Pittsburgh. Black and galvanized sheets are not so firmly held, and there are reports of concessions of $2 and $3 a ton from the so-called regular quotations of 3.85c. for black and 5c. for galvanized.

Warehouse Business.—Consumers are piecing out their year-end requirements with items from jobbers' stocks, and there is a fair volume of warehouse business. Prices are unchanged, and for local delivery are as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅛ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 3.50c.; Norway iron, 7c.

Coke.—Pressure to sell blast furnace coke for shipment before the end of the year has brought some quotations as low as $3.90, Connellsville. For first quarter the price situation is unchanged, $4.50 to $5 being quoted. Foundry coke is available at $4.75 to $5.50, ovens, according to grade.

Youngstown Scrap Market

YOUNGSTOWN, Dec. 18—More activity is reported this week by dealers in scrap, involving chiefly the heavy grades. A number of sales, involving small-lot tonnages, were closed within the past few days, while melters are putting forth inquiries for tonnage required during the first quarter of 1924.

In view of the recent activity in scrap in nearby districts, involving the heavy melting grades, this grade is now quotable at $19 in the Mahoning Valley, an increase of $1 per ton within the past two weeks, and comparing with a range from $17 to $17.50 three weeks ago.

Dealers here are inclined to believe that the current market of $19 is firm, and are bidding up on supplies to cover short sales. One of the leading interests, however, states that it is not among those reported to have bid from $18.50 to $18.75, and states that it is not inclined to go to this figure at this time.

Other grades of scrap have not been materially affected by the advance in heavy melting. Compressed sheet steel is held at $16.50 maximum, machine shop turnings at $14 and cast iron borings at $14.

Pennsylvania to Improve Erie Ore Docks

The Pennsylvania Railroad has provided for enlargement of coal and ore-handling facilities at its docks at Parade Street, Erie, Pa., and has purchased the necessary equipment, including a Mead-Morrison unloader. Cost of the improvements, as stated by an official of the railroad, will be $80,000. The dock at present is equipped with one electric Hulett and one Mead-Morrison combination bridge and unloader with 10-ton and 9-ton buckets respectively. Present capacity is 16,000 tons of ore per 20-hr. day, and there is storage capacity for 300,000 tons.

The November wage distribution of $6,928,981 by Youngstown industries represents a decline of $54,889, as compared with the October disbursements, but is a gain of $1,189,524 over November, 1922. For the first 11 months of this year, the city's industries have paid $71,244,679 in wages, comparing with $54,046,347 distributed during the 12 months of 1922 and $50,384,741 paid in 1921. An annual payroll for 1923 of $77,000,000 is forecast, the second largest in the history of the city and comparing with $94,000,000, distributed in 1920.

British Iron and Steel Market

Pig Iron Firm and Active; Steel Strong Large Rail and Car Orders Placed—Ruhr Plates Offered at Low Price

(By Cable)

LONDON, ENGLAND, Dec. 18.

Though the holidays are near, pig iron is firm and active. There is particularly keen demand for hematite for the domestic trade. Two additional furnaces have been blown in, making a total of 46 Cleveland furnaces now operating, including 14 on foundry and forge iron, 16 on hematite and 16 on other grades.

Hematite is advancing though supplies are increasing. Foreign ore is quieter. Sellers of Bilbao Rubio ask 24s. ($5.26); buyers offer 23s. ($5.04) c.i.f. Tees.

Exports for November include 47,437 tons of pig iron and a total of 394,891 tons of iron and steel.

Steel is strong, with an upward tendency on increased domestic bookings. The plate rollers are well filled for four to eight weeks. There are good Continental inquiries but little business resulting. Export buying generally is poor.

Rail orders to the amount of £1,000,000 ($4,380,000) have been placed by the London, Midland, Scottish Railroad; also £1,000,000 in mineral wagons (coal and ore cars). The Indian railroads are buying 285 cars from the Metropolitan Railway Wagon Co.

Continental steel is weaker but prices are not yet sufficiently low to attract buyers. There is some Indian demand on a fair scale.

British works have bought basic pig iron at £4 11½s. ($20.04) f.o.b. Hamburg. Sheet bars are being sold at £6 13½s. ($29.24) f.o.b. Antwerp. The German Ruhr works are offering plates at £7 15s. (1.51c. per lb.) f.o.b.

Tin plate demand is less excited but buying still is good for both domestic and export trade. The works are well sold up.

Galvanized sheets are weak on the appearance of needy sellers but the works generally are well filled. The main overseas demand is sluggish.

Japanese demand for black sheets is spreading over March but makers have little to sell before April, May and June. Merchants are securing premiums for thin sheets for early shipment.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.38 per £1, as follows:

Durham coke, delivered	£1	18½s.	to	£1	19s.	$8 43 to	$8 74
Bilbao Rubio ores		1	4			5 26	
Cleveland No. 1 foundry		4	6½			22 22	
Cleveland No. 3 foundry		4	0			21 90	
Cleveland No. 1 foundry		4	12			21 68	
Cleveland No. 1 forge		4	18			21 46	
Cleveland basic		5	0			21 90	
East Coast mixed		5	2½	to	5 3½	22 45 to	22 67
East Coast hematite		4	18	to	5 0	21 68 to	21 90
Ferromanganese		17	0			74 46	
Ferromanganese*		17	0			74 46	
Rails, 60 lb. and up		8	15	to	9 15	38 32 to	42 70
Billets		8	5	to	8 15	36 13 to	38 32
Sheet and tin plate bars, Welsh		8	18¾			39 15	
Tin plates, base box		1	3¾	to	1 4½	5 20 to	5 31
						C per Lb.	
Ship plates		9	10	to	10 0	1 86 to	1 95
Boiler plates		12	0	to	13 10	2 54 to	2 64
Bars		10	0	to	10 10	1 95 to	2 05
Channels		9	5	to	9 15	1 81 to	1 91
Beams		9	0	to	9 10	1 76 to	1 86
Round bars, 3 to 7 in.		10	5	to	10 15	2 00 to	2 10
Galvanized sheets, 24 g.		18	12½			3 64	
Black sheets, 24 gage		14	0			2 74	
Black sheets, Japanese specifications		15	5			2 88	
Steel hoops		12	10	&	12 15*	2 44 &	2 48*
Cold rolled steel strip, 20 gage		17	12½			3 45	
Cotton ties, Indian specifications		15	0			2 93	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:							
Belgium	£4	13½s.	to	£4	15s.	$20.47 to	$20.80
France	4	13½	to	4	15	20.47 to	20.80
Luxemburg	4	13½	to	4	15	20.47 to	20.80
Billets (nominal):							
Belgium	6	7½				27.92	
France	6	7½				27.92	
Merchant bars:						C per Lb.	
Belgium	7	10	to	8	0	1.47 to	1.56
Luxemburg	7	10	to	8	0	1.47 to	1.56
France	7	10	to	8	0	1.47 to	1.56
Joists (beams):							
Belgium	6	18¾	to	7	2½	1.36 to	1.39
Luxemburg	6	18¾	to	7	2½	1.36 to	1.39
France	6	18¾	to	7	2½	1.36 to	1.39
Angles:							
Belgium	8	0	to	8	5	1.56 to	1.61
¼-in. plates:							
Belgium	7	17½	to	8	2½	1.54 to	1.59
Germany	7	17½	to	8	2½	1.54 to	1.59
⅜-in. plates:							
Luxemburg	7	17½	to	8	2½	1.54 to	1.59
Belgium	7	17½	to	8	2½	1.54 to	1.59

Domestic Steel Demand Increasing More Blast Furnaces Blowing In

LONDON, ENGLAND, Nov. 29.—Though the country is in the throes of the election, the iron and steel trades in general have suffered little ill effects, and in fact some of the works are now busier than they have been for several months past. The end of the boilermakers' dispute is, in part, responsible for the stimulus, releasing as it has many important shipbuilding jobs, which had either been held back, or which were partly under construction. The home demand for raw materials has broadened considerably, and one or two makers have found it opportune to put more furnaces in blast. Overseas buying of pig iron has also appeared, but in no large proportion, though some fair quantities have been sold on continental account, but the backbone at the present time is in the home demand from steel works. No. 3 Cleveland is held for 100s. and indications point to this level being exceeded in the near future. Hematite has also been enjoying improved conditions and some good sales have been made to home consumers for deliveries spreading well forward. The price of East Coast Mixed Numbers is about 101s. 6d. upward.

As mentioned above, there is more doing in the steel trade. The shipyards are beginning to get back to work again, with the result that very recently plate makers have received orders sufficient to keep them rolling for a month or more. Railroad material is also being called for, and further contracts are being placed. Demand for specialties continues a prominent feature, tinplates in particular being in strong request and changing hands at advancing prices. The basis price now is in the neighborhood of 24s., f.o.b. Galvanized sheet makers are busy, mainly on their Far Eastern contracts booked some time ago, and have little to spare for the first quarter of next year. It is interesting to note, also, that the South Durham Iron & Steel Co. has been contemplating diversifying its manufactured products and has made arrangements to erect a new plant for the rolling of galvanized sheets, while there has also been talk of tinplate production, but so far only the galvanized has been arranged. This plant is situated in the north of England and will, therefore, be a competitor with Welsh producers.

The Metropolitan Vickers Electrical Co., a subsidiary of Vickers, Ltd., has been awarded a contract by the Soviet Government for the supplying of certain electrical apparatus for electric power stations, which are at present under construction in Russia.

The Compressed Gas Manufacturers' Association, New York, will hold its eleventh annual meeting and dinner on Jan. 21. On Jan. 22 and 23 various group meetings will be held. The association represents the manufacturers of all industrial gases.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinfor ing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....2.75c. to 3c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.06
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.,
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads..60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.50c. off list
Hot pressed nuts, tapped.....4.50c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts,
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....70, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	U. S. S.		Per 1000 S. A. E.	U. S. S.
¼-in.	$14.50	$13.00	⅝-in.	$15.00	$15.00
5/16-in.	6.00	6.00	⅞-in.	19.50	20.00
⅜-in.	6.50	7.00	⅞-in.	23.50	28.50
7/16-in.	9.00	9.50	1-in.	37.00	37.50
½-in.	11.00	12.50	1-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.90
Small rivets .....65, 10 and 5 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$3.00 to $3.15
Spikes, ½ in., ⅝ in. and ⅝ in., per 100 lb..... 3.15 to 3.25
Spikes, ⅞ in..... 3.15 to 3.25
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.50
Track bolts, ⅝ in and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	23	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	58	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1¼ in.	+18
2½ to 2¾ in.	37	1⅜ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3½ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3½ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	16	2½-in. O.D. 10 gage	20
2-in. O.D. 11 gage	17	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2½ in. O.D. 12 gage	17	2½-in. O.D. 9 gage	55
2½-in. O.D. 11 gage	17	3½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.95	25-lb. coating I. C.	16.20
12-lb. coating I. C.	13.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.90c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.90c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	8.45
Old range non-Bessemer, 51½ per cent iron	7.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.95

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganse ore, washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$109.00 to $110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	140.00
Ferrosilicon, 50 per cent, delivered	75.00
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr, per lb. contained Cr, delivered	11c. to 12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10c. to 11c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent	$38.00 to $39.00
Spiegeleisen, domestic, 16 to 19 per cent	37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.	
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton	6.00 to 7.00	

Silica Brick:	
Pennsylvania	42.00
Chicago	49.00
Birmingham	50.00
Ground silica clay, per net ton	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	48.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	46.00
Slabs	46.00
Wire rods, common soft, base, No. 5 to 9-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c. to 2.40c.
Skelp, sheared, per lb.	2.35c. to 2.40c.
Skelp, universal, per lb.	2.35c. to 2.40c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ½-in. and smaller, base, per 100 lb.	3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago per lb.	3c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.95—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic	0.34	Detroit	0.29	Omaha	0.735
New York, export	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic	0.365	Indianapolis	0.31	Denver	1.26
Boston, export	0.255	Chicago	0.24	†Denver (pipe)	1.17

*Pacific Coast	$1.15
*Pac. Coast, ship plates	1.20
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Awards Exceed 33,000 Tons and Fresh Projects Call for Upward of 25,000 Tons

The volume of fabricated steel bookings totals over 33,000 tons, of which about 9000 tons is for bridges, 4300 tons for schools and the remainder mostly for private enterprises. The largest single award, 6500 tons, is for a building for the Brotherhood of Locomotive Engineers, Cleveland. Pending projects call for more than 25,000 tons, the largest in several weeks. Awards include:

James Madison High School, New York, 3000 tons; general contract awarded to T. A. Clarke; steel probably to be fabricated by a leading independent steel company.

Bing & Bing, apartment building, West Forty-fifth Street, New York, 900 tons, to Taylor-Fichter Steel Construction Co.

Brotherhood of Locomotive Engineers, office building, Cleveland, 6500 tons, to Bethlehem Steel Co.

Bridge over Raritan River, Perth Amboy, N. J., 5000 tons, to Bethlehem Steel Co.

New York Central, reinforcing of sub-structure over tracks to sustain building to be erected at 277 Park Avenue, New York, 250 tons, to Belmont Iron Works.

Baltimore & Ohio Railroad, bridge at Parkersburg, W. Va., 2000 tons, to unnamed fabricator.

Mantaup Power Co., Fall River, Mass., power plant, 3000 tons, to American Bridge Co.

Shampan loft building, New York, 1500 tons, to Hedden Iron Construction Co.

Paragon loft building, New York, 600 tons, to Hinkle Iron Works.

Public School No. 121, New York, 1300 tons, to A. E. Norton, Inc.

Bohack bakery building, Brooklyn, 500 tons, to Hay Foundry & Iron Works.

Los Angeles Gas & Electric Corporation, Los Angeles, office building, 2298 tons, to American Bridge Co.

Great Northern Railroad, bridge work, 1683 tons to American Bridge Co.

Ford Motor Co., assembling plant, Kansas City, Mo., 1100 tons, to Mississippi Valley Structural Steel Co.

Illinois Bell Telephone Co., Chicago, Superior office, 740 tons, to Gage Structural Steel Co.

United States Government Bureau of Yards and Docks, store house, Pearl Harbor, H. I., 488 tons, to McClintic-Marshall Co.

Dells Paper & Pulp Co., 13 tainter gates and runway steel for dam, Eau Claire, Wis., 275 tons, to Wausau Bridge & Iron Works.

Madigan Brothers, Chicago, mercantile building, 201 tons, to Gage Structural Steel Co.

Sanitary Clay Products Co., Kokomo, Ind., plant addition, 250 tons, to Heatherington & Berner.

Missouri River Bridge, Mobridge, S. D., 1000 tons to Minneapolis Bridge Co. instead of to Minneapolis Steel & Machinery Co. as reported last week.

Third National Bank building, Dayton, Ohio, 1050 tons, to American Bridge Co.

M. Wile & Co., Buffalo, factory, 500 tons, Jones & Laughlin Steel Corporation low bidder.

Salvation Army Building, Pittsburgh, 500 tons, to Jones & Laughlin Steel Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Macmillan Co., book publishing building, Fifth Avenue, New York, 1000 tons.

Fifth Avenue Coach Co., New York, addition to shops, 600 tons.

Office building, 208 West Thirtieth Street, New York, 500 tons.

French Institute in United States, building at Sixtieth Street, New York, about 600 tons.

Mechanics Bank, Brooklyn, about 150 tons.

Loft Building, 1 West Forty-seventh Street, New York, 1500 tons.

Office building, Times Square district, New York, 3000 tons.

Apartment building, Lexington Avenue and Thirty-sixth Street, New York, 500 tons. Also several other apartment buildings in various locations in New York totaling 2000 to 3000 tons or more.

Montgomery building, Spartanburg, S. C., 1000 tons.

Sea Gate Hotel, Coney Island, New York, 800 tons.

Orthopedic Hospital, East Fifty-eighth Street, New York, about 500 tons.

Crane Co., Chicago, foundry building, 7000 tons.

Great Northern Railroad, repairs to bridges Nos. 95 and 68, 950 tons.

Board of Trade building, Kansas City, Mo., 1200 tons.

Buick Motor Co. plant, location not given, 2560 tons.

Toledo Art Museum, Toledo, Ohio, 400 tons.

RAILROAD EQUIPMENT BUYING

Few Orders for Rolling Stock—Chesapeake & Ohio Withdraws Inquiry for 2000 Freight Cars

Only 1350 cars were ordered in the past week, and inquiries for domestic use total only 100 cars. The Indian State Railways are asking prices on 3000 small cars, but the business is expected to go to England. The interesting development of the week was the announcement of the Chesapeake & Ohio that it would not buy the 2000 freight cars it inquired for because of the high prices quoted on the specialties.

Locomotives in need of repair on Dec. 1 totaled 10,572, or 16.4 per cent of the total number active, according to the Car Service Division of the American Railway Association, a decrease of 224 compared with the number in need of repair on Nov. 15. Of the total number, 9755, or 14.9 per cent, were in need of heavy repair on Dec. 1, a decrease of 224 from Nov. 15.

The Chesapeake & Ohio Railroad has definitely withdrawn its inquiry for 2000 cars, giving as a reason the high prices quoted on the specialties.

The Indian State Railways, Simla, India, is inquiring in the United States for 3000 small cars of 16 types, requiring about 4 tons of steel to the car. Bids close Jan. 22, 1924. It is expected here that the business will go to British car builders.

The Great Northern Railway will rebuild 1000 box cars in its own shops and in the Siems-Stembel plant at St. Paul, Minn. The cars will be converted into stock cars.

The Atlanta & West Point Railroad is inquiring for 100 composite high-side gondolas of 50-ton capacity.

The Norfolk & Western Railroad has contracted with the Ralston Steel Car Co. and the Newport News Shipbuilding & Dry Dock Co. for the rebuilding of 1000 steel hopper cars.

The Chile Exploration Co., 120 Broadway, New York, is inquiring for a number of gondola ore cars, each 70 tons capacity.

The Interstate Public Service Co., Indianapolis, has ordered 3 sleeping cars, 2 dining cars, 2 express cars, 3 express trailers and 10 stock cars from the American Car & Foundry Co.

The St. Louis Southwestern has divided an order for 1000 box cars between the American Car & Foundry Co. and the Mt. Vernon Car Mfg. Co.

The Chicago & Alton has ordered 250 box cars from the Pullman Co.

The Southern Pacific is expected to close for 10,000 cars for its own lines and for the Pacific Fruit Express some time this week.

The Rapid Transit Subway Construction Co., New York, has placed 100 motor subway cars with the American Car & Foundry Co.

The Fruit Growers Express is inquiring for 1000 underframes.

The Central of Georgia is inquiring for 4 coaches, 2 baggage and mail cars and 3 baggage and express cars in addition to the 6 cars mentioned last week.

The St. Paul & Tacoma Lumber Co. placed 1 locomotive with the Baldwin Locomotive Works.

The Clemmins Logging Co. ordered 1 engine from the Baldwin Locomotive Works.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery.

	Copper, New York		Straits Tin	Lead		Zinc	
Dec.	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
12.....	13.25	12 87½	47.75	7.62½	7.40	6 75	6 22½
13.....	13.25	12 87½	47.95	7.65	7.50	6.85	6.30
14.....	13.25	12 87½	47.25	7.60	7.50	6 77½	6.22½
15.....	13.25	12 87½	.....	7.75	7.60	8....	6.20
17.....	13.25	12 87½	46.75	7.75	7.60	6....	6.20
18.....	13.25	12 87½	47.25	7.75	7.60	6.85	6.20

*Refinery quotation; delivered price ½c. higher.

New York

NEW YORK, Dec. 18.

Most of the markets are quiet as is usual toward the end of the year. The copper market is steady with demand fairly good. Buying of tin continues active. Lead on small transactions has advanced. Demand for zinc is light with the market slightly easier.

Copper.—Firmness continues to be the feature of the copper market with practically no change in price for the last three weeks. Some sellers insist that the tone is a little stronger this week, but electrolytic copper can still be bought at 13.12½c., delivered, as the minimum price, with some producers asking not less than 13.25c., delivered, all quotations pertaining to the first quarter. An explanation offered for the steadiness of the market is that there has been steady consumptive buying of moderate proportions since late in November and that there has been no necessity to advance or reduce prices, due either to a lack of demand or an unusual eagerness to buy. Foreign buying has also been satisfactory with France the chief purchaser. Lake copper is quoted at 13.25c., delivered.

Tin.—The week has been a fairly active one with total sales during the days covered by this report amounting to about 1000 tons. There were large sales the middle of last week, about 450 tons being sold on Dec. 12, with about 100 tons changing hands on Dec. 11, on which day more could have been sold had sellers not withdrawn. The market was exceedingly dull on Dec. 13 and quiet on Dec. 14, sales for the two days amounting to about 200 tons. On the latter day prompt tin sold at 47.12½c. to 47.25c., with futures at 47c. On Saturday and on Monday at least 150 tons were sold each day. Consumers have been the principal buyers in all these transactions and it is therefore presumed that they have comfortably covered their requirements for some little time to come. Spot Straits tin today is quoted in New York at 47.25c., New York, with the market only moderately active. London prices today were about £5 to £6 per ton higher than a week ago at £234 5s. for spot standard, £236 5s. for future standard and £236 5s. for spot Straits. Arrivals thus far this month have been 4190 tons with 4491 tons reported afloat.

Lead.—There is an entire absence of large transactions and the market is dominated by the sale of small lots at varying fancy prices, mostly for prompt delivery. Sales are reported anywhere from 7.50c. to 8c., New York, and 7.50c. to 7.75c., St. Louis. It is therefore difficult to quote a fair market price under such conditions. As near as can be gaged the New York outside market is close to 7.75c., with the St. Louis price around 7.60c. The leading interest still maintains a quotation of 7.25c., New York, and has done some business for future delivery at that level.

Zinc.—This market continues exceedingly quiet and slightly easier, with prime Western quoted at 6.20c., St. Louis, or 6.55c., New York, with a premium of about five points per month for future delivery. Neither galvanizers nor brass makers are buying liberally, but covering only their immediate needs. Some producers look forward with confidence to better conditions in January and feel that the market at present is close to the bottom.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Both shot and ingot nickel in the outside market are quoted at 29c. to 32c. per lb.

Antimony.—Wholesale lots of Chinese metal are higher at 9.25c. for prompt and 9c. per lb. for future delivery, duty paid, New York.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26c. to 26.50c., delivered, duty paid, with only a few importers able to do business. No quotations are available from the leading American producer.

Old Metals.—The market is quiet and values are unchanged. Dealers' selling prices are as follows:

	Cents per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	11.75
Copper, light and bottoms	10.00
Heavy machine composition	10.75
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.00
Lead, heavy	6.75
Lead, tea	5.75
Zinc	.00
Cast aluminum	17.50
Sheet aluminum	17.50

Chicago

CHICAGO, Dec. 18.—In a quiet market lead has advanced and the other metals remain unchanged. Among the old metals lead pipe has gone up. We quote in carload lots: Lake copper, 13.50c.; tin, 48c.; lead, 7.60c.; spelter, 6.30c.; antimony, 11c., in less than carload lots. On old metals we quote copper wire crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 6c.; zinc, 4.25c.; pewter, No. 1, 25c.; tin foil, 32c.; block tin, 36c.; all buying prices for less than carload lots.

Furnace and Mill Operations in the Mahoning Valley

YOUNGSTOWN, Dec. 18.—The A. M. Byers Co., Pittsburgh, planned to blow in Dec. 20 Mattie blast furnace at its Girard plant, which has been idle for repairs and overhauling. The resumption of this stack and suspension by the Republic Iron & Steel Co. of a lapweld tube mill constitute the most important changes this week in operating schedules of Mahoning Valley iron and steel properties. The sheet mill plant of the Falcon Steel Co. at Niles is entirely idle.

Resumption of the Byers furnace brings the total in the Youngstown district to 19 active stacks, of 27.

Of the 17 tube mills in the Valley, 13 are active, the Sheet & Tube having three idle and the Republic company one.

The "D" blast furnace in the East Youngstown group of the Sheet & Tube company will be blown in as soon as work of rehabilitation is completed. The date of its resumption is still undetermined.

Of the 120 sheet and jobbing mills in the Mahoning Valley, 70 were scheduled on Monday, a gain of two as compared with the week before. The Sharon Steel Hoop Co. has all nine sheet mills at its Haselton plant scheduled this week.

Steel making schedules in the district continue with little change, 32 of the 51 independent open-hearth furnaces being active and all of the Bessemer plants.

All plate mills are suspended, while strip mill production is being maintained at 65 per cent.

The Falcon Tin Plate Co. is operating four mills at its Canton property, while the Trumbull Steel Co. has 30 tin mills active.

At the last meeting of the New England Foundrymen's Association, at Boston, the Peter F. Leonard Foundry Co., Salem, Mass., and the Carborundum Company, Boston, were made members of the association. E. H. Ballard, General Electric Co., Lynn, Mass.; E. M. Shaw, Walker, Pratt Co., Watertown, Mass., and H. E. Wetherbee, James Hunter Machine Co., North Adams, Mass., were made a nominating committee for officers to be balloted for at the annual meeting of the association next month. Charles A. Reed, Reed, Fears & Miller, Inc., Boston, will be in charge of arrangements.

PERSONAL

Charles L. Close, manager of the Bureau of Safety, Sanitation and Welfare, United States Steel Corporation, has returned to his office, 71 Broadway, New York, after an absence of four months. Following a major operation, Mr. Close went to Florida and is now entirely restored to health.

E. H. Haslam, Conway Building, Chicago, formerly vice-president of Mackintosh-Hemphill Co., Pittsburgh, and recently with the Steel & Tube Co. of America, Chicago, has been retained by Hadfields, Ltd., Sheffield, England, to assist in the development of the company's interests in the United States. Incidental to his duties in that connection he has been appointed president of the Hadfield-Penfield Steel Co.

William A. Baker, formerly in charge of the Detroit office of the Firestone Steel Products Co., has been appointed sales manager of the company.

John A. Oartel, safety director Carnegie Steel Co., Pittsburgh, spoke on "One Hundred Per Cent Safety in Industries and How to Get It" at the opening meeting, Dec. 14, of a series conducted by the Baltimore Safety Council, Baltimore. More than 800 superintendents, foremen and others representing Baltimore industries attended.

C. A. Smith, formerly in the Cleveland district office of the New Jersey Zinc Sales Co., has been transferred to the Pittsburgh office of the company. Before going to Cleveland Mr. Smith had been in the New York office.

R. L. Cain has been appointed superintendent of open-hearth furnaces at the Upson works, Borune-Fuller Co., Cleveland, succeeding W. C. Troupe who resigned a short time ago to become associated with the McFeely Brick Co., Pittsburgh.

F. S. Whitman, president Belvidere Screw & Machine Co., Belvidere, Ill., has resigned on account of ill health.

Carl A. Johnson, president Gisholt Machine Co., Madison, Wis., was re-elected president for a second time by the Wisconsin Manufacturers' Association at its annual meeting held in Milwaukee, Dec. 4-6. George L. Vits, general manager Aluminum Goods Mfg. Co., Manitowoc, was elected vice-president. George B. Ingersoll, vice-president and general manager Fairbanks, Morse & Co., Beloit, was re-elected treasurer. George F. Kull, Madison, is executive secretary and manager.

Harrison Boyce, inventor of the motor-meter, announces his retirement from active management of the Motor-Meter Co. in order to give more time to the promotion of boycite, a fuel ingredient produced by the Boyce & Veeder Co., Inc., Long Island City, N. Y. His former activities as general manager will be assumed by E. V. Hennecke, sales manager Motor-Meter Co. for the last five years.

Albert Ladd Colby, consulting engineer Bethlehem, Pa., sailed for Europe Dec. 12 on professional work which will require his absence until about April 1. His address while abroad will be care of the Iron and Steel Institute, 28 Victoria Street, S. W. 1, London, England.

Clinton G. Armstrong, formerly consulting metallurgist for the Chicago Flexible Co. and research metallurgist for the Western Electric Co., has joined the Calorizing Co., Pittsburgh, as sales engineer. He will be connected with the Chicago office.

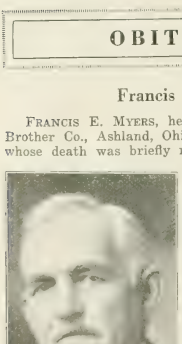
A. T. B. Shiels has been appointed Northern Pacific Coast representative of the Bethlehem Shipbuilding Corporation, Ltd., succeeding Capt. J. F. Blain, resigned. Mr. Shiels will maintain the present offices at 422-23 Colman Building, Seattle, Wash.

J. B. Orbison, who has taken charge of the Springfield, Ohio, works, American Radiator Co., has made extensions and alterations to the plant by which capacity is doubled. He succeeds Henry Dyer, manager for the last ten years, who resigned to take up other work. Mr. Orbison says the works will be busy to the end of the year and that the outlook for next year is promising.

OBITUARY

Francis E. Myers

FRANCIS E. MYERS, head of the F. E. Myers & Brother Co., Ashland, Ohio, manufacturer of pumps, whose death was briefly recorded in THE IRON AGE of Dec. 6, was born in Perry Township, near Ashland, and his early days were spent on a small farm. When he was 23 years of age, he was employed as a farm machinery salesman. In 1875 he started a little implement shop, but later took a position as salesman with the Bucher & Gibbs Plow Co. and worked his way to the head of the company. During this time, his brother, P. A. Myers, had secured a patent on a double-acting force pump in the manufacture of which they joined hands. So remarkable was the growth of the enterprise that addition after addition was made to the plant which today employs several thousand men. Mr. Myers was an industrial engineer of high order and as sound in financial judgment as in plant management. Testimony to these qualities lies in the recollection that the company ran full force throughout the crisis of 1907. Yet with all these interests he gave freely of his time to public and civic affairs. He was at one time president of the Farm Equipment Manufacturers' Association, at the last meeting of which he was given life membership. He was also former president and builder of the Cleveland, Southwestern & Columbus Railway, one time director of the Aurora, Elgin & Chicago Railroad, of the Mansfield Traction Power & Light Co., and also of the Nickel Plate Railroad. He was a conspicuous figure in many other enterprises in and outside of Ashland. Mr. Myers was chairman of the Panama-Pacific Exposition Committee of Ohio. Among those surviving are three brothers: G. D. Myers, a director and general sales agent of the company; A. N. Myers, a director in charge of employment; Phillip A. Myers, also connected with the company; a son, John C. Myers, advertising manager, and several sisters and daughters.



WILLIAM A. ROOME, treasurer Chamberlin-Roome Steel Co., steel jobber, Chicago, died following a stroke of apoplexy, Dec. 12, aged 57. Prior to participating in the organization of the Chamberlin-Roome Steel Co., in 1921, Mr. Roome was for about ten years Chicago district sales representative of the Otis Steel Co., Cleveland. Before that he was identified with the sales organizations of Joseph T. Ryerson & Son and the Illinois Steel Co.

CHARLES H. POND, for 30 years president of the Scranton Forging Co., Scranton, Pa., died on Dec. 3.

STEPHEN C. MASON, secretary McConway & Torley Co., Pittsburgh, died at his home in that city, Dec. 12, following an illness of about a month. Mr. Mason was

born in Fairlee, Vt., 63 years ago and, before going to Pittsburgh in 1895 to become associated with the McConway & Torley Co., had been assistant statistician of the Interstate Commerce Commission in Washington for about 10 years. He became secretary of that company in 1899 and since had held that position. He was president of the National Association of Manufacturers from 1918 to 1921. He was a director of the Railway Business Association and a vice-president of the National Founders Association.

J. F. Morgan

J. F. MORGAN died at his home in Jackson, Ohio, Dec. 12, at the age of 81 years. Mr. Morgan was born in Cardingshire, Wales, June 9, 1842, and when six years old came with his parents to America, settling in the charcoal furnace district of Jackson County, where he grew to manhood. During the Civil War he served in the Union Army and was mustered out with his company at Nashville, Tenn., at the close of hostilities. A few years later he became identified with southern Ohio furnace interests, his first experience being with the Olive Furnace Co., operating a charcoal stack near Ironton, Ohio. Following this he went to Jackson, being connected with the operation of the Tropic stack, where the native stone coal was used almost exclusively for smelting purposes. He remained with that company until its dissolution, after which he went to Oak Hill, Ohio, to take charge of the Etna Fire Brick Co. It was while connected with the latter company that he became interested in the organization of the Jackson Iron & Steel Co. in 1906 and was finally persuaded to become active in the management of its affairs, returning to Jackson in 1909 as secretary and treasurer, in which capacity he served until his death.

The passing of Mr. Morgan takes from the active list the last of those pioneers of the furnace industry in southern Ohio who have seen the business grow from the old charcoal stack, making a few tons a day, up to its present advanced stage.

Sheet Sales Drop in November

PITTSBURGH, Dec. 18.—November sales of sheets by manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers fell approximately 20,000 tons behind those of October, and about 58,000 tons under the September record. Shipments fell 31,000 tons under those for October and there was a drop in production of 37,000 tons, compared with the previous month. Unfilled orders showed a decrease for November of about 27,000 tons. Net obligations of makers arrived at by deducting unshipped and unsold stocks from unfilled tonnage as of Nov. 30 were 167,828 tons. November figures in net tons compare with October and September as follows:

	November	October	September
Capacity	407,000	424,000	377,000
Per cent reporting	69.0	69.5	68.8
Sales	165,491	185,110	223,556
Production	188,144	225,714	185,577
Shipments	199,836	230,820	205,722
Unfilled tonnage	280,013	307,540	343,096
Unshipped stocks	66,624	71,902	84,338
Unsold stocks	45,561	34,982	29,975

Advisory Committee on Non-Ferrous Metals

The regular autumn meeting of the advisory committee on non-ferrous metals was held at the Bureau of Standards Nov. 16. The discussion covered tentative and proposed specifications for non-ferrous metals and alloys, new standard samples, the effect of impurities on the mechanical properties of bearing metals, corrosion of non-ferrous metals, electrodeposition, the effect on hardness of the cold rolling of metals, aluminum casting alloys, the fatigue resisting properties of duralumin, the work of the bureau on pure zinc in connection with the physical constants of metals, new refractories, molding sand research, tests on the tensile properties of non-ferrous alloys at elevated temperature, mercury vapor poisoning in research work, and possible applications of metal spraying.

DEMAND IMPROVING

President Campbell Gives His Views on Market Conditions

YOUNGSTOWN, Dec. 18.—At the annual meeting last week of sales representatives of the Youngstown Sheet & Tube Co., President James A. Campbell stated that improved demand is developing both in the East and in the Chicago district for the heavier steel products, such as plates and structural shapes.

Little or no improvement has yet materialized in the requirements for oil country pipe, though the demand for standard pipe is still holding firm. Mr. Campbell looks for better lapweld tube demand by next spring. He points out that oil production is still below demand due to the falling off of output in some of the important producing fields. This is a condition, he believes, which will shortly stimulate drilling, which will mean larger sales of lapweld sizes of tubes and other oil country pipe supplies.

Mr. Campbell still contends that finished steel prices are unlikely to go lower, pointing to the stability of prices in the semi-finished field, particularly in sheet bars. When consumers come to realize that prices are unlikely to further decline, he believes that buying will be resumed on a broader scale.

The Sheet & Tube company is preparing to enlarge its blast furnace operations, having accepted recently large orders for pig iron to be delivered from its stacks at Youngstown and in the Chicago district. Since Dec. 1, the company's stack at Indiana Harbor, acquired from the Steel & Tube Co. of America, has shown a daily production of 699 tons. The furnace was built about four years ago.

Automobile companies are pressing inquiries as to the ability of makers of full-finished sheet stock to supply their early 1924 requirements. District producers indicate that the 5.35c. base quotation, for No. 22 gage auto body stock, is firm and will be adhered to. There also appears to be less price cutting on the common sheet grades than formerly, although a number of the non-integrated rollers are still accepting tonnage under the market in order to keep their mills operating.

With operations at 65 per cent, the strip market is still in favor of the buyers and prices range from 2.75c. to 3c. on the standard gages. Cold strip is quotable from 4.75c. to 5c., some interests having gone below the market to obtain business.

The plate market is very inactive, but makers are holding to the 2.50c. base price.

Bookings of Steel Castings in November

WASHINGTON, Dec. 18.—The Department of Commerce announces that November bookings of steel castings, based on reports from principal manufacturers and representing over two-thirds of the commercial castings capacity of the United States amounted to 39,660 tons, as against 37,446 tons in October. The following table shows the bookings of commercial steel castings for the past eleven months by 65 identical companies, with a monthly capacity of 96,900 tons, of which 38,300 tons are usually devoted to railway specialties and 58,600 tons to miscellaneous castings.

	Total		Railroad Specialties		Miscellaneous Castings	
Month 1923	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January	100,605	103.8	47,879	125.0	52,726	90.0
February	90,152	93.0	39,845	104.0	50,307	85.8
March	143,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,788	101.3	50,705	86.5
June	84,878	87.6	42,773	111.7	42,105	71.9
July*	52,066	53.7	16,741	43.7	35,325	60.3
August	50,515	52.1	18,332	47.9	32,183	54.9
September	47,574	49.1	21,685	56.6	25,889	44.2
October	37,446	38.6	9,845	25.7	27,606	47.1
November	39,660	40.9	12,916	33.7	26,744	45.6

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

Plans of New Companies

The Jordan Machine Tool Co., 249 Third Avenue, South, Minneapolis, Minn., has been incorporated with capital stock of $50,000 and will manufacture Jordan cylinder reboring and regrinding machines. Manufacturing will be done under contract, but no awards have yet been made. The company will also handle pistons, piston pins, rings and replacement parts necessary to this line. R. E. Nyberg, secretary-treasurer, is interested in hearing from companies equipped to manufacture its product.

Centrifugal Cast Iron Pipe Co., 15 Exchange Place, Jersey City, N. J., has been incorporated with capital stock of 300,000 shares no par value stock, to take over the assets and business of the original Centrifugal Cast Iron Pipe Co. The new company will continue the business along the same lines. Raymond Ritti is secretary.

The Southern Radio Corporation of Texas, 608 West Evergreen Street, San Antonio, Tex., has been organized with $35,000 capital stock to act as distributor in radio and electrical appliances. John C. Rodriguez is president; W. G. Egerton, vice-president, and Frank Kaymore, secretary-treasurer.

The Holtson Mfg. Corporation, 119 East York Street, Baltimore, recently organized, will manufacture oil burners and kindred products, and will do a general machine repair business, specializing in marine engines. It is in the market from time to time for iron castings, pressure tanks, iron pipes and fittings, also various parts for marine engines. W. B. Holtson is president.

The Lehigh Sewer Pipe & Tile Co., Ft. Dodge, Iowa, has been incorporated with $800,000 capital stock to manufacture sewer pipe, having taken over the business by that name established in 1907. No other changes have been made. Address in care of George W. Avery.

Stevens Duryea Motors, Inc., Chicopee Falls, Mass., recently organized to manufacture Stevens-Duryea cars, has plant and equipment for present needs and is making only slight purchases to complete inventory. Ralph R. Owen is president.

The Baker Mfg. Co., Hinton, W. Va., recently organized to manufacture mechanical products, will have manufacturing done under contract. Address in care of R. F. Dunlap.

The Dobbins Mfg. Co., 225 North New Jersey Street, Indianapolis, has been organized to manufacture automotive products. Work will be done by contract, awards having been let. The company operates an assembling plant. C. O. Dobbins is president and B. F. Rhodabarger, vice-president and general manager.

The New England Oil Burner Co., 20 Aborn Street, Providence, R. I., recently organized, will act as distributor of oil burners and kindred products. Willard W. Stearns is treasurer.

The Solar Mfg. Co., 403 Lafayette Square Building, Buffalo, has been organized to manufacture automotive products and specialties. No building is contemplated, all work being done by contract. J. P. Hearney heads the company.

The General Service Co., 707-8 Guaranty Trust Building, 606 Woodward Avenue, Detroit, has been organized to manufacture oil burners and equipment. Its products have been manufactured for several years in Canada, and work in this country will be done by an associated concern. George M. Seymour is general manager.

The Super-Ear Corporation, 41 Union Square, New York, has been incorporated with capital stock of $100,000, and is now making preparations to manufacture acoustic devices. Incorporators are: H. Shoen, I. Ross and L. S. Scher, the last name being head of the company.

The Williamsburg Electric Supply Co., 636 Broadway, Brooklyn, recently incorporated with $100,000 capital stock to manufacture and deal in electrical equipment, will confine activities to distribution. Incorporators are: J. A. Korn and M. A. and P. Cutler.

Veolayne, Inc., New York, has been incorporated with capital stock of $25,000 to manufacture wireless equipment and parts. Some manufacturing has been done, but negotiations have not yet been completed for producing on a larger scale. Temporary address is care of J. C. McDermott, 27 William Street.

The Steinmetz Radio Service Corporation, 458 Saratoga Avenue, Brooklyn, recently incorporated with nominal capital, will act as distributor of wireless products. No manufacturing is contemplated. Address care of A. H. Simon, 189 Montague Street, Brooklyn.

The Superb Auto Repairing Co., 54 Newlots Road, Brooklyn, recently incorporated with $10,000 capital stock, will operate a machine and repair shop. Plant and equipment have been provided. Incorporators are: L. Strauss, E. Lavender and M. Bradie.

The Holmes Vapor Carburetor Motor Corporation, New York, recently incorporated with $100,000 capital to manufacture automotive products, has interrupted negotiations, owing to the illness of one of the principals. It is unlikely that plans will be resumed until after the holidays. Edward Holmes, 255 West Forty-third Street, is head.

The Furco Steel Corporation, 127 Christopher Street, New York, has been incorporated with capital of 1,000 shares, no par value stock, to manufacture and deal in iron and steel products. Plans have not yet been completed. Incorporators are: J. S. and A. R. Purdy, and H. Deves.

The Wurldsbest Ventilator Co., 170 Fifth Avenue, New York, has been incorporated with capital stock of $150,000 to manufacture ventilators and ventilating equipment. Production is now handled by contract through the Automobile Sheet Metal Works, Richmond, Ind. The company expects to manufacture approximately 300,000 ventilators during the coming year. R. B. Respess heads the company.

The Backer Metal Specialties Corporation, 406 Broome Street, New York, has been incorporated with $50,000 capital stock to manufacture metal products, specializing in small domestic articles. Small quantities of brass and nickel are used. A. Backer, formerly vice-president, Puliman Metal Specialties Co., Forty-fourth Street and Tenth Avenue, is president of the company. Operations have been started.

The United States Radio Kraft Corporation, 132 Nassau Street, New York, has been organized with capital stock of $100,000 to manufacture wireless equipment. Although manufacturing may be undertaken later, present activities are devoted to acting as distributor for large manufacturers of radio equipment. Abraham Segall heads the company.

The Wheeler-Raisley Mfg. Co., 160-70 Mechanic Street, New Haven, Conn., incorporated with capital stock of $50,000, will manufacture stainless steel cutlery for the present and later may expand to include automobile equipment. It has leased 10,000 sq. ft. of floor space and has equipment to begin operations. Gardner E. Wheeler, general manager Wheeler Radiator & Mfg. Co., East Cleveland, Ohio, and for the last 15 years associated with the English & Mersick Co., New Haven, is president. John C. Raisley, formerly manager of the Hemming Brothers Mfg. Co., New Haven, is vice-president and secretary.

The Equipment Devices Co., care of the Corporation Trust Co. of America, Dupont Building, Wilmington, Del., has been organized with capital stock of $1,200,000 to manufacture devices. No equipment will be needed. The business is being financed privately.

The Eversharp Mfg. Co., New Brunswick, N. J., has been organized with $100,000 capital stock and is manufacturing horseshoes, calks and other steel specialties, particularly railroad equipment. Its factory, a new steel structure, is completely equipped for cold heading, heat treating and pressing. George F. McCormick is president-treasurer and B. J. Trumbull is vice-president and sales manager.

The International Derrick & Equipment Co., 186 East Broad Street, Columbus, Ohio, has been organized as a consolidation of the Columbus Structural Steel Co., the International Steel Products Co. and the International Derrick & Equipment Co. The new organization will manufacture and distribute oil, gas and artesian well drilling and pumping derricks and equipment. Harry M. Runkle is president.

The Wausau Motor Parts Co., Wausau, Wis. has been organized with capital stock of $50,000 to manufacture automotive parts and equipment. The company has been in operation for two years at Menominee, Mich., making piston rings. It recently moved its plant to Wausau. Additional equipment will be added gradually. E. N. Viele is general manager.

The Line Hardware Mfg. Co., 18222 Oakview Road, Cleveland, has been organized by J. D. Hoit, formerly connected with the Electrical Materials Corporation, which is no longer in existence.

The Duty Air Brake Co., Harrisville, W. Va., has been organized with $20,000 capital stock to manufacture air brakes. So far manufacturing has been done by contract, but the company is open for bids on equipment. The management would like to hear from automobile manufacturers who are interested in the product. C. B. Lewis is general manager.

Scott Brothers, Inc., 1548 South Water Street, Philadelphia, has been incorporated with $100,000 capital stock, to manufacture auto truck equipment, but for the present will haul freight and other material in and near Philadelphia. J. W. Scott heads the company.

The R. B. Stoker Co., 57-61 Berriman Street, Brooklyn, has been incorporated with capital stock of $25,000 to manufacture roofing products. Its plans are not definitely decided, but if manufacturing is undertaken, it will likely be done by contract. M. B. Price, W. M. G. Watson, and H. St. George are the incorporators.

The King Lamp & Mfg. Co., Hudson Reed Building, New York, has been organized with $1,000 capital stock to manufacture electric lamps and devices. It will act as distributor for the time but may manufacture on a small scale in the remote future. Address in care of L. B. Brodsky, 299 Broadway, New York.

The Pinzet Co., Inc., New York, has been incorporated with $50,000 capital stock to manufacture machinery and parts, specializing in a machine for binding papers and pamphlets. Manufacturing will be done by contract. C. Aaron and H. A. Reiting are the incorporators. Address care of W. F. McCormack, 256 Broadway.

The New City Car Co., care of the Corporation Trust Co. of America, du Pont Building, Wilmington, Del., has been organized with capital stock of $10,000,000 to manufacture wheels. This is a close corporation and there will be no stocks nor securities offered for publice sale. Materials and equipment will be purchased from time to time, but trade relations have already been established

Thomas J. Peterson, for the past 12 years connected with the Georgia Supply Co. as vice-president and manager of the Jacksonville branch, and W. W. Starr, formerly of the Manhattan Rubber Mfg. Co., are opening a wholesale mill supply house at 134 East Bay Street, Jacksonville, Fla.

The Beisel Spring Wheel Corporation, 49 West Sixty-fourth Street, New York, recently organized to manufacture a new type of steel wheel for automobiles and trucks, will contract work for the present on passenger car wheels. Eventually the company will operate its own plant and will add truck wheels, which employ good quantities of high grade steel. William J. Beisel is president.

The Hydraulic Transmission Corporation of America, 874 Broadway, New York, has been organized with nominal capital to manufacture a front wheel drive truck and also a hydraulic transmission. Negotiations for manufacturing have not been taken up, but it is likely that the company will lease a factory and do its own manufacturing. Trucks embodying these new features, are now on exhibition. John Keller is president and Hilaire J. Holder, formerly with the Chevrolet and Scripps-Booth companies, is general manager.

The H. C. Oswald Supply Co., 2360 Third Avenue, New York, has been incorporated with $50,000 capital stock to manufacture and deal in metal products but unless plans are changed, the company will act as distributor in these lines for the time being. H. C. Oswald heads the company.

The Allied Die Casting Corporation, Stillman Avenue, Honeywell and Buckley Streets, Queens, New York, has been incorporated with capital stock of $100,000 to manufacture die castings and light products. Operations have been started. Incorporators are E. H. Kelley, W. E. Johnston and G. W. Reynx.

The Karwill Specialty Co., 103 Park Avenue, New York, has been incorporated with capital of 1000 shares, no par value stock, to manufacture pipe and plumbing supplies, specializing in a new product which will be manufactured by an outside concern. N. G. Martin, B. H. Trask and E. H. Miller are the incorporators.

Trade Changes

H. F. Chase has been appointed by the American Nickel Corporation, Clearfield, Pa., manufacturer of malleable nickel and Mond nickel alloys, as representative in the New York district, with offices at 350 Madison Avenue.

The Walton & Macke Nail Co., Kokomo, Ind., leased its plant from Oct. 31, 1919 to Oct. 31, 1922, to a company which incorporated and operated as the Walton & Macke Nail Co., Inc. The latter company is now dissolving, but this action has no bearing on the original and present company, known as the Walton & Macke Nail Co., a partnership, which is still doing business in cement coated nails.

The Davis Boring Tool Co., Inc., 3713-24 Forest Park Boulevard, St. Louis, has construction well under way on a modern, fireproof factory, which will give approximately five times the present capacity.

The Midvale Co., Nicetown, Philadelphia, manufacturer of forgings, alloy steels, locomotive tires, etc., announces the opening of a sales office in Room 914, Union Trust Building, Pittsburgh, in charge of Harvey S. Garrett as district sales manager.

The Lake Superior Iron Ore Association has moved its offices from the Rockefeller Building to the new Union Trust Building, Cleveland.

The Isthmian Steamship Line, subsidiary of the United States Steel Corporation, has opened an office in the Union Trust Building, Cincinnati, with E. L. Kimes as manager. Mr. Kimes has been connected with the Cleveland office.

The Falstrom Co., Passaic, N. J., maker of sheet metal products, has opened a New York office at 198 Broadway, in charge of A. B. Jonas.

The Townsend Co., maker of rivets, wire nails and wire, New Brighton, Pa., has moved its Chicago office to Room 721 London Guarantee and Accident Building, 360 North Michigan Avenue. D. C. Noggle, sales manager of the Indianapolis branch, has moved his office to 618-19 Fletcher Savings & Trust Building.

The Kearns-Dughie Motors Corporation, manufacturer of motor trucks, Danville, Pa., has purchased all assets of the Belmont Motors Corporation, Lewistown, Pa. With the 70,000 sq. ft. of floor space, production will be considerably increased. Manufacturing will be done at Lewistown and the Danville plant will be used as the sales and service branch.

The Bethlehem Shipbuilding Corporation, Ltd., announces the removal of its San Francisco sales offices to 1000 Matson Building, 215 Market Street.

The J. C. Smith Hoe & Tool Co., Evansville, Ind., has changed the name to the Young Car Co. and expects to manufacture bodies for commercial auto trucks in addition to the mine cars, hoes and tools it has been making for several years. John F. Young is president.

J. E. Rhoads & Sons, makers of leather belting and lace leather, has moved its central office from 12 North Third Street to 35 North Sixth Street, Philadelphia.

By an arrangement made between the Diamond Chain & Mfg. Co., Indianapolis, and the Chain Belt Co., Milwaukee, the latter will represent the Diamond company through newly established branches on the Pacific Coast. Both companies were previously represented in the territory by Meese & Gottfried, San Francisco. The new Chain Belt Co. offices are at 67-69 First Street, Portland, Ore., and 1040 Sixth Avenue South, Seattle, Wash.

The Whitney Mfg. Co., Hartford, Conn., has appointed the Pittsburgh Gear & Machine Co., Twenty-seventh and Smallman Street, Pittsburgh, as distributor in that district for the Whitney roller chain and silent chain.

The Chicago Pneumatic Tool Co., New York, announces the General Machinery Co., Spokane, Wash., as agent in the eastern part of Washington and northern Idaho.

The H. B. Wilson Co., St. Louis, composed of H. B. Wilson and J. M. Shea, who have represented the Mahr Mfg. Co., in that city for the last two years, has been given additional territory extending along lines of various railroads running out of St. Louis and taking in Kansas City.

The Building Products Co. has purchased the good will and patents of the Hodges adjustable shores, made in Cincinnati, and has purchased a plant in Toledo, Ohio, to manufacture them. The Building Products Co. has specialized on concrete form construction work. The property of the Milmine Iron & Steel Works at Toledo, including 1½ acres of land with modern buildings and machinery and sidings from both the New York Central and Clover Leaf railroads, has been purchased as the new home of Hodges shores. The Hodges shore was developed by Jesse E. Hodges, formerly general superintendent Ferro Construction Co., Cincinnati. It has been on the market for eight years. The Milmine plant will be the new home also of Blaw-Knox steel floor pans.

Directors of the Scoville Mfg. Co., Waterburg, Conn., have proposed the purchase of the American Pin Co. and the Oakville Mfg. Co. in notices sent to stockholders. Both the Pin company and the Oakville company are located in Waterbury and are capitalized at $1,350,000 and $600,000, respectively. The proposal would authorize issuance of $2,700,000 additional stock and $300,000 debentures.

Burton E. Carpenter, 1065 Columbia Avenue, Chicago, has been appointed mid-western representative of the Garvin Machine Co., New York.

William J. Breen is representing H. H. Adams & Co., New York, pig iron, coke, in New England.

The Frank B. Pope Co., refractories dealer, has moved from 2223 Oliver Building, Pittsburgh, to room 1511 of the same building.

The Townsend Co., manufacturer of rivets, wire nails and wire, New Brighton, Pa., will move its Chicago offices to Room 721, London Guarantee & Accident Building, 360 North Michigan Avenue, effective Dec. 15.

The Anodion Metal Co., Guilford Avenue and Oliver Street, Baltimore, manufacturer of lighting fixtures, etc., has changed its name to the Anodion Mfg. Co. C. W. Harvey is manager.

The Globe Iron-Crush & Shot Co., Mansfield, Ohio, has changed its name to the Globe Steel Abrasive Co.

Machinery Markets and News of the Works

INQUIRY BY RAILROADS

Southern Issues List of 210 Items—Baltimore & Ohio Also in Market

Scattering Railroad Orders in Past Week, But Buying by Industrial Companies Is Light

If present indications may be taken at their face value, there will be considerable buying of machine tools by some of the railroads soon after Jan. 1, or possibly before. The outstanding development is an inquiry from the purchasing department of the Southern Railway at Washington for 210 items, including a large number of pneumatic riveting hammers. The Baltimore & Ohio Railroad has also come into the market for quite a number of tools.

Miscellaneous orders have been placed by a number of roads, including the New York Central, which has begun covering on its recent inquiries. The Norfolk & Western is expected to place orders this week. The Santa Fe is preparing a list to be issued soon, covering a large amount of equipment, machine tools and cranes, for its shops at San Bernardino, Cal. The Union Pacific list, it is predicted, will be closed some time this month.

Automobile manufacturers, who have been active buyers throughout the year, are doing very little this month, but more inquiry from this source is expected next month. The Eaton Axle & Spring Co., Cleveland, is in the market for 10 machines. The Studebaker Corporation at Detroit bought four turret lathes.

Machine tool requirements for the new switchboard plant of the General Electric Co. at Philadelphia will probably be decided upon soon, in view of the fact that orders for 14 electric cranes for the buildings have just been placed with four crane builders.

New York

NEW YORK, Dec. 18.

ALTHOUGH orders of machine tools from industrial plants continue to come to local machinery dealers in mere driblets, prospects for a resumption of buying after the first of the year appear somewhat brighter. Promises of railroad buying after Jan. 1 also seem more definite. Some in the New York trade are quoting on the large list of the Southern Railway published in this issue under the Philadelphia heading and also on tools required by the Baltimore & Ohio. The New York Central has begun to place orders against its recent inquiries. Among the tools bought the past week were an axle lathe, a 36-in. x 16-ft. engine lathe and a 19-in. engine lathe. The Kansas City Southern has bought from an Eastern company a 12-ft. plate-flanging clamp and a 400-ton car-wheel press and the Pennsylvania Railroad bought from the same company a horizontal cotter and keyseating drill. Other orders placed in this market include a 14-ft. plate-bending roll for the Lombard Iron Works & Supply Co., Augusta, Ga.; a 1500-lb. steam hammer for the Carnegie Steel Co., Pittsburgh; a 5-ft. radial drill for the West Leechburg Steel Co., Pittsburgh, and a side-head boring mill for the Whitney Mfg. Co., Hartford, Conn.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Dec. 28 for two fuel oil heaters and spare parts for the Brooklyn Navy Yard, schedule 1678; until Jan. 8 for 120 pressure switches for the same yard, schedule 1695.

The Cuba Cane Sugar Corporation, 123 Front Street, New York, has plans for a new refinery at Velasco, Cuba, and will commence work at an early date. A portion of the machinery now at the company mills at Centrals Feliz, Socorro and Lequeitio, Cuba, will be removed to the new plant, and additional equipment installed.

Grim & Cummings, 57 Frost Street, Brooklyn, laundry machinery and parts, plan for the installation of a lathe, milling machine and kindred equipment.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a company in Brazil which proposes to build a cold storage plant to cost about $200,000, intending to use American machinery. Reference No. 113282.

The Centennial Paper Mills, Inc., Valatie, N. Y., is planning the installation of power plant equipment, including a 200 kw. generator, direct-connected to steam turbine engine, with switchboard and auxiliary equipment.

Walter C. Talbot and Mortimer Brockway, Beacon, N. Y., have acquired the local plant and site of 160 acres of the Verplanck Brick Co., including waterfront and dock on the Hudson River. The new owners will install additional power equipment, conveying machinery, mechanical drying equipment, etc., to expand and modernize the plant.

The Belgian Government is taking bids until early in February for the construction of a new drydock, with operating machinery, to cost about $1,000,000, and solicits bids from American companies. Plans and specifications on file at three district offices of the Bureau of Foreign and Domestic Commerce, 734 Custom House, New York; 930 Witherspoon Building, Philadelphia, and 1801 Custom House, Boston.

Elevating, conveying and other material-handling machinery will be installed in the ten-story warehouse, 100 x 121 ft., to be erected on the Eastern Parkway, Brooklyn, by the St. Mark's Holding Corporation, 1043 Pacific Avenue, to cost about $700,000. Charles B. Meyers, 31 Union Square, New York, is architect.

The American Locomotive Co., 30 Church Street, New York, has plans for a one-story shop at Schenectady, N. Y., to cost $100,000 with equipment.

The Harrison Box Co., Harrison Place and Varick Street, Brooklyn, is taking bids on a general contract for a two-story addition, 100 x 150 ft., to cost about $45,000, with machinery. McCarthy & Kelly, 159 Remsen Street, architects.

The Board of Albany County Superivsors, Albany, N. Y., will purchase in the near future one 10-ton caterpillar type tractor and four 5-ton tractor machines. J. J. McNulty is chairman.

The Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Washington, room 815, will receive catalogs and literature of brick-manufacturing machinery, transmission and power equipment for brick plants, with capacity from 5000 to 30,000 brick per day, for reforwarding to Consul A. T. Haeberle, Sao Paulo, Brazil, where a market exists for American machinery of this kind.

Bids will be received by C. S. White, purchasing agent, New York Central Railroad, Room 344, 466 Lexington Avenue, New York, until Dec. 28 for wire nails, staples, steel tubes, axles, cast iron wheels, and other equipment, to be covered by serial contract No. 34-1923.

Van Zandt, Inc., River and Rensselaer Streets, Troy, N. Y., will install a coal conveyor, with elevating equipment, at the power house at its shirt factory, with capacity of about 3 tons per hr., elevating height, 18 ft.

Bids will be received by the secretary, Public Works Tenders Board, Wellington, New Zealand, until April 30 for the construction of power plant, known as Section 2, Arapuni Electric Power Scheme, as per plans and specifications on application.

An electric power plant will be erected by the Distinctive Pictures Corporation, 366 Madison Avenue, New York, Arthur S. Friend, president, at its proposed studio plant in Queens Borough, to cost more than $250,000. William O. Hurst is company architect.

The E. W. Bliss Co., Inc., Brooklyn, has disposed of another portion of its former plant at Plymouth and Pearl

Streets, 125 x 142 ft., to John J. Heither who will have plans drawn for a two-story automobile service and repair building to occupy the entire site.

The Sociedade de Usinas Siderurgicas, city of Santa Barbara, state of Minas Geraes, Brazil, has plans for the construction of an iron and steel plant, including foundry, machine shops, general iron works and other buildings. A blast furnace is also projected.

Manual training equipment will be installed in the high school to be erected at Fort Edward, N. Y., estimated to cost $250,000, for which plans are being drawn by Loth & White, 190 State Street, Albany, N. Y., architects.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, will construct a large storage and distributing plant, with pipe line, pumping station, etc., in the vicinity of Cacalilac, Mexico, to handle the output of the Mexican Seaboard Oil Co., Cacalilac, for which a contract recently was made. It will cost more than $200,000, with equipment.

The Tidewater Oil Co., 11 Broadway, New York, will commence the erection of a storage and distributing plant at 83-101 East Peddie Street, Newark, consisting of five buildings and pumping plant, to cost $170,000, with equipment. A service and repair building for company motor trucks will be included, costing $50,000.

Bids will be received by the Board of Education, Department of Supplies, City Hall, Newark, until Dec. 27 for sheet metal shop machinery, pumps and valve reseating equipment, electrical equipment and other apparatus. R. D. Argue, secretary.

L. Bamberger & Co., 147 Market Street, Newark, department store, are having plans drawn for a five-story service, operating and storage building, for company automobiles and motor trucks, and other equipment, to cost about $1,000,000. Abbott, Merkt & Co., 175 Fifth Avenue, New York, architects and engineers.

The F. E. O. Corporation, 67 William Street, East Orange, N. J., Frank P. Oexle, general manager, will take bids at once on a general contract for a two-story automobile service and repair building, 59 x 250 ft., at Spring Avenue and North Willow Street, Montclair, N. J., to cost about $130,000.

The Town Council, Hammonton, N. J., plans the installation of two electrically-operated pumps and auxiliary machinery at the municipal pumping plant, including air compressors and machinery for converting the station from steam to electric operation. Town Engineer Baker in charge.

Fire, Dec. 8, destroyed a portion of the pipe fitting plant of the American Copper Products Corporation, Bayway, Elizabeth, N. J., with loss estimated at $30,000. It is planned to rebuild.

Manual training equipment will be installed in the proposed senior high school to be erected at Maplewood, N. J., estimated to cost $500,000, for which plans will be drawn at an early date. Henry W. Foster is superintendent of schools, in charge.

The New Jersey Power & Light Co., 30 West Blackwell Street, Dover, N. J., is perfecting plans for extensions in generating plants and system and the installation of additional machinery. A block of preferred stock is being sold to finance the work.

The Pyrene Mfg. Co., 520 Belmont Avenue, Newark, manufacturer of fire extinguishers, has plans for a one-story plant, 100 x 310 ft., at 109-13 Meeker Avenue, to cost $65,000.

The Albert Pipe Supply Co., Berry and North Thirteenth Streets, Brooklyn, is in the market for a three-phase, motor connected friction saw and also a large pipe threading machine, standard makes only.

Buffalo

BUFFALO, Dec. 17.

PLANS are being perfected by the Board of Education, Buffalo, for a new vocational school in the Kensington district, to cost about $550,000. Ernest C. Hartwell, superintendent of education, in charge.

The Mohawk Paper Makers, Inc., Cohoes, N. Y., will commence the erection of a one-story power plant, 47 x 90 ft., to cost $100,000 with equipment.

The Elba Cold Storage Co., Elba, N. Y., recently organized, care of C. K. Porter & Sons, 73 West Eagle Street, Buffalo, architects, will take bids for a two-story cold storage and refrigerating plant, 100 x 140 ft., to cost $125,000, with equipment.

The Rochester Gas & Electric Corporation, Rochester, N. Y., is disposing of a bond issue of $4,000,000, a portion of the proceeds to be used for extensions and equipment. Robert M. Searle, president.

The Board of Contract and Supply, Syracuse, N. Y., will purchase lathes and other mechanical equipment for local schools. F. E. Barry, secretary.

Fire, Dec. 10, destroyed a portion of the machine shop at the plant of the General Electric Co., River Road, Buffalo, with loss of about $20,000. It is planned to rebuild.

The Truck Equipment Co., 1751 Fillmore Avenue, Buffalo, manufacturer of motor truck equipment, has plans for a one-story addition to cost $[illegible].

The Rochester Packing Co., 900 Maple Street, Rochester, N. Y., will install an ice and refrigerating plant at its new five-story factory, 200 x 300 ft., to be erected on Exchange Street, Albany, N. Y., estimated to cost $500,000 Henschein & McLaren, 1637 Prairie Avenue, Chicago, are architects.

The Binghamton Light, Heat & Power Co., Binghamton, N. Y., is disposing of a block of mortgage bonds, the proceeds to be used in part for extensions.

J. H. Knobloch, 79 Tamarack Street, Buffalo, is planning to purchase presses and other equipment for the manufacture of cement and concrete blocks.

A manual training department will be installed in the two-story high and grade school to be erected at Sodus, N. Y., estimated to cost $175,000, for which bids are being asked on a general contract. Max Umbrecht, Fayette Park Building, Syracuse, N. Y., architect.

The Cutler Ice Co., 310 Front Street, Binghamton, N. Y., will commence erection of a new ice-manufacturing plant to cost $50,000.

Fire, Dec. 13, destroyed the engine department and portion of main plant of the Ellicottville Novelty Co., Ellicottville, N. Y., manufacturer of turned wood specialties, with loss estimated at $50,000 including machinery. It is planned to rebuild.

The Common Council, Gouverneur, N. Y., is perfecting plans for a municipal electric power plant to cost $60,000. L. Reynolds, Geneva, N. Y., is engineer.

The Home Refrigerating Co., Watertown, N. Y., affiliated with the Northern Utilities Corporation, same city, plans the installation of machinery. J. N. Carlisle, head.

The Parker Rust Proof Co. of Buffalo, Inc., 11 Cleveland Place, Buffalo, has been organized with $18,000 capital stock and will establish a plant to rust-proof iron and steel by the Parker process. The company has purchased rights to the process for western New York. Sand blasting and chemical apparatus will be purchased. R. C. George is president.

The Otis Elevator Co., Buffalo, has bought a 3-ton Moore electric furnace for installation at its Buffalo works to replace two other electric furnaces. This furnace will be installed with acid bottom for foundry operation.

Philadelphia

PHILADELPHIA, Dec. 17.

THE Southern Railway, through its purchasing department in Washington, has issued an inquiry for 210 items of shop equipment, of which 157 are pneumatic riveting hammers and the remainder are mostly machine tools of various types. The Baltimore & Ohio Railroad is also in the market for a number of tools for its shops at Glenwood and Montclair, Md.

The list of the Southern Railway is given below. All of the machines unless otherwise specified are to be motor driven, 220 volt, three phase, 60 cycle.

One double-head axle lathe to take 6 x 11 in. axles.
One car-wheel turning lathe for 42-in. wheels.
One steel car-wheel turning lathe for turning wheels up to 42 in. diameter.
One 18-in. tool room lathe.
Four 16-in. portable bolt lathes.
One 20-in. engine lathe, 12-ft. bed.
One 36-in. engine lathe to take 8 ft. between centers.
One 36-in. engine lathe, 12-ft. bed or not less than 6 ft. between centers.
One 24-in. heavy-duty lathe, 8 ft. between centers.
One 3 x 36 in. steel-head turret lathe with locomotive attachments.
One 90-in. driving wheel lathe with quartering attachment.
One 42-in. vertical boring mill with two heads on cross rail.
One 42-in. turret and side-head boring mill with table chuck.
One No. 3 universal milling machine.
One 15-ft. planer to plane sheets to 1 in. thickness.
One 42 x 42 in. x 14 ft. planer with two heads on cross rail.
One planer and matcher for car flooring, roofing and lining.
One 4-side timber planer for car sills to plane 12 x 18 in.
One 5-spindle wood borer.
One car timber planer.
One 32-in. heavy-duty shaper.
Two heavy-duty, draw-cut shapers for driving box work.

One 48-in. car-wheel press, 400 tons.
Two automatic radial stay threading and turning machines.
One staybolt threading machine.
One 26-in. slotting machine.
One 24-in. vertical turret lathe.
Two 2-in. double-head bolt cutters.
One 2-in. bolt heading and forging machine.
One flanging machine for flanging plates up to ¾ in. thick.
One pneumatic air and steam hose mounting machine.
One 4-in. pipe cutting machine, belt drive.
Two electric flue welding machines.
One 200 amp. electric welding machine, 440 volt, three phase, 60 cycle.
One 200 amp. electric welding machine, 220 volt, three phase, 60 cycle.
Two Modern twist drill grinding machines, capacity up to 2½ in. diameter drills.
Forty No. 60 pneumatic riveting hammers.
Forty-seven No. 80 pneumatic riveting hammers.
Seventy No. 90 pneumatic riveting hammers.
Three Sundstrand heavy-duty internal surface grinders.
One 48-in. throat motor-driven punch, capacity 1½-in. hole in 1¼-in. plate.
One 48-in. throat motor-driven shear, capacity equal to 1½-in. hole in 1¼-in. plate.
One pneumatic flue welding hammer and dies for superheater flues.
One flue welding furnace for superheater flues.
Two 24-in. wheel emery grinders, belt drive.
One 200 hp. water tube boiler to be erected by manufacturer.

The Metropolitan Edison Co., 16 South Fifth Street, Reading, Pa., through its management engineers, W. S Barstow & Co., New York, announces a program of expansion of physical properties of its subsidiary companies contemplating ultimate expenditure of $20,000,000. There is now under construction at Middletown, Pa., on the Susquehanna River, a base load generating station costing $4,000,000: construction work has also been started on a plant of equal capacity on the Delaware River, eight miles below Easton, Pa. The Metropolitan Edison Co. controls the Metropolitan Electric Co. of Reading, the Edison Electric Illuminating Co. of Lebanon, the Lebanon Valley Electric Co., the Pennsylvania Edison Co., the York Haven Water & Power Co. and several others, all of which have been welded into a single system.

The Goshen Furnace Corporation, 1607 Real Estate Trust Building, Philadelphia, is in the market for a second-hand vertical tubular boiler, 54-in. diameter, not over 6 ft high, capacity 100 lb. steam pressure.

A building permit has been issued to the General Electric Co., Schenectady, N. Y., for the second unit of its new plant at Sixty-eighth Street and Elmwood Avenue, Philadelphia, one-story, 119 x 254 ft., to cost $300,000, with equipment, for which a general contract has been let to the White Construction Co., Inc., New York. Harris & Richards, Drexel Building, architects.

Packard, Inc., 319 North Broad Street, Philadelphia has taken title to property, 200 x 207 ft., at North Broad Street and Allegheny Avenue, as site for a four-story automobile service and repair building, to cost $900,000 with equipment. Philip S. Tyre, 1509 Arch Street, architect. Robert B. Parker, president.

Work will commence on a five-story automobile service and repair building at 2221-25 North Broad Street, Philadelphia, to cost $190,000, for which the owner's name will be announced at a later date. G. V. Warren, 1913 Arch Street, architect, in charge.

A one-story power house, 30 x 40 ft., will be erected at the plant of the Wilmington Bleachery Co., Market and Race Streets, Wilmington, Del., at Holmesburg, Philadelphia, the entire project to cost $130,000.

The Atlas Ball Bearing Co., Third Street and Glenwood Avenue, Philadelphia, will rebuild its power house and install additional equipment, partially destroyed by fire recently.

Frank W. Harper, head of the F. W. Harper Co., Hunt Building, Trenton, N. J., building materials, is completing negotiations for the purchase of the plant and equipment of the Trent Brick Co., for $50,500. The works will be remodeled and additional machinery installed. Robert A Messler is receiver.

Fire, Dec. 10, destroyed a portion of No. 5 shop at the plant of the Stanley G. Flagg Co., Stowe, manufacturer of iron and steel castings, with loss estimated at $21,000. It is planned to rebuild. Headquarters are at 1421 Chestnut Street, Philadelphia.

Manual training equipment will be installed in the new Southern junior high school to be erected at Tenth and Chestnut Streets, Reading, Pa., estimated to cost $1,000,000. Edward Z. Scholl, 136 Robeson Street, architect.

C. A. McClure and George W. Crowley, Jr., care of James Collins Jones, Bullitt Building, Philadelphia, representative, are organizing the Williamsburg, Three Springs, Saltillo and Saxton Power companies, to install plants and systems in the localities for which named.

Fire, Dec. 10, destroyed the Tip Top coal breaker and equipment of the Beaver Valley Coal Co., Hazleton, Pa., with loss estimated at $50,000. Rebuilding plans are being considered.

The H. Geisel Co., Sellersville, Pa., is planning for a new factory at Perkasie, Pa., for the manufacture of cutlery, estimated to cost $27,000.

The Hamilton Watch Co., Lancaster, Pa., has plans for an addition, including improvements in present plant, estimated to cost $20,000. Equipment will be installed for an additional output of about 450 watches daily.

The Easton Gas Co., Easton, Pa., will make extensions and improvements, including a new holder at Raspberry and Franklin Streets, and installation of additional generating and other equipment, to cost $1,500,000.

The Vallamont Planing Mill Co., 1009 Market Street, Williamsport, Pa., plans for a new three-story factory 120 x 160 ft., to cost about $155,000, including the installation of electrically-operated machinery and power equipment. J. C. Wilson, head.

The Hillside Coal Co., Pittston, Pa., has plans for a new coal breaker to cost about $80,000 with machinery.

The Lackawanna Laundry Co., 308-12 Penn Avenue, Scranton, Pa., will install power equipment, conveying and other machinery at its proposed addition estimated to cost $100,000. A. B. Warman, head.

The Anthracite Chain & Engineering Co., Hazleton, Pa., recently organized with a capital of $50,000, is perfecting plans for works to manufacture mechanical chains and conveyor equipment invented by S. J. Benner, one of the heads of the company. E. D. Snyder and J. H. Lahm, Hazleton are also interested.

John S. Fisher and A. J. Musser, officials of the Juniata Public Service Co., Juniata, Pa., are organizing two subsidiaries, the Mifflin and the Berrysburg Electric Service companies, to install plants and systems in Mifflin Township and Berrysburg Borough.

The Ocean City Gaslight Co., Ocean City, N. J., has arranged an appropriation of $100,000, for extensions in its plant, including new generating and purifying equipment, for capacity of 1,500,000 cu. ft. per day. Work will commence on a new 500,000 cu. ft. gas holder.

Fire, Dec. 8, destroyed a portion of the plant of the Ayers Machine Co., Salem, N. J., manufacturer of canning machinery, and practically destroyed the factory of the J. B. Campbell Mfg. Co., manufacturer of linoleum, etc., adjoining, with combined loss estimated at $160,000, including equipment.

Chicago

CHICAGO, Dec. 17.

WITH inquiries more numerous and store trade more active, local machine tool dealers look forward to a busy January. Bookings so far this month have been better than expected, in view of the fact that December is ordinarily dull because of inventory-taking and holiday activities. The Pettibone-Mulliken Co. has purchased two horizontal boring mills in addition to the machines mentioned in this column last week. The Sullivan Machinery Co., Michigan City, Ind., is placing orders for considerable equipment, having purchased two radial drills, a turret lathe, two horizontal boring mills, several engine lathes and a number of other machines.

Interest continues to center in railroad buying. The Union Pacific has issued an inquiry for a centering machine in addition to the tools mentioned last week, and is expected to close against its list, involving about $50,000, before the end of the year. It has already purchased a hydraulic combination mounting and demounting wheel press. The Burlington has placed orders for two 54-in. vertical boring mills, two pattern makers' lathes, and two used guide bar grinders. Its purchases against its recent list, the bulk of which was placed some weeks ago, now aggregate approximately $200,000. The Santa Fe is expected to issue an extensive list shortly, covering cranes and machine tools for the extension of its San Bernardino, Cal., shop. It has just asked for figures on a 100-in. Niles, or equivalent, double wheel quartering machine. The Kansas City Southern has purchased a motor-driven 18-in. engine lathe, and the Denver & Salt Lake has placed an order for an hydraulic bushing press.

The Crane Market

While there continues to be a general disposition to delay purchases until after Jan. 1, particularly on locomotive and small capacity overhead cranes, a few awards are noted this week. Among current inquiries is one from the General Electric Co., which has closed on its list of 14 cranes for Philadelphia, calling for two 100-ton, 75-ft. span, 4-motor overhead cranes with 25-ton auxiliaries, for Pittsfield, Mass. Stone & Webster, Boston, have not yet closed on the 25-ton overhead crane for Providence, R. I., inquiry for which recently appeared. The Southern California Edison Co. has purchased a 40-ton, 37-ft. span and a 15-ton, 37-ft. span, overhead cranes and the Norfolk & Western Railroad has placed a 10-ton 23-ft. span crane. A number of overhead cranes and a locomotive crane were sold last week at the public auction of the Isaac G. Johnson & Co. plant, Spuyten Duyvil, New York.

Among recent purchases are:

General Electric Co., Schenectady, N. Y., nine 3-ton overhead traveling cranes from the Northern Engineering Works; two 10-ton overhead cranes from Alfred Box & Co.; two 5-ton overhead cranes from the Chesapeake Iron Works and a 25-ton overhead crane from the Niles-Bement-Pond Co., all for installation at Philadelphia.

J. Schadel & Co., iron and steel scrap, Springfield, Ohio, a 25-ton, locomotive crane with generator and magnet for a new yard at Portsmouth, Ohio, from the Browning Co.

Vanadium Alloy Steel Co., Latrobe, Pa., a 5-ton, 80-ft. span magnet handling crane from the Milwaukee Electric Crane & Mfg. Co.

Sandusky Cement Co., Cleveland, a 7½-ton 50-ft. span bucket handling crane from the Milwaukee Electric Crane & Mfg. Co.

McKay Machine Co., Youngstown, Ohio, a 7½-ton, 37-ft. span, 3-motor crane from the Northern Engineering Works.

Atlantic Refining Co., Franklin, Pa., a 5-ton, 43-ft. span crane from the Northern Engineering Works.

Gilbert Steel Co., Pittsburgh, a 5-ton, 50-ft. 5-in. span, 3-motor, mill-type crane from the Northern Engineering Works.

Western Gas Construction Co., Fort Wayne, Ind., a 5-ton electric traveling crane from the Niles-Bement-Pond Co.

Thomas L. Green Co., Indianapolis, a 5-ton, 48-ft. 6-in. span, 3-motor, overhead traveling crane from the Milwaukee Electric Crane & Mfg. Co.

Northwestern Pacific Railroad, San Francisco, a 15-ton electric traveling crane from the Whiting Corporation.

Southern Wheel Co., Birmingham, Ala., seven 1½-ton jib cranes from the Whiting Corporation.

Pere Marquette Railroad, Detroit, eight jib cranes of 1 to 6 tons, from the Whiting Corporation.

Holden Co., Ltd., Montreal, a 150-ton, 100-ft. boom, 16-wheel, used Brownhoist locomotive crane for 24-gage track, from Philip T. King, New York.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: No. 7 cupola for the Birmingham Stove & Range Co., Birmingham, No. 7 cupola for the Essex Foundry Co., Newark, N. J., and No. 6 cupola for the Saco-Lowell Shops, Boston.

Bradford Foote, until recently a member of the firm of Foote Brothers Gear & Machine Co., Chicago, who purchased the Crofoot Gear Works, Cambridge, Mass., for removal to Chicago, has bought the plant of the Acme Corporation at the corner of Oakley and Austin Avenues, Chicago. The Acme Corporation will move Feb. 1, to a new plant on Lake Street, near Forty-second Avenue, Chicago.

The William E. Pratt Mfg. Co., 190 North State Street, Chicago, recently incorporated with $50,000 capital stock, is a continuation of a company of the same name, not incorporated, which was established in 1893. The company has a malleable iron foundry at Joliet, Ill., occupying eight acres and employing 800 men. The plant, which has a yearly capacity of 12,000 tons, does a jobbing business. The company also conducts a jobbing machine shop and a hardware manufacturing business, its products including hog rings, wire belt fasteners, husking pins, farming tool brackets, clamps, clevises and other specialties. Officers are William E. Pratt, president; F. T. Radecke, vice-president, and A. F. Boehm, secretary and treasurer. No purchases of additional equipment are contemplated at this time.

A. T. Kincaid & Co., 321 East Monroe Street, Springfield, Ill., recently incorporated with $25,000 capital stock, will engage in the furnace and the heating appliance business, but will not do any manufacturing at present. Offices and warehouse are at the address given. Officers have not yet been elected.

Jaeger & Co., Inc., 122 West Kinzie Street, Chicago, recently organized with $50,000 capital stock, will confine its activities almost exclusively to the merchandising of bakers' supplies, and will manufacture only a few of these articles. Hans Jaeger is manager.

A. W. Cash Valve Mfg. Corporation, 250 East Wood Street, Decatur, Ill., recently incorporated with $10,000 capital stock, has established a shop at the address given and will manufacture pressure reducing and regulating valves, relief valves, ammonia expansion valves, pump governors, etc. It also expects to do some jobbing work. Officers are A. W. Cash, president, and George B. Madden, secretary and treasurer. No additional equipment will be bought at this time.

Michael Reif, 1340 George Street, Chicago, has let contract for a one-story tin shop, 28 x 101 ft., at 2049 Belmont Avenue, to cost $10,000.

The machine shop of the Aluminum Casting Mfg. Co., Davenport, Iowa, recently destroyed by fire, will be replaced by a brick structure as soon as insurance claims are adjusted. The machine shop was the only portion of the plant affected, and production is continuing as usual in the foundry.

The Iowa Malleable Iron Co., Ninth and Kirkwood Streets, Fairfield, Iowa, has plans for two one-story additions to its foundry, 100 x 140 ft., and 100 x 125 ft., to cost approximately $100,000. Bids will be asked on general contract in about 90 days. A. A. Wickland & Co., Inc., 5 South Wabash Avenue, Chicago, is engineer. W. W. Hughes is secretary and general manager.

The Globe Portland Cement Co., 416 McKnight Building, Minneapolis, Minn., has plans for its proposed works at Dubuque, Iowa, estimated to cost $2,000,000 with machinery. The Charles L. Pillsbury Co., 1200 Second Avenue, South, Minneapolis, is architect and engineer.

The Common Council, Bedford, Iowa, is having plans prepared for a municipal electric plant to cost about $65,000. The Prince-Nixon Engineering Co., Peters Trust Building, Omaha, Neb., is engineer.

The Common Council, Winthrop, Minn., is considering the erection of a municipal electric power plant, to cost $100,000 with machinery. August Malm is clerk.

Manual training equipment will be installed in the high school to be erected at Gordon, Neb., estimated to cost $110,000, for which bids will be called on a general contract early in February. F. B. Watson, Norfolk, Neb., is architect.

The United Light & Railways Co., Davenport, Iowa, is disposing of a bond issue of $1,000,000, a portion of the proceeds to be used for plant and system extensions. Frank T. Hulswit is president.

The C. D. Edwards Mfg. Co., Albert Lea, Minn., manufacturer of road machinery, has plans for a one-story addition to cost about $55,000. Gaarder & Gaarder, Home Investment Building, are architects.

New England

BOSTON, Dec. 17

BUYING of machine tools in this market the past week was better than in the previous week, but was confined to comparatively little equipment and a few dealers. The New York, New Haven & Hartford Railroad purchased two new Warner & Swasey machines, a No. 2A and a No. 3A, which represents the first interest shown in shop equipment by any New England railroad in a long time. The Saco-Lowell Shops, Boston, textile machinery, is negotiating for Warner & Swasey lathes for its Lowell shops, but has under consideration a plan for revamping similar tools now in use at that plant. That company has, however, purchased Cincinnati milling machines and Monarch geared head lathes, as well as grinding tools and hack saws, but has not covered its equipment requirements. A South Boston shop purchased a used milling machine and press, and a local manufacturer grinding machines. Dealers are fairly well occupied on prospects that give every promise of closing shortly after Jan. 1.

Local machine tool houses will close Dec. 22 and not resume business until Dec. 26.

Bids are in on a proposed one-story, 120 x 170 ft. plant for the National Can Co., 36 North Washington Street, Boston, to be erected at Dorchester. Krokyn & Brown, 7 State Street, Boston, are the architects.

Griffith, Kiever & Co., 118 Western Ave., Brighton, Boston, builders finish, have awarded contract for a one-story, 100 x 160 ft. plant. Motors, belting, etc., will be required. Plans are private.

The Whittenton Mfg. Co., 437 Whittenton Street, Taunton Mass., cotton goods, has foundations in for a two-story and basement, 70 x 77 ft. addition. Cole, Osgood & Kimball, 220 Devonshire Street, Boston, are the engineers. Motors will be installed to drive looms.

Bids are being taken for a sub-station addition on Glenville Terminal, Allston, Boston, and a sub-station at Dedham, Mass., to be erected by the Edison Electric Illuminating Co., 39 Boylston Street, Boston. Bigelow & Wadsworth, 120 Tremont Street, Boston, are the architects.

Plans are being considered by the Continental Wood Screw Co., Inc., Mount Pleasant Street, New Bedford, Mass., for a two-story addition, 40 x 100 ft., to cost $50,000.

A building permit has been issued to the Safety Car Heating & Lighting Co., Dixwell Avenue, Hampden, Conn., for a two-story addition to cost $40,000.

The Davol Rubber Co., Point Street, Providence, R. I., will commence the construction of a new plant on Smith Street, to cost $100,000 with equipment.

The Worcester Machinery Co., 140 Commercial Street, Worcester, Mass., plans the purchase of a pipe threading and cutting machine, to handle stock 8 in. and larger.

The East Millinocket Light Co., Millinocket, Me., has acquired the plant and property of the Millinocket Light Co., for $106,000. Plans are under way for extensions and additional equipment.

Fire, Dec. 6, destroyed a portion of the hydrate lime plant and machinery of the Lee Lime Co., Lee, Mass., with loss estimated at $50,000. It is planned to rebuild.

J. A. Glass, 27 Purchase Street, Boston, operating a metal works, plans the installation of a combination punch and shear.

The Pierce-Arrow Motor Car Co., Buffalo, has leased property at Boston for a factory branch and service works for its motor truck division.

The New York, New Haven & Hartford Railroad Co., New Haven, Conn., will commence the erection of a power house and oil storage plant at East Hartford, Conn., to cost about $50,000.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Jan. 8 for 50 crucibles for the Portsmouth Navy Yard, schedule 1704; until Dec. 28 for 30,000 ft. pneumatic hose for the Boston yard, schedule 1703.

The Penn Metal Co., Boston, has purchased the machinery and equipment of the Dexter Metal Mfg. Co., Philadelphia, manufacturer of steel shelving, metal lockers and steel equipment. Additions are being made to the Penn company's factory and the Dexter equipment will be installed shortly after Jan. 1. The Dexter Metal Mfg. Co. will be exclusive sales agent for the steel shelving and lockers manufactured by the Penn Metal Co. C. Joseph Dexter becomes a director and vice-president of the latter company and George Sagendorph, president Penn Metal Co. an officer of the Dexter Metal Mfg. Co.

Detroit

DETROIT, Dec. 17.

THE Detroit Motor Bus Co., Edlie Street, Detroit, is having plans prepared for a one and two-story service and repair shop, with pumping plant and power department, estimated to cost $300,000. The Austin Co., 208 South La Salle Street, Chicago, is architect.

The Thwaite Furniture Co., Grand Rapids, Mich., is arranging for the purchase of the former plant of the National Spring & Wire Co., Albion, Mich., for a new factory. It will be remodeled and machinery installed, estimated to cost $50,000.

The Brown-Hutchinson Iron Works, 7807 Morrow Street, Detroit, has taken out a building permit for a one-story addition, estimated to cost $34,000, including equipment.

The White Motor Products Co., 215 South Leavitt Street, Chicago, L. T. Jamme, president and general manager, plans for new works at Muskegon Heights, Mich., remodeling and extending an existing building, estimated to cost $60,000.

The Consumers Power Co., Jackson, Mich., will build a new dam on the Manistee River, near its present Junction dam, and install additional machinery at its hydroelectric generating stations in this section.

The Capitol Brass Works, 2306 Franklin Street, Detroit, has filed plans for a four-story addition, estimated to cost $35,000, including machinery, for which a general contract has been let to Harry M. Frier, Penobscot Building.

The Reo Motor Car Co., Lansing, Mich., will build an addition to its power house, to include the installation of 1000 hp. boilers and other equipment.

The Michigan Central Railroad Co., Lansing, Mich., has tentative plans for a new engine house and repair shop at North Lansing, with initial capacity of about 10 locomotives at one time.

The Aladdin Motion Picture Camera Co., Detroit, now being organized, plans the establishment of a factory to manufacture a motion picture camera and machinery, to sell at a popular price. Precision and other equipment will be installed. David A. Brown, A. W. Ehrman, are heads. Hamlin, Kay & Nathan, Penobscot Building, stock brokers, are interested in the new company.

The Automotive Parts Co., Detroit, with branch works at Grand Rapids, Mich., and Toledo, Ohio, has been acquired by George W. Borg, head of the Borg & Beck Co., 6150 Second Street, operating an automobile parts business. Plans for extensions are under consideration.

The Graham Brothers Co., Evansville, Ind., manufacturer of motor trucks, has taken over the former plant of the King Motor Car Co., Conant Road, Detroit, which has removed its works to Detroit, as well as the new Detroit plant of the Denby Motor Truck Co., of that city, but never occupied. The acquisitions will increase the plant area of the purchasing company about three times; the former King plant will be equipped for assembling truck chassis, while the Denby structure for the time being will be used for storage and paint service.

Fire recently damaged the plant and office of the Cadillac Iron Works, Cadillac, Mich. The company manufactures brick presses, wire wheels and shock absorbers, besides doing a general jobbing machine shop business.

The U. G. Body Co., River Street, Lansing, Mich., is installing new equipment for wood and steel working in connection with the building, repair and remodeling of automotive bodies.

The American Vehicle Corporation, 6553 Woodward Avenue, Detroit, incorporated with capital stock of $10,000, will manufacture toy wagons with all-steel under works. It is in the market for disk wheels and drop forged steering knuckles, which may be replaced by malleable castings. The company is open to contract for these and will operate an assembling plant. Initial capacity will be 500 wagons per day. Lewis C. McSouth is vice-president.

Pittsburgh

PITTSBURGH, Dec. 17.

IF inquiries terminate into orders, the machine tool trade will have a very busy period after the first of the year. Furthermore, current business is good for this season. The Railway Steel Spring Co., which is building a new plant at Latrobe, Pa., to which the business in Pittsburgh will be removed, has bought a number of tools, including two board drop hammers and a trimming press, and another order running into a fair-sized amount of money was for a pipe machine, two lathes and a drill press from the Stevens-Wood Engineering Co., Youngstown. The Standard Sanitary Mfg. Co., will probably place the tools for its new plant in Baltimore before Christmas, so that work can be pushed on the foundations.

The Pennsylvania Railroad has issued a revised list of 13 tools for its new repair shop at Sharpsburg, Pa. The trade, in addition, has a number of single tools to figure on and there is a very hopeful feeling about early 1924 business.

A number of the steel companies are considering plans for new mill installations, the Republic Iron & Steel Co., being a probable buyer of a new continuous bar mill, with a 13,000 hp. steam engine drive.

Bids will be received by the City Controller, City-County Building, Pittsburgh, until Dec. 24, for one portable gasoline engine-driven air compressor, for the Bureau of Water. John P. M. Murphy, director.

The Municipal Service Co., Titusville, Pa., has acquired the plant and property of the Titusville Electric Light & Power Co. Plans are under way for extensions and the installation of additional equipment.



The Method of Tapping Large Size Holes In Pipe By Hand Machines Is Frequently Long and Tedious, In Many Cases Taking Four Men About Five Hours to Tap a 4-In. Hole in a Cast Iron Main. A gas company in Greater New York using the machine shown herewith claims that it permits of drilling, reaming and tapping a 3-in. hole in 10 min. and a 4-in. hole in 15 to 18 min. This apparatus, which is known as the Boyd pipe tapping machine and is manufactured by the Silent-Hoist Co., Brooklyn, N. Y., may be driven by an air motor, using an ordinary air drill on the drive shaft as shown, or by electric motor or gasoline engine, in connection with a flexible coupling shaft. The machine is arranged with automatic feed but may also be fed by hand as shown for drilling. Employed as a hand machine, instead of having a direct application of the ratchet to the tap as usual, a gear reduction is used to increase the power applied

The Bessemer Motor Truck Co., Grove City, Pa., recently merged with the American Motors Co., Plainfield, N. J., to form the Amalgamated Motors Corporation, is arranging to discontinue operations at its local plant and will complete shipments of machinery to the Plainfield works during January. A machine and repair plant will be maintained at Grove City for at least twelve months, with all manufacturing concentrated at Plainfield. The Amalgamated company recently added the Krebs Motor Truck Co., to its consolidation, headed by J. C. L. Krebs, formerly connected with the Clydesdale Motor Truck Co., Clyde, Ohio.

The Penn Public Service Corporation, Johnstown, Pa., has closed negotiations for the purchase of the Corry Electric Light Co., Corry, Pa., and will take possession in January. Extensions are planned, including additional equipment.

The Chambersburg Ice & Cold Storage Co., Martinsburg, W. Va., plans a two-story addition, estimated to cost $70,000 with equipment.

The Wheeling Glass Mfg. Co., Wheeling, W. Va., has acquired the plant of the North Wheeling Glass Co., and will take immediate possession. It is planned to remodel and install power and other equipment to give employment to about 500 operatives.

The Laurel Run Coal Co., Shinnston, W. Va., recently formed with capital of $250,000, plans the installation of electric power equipment and mining machinery in the Laurel Run section. Thomas H. Laulis, Shinnston; and Charles E. Pitter, Fairmount, W. Va., are heads.

The Monongahela-West Penn Public Service Co., Fairmont, W. Va., plans extensions in its power plant and system in the Upper Monongahela Valley section. A portion of a stock issue of $1,000,000, soon to be sold, will be used for the work and purchase of equipment. George M. Alexander is president.

The Clarksburg Glass Co., Clarksburg, W. Va., will remodel its plant and install machinery to replace present hand operation, including electric power equipment. Eight sheet glass machines, and auxiliary apparatus, will be provided, with increase in working force to 250 operatives.

The Clarksburg Wholesale Co., Clarksburg, W. Va., recently formed by a consolidation of local interests, with capital of $500,000, has tentative plans for an ice and cold storage plant, estimated to cost $85,000. W. I. Booth is president, and C. P. Hood, secretary.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has plans for extensions in its ore docks at Erie, Pa., including the installation of cranes, conveying and other handling machinery, estimated to cost $500,000. The capacity will be doubled.

F. A. Scott, Fairmont, W. Va., and associates, have acquired the Stone Lick Coal Co., Weston, W. Va., and plan the installation of electric power and mining machinery.

The Sullivan Pocahontas Coal Co., Tralee, W. Va., recently organized to consolidate the Raleigh, Fire Creek, Wood Sullivan, Mead Pocahontas and other coal companies in this section, has tentative plans for expansion and the installation of electric power and other mining machinery. J. C. Sullivan is head.

St. Louis

ST. LOUIS, Dec. 17.

BONDS for $500,000 have been approved by the Board of Public Service, St. Louis, for a city power plant, for which plans will soon be drawn.

The Common Council, Ava, Mo., plans the installation of electric pumping machinery at the municipal waterworks to cost $35,000.

The Jessner Welding Co., 202 West Third Street, Pittsburg, Kan., plans the installation of electric grinding equipment. O. F. Jessner is head.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., is disposing of a bond issue of $2,500,000, a portion of the proceeds to be used for extensions and additional equipment. J. J. O'Brien is vice-president.

The Mathews Motor Co., 301 North Pine Street, Pittsburg, Kan., plans the purchase of an electric drill, cylinder grinding, and other machines. C. S. Mathews is head.

The Common Council, Olathe, Kan., is planning for the installation of electric pumping machinery at the waterworks. The E. T. Archer Engineering Co., New England Building, Kansas City, Mo., is engineer.

The C. C. Utility Co., Eureka, Ark., has acquired the plant and property of the Harrison Electric Co., Harrison, Ark. Plans are projected for extensions, with additional machinery, and construction of new ice and cold storage plant estimated to cost $150,000.

The Davis Boring Tool Co., 3710 Forest Park Boulevard, St. Louis, has contracted with the Forest Spring Real Estate Co., St. Louis, for a new two-story plant, 75 x 180 ft., to cost $50,000. It will be occupied under lease. C. G. Schorieh, Syndicate Trust Building, is general contractor.

W. D. Beard, Ponca City, Okla., and associates are arranging for a new local ice-manufacturing plant to cost approximately $75,000. A plant, now in operation, will be continued.

A bond issue of $100,000 has been approved at Hannibal, Mo., for the installation of additional waterworks equipment, including pumps, motors and auxiliary machinery. D. H. Maury, 304 South Dearborn Street, Chicago, is engineer.

The Kansas City Cold Storage & Warehouse Co., Kansas City, Mo., is perfecting plans for a new eight-story plant estimated to cost $1,250,000, with ice-making, cold storage and other equipment.

The N. O. Nelson Mfg. Co., Tenth and Chestnut Streets, St. Louis, manufacturer of pipe, plumbing equipment, etc., has awarded a general contract to the Herman & McCain Construction Co., Riegler Building, for its factory branch at Little Rock, Ark., to cost $100,000.

The Common Council, Russell, Kan., plans the installation of electric pumping machinery at its proposed municipal

waterworks, estimated to cost $95,000, for which bonds have been approved. J. W. Murphy is clerk.

The Diamond Wood Heel & Mfg. Co., 407 South Broadway, St. Louis, will install electric-operated machinery and transmission equipment at its proposed two-story and basement plant at 3500 South Broadway, 75 x 170 ft., to cost $70,000. E. J. Hess, 3228 Magnolia Avenue, is architect.

W. A. Stevens, Quapaw, Okla., is planning to purchase a lathe, bandsaw, universal saw, transmission equipment and other machinery for a proposed woodworking plant.

The Mendenhahl Motor Co., 2317 Locust Street, St. Louis, is taking bids on a general contract for a four-story service and repair building, 38 x 155 ft., estimated to cost $150,000 W. P. McMahon, Title Guaranty Building, is architect.

The Pat-C Auto Signal Mfg. Co., 1823 Main Street, Joplin, Mo., plans the installation of a lathe, metal sanding machine and other equipment.

The Walter A. Zelnicker Supply Co., St. Louis, is inquiring for a jaw crusher, 36 x 48 in. or larger.

Cincinnati

CINCINNATI, Dec. 17.

MACHINE tool buying is "light, but inquiries show no indication of letting up. While a fair number of orders are being booked, tools under negotiation give promise of some very active business shortly after the first of the year. Dealers report a fair volume of orders for small tools, while used machinery sales are light, which is usual at this season.

Railroad inquiries and buying are fairly active. The Norfolk & Western is expected to place orders this week and the Union Pacific list will probably be closed this month. The Pennsylvania Railroad, Central Region, has added two lathes to its inquiries, and the Boston Elevated Railway is in the market for two lathes. The Detroit United Railways is taking bids on one turret lathe.

Reorganization of the Monitor Stove & Range Co., Cincinnati, is expected to be completed before Jan. 1. The plant is now being operated under a receivership, but this will be lifted, new capital put into the company and a new board of directors elected.

The Cincinnati Advertising Products Co., Cincinnati, has awarded contract for two additional stories to its plant at 1101 York Street, to cost with equipment about $25,000.

The National Marking Machine Co., Spring Grove Avenue, Cincinnati, has purchased the plant of the Lunken Window Co., in Cumminsville, for expansion. The company will not immediately occupy the new plant.

The National Refrigolier Sales Co., Greenville, Ohio, recently incorporated with a capitalization of $50,000, is contemplating the manufacture of refrigerators, ice boxes and cabinets, but nothing definite has been decided. L. E. Kerlin, is the company's attorney.

The Reed Auto Equipment Co., Middletown, Ohio, has been incorporated with a capitalization of $25,000 to take over the business of the Reed Mfg. Co., manufacturer of shock absorbers. The company will continue to manufacture this product, but later expects to add other lines. E. O. Reed is president.

The W. B. Oglesby Paper Co., Middletown, Ohio, has plans for a two-story addition at its Sorg-Oglesby mills, 100 x 100 ft., to cost about $90,000. Thomas G. Scott & Sons, Middletown, are architects. L. C. Anderson, vice-president.

The John Steptoe Co., 2951 Colerain Avenue, Cincinnati, is in the market for a used gear hobber for gears up to 24 in. in diameter, also a bevel gear cutter.

M. H. Crump., P. O. Box 525, Bowling Green, Ky., is in the market for machinery for local asphalt properties, including crushing and conveying equipment, electric power plant machinery, steam power equipment, belting, transmission equipment, steam shovel, and auxiliary equipment.

Bids will be received by the Highway Iron Products Co., Columbia Building, Louisville, manufacturer of corrugated culverts and other iron products, until Dec. 27 for erection of its proposed one-story plant at Magnolia and Seventeenth Streets, to cost $105,000. The present business at Ligonier, Ind., will be removed to this location and additional machinery installed. Joseph & Joseph, Francis Building, are architects. Charles L. Watson, vice-president.

The interests of R. R. Rabe and Clifford Friar in the Rabe Pipe & Foundry Co., Chattanooga, Tenn., are said to have been acquired by Frank Gebbie and associates. The new owners propose to reorganize the company and extend the foundry.

The Louisville & Nashville Railroad Co., Louisville, will take bids on general contract until Dec. 31 for a one-story machine shop at Etowah, Tenn., 110 x 175 ft., estimated to cost $65,000. W. H. Courtenay, chief engineer, in charge.

Indiana

INDIANAPOLIS, Dec. 17.

BIDS will be asked early in January by the H. T. Electric Co., 612 North Capitol Avenue, Indianapolis, manufacturer of electrical equipment, for a new plant to cost $30,000 Edward D. Pierre, Hume-Mansur Building, is architect.

R. B. White, Anderson, Ind., and associates have organized a company to acquire the plant of the Anderson Foundry & Machine Co., now in receivership. Winfield T. Durbin, receiver, has been instructed by the court to receive sealed bids for the property, and sell for not less than $616,000, or amount of invoice of assets.

The Bucyrus Co., Evansville, Ind., manufacturer of dredging machinery, etc., is perfecting plans for an addition to its plant. Headquarters of the company are at South Milwaukee, Wis.

John Cook & Co., Indianapolis, manufacturers of aluminum ware, will remove their plant to larger quarters at 1717 Gent Street, where additional equipment will be installed.

The Board of Public Works, Anderson, Ind., is planning the installation of additional equipment at the city power plant, including a 5000 kw. turbine-generator set.

Manual training equipment will be installed in the new junior high school to be erected at East Chicago, Ind., Todd Park section, estimated to cost $400,000, for which bids will be asked on a general contract early in January. K. D. Norris, Calumet Building, is architect.

The Terre Haute, Indianapolis & Eastern Traction Co., Terre Haute, Ind., will soon take bids for the erection of new shops and car barns estimated to cost $50,000.

The National Terminals Corporation, Pennsylvania and Georgia Streets, Indianapolis, recently organized with assets of about $12,000,000 to consolidate the Indiana Refrigerating Co., Indiana Terminal Warehouse Co., and other interests, is formulating plans for a series of cold storage plants and terminals in Toledo and Columbus, Ohio; Philadelphia, Pittsburgh and Buffalo. Each plant will cost $1,000,000 with machinery, including material-handling equipment in the warehouse section. William J. Hogan is president and treasurer, and Norman E. Metzger, vice-president and secretary.

Cleveland

CLEVELAND, Dec. 17.

WHILE business in machine tools is dull, the volume is about as good as usual at this time of the year. The only new inquiry of any size is for 10 machines for the Eaton Axle & Spring Co., Cleveland. Inquiry for single machines is fair but prospective purchasers are slow in placing orders. Nothing is pending at present from the machine automobile companies except a few scattering tools. A local manufacturer of turret lathes the past week took four machines for the Detroit plant of the Studebaker Corporation, two for the New Haven Railroad and three for a Cincinnati brass working plant.

A fair volume of inquiry is coming out for heavy handling equipment. Two ore bridges, one in the Chicago and one in the Buffalo district, are being figured on, as well as some dock handling equipment, and an Eastern railroad has an inquiry out for six locomotive cranes. The McMyler Interstate Co., Bedford, Ohio, has taken a 175,000 lb. pile driver for a Western railroad.

The Horsburgh & Scott Co., Cleveland, manufacturer of gears, has commenced the erection of a three-story concrete building, 120 x 140 ft. for plant and office purposes.

The City Ice & Fuel Co., Cleveland, has taken bids for rebuilding its ice manufacturing plant at East 102nd Street and Elk Avenue. The capacity will be increased from 80 to 150 tons a day and the steam plant will be electrified.

The Kenton Wood Produce Co., Kenton, Ohio, will erect a saw mill and is in the market for two 10-hp. and one 50-hp 220 volt a. c. 60-cycle motor, a self-feeding rip saw, hack saw and derrick type of hoist.

The Great Lakes Refining Co., Toledo, Ohio, will soon begin the erection of an oil refinery at an estimated cost of $150,000.

The Acme Ornamental Iron Works, Youngstown, Ohio, plans the erection of a one-story factory, 60 x 100 ft. In equipment it will require motor, punching and shearing machinery, grinders, drilling machines, lathes and power saws.

The plant formerly occupied by the Elyria Steel Products Co., Elyria, Ohio, has been purchased by the Premier Refining & Mfg. Co.

The American Electric Switch Co. recently organized, which purchased the plant of the Lewis Electric Co. in Minerva, Ohio, has elected E. F. Duquette, president; Charles F. Wolfe, vice-president and general manager and C. B. Kramer, treasurer and sales manager. The plant has 25,000 sq. ft. of floor space and is equipped with shearing, stamping, welding and assembling machines and die and enameling departments.

The Columbia Silica Co. recently incorporated in Akron to manufacture sand blast sand, is building a plant near Akron. P. A. Snyder is president and J. E. Ruch, general manager.

Milwaukee

MILWAUKEE, Dec. 17.

HOLIDAY quiet pervades practically every division of the machine-tool business. Active inquiry is a heartening feature, which relieves the lack of buying. The first half of December witnessed some fair orders for single items, but business showed a decline from the November average. Inquiry involves possible small-lot purchases, which probably will not be made until after inventories are taken. The industrial situation appears sound and gives promise of well sustained activity. New enterprises of an apparently substantial nature are in process of establishment which will mean a moderate volume of buying, both of new and used machinery.

The Sivyer Steel Casting Co., Milwaukee, has increased its capitalization to $900,000, consisting of $700,000 common and $200,000 preferred stock, to handle its business growth. Further enlargement of the works at Thirty-seventh Avenue, is in prospect during the coming year. Fred L. Sivyer is president.

The Field Motor Co., Rice Lake, Wis., incorporated several months ago with an initial capital of $25,000, has completed experimental work on a new design of passenger automobile and contemplates the erection of a one-story brick and steel assembling shop, 60 x 150 ft., early in the spring. Production of parts will be contracted for at the outset. The O. E. Szekely Co., Moline, Ill., is manufacturing the engine. T. H. Field is president, and R. C. Peck, secretary, of the Field company.

The Milwaukee Sewerage Commission, 508 Market Street, Milwaukee is asking bids until Dec. 21 for furnishing 340 standard manhole frames and covers for delivery within twelve months from date of contract. John H. Fowles is secretary.

The Manegold Mfg. Co., Milwaukee, has been incorporated with a capital stock of $50,000 to manufacture metal products, principally handles, locks and other fittings and parts for automobile bodies. The principals are William H. Manegold and Frank W. Manegold, who has been for many years secretary Briggs & Stratton Co., Milwaukee. Definite plans have not been made public but negotiations are pending for the lease of a building which will require considerable new equipment. Temporary offices are at 867 Summit Avenue, Milwaukee.

The Belle City Malleable Iron Co., Racine, Wis., has started work on the erection of the second section of its new annealing building. Each unit is 77 x 155 ft. The work is part of a plant replacement and improvement program involving an outlay of $900,000.

The Marathon Battery Co., Wausau, Wis., has been chartered with a capital stock of $150,000 to manufacture storage batteries, dry cells, electrical machinery and similar goods. A building has been leased and purchases of equipment are about to be made. The principals are Edgar J. McEachron and W. H. Thom of Wausau, and E. A. Fuller of Madison, Wis.

The American Mill Supply Co., 1718 Vliet Street, Milwaukee, will build a new warehouse, shop and service building, 40 x 135 ft., part two stories and basement, at 1371-1375 Auer Avenue. With equipment the investment will be about $45,000. The architect is Hugo V. Miller, 646 Twenty-sixth Street, local.

The Board of Education, Antigo, Wis., has engaged Claude & Starck, architects, Madison, Wis., to design a $125,000 junior high and vocational training school, 68 x 122 ft., two stories and basement. Bids will be taken about March 1 and equipment will be purchased next summer. J. P. Waddell is city superintendent of schools.

The American Pfler & Tool Corporation, Milwaukee, has been organized by Oliver L. O'Boyle, Walter S. Bronk and George F. Tidmarsh, 133 Third Street, with $50,000 capital stock to establish a factory to produce a general line of mechanics' tools and equipment for the automotive industry. It is planned to lease a building and purchase machines for working forgings and other parts.

The Manitowoc Church Furniture Co., Waukesha, Wis., will begin work at once on the erection of a $75,000 addition, 100 x 160 ft., one story, at 1214 Lincoln Avenue. The present wood and metal-work equipment will be materially supplemented. C. F. Schuetzke is general manager.

The Nippert Mfg. Co., Sturgeon Bay, Wis., has been organized by J. W. Nippert and Walter Haertel to manufacture hardware specialties and metal products. A site has been purchased on the bay front for a machine shop to be erected next spring. At the start attention will be concentrated on a patented window and screen fastener and other building specialties. Later other products will be added to the line. The new concern is capitalized at $50,000.

The Board of Education, Appleton, Wis., which recently rejected all bids entered for the construction of two junior high schools and industrial training buildings, has ordered revised plans from Perkins, Fellows & Hamilton, architects, 814 Tower Court, Chicago and will take new bids after Jan. 1. The estimated cost is $150,000 each. Paul V. Cary, 803 College Avenue, is chairman, building committee.

The Wesley Steel Treating Co., 651 South Pierce Street, Milwaukee, has increased its capital stock from $25,000 to $50,000 and plans to enlarge its shop and install additional furnaces.

The Board of Education, Mayville, Wis., is having plans revised by Parkinson & Dockendorff, architects, LaCrosse, for the proposed new $200,000 high school. Original bids exceeded the appropriation. New tenders will be asked some time in January. O. D. Naber is chairman, building committee.

Joseph J. Plank & Co., Appleton, Wis., specializing in the manufacture of dandy rolls, used by paper manufacturers for water-marking, has received an order from Yokohama, Japan, for 16 rolls, the largest export order the Appleton company has ever booked. Other Fox River Valley manufacturers of paper mill machinery and specialties report unusually large orders from Japan.

The Reid Clipper Co., Racine, Wis., has been incorporated with an initial capital of $6,000 to manufacture electric motor-driven industrial and domestic appliances, featuring an automatic tool for barbers, veterinarians, etc. M. Andis of the Andis Tool Co., Racine, is forming the new organization in association with H. H. Cochran and H. J. Vincent.

The Board of Education, Mineral Point, Wis., has accepted plans by Edward Tough, architect, Madison, for the proposed new $150,000 high school, with manual training departments, to be erected next year. Bids probably will be asked for construction early in January. Allen M. Tucker is secretary of the board.

The Steel Products Corporation, Sheboygan, Wis., organized with $50,000 capital to take over the automobile bumper and accessory department of the Jenkins Machine Co., same city, is buying some additional tools, but will defer its main purchases until it establishes a plant of its own. For the present quarters are being leased from the Jenkins company. A. G. Stuedeman is president; Robert C. Ebenreiter, vice-president; Fred Zschetzsche, secretary-treasurer and general manager.

The Kimberly, Wis., Board of Education has engaged Oppenhamer & Obel, architects, Green Bay and Wausau, Wis., to design a combination high, junior high and vocational training school, to be built in three units costing $100,000 to $125,000 each. Plans probably will be ready for bidders on Feb. 1. M. H. Kettenhofen is secretary.

Gulf States

BIRMINGHAM, Dec. 17.

BIDS will be received by the United States Engineer Office, Trust Company Building, Galveston, Tex., until Dec. 24, for two cast steel swinging sheave housings, circular 24-60; until Dec. 26 for six cast steel spud cable idler sheaves, two cast steel spud idler drums, and patterns, circular 24-57.

The Piedmont Ice Co., Piedmont, Ala., recently organized, is having plans drawn for an ice-manufacturing and

refrigerating plant. J. M. Townley, Carbon Hill, Ala., is head.

The Middle States Oil Co., New Orleans, will install additional equipment at its local refinery to cost $75,000. P. D. Saklatvala is president.

Fire, Dec. 11, destroyed a portion of the plant of the Rigsbee Electric Co., 1800 Main Street, Dallas, Tex., with loss estimated at $25,000. It is planned to rebuild.

The Nashville, Chattanooga & St. Louis Railway Co., Nashville, Tenn., has acquired the plant and property of the Cumberland Coal & Lime Co., Cumberland, near Bridgeport, Ala., and has plans for a crushing and sorting plant for ballast production, including electric power equipment. H. McDonald, Nashville, is chief engineer.

The Chamber of Commerce, Tuscaloosa, Ala., is in negotiation with a paper manufacturing company, name temporarily withheld, for the construction of a paper mill on a tract to be donated. A power house will be built. It is estimated to cost $2,000,000 including machinery.

Fred H. Jones, First and Commerce Streets, Fort Worth, Tex., will take bids until about Jan. 1, for a new three-story plant, 100 x 100 ft., for the manufacture of automobile equipment and accessories, estimated to cost $100,000 including equipment. Earl T. Glasgow, First National Bank Building, is architect.

The Great Southern Lumber Co., Bogalusa, La., will commence foundations in January for a new mill at New Orleans for the production of paper-board products, to include a power house, estimated to cost $1,000,000 with machinery.

W. S. McDaniel, Columbus, Tex., and associates are perfecting plans for a hydroelectric power station on the Colorado River, near the city, to cost $150,000 including machinery.

The City Council, Hillsboro, Tex., has authorized the installation of electric pumping machinery at the municipal waterworks to replace present steam-driven equipment.

Charles F. Mould, 222 Magnolia Avenue, Daytona, Fla., has inquiries out for electroplating equipment.

Manual training equipment will be installed in the new school to be erected at White Street and Esplanade Avenue, New Orleans, by the Parish School Board, estimated to cost $175,000. E. A. Christy is city architect, in charge.

The New Orleans Dock Board, New Orleans, is planning the installation of additional machinery at the municipal coal tipple on the city docks.

H. T. Phelps, Hicks Building, San Antonio, Tex., has inquiries out for a jaw type crushing machine, about 100 tons capacity, with auxiliary equipment.

Fire, Dec. 6, destroyed a portion of the plant of the Letellier, Phillips Paper Co., 623-45 South Front Street, New Orleans, with loss estimated at $50,000. It is planned to rebuild.

The Elephant Butte Irrigation District, Las Cruces, N. M., and the El Paso Water Improvement District, El Paso, Tex., are planning the construction of a joint hydroelectric generating plant at the Elephant Butte dam, with secondary power plant on neighboring site, estimated to cost $4,000,000 with machinery. H. H. Brook is president and manager of the first noted organization.

The Municipal Light and Water Department, Lakeland, Fla., Charles Larsen, superintendent, plans the installation of two 2000-gal. per min. capacity centrifugal pumps at the city waterworks, with auxiliary machinery, estimated to cost $150,000.

The Florida Paper Mills Co., recently organized as a subsidiary of the Grass Fibre Pulp & Paper Co., Leesburg, Fla., will commence foundations for the first unit of its proposed mill at South Jacksonville, with power house, estimated to cost $250,000. Gilbert Leach is secretary and treasurer.

Fire, Dec. 5, destroyed the ice-manufacturing plant of the Eureka Ice Co., Jackson and Commerce Streets, Houston, Tex., with loss estimated at $150,000 including equipment. It is planned to rebuild.

The Gulf States Chemical & Refining Co., Birmingham, has leased a building at Montgomery, Ala., and will remodel and install machinery for a new plant, to cost approximately $60,000. It is expected to erect new works at this location later. A. M. Kennedy is general manager.

The White Co., Leeland Street, Houston, Tex., manufacturer of automobile trucks, with headquarters at Cleveland, has awarded a general contract to J. Statler, Austin Street, for a one-story service and repair building, 100 x 100 ft., to cost about $65,000. P. E. Seamans is local manager.

The Common Council, Marianna, Fla., has preliminary plans for the construction of a municipal hydroelectric generating station on the Chipola River, to cost about $100,000.

The Southwestern Bell Telephone Co., Capitol Avenue, Houston, Tex., will commence the construction of an eight-story machanical and storage building, with machine and electrical repair works, to cost about $100,000.

The Alabama Polytechnic Institute, Auburn, Ala., will take bids in about a month for a new three-story engineering and mechanical building, 190 x 200 ft., estimated to cost $300,000. Warren, Knight & Davis, Empire Building, Birmingham, are architects.

B. A. Finch, 500 North Akard Street, Dallas, Tex., is planning to purchase machinery for a marble quarrying and finishing plant, electrically-operated, including polishing and handling machinery.

The Atlantic Refining Co., Beaumont, Tex., has preliminary plans for the construction of a pipe line, with pumping unit, to its storage plant on the Neches River, estimated to cost $100,000.

South Atlantic States

BALTIMORE, Dec. 17.

BIDS will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 8, for wire and cable for Eastern and Western yards, schedules 1700 and 1701; also for two induced draft fans and spare parts for the Norfolk Navy Yard, schedule 1687.

The Stasco Milling Co., care of the Industrial Bureau, Board of Trade, Baltimore, said to be affiliated with the Stasco Laminated Slate Co., Poultney, Vt., has purchased property at Whiteford, near Baltimore, and will commence the erection of a plant for the production of roofing slate, estimated to cost $250,000 with machinery. It will include a power house and machine shop.

The Common Council, North Wilkesboro, N. C., has authorized plans for rebuilding the municipal electric power plant, recently destroyed by fire, to cost $85,000, including oil-operated engines, generator, switchboard, etc., for which bids will soon be asked. S. L. Pardue, city clerk.

The Johnson Wire & Iron Works, High Point, N. C., manufacturers' agents, is in the market for a new or used power punch, about ⅝-in., motor drive; also for an electric welding machine and spot welder.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding the construction of two or more match manufacturing plants in England, where American machinery will be required, estimated to cost $2,000,000. Reference No. 13127.

The Virginian Railway Co., Norfolk, Va., has issued bonds for $5,000,000, a large part of the proceeds to be used for the electrification of a portion of its lines. Plans have been drawn for the initial power plant at Narrows, Va., to cost about $250,000.

The Southern Iron & Equipment Co., 217 Grant Building Atlanta, Ga., is in the market for a turret lathe.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until Jan. 2, for electric motor, nails, track bolts, splice bars and similar equipment, circular 1580.

The Consolidated Veneer & Panel Co., High Point, N. C., plans a new three-story factory on Manning Street to cost $25,000 exclusive of equipment.

The Taylor-Parker Co., Water Street and Commerce Place, Norfolk, Va., has inquiries out for two fuel oil engines, 40 hp. and 100 hp. respectively; also for two watertube boilers, 250 to 300 hp., and auxiliary equipment. C. A. McLean is head.

The Austell Cabinet Co., Austell, Ga., recently organized, has plans for a new factory, 400 x 755 ft., to cost about $100,000, with machinery and power equipment. Roy S. Mather, Mather Brothers, Atlanta, Ga.; E. E. Yarborough and A. B. Harrington, both of Austell, are heads.

Manual training equipment will be installed in the new high school to be erected at Hickory, N. C., estimated to cost $225,000, for which bids will be taken at once on general contract. C. Gadsden Sayre, Anderson, S. C., is architect.

The Baxter & Allen Iron Works, Inc., 47 Pinckney Street, Charleston, S. C., desires information and prices of equipment for a brass foundry, including electric furnaces, etc.

Ovens, power equipment, conveying and other machinery will be installed in the two-story and basement baking plant, 100 x 160 ft., to be erected by the Carolina Baking Co., Charlotte, N. C., estimated to cost $250,000. The McCormick Co., Inc., Century Building, Pittsburgh, is architect. H. O. Miller, president.

The Bureau of Foreign and Domestic Commerce, Washington, has information of a company at Vienna, Austria, in

the market for knives for leather-working machinery, No. 8435; of a firm at Santiago, Chile, desiring to [illegible] American roof plate manufacturing machinery, No. [illegible]; a concern at Calais, France, desiring automatic unloading machinery for material from presses, No. 8425; a [illegible], at Durban, South Africa, inquiring for American wire nail manufacturing machinery, No. 8476; a firm at Bangkok, Siam, desiring sawmill machinery, No. 8404; a concern at Halifax, N. S., desiring to purchase machines and tools for machine shop, pulp wood grinders, 4000 hp. motor, and other equipment, No. 8461; and a company at Buenos Aires, Argentina, for fruit canning machinery, No. 8399.

The Common Council, Louisa, Va., is planning to rebuild its municipal electric plant and waterworks station recently destroyed by fire. A list of machinery will soon be available.

William H. F. Thielman, R. F. D. No. 1, Barnett, Ga., is in the market for machinery for a shingle and lath mill.

The Board of District Commissioners, District Building, Washington, will erect a two and three-story addition, 100 x 140 ft., to the Armstrong manual training school, near Third Street, to cost $500,000 with equipment. A. L. Harris, District Building, is architect.

R. E. Carrington, Sanford, N. C., has plans for a local ice-manufacturing and pre-cooling plant, and will make inquiries for machinery and power equipment at once.

A manual training department will be installed in the new school to be erected at Claymont, Del., estimated to cost $275,000, for which bids will soon be asked on general contract. The Board of Education is in charge.

An electric power plant will be constructed by the Appalache Hosiery Mills, Landrum, S. C., at its proposed mill estimated to cost $85,000. Joseph Lee is president.

The Paul Rubber Co., Salisbury, N. C., is in the market for tools, pumping equipment, buffing wheels, boilers and other machinery.

Bids will be received by the Norfolk & Western Railway Co., J. H. Clemmitt, purchasing agent, Room 351, N. & W. Railway Building, Roanoke, Va., until Dec. 26, for requirements for steel springs from Jan. 1 to March 31, Contract Serial No. AA-282; also for requirements for wire fencing, same period, Contract Serial AA-284, and other equipment.

The Georgia Mirror & Plating Co., 309 Albany Street, Waycross, Ga., has inquiries out for an electric plating machine.

The Ault Mfg. Co., High Point, N. C., has a list of machinery wanted for installation in a local furniture manufacturing plant.

The Locke Insulator Corporation, Baltimore, will erect a one-story brick building, 81 x 122 ft., at Charles and Cromwell Streets at a cost of $15,000.

Pacific Coast

SAN FRANCISCO, Dec. 12.

BIDS are being asked by the Weber Showcase Co., 316 South Los Angeles Street, Los Angeles, for a new one-story plant, 360 x 800 ft., estimated to cost $200,000 with machinery. A mechanical conveyor will be installed. Walker & Eisen, Pacific Finance Building, architects.

The Los Angeles Ironall Co., 502 Hass Building, Los Angeles, is having plans drawn for a six-story factory, 100 x 150 ft., to cost about $165,000 with machinery. Frank D. Chase, Inc., Title Insurance Building, is architect and engineer.

The city of Los Angeles, Harbor Department, City Hall, has awarded a contract to the Austin Co., Los Angeles, for a one-story cotton compressing plant, 150 x 500 ft., at Municipal Pier No. 1, San Pedro, to cost about $85,000. Presses and other machinery will be installed.

The Utah Power & Light Co., Salt Lake City, Utah, has plans for an addition to its steam-operated electric power plant at West Salt Lake, estimated to cost $1,500,000 with machinery.

The Northwest Copper & Sheet Metal Works, Seattle, has awarded contract to A. E. Sandstrom, Seattle, for a one-story plant, 100 x 100 ft., at East Madison and Sixth Streets, estimated to cost $40,000 with equipment. Edmund Bergholtz, Spalding Building, is architect.

R. C. Durant and Albert G. Waddell, both of Oakland, Cal., are organizing a company to manufacture transmissions and gears for automobiles, primarily of Starr type, invented by C. B. Starr, interested in the new concern. Plans are under way for works at Los Angeles estimated to cost $1,000,000 with machinery.

The Southern California Edison Co., Los Angeles, has engaged Stone & Webster, Inc., 147 Milk Street, Boston, engineer, to prepare plans for an addition to its steam-operated electric generating plant at Long Beach, to cost approximately $2,000,000. It will provide for an increase of 80,000 hp. in capacity.

Manual training equipment will be installed in the one and three-story junior high school to be erected at the Exposition and Harvard Boulevards, Los Angeles, estimated to cost $350,000, for which plans will be prepared by Frederick J. Soper, 1105 Kerckhoff Building, architect.

The State Highway Commission, Forum Building, Sacramento, Cal., has authorized the construction of a one-story machine and repair shop for State equipment at Lankershim, estimated to cost $35,000.

The Southern Pacific Railroad Co., Los Angeles, has awarded a general contract to Charles A. Fellows, Central Building, for a one-story locomotive shop at its Alhambra Avenue yards, 80 x 500 ft., primarily for engine erecting, estimated to cost $200,000. One 200-ton and two 15-ton traveling cranes will be installed.

The Harris Ice Machine Works, 174 East Water Street, Portland, will commence the erection of a one-story machine shop at 188 Tillamook Street, to cost $25,000. J. F. Foss, 969 Knott Street, is architect.

The Los Angeles Concrete Tile Co., I. W. Hellman Building, Los Angeles, has acquired 4 acres at Mission Road and Fremont Avenue, for a new plant, consisting of two buildings, one and two-story, 70 x 200 ft., and one-story 75 x 150 ft., with power house, estimated to cost $75,000.

The Union Oil Co., Union Oil Building, Los Angeles, plans the construction of a pipe line from the Torrance oil field to its refinery at Wilmington, Los Angeles Harbor, with [illegible] pumping station and auxiliary equipment.

Canada

TORONTO, Dec. 17.

MACHINE tools sales have fallen off slightly the past few days as a result of the approaching holidays, but inquiries continue to make their appearance and it is the opinion that the demand for equipment will be resumed actively after the first of the year. The Canadian Pacific and Canadian National railroads have been ordering only tools urgently needed for replacement, but it is understood that some good sized lists will be forthcoming early in 1924.

The automotive industry is also showing interest in the market but inquiries indicate a tendency to buy later. A feature of present conditions is that in addition to inquiries, received by dealers, some of the larger purchasers are entering the market and placing fair sized orders for equipment without first sending out inquiries or lists. Small tools are moving steadily.

The Acme Supply Co., 7 St. Nicholas Street, Montreal, is in the market for an automatic jig saw.

A. Dumas, 2155 Papineau Avenue, Montreal, will purchase tools for a welding and repair shop.

A. Desjardine, 3872 Notre Dame Street, Montreal, is asking for complete equipment for a forge shop.

E. Clavel, 2836 St. Dominique Street, Montreal, will purchase drill press and other tools for a forge shop.

The Canadian Iron Foundries, Ltd., Fort William, Ont., whose plant was recently damaged by fire has started to rebuild and is interested in equipment for a furnace room and foundry.

Bruce & Price, 159 Prince Street, Montreal, are asking for prices and information on complete foundry equipment.

The Canada Spool & Bobbin Co., Walkerton, Ont., will increase the output of its plant and is interested in equipment for manufacture of spools, bobbins, etc.

Bisson & Dube, 867 Bordeaux Street, Montreal, are asking for a drill press.

Tindal Brothers, Morrisburg, Ont., will purchase miscellaneous small tools, shears, lathe, etc., for a garage.

The J. B. Watson Furniture Co., Kincardine, Ont., proposes to build a $20,000 addition to its factory and is interested in the purchase of machinery for manufacture of reed chairs, etc.

The Shale Brick Co. of Canada, Ltd., Crown Office Building, Toronto, will build an addition to its machine shop at Cooksville, Ont.

The Canadian Mirror & Novelty Mfg. Co., Hull, Que., will build an addition to its factory to cost $40,000.

The Empire State Ice Co., Chicago, and Windsor, Ont., has started work on the erection of an ice plant at Windsor to cost $200,000.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:
- Refined iron bars, base price ..... 3.54c.
- Swedish charcoal iron bars, base..... 7.00c. to 7.25c.
- Soft steel bars, base price ..... 3.54c.

Hoops, base price ..... 5.19c.
Bands, base price ..... 4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base ..... 3.64c.
Channels, angles and tees under 3 in. x ¼ in., base ..... 3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier ..... 3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.40c. to 4.70c.	.....
Nos. 22 and 24	4.45c. to 4.85c.	5.10c.
No. 26	4.50c. to 4.90c.	5.15c.
No. 28	4.60c. to 5.00c.	5.25c.
No. 30	4.80c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.70c. to 5.10c.
No. 16	4.85c. to 5.25c.
Nos. 18 and 20	5.00c. to 5.40c.
Nos. 22 and 24	5.15c. to 5.55c.
No. 26	5.30c. to 5.70c.
No. 27	5.45c. to 5.85c.
No. 28	5.60c. to 6.00c.
No. 30	6.05c. to 6.45c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—41	—24	⅛ in. Butt...	— 4	+19
¼ in. Butt...	—46	—32	¾ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap....	— 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap..	—34	— 6	7-12 in. Lap..	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 27¼c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 21c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20		
			Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		80 lb..	$6.55	$6.30
			90 lb..	6.65	6.40
			100 lb..	6.75	6.50
IC..	$12.55	$10.70	IC..	7.00	6.75
IX..	13.95	12.55	IX..	8.25	8.00
IXX..	15.55	13.75	IXX..	9.50	9.25
IXXX..	17.10	15.30	IXXX..	10.75	10.50
IXXXX..	18.85	16.80	IXXXX..	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	50c.
Bar	58c. to 60c.

Copper

Lake ingot	15¾c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8½c. to 8¾c.
Bar lead	10½c. to 12c.
Solder ½ and ½ guaranteed	34¾c.
No. 1 solder	32¾c.
Refined solder	28¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	11c. to 12c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. ..... 36c.

Old Metals

Business is quiet and values unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.25
Copper, light bottoms	9.00
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	8.00
Lead, heavy	6.25
Lead, tea	5.25
Zinc	4.00
Cast aluminum	15.75
Sheet aluminum	15.75

PHOSPHOR BRONZE

ELEPHANT BRAND

REG. U.S. PAT. OFF.

INGOTS
CASTINGS
RODS
WIRE
SHEETS
TUBES
ROPES

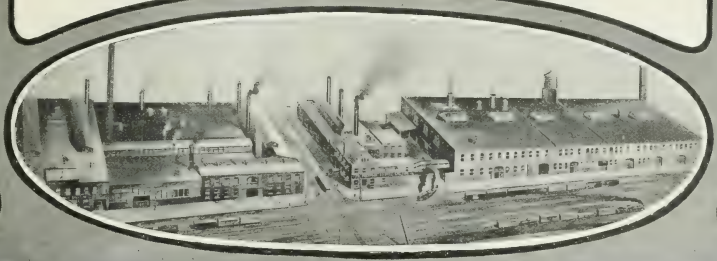
THE manufacture of Phosphor Bronze in the United States was started originally by us over 40 years ago and the wonderful advancement made in its adaptation to industrial mechanical uses are achievements in which we feel a just pride and satisfaction.

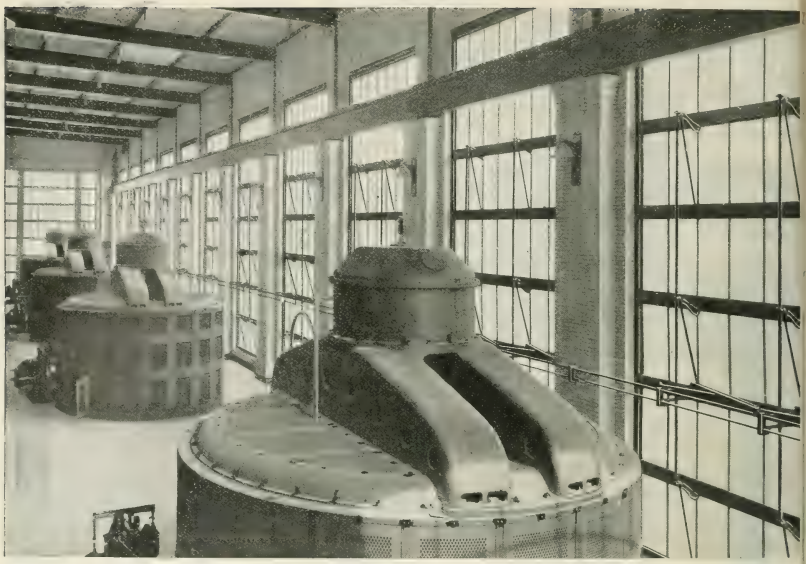
The most skeptical have long since been convinced that ELEPHANT BRAND PHOSPHOR-BRONZE is the logical metal to use for General Machine Castings, Bearings, Bushings, Pinions, Gears, Valves, Pumps, Plungers, Cylinder Linings, Tuyeres and all parts where resistance to corrosion, toughness and great tensile strength are the desired factors.

Ingots, Castings, Wire, Sheets, Rods and stock Bushings from 1″ to 6″ diameter.

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The powerhouse shown above was built and designed for Henry Ford & Son, Green Island, N. Y., by Stone & Webster. It is a typical installation example of Truscon Continuous Sash in sidewalls. When closed these windows are weathertight and by pressing a button all the natural ventilation required can easily be obtained.

Not only are Truscon Steel Windows known for their excellence in design and workmanship, but their methods of mechanical operation show a long line of tried and tested successes.

There are types of Truscon Mechanical Operators to meet practically every ventilating requirement. No matter how large or small your problems Truscon engineers can solve them.

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From a modest start with the manufacture of reinforcing steel for concrete the company has developed until it is the largest manufacturer of steel building products in the world.

Truscon's success is built upon real service.

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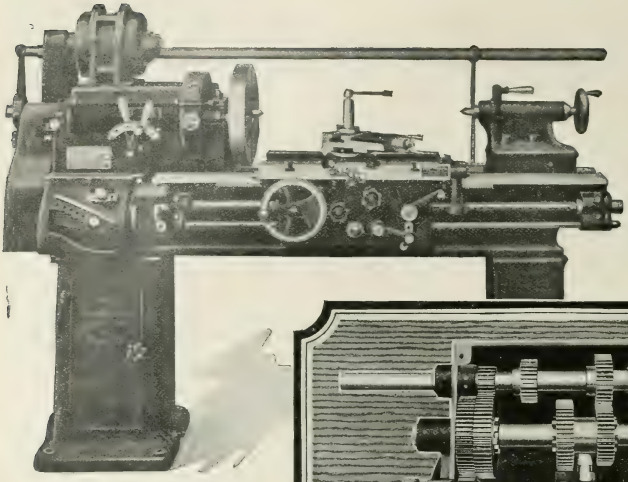
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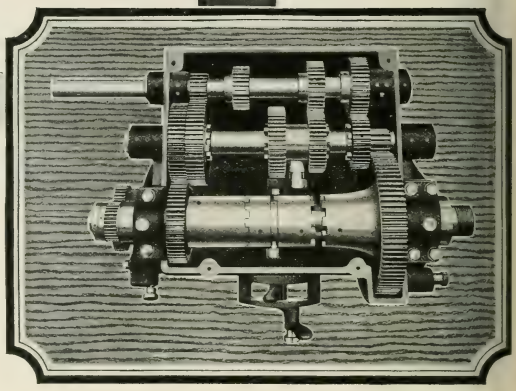
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About 1600 Names of Regular Advertisers



Monarch 16" Motor Driven Lathe and view of headstock interior showing gears made of Agathon Alloy Steel



AGATHON STEELS

Adopted By Another Machine Tool Builder

Here's another one of America's leading machine tool builders adopting Agathon Alloy Steel for headstock gears. Here's another manufacturer who realizes the life, the satisfaction and increased demand for his product is based upon the performance of those parts forming the heart of the machine.

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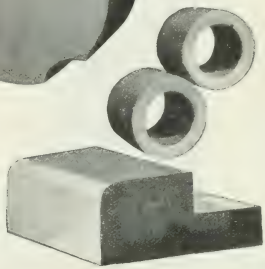
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Conform exactly to specifications
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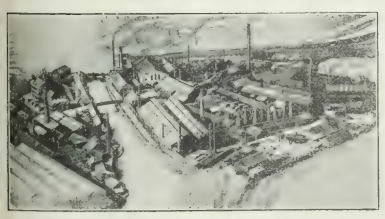
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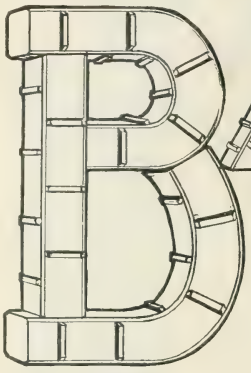
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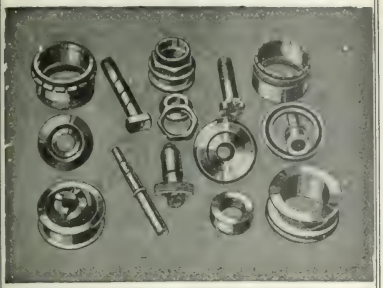
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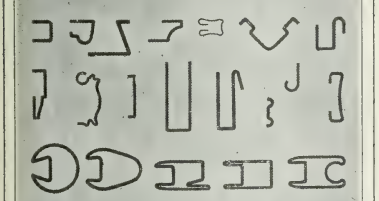
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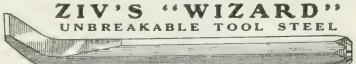
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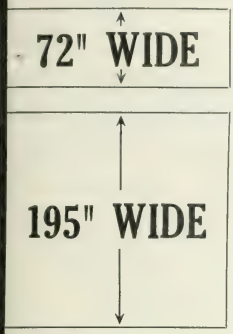
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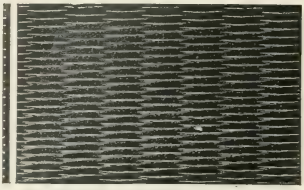
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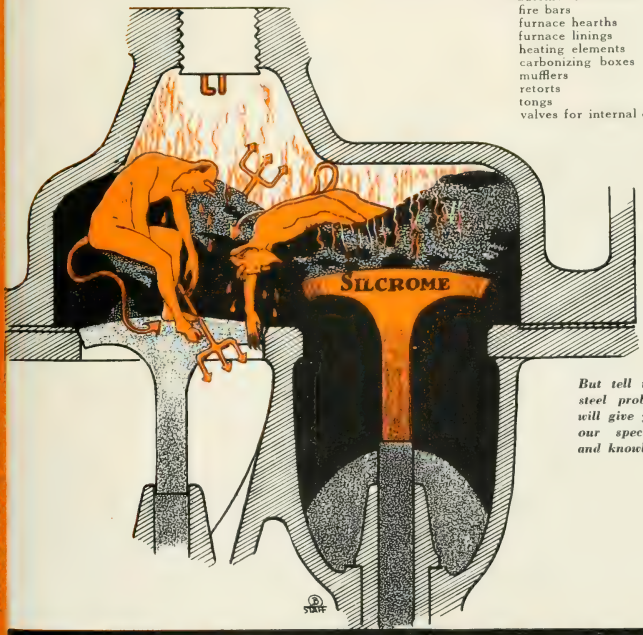
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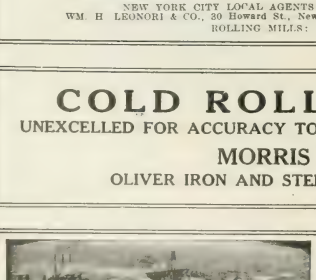
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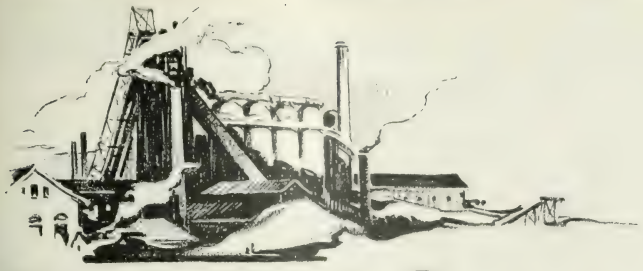
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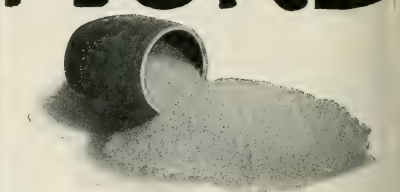
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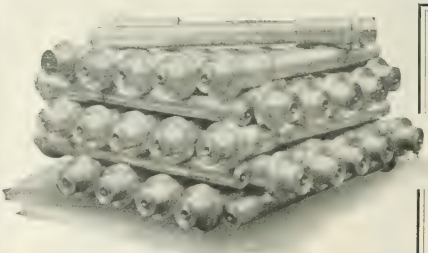
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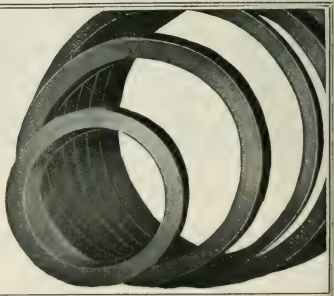
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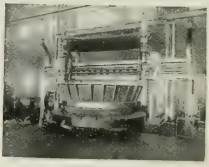
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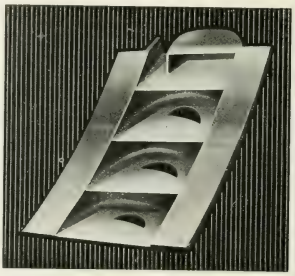
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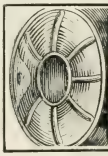
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During our twenty-three years in the stamping business we have specialized in making Automobile, Motorcycle and Bicycle parts.

Many manufacturers of these articles have substituted Hamco Stampings for troublesome castings because they are lighter, stronger and less expensive. They require no machining or polishing.

Let us tell you what you can save by using them.

The H. A. Matthews Mfg. Co., Seymour, Conn.

WESTERN REPRESENTATIVES
MIDLAND SALES AND ENGINEERING CO., 630 BOOK BUILDING DETROIT, MICH.

STEEL STAMPINGS

Deep-Drawn or Shallow

On either kind of stampings we can give you prompt service and low prices. We have the experience, equipment and steel stocks to assure you quality work, and quick delivery. Send us a sample or blue-print and we'll show you what we can do.

The Oakes Co.
Indianapolis
U.S.A.

STAMPINGS—WIRE SHAPES

25 YEARS IN THE FIELD

After twenty-five years of making stampings and wire shapes, we feel that we can satisfy the demands of the most exacting.

Let us show you the grade of work we have been giving our customers.

Send blueprints for estimate.

TITCHENER-DIEHL CO.
1844 W. AUSTIN AVE.
CHICAGO, ILL.



By Choosing the Right Method

that is, by changing from a screw machine product to PRESSED STEEL, the firm for which we make this part is saving forty per cent of the former cost.

Thirty-five years' experience in producing Sheet Metal Stampings testifies to our ability to solve unusual problems.

MATTHEWS
Manufacturing Co.
Sheet Metal Stampings
WORCESTER, MASS.

Your Small Metal Parts

With exceptional equipment for swaging, grinding, turning, stamping and drawing, we will give you *prompt service* in Quality Small Metal Parts.

For 50 years Torrington Products have been widely known for Quality and Service.

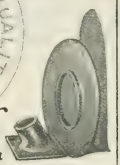
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THE TORRINGTON COMPANY
EXCELSIOR PLANT
55 FIELD ST. TORRINGTON, CONN.

Stampings

BRAND OF SUPREME QUALITY

The **Ireland & Matthews**
Manufacturing Company
Detroit, Michigan



WORCESTER STAMPED METAL

· QUALITY · STAMPINGS

STAMPED METAL PARTS

For every industry

40 Years of Light and Heavy



Stamping Experience. We offer you the benefit of our knowledge and equipment.

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DRAWN AND STAMPED COPPER, BRASS, ALUMINUM SHELLS and SPECIAL PARTS READY FOR ASSEMBLING

FINISHED ASSEMBLIES

We make metal parts for many of America's foremost products.

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Your stamping orders will be accurately and promptly filled in our plant because we have the facilities.

That includes equipment, experienced personnel and a policy that our customers must be satisfied.

Send us blueprints for quotations.



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of unusual quality and greater strength. Prompt deliveries. Send us your blueprints.

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We make the right kind of metal stampings and do drawing work, specializing in quantity production Screw Machine Products. Any metal specialties. Let us put our experience behind your product.

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DIES & TOOLS COMPLETE PLANT
OVER 30 YEARS EXPERIENCE
THE OTTO KONIGSLOW MFG.CO.
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ROCK BOTTOM PRICES
QUALITY PRODUCT ON PRODUCTION BASIS
"UNIFORMLY ACCURATE"
WILL BE GLAD TO QUOTE FROM YOUR BLUEPRINTS OR MODELS
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CUT COSTS GET OUR PRICES

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Specialists in Metal Goods

Metal goods to order from Brass, Zinc, Aluminum, Steel. Drawn work, stampings, assembled parts or completed articles. All finishes. Estimates furnished.

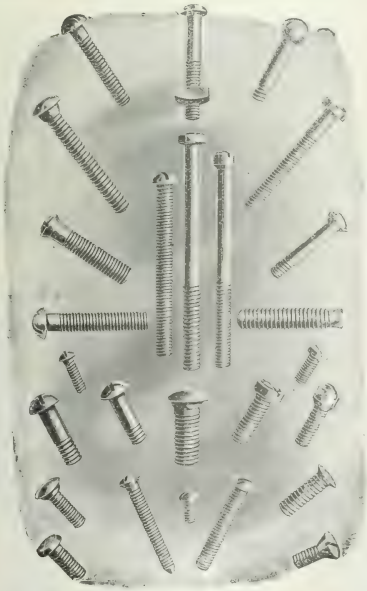
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Bridgeport, Conn.

Screws—
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Pins—

Threaded & Formed Wire
Screw Machine Products

Prices right. Let us quote you.

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Waterbury, Conn., U. S. A.
Since 1849



MACHINE SCREWS

SQUARE AND HEXAGON NUTS

"Promco" Quality Brands

With every facility for producing a quality article and a development of a service that is unique is only one of the many reasons for our suggesting that it may prove of benefit to you to investigate our products and become familiar with our policy.

When in the market, write us for an estimate on your requirements, stating the quantity desired, and a prompt estimate will be sent you.

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TORRINGTON, CONN., U. S. A.

The illustration indicates a few of the many special parts that we have developed for other manufacturers



WOOD SCREWS

Iron, Steel, Brass, Bronze and Monel

Iron Rivets—Any Style Head **Tinners and Coopers Rivets**

Pipe Couplings

Bessemer and Basic
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Resistance Wire

BRIDGEPORT SCREW CO.
BSCo.
BRIDGEPORT, CONN.
Trade Mark

Steel and Brass Fine Wire
Monel Wire
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Brush Wire

THE BRIDGEPORT SCREW CO. **Bridgeport, Conn.**

Representatives:
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Dan M. Bell, Dallas, New Orleans
Milton Pray Company, San Francisco, Los Angeles, Seattle

You are on the right road if your search for a better screw leads you to a Mac-it Hollow or Safety Set Screw

Mac-it Hollow Set Screws

Where endurance in the fullest sense of the word is expressed.





Mac-it Hollow Set Screws positively will not round in the hexagon hole, neither will they split, spread or upset at the point.

THE STRONG, CARLISLE & HAMMOND CO.

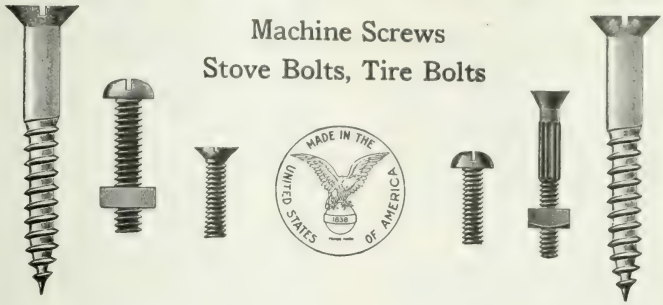
Ask your Jobber for Mac-it Screws

General Distributors
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Cleveland, Ohio

Ask for Mac-it Hollow Screw, wrench and test block

Wood Screws

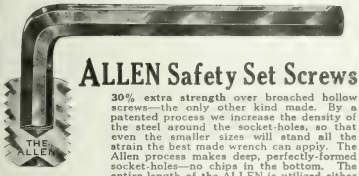
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American Screw Company

Providence, Rhode Island

WESTERN DEPOT:
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ALLEN Safety Set Screws

30% extra strength over broached hollow screws—the only other kind made. By a patented process we increase the density of the steel around the socket-holes, so that even the smaller sizes will stand all the strain the best made wrench can apply. The Allen process makes deep, perfectly-formed socket-holes—no chips in the bottom. The entire length of the ALLEN is utilized either for solid metal at the point, or depth of socket for the wrench. All sizes in stock from ⅛ to 1½ in.; any length, point or thread. Also Pipe Plugs, Socket-Head Cap Screws, Tap Extensions and Socket Wrenches—Allen process. Descriptive catalogue on request.

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BRIGHT FORGED SCREW PRODUCTS

Perfect Polish — Flawless Threads
Rugged & Tough — Uniform Texture
No Weak Spots or Crystallization

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DETROIT, MICH.

The Cleveland Cap Screw Co.

MANUFACTURERS
Cut thread Hexagon
Hd. Cap Screws
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Sales Offices at Atlanta, Ga.; Chicago, Ill.; Detroit, Mich.; Minneapolis, Minn.; New York, N. Y.; San Francisco, Calif.

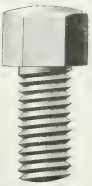




MACHINE SCREWS

STANDARD, OR MADE
TO YOUR DESIGN

HARVEY HUBBELL, Inc.
BRIDGEPORT, CONN.



"If made of Metal, we make it."

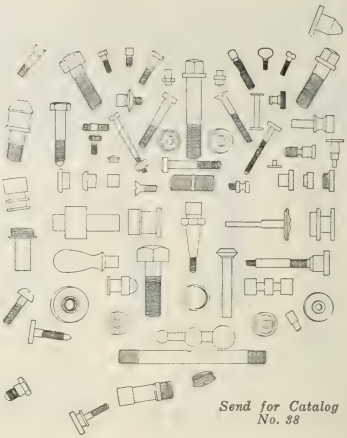
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Stampings
Metal Specialties

WRIGHT MACHINE CO.
WORCESTER, MASS.

Formerly R. P. Phillips Mfg. Co. Critchley Machine Screw Co.

Shimer Screw Machine Products



Send for Catalog No. 88

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We will work up parts to your blue print from bars or iron, steel, brass, or aluminum. Send us your specifications and we will quote you interesting prices.

SAMUEL J. SHIMER & SONS

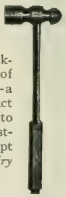
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"No job too big, no job too small" applies seriously to Perry-Fay Products. Five hundred good firms on our books. Many of the *G-Aa* class; dozens of one-man machine shops.

They have us make almost every conceivable kind of screw machine product, from an ant-size radio screw to ten-pound wine-press bolts. And in quantities measured by tens, hundreds, thousands and millions.

Match your needs with our engineers' data. Send a blueprint or sample.



This six-inch, desk-size hammer of hardened steel—a Perry-Fay product—will be sent to you free and postpaid upon receipt of your *first inquiry*

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Screw Machine Products ELYRIA, OHIO

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Metal Parts and Assemblies

Good Uniform Quality assures satisfaction

THE NEWTON MFG. CO.

W. M. Street, Plainville, Conn.

AUTOMATIC SCREW MACHINE PRODUCTS

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STRENGTH-ACCURACY-SERVICE

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THE NEW BRITAIN MACHINE COMPANY, NEW BRITAIN, CONNECTICUT

"BARNES-MADE" SPECIAL SCREW MACHINE PRODUCTS



Accurately Conforming to Specifications

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"SERVICE"?

"Service" as interpreted by us, is not merely filling orders for screw parts in the time specified —it means a lot more than that. It means giving the customer *all that we have* in order to assure his satisfaction.

In other words it means perfect cooperation and an earnest desire to answer his demands.

How can we serve you?

Screw Machine Products Corp.
1014 Eddy St., Providence, R. I.

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SCREW MACHINE PRODUCTS

We do special work better because we have eliminated standard screws. Our whole attention and all our facilities can thus concentrate on specific problems that require special tooling.

Costs are low, work high class and deliveries prompt. Send blueprints for an estimate.

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Belvidere, Illinois



Safety Hollow Set Screw

Screw Machine Products
Try us for Accuracy, Price and Service—Send for Literature
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The "Pioneer" Steel Hanger People

ACCURATE
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"FOSTORIA"
SCREW
MACHINE
PRODUCTS
and Service
THE FOSTORIA SCREW CO.
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Machine Finished
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SEWING MACHINE
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MANUFACTURERS OF
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GREY IRON CASTINGS
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SCREW
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PRODUCTS
The Milford Manufacturing Co.
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OUR 50 YEARS'

Experience in the screw machine product business stands back of our output of standard and special parts. Demand "Western" Products.
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Screw Machine Products

CAP and SET
SCREWS

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BOLTS, NUTS, RODS AND RIVETS
THE KIRK-LATTY
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Quality H&G Precision
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THE EASTERN MACHINE SCREW CORPORATION
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CLARK BROTHERS BOLT CO.
MILLDALE, CONN.
ESTABLISHED 1854

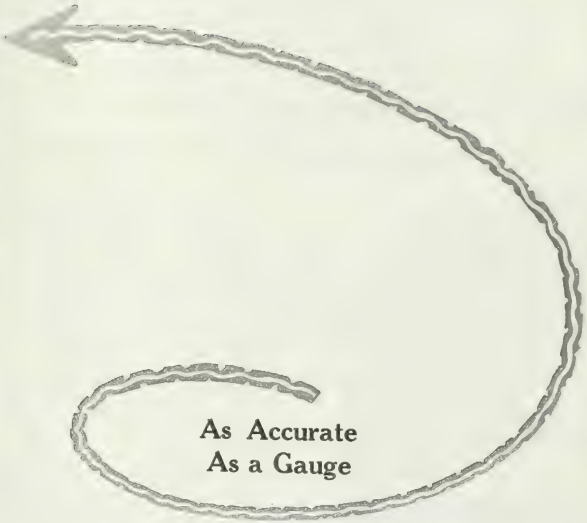

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Give us those intricate jobs that require just a little more skill and experience than usual. You will find our service is reliable and prices reasonable. Send blue prints or samples.
Automatic Capacity, 1/16 to 1⅝
Hand Mach. Capacity, 3/16 to 2¼
Hand Mach. Chucking Capacity, ¼ to 12"
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Daily shipment made country-wide. Gladly send customers references. Use best materials from largest mills. Confirmation on request. We cancel invoices without a quibble if you are dissatisfied with our merchandise.

Fabricated Parts from Non-Ferrous Metals
Made From: Bolts, Nuts, Bushings, Springs, Ferrules, Coils, Nipples, Balls, Washers, Etc.
Brass, Bronze, Copper, Aluminum, Naval Brass, Monel Metal, Etc.

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EVERITT ENGINEERING
THE EVERITT CO.
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IT would be possible to take an Empire *New Process* bolt and gauge the threads of a nut with it—so accurately are its own threads built up by the new method.

They are at least six times more accurate than cut threads—and vastly stronger.

This is an achievement for which bolt users have long been waiting.

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BOLT & NUT COMPANY
PORT CHESTER, N.Y.
PEMBERWICK, CONN. · CHICAGO · SAN FRANCISCO ROCK FALLS, ILL.
Bolts, Nuts and Rivets Since 1861

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BOLTS, NUTS, WASHERS, PICKS, CROW BARS, WEDGES, CAR AND GENERAL FORGINGS, UPSET BRIDGE AND BOILER RODS, DROP FORGINGS, WAGON FORGINGS, SINGLETREE TRIMMINGS, TELEPHONE AND TELEGRAPH POLE LINE HARDWARE, SCREW RAILROAD SPIKES, BOAT SPIKES HARROW TEETH, ELEVATOR CHAIN LINKS, STEEL BARS AND CONCRETE RE-INFORCEMENT BARS.

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HEAVY & MARINE HARDWARE

SHIPBUILDERS RAILROAD AND CONTRACTORS SUPPLIES

ESTABLISHED 1885
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MANUFACTURERS OF

RAILROAD TRACK BOLTS
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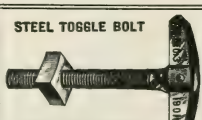
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Nuts, Washers, Lag Screws, Rivets, Hook and Eye Bolts, Forgings, etc., either plain or galvanized. Try us today.

Prompt shipments everywhere.

200 RUBY STREET ROCKFORD, ILLINOIS

STEEL TOGGLE BOLT



HOOD RIVETED ON

Wrigley's Toggle Bolt

With Doubled Flanged Sides and Rigid Back

For securing Brackets and Fixtures to Hollow Tiling, Marble Slabs, Steel Ceilings or Plastered Walls where screws or nails fail to hold.

Write for Discounts

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Do You Want the BEST Expansion Bolts?



THE BROHARD COMPANY, Philadelphia, Pa.

HARRISON BOLT AND NUT CO.

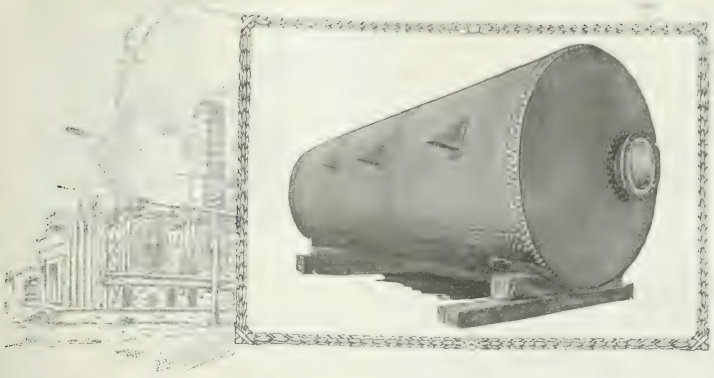
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BOILER PATCH AND STAYBOLTS

Special and Odd Shape Bolts, Washers, Rivets

Harrison Brass and Galvanized Bolts New Jersey



Champion Rivets were used throughout

ILLUSTRATED above is a very interesting high pressure still, 10 feet in diameter and about 30 feet long, built by The Petroleum Iron Works, Sharon, Pennsylvania.

Note particularly the Champion Victor Rivets which were especially designed for this still. Oil refining entails high pressure service of the most exacting kind, and The Petroleum Iron Works Company desired a rivet with an extra size head. In addition to making by far the greater number of rivets used in locomotive building, boiler manufacturing and high pressure service generally, Champion enjoys the privilege of producing special types of rivets which are not made by other rivet manufacturers.

If you have a rivet problem, take it up with us.



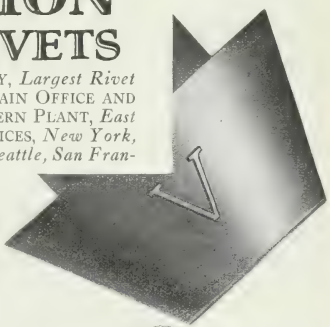


Write for a copy of "Scientific Facts"—more than a catalog of rivets —a Rivet Handbook.

CHAMPION VICTOR RIVETS

THE CHAMPION RIVET COMPANY, *Largest Rivet Manufacturer in the World.* MAIN OFFICE AND WORKS, *Cleveland, Ohio.* WESTERN PLANT, *East Chicago, Indiana.* BRANCH OFFICES, *New York, Philadelphia, Chicago, Boston, Seattle, San Francisco, New Orleans, St. Louis.*

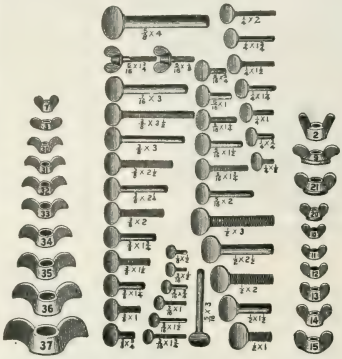




ON EVERY HEAD

V VICTOR

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MANUFACTURERS OF



Malleable and Soft Grey Iron, Steel, Aluminum. Brass and Bronze Castings to order.

Carry a large stock and variety of styles and sizes of Malleable Iron Thumb Nuts and Thumb Screws; Threaded and Blanks. Malleable Iron Fittings for Gas, Air, Steam and Water.



Superior Quality
cold made rivets every kind and all sizes

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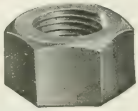
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New Orleans, Canal Bank Bldg. Annex
Cincinnati, 2nd Nat. Bank Bldg.
Kansas City, Reliance Bldg.
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Seattle, L. C. Smith Bldg.
San Francisco, Monadnock Bldg.
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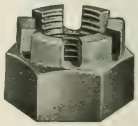
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RIVETS
PUMP CHAIN
(HOT GALVANIZED)

GARLAND MANUFACTURING CO.
Successor to Garland Nut & Rivet Co.
West Pittsburgh, Lawrence Co., Pa.

CUT NAILS
WIRE NAILS
NORTON IRON WORKS
Ashland, Kentucky



Milled from Bar to S. A. E. Std. Specifications.
HEX., PLAIN AND CASTELLATED NUTS
Western Screw Products Co.
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Track, Boat, Dock Track, Machine

BARS (Plain and Deformed) RAIL FISH PLATES.
TIE RODS, NUTS, WASHERS

dependable products and prompt shipment from quickly accessible R. R. Terminals or S. S. Piers at New York City and Jersey City.

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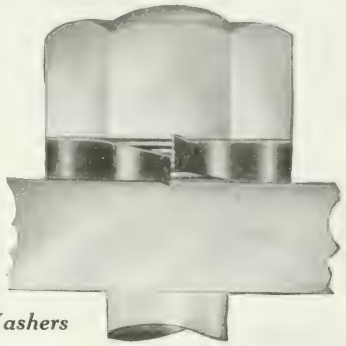
COATED WIRE NAILS
WIRE—BRIGHT
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GALVANIZED WIRE NAILS
COTTER PINS

American Steel Company
Park Building, Pittsburgh, Pa.

How Long Will the Bolts in Your Product Hold?

If you're using a Positive Lock Washer under every nut, your bolts are vibration proof. A bolted assembly that is subjected to vibration should have this protection.

Look at the illustration and you'll see why these washers never "let go." The hardened steel barbs bite into the nut and seat. Vibration only serves to make them bite deeper.



We also make Plain Lock Washers

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BOILER—STRUCTURAL—SHIP

S. Severance Manufacturing Co.

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Tacks and Nails—Double-pointed Tacks and Staples—Spring Cotters—Small Washers and Riveting Burrs.

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The Blake Nut-Lock and Bolt

Acknowledged to be 100% more efficient and more positive than anything of its kind ever put on the market. Will lock a Hexagon Nut every 1/12 turn as against every 1/6 turn with the universally used Castellated Nut. Eliminates all shearing strain on cotter key. Samples and prices furnished on request.

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HOBBS LOCK WASHERS

So dependable, so unfailingly reliable, that their performance need never be questioned or discounted.

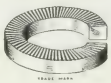
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NEVER SLIP LOCK WASHER



This lock washer grips the nut 60% tighter than any other lock washer on the market.

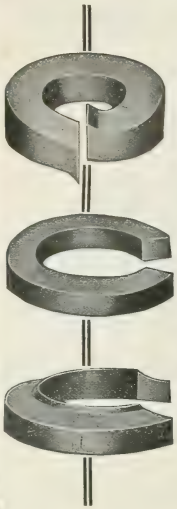
Made in *all* sizes for every purpose.

Get a small assortment.

LOCK WASHER DIVISION

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30th and Thompson Streets
PHILADELPHIA, PA.

SAFETY



and Reliance Lock Washers are synonymous terms.

This all important factor is assured because the quality of steel we use is of the highest and the scientific development of the proper size and shape for a given service insures safety and satisfaction.

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Of Wrought and Steel Plate

Felloe Plates
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Malleable Washers and Cast Iron Washers

Wrought Washer Mfg. Co.
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You will find our service a source of great satisfaction in the prompt supply of washers and

Light Steel Stampings

Washers—

Standard and special shapes and sizes.
Any quantity.

Joliet
Wrought Washer Company
Joliet Ill.

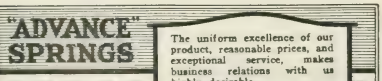
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We not only manufacture high grade Wire Springs of any design, made from Brass, Bronze, Premier, Music and Oil Tempered Steel Wire, but we are in a position to advise with our patrons on the economical and efficient solution of their spring problems. Let us help you.

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"ADVANCE" SPRINGS

The uniform excellence of our product, reasonable prices, and exceptional service, makes business relations with us highly desirable.



ADVANCE SPRING & WIRE CO. 1749 Carroll Ave. Chicago, Ill.

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DIE Springs
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Springs for Machinery

Send Us Your Inquiry for

HIGH GRADE SPECIAL SPRINGS

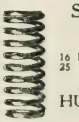
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We manufacture Compression, Extension and Torsion Springs and Close Wound Tubes in almost unlimited sizes, from Steel, Music, Brass, Phosphor Bronze, and Nickel Silver Spring Wires from the Smallest to Wire ⅜" in Diameter.

May We Serve You?

THE SUPERIOR SPRING COMPANY
Shuey Bldg., Springfield, Ohio



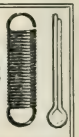
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(By Express—Not Prepaid)

16 lbs. Assorted Springs.....$2.00
25 lbs. Assorted Cotters..... 3.50

Send for catalogue

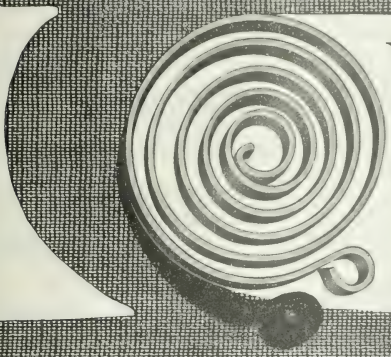
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The Wallace Barnes Co.

"Spring Makers for Three Generations"

Bristol Connecticut



Your Product Requires

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We Make Them

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Remember this NAME—

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When you are in the market for

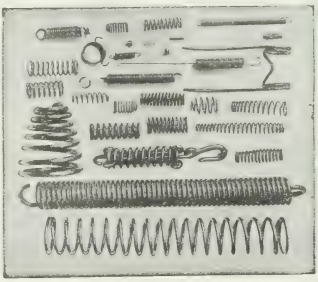
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If it is a small wire spring or wire shape you need, and it must be specially designed and the cost must be reasonable, and you want either a small or large quantity and you cannot take chances on deferred deliveries—then we are the people you should do business with.

May we estimate on your needs.

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Guaranteed COIL SPRINGS of Every Description

Manufactured to your order from ½" or smaller wire of the following materials:

Carbon Manganese, Chrome Vanadium, Piano, Phosphor Bronze, Brass, Oil Tempered Wire or any Alloy Steel desired.

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Turn your wire specialty and spring problems over to us in your own economy. Our specialties backed by over thirty years of experience.

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Quality, Practical Method of Manufacture and Heat Treatment are all essential in order to produce the highest character of springs. *Send for illustrated booklet.*

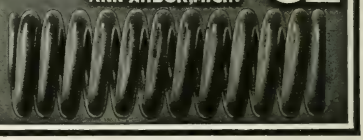
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COOK SPRINGS FOR MECHANICAL PURPOSES
COIL AND FLAT OF EVERY DESCRIPTION
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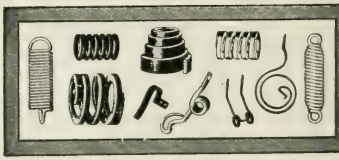


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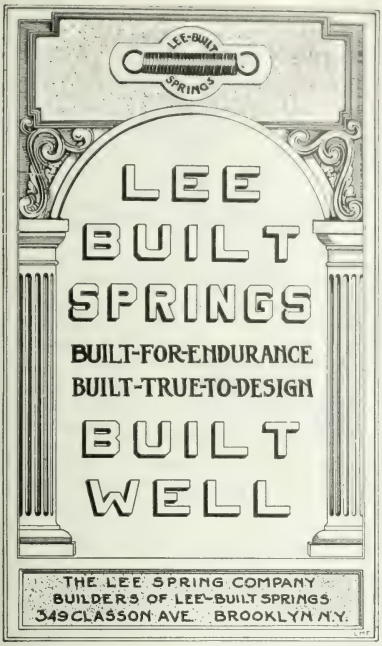
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THE WM. D. GIBSON CO.
Manufacturers of Coiled and Flat Springs



Any required shape or size. Made to sample or specifications. Crucible and Vanadium steel, brass and Phosphor Bronze. Send for our treatise on "Springs." It's as good as a textbook.

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FLAT SPRINGS

For Every PURPOSE and for BETTER SERVICE

THE DUNBAR BROS. CO.
BRISTOL, CONN.

SPRINGS



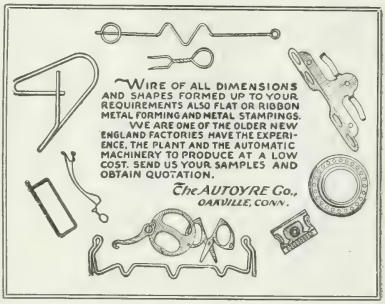
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Send your blueprints for an attractive estimate, and write us for engineering advice on your spring problems.

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Tell us what you want in wire shapes and we'll show you what *real accuracy* in this kind of work is.

Accuracy is the first thing to consider in wire drawings—make sure of obtaining it by entrusting your work to us.

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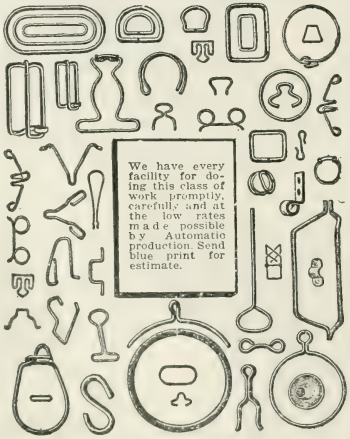
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THE **WEBB WIRE WORKS**
NEW BRUNSWICK, N.J.

IRON and STEEL
WIRE

Established in 1857, these Mills have been devoted to the manufacture of the highest grades of wire as well as specialties in wire drawn from Swedes Iron, Bessemer, Open Hearth and Crucible Steel

Special Wires from Carbon Steels of Particular Analyses

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If you require Wire Rods, Bright Hard Drawn Manufacturing Wire, Annealed Wire, Galvanized Wire, Galvanized Barbed Wire, Bright and Galvanized Staples, and Straight and Cut Wire; it will be to your interest to investigate our products which represent the highest standards of quality. Our manufacturing facilities are unexcelled and our various warehouses carry sufficient stock for prompt shipments.

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QUALITY *and* SERVICE UNEXCELLED

Specialists in Superior Grades of

HIGH CARBON ROUND AND FLAT WIRES

PIANO WIRE, MUSIC SPRING WIRE, ALSO
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WIRE

IRON STEEL

WIRE "SENECA"

EXTRA FINE

QUALITY SIZES
UNIFORM GAGE EVEN TEMPER

FOR

MATTRESSES, BROOMS, ROPES, PINS, CLIPS

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Rods—Armco Ingot Iron and Special Analysis Steels.
Wire—Plain and Galvanized, Rope, Telephone, Telegraph, Bond, Strand, Gas and Electric Welding Wire.
Fence—Woven Wire for Farm and Railway Right of Way, Wire Link Protection for Industrial Plants, Lawns, Schools, Estates and Factory Partitions.
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DROPFORGED
and drop forgings to Drill, Thread, or Tap
LLOYD FORGE CO. ANNVILLE, PA.

TURN BUCKLES



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Also Manufacturers of Drop Hammers, Forging Hammers and Vises
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INSULATED WIRES AND CABLES

"Made for Users Who Want the Best"

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Drop Forged
WIRE ROPE FITTINGS

Stock and Specification Designs—exhaustive tests are invited for strength, practicability and workmanship.

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The Thomas Laughlin Co.
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Established 1867

WICKWIRE SPENCER STEEL CORP.

WICKWIRE WIRE ROPE

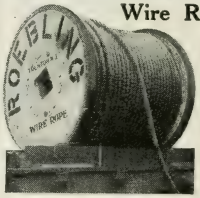
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Quality and service always

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OFFICES AND WAREHOUSES
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BLUE CENTER STEEL
Wire Rope



Made of a Superior Grade of Steel

Produced in our own furnaces

JOHN A. ROEBLING'S SONS CO.
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WIRE ROPE

STRONG POWERFUL DURABLE

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ALL GRADES OF WIRE CLOTH MADE OF ALL KINDS OF WIRE

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GRAY-WICK
SCREEN WIRE CLOTH



Dull Finish—Multiple Coat Galvanized After Weaving

Electro Zinc Coating of uniform thickness and enameled with white varnish, both being applied after weaving, which binds wire together and makes a dull gray finish throughout.

Made in even inch widths from 18 to 48 inches.

12 Mesh, No. 33 guage each way
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No. 34 guage warp
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Write your Jobber for Full Information and Prices

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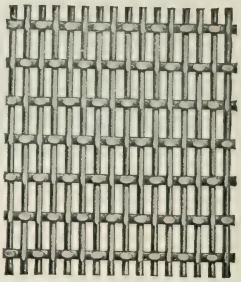
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REK-TANG ROLLED SLOT SCREEN

The manufacturer's first query regarding wire screens is to the point—"Is it efficient?"

Wire screens may be all that is desired in quality, yet their service will not be of the best unless the same attention is given to their construction.

Rek-Tang Rolled Slot Screen is a combination of both high grade material and scientific design; the two make a screen that is the most economical you could buy.



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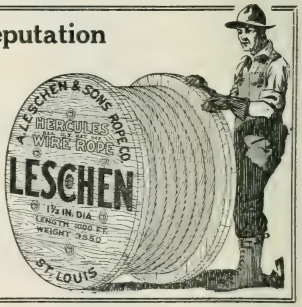
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General Offices and Factory: Newstead Ave. and Wabash R. R.
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WIRE PRODUCTS
for Industrial Uses

Whether you require the finest wire cloth for manufacturing purposes or the coarsest screen, Audubon construction assures long life and dependability. Send for illustrated catalog.

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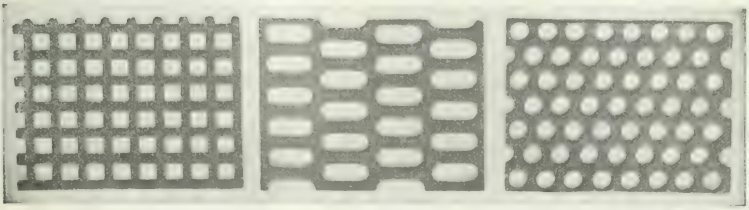
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ROUND—OBLONG—SQUARE HOLES
all sizes—all shapes
For all Screening—Ventilating and Draining Purposes
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PERFORATED METAL SCREENS

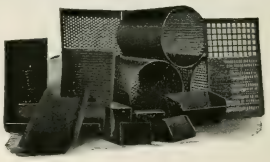
Our Products Include

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Either plain sheets or manufactured screens for cleaning and sizing coal and coke, for slate pickers, revolving screens, cottonseed oil mills, cement and ore, filter plate presses, locomotive strainers, etc.

Hendrick screens have been used successfully for all the above and many more purposes. Doesn't this suggest that Hendrick service will prove profitable to you?

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The experience gained by our half century in one business has taught us the value of co-operation so we freely offer you the services of our experimental department.

May we send you a Metal Sample Plate?

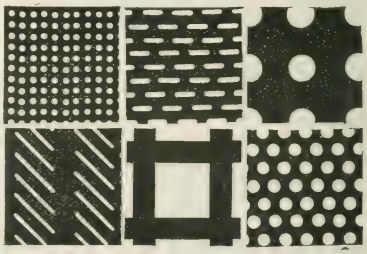
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ROCHESTER, NEW YORK

LET US DO YOUR PERFORATING

We solicit your work on the strength of our long experience and facilities.

We can furnish perforated metals of every kind, what are your requirements?

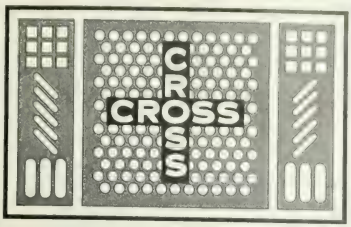


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Of the kind that holds customers year after year, is only possible through adequate equipment, thorough knowledge of the business, a loyal and well-trained organization and ample financial resources.

Over half Cross's present sales are to customers who have bought of us steadily from five to nearly twenty years.

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Fully 60% stronger than any other form of pipe construction

One fifth the weight of cast iron pipe.
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COLD DRAWN
SEAMLESS STEEL TUBING
Manufacturers D Since 1903
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Cast Iron Pipe

Of every description
Quality and Service Guaranteed
Let us quote
U.S.CAST IRON PIPE & FOUNDRY CO.
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The Best Metal Tube for Your Needs



Tubing of Steel, Brass, Copper, Aluminum Nickel-Silver

Specialists in Precision and Hypodermic Needle Tubing

"One of the items that has made our —— successful has been the good tubing received from you, and we want to compliment you on making good tubing."

Write us about your tubing needs.

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SPIRAL RIVETED PIPE
LAP WELDED PIPE
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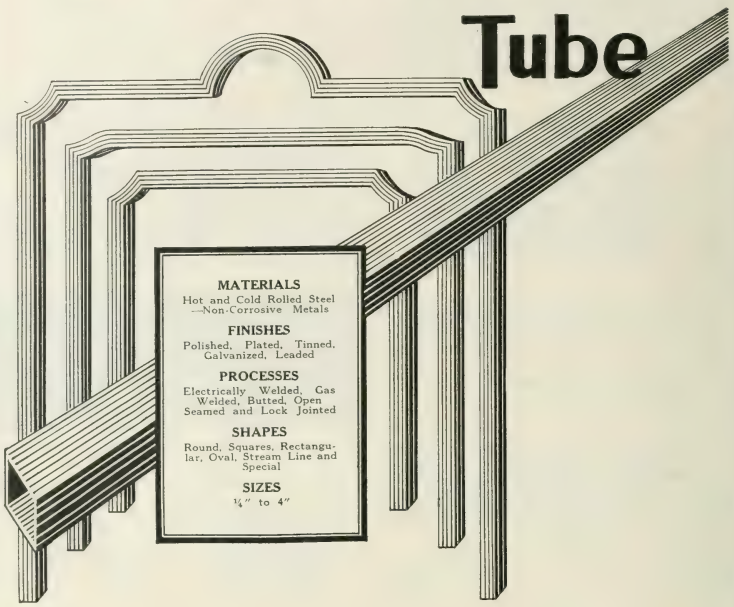
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As a step toward better pipe service—

USE THE COUPON

NATIONAL TUBE COMPANY
Frick Building, Pittsburgh, Pa.

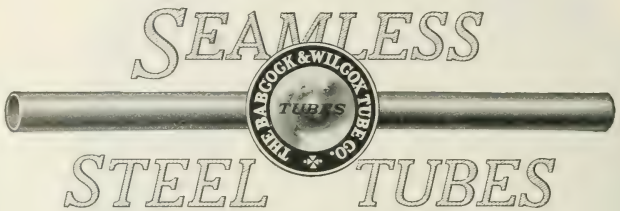
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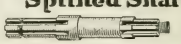
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WITH MODERN EQUIPMENT

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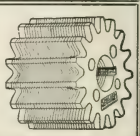
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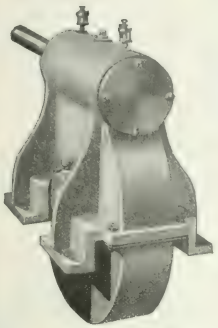
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Made promptly to any specification



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[illegible] Philadelphia and our Farmac cleaners.

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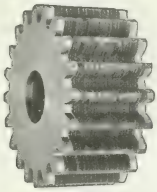
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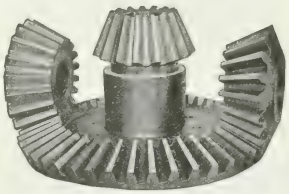
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If you have a difficult gear set problem, you can safely entrust your order to us.

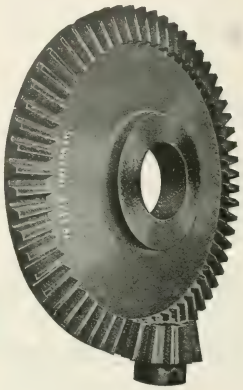
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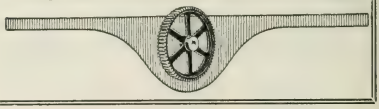
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Made up in any material required.

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BALL BEARINGS

See full page Announcement in first issue of this month.

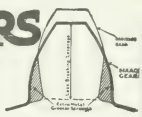
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Strongest at the base "Where Strength is Needed"

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RADIAL, ANGULAR-CONTACT, THRUST

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Hindley Gearing

Will Do the Work When Common Worm Gearing Fails

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Spur, bevel, spiral or special gears in iron, steel, bronze, Formica, or new process Rawhide. 16,000 industrial gear patterns.

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Double-acting thrust bearing, flat seats (grooved races) 2100-F Series



Single-acting thrust bearing, flat seats (grooved races) 1100-F Series



Single-acting, self-aligning thrust bearing 1100 Series



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Double-acting self-aligning thrust bearing, housing washer 2100-U Series

The Golden Rule in Business

We give the kind of service we like to get

Strom service is as good as we know how to make it. We have studied what manufacturers need. And we have adapted our service to their needs.

On orders for ball bearings from stock we can frequently make shipments the same day the order is received.

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Strom BALL BEARINGS

"Wherever a Shaft Turns"

U. S. BALL BEARING MFG. CO.
4564 Palmer Street, Chicago, Ill.



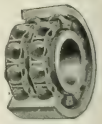
Single-row deep-groove Standard type, radial bearing



Double-row, deep-groove Standard type, radial bearing



Angular contact bearing, combination radial and thrust



Double-row, maximum type, radial bearing



Single-row, maximum type, radial bearing

New Departure Ball Bearings



Synonymous With Efficiency

THE history of progress in machine design in all industries has closely paralleled the growing acceptance of ball bearings in new designs.

Just now the makers of all devices incorporating electric motors or generators are showing new interest in the peculiar advantages of ball bearings for increasing both the efficiency and salability of their product.

To assist those who wish to look into the subject of ball bearings in electric motors or generators we have compiled in a special binder engineering data bulletins showing application in 41 types of machines, together with general mounting directions, load charts and dimensional data. This material will be furnished free upon request. Ask for the special bulletins on electrical machinery.

THE NEW DEPARTURE MANUFACTURING CO.
BRISTOL, CONN.

Detroit Chicago

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Thrust Capacity

Schatz "Universal" Annular Ball Bearings are distinctive in this respect. The Three Area Contact not only supports large radial loads efficiently, but by its design enables the bearing to withstand thrust loads far beyond the capacity of any other ball bearing.

Schatz "UNIVERSAL" Registered *Annular* U.S. Pat. Off. **BALL BEARING**

Conforms to the highest standards of bearing manufacture. The three area contact makes it unusually adaptable to all requirements.

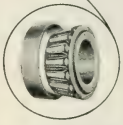
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Pure Rolling Action

Less Friction— More Power Delivered

Bock Taper Roller Bearings carry both radial and thrust loads. Their remarkable freedom from friction is due to the round head rollers, an exclusive patented design, which insures *pure rolling action.*



Longer life, greater freedom from adjustment (although they are adjustable) more power delivered — these are facts which we shall be glad to demonstrate to you.

Please write us.

THE BOCK BEARING COMPANY, Toledo, Ohio

BOCK

***Quality* TAPER ROLLER BEARINGS**



for cranes, tractors, trolleys, mine cars, conveyors, steel mill equipment, motor cars, line shafts, machine tools, industrial cars, industrial trucks, textile machinery pumps, etc

HYATT ROLLER BEARINGS

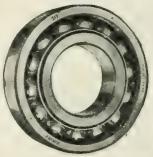


Hyatt line shaft roller bearing

Hyatt Roller Bearing Company

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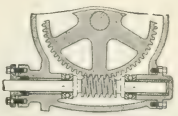
The New Pressed Steel Separator makes the famous Gurney Ball Bearing even better. Ask for circular, "Separators, Old and New."

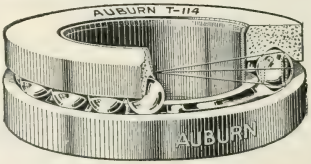
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402 Chandler St.
Jamestown, N. Y.

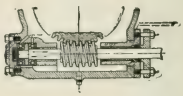
GURNEY BALL BEARINGS

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Worm Drives when equipped with AUBURN BALL BEARINGS are free from overheated bearings, lost motion, and consume less oil, besides lasting longer, due to maintained alignment. Send details of your problem and obtain the benefit of our 30 years' experience. Catalogue on request.

Steel, Brass and Bronze Balls

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The Pow-R-full motor was evolved from the experience of thousands of motor users

FROM the beginning the new Wagner Pow-R-full Motor developed from a definite plan to build a motor comprising characteristics required to afford users a motor more closely in line with their actual needs.

From thousands of motor users suggestions were gathered and carefully studied. Investigation was made into the service records of motors applied to hundreds of tasks under conditions almost infinitely varied.

The Wagner Pow-R-full Motor was evolved from this data. Its introduction to the motor trade has established a new standard of motor service.

Every up-to-date motor dealer—and every motor user who wishes to keep posted on the latest development of motor progress—should write for Bulletin 1321.

WAGNER ELECTRIC CORPORATION, SAINT LOUIS



Wagner Quality Pow-R-full Motor

61-5520-20

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for heavy duty service in
steel mills and machinery

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Made of Superior Quality of Cast Metal Bronze; and, when interlined with

"METALINE"
(TRADE-MARK)

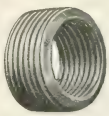
They require no oil for Lubrication, thus insuring Cleanliness and obviating the Fire Danger.



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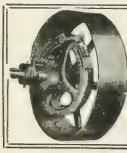
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That's the business of a Caldwell Friction Clutch. A flexible band lined with asbestos; a heavy friction ring to transmit the power; a single lever to operate the clutch; one screw for complete adjustment. In fact, only eleven parts all designed and built to stand the brunt of long, hard service with the minimum of attention. Send for Catalog.

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Incorporated
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Friction Clutches



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FRICTION CLUTCHES

You Can Depend
Upon Them
Made Only By
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BROWN'S
MULE-PULL CLUTCHES

HAVE RING-OILING LUBRICATION

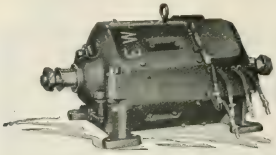
Brown Engineering Co.

143 N. THIRD STREET READING, PA.



An honest effort of the thumb will engage it. A baker on Saturday could adjust it. Performance will prove these things.

The Conway Clutch Co.
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CROCKER-WHEELER
Form W Rolling-Mill
Motors
220 or 230 Volts, Direct
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Size 6½ to 200 H. P.

The C-W Form W Motor is built to endure the severe duty required to drive rolling mill and similar machinery. Ordinary forms of motors will not stand up under the heavy shocks, jars and severe temperature conditions accompanying such work. Especially heavy mechanical parts and careful electrical design in the form W take care of the severe strains and prevent sparking. In addition, the motor is fully enclosed and the mica and asbestos insulation enable them to withstand high temperatures.

The best mill engineers gave their advice before the Form W was designed and the service these C-W Motors are giving accounts for their country-wide popularity.

These Motors are much in use for cranes, roll trains, transfer and lifting tables and all auxiliary service about a steel mill.

The Model W is a brute for strength and a wonder for performance. For complete details address

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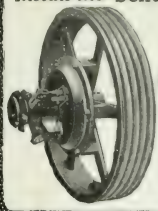
AMPERE, N. J.

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CROCKER-WHEELER MOTORS
"Niagara's Rival for Dependable Power"

Install the **Schultz Trouble-Proof Clutch**



Insist on a transmission appliance you can depend upon

Eliminate Costly Shut Downs

The Schultz Clutch seldom gets out of order. When it does, your average workman can restore it to first-class condition in a few minutes, because it is simply but durably constructed. The simplest is the best and the best the cheapest. Write for catalog

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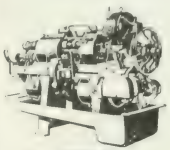
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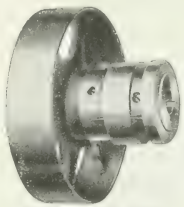
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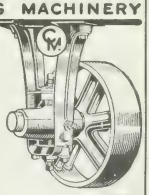
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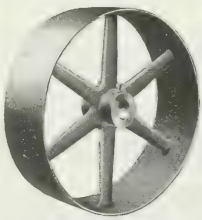
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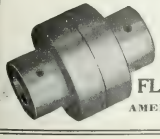
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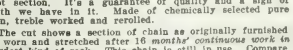
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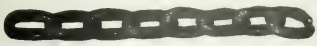
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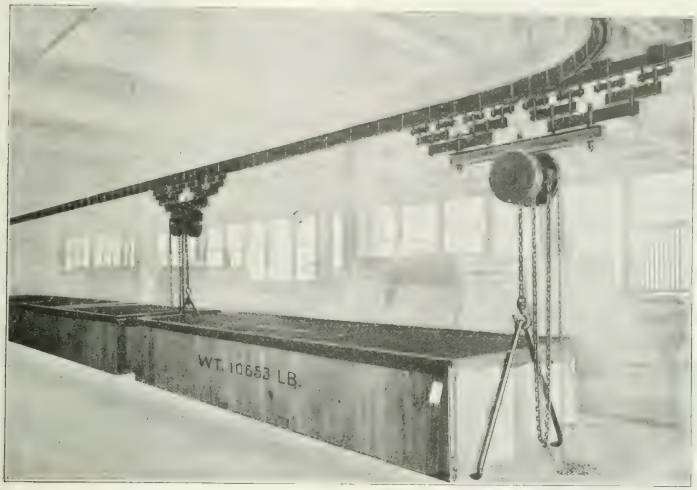
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"The right method of handling materials is sure to mean decreased costs. By using Richards-Wilcox *OveR-Way* equipment our assembly costs half what it would with hand trucks, and we require 50% less floor space. Besides, when there is a heavy demand for trucks, this equipment enables us to keep up our production.

"We have about 3 miles of Richards-Wilcox *OveR-Way* equipment in our truck plant here at Pontiac. It is used for unloading materials and heavy units brought to the plant, placing them in the storeroom, handling the units in assembly and, in the case of trucks destined for export shipment, lifting the chassis to the boxing conveyor and from there to the flat cars. In other words, Richards-Wilcox equipment is used in every step of the work.

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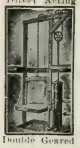
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There is fame and fortune in it
For the Bright Young Engineer,
Who will **"Hook 'er to the Biler,"**
And make the Big Boss Grin,
As he sees the old mill hummin'
And the Dollars rollin' in.

If your mills are runnin' "cat bird,"
And no Dividends can come,
Just **"Hook 'er to the Biler,"**
And watch the old Bird hum,
The trouble with your lay-out,
It's too infernal slow,
Just let us fellers **"Hook"** ya,
Then watch your earnings grow.

"Attach it to the Steam Generator"
(As the London publisher demanded we should say it.)


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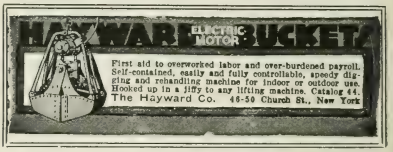

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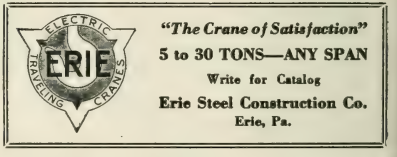


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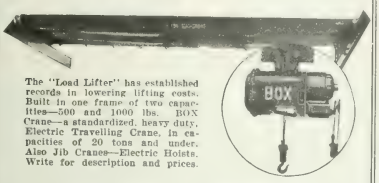
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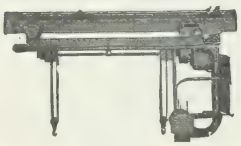
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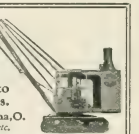
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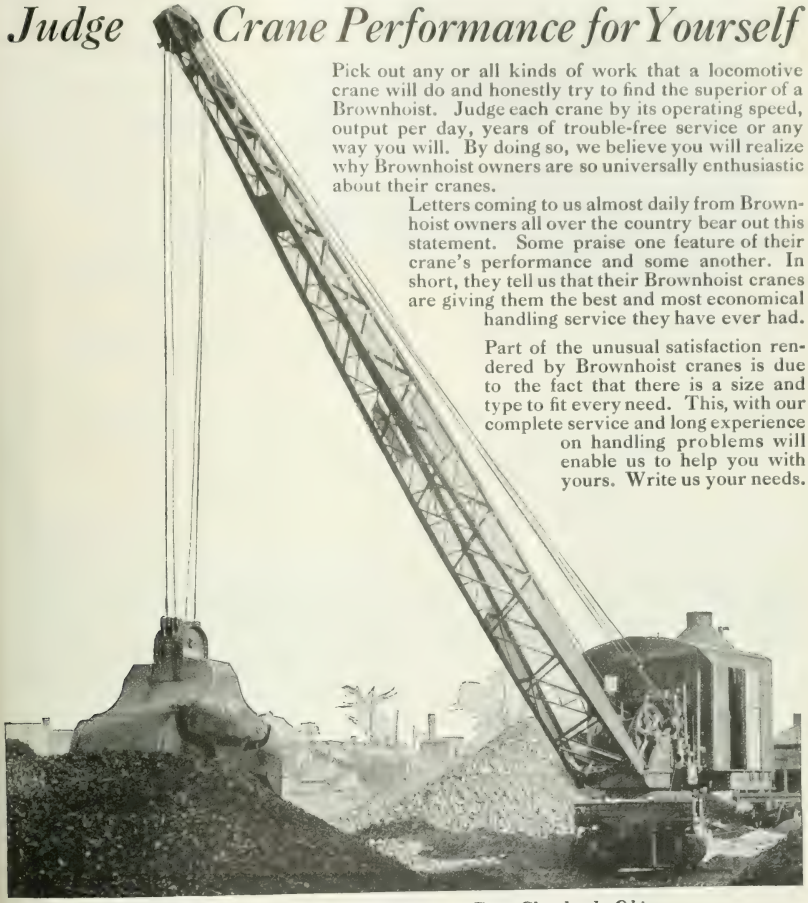
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See page 197

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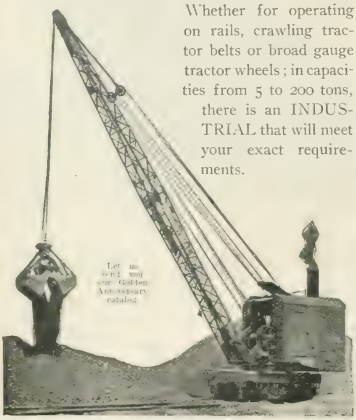
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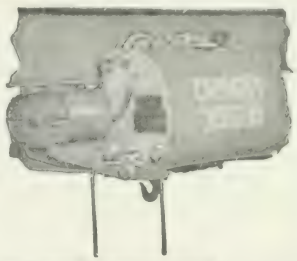
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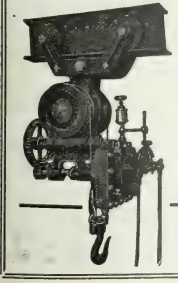
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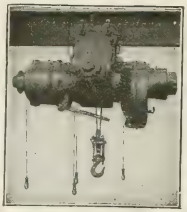
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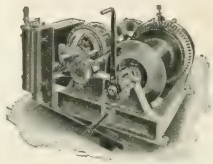
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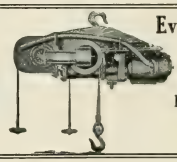
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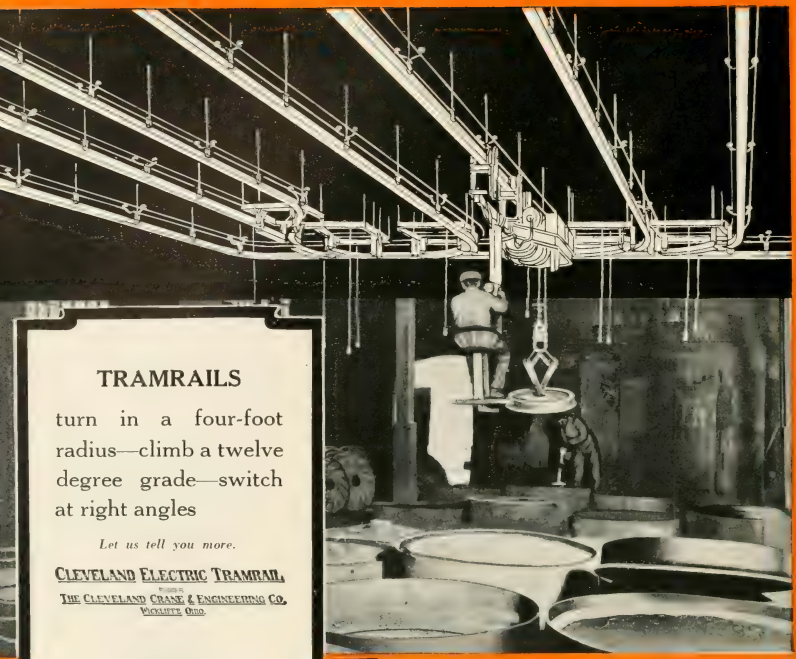
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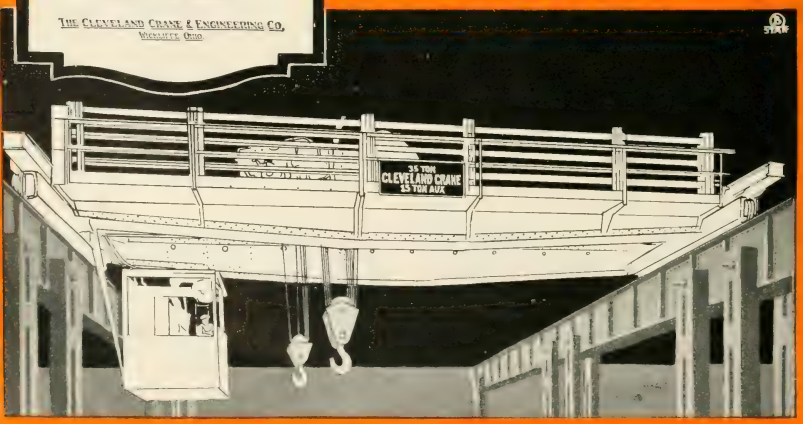
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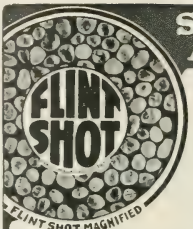
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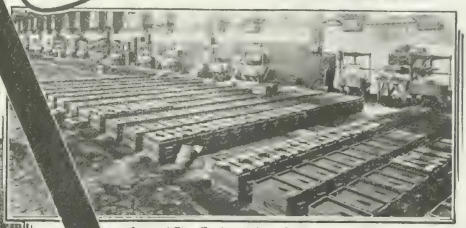
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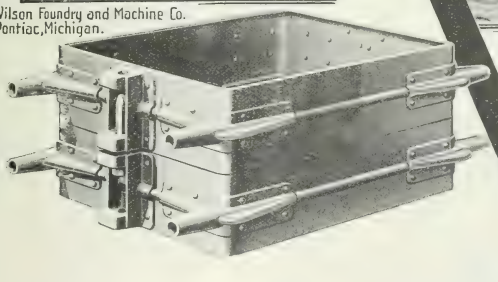
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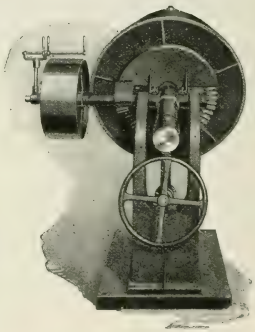
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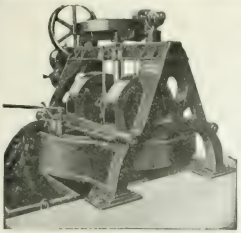
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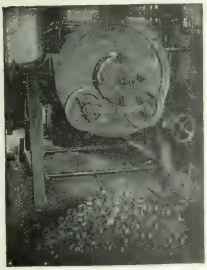
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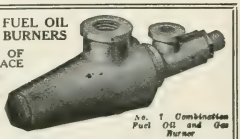
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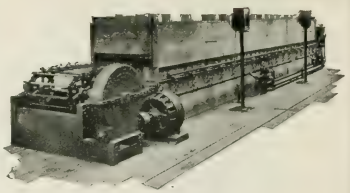
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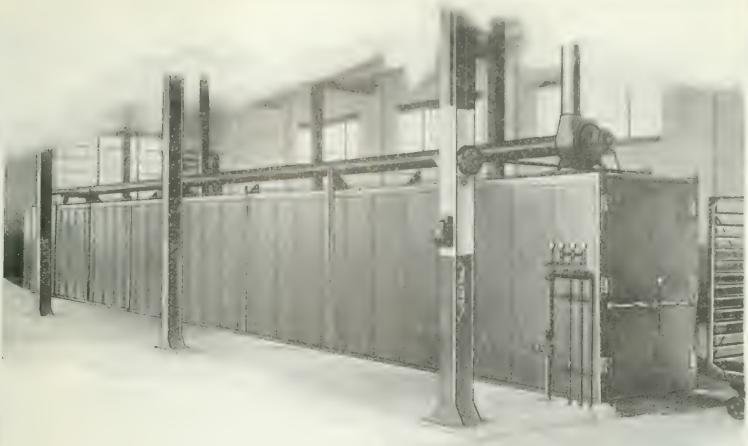
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The experience of the foundry superintendent with the inefficiency and inconvenience of the old style brick ovens led to the selection of a Gehnrich for this installation.

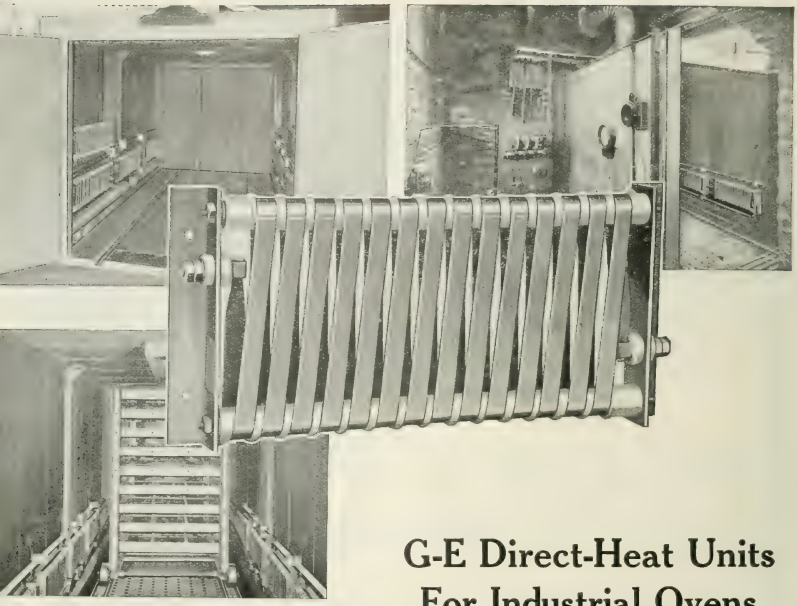
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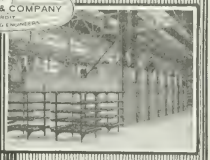
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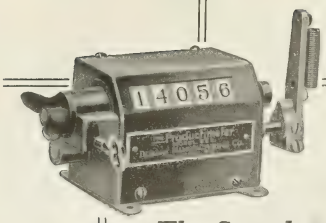
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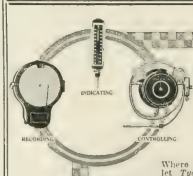
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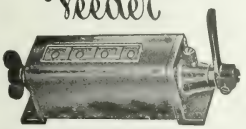
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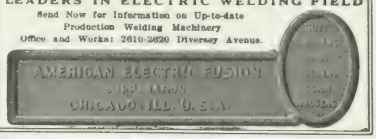


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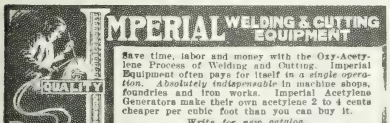
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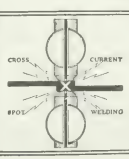
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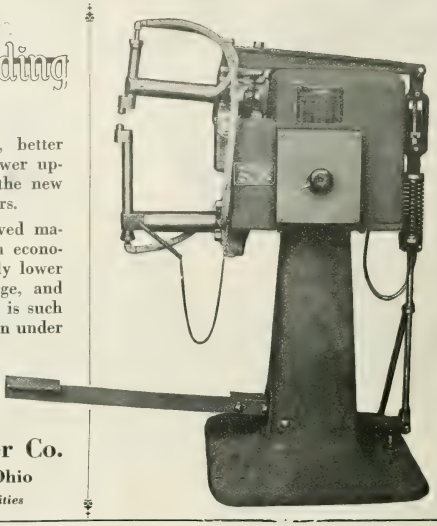
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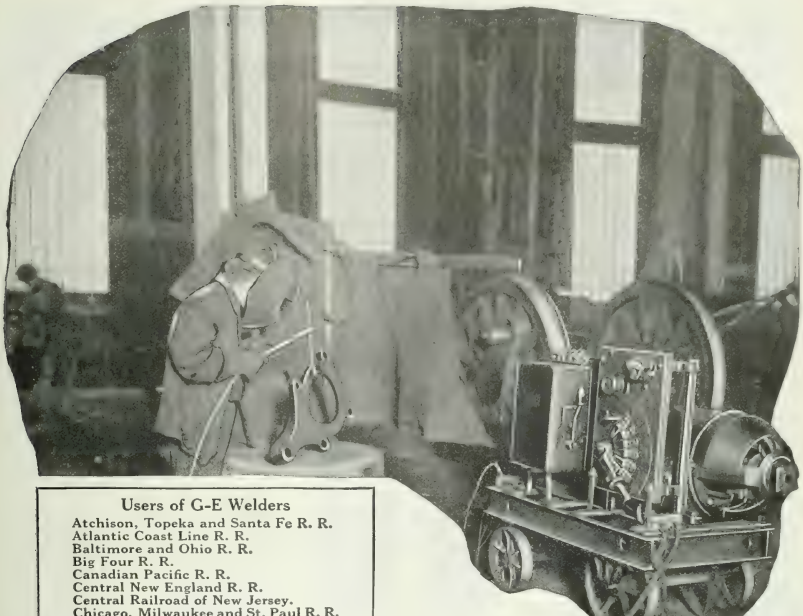
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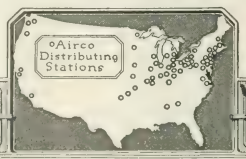
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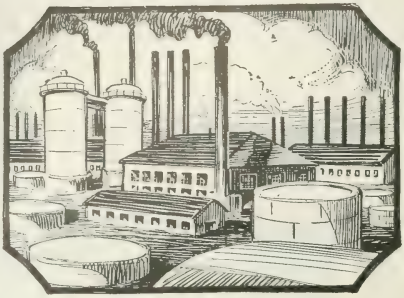
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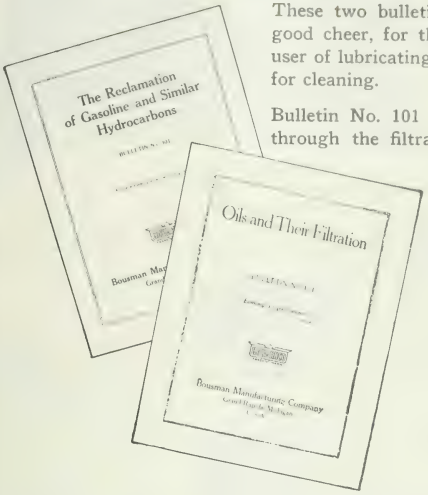
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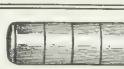
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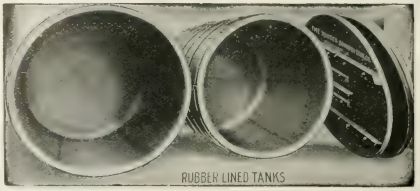
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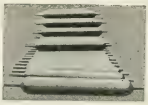
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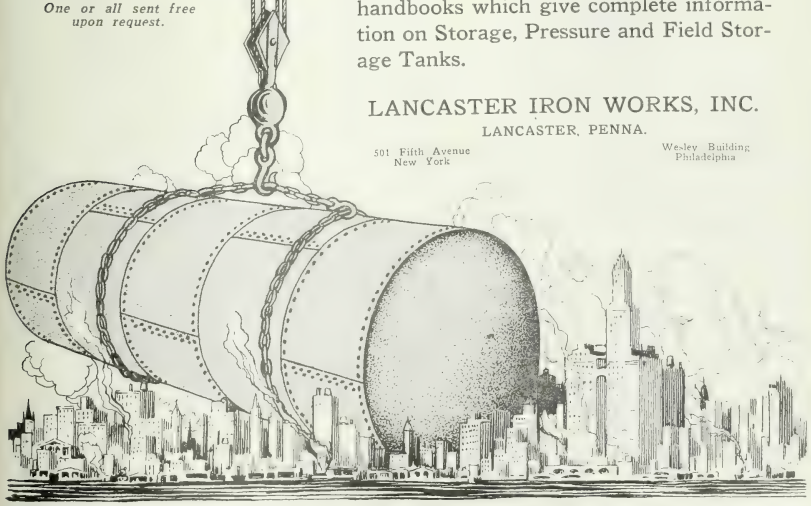
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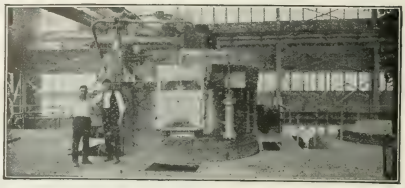
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An excellent investment for machine shops, warerooms, foundries, pickling rooms and other parts of the plant where the floors receive hard wear. Write today for our booklet "Factory Floors."

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They Make a Habit of It

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They have found that this is an economical way to get profitable offers from responsible buyers.

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"The results obtained from our ad were very satisfactory."

You will find the advertising rates on the first page of Section No. 51. Anything for sale now?

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SUPPOSE your shipment is damaged enroute? Your customer is dissatisfied. Your goods are partially ruined or destroyed. Time is lost. Money is lost.

A Transportation Policy with the Insurance Company of North America will insure your goods against the risks and perils of transportation from warehouse to warehouse. It will insure your shipments continuously, not only on railroads but on trucks, freight platforms and ferries, to the moment of actual delivery.

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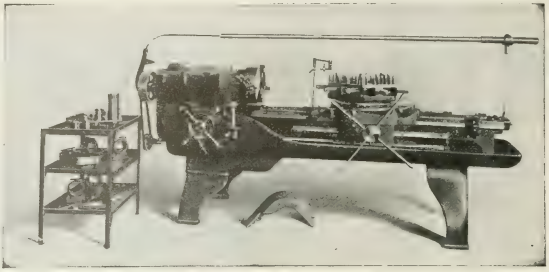
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THE IRON AGE

New York, December 27, 1923

ESTABLISHED 1855 VOL. 112, No. 26

High-Speed Steel for Cast Tools

Electric Melting Practice—Proportioning and Handling the Charge—Molds and Heat Treatment

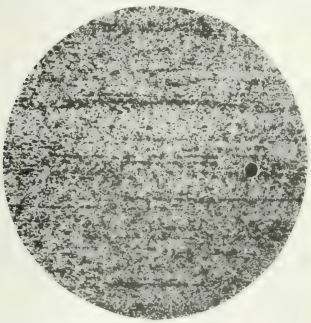
BY J. M. QUINN

THE literature on high-speed steel gives few details concerning the actual making of the steel in the electric furnace and very little has been written regarding high-speed steel cast into semi-finished tools. The writer believes this is a subject in which many are interested. A description of the process follows:

A patent was granted not long ago from which sections are here quoted and it is enlightening to note that actual furnace practice closely follows the specifications of the letters patent except for certain details.

> The purpose of this invention is the production of a high-speed or other steel tool directly from the molten alloy by casting in the general form in which it is to be used without the preliminary casting in the ingot and the forging to form.
>
> In the manufacture of alloy steel tools, especially high-speed tools, it has been necessary to first cast the molten metal composition as an ingot and then mechanically work the metal to the desired tool form. The metal has not been cast directly in the form in which it is to be used, as when first cast the metal has such an internal structure as to be mechanically defective. This defective structure has been overcome, to a certain extent, by forging or other mechanical treatment and various annealing and heat treatments.
>
> The defective structure of the ingot casting is believed to be due to the presence of various impurities in the melt such as phosphorus and sulphur but even more to gaseous substances, occluded or otherwise associated with the metal.
>
> This invention consists in eliminating the causes which produce the defective structure in the ingot by producing a molten composition of such purity before casting that the operation may be effected directly in the general form of the tool desired, whereby the expensive forging and similar operations may be obviated.
>
> This is effected by selecting constituents of such purity and also so purifying and scavenging the melt prior to casting as to greatly reduce or eliminate these disturbing influences in the cast material.
>
> A specific example of a mode of applying the invention will now be given. A graphite crucible is charged with 20 parts of iron, preferably refined iron. This iron is in small fragments and to it is added 25¾ parts of ferrotungsten (80 per cent or eighteen parts being tungsten), 7½ parts of ferrochromium (60 per cent or 4½ parts being chromium) and 5 parts ferrovanadium (30 per cent or 1½ parts being vanadium). With a charge to total 100 lb., 8 oz. of ferromanganese is now added together with 8 oz. of S A M Lion Brand metal. Upon this mass in the crucible is dumped 40 parts more of the iron for the charge. The crucible is then intensely heated to bring the contents up to a uniform thin liquid in consistency. As this liquefying stage is approached, and about 20 minutes before the mass is thoroughly molten for the pouring, 16 oz. of

*6506 Kenwood Avenue, Chicago. Formerly superintendent of electric furnaces, United States High-Speed Steel & Tool Corporation, Albany, N. Y.



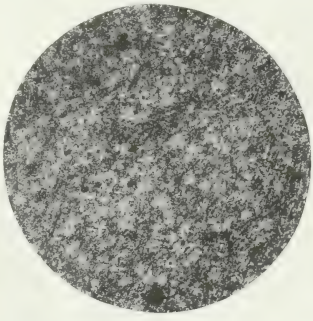


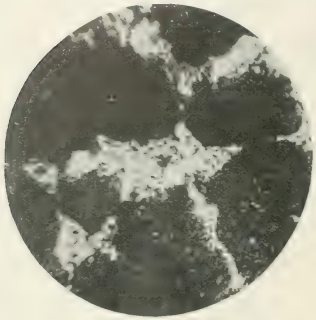
Fig. 1—Photomicrograph of Rolled High-Speed Steel in Annealed Condition, Longitudinal Section. Magnification 100 diameters. Extreme case of fibrous or "woody" structure. Fig. 2 (right) Photomicrograph of cast high-speed steel tool in annealed condition, furnace cooled, magnification 100 diameters, showing cellular structure or carbide envelopes

ferrotitanium is added. This time interval should be such after the addition of this titanium, that the titanium may have just sufficient time for thoroughly dissolving throughout the metal. This example is in no wise to be held as limiting the invention. The invention is not limited to any particular composition but has as its essential feature the production of a melt of such a character that the material can be directly cast.

The various ingredients incorporated with the iron may be considered to have various functions in improving the material. In this connection, the alloy substances selected for the particular character of tool may be pure or in some combination as with iron. It is desirable that none of the ingredients have deleterious quantities of substances, as sulphur or phosphorus. The less of these volatile impurities the quicker the purification takes effect.

The S A M metal may be considered the regular trade alloy on the market, including iron, manganese, aluminum and silicon. The use of this scavenging alloy may be described as a de-oxidizer in the melt herein, in which it may be further assisted by the added manganese in the ferromanganese while the titanium also has a purification function in assisting in the production of blow-hole free casts as in the driving off of nitrogen. The purification, therefore, as conducted hereunder, eliminates gas from the melt in the production of the uniform internal structure of the cast.

Molds, as for instance sand molds, are provided of the contour for the finished product. These molds may be provided with chills, as found desirable, especially for assisting in such uniformity of cooling as may best minimize internal stresses in casting. The high speed tool steel melt is poured directly into molds, and the castings therefrom, on cooling, are at once in the finished form for high-speed tools.



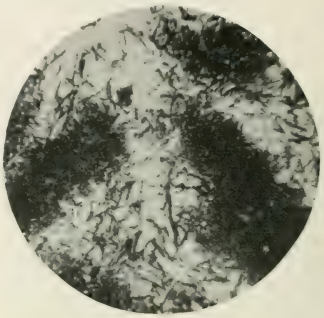


Fig. 3—Photomicrograph of Cast High-Speed Steel Tool. Same specimen as Fig. 2, but magnified 500 dia. Shows up double carbides (white). Fig. 4 (Right) Photomicrograph of cast high-speed steel tool. Annealed and furnace cooled, then quenched in a special medium from a high temperature. The structure is martensitic (dark) and austenitic (white) with unabsorbed double carbide eutectic

Similar to all high-grade steels, the selection of good basic materials is essential for excellent products. In this particular process the best commodities available were purchased. This has reference not only to metals and alloys, but also to the refractories and other supplies used. While analysis is an important factor in the selection of materials, the dominant factor should be their metallurgical characteristics which is partially gained by practical experience. In plants where there is no technical department it is a good plan to purchase brands of raw materials, so-called, from reputable concerns. In all cases care should be taken to insure a constant supply of the same grade material, as much time and thought are given to obtaining a "mix" for certain definite results.

Before charging a heat of high-speed steel, a hot furnace is required, the ideal condition being to attain this heat from the tapping out of a previous heat. However, a hot furnace is also secured by preheating with electricity, oil, gas, or other means. With a hot furnace the melting down time is reduced to a minimum and the metal and also the first slag contain less oxides than when starting with a cold furnace. Extreme care is taken by those making quality steel to see that only clean scrap is charged. It was the practice at the plant with which the writer was identified to rumble all scrap which had accumulated rust or foreign matter. This is one of the reasons why the heats melted "dead" and usually under a reducing slag without the addition of reducing agents.

Proportioning the Initial Charge

It is desirable that the initial charge be so proportioned that the preliminary carbon, silicon, manganese and vanadium contents are lower than the low limits of the specifications, while the chrome and tungsten should be well within the limits. Some opinions for this practice are given:

Carbon in the course of furnace operations can easily, through minor accidents such as electrode breakage or other causes, be increased beyond the desired limits (which is apparent only after the preliminary analysis has been made) and that means a delay caused through necessary additions of both Swedish iron and alloys required to lower the carbon within the specification. On the other hand, if the carbon is lower than the specification, it is an easy matter to adjust this element by the addition of broken electrodes or other means.

Silicon content should be as low as possible in the original charge, for this will permit the use of the maximum amount of ferrosilicon at the time of deoxidation.

Manganese and vanadium are desired in small percentages in the original charge. It is preferable to make all additions of these commodities in the form of ferroalloys after the preliminary analysis, when a good reducing slag is obtained and when the temperature of the bath is raised considerably above the pouring temperature. This not only decreases the alloy losses but also permits these alloys to have their full effect as deoxidizing mediums in the steel.

Ferrochromium is usually mixed with the ferrotungsten and added at the same time. It is believed by some operators that even the mechanical mixing of alloys lowers the solubility point of each alloy and this appears to be true in practice as the chrome-tungsten mix seemingly goes into solution in the metal quicker than either alloys added separately. Ferrotungsten should be added with the original scrap charge and placed almost central near the top of the charge, but being covered with a thin layer of iron or scrap to prevent the oxidation and subsequent

(*Continued on page* 1755)

New Source of High-Grade Coking Coal

Discovery Calculated to Make Available Large Reserves of Low Ash Coal from Practically Every Coking Coal District

BY H. M. CHANCE

PRACTICALLY every coking coal district contains large quantities of coking coal of higher grade than any heretofore available for making low ash metallurgical coke. This high-grade coal contains less than 5 per cent ash, frequently less than 4 per cent ash, and in some cases possibly less than 3 per cent ash. It is not phenomenally low in sulphur, but will often contain a smaller percentage of sulphur than coals now used for making metallurgical coke. Its low ash makes a lower percentage of phosphorous probable.

This high-grade low ash coal exists in coal-beds of good, bad and indifferent quality, scattered through the coal in masses ¼ in., ½ in., ¾ in., 1 in. or 2, 3 or 4 in. in diameter. There are no visible lines of demarcation separating these masses of pure coal from the impure coal.

Many coalbeds normally furnishing coal averaging, say, 10 to 14 per cent ash, which by the complete removal of slate, fireclay, etc., cannot be reduced below 8 or 10 per cent ash, consist of a mixture of perhaps 50 per cent of coal averaging less than 5 per cent ash and 50 per cent of coal averaging 11 to 15 per cent ash.

Coalbeds normally furnishing coal having 8 to 10 per cent ash, which by the removal of slate, fireclay, etc., can be reduced to about 6 or 7 per cent ash, consist of a mixture of perhaps 50 per cent of coal averaging less than 4 per cent ash and 50 per cent of coal averaging 8 or 10 per cent ash.

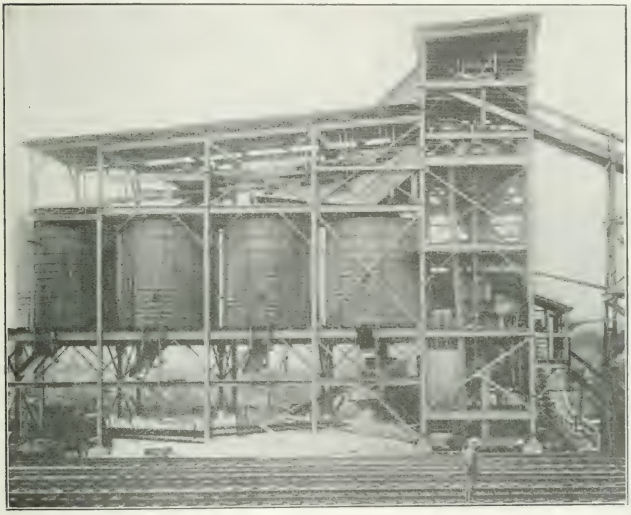
These examples serve to illustrate the important fact already stated, that coal is not a homogeneous substance, that the ash is almost always scattered throught it irregularly, and consequently that nearly all coalbeds producing merchantable coal contain an important and material percentage of low-ash coal.

Fortunately the specific gravity of each piece of coal depends upon the quantity of ash present in that piece, and this difference in specific gravity furnishes a ready means for separating the low-ash coal from that of higher ash content. The specific gravity increases about 0.01 for each per cent of ash present in the coal. Thus if coal with 3 per cent ash has a specific gravity of 1.35, the same coal with 4 per cent ash will have a specific gravity of about 1.36; with 5 per cent ash, 1.37; with 6 per cent, 1.38; with 8 per cent, 1.40; with 13 per cent, 1.45, and so on.

Hence, if a separation be made by a "float and sink" method by introducing the coal into a liquid of the desired specific gravity, as for example 1.38, all the coal having a specific gravity less than 1.38 will float and all the coal having a specific gravity greater than 1.38 will sink, and an exact separation will thus be made, dividing the coal into two definite grades, the low ash grade having less than 6 per cent ash.

Chemical solutions or high gravity liquids could be used for making such a separation experimentally, but could not be used commercially.

Fortunately the sand flotation process supplies a liquid of any desired specific gravity by which such separations are easily made. This process consists in



A Plant for the Sand Flotation Method of Separating Low Ash from High Ash Coal Would Doubtless Be Similar to a Plant Using the Same Process for Removing Slate, Rock and Other Impurities from Anthracite Coal. The anthracite washery here shown is at Winton, six miles from Scranton. It has one 15-ft. separating cone, whereas the differential separation required under the author's scheme would call for two

*H. M. Chance & Co., consulting mining engineers, Philadelphia.

the production of a heavy gravity liquid, termed a "fluid mass," by agitating a definite mixture of any suitable comminuted solid, such as sand, and water, the sand being kept in suspension in the water by suitable means for providing agitation and the mix readily maintained at any desired specific gravity. The specific gravity is under close control and can be varied accurately at will.

This process was introduced in the anthracite districts of Pennsylvania by the building of a plant two years ago. There are now six plants in daily operation and another shortly to be completed. These seven plants are owned by seven different companies, are widely separated and no two of them are treating coal of exactly the same kind. The process is used not to make differential separation of coal into two or more grades, but to prepare the coal for market by the removal of slate, rock, pyrite, and heavy bony coal, one machine doing the work of a large number of jigs, spirals and other slate removers. At these plants the coal is fed unsized (from egg to No. 4 buckwheat) into the separating fluid mass and the floated coal is sized for market after separation of the impurities has been effected.

These plants have a combined capacity to treat over 1,000,000 tons annually and represent investments aggregating about $1,000,000.

The sand flotation method is especially adapted to the flotation of pieces of low-ash coal, whether these pieces be large or small. Therefore, in carrying out the process in the washing of bituminous coals for the purpose of separating the low-ash coal as an especially high grade material, crushing should be reduced to a minimum, that is, in many cases the separation should be made without crushing the coal smaller than 3 or 4-in. size. In other cases crushing to perhaps 1½ or 2-in. size may be necessary, but usually and ordinarily crushing to 3 or 4-in. size will be sufficient to separate a large part of the low-ash coal from coal containing a larger percentage of ash.

To avoid the difficulties which follow the wetting of the very fine coal, coal smaller than ⅛-in. mesh or perhaps smaller than ¼-in. mesh can be screened out and ordinarily will not require washing, because in many cases this fine material will not contain an excessive percentage of ash and, owing to the fact that the coal has not been finely crushed, the percentage of this fine material will be relatively small. This dry material usually can be added to the washed coal without appreciably raising the ash percentage in the finished product. If, however, this finer material does carry a large percentage of ash, it should be disposed of otherwise, because it would not then be permissible to add it to the high grade low-ash washed coal.

We shall assume that the machine is fed with run of mines coal, the larger lumps of which have been crushed to 3 or 4-in. size, and material smaller than ⅛ or ¼ in. has been removed prior to the coal's being fed into the machine. The separating fluid mass in the machine will be kept at a specific gravity high enough to float all of the coal. good, bad and indifferent, but low enough to permit all of the slate, pyrite and rock to sink, thus effecting a preliminary cleaning of the coal by the removal of these heavy impurities.

The coal floating in this first machine (or in the first compartment of a two-compartment machine) will overflow into a second machine (or into the second compartment) in which the specific gravity will be just sufficient to float the grade of low-ash product which it is desired to separate,and to permit all of the heavier coal to sink, thus effecting a differential separation, dividing the coal into two products, the first a very low-ash preduct and the second a higher ash product; and this separation has been accomplished without fine crushing of the coal.

In many cases it may be desirable to utilize the higher ash product directly as a steam fuel, or to market it as such, but if the larger lumps of this higher ash coal contain low-ash coal which can be separated by crushing, and if it be desired to increase the percentage of low-ash coal recovered, these larger pieces can be crushed to somewhat smaller size, which will be a size, learned by experience with the particular coal, at which most of the low-ash coal is freed from adherence to pieces of higher ash coal. The crushed product will then be returned for re-treatment to the first machine. The object in returning this crushed product to the first machine is to remove from it any pieces of slate, rock, or layers or nodules of pyrite which have been freed from the larger pieces by crushing to smaller size.

The process carried out in this way is sufficiently simple and will eliminate most of the troubles in coal washing plants caused by the fine coal or sludge, because very little sludge will be made and but little will be permitted to enter the machine. The separating fluid mass produces practically no attrition upon the coal and the only sludge producing agent in the plant is the fine screen over which the coal is passed for the removal of the sand, after the coal leaves the separator, and this screen, fine enough to permit the sand to pass but not fine enough to permit coal to pass, produces a very small percentage of sludge. Whatever sludge is produced, and that which the preliminary screens fail to remove, will of course be recovered and the water clarified for re-use by methods usually employed for this purpose.

The adaption of the process to the treatment of bituminous coals promises to be of especial value to the iron and steel industries in supplying for blast furnace operation a means of producing coke that is purer and better than any heretofore available.

Titanium and Silicon for Rail Steel

An investigation of some of the properties of steel rails deoxidized by the addition of titanium and silicon has been carried out by the Bureau of Standards. The tests showed that the steel treated with titanium was sounder and more homogeneous than the silicon treated steel, there being much less evidence of segregation in sulphur prints of the titanium treated steel and practically no streaks of impurities after etching. The decreased segregation brought about by the titanium treatment resulted in greater toughness and somewhat greater uniformity of mechanical properties in the portion of the rail from the top of the ingot. At the bottom end of the rail, however, the titanium treatment did not improve the steel appreciably more than the silicon treatment did. The greatest value of titanium treatment lies in its control of segregation and the elimination of the hard and brittle portions which the first rails from the ingot sometimes contain.

These tests form a continuation of previous studies of the various processes of steel rail manufacture with a view to establishing the best practice for insuring sound rails. The work was carried out in cooperation with the Titanium Alloy Mfg. Co., the Illinois Steel Co., the Illinois Central Railroad, and the R. W. Hunt Co., and consisted of a survey for homogeneity, soundness, and uniformity of mechanical properties of sections from the top and bottom ends of the first rail of a series of heats, some of which were deoxidized with titanium and some with silicon.

The results are given and the tests described in Technologic Paper No. 241 of the bureau entitled "A Comparison of the Deoxidation Effects of Titanium and Silicon on the Properties of Rail Steel."

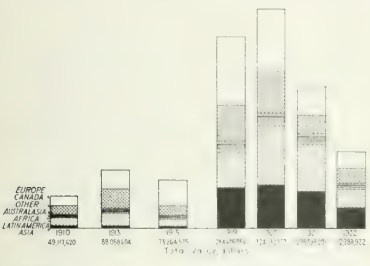
William Monroe White, chief engineer and manager, hydraulic department, Allis-Chalmers Mfg. Co., Milwaukee, gave an illustrated talk on hydro-electric development with special reference to the hydraulic equipment at a meeting on Wednesday evening, Dec. 19, of the Boston Society of Civil Engineers and members of the Boston Section A. S. M. E. and A. I. E. E., in Chipman Hall, Tremont Temple, Boston. Mr. White has had direct supervision of design and construction of many of the units now in operation on large hydro-electric developments throughout this country and Canada.

Japan's Probable Machinery Requirements

Needs of Reconstructing Damaged Areas and Industries Expected to Produce a Demand for Wide Variety of Equipment Over Long Period

BY W. H. RASTALL*

FIGURES collected by the Bureau of Foreign and Domestic Commerce show that for 1922 Japan ranked second among the markets of the world for American machinery, being exceeded only by Canada in taking more of our equipment than was absorbed by any other single country in the world. In



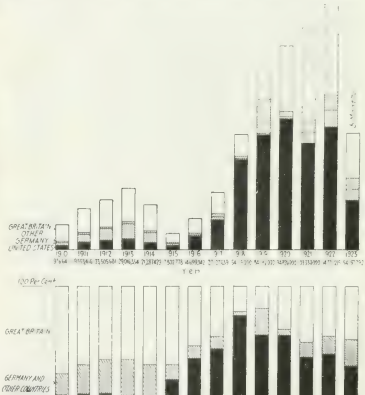
This Chart of the Distribution of American Machinery to Various Parts of the World Shows That, While the Percentage Sent to European Countries Is Diminishing, That Sent to Asia Is Rapidly Increasing. The upper half of the chart shows change in destination in money value and the lower half change in destination in percentages

1921 Japan ranked fourth, being outclassed by Canada, Mexico and Cuba. In 1919 Japan also ranked fourth. In 1913 she ranked eighth, and in 1910 tenth.

While the percentage of American machinery sent to European countries is diminishing, that sent to Asia is rapidly increasing, for while prior to 1915 these Asiatic countries absorbed say 5 per cent of our machinery exports, for 1921 and 1922 this volume had risen to more than 25 per cent, and this in spite of the fact that the volume of machinery exported in these later years was greatly in excess of the volume exported during the pre-war years. It is one of the fundamentals of sales policy that effort can be spent most effectively in markets that are expanding. So that apart from all other considerations, the Japanese market has proved itself probably to be the most important export market we have and one in which the fundamental conditions of expansion justify the expenditure of real sales effort as contrasted to the situation that has been experienced in Europe during recent years.

Since 1915 there has been a marked expansion in the machinery import trade of Japan and an especially gratifying increase in the volume of such imports from this country. Consider for a moment the position occupied by Germany and the volume of the machinery business secured by German interests during the various years. Although some of our newspapers and trade periodicals have at times published articles regarding the position of Germany in the machinery trade of the world, you will note that the German interests have never really been a really important factor in the Japanese market, although in certain pre-war years they did secure a larger volume of the machinery business than did American manufacturers.

Expressed as a percentage, the machinery trade in the United States shows an expansion from 18.2 per cent in 1910, or 16.7 per cent in 1914, to a maximum of 78.8 per cent in 1918, but has since



Since 1915 There Has Been a Marked Expansion in the Machinery Import Trade of Japan and an Especially Gratifying Increase in the Volume of Such Imports from the United States. The upper half of the chart shows change in origin of machinery imports by Japan, in money value (yen), and the lower half shows the change in origin expressed in percentages

been reduced to 50 per cent for 1922 and 42 per cent for the first five months of 1923. Conditions have now reached a point where the competition for this business lies between British and American manufacturers, and the two years following the war had a tendency to throttle these British exports, after which there was a revival, and by 1921 the British had worked up to 40 per cent of the total. For 1922 the showing was less

*The author is Chief of the Machinery Division, Bureau of Foreign and Domestic Commerce, Washington. This article is extracted from a paper he read at the recent Foreign Trade Convention in Cleveland.

favorable and for the five months of 1923 they were still behind the 1921 record. It is, of course, impossible to say whether any position of stability has been reached or whether there ever will be a real basis for comparison between the volume of this business secured by the British and our own manufacturers. All of this, however, provides a general picture of the situation existing in the Japanese market.

Japanese Exchange Fluctuations

In considering Japan as a market, a word should also be said regarding the exchange situation. During recent years a great deal has been said about the exchange fluctuations of Europe and, to a greater or less extent, in Latin America and elsewhere. It is recognized that these fluctuations seriously interfere with the conduct of normal business and in some instances the exchange problem alone has been sufficient to discourage American trade. However, with regard to Japan, in addition to being perhaps our best foreign market for machinery, it should be remembered that during the last decade exchange has probably fluctuated less than 5 per cent. Japan is one of the few countries that have managed to approximate the gold standard. This factor alone would justify sales effort in the Japanese market when such might not be the case elsewhere. All things considered, as a machinery market Japan ranks very high both on the score of the volume of business that has been done, the soundness of the fundamental conditions upon which this business is based, and the prospects for an important future trade.

Earlier speakers have referred to the earthquake and the fact that 40 per cent of Tokio and 80 per cent of Yokohama were completely wiped out, and in each instance this destruction affected practically all of the business districts in both of these cities. During the early weeks of September there were no business organizations in either of those cities, although in some instances the managers of these companies showed a remarkable resourcefulness in arranging new premises, and by early October a number of the machinery dealers in Japan had cabled to their American correspondents that business had been resumed in the old cities. Many of these companies have suffered severe financial losses and in some instances the members of their staffs have been lost, but with a remarkable spirit the situation has been met and business resumed.

Reconstruction Plans for Destroyed Cities

The reconstruction of Tokio and Yokohama has been placed in the hands of the so-called "Capital Restoration Board," which might perhaps be more appropriately translated "Metropolitan Restoration Board," as it will have charge of rebuilding the devastated area from Tokio to Yokohama. One of their first efforts has been to study the wrecked buildings from the engineering or architectural side in order that a building code might be developed and the new cities provided with structures best suited to resist earthquakes and fire.

It will be clear that this alone is a very large and difficult task. It should also be remembered that both Tokio and Yokohama had outgrown the original plans on which these cities were built. Tokio particularly was originally a city of old Japan, surrounded by walls, composed of small buildings of frame type, with tortuous and narrow streets, lacking in all of the conveniences of a modern city, and typically Oriental in every aspect, while during recent decades it has become a modern city with an abundance of Occidental business, and has felt the need for all manner of modern improvements. This need has been so keenly felt that American experts were invited to Japan before the earthquake to develop city plans for both Tokio and Yokohama providing for the growth of these cities. It was recognized that the redesigning of these cities would be a very difficult and extensive undertaking, notwithstanding which very substantial appropriations had been made and plans developed under which the cities would be gradually reconstructed over a long period of years. Now that so much of the area has been swept by fire and the buildings obliterated, it will be comparatively easy to arrange for the necessary improvements in these city plans, but it will be entirely impossible for the authorities in the metropolitan district to grant any permits for permanent buildings or other structures until the city plans have been worked out and provision made that streets are not blocked by these new permanent buildings. Provision must also be made for adequate sewerage, more adequate water supply, better transportation, and in a thousand directions the Metropolitan Reconstruction Board must perfect its plans before real reconstruction must begin.

Immediate Needs of Japan

With regard to the immediate needs of Japan it should be remembered that in the first five months of this year Japan imported over $27,000,000 worth of industrial machinery, and by industrial machinery is meant only those classes that are used in factories, mines and engineering constructions. Automotive equipment, electrical, and figures covering piping, wiring, engineering supplies and the wide range that is often included under engineering equipment are excluded from these totals. It would appear that the imports for 1923 will approximate or exceed those for 1922 and the market for such supplies, even under pre-earthquake conditions, was expanding.

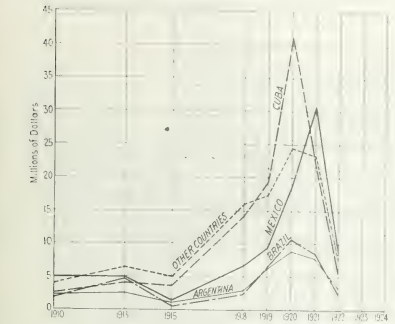
The immediate result of the earthquake has developed an important demand for lumber, corrugated iron, wire nails, and general building supplies. In addition, there is a demand for surveying instruments and such equipment as is needed in developing the new building code, and the new city plans and such wiring and electrical equipment as has been necessary to rehabilitate the electric systems, both power and telephone, in the devastated area. From a thousand sources similar demands are developing, and while financial consideration may restrict such purchases to a minimum, it is also probable that the total represented by items of this character will be important.

Looking beyond the present month to the period when permanent construction will be possible, the indications are that reinforced concrete buildings and steel buildings will be the approved types for the more important structures in the metropolitan area, and manufacturers of machinery suitable for such work may expect a demand in these directions. Manufacturers of pneumatic tools, air compressors, concrete mixers, hoists, rock crushers, etc., should take steps to strengthen their representation in this market as may be necessary to meet the situation arising as a result of this disaster. It is impossible to state exactly how much business will develop in any given direction, as altogether too many factors are involved in the problem. But every indication suggests that new Tokio will be vastly superior to old Tokio and new Yokohama likewise, and the contrast between these will probably be far more marked than the contrast between new San Francisco and old San Francisco, or new Baltimore and old Baltimore.

Another most important work will be in perfecting means of communication. Millions will probably be spent in the harbors of Yokohama and Tokio and manufacturers of dredges and construction machinery of the types used for such work may expect a certain demand to develop in this connection. Cranes and cargo-handling equipment will also be in demand.

There should also be a big improvement in highways and motor transportation, and although the Japanese authorities have not yet completed their investigations as to the types of paving most suited to the needs of the country and the Japanese Treasury, it seems probable that greatly improved roads will be built more or less throughout the metropolitan area. An important number of motor trucks has already been ordered for the reconstruction of these cities.

The industries demolished in the devastated area were of comparatively small importance, as Osaka was the great industrial area of Japan and it has been stated that the total number of employees in the factories of



Value of Exports of Machinery from the United States to Countries of Latin America, 1910 to 1922, Inclusive

Tokio were only about 5 per cent of those in the Osaka district. Less than 10 per cent of the cotton spindles of Japan were in the devastated area and many of these spindles were either not damaged or can be salvaged so that, although the cotton spinning industry is probably the most important in Japan, this disaster will not call for any important volume of new spindles. The same general remarks can apply in a number of other directions. The machinery losses of the industries that were in the devastated region are shown in the following statement issued by the Commercial Attaché of the Japanese Government in this country:

	Yen
Textile	14,000,000
Electrical, including telephone, telegraph	18,000,000
Electrical appliances	4,000,000
Automobile, bicycle	4,000,000
Surgical equipment	1,500,000
Rubber products	10,000,000
Printing	1,000,000
Glassware, enamels	2,500,000
Pencils	1,000,000
Brick	200,000
Safes	250,000
Galvanizing	450,000
Bolts, fittings	400,000
Rice	150,000
Sawmill	200,000
Celluloid	250,000

Government Bureau Offers Aid

The kinds and classes of machinery regularly imported in Japan are shown quite clearly in the customs returns published by that government, and it is to be expected that a reasonable demand for such equipment will continue indefinitely, and to a certain extent will be increased as the result of this disaster; but it should be emphasized that successful foreign trade depends, not upon a spasmodic effort following a disaster of this kind, but upon the application of consecutive and constructive salesmanship at all times. In the machinery industry, the average American factory exports perhaps 20 per cent of its production. The average English shop exports perhaps 60 per cent of its production and the prosperity of these companies depends in greater or less degree upon this export ratio. The Bureau of Foreign and Domestic Commerce will be very glad to cooperate in the solution of export problems arising, and going after such business.

Activities of New England Industries

The Bath Iron Works, Bath, Me., primarily a shipbuilding proposition, but for some time engaged in locomotive repair work, is now manufacturing magazine wood pulp grinders for the Great Northern Paper Co. The machines are designed for wood in four foot lengths, and are of heavy construction, each unit weighing 95,000 lb.

The American Steel & Wire Co., Worcester, Mass., is running full, some departments day and night, with more than 5000 on the payroll. The cable units, South Works, are the hardest pushed for deliveries. The Worcester, Clinton, Spencer and Palmer, Mass., works of the Wickwire Spencer Steel Corporation are either on full or double time. The C. F. Wright Steel & Wire Co. and the Worcester Wire Works, Inc., are building plant additions to care for increased business. The Osgood Bradley Car Co., the Morgan Construction Co. and the Curtis & Marble Machine Co., Worcester, are extremely busy. Otherwise business in Worcester's metal working industries is slowing down, as is usual at this time.

New England automobile manufacturers generally are not sharing in the prosperity enjoyed by Middle West makers. One manufacturer has just been forced into an unfavorable position through forced bankruptcy proceedings against its backer; the receiver of the Stanley Motor Carriage Co., Newton, Mass., has proposals acceptable to the principal creditors, which may result in an early reorganization of the company; the Stevens Duryea, Chicopee, Mass., plant recently was sold by receivers; the Northway Motors Co. is about to pass into new hands, having assumed financial difficulties.

The New England textile machinery business, which only a few months back was hard pressed for deliveries, has experienced a setback. The heater and radiator industries, on the other hand, are operating in full.

Increased Melt of Ohio Foundries

The Ohio State Foundrymen's Association, Cleveland, reports that operations of Ohio foundries for November were on a more satisfactory basis than in October. November figures indicate the industry operated at 70.29 per cent of normal or capacity, an increase of 2 per cent as compared with October. November, 1922, was on the basis of 64 per cent of normal. Stocks on hand show an increase of about 5 per cent. Stocks received declined 4 per cent.

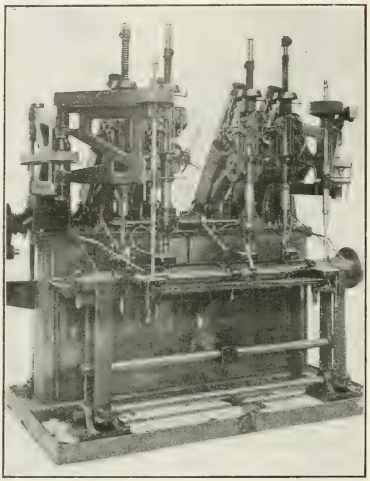
Non-ferrous operations show an increase of 5 per cent over October. During November the industry operated at exactly 60 per cent of capacity; October figure stood at 55 per cent. November justified the anticipations of non-ferrous operators expressed some weeks ago in that conditions were improving. Prospects in this department are reported as being encouraging.

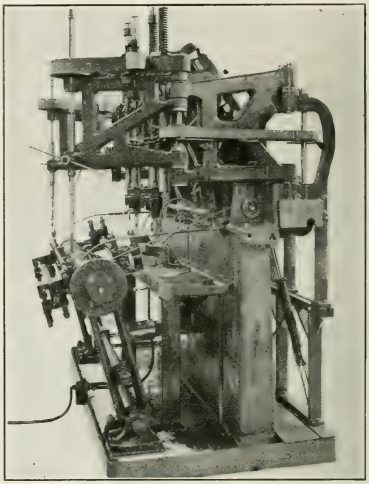
Organized by the city of Brussels and the Belgian Government, the Fifth Commercial and International Brussels Fair will be held from April 1 to 16, 1924. The Brussels Samples Fair is entirely devoted to industry and commerce and is not a commercial enterprise. Full particulars about regulations, advertising and applications may be obtained from the Executive Committee, 19 Grand Place, Brussels, or at the Belgian Consulate, 25 Madison Avenue, New York.

Special Machine for Axle Drilling

An increase from 20 to 40 an hour in the drilling and reaming of automobile front axles is claimed for the machine illustrated, which was developed by the Barnes Drill Co., Rockford, Ill. The increase in production is attributed largely to the employment of a turnover jig which permits of reaming simultaneously with the drilling and also reloading while the axle is being drilled.

The machine itself is a four-spindle, adjustable-head all geared gang drill, equipped with two radial heads added, as shown. The radial heads are of jointed construction so that they will swing into the reaming position without interfering with the main spindles which drill the king pin holes. While one axle is being drilled under the main spindles of the gang, using auxiliary heads for the spring pad holes, the king pin holes are reamed in the outer or upside-down position of the turnover jig. Thus the drill bushing is out of the way of the reamer. The finished axle is then removed and a new forging chucked in the jig, the reaming and reloading being accomplished during the drilling operation in the opposite position.





Special 24-In. Adjustable Head Gang Drill for Front Axle Drilling and Reaming. The radial heads at each end swing in to ream king pin holes of the drilled axle in one station of the jig, while the machine is drilling king pin holes and spring pad holes in another axle in the jig. The end view shows the jig in outer position ready to turn over

A foot pedal operating an air cylinder is used to push the jig to the outer position so that the jig will clear the table when turned over, the air cylinder then drawing the jig back to the working position. It is said to take less than 10 sec. to index the jig.

The jig has quick lateral adjustment to bring the bushing guides to the center of the boss on the axle forging, which has a slight variation because of shrinkage in the overall length of the forging. The outer spindles of the machine itself may be brought quickly to the center of the bushing by movement of the lever shown at the center of the gang.

The company's adjustable-head, all geared gang drills are so called because they have lateral spindle adjustment. The spindle at the left end is fixed, the other heads being adjustable by means of rack and pinion, giving a range in center distances from 17 in. between any two adjacent spindles to 80 in. between the two outside spindles on the 24-in. four-spindle machine. Each spindle has eight geared speeds and feeds.

Structural Steel Bookings Better in November

WASHINGTON, Dec. 21.—The Department of Commerce announces November sales of fabricated structural steel, based on figures received from the principal fabricators of the country. Total sales of 120,858 tons were reported for November by firms with a capacity of 223,472 tons per month, or 54 per cent of capacity. Shipments of firms reporting this item represented 65 per cent of capacity, as against 78 per cent in October.

A survey of the present capacity of the industry indicates that the capacity normally used for structural work is about 250,000 tons per month for 1923, the same as reported for 1922. Reports received from 170 identical firms show a capacity of 231,682 tons in 1923 as against 228,280 tons in 1922, six of the firms included in the 1922 total being now out of business.

Tonnage booked each month by 177 identical firms (of which six are now out of business), with a capacity for 1923 of 234,057 tons per month, is shown below, together with the per cent of shop capacity represented by these bookings. For comparative purposes the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month. The percentage of shop capacity for the months of 1923 has been slightly changed by use of the revised 1923 capacity figures in the calculation.

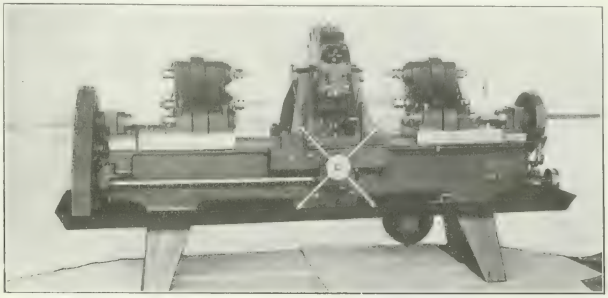
	Actual	Per Cent	Computed
1922	Tonnage Booked	of Capacity	Total Bookings
October	133,037	58	145,000
November	112,367	49	122,500
December	138,737	60	150,000
1923			
January	173,294	74	185,000
February	184,887	79	197,500
March	220,400	94	235,000
April	186,117	80	200,000
May	131,875	56	140,000
June	118,117	50	125,000
July	117,563	50	125,000
August	134,431*	58	145,000
September	121,096**	52	130,000
October	111,692***	48	120,000
November	120,858****	54	135,000

*Reported by 176 firms with a capacity of 232,857 tons
**Reported by 174 firms with a capacity of 232,107 tons.
***Reported by 169 firms with a capacity of 231,257 tons.
****Reported by 153 firms with a capacity of 223,472 tons.

Three-Spindle Duplex Horizontal Drill

The three-spindle, duplex horizontal drilling machine illustrated, developed primarily for drilling, boring and reaming automobile steering knuckles but adaptable also to the machining of other parts, has been placed on the market by the Garvin Machine Co., New York.

The machine, which is designated as the No. 1-S, is of the company's standard design, having as added features the three spindles in each head and the squirrel-cage type of fixture. The work is held in this fixture and three different pieces are operated on at the same time, one piece being drilled with a ¾-in. drill, another piece bored to 27/32-in. size, and the third piece finished reamed to ⅞-in. The heads feed into the work automatically and are returned by the pilot wheel shown at the front of the machine. The fixture is then indexed to the next piece and the feed thrown in. The machine is said to finish a steering knuckle every 40 seconds.



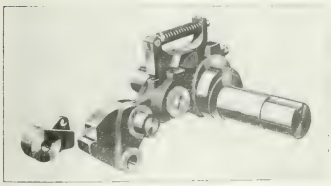
Machine for Drilling, Boring and Reaming Automobile Steering Knuckles. The three spindles in each head and the squirrel cage type of fixture are features. Each head is driven independently by a motor at the rear and heads feed into the work automatically. Three different pieces are operated on at the same time. One piece is finished every 40 sec.

Each head is driven independently by a 7½-hp. motor bolted to the rear of the bed of the machine, making a compact direct drive. The power is transmitted through spur gears to the main driving shaft in the heads. All gears are protected by guards, and the work is flooded by lubricant from the pump shown at the right hand in the illustration.

Stop Motion Device for Forging Machine

A new stop motion device called the rocker type drop lock has been adopted as a standard equipment for the new model bolt heading upsetting forging machines of the Ajax Mfg. Co., Cleveland.

The operation of a stop motion forging machine is somewhat similar to a press, in that the slides remain at rest until the hot stock is located in the impression in the stationary die and the machine is tripped. In such operator-controlled machines, the almost universal method of bringing the slides into action is by a hub clutch in a revolving gear or flywheel engaging direct into the end of the crankshaft, which is at rest. As this requires the sudden picking up of the crankshaft to full speed there is usually a resultant shock, particularly evidenced when heavy parts are involved.



Stop Motion Mechanism of Ajax New Model Forging Machines

With the drop lock device illustrated the crankshaft with pitman attached is in idle rotation when the slides are at rest as with the old type drop lock, but the wrist pin end of the pitman is carried by an oscillating rocker fulcrumed at the bottom of the header slide instead of by reciprocating slide blocks, as formerly. While the machine is idle this rocker swings free under the drop lock. When the treadle is depressed the lock drops onto the upper surface of the rocker and rides on this surface until the rocker reaches its extreme back travel, where the lock falls into engagement. As this occurs just as the crankshaft passes over its back dead center, the velocity of the reciprocating and oscillating parts is practically zero when engaged and the slides are thrown into motion with a natural acceleration without shock, for as many strokes as desired. Upon removing the foot from the treadle, the lock is disengaged and the slides come to rest at their extreme back travel.

This device is similar in principle to the slide block type of drop lock, which it replaces. However, it is claimed to be a decided improvement over the old design, due to the extreme shortness of the lock, the increased engaging area and smooth action. Its relatively light weight eliminates the necessity of a counterweight and timing lock employed formerly. The new device is protected by patent granted recently to its inventor J. R. Blakeslee, president of the Ajax Mfg. Co.

Steel Furniture November Shipments

November shipments of steel-furniture stock goods, based on reports received from 22 manufacturers by the Department of Commerce, amounted to $1,339,425 against $1,365,600 in October and $1,204,310 in November, 1922. The totals for the first eleven months of 1923 and 1922 are $15,378,193 and $11,551,874, respectively.

Economy in the use of fuel is the subject of a meeting to be held at the Engineers' Club, Philadelphia, 1317 Spruce Street, Jan. 15. Sessions are scheduled for morning, afternoon and evening, and are expected to cover railroads, public utilities, manufacturing uses, metallurgical uses and domestic uses. A complete program will shortly be available and may be obtained by applying to Charles E. Billin, secretary.

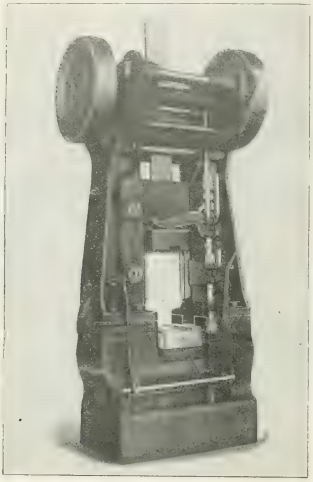
The members of the Electric Hoist Manufacturers' Association report a decrease of 13.58 per cent in the number of hoists ordered in November as compared with the previous month, and a decrease of 11.43 per cent in the value of hoists ordered. Shipments for November decreased 5.35 per cent as compared with October.

NEW LINE OF DROP HAMMERS

Adjustment for Uneven Wear of Roll Bearings—Inserted Ram Guides—Other Features

A line of board drop hammers incorporating improved features, which are said to overcome difficulties heretofore tolerated as necessary evils in the drop forge shop, has been brought out by the Merrill Brothers, Maspeth, N. Y. The machines are available in sizes ranging from 600 to 5000 lb. falling weight.

Exclusive features claimed include adjustment to compensate for uneven wear of roll bearings, absolutely straight friction bar, rigid and non-adjustable upright frames, inserted, adjustable and reversible ram guides, treadle safety lock, and front and back die adjustment, immovable when locked by the die key. The hammers are being offered after exacting tests in actual service.



Inserted Ram Guides Permit of Taking Up Wear On the V's as it Develops. Ease of removing and replaning the inserted guides is a feature

In the lifting mechanism, the arrangement of sliding boxes used for 25 years in the previous design has been improved by the substitution of roll rockers. Direct horizontal pressure against the board is said to be maintained as with the sliding boxes, with the advantage of better support for the roll pressure and belt pull. The hammer may be operated with the belts driving from the front or from the rear or one from the front and one from the rear.

To maintain parallelism of the rolls there has been incorporated a compensating eccentric in one of the eccentric sleeves, the adjustment of which may be made conveniently without removing any of the lifter parts. If desired the hammer may be quickly arranged to use thick or thin lifting boards, by changing the roll eccentric bushing. The eccentric construction is such that when the friction bar falls the rolls are practically locked, an arrangement intended to permit the use of a very light friction bar, roll the board more nearly straight and prevent excessive wear near the point of pick-up.

The main roll bearings are ring oiled from four large and accessible oil pockets, which hold about a four weeks' supply. Sliding bearings, where the pressure is high but the movements small, are lubricated by means of oil-soaked felt pads.

Friction rods on drop hammers are usually made with one and sometimes two offsets at the upper end, a construction which in connection with the kickback from the roll releasing lever is said to render them susceptible to crystallization and breakage. The new hammers have a straight friction bar with an eye at the upper end for attachment to the eccentric lever. The roll releasing lever is designed to lift the friction bar to its seat without shock, permitting the hammer to run practically at as high a speed as the lifting board will stand. It is constructed so that the leverage shortens as the friction bar is raised, which is accomplished by means of a rolling contact on a non-metallic surface on the ram, giving, it is claimed, a greater friction roll opening than with a plain lever operating on a ram pin. The under surface of the lever being curved, the pressure against the ram is in a vertical direction, which is intended to eliminate the kickback on the whole roll releasing mechanism.

A unique bottom stop for the rod has been incorporated. Both seats for the upper and lower positions of rod are in one assembly, the entire mechanism being removable by releasing two vertical guide bolts. Wear due to the drag of the lower end of the rod when being raised from its lower position is taken by the front of the stop plate. The base casting is protected from wear and the plate may be removed and redressed or renewed. Suitable non-metallic plates are placed under the stop seats to take the shock of the falling rod.

The clamp for holding the ram suspended is conveniently adjustable in conjunction with the special treadle. The clamps are placed under the rolls and are full floating to conform to the alinement of the board. The board clamp assembly may be removed without removing any parts of the lifter.

The upright frames are of steel castings of I-beam section. The bearings on the base have been increased in all directions, as well as the depth and length of the upright guide in the anvil. The foot of the upright is tightly fitted on four sides to the top of the base, eliminating movement in any direction. Four hold-down bolts are used which, in combination with the lifter construction and tie rods at the top of the uprights, is intended to prevent rocking of the uprights on the base. Dirt clearance under the upright foot in the anvil has been provided, dirt and scale being removed without taking down the upright from the base. The clearance surfaces are pitched so that the dirt may find its way through an outlet at the side of base. The upright feet are deeply guided in the anvil, and the side thrust from breakdown work is taken in a manner intended to prevent failure at this point of either the upright or base.

Provision has been made for the convenient truing of the V's of the uprights when they become too badly worn for accurate forging. Adjustable and reversible ram guides are fitted to the steel upright frames and a planer large enough for truing the V's of the ram may be used for planing the guides, as the adjustable pieces are not longer than about 5 ft. on the largest hammers and are plain, straight and square sections. Because of the ease of removing and replaning the inserted guides, it is expected that the V's will not be permitted to become badly worn. Being reversible, the guides have double V's, which prolong the usefulness of these wearing surfaces. The inserted guide adjustment is simple. The guides may be dropped back into the uprights to permit the ram to be removed, as well as take up for uneven wear at the bottom of the guide and ram. By adjusting both the bottom and top guide adjusting wedges, the face of the ram may be squared up from right and left with the face of the shoe.

To prevent mishaps from accidental tripping of the treadle, a positive acting device has been incorporated, whereby the treadle cannot be tripped except by placing the foot on a pad provided. This pad, which is about 6 in. square, may be adjusted from right to left to suit the convenience of the operator.

Die adjustment from front to back is accomplished by means of a double taper insert in the top of the forged steel shoe opposite the die key. This construction is said to be positive, and the die cannot get loose without the die keys coming out.

Pulverized Coal in Open-Hearth Work

Comparison with Other Fuels—Its Disadvantages in Open-Hearth Operation—Data on Steel Production with Pulverized Coal and Producer Gas

BY R. H. LOWNDES*

IT has been well said that energy is the foundation of industry; therefore it behooves those interested in industry to study closely all possible phases of the development of energy. There are at most but few sources of energy, three of which are direct and a small number indirect. Further, the three so-called direct sources may all be attributed to but one source. These three are wind, water and heat.

Industrial heat energy is obtained by the burning of fuel, which is the bringing together of any two substances that will unite chemically with evolution of heat. Oxygen, one of the most plentiful of substances, is very active chemically, and carbon, the most abundant of all substances, has a strong affinity for oxygen. It is most reasonable, therefore, that these two elements should constitute our chief sources of heat.

In the burning of coal with air lies the chief source of our heat-derived energy. Our principal effort is to obtain the maximum heat by the best methods of burning. The purpose for which the heat derived is to be used is the principal factor in determining the choice of the method of burning.

Basis of Comparison of Pulverized Coal with Other Fuels

It is our purpose to discuss specifically the burning of coal in the pulverized state for the production of steel in the open-hearth furnace, and to determine, if possible, whether or not this application is a good one. This can of course be judged only on a basis of comparison with the use of other fuels and other methods of burning. This comparison involves the study of three factors:

1—The cost of the fuel burned, based preferably on the tons of steel output to care for the quantity of steel produced.

2—The quality of the steel produced.

3—The consequent cost of repairs and upkeep of the furnace and its accessories.

In considering the first of these factors it is necessary to take into account the cost of coal per ton; the cost of milling per ton and the possible losses consequent upon this milling. By milling is meant the crushing, drying, and pulverizing of the coal and its delivery to the burners along with the necessary air.

Cost of the coal is always known. Cost of milling includes several costs which are readily determined. First is cost of installation of a coal mill, on which a reasonable rate of return must be figured. Thus if the coal mill cost, say $25,000, a return of 6 per cent would mean $1,500 per year. This, divided by the tons of coal milled, should be added to the cost of fuel per ton. Also a reasonable sinking fund, reckoned as a percentage of the investment, should be set aside for depreciation and obsolescence; and this, too, should be added to the cost of the fuel. Insurance should likewise be reckoned as an annual expense and charged to the cost of the fuel. Next is the cost of power to drive the mill, with its crushers, driers, pulverizers, elevators and conveyors, air compressors and fans; the labor cost, and cost of repairs and upkeep, oil, waste, etc.

Possible losses in fuel value in milling are more difficult to reckon. They are due principally to coal burned to dry the fuel in the drier; loss in volatile combustible driven off in the process of drying; loss in leakage of coal dust; loss in occasional emptying of bins to prevent packing or spontaneous combustion; loss in fires, which occasionally take place.

The losses enumerated are all small, and for a broad discussion need be noted only, and then perhaps discounted. The coal burned to dry the fuel may be neglected, since this additional amount is automatically consumed in any method in first driving off the moisture before the available heat in the fuel becomes obtainable. The loss in volatile is apparently quite small. The best available data on this particular point show an average loss of something less than 1 per cent. It seems to be admitted that here is a small loss, but not enough to cause any concern. H. R. Collins in 1918 stated that driers were manufactured which were able to eliminate moisture without distilling any of the volatile combustible matter in the coal. He then described the modern drier, employing temperatures not greater than 300 deg. Fahr., and stated that the volatile combustible matter was not likely to be driven off until the temperature rose above 400 deg. Fahr.

Loss in coal-dust leakage is purely mechanical, and the latest mills have almost entirely stopped this leakage. Until they did so, however, this loss was quite heavy. The loss in having to empty bins is also minimized by increased knowledge of the quantities of fuel necessary in any specific operation, and the consequent prevention of large accumulations in the bins. This same control also minimizes the loss due to fires, and in the modern mill they are almost unknown.

Assuming, then, that coal can be pulverized at a cost of something like 65c. per ton (J. W. Fuller estimates that coal can be pulverized and delivered to the burners for 35c. per ton, as compared to 60c. per ton for gas producers), with coal costing, say, $6.50 per ton, the milling adds about 10 per cent to the cost of the fuel. We have a right to expect this to be returned by virtue of the much-improved burning; and indeed, so far as the heat obtained is concerned, this additional expense is more than justified. This loss is less expensive than the B.t.u. loss in the gas producer. With good burners and proper air adjustment, what may be termed the carburetion of the coal dust is so good that combustion is excellent.

Analyses of the products of combustion show the percentage of CO_2 to be very high, in some cases as high as 15.8 per cent. H. R. Collins (Fuller Engineering Co.) reports tests where this value reached 17 per cent. The excess air necessary is small, only about 18 per cent, and at the very high temperatures reached the sulphur is also largely burned and carried off up the stack as SO_2.

In considering the quality of the steel produced, the following items enter: the control of the flame, not only chemically but also as to intensity, direction, shape, and velocity; the kind of coal used; its constituents other than carbon; the kind and amount of so-called impurities, moisture, volatiles, sulphur, and ash being the chief items. Each of these may affect the steel.

The flame may be directed, lengthened, shortened, made oxidizing or reducing as desired, and the temperature may be kept remarkably constant at any desired point within quite wide ranges.

Disadvantages of Pulverized Coal in Open-Hearth Operation

All of this leads to the belief that pulverized coal is indeed an ideal fuel. For some uses this may be so, but we have not yet considered the third factor in our discussion of open-hearth operation, namely, the cost of repairs and upkeep of the furnace and its accessories.

*Chief engineer Atlantic Steel Co., Atlanta. Abstract of paper presented at Chattanooga regional meeting of the American Society of Mechanical Engineers, Oct. 24.

It has been our experience at the Atlantic Steel Co. that herein lie the greatest difficulties. We have found the condition of our coal-fired furnace after 100 heats is worse than the condition of a similar furnace, oil-fired, after 287 heats. The gas-fired furnaces suffer even less. In round numbers, we have obtained about three times as many heats from our other furnaces as from the coal-fired furnace, where the refractories cut away, the slag pockets fill faster, and the checkers become choked.

It appears that the excess air carried along with the sweeping flame at the terrific temperature attained so rapidly will attack and cut the refractories more than it does with either the oil or the gas flame. Compared with the gas flame this is not so surprising, but when compared with the oil flame we must seek more closely for a cause of the difference. There are some who attribute the possible cause of the rapid cutting of the refractories with the coal flame to the presence of incandescent ash particles impinging at high temperature in conjunction with the highly heated excess air. This ash, it is supposed, may start some sort of slagging action, which lays the surface of the brick more open to the attack of the oxygen. Certain it is that the ash has a pronounced effect on the slag of the bath.

But the chief source of annoyance and expense lies in the deposit of ash as slag in the slag pockets and in the checkers. This takes place rapidly, and the toughness of the deposited slag is pronounced. We found that a high stack velocity lessens this deposit materially; but this increase of stack velocity is obtained at the expense of several things. It calls for additional excess air to increase the volume of gases passing, so as to increase the velocity. This of course at once reduces the temperature of the flame, but at the same time it increases the cutting effect on the refractories.

To carry off this extra volume of flue gas necessitated our passing the gases from the checkers directly to the stack, cutting out the waste-heat boiler. This is of course another serious loss of heat energy. Attempts to use the waste-heat boiler reduced the flue-gas velocity so that the slag deposited rapidly, and the checkers became badly choked. This choking of the checkers further reduced the gas velocity, which caused a further drop in flame temperature, which in turn seemed to cause more sulphur to enter into combination in the steel.

Both the temperature and intensity, as well as the direction of the flame, had to be kept within certain limits to avoid sulphur troubles. It seems that the sulphur oxidizes and passes off as SO_2 at and above certain temperatures. This is doubly advantageous, as the sulphur is not only disposed of but it generates heat in burning. When the temperature falls below this critical value the sulphur prefers the iron to the oxygen and goes into the steel, combining in more than one compound.

So, to get rid of the sulphur the flame intensity should be high, the flame should not be depressed—that is, it should be directed above the bath, and the excess air must be adjusted within narrow limits. Too little excess air and the sulphur is not oxidized; too much, and the temperature drops, and again the sulphur is not oxidized. When these several adjustments are about right to effect a maximum riddance of sulphur, the velocity of the gases is reduced to a point where the refractories cut and the slag deposits heavily.

Cutting off the waste-heat boiler and increasing the excess air increases the flue-gas velocity and lessens the ash and slag deposit; but the refractories cut faster, the temperature of the flame drops, more sulphur enters the bath, and the use of the boiler is entirely lost.

The experience here recounted ran over a period of about seven years, 1916 to 1922, inclusive. These years were seriously affected by war conditions, both high and low peaks being reached in that time. It has been difficult, therefore, to compile any very fair set of data. But the conspicuous and interesting fact is that both study and experience have clearly shown us that the major objections to the use of pulverized coal in the open-hearth furnace lie not in the preparation nor in the burning of the coal, but almost entirely in that part of the work which coal-burning literature touches on so little or not at all, namely, the consequent clean-up, upkeep and repairs.

There is but one way to evaluate pulverized coal correctly as a fuel for the open-hearth furnace, and that is to watch the industry for a decade or two longer. With the ever-increasing improvements for taking care of difficulties as they present themselves, this type of fuel may come to be more and more used in open-hearth work. But at present the Atlantic Steel Co. has just discarded its coal-fired furnace, because of the higher cost of producing steel by this means.

Comparative Costs of Open-Hearth Operation with Pulverized Coal and Producer Gas

In the table will be found figures taken from data accumulated during 1922. This year was chosen as being most nearly representative, since prices of commodities and labor, and of production in general, were then somewhere about midway between the high peak of the war and the low peak of the intervening depression. These figures show some of the actual costs, and these in turn show why this method of open-hearth operation was abandoned by the Atlantic Steel Co.

Steel Production in Open-Hearth Furnaces Burning Pulverized Coal—Atlantic Steel Co., 1922

Date	Fuel—Per ton coal for milling	Fuel—Pounds coal per ton steel	Steel—Tons output	Steel—Heats per furnace	Steel—Sulphur in steel per cent	Repairs—Per month	Repairs—Per ton steel
Month	coal						
Apr.	$4.83	$0.67	668	2271	49	....	$343	$0.15
May	4.95	0.60	740	2580	52	....	771	0.30
June	5.23	0.68	1170	412	9	....	....	7.28
July	5.40	0.61	580	2453	50	....	....	1.98
Aug.	6.84	0.60	660	2124	44	....	1,247	0.59
Sept.	7.22	0.82	630	2048	42	....	1,713	0.83
Oct.	7.38	0.56	638	1768	37	....	3,526	2.00
Nov.	7.49	0.52	686	2383	47	....	3,468	1.46
Dec.	8.27	0.58	684	2370	47	....	1,261	0.53
Avg.	6.40	0.62	636*	2068	42	0.065	1,761	1.68
Do., for gas†	6.40	0.60	548	2016	39	0.045	1,361	0.96

Tennessee coal used, averaging 36 per cent volatile, 53 per cent fixed carbon, 3½ per cent moisture, 6 per cent ash, and 1½ per cent sulphur.

Dried at an average temperature of 200 deg. Fahr., to about 1 per cent moisture.

Average pulverization showing 93 per cent passing 100-mesh screen and 81½ per cent passing 200-mesh screen.

*This figure obtained by dividing total coal consumption by total steel output.

†Average for the same months for two gas-fired furnaces.

It is apparent at a glance from the figures in the table that the gas-made steel is both better and cheaper. It is also apparent that the chief objections to the use of pulverized coal lie in the difficulties engendered in the necessity of running the ash through as a part of the products of combustion.

A report on "Pulverized-Coal Systems in America," compiled by Leonard C. Harvey, and published in London in 1919, shows that the Atlantic Steel Co. is not alone in its findings as to the life of checkers. Under the heading "Opinions of Users" occurs the following statement:

> Have found the average life of checkers for various fuels in the open-hearth furnace to be—
>
> For natural gas.....1000 heats
> For producer gas ..... 350 to 500 heats
> For oil ..... 350 to 500 heats
> For pulverized coal..... 225 to 250 heats

Use of Pulverized Coal in Soaking Pits

The Atlantic Steel Co. is continuing its use of pulverized coal in the soaking pits, where the results are far more satisfactory than they were in the furnace, but are not so good as with producer gas. The slag and ash deposit of course takes place in the combustion chamber, in the soaking pit proper, and at the base of the stack. But this deposit is more readily removed and need never be allowed to accumulate sufficiently to choke the passages. The flame may be made either oxidizing or reducing and, since the steel remains in the solid state, the sulphur gives no trouble. For soaking-pit operation the use of pulverized coal appears to be acceptable. We have not used pulverized coal under

boilers, except indirectly under the waste-heat boilers from the open-hearth furnace.

It is interesting to note that, in spite of the promising outlook presented by the possibilities in the use of pulverized coal, in actual practice the use of this fuel in open-hearth operation proved with us, as with others, to be unsatisfactory. Nor must it be forgotten that the trouble lay in that part of the operation which is not to be found merely in a study of fuel combustion.

There is reason to hope and to believe that the near future will enable the open-hearth furnaces in small as well as large plants to use pulverized coal as a fuel. But before this can be done there must be some experimenting, and the smaller plants must await the results of these experiments, which only the larger plants can be expected to perform.

FRENCH FOUNDRY APPRENTICES

Good Molders Turned Out Interesting Contests in Molding and Casting

BY HENRY M. LANE

SOME time ago THE IRON AGE published photographs of foundry apprentices and of castings they had made in connection with competitions in the foundry of Ph. Bonvillain & E. Ronceray Co. in France. Mr. Ronceray has taken a great interest in the training of foundry personnel. His activities have been in three lines—first, his interest in the French Foundrymen's Association, which he organized some years ago; second, his interest in foundry apprentices; and third, his interest in an advanced school of foundry operators, of which we will have something to say later.

In regard to apprentices, the Ronceray firm as a manufacturer of molding machines has very little use for molders, as a comparatively small number will do all the work. But, realizing that apprenticeship in the old sense was dying out in France, Mr. Ronceray secured the services of a good molder, who was at the same time a good instructor, and employed a number of boys as apprentices. He then attempted to make real mechanics of them, teaching them not only the molding trade, but the making of patterns and pattern plates by the French pattern plate method.

A few other foundries had some apprentices but, by active work through the Foundrymen's Association and working with individual foundrymen, Mr. Ronceray managed to increase greatly the various apprentices in different shops until today there are 98 in the different iron shops in the Paris district, and something over 80 in the brass and aluminum foundries. He succeeded in getting the cooperation of the various foundrymen covering the treatment of the entire problem and particularly the instruction of apprentices.

To test the ability of the various apprentices, competitions are held each year of the first, second and third apprentices, and in connection with this a number of different types are given. The French Government Educational Department gives a number of medals for excellent work, also some diplomas. Another department of the Government and certain private individuals have made available textbooks on foundry practice, which are distributed as prizes. The contests are held in different foundries, some on Sunday and some on week days, and the interest the boys take in these contests is surprising.

Unusually Young Apprentices

From an American point of view the boys are very young, but this is made necessary by the French laws; the boys are allowed to be apprenticed at 13 years and, if they have made certain grades in school, with the parents' consent they can be apprenticed before this. Mr. Ronceray, with other manufacturers, has for several years been trying to get laws passed limiting the age to 14 years, but thus far it has been impossible. The average French family feels the need to have the children earning at as early a period as possible. So every boy is urged to make the best possible grades in school, so that he can go to work slightly before thirteen, and most of them accomplish it.

There are many trades which are ready to take the boys at this age, so trades which set a higher age limit would not be able to get apprentices. All the foundries try to get older boys, but the majority of the boys start at thirteen or a little before.

Managers Take a Lively Interest

The first of the three contests for the aluminum molders this year was held on Saturday, Nov. 17, at La Metallurgique Electrique. The second was held on Sunday, Nov. 18, for iron molders, at Fonderie Werts. This was for the second year boys. The third contest for the iron molders of the third year boys was held at Ph. Bonvillain & E. Ronceray's plant on Saturday, Nov. 24. The first year boys had their contest at Fonderie Dubarry on Sunday, Nov. 25.

The reason for holding the contest of the third year boys on Saturday was that it was an all-day contest, in which the boys were making comparatively large and difficult pieces. The judges were the owners and managers of some of the largest foundries in France and they were on the job with the boys and stayed throughout the contest, and in some instances for a considerable time thereafter, in carefully studying the work. In most cases the pieces were poured and the castings inspected, so that the committee judged both molds and castings. The boys are judged on a scale in which 20 represents the maximum, and are judged on three points—first, the time taken to make the mold; second, the quality of the mold; and third, the quality of the casting.

In America we have nothing corresponding to this type of apprenticeship and the direct personal interest taken in the boys by the owners, superintendents and foremen of the plants is surprising. The boys turned out are first class molders. Of course, they vary as to personal ability, but many of them at the end of their apprenticeship are better molders than it is possible to find in most of the jobbing foundries of the United States.

Insofar as possible, at the end of the apprenticeship each boy is encouraged to leave the shop in which he has served his time and to work in several other shops for experience. The boys who have gone forward and studied at the same time are then encouraged to take special courses in foundry matters at the French schools, but we want to make these schools the subject of a later article.

Merchantable Castings Produced

In the contest of third year boys at the Ronceray plant, one boy started at 7 a. m. to make a pattern plate to cast four stove legs. This was made by the French process and at 4 p. m. castings were made from the pattern plate and they were good, merchantable castings. The French pattern plate process certainly would serve America in many ways, if we had men who understood the process and would follow it out. The pattern plates are usually made of soft metal and will not stand the use of the vent wire, but, with the type of hydraulic machine on which they generally are used, venting with a wire is unnecessary.

In the contest of the second year boys those who are in the core room had to make cores from several core boxes and, in addition, had to take a block of dry core sand and file from it a special core that was supposed to be required in a hurry.

Progress Made on New Sheet Standards

Mills. Distributors. and Department of Commerce Cooperate to Eliminate Obsolete Gages and Sizes— Comprehensive Survey Now Under Way

A REPRESENTATIVE jobber in iron and steel products finds it necessary to carry more than 500 different gages and sizes of sheets, although only 40 per cent of these items represent more than 75 per cent of the annual sales. Orders for more than 50 items are so small in the course of any given year as to be almost negligible. It is obviously a great burden to provide storage space for large numbers of different gages and sizes which are practically obsolete and are sold only at extended intervals.

The persistence of these numerous specifications for which the demand has diminished almost to the vanishing point is explained both by competitive considerations and lack of accurate knowledge regarding the relative importance of different items. Warehouses have carried a complete assortment of sizes and gages in an effort to supply all possible wants of customers. For similar reasons, mills have found it necessary to roll this wide range of different products. Yet it has been found that various items which have been regarded as of fair importance from the standpoint of tonnage rolled actually represent only one-half of one per cent of total sales.

While the need for simplification of sheet standards has long been recognized, it remained for the United States Department of Commerce to take the initiative toward inaugurating a campaign to that end. At a meeting of the Metal Branch of the National Hardware Association of the United States at Cleveland in May, Major A. E. Foote, Division of Simplified Practice, Department of Commerce, Washington, delivered an address in which he explained what had been accomplished in the way of eliminating waste in various industries. In the ceramic industry, for example, 66 varieties of paving brick have been reduced to seven. Likewise fully 31 sizes of fruit baskets have been reduced to three. In concluding, he extended an invitation direct from Secretary Hoover to manufacturers and distributors of sheet and tin mill products to cooperate with his bureau in order that unnecessary items might be eliminated.

Promptly following his remarks, Chairman W. H. Donlevy of the Metal Branch appointed a sheet steel simplification committee comprising: Chairman, W. C. Carroll, Inland Steel Co.; L. D. Mercer, United Alloy Steel Corporation; W. E. Scott, Youngstown Sheet & Tube Co.; F. O. Shoedinger, F. O. Shoedinger Co.; Arthur M. Long, Trumbull Steel Co.; W. W. Sebald, American Rolling Mill Co. This committee set to work and made the following tentative recommendations applicable to all products: even gages, No. 10 to 28 inclusive; sizes—widths, 24, 28, 30 and 36 in.; lengths, 84, 96 and 120 in.; also 24 x 101 in. in gages 26 and 28, and 42, 44 and 48 in. wide by 144 in. long in No. 20 gage and heavier. These were unanimously adopted by all American sheet manufacturers, and for further work a committee, headed by Mr. Carroll, was appointed by the National Association of Sheet and Tin Plate Manufacturers to cooperate with the Metal Branch committee of the National Hardware Association and with the Division of Simplified Practice of the Department of Commerce.

A complete survey has been undertaken with a view of finding what items and how many are practically obsolete and can be eliminated without affecting in any way the requirements of the consumer. To secure this information it is necessary to review individual items on invoices over a considerable period and when all this information has been gathered, to relate each item to the total tonnage shipped. Much of this work, of course, is a matter of detail, and for that reason it is being done by clerical forces supplied by the National Association of Sheet and Tin Plate Manufacturers. At the conclusion of the survey, the results and recommendations will be submitted to the Department of Commerce and considered at a meeting called by Secretary Hoover at which all parties interested will be represented. The Department of Commerce will then publish a bulletin setting forth the conclusions arrived at by the parties at interest and will lend its moral support to the general establishment of the new standards.

The significance of the movement now under way can better be appreciated by quoting from an address by Secretary Hoover before the manufacturers of bedsteads, springs and mattresses, whose production as well as distribution problems have been greatly simplified: "A great deal has been accomplished in many industries in the direction of simplification. The idea is not new; it has been growing steadily for years. There are indeed many reasons why this question is of more importance now than ever before, because our distribution costs are enormously increased by additions to the cost of transportation, labor, rents and a thousand things, always including taxes. Clearly, if we are to restore the general level between incomes, we can do most if we decrease costs, particularly distribution costs. I know of no method that is more direct and fruitful than that of simplification."

Short Period of Holiday Inactivity in Birmingham District

BIRMINGHAM, ALA., Dec. 24.—The holiday lay-off in the Birmingham district will be short this year, but not so short as during the war. The cast iron pipe plants will be idle less than 10 days. The National Cast Iron Pipe Co. is to start its DeLavaud machines Wednesday and the old plant by Monday of next week. The American Cast Iron Pipe Co. will resume next Monday and the United States Cast Iron Pipe & Foundry Co. is to also be back in operation next week. Several of the sanitary pipe plants will be back in operation Wednesday and the bulk of them by next Tuesday.

The Gulf States Steel Co. will resume operations the middle of this week in its open-hearth furnaces at Gadsden and the finishing mills will also be started. Orders in hand and in sight warrant steady operation for some time. The big steel plant of the Tennessee Coal, Iron & Railroad Co. at Ensley will only see few days shutdown, until Wednesday.

By order of the United States District Court the estate of the King Pressed Steel & Mfg. Co. will be sold at public auction on the premises 13 Hawthorn Street, Newton, Mass., on Dec. 27.

NIAGARA FALLS POWER

Largest Hydraulic Unit Ever Built Has Been Put in Operation

On Dec. 18 the first of three new 70,000-hp. turbo-electric units was placed in operation at Niagara Falls, N. Y., in the plant of the Niagara Falls Power Co. in the gorge below the Falls. The turbine is direct connected to a 52,000-kw. generator operating at 12,000 volts. A total of $12,000,000 is involved in the new station. Some of the development of this project is detailed in the following paragraphs.

Two power companies on the American side of the falls were consolidated some time ago, the Hydraulic Power Co., absorbing the Niagara Falls Power Co., but taking the name of the latter. For more than 20 years the Niagara Falls company has had two stations, one on each side of an intake canal about one mile above the American Falls. Each of these stations has 10 units of 5500 hp. each. Tail water from the 20 turbines of these stations flows through a tunnel, egg-shaped, 19 ft. high and 17 ft. wide and about 7000 ft. long, running under the city and discharging under the International Bridge just below the American Falls. Power to the extent of 10½ hp. is obtained from each cubic foot of water per second passing through this station.

The Hydraulic Power Co. station No. 1 at the foot of the cliff below the falls has an open canal about 7000 ft. long bringing water from above the upper rapids. From the fore-bay water passes through penstocks to 13 units of 10,000 hp. each. This plant has been running for years. It produces power to the extent of 20 hp. per cu. ft. of water per second and discharges the water through draft tubes directly into the lower river.

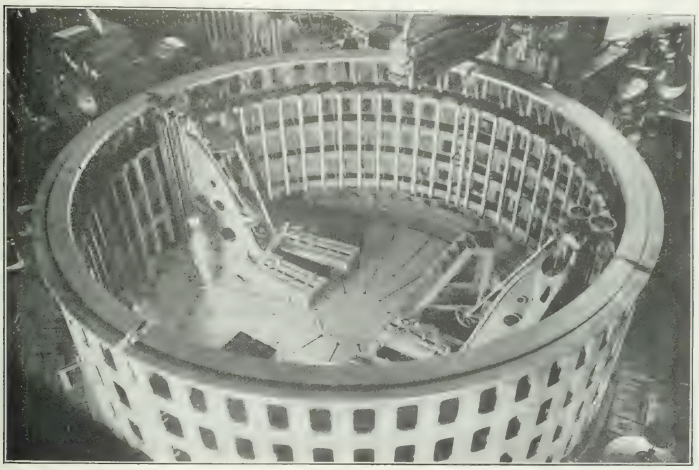
During the war a new hydraulic company station was built adjoining the old and immediately upstream. This contains three units of 37,500 hp. each, producing power at 21 hp. per cu. ft. per second. This gives between 90 and 91 per cent efficiency between the water and the switchboard.

Another station is under construction immediately upstream from the last, which will contain three 70,000-hp. units and will, it is hoped, give still better efficiency—93 per cent being the goal.

This makes a concentration below the falls of 19 units (aside from two 1000-hp. units used for exciters) with an aggregate of 452,500 hp. Adding the 110,000 hp. above the falls there is a total of 562,500 hp. installed. The plant above the falls will be used solely as a standby, after the new plant is finished.

Treaty arrangements with Canada permit the United States to divert 19,500 cu. ft. per second (and Canada 25,000 cu. ft.) from the Niagara River for power production. It is anticipated that this plant, when the new units are in service, will consume this amount at full load and it is reported that the market is at hand for all power which can be produced.

Some of the outstanding features of the new 70,000-hp. units have to do with their great magnitude. Each is installed in a bay measuring 50 x 60 ft. The weight of the equipment in this bay will be 2000 tons, or two-thirds of a ton per sq. ft. A heavily reinforced concrete slab, 12 ft. 6 in. thick and containing 86 tons of reinforcing steel, will be used to carry this load and to tie everything tightly into the rock face of the cliff to prevent disturbance from the flow of water. Each turbine has a steel penstock 21 ft. in diameter extending (almost horizontally) 96 ft. back into the face of the cliff. It is here cemented into the solid limestone, through which the inclined channel has been cut from the canal above. The penstock is made of plates 1½ in. thick which were riveted by means of the mammoth bull riveter described in THE IRON AGE on page 332, Aug. 9.



Stator Castings of 65,000-Kva. Generator Arranged On Turntable, In Works of the General Electric Co., for Machining. The rotor running inside this stator is direct connected to a 70,000-hp. turbine operating under 213-ft. head of water. These units are the largest ever built

Each unit includes a turbine built by the I. P. Morris Co., Philadelphia, designed for a speed of 107 r.p.m. with operating head of 213½ ft. Each unit is controlled by a Johnson Hydraulic Co. penstock valve, these being the largest in the world. Some 3200 cu. ft. of water per second will pass through each unit at full power. The rotor of the turbine is a single casting weighing 105,000 lb., and revolves on a shaft 32 in. in diameter.

Built by the General Electric Co., the generator is also the largest in the world. The stator, shown in our illustration, is 26 ft. high and 35 ft. in diameter. It weighs 228 tons. The rotor has 28 8-ton poles, is 21 ft. in diameter, and weighs 425 tons. Its axis is verti-

cal and it is placed immediately above the casing of the turbine.

To handle the weights involved has made something of an engineering problem for the two 100-ton cranes installed over the six units of the two latest plants. The crane runway over the three biggest units has been designed for a load of about 500 tons. Each of the two cranes has had heavy doubling plates added to the upper and lower flanges of each girder, while eight-wheel trucks have been substituted for the earlier four-wheel trucks. Each of the 100-ton hoists on each crane has been duplicated by a second hoist, making a total of four. Equalizing bars to carry between the two hoists of each crane have been provided and a third equalizing hoist to act between these two. With this equipment it was arranged to handle the 425-ton rotor. The total weight carried by the crane hooks, including the weight of the equalizing bars, was to be about 470 tons.

It has been figured that the three new 70,000-hp. units will deliver as much energy as corresponding steam power calling for 2,000,000 tons of coal a year. Each of them has sufficient power to provide all the electric lighting required by a city as large as Boston.

Four-Wheel Drive Lift Truck

The industrial truck illustrated, known as Tec Uplift, was placed on the market recently by the Terminal Engineering Co., 17 West Forty-fourth Street, New York. A notable point is the absence of the small diameter pilot or trailer wheels. The claim is that the truck has, accordingly, freedom of action in traversing obstructions, as in crossing cobbled streets, or railroad crossings. It may also approach close to a freight car, to the floor of which material is to be lifted or from which it is to be removed, with the truck on the rail level. The feature is also emphasized as similarly advantageous in stacking goods in a warehouse.

The truck is available with varying heights of uprights to suit different requirements. In all cases the table will drop to a surface height of 5 in. from the floor. The table is 4 ft. long by 26 in. wide. Provision has been made for changing the style of table by dropping out the table and saddle shown, and placing in the uprights other types of saddles with horns—double tang, or vee type tables. The horn type is intended for handling coiled rod or reels, and material of similar form, and the double tang type, the top of which goes down to within 2 in. of the floor, for handling tin plate. Tables for handling tote boxes and other work are also available. The capacity on separable bodies ranges from a 2100-lb. evenly distributed load on 6-ft. platform to a 3000-lb. load on a 3-ft. platform.

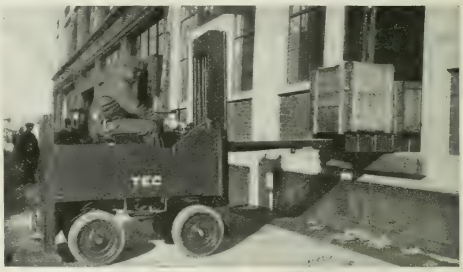
At no-load the hoist operates at 50 ft. per min., and with a 3000-lb. load at 25 ft. per min. The hoisting unit is driven by an inclosed motor of the same type, rating, and frame as those used in driving the truck. The reduction is through worm and gear, the worm and shaft being integral. A solenoid is used to release the brake on the motor shaft and an automatic brake prevents the load from being lowered too rapidly.

It is claimed that the truck will operate effectively in snow and ice conditions, needing no specially prepared runways. The truck is carried on four wheels, which are individually driven, each being provided with a standard vehicle motor. There are three revolving members in the drive unit, consisting of motor shaft, reduction gear and pinion, which are integral, and the wheel itself. The entire unit is grease packed. The reduction gear and wheel rotate on roller bearings, and the motor has ball bearings.

Steering is accomplished by rear wheels only, and the turning radius is 6 ft. 9 in. The rear wheels are equipped with full leaf springs and are each provided with internal expanding type brakes actuating inside the reduction gear member. Brakes are controlled by the operator's foot. An odometer is provided on one wheel to record mileage. The battery is placed over the rear wheel in a special compartment arranged for the purpose, where it acts as a counterbalance for the load and a seat for driver. In addition to the counterbalancing effect thus provided for the load, more weight is attached at the rear of the truck in the form of plate. A coupling device is provided for use when it is desired to use the truck as a tractor.

Census to Speed Up 1923 Statistics

The Bureau of the Census is now engaged in collecting statistics of manufactures covering the calendar year 1923. These statistics are compiled in accordance with the act of Congress of March 3, 1919, and the schedules have been prepared after conference with the associations and others interested in the various industries. The schedules will be mailed to the manufacturers on Jan. 2 and the director of the census is anxious to publish the statistics at the earliest possible date in order that they may be of the greatest possible commercial value. Manufacturers are urgently requested to forward their reports to the bureau at the earliest possible date, preferably before the end of January. The bureau has agreed to tabulate the results as rapidly as the schedules are received and publish the totals within a few days after the receipt of the last report.



Four-Wheel Drive Lift Truck. Absence of small diameter pilot or trailer wheels, permitting freedom of action in traversing obstructions, and close approach to freight car floor, is a feature

If the reports are not made by mail it will be necessary for the Government to go to the expense of sending a special agent to the various establishments. It is to be hoped there will be prompt cooperation.

A report on the port of Philadelphia, including Camden, N. J., Chester, Pa., and Wilmington, Del., prepared in the office of the chief of engineers by the board of engineers for rivers and harbors of the War Department in cooperation with the bureau of research of the shipping board, has been issued. It is No. 4 of a series of reports covering important seaports of the United States. No. 1 on Portland, Me., No. 2 on Boston, and No. 3 on Mobile, Ala., and Pensacola, Fla., have already been issued. The purpose is to present information of value to vessel operators, producers, manufacturers, importers, exporters and all other persons having occasion to ship goods through our ports. A copy may be had for 75c. from the Superintendent of Documents, Government Printing Office, Washington.

Clement K. Quinn & Co., miners and distributors of Lake Superior iron ores, Duluth, Minn., have moved their Cleveland branch office from the Kirby Building to the Union Trust Building. L. E. Ives, sales manager, will continue in charge.

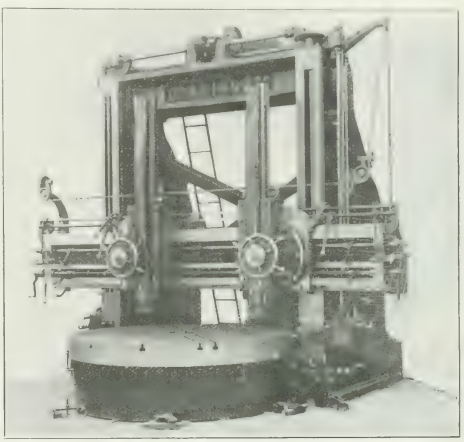
New Massive Boring Mill

An 8-ft. massive boring mill recently built by the Cincinnati Planer Co., Cincinnati, and incorporating special features is shown in the accompanying illustration. Ease of control is emphasized.

The table is driven by a bevel ring gear which is bolted to its under side. The bevel driving pinion is supported on both sides and is a separate unit from the driving gear box. The upper spindle bearing is adjustable to compensate for wear. The driving gear box is simplified to four speeds when used with a variable speed motor but has nine speeds when used with constant speed motor. All gears are of steel and shafts are of high carbon steel running in bronze bushings. The motor is mounted on top of the box and geared to the drive shaft. Levers for obtaining table speed changes have been placed directly at the operator's position.

The housings, which are extra high, are bolted, dowelled and tongued and grooved to the extension and tied together on top by a heavy box arch, thus reducing vibration. A cross brace serves further to stiffen the housings. The heads are of improved design. The capstan hand wheels shown permit of ready feeding by hand and may then be locked. The rams have long bearings and have steel racks bolted to them, which allows for replacement. The feed and rapid traverse are controlled from the side of the head so that when using the head in the center of the table the control levers are within reach. Sensitive handles are also provided to permit of close setting of tools.

The feeds are obtained through an all-steel gear box having eight feeds. This box has a vertical tumbler arrangement which automatically locks itself when placed in position. The rail is raised and lowered by an elevating device having positive clutches and a friction for safety. There is a limit stop that automatically throws out the clutch when the rail reaches maximum height. The cross bracing, arrangement of control levers and capstan handwheels may be noted from the illustration.



Special 8-Ft. Boring Mill. Among other features, the heads are of improved design. The capstan hand wheels shown permit of ready hand feeding

Dayton Foundries Merged

The Advance Foundry Co., Dayton, Ohio, has taken over entire plant and equipment, as well as the entire official and working organization, of the American Foundry & Casting Co., the merger to be known as the Advance Foundry Co. J. M. Green, present sales manager of the American Foundry & Casting Co., will assume the same position with the Advance Foundry Co. Both companies included in the merger have manufactured heavy, medium and light gray iron and semi-steel castings for a period of 25 years. The merger will greatly increase the output of the new company, which recently made extensive additions to the Advance plant. Anthony H. Kramer heads the new company and Alfred W. Schneble is secretary and treasurer.

Cleveland branches of the Westinghouse Electric & Mfg. Co. and the Westinghouse Lamp Co. have consolidated in one building their sales and service departments and their warehouses. A new five-story building, which is called the Westinghouse Electric building is located on Ashland Road and each floor contains 14,500 sq. ft. The executive, sales and clerical divisions are on the top floor. Two floors are given over to the service department and two to warehousing facilities.

Refractories Report for November Rather Unfavorable

Monthly report of the Refractories Manufacturers' Association for November was a rather unfavorable one, showing a substantial decrease in the shipments of both clay fire and silica brick, a considerable increase in cancellations, particularly of silica brick and further gains in stocks on hand, notably of clay fire brick. Net new business decreased as compared with October in both kinds of brick and makers started the last month of the year with the smallest order books they have had in many months.

The figures in 9-in. equivalents for November compare with those for the previous month (figures in parentheses being the percentages to economical monthly producing capacity in those plants reporting) as follows:

November Refractories Statistics

	November	October
Clay Fire Brick		
Capacity reporting	74,339,727	74,212,811
Stock first of month	170,139,089(226)	164,324,610(220)
Production	51,860,352(69)	57,774,841(77)
Shipments	46,535,313(62)	53,316,214(71)
Stock end of month	175,464,128(233)	168,782,237(226)
New orders	44,334,971(59)	45,870,737(61)
Cancellations	1,816,039(2)	602,722(1)
Net new business	42,518,932(57)	45,268,105(60)
Unfilled orders	57,449,846(76)	60,737,806(81)
Silica Brick		
Capacity reporting	22,565,500	22,565,500
Stock first of month	35,210,516(156)	34,473,914(153)
Production	7,887,023(35)	10,024,736(44)
Shipments	7,036,155(31)	9,288,134(41)
Stock end of month	36,161,384(160)	35,210,516(156)
New orders	7,818,602(35)	7,133,529(32)
Cancellations	878,889(4)	55,956(0)
Net new business	6,940,513(31)	7,077,643(31)
Unfilled orders	23,879,332(106)	23,974,974(106)

The stock on hand includes large quantities of shapes made up in advance of the receipt of actual orders and is in no sense "free stock"—that is, it could not be made to apply on new orders.

The actual free stock of 9-in. straights on Nov. 30 was approximately as follows:

Clay fire brick, all grades, 54,264,718 (68 per cent of the monthly economical producing capacity of those reporting.)

Silica brick, 7,923,779 (87 per cent of the monthly producing capacity of those reporting.)

Using Ledger Records for Gaging Credits

Interchanging Through a General Credit Bureau of the Facts of the Financial Relations Between a Buyer and Numerous Sellers

BY C. V. HOWARD*

THERE are many channels through which credit information is available, but one which has enjoyed rapid growth of late years is the service rendered by interchange bureaus giving confidential exchange of ledger experiences between members of the general credit association. All business men, particularly credit men, are interested in securing the means to minimize the bad debt waste so burdensome to honest business.



C. V. HOWARD

The interchange bureau provides tabulated reports which instead of relying on gossip, hearsays, rumors or the debtor's estimation of himself, disclose actual facts, such as "how long sold;" the highest credit extended by each concern reporting; amounts owing; amounts past due, if any; how long past due; dates of last sale; terms of sale; manner of payments; unfilled orders or contracts and other comments which come under a ledger transaction. Information of this character gives an indication of the moral risk.

The reports are easily and quickly read as the experiences are in column formation and it is not necessary to read long paragraphs of typewritten remarks to obtain the real and vital facts. Total amounts owing and past due can be ascertained almost at a glance and the entire report quickly summarized.

*Manager interchange bureau, New York Credit Men's Association, 320 Broadway, New York.

Realizing the necessity for closer cooperation on credit matters among concerns engaged in the iron, steel and hardware industries, the following New York men were factors in bringing about this needed credit reform through the confidential exchange of ledger experiences: J. L. Thompson, Yale & Towne Mfg. Co.; C. E. Thomas, United States Steel Products Co.; F. M. Brodhead, J. K. Larkin & Co.; T. J. Lynch, Concrete Steel Co., and W. H. Siebert, Hammacher, Schlemmer & Co., Inc.

During the past six years a great many business houses in these and other industries have solved their credit problems and saved many thousands of dollars by cooperating with the interchange bureau of the New York Credit Men's Association, which is operated not for profit but for service. At the present time the bureau is serving over 100 different industries many of which are closely allied. The clearance of debtors' names results in an interlocking of information among many trades and produces the strongest possible reports. The reciprocal branch of the service provides a free report for members on each debtor where experiences have been exchanged.

Many benefits are the result that the interchange bureau reports can be revised within three days. They are invaluable in revising accounts, in helping to eliminate the undesirable buyer, and they are valuable when a customer asks for an extension. They give the information and advice of those who know, disclose the accounts that are discounted or paid when due, minimize the bad debt waste, aid in keeping tab on special accounts (a great percentage of which go wrong), keep the credit files alive and right-up-to-the-minute with the latest information, suggest when the customer is overbuying or is buying in other than his legitimate territory, tell whether the customer is paying the new creditor promptly and allowing others to wait, and sometimes disclose that one may be mistaken in the belief that he is the principal creditor. To houses selling small accounts when the agency rating is blank,

PLAYING POLITICS

Radicals Block Organization of Both Branches of Congress

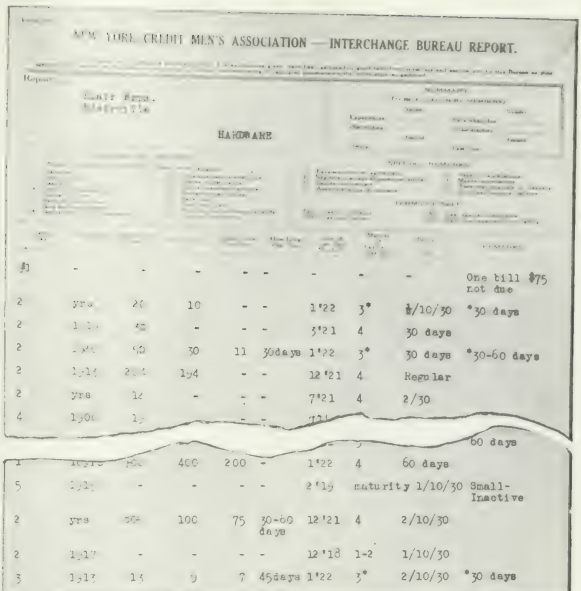
WASHINGTON, Dec. 24.—Recessing on Thursday of last week for the holiday session, Congress so far has lived up to forecasts. It has done nothing but wrangle and play politics. Indications are that this will represent the vast amount of its so-called labors throughout the present session, which is expected to adjourn about the time the Presidential campaign gets under full blast next summer.

The House finally has been organized, but the Senate still is in a stew over the chairmanship of the Committee on Interstate Commerce, a Democrat, Senator Smith, of South Carolina, ostensibly having more strength than his chief opponent, Senator Cummins, Republican, of Iowa. This spectacle of Congress with its various blocs and many quaint ideas and radical agitation, promises to be an extremely expensive one to the country. Not only is the country paying Congress enormous sums for doing nothing constructive, but faces a much heavier penalty by reason of its present attitude of side-stepping important issues. The hope is entertained, however, that pressure can be brought upon Congress to meet the issues squarely and dispose of them in a business-like manner, though the expectation may be entirely too much for achievement. The outstanding issue in this connection at present relates to taxes and the bonus.

While the Administration is absolutely opposed to bonus legislation, there appears to be a majority in Congress, many of them so-called Administration leaders, who insist that bonus legislation will be enacted even in the face of a veto by President Coolidge. At the same time, this majority is insisting that taxes be reduced.

Indications are that there will be a so-called tax reduction as it affects normal taxes and perhaps along the lines suggested by Secretary Mellon. But it is seriously doubted that surtaxes, which rest so heavily on business, will be cut. Even reduction of normal taxes will be theoretical, it has been pointed out, if the bonus legislation is to be enacted, because, obviously, the bonus will require not only the full Treasury surplus as it is accumulated, but will require enormous sums to cover the bond issue that would be necessary.

Secretary Mellon in a letter addressed last week to Representative Andrew on the cost of the bonus bill vetoed by President Harding declared that the total



NEW YORK CREDIT MEN'S ASSOCIATION — INTERCHANGE BUREAU REPORT.

HARDWARE

$5	-	-	-	-	-	-	-	-	One bill $75 not due
2	yrs	20	10	-	-	1'22	3*	1/10/30	*30 days
2				-	-	3'21	4	30 days	
2			30	11	30days	1'22	3*	30 days	*30-60 days
2			194	-	-	12'21	4	Regular	
2	yrs	1c	-	-	-	7'21	4	2/30	
4				-	-				60 days
1			400	200	-	1'22	4	60 days	
5		-	-	-	-	2'19	maturity	1/10/30	Small-Imotive
2	yrs		100	75	30-60 days	12'21	4	2/10/30	
2		-	-	-	-	12'18	1-2	1/10/30	
3				7	45days	1'22	3*	2/10/30	*30 days

This is a completed report showing what the inquiring member received as a result of the inquiry. All other interested members received free of charge a complete copy of the report in exchange for their experience.

How the Credit Information Is Compiled and Made Available to All Supplying the Data Is Here Shown. The cut is a reproduction at a reduced scale of the blank used by the New York Credit Men's Association

or less than $500, the reports are valuable. The cost of several years' dues in the bureau may be saved by one reciprocal report for which there is no charge.

The service of the interchange bureau, the foundation of which is cooperation, reduces to a minimum the details of gathering credit experiences on a debtor. Petty jealousies between competitors have been swept aside. The old days of secrecy in regard to accounts have passed Actual ledger experiences are confidentially given in detail.

---

direct cost of that proposed bonus would be $5,085,833,687, and an average for the first four years of over $250,000,000 annually. There are active plans under way to revive this identical measure.

"It must be obvious to any impartial mind that a new obligation of the United States made in time of peace to pay over $5,000,000,000, of which $1,000,000,000 comes in the first four years, and an average drain on the Treasury for 20 years of $211,000,000 a year, which is one-fifth of the total pre-war cost of Government, cannot be undertaken without serious economic consequences," said Secretary Mellon. "If such a commitment is made, any reduction of Federal taxes upon a comprehensive plan will probably not be seen in this generation."

In the face of the unanswerable arguments of Secretary Mellon showing the stupendous burden that the bonus would place not only upon the present generation, but upon posterity as well, a politically made Congress still is rushing forth to saddle this crushing load upon the country. It is evident that the members of the Ways and Means Committee of the House now considering tax revision are trying to find some magical means of providing a bonus and a tax reduction at the same time, and endeavoring to lead the country into the belief that payment of the bonus would not be felt.

It is expected that the Ways and Means Committee will make a report by Jan. 10 on the administrative features of the new tax bill, after which bonus legislation is expected to be taken up, thus being given precedence over any so-called tax reduction program. One of the discussions made regarding the administrative features relates to proposed changes in the capital assets feature of the present tax laws by which gains on capital transactions, including stock dividends, would be taxed under the income provision rather than on the present basis of 12½ per cent on capital gains.

Treasury experts have been asked to work out the proposed change. Day to day meetings will be held by the subcommittee of the Ways and Means Committee to consider technical features while Congress is in recess.

Compressed Air Trade Standards

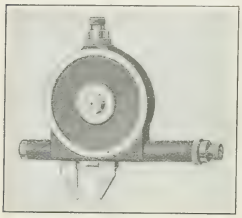
In a pamphlet of 40 pages, the Compressed Air Society publishes the results of extended study and research on standards for compressed air equipment. This includes not only nomenclature and terminology but questions of compressor speeds, standard capacities and pressures, installation and care of compressors, cleaning the intake air, lubrication and standards of practice in compressor testing.

Optical Gear Tooth Micrometer

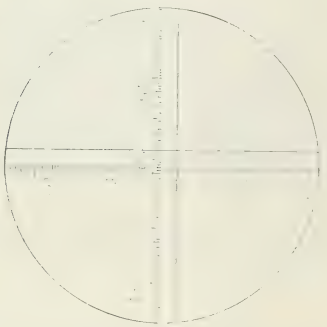
The optical gear tooth micrometer illustrated, which is being manufactured by Carl Zeiss, Jena, Germany, has been placed on the American market by George Scherr, 143 Liberty Street, New York.

The instrument permits of direct reading by scale of chordal thickness on the pitch line and the addendum of a gear tooth. The graduation of the scale is sharply defined and magnified a thousandth part of an inch appearing to the eye as large as one-sixteenth of an inch to the naked eye. Quick adjustment to within one-thousandth of an inch by the scale is a feature, and one-ten-thousandths may be conveniently estimated between graduations.

In setting, the instrument is held closely to the eye and by looking through the small aperture in the center



Optical Gear Tooth Micrometer. The instrument may be quickly set to exact chordal thickness and addendum. The scales engraved on the glass are shown below



two well-defined scales engraved on glass are seen, one of the scales running vertically, the other horizontally through the center of the field, as shown in the illustration. The scales are moved by turning the micrometer screws until the two measurements required, thickness of tooth on the pitch line and the addendum, are indicated. The measuring jaws of the micrometer are then set and the instrument is ready for use.

Cutters, gages and forming tools for producing the latter may also be checked. The range of the instrument is from 18 to 1½ diametral pitch. The weight is 1 lb.

Holiday Quiet in the Connellsville Region

UNIONTOWN, PA., Dec. 24.—With little increase in coal production in the Connellsville region, coke output is remaining about stationary, a gain of only 2000 tons being shown in combined furnace and foundry interests for the week ending Dec. 15 over the preceding week. Generally speaking, contracting for the first quarter or half of the new year is not being done. A 27,000-ton coke contract is reported from one plant without price being divulged, although it is understood that the figure was around $4.50. One other large corporation is understood to have contracted for a large portion of its capacity for the first quarter in coke and coal, but aside from this few such orders have been entered. The general tendency on the part of the independent coke operators is to withhold entering into contracts for the first quarter.

Absence of an unusual pre-Christmas buying to protect consumers over the holiday's slump tended to soften the market during the week.

The Frick Coke Co. plants operated six days this week as a bonus to employees, the company having been operating four and five days a week for several months.

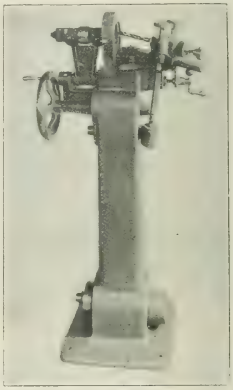
One plant of considerable size in the region took on an order covering operation for the month of December, the price representing cost, in order to give employees work during the month in a spirit of Christmas.

Drill Pointer for Two Flute Drills

A new machine for grinding drills, designated as the No. 2 drill pointer, having a range from No. 60 to ½ in. two flute drills has been added to the line of the Oliver Instrument Co., Adrian, Mich.

As in the company's larger machines, the drill point is produced automatically by passing the wheel across the point of the drill while the drill is turning and at the same time feeding the wheel into the drill by means of a cam and spring, uniformly increasing the angle of point clearance as the web of this is approached. The duty of the operator is merely to set the drill in the correct relation to the setting gage. Only one setting is required for grinding both lips, both being of the same length.

The arrangement of parts of the machine may be noted from the illustration. The grinding wheel is driven by a ¼-hp. 1750-r.p.m. motor located in the base of the machine. The mechanism is operated by means of a hand wheel on the crankshaft. The pulley, pinion, gear and clutch of the full power driven machines are omitted, and the machine is simplified by the omission of the nest of change gears and shifter mechanism required in the No. 4 and No. 5 models, which are for grinding three or four-fluted drills.



Automatic Drill Pointer for Grinding Two-Lipped Drills. The capacity is for No. 60 to ½ in. inclusive

The machine is designed with a universal or swivel carriage which permits grinding of drills to any point angle desired. The standard equipment includes the driving motor, a large and small bushing holder and a V rest for supporting the end of the drill, a No. 3 Jacobs Chuck, a No. 1 and 2 Morse taper sleeve and a wheel truing device. Height is 50 in., size of base 17 x 18 in. Weight with standard equipment is 315 lb.

Domestic sales of oak leather belting reported for November by the Leather Belting Exchange, representing about 60 per cent of the total product, amounted to 347,202 lb., valued at $642,324, or an average of $1.85 per lb. This compares with 447,264 lb., $827,438 and $1.85 in October and with 467,816 lb., $826,164 and $1.77 per lb. in November a year ago.

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 317 West Fort St. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Contracts and Orders in Steel

A REFORM that was unsuccessfully urged as a proper subject of united effort and has now occurred without such effort is not without interest. At intervals it used to be urged that the steel industry should make its sales contracts binding instead of leaving fulfillment to the preference of the buyer. The so-called contracts were denominated "accordion contracts," "jug-handled contracts," "option contracts" and the like. All this was only a few years ago. At one time the matter came before the American Iron and Steel Institute and a committee was appointed to formulate a method of bringing about a reform.

What was sought, chiefly, was means whereby the contracts as they were then made could be enforced against the buyer, who, according to the usual practice, could ignore the contract by refraining from specifying, and this he did when it suited him; in other words, when the material could be bought in the open market at less than the contract price. If the mill holding the contract elected to meet the outside price, as was often the case, it was merely selling the material a second time. It was not enforcing the contract.

Inasmuch as buyers did not, as a rule, take out their full contract tonnages, it was the custom of mills to oversell. If it was estimated the buyer would specify two-thirds of his tonnage, the mill endeavored to oversell by 50 per cent. Then it would break even. When the market advanced, the buyer was likely to specify in full. Then the mill fell behind in deliveries. The buyer received all the steel he currently needed, with low-priced tonnage still coming to him, and was safe in piling additional specifications on the mill. In times of great activity, market reports were full of statements as to how far "behind" mills were in making deliveries, and there were cases when the period ran to six months.

All this may sound like ancient history, but it is by no means ancient by the count of years. When reform was talked of, what the mills seemed to want was means to enforce these same contracts in a falling market. There was little inclination to recognize the point that the difficulty lay not in the terms of the contract nor in the practice of permitting the customer to evade, but in the making of the contracts. One should not expect to be able to make contracts so far ahead. The mills were afraid not to contract ahead, lest their competitors should get their business, and while they did not say so they no doubt felt that the existence of these contracts would help to sustain prices, for should a mill cut prices it would thereby invalidate its large contract tonnage.

Through the influence of the experience in Government control of the market during the war, the scarcity of steel in 1920 and a general accretion of courage, the steel mills have very largely reformed their practice, without any concerted effort. Contracts are still made, but they are only for short periods. In general, the farthest forward deliveries are for construction jobs, where the price has always been a firm one.

The steel industry has not lost in strength and stability by this change. It has gained. Its prosperity must run with the activity and prosperity of its customers and not by phrases in contracts or by taking customers into court. The various competitors have as much desire to maintain prices as they had when the jug-handled contract was in full sway.

How to Kill the Bonus

THE two great English-speaking nations now find themselves in the same position as to government, for in neither case is there a party with a clear majority upon which it can depend. This condition often results in inefficiency and confusion. This will probably be true in England, and the prospects at Washington are far from being clearly defined. From some recent maneuvers it would appear that party advantage will be a chief objective; hence more than a possibility of a stalemate on some important measures.

The business interests of the country have much to be thankful for, especially for the courageous declarations of President Coolidge in opposing the bonus and favoring the Mellon plan of reducing taxation. At present the supporters of the bonus have a clear majority in the House, while in the Senate the vote will probably be very close. The attitude of several Senators whose position is not definitely known promises to settle the question whether the bonus will be passed

and taxes remain substantially as they are or the bonus be defeated and taxes reduced so as greatly to relieve the taxpayers of the country. Secretary Mellon has pointed out that his plan would result in a reduction of the income tax not only for the 7,000,000 income taxpayers but for the entire 110,000,000 people in the United States. His forecasts made in previous reports that high taxes would drive capital out of business productive of revenue to the Government are being fulfilled in the progressive diminution in the number of taxable incomes in excess of $300,000.

The action taken by the Ways and Means Committee of the House a few days ago shows that even in that branch of Congress the effect of public opinion in opposition to the bonus is being felt, for it was decided to take up consideration of the Mellon plan as to administrative features before considering the so-called "adjusted compensation" bill.

If the people of the United States agree with President Coolidge in opposing war taxes in time of peace, they will make that fact known to their representatives in Congress, particularly their Senators. Emphatic and continued expression of disapproval of the bonus and of approval of tax reduction cannot fail to have its effect upon the action of Congress.

If the people of the country are heard from vigorously, the expected veto of the bonus will not be over-ridden. It seems trite to advise writing to Congressmen, but seldom has there been a time in all our history when the opportunity of the voters to use their influence has been so clear-cut or the duty to do so more imperative.

Tax Reduction

THERE ought not to be any argument respecting Secretary Mellon's proposal to reduce income taxes. Our present high taxes are a misfortune. The ability to reduce them is a blessing. All should want to enjoy it and we think everybody does.

Opposition to this benign measure can reflect nothing but selfish interests, such as the wish of politicians to enhance themselves by taking money from some people and giving it to others, by appropriating it for pork barrel purposes, and by squandering it miscellaneously; or the wish of disgruntled people to concentrate the expense of government upon a relatively small class of taxpayers.

Our existing system of Federal taxation, which was framed hastily during the stress of war, is gravely faulty and economically harmful. Its greatest evil is in the sharply increasing surtaxes. In the emergency of war the rich were reasonably required to give to the nation a large part of their income that they did not need. In peace, when there is no longer the exigency of national salvation, the question is not whether the rich can afford to pay, or whether they ought to be soaked just because they are rich, but rather is it whether the people ought to continue a system that is so harmful to themselves as a whole. The harmfulness is so clear that there ought not to be need to point it out.

The surplus income of the rich goes normally for constructive uses that are of benefit to everybody. If it be taken away from them by the Government it is bound to be squandered to a large extent. The maximum evil would appear in taking it away from them and distributing it to another class of people, like the ex-soldiers, as a bonus. Even the possibility of committing such economic crimes is but ephemeral, for with destruction of the incentive to create a surplus income there would sooner or later cease to be any. These arguments are not academic, but are distinct reflections of what actually has been happening.

There reasonably may be discussion of the manner by which Secretary Mellon proposes to make the reductions. The proposed abolition of what are called nuisance taxes is generally approved. Yet those taxes, which partake of the nature of a sales tax, are in theory rather commendable. To a considerable extent their payment is optional, to a considerable extent they fall on luxuries, and their collection is not difficult. The plan for the reduction of income taxes is eminently fair. According to it amelioration is spread among all classes of taxpayers in a well-equalized manner. We believe that it would be economically beneficial to make even greater reduction in the surtaxes, especially on earned incomes, and to introduce measures for the collection of taxes from many wage earners who now escape.

However, the recommendations of Secretary Mellon, which are those of an expert, are probably far better than anything that Congress is likely to be able to evolve, and we hope that there will not be too much tinkering with what is essentially a good plan. Tax reduction ought to be effected by Congress in short order and as a nonpartisan measure. That is, perhaps, too much to hope from the hands of politicians, but Secretary Mellon's proposal has so captured the popular imagination that the politicians will need to watch their steps. The people may not be able to understand our complicated economic problems, but there is not one of the millions of income taxpayers who does not know what it means to be requisitioned less severely and who does not like the idea, and who does not want it to be consummated quickly.

Pig Iron and Steel Production

THERE is a remarkable difference between the respective tonnages of pig iron and steel ingots produced this year and last. The statistical comparison is that pig iron production increased 48 per cent from 1922 to 1923, while the production of ingots increased only 25 per cent. The relation for a series of years is shown in the following table:

	Pig Iron Gross Tons	Steel Ingots Gross Tons	Excess Ingots Over Pig Iron Per Cent
1918	39,434,797	41,401,917	5.0
1917	38,621,216	43,619,209	12.9
1918	39,054,644	43,051,022	10.2
1919	31,015,364	33,694,795	8.6
1920	36,925,987	40,881,392	10.7
1921	16,688,126	19,224,084	15.2
1922	27,219,904	34,568,418	27.0
1923	40,250,000	43,000,000	6.8

Reference to statistics of pig iron production by grades shows that the wide variations shown

in the above table are not due to activity at foundries varying out of line with activity at steel mills. In 1918 there was a little more activity at steel mills than at foundries, due to the special requirements of the war. The normal for the present and the recent past may be read from the table at 10 to 12 per cent excess of ingot tonnage over pig-iron tonnage, and the higher percentage in 1921 does not count particularly, as both tonnages were small.

It is plain, therefore, that the high relation of steel ingots to pig iron in 1922 was altogether exceptional. The cause, of course, was the great coal strike, which made coke very scarce. The consumption of scrap in steel making in 1922 must have been very large, for there is at least 4,000,000 tons of extra ingot production to be accounted for. All stocks of pig iron were exhausted, but the stocks at the beginning of 1922 cannot have been large.

Imports of pig iron in 1922 were insignificant, relative to the tonnage of steel to be accounted for. Some pig iron previously bought came in during the first three months of 1923, but added only a trifle to the apparent excess of pig-iron supply in 1923, when pig iron ran rather high relative to ingots. That stocks of pig iron are considerably higher now than at the beginning of the year is well known.

It is made plain, in the retrospect, that the steel industry can in an emergency gather together a large tonnage of scrap. Just where it all comes from no one can say. There was no very remarkable advance in scrap prices during 1922, relative to prices of billets or finished steel products. Along this same line, when prices of scrap last August, September and October were at particularly low levels, the offerings were light. Scrap was being held back for better figures. Apparently there will normally be a large reserve of scrap to fall back upon when it happens to be particularly needed.

CORRESPONDENCE

When Welding Fails

To the Editor: The average firm using welding for production has long recognized the importance of ideal welding conditions, but the average foundry or factory which uses welding to reclaim broken parts or save defective castings certainly should see that their foreman investigates more thoroughly the application of welding to their various problems.

In the average plant of the last-mentioned class we usually find the welding in charge of the shop foreman or master mechanic. He is usually well educated in problems of every sort except welding. Welding as a rule is forced upon him; the firm buys an outfit and hires a welder, and of course the welder has to recognize someone in authority as boss, so the master mechanic or the shop superintendent automatically assumes the rôle.

Welding is new to him, and if he happens to get a good welder for the first one he readily sees that remarkable things can be accomplished. He accepts this result as a matter of course, rarely stopping to think or reason why. The fundamentals such as fusion, neutral flames, fluxes, pressures, selection of tips, proper care of regulators and torch, the expansion and contraction, the cause of a hard cast iron weld, and many other things which enter into the work, are never grasped by him.

This state of affairs usually goes on until some unusual job comes up for which the welder needs some special equipment, such as firebricks, flux, special wire, or charcoal, or any one of the many things that are often needed. The "boss" knows nothing of the vital importance of these things and tells the welder he can get along without them. The welder has two courses he can follow. He can go ahead and spoil the job, or he can quit. A good welder will usually quit rather than tackle a job he knows he is not equipped to handle. Of course some other welder is usually hired who will tackle the job thinking only of his "so much an hour," and thus add another failure against the process of welding.

I am going to cite three little instances that were recently brought to my attention, to illustrate my point.

A certain large firm ran into a small aluminum proposition that needed some small shrinkage cracks and blowholes welded, so they bought equipment and expected a man to successfully weld the small castings on a barrel out of doors. Another concern wanted some wrongly machined castings built up to size, and offered the welder no chance to preheat them, then found fault because the welds were hard. Another firm had a cast iron pot to be welded, the welder preheated the pot, and after welding carefully covered it over to prevent shrinkage cracks. After the welder had gone out to some other part of the plant to another job, the shop foreman, who was in a hurry for the pot, uncovered it and allowed it to cool too quickly and then found fault with the welder who did the job because it cracked. These three instances show how little the average man in charge of a shop knows about welding.

A firm which expects to get the most out of its welding should first get the services of a first class experienced welder and then realize that the welder needs all the help and cooperation he can be given. The welder knows his needs and will not ask for anything that is not necessary. Today nearly any public library has many books and magazines on the subject of welding, and every man who is responsible in any degree for the success of welding in his shop should equip himself with a reasonable knowledge of the art of welding.

Welding associations and manufacturers of welding equipment are today trying hard to send into the field high grade, intelligent welders, equipped with all the proper knowledge to produce good welds, but after obtaining this knowledge it avails them little if the firms for whom they work do not do their share toward helping them in every way to carry out the theories so essential to a successful weld. R. K. RANDALL.

Cleveland School of Technology, Y. M. C. A., Cleveland.

Molders in Stove Plants Granted Advance in Wages

An increase of 10 per cent in wages of stove molders has been granted by the membership of the Stove Founders' National Defense Association, following the conclusion of negotiations at Atlantic City with the officers of the International Molders Union of North America. The new wage scale goes into effect Jan. 1. The settlement was in the nature of a compromise, the molders having asked for an increase of 20 per cent, with a minimum day rate of $8. The 10 per cent advance brings the minimum rate for day workers to $7.25 for eight hours.

At St. Louis notice has been served on the Contracting Lathers' Association by the Wood, Wire and Metal Lathers' Association that beginning April 15 the wage scale will be for wood lathers, $10 per 1000 laths, instead of $8, at present, and $15 a day for metal lathers, instead of $11. Wood lathers nail from 1300 to 1500 laths a day, and the new scale would yield them $13 to $15 a day.

British Iron and Steel Market

Pig Iron Firm but Quiet: Steel Strong Ruhr Resumption Very Slow £1,000,000 Welsh Tin Plate Selling Corporation Formed

(By Cable)

LONDON, ENGLAND, Dec. 24.

Pig iron is quieter, owing to holidays, but the market's close was firm. The output has been increased further, Pease & Partners, Ltd., having blown in two hematite furnaces. The total number of Cleveland furnaces of all kinds now operating is 48. Hematite is strong, with an upward price tendency.

Steel is strong on increased domestic buying, though the tendency of some consumers is to await the Ruhr developments. Plate rollers have good orders on hand.

Continental markets are weak, but the position is difficult to gage, owing to a general reluctance of overseas buyers to commit themselves to forward contracts and the uncertain position of the works' order books.

In the Ruhr the resumption of operations is proceeding very slowly. Gutehoffnungshütte has two furnaces (out of eleven) now blowing. Friedrich Krupp, A. G., has two units (out of ten) blowing at Rheinhausen. Hoesch Eisen & Stahlwerk, Dortmund, is starting two furnaces shortly (out of seven). Rheinische Stahlwerke (six furnaces) and Phoenix, A. G. (eighteen), still are idle.

At the Thyssen plants two furnaces and the thin sheet mill are operating. The Bochumer Verein is making a start with a small labor force. Owing to the introduction of the 10 hr. day the works will not require all of their previous workers.

Tin plate is firm, with good business still passing, both domestic and for export. Oil plates are quiet, as buyers previously have purchased up to June.

A Welsh tin plate corporation is being formed with a capital of £1,000,000 ($4,866,500 nominal; $4,340,000 now) to absorb a number of tin plate merchant firms and handle the output of Richard Thomas & Co., Ltd., Swansea, Grovesend Steel & Tin Plate Co., Ltd., Gorseinon, W. Gilbertson & Co., Ltd., Glamorgan, and other works. This is the outcome of efforts of W. J. Firth to consolidate the works as against the merchant houses and wipe out the middlemen. The merchant firms absorbed include W. J. Firth, London; S. J. Burrell Prior, Ltd., London; Cyril W. Maggs & Co., London; Phillips & Hill, London; F. S. Candelin & Co., London; McLean, Connor & Co., Kennedy, Berry & Co., Ltd., London, and Wedekind & Co. Capital was provided by the works contributing £2,500 per mill.

Galvanized sheets are weak on poor demand.

Black sheets are firm but demand is sluggish. The works are well sold ahead.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.34 per £1, as follows:

Durham coke, delivered	£1	18½	to	£1	19s.	$4 14s. to $4 46
Bilbao Rubio ore	1	1				21
Cleveland No. 1 foundry	2	6½				23 11
Cleveland No. 2 foundry	2	6				23 11
Cleveland No. 4 foundry	1	19				23 46
Cleveland No. 1 forge	1	18				23 25
Cleveland basic	1	18				23 10
East Coast mixed	2	2½	to	2	3½	24 16s. 24 46
East Coast hematite	1	19	to	2	0	23 18s. 24 70
Ferromanganese	12	0				73 18
Ferromanganese*	12	0				73 18
Rails, 60 lbs. and up	8	15	to	9	15	37 97 to 42 31
Billets	8	5	to	8	15	35 86 to 37 97
Sheet and tin plate bars, Welsh	8	18¾				38 79
Tin plates, base box	1	3¾	to	1	4¼	5.15 to 5.26
						C. per Lb.
Ship plates	9	15	to	10	5	1.53 to 1.59
Boiler plates	13	0	to	13	10	2.52 to 2.62
Tees	10	0	to	10	10	1.94 to 2.03
Channels	9	5	to	9	15	1.79 to 1.89
Beams	9	0	to	9	10	1.74 to 1.84
Round bars, ¾ to 3 in.	10	10	to	11	0	2.03 to 2.13
Galvanized sheets, 24 g.	18	10	to	18	15	3.58 to 3.63
Black sheets, 24 gage	14	0				2.71
Black sheets, Japanese specifications	15	5				2.95
Steel hoops	12	10	&	12	15*	2.42 & 2.47*
Cold rolled steel strip, 20 gage	17	12½				3.42
Cotton ties, Indian specifications	15	0				2.91

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Nominal)

Foundry pig iron:						
Belgium	£4	13½s.	to	£4	15s.	$20.29 to $20.61
France	4	13½	to	4	15	20.29 to 20.61
Luxemburg	4	13½	to	4	16	20.29 to 20.61
Billets (nominal):						
Belgium	6	2½	to	6	7½	26.58 to 27.67
France	6	2½	to	6	7½	26.58 to 27.67
Merchant bars:						C. per Lb.
Belgium	7	5	to	7	15	1.40 to 1.50
Luxemburg	7	5	to	7	15	1.40 to 1.50
France	7	5	to	7	15	1.40 to 1.50
Joists (beams):						
Belgium	6	15	to	7	2½	1.31 to 1.38
Luxemburg	6	15	to	7	2½	1.31 to 1.38
France	6	15	to	7	2½	1.31 to 1.38
Angles:						
Belgium	8	0	to	8	5	1.55 to 1.60
⅛-in. plates:						
Belgium	7	17½	to	8	2½	1.53 to 1.57
Germany	7	17½	to	8	2½	1.53 to 1.57
¼-in. plates:						
Luxemburg	7	17½	to	8	2½	1.53 to 1.57
Belgium	7	17½	to	8	2½	1.53 to 1.57

New Trade Publications

Flexible Couplings.—Smith & Serrell, Central Avenue and Halsey Street, Newark, N. J. A 32-page catalog devoted to Francke flexible couplings for direct-connected machines of all descriptions. These couplings are made entirely of metal and for any size, speed or power which may be desired. They were first used in 1910 for small steam turbine drives and have been subject to development and standardization since that date. Among the uses illustrated in the catalog are connections between motors and rubber calender machines, a steam turbine connection driving equipment at both ends of the shaft, machine tools, circulating pumps, steel mill drives, fans, air compressors, generators, ball and tube mills, oil pipe lines, hoists and mine pumps, marine engines, etc. The catalog gives dimensions of various sizes designed for various purposes, together with diagrams, sections, etc., to illustrate connections.

Handbook of Conveyor and Elevator Belting.—Goodyear Tire & Rubber Co., Inc., Akron, Ohio. A 64-page handbook in flexible cover outlining principles of design and operation applying to belt conveyors and to belt elevators, separately. The information covered is based on practice and years of experience. Many illustrations are given showing types of equipment and applications to industries of various kinds. Questions of belt stretch, take up, loading, joints, inclines, lubrication, etc., are handled, one after the other, with such design items as belt tension, number of plies, etc., for handling specific conditions.

Burning Fuel Oil.—Mahr Mfg. Co., Minneapolis. 16-page pamphlet devoted to the correct method of burning fuel oil and dealing with different types of atomizers, the high temperatures obtained with the closed combustion type burner and methods of venting the furnace. Different types of furnaces are considered, together with the refractory lining. Finally, there is discussion of oil consumption and the cost per ton of castings annealed and the cost of heating rivets.

New Books Received

Eleventh Annual Report of the Secretary of Commerce, 1923. Pages 235, 6 x 9 in. Published by the Government Printing Office, Washington. Price, 20c.

Lehrbuch der Eisenhüttenkunde. By Dr. Bernhard Osann. Pages 923, 6½ x 9¼ in.; illustrated. Published by Verlag von Wilhelm Engelmann, Leipzig, Germany. Price, bound, 32 gold marks; unbound, 29 gold marks.

Labour in the Coal-mining Industry. By G. D. H. Cole. Pages 274, 6¾ x 10 in. Published by Oxford University Press, 35 West Thirty-second Street, New York. Price, $2.50.

Iron and Steel Markets

BUYING BROADENED

Holiday Shutdowns Mark Year End

Semi-finished Steel Contracts—Price Situation Strengthened—Foreign Competition

Further buying, broad in scope if not great in quantity, marked the week. Sales usually were not at expense of prices, but indications still are that buyers see no protection in contracts and cover only for closely estimated requirements.

Steel making output may taper off in the remainder of the year, as numbers of rolling mills, taking advantage of the satisfied demand for immediate deliveries, are employing a part or all of the holiday period to make repairs. At that, the production of steel ingots for 1923 seems likely to exceed 43 million tons, and the pig iron make will be a record at over 40 million tons.

The idea of price firmness has spread to semi-finished steel, first quarter contracts in rerolling billets at the $40, Pittsburgh, price being reported. One Middle Western sheet bar producer has so heavily booked for the quarter that it has withdrawn from the market. Some of the sheet bar business provides for prices obtaining at the time of shipment. Forging billets alone seem not definitely strong at $45, because obtainable from more mills than usual.

Sheet buying has been notably heavy. December orders of independent makers are estimated in excess of 300,000 tons, but it is not yet clear that price shading has disappeared.

In tin plate, following a record output of 40,000,000 boxes for 1923, the leading producer is solidly committed against its maximum production for the first half of next year and the position of the independents is almost as favorable.

The outstanding structural steel activity is shown by awards of 26,000 tons, including 8650 tons for bridge work. Fresh inquiries amount to 37,000 tons, including 11,000 tons for the Chicago Tribune tower and 6050 tons for assembling plants for the Ford Motor Co. November bookings of fabricated steel, according to Census Bureau statistics, amounted to 135,000 tons, better than the average for the six months preceding and 10 per cent more than November of last year.

Railroad equipment business was lean, 1225 cars being the total of purchases, an equal number the total of inquiries and none taking much steel. Bids are now all in on the Southern Pacific cars, requiring some 100,000 tons of plates, shapes and bars. The New York Central has distributed 30,000 tons of tie plates and 25,000 kegs of track bolts.

The appearance of inquiries for a considerable tonnage of pig iron from speculative sources, including 10,000 tons understood to come from New York banking interests, is accepted as evidence of belief that prices have touched bottom. Some pig iron bought recently by brokers is being sold at concessions and a sale of 10,000 tons of basic by a steel company in western Pennsylvania was made below recent Valley quotations, but for the most part prices are firm and deliveries are going forward satisfactorily. A St. Louis buyer has asked for earlier shipment of 5000 tons bought for first quarter delivery. A Canton, Ohio, company has purchased 5000 tons of basic.

German No. 1 foundry pig iron, now at 116 gold marks per metric ton, is in American currency $28.05 per gross ton, comparing with $23.30 for British iron and $22.75, the foundry component for THE IRON AGE pig iron composite price.

Eastern plate makers are confronted by European competition. An Atlantic Coast ship and car builder finds a 2c., Pittsburgh, price necessary to meet a foreign mill quotation on 2700 tons of car plates. This is a big gap from the $2 a ton concession occasionally met from the 2.50c. price.

Hot-rolled flats and cold-rolled strips are well sold into the first quarter, and the steel bar market has been enlivened by a number of first quarter sales to makers of shafting and cold-finished bars.

Bolts, nuts and rivets give a sign of the changing price sentiment, Pittsburgh reporting more freedom of movement than when prices were lower.

Current demand in nails is sufficiently heavy to make it difficult to build up stocks for spring demand.

A Welsh £1,000,000 tin plate selling corporation has been formed, absorbing eight tin plate merchants, with the idea of wiping out the middlemen. It will handle the output of three or more of the large works.

For the South Manchuria Railroad 200,000 tie plates have been placed in the United States.

No change has occurred for several weeks in either of THE IRON AGE composite prices, the pig iron composite standing at $21.88, while finished steel is 2.775c. per lb. One year ago pig iron was $25.79 and finished steel 2.439c.; two years ago, $18.68 and 2.062c.

Pittsburgh

Marked Change for the Better—Sheet Orders Heavy—Tin Plate Prospects Bright

PITTSBURGH, Dec. 24.—The closing week of the year finds the steel industry in a cheerful mood, because the past ten days have been marked by an appreciable change for the better in business and there is increased evidence that consumers are abandoning ideas of lower prices in the near future. Sheet orders lately have been in the heaviest volume since the early part of the year and it is now expected that the December orders of independent makers will be close to, if not actually in excess of, 300,000 tons. The American Sheet & Tin Plate Co. also has felt the betterment, notwithstanding that its prices are somewhat above those of most independent producers.

It is doubtful whether tin plate prospects ever before were brighter than they are now. The leading producer is solidly committed against its maximum production over the first half of 1924 and the position of independent companies is almost as favorable. Incidentally, this year will establish a record production of tin plate, with an output of close to 40,000,000 boxes. Wire products are being booked in greater volume than recently. Makers of hot-rolled flats and of cold-rolled

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 24, 1923	Dec. 18, 1923	Nov. 27, 1923	Dec. 26, 1922
No. 2X, Philadelphia†	$24.26	$24.26	$24.14	$28.76
No. 2, Valley furnace†	22.00	22.00	22.00	27.00
No. 2, Southern, Cin'ti†	25.05	25.05	25.05	27.05
No. 2, Birmingham, Ala.†	21.00	21.00	21.00	23.00
No. 2 foundry, Chicago*	23.00	23.00	23.00	28.00
Basic, del'd, eastern Pa.	23.25	23.25	22.75	26.75
Basic, Valley furnace	21.00	21.00	21.00	25.00
Valley Bessemer, del P'gh	24.76	24.76	24.76	29.27
Malleable, Chicago*	23.00	23.00	23.00	28.00
Malleable, Valley	20.00	20.00	20.00	27.00
Gray forge, Pittsburgh	23.26	23.26	23.26	28.27
L. S. charcoal, Chicago	29.15	29.15	28.15	33.15
Ferromanganese, furnace	109.00	109.00	107.50	100.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. billets, Pittsburgh	40.00	40.00	40.00	36.50
O.-h. sheet bars, P'gh	42.50	42.50	42.50	36.50
Forging billets, base, P'gh.	45.00	45.00	45.00	42.50
O.-h. billets, Phila.	45.17	45.17	45.17	43.17
Wire rods, Pittsburgh	51.00	51.00	51.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.35	2.35	2.35	2.00
Light rails at mill	2.25	2.25	2.25	2.10

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.62	2.62	2.67	2.275
Iron bars, Chicago	2.40	2.40	2.40	2.35
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	1.95
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.29
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.34
Steel hoops, Pittsburgh	3.00	3.00	3.00	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Dec. 24, 1923	Dec. 18, 1923	Nov. 27, 1923	Dec. 26, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.	4.90	4.90	4.85	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.50	$20.00	$18.50	$24.50
Carwheels, Philadelphia	19.50	19.50	18.50	20.00
Heavy steel scrap, P'gh	19.00	19.00	16.50	20.00
Heavy steel scrap, Phila.	17.50	17.00	15.50	17.00
Heavy steel scrap, Ch'go.	17.25	16.50	14.50	17.75
No. 1 cast, Pittsburgh	21.50	19.50	19.00	22.50
No. 1 cast, Philadelphia	21.00	20.00	20.00	21.00
No. 1 cast, Ch'go (net ton)	20.00	20.00	19.00	20.50
No. 1 RR. wrot. Phila.	19.00	18.50	18.00	20.00
No. 1 RR. wrot. Ch'go (net)	16.00	15.50	13.00	16.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$8.00
Foundry coke, prompt	4.75	4.75	5.00	8.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.25	14.75
Electrolytic copper, refinery	12.87½	12.87½	12.87½	14.50
Zinc, St. Louis	6.25	6.20	6.37½	6.95
Zinc, New York	6.60	6.55	6.72½	7.30
Lead, St. Louis	7.75	7.60	6.70	6.97½
Lead, New York	8.00	7.75	7.00	7.30
Tin (Straits), New York	47.30	47.25	47.00	39.00
Antimony (Asiatic), N. Y.	10.25	9.00	9.00	6.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 24, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Dec. 18, 1923,	2.775c.
Nov. 27, 1923,	2.775c.
Dec. 26, 1922,	2.439c.
10-year pre-war average,	1.689c.

Composite Price, Dec. 24, 1923, Pig Iron, $21.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago Philadelphia and Birmingham

Dec. 18, 1923,	$21.88
Nov. 27, 1923,	21.86
Dec. 26, 1922,	25.79
10-year pre-war average,	15.72

strips are now very well sold into the first quarter and the steel bar market has been enlivened by the placing of a number of first quarter contracts by the makers of cold finished steel bars and shafting. Plates have not caught the stride of the market yet and activity in structural shapes is in the form of requests for protection rather than in actual orders. Structural projects are coming up for bids in greater volume than for several months, however, and buying is expected to assume rather big proportions before the new year is very far advanced. Makers of pipe take hope from the improvement in the oil situation.

The formal order as distinct from the contract still is a favorite mode of buying in many lines, for there is no well defined belief in the minds of either buyers or sellers that higher prices are immediately ahead. Maintenance of present prices seems to be the chief aim of producers, because the memory of what happened to business as a result of the sharp price advances of last spring still is fresh in their minds. With buyers entertaining no serious thought of higher prices or the possibility of interruption to steel plant operations and shipments, it is natural they should be prone to place orders rather than contracts.

The appearance of two large speculative inquiries for steel making grades of pig iron, one for 10,000 tons, said to be for the account of New York bankers, encourages the notion that prices are as low as they are going to be for the present. Most recent transactions in these grades, however, suggest that the market is not yet solidified at current quotations.

The scrap market retains its strength, recent re-

ported purchases by the Steel Corporation for this district being confirmed, while independents, after balking at first, lately, with one or two exceptions, have bought and paid the higher prices. The fuel situation still is more favorable to buyers than producers. Whether there will be a strike or a suspension of the soft coal mines on April 1, with the expiration of the present agreement, should be gleaned from a meeting of the operators and mine union officials in Cleveland on Jan. 4.

Plant operations will be light in this and nearby districts this week in observance of the Christmas holidays. Most of the rolling mills suspended last Saturday at noon, not to resume until Wednesday.

Pig Iron.—Business of the past week has plainly reflected the proximity of the end of the year and the desire to avoid adding to inventories. The steel interest at Johnstown, in an effort to round out its first quarter schedule on merchant iron, has sold about 10,000 tons of basic iron at prices well under those named by Valley producers, but since the bookings are believed to have filled up that seller, the price ideas of the Valley furnace interests are undisturbed. There is a belief that steel-making irons, which shared only to a limited extent in the November wave of buying, will get going soon after the turn of the new year, this idea being based upon the improved business in finished steel and the fact that iron now is cheap in relation to scrap. Only small lots of foundry iron have been sold, but producers find no trouble in getting $22 for the base grade. More is asked by some makers, but no sales are reported at the higher figures. Sales of several lots of low phosphorus iron are pending and will probably be closed in the next ten days. Competition from Eastern furnaces is less than it has been on this grade and it is expected the business will go to the Valley producer who is quoting $29 for copper free iron. A recent sale of 3000 tons of standard malleable iron at $20, Valley furnace, probably removes all the standard iron available at a price so low.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	23.00
Gray forge	$21.50 to 22.00
No. 2 foundry	22.00 to 22.50
No. 3 foundry	21.50 to 22.00
Malleable	20.00 to 22.50
Low phosphorus, copper free	29.00 to 30.00

Ferroalloys.—Evidence of a tendency on the part of British producers of ferromanganese to meet the domestic price of $109, seaboard, has appeared. We note one sale in this district of 250 tons of British material at $110, but with a rebate of $1 a ton allowed if payment is made within 30 days. Considerable business has been done in domestic material, but it has been made up of numerous sales of small tonnages. The response of buyers to a price of $75, delivered, for 50 per cent ferrosilicon has not been all that could be expected and it is intimated that one large producer has been named more favorable terms. A very fair volume of 1924 ferrochromium business has been placed at 10c per lb. contained chromium, for the material of higher carbon content. Speigeleisen still is rather slow of sale despite the recent cut in prices. Prices are given on page 1751.

Semi-Finished Steel.—The market takes on more activity with the approach of the opening of the new year, and prices are becoming more clearly defined. Two large users of billets in this district have covered for their first quarter requirements, one taking 2500 tons a month and the other 10,000 tons a month, at $40, Pittsburgh. Sale of a round tonnage of slabs for first quarter delivery to a sheet maker also is noted at $40, Pittsburgh. Sheet bars still are priced at $42.50, Pittsburgh or Youngstown, by leading makers and apparently that is to be the price for the first quarter. Sheet makers are advising the mills of their probable first quarter requirements, but are not yet specifying very freely. Small sales of 1½-in. billets have been made at $42.50, Pittsburgh, by a Youngstown mill, but as a general rule the size extra over base for small billets is being waived. Forging billets are not very strong at $45, base, because they are to be had from more mills than usual. In times of rush and labor shortages a good many mills pass up forging steel business. Skelp is slow and untested and, while a good many rod contracts for first quarter shipments have been placed, specifications are light and current demands few. Base price on rods now applies to No. 5 to ⅜-in.; hitherto, rods coarser than ¼-in. commanded an extra of $2.50 a ton. Usually a size extra applies for fineness rather than coarseness; in the case of rods, it is stated that the bulk of orders are for No. 5 (0.207 in.) and change of roll for larger size involves extra expense. Prices are given on page 1751.

Iron and Steel Bars.—Some of the makers of cold-finished steel bars have entered contracts for their first quarter requirements of hot-rolled bars, but this tendency is not yet very pronounced either on the part of other makers of that line or the bolt, nut and rivet manufacturers. In the absence of signs of higher prices in the near future and with deliveries on orders very prompt, most consumers incline to the order instead of the contract and specification method of buying. A very fair volume of January shipment business is coming to makers and the regular price of 2.40c., base, Pittsburgh, is closely observed. Iron bars also are firm in price, but demand reflects the lack of railroad car buying.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Structural Material.—This market is taking on a more active appearance, not because local shops are getting many large awards, but because a veritable flood of inquiry is being figured against and there is much seeking of protection on the tonnages required. It cannot be safely predicted how much of the work upon which the drawing rooms are now busy will be let, but it is said that investors are not talking price as much as formerly and similarly in plain material, there seems to be more inclination to accept current prices as likely to hold. Prices are given on page 1750.

Plates.—Buyers still are pursuing a careful buying policy and are not anticipating their requirements. A fair number of small orders are coming out and on these less trouble than recently is experienced in obtaining the full price. Plate prospects for early 1924 are not considered very favorable locally, for there is little ship, car or tank building in sight at present. Railroad buying is expected to run heavier in 1924 to roads, bridges and terminals and the improvement in the oil market is expected to result in less demand for storage facilities. Prices are given on page 1750.

Wire Products.—Mills in this district have a good volume of January business against which to produce and ship. There is more inclination on the part of both manufacturing consumers and jobbers to enter contracts, but it is not as pronounced as usual, presumably because delivery against orders is prompt and there is nothing in sight just now to suggest higher prices in the near future. Movement of nails and of manufacturers' wire stands out. Efforts of manufacturers to build up stock of rails against the spring demand are not making much progress because current demands are so heavy. Local mills disclaim encountering price cuts except on coated nails, which can be bought from Middle Western mills at $2.60 per count keg, as against $2.70, the base price of mills here. Prices are given on page 1750.

Steel Rails.—Principal demand for light rails is originating in the anthracite regions and on account of freight disadvantages, mills in this district are not benefited. Glen Alden Coal Co., was a recent buyer of 2000 tons of light sections for delivery in the Wilkes-Barre district; this business is believed to have been placed with a rerolling mill, said to have an agreement with the Delaware, Lackawanna & Western Railroad, stockholders of which control the Glen Alden Co., to take its old rails and reroll them on a conversion basis. Billet rails still are priced at 2.25c.,

base, with rerolled sections [illegible] from 2c. down to 1.85c., base.

We quote light rails rolled [illegible]
base (25 lb. to 75 lb.), [illegible]
base (12 lb. to 16 lb.), [illegible]
$43 per gross ton mill, for [illegible]
hearth sections.

Hot-Rolled Flats.—Business has expanded materially in the past fortnight and with most makers now well committed against their probable first quarter production, prices are firmer than they have been. The market now is quotable squarely at 3c., base, for hoops, bands and strips, lower quotations having largely disappeared. Prices are given on page 1750.

Cold-Rolled Strips.—Makers have been getting liberal orders and contracts lately and while they are not entirely filled up for the first quarter, they are well sold into that period. Prices below 5c., base, have entirely disappeared.

Bolts, Nuts and Rivets.—These products are moving with more freedom at present prices than they did at lower figures. Much contracting for first quarter has been done, and with makers now comfortably filled, price cutting has ceased. Prices and discounts are given on page 1750.

Coke and Coal.—Despite the furnace coke contracts recently placed and the old ones which were renewed for first quarter, there is still considerable open capacity for that period and some uncertainty about prices. Business of this sort already concluded has been at prices ranging from $4.50 down to $4.25 per net ton at ovens on most of the tonnage, but one producer is reported to have gone as low as $3.75 on one piece of business involving 25,000 tons a month and on other business has named prices that will mean a general average of about $4. Spot furnace coke holds right around $4. Occasional sales are made of loaded cars at less, but an inquiry for production coke would hardly bring out a lower price than $4. Spot foundry grade holds at the recent range of from $4.75 to $5.50, while the contract market is quotable from $5.50 to $6.50. Coal prices reflect a light demand and ample supplies. Mine run steam coal is to be had at $1.90 to $2.10 from all mines except those supplying domestic requirements. Mine run coking coal ranges from $1.75 to $2 and gas holds at $2.25.

Tubular Goods.—Mills still are well provided with business in standard pipe, but are running out of orders for oil country goods and the fact that jobbers are taking inventories is causing some holding up of shipments of standard pipe for the remainder of this year. Specifications for January shipments of this class of goods are fairly heavy and the turn for the better in the oil situation is expected to bring about an increase in drilling programs with a consequent increase in the demand for pipe. Boiler tubes still are extremely dull, but there is a good market in mechanical tubing, largely as a result of the demands of the automotive industry. Prices are soft on boiler tubes, and special prices have been made to secure some big mechanical tube orders, but pipe prices are well maintained. Discounts are given on page 1750.

Sheets.—Demand still is expanding and it is now certain that the mills will start the new year with much heavier order books than seemed probable a few weeks ago. The fact that the end of the year is near is resulting in the release of much tonnage that had been held up to escape being included; there has been a notable increase in orders from jobbers and the automobile and parts makers are increasing their commitments. There is some contracting for first quarter, but the formal order still is the more popular method of purchase. Prices are strengthening as a result of the increased orders and while prices $2 per ton below the regular market quotations on black and galvanized sheets have not entirely disappeared, fewer makers than formerly will take business at the lower prices. Sales of blue annealed sheets below 3c., base, have practically disappeared. Most sheet mills suspended last Saturday at noon for the Christmas holidays. Prices are given on page 1750.

Tin Plate.—Mills have bookings sufficient to carry them at practically full capacity through the first half of 1924 and there already [illegible] of a possible shortage before the end of that period, since announced plans of packers call for the largest pack of foods in the history of the industry and supplying the demand for cans for that purpose will probably mean little open tin plate capacity for other purposes for several months. The market is very firm at $5.50 per base box, Pittsburgh, for standard cokes. This year's production of tin plate is estimated at 40,000,000 boxes, a new high record mark.

Cold-Finished Steel Bars and Shafting.—The fact that a Chicago base has been set up by one mill in the Chicago district on this line has had seemingly no effect upon local prices nor upon the selling policies of local producers as to sales either in the Chicago district or in territory where the Chicago mill has an advantage of freight over Pittsburgh. All makers here still are quoting 3c., base, Pittsburgh, and equalizing freight with the Chicago mill in competitive territory. Much business is coming this way, even out of the Chicago district, although this means a Pittsburgh equivalent price of 2.66c., base. This is possible, however, only because some mills still have some low-priced steel bars and one company makes its own hot-rolled bars. Expanding programs of automobile companies is helping general business. Ground shafting is unchanged at 3.40c., base, f.o.b. mill for carloads or more.

Track Supplies.—Two local makers of spikes shared in the recent distribution of orders by the New York Central Lines and with a large Pennsylvania order pending, it is expected they soon will be comfortably fixed in the matter of backlog business. Depressed coal market keeps down the demand for small spikes. Prices show no special change. They are given on page 1750.

Old Material.—The report is confirmed that the Carnegie Steel Co. made an additional purchase of heavy melting steel at $19.50, the amount being placed at 10,000 to 20,000 tons, and as most of the independent companies in this and nearby districts have joined in the buying movement, paying $19 to $19.50, the market now is squarely quotable at that range. There has been a sharp advance in No. 1 cast, on a good-sized purchase by a large electrical company, and the market continues to exhibit marked strength on blast furnace grades. Steel foundries remain out of the market, and for that reason there has been no material stiffening in prices of knuckles, couplers, springs and other railroad specialties.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$19.00 to $19.50
No. 1 cast, cupola size	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland Md.; Huntington, W. Va., and Franklin, Pa.	18.50 to 19.00
Compressed sheet steel	17.00 to 17.50
Bundled sheets, sides and ends	15.50 to 16.00
Railroad knuckles and couplers	20.00 to 20.50
Railroad coil and leaf springs	20.00 to 20.50
Low phosphorus blooms and billet ends	22.50 to 23.00
Low phosphorus plate and other material	21.50 to 22.00
Railroad malleable	18.50 to 19.00
Steel car axles	[illegible]
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	20.00 to 20.50
Machine shop turnings	14.50 to 15.00
Sheet bar crops	19.50 to 20.00
Heavy steel axle turnings	16.50 to 17.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	14.50 to 15.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	19.00 to 19.50

F. E. Cardullo, W. H. Lee and William Schaefer were elected directors of the Engineering Club of Cincinnati at the annual meeting held Dec. 19. Lieut. F. O. Carroll, McCook Field, Dayton, Ohio, spoke of the work of the engineers in the air service.

Chicago

Buying of Finished Steel Increasing—More Pig Iron Sales Than Expected

CHICAGO, Dec. 24.—Buying of finished steel, while not yet heavy, is improving and there are indications that consumers are tired of waiting for price reductions and have decided to buy against their first quarter requirements. The automotive interests have led the way with fairly liberal orders and other classes of users are expected to follow suit.

The building industry promises to take large quantities of steel, forcibly contradicting the opinion frequently expressed of late that construction activity is due for a decline. Lettings for the week aggregate nearly 8500 tons and active pending fabricated projects involve nearly 35,000 tons. Early action is expected on the Southern Pacific inquiry for 10,000 cars, but otherwise few car orders are in sight. It is possible that railroad car buying will not loom up as so large a factor in the market as was expected. The mills are well booked in rails and recent orders for track fastenings have been conspicuous.

Mill prices are firm and operations are substantially the same as a week ago, although most mills will shut down on Christmas Day in all except the continuous process departments.

Pig Iron.—The market is quiet, although spot sales have been somewhat heavier than had been expected. In some instances, melters underestimated their December needs when they closed for first quarter. A number of others have increased their orders for the first three months of next year. Holiday shutdowns of foundries are probably less general than is customarily the case. Malleable plants doing business with a leading automobile maker are especially pleased with heavy orders for castings recently placed. Prices are firm in what is understood as the Chicago territory, but in Michigan where Lake Erie furnace competition had to be met, an order for 500 tons of malleable for first quarter shipment was booked at $25 base, Chicago furnace. We note sales of 400 tons of Southern foundry at $21 base, Birmingham. The New York Central is inquiring for 600 to 800 tons of foundry for first quarter shipment to Elkhart, Ind.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal averaging sil. 1.50, delivered at Chicago..	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	$23.50 to 24.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	23.00 to 23.50
Malleable, not over 2.25 sil	23.00 to 23.50
Basic	23.00 to 23.50
High phosphorus	23.00 to 23.50
Southern No. 2	27.01
Low phos., sil. 1 to 2 per cent, copper free	$34.79
Silvery, sil. 8 per cent	37.29

Ferroalloys.—Although there have been a few small sales of spiegeleisen recently at $39, furnace, the lowest present quotation is $40, furnace, or $48.58, delivered. Ferromanganese is held at $110, f.o.b. New Orleans or Baltimore. No sales are reported but several carlot inquiries are pending. Small lots of 50 per cent ferrosilicon for spot shipment have been sold at $75, delivered.

We quote 80 per cent ferromanganese, $117.56 to $118.38, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, $47.58 to $48.58, delivered.

Plates.—All bids are in on the Southern Pacific cars and awards are expected momentarily. This equipment will require fully 100,000 tons of plates, shapes and bars. The mills' principal hope for tonnage lies in car steel. Oil storage tank buying has ceased; orders from miscellaneous sources are few, although as the new year draws near there appears to be an increasing propensity to buy, particularly for quick shipment to replenish exhausted stocks. If inquiries are to be taken as a criterion, a good volume of buying should develop early in January.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—Jobbers and manufacturing users of soft steel bars are commencing to place their first quarter needs and while, generally speaking, mill bookings still fall short of shipments, there is less propensity on the part of the buyers to delay purchases in the expectation of lower prices. One local mill has booked orders for 12,000 tons, consisting mostly of bars, as well as some plates and shapes. Inquiries are increasingly numerous and purchases of small lots for quick shipment are encouraging in volume. The situation in bar iron and hard steel bars shows no appreciable change.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.45c.; bands, 3.95c.

Structural Material.—Building prospects grow brighter as the new year approaches. Bids will be taken on the Tribune Tower, Chicago, involving 11,000 tons, Jan. 15. Plans will be out early next month on the Lake Shore Athletic Club, Chicago, involving about 5000 tons. Figures will also be asked early next year on a new building to replace the present St. Luke's Hospital, Chicago, work which will require approximately 5000 tons. An extension to a boiler house for the Crane Co., Chicago, will take 700 tons. The assembly plant projected for the Ford Motor Co. at St. Paul, Minn., is being redesigned and will probably require 6000 tons. Lettings during the week comprise a number of good-sized tonnages. Among them are the Donaldson store building, St. Paul, 3500 tons; the Board of Trade Building, Kansas City, Mo., 1200 tons; and Great Northern bridge work, 950 tons. Mill prices are firm and unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Rails and Track Supplies.—Out of 75,500 kegs of track spikes placed by the New York Central, 20,000 were ordered from the Illinois Steel Co., 4500 from the Inland Steel Co. and 40,000 kegs were divided between the Jones & Laughlin Steel Corporation and Dilworth, Porter & Co., Pittsburgh. The New York Central's inquiry for 30,000 tons of tie plates has also resulted in orders, which have been distributed among Dilworth, Porter & Co., the Bethlehem Steel Co., the Sellers Mfg. Co. and the Illinois Steel Co. The road also bought 25,000 kegs of track bolts, placing the bulk of them with the Bourne-Fuller Co. at a reported price of 3.50c. mill. Sales of standard rails by local mills during the week aggregated 6000 tons. Most of this tonnage was placed by frog and switch manufacturers. In reviewing the entire year, it is estimated that fully 1,000,000 tons of standard rails were bought by roads served by Western mills. Part of this tonnage, particularly for roads running East from Chicago, went to mills in other districts, so that the total tonnage actually booked by Western producers probably ranges from 750,000 to 800,000. Sales for the country at large are estimated at more than 2,000,000 tons.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Bolts and Nuts.—Specifications are fairly good and contracts are being booked steadily as the first quarter approaches. The outstanding feature of the market, however, is the increasing firmness of discounts. Prices ruling in this district are those on page 1750, except that for Western delivery they are on a f.o.b. Chicago basis.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅞ x 4 in., 40 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 9 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Sheets.—The attitude of practically all producers toward prices is notably firmer and concessions below the Steel Corporation figures are not only less frequent, but are confined almost entirely to tonnage for spot shipment. First quarter buying is proceeding at a better rate than had been expected during the holiday season, and some producers will soon be comfortably booked for the period. In fact, some observers are of the opinion that a scarcity market is not far distant.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Wire Products.—While business is coming in more freely for delivery after Jan. 1, no general buying movement has yet developed. The situation, however, is regarded as encouraging. Prices, which are firm, are shown on page 1750.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Cast Iron Pipe.—Bookings have been heavy and the price ideas of sellers are increasingly firm. The United States Cast Iron Pipe & Foundry Co. has taken 2000 tons for Cincinnati, 6500 tons for Denver, and 1800 tons for Toledo. The Grand Rapids Gas Co. has placed 1400 tons with the leading interest. The city of Omaha, Neb., is in the market for 3500 to 5000 tons. The National Cast Iron Pipe Co. is now bidder on 500 tons for New Holstein, Wis. Prices range from $47 to $48, Birmingham, on 6-in. and larger.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $59.20 to $60.20; 6-in. and above, $55.20 to $56.20; class A and gas pipe, $5 extra.

Reinforcing Bars.—Prospective business, much of it industrial work, is in promising volume, although in many instances the awarding of tonnage will not take place until some time after the first of the year. For the time being the price situation is unsteady and although sellers are trying to hold to 3c., Chicago warehouse, concessions have been made down to 2.75c. The latter figure has been rather commonly quoted on road work. The largest letting of the week, 800 tons for a grain elevator at Oswego, N. Y., was placed with the Kalman Steel Co. General contracts recently placed in Indiana for State highway work involve 1700 tons of bars which are expected to be bought shortly. Lettings include:

Grain elevator, Oswego, N. Y., 800 tons to the Kalman Steel Co.

Ford Motor Co. assembly plant, St. Paul, Minn., 175 tons to C. A. P. Turner Co.

Junior High School, South Bend, Ind., 200 tons to Truscon Steel Co.

Security Van & Storage Co., warehouse, Duluth, Minn., 130 tons to Kalman Steel Co.

Catholic Seminary, Area, Ill., 230 tons to American System for Reinforcing.

Pending work includes:

Indiana steel highway work, 1700 tons, general contracts awarded largely to Indiana contractors.

Harrison School, Grand Rapids, Mich., 400 tons.

Peabody Hotel, Memphis, Tenn., 1200 tons, rail steel specified.

Old Material.—Recent reports that the Steel Corporation had bought a substantial tonnage of heavy melting for Gary lack confirmation. The fact that one important local dealer has been making heavy purchases of melting steel at advancing prices has been interpreted as indicating that orders have been placed subrosa or are momentarily expected. Outside of this, there is no evidence of any interest in steel by the leading producer. In fact, some observers doubt seriously that purchases will be made in view of the heavy scrap stocks at Gary, estimated as aggregating fully 200,000 tons. It is the general opinion, furthermore, that unless the mills do come to the support of the market, advances in prices cannot continue. Outside of liberal purchases of busheling and wrought by a local iron mill, consumer buying has been generally light. Railroad offerings include the Burlington, 7400 tons, and the Soo Line, 200 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$20.50 to $21.00
Cast iron car wheels	20.50 to 21.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	20.00 to 20.50
Railroad tires, charging box size	20.50 to 21.00
Railroad leaf springs, cut apart	20.50 to 21.00
Rails for rerolling	18.00 to 18.50
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	17.25 to 17.50
Frogs, switches and guards cut apart	17.25 to 17.50
Shoveling steel	17.00 to 17.25
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheets	13.50 to 14.00
Axle turnings	14.00 to 14.50
Steel angle bars	19.00 to 19.50

Per Net Ton

Iron angle and splice bars	21.00 to 21.50
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	26.00 to 26.50
Steel car axles	18.00 to 18.50
No. 1 busheling	13.50 to 14.00
No. 2 busheling	8.50 to 9.00
Cut forge	15.50 to 16.00
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	16.00 to 16.50
No. 2 railroad wrought	15.50 to 16.00
Steel knuckles and couplers	18.50 to 19.00
Coil springs	20.00 to 20.50
No. 1 machinery cast	20.00 to 20.50
No. 1 railroad cast	19.00 to 19.50
No. 1 agricultural cast	19.00 to 19.50
Low phos. punchings	16.50 to 17.00
Locomotive tires, smooth	17.50 to 18.00
Machine shop turnings	9.00 to 9.50
Cast borings	11.25 to 11.75
Short shoveling turnings	11.25 to 11.75
Stove plate	17.00 to 17.50
Grate bars	16.50 to 17.00
Brake shoes	17.50 to 18.00
Railroad malleable	18.25 to 18.75
Agricultural malleable	18.25 to 18.75

Merger Hearing at Buffalo Ended

BUFFALO, Dec. 24.—Hearings before the Federal Trade Commission on the Bethlehem-Midvale steel merger were adjourned Dec. 20. The commission conducted sessions in Buffalo for three weeks with Examiner George McCorkle. While no official announcement was made as to the location of the next hearings, it is understood the commission will resume at Washington early in January. The Buffalo hearings were not productive of any special testimony other than the lines followed in other cities where examinations were conducted.

Twelve new steel passenger coaches are being built for the Indianapolis & Cincinnati Traction Co. as a part of the new $800,000 equipment program of the company. Trucks for the new coaches are being built by the Baldwin Locomotive Works in Philadelphia and the bodies by the Cincinnati Car Co., Cincinnati. The Westinghouse Electric & Manufacturing Co., which originally equipped the road, has the contract for providing the motor air brake and control equipment for the 12 new motor passenger cars and four extra motors; for equipment for freight motor cars and for eight automatic substations, one semi-automatic substation and one portable automatic substation.

New York

Car Plates May Be Bought in England for Delivery on Atlantic Seaboard

NEW YORK, Dec. 24.—There is in the minds of some buyers an apparent belief that present finished steel prices will hold for first quarter as is evidenced by the purchase for early shipment of 3000 tons, mostly structural shapes, by a local jobber who is considered a careful buyer, and it is reported that the lowest price he was able to develop was 2.40c., Pittsburgh. On the other hand representatives of American plate mills have been informed that it would be necessary for them to quote 2c., Pittsburgh, on 2700 tons of car plates required by a shipbuilding and carbuilding works on the Atlantic seaboard to meet the competition of foreign mills. As no mill here was willing to go that low it was indicated today that the business would go abroad. THE IRON AGE cable from London in the issue of Dec. 20 showed that sheared plates are quoted in England at the equivalent of 1.86c. to 1.95c., f.o.b. works, while Ruhr plates were available at 1.51c. Even with ocean freight rates, plus insurance and duty, these plates, it is stated, can be delivered at points along the Atlantic Coast at prices much lower than plates from American mills on the basis of 2.40c., Pittsburgh. The demand for structural material continues strong, and while less new work has come out in the past week than in the week before it is plain that the lull is due to the holidays, much more tonnage being in sight that will come into the market within the next few weeks. Many of the offices of steel companies closed at noon on Monday and there was little business transacted.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Ferroalloys.—Numerous inquiries continue to appear, the total aggregating about 2000 tons, all for delivery next year. There have been sales at both the domestic price of $109 and the British price of $110, seaboard, one put at 1000 tons. There have been sales of several carload lots of spiegeleisen at $40, furnace, and there has been a fair amount of inquiry. Contracts for 50 per cent ferrosilicon for next year's consumption continue to be negotiated at $75, delivered, but details are lacking. The same is true of ferrochromium, but it is understood that the price is about the same for 1923.

Pig Iron.—As the old year draws to a close, the most encouraging feature of the market from the standpoint of the seller is the fact that while few requests to defer shipments are being received, most melters are taking the iron when it is due them and some are requesting anticipation of shipments. This would indicate that at least fair activity of foundries may be expected after the troublesome inventory period has passed. The Worthington Pump & Machinery Corporation, which has been in the market for about 2000 tons, is understood to have found conditions firmer than had been expected and is awaiting further developments. The Ingersoll-Rand Co. has purchased 500 tons of malleable iron, but no other sale in excess of 200 or 300 tons has been reported. Recent sales have, however, aggregated a fair tonnage, one company having disposed of nearly 7000 tons during the past week. Prices are firm so far as furnaces are concerned at $22, Buffalo, and $23 eastern Pennsylvania, but some speculative iron can be had at slightly lower figures.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia.:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.27
East. Pa. No. 2, sil. 1.75 to 2.25	25.27
Buffalo, sil. 1.75 to 2.25	26.91
No. 2X Virginia, sil. 2.25 to 2.75	30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.94

Warehouse Business.—Very little activity is noted this week, business having quieted down during the holiday season. Despite the dullness expected until after Jan. 1, some warehouses report that December may prove to be a better month for volume of business than November. Prices are firm, even black and galvanized sheets showing more strength. The pipe market is quiet and prices unchanged. We quote prices on page 1768.

Cast Iron Pipe.—The market shows no developments of importance. Business continues active despite what is usually the dull season for business. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Purchasing of soil pipe has declined, but foundries are fairly well filled with orders. The last week of the year sees curtailment of production for purpose of inventory and equipment repairs. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 29½ to 35¾ per cent off list; heavy, 39½ to 45¾ per cent off list.

Coke.—Quotations are unchanged and a fair demand, despite the current dullness of business, continues. Standard foundry coke is firm at $5.25 to $6.25 per ton and standard furnace at $4 to $4.50 per ton. By-product is quoted at $10.91, Newark and Jersey City, N. J.

Old Material.—Prices continue firm with an upward tendency in an extremely quiet market, induced by the holidays. Heavy melting steel is strong at $16.50 per ton for No. 1 grade delivered eastern Pennsylvania consumers with railroad quality at $17 per ton delivered. Specification pipe continues going forward to Milton and Lebanon, Pa., consumers at $16 per ton delivered. Stove plate is firm at $16.50 per ton delivered either at Harrisburg, Pa., or to West Mahwah, N. J. Clean cast borings have been bought delivered eastern Pennsylvania at $15.50 per ton and machine shop turnings are quotable at about $14.50 per ton delivered to points in eastern Pennsylvania. A fair degree of activity in shipments of borings and turnings from New England sellers to the Pittsburgh district is reported. Forge fire is firm at $14 per ton and better, delivered eastern Pennsylvania.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.50 to $13.00
Steel rails, short lengths, or equivalent	13.75 to 14.25
Rails for rolling	15.00 to 16.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	16.00 to 17.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	13.50 to 14.00
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (clean)	10.00 to 10.50
Machine-shop turnings	10.50 to 11.00
Mixed borings and turnings	9.00 to 9.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.00 to 12.50
Stove plate	12.50 to 13.50
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	14.00 to 15.00
Cast-iron car wheels	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00
No. 1 heavy cast, not cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	16.00

Buffalo

Feeling of Optimism Prevails as the Old Year Nears End

BUFFALO, Dec. 24.—The year will be brought to a close with the pig iron producers all in possession of satisfactory backlogs and a general feeling of optimism. Sales and inquiry are extremely light; less than 4000 tons has been sold. One interest, which did not make the drastic price advances following the buying movement and trailed along for several weeks, has reached the same policy as district competitors within a few days and is now on a $23 base schedule. This practically puts the entire group of sellers on a more uniform price basis than has been sustained since the beginning of the November buying movement. With the exception of one inquiry for 1000 tons, no large tonnages are engaging attention. Such inquiries as are now in hand are for small, scattered tonnages.

There is a disparity with reference to differentials. One furnace is asking one dollar differential on higher silicons, but it is easy to buy at differentials of 50c.

We quote f.o.b. [illegible]

No. 1 foundry, sil. 2.75 to 3	
No. 2 foundry, sil. 2.25 to 2.75	
No. 2 plain, sil. 1.75 to 2.25	
Basic	22.00
Malleable	22.00
Lake Superior charcoal	

Finished Iron and Steel.—Notwithstanding holiday inactivity, demand for bars and sheets has been fairly satisfactory. Bar prices hold, but sheet prices are being shaded for prompt shipment business. These concessions are not being made for delivery over the first quarter.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Old Material.—Inventories show the lowest stocks of old material in years. Practically every consumer has permitted his stock piles to drop almost to the point of exhaustion and this is taken as an indication of a lively demand for heavy melting steel and other products early in January. Sales of steel this month will engage attention all through January.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$16.00 to $18.00
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	14.00 to 15.00
Car wheels	18.00 to 18.50
Machine shop turnings	10.00 to 11.00
Cast iron borings	12.50 to 13.00
No. 1 busheling	14.00 to 15.00
Stove plate	17.00 to 17.25
Grate bars	16.00 to 16.50
Bundled sheet stampings	10.00 to 11.00
Hydraulic compressed	14.00 to 14.50
Railroad malleable	19.50 to 20.50
No. 1 machinery cast	19.50 to 20.50

St. Louis

Request for Early Shipment of 5000 Tons Ordered for First Quarter

ST. LOUIS, Dec. 24.—The usual holiday lull prevails in the pig iron market. There were no inquiries of note during the week, and sales were light, and were confined to small lots for prompt shipment. One of the recent heavy purchasers of pig iron asked for shipment of 5000 tons before the end of the year on account of its first quarter contracts. On the other hand, there has been some request to delay shipment until after the first of the year on some of the purchases that were made for prompt shipment, this being done to lighten inventories. Foundries catering to the railroad trade report a decrease of orders. The market price of $23 to $23.50 Chicago, and $21 Birmingham still prevails, with the St. Louis Coke & Chemical Co. quoting $25 to $26 Granite City.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and $1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$25.16 to $25.66	
Northern malleable, sil. 1.75 to 2.25	25.16 to	25.66
Basic	25.16 to	25.66
Southern fdy., sil. 1.75 to 2.25 (rail)		26.17

Finished Iron and Steel.—The only activity reported is in material for tin plate manufacturers, who have placed some contracts for first quarter. Other manufacturers using steel products are holding off to see what the new year will bring forth in the way of orders. Their stocks are low, and they will need material for what orders they get. Warehouse business is dull. No new railroad inquiries are reported.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke. A few [illegible] coke fill the needs of the coke market. The weather has been too warm to create much of a demand for domestic grades. The dealer is too well stocked to place any orders for additional supplies. Industrial grades are dull. The weather has been too warm, for one thing, to warrant fires in plants.

Old Material.—Prices of old material continue to shoot upward, advances during the week ranging from 50c. to $1.50 a ton. It still is a dealers' market. They still live in hopes of heavy buying by consumers after the first of the year and have been bidding high prices for material offered in railroad lists. An unusual circumstance attending the bidding for railroad material is the entry into the market of consumers themselves. Dealers learned of this and outbid the consumers. This means virtually that the consumers have bid up prices on material they ultimately must buy. The only new railroad list of the week was issued by the Chicago & Alton, 1000 tons.

	Per Gross Ton
Iron rails	$17.00 to $17.50
Rails for rolling	18.50 to 19.00
Steel rails, less than 3 ft.	20.00 to 20.50
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 and over	32.50 to 33.50
Cast iron car wheels	19.50 to 20.00
Heavy melting steel	17.50 to 18.00
Heavy shoveling steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.50 to 18.00
Railroad springs	19.50 to 20.00
Heavy axles and tire turnings	14.00 to 14.50
	Per Net Ton
Steel angle bars	16.00 to 16.50
Steel car axles	19.00 to 19.50
Iron car axles	26.00 to 26.50
Wrought iron bars and transoms	20.00 to 20.50
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	15.50 to 16.00
Cast iron borings	11.50 to 12.00
No. 1 busheling	14.00 to 15.00
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	16.50 to 17.00
Machine shop turnings	10.50 to 11.00
Champion bundled sheets	10.00 to 10.50

Birmingham

Lull in Buying of Pig Iron Is Not Expected to Be Prolonged

BIRMINGHAM, ALA., Dec. 24.—The lull in the Southern pig iron market promises to be over shortly, as it is expected that the melters who have been buying from hand to mouth will begin again this week. Iron quotations are still on a base of $21 per ton, No. 2 foundry. It was expected that there would have been an advance by this time. The Alabama Co. and the Woodward Iron Co. are pushing improvements on a furnace each. The amount of iron sold for delivery during the first three months of the year and the business expected will warrant operation of not only the furnaces now in operation but two or three others. The Shelby Iron Co., manufacturer of charcoal iron, is making preparations to start its Shelby furnace in January. A little of its product is still on the yards. The surplus iron on yards in Alabama has been brought down to less than 80,000 tons, including basic.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$21.00
Basic	21.00
Charcoal, warm blast	33.00

Cast Iron Pipe.—Lettings were received by all three of the pressure pipe makers in this district during the past week and shipments have been steady. Unanimous reply to questions as to state of business and prospects is that there is warrant for steady operation for some time.

4-in. water, $51; 6-in., $47; larger sizes, $46; 4-in. gas, $56; 6-in., $52; standard sanitary pipe, $55; heavy gage, $45.

Coke.—The coke market continues slow though introduction of the commodity as a domestic fuel in various sections of the country and at home is proving profitable. Foundries and other plants using coke are not contracting far ahead. Prices are as low as they have been in years, $5 to $6 for by-product coke.

Old Material.—The scrap iron and steel market has tapered off almost to nothing except where there is selling at lower prices than those given. The published list of the past two weeks is continued. Purchases of old material have been limited in tonnages. The rest of the month promises to be quiet in this line. All yards of dealers in old material are well supplied. Railroads have been offering a large quantity of scrap and some dealers have been taking advantage of the opportunity to get in the product at a low quotation.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$16.00
Heavy melting steel	12.00
Railroad wrought	14.00
Steel axles	17.00
Iron axles	20.00
Steel rails	13.00
No. 1 cast	18.50
Tram car wheels	15.50
Car wheels	15.00
Stove plate	14.00
Machine shop turnings	6.00
Cast iron borings	8.00

Boston

Pig Iron Business Has Dropped Off—Scrap Market More Active

BOSTON, Dec. 24.—Business in pig iron has dropped to small proportions. Eastern Pennsylvania $22.50 furnace base iron seems to be out of the market, $23 now being the general price. A New York furnace, however, with a $3.65 freight rate into New England, is offering No. 2X at $22.50 furnace, or $26.15 delivered, and one Buffalo furnace heretofore on a $23 base is now openly quoting $22 furnace, or $26.91 delivered, with 50c. differentials. Buffalo resale No. 2X is still available at $26.91 delivered, No. 1X at $27.91 to $28.41, and No. 2 plain at $25.91. The market for Northern irons therefore is not as firm as is that for other irons. The situation insofar as Virginia and Alabama irons are concerned remains unchanged. Foundries are buying such irons only for mixture purposes and then in a small way.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$27.15
East. Penn., sil. 1.75 to 2.25	26.65
Buffalo, sil. 2.25 to 2.75	$26.91 to 27.41
Buffalo, sil. 1.75 to 2.25	25.91 to 26.91
Virginia, sil. 2.25 to 2.75	30.42 to 32.42
Virginia, sil. 1.75 to 2.25	29.92 to 31.92
Alabama, sil. 2.25 to 2.75	31.10
Alabama, sil. 1.75 to 2.25	30.60

Coke.—New England by-product foundry coke makers are securing more shipping instructions on 1923 contracts than they did earlier in the month, and there also has been some belated buying for first half, 1924 requirements. The demand for crushed coke has improved as well, consequently the position of the oven owners is more secure than a fortnight ago. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote $12.50 delivered in New England for foundry coke. Little Connellsville coke is offered in this territory.

Old Material.—Although not active, the market for old material is more so than it has been in many months. Buying is confined almost wholly for shipment to eastern Pennsylvania and prices average 50c. a ton higher than a week ago. The tonnage of heavy melting steel moved out of New England the past week has run well up into four figures, and several hundred tons have gone to a Worcester, Mass., steel plant. Most transactions in machine shop turnings have been at $10 on cars at shipping point. One lot of chemical borings was taken at $12, but that figure is above average prices quoted. Mixed borings and turnings early in the week were secured at $8.50, but the market today is easily 50c. higher than that figure. Forged scrap and bundled skeleton both have sold at $10 more frequently than at a smaller price. The Bancroft & Martin Rolling Mill, Portland, Me., offers $19 delivered for shafting, but little material is available at that figure. The Charlestown Navy Yard, Boston, during the past week sold among various materials, approximately 1,000,000 pounds of ship plate at $1.20½ per 100 lb. Second high bid was $1.20. A Chelsea, Mass., dealer bought the lot. At the Watertown Arsenal, Watertown, Mass., 260 tons of armor plate billets sold at .612c. per lb.; 220 tons of angles at .536c., and a round tonnage of pump carts at .73c.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $23.00
No. 2 machinery cast	20.00 to 21.00
Stove plates	16.00 to 16.50
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$13.00 to $13.50
No. 1 railroad wrought	13.50 to 14.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1-in. in diam., over 2 ft. long)	11.00 to 11.50
Machine shop turnings	9.50 to 10.00
Cast iron borings, chemical	10.50 to 11.00
Cast iron borings, rolling mill	9.50 to 10.00
Blast furnace borings and turnings	9.00 to 9.25
Forged scrap and bundled skeleton	9.00 to 10.00
Shafting	17.00 to 17.50
Street car axles	17.00 to 17.50
Rails for rolling	13.50 to 14.00

Philadelphia

Slightly More Inquiry for Steel Products for First Quarter with Prices Firm

PHILADELPHIA, Dec. 24.—Indications multiply that consumers of steel are giving less thought to the possibility of further softening of prices. Some first quarter contracts are being placed, particularly for billets, blue annealed sheets, hot-rolled strips and bands. The large tonnages of structural steel placed on mill books within the past few weeks have encouraged that branch of the steel industry, and in some quarters propositions at less than 2.50c., Pittsburgh, for shapes are less likely to be entertained.

Most of the Eastern plate mills will be shut down all of this week and will not resume before the first of next week. Yet the plate mills have operated at a better rate in the past week than in any week in the past month. They have, however, cleaned up all of the tonnage on their books and will try to accumulate more orders before resumption. Plate inquiries are slightly more numerous and there are a few good-sized tonnages in prospect, a situation that has not existed recently.

Pig iron is quiet, but the scrap market shows a fair degree of activity with prices continuing to strengthen.

Pig Iron.—No business of importance in pig iron has been transacted in this district in the past week excepting one lot of 700 tons of copper bearing low phosphorus iron, which went at $28, furnace. The demand for foundry grades has been almost nothing, while in basic there has been no inquiry. Foundry iron remains firm at $23, base, furnace, with 50c. differentials for silicon content higher than 1.75 to 2.25 per cent. It seems probable that Eastern trunk line railroads will reduce the freight rate on pig iron from Buffalo furnaces to Boston rate points from $4.91 to $4.90, leaving the rate from eastern Pennsylvania furnaces unchanged. The Everett furnace went out of blast last Friday.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25	$23.76 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.25 to 23.50
Gray forge	23.00 to 23.50
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.50 to 28.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—An Eastern steel company last week bought 1000 tons of ferromanganese for the first four months of 1924 at $109, furnace. This seems to have established the market firmly at that figure as a minimum, while British ferromanganese is still quoted

at $110, seaboard. One domestic producer quotes $115, furnace.

Semi-Finished Steel.—A few contracts for open-hearth rerolling billets, none involving more than 500 tons, have been made at $40, Pittsburgh, and this seems to indicate that the purchasers do not expect any further weakening in finished material prices. A lot of forging billets is under negotiations for first quarter at $45, Pittsburgh.

Light Rails.—The Glen Alden Coal Co. has placed an order for 2000 tons of light rails.

Plates.—Some of the Eastern plate mills are shut down all of this week and will probably resume Dec. 31 or Jan. 2. Last week's operations were at a fairly good rate, but all of the tonnage on mills' books was rolled and the mills hope to accumulate enough new business within the next week for resumption of rollings. A few thousand tons for penstock and gas holder work are under negotiation and may be placed soon. The United Gas & Improvement Co. is figuring on construction of three gas holders which will require about 1000 tons. Penstock work, on which contractors are bidding, will require 1000 tons. These are larger tonnages than have recently come into the market and have created a slightly more hopeful feeling among the companies' rolling plates. Prices are unchanged at 2.40c. to 2.50c., Pittsburgh, with reports of 2.35c. occasionally being quoted on some of the more desirable business.

Structural Steel.—The Pennsylvania Railroad has awarded 5000 tons of steel for a new bridge at Sunbury, Pa., to the Bethlehem Steel Co. The leading independent structural steel mill in the East has recently accumulated a very satisfactory backlog and other mills have shared to a lesser degree in the recent heavy contracting for building construction. Although it is still possible to obtain quotations of 2.35c. to 2.40c., Pittsburgh, there is in some quarters less inclination to go below 2.50c. on new work. If the bookings of the past few weeks are duplicated during the next few weeks Eastern mills will have a satisfactory outlook for first quarter.

Bars.—The steel bar price remains firm at 2.40c., Pittsburgh. Very little contracting for first quarter has been done by consumers and jobbers, but the stocks of the latter are admittedly low and some buying from this source may appear shortly after the first of the year. A little better demand for bar iron has been stimulated by the recent reduction by Eastern mills to 2.30c., Pittsburgh.

Sheets.—Several first quarter contracts for blue annealed sheets at 3c., Pittsburgh, have been booked by the leading independent maker of this district. Black and galvanized sheets are quoted at 3.85c. and 5c., respectively, by most of the larger producers but concessions from these prices are still offered by some mills, particularly when early specifications can be procured.

Warehouse Business.—Local jobbers are encouraged by the fact that demand for steel out of stock has continued at a very good rate right up to the Christmas holidays. Jobbers' stocks are running low and replenishment will undoubtedly be in order after Jan. 1. Prices continue unchanged, for local delivery being as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Coke.—Blast furnace coke for shipment before Jan. 1 is available at $3.85 to $4, Connellsville, while first quarter contracts are offered at $4.40 to $4.50. Foundry coke ranges from $4.75 to $5.50, ovens.

Old Material.—Inquiries for steel scrap from Europe have come to Philadelphia dealers within the past week, definite offers having been made by steel manufacturers in England, France, Italy and Spain, while German interests have inquired without making any definite offers. Not more than $20, c.i.f., has been offered by any of the steel makers in the four countries first named, and in view of the increasing strength of the steel scrap market here it is doubtful whether any business will be negotiated at present. Fully 100,000 tons, it is stated, could be sold for shipment abroad if prices could be quoted that would meet the views of buyers abroad. One mill, alone, in England would take 50,000 tons. Demand for scrap from consumers in eastern Pennsylvania continues at a fair rate, with no large purchases during the past week. Prices, however, continue to strengthen. It would be difficult for a consumer to buy steel scrap under $17.50, deliverd, though brokers have picked up a little tonnage to apply on recent orders at slightly under this figure. Several grades, both for steel making and foundry use, have moved up 50c. and $1 a ton within a week.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.50
Scrap rails	17.50
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Cast-iron car wheels	19.50 to 20.00
Rolled steel wheels	20.00 to 21.00
No. 1 railroad wrought	19.00 to 19.50
No. 1 yard wrought	17.50 to 18.50
No. 1 forge fire	15.00
Bundled sheets (for steel works)	15.00
Mixed borings and turnings (for blast furnace use)	12.00 to 13.00
Machine shop turnings (for steel works use)	15.00
Machine shop turnings (for rolling mill use)	15.00 to 15.50
Heavy axle turnings (or equivalent)	15.50 to 16.00
Cast borings (for steel works and rolling mills)	14.00 to 14.50
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	21.00 to 22.00
Heavy breakable cast (for steel plants)	18.00 to 19.00
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 18.00
Railroad malleable	18.50 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.00 to 17.50
Shafting	24.00 to 25.00
Steel axles	23.00 to 24.00

Cleveland

Buyers of Finished Material Show Belief Prices Will Not Decline

CLEVELAND, Dec. 24.—Considerable additional business in first quarter contracts came out during the week, largely in steel bars and strip steel. The bar contracts were placed at the regular 2.40c. price. This business indicates confidence on the part of buyers that present prices will hold. Current orders for small lots of steel bars also show an improvement. Some fair sized orders for rail steel bars were placed by tool manufacturers at concessions of from $2 to $3 a ton from the soft steel bar price. The demand for plates, which has been light for some time, shows an improvement. Some new inquiry for good sized lots has come from tank shops. There is still a range in plate prices from 2.40c. to 2.50c. Automobile companies placed considerable tonnage of hot-rolled strip steel either in the form of contracts or blanket orders at 2.90c. While this price is still available for desirable lots, the market is firmer and some mills that are comfortably filled for the first quarter are holding to 3c. The 2.90c. price is being shaded for wide strip that comes in competition with plates and skelp. The hoop and band market has not been tested since the attempt was made to hold the price at 3c. The New York Central Railroad will take bids Dec. 28 for its steel requirements for the first quarter, including steel bars, plates, structural material, sheets and various

other products, quantities required not being specified in its inquiry. Structural inquiry is light but considerable work is pending which is likely to be carried over into next month. Two or three lake boats are also pending.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Iron Ore.—Stocks of Lake Superior ore at docks and furnace yards were over 1,000,000 tons lower on Dec. 1 than on the same day last year, being 42,836,466 tons as compared with 44,004,201 tons on the same day a year ago and with 41,042,399 tons on Nov. 1. The amount on hand at furnaces Dec. 1 was 34,079,961 tons. Consumption of Lake Superior ore in November amounted to 4,441,477 tons, a decline of 359,094 tons from October. This compares with 4,380,996 tons consumed during November, 1922. Interior furnaces in the central district in November consumed 2,214,575 tons, a decline of 191,230 tons. Lake front furnaces including Canadian furnaces, used 1,867,707 tons, a decline of 171,186 tons and Eastern furnaces consumed 225,481 tons, a gain of 2100 tons over October.

Pig Iron.—The United Alloy Steel Corporation, Canton, Ohio, has purchased 5000 to 6000 tons of basic iron for the first quarter. This is understood to have been placed with a nearby furnace having a lower freight rate than from the Valley district at $21. J. B. Clow & Sons are inquiring for 6000 tons of pipe making iron for their Newcomerstown and Coshocton, Ohio, plants for the first quarter. With these exceptions very little activity developed during the week, although one producer sold 2000 tons of foundry and malleable iron in lots of 500 tons and under for the first quarter. One consumer who recently purchased 1000 tons of foundry iron is now inquiring for 500 tons additional for the first quarter. Prices are firm and unchanged. The common quotation of lake furnaces is $22.50 for foundry and malleable iron, which is firmly held for Cleveland delivery. For shipment to some points, a lake furnace is quoting $23. In the Valley district, quotations on foundry iron range from $22 to $22.50. Some consumers have held up pig iron shipments until after inventories, but on the other hand a few foundries have asked furnaces to anticipate shipments on first quarter contracts.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.00
Northern No. 2 fdy., sil. 1.75 to 2.25	23.00
Southern fdy., sil. 1.75 to 2.25	27.00
Malleable	23.00
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	$29.00 to 30.00

Semi-Finished Steel.—Some additional business was placed during the week. The leading local producer is virtually sold up for the first quarter and has withdrawn from the market. While this interest has taken some sheet bar business at $42.50, most of the contracts for sheet bars and all the billet and slab business was taken subject to trade paper quotations at time of shipment.

Sheets.—A good volume of sheet business was booked during the week, largely in body sheets from the automotive industry. Some buyers placed first quarter contracts and others bought only for January shipment. Prices on these are generally holding to 5.35c. The market on other grades shows an increasing firmness, although both black and blue annealed sheets can be bought at a concession of $2 a ton from regular prices for prompt shipment.

Reinforcing Bars.—Owing to the open winter, the demand for reinforcing bars continues fairly active. Soft steel reinforcing bars are commonly quoted at 2.30c. Rail steel bars are unchanged at 2.10c.

Coke.—The spread in prices has narrowed somewhat on Connellsville foundry coke, which is now quoted at $5 to $6.50 for standard grades for prompt shipment. A moderate volume of business is being placed in first quarter contracts at $6.25 to $6.50.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers have covered a large share of their trade with first quarter contracts at regular prices which are firmly maintained, and some consumers are placing current orders for shipment early in January to fill in their depleted stocks. Prices are firm at regular quotations. Many rivet consumers are placing first quarter contracts, which will be closed at the regular 2.90c. price. Current business is light.

Old Material.—Some additional purchases of scrap in round lots were made during the week, mostly by Valley district mills. The market has now quieted down although there is considerable activity among dealers who are covering against their recent sales. Mills have paid $19 for heavy melting steel and possibly a little higher, as that price in some cases has been offered by dealers. Compressed steel is being purchased by dealers at $17 for Valley delivery. Sales of borings and turnings to a Cleveland consumer are reported at $14.50. The market is very firm and prices have further advanced about 50c. a ton on most grades.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$16.75 to $17.00
Rails for rolling	17.50 to 18.00
Rails under 3 ft	17.50 to 17.75
Low phosphorus melting	19.50 to 20.00
Cast borings	13.50 to 14.00
Machine shop turnings	13.00 to 13.25
Mixed borings and short turnings	13.75 to 14.00
Compressed sheet steel	14.75 to 15.00
Railroad wrought	15.00 to 16.00
Railroad malleable	20.00 to 20.50
Light bundled sheet stampings	12.00 to 12.25
Steel axle turnings	14.50 to 15.00
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.25 to 14.00
Drop forge flashings	13.25 to 13.50
Railroad grate bars	18.00 to 19.00
Stove plate	18.00 to 19.00
Pipes and flues	13.50 to 13.75

The new Union Trust Building, Cleveland, will shortly become one of the most important centers in the iron and steel, iron ore and lake shipping industry in that city. The Cleveland-Cliffs Iron Co. and J. F. Corlett & Co., steel sales agents, will move from the Rockefeller Building to the Union Trust Building, Jan. 1, and other companies that will become tenants in the same building a month or two later will include Pickands, Mather & Co., Bethlehem Steel Co. and the Youngstown Sheet & Tube Co. The Jones & McLaughlin Steel Corporation and Lake Superior Iron Ore Association have already moved into the new building.

Cost of Living Higher

Figures prepared by the National Industrial Conference Board show that the cost of living of the average wage earner was higher in November than at any previous time within the past two years. It is placed at 65.3 per cent above the 1914 figure, the principal increase during the month being in rent, which now stands 80 per cent higher than pre-war. Increases occurred also in food and sundries, while decreases were recorded in clothing, fuel and light. Compared with July, 1914, the purchasing value of the dollar is now figured at 60.5c.

A survey of the expense involved in the upkeep of automobiles used by salesmen will be made by a committee of the Sales Managers' Bureau of the St. Louis Chamber of Commerce. The object of the survey is to get information which may be used by all sales executives in determining amounts allowed salesmen for cars used in their daily business. It is hoped that a general inquiry into the practices of many firms will disclose principles which will prove of value in adjusting this item of salesmen's expense accounts.

Cincinnati

Moderate Buying of Pig Iron Sale of 2500 Tons of Southern in the East

CINCINNATI, Dec. 24.—The pig iron market is dull, but not any more so than usually is the case at this season of the year. Orders generally run from carload lots to 200 tons. An Indiana melter closed on 500 tons of Northern last week, dividing the order between three furnaces on the basis of $22.50, Ironton. Some sales of Southern iron were made on a basis of $21, and an Eastern melter is reported to have placed an order for 2500 tons at this price. Inquiries are light, one from central Ohio calling for 200 tons; there is little inquiry for basic, Bessemer or silveries and prices are holding to schedules. Ferroalloy contracts for next year's requirements are being negotiated in fair numbers. The pig iron melt in this district shows little diminution and in fact some sections report orders for castings more numerous.

Based on freight rates of $1.06 from Birmingham and $2.27 from Hamilton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (basis)...	$25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.55
Ohio silvery, 8 per cent	24.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern	24.77
Malleable	24.77

Finished Materials.—There is a much better demand current for finished materials of all kinds, and during the past week some fair-sized orders were placed. First quarter contracts were also negotiated for substantial tonnages of bars, shapes and plates, while wire products have also shown noticeable activity. Prices generally are stiffening in that mills which had been shading prices for December shipment are now quoting regular prices for first quarter. This is especially noticeable in bolts and nuts, and first quarter contracts were placed in fair volume at the regularly quoted prices.

Reinforcing Bars.—A number of small projects were placed during the past week, involving a fair aggregate tonnage. A number of new projects are scheduled to come up for bids shortly after Jan. 1. Prices generally are unchanged at $2.20 for rerolled bars to $2.40 for bars from new billets.

Structural Activity.—A warehouse building for the L. & N. Railroad, at New Orleans, involving 1300 tons, is up for bids. The same road is taking bids on a shop at Etowah, Ala., for which about 450 tons will be required. A highway bridge over the Eel River, in Indiana, up for bids, calls for 220 tons. The building situation is promising in this distrct, and contractors expect a rush of inquiries following the turn of the year.

Sheets.—First quarter contracts are being placed for sheets and current business for immediate shipment is also improving. Prices are stiffening, less being heard of concessions being offered by the smaller mills.

Warehouse Business.—Cold-rolled steel has been reduced $3 per ton, following reductions made by warehouses in Chicago and Indianapolis. Orders are coming through slowly, but this condition is natural to the holiday period, and no significance is attached to it.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.10c.; cold-rolled flats, squares and hexagons, 4.60c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.80 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Coke.—There is little activity in coke of any kind. Prices are unchanged from last week, though a firmer tendency is noted. We quote:

Connellsville furnace, $4.00; foundry, $4.50 to $5.00; New River foundry, $10.00 to $11.00; Wise County furnace, $4.75 to $5.25; foundry, $5.75 to $7.00; by-product foundry, $8.00, Connellsville basis.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. was the only bidder on 10,000 ft. of 10- and 16-in. pipe for the City of Cincinnati. The bid was $16,000 below the estimate, being for $94,105.50.

Old Materials.—There is little activity in the local market as far as sales to consumers are concerned, but dealers are still buying heavily, and as a result prices continue to advance. The market is at least 50c higher than last week, with offers of $15.50 for heavy melting steel finding no sellers. We note one sale of heavy melting steel to a dealer at $18.50, delivered to a point having a freight rate of $2.40 from Cincinnati.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$11.50	to $12.00
Iron rails	14.00	to 14.50
Relaying rails, 60 lb. and up	25.00	to 26.00
Rail 16 to 20 lbs.	18.00	to 19.00
Heavy melting steel	15.00	to 15.50
Steel rails for melting	14.50	to 15.00
Car wheels	14.50	to 15.00
	Per Net Ton	
No. 1 railroad wrought	13.00	to 13.50
Cast borings	10.50	to 11.00
Steel turnings	10.00	to 10.50
Railroad cast	15.50	to 16.00
No. 1 machinery cast	18.50	to 19.00
Burnt scrap	12.50	to 13.00
Iron axles	23.00	
Locomotive tires (smooth inside)	14.50	to 15.00
Pipes and flues	9.50	to 10.00

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	43½	44⅞	Int. Har. pf.	106	107
Allis-Chal. pf.	91⅝	92½	Jones & Laughlin	107⅝	107⅝
Am. B. S. & Fdy.	75½	75½	Lima Loco.	61	66⅝
American Can	102⅞	107⅝	Midvale Steel	28	28¾
Am. Can pf.	108½	109	Nat.-Acme	9	9
Am. Car & Fdy.	160	163	Nat. En. & Stm.	40⅝	42½
Am. Car & F. pf.	119	119	Nat. En. & S. pf.	89	89½
American Loco.	71¼	71¼	N. Y. Air Brake	40	41½
Am. Loco. pf.	115¼	116	Nova Scotia Stl.	15	15
Am. Radiator	91⅜	96¼	Otis Steel	8½	9⅛
Am. Stl. Fdries.	36½	37⅝	Otis Steel pf.	55	57
Baldwin Loco.	122¼	127¾	Pressed Steel Car	52	54
Bald. Loco. pf.	111	111	Pressed Steel pf.	81	82
Bethlehem Steel	51	53½	Replogle Steel	10¾	13½
Beth. Stl. 7% pf.	90¼	91⅝	Republic	46¼	50
Br. Em. Steel	4	4	Republic pf.	89	89⅞
Br. Em. Stl. 1 pf.	52¼	52¾	Sloss-Sheffield	55½	60⅛
Br. Em. Stl. 2 pf.	12⅜	13	Sloss-Sheffield pf.	84	84
Chic. Pneu. Tool	82	83	Steel of Canada	73½	76
Colo. Fuel	23½	23⅝	Transue-Wms.	22	24¼
Crucible Steel	64	66⅞	Un. Alloy Steel	30	31
Crucible Steel pf.	90⅜	90⅜	U. S. Pipe	61	66½
Deere pf.	61¼	62⅝	U. S. Pipe pf.	81	82¾
Gen. Electric	192	197⅝	U. S. Steel	93¾	96
Gt. No. Ore Cert.	27¼	29	U. S. Steel pf.	118¾	119⅝
Gulf States Steel	78½	82	Vanadium Steel	29	32⅝
Inland	24¼	26½	Westinghouse Air Br.	82⅞	86
Int. Har.	75⅜	79½	Ytown S. & T.	67¾	68⅜

Trade Changes

Under a new arrangement the A. D. Joslin Mfg. Co., 238 West Erie Street, Chicago, manufacturer of bank and railroad office equipment, will develop additions to its line. It is planned to enlarge greatly the scope of operation. As a step in the plan, L. D. Graham has been appointed vice-president in charge of sales and advertising.

Pilling & Co., Inc., announce the removal of the Philadelphia office to 1400 Bankers Trust Building, 1315 Walnut Street.

The Hayes Brass Foundry, Inc., is in new quarters at 1624 North Salina Street, Syracuse, N. Y., where facilities have been increased considerably.

The Standard Structural Steel Co., Hartford, Conn., formerly at 239 Homestead Avenue, has taken over the plant of the Hartford Iron Works, 1014 Weathersfield Avenue. With the increased facilities of its new location, the company will be in a position to handle structural steel work of any size.

The Oesterlein Machine Co., Cincinnati, has appointed John Cetrule of the Triplex Machine Tool Co. as district sales engineer for the New York territory, with headquarters at 50 Church Street, New York.

Automobile bumpers will be manufactured in the new factory building which has been added to the plant of the Penn Spring Works, Inc., Baldwinsville, N. Y., manufacturer of chassis springs. W. F. Martin, president of the Amco Mfg. Co., Indianapolis, has resigned from that organization as general manager and will become sales manager of the jobbers division of the Penn works.

BELGIAN MARKET STEADY

Prices Fairly Well Maintained—British Hematite Iron Sold in Belgium—French Steel Competes

ANTWERP, BELGIUM, Dec. 8.—The iron and steel market shows no change from the conditions of a fortnight ago. With the firmness of the exchange and a sufficient demand makers have been able to maintain prices on nearly all products. Moreover, the continued high exchange rates and higher wages have caused since the beginning of the year a continual increase of production costs. Consequently, sellers are not inclined to attract business by concessions in prices. For instance, coke, although produced largely of Belgian coals, has been steadily increasing. At the beginning of 1921 coke was sold at 117 fr. for ordinary and 150 fr. for washed. Prices declined until May, 1922, when they were 87 fr. for ordinary and 110 for washed. On Jan. 1 of this year prices rose to 108 fr. for ordinary and 155 fr. for washed. At their peak in the middle of the year, prices declined and were 172.75 fr. for ordinary and 217.50 for washed in November and December. During the great shortage of coke in the first half of the year iron and steel works were forced to buy quantities of British coke at high prices, while bonuses were as a rule paid for inland coke, the foregoing quotations representing only official and nominal prices. The same is true of wages, which are now, in some cases, 30 to 40 per cent higher than last year. Notwithstanding these conditions most works are well provided with orders. Especially during the past few weeks fair-sized orders have been received from abroad, principally Japan. Shipments have already been made on previous export purchases, and large quantities are awaiting shipment at Antwerp and at works. Deliveries are extended and in some cases makers are not offering better than three or four months.

Prices are unchanged, as follows, francs per metric ton, for domestic delivery:

	Frs.	
Commercial iron No. 2	700	$32.60
Commercial iron No. 3	725	33.80
Commercial iron No. 4	775	36.00
Heavy sheets	750	34.90
Thin sheets	1,150	53.80
Bar iron, base	700	32.60
Rails	700	32.60
Heavy beams	650	30.20
Open-hearth steel, ordinary	700	32.60
Spring steel	1,300	60.50
Galvanized wire, base	1,450	67.50
Wire nails	1,250	58.10
Basic Bessemer ingots	525	24.40
Blooms	550	25.60
Billets	580	27.00

For special specifications and early deliveries somewhat higher prices are obtained but not as a general rule. A number of British purchasers have been offering material but prices advanced have not always been as low as the quotations of Belgian makers.

Prices for high phosphorus foundry pig iron, after rising have again fallen to their former level. This is principally caused by the fact that Lorrain and Luxemburg works, for a time out of the market are again quoting. Semi-phosphorus foundry iron, analyzing Sil. 2.50 to 3.00 per cent, Mn. 1 per cent max., sul. 0.05 per cent, phos., 0.6 to 0.8, is quoted at 450 fr., f.o.b. Antwerp or $25.50 c.i.f. New York and $26 c.i.f. Pacific ports. Basic pig iron is not available yet. Nominal prices are about 425 fr. or $19.75. Good inquiries are on the market from England but the entire production is being consumed by the steel works for their own requirements. Belgian hematite iron is not offered in large quantities. Deliveries offered by the makers are extended and prices high. Quotations are about 530 fr., f.o.b. Antwerp, $24.65 or 113s. Most of this business is going to British makers, who are quoting 107 to 108s., c.i.f. Antwerp.

For semi-finished products there is strong competition from Lorrain works. In general they quoted lower prices than Belgian makers either for domestic consumption or for deliveries f.o.b. Antwerp. Bars have gone on a basis of 675 fr. f.o.b. Antwerp, $31.40, while prices for beams have declined to 630 fr., $29.30, which is about $1 under the quoted prices. French quotations were principally the cause of these reductions as Belgian works as a result of the orders in hand would certainly have maintained the last quoted prices, especially as there has been a good British demand for steel and prices offered in pounds sterling were quite acceptable.

BRITISH IRON AND STEEL

Production and Export Movement for Eleven Months Compared

WASHINGTON, Dec. 24.—Iron and steel exports from the United Kingdom in November amounted to 394,891 gross tons, or an increase of about 2 per cent over October, according to a cable received by the Department of Commerce from Commercial Attaché Walter S. Tower, London. Imports of iron and steel products into the United Kingdom totaled 97,462 tons in November, which was next to the smallest figure of the year, imports in May amounting to only 82,248 tons. Exports from the United Kingdom for the 11 months ended with November amounted to 3,964,666 tons, and the total for the year 1923 will be between 4,350,000 and 4,400,000 tons. Imports for the 11 months were 1,214,261 tons and the total for the year is estimated at approximately 1,300,000 tons.

In the first table are imports and exports, by-products, for October and November of this year.

British Iron and Steel Trade During October and November, 1923, in Gross Tons

	Imports		Exports	
	October	November	October	November
Pig iron and ferroalloys	4,231	6,693	66,490	57,798
Ingots, blooms, billets, slabs, etc.	46,984	40,115	1,668	1,644
Tin plate	....	....	51,398	55,552
Galvanized sheets	....	....	57,835	61,742
Plates and sheets	7,807	6,191	50,475	59,370
Steel bars, rods, angles, etc.	9,704	10,949	37,805	34,261
Iron bars, rods, angles	12,144	12,061	3,997	4,534
Rails	1,008	856	22,962	28,985
Railroad material, other than rails	881	1,364	15,346	17,879
Structural steel	7,152	4,429	7,799	8,769
Hoops and strips	1,776	2,370	7,894	6,160
Cast tubes, pipes and fittings	1,364	1,010	7,160	7,089
Wrought tubes, pipes and fittings	2,337	1,412	14,803	12,967
Bolts and nuts, including screws for metals	306	575	2,201	2,555
Nails, tacks, rivets and washers	438	457	1,458	1,600
Wire	2,955	2,424	6,449	6,202
Wire cables and rope	....	....	2,601	1,933
Wire nails, including staples	4,189	3,573	380	349
Wire manufactures, n.e.s.	392	284	2,923	1,715
Castings	506	633	835	167
Forgings	180	169	138	155

Pig iron production for November reached 597,600 tons and steel ingots 749,500 tons, compared with 592,600 and 702,100 tons respectively for the previous month. There were 199 blast furnaces and 345 open-hearth furnaces in operation at the end of November compared with 188 blast and 306 open-hearth furnaces at the end of October. The cable adds:

"The total output of pig iron for the 11-month period is 6,807,900 tons and that of steel ingots 7,889,400 tons. If approximately the same production or a little better is maintained during December, the figure for pig iron will be within 25 per cent of the pre-war year of 1913 and about equal to that of 1921 and 1922 combined. Steel ingots will be one-eighth greater than 1913 and about 10 per cent short of the total output of 1921 and 1922 together. Taken as a whole, with allowances for the lack of domestic demand and the general unsettled conditions in continental Europe and other parts of the world, iron and steel production in the United Kingdom and its foreign trade in 1923 compare favorably with previous years. In a broad way

the British iron and steel industry faced comparable, if not similar, conditions to those which were met by the American industry in 1922."

Except for a falling off during the summer months in the third quarter, there has been a steady improvement during the year insofar as quantities are concerned. In the second table monthly averages of production, imports and exports for the post-war years are compared with those of 1913. It will be noted that in 1923 the tonnage of exports is 50 per cent as great as the tonnage of ingots, compared with 66 per cent in 1913.

Bench Iron and Steel Products and Foreign Trade, 1913 and 1919 to 1923, Inclusive, in Monthly Averages of Gross Tons

Year	Production — Pig Iron	Production — Steel Ingots	Iron and Steel Products — Imports	Iron and Steel Products — Exports
1913.....	855,000	639,000	185,900	414,100
1919.....	617,000	498,000	184,800	91,800
1920.....	669,500	755,600	92,400	271,000
1921.....	217,600	302,100	137,100	141,400
1922.....	408,300	486,000	73,500	283,100
1923*.....	618,900	717,200	110,400	360,400

*Average for 11 months.

To Test Flexibility Provision of Tariff

Mandamus Suit Will Bring Decision on an Important Feature of the Fordney Act

WASHINGTON, Dec. 24.—Affording the first opportunity for a court decision regarding the constitutionality of the flexible provision of the tariff, unusual interest has been manifested in the mandamus suit recently filed in the Supreme Court of the District of Columbia by Attorney Marion De Vries on behalf of the Norwegian Nitrogen Products Co., Inc., importer of sodium nitrite. Judge De Vries formerly was presiding Justice of the United States Court of Customs Appeals and took a prominent part in framing the administrative and flexible sections of the present tariff act, and the action he has instituted is to clear up the much discussed question as to whether Section 315, the flexible provision of the tariff act, is constitutional. In his petition for a writ of mandamus, Judge De Vries affirms the legality of the flexible provision and at some length gives his reason for the belief that Congress was acting within its power in delegating to the President the right to raise or lower imposts. Specifically, the suit relates to the right of the Norwegian Nitrogen Products Co., Inc., to inspect all the data presented by a domestic corporation, the American Nitrogen Products Co., which filed an application for an increase in the tariff duty on sodium nitrite.

In the petition filed with the Court, Judge De Vries maintains that large sums of money are being expended by the Tariff Commission and that the business of the country is being held in abeyance by various proceedings and that members of Congress are relying upon the commission and the President to specify demands for changes in duties which are deemed for the public welfare. All of this, it is pointed out, will be of no avail if the flexible provision is declared unconstitutional. For this reason the petition suggests early action by the court on the petition.

In addition to presenting the question of constitutionality, Judge De Vries says the petition also involves the question of the right of interested parties to inspect all data presented by a petitioner or collected by the commission, and the right of interested parties to be heard on this issue as well as the right to offer contravening evidence. Judge De Vries says the issue is not what should be done in such a case as a political or economical question, but what are the rights of the parties under the law as presently written.

This feature of the law, it is declared, received considerable attention by Congress, but not so much as the active principle of the law and its constitutionality, or what trade facts should be made by Congress, the duties to be ascertained and proclaimed by the President.

Judge De Vries says that if the two issues involved can not be presented and decided in the proceeding of the kind such as he brought, the only way in which they can be determined would be to wait until after proclamation by the President of the rate of duty under the flexible provisions, and until an importation of merchandise affected by a change in rates was made, a new duty levied, a protest made to the Board of General Appraisers, hearings held, decision made by the board, its appeal to the United States Court of Customs Appeals, and finally, a review by the Supreme Court of the United States. Judge De Vries declared that this routine would probably require two years.

Production of Pig Iron and Steel in Canada Decreases

The production of pig iron in Canada for November reached a total of 62,202 long tons, or 11,396 tons less than that produced in October, when the output amounted to 73,598 tons. The quantity of basic and foundry iron was fairly well maintained, 38,110 tons of basic iron being made for the further use of the companies reporting, while practically the entire output of 15,416 tons of foundry iron was made for sale. Malleable iron made for sale amounted to 8676 tons, a decline of 43 per cent from the output in October.

The cumulative production for the 11 months ending with November by grades was 513,774 tons of basic pig iron; 209,188 tons of foundry iron; and 97,434 tons of malleable iron, or a total output of 820,396 long tons. Compared with the production for the 11 months of other years, the production of 1923 shows an increase of 114 per cent over that of 1922 and 48 per cent over that of 1921. The average monthly production to date this year was 75,000 tons, and during the past five years this average was exceeded only once, this being in 1920, when the monthly average reached 84,000 tons.

The lowered output of pig iron was reflected in a decreased production of steel ingots and castings, the output for the month being 54,674 gross tons as compared with 67,496 tons in October. The decline was chiefly in steel ingots produced for the further use of the companies reporting and in the quantity of steel casting made for sale. Steel ingots amounted to 51,426 tons or a decline of 18 per cent from the output in October, and the output of steel castings dropped to 3248 tons or 30 per cent below the October figures. The production of ingots and castings for the 11 months of this year was 843,522; this being some 48 per cent greater than for the corresponding period of 1922, and 26 per cent above the total tonnage of 1921. The average monthly production this year reached a total of 77,000 tons, as compared with a monthly average for the past five years, 1919 to 1923, of about 69,000 tons.

The Algoma Steel Corporation, Sault Ste. Marie, Ont., will start operations at its rail mill on Jan. 14, and it is also expected that the merchant mill will start at the same time. With the starting of these mills the corporation proposes to blow in two blast furnaces in addition to the one now blowing, and additional coke ovens will be operated as well as both open-hearth plants. No announcement has been made as to what rails will be rolled, as negotiations are still pending with the railway companies, but it is expected that the first rolling will be for the Canadian National Railways for the Eastern lines.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinfor ing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....3c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Galvanized Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in.....2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb.....2.90
Spring wire, base, per 100 lb.....3.70
Galvanized wire, No. 9, base, per 100 lb.....3.35
Galvanized barbed, base, per 100 lb.....3.80
Galvanized staples, base, per keg.....3.80
Painted barbed wire, base, per 100 lb.....3.45
Polished staples, base, per keg.....3.45
Cement coated nails, base, per count keg.....2.70
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads..60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.50c. off list
Hot pressed nuts, tapped.....4.50c. off list
C.p.c. and t. square or hex. nuts, blank.....4.00c. off list
C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅞ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	6.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50

	Per 1000	
	S. A. E.	U. S. S.
9/16-in.	$15.00	$15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.90
Small rivets .....65, 10 and 5 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb.....$3.00 to $3.15
Spikes, ½ in., ⅝ in. and ⅜ in., per 100 lb.....3.15 to 3.25
Spikes, ⅜ in.....3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.....3.25 to 3.50
Track bolts, ¾ in and larger, base, per 100 lb..4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb..5.00 to 5.50
Tie plates, per 100 lb.....2.55 to 2.60
Angle bars, base, per 100 lb.....2.75

Welded Pipe

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1⅝ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....84 per cent off list
Carbon 0.30 to 0.40, base.....82 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	25
2-in. O.D. 10 gage	17	1¾-in. O.D. 9 gage	15
2¼ in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.90c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.45

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganse ore, washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$109.00 to $110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	110.00
Ferrosilicon, 50 per cent, delivered	75.00
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr, per lb. contained Cr, delivered	11c. to 12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10c. to 11c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent....$38.00 to $39.00
Spiegeleisen, domestic, 16 to 19 per cent.... 37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silicas, per net ton f.o.b. Illinois and Kentucky mines $22.00

Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines 23.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	—	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton	6.00 to 7.00	
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		48.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4 in. and over	$40.00
Rolling billets, 2 in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	40.00
Wire rods, common, soft, base No. 5 to ⅜-in.	2.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$3.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c. to 2.40c.
Skelp, sheared, per lb.	2.35c. to 2.40c.
Skelp, universal, per lb.	2.35c. to 2.40c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ½-in. and smaller, base, per 100 lb.	3.15 to 3.25
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago per lb.	3c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(1¼% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.26
Boston, export	0.255			†Denver (pipe)	1.17

*Pacific Coast	$1.15	Birmingham	0.58
*Pac. Coast, ship plates	1.20	Memphis	0.56
Jacksonville, all rail	0.70	Jacksonville, rail and water	0.415
New Orleans	0.67		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Awards Total Nearly 26,000 Tons, With More Than 36,000 Tons Pending

Pre-holiday week brought no marked change in the unusual winter activity of structural steel work. Projects awarded during the week, as reported to THE IRON AGE, totaled nearly 26,000 tons, including 5000 tons, the largest single job, for a bridge at Sunbury, Pa., for use of the Pennsylvania Railroad. Bridge work totaled 8650 tons. Of the new work that has come out for bids, 11,000 tons of a total of more than 36,000 tons, is for a tower for the Chicago *Tribune* Building, Chicago, and there are two other new projects each of 5000 tons.

Pennsylvania Railroad, bridge at Sunbury, Pa., 5000 tons, to Bethlehem Steel Co.

Philadelphia Coppersmithing Co., Philadelphia, manufacturing building, 125 tons, to Montgomery Iron & Steel Co.

American Cellulose Co., Cumberland, Md., 900 tons to Lehigh Structural Steel Co. and 600 tons to Austin Co.

Norfolk & Western Railroad, bridge, 200 tons, to American Bridge Co.

Baltimore & Ohio Railroad, bridge, 2000 tons, mentioned last week as being awarded to unnamed fabricator, went to Fort Pitt Bridge Works.

State Hospital, Middletown, N.Y., 250 tons, to Kellogg Structural Steel Co.

New York Central Railroad, bridge repairs, 2500 tons, of which 2250 has been awarded to the McClintic-Marshall Co. and 250 to Bethlehem Steel Co.

Barnard College, dormitory, 650 tons, to Harris Structural Steel Co.

Turner Construction Co., apartment building, New York, 500 tons, to Hedden Iron Construction Co.

New York Telephone Co., Seventy-third Street, New York, 600 tons, to Eidlitz & Ross.

Public schools Nos. 71 and 121, totaling 2000 tons, to A. E. Norton, Inc.

Japan, standardized steel buildings, 1,000,000 sq. ft., to Milliken Brothers Mfg. Co.

Sadowsky loft building, West Thirty-eighth Street, New York, 2500 tons, to Hinkle Iron Co.

Public school No. 202, Brooklyn, 1500 tons, to Levering & Garrigues Co.

Donaldson store building, St. Paul, Minn., 3500 tons, to Minneapolis Steel & Machinery Co.

Board of Trade Building, Kansas City, Mo., 1200 tons, to Kansas City Structural Steel Co.

Great Northern Railroad, repairs to bridges Nos. 95 and 68, 950 tons to American Bridge Co.

Milwaukee Electric Railway & Light Co., 600-cu yd. dump scow, 210 tons, to Milwaukee Bridge Co.

Board of Commissioners, Port of New Orleans, dock shed at Claiborne Avenue, 1750 tons, to Lukens Steel Co.

Ford Motor Co., low temperature coke oven bunkers, 765 tons, and by-product building, 165 tons, River Rouge, Mich., to Whitehead & Kales.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New York Telephone Co., building on West Street, New York, 18,000 tons, previously mentioned, will probably be awarded within a week, action being held up pending the outcome of an appeal to the Bureau of Standards and Appeals for modification of zoning law restrictions.

New York Telephone Co., central exchange, Yonkers, N. Y., 600 tons.

Shroeder & Koppel loft building, mid-town section, New York, 1500 tons.

New York Central Railroad, bridge repairs, 200 tons.

New York, New Haven & Hartford Railroad, bridge repairs, 200 tons.

Hotel, West Palm Beach, Fla., 1500 tons.

Bellevue Hospital, two pavilions, 2000 tons; job previously reported as 1000 tons.

Chicago Tribune tower, Chicago, 11,000 tons, bids to be in by Jan. 15.

Ford Motor Co., assembly plant, St. Paul, Minn., 6000 tons, plans being revised.

Lake Shore Athletic Club, Chicago, 5000 tons.

St. Lukes Hospital, Chicago, 5000 tons.

Crane Co., Chicago, boiler house addition, 700 tons.

High school, Ironwood, Mich., 700 tons, bids in.

Highway bridge over Eel River, State of Indiana, 220 tons, bids in.

Louisville & Nashville Railroad, warehouse, at New Orleans, 1300 tons, bids being taken.

Louisville & Nashville Railroad, machine shop, at Etowah, Ala., approximately 450 tons, bids being taken.

Elks' Club, Wichita, Kan., 300 tons.

Ford Motor Co., assembly plants at Louisville, Ky, 2000 tons; Charlotte, N. C., 1650 tons; Memphis, Tenn., 1650 tons; Jacksonville, Fla., 750 tons.

Nurses' Home, Ann Arbor, Mich., 200 tons.

RAILROAD EQUIPMENT BUYING

Orders and Fresh Inquiries Each Number 1225, But Not Heavy in Steel

Orders for railroad cars were placed for 1225 and fresh inquiries appeared for a like number, but the steel requirements are not heavy in the case of this equipment.

The car service division of the American Railway Association announces that reports filed by the carriers showed that on Dec. 1, 155,626 freight cars, or 6.8 per cent of the ownership, were in need of repairs. This was an increase of 6434 over the number in need of repairs on Nov. 15, at which time there were 149,192, or 6.5 per cent.

The Cotton Belt has awarded orders for 1000 box cars, half each to the American Car & Foundry Co. and the Mount Vernon Car Mfg. Co.

The Western Pacific has ordered 200 box cars from the Standard Tank Car Co.

The Western Fruit Express is inquiring for 1000 refrigerator cars.

The Lehigh Valley has placed 25 milk cars with the American Car & Foundry Co.

The Western Pacific has increased its inquiry for 500 refrigerator cars to 775.

The Seaboard Air Line is in the market for 932 flat car bodies.

Swift & Co., Chicago, are inquiring for 100 to 300 underframes.

The Great Northern has placed 500 underframes with the Minneapolis Steel & Machinery Co.

The Carmichael Safety Gate Co., Indianapolis, organized to manufacture a safety gate designed to prevent accident and loss of life at railroad grade crossings, has been incorporated for $50,000. The device, patents for which are held by H. E. Carmichael, is to be built at the plant of the Castle Refrigerator & Machine Co., 138 South Neal Street, Indianapolis. Mr. Carmichael is president of the company, Oden Wadleigh, vice-president, and Charles Lutz, secretary-treasurer.

The Chicago, Milwaukee & St. Paul Railroad has been authorized by the Interstate Commerce Commission to extend its line to the new Ford Motor plant, under construction in St. Paul. It will require five miles of track to reach the Ford plant from the present line of the C. M. & St. P. Railroad.

Plans are in progress for railroad shops and yards at Evansville, Ind., by the Illinois Central Railroad that will cost approximately $1,000,000. The program will include round house shops, tracks, coal bunkers and several buildings. F. L. Thompson, 135 East 11th Place, Chicago, is the company's engineer.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Dec.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
19.....	13.25	12.87½	46.62½	8.00	7.75	6.55	6.30
20.....	13.25	12.87½	46.57½	8.00	7.75	6.55	6.30
21.....	13.25	12.87½	47.12½	8.00	7.75	6.60	6.25
22.....	13.25	12.87½	.....	8.00	7.75	6.60	6.25
24.....	13.25	12.87½	47.30	8.00	7.75	6.60	6.25

*Refinery quotations; delivered price ¼c. higher.

New York

NEW YORK, Dec. 24.

Holiday dullness pervades all the markets and they are featureless. The copper market is steady and the tin market is firm. Lead is scarce and higher and the zinc market is a little stronger.

Copper.—The copper market continues practically unchanged in the firmness which has characterized it for several weeks, although demand has fallen off a little in the last few days. A fair amount of inquiry continues, with some buying. While the minimum quotation is 13.12½c., delivered, with some asking 13.25c. for first quarter delivery, there were one or two isolated cases last week of 13c., metal, but they were not sufficient to establish a market. Lake copper is quoted at 13.25c., delivered, but largely nominal.

Tin.—The week has been another moderately active one with sales running into several hundred tons. On Dec. 18 and 19 there were some dealers who attempted to press the metal on the market and as a consequence prices gave way, but on Thursday, Dec. 20, these dealers became buyers and later in the day consumers came into the market so that the total turnover was at least 500 tons. Purchases were made on a scale up from 46c. to 46.62½c., with some transactions as high as 46.75c. early in the evening. Today at least 100 tons has changed hands with the market firm and higher. During the week about 200 tons was sold on the New York Metal Exchange. Spot Straits tin today was quoted at 47.30c., New York, but there are no London prices today because the market there is closed from last Friday night to next Thursday morning. Arrivals thus far this month have been 4470 tons, with 4241 tons reported afloat.

Lead.—The market is very strong and business has been done up to 8c., New York, and over. There was a sale of one round lot in the last few days for delivery late in January at 8c. and there are sellers asking 8.12½c. and higher. A sale is also noted of a substantial quantity, but less than a carload, at 8.25c., New York. The American Smelting & Refining Co. advanced its price Dec. 19 to 7.40c., New York, an increase of $3 per ton. The metal is exceedingly scarce.

Zinc.—Due to a little more activity on the part of consumers and dealers, prime Western advanced about five points during the week and is now quoted at a minimum of 6.25c., St. Louis, or 6.60c., New York. Just at present there is very little activity, but the market is considered strong.

Old Metals.—The market is sluggish and business is very quiet. Dealers' selling prices are as follows:

	Cents per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	11.75
Copper, light and bottoms	10.00
Heavy machine composition	10.75
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.00
Lead, heavy	7.00
Lead, tea	5.75
Zinc	5.00
Cast aluminum	18.00
Sheet aluminum	18.00

Nickel.—Quotations of shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. Both shot and ingot nickel in the outside market are quoted at 29c. to 32c. per lb.

Antimony.—Chinese metal is scarce and higher and sales for spot delivery have been made at 10.25c., New York, duty paid, with transactions for shipment from China at any time in the next few months at 9.50c., duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26c. to 26.50c., duty paid, with only a few importers able to do business. The leading American producer does not make public its quotations.

Chicago

CHICAGO, Dec. 24.—Tin and lead have advanced while zinc has declined. Although the week was quiet, activity is on an ascending scale. This has been particularly evident in the case of tin which is now being purchased more freely by consuming interests whereas heretofore buying has been confined largely to dealers. There has also been increasing interest in lead and copper among the old metals, grades of lead and tin having advanced. We quote in carload lots: Lake copper, 13.50c.; tin, 48.50c.; lead, 7.70c.; spelter, 6.25c.; antimony, 11c., in less than carload lots. On old metals we quote copper wire crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 6.50c.; zinc, 4.25c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin, 38c.; all buying prices for less than carload lots.

GERMAN IRON ABOVE PRE-WAR

Foundry Pig Higher in Germany Than in England or United States

(By Radiogram)

BERLIN, GERMANY, Dec. 24.—Foundry pig iron is now quoted at 116 gold marks per metric ton ($28.05 per gross ton).

[This compares with 75.50 m. ($18.27) pre-war; with 5549 m. (paper, amounting to $18.60) Apr. 1, 1922; 153,688 m. ($23.42) Dec. 26, 1922; 616,300 m. ($29.74) Apr. 9, 1923 and with 12,960,000 m. ($12.51) July 30, 1923. It compares also with $23.32 for British (Cleveland) No. 1 foundry iron (last week) and with $21.88 prevailing for several weeks as THE IRON AGE pig iron composite price, of which $22.75 represents the level of foundry iron.]

Detroit Scrap Market

DETROIT, Dec. 24.—Practically no sales of old material were made during past week. Dealers are expecting heavy shipments during the early part of January as all stocks of metal on melters' yards are at a very low point. One of the largest producers is offering approximately 3500 tons of short shoveling turnings, cast iron borings, steel flashings, regular hydraulic compressed and heavy melting steel on a competitive basis for January delivery. Prices are the same as a week ago.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$14.50 to $15.00
Shoveling steel	13.50 to 14.50
Borings	10.00 to 11.00
Short turnings	10.00 to 11.00
Long turnings	9.50 to 10.00
No. 1 machinery cast	17.00 to 18.00
Automobile cast	23.50 to 24.00
Hydraulic compressed	11.50 to 12.00
Stove plate	15.00 to 16.00
No. 1 busheling	10.00 to 11.00
Sheet clippings	8.75 to 9.25
Flashings	10.50 to 11.00

Extensions to the plant of the Timken Roller Bearing Co., Canton, Ohio, recently reported, will include the installation of a 32-in. blooming mill and soaking pits. New buildings will be erected for this department.

PERSONAL

Louis I. Brown, president, Brown-Ward Co., Detroit, has been elected president of the Star Furnace Co., Jackson, Ohio, succeeding the late C. O. Brown. Homer E. Davis is secretary.

P. F. Frost, has been appointed general manager of sales with offices at 149 Broadway, New York, by the Cambridge Wire Cloth Co., Cambridge, Md.

Col. Oscar H. Fogg, secretary-manager of the American Gas Association, 342 Madison Avenue, New York, has resigned to become president and general manager of the Baltimore Gas Appliance & Mfg. Co., Baltimore. Colonel Fogg has headed the association since 1919. He will be succeeded by Alexander Forward of Richmond, Va., a member of the Virginia State Corporation Commission, which position he has resigned.

James Partington of the American Locomotive Co., New York, has been made chairman of the standing committee on professional divisions of the American Society of Mechanical Engineers for 1924. Other members of the committee are H. V. Coes, John H. Lawrence, Sanford A. Moss, and F. O. Hoagland.

James A. Smith, general superintendent, General Electric Co., Schenectady, N. Y., has been chosen head of the machine shop practice division of the American Society of Mechanical Engineers for the coming year. The division will cooperate in preparing the technical program for the annual machine tool exhibit at New Haven in the early autum.

S. M. Fechheimer, who has been connected with the Truscon Steel Co. since its inception 20 years ago, for the first five years actively in charge of engineering work and for 15 years in charge of publicity and advertising, has established himself in the advertising business as the Industrial Advertising Co., 615 Wayne Street, Detroit.

Samuel T. Harleman has resigned as assistant to vice-president and general sales manager of the Atlas Steel Corporation, Dunkirk, N. Y., and will be connected with Henry Disston & Sons, Inc., Tacony, Philadelphia, as assistant manager of the steel sales department. Mr. Harleman graduated from Lehigh University in 1901 in mechanical engineering and after five years in the motive power department of the Lehigh Valley Railroad, entered the steel business with the Bethlehem Steel Co. at the Bethlehem plant, leaving in 1918 to go with the Atlas company.

Frank L. Gilman, works manager of the new Kearny, N. J., branch, Western Electric Co., New York, now under construction, has announced the following appointments at this plant: H. G. Dean, plant manager, heretofore inspector of plants with headquarters at New York; F. A. Macnutt, clerical and production superintendent, formerly supervisor of personnel and installation at the Hawthorne, Ill., works; G. A. Landry, assistant technical superintendent, manufacturing division, previously engineer in the installation department at the Hawthorne plant; Frederick Kuster, assistant clerical superintendent manufacturing division, previously superintendent of equipment service at Hawthorne, and E. G. Johnston, assistant superintendent of industrial relations, previously in that capacity at the Hawthorne plant.

Richard H. Scott, formerly vice-president and general manager, Reo Motor Car Co., Lansing, Mich., has been elected president, succeeding R. E. Olds, who becomes chairman of the board of directors. Horace Thomas, chief engineer, has been elected vice-president to succeed Mr. Scott.

Fred R. Low, president, American Society of Mechanical Engineers, has accepted the invitation of the Engineers Society of Milwaukee to be guest of honor and address the monthly meeting to be held on Jan. 16, at the Milwaukee Athletic Club.

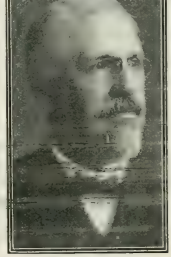
Joseph Grossman, president, Grossman Brothers Co., iron and metals, 240 Madison Street, Milwaukee, has resigned and is retiring from all connection with the company. He will engage in business on his own account and expects to announce his new location Jan. 1.

J. E. McLurg, general manager, Halifax Shipyards, Ltd., has been appointed vice-president of the British Empire Steel Corporation, Montreal, Quebec, filling the vacancy created by the retirement some time ago of D. H. McDougall. The new vice-president will be in charge of operations of all constituent companies, with headquarters at Halifax, N. S. Prior to the war, Mr. McLurg was associated with the Algoma Steel Corporation, as superintendent of transportation and manager of sales. He went overseas and on his return to Canada took up his duties as general manager of the Halifax Shipyards, Ltd.

Obituary

Charles Harvey Pond

CHARLES HARVEY POND, brief mention of whose death was made in THE IRON AGE last week, was born in Southington, Conn., Dec. 15, 1847, a descendant of an old New England family, whose members were counted among the earliest settlers of Connecticut. He was educated in the public schools and Lewis Academy, in his native town. His early manhood was spent in learning the iron manufacturing business and in 1874 he was junior member of the firm of Taylor, Mitchell & Pond, Massilon, Ohio, manufacturers of T-rails. After five years there Mr. Pond returned to Southington, where he was connected with J. B. Savage, manufacturer of forgings, and in 1887 that business was moved to Scranton, Pa., and incorporated as the Scranton Forging Co.



C. H. POND

At first Mr. Pond was secretary and manager, but in 1890 he succeeded to the presidency. At the time of his death on Dec. 3 he was president and manager. He was interested in several other Scranton enterprises and was one of the organizers of the Pennsylvania Manufacturers' Association.

In an extended tribute to his business ability and to his characteristic kindly manner the *Scranton Chamber of Commerce Journal* said: "He was, all of his life in this city, one of the active members of the Scranton Board of Trade. Not willing to be a merely contributing member of the organization, he always took an active part in its work and at the time of his death was one of a small committee of five which was making a detailed investigation of one of the most important industrial propositions that has been before the organization in years."

WILLIAM J. HAYNES, president Haynes-Langenberg Mfg. Co., St. Louis, manufacturer of furnaces, died at his home there on Dec. 20, after an illness of two weeks. Mr. Haynes was born in Mount Airy, N. C., in 1851, a direct descendant of Maj. Robert Hill, who fought in the Revolutionary War. He went to St. Louis in 1861, in a prairie schooner. He had been connected with the Haynes-Langenberg Co. for the last ten years, previously having been with the Langenberg Grain Co.

H. C. WHITTLESEY, formerly secretary-treasurer Wilcox, Crittenden & Co., Inc., Middletown, Conn., manufacturer of marine hardware, died on Dec. 13, while visiting his son, P. V. Whittlesey, at Nyack, N. Y. He was born in Newington, Conn., in 1857 and was graduated from Yale University with high honors in the class of 1880. Last year Mr. Whittlesey resigned from active business life, having served many years as secretary-treasurer of the company.

High-Speed Steel for Cast Tools

(Continued from page 1752)

possible volatilizing caused by the ... the arc. If the addition of ... after the preliminary analysis, ... to repeatedly stir the bath as ... ly heavy and easily settles on the furnace bottom, making uniformity of the melt impossible. It is preferable to avoid large additions of this alloy at late periods of the operation.

Chrometungsten alloy is recommended for all additions where it is possible to ... solution much more readily than the mixed alloys of chrome and tungsten. It is also true of all these alloys that those containing small amounts of carbon do not go into solution as readily as those having higher carbon content.

Let us assume a ton of steel is to be made in the electric furnace to meet the following specifications in percentages:

Car.	Mang.	Sil.	Phos.	Sul.	Van.	Chr	Tun
0.65	0.45	under	under	under	1.00	3.75	17.50
0.75	0.55	0.25	0.020	0.020	1.60	4.25	18.50

The method of proportioning the charge is given in Table 1, and it will be noted that the calculated preliminary analysis follows the procedure given above, and is: Carbon, 0.55; manganese, 0.30; silicon, 0.17; vanadium, 0.75; chromium, 4.27, and tungsten, 18.50. The figures for carbon, chromium and tungsten are increased or decreased according to the working of the furnace. It will be appreciated that these are not exact figures of the process.

Charging the Material

The heaviest pieces of scrap are placed on the bottom of the furnace, directly under the electrodes, then wash metal (when used), then the rest of the high-speed scrap, followed by Swedish iron, ferrochrome and ferrotungsten. The amount of high-speed scrap added was 30 to 50 per cent of the charge, although some heats were made using 90 per cent high-speed scrap. However, this was done only in cases where very desirable scrap was available. The whole charge is placed in the furnace at one time, as quickly and in as compact a mass as possible, then covered with a blanket of lime to reduce oxidation of the scrap during melting. With the doors sealed, the power is turned on and in a short time, when steady arcing is obtained, the maximum amount of current is "shot in" on the high voltage tap, the object being to melt down as quickly as possible. During this melting period the furnace doors are not opened except when absolutely necessary to push in the remainder of the scrap clinging to the banks or because of some trouble developing, such as electrode breakage, etc. In this manner a mildly oxidizing atmosphere should be obtained in the melting chamber shortly after starting the furnace and later change to a neutral atmosphere as the melting progresses, which closely resembles crucible practice.

Shortly before the scrap is all melted fluorspar is added to thin up the heavy slag and, as previously mentioned, this slag is usually white or slightly reducing. The bath must now be well rabbled to insure a uniform composition of the metal. If the slag for some unforeseen reason contains a quantity of oxides indicated by its dark color, a slag mixture of lime, 50 per cent silicon and coke is shoveled on the slag, which is similar to usual electric furnace practice. These additions must be continued at reasonable periods until the greater proportion of the oxides has been reduced into the metal and a white or slightly carbide slag is obtained. A spoonful of metal is then taken out of the furnace from which a wafer test for the chemist is poured and also a block test for the melter's observation. The surface of this block test almost always indicates the condition of the metal in the furnace and some high-speed steel makers claim that further information cannot be secured by fracturing the test piece. However, on this point the writer does not agree, especially when making steels which have to be in excellent condition before pouring. We always break the block tests, being sometimes surprised at the texture of the fracture or other conditions observed, and this when the outer surface of the test indicated the steel apparently to be normal.

In 30 to 45 min. after the first preliminary test was taken the carbon should be known and any adjustment of this element made. As many more preliminary tests should be taken for carbon as will insure correct final analysis, allowance being made for the usual carbon pick up from the carbide slag which varies from 0.05 to 0.10 per cent, depending on several conditions. Should the preliminary carbon be too high or chromium or tungsten much too low, the heating up of the metal is arrested and the necessary iron and alloys added as quickly as possible. Such an occurrence delays the operation an hour or more and often means reworking the heat with the attending possibility of having adverse furnace conditions and an inferior product. It takes a large percentage of tungsten about an hour to melt and be thoroughly mixed in the bath by repeated stirrings while chromium will be taken up by the metal much quicker. However, the chromium oxidizes more readily, forming calcium chromate, and it is often necessary to reduce this from the slag before proceeding too far with the heat.

While waiting an hour to an hour and a quarter for the rest of the preliminary analysis, the bath is gently stirred a few times to aid in the elimination of impurities and equalize the temperature. After each stirring slag and metal tests are taken for observation and when necessary, additions of lime, spar and coke are made to maintain a reducing condition. All through the operation the furnace doors are opened only when absolutely essential, the idea being to exclude atmospheric oxygen as much as possible. During this interval the temperature of the bath is gradually raised by increasing the amperage on the low voltage tap with the object of securing the maximum desired temperature, with a nearly completely degasified metal, shortly after the preliminary analysis is reported. This high temperature also results in the possibility of slag diminution in the steel and also the hotter the metal[1] the more completely may it be degasified.

The preliminary analysis reported should now be about as follows, showing a pick up of carbon and slight reduction of other elements as compared with the calculated amounts; such slight oxidation of the alloys indicates good furnace conditions and the metal therefore should be in excellent shape:

	Car.	Man.	Sil.	Van.	Chrome	Tungsten
Preliminary Test	0.58	0.20	low	0.50	4.10	18.20
Percent bath to be raised.....	0.07	0.30	0.05	1.00	none	none

The manganese and vanadium are calculated slightly higher than desired to allow for losses in further deoxidizing the metal. The usual formula used in figuring these additions is given, and also its application.[2]

(Pounds of Alloy to be added) = (Weight of Metal) x (Per cent Metal to be Raised) = (Per cent Ferroalloy)—(Percentage Desired in Final Metal)

As the bath already contains 0.50 per cent vanadium and 1.00 per cent additional is desired, then (2000 × 1.10 per cent) divided by (35 per cent alloy minus 1.50 per cent desired in final metal) equals 66 lb. ferrovanadium. Reduced to actual figures is: 2000 × 1.10 ÷ (35 — 1.50) = 66 lb. Va. As this ferrovanadium contains 1.42 per cent carbon, then 66 × 1.42 ÷ 2000 = 0.04 per cent carbon bath will be increased by this ferrovanadium addition.

The manganese and silicon are figured in a similar manner, except in this case the percentages desired in the final metal are so small that this is not considered in the formula. Manganese calculation is $\frac{2000 \times 0.35}{80}$ =9 lb. ferromanganese. As this 80 per cent ferromanganese contains 6 per cent carbon, then 9 × 6 ÷ 2000 = 0.03 per cent carbon, bath will be raised by this

[1] Acid Electric Furnace Operation, J. M. Quinn, THE IRON AGE, April 26, 1923.

[2] Short Method for Figuring Alloys, J. M. Quinn, *The Blast Furnace and Steel Plant*, April, 1923.

ferromanganese addition provided there is no oxidation of the alloy. Silicon calculation is $\frac{2000 \times 0.05}{50} = 2$ lb. ferrosilicon.

By the time the alloys are all calculated and weighed the steel should be nearly deoxidized, indicated by a series of chilled block samples. These test bars must show an entire absence of blow holes on the upper side exposed to the air on cooling, and should solidify entirely flat or slightly wrinkled, surface oxidation excepted. Even when there is an entire absence of blow holes and the upper surface of the test is slightly depressed or concave, the fracture must be observed closely for excessive shrinkage, for such a condition means an inferior metal for high-speed tools. This shrinkage is usually caused by too great a use of metallic deoxidizers during the working of a troublesome heat or where conditions were not normal.

All reactions of deoxidation are exothermic and consequently can only be completed when the components are in a condition of lowering their temperature. This is why it is essential to have the maximum temperature of the steel at the start of final deoxidation in the furnace but not at the time of tapping. At too high a temperature or on its rise, the steel can not be completely killed even in the presence of an excess of deoxidizing mediums, because there will be an equilibrium between the gases or oxides in the steel and the deoxidizers. Consequently, when cooling starts the reactions will readily be completed as the drop from the high temperature represents the best condition for all exothermic reactions. All of the deoxidation must proceed in the furnace, for when the steel is in the ladle the cooling is too rapid and the steel would be solidified before the completion of reactions and castings be inferior.

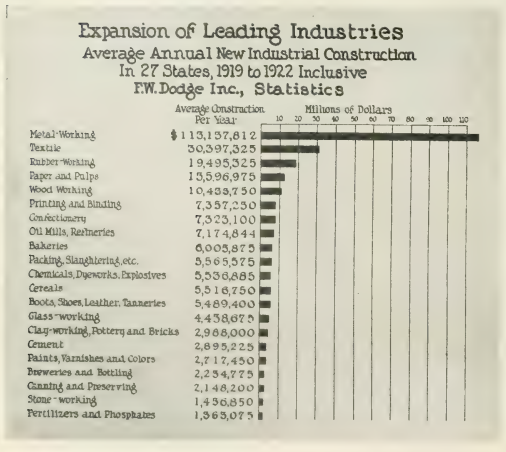
With the attaining of the proper temperature, correct analysis of metal and slag conditions, the power is cut down slightly. Then the alloys of manganese, silicon and vanadium are added to the bath in sealed containers to eliminate as much as possible their being mechanically entrapped in the slag. After a short time the metal is thoroughly stirred and a metal sample taken for observation which should show the steel about ready for pouring from the furnace.

At this time, further deoxidation of the steel was proceeded with by a process which can not be published and which made it possible to pour the metal into molds of tool form. However, when these further reactions had taken place the metal was poured into a bottom pour ladle to which some special alloys were added. The greatest care was taken to proportion the temperature during this last stage of the operation, for the steel, although not at its maximum of temperature, must be poured into the ladle very hot, to leave plenty of time for the necessary reactions to take place, and still enter the molds with sufficient liquidity. After these reactions ceased the metal was transferred to 100-lb. hand carried ladles, and when the proper temperature was obtained the metal was poured as quickly as possible. During the time the molds were being filled the film of oxide which forms on the top of the metal in the small ladles was prevented from entering the molds.

Molds and Heat Treatment

The molds for these castings are a special foundry proposition requiring the use of high-grade materials and great attention to details not often considered in regular foundry practice. **A chilled molding system** was developed where all sand washing was practically avoided, however, green sand, dry sand and cores with chill plates were used, depending on the type of tool to be made. It must be remembered that excessive segregation can be lessened and in some cases eliminated, provided the metal is reduced in cross section sufficiently, also the degree of segregation is dependent upon the initial casting temperature, rate of cooling from the liquid to solid state. This is one of the reasons why these small castings are less segregated than ingots.

The heat treatment of this steel follows the general practice of ordinary high-speed steel, except for the different ranges of temperatures because of the special analysis and also the quenching mediums used. The object of this heat treatment was to have all tools show a martinsitic structure under the microscope with a slight tendency to grade down to a troostitic structure. The photomicrographs, Fig. 1 of ordinary high-speed steel should be compared with Figs. 2, 3 and 4 of a cast high-speed steel cutter, the latter showing in general the structure obtained with this steel. The steel has the same structure in all planes and differs distinctly from forged or rolled stock which is fibrous. As a result, the strength and unique cutting qualities of this steel are the same in all directions.



WHILE the Metal-Working Industries Have No Monopoly on New Construction, This Chart Shows That They Accounted for More Building Operations in the Four Years Surveyed, Than the Sum of the Next Ten Manufacturing Groups in Point of Construction Activity. In fact, in the total building program of the 20 industries shown below, metal-working was only 28 per cent greater than that of the leading industry alone. That this should be the case, in view of the great war-expansion of metal-working plants and the post-war efforts to find outlet for the "excess" capacity thus created, is but another indication of the inherent strength of the machinery-building and other metal-working portions of our industrial structure

BLAST FURNACE RECORD

Number of Active Stacks Decreased by Twelve Compared with End of 1922

The end of the year finds 11 fewer blast furnaces in production in the Pittsburgh and nearby districts than at the end of 1922. In the area embraced, bounded by Johnstown and Erie, Pa., Dover, Ohio, and Wheeling, W. Va., there are now 117 steel works and 24 merchant furnaces. Of these 11 of the merchant stacks are in production, while iron is being produced in 81 of the steel works stacks. At the end of 1922 there were 142 furnaces, the Hall furnaces of the Republic Iron & Steel Co. at Sharon, Pa., having been dismantled in the past year. There were then in production 11 merchant furnaces and 92 steel works stacks.

The American Steel & Wire Co. has the same number of furnaces making iron as a year ago, as has also the National Tube Co. and the Carnegie Steel Co., although the active stacks of the latter are not the identical ones which were producing a year ago. The Jones & Laughlin Steel Corporation a year ago had all 12 of its furnaces making iron, as against nine now in production. Only one furnace of this company is cold, however, the two others being banked. The Republic Iron & Steel Co. has four furnaces making iron, the same number as a year ago, but the Youngstown Sheet & Tube Co., now having nine furnaces in the Youngstown district, as a result of its acquisition of the Brier Hill Steel Co., has five stacks in production against seven, the total of the two companies a year ago. The Pittsburgh Steel has one furnace in against two a year ago; the Bethlehem Steel Co., four in at Johnstown, Pa., against eight a year ago, and the Wheeling Steel Corporation, not including Portsmouth, Ohio, two, against three at the end of 1922.

Merchant furnaces idle now which were in production a year ago are those of the Clinton Iron & Steel Co., Pittsburgh, the Penn Iron & Steel Co., Canal Dover, Ohio; Reliance Coke & Furnace Co., Sharpsville, Pa.; one furnace of the Shenango Furnace Co., Sharpsville, Pa., and the Perry Iron Co., Erie, Pa. Merchant furnaces now producing, which were idle a year ago, include the stacks of the Sharpsville Furnace Co., Sharpsville, Pa.; the Stewart Furnace Co., Sharon, Pa.; the Adrian Furnace Co., Dubois, Pa., and two McKinney Steel Co. furnaces at Josephine, Pa.

The record of furnaces in production and out or banked at the close of the year makes the following comparison:

PITTSBURGH DISTRICT

Steel Works Furnaces

	Total	—1923— In	Out	—1922— In	Out
American Steel & Wire Co.—					
Donora, Pa.	2	1	1	1	1
Schoenberger	2	2	0	2	0
Carnegie Steel Co.—					
Carrie	7	7	0	7	0
Clairton	3	3	0	3	0
Duquesne	6	5	1	6	0
Edgar Thomson	11	8	3	7	4
Edith	1	0	1	0	1
Isabella	3	2	1	2	1
Lucy	2	0	2	1	1
Neville	1	1	0	1	0
Pittsburgh Crucible Steel Co.	2	1	1	1	1
Jones & Laughlin Steel Corporation—					
Aliquippa	5	5	0	5	0
Eliza	6	4	2	6	0
Soho	1	0	1	1	0
National Tube Co.	4	4	0	4	0
Pittsburgh Steel Co.	2	1	1	2	0
Merchant Furnaces					
Clinton Iron & Steel Co.	1	0	1	1	0
Total	59	45	14	50	9

MAHONING & SHENANGO VALLEY DISTRICTS

Steel Works Furnaces

Carnegie Steel Co.—					
Farrell	3	3	0	3	0
New Castle	4	3	2	4	0
Niles	1	0	1	0	1
Ohio	6	6	0	6	0
Sharon	1	0	1	0	1
Republic Iron & Steel Co.	7	4	3	*4	4
Sharon Steel Hoop Co.	1	1	0	1	0
Trumbull Cliffs Furnace Co.	1	1	0	1	0
Youngstown Sheet & Tube Co.	9	5	4	7	2
Merchant Furnaces					
A. M. Byers Co.	1	1	0	1	0
Hanna Furnace Co.—					
West Middlesex	1	0	1	0	1
Leetonia, Ohio	1	1	0	1	0
Dover, Ohio	1	0	1	1	0
Reliance Coke & Furnace Co.—					
West Middlesex, Pa.	1	0	1	0	1
Sharpsville, Pa.	1	0	1	1	0
McKeefrey Iron Co.	1	0	1	0	1
Sharpsville Furnace Co.	1	1	0	0	1
Shenango Furnace Co.	3	1	2	2	1
Strathmore Furnace Co.	1	1	0	1	0
Stewart Furnace Co.	1	1	0	0	1
Valley Mold & Iron Corporation	1	0	1	0	1
Total	45	28	19	33	15

WESTERN PENNSYLVANIA

Steel Works Furnaces

Bethlehem Steel Co., Johnstown, Pa.	11	4	7	8	3
Merchant Furnaces					
Adrian Furnace Co., Dubois, Pa.	1	1	0	0	1
American Manganese Mfg. Co.	2	0	2	0	2
Kittanning Iron & Steel Mfg. Co.	1	0	1	0	1
McKinney Steel Co.—					
Scottdale, Pa.	1	1	0	1	0
Josephine, Pa.	2	2	0	0	2
Perry Iron Co.	1	0	1	1	0
Punxsutawney Furnace Co.	1	1	0	1	0
Total	20	9	11	11	9

WHEELING DISTRICT

Steel Works Furnaces

Carnegie Steel Co.—					
Bellaire, Ohio	2	2	0	0	2
Mingo, Ohio	4	3	1	3	1
Steubenville, Ohio	1	0	1	0	1
National Tube Co.	2	2	0	2	0
Wheeling Steel Corporation	5	2	3	3	2
Weirton Steel Co.	1	1	0	1	0
Total	15	10	5	9	6
Grand total	141	92	49	103	39

*One furnace dismantled since a year ago.

Immigration in Third Quarter

Returns from the Commissioner General of Immigration show that 263,259 immigrant aliens were admitted to the United States during July, August and September, while 20,603 emigrant aliens departed. The net gain in population, from this source, was thus 242,656. The rate of increase cannot of course be maintained, because several important sources, including Great Britain, have exhausted their annual quotas under the act of May 19, 1921.

Details of the in-and-out movement are shown in the table, which gives the monthly figures for the three months and the labor classification for the total. It will be noted that we gained 58,791 skilled laborers and 94,535 other workers. Included under "miscellaneous" were 40,384 "common" laborers admitted and 8172 departed, or a net gain of 32,212.

1923	Immigrant Aliens Admitted	Emigrant Aliens Departed	Net Gain
July	85,542	8,041	77,501
August	88,286	6,489	81,797
September	89,431	6,073	83,358
Third quarter	263,259	20,603	242,656
Of the above:			
Professional	9,023	658	8,365
Skilled labor	60,619	1,828	58,791
Miscellaneous	97,318	11,148	86,170
No occupation*	96,299	6,969	89,330

*Including women and children.

The Pittsburgh Steel Co. has blown out one of its two furnaces at Monessen, Pa., for relining, but this loss has been offset by the starting up of a furnace of the Bethlehem Steel Co. at Johnstown, Pa. Recent resumption of the Mattie furnace of the A. M. Byers Co., Girard, Ohio, brings the total number of furnaces in production at the present writing in Pittsburgh and nearby districts to 92 out of a total of 141, in the area bounded by Johnstown and Erie, Pa., Dover, Ohio, and Wheeling, W. Va.

BRITISH MARKET QUIET

Result of Election Induces Quiet—Settlement with Boilermakers Renews Shipyard Activity

LONDON, ENGLAND, Dec. 13.—Trading in iron and steel during the past fortnight has been rather upset by the general election and now that the result is known, still further quiet has set in. It must be remembered, however, that December is usually quiet in view of the fact that it witnesses the ending of the year, the approach of holidays, and a period of stock-taking. Purchases of pig iron have been heavy during the past month, chiefly on home account, a result of the cessation of the boilermakers' dispute releasing many shipyard contracts and sales have been made, in some instances covering deliveries for the whole of next year. Prices of all makes of pig iron are firm, particularly for hematite, where the tendency is still upward. A halt seems to have been called in the values of foundry pig, Cleveland G. M. B. remaining at about 100s. Hematite on the other hand is changing hands at as high as 102s. 6d. for delivery early next year. Output has recently been expanded by blowing in additional furnaces, but even this has failed to deflect values, and with home demand likely to expand, lower prices are hardly likely for some time to come.

In the finished iron and steel markets considerable improvement is noticeable in business with home consumers, plate mills in particular being busy, in some cases with order books still filled for two or three months ahead. During thirty weeks' idleness, caused by the boilermakers' dispute, the shipyards were inactive, but orders were steadily accumulating, and now that these have been released naturally there is a rush of business in plates and allied products. Ordinary merchant buying is light and export trade is also in a weak condition, there being little inclination on the part of foreign purchasers to enter into commitments, and even trade with Continental producers has suffered of late. Home trade prices are advancing, ship plates now being quoted up to £10 5s. a ton, makers showing an inclination to ask more money for export.

Among recent shipbuilding contracts is one placed by the Royal Mail Steam Packet Co., with Harland & Wolff of Belfast for two motor passenger liners of 22,000 tons gross. The Greek Government has awarded J. S. White & Co., of Cowes, Isle of Wight, contracts for the complete overhauling of machinery and constructional alterations on four Greek destroyers, while the Furness Shipbuilding Co. has secured Canadian contracts for two steamers of 2000 tons dead weight and for five oil carrying barges for the Imperial Oil Co., of Toronto. Launchings of Harland & Wolff this year total 101,823 gross tons, which is stated to be greater than any other firm in Great Britain and Ireland. This output includes high-power passenger steamers for the P. & O. and the Atlantic transport liner "Minnewaska," two single-screw steamers of about 7000 tons each for the British Mexican Petroleum Co., and one twin-screw Diesel engine vessel of 9500 tons for the Royal Mail Steam Packet Co.

Richard Thomas & Co., the largest tin plate manufacturers, recently issued their report covering the year ended Sept. 30, 1923. This shows that the net profit £311,219 is £71,575 larger than a year ago. The preference dividends absorbed £228,664, the ordinary dividend £82,281, and £163,593 was carried forward to the next accounts. In connection with the purchase by the company of the Grovesend Steel & Tin Plate Co., it is stated that the new shares offered in connection with the deal were practically all taken by the present shareholders of Richard Thomas & Co., the small balance not applied for being acquired by the directors who acted as sponsors for the issue.

Spur Gear Hobbing Machine

A No. 34 spur gear hobbing machine similar in general design to the No. 44 spur and spiral gear hobbing machine, described in THE IRON AGE of Oct. 25, has been added to the line of the Brown & Sharpe Mfg. Co., Providence. The machine is rated to hob spur gears up to 18 in. pitch diameter, 3 diametral pitch in cast iron or 4 d.p. in steel.

Simplicity of design, the ability to maintain accuracy over a long period and ease of operation are general features claimed. Special attention is said to have been given to the support of all gears, and spiral bevel gears are used where thought desirable. Low and compact design of the hob slide and swivel, bringing the hob spindle close to the ways, is intended to assure maximum rigidity. The work is supported by an overhanging arm as in the previous machine, and additional support is provided for heavy gears by an adjustable rim rest placed back of the work being cut, which takes the thrust of the hob. The No. 34 machine is also provided with the balance wheel, mounted directly on the hob spindle, for steadying the cutting action of both the hob and the machine, thereby eliminating chatter. The hob slide may be run back and forth by power when the hob is stationary, a feature emphasized as eliminating laborious hand operation. Hand wheels and control levers are located on the front of the machine and within easy reach.

The machine is self-contained and may be driven directly from the main line shaft to the single friction pulley. For motor drive, the motor is mounted on a bracket at the rear and geared direct to a friction gear on the main drive shaft. From the friction pulley the drive passes to the hob slide quick-return mechanism and then through the speed change gears. From these gears the drive goes forward to the hob spindle and index mechanism and then along the rear of the machine bed to the hob slide feed screw.

Ten changes of speed, from 45 to 165 r.p.m. in geometrical progression are provided for the hob spindle and provision for 1½ in. end adjustment of this spindle is included to permit using several sections of the hob before resharpening. Hobs up to 5 in. in diameter may be used and either a 1¼ or 1½ in. spindle may be provided. A 10 deg. adjustment of the hob swivel is provided for right-hand hobs only. A vernier reading to 5 min. permits of accurate setting. The index change gears permit of cutting all numbers of teeth from 6 to 50, and all numbers from 50 to 180 except prime numbers and their multiples.

The arrangement of the indexing mechanism is similar to that in the No. 44 machine and a hand wheel is provided on the index worm shaft to permit the worm to be operated by hand. This is intended to be of substantial value in recutting gears, as it has graduations to indicate the relative adjustment of the work arbor. The work spindle front end has a No. 16 B & S taper hole with a 2½ in. diameter hole through the center for holding shafts or work arbors, and is fitted to receive a faceplate or fixture.

Change gears give 12 changes in feed of the hob slide in geometrical progression from 0.025 to 0.153 in. per revolution of the work. After leaving the change gears the drive is through a worm and worm wheel, which turns free on the feed screw. A lever controls a clutch on the feed screw shaft; the clutch if thrown to one side engages the lead screw, and if thrown to the other connects the power quick return. The clutch also has a neutral position. The feed screw may be rotated in either direction by hand. A vertical lever at the top of the feed case operates another clutch and controls the rapid power advance, the power quick return being controlled by the horizontal lever. Both are operative when the hob is rotating or idle.

A motion picture film has been completed by the E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del., entitled "Dynamite at Work." The reels may be obtained upon application to the Du Pont company. Among other things there is a slow motion picture of a shot of some 45,000 lb. of dynamite in a quarry.

GERMAN SITUATION

Finish of Ruhr Struggle Industry Adapting Itself to Changed Conditions—Working Overtime

BERLIN, GERMANY, Dec. 1. With the signing of the agreement between the Mission Interalliée de Controle des Usines et des Mines and the representative of the Mining Association (Bergbaulicher Verein) at Düsseldorf, the Ruhr problem has entered a new phase. The agreement is of vast importance not only to the Ruhr district but also to the whole of Germany and may be compared with the Versailles treaty. With sufficient good will on both sides it may be the turning point toward a new and better era.

Conditions in the Ruhr districts have lately shown a great resemblance to those existing in November, 1918. About 2 million are out of work with another 1½ million on short time. The official cost of living index has increased to more than 50 per cent above the purchasing power of the mark but prices in the occupied area are higher than in other parts of Germany. The excitement among the crowded population reached the highest pitch when the Berlin Government had to declare that it was unable to continue to pay compensation to the industry to keep its employees at work. More dismissals of workmen took place then and the industrial leaders probably feared violent outbreaks of public resentment.

Unless the price of Ruhr coal can be kept at a level with British quotations, there is little possibility to keep the coal industry going. In consideration of the crisis the mine owners and the representatives of the employees have made an agreement that one hour overtime is to be worked in the Ruhr mines. For the other overground workers not directly connected with coal production a new arrangement is to be made in regard to working hours. One of the main factors is the question of transportation, as it will be some time before the railroads will be in full working order.

Conditions in the German engineering industry show no improvement. Customers are awaiting a clearing up of the situation especially in regard to the exchange problems. For some time the mark exchange has been fixed much higher at the Berlin bourse than abroad. Owing to this discrepancy and the fear that a further drop in the mark would take place, goldmark prices were raised all round and are in some cases three to four times pre-war level to cover the risk on papermark payments. Engineering firms have, however, hardly doubled their prices. The keen competition has kept prices low, and orders have been accepted on an unprofitable basis in order to get the means to carry on. The industry in the occupied area is greatly hampered by the export restrictions and the tax.

Difficulties in Restarting Ruhr Industries

There are many difficulties in the way of restarting the iron works on the Ruhr, and some time will elapse before anything like a normal working is attained. At some works the stock of ore is low and the scrap available has been considerably reduced by French requisitioning. For a full restarting of the works large amounts of raw material would have to be procured, but as railroad transport is still dislocated, sufficient supplies will only gradually be available. Producers of scrap have petitioned the Government to grant export permission, but owing to the prevailing scarcity this was refused. The sending of semi-finished material and rolled finished iron products to unoccupied Germany is prohibited by the occupation authorities and permission has to be procured in every case. Extensive informations concerning the goods and the respective business transaction have to be furnished with every application.

The Solingen hardware, cutlery and tool industry is also struggling against adverse conditions. Home and foreign orders are declining. Raw materials are far above pre-war level and wages have in most cases been put on a goldmark basis and range between 0.35-0.50 marks (8½ to 12 cents) per hour. The Solingen Chamber of Commerce has concluded an agreement with the Rhineland commission, which is reducing the export duty for several Solingen products to 2 per cent. There are indications of a better export demand and German firms have been cutting prices to get orders.

Some Slowing Down in Austria

In the Austrian iron industry the flow of orders that had come to the works on account of the Ruhr occupation has ebbed down, but inland demand has largely improved. The Alpine Montan Gesellschaft and the South Slavonian iron works have made an agreement to restrict competition, and similar agreements are under negotiation with Czechian works. The prices for German machinery being higher than Austrian quotations, many export orders are secured by Austrian firms against the competition of their principal rival. They are also holding the home market and German machinery is at present imported to a very small extent. The cessation of reparation deliveries of German machines to Slavonia is also increasing the demand. The Austrian output of iron and steel products during the present year has increased considerably.

Business Conditions as Indicated by Coal Statistics

Based on the industrial consumption of coal, the volume of business as a whole during the month of November settled back to the level recorded for the month of September, according to the latest bulletin of the fuel committee of the National Association of Purchasing Agents. However, when taking into consideration that during November there were two legal holidays leaving only 24 working days as compared with 27 in October, the committee finds that the average daily volume of business was on about the same level for both months.

Of the total number of reports received from consumers of industrial coal for November, 47 per cent indicated increases in business, 24 per cent remained stationary, and 29 per cent showed decreases as compared with the preceding month.

Many branches of industry engaged in producing commodities entering into the holiday trade and seasonal lines showed increases, while a considerable number of industries in the staple and standard lines remained stationary or eased off a little.

Stocks and production of reporting companies were as follows:

Estimated Stocks on Hand		Net Tons
Sept. 1, 1923		76,480,000
Oct. 1, 1923		77,620,000
Nov. 1, 1923		77,015,000
Dec. 1, 1923		75,269,000
	Net Tons Production	Estimated Consumption
Month of August	57,547,000	42,750,000
Month of September	49,527,000	39,700,000
Month of October	57,364,000	46,217,000
Month of November	51,075,000	39,720,000

(Of the November production 43,329,000 tons was soft coal and 7,746,000 tons hard coal.)

The stocks of hard and soft coal in commercial consumers' bins on Dec. 1 were approximately 1,746,000 tons less than on Nov. 1. Based on the rate of consumption in November the stocks on Dec. 1 were sufficient to meet the industrial requirements of the United States and Canada for 47 days on the average.

The total production of coal fell off approximately 6,289,000 tons during November. This lower production in a large measure is due to two legal holidays, and the celebration by the miners of several church holidays during the month. Anthracite production was also hampered by strikes in several of the larger operations.

The Interstate Commerce Commission at Washington has again postponed the effective date of its order in the assigned car case, this time to April 1. Announcement of the latest postponement was made last Saturday. Arguments in the case were completed recently.

Machinery Markets and News of the Works

HOLIDAY LULL

Many of the Prospective Machine-Tool Purchases Being Postponed

General Electric Co., Schenectady, One of the Largest Buyers of Past Week

A holiday lull settled over the machine-tool markets last week and salesmen were in most instances put off until after Jan. 1. The General Electric Co. closed for a number of machines for Schenectady and West Lynn, and is expected to come into the market shortly for equipment for its new switchboard plant now being built in Philadelphia.

There has been a little miscellaneous railroad buying, and more is expected soon. The Union Pacific will probably act this week upon a list recently issued which calls for about $50,000 worth of shop tools. The Pennsylvania Railroad has pending an inquiry for 18 tools for a new shop at Sharpsburg, Pa.

Prospects for an increasing volume of business after the first of the year seem promising, providing business in general shows signs of improvement.

New York

NEW YORK, Dec. 24.

THE General Electric Co., Schenectady, N. Y., was one of the principal buyers of the past week, and further purchases from this source are expected soon for its new switchboard plant now being built in Philadelphia. Machine-tool sellers have many inquiries on hand, but prospective buyers have in most instances postponed action until after Jan. 1. Orders received in New York sales offices the past week include the following: Walter Scott & Co., Plainfield, N. J., 6-ft. radial drill; Michigan Alkali Co., Detroit, 6-in. spindle horizontal boring, drilling and milling machine; Chicago, Burlington & Quincy Railroad, 42-in. planer; Chicago Great Western Railroad, 60-in. vertical milling machine; side-head boring mill, American Car & Foundry Co.; Western Electric Co., Chicago, 5-ft. boring and turning mill.

Frank Feraro, 825 Blake Avenue, Brooklyn, is having plans drawn for a one-story plant, 50 x 100 ft., for the manufacture of pipe nipples and kindred products, to cost $21,000. Louis Schillinger, 167 Van Sicklen Avenue, is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 8, for 18,000 sq. ft. of brass wire cloth for the Brooklyn Navy Yard, schedule 1717.

The Albany Hardware & Iron Co., 41 State Street, Albany, N. Y., has engaged Fuller & Robinson, 95 State Street, architects, to prepare plans for its proposed seven-story works and distributing plant, 120 x 200 ft., to cost approximately $500,000. William I. Baker is president.

The Chilean State Railways, 141 Broadway, New York, will be in the market for steel and metal products, and equipment, for estimated 1924 requirements, as per lists now available.

The National Biscuit Co., 85 Ninth Avenue, New York, has awarded a general contract to Isaac Beers, Times Building, for a one-story machine and repair shop, 110 x 175 ft., at 450-60 West Fifteenth Street, to cost $75,000. J. B. Terrance, Rutherford, N. J., is architect. R. E. Tomlinson is president.

V. Nogin, director of the All-Russian Co-Operative Society, Ltd., 136 Liberty Street, New York, has arrived in this city from Moscow, to purchase a quantity of textile transmission and other machinery for shipment to Russia.

The Department of Plants and Structures, Municipal Building, New York, has been granted an appropriation of $50,000 for the installation of equipment for a radio station in Central Park. Grover A. Whalen is commissioner.

The American & Foreign Power Co., Inc., has been organized under Maine laws by the Electric Bond & Share Co., 71 Broadway, New York, to be operated as one of its utility groups in foreign countries. Properties of the parent company in Cuba, Panama and Guatemala will be taken over and extended by the new organization, and other plants acquired. The company is capitalized with 520,000 shares of preferred stock, and 920,000 shares of common stock, no par value. An issue of 400,000 shares of the first noted, to aggregate $38,400,000, will be sold to carry out the project. S. Z. Mitchell, president of the parent company, will act in the same capacity for the new organization.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a mill to be constructed in Queensland, Australia, for the manufacture of wall board and kindred products from sugar cane waste, in which it is proposed to use American machinery and power equipment. The Australian Cotton Association is indirectly interested in the project. Reference No. 112213.

Morris Leavitt, 1195-97 Atlantic Avenue, Brooklyn, manufacturer of parquet flooring, has plans for a four-story addition at 71-83 Beaver Street, to cost $35,000. Adolph Goldberg, 164 Montague Street, is architect. Machinery will be electrically-operated.

Ovens, power equipment, conveying and other machinery will be installed in the new three-story baking plant to be established by the Wagner Pastry Co., 9 Vesey Street, Newark, N. J., at Long Island City, where a building recently erected by the Interstate Land Holding Co. has been purchased. It will cost $125,000. W. J. Biddle is president.

The Transit Commission, 49 Lafayette Street, New York, will use an appropriation of $1,000,000 for additional repair shops at the yards of the Interborough Rapid Transit Co., 148th Street, now in course of erection, including machinery. It is expected to have the structures completed next summer.

The W. & A. Fletcher Co., 1301 Hudson Street, Hoboken, N. J., operating a shipbuilding and repair plant, has acquired the business of the Empire Electric Welding & Repair Co., foot of Thirty-sixth Street, Brooklyn, and will take possession Jan. 1. The property will be remodeled for a branch ship repair works.

The Arthur B. Shepard Co., 1836 Euclid Avenue, Cleveland, manufacturer of fabricated steel buildings, has acquired 2½ acres at Irvington, N. J., heretofore held by Gould & Eberhardt, for a new branch plant. The initial works will be one-story, 50 x 200 ft.

The Newark Cutlery Mfg. Co., 360 Fourteenth Avenue, Newark, will commence the erection of a new plant on Cordier Street, Irvington, N. J., to cost $25,000.

The General Engineering & Management Corporation, 165 Broadway, New York, will install an electrically-operated pumping plant with capacity of 2,000,000 gal. per day at Lakewood, N. J., in connection with a new sewerage treatment plant. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers.

The National Light & Electric Co., 291 Market Street, Newark, manufacturer of wireless and electrical equipment, has purchased property at 61-63 Lafayette Street, adjoining a four-story structure on Mulberry Street, acquired several months ago, for extensions.

The Interflash Signal Corporation, 120 Broadway, New York, manufacturer of railroad and highway signal devices, has leased a portion of the building at Plane and Augusta Streets, Newark, for a new plant, primarily for parts manufacture and assembling.

The Maccar Truck Co., Scranton, Pa., is establishing a factory branch at Sixth Avenue and Twelfth Street, Newark, totaling 14,000 sq. ft. of floor space, to include parts department and repair shop. Bertram W. Wright will be in charge.

The Packard Motor Car Co., Broad and Kinney Streets, Newark, has leased the two-story building, 150 x 155 ft., at Central Avenue and Hoyt Street, for a new service and repair branch.

The Lackawanna Laundry Co. [illegible] will install power, conveying and other machinery in a two-story addition, estimated to cost $[illegible], on which plans are being drawn by Neil J. Convery, 942 Broad Street, architect.

An electrically-operated pumping plant will be installed by the Common Council, Westmont, N. J., in connection with a new sewerage disposal works, estimated to cost $60,000. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers.

New England

BOSTON, Dec. 24

BUYING of machine tools continues on a small scale. The most recent purchases include a 6-in. vertical shaper by the General Electric Co., West Lynn, Mass.; 24-in. x 10 ft. lathe by the Taunton-New Bedford Copper Co., New Bedford, Mass.; 30 x 60 x 17 gap lathe by the Charlestown Navy Yard, Boston; large horizontal boring machine costing the Massachusetts buying more than $7,000; new disk grinding and miscellaneous used turning tools by a South Boston manufacturer, and odd lots of single machines. Anything even suggesting a list has been put over until after Jan. 1. Machine tool dealers and manufacturers in general will do considerably better in 1923 than in 1922, notwithstanding the inactivity during the past two months.

Small tools have sold well this month, although the past week has witnessed a letdown in orders.

The mechanical equipment of Stevens-Duryea, Inc., Chicopee, Mass., automobiles will be sold at public auction. The buildings will not be included. The plant was sold by receivers in October to a syndicate headed by R. M. Owen, New York.

Fred Drew, Brockton Last Co., Brockton, Mass., has taken over the recently liquidated Boston Last Co., heating appliances for shoe manufacturers, and has leased part of the G.G. Roberts Corporation tack factory, South Avenue, Whitman, Mass., under the name of the Boston Electrical Heating Corporation. The new firm is in the market for mechanical equipment and expects to begin operations shortly after the new year.

The Westinghouse Electric & Mfg. Co., East Springfield, Mass., has received a $1,500,000 order from the Radio Corporation, which includes radio receiving sets of new design. Work will start immediately and the operating force at the East Springfield plant will be increased.

Work is well under way on the erection of one-story wood-working shop for John D. McPhee Co., 124 Western Avenue, Brighton, Boston. Plans are private.

Foundations are in for a one-story, 54 x 60 ft. foundry and one-story, 15 x 30 ft. extension for the William J. Collins Foundry Co., Inc., Milford, Mass. to cost $10,000. W. J. Collins is in charge of the work.

Bids close this week for a $700,000 high school to be erected in Tudor Street, Chelsea, Mass., three-stories, 230 x 232 ft., to contain a machine shop and manual training departments. S. S. Eisenberg, 46 Cornhill, Boston, is the architect.

Plans are being prepared by John A. Stevens, Lowell, Mass., engineer, for a new power plant for the Draper Corporation, Hopedale, Mass., textile machinery.

The Central Maine Power Co. has been authorized by the Maine public utilities commission to issue $749,700 7 per cent preferred stock. Of this amount $600,000 will be used for future expenditures, $47,000 for sinking fund retirements, $5,000 for the retirement of second mortgage bonds and the remainder for the purchase of land and water rights at Skowhegan.

Contract has been awarded by the Pressed Metal Co., Providence, R. I., recently organized, to the Rowley Construction Co., Central Avenue, for a one-story plant, 107 x 265 ft., on Campbell Street, to cost $150,000. It will manufacture automobile parts. The company is headed by Darius Goff, Frank J. Powers and D. W. Flint, Cranston, R. I.

The Haverhill Electric Co., Haverhill, Mass., will make extensions in its power house at 161-65 Water Street, 75 x 91 ft., estimated to cost $35,000. Charles H. Tenney & Co., 200 Devonshire Street, Boston, are engineers.

A power plant will be constructed by the Sayles Finishing Plants, Inc., Saylesville, R. I., at its proposed textile mill near Asheville, N. C., estimated to cost $2,000,000.

The Franklin Light & Power Co., Farmington, Me., has purchased a site on the Carabasset River, North Anson, Me., for a hydroelectric power plant, with initial output of about 40,000 hp., to cost $125,000, including power dam, etc.

Metals controls, recently organized with $[illegible] capital, will establish in the four story and basement printing plant [illegible] to be erected by the Waterbury Lithographing Co., Waterbury, Conn., to cost $200,000, for which bids are being asked on general contract. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects and engineers.

New interests have acquired the plant and business of the New Haven Copper Co., Seymour, Conn., operating with a capital of $200,000, and will take immediate possession. Plans are being considered for improvements and the installation of additional equipment.

The Boston Sand & Gravel Co., 300 Condor Street, East Boston, is planning for the installation of an electrically-operated coal hoist and tower, with bucket about 1½ yd. capacity.

Work is under way on a two-story automobile service and repair shop for municipal automobiles at Board and Rollstone Streets, Fitchburg, Mass., with other municipal shops, 44 x 110 ft., 60 x 66 ft., and 30 x 60 ft., to cost $100,000. The City Council is in charge. H. A. Foster, 78 Fox Street, is architect.

A State charter has been issued to the New England High Carbon Wire Co., Millbury, Mass., with capital of $50,000 and 1100 shares of stock, no par value. It has recently acquired the former plant of the Millbury Rubber Co., and will install equipment for the manufacture of wire and metal products. Carl Thure Lund, 4 Stebbins Street, Worcester, Mass., is president and treasurer. Albert W. Blackmer is also interested in the company.

The Boston & Maine Railroad Co., North Station, Boston, will arrange a list of equipment for installation in its proposed power house at Worcester, Mass., to cost about $65,000. A. W. Munster is purchasing agent.

Philadelphia

PHILADELPHIA, Dec. 24

AN expansion program has been arranged by the Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, including the construction of two generating plants in the city and one at Chester, Pa., to cost more than $5,000,000, with machinery. Work on the Chester station has commenced. Bids will soon be asked for a power substation on North Eleventh Street, for which plans are being drawn by John T. Windrim, Commonwealth Building, architect.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is taking bids on general contract for rebuilding the portion of its Pavonia car and locomotive shops at Camden, N. J., destroyed by fire several weeks ago, with loss of more than $150,000 including equipment.

E. F. Houghton & Co., 240 West Somerset Street, Philadelphia, manufacturers of lubricating oils, etc., have filed plans for a three-story addition at Third and Somerset Streets, to cost $75,000.

The Electric Development & Machine Co., 221 North Twenty-third Street, Philadelphia, has arranged a fund of $75,000 for the erection of its proposed plant at Shelmire and Edmund Streets.

The Congoleum Co., Inc., Morris Building, Philadelphia, plans the construction of a one-story power house at its new one- and three-story plant, 103 x 120 ft., and 65 x 100 ft., at Salem, N. J., estimated to cost $10[illegible],000, for which a general contract has been awarded to the Austin Co., Jefferson Building.

Work will commence on a power house at Fifth and Bristol Streets, Philadelphia, for the Brandle & Smith Co., Eighth and Dauphin Streets, confectioners, to cost $95,000, with equipment.

C. Stanton, 1201 Providence Road, Scranton, Pa., is having plans drawn for a four-story automobile service and repair building to cost approximately $350,000, including equipment. Lester Davis, 616 Spruce Street, is architect.

The Counties Gas & Electric Co., Ardmore, Pa., has work in progress on a new steam-operated electric generating plant at Barbadoes Island, Norristown, Pa., with capacity of 50,000 kw., and will triple the output of the station later.

The Pennsylvania Railroad Co., Altoona, Pa., has preliminary plans for two additional shops at Juniata.

Manual training equipment will be installed in the three-story high school to be erected at Palmerton, Pa., for which revised plans are being prepared, estimated to cost $175,000. W. H. Lee, Fifteenth and Race Streets, Philadelphia, is architect.

The E. Tiffany Co., Main and Franklin Streets, Hallstead, Pa., plans a new factory for the manufacture of trimming shears for trees and kindred specialties.

Fire, Dec. 18, destroyed a portion of the oil storage and distributing plant of the Butler Oil Sales Co., Sunbury, Pa., with loss estimated at $65,000 including equipment. It is planned to rebuild.

The Crane Market

Few new inquiries for either overhead traveling cranes or locomotive cranes have appeared in the past week and orders not yet placed are expected to be carried over to the new year. An inquiry that has been pending for some time was suddenly issued last week with a closing date of Dec. 26 specified. This was the list of the Western Electric Co., for Kearny, N. J. and included a 30-ton, 42-ft. 6½-in. span, 4-motor; 20-ton, 19-ft. 8-in. span, 3-motor; 25-ton, 46-ft. 2¼-in. span, 3-motor, with alternate on 4-motor; two 5-ton, 46-ft. 2¼-in. spans, 3-motor; a 5-ton, 12-ft. 9⅝-in. span hand power; and a ½-ton, 46-ft. 8-in. span, 1-motor crane. Among current locomotive crane inquiries is one from the Baltimore & Ohio Railroad, Baltimore, Md., for a list of six locomotive cranes.

Among recent purchases are:

Charles Wagner Construction Co., Jersey City, N. J., a 25-ton bucket handling locomotive crane from the Browning Co.

American Brake Shoe & Foundry Co., West Mah Wah, N. J., a 20-ton locomotive crane from the Ohio Locomotive Crane Co.

Boston Elevated Railway Co., Boston, Mass., a 10-ton special electric locomotive crane from the Industrial Works.

Babcock & Wilcox Co., Bayonne, N. J., a 17½-ton locomotive crane from the Industrial Works.

Interstate Iron & Steel Co., Chicago, a 27-ton, 55-ft. boom, locomotive crane from the Industrial Works.

Lehigh Structural Steel Co., Philadelphia, a 5-ton electric traveling crane from the Pawling & Harnischfeger Co.

New York Central & Hudson River Railroad, a 5-ton, 35-ft. span, 1-motor, overhead traveling crane for Selkirk, N. Y., from the Whiting Corporation.

Lehigh-Portland Cement Co., Allentown, Pa., a 25-ton, 60-ft. span, 3-motor overhead crane for power house installation at Mason City, Iowa, from the Northern Engineering Works.

Stone & Webster, Boston, Mass., a 10-ton, 79-ft. 1½-in. span electric crane for Phillipsdale, R. I., from the Northern Engineering Works.

Nickel Plate Railroad, Cleveland, Ohio, a 5-ton, 21-ft. radius, electric jib crane for installation at Cleveland, from the Whiting Corporation.

General Electric Co., Schenectady, N. Y., three 5-ton electric cranes for Schenectady, from Alfred Box & Co.

Northwestern Pacific Railroad, San Francisco, a 15-ton, 60-ft. span, 3-motor, overhead traveling crane from the Whiting Corporation.

Government of the Philippines, four 2-ton and one 15-ton gantry crane for Manila from the Wellman-Seaver-Morgan Co.

Manual training equipment will be installed in the two-story and basement high school to be erected at Avalon, Pa., estimated to cost $190,000, for which bids will be called on a general contract about Jan. 2. Maurice E. Kressly, 13 North Fourth Street, Harrisburg, Pa., is architect.

The B. F. Campbell Thermometer Works, Catasaqua, Pa., are perfecting plans for a factory to manufacture precision thermometers and equipment.

Following the construction of its new generating station with capacity of 25,000 kw., now under way at Saxton, Pa., the Penn Central Power Co., Altoona, Pa., plans the erection of additional units for an ultimate output of 80,000 kw.

Baking and power equipment, conveying and automatic machinery will be installed in the new confectionery plant to be established at Philadelphia, by the J. N. Collins Co., Minneapolis, Minn. The former mill of the Wilson Thread Co., Horrocks and Orthodox streets, has been acquired and will be remodeled.

The East Penn Electric Co., Pottsville, Pa., is concluding negotiations for the purchase of nearby light and power companies for expansion. Arrangements are being made for a generating plant on the Juniata River, near Iroquois, Pa.

The Board of Education, Forty Fort, Pa., has engaged Ralph M. Herr, Simon Long Building, Wilkes-Barre, Pa., architect, to prepare plans for a two-story and basement high school, with manual training department, to cost $300,000.

Buffalo

BUFFALO, Dec. 24.

A BOND issue of $1,183,000 is being sold by the Northern New York Utilities, Inc., Watertown, N. Y., a portion of the proceeds to be used for a 10,000 hp. hydroelectric power plant, and 6700 hp., steam-operated generating station. J. N. Carlisle is president.

The Goodene Bank & Service Co., M. Goodene, president, Hayne Building, Elkhart, Ind., manufacturer of metal fixtures, etc., has preliminary plans for a new two-story and basement factory at Buffalo, 150 x 200 ft., estimated to cost $100,000. E. J. Ellis, 215 North Michigan Street, Elkhart, is architect.

The City Council, Gouverneur, N. Y., has engaged L. Reynolds, Geneva, N. Y., engineer, to prepare plans for its proposed power plant and pumping station, estimated to cost $75,000.

The Penn Spring Works, Lock Street, Baldwinsville, N. Y., manufacturer of automobile springs and bumpers, has plans for an addition. New machinery will be installed.

The Star Dry Cleaning Co., 1205 Genesee Street, Syracuse, N. Y., will take bids at once for a one-story power house, 30 x 38 ft., to cost $30,000. Paul Wolter, Welting Building, is architect.

Manual training equipment will be installed in the three-story high school to be erected at Hamburg, N. Y., for which bids will be asked on revised plans about Jan. 2, estimated to cost $350,000. Frank Spangenberg, 250 Delaware Avenue, Buffalo, is architect

B. H. Rogers, Penn Yan, N. Y., will arrange a list of machinery to be installed in a plant to manufacture building materials, including tools, power and transmission apparatus.

The Beechnut Packing Co., Canajoharie, N. Y., has awarded a contract to the Morton C. Tuttle Co., Park Square Building, Boston, for the erection of a four-story addition, 60 x 100 ft., to cost approximately $125,000.

Cincinnati

CINCINNATI, Dec. 24.

INQUIRY continues heavy and buying is also being maintained at a fair rate. Heavy tools, such as planers and boring mills, have been in good demand and some large orders have been placed recently. Among purchasers of planers and boring mills are the Ramapo Iron Works, Pettibone-Mullikin Co., Westinghouse Electric & Mfg. Co., Thomas Elevator Co. and the Nash Motors Co. Local dealers report buying holding up fairly well, though demand is usually for the smaller tools. Second-hand machinery is also fairly active.

A number of railroads are now negotiating for tools, and some of the lists are expected to close within the next week or two. The Louisville & Nashville is understood to be preparing a list for a machine shop to be erected in Alabama. The Sante Fé has issued an inquiry for two engine lathes, and is expected to issue a large inquiry for miscellaneous shop equipment shortly after the new year.

Prices generally are being well maintained, on both new and used equipment.

The Gramm-Bernstein Motor Truck Co., Lima, Ohio, has been purchased by a syndicate headed by E. J. Marshall, Toledo, which contemplates reorganization of the company. The plant will continue to build motor trucks.

The Kilgore Mfg. Co., Westerville, Ohio, manufacturer of toy pistols and caps, was gutted by fire Dec. 14. The assembly plant, general offices and storage building were destroyed, the loss amounting to approximately $50,000. Temporary quarters have been secured and manufacturing operations have been resumed. The company will rebuild as soon as possible, according to H. H. Watkins, general manager.

The Duro Pump & Mfg. Co., Dayton, Ohio, manufacturer of pumps and water supply system, is having plans prepared for an addition to its plant on Amelia Street. The cost of the improvement will be approximately $200,000, including equipment. Schenck & Williams are the architects.

The Louisville Hydro-Electric Co., 321 West Chestnut Street, Louisville, is perfecting plans for a new hydroelectric generating plant to cost about $1,500,000 with machinery and transmission system. D. McDonald is engineer.

The Hoshall Machinery Co., P. O. Box 187, Memphis,

Tenn., has inquiries out for a 150 k[illegible] connected to automatic engine, three-phase, 60 cycle.

The Sanford-Day Iron Works, Inc., Knoxville, Tenn., recently organized under Delaware laws with capital of $480,000, will take over and expand the plant of the company of the same name.

The Standard Oil Co., Toledo, Ohio, has tentative plans for additional units at its refinery in the East Side section, to cost more than $2,000,000 with machinery and power equipment.

The Public Light & Power Co., Chattanooga, Tenn., plans the installation of additional equipment at its hydro-electric generating plant at Shelbyville, Tenn.

South Atlantic States

BALTIMORE, Dec. 24.

Purchase has been made by the Holtson Mfg. Corporation, 119 East York Street, Baltimore, recently organized, of the former works of Unger & Hopf. The property will be remodeled for the manufacture of oil burners and oil-burning apparatus. James B. Holtson is president.

The Appalachiar Power Co., 31 Nassau Street, New York, has engaged Ville, Blackwell & Buck, 49 Wall Street, engineers, to prepare plans for a new electric power house at Glenlyn, Va., with capacity of 60,000 kw., to cost approximately $1,750,000 with transmission system.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a Scotch type boiler, 250 to 300 hp.; two 150-hp. return tubular boilers, and auxiliary equipment; 100-hp. motor, and one 75-hp. motor, each three-phase, 60-cycle, 220 volts; one 18 to 20-in. mechanical extractor for laundry service.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 8 for 20,000-ft. two-conductor cable, schedule 1707; a quantity of plastic fire brick material, schedule 1714; until Jan. 15 for 26,200 ft. steel pipe for the Norfolk, Va., and Mare Island navy yards, schedule 1718; 9,000 composition nipples, schedule 1721, and for a quantity of brass machine screw nuts, schedule 1722, both for the Mare Island Navy Yard.

The Southern Power Co., Charlotte, N. C., has taken options on property near Spartanburg, S. C., as a site for a new steam-operated electric generating plant, to cost about $250,000.

The Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Washington, will receive catalogs and price lists of machinery for cutting timber into railway ties, for reforwarding to the branch office at Rio de Janeiro, Brazil, which has received inquiries for American machinery of this character.

The Puritan Brick Co., Aberdeen, Md., recently organized with a capital of $225,000, has plans for a new plant, with power house and machine shop, estimated to cost $100,000. George Hays Mitchell, Aberdeen, is one of the heads of the company.

The Ansley Lumber Co., Estill, S. C., has inquiries out for a 50-kw. generator and auxiliary equipment.

The Austell Cabinet Co., Austell, Ga., lately formed to build a local plant, is in the market for an engine, boiler, motors and other power and operating machinery. A. B. Harrington is one of the heads of the company; W. F. Collier is construction engineer in charge.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a mechanical cotton baler, second-hand, good condition; one 30 to 40-hp. motor, and one 30-in. solid curb extractor.

The Washington Gas Co., Washington, N. C., will build a steam power house and install generating equipment at its proposed artificial gas plant at Kinston, N. C., estimated to cost $100,000 with machinery.

E. L. Williams, Pelham, Ga., is in the market for machinery for a saw mill, including 50 to 75-hp. engine, boiler and auxiliary power equipment.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a company at Pizen, Czechoslovakia, in the market for American machinery for the manufacture of wire and wire-fencing, and for pin and safety pin manufacturing machines, No. 8521; of a company at Chihuahua, Mexico, desiring match-manufacturing machinery, No. 8549; a concern at Ciudad Juarez, Mexico, in the market for machinery for wire nail manufacture, No. 8546; a company at Johannesburg, South Africa, for machinery for the manufacture of greases, oils, soaps, etc., No. 8517; a company at Algiers, Algeria for mining machinery and tools, No. 8548; and a concern at St. Michael, Azores, for feed grinders and crushers, and machinery for handling vegetable fibre, No. 8502.

Bids will be received by the [illegible] of the District of Columbia, District Building, Washington, until Jan. 12, for one boiler, return tubular, self-contained, in steel casing with firebrick lining.

The Muriel Lumber Co. Wadesboro, S. C., recently formed with a capital of $100,000, is planning the installation of saw mill machinery, planers and woodworking equipment in a local building. The company will also purchase a boiler, engine and auxiliary power equipment. L. D. Robinson is president.

The Pine Waste Products Co., Inc., Stamford, Conn., has tentative plans for a new pulp and paper mill on site in Georgia, location to be given out later, to cost in excess of $100,000, with machinery.

Bids will be received by the General Purchasing Officer, Panama Canal, until Jan. 11, for pinions, switchboards, air compressor steel conduit, electric motor storage batteries, insulated cable, screws, nuts, rivets, chain bolts, pipe jointers, and other equipment, circular 1581.

Chicago

CHICAGO, Dec. 24.

THE International Harvester Co., 606 South Michigan Avenue, Chicago, has preliminary plans for new branch works on Chester Street, Chattanooga, Tenn., adjoining its present plant, to cost close to $100,000 with equipment.

Manual training equipment will be installed in the proposed three-story high school to be erected at Deadwood, S. D., estimated to cost $250,000, for which bids will soon be asked on a general contract. Perkins & McWayne, Paulton Building, Sioux Falls, S. D., are architects.

The Common Council, New Prague, Minn., has tentative plans for a new municipal electric light and power plant, estimated to cost $75,000. E. E. Budin is city clerk.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, is disposing of a bond issue of $15,000,000, a part of the proceeds to be used in connection with an expansion program next year.

The Ford Motor Co., Highland Park, Detroit, is having revised plans drawn for a one-story machine shop, 45 x 100 ft., at Torrence Avenue and 128th Street, Chicago, to cost approximately $40,000. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Wisconsin Railway, Light & Power Co., Winona, Minn., will make extensions and improvements in its power plant and building at Third and Lafayette Streets, to cost $60,000.

Manual training equipment will be installed in the new two-story high school to be erected at Belleville, Ill., estimated to cost $200,000, for which foundations will soon be laid. The Board of Education is in charge.

The Des Moines Electric Co., Des Moines, Iowa, is perfecting plans for a new steam-operated electric generating plant at the junction of the Des Moines and Raccoon Rivers, with initial capacity of 35,500 hp., divided into two units, estimated to cost $5,000,000. Later the station will be increased, with total cost estimated at $15,000,000. The company is a subsidiary of the Illinois Power & Light Corporation, Chicago.

A manual training department will be installed in the new four-story high school to be erected at Joliet, Ill., estimated to cost $500,000, for which foundations will soon be laid. The Board of Education is in charge.

Pittsburgh

PITTSBURGH, Dec. 24.

TENTATIVE plans are being arranged by the Phillips Mine & Mill Supply Co., 2227 Jane Street, Pittsburgh, for the erection of a new factory to cost $100,000, replacing a portion of the works recently destroyed by fire. J. M. Phillips is head.

The Duquesne Light Co., Chamber of Commerce Building, Pittsburgh, has plans for four new power substations, to cost approximately $400,000 with machinery.

The Consolidation Coal Co., 67 Wall Street, New York, is arranging for a preferred stock issue of $10,000,000, a portion of the proceeds to be used for extensions in its properties in West Virginia and the installation of additional equipment.

The Pittsburgh Sheet Glass Co., Tylerdale, Pa., has work in progress on a new plant to cost $700,000 with machinery. A power house and machine shop will be included.

The Wardensville Paint & Mineral Co., Wardensville, W. Va., will break ground early in the new year for several

additions, estimated to cost $40,000 including machinery. E. H. Ranck is president.

The Buckeye Steam Coal Co., Arrott Building, Pittsburgh, has plans for a new tipple and hoisting plant to cost about $90,000.

The Standard Seamless Tube Co., 313 Sixth Avenue, Pittsburgh, has awarded a general contract to the McClintic-Marshall Co., for a one-story addition at Ambridge, Pa., 80 x 500 ft., to cost $95,000. J. B. Wharton is structural engineer for the company.

The West Penn Power Co., West Penn Building, Pittsburgh, is disposing of a bond issue of $7,500,000, a portion of the proceeds to be used for extensions and equipment, including additions to the generating station at Springdale, now in progress. A. M. Lynn is president.

The Coal River & Eastern Railway Co., Seth, W. Va., recently organized with capital of $1,000,000 to build a new line from Seth to Ashford, W. Va., about 16 miles, plans the erection of a locomotive and car repair shop. The company is headed by George B. Hooper and Laurence E. Clark, both of 308 Euclid Avenue, Cleveland.

The Westmoreland Specialty Glass Works, Jeannette, Pa., has extensions in progress to double the capacity of the plant, costing more than $100,000, with equipment.

The Carnegie Coal Co., Carnegie, Pa., has been formed with a capital of $1,750,000 to take over and consolidate the company of the same name with the Wabash Coal Co., Verner Coal & Coke Co., and the Burgettstown Coal Co. Plans are being developed for extensions, and the installation of additional equipment.

The Pennsylvania-Overland Co., 713 Railroad Street, Johnstown, Pa., local representative for the Overland automobile, is taking bids for a two-story service and repair building to cost $65,000.

The Junior Pocahontas Coal Co., Welch, W. Va., has tentative plans for a new power house to replace a structure recently destroyed by fire.

Gulf States

BIRMINGHAM, Dec. 24.

PLANS are being drawn by the L. Harrington Co., Houston Building, San Antonio, Tex., engineer, for a new rock crushing plant at Salado, Tex., for a company whose name is temporarily withheld. It will include a plant, elevating machinery, washing plant, screens, etc., and power house, and cost $90,000.

The Marianna Light & Power Co., Marianna, Fla., has engaged the Southern Engineering Corporation, Albany, Ga., engineer, to prepare plans for a hydroelectric generating plant on the Chipola River, estimated to cost $250,000, with power dam and transmission system. G. M. Thomas is managing director.

The Fisher Supply Co., Dallas, Tex., pipe and plumbing equipment, has commenced the erection of a new storage and distributing plant on South Harwood Street, one-story, L-shape, 40 x 170 ft., with pipe yard, 90 x 127 ft., estimated to cost $45,000. Hoisting, conveying and other equipment will be installed. Flint & Broad, Dallas, are architects.

Wood Brothers, Graham, Tex., C. L. Wood, head, have purchased property at Fifth Avenue and Tenth Street, St. Petersburg, Fla., 125 x 140 ft., as a site for a new ice-manufacturing and cold storage plant, to cost $250,000 including machinery.

Bids will be received by F. M. Pepper, city clerk, Belzoni, Miss., until Jan. 10, for equipment for a municipal power plant and waterworks, including two 200 kw. turbines and generators; two 300 hp. watertube boilers; coal conveying machinery; two 500 gal. per min. motor-driven centrifugal pumps; one 500-gal. motor-driven pump; one 1000-gal. motor-driven fire pump; two centrifugal pumps for boiler feed, turbine driven; one 1000-gal. steam-driven fire pump; two 350 to 400 hp. full Diesel oil engines, with generators; 8-panel switchboard and auxiliary equipment. J. J. Sisloff is superintendent of the water and light department.

Bids will be received by C. J. Ryan, city manager, Fort Pierce, Fla., until Jan. 9, for one electrically-operated distilled water ice-manufacturing plant, 20 tons, daily capacity, for municipal service.

The Ford Motor Co., Highland Park, Detroit, has increased its holdings at Jacksonville, Fla., to a total of 9½ acres of waterfront land, and has plans for a new automobile assembling works, estimated to cost $350,000 with machinery.

The Texas & Pacific Railroad Co., Dallas, Tex., has preliminary plans for new engine shops, engine house, car works and other structures, with power house, at Belt Junction, estimated to cost $750,000, with machinery.

Edward Frederick, 802 East Commerce Street, San Antonio, Tex., has plans for a new factory to manufacture store fixtures and kindred equipment, with electrically-operated machinery, estimated to cost $35,000.

Electric pumping machinery will be installed by the City Council, Meridian, Miss., in connection with proposed improvements at the municipal waterworks to cost $80,000, for which a bond issue will be arranged.

The Board of Education, St. Augustine, Fla., has selected Fred A. Henderich, St. Augustine, architect, to prepare plans for a new high school on Hastings Street, and junior high school for negroes, with manual training departments. A portion of a bond issue of $300,000, will be used for the structures.

The Common Council, Mart, Tex., is arranging a bond issue of $150,000, for a waterworks system and the installation of electric pumping machinery. Koch & Fowler, Central Bank Building, Dallas, Tex., are engineers.

Electric power equipment, elevating and conveying machinery, loading and other equipment will be installed in the grain elevator to be erected by the Kansas City Southern Railway Co., Kansas City, Mo., at Port Arthur, Tex., to cost close to $500,000 with machinery. A. N. Reese, Port Arthur, is engineer.

The City Council, Port Arthur, Tex., is having plans drawn for extensions in the municipal waterworks and the installation of electrically-operated pumping units, estimated to cost $900,000. M. C. Erwin is city engineer.

The F. B. White Typewriter Co., Inc., 327 North Oregon Street, El Paso, Tex., recently organized, has leased a building and will establish a plant for typewriter parts production, rebuilding and repairs. Equipment will be installed at once. F. B. White is president and general manager.

Pacific Coast

SAN FRANCISCO, Dec. 19.

BIDS will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Jan. 8, for machine tools for the naval station, San Diego, Cal., schedule 1696.

C. H. Warner, San Gabriel, Cal., inventor of the Warner speedometer, and associates have organized the American Liquid Meter Co., with capital of $500,000, specializing in the manufacture of liquid measuring equipment. Property has been secured at Alhambra, Cal., for a new plant, estimated to cost $100,000 with machinery. The initial unit will approximate 10,000 sq. ft., and other buildings will be erected later. Mr. Warner will be vice-president.

The National Paper Products Co., 1789 Montgomery Street, San Francisco, affiliated with the Zellerbach Paper Co., 534 Battery Street, is perfecting plans for the initial unit of its plants at Los Angeles, estimated to cost $1,200,000. A power house and machine shop will be built.

The R. E. Borbeck Co., Los Angeles, has negotiations under way with the Chamber of Commerce, Watts, Cal., for a site for a new plant to manufacture tile products, estimated to cost $75,000 with machinery.

The Southern Sierras Power Co., Riverside, Cal., will commence work in January on a hydroelectric generating plant on the Owens River Gorge, Mono County, estimated to cost $500,000 with transmission system. A. B. West is president.

Manual training equipment will be installed in the new junior high school to be erected at San Bernardino, Cal., at Eighth and E Streets, estimated to cost $230,000. The Board of Education is in charge.

The National Ice & Cold Storage Co., Riverside, Cal., will commence the erection of a two-story addition to its cold storage building, estimated to cost $45,000 with equipment. George T. Roberts is general manager.

The Common Council, Nampa, Idaho, is planning the construction of a municipal electric power plant, estimated to cost $85,000 including equipment.

The Orange County Lumber & Box Co., Newport Beach, Cal., recently organized with a capital of $200,000, plans the construction of a power house at its proposed mill on 30-acre tract lately purchased. The plant will cost about $100,000 with equipment. James Irvine, Jr., and C. S. Chapman head the company.

The Southern California Edison Co., Los Angeles, has plans for an addition to its power station at Colton, Cal., to cost $250,000 with equipment.

The Common Council, Pasadena, Cal., is arranging for a bond issue of $250,000, the proceeds to be used for extensions in the municipal electric power plant and the purchase of additional equipment.

The Columbia Valley Power Co., Madras, Ore., is planning the construction of a hydroelectric power house in Deschutes County, estimated to cost $750,000 with machinery.

The Oregon-American Lumber Co., Vernonia, Ore., has plans for the erection of a new one-story mill, 92 x 300 ft., and power house, estimated to cost $125,000 with machinery.

The Simple Auto Wheel Co., Tacoma, Wash., has plans for a new one-story works at 2302 Edison Street, to manufacture automobile wheels.

The White Co., Cleveland, manufacturer of motor trucks, has acquired a half-block of property bounded by Lakeside, Twelfth, Market and Mission Streets, San Francisco, 275 x 550 ft., as a site for a new factory branch to cost $200,000 with equipment. G. A. Urquhart is vice-president.

Detroit

DETROIT, Dec. 24.

THE Fisher Body Corporation, General Motors Building, Detroit, has organized the Fisher-Hurd Lumber Co., to take over and operate 100,000 acres in Tennessee, Arkansas and Louisiana, recently acquired. A number of mills will be constructed, with power plants and electrically-operated machinery. O. P. Hurd, Memphis, Tenn., will be president and general manager of the new company.

The Detroit Concrete Receptacle Co., 4225 Michigan Avenue, Detroit, has arranged for an increase in capital from $100,000 to $350,000 for expansion, a portion of the proceeds to be used in connection with a new plant in the Woodward Heights section.

The Northrop Lock Co., Orion, Mich., manufacturer of special locks and locking devices, is negotiating with the Chamber of Commerce, Adrian, Mich., relative to a site for a new plant. It is proposed to remove to this location and provide equipment for larger production.

The Ford Motor Co., Highland Park, Mich., is taking bids on a general contract for its assembling plant and machine works on Riverside Boulevard, Memphis, Tenn., estimated to cost $750,000 with equipment. Bids will also be called soon for the construction of a one-story assembling works on Roy Street, Seattle, 50 x 310 ft. Albert Kahn, Marquette Building, Detroit, is achitect for both structures.

The Miller-Seldon Electric Co., 1259 Park Street, Detroit, manufacturer of electric equipment, has filed plans for a three-story plant on McGraw Street, estimated to cost $85,000.

The Hupp Motor Car Corporation, Mt. Elliott and Milwaukee Avenues, Detroit, is arranging for a stock issue of $3,000,000, a portion of the proceeds to be used for expansion.

The Kalamazoo Sanitary Mfg. Co., Kalamazoo, Mich., is arranging an extension program to double the capacity of its plant. A number of new buildings will be erected in the spring and considerable additional machinery purchased.

The Sutherland Paper Co., Kalamazoo, Mich., will commence the construction of an addition for its carton department, to cost $80,000 with machinery.

The Detroit School Equipment Co., Penobscot Building, Detroit, has taken over the former plant of the Michigan Truck & Lumber Co., Holly, Mich., for a branch factory to manufacture desks and kindred equipment.

The Wood Products Co., Grand Rapids, Mich., recently formed with a paid-in capital of $30,000, is perfecting plans for a factory to manufacture lamps and kindred specialties. Headquarters have been established at 310 Winter Street. Frank M. Curran is president, and John Drieborg, secretary, treasurer and general manager.

St. Louis

ST. LOUIS, Dec. 24.

PLANS are being arranged by the Missouri Marble Quarries, Inc., St. Louis, G. C. Breaker, Boatmen's Bank Building, head, for a new plant in the vicinity of Rush Tower, Mo., on the Mississippi River, with power house, estimated to cost $150,000, including machinery.

The Arkansas Central Power Co., Little Rock, Ark., will build a one-story addition to its local power plant, 25 x 105 ft., with equipment estimated to cost $125,000. Other extensions and improvements will be made. C. J. Griffith is general manager.

The Tri-Cities Power Co., Bolivar, Mo., recently organized, will commence the construction of a new power house, with transmission system, to cost approximately $75,000. Joseph M. Diel is secretary.

The Warren Steel Castings Co., 3400 Maury Avenue, St. Louis, has awarded a general contract to the Edmunds-Lund Construction Co., Merchants' La Clede Building, for its proposed one-story foundry, 60 x 200 ft., at the Kingshighway and Fairview Avenue, to cost about $65,000. C. E. Raydon is president.

Manual training equipment will be installed in the three-story high school to be erected on the Natural Bridge Road, St. Louis, estimated to cost $1,500,000, for which foundations will be laid at once. The Board of Education, 911 Locust Street, is in charge.

The Stimson Lumber Co., Memphis, Tenn., plans the construction of a power house at its proposed saw and lumber mill on 45 acres, at Dumas, Ark., to cost about $125,000.

The Common Council, Carter, Okla., plans the installation of electric pumping machinery in connection with a new waterworks system. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are engineers.

Bids will be received by M. Peshek, Jr., city clerk, Oklahoma City, Okla., until Jan. 15, for equipment for the municipal waterworks, including gates and operating mechanisms, steel flashboards and mechanisms, etc., as per plans on file.

The Stratton-Warren Hardware Co., Memphis, Tenn., has acquired the plant and business of the Kidd-Bossinger Hardware Co., Little Rock, Ark. Plans are under consideration for expansion and the installation of additional equipment.

The Common Council, Stillwater, Okla., plans the installation of electric pumping machinery at its new waterworks, for which plans are being drawn by V. V. Long & Co., Colcord Building, Oklahoma City, Okla., engineers.

The Van Veneer Co., Malvern, Ark., has plans for a new one-story factory, 100 x 210 ft. Machinery will be electrically-operated. The company is in the market for a 150 kw. generator, motors and other equipment.

Manual training equipment will be installed in the proposed three-story high school to be erected at Guthrie, Okla., estimated to cost $300,000, for which bids will soon be asked on a general contract. Hawk & Parr, Magnolia Building, Oklahoma City, Okla., are architects

Indiana

INDIANAPOLIS, Dec. 24.

FIRE, Dec. 17, destroyed a portion of the plant of the Lindley Box & Paper Co., Marion, Ind., with loss estimated at $150,000, including machinery. It will rebuild at once, increasing the size of the former works. L. R. Lindley is president.

Manual training equipment will be installed in the new two-story junior high and grade school to be erected at Marion, Ind., estimated to cost $225,000, for which foundations will be laid at once. Hiram Elder, Custer Building, is architect.

The Carmichael Safety Gate Co., Indianapolis, recently organized with capital of $50,000 to manufacture patented safety gates for railroad grade crossings, has perfected arrangements with the Castle Machine Co., 143 Neal Avenue, to carry out initial production at its shops and a portion of the works will be given over to this service. H. E. Carmichael is president and Charles Lutz, secretary and treasurer.

V. Milcarek, Michigan City, Ind., care of Ohlgrim & Boonstra, architects, is having plans drawn for a new plant, with main two-story and smaller adjoining buildings to manufacture tile products, estimated to cost $300,000 with machinery. A power house will be built.

Fire, Dec. 17, destroyed a portion of the plant of the Hinde & Dauch Paper Co., Muncie, Ind., manufacturer of corrugated paper products, with loss estimated at $60,000. It is planned to rebuild. Headquarters of the company are at Sandusky, Ohio.

Bids will be received by the Board of Public Works, South Bend, Ind., until Jan. 16, for a turbine driven centrifugal pumping unit and auxiliary equipment for the municipal water works, estimated to cost $30,000 installed. Plans and specifications at the office of the City Water Works.

The Indiana General Service Co., Marion, Ind., is planning for the installation of generating and auxiliary machinery at its local power plant, to replace the equipment destroyed by fire Dec. 15, with loss estimated at $25,000.

Electric pumping equipment will be installed at Seymour, Ind., in connection with a new sewerage plant and system, estimated to cost $240,000. C. H. Hurd, Indianapolis, is engineer. The City Council, Charles L. Kessler, mayor, is in charge.

W. L. Bedford, Indianapolis, is organizing the Reliance Auto Shop, to establish a plant at 232 Caven Street, for the manufacture of automobile bodies.

The Terre Haute Paper Co., Terre Haute, Ind., operating two paper mills, has acquired the former plant and property, totaling 35 acres, of the Commercial Distillery for enlargements. W. G. Clark is general manager.

Canada

TORONTO, Dec. 24.

E. LAFLAMME, Montmagny, Que., is establishing a factory for the manufacture of furniture and will purchase equipment for making chairs, wood products, etc.

The Page-Hersey Tubes, Ltd., Church Street, Toronto, contemplates the erection of new finishing building, of brick and steel.

The Winnipeg Electric Railway Co., Winnipeg, contemplates construction of a coal gas plant, consisting of 17 combination gas ovens of the Becker type having a capacity of 6.8 net tons of coal per charge, together with producer plant and coal and coke handling equipment.

The municipality of High River, Alta., contemplates the installation of an additional 75 hp. electric unit and equipment for a fuel power plant. S. W. Salt is secretary.

The Riverside Iron Works, Calgary, Alta., has started work on the erection of a plant to manufacture transmission equipment, dredges for irrigation work, tractors, etc.

C. R. Tetley, 314 Beaver Hall Hill, Montreal, is preparing plans for a $2,000,000 silk factory to be erected at Cornwall, Ont., for Courtaulds, Ltd., of Coventry, England. The architect will call for tenders early next spring.

F. W. Clarke, 17 St. James Street, Quebec, has secured forest concessions on Manicougan River and will build a sawmill to cost $1,000,000. Construction will start in the spring.

Hunt Brothers, Ltd., London, Ont., contemplate the erection of a grain elevator at Point Edward, Ont., with capacity of 1,000,000 bu.

Western Canada

The G. W. Murray Co., Ltd., Winnipeg, has started work on the erection of a wood-working factory on Market Street, to cost $40,000.

The McLean Shingle Co., Ltd., New Westminster, B. C., is having plans prepared for a shingle mill at Fraser & Pitt River Junction, at a cost of $60,000.

The superintendent of lighthouses, Ketchikan, Alaska, will receive bids until Jan. 21, 1924, for two internal combustion engine-driven air compressors.

The Alberta Flour Mills, Calgary, Alta., is asking for complete equipment for a flour mill. W. B. Sifton is purchasing agent.

Edward E. Phillips has purchased two-acres on the waterfront, between Marne Drive and the Fraser River at Burnaby, B. C., and will erect a sawmill to cost $100,000.

Dale Machinery Co., Inc., Will Open Office

The Dale Machinery Co., Inc., will soon open offices at 308 Machinery Hall, 549 West Jackson Boulevard, Chicago, and will handle a complete line of machine tools in what is generally understood as Chicago territory. James J. Dale, until recently vice-president in charge of sales and director of the Consolidated Machine Tool Corporation of America, is president, and C. M. Robertson, manager the Chicago office of the Consolidated Machine Tool Corporation of America, has been elected vice-president. At the time that Mr. Dale, together with the late C. K. Lassiter and W. H. Marshall, organized the Consolidated Machine Tool Corporation, the physical assets of the Dale Machinery Co. were purchased, but its corporate entity remained independent. The Dale Machinery Co. in 1920 succeeded to the business of the Dale-Brewster Machinery Co., which in turn in 1916 took over the business of the Horne-Dale-Brown Co., which was organized by Mr. Dale and his associates in March, 1915. Mr. Robertson joined the Dale-Brewster organization in January, 1918, and has been with that company, the Dale Machinery Co. and the Consolidated Machine Tool Corporation ever since. From 1909 to 1918 he was associated with the E. L. Essley Machinery Co., Chicago, and for eight years prior to that was superintendent of the plant of the Colburn Machine Tool Co. at Franklin, Pa. Also actively interested in the new organization are F. C. Hermann and W. E. Bewley, until recently connected with the Chicago office of the Consolidated Machine Tool Corporation. Mr. Hermann has been with the Consolidated company and the Dale Machinery Co. since 1921, prior to which he was for one year sales representative connected with the Chicago office of the Reed-Prentice Co., Worcester, Mass. Previous to that, he was for ten years sales representative for Stocker-Rumely-Wachs Co. and the H. A. Stocker Machinery Co. at Chicago. His earlier experience was in the machinery supply business. Mr. Bewley has been for four years connected with the sales department of the Consolidated company and the Dale Machinery Co., and prior to that was for ten years identified with Manning, Maxwell & Moore, Inc.

Plans of New Companies

The John Robertson Co., Brooklyn, has been incorporated with capital stock of $500,000 to manufacture machinery and parts. The company is not in a position to announce its plans at present, but it is understood that preliminary negotiations will be cleared away by the first of the coming year. Present address is in care of L. A. Brown, 44 Court Street.

The Vitalock Co., 1721 Broadway, New York, has been incorporated with $175,000 capital stock and will manufacture an automotive device. Its product is now on the market in limited quantities. H. A. Sharpe heads the company.

The Johnson Motor Products, Inc., New York, has been organized with capital stock of $100,000 and will assemble and distribute automotive equipment. A building has been leased and the company is preparing to install equipment. The incorporators are: P. J. Holdsworth, E. Griffin and E. P. Morse, Jr. Address care of L. J. Elias, 40 Wall Street.

The Auto Carbonfoe Device Corporation, 153 West Sixty-fourth Street, New York, recently incorporated with $60,000 capital, is manufacturing an automotive device and, while part production is being done by a New York manufacturer, it is likely that other work will be placed later. Harry F. Flugge is president and treasurer.

The Super-Ear Corporation, 41 Union Square, New York, recently incorporated with capital of $100,000 to manufacture acoustic devices, is having dies made and will start production as soon as these are installed. L. S. Scher heads the company.

The National Safety Oil Burner Corporation, 53 Park Place, New York, has been organized under Delaware laws with capital stock of $50,000 to manufacture oil burners for industrial and domestic use. Plans are not definite, but in case the company does its own manufacturing it will likely locate in Bridgeport, Conn., or Jersey City, N. J. Mark de Lisser, Styles Bennett and Bert Seabolt are the principals.

The Fleischman Mfg. Co., 2695 Nostrand Avenue, Brooklyn, has been organized with nominal capital to take over an established business in the manufacture of screens and kindred wire products. Additional capital has been taken into the company and small expansion may be undertaken later. S. and B. Fleischman and B. Kwitken are the principals.

J. B. Ferguson, Inc., New York, has been incorporated with $10,000 capital stock and is manufacturing radio equipment. Its factory at 80 Beaver Street is now in operation. J. B. Ferguson, 29 Broadway, heads the company.

R. F. Rice, Inc., care of M. G. Palliser, 1 Liberty Street, New York, incorporated with $15,000 capital stock, will act as distributor of engines, motors and kindred products.

The Glide-Feinberg Fibre Box Corporation, New York, incorporated with capital stock of $50,000, will manufacture fibre containers. Address care of Kleiner & Britwitz, 299 Broadway.

The Davis Keyseater Co., 255 Mill Street, Rochester, N. Y., has been organized to acquire that part of the Davis Machine Tool Co., Inc., Rochester, which pertains to keyseating machines, in which the new company will specialize.

The Concrete Block Machine Co., Green and Columbia Streets, Newark, N. J., has been organized with capital stock of 1000 shares, no par value stock, and will manufacture a machine which makes four-ways-interlocking blocks used for construction. The company takes over a partnership that has existed a considerable period, hence full equipment is available for immediate production. P. W. Wittemann heads the company.

The General Metal Recovery Co., Denver, has been organized with capital of 1500 shares of stock to manufacture metals. It is in the preliminary stages of organization and will have definite plans in the early part of 1924. Present address is in care of H. D. Vaugh, 538 United States National Bank Building.

The Chism Mail Box Co., 2511 Union Central Building, Cincinnati, has been organized with $100,000 capital stock to manufacture apartment mail boxes. Manufacturing will be done by the Edwards Mfg. Co., Cincinnati. L. W. Chism is president.

The Baker Reduction Gear Co., 10228 Woodward Avenue, Detroit, has been organized with capital stock of $10,000 to manufacture automotive products, which are now being manufactured under contract. Earl Howe heads the company.

The Stevens Mfg. Co., 8 Merrimack Street, Lowell, Mass., has been organized with capital stock of $25,000 to manufacture shock absorbers. Its affairs are still in the experimental stage. John K. Stevens heads the company.

The Keystone Forging Co., Northumberland, Pa., has been organized as a consolidation of the company by that name and the M. F. Ford Mfg. Co. The net worth of the

consolidation is approximately $100,00[illegible] of floor space are available. Plant improvement has been completed and new machinery installed for manufacturing standard automotive forgings. The officers of the company are A. I. Spiro, president, and J. J. Axlirod, vice-president and general manager. Offices are maintained in Detroit at the General Motors Building, in New York at 347 Fifth Avenue and in San Francisco at 528 Mills Building.

The Metal Hose & Tubing Co., recently incorporated with $65,000 capital, in St. Louis, is a branch of the company by that name at Raymond and Tillary Streets, Brooklyn. All manufacturing will be done at the Brooklyn plant. Address of the St. Louis office is 1621 Pine Street. R. S. Westcott is treasurer.

The Antenna Insulator Co., 15 Bagley Street, Pawtucket, R. I., has been organized to manufacture weatherproof insulators. The company is now machining insulators for the Continental Fibre Co., Newark, Del. L. H. Bean is president.

The Ruthe Mfg Co., 109 Bank Street, Newark, N. J., has been organized to manufacture tool chests, having an equipped factory now in operation.

The Bassett Battery Co., Inc., 43 Howe Street, New Haven, Conn., has been organized to manufacture battery cases and to operate a service station. G. F. Lacy heads the company.

The Central Sanitary Mfg. Co., organized with capital stock of $40,000, has taken over the business and equipment of the Sergeant-Denning Co., Mexia, Tex., and will manufacture plumbing supplies on a small scale. J. F. Denning is president.

The McNamara Steel Development Co., 1405-77 West Washington Street, Chicago, has been organized with capital stock of $250,000 to manufacture oil well drilling bits. holders, mining bits and steel specialties. The principals of the company have been working in this direction for the last seven years. Work is bing done by contract. Allan Miller is secretary-treasurer.

The Service Maid Corporation, 308 North Michigan Avenue, Chicago has been organized to manufacture dishwashing machinery. It is having its machines built under contract. The company plans to have a plant of its own, complete for operation, within six months. T. C. Hicks heads the company.

The Key Safe Mfg. Co., care of the Berg Mfg. Co., Milwaukee, recently organized with $75,000 capital stock, is taking over a plant in operation for several years, fully equipped and ready for production. Materials used are malleable iron and bronze brass.

The Hold-Mar Vacuum Piston Co., Inc., Room 201, Chamber of Commerce Building, Newark, N. J., recently organized, is now manufacturing vacuum chambers. Casting and machining will be done by contract for a short time, after which the company purposes to build its own plant and install machinery. W. E. Holder is president.

The Atlas Aluminate Cement Co., 25 Broadway, New York, recently organized with capital of 1500 shares, no par value stock, is making a thorough investigation of aluminate cement with the expectation of manufacturing the product in the course of a few months. C. R. Hulsart heads the company.

Industrial News Items

Sale of the Anderson Foundry & Machine Co., Anderson, Ind., one of the R. L. Dollings subsidiaries now in the hands of the receivers, to a new corporation has been authorized by the court on a petition of Winfield T. Durbin, receiver of the Anderson company. The receiver has been instructed to receive sealed bids for not less than the invoice of the assets, $616,000. Bert McBride of Indianapolis is receiver of the R. L. Dollings Co. in Indiana. R. B. White of Anderson, sales manager of the Anderson company for more than four years, and associates, have made a proposition for the organization of the new company and the operation of the business. The new corporation, under the agreement of a joint committee, will have a capital stock probably of $1,800,000 of which $1,200,000 will be a common stock issue and the remainder preferred. There will also be an issue of bonds for $350,000 probably to provide working capital, bear the expense of the reorganization and for other needs.

E. S. Gorrell, of Boston, has been appointed vice-president of the Nordyke & Marmon Co., Indianapolis, to succeed Frederick E. Moskovics, who resigned some time ago to give his attention to private interests. Mr. Moskovica was recently appointed receiver for the Stevenson Gear Company, Indianapolis.

The plant of the Mosel Mfg. Co., Berlin, Conn., steel products, has been closed by order of the directors and the company is going out of business. It has an authorized capitalization of $100,000, about half of which was paid in, and was organized in 1[illegible] by [illegible] and Howard Wessel. The company is understood to have no liabilities. Included in its assets is a plant in Winchester, with equipment.

Albert T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass., is again offering prizes for pupils of schools below the college grade. The subject of the new prizes is to be "Sharing Our National Income." The first prize is $500, the second prize $300, and seven other prizes are of $100 each. Full particulars can be obtained by addressing the company.

Liquidation of the affairs of the Hercules Steel Casting Co. of Milwaukee, placed in the hands of a receiver several months ago, has progressed to the point where disposition of the property and other assets is to be made at once by Edward L. Cullen, receiver, with offices at the works, 871-881 Robinson Avenue, Milwaukee. Bids are now being received until Jan. 21, at 5 p. m. The property consists of 2½ acres, a foundry, 60 x 260 ft., with a 10-ton Vom Baur tilting electric furnace, core ovens, cranes, flasks, torches, etc.

Industrial Finance

Stockholders of the Superior Steel Corporation, Pittsburgh, at a meeting held at Richmond, Va., Dec. 10, approved a proposal of the directors for the sale of 40,000 unissued shares of common stock. These shares are to be sold to a syndicate composed of the present management of the corporation headed by James H. Hammond, chairman of the board of directors. Proceeds from the sale of the stock will be used to retire both classes of preferred stock at $115 and accrued dividends. Stockholders will be asked at a meeting to be held Feb. 15, 1924, to approve an issue of $2,750,000 first mortgage 6 per cent, 15-year sinking fund bonds.

Report of the Canadian Car & Foundry Co., Ltd., for the year ended Sept. 30, shows net income of $1,427,573, against a deficit of $586,632 in 1922.

Although details are lacking, announcement is made that arrangements have been completed with banks, whereby the Wickwire-Spencer Steel Corporation will be provided sufficient funds to care for working capital needs.

Stockholders of the Superior Steel Corporation have approved the sale of 40,000 common shares to a syndicate at $30 a share, the proceeds, together with other financing, to be used to retire on Feb. 15, next, the 32,500 shares of preferred stock outstanding at $115 and accrued dividends. Another stockholders' meeting has been called for Feb. 15 to vote on the directors' recommendation to sell $1,750,000 6 per cent first mortgage bonds which, if passed will make outstanding $2,750,000 in bonds and 100,000 common shares.

An arrangement has been reached between the Bridgeport Brass Co., Bridgeport, Conn., and the United States Department of Justice, whereby the former has turned over $400,000 to the Government in settlement of claims made by the war department that the company had been overpaid $700,000 on ordnance contracts

A preliminary certificate of dissolution has been filed by the Middlesex Machine Co., Inc., Hartford, Conn. Claims may be sent to W. I. Charter, E. Y. Judd and John F. Forward, a majority of the directors.

The Gulf States Steel Co. has purchased approximately 75 per cent of the 6 per cent second preferred stock outstanding at the close of 1922, leaving $15,000 still outstanding. In addition, the company has outstanding $2,000,000 7 per cent first preferred stock and 112,120 shares of common. It has no funded debt.

Plans are in progress to increase the authorized common stock of the Laconia Car Co., Laconia, N. H., from 10,000 to 65,000 shares of no par value. In lieu of the accumulation of unpaid dividends on the preferred stock, 10,000 of the new common shares will be given preferred stockholders. At the same time the preferred stock will become convertible into common stock on a basis of 4½ shares of common for each share of preferred.

Directors of the Youngstown Sheet & Tube Co. have declared a quarterly dividend of $1.25 per share on common stock and $1.75 on preferred. The common dividend is unchanged from the previous payment and will bring the total distribution this year on the common stock to $4.75 per share.

Net income of the Penn Seaboard Steel Corporation for the ten months ended Oct. 31, after all charges, was $27,497. Profit and loss surplus as of that date was $3,228,289, compared with $4,000,541 on Jan. 1. Current assets of $2,325,179 were shown, against current liabilities of $1,538,643.

A. B. McCall of Kenosha, Wis., has been appointed trustee of the bankrupt estate of the K. & F. Mfg. Co., Kenosha, manufacturer of tools, dies, jigs and metal products. H. G. Maddock has served as receiver since involuntary proceedings were instituted in September. Mr. McCall served as trustee of the Winther Motors, Inc., Kenosha.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.40c. to 4.70c.	.....
Nos. 22 and 24	4.45c. to 4.85c.	5.10c.
No. 26	4.50c. to 4.90c.	5.15c.
No. 28	4.60c. to 5.00c.	5.25c.
No. 30	4.80c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.70c. to 5.10c.
No. 16	4.85c. to 5.25c.
Nos. 18 and 20	5.00c. to 5.40c.
Nos. 22 and 24	5.15c. to 5.55c.
No. 26	5.30c. to 5.70c.
No. 27	5.45c. to 5.85c.
No. 28	5.60c. to 6.00c.
No. 30	6.05c. to 6.45c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¾ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 27¼c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 21c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	$10.70	IC	7.00	6.75
IX	13.95	12.55	IX	8.25	8.00
IXX	15.55	13.75	IXX	9.50	9.25
IXXX	17.10	15.30	IXXX	10.75	10.50
IXXXX	18.85	16.80	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	50c.
Bar	58c. to 60c.

Copper

Lake ingot	15⅝c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8¾c. to 9c.
Bar lead	10½c. to 12c.
Solder ½ and ½ guaranteed	34¾c.
No. 1 solder	32¾c.
Refined solder	28¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	11½c. to 12½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market continues quiet and sluggish. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.25
Copper, light bottoms	9.00
Brass, heavy	6.00
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.25
No. 1 red brass or composition turnings	8.00
Lead, heavy	6.25
Lead, tea	5.25
Zinc	4.00
Cast aluminum	16.00
Sheet aluminum	16.00

Did You Ever Wonder Why

Better Makes of Steam Hammers Look So Much Alike?

AS far as we know, Bement Hammers were the first steam hammers developed in this country. Their particular fitness for the work they were to do was quickly recognized and in the many years they have been built, their design has received the frequent compliment of being copied both at home and abroad.

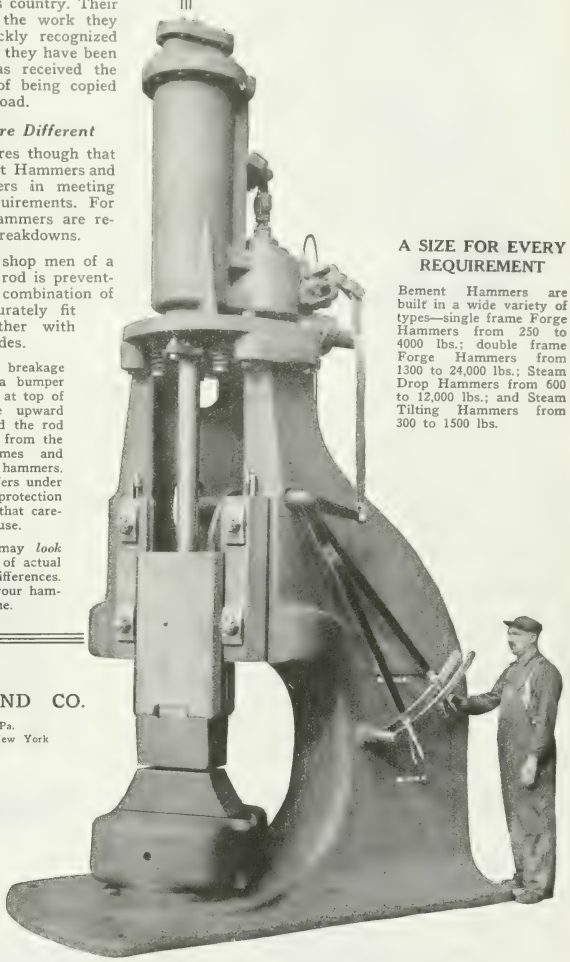
Where Bements Are Different

There are a few features though that still distinguish Bement Hammers and mark them as pioneers in meeting modern forge shop requirements. For one thing, Bement Hammers are remarkably free from breakdowns.

The bugbear to forge shop men of a bent or broken piston rod is prevented in our design by a combination of extra heavy and accurately fit frame and rod together with truly parallel ram guides.

Insurance against cylinder breakage is doubly provided for; a bumper spring in the safety cover at top of the cylinder arrests the upward flight of the piston should the rod ever break or work loose from the ram—it happens sometimes and wrecks other makes of hammers. Another set of spring buffers under the cylinder act as added protection against overtravel of ram that careless handling is apt to cause.

Other Steam Hammers may *look* like Bements but the test of actual service shows up their differences. Buy a Bement and keep your hammer gang busy all the time.



A SIZE FOR EVERY REQUIREMENT

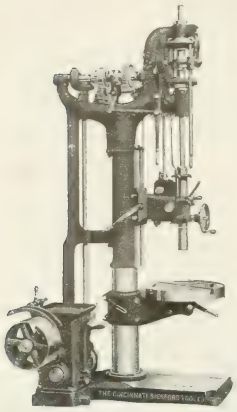
Bement Hammers are built in a wide variety of types—single frame Forge Hammers from 250 to 4000 lbs.; double frame Forge Hammers from 1300 to 24,000 lbs.; Steam Drop Hammers from 600 to 12,000 lbs.; and Steam Tilting Hammers from 300 to 1500 lbs.

NILES - BEMENT - POND CO.

Hammer Works—Ridgway, Pa.
General Offices—111 Broadway, New York

BEMENT HAMMERS

Noted for Their Speed and Endurance



The Cadillac Motor Car Company, Detroit, Michigan, installed a large number of CINCINNATI upright drilling machines for drilling, reaming, counter-boring and tapping its four-cylinder motors, and liked them so well that we were given the order for such additional tools as were required when the company introduced its eight-cylinder motor some years later.

It is a delight to watch the operators manipulate them. They withdraw the drill and change feeds simultaneously—with the same hand—and so quickly that none but a keen-eyed observer can detect the double performance. The feeds in the 21 inch machine illustrated are 6, 9, 13, 18, 27 and 39 thousandths per revolution, while it has 16 speeds, ranging from 38 to 534 r.p.m., of which 11 are suitable for drilling holes of 3 inches and under. The efficiency of the tool is truly remarkable and no plant can attain maximum output without it.

The Cincinnati certainly circumvents climbing costs

The Cincinnati Bickford Tool Co.

Oakley, Cincinnati, Ohio, U. S. A.

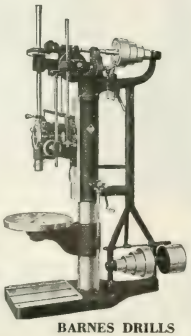
FOUNDED 1874

COMPLETE LINE OF 8 INCH TO 50 INCH SWING

With or Without Tapping Attachment

Upright DRILLS
Horizontal DRILLS
Gang DRILLS

Convenience of Operation
Accuracy
Strength

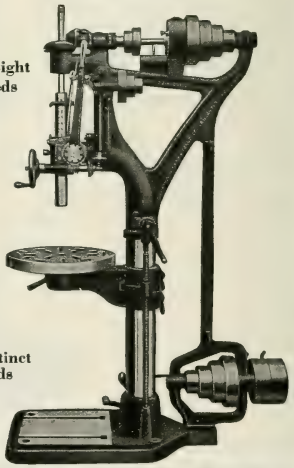


Made by
W. F. & John BARNES CO.
69 Ruby Street
Rockford, Ill.
U. S. A.

BARNES DRILLS

Champion 22 Inch Back Geared Power Drill

Has Eight Speeds



3 Distinct Feeds

Guaranteed absolutely accurate. Especially designed for reboring automobile and tractor cylinders. Equal in many respects to a 25-inch drill.

MANUFACTURED BY

Champion Blower & Forge Company

Lancaster, Pa.

Self-Oiled and All-Geared Drills



These drills have great power, speed and productive capacity.

The absence of cone or inherent belts means dependable action. The self-oiling feature insures longer drill life and a higher production figure.

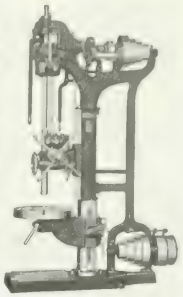
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BARNES DRILL CO.
Incorporated 1907
815-831 Chestnut Street
ROCKFORD, ILL., U. S. A.

"SUPERIOR" DRILLS

A Drilling Machine is no better than its bearings and alignment. The bearings of this drill are machined from the best grade of bronze bearing metal obtainable.

We guarantee the alignment to show no more than .001 inch error in 12 inches.



Kokomo Hi-Speed

And There's a Lot of Information in a Booklet That We Will Gladly Give to You. Ask Us.

SUPERIOR MACHINE TOOL CO.
KOKOMO, IND., U. S. A.



Theoretically CORRECT DRILL POINTS

automatically formed on the OLIVER OF ADRIAN

DRILLPOINTER

produce 2 to 5 times as many holes per grind.

Reduce thrust nearly 50% and will INCREASE DRILL PRODUCTION 25%.

Send us some drills to grind and let us prove it.

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ADRIAN MICH.

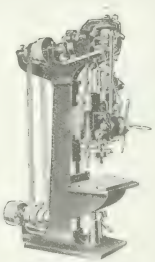


OUR CATALOG

illustrates and explains in detail
WESTERN RADIAL DRILLS
KNOWLEDGE SAVES MONEY

It will pay you to have our catalog handy when you need RADIAL DRILLS.

Western Machine Tool Works
LAKE STREET HOLLAND, MICH.



Model "F"

Finish Your Job in One Set-Up

This is possible with the

TURNER TURRET

Designed to complete a series of operations without shifting the work or changing tools. Reduces cost. Increases output. *Write for particulars.*

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Danbury, Conn., U. S. A.

DRILLING MACHINERY

FULL BALL BEARING
HIGH-SPEED AND HEAVY-DUTY
ONE TO SIX SPINDLES
HIGH-SPEED AND HEAVY-DUTY TAPPERS

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NATCO
THE HOLE STORY IN ONE WORD

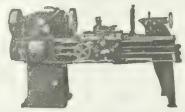
The "Hole" Story in One Word

The National Automatic Tool Co.

RICHMOND, IND.

Largest Exclusive manufacturers Multi-Drillers and Multi-Tappers

Write for full information.



Heavy Duty Lathes

that will produce to the closest precision limits and stand up to severe service conditions.

Get the catalog and see why.

The Greaves-Klusman Tool Co., Cincinnati, Ohio

ROYERSFORD TWENTY-INCH BACK GEARED



This 20-inch back geared, vertical drill has a capacity of 1¼ inches.

Rigid, accurate, this drill is not only a big producer, but a machine for fine work.

Write for circular.

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(incorporated)
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CINCINNATI ACME

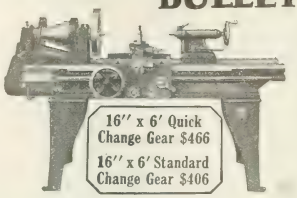
Turret Machinery



Full Range of All Types and Sizes

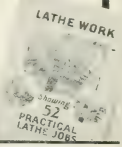
THE ACME MACHINE TOOL CO.
Cincinnati, Ohio

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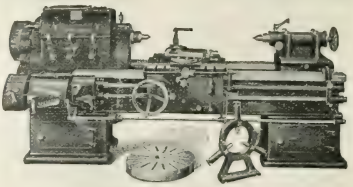
This Bulletin, "Lathe Work," illustrates and describes 52 practical lathe jobs, showing the proper method of machining each job. It will be sent free on request. Write for it today.

Over 30,000 users attest to the performance, accuracy and dependability of SOUTH BEND LATHES. If you are interested in this great lathe value, ask for Catalog No. 83 when you write for the bulletin.



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444 E. Madison Street
SOUTH BEND, INDIANA

SOUTH BEND LATHES



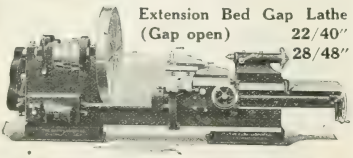
"LEHMANN LATHES"
TWO TYPES—3 Step Cone, Double Back Geared and Geared Head—Single Pulley and Direct Motor Drive
Five Sizes—16/18¾″-18/20¼″-20/22″-22/24½″-24/27⅛″ Swing

A Clutch that Needs No Adjustment

This clutch gives forward, reverse or brake control to the spindle. It operates through helical spur gears, the side thrust of which provides enough contact pressure to *always pull a little more than the load imposed.*

This is but one of the many important features of Lehmann Lathes. Our catalog gives complete details—write for it.

LEHMANN MACHINE COMPANY
3566 Chouteau Ave., ST. LOUIS, MO



Extension Bed Gap Lathe
(Gap open) 22/40″
28/48″

There is really no limit within reason to the work that can be done on this type of Gap Lathe. This tool enables the operator to at all times have a lathe ready for any job, without tearing down and setting up. Especially adapted for: Coal Mines, Railroad Shops, Steel Mills, Public Service Corporations, Shipbuilding, Machine Tool Shops, Oil Refineries, Sugar Refineries and all large shops for repair work.

Let Us Send You a List of Users.

THE RAHN-LARMON CO., CINCINNATI, OHIO

TURRET MACHINERY
All Types and Sizes
DRESES MACH. TOOL CO.
Cincinnati, Ohio

REED-PRENTICE COMPANY
MACHINE TOOLS
WORCESTER MASS., U.S.A.

LATHES
PLANERS
DRILLS
HAMILTON MACHINE TOOL CO.
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GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.
Let our ads. be in the first of the month issues
MACHINE TOOLS, TAPS AND DIES, SCREW PLATES, REAMERS, MILLING CUTTERS, TWIST DRILLS, GAGES, PIPE TOOLS.

GISHOLT PRODUCTS

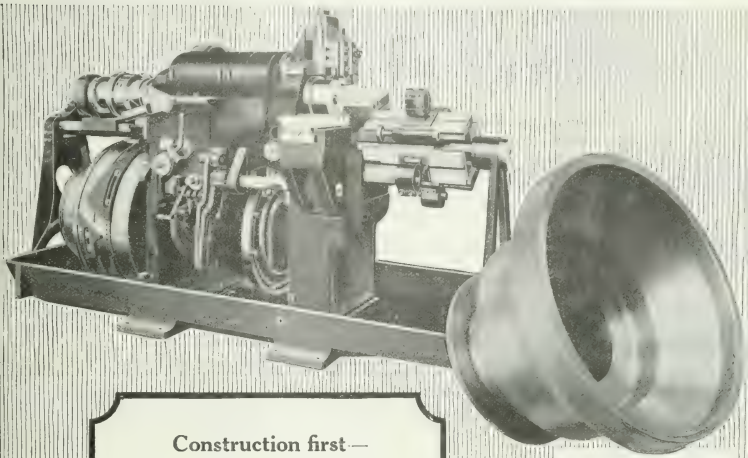
Turret Lathes
Automatic Turret Lathes
Vertical Boring Mills
Horizontal Boring Mills
Universal Tool Grinders
Tool Post Tool Holders
Reamers (Solid-Adjustable)
Boring Bars
Periodograph (Time Recorder)
Contract Tool Work

Separate catalogs are issued for each product. Send for the one in which you are interested.

GISHOLT MACHINE CO. MADISON, WIS.

CONSOLIDATED
MACHINE TOOL CORPORATION of AMERICA
General Office—Rochester, New York
BETTS MACHINE WORKS—COLBURN MACHINE TOOL WORKS—HILLES & JONES WORKS—MODERN TOOL WORKS—NEWTON MACHINE TOOL WORKS
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Chicago Cleveland Detroit New York Philadelphia Pittsburgh St. Louis
See Our Double Page Ad in the First Issue of Each Month

Model L Gridley S. S.

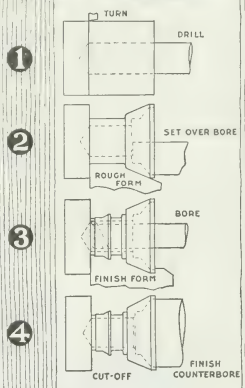


Construction first— your costs depend on it

The kind of tool support you see in the 5¼" Model L Gridley Turret Lathe above is responsible for the heavy forming, boring and counterboring operations shown on the diagram of this steel job.

And the standardization of tools for both roughing and fine finishing enables you to change from one job to another on the shorter runs without excessive expense of equipment or time.

After all it's the quantity per hour that measures the cost per piece. It costs you nothing to find out how many you can get on Gridleys. Capacities 2¼" to 5¼".



The National Acme Company

Windsor, Vt. Cleveland, O.

New York — Boston — Buffalo — Chicago Detroit — Los Angeles

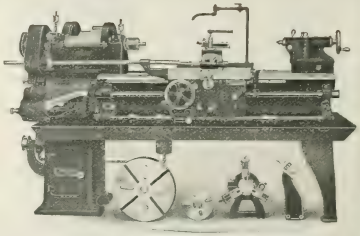
THE CISCO ENGINE LATHE

Has Every Feature a Good Lathe Should Have

Those jobs that require really accurate handling and must be finished in a hurry, can be well taken care of with The Cisco Engine Lathe. In this tool you will find every quality that is needed in a tool room lathe.

Simplicity is only *one* of the big features. Without removing a single gear, a thread cutting range from 2 to 40 per inch is available.

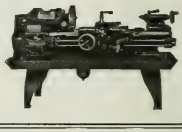
Many more points of superiority are shown in our catalog —write for it.



The Cisco Machine Tool Co.
Cincinnati, Ohio

MONARCH LATHES

The price is right and complete satisfaction is guaranteed. All sizes and styles. From 9" to 30" swing.



THE MONARCH MACHINE TOOL CO.
108 Oak Street Sidney, Ohio

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIALS. CINCINNATI, U.S.A.

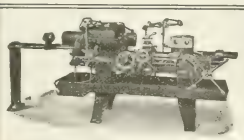
Steinle Turret Machine Co.
THE FULL SWING SIDE CARRIAGE
TURRET LATHE
STEINLE TURRET MACHINE CO.
MADISON WISCONSIN U. S. A.

$695.00
for the remarkable new
Vertical Broaching Machine
for push or pull broaches.
Write now.
American Broach & Machine Co. Ann Arbor Michigan



International Machine Tool Co.
THE LIBBY TURRET LATHE
INTERNATIONAL MACHINE TOOL CO.
INDIANAPOLIS INDIANA

Boring, Drilling, Milling, Precision?
Specify The **LUCAS** "Precision"
Horizontal Boring, Drilling and Milling Machine
LUCAS MACHINE TOOL CO.
CLEVELAND OHIO, U. S. A.
Lucas Patent Power Forcing Press

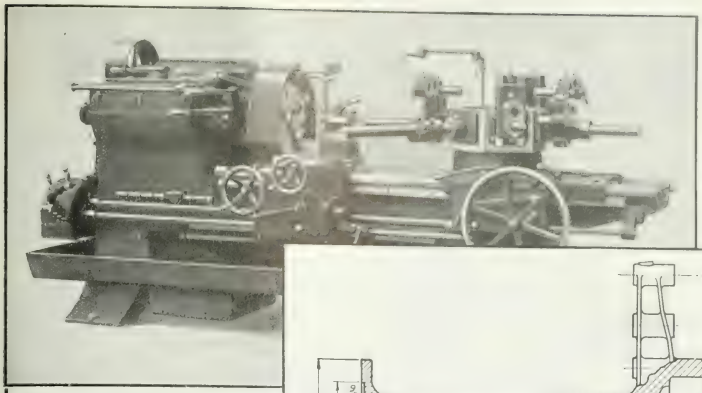


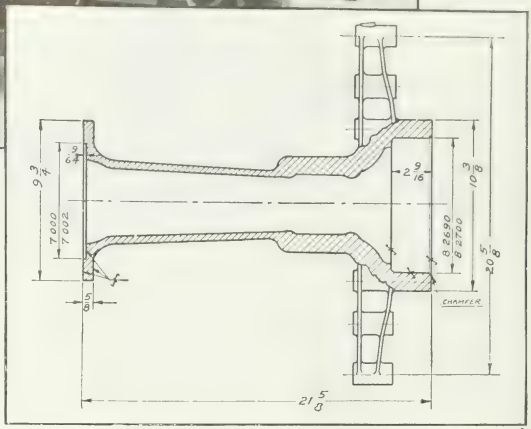
THE FOSTER SCREW MACHINE with their tools and attachments will increase your production.
Foster Machine Co.
Elkhart, Ind.

Cone 4-Spindle Automatics
Are economical and accurate producers of screw machine parts up to 3½" to 7". They cut costs, increase production, boost profits. Write for particulars.
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Agent for Michigan Territory: J. C. Austerberry, 684-690 E. Congress St., Detroit, Mich. Chicago Representative: John H. Glover, 32 N. Clinton St.

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New London, Conn.
MAKERS OF
BROACHING MACHINES and BROACHES

BAKER
Vertical Boring and Drilling Machines
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BAKER BROTHERS TOLEDO OHIO, U. S. A.





Both Ends Completed in One Chucking

Big Saving in an Up-to-Date Motor Truck Plant

A rear axle tube for a Motor Truck required 28 minutes to finish. Because additional equipment was necessary to finish a new and larger tube, the manufacturer investigated other methods than what he was using.

He found that a Warner & Swasey 3-A Turret Lathe could do the work on this larger tube in **10½ minutes.** A big saving over the **28 minute** method.

The Warner & Swasey Company

Cleveland, U. S. A.

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CHICAGO: 618-622 Washington Boulevard
MILWAUKEE: 1143 Wells Building

BOSTON: Oliver Building

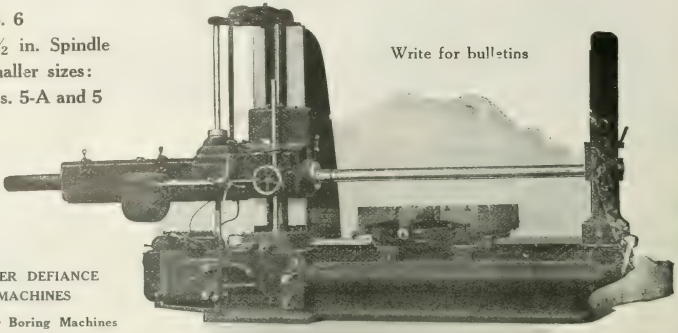
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DETROIT: 5028 Second Boulevard
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It Will Pay You to Install This

"DEFIANCE" BORING, MILLING, DRILLING AND TAPPING MACHINE

Considering the accuracy, speed and convenience of this machine, its installation in your plant will prove a profitable investment.

No. 6
4½ in. Spindle
Smaller sizes:
Nos. 5-A and 5



Write for bulletins

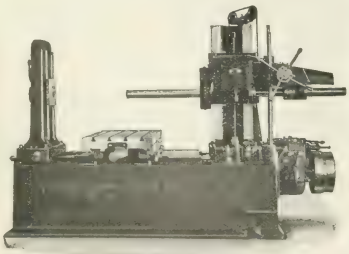
OTHER DEFIANCE MACHINES

Cylinder Boring Machines
Heavy Service Drilling Machines
Rail Drills
Multiple Drilling Machines
Multiple Tapping Machines
Valve Grinding Machines

The Defiance Machine Works
Defiance, Ohio
Established in 1850
Designers and Builders of Precision-Production Machine Tools

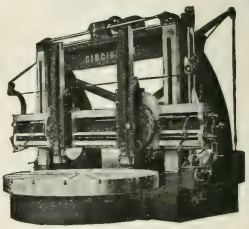
UNIVERSAL
(Horizontal)
Boring Machine

"Where Accuracy Counts, We Win"



Universal Boring Machine Co.
Hudson, Mass., U. S. A.

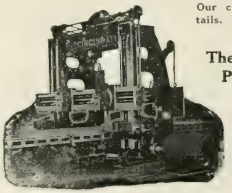
Planers and Boring Mills That Increase Production



You can increase your profits by increasing production. Another means of doing it is by reducing repairs.

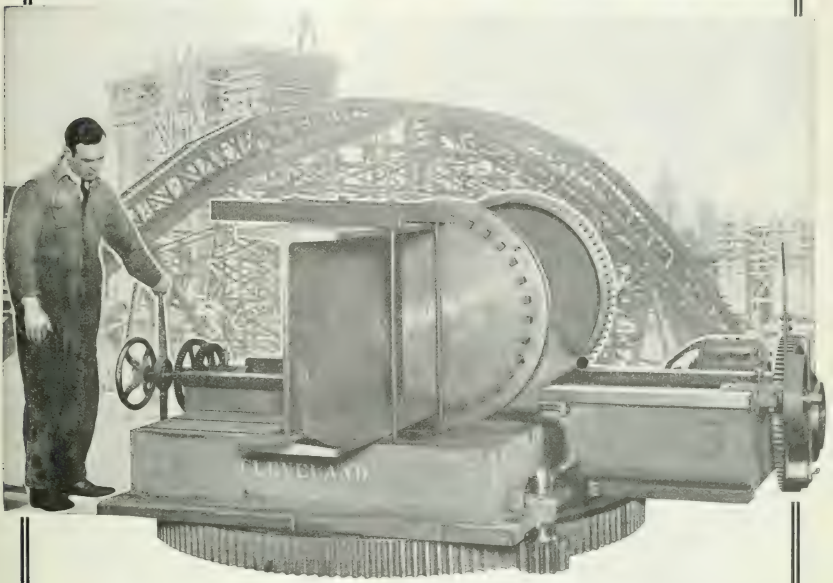
CINCINNATI PLANERS and BORING MILLS are built with these two objects in view. Special time and labor saving improvements are included to effect the former, and rugged construction is followed throughout to ensure the latter.

Our catalogs give details. Write for them.



The Cincinnati Planer Co.
Cincinnati, Ohio
U. S. A.

Machine Tools **COLD SAW STEEL** Small Tools



A Few Points of Interest About the Cleveland Rotary Planer

All the gears on the machine have cut teeth. High speed tool steel is used for the cutters. The cutter head ring is of steel shrunk on the cutter head.

The cutter head has an "in and out" feed of 1½", adjusted by the handwheel.

A positive automatic lock is provided inside the handwheel, preventing movement of the head when set.

There are so many good points to talk about in this machine that it is impossible to give more than an outline of its good features. Let us send you the *complete* description, you'll find it interesting reading and probably profitable too.

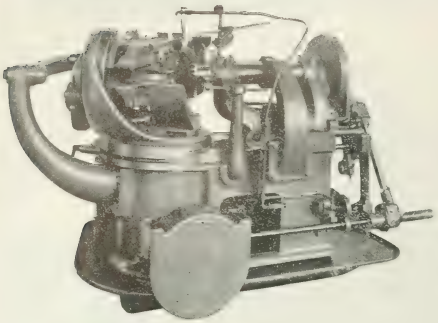
NEW YORK
50 Church St.

CHICAGO
332 S. Mich. Ave.

THE CLEVELAND PUNCH & SHEAR WORKS CO.
Main Office & Works · CLEVELAND, OHIO
PITTSBURGH - CHICAGO - PHILADELPHIA ~ NEW YORK

PHILADELPHIA
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18″ Bevel Gear Generator

GLEASON

18″ BEVEL GEAR GENERATOR

Two Tool Generating Type Suitable for quantity production of medium size gears.

Fully Automatic.

Descriptive leaflet sent upon request

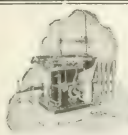
GLEASON WORKS, ROCHESTER, NEW YORK, U.S.A.

STOCKBRIDGE
SHAPERS
All sizes have Patented Two-piece Crank Motion. Save time—money
STOCKBRIDGE MACHINE CO., Worcester, Mass.
Agents: Niles-Bement-Pond Co.

SHAPERS simply designed but accurate and efficient
12-in. to 32-in. Stroke (Inclusive)
THE SMITH & MILLS COMPANY
Cincinnati, Ohio, U. S. A.

NEWARK GEAR CUTTING MACHINE CO.
Henry E. Eberhardt, President
MANUFACTURERS OF
GEAR CUTTING MACHINES
GEAR HOBBING MACHINES
73 PROSPECT ST., NEWARK, N. J.

"OHIO" SHAPERS
THE OHIO MACHINE TOOL CO.
SINCE 1887
KENTON, OHIO



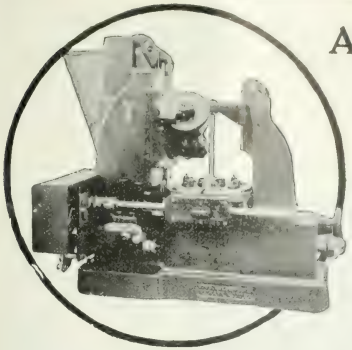
MORTON
Keyseaters
Stationary type—18-24 and 30" stroke. Built to endure, and to economically perform every Key-seating operation. Send for bulletin IF.
MORTON MFG. CO.,
Muskegon Heights, Mich.

CAMPBELL
INTERNAL KEYWAY CUTTER
FOR USE IN DRILLING MACHINES
Is A Revelation in Compact Machine Tool Construction.



It Costs So Little But Does the Work of An Expensive Machine.
Send for Particulars.
CAMPBELL MACHINERY CORPN.
LEECHBURG, PA.

Gray Planers
Sizes 24" to 96"
Write for Maximum Service Booklet.
The G. A. GRAY CO.
CINCINNATI, OHIO



36-H Hobber
Generates up to 2 Dia. P.

Are Your Gear Costs High?

If you have thought that your gear costs were too high, may we suggest that you let us show you what the G & E Gear Hobber can do for you?

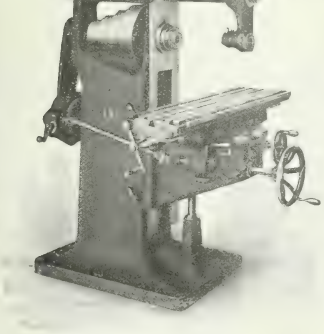
This machine will cut spur, helical and worm gears at a rate far exceeding any other method. They will be more accurate and uniform and there will be fewer rejections.

We will be glad to show you time studies to prove these facts.

GOULD & EBERHARDT
"HIGH DUTY" SHAPERS
AUTOMATIC GEAR AND RACK CUTTING MACHINERY
ESTABLISHED 1833 NEWARK, N.J. U.S.A. CHANCELLOR AVE.

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Garvin Plain Milling Machines Serve Two Purposes



No. 13 Plain Miller

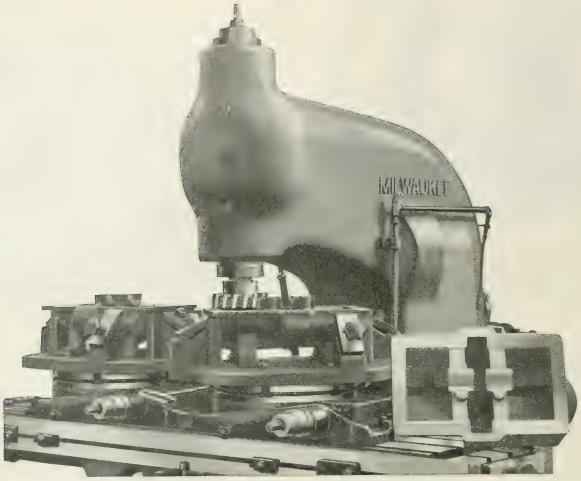
Garvin Plain Milling Machines are equally satisfactory on production work or on special jobs. Quick application of attachments is made in either case, and the machines are quickly converted from one class of service to the other.

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Spring and Varick Sts., New York

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KEARNEY & TRECKER
CORPORATION
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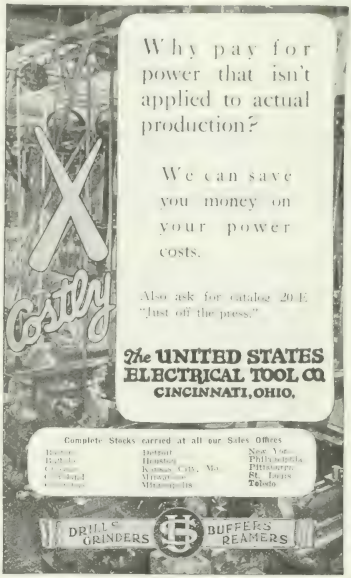
Please send PRODUCTION SERVICE Data Sheets and Illustrated Booklet to:

NAME .....
FIRM NAME .....
FIRM ADDRESS .....

67

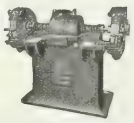
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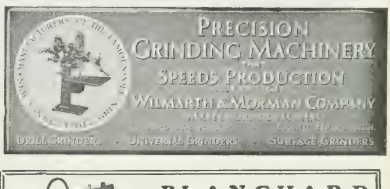
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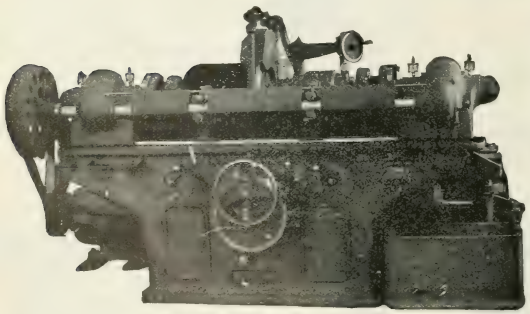
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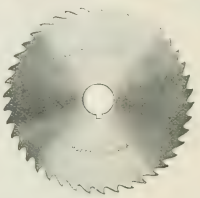
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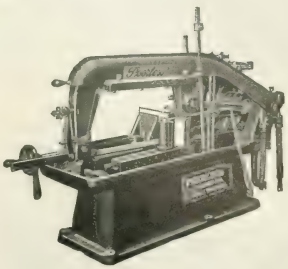
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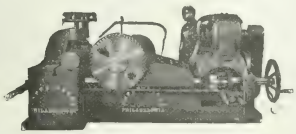
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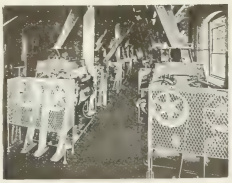
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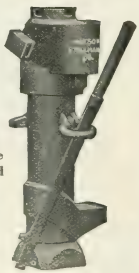
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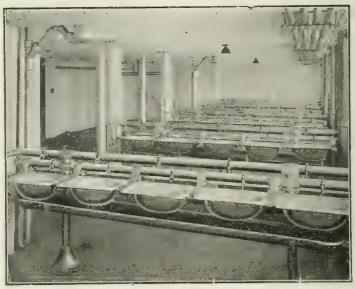
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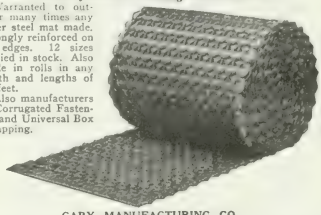
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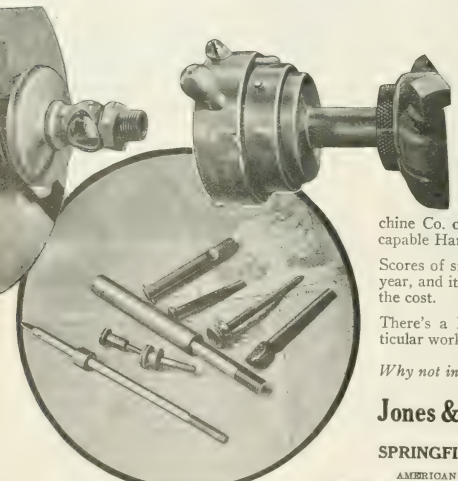
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For the chances are good that the projector was made by the Duplex Machine Co. out in Brooklyn—and that is where this capable Hartness Automatic is at work.

Scores of small threaded parts like these, year after year, and it stands high today with those who count the cost.

There's a Hartness Automatic Die for your particular work. It will save you money.

Why not investigate it?

Our new catalog, "The Hartness Automatic Die" is gladly sent upon request. Write on company's letterhead and indicate official title.

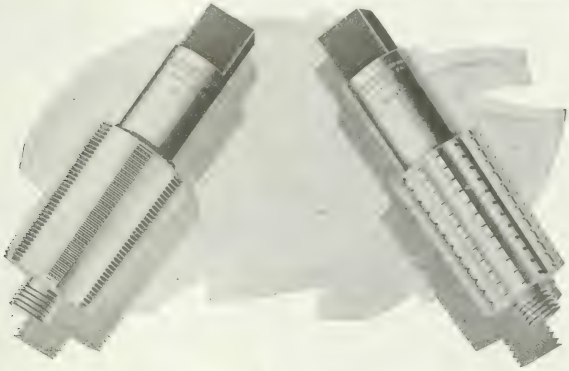
Jones & Lamson Machine Company

DIE DIVISION

SPRINGFIELD VERMONT, U. S. A.

AMERICAN AGENTS FOR DIES AND CHASERS:
Boyer-Campbell Co., Detroit. Carey Mchy. & Supply Co., Baltimore. E. L. Easley Mchy. Co., Chicago, Milwaukee and Moline. The E. A. Kinsey Co., Cincinnati, Indianapolis and Columbus. Machinists Supply Co., Pittsburgh. Robinson, Cary & Sands Co., St. Paul and Duluth. Coghlin-Kirby Machinery & Supply Co., Toledo, Ohio. A. V. Wiggins & Co., Syracuse. FOREIGN AGENTS: For France, Spain and Belgium, F. Auberty & Co., 182 Rue Lafayette, Paris. For Holland, Spliethoff, Beeukes & Co., Rotterdam. For Sweden, A. Bol Oscar Lindbom, Post Box 420, Stockholm. For Australia, McPherson Pty., Melbourne. Japan, Manchuria, Korea, Formosa, Mitsui Busan Kaisha, Ltd., Tokyo, Japan.

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Made for Flexible Staybolt Work

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Brubaker's Flexible Staybolt Taps and Reamers of the type shown above have been especially developed to facilitate the handling of this important class of work.

Their use assures absolute accuracy in the reaming and threading of holes for flexible staybolt sleeves and is a guarantee of greater output from taps and reamers with corresponding decisive reductions in the cost of installing and renewing flexible staybolts.

Manufactured to exactly conform with the dimensions, sizes and taper of the standard makes of flexible staybolts and hardened by our special process of tempering to assure long life of cutting edges and maximum production from each tap or reamer—these special Brubaker tools cut your costs down to bed-rock for this particular line of staybolt threading.

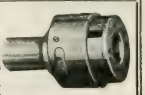
Prove it by trying them in your shops.

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Factory: Millersburg Pa.
Sales Office: 50 Church St. New York

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SCREW PLATES

AMERICAN TAP & DIE COMPANY
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Standardize With This Die Head
Wherever high quality and maximum production are paramount, manufacturers are standardizing on H & G Die Heads, because threads may be cut faster. Chasers last longer, threads are cut perfectly and the die head always functions properly. It is correctly designed and properly made. Write for free shop test.

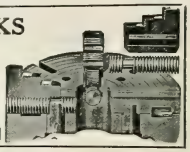


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Dies—Self Opening, Adjustable
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Established 1887





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Hand-Operated
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Instant release by hand even after most severe driving strain. Drives high speed drills without slipping.

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Improve Production



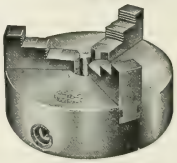
By avoiding the delays that often occur in trying to remove an arbor the old way, your mechanic's time is free for productive work.

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We furnish this chuck regularly with iron or steel bodies in three or four jaw styles



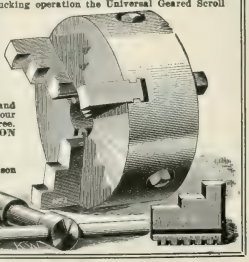
Two Sets of Jaws

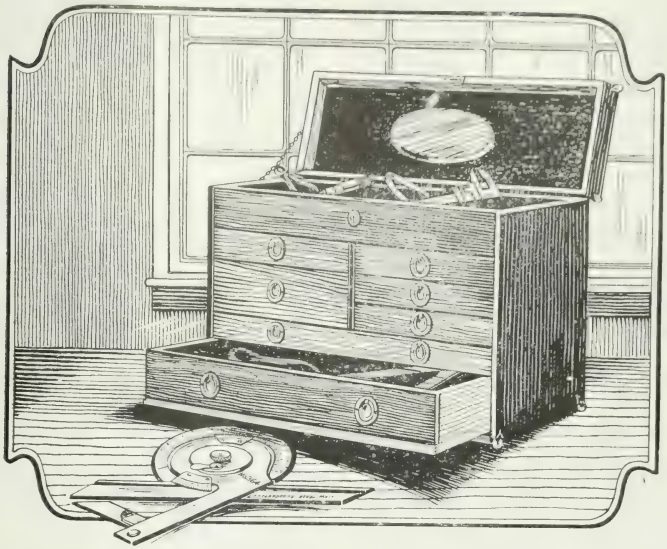


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Building for the Future
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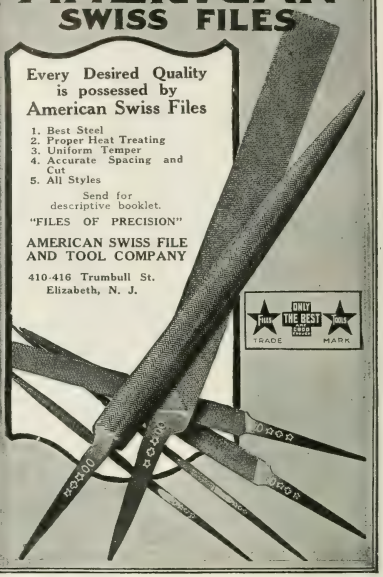


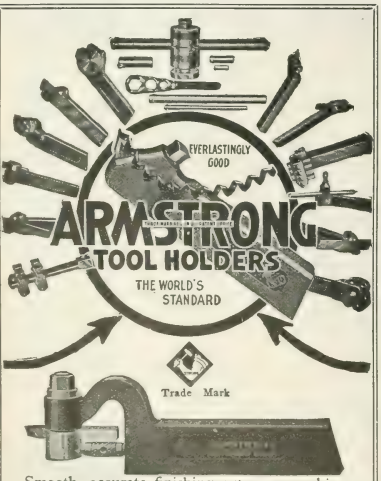
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A Handy Tool for Odd Jobs
With an Oster Die Stock there's no "unwinding" at the end of each cut. The dies lift off and leave the thread ready for a tight, permanent joint.
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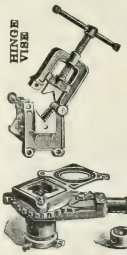


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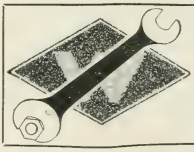
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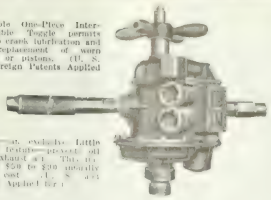


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Moisture Separator Insures Longer Tool Life



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do *double* the work of any other punch. They save you the time and inconvenience of broken punches.

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Chipping and Calking Hammers

THE SPEED KING



They are Speedy

They are Dust Proof

They Work Without a "Kick"

They Speed Up Output and Lower Cost of Cleaning

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"Better Threads at Lower Cost"

Pipe and Bolt Threading Machines
Belt or Motor Driven—Range ⅛" to 24"

WILLIAMS TOOL CORPORATION, Erie, Pa.
Canadian Plant, Brantford, Ont.

PIPE THREADING

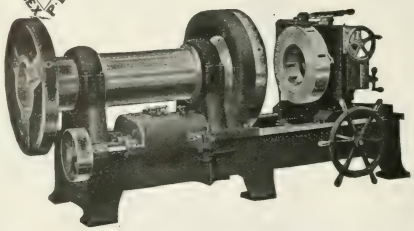
HAND OR POWER AND CUTTING MACHINERY

The Merrell Manufacturing Co.
83 Curtis Street Toledo, O.

PEERLESS B&K DUPLEX

B. & K. Pipe Machines

PEERLESS B&K DUPLEX

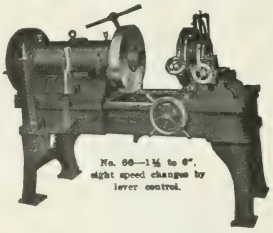


Are improved right up to present-day shop requirements. Their features enable the operator to save hard labor and time at every turn. Unlike hand work the threads they cut are sure to be accurate. One hundred and forty B. & K. Pipe Machines are in use in one city. Made to cut pipe from ¼-in. diam. to 18-in. diam.

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Bignall & Keeler Machine Works
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JARECKI PIPE THREADING MACHINES



No. 60—1¼ to 6", eight speed changes by lever control.

are backed by over 40 years untiring effort to produce the most efficient and durable machine possible to construct.

You should adopt them as standard equipment. Hundreds of concerns have and found them entirely satisfactory. Why not you?

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Builders of Machinery including Pipe Cutting-off Machines, Power Presses, Swaging Machines, Brazed Tubing Machinery. Also Grey Iron Castings.

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COULTER MACHINES ARE BOUGHT FOR WHAT THEY DO

Coulter Automatic Thread Chasers and Hob Thread Millers.
Coulter Multiple Spindle Profilers.
Coulter Shaping Planers.
Can we send you specifications or arrange to demonstrate?

THE AUTOMATIC MACHINE CO.
BRIDGEPORT, CONNECTICUT

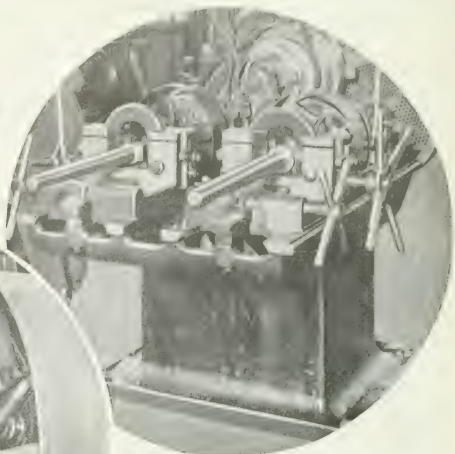
Wire Drawing Machines
Wire Insulating Machines
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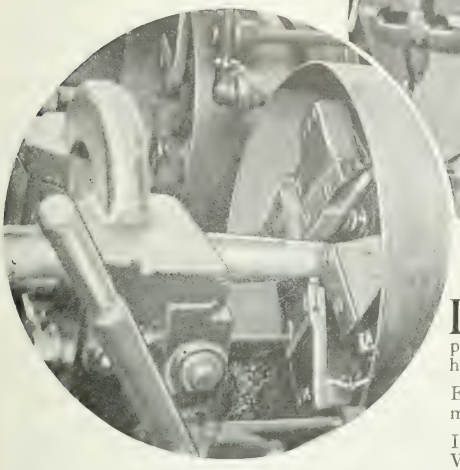
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Stand up to the High Production Drives





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LANDIS Threading Machines—Single, Double and Triple Spindle—are superior screw-thread equipment where high production at close limits is a factor.

Exceptionally long die life causes comment from every Landis operator.

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We show a double-spindle machine threading 3½% Nickel Steel Side Axles. A rough and finish cut is taken to produce a thread 1¾ in. long. Every hour 24 axles pass the inspectors.

The Foreman of the Sheldon plant says: "The machine has proved the most efficient for our work. The dies hold their cutting qualities under the highest speeds."

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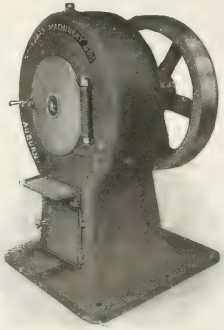
LANDIS MACHINE COMPANY, Inc., Waynesboro, Pa., U. S. A.

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This "STANDARD" Swaging Machine, in its simple, sturdy construction, easy operation and speedy production is typical of the Standard Line.

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Standard Machinery Co.
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A complete line of Machinery for Shafting plants for finishing bars and tubing.

POINTERS — TURNING MACHINES
DRAW BENCHES — PRESS STRAIGHTENERS
ROLL STRAIGHTENERS — CUT OFF MACHINES
SHAPE STRAIGHTENERS

Large users of bars and tubing in screw machines will find that Brightman Straighteners and Turning Machines can cut down costs

The BRIGHTMAN MANUFACTURING CO.
COLUMBUS, OHIO

Whitney Ball Bearing, Straightening and Balancing Machine



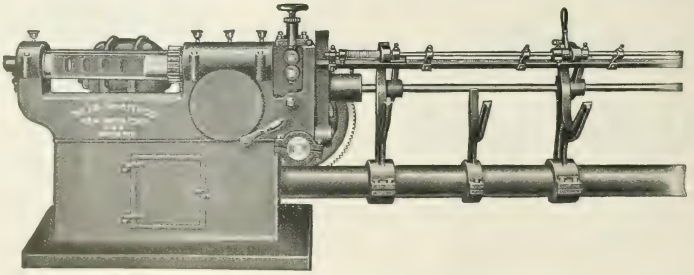
Will Straighten 2 Inch Shafts

Easy to operate, and as accurate as our experience and knowledge enables us to make it.

Let us tell you about it.

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AUTOMATIC WIRE STRAIGHTENING and CUTTING MACHINE



a machine which fills a long felt need. We were inventors and builders of the *first* automatic machine for straightening and cutting wire to lengths from the coil, and are the first and only makers of direct motor driven machines of the rotary type for round wire.

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WIRE STRANDING EQUIPMENT
Smooth running; quiet; enormous production.

Music Wire Straightening & Bundling Machines
Straightens and Bundles Music Wire for Use with Automatic Machines

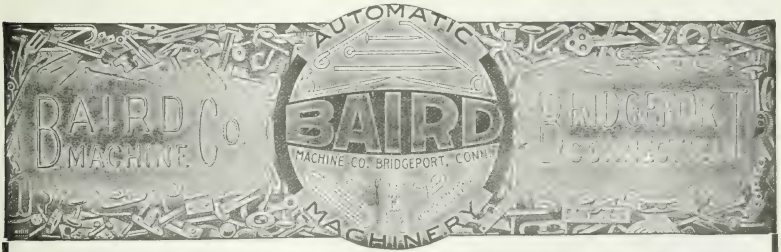


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Wire Straightening and Cutting.
Screw Wire.



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Hinge machinery and machines for producing different products of hardware.

Wire straightening and cutting, forming stamping and ferruling machine.

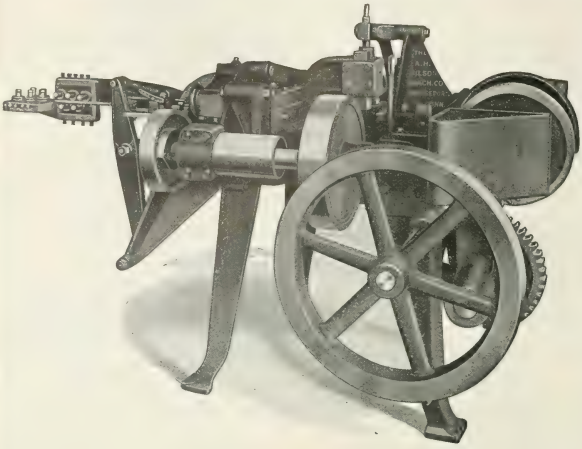
PRESSES—All types, foot, bench, single and double action, open back, single and double action pillar pattern, cam, toggle and double gate or tandem. Baird presses are machined for attachments and can be quickly made over into full automatic, self-feeding machines that perform several operations upon the material passing once through the press. They take care of the future.

Eyelet Machines—or multiple press for eyelets, snap and glove fasteners, phone cord tips, curtain rings, collar buttons, pencil tips, umbrella shells, paper fasteners, bottle stoppers, cartridge work, thimbles, grommets, lamp sockets, electrical parts, button parts, caps, hollow rings, shells, oil burner parts, etc.

Tumbling Barrels—All kinds for all purposes. Oblique, horizontal, exhaust and non-exhaust, steam drying, japanning, coating, painting, mixing, heating, cooling, cleaning, grinding, rust proofing, lacquering. Standard machines adapted for all purposes with various types of barrel, as wood, cast iron, sheet iron, cast brass, sheet brass, copper, etc.

Burnishing Machines—Ball burnishing outfits for every purpose.

The Nilson Four-Slide Wire Forming Machine



The Nilson Automatic Four-Slide Wire Forming Machine is just what manufacturers have wanted for a long time.

It's accurate and economical. That's due to the four equal-length slides.

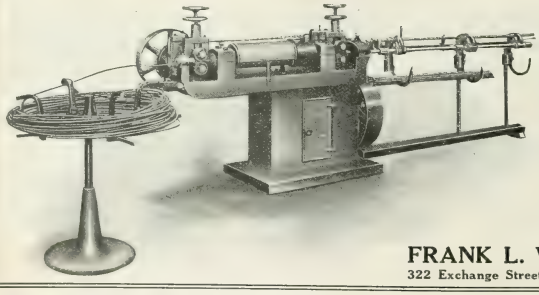
The wire feed is applied in a straight line from crank disc, an exclusive Nilson feature that does away with the old cramping and binding.

The special lubricating system is automatic and continuous, no danger of overheating.

Standard roll straightener and rotary straightener are interchangeable, and the roll straightener is adaptable for both flat and round stock.

If you are interested in wire forming machinery write for full details. It will pay you well to examine the exclusive features of the Nilson.

The A. H. Nilson Machine Company, Bridgeport, Conn.



Wells' Automatic Rotary Wire Straightening Machines

Made in Four Sizes
1/16 to ½" Wire

Catalog Furnished on Request

Manufactured by

FRANK L. WELLS COMPANY
322 Exchange Street Kenosha, Wis.

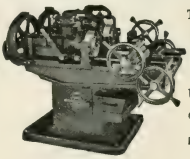
KANE & ROACH
NIAGARA & SHONNARD STS., SYRACUSE, N. Y.

STRAIGHTENING MACHINES
BENDING MACHINES, Hand and Power HAMMERS, Power
SHEET METAL MACHINERY COLD ROLLING MACHINERY
SPECIAL MACHINERY PUMPS, Centrifugal and Hydraulic

WIRE DRAWING AND HANDLING EQUIPMENT
ROD MILLS, DRAW BENCHES Etc.
VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO

BOLT THREADERS, NUT TAPPERS, HEADING MACHINES, ETC.

Write to us for anything you want in the bolt and nut Machinery Line



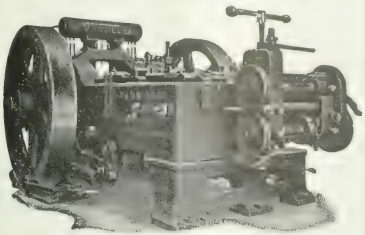
The Acme Machinery Company Cleveland Ohio U. S. A.
Cor. St. Clair and Hamilton Sts.

EUROPEAN AGENTS:
Burton, Griffiths & Co., London, England. Glaenzer & Perreaud, Paris, France. Ing. Ercole Varisi, Milan, Italy. Henry W. Peabody & Co., Melbourne, Australia.

MANVILLE

DIRECT-ACTING DOUBLE STROKE
OPEN-DIE COLD HEADERS
WITH FRICTION FEED

The Header You Will Ultimately Install



Manville No. 5 B—D.S.O.D.—Header

This Powerful High Duty Machine is the latest Manville Cold Heading Machine for Upsetting Bolt, Rivet, Screw Blanks and other special headings by the Cold Process.

It has a maximum capacity of ¾" diameter by 7" long, 45 blanks per minute.

Write for Bulletin 14B

E. J. MANVILLE MACHINE CO.
WATERBURY, CONN., U. S. A.

Builders of Cold Headers, Thread Rollers, Screw Slotters, Bolt Head Trimmers, Power Presses, Wood Screw Machines, Nut Blanking Machines, Wire Formers, and special automatic machinery.



NATIONAL BOLT CUTTERS

"Always Cut Accurate Threads"

Do not require skilled labor.
Dies can be changed or adjusted in a minute's time.
Die Head has a positive lock, hence insures uniform diameter and accurate thread, regardless of stock variations.
The National interchangeable Case Die insures 30% to 50% less upkeep cost.
Thousands of satisfied users will attest the National has no equal.
Don't buy a Bolt Cutter without thorough investigation of the National.
Built in 22 different sizes and styles.

THE NATIONAL MACHINERY COMPANY
TIFFIN - - OHIO

PAWTUCKET
MANUFACTURING COMPANY

Builders of the "Pawtucket Line" of Bolt Forging Machines, and Cold Punched Nut Presses, also the Knowles Keyseating and Broaching Machines.

PAWTUCKET, R. I., U. S. A.

ALLEN RIVETERS

Can be depended upon to produce the maximum number of good rivets with the least consumption of power.

Send for Lastest Catalog

JOHN F. ALLEN CO., 172 GERARD AVE., NEW YORK

COOK'S WOOD-SCREW MACHINES

for making IRON AND BRASS WOOD-SCREWS

We furnish complete plant installation for Starting Wood-Screw Factories

SECURE OUR HANDBOOK 5-H

THE ASA S. COOK CO.
HARTFORD, CONN., U. S. A.

BELOIT
Punches, Shears *and* Bending Rolls

HENDLEY & WHITTEMORE CO. BELOIT, WIS.

WATERBURY FARREL FOUNDRY AND MACHINE COMPANY

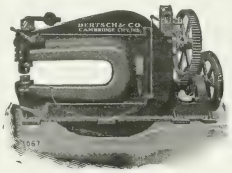
Rivet, Bolt and Nut Machines, Power and Hydraulic Presses, Multiple Plunger "Eyelet" Machines. Machines for cold rolling and drawing sheets, rods and wire.

Home Office and Works: 465 Bank St., Waterbury, Conn. Western Office: 1016 Williamson Bldg., Cleveland, Ohio.

FOREIGN AGENTS:

Geo. H. Alexander, Birmingham, England. For Rivet, Bolt, Nut, Wire Drawing and Collapsible Tube Machines.
Fenwick Frères, Paris, France. For Rivet, Bolt and Nut Machines.
D. Weil, Paris, France. For Wire Drawing Machines.

PUNCH



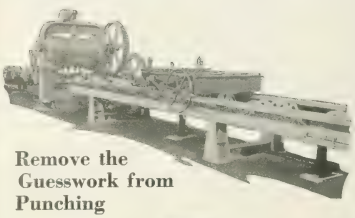
This cut shows one of our 72" throat Punches, with a full floating punch, and an electric solenoid controlled clutch operated by means of an electric push button.

We have had forty years' experience designing and building Punches, Shears, Rolls and Presses; all sizes up to 150 tons in weight.

BERTSCH & COMPANY

Cambridge City, Ind., U. S. A.

THE LONG AND ALLSTATTER CO.
POWER PUNCHING & SHEARING MACHINERY
HAMILTON, OHIO, U.S.A.
AMERICAN PUNCH & SHEAR WORKS — THE QUALITY LINE



Remove the Guesswork from Punching

THOMAS Spacing Tables remove the guesswork from punching by eliminating the uncertain factor of stretch which it is so difficult to allow for with any degree of certainty by the old layout method.

In addition there is an enormous saving in time as the operation is automatic.

Write for complete details.

Punches and Shears
Multiple Punches
Gate Shears
Angle Shears
Angle Bending Machines
Spacing Tables

THOMAS SPACING MACHINE CO.

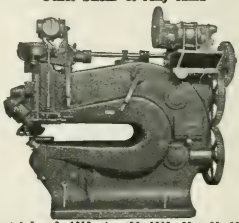
"QUICKWORK"
(TRADE-NAME REGISTERED THROUGHOUT THE WORLD)

ROTARY SHEARS
MADE IN VARIOUS SIZES AND STYLES

For cutting all gauges of sheet and plate up to 1½ inches thick used in building Ships, Boilers, Cars, Tanks and General Plate and Sheet Metal Work. Cut square or beveled edges in straight or irregular shapes, also cut rings and discs, and cut openings without starting in from side of sheet. Leaves the metal flatter than any other Rotary or Short Straight-Bladed Shear. Cuts a clean edge that requires no finishing.

Joggling and flanging rolls can be used interchangeably with the cutters.

Do Long Straight Cutting Faster Than Any Other Shear of Any Kind



Patented June 3, 1913; Aug. 26, 1919; Mar. 29, 1921. Other patents pending.

One "QUICKWORK" does the work of a number of old style machines. Does it better and from two to ten times quicker.

Eliminate Oxy-acetylene Cutting and Plate Planing.

WRITE FOR CATALOG No. 60.

THE QUICKWORK COMPANY
ST. MARYS, Ohio, U. S. A.

Cable Address: "QUICKWORK." All standard codes used.
New York Exhibit: Grand Central Palace.
Agent for British Isles: Oliver Machinery Co., Manchester, England.

PUNCHES and SHEARS

"C" FRAME HORIZONTAL MULTIPLE
NEVERSLIP FLOOR CRANES
VERTICAL BULLDOZERS
ANGLE BAR PLATE

BEATTY MACHINE & MFG. CO.
HAMMOND, IND.



BAR SHEARS
OPEN THROAT

Solid Steel Frame—Five Sizes

For cutting flat, round, square and twisted bars up to 3 inches. Ask for special catalog if you want the most suitable tool for warehouse or shop.

Punches and shears for every purpose.

6 W. 32nd St. Amplex New York City

Shear Blades

The Cleveland Knife & Forge Company
CLEVELAND, OHIO

CORRUGATING MACHINES
POWER SHEARS
OTHER SHEET METAL MACHINERY

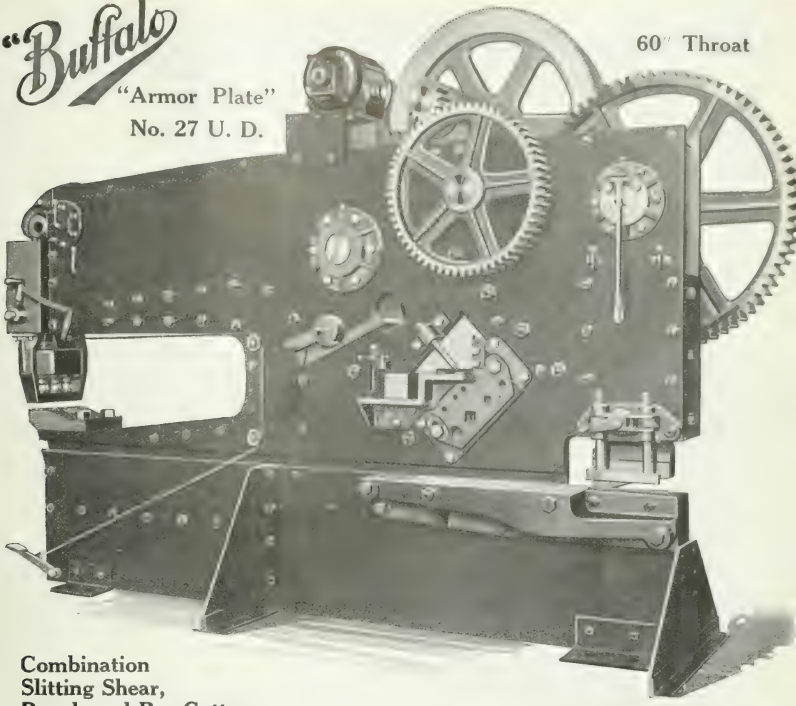
See our advertisement in first issue each month

The Streine Tool & Manufacturing Co.
New Bremen, Ohio, U. S. A.

"Buffalo"

"Armor Plate"
No. 27 U. D.

60" Throat



**Combination
Slitting Shear,
Punch and Bar Cutter**

The choice of prominent "roads" that usually order in quantity

Among the many railroads using Buffalo "Armor Plate" Punches, Shears and Bar Cutters are the Illinois Central, Pennsylvania, Denver & Rio Grande Western, Canadian National, Pere Marquette, Michigan Central, Chicago, Rock Island & Pacific, and New York Central.

The machine shown above has the following important maximum capacities:

Punches 1⅜" hole in 1" boiler plate.

Shears 1" Boiler plate—14" Knives.

Bar Cuts 2½" Rds., 6 x ¾ Ells and with special knives 10" Channels and beams.

Mitres 4½ x 9/16 angles easily with our diagonal plunger.

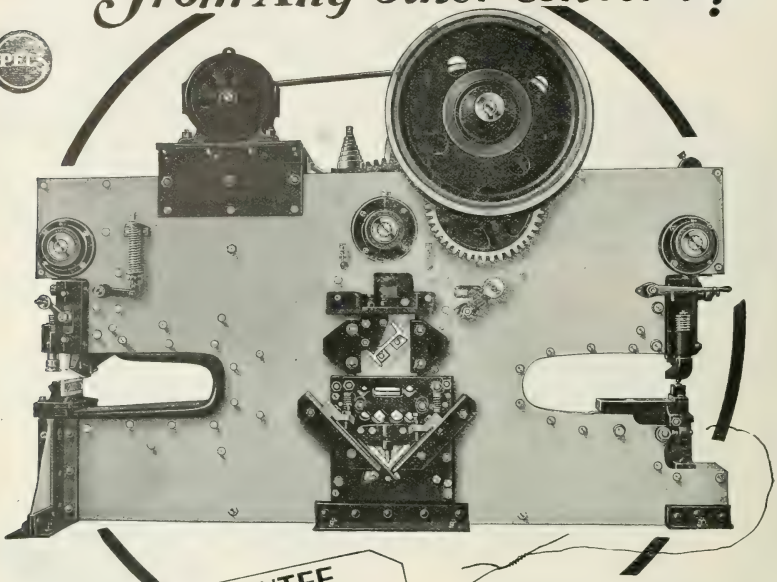
15 Strokes per minute. Only 15 H.P. required for really three machines.

We build a complete line of punches, shears, bar-cutters, benders, riveters, coping machines and universal machines.

Buffalo Forge Company

492 Broadway Buffalo, N. Y.

Can You Get Such a Guarantee from Any Other Concern?



PELS GUARANTEE

The Guarantee under which we have sold machinery for thirty years is as follows:

1. That the machine will perform continuously, and with ease, at **THE HIGHEST CAPACITIES NAMED.**
2. That the frame, without any reservations whatsoever, is **ABSOLUTELY UNBREAKABLE.**
3. That we will replace any parts proving defective in construction or design within one year from date of installation.
4. That we will replace any knives showing flaws.

For twenty-odd years we have been backing up these super-tools with this same generous, frank, and rigid guarantee.

Like you, we absolutely run no chance, because *we know* from actual experience that *the Pels* plate construction, plus their exceptional workmanship, is right.

WE CAN AFFORD TO GUARANTEE THEM

YOU CANNOT AFFORD NOT TO USE THEM

Henry Pels & Co.
90 West St New York

Send for one of our instructive bulletins on Punching and Shearing. They are free. State in what class of work you are most interested.

This Machine Saves $500 For Lee Trailer & Body Co.

THE Lee Trailer and Body Company of Chicago in 1916 purchased a Ryerson Quadruple Combination Punch and Shear. This machine embodied four single tools in one, handling punching, plate and bar shearing, angle and tee cutting and coping and notching.

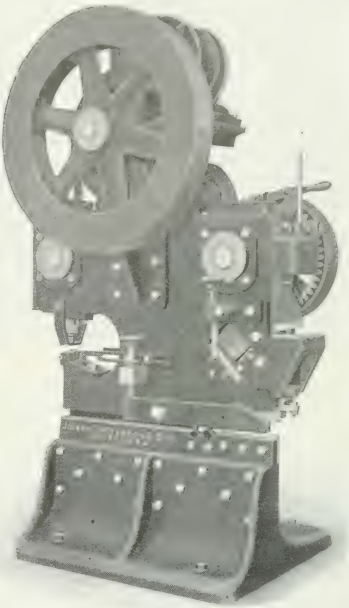
The minimum cost of the four separate machines would have been approximately $500.00 more than the price of the Ryerson Machine. In 1919 when increased production demanded additional equipment a second machine was installed. The success of these two machines is best told by L. H. Warfel, Superintendent for the Lee Company.

"In the manufacturing of various kinds of metal bodies for trucks and trailers, we use two Ryerson Punching and Shearing machines. We have had one of these machines seven years and the other four years. At times we are forced to operate these machines for several months at a stretch at the rate of 20 hours a day."

Mr. Warfel then gives an itemized account of how these two machines are actually saving his company approximately $667.00 a year. He then adds:

"The material and workmanship found in the Ryerson Punch and Shear is excellent. It cuts clean and true without distortion. We bought the second machine because of the good performance of the first one."

We'll be glad to send you a copy of a neutral engineer's survey of this installation on request.



The facts contained in this advertisement are part of Nielsen Certified Performance Survey No. 13 RY-H and represent the user's point of view.

JOSEPH T. RYERSON & SON INC.

Established 1842

Plants CHICAGO ST. LOUIS DETROIT CINCINNATI BUFFALO NEW YORK
Branch Offices: MINNEAPOLIS MILWAUKEE DENVER TULSA HOUSTON SAN FRANCISCO

RYERSON MACHINERY

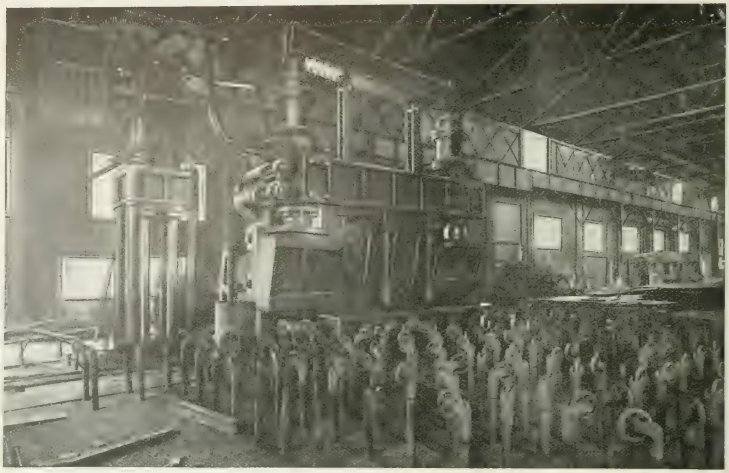


Plate Shear Bargain

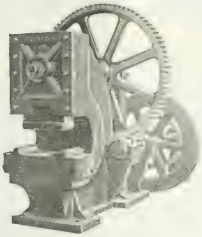
THE liquidating sale of the entire properties of the Carbon Steel Company places on the market at an attractive price one 2"x128" hydraulic plate shear, 26" gap, manufactured by R. D. Wood & Company, Philadelphia, Pa.

Shear is equipped with 27" x 22" x 16" x 7' stroke, triple power hydraulic intensifier, with two hold down magnets and is complete with piping and guard rail.

The above is but one of the many bargains now offered to plant executivs.

Write for copy of indexed catalogue of buildings and equipment.

CARBON STEEL CO.
PITTSBURGH, PA.



"Ironton"

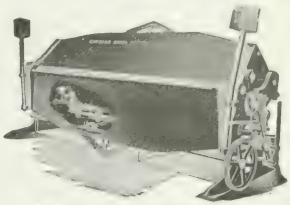
Rail Breaker

Our type C Rail Breaker for an economical solution of your problem of breaking and straightening all sizes of rails.

The Ironton Punch & Shear Co.

Ironton—Ohio—U. S. A.

Chicago Steel Bending Brakes



16 Ft. Power Brake, Capacity ⅛" Plate

Bend and Form Your Sheets and Plates on These Labor Saving Machines

USED BY

U. S. Army and Navy	Tank and Boiler Shops
Railroads	Shipbuilders
Auto Manufacturers	Aeroplane Manufacturers
Sheet Metal Shops	Structural Shops

Made from 3 to 26 feet long to bend from light sheets to ¾ inch steel plate, hand and power

Write for Catalog No. 19

DREIS & KRUMP MFG. CO.

McKinley Park Station CHICAGO

San Francisco Office: 200 Second Street

THE MARSHALLTOWN LINE

Throatless Shears
Bevel Shears
Splitting Shears
Plate Millers

We Manufacture Circle Shear Blades of All Types.

MARSHALLTOWN MANUFACTURING CO

MARSHALLTOWN, IOWA

YOU CAN'T EXPECT TOO MUCH FROM A MILWAUKEE!

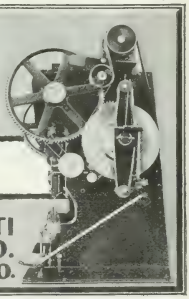
MILWAUKEE SHEARS

Milwaukee Alligator Shears will show you what shear performance means. Let us introduce this line to you with our catalog 1A.

DOELGER & KIRSTEN

MILWAUKEE 30th and Chambers Sts. WISCONSIN

CINCINNATI PRESS BRAKES All-steel Construction



Cut steel gears

The CINCINNATI SHAPER CO.

CINCINNATI, OHIO.

SOLID STEEL — WAPAKONETA — LAID STEEL

Shear Blades

THE WAPAKONETA MACHINE CO.

INCORPORATED 1891

WAPAKONETA, OHIO

AUTOMATIC

LOCKSEAMING

MACHINES AND THEIR PRODUCT

STOLP COMPANY, INC., GENEVA, N.Y.

SHEET METAL WORKING MACHINERY



Leffler

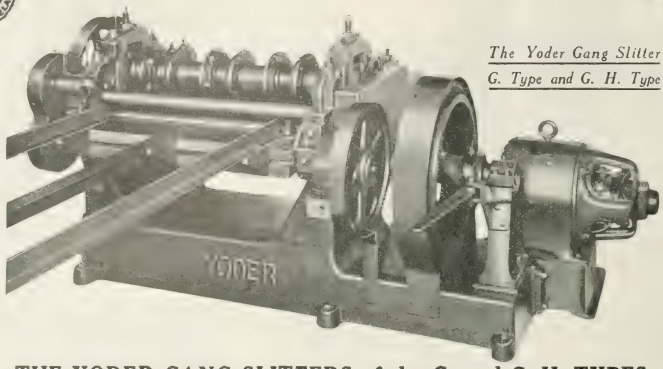
MACHINES AND DIES Are Used For—

Brass Goods, Metal Ceilings, Electrical Goods, Kitchen Utensils, Lamps and Lanterns, Wash Boilers, Plain and Decorated Tin Cans of all kinds.

If you want to manufacture your goods economically, see "Leffler."

CHAS. LEFFLER & CO.

Established 1891 61 Clymer Street, Brooklyn, N. Y.

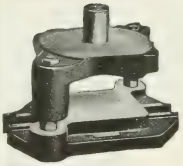


The Yoder Gang Slitter
G. Type and G. H. Type

THE YODER GANG SLITTERS of the G. and G. H. TYPES

Are built with Threaded Mandrels and threaded, split, adjustable cutters. Slit, or trim the edges of sheets and plate to 48″ wide. Equipped with push and pull rolls, and five roll leveler. Cutters ground without removing from mandrel. Cutters adjusted, added or removed, without dismantling machine. High speed and great accuracy. Capacity to ⅜″ thickness. Production three to six times that on a squaring shear, at no increase of labor costs.

THE YODER COMPANY, CLEVELAND, O.



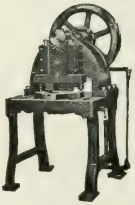
The Right Press at the Right Price

Here is a high class job that you can depend on for as great or better accuracy than your own tool-room product.

Then, manufactured on a production basis in many standard sizes, it is the most economical sub-press you can buy. Get details.

U. S. Tool Co., Inc.
117 Mechanic St., Newark, N. J.

NOTICE THE LARGE RANGE OF SIZES GIVEN IN OUR BULLETIN
F. C. DANNEMAN
124 Baxter St., N. Y. C.
Sales Distributor for Greater New York. Complete Stock in N. Y. C. Warehouse.



L & N Open Back Mitre Press

We manufacture Power Brakes or Forming Presses and squaring shears in capacities from 16 gauge to ⅜″, from 4′ to 12′ in length. We also manufacture Mitre Presses, special sheet metal machines, forming and mitre dies, and Shear Blades.

LOY & NAWRATH DIVISION
Birmingham Iron Foundry
DERBY, CONN.

A new and improved
BLANK HOLDER
is now an exclusive feature of our

Toggle Drawing Press

It holds the blank positively and evenly during the entire work stroke.

Write for details.

We Also Make a Complete Line of
SHEET METAL MACHINERY

J. M. ROBINSON MFG. CO.
CINCINNATI OHIO

SAFETY & SPEED

The Improved Wiesman Safety Guard sweeps *entire* length of Bolster Plate on *half* of downward stroke of punch.

This means that *both* hands of operator are protected.

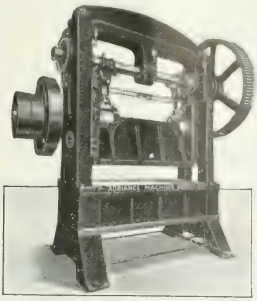
The Guard Arm returns *beyond* the center of the ram on *half* of upward stroke. This allows the operator to feed *fast*, knowing that he is *safe* if the press *repeats*.



Write for our 30-day free trial offer

The Wiesman Manufacturing Co.
35 S. St. Clair St., Dayton, Ohio

THE WORLD'S STANDARD



"ADRIANCE"

DOUBLE CRANK PRESSES

Recommended for operating large punching or forming dies or gangs of punches over a large area. For stamping out expanding metal lath, armature disks and segments, cornice work, stove boards, radiators, ice cans, automobile trays and a variety of other work of large dimensions.

ADRIANCE MACHINE WORKS, Inc.

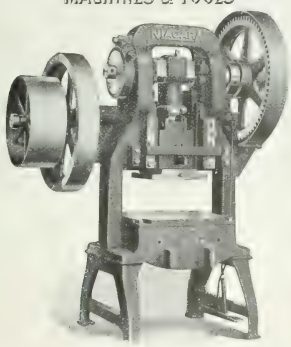
Established 1888

82 RICHARDS STREET BROOKLYN, N. Y.

Incorporated 1913

SHEET METAL WORKING

MACHINES & TOOLS



Arch Presses Have a Wide Range of Uses

The large space between Uprights and the big opening possible in the bed of the press make presses of this series very useful because of their adaptability to a very wide range of work. Write for special bulletin describing Niagara Arch Presses.

NIAGARA MACHINE & TOOL WORKS

Established 1879

BUFFALO, N. Y., U. S. A.

NIAGARA

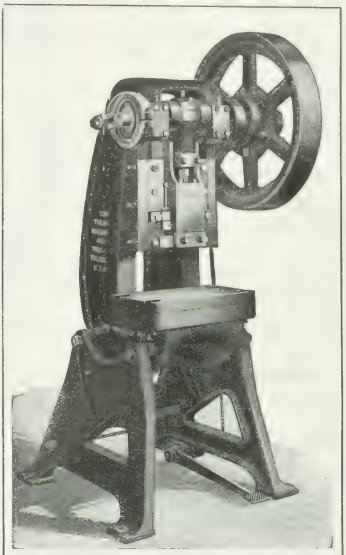
THE

"TOLEDO"

INCLINABLE

OPEN BACK

PRESSES



The "Toledo" Inclinable Open Back Press No. 3

The "Toledo" Inclinable Open Back Presses are built with or without gearing and have been in use for more than thirty years, and are unsurpassed for their wide range of usefulness and durability. They are adapted for a great variety of work, including nearly every kind of blank cutting, forming, perforating, drawing, shaping and combination die work, covering a large proportion of the operations required in the manufacture of tin cans, pieced and stamped ware, petroleum cans, powder kegs, lamp and lantern trimmings, electric and brass goods, armature discs and segments, bicycle parts, locks, silverware, spoons, stove and trunk trimmings, automobile parts, and many other articles too numerous to mention here.

Excellent facilities for all kinds of high grade machinery. Forging and gear cutting a specialty.

Founders and Machinists and Engineering Specialists on equipment for sheet metal products.

"PRESSES FOR EVERY PURPOSE"

Estimates furnished. Correspondence Solicited

THE TOLEDO MACHINE & TOOL CO.

TOLEDO

TOLEDO, OHIO

U. S. A.

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TOLEDO

1897 **CHAMBERSBURG** 1923

THE STANDARD OF COMPARISON

CHAMBERSBURG BUSHING PRESS

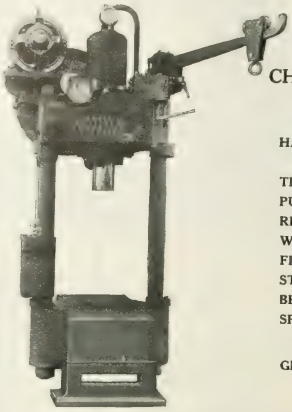
Type B—Sizes from 25 Tons Up

Hydro-pneumatic operation with weighted pull-back makes it extremely fast in operation.

All working parts, including pump, motor, crane, etc., are mounted on the top platen.

Absolute accessibility and clear working space result from above design.

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TRIMMING PRESSES,
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RIVETING Machinery
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FLANGING Machinery
STRAIGHTENING and BENDING Machinery
SPECIAL Machinery built to individual requirements.
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CHAMBERSBURG ENGINEERING COMPANY, Chambersburg, Pa.

Nationally Represented by MANNING, MAXWELL & MOORE, INC.
Offices All Principal Cities

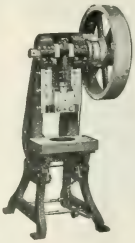
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"PECK" Automatic Drop Lifters will convert any drop—hand, foot or automatic—into a highly efficient unit.



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for manufacturing. Great power backed by sturdy construction enables

HIGH DUTY **ROCKFORD** PUNCH PRESSES

to stand the grind of hard, continuous usage. Made in Straight Side and Inclinable types and various sizes.
Write to-day for details.

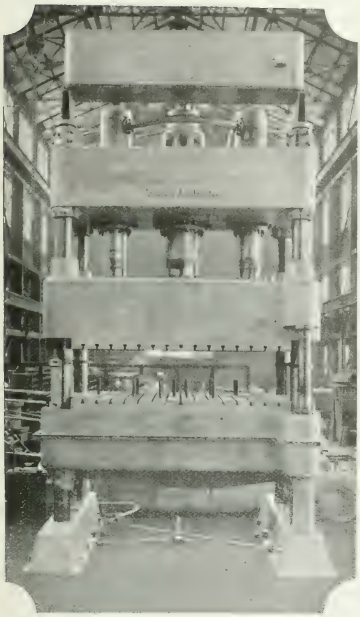
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Presses, Dies, Sub-Presses
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CUTTING. FORMING. PUNCHING
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PRESSES

HYDRAULIC PLATE FLANGING PRESSES



Bethlehem Three Cylinder Down-Stroke Hydraulic Plate Flanging Press

THE illustration herewith is a Three Cylinder Down-Stroke Hydraulic Plate Flanging Press.

The main features of this press are high speed production, ease and flexibility of operation, separate facing plates, and rugged all-steel construction throughout.

Economy and rapidity of operation accomplished by prefilling arrangement and high forging speeds, is also enhanced by rapid action of the stripping platen with which the press is equipped.

Hydraulic connections to the center and end cylinders are so arranged that either full or proportional power may be used, according to the class of work being produced.

Bethlehem specializes in the design and construction of all kinds of presses and heavy machinery for any purpose. Our engineers are constantly developing new machines to take care of unusual requirements.

Send us your inquiries.

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Sales Offices:

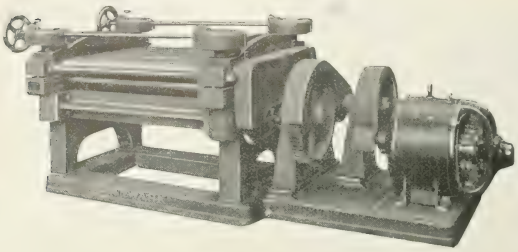
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Buffalo Cleveland Cincinnati Detroit Chicago St. Louis San Francisco

BETHLEHEM STEEL EXPORT CORPORATION, 25 BROADWAY, NEW YORK CITY. *Sole Exporter of Our Commercial Products.*

BETHLEHEM

SOUTHWARK
PLATE LEVELING ROLLS

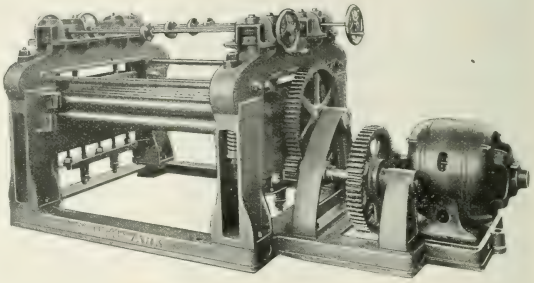
for STRAIGHTENING ROLLED PLATES *and* SHEETS
also used for BREAKING OR SOFTENING SHEETS BEFORE FLANGING OR PRESSING



The leveling roll shown at the left has 17 staggered rolls which are set by adjusting screws to give the proper action on the plate for either straightening or for breaking the fibres in sheets and plates before flanging operations.

In the breaking operation the rolls at the end of the machine at which the plate enters are set to mesh well into each other, while the rolls at the end from which the plate leaves the machine are set for leveling. The plate is thus given a wavy bending motion while passing the first rolls which effectually softens its fibres. It is perfectly flat when it emerges from the machine.

The roll illustrated at the right has four pinch rolls, the end rolls being set in line with each other, the intermediate rolls being staggered. This machine is equipped with spring steelyards for holding the top rolls in their proper position.



SOUTHWARK HYDRAULIC PRESSES
FOR EVERY PURPOSE

AMONG OUR STANDARD HYDRAULIC AND POWER TOOLS

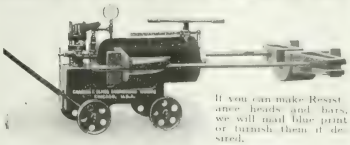
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Forging Presses
Broaching Presses
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Bushing Presses
Car Wheel Presses
Forcing Presses
Plate Bending Presses
Pipe Bending Presses
Angle Bending Presses
Straightening Presses
Upsetting Presses
Stationary Riveters
Portable Riveters
Joggling Presses
Extrusion Presses
Spring Banding Presses
Spring Stripping Presses
Testing Presses
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Pumps, Fittings, etc., etc.

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Special Machinery
For many purposes.

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FOUNDRY AND MACHINE CO.
ESTABLISHED 1836
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EST. 1851 **ELMES** INC. 1895
HYDRAULIC FORCING PRESSES
Wheel it to the work. Drop the work in place.



If you can make Resistance heads and bars, we will mail blue print or furnish them if desired.

CHARLES F. **ELMES** ENGINEERING WORKS
Hydraulic Machinery—Special Machinery
1003-1011 Fulton St. Since 1851. CHICAGO, U. S. A.

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built and installed by us 25 years ago, is still in service. Designed with the best engineering skill and built of the best materials for every purpose.

Refer your special problems to us.

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Nos. 2, 3, 4 and 5 Rotary Riveting Hammers
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Nos. 5 and 7 Rope Lift Crank Drop Hammers
No. 1 Taper Roll
No. 13 Punch and Shear, Sgl. 15" Throat
No. 14 Punch and Shear, Sgl. 15" Throat
No. 14½ Punch and Shear, Sgl. 12" Throat
No. 2 Horizontal Bending and Straightening Machine
150 Lb. Yeakley Hammer
No. 12 Structural Punch, Sgl. 25" Throat
6-66 Straight Sided Double Crank Tie Rod Press

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WILLIAMS, WHITE & CO., Moline, Illinois
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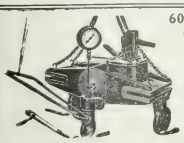
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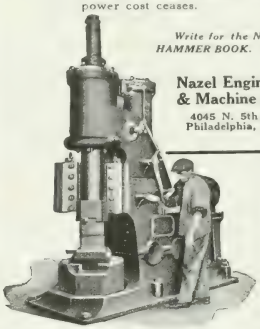
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for pressing on and off Cranks, Crank Pins, Sheaves, Pinions, Car Wheels, etc., by hand. Two sizes. Send for circular.
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you secure greater economy than in hammers operated from an independent air supply, for in hammers so worked, the full pressure must be constantly produced and wherever less than the full pressure is required in the hammer cylinder, the difference is wasted by throttling at the valve. With the Nazel, only the actual air required in each instance is produced, and when hammer stands idle the power cost ceases.

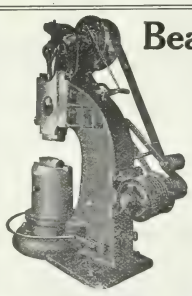
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Built in three types, Six Sizes, Belt or Motor Driven, with capacities up to 8" square for all kinds of machine, railroad and general forging.

NAZEL HAMMERS require no storage tanks, independent compressors or piping



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FOR
General Forging
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Belt or Motor Drive
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Look through the window
with us into shops here and there and see for yourself what
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are doing for others. See our full page ad. last week and next week.
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Power Hammers

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All parts are easily accessible. Perfectly controlled from the lightest touch to the heaviest blow.

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Made in 25 lb., 50 lb., 100 lb., 250 lb. and 500 lb. sizes.

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Bar Shears (hand power)

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EST. 1860 **NEWBOLD** INC. 1895

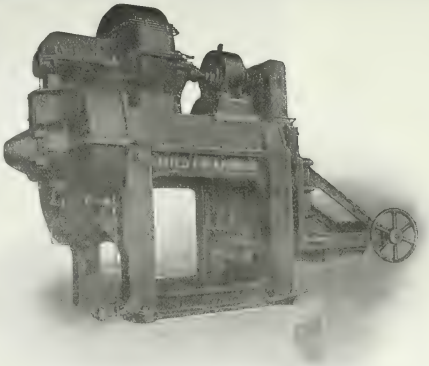
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Tanks, Stacks, Breechings, Dredge Pipe and Pontoons, etc.
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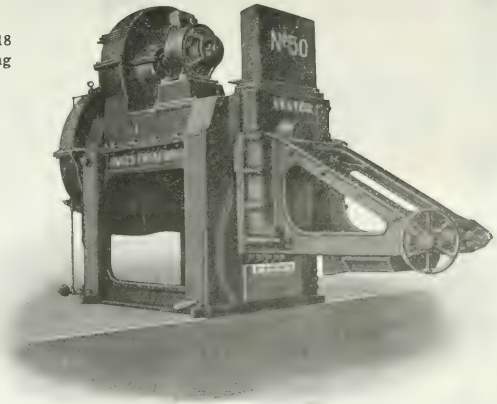
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Patented May 7, 1918
Other patents pending



New four-post type No. 50 shear, for cutting slabs and bars. Capacity hot slabs 6"x30", cold bars 3-8"x3½, or 4-8"x2½" with standard 42" length of knife, and by widening base and lengthening knife to 72" it will cut 8-8"x1¾" cold bars. Pressure between the knives 1,250,000 lbs., max. stroke 9". This type of shear also built to give a pressure of 750,000 lbs. between the knives, and a max. stroke of 12".

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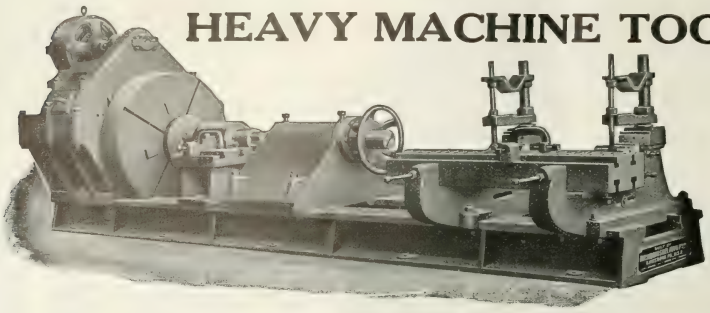
No Righthand or Lefthand to shear.—Front of shear below gage is flush with bottom knife, leaving front of shear entirely clear for bar piler and handling.—All gears and flywheel fully enclosed.—Gears run in oil.—Continuous oiling system for bearings and gears.—Knifehead spring balanced, springs fully enclosed.—Clutch patented, positive throwout, non-knocking type, fully enclosed.—Separate spring actuated pinch rolls for cutting sheet bars.—Various types of gages can be used.—The gage shown is a double screw type and can be furnished either hand or motor operated.

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Rolls Sand Chilled — IRON CASTINGS ROLL LATHES

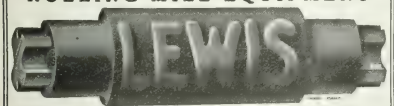
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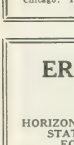
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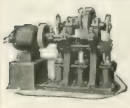
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DALLAS, TEXAS, 2001 Magnolia Building
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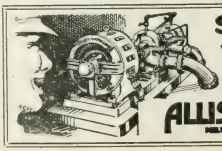
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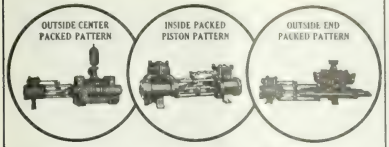
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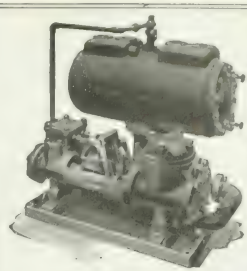
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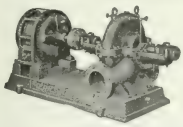


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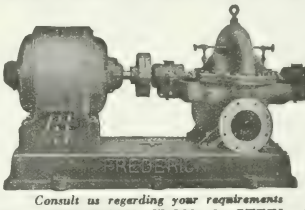
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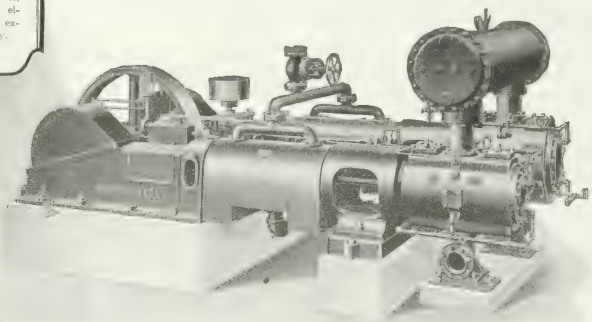
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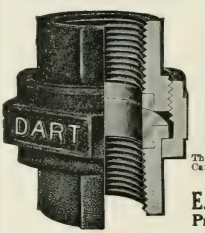

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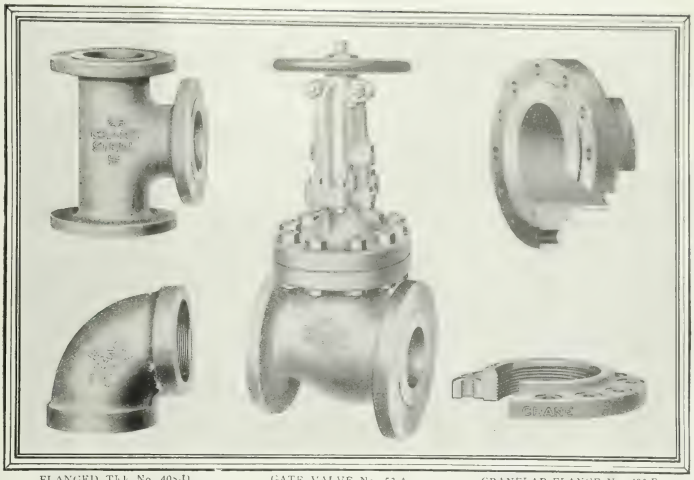
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2—24"x8' Universal.
1—24"x10' American.
15—24"x10' Cisco.
9—24"x12' Providence.
1—24"x16' Lodge & Shipley.
1—24"x20' Lodge & Shipley.
26—28"x10' Sidney.
7—25"x10' LeBlond.
16—25"x12' LeBlond.
1—24"x15' Pond.
4—26"x10' Walcott.
15—26"x10' Whitcomb-Blaisdell.
24—26"x10' Canada.
13—26"x11' Wickes.
4—26"x13' Wickes.
27—26"x10' Niles-Bement-Pond.
44—26"x 8' Bridgeford.
85—26"x 6' Bridgeford.
99—26"x10' Bridgeford.
17—26"x12' Bridgeford.
2—26"x14' Bridgeford.
2—26"x16' Bridgeford.
2—26"x18' Bridgeford.
1—30"-32"x20' American, Gd. Hd.
2—30"x11' W. & G.
18—32"x12' Pittsburgh.
1—32"x12' Wickes.
2—36"x12' Wickes.
8—36"x14' Johnson, Gd. Hd.
1—36"x20' Putnam.
6—36"x20' Pittsburgh, Gd. Hd.
4—36"x27' N.-B. P., Gd. Hd.
2—36"x42' LeBlond, Gd. Hd.
3—38"x12' Pitfield.
1—40"x42' Gisholt Gun Boring.
7—42"x16' Bradford.
2—42"x24' Pond.
1—33"-51"x90' Bradford.
1—40"x18' Johnson, Gd. Hd.
1—56"-64"x8' Johnston.
1—36"x42' Gisholt Gun Boring.

DRILL PRESSES

1—22½" W. F. & J. Barnes.
2—25" W. F. & J. Barnes.
2—No. 310 Baker.
1—No. 15 Baker.
1—No. 21 Foote-Burt.
1—25" 3-spdle. Rockford.
1—4-spdle. Reed Prentice.
4—4-spdle. Allen.
10—6-spdle. Allen.
1—No. 3 Fay Multiple.
1—No. 31 Natco.
6—No. M-1 Natco.
2—M-37 Natco Multiples.
1—No. 41 Natco.
1—No. 6 24" Moline Hole Hog.
1—No. 6-24", 4-spdle. Moline Hole Hog.
1—No. 66 to 26", 4-spdle. Moline Hole Hog.
1—No. 15, 8-spdle. Foote-Burt.
2—No. 15, 8-spdle. Foote-Burt.
1—6-spdle. Quint Turret.

RADIAL DRILLS

2—5' American, Sens.
3—4' Carlton, Sens.
1—3' Prentice.

VERTICAL BORING MILLS

7—24" Bullard, Vert. Turret Lathe.
6—24" Bullard, New Era.
2—30" Gisholt.
1—48" Auburn.
1—52" Bullard.
1—60" Bullard.

HORIZ. BORING MACHINES

1—Cincinnati-Way Boring Mach.
3—No. 1 Barnes Horiz., 2 Heads.
1—Rockford Double Head.
3—Foote-Burt.
1—4" Newark.
1—Bement & Smith.
1—2-spdle. Espen-Lucas.
1—No. 1, 3½" Bar Barrett.
1—Rochester Floor Type.
1—No. 3 Beaman & Smith.
1—No. 3A Universal.

SHAPERS

1—24" and 28" Ohio.
2—16" Cincinnati.
1—20" Cincinnati.
2—No. 14-B Milwaukee.
1—No. 2 Rockford, SP.D.
5—2B Milwaukee.
7—No. 2-B Brown & Sharpe, S. P. D.
3—No. 2-B Brown & Sharpe, S. P. D., Heavy.
1—No. 2½ Rockford.
4—No. 3 Kempsmith.
2—No. 3 Brown & Sharpe.
1—No. 3 Brown & Sharpe Univ.
1—No. 3 Heavy Brown & Sharpe.
1—No. 3-A Brown & Sharpe.
1—No. 4 Brown & Sharpe.
1—No. 4-B Brown & Sharpe.
1—No. 4-B Heavy Brown & Sharpe.
3—No. 4 LeBlond H. D.
4—No. 4 Cincinnati.
1—No. 4 Hapgmith Motor Dr.
175—P. & W., Hendey, Becker and Garvin Lincoln Millers.
1—No. 1 Brown & Sharpe.
3—No. 33 Kempsmith.
2—12" P. & W., Semi-Auto.
1—18" Cincinnati Auto.
7—Putnam Semi-Auto.
1—Type A, 16" Briggs.
1—Type A 28" Briggs.
2—4" Type A Whitney Spline.
3—Pratt & Whitney Cam.

VERTICAL MILLERS

1—No. 1 Brown & Sharpe, Vert.
1—No. 2 Cincinnati, Vert.
3—No. 4-B Becker, Vert.
1—No. 3-H Becker, Profiler
8—No. 3 Brown & Sharpe, Vert.
1—No. 3 Cincinnati, Vert.
2—Model S. D. Becker, Vert.
1—No. AB Becker, Vert.
7—No. 5-B Becker, Vert.
8—No. 5-C Becker, Vert., New.
2—Style B Becker, Vert.
5—No. 6 Becker, Vert.
1—No. 5 Brown & Sharpe.

SLAB MILLERS

1—3-spdle. Besman & Smith Slab.
1—24"x24"x8" Ingersoll, 1 Vert. Head.
1—24"x24"x12" Ingersoll, 2 Hor. Heads.
1—24"x24"x12" Ingersoll, 2 Vert. Spdls.
7—24"x24"x12" Ingersoll Slab.
1—32"x32"x12" Ingersoll, Hor. Duplex.
1—Beaman & Smith Open Back.
1—48"x10" Newton.
1—No. 11A Newton, Duplex.

GEAR CUTTERS AND HOBBERS

1—No. 00 Schuchardt & Schutte.
8—No. 1 Farwell.
1—No. 5 Lees-Bradner.
1—No. 2½-15Hton Gear Cutter.
1—18"x10" Gould & Eberhardt.
1—No. 1 Schuchardt & Schutte.
2—24" Gould & Eberhardt.
1—30" Flather.
5—No. 6 Fellows.
3—No. 3 26" Brown & Sharpe.
3—36" Brown & Sharpe.
1—26" Gould & Eberhardt.
1—No. 615 Fellows.
3—No. 36 S. M. Gould & Eberhardt.
1—11" Gleason Gear Generator.

THREAD MILLERS

2—6"x14" Pratt & Whitney.
3—No. 3 Lees-Bradner.
7—No. 3-B Lees-Bradner.
6—Foster.
2—Holden & Morgan.

AUTO SCREW MACHINES

3—No. 76 National Acme.
3—No. 56 National Acme.
2—1½" Model A Cleveland.
1—2" Model A Cleveland.
2—2⅜" Cleveland.
1—2½"x9" New Britain.
2—3¼" Gridley Single Spindle.

GRINDERS

8—Heald Drill.
1—Grand Rapids Drill.
1—Wilmarth & Morman Drill.
1—No. 6 Gardner Disc, B B.
1—No. 16 Besley Disc.
1—Modern Internal.
1—No. 10-A Brown, Internal.
2—No. 20 Bryant, Internal.
1—No. 75 Heald, Internal.
1—No. 210 Heald, Ring.
1—No. 2 Bath Surface.
1—22" P. & W., Vert.
1—15"x8" Norton Surface
1—No. 2 Fraser, Univ.
1—No. 2 Webster & Perks, Univ
6—6"x32" Norton.
1—6"x20" Fitchburg.
1—10"x30" Landis.
1—10"x36" Landis.
12—10"x36" Norton.
1—10"x50" Norton.
3—10"x72" Norton.
1—12"x36" Fitchburg.
5—12"x36" Modern.
5—12"x36" Landis.
1—No. 3 Landis, Univ.
1—12"x120" Landis.
1—14"x36" Norton
1—48"x48" Queen City.
13—14"x50" Norton.
5—14"x72" Norton.
1—36"x48" Landis Crankshaft.
1—16"x72" Norton.

TURRET AND SCREW MACHINES

2—No. 0 Foster.
1—No. 2 Bardons & Oliver
3—No. 2 ⅝" Pratt & Whitney
3—No. 2 Warner & Swasey
2—No. 2 Foster.
4—No. 2 Warner & Swasey
3—No. 3 Bardons & Oliver.
9—No. 3 Foster.
14—No. 4 Wood.
1—No. 2 W. & S., Holl. Hex.
2—No. 4 Bardons & Oliver.
1—No. 6 Wood.
1—1⅝" Pratt & Whitney.
8—2"x26" Pratt & Whitney.
1—2½"x26" Greenlee.
2—2¼"x26" P. W., Gd. Hd.
3—8"x36" Jones & Lamson.
1—34"x30" Cincinnati Acme.
2—No. 5-A Potter & Johnston.
9—6-A Model 2 Potter & Johnston.
1—No. 8 Warner & Swasey.
1—No. 10 Bardons & Oliver.
1—18" Libby.
1—21" Gisholt.
9—24" Gisholt. Motor Drive.
5—24" Gisholt.
6—34" Davis.
3½—24" Steinle.
1—34" Gisholt.

PRESSES

4—No. 57 and 58 Toledo, Nosing . .
2—No. D, G, G, 56 Ferracute, Gd.
2—No. 39 Bliss, Gd., Twin Drive.
1—No. 69 Stoll, Geared.

MISCELLANEOUS

9—No. 1, 3, 4 LaPointe Broach.
3—No. 3 J. N. LaPointe Double.
70—Newton, Betts, Pratt & Whitney and Garvin Profilers.
1—No. 2 Garvin Vert. Tapper.
1—125 lb. United Hammer.
1—1500 lb. Niles - Bement - Pond Steam Hammer.

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Complete List in Big Booklet just issued —Write.

Triple-Geared Lathes

72-in. Swing, 40-ft. Bed, Pond.
60-in. Swing, 22-ft. Bed, Putnam.
60-in. Swing, 16-ft. Bed, Putnam.
52-in. Swing, 16-ft. Bed, Pond.
42-in. Swing, 17-ft. Bed, Putnam.
36-in. Swing, 23-ft. Bed, Johnson.
36-in. Swing, 17-ft. Bed, Pond.
34-in. Swing, 12-ft. Bed, Putnam.
30-in. Swing, 12-ft. Bed, Johnson.

Back-Geared Lathes

30-in. Swing, 38-ft. Bed, Lodge & Shipley, patent-head, quick-change head each end.
30-in. Swing, 18-ft. Bed, Johnson, quick-change.
26-in. Swing, 14-ft. Bed, Lodge & Shipley, quick-change.
24-in. Swing, 12-ft. Bed, LeBlond, with chuck.
Smaller sizes, down to 16-in. Swing, all lengths of Bed.

Roll Lathes

50-in. Swing, 37-ft. Bed, American, Motor-drive.
42-in. Swing, 26-ft. Bed, American, Motor-drive.
42-in. Swing, 21-ft. Bed, American, Motor-drive.
42-in. Swing, 20-ft. Bed, American, Motor-drive.

Upright Boring and Turning Mills

120-in. Swing, Niles, 2 Hds.
90-in. Swing, Niles, 2 Hds.
84-in. Swing, Betts, 2 Hds.
72-in. Swing, Betts, 2 Hds.
62-in. Swing, Baush, 2 Hds.
60-in. Swing, Bullard, 2 Hds.
56-in. Swing, Niles, 2 Hds.
54-in. Swing, Baush, 2 Hds.
52-in. Swing Gisholt, 2 Hds.
24-in. Swing, Bullard, with side head.

Horizontal Boring and Drilling Machines

3 to 12-in. bars, including:
8-in. bar, Floor type, Beaman & Smith.
6-in. bar (2), Floor type, Niles Tool Works.
5½-in. bar, Knee type, Beaman & Smith.
5-in. bar, Floor type, Niles Tool Works.
3⅞-in. bar, Knee type, Betts.
Other various sizes, Niles Tool Works, Pawling & Harnischfeger, Beaman & Smith.

Pipe Machines

Built by United Engineering & Foundry Co.—Several 2" to 6"—A number 6" to 12"—Arranged for motor drive—no motors.

Bolt and Pointing Machines

1—3-in. "Acme" With Landis head Capacity up to 3-in. bolts (No Landis cutters included)
1—1½-in. "Putnam" Stud Pointing Machine.
1—1½-in. "Merriman" Stud Pointing Machine.

Planers

60"x60"x20' Niles Tool Works, 4 Heads.
56"x56"x12' G. A. Gray Co.'s, 2 Heads.
54"x54"x10' G. A. Gray Co.'s, 2 Heads.
42"x42"x8' Pond Mch. Tool Co., 4 Hds.
38"x38"x12' G. A. Gray Co., 2 Heads.
36"x36"x10' Wm. Sellers & Co.'s, 2 Hds.
36"x36"x8' Betts, 2 Hds.
30"x30"x16' Pond, 2 Heads.

Radial Drills

1—10-ft. Arm, Baush.
2— 7-ft. Arm, Prentice Bros.
1— 6-ft. Arm, Pond Mch. Tool Co.
2—6-ft. Arm, Niles Tool Works. Small sizes down to 2½-ft. Arm.

Turret Lathes

"GISHOLT"—Several sizes, including 14-in., 22-in., 24-in. and 28-in. Swing.
"STEINLE" (2), 24-in. Swing, 4 and 6-in. Hollow spindles.
"POTTER & JOHNSTON" Automatics, 6-A and 7-A.
"WARNER & SWASEY" Nos. 2 and 4.
"JONES & LAMSON" 2 x 24-in. and 3 x 36-in. Flat Turret.

Planer Type Slab Milling Machines

1—50-in. between housings, 42-in. between heads, 42-in. under crossrail, 12-ft. in length inside pockets, with four milling heads, 2 on crossrail and one on each housing. Complete with motor drive, including 25 H.P. Westinghouse variable speed motor.
1—22-in. between housings, table 5-ft. in length. Slab type Ingersoll.
1—20-in. between housings, table 5-ft. in length, Slab type Ingersoll.

Locomotive Crane "Industrial Works" 40-ft. Boom

4 tons at 38-ft. radius.
20 tons at 12-ft. radius.
With outriggers—
6 tons at 38-ft. radius.
22 tons at 12-ft. radius.

48 other Lathes, sizes ranging 12" to 60" Swing, 6 to 38-ft. Beds, Belt and Motor-driven.
16 Planers, 30" to 96" wide, 10 to 30-ft. lengths of Tables.
21 Horiz. Borine, Drilling and Milling Machines, 2¾" to 12" diam bors.
29 Turret Lathes, Jones & Lamson, Steinle, Gisholt, Potter & Johnston, Warner & Swasey.
17 Radial Drills, 2½-ft. Arm to 10-ft. Arm.
11 Pipe Machine Grinders, 2" to 12".
14 Miller Machines.
16 Grinders.
40 Motors.
Complete Boiler Shop Equipment. Punches, Shears, Rolls, Riveters, Etc.

Boiler-Shop Tools

PUNCHES AND SHEARS
1—24-in. throat, "Cleveland Punch & Shear Works." Belt drive.
1—Rotary Bevel Shears, "Lennox" No. 2, Capacity ⅜-in. to ¾-in. Single pulley.
BENDING ROLLS
1—8-ft. between housings, "Bertsch & Co." With 3 rolls each 9-in. dia. Drop end housings with power for adjusting rear bottom roll. With 10 H.P. motor and controller.
MANHOLE MACHINES
1—Manhole Ring Flanging Machine. 24-in. x 6-in. with table. Belt drive.
1—Manhole Ring Facing Machine. 24-in. x 5-in. with table. Belt drive. Valuable for anyone having 500 to 600 plates from ⅜-in. to ⅝-in. per year.
OVERHANG FLUE HOLE DRILLING MACHINES
2—Machines on the one bed. 36-in. overhang of spindle out from column with 4-ft. dia. of table mounted on track.
RADIAL DRILLS
1—10-ft. arm, "Cleveland Punch & Shear Co." With lever feed, belt drive.
1—4-ft. arm, "Bickford." Speed box, single pulley drive.
1—28-in. swing Upright sliding head. Back gears and power feed.
RIVETING MACHINES
1—Pneumatic Jaw Riveter, "Hanna Engineering Works." 16-in. gap, 11-in. cylinder, 24-in. reach.
1—Hydraulic Riveter, "R. D. Wood & Co." With steel bolt 10'0" gap. Having three pressures, 25 Tons, 50 Tons and 75 Tons. This Hydraulic Riveting Equipment includes the following: 1 Hydraulic crane, 10 ton capacity, 30-ft. lift.
1 Hydraulic accumulator 1500 lb. pressure, 12-in. x 12-ft. steel wrap cylinder. "R. D. Wood & Co."
1 Power Pump, 3 x 12-in. Duplex Hydraulic "Deane Bros." Arranged for and including motor drive.
This hydraulic Riveting Equipment is to be sold as a unit.

Miscellaneous Machine Tools

1—Board Drop Hammer, 1200 lbs., "Billings & Spencer."
1—Gear Cutter, 12-in. spur, "Gould & Eberhardt." Arranged for motor.
1—Gear Cutter, 60-in. spur, "Brown & Sharpe" No. 5.
1—High Speed Friction Saw, "Ryerson" No. 3. Complete with 45/90 H.P. Special 230 V., D.C. Motor. Running arm, 1800 R.P.M. and a small motor for operating feed mechanism. In service about one month.
1—Slotting Machine, 15-in. Stroke.
2—Slotting Machines, 12-in. stroke, "Bement."
1—Broaching Machine, "American" No. 2.
1—Keyseating Machine, "Mitts & Merrill" No. 0. Table 24-in. square.
1—Shaper—New—Plain, "Smith & Mills Co." 12 in. stroke.
1—Shaper—New—Back Geared, "Smith & Mills Co." 20-in.
1—Shaper—Used, 8-in. stroke.
1—Centering Machine, "Whiton," 3 spindle, 4-in. capacity, extreme 5-in., belt driven.

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Screw Machines

1—28" Gisholt Turret Lathe.
1—1½" Dreses Geared Friction Head.
1—2¼x11 Acme Screw Machine.
6—3½" Gridley Automatic, SPD.
1—No. 5½ Bardon-Oliver Screw Mch
1—No. 4 Goods Screw Machine.
1—No. 2 P. & W. Screw Machine
2—No. 2-A Warner-Swasey Turret.
2—No. 2 Jones-Lamson Turret.
1—3x36 Jones-Lamson Turret.
1—14"x5" Ledge-Shipley Turret.
1—2½" Perkins Turret.
1—2½"x8" Bogart Turret.
1—No. 6-A Potter-Johnson Turret.
1—18" Libbey Turret Lathe.

Saws

1—No. 1 Cochrane-Bly Cold 4" Saw.
1—No. 1 Cochrane-Bly Metal Saw.
2—6" Racine High Speed.
2—6" Peerless High Speed.

Presses

1—No. 2 Niagara Press.
1—No. 93-B Toledo Geared Double Crank Trimming.
1—No. 1 Ferracute Press.
1—No. 10 Bliss Inclinable.
1—No. 2-B Standard Double Acting.
5—No. 1 Taylor Bench Power.
1—No. 6 Leffler Inclinable
1—Three-Cylinder W. Press.
1—No. 1300 Mac Arns Press.
1—No. 4 Stiles Type.

Miscellaneous

1—¾" Acme Bolt Cutter.
4—No. 00 Gould-Eberhardt Gear Cutter, spur and bevel.
4—24"x10" G. & E. Hobbers.
1—24" G. & E. Gear Cutter.
1—26" Brown-Sharpe Gear Cutter.
1—00-H Gould-Eberhardt Gear Cutter.
1—96" Gould-Eberhardt Gear Cutter.
1—96" Gleason Gear Generator.
1—300 lb. Bradley Upright Helve.
1—900 lb. Billingsbeaver Board.
1—1500 lb. Erie Double Frame Steam Hammer.
1—2000 lb. Chambersburg Steam Drop Hammer.
1—2-lb. Erie Single Frame Steam Forging.
1—6000 lb. Chambersburg Steam Drop Hammer.
1—36 RM G. E. 3-spindle Gear Hobber.
1—No. 1 Lapointe Broach.
1—No. 2 Lapointe Broach.
1—No. 3 Lapointe Broach.
1—Everett-Metcalfe Blueprint Mch
1—No. 11 Dwight Slate Marking Mch.
1—Gould Single Acting Triplex Pump.
1—No. 104 Curtis-Curtis Pipe Mch. 2½" to 10" RB.
1—Chester Pipe Machine.
1—No. 0 Eastman Photostat.
1—No. 12 Leland-Gifford Profiler
92—No. 12 Hole Profilers
1—Oswald Duplex Generator.
1—½" Shuster Wire Straightener.
No. 1 and No. 2 Baker Kerosene Locomotives, Type CSB.
1—1½" Acme Six Spindle Semi-Auto Nut Tapper.
1—Six Spindle Acme Nut Tapper, latest type.
1—Mead-Morrison 1 cu. yd. Clam Shell Bucket.

Special

All sizes **Radbore** Square Head Drillers 35% of new price.

Milling Machines

1—No. 2 Cincinnati Vertical.
1—No. 2-H Becker Vertical.
1—No. 3 Cincinnati Vertical.
1—No. 4 Cincinnati Vertical.
1—18" Cincinnati Plain.
1—No. 1 Cleveland Plain.
1—No. 2-B Kearney-Trecker Plain.
1—No. 2 Cleveland Plain.
1—1½-B Milwaukee Plain.
1—No. 1½ Rockford Plain.
1—No. 2 Garvin Plain.
1—No. 2 Rockford Plain.
1—No. 3 LeBlond Plain.
1—No. 3 Cincinnati Plain.
1—No. 3 Cincinnati H. P. Plain.
1—No. 3 Brown-Sharpe Plain.
1—No. 3-B Brown-Sharpe Plain.
1—No. 3-B Hendey Plain.
1—No. 4 Cincinnati Plain, S.P.D.
1—No. 5 Brown-Sharpe Plain.
1—No. 1½ Brown-Sharpe Universal.
1—No. 2 Kempsmith Universal.
1—No. 2½ Rockford Universal.
1—No. 3 Kempsmith Universal.
1—No. 3-S Cincinnati Universal.
1—No. 3 Pratt-Whitney Bench Hand.
1—No. 5 Van Norman Bench Hand.
1—No. 6 Whitney Hand.
2—No. 7-H Becker Lincoln Type.
6—No. 1 Standard Hand.
1—No. 3 Garvin Plain Table 12x64
1—No. 1 Van Norman Hand.
1—Cincinnati Duplex, 24" table feed
9—No. 1 Becker Hand Shaping
9—Type A Briggs Slab.
2—5" Pratt-Whitney Automatic.
2—Type B Briggs Slab
1—No. 3 Lees-Bradner Thread.
1—24"x24"x12" Ingersoll Slab.
1—54"x36"x12" Newton Horiz. Slab.

Planers

1—24"x24"x8' Gray, arranged motor.
1—24"x24"x8' Cincinnati, 1 head.
1—24"x24"x6' Ohio Planer.
1—26"x26"x6' New Haven, 1 head.
1—30"x30"x8' Cincinnati, 2 heads.
1—32"x32"x10' Gray, 2 heads.
1—36"x36"x20' W-Powell, 4 heads.
1—36"x36"x10' W-Powell, 2 heads.
1—36"x36"x10' Pond Planer, 2 heads
1—36"x36"x10' Cincinnati, 2 heads.
1—36"x36"x18' Cincinnati, 3 heads.
1—42" Simmons Open side, 2 heads 48"x36"x18' Gray Planer, 4 heads with motor.
1—60"x60"x20' W-Powell, 4 heads.
1—60"x60"x16' American, 4 heads.
1—60"x60"x18' Powell, two heads
1—84"x84"x20' Betts Heavy Duty Planer, four heads.
1—72"x72"x20' Pond Planer.
1—100"x100"x122" Niles Solid Bed Planer, reversing motor drive.
1—14' Hilles-Jones Plate.

Slotters and Shapers

2—10" Bement Slotters.
1—14" Pratt Slotter.
3—15" Newton Slotters with motor.
1—15" Hendey.
1—15" Brown-Johnson Shaper.
1—20" Hendey Shaper.
1—20" Smith-Mills Shaper.
1—20" Cincinnati Shaper.
1—20" Gould-Eberhardt Shaper.
1—24" Stockbridge Shaper, Back Geared.
1—24" Milwaukee.
1—24" Springfield Heavy Duty Shaper.
2—26" Fellows Gear Shapers.
1—48" Morton Draw-Cut Shaper

Lathes

1—92"x20' Fitchburg Engine Lathe.
1—72"x36' N.-B.-Pond Forg.
1—60"x20' New Haven Triple Geared.
1—60"x18' Pond Lathe.
1—48"x32' Bridgeford Geared Head, Motor Drive.
1—57"x23' Putnam Medium Duty.
1—52" x 23' New Haven, arranged motor.
1—48"x24' Ledge-Shipley Lathe, Triple Geared.
1—48"x36" Niles-Bement-Pond, Screw cutting.
1—40"x17' Fitchburg Lathe.
1—36"x27' Pond Triple Geared.
1—36"x34' Bridgeford Geared Head
2—36"x16" N. B. Pond Geared Head
1—26" x 18" Bridgeford, Geared Head, Motor.
1—26"x16' Niles Haven Medium Duty.
1—26" x 10' Niles-Bement-Pond, motor drive.
1—26"x16' Putnam Geared Head.
2—26"x12' Putnam Lathes.
1—26" Stephens Pulley Lathe.
1—24"x22" Pond Heavy Duty, T. H.
1—24"x21' Pond Heavy Duty.
1—24"x18' Pond Heavy Duty.
1—22"x34' Bridgeford Geared Head, double carriage.
1—22"x28' Bridgeford Geared Head, double carriage.
1—22"x25' Ricon Turning.
1—20"x8' Pond Heavy Duty.
1—20"x42' LeBlond, with motor, Tapping Attach.
1—20"x20' Pond Heavy Duty.
1—20"x16' Lodge - Shipley Selective Head.
1—20"x16' LeBlond Heavy Duty.
1—20"x14' Pond Heavy Duty.
1—20"x12' Pond Heavy Duty.
1—20"x10' American Heavy Duty.
1—27"x15' Bridgeford Center Drive Double End Arbor.
3—22"x24' LeBlond Heavy Duty.
1—27"x22" LeBlond Geared Head.
2—20"x12' Boye-Emmes, with motor, attachments.
8—26"x12' Putnam, Taper Attachment.
1—25"x10' LeBlond Heavy Duty.
3—25"x10' LeBlond Heavy, Motor Driven.
1—24"x28' Lodge-Shipley, Pat. Head.
1—24"x10' Prentice Cone.
1—24"x10' Flather Cone.
1—24"x10' Schumaker-Boye Cone.
1—24"x10' Reed Heavy Duty.
1—24"x8' Reed Cone.
1—22"x10' Niles Cone.
1—22"x8' Reed Medium.
1—22"x8' LeBlond Heavy Duty.
2—20"x8' American Geared Head, arranged motor.
1—20"x8' Reed Medium.
1—20"x8' Lodge-Shipley.
3—19"x10' LeBlond Motor Drive.
1—19"x8' New Haven Heavy Duty.
1—19"x8' Reed Medium.
1—18"x11' Fitchburg Lathe.
1—18"x8' Reed Medium.
1—18"x8' Sidney Medium.
1—18"x8' Superior Medium.
1—18"x8' Rahn-Larmon Series AA.
1—18"x8' Rahn-Larmon Series A.
1—18"x8' American Medium.
6—18"x8' LeBlond Geared Head, arranged motor.
1—17"x8' Sidney Heavy Duty.
1—16"x8' Springfield "Ideal" Tool Room Lathes.
1—16"x8' Springfield "Ideal" Tool Room Lathes with Taper.
1—16"x8' Springfield "Ideal" Tool Room Lathes.
1—16"x8' Springfield "Ideal" Tool Room Lathe.
1—16"x8' Sidney Medium.
2—16"x8' Porter Medium.
1—16"x8' Lucas Lathe.
2—16"x8' Sidney Heavy Duty.
2—15"x10' Reed Plain Turning.
1—15"x8' Sidney Heavy Duty.
2—15"x6' Sidney Heavy Duty.
2—15"x10' R. & R. Style M.
1—14"x8' Sidney Medium
1—14"x6' Monarch Quick Change.
3—14"x6' Mulliner Tool Room, with Taper.
2—13"x6' Sebastian.
1—12"x6' Sidney Standard.
2—11"x5' Seneca Falls Star.
1—11"x5' Mevers Standard.
1—10"x4' R. & R. Speed.
1—9"x5' Seneca Falls Star.
3—Porter-Cable Mfg. Lathes.
9—12" Lathe Headstock.

Automatics

4—No. 00-G Brown & Sharpe Automatics.
2—No. 0 Brown & Sharpe Automatics.
4—No. 2 Brown & Sharpe Automatics
1—No. 2 Brown-Sharpe with slotting
1—No. 1 Brow-Sharpe.
1—No. 52 National Acme, four spdle.
1—No. 53 National Acme, four spdle.
1—No. 54 National Acme, four spdle.
1—3¼" Cleveland, Model A.
1—1¼-1½" Cleveland Full Automatic.
2—2" Cleveland, Model A.
1—⅞" Cleveland, Model A.
2—2¼" Gridley, four spindle.
1—3¼" Gridley, single spindle.
1—4¼" Gridley, single spindle.

Boring Mills

4—24" Bullard Rapid Production.
1—24" Bullard New Era Threading.
1—36" Bullard New Era Type Vertical.
1—37" Baush, two swivel heads.
1—34" Bertram Vertical Turret.
1—32" Bullard, two swivel heads.
1—42" Bullard New Era Vert. Turret.
2—42" Bullard, two swivel heads.
1—48" Colburn two swivel heads.
1—60" Niles Vertical Mill.
1—8' Bickford Vertical, two heads, with motors.
1—10' Niles Vertical, two heads.
1—No. 2 Bickford Horizontal.
1—No. 2 Barrett Cylinder.
1—5" Bar Beaman-Smith, Floor Horizontal.
1—No. 31 Lucas Horizontal, Rotary Table, 8' bed.
2—Special Horiz. Mills, 9" Bar, Espen-Lucas, similar to Barrett Type.

Drills

3—14" Washburn Sensitive.
1—24" Aurora Sliding Head.
1—26" Rockford Sliding Head.
1—28" Barnes Sliding Head.
1—28" Snyder Sliding Head.
1—36" Cincinnati-Bickford.
1—Single Spindle Ship.
2—4 Spindle Heavy-Wright, Class K, and A
1—4 Spindle Rockford Gang Drill.
4—6 Spindle Allen Sensitive.
1—12 Spindle Baush Drill, type 24-C.
1—16 Spindle Baush Multiple.
2—No. 117 Hole Hog Heavy Duty.
5—No. 1 Pratt-Whitney Tube Drillers.

Radials

1—3' American Speed Box.
1—3' Silver, arranged motor.
1—4' Bement-Miles Cone.
1—4' Hammond H. S. Sensitive.
1—4' Bickford Plain Radial, Tapping Attach
1—5' Bickford.
1—6' American Speed Box, Universal.
2—6' Western Triple Geared, Heavy Type, Plain, Tapping Attachment.
1—6' Bickford Plain, Cone.
2—6' Reed-Prentice Speed Box.
1—7' Pond Radial, Heavy Duty, Tapping Attachment.
1—7' Warren Semi-Universal.
1—112" Pond Radial, motor drive.

Grinders

1—30"x12" Landis Plain, 50 H.P. Motor.
1—12"x24" Landis Plain.
1—12"x36" Landis Plain.
1—12"x36" Modern Grinder, self-contained.
1—14"x50" Norton Plain.
1—No. 2 Brown & Sharpe Universal.
1—No. 3 Brown & Sharpe Universal.
1—No. 2 Cincinnati Univ. Tool and Cutter.
1—No. 3 Modern Universal Grinder.
1—No. 14 Besley Double Disc Grinder.
1—26" Blanchard Grinder, Belt Drive.
1—26" Blanchard, motor drive, 35 H.P. Motor.
1—14" Pratt-Whitney Vert. Surface, with magnetic chuck.
1—Bridgeport Double End Grinder.
1—Ramson Motor Driven, 16" wheel, with motor.
1—No. 2 LaSalle Surface.
1—No. 11 Brown & Sharpe Plain.
1—No 70 and No. 75 Heald Internal.

DISTRIBUTORS FOR LINCOLN 40° MOTORS

Simmons Machine Tool Corp.

BUFFALO OFFICE 88 EXCHANGE ST. — ALBANY, N.Y. — NEW YORK OFFICE 182 LAFAYETTE ST.



Announcing the Liquidation

of

Forging, Trimming and Tool Making Machinery

at

Public Auction

On account of removal of J. H. WILLIAMS & CO., to their Buffalo Plant, CHARLES KRISER, Auctioneer, will sell on JANUARY 22nd, 1924, at the plant at No. 150 HAMILTON AVENUE, BROOKLYN, NEW YORK,

All Surplus Machinery. Partial List Below:

FORGING DEPARTMENT

27—Board Drop Hammers (from 300 to 2000 lb.), Bliss & Waterbury make.
3—Steam Hammers (from 600 to 800 lb.).
1—Bradley Helve Hammer.
1—3" Acme Bolt Header.
2—No. 5 Hilles & Jones Guillotine Shears, cap. 4" x 4" cold billets.
1—Hilles & Jones Shear, cap. 2" x 2½".
1—160,000 lb. Tinius Olsen Testing Machine, motor driven.
Gas Furnaces and Trimming Presses.

TRIMMING DEPARTMENT

25—**Power Presses,** E. W. Bliss and Farrel Foundry, straight sided, inclinable and geared, from 20 to 100 ton capacity.
5—Cold Saws, Higley and Burr.
15—**Drill Presses,** from 18" to 26". Marking Machines.
5—**Landis Threading Machines.**
20—**Milling Machines,** Brown & Sharpe, Hendey and Briggs makes.

TOOL and DIE DEPARTMENT

5—Gould & Eberhardt Shapers, 16" and 24".
1—Pratt & Whitney Tool Room Shaper.
10—Lathes, Hendey, American and Lodge & Shipley, taper attachment and draw-in collets.
4—**No. 2 Brown & Sharpe Universal Milling Machines.**
1—Brown & Sharpe No. 3 Plain Miller.
5—**Planers,** 24" x 24" x 6' to 42" x 42" x 10', Pond and Gray makes.
1—No. 6 Becker Vertical Die Miller with rotary table.
5—Pratt & Whitney Vertical Die Millers.
1—Hydraulic Die Sinking Machine.
1—Brown & Sharpe Universal Grinder No. 2.
3—Allen Sensitive Drills, Arbor Presses, Surface Grinders, Tool Grinders, Polishing and Grinding Stands, Benches, Vises, etc., and hundreds of other items.

NOTE!!! MANUFACTURERS and DEALERS!!!
SALE COMPRISES 250 MACHINES
We are preparing CATALOGUE
GET YOUR COPY NOW!!!
WRITE . . . WIRE . . . or . . . 'PHONE

INDUSTRIAL PLANTS CORPORATION

2270
Rector 2271
0348

25 Church Street, New York

The Largest and Most Attractive Stock of High Grade Tools in Western Pennsylvania

"Get Our Prices Before Buying"

BORING MILLS

Beaman-Smith No. 5 Post Mill, spindle 8" dia., M. D.
Niles 36", 51", 90", 10', 2 heads.
Betts 84', Pond 84", Bullard 30", 42".

DRILL PRESSES

Baush 9', Pond 6½'-8', Radial Drills.
Prentice 7', Morris 3' Radials.
Bickford 5', Dress 3½' Radials.
Canedy-Otto 2½' Post Radial.
New Haven 40" Upright Drill.
Prentice 26", Champion 20"-22" Upright.
American 28", Silver 20" b.g.

LATHES

Cleveland and Blaisdell 16" x 6'. h.s.
Prentice 18' x 18' h.s. taper att.
Sidney 18" x 8', Mueller 18" x 8', qcg., dbg.
Bogert Turret Engine Lathe 20" x 8'.
Walcott 26" x 10'6", qcg., dbg.
Putnam 26" x 20½', c.r.
Putnam 28" x 14', h.s., cr.
New Haven 30" x 13', c.r.
New Haven 38" x 14½'.
Johnson 50" x 49'6" Triple Geared.

TURRET LATHES

Jones & Lamson 2¼" x 24" flat.
Jones & Lamson 3" x 36" flat.
Gisholt 24" x 6', belt and motor drive.
Fox 16" x 5', 6 hole turret.

PLANERS—SHAPERS

Chandler 24" x 24" x 8' Planer, 1 head.
Pond 48" x 48" x 22' Planer, 4 heads.
Cleveland Open Side Planer, 48" x 48" x 16'2", 2 rail and 1 side head.
Sellers 120" x 120" x 25' Planer, 4 hds.
Columbia 20", B.G. Crank Shaper.
G. & E. 16" S. G. Shaper.

MISCELLANEOUS

Brown & Sharpe No. 13 Gear Cutters.
Landis No. 3 Universal Grinder, 12" x 42".
Ott 6" x 6" Internal Grinding Machine.
Chicago Duplex Air Compressor 19x12x14.
Eaton-Cole-Burnham 4" and 8" Pipe Machines.

We Extend to All Our Friends and Patrons Best Wishes for a Happy & Prosperous New Year

MILLING MACHINES

Cincinnati No. 3-S and No. 2 Universal.
Hendey-Norton No. 3 Universal.
Brown & Sharpe No. 2-B Plain.
Cincinnati No. 2 Vertical.

PRESSES

Garrison No. 97 Gap Housing Dbl. Crank.
Bliss Dbl. Grd. Tie Rod Nos. 76½, 78½, 79½, 80½.
Bliss No. 15-B Double Crank.
No. 56 Double Housing Knuckle Joint Press, 2" Stroke.
Stiles No. 3 Inclinable 1¼" Stroke.
Zeh & Hahnemann Inclinable.

FORGING MACHINERY

Bement-Miles 1500 lb. Steam Drop Hammer.
Bement-Miles 800, 2000 and 2500 lb. Steam Forging Hammers.
Bradley Helve 25 lb. Hammer.
Williams & White 55 lb. Upright Hammer.
W.W. No. 2 and 5 Bulldozers.

PUNCHES—SHEARS

Cincinnati Punch and Shear, 12" throat.
Massillon Punch and Shear, 20" throat.
Long & Alstatter No. 3, No. 6, No. 7 Punch and Shears.
Rock River D. E. Punch and Shear, 24" throat, cap. ¾" x ¾".
Reade S. E. Punch and Shear, 50" throat.
King Bridge Co. Punch 30" throat, 1¼" x 1¼".
D & K No. 3 Alligator Shears, M.D.
H. & J. Gates Shear cap. 8¼" x ½".
H. & J. Guillotine Shear, cap. 2½".
Pusey-Jones Guillotine Shear, cap. 3".
Mesta Sq. Shear, 156" x ¾".
Niagara 36", Stoll 53" Sq. Shears.
Acme ¾" Steel Bed Upsetter.
Niles 15" Slotter, 30" rotary table.
Acme 1" x 7" Screw Machine.

RUSSELL MACHINE COMPANY, Pittsburgh, Pa.

SECOND HAND MACHINE TOOLS

DRILLS

1 spdl. Avey, Allen, Henry & Wright, ball bearing
2 spdl. Avey and Henry & Wright, ball bearing
4 spdl Avey and Henry & Wright ball bearing
No. 3—4 spdl. Avey, ball bearing, high speed drill, power feed to each spindle
20", 25", 28", 30", 32", 36" uprights
3, 4, 5, 6 ft. radials
D-2 Colburn manufacturing drill
No. 513 Baker heavy manufacturing type
No. 12 Natco multiple spindle drill
No. 13 Natco multiple spindle drill
8 spdl. Fox multiple spindle drill
4 spdl. Rockford manufacturing drills, 23"
8 spdl. Barnes drills 20"
4 spdl. Barnes drills 20"

BORING MILLS

No. 0 Giddings & Lewis, table type, horizontal 3" bar
No. 1 Lucas, table type, horizontal 3" bar
No. 2 Rockford horizontal boring and drilling machine
Bement-Niles R & L, table type, horizontal 3⅞" bar
34" Colburn vertical type, turret head
24" and 36" Bullard, New Era type turret head
62" Rogers, 2 heads on rail
100" J. M. Poole, 2 heads on rail

GRINDERS

No. 1 Brown & Sharpe universal
12" x 36" Cincinnati universal
8", 6", 10" swing x 18", 32", 36", 72" long Norton plain
14" Pratt & Whitney vertical, surface type
10" Gardner, rotary surface type
No. 1 Cincinnati cutter and tool
No. 2 Walker cutter and tool
No. 1 and 2 Norton cutter and tool
No. 2 Oakley cutter and tool
No. 66 Heald cylinder
Taylor high speed water tool
No. 2 Morse plain
No. 14 Brown & Sharpe, plain
10" x 24" Landis, plain

SCREW MACHINES AND TURRET LATHES

No. 0 B. & S. automatic
⅜", ½", ⅝", ⅞" Cleveland automatic plain, Model "B"
½", ⅝", ⅞" Cleveland automatic turret, Model "A"
4½" Gridley automatic, arranged for motor drive, with motor
1", 1½", 2¼" Cincinnati Acme with wire feed
⅝", 1", 1½" Pratt & Whitney, with wire feed
No. 2 B. & S. with wire feed
2¼" and 3¼" Jones & Lamson, flat turret type, with both bar and chucking equipment
2¼" and 3¼" Cincinnati-Acme ditto
16" Warner & Swasey, Fox turret type with chasing bar
16" Cincinnati-Acme, Fox turret type with chasing bar
2 spdl. Jones & Lamson flat turret lathe, turret type, with chucking equipment
No. 2-A Warner & Swasey turret machine
24" Steinle heavy mfg. turret lathe

LATHES

9" x 20"Porter Cable mfg. type
14" x 6' Lodge & Shipley, C.R., P.C.F., Q.C., cone head
14" x 6' LeBlond C.R., P.C.F., Q.C.
16" x 8' LeBlond C.R., P.C.F., Q.C.
16" x 8' Champion C.R., P.C.F., Q.C.
18" x 8' Prentice Bros. C.R., P.C.F., Q.C., geared head
20" x 12' American C.R., P.C.F., Q.C., geared head
20" x 8' American C.R., P.C.F., Q.C., cone head
20" x 10' Lodge & Shipley C.R., P.C.F., Q.C., cone head
21" x 22' Lodge & Shipley C.R., P.C.F., Q.C., cone head
22" x 10' LeBlond C.R., P.C.F., Q.C., cone head
24" x 12' LeBlond C.R., P.C.F., Q.C., cone head
32" x 14' Hamilton C.R., P.C.F., Q.C., cone head, triple geared
14—28" x 8' Fay & Scott gap lathe, cone head
18—36" x 8' Fay & Scott gap lathe, cone head
24—46" x 10' Fay & Scott gap lathe, cone head
2—32" x 8' LeBlond gap lathe, cone head

SHAPERS AND PLANERS

12" Smith & Mills crank shaper
14" Pratt & Whitney crank shaper
15" Kelly crank shaper
16" Gould & Eberhardt crank shaper, back geared
20" Gould & Eberhardt crank shaper, back geared
24" Gould & Eberhardt crank shaper, back geared
26" Smith & Mills crank shaper, back geared
15" 20" Hendey friction driven shaper
24" x 24" x 6' Flather planer, 1 head
36" x 36" x 12' Pond planer, 2 heads
50" x 46" x 14' Pond planer, 2 heads
66" x 54" x 12' Pond planer, 2 heads
66" x 60" x 30' Bement planer, 3 heads
72" x 72" x 20' Gleason planer, 3 heads

MILLERS

No. 0 and ½" Van Norman duplex millers
Nos. 2, 3, 4 Cincinnati plain
Nos. 2 and 3 Cincinnati universal
No. 2 Hendey universal
No. 2-A Brown & Sharpe universal
Nos. 2, 3, 4 Cincinnati vertical
No. 2-C Becker-Brainerd vertical
No. 4½ x 12 Pratt & Whitney, thread type
34" x 10' Ingersoll, slab type

MISCELLANEOUS

No. 1, 3 Lapointe broaching machine
36" Gould & Eberhardt automatic gear cutters
V & O Bliss and Ferracute power presses
No. 00 Baker Bros. keyseater
No. 2-X Garvin vertical tapping machine
½" Landis bolt cutter
Pratt & Whitney riding machine
Norton running balancing machine

HENRY PRENTISS & COMPANY

149 BROADWAY, NEW YORK

BOSTON SYRACUSE BUFFAL O HARTFORD ROCHESTER

Largest Stock in the East

New and Used High Grade Modern MACHINE TOOLS

Guaranteed **At Prices to Net You a Worthwhile Saving**

Boring Mills

4—BULLARD 24" New Era type, vert.
1—BULLARD 24" Rapid Production, vert.
1—ROGERS & HEMPHILL 30" vert.
2—N.-B.-P. 52" vert.
1—FOSTER bor.
1—BICKFORD No. 2 hor.
1—CLEMENT MILES 2½" bar, bor.
1—LANDIS No. 35 hor.

Drills—Upright and Radial

4—ALLEN single spindle.
11—ALLEN 2 spindle H.S.
35—ALLEN 6 spindle H.S.
3—SNYDER 28" vert.
1—MINSTER 16-8, heavy duty.
1—FOOTE-BURT No. 25.
1—FOOTE BURT 44½, 4 spindle rad.
2—HENRY & WRIGHT 4 spindle B. B.
2—NEW TURNER No. 3 vert. Turret.
1—HAMMOND H.S. Radial.
1—RAUSH 6 ft. Plain Radial
1—N.-B.-P. 96" Ridgeway motor drive plain Radial.
1—WESTERN 6" plain Radial.

Automatic Screw Machines

7—GRIDLEY 4 spindle, cap. 1¼.
6—CLEVELAND, Model A, ⅝-1¼".
2—CLEVELAND 1¼".
1—NATIONAL-ACME No. 56, motor.
1—NATIONAL-ACME No. 515, motor.
4—B. & S. No. 0.
1—B. & S. No. 2.
5—P. & J. No. 6-A Turret.
20—P. & J. No. 6-A Turret.
2—NEW BRITAIN No. 22.
1—NEW BRITAIN No. 23.

Millers—Plain, Mfg. Univer. and Ver.

1—LEBLOND No. 4 Univ., S.P.D.
1—LEBLOND No. 3 Universal.
1—KEMPSMITH No. 2 Univer-al.
1—BECKER No. 2 Universal.
1—ROCKFORD No. 2½ Universal
1—LEBLOND No. 4 Plain, cone drive.
1—BROWN & SHARPE No. 4 plain.
1—CINCINNATI No. 2 plain.
2—TAYLOR & FENN Vertical.
1—BECKER No. 3 Vert.
1—BECKER No. 4B Vert.
5—BECKER No. 5C Vert.
1—BECKER "C" Vert.
5—BECKER No. 6 Vert. 62" table.
2—NEW GARVIN No. 2 Duplex.
1—VAN NORMAN No. 2 Duplex
1—NEWTON Duplex.
3—BROWN & SHARPE No. 12 manufacturing type.
15—NEW P. & W. No. 10.
1—BROWN & SHARPE No. 12 hor.

Gear Cutters

2—BILTON No. 1.
2—BARBER-COLMAN No. 2.
1—HERCULES 8".
2—BROWN & SHARPE 3 x 26.
2—BROWN & SHARPE No. 4, 86" heavy.
1—GOULD & EBERHARDT 60" spur.
1—S. & S. 26" spur and spiral.
3—FELLOWS No. 6 and No. 612.
2—GLEASON 6" bevel
1—GLEASON 11" double tool gen.
5—GLEASON 18" double tool gen

Planers

[illegible]

Grinders

6—SPRINGFIELD-BRANDES 12 x 12 x 18" Vert.
16—[illegible] 12 x 36
3—NORTON 3 x 18.
4—NORTON 6 x 32.
7—NORTON 10 x 30.
1—NORTON 10 x 72.
1—LANDIS No. 4 20".
1—LITCHFIELD 12 x 54.
10—BRYANT No. 2-6, chucking.
2—HEALD No. 2 Internal.
1—HEALD No. 60 cylinder.
6—HEALD No. 20.
6—SELLERS No. 1 Universal, tool cutter.
1—VAN NORMAN No. 31
1—BRYANT-HEALD No. 16, motor driven.
1—BLANCHARD No. 10 vertical.

[illegible]

12—NEW SOUTH BEND 16 x 8

1—LEBLOND 14 x 6, Q.C.G.
1—MULLINER 14 x 6', taper att.
[illegible]
2—LEBLOND 16 x 8, Compound, Q.C.G.
2—RAHN-LARMON 16 x 8, Q.-C.G.
1—OLIVER 16 x 7, Q.C.G.
1—LEBLOND 16 x 8, Q.C.G., taper.
2—LEBLOND 17 x 6, Q.C.G.
1—LEBLOND 17 x 8, Q.C.G.
2—MULLINER 18 x 8, Q.C.G.
2—NEW CINCINNATI 18 x 8, Q.C.G.
1—RAHN-LARMON 18 x 14'.
4—LEBLOND 19 x 10, Q.C.G., D.B.G.

[illegible]

Shapers and Slotters

1—QUEEN CITY 24".
[illegible]
1—AMERICAN 28".
1—NEWTON 10" Slotter.
1—NEW 15-18" Dill Slotter; motor driven.

Drills—Multiple Spindle, Rect. Head

2—NEW BAUSH No. 3, 21 spindle.
1—NEW BAUSH No. 4, 36 spindle.
1—FOX 6 spindle.
1—DRAKE & WHITNEY No. 11.
1—PRATT & WHITNEY No. 12.

Presses

1—[illegible] No. 857 Rack and Pinion Reducing.
1—[illegible] No. 946.
2—NEW TOLEDO No. 57-8, 4½" stroke.
3—BLISS No. 1 Toggle.
1—BLISS No. 1½ double action cam.
1—BLISS No. 64 double action.
2—WAYBRIDGE & FARRELL double connection 2" and 4" strokes.
1—WAYBRIDGE-FARRELL No. 3½ double action toggle
1—BLISS STILLES type No. 3.
1—BLISS No. 74½ punch
3—CONSOLIDATED No. 4.

Miscellaneous

1—ACME bolt cutter, 3" cap. motor.
1—ACME bolt cutter, 2 spdle., 1".
1—NATIONAL 1" bolt cutter.
3—P. & W. No. 12 profilers.
1—QUICKWORK No. 4 B Rotary Shear.
1—LONG & ALLSTATTER No. 3 Punch.
1—HILLES & JONES No. 2 plate Punch.
1—WICKES single end motor driven Punch
2—P. & W. 4½ x 12" Thread Millers.
2—P. & W. 6 x 14" Thread Millers.
1—DREIS & KREMP 36" Brake.
1—LOY & NAWRATH Brake, No. 5on, 5'.
1—YOUNG Powder Feeder.
3—LAPOINTE No. 1 Broaches (N.-L.)
1—LAPOINTE No. 2 Broach (N.-L.)
1—LAPOINTE No. 2 double spindle Broach.
5—NEW MINER & PECK 50 lb. Hammers.
7—MINER & PECK 85 to 640 lb. Drop.
5—NEW LITTLE GIANT HAMMERS, belt driven 25, 50, 100.
4—UNITED Hammer Co. 25, 50, Hammers.
1—ERIE 1100 lb. Hammer.
1—NAZEL Hammer 2-B.
1—ACME Upsetter, 2" cap.
4—COCHRANE & BLY No. 2 Cold Saws.
1—BILTON No. 199 Cut-off Saw.
20—RACINE 6 x 6 high speed Saws.
1—AJAX 1½ Upsetter.

***ATTENTION*—50—HEALD No. 70**

Grinders at Bargain Prices. Inquire

Turret and Screw Machines

1—FOSTER No. 1-B Turret
1—WAGNER & SWASEY No. 2-A.
2—WARNER & SWASEY No. 3-A.
5—FOSTER No. 2-B Turret.
1—NEW FOSTER No. 10 Turret.
4—GREENLEE 2½" x 26" Turret.
4—J. & L. 2 x 24.
1—J. & L. 2 spindle Turret.
1—J. & L. 3 x 36" flat.
1—GISHOLT 21" Flat Turret.
1—STEINLE 24" Turret.
1—NEW PRATT & WHITNEY 2½ x 26 Flat Turret.
25—NEW wire feed plain hd. Screw.
2—NEW MILHOLLAND No. 4.
5—FOSTER No. 4 Screw
1—ACME 1¼" Turret.
1—W. & S. No. 6 B.G., P.F.
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48" x 48" x 12' Niles, 2 heads, belt drive.
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30" x 30" x 6' Gray Planer, 1 head
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36" x 36" x 18' Gray, 2 heads.
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36" x 36" x 10' Pond, 2 heads.
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30" x 30" x 8' Flather, 2 heads.
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24" x 24" x 8' Pratt & Whitney, 1 head.
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And four others 16" to 22" from 4' to 6' platen.

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Very nearly new.

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5000 pound Chambersburg double leg Steam Hammer.

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21″ Gisholt
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This tool was operated only intermittently during a period of two years and is in excellent condition.

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12″ to 63″ and most intermediate sizes.

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26x26x4 ft. 100
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30x26x16 ft. 400
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42x42x20 ft. 2 heads on cross rails..... 1000
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Putnam compound rest 84″ swing 26 ft. bed 2000
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We have on hand some Lathes for $50.

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Longitudinal Feed..... 18″
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(2) No. 3 Barnes horizontal Drilling Machines, No. 3 spindles.
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4¼" Gridley single spindle automatic Screw Machine.
54" x 54" x 14' Pond Planer, three heads, arranged for four.
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LONGITUDINAL FEED	26"
CROSS FEED	8"
VERTICAL ADJUST.	13"
SIZE OF TABLE	8½ x 27"

PRICE $490.00 EACH

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One Longelier Swaging Machine No. 6-H.S.

in good operating condition. This machine is a wonderful heavy stand and will be sold very cheap. The machine is capable of reducing 1" rod or tube or pointing same for reducing.

ADDRESS BOX W-67
care The Iron Age, New York.

Pond Lathe—48" x 21'

Geared Head Engine, all steel gears, rapid power traverse to carriage 20 H.P. G.E. Motor included, 90% new.

THE CARPENTER STEEL CO.
Reading, Pa.

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10 No. 60 HEALD CYLINDER GRINDERS

Good Condition

MUST BE SOLD AT ONCE AT SACRIFICED PRICES

Special Discount to Dealers

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WRITE OR WIRE

MR. AL. TROYKE,
Care of Continental Motors Corporation
DETROIT, MICH.

Large Vertical Boring Mill

10' Betts Vertical Boring and Turning Mill. Two swivel heads on rail.

All gear feeds—arranged for motor drive.

Can be inspected in operation.

Sun Machinery Company, Inc.
Ordway Bldg., Newark, N. J.

No. 2 Cincinnati H.P. Vert. Miller.
No. 2-B Hendey Universal Miller.
30" King Vertical Boring Mill.
48" Bickford Vert. Boring Mill, 1 Hd
62" Bullard Vert. Boring Mill, 2 Hds.
90" Niles Vert. Boring Mill, 2 Hds.
4' Mueller Plain Radial, G.B., S.P.D.
5" National Forging Machine.
321' Laidlaw Compressor, B.D.
10"-12" Dill Universal Slotter.
No. 60 Heald Cylinder Grinders.
2½" Landis D.H. Bolt Cutter, M.D.
8" Cox Pipe Machine, Does 2½" to 6".
4" Oster Pipe Machine, B.D.
6¼ Bliss Press—6" Stroke.
No. 56 Toledo Presses—3" Stroke. (3).
No. 206-C Toledo Geared Presses, 3" Stroke.
Nos. 67 and 68 D.H. Stoll Presses.

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Beaudry 500 lb. Hammer—Good Condition.—$600.00.
Bradley 80 lb. Cushioned Helve—Housing cracked and patched with strap of steel has been in use this way for three years—Fair condition—$200.00.
Bessemer Gas Engine—10 HP. in good condition except for crack in water jacket—$200.00.

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LAST FOUR DAYS
OF
LIQUIDATION
OVERSTOCKED FROM OUR $500,000 STOCK OF
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We Must Realize $50,000 Within the Next 4 Days
Liquidation on the Basis of 25% Off

No. 78½ Bliss, trimming, 8″ stroke, bed 60″ x 30″ double geared, 65000 lbs., former price $3500	**Sale Price $2500**
*No. 20 Perkins, geared, bed 96″ x 36″, 5″ stroke, 36000 lbs., former price $3000	**Sale Price $2250**
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Also a Tremendous Stock of Other Types and Makes

NOTE—This press not in Philadelphia. Wire for location.

DON'T WRITE — DON'T PHONE — DON'T WIRE

OR YOU WILL BE TOO LATE—COME ON THE FIRST TRAIN AND BRING ALONG A CHECK

OUR LOSS IS YOUR GAIN—WE ARE SLASHING PRICES ON EVERY PRESS IN STOCK

JOSEPH HYMAN & SONS

RICHMOND STREET AND ERIE AVENUE
PHILADELPHIA, PA.

Remember—Last Day of Sale December 31st

Bending Roll, 12' Rock River, 5/8" cap., pyramid type, arr. M. D.
Boring Mill, 34" Colburn.
Car Wheel Borer, 42" Niles-B-P.
Drill, Deep Hole, 10' Stetcher.
Hammer, 1100 lb. Erie Single Frame steam forging.
Miller, Slab, 30" x 36" x 12' Newton, 1 vertical head.
Planer, Plate, Hilles & Jones No. 3—35' Arr. M. D.
Planer, 48" x 48" x 16' Pond.
Punch, No. 8 Whiting, S. E., 48" throat, cap. 1 3/16" x 1".
Punch, Rock River, single end 48" thrt., cap 1 3/16" x 1".
Punch, 48" Cleveland, 1¼" x 1".
Shear, Angle, Cleveland, Dbl., cap. 5" x 5" x ½".
Shear, Gate, Hilles & Jones No. 6½, cap. 8' 6" x 1", 12" gap.
Turret Lathe, 24" Bullard Vert.
Shear, Quickwork, 36" x 3/16".
Turret Lathes, 18" & 26" Libby.

The E. L. ESSLEY · MACHINERY · Co.
551-557 Washington Blvd., Chicago
Branch: 78-80 W. Water St., Milwaukee

PRESSES

No. 59¾ Toledo S.S. Double Geared.
No. 95C Toledo S.S. Double Crank Geared.
No. 94C Toledo S.S. Double Crank Geared.
No. 67 Toledo S.S. Single Crank Plain.
No. 55 Toledo S.S. Single Crank Plain.
No. 52 Toledo Arch Single Crank Geared.
No. 35 Toledo Solid Back Geared.
No. 34 Toledo Solid Back Plain.
P.G.-5 Ferracute Solid Back Geared and many others of all kinds.

Riverside Machinery Depot
251 St. Aubin Avenue, Detroit, Mich.

HAMMERS

Steam Drop
2500 lb. Erie
5000 lb. Chambersburg
12000 lb. Chambersburg

PRESSES

No. 59 Toledo, Back geared
No. 57 Toledo, geared
250 Ton, Chambersburg, Hydraulic

BULLDOZERS

No. 8 W.W. Friction Clutch Pulley
No. 7 W.W. Friction Clutch Pulley

MUST BE MOVED

Prices low for quick sale.

MARR-GALBREATH MACHINERY CO.
127-129 Water St. PITTSBURGH, PA.

PRESSES

2—D. G. 55 Ferracute straight side geared presses, 6" stroke.
1—D. G. 75 Farracute straight side geared press, side shear att., 4" stroke.
Our prices are attractive before removal.

SAMUEL MACHINERY COMPANY
137 No. 3rd St., Phila., Pa.

WE OFFER

2 No. 3 Hilles & Jones Combined Punch and Shear
2—No. 1 Double Action Bliss Toggle Presses
1—750 Ton Elms Forging Press.
6—Welding Hammers, 3 Shaping Hammers
1—Four Stand 5" Hot Rolling Mill, complete.

CONSOLIDATED PRODUCTS CO.
15 Park Row New York City

ROLLING MILL

[illegible]

STIFF LEG DERRICKS

[illegible]

STEAM DROP HAMMERS

[illegible]

TRIMMING PRESSES

Suitable for drawn forgings.

STEAM FORGE HAMMERS

[illegible]

AIR FORGING HAMMER

[illegible]

UPSETTER

[illegible]

METAL PLANERS

[illegible]

METAL SHAPERS

28 in. "Invincible," stroke 28 in., which can be increased to 32 in. Planes 32 in. wide "Gould & Eberhardt"
25 in., Back Geared "Smith Mill"
24 in., High Duty "Gould & Eberhardt"
24 in., Extra Strong "Milwaukee"
Also 20 in., 16 in., 15 in., 14 in., and 12 inch

BORING AND TURNING MILL

37 in., Two swivel Heads. "Bullard"

SLAB MILLER

22" x 10" 8' Horizontal Cutting Head Rise Up and Down Travel "Ingersoll"

RADIAL DRILL

Arm 5 ft., Traverse 34 in., Hole No. 5 Morse Taper "Reed Prentice"

DRILL PRESS

No. 2 D Heavy Duty, Swing 24 in. Capacity 2½" hole "Colburn"

PUNCHING PRESS

No. 76 Flywheel, stroke 2 in. standard, 2½ in. maximum "Bliss"

Practically as good as new. The bar mill and hammers not installed; others demonstrated in operation.

ALLEGHENY GEAR WORKS, 1510 Page N. S., Pittsburgh, Pa.

METAL CUTTING SAWS

[illegible]

ENGINE LATHES

[illegible]
Swing 35½ in. carriage 22½ in. [illegible]
[illegible] "Reliance"
[illegible] "Monarch"
26 in. x 9 ft., heavy duty, swing 27 in. Carriage 17¾ in. [illegible]
[illegible] "Bridgeport"
All geared head and complete taper att. with first 3.

TURRET LATHES

24 in. 8 ft. bed, swing 24 in. carriage 13¾ in. spindle bore 6½ in. "Gisholt"
Special Speed Automatic Swing 24 in. for topping and facing mostly ¾ in., 1½ in. and 2 in.

GEAR CUTTERS

No. 6 Dia. 7.2 in. Face 11 in. "Brown Sharpe"
No. 5 Dia. 60 in. Face 11 in. "Brown Sharpe"
No. 3 A Dia. 36 in. Face 10 in. "Cincinnati"
No. 12 Dia. 18 in. Face 4 in. "Brown Sharpe"
No. 1 "Brown Sharpe"

GEAR HOBBERS

No. 12, dia. 12 in., face 10 in., pitch 3 1 4 S. "Barber Coleman"
No. 5A, swing 19 in., face 8 in., pitch 4 S "Lees Bradner"

GEAR SHAPERS

Numbers 6 and 62 and 612.
Spur Gears 35 in. dia. 5 in. face 4 pitch Internal
25 in. dia. 3 in. face 4 pitch "Fellows"

BEVEL GEAR GENERATORS

11 in. and 15 in. (straight) "Gleason"

GEAR TESTERS

18 in. Bevel Gear. "Gleason"
No. 1 for Spur Gears "Brown & Sharpe"

GRINDERS

No. 20 Deep Hole Chucking. Chuck range 12 in. swing 12¾ in. "Bryant"
12 in. x 66 in. Plain Wheels, 18 in. dia. 1½ in. and 2½ in. face "Landis"
No. 70 Internal Swing 15 in., grinds 11 in. deep. "Heald"
No. 2 Universal Tool and Cutter, swing 10 in. to 12 in. centers 32 in. "Norton"

HAMMERS

Nazel—M.D., 770 lbs.
Chambersburg 7500 lbs., Steam
Chambersburg 1500 lbs., Steam
Chambersburg 1200 lbs., Steam
Erie 1200 lbs., Steam
Niles B Pond 600 lbs. Steam
Toledo 1500 lbs., Board Drop
Toledo 2000 lbs., Board Drop

All In Very Good Condition

Riverside Machinery Depot
251 St. Aubin Avenue, Detroit, Mich.

WE HAVE TEN ARC WELDERS

440 volt 3 phase, 25 cycle, 200 ampere. Brand new. Sell at sacrifice. If different current is required, we will change same for customer.

STANDARD STEEL TUBE CO.
Toledo, Ohio

ELECTRIC WELDERS

Lincoln 200 ampere welders, also Wilson welder arranged for four operators.
Very attractive prices.

M. D. GOODMAN
The Electric Specialist
185 Bigelow St. Newark, N. J.

Forging Machinery:

1—[illegible] Bradley Cushioned Helve Hammer
1—200 lb., 1—500 lb. Upright Bradley Cushioned Helve Hammers
1—1", 1—1½", 1—2" and 1—2½" Ajax Upsetting and Forging Machines.
1—1½", 1—5" National Upsetting and Forging Machines.
1—1½" Continuous Motion Ajax Rivet Machine.
1 Ajax Hot Saw.
1 No. 4; 1 No. 2½; 1 No. 7; 1 No. 5 Williams White Bulldozers.
1 No. 3; 1 No. 6 Ajax Bulldozers
1—Bristol Die Sinking Machine.
1—2" Capacity Landis Pipe Threading Machine.

Donahue Steel Products Co.
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BUTT WELDER

75 K.W. Federal, type 11A, 220 V., 60 cy. Welds tubing up to 3". Flats up to 10" wide. Angles up to 2" sq.

Used only 30 days. Priced low.

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SPOT AND BUTT WELDING MACHINES

We buy or sell both new and second hand, or we will do your welding for you.
Write us your needs, or if you have any Electric Welders to sell, tell us what they are.

Electric Welding Sup. & Sales Co.
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Rim Plant & Welding Equipment

New and Used. Priced Right

Benders, Pneumatic

1—Medium light duty, up to ½" round, for side rings. Used.
1—Grotnes No. 0 Pyramid, 3 rolls, heavy duty, up to 5". New.
2—Johnston & Jennings, type "D," 3 roll, for rim and felloe band up to 4". New —Used.
4—Johnston & Jennings, type "B," for rim and felloe bands up to 7". New
1—Johnston & Jennings, type "C," for rim and felloe band up to 12". New.

Bulldozer or Expander

1—Williams-White, 24" stroke. Used.

Furnaces

3—Tate-Jones forging furnaces, Style No. 4068, 12-36" chamber. New.
1—Tate-Jones, No. 2761, 24"x24", pack hardening and annealing. New.

Grinders

6—Bridgeport No. 6 ACA motor Grinders. New.

Hammers

3—Thor, size 15, pneumatic chipping. New.

Milling Machines

2—United States hand milling machines with oil pump. New.

Pumps

1—Tate-Jones, No. S-2, fuel oil, 160 GPH. New.
1—West Tire Setter, hydraulic triplex oil pump No. 1409. Used.

Riveting

1—Baird Riveter, No. 325, 10x9, 70 tons capacity. New.

Rim Rollers

1—Grotnes, capacity up to 8". Used.
1—Elyria, capacity up to 12". New.

Rim Shrinker

1—20" Grotnes Rim Shrinker. New.

Saws

1—Hickey No. 26 cold cut power saw, 36". New.

Tire Setters

3—No. 4 West Specials, 1500 lbs. hydraulic capacity 12 to 48". New.
1—No. 5 West, with 3 HP motor and triplex oil pumps. Used.

Vises

8—Pneumatic Chipping Vises, 6" jaw, 4" opening. New.
10—Hannifin high-powered, air-operated milling machine vises, 0" to 5". New.

Welders

2—Johnston & Jennings No. 160-A for heavy butt welding, capacity 8"x3¼". New.
1—Federal No. 15-A Butt Welder, 75 KW Transformer, oil cooled, capacity 4"x 3". New.
1—Federal No. 15-A Butt Welder, 100 KW Transformer. Capacity 5"x3". New.
1—Taylor, type S-62, Spot Welder, 10 KW transformer, capacity ¾". Used.
1—Thompson No. 80-A-1 Butt Welder, 440 Volt, current, capacity, 1"x7". New.

All of our used equipment is in first-class condition. Prompt shipment.

Our Customers Must Be Satisfied

Wont you let us figure on your requirements?

By-Products Sales Division—Section B

THE GOODYEAR TIRE & RUBBER COMPANY
Akron, Ohio

Blowing Engine

Weimer Engine with Mesta Heads, 52" steam, 60" stroke, 96" Tubs. Good condition. Price right.

HENRY POTTS & CO.
650 Real Estate Trust Bldg., PHILADELPHIA

ONE DETROIT ROCKING ELECTRIC FURNACE—PRACTICALLY NEW

1-ton Capacity. Includes Transformer, all auxiliary equipment and one new lining.

ONE 60" SCHWARTZ OIL BURNING BRASS FURNACE

AMERICAN MANGANESE BRONZE CO.
Holmesburg, Phila., Pa.

Here's a Real Bargain!

Complete Electric Equipment, Westinghouse, for 6-ton Electric Furnace, 1500 KVA, transformers 22,000 volts, 3-phase, 60 cycle to 106 volts. Thury Regulator, Tilting Motor, Switch Board and Control. Still in original crates.

Pennsylvania Engineering Works
New Castle, Pa.

400—New Crucibles, Size No. 60 made by Gautier, 6c per No. F.O.B., N.Y.C.

12—Tabor Roll-Over Moulding Machines in perfect condition. $75.00 per piece F.O.B. N.Y.C.

2—Two-ton Side Blast Steel Converter Shells with tilting device and trunnion bearings, $300.00 per piece F.O. B. N.Y.C.

1—Root Blower, Large Size, in perfect condition, $250.00 F.O.B. N.Y.C. Must sell at once.

Apply:—A. HIRSCH

407—8th Ave., New York City

One—300 cubic foot, 90 lbs. pressure, vertical three cylinder air compressor direct connected to 55 H.P., 250 volt D.C. motor with complete control built by Milwaukee Brake and Electric, splendid condition.

One—4¾" x 4¾" Worthington Vertical water cooled air compressor mounted on common base with and belted to G. E. 7½ H.P., 220 volt, 3 phase, 60 cycle motor, practically new.

Two—Dean of Holyoke 5" x 8" vertical triplex belt or motor driven pumps, 250 lbs. pressure, capacity 100 gallons, condition equivalent to new.

ADDRESS BOX C-819
care *The Iron Age*, Guardian Bldg., Cleveland, O.

Ingersoll-Rand Air Compressor

Class NF 1, single cylinder, straight line, steam driven. Capacity 350 to 400 cubic feet, 80 to 100 lbs. pressure.

THE OHIO WOOD PRESERVING CO.
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New Surface

CONDENSERS

in perfect condition at 1/6 of manufacturer's cost.

For further details write to

TUBE CONVERSION COMPANY
215 Broadway, New York, N. Y.

COMPRESSORS, "Ingersoll-Rand" Class ER-1, 12x10 plate valves, 224 ft. cap. with unloader and lubricator; condition A-1; like new $650.00; 11x12 "Worthington" enclosed, feather valve single stage belt driven cap. 350 ft. at 270 R.P.M., 100 lb. pressure, lubricator, unloader and idler $750.00; Extra for 75 H.P., 3 ph., 60 cy. motor for above $350.00; **POWER PLANTS,** 2-units 200 KW., 220 volt, D.C. Triumph Generators, d.c. to Buckeye automatic engines, now running; **PIT LATHE** Lane & Bodley make 17 ft. face plate, swings 30 ft. completely refitted bargain for quick sale; **SPENCER TURBO COMPRESSOR** 5400 cu. ft. cap. at 1¼ lb. pressure; **HARDINGE CONICAL BALL MILL,** steel lined 3' dia. x 6' 5" with scoop feeder; **BAND SAW,** motor driven, 36" Fay & Egan No. 345 belted to 5 H.P., 3 ph., 60 cy., 220 volt motor; **SWING SAWS,** belt driven; **CRANE,** 25 ton P. & H. with 5 ton aux. hoist, 53' span, 220 volt, D.C.; **ELECTRIC HOISTS,** Shepard 1/2, 1, ¾, 2 ton, 220 volt, D.C.; **CHAIN HOISTS,** 4 ton Harrington, 5 ton Peerless; **SHEAR** alligator 6" blades; **STRETCHING ROLL MILL** No. 1; **BOOTH ELECTRIC FURNACE,** No. 5R brass melting, 500 lbs. capacity, practically new, fully equipped, swing board with instruments and transformers, extra set linings; **MOLDING MACHINES,** No. 0, S. jar ram, 2 Tabor, 5 Berkshire, hand and air squeeze; **ROOTS-CONNERSVILLE BLOWERS** for cupola and oil burning service, "Sirocco" Multivane Blowers, brand new, No. 4 ball bearing, for ventilating or heating; Complete Brass & Iron Foundries outfitted.

THE CLIFTON-PRATT CO.
1224 W. 8th ST. CINCINNATI, O.

CORLISS ENGINE (Hamilton Type)
400 H.P. 26 x 42
85 R.P.M.
125 lbs. Steam Pressure
Rope Drive Sheave on Engine 14' 10"
Sheave on Jack Shaft 56" dia. 6" bore
Complete with slack rope device and electrical safety stop.

TWO WESTINGHOUSE 550 VOLT D.C. GENERATORS
200 K.W. 400 Amperes—510 R.P.M.
34.5 inch Pulley with 33 inch face
Each of the above Generators have Generator Panel with Rheostat, Volt Meter and Ammeters, also two panels equipped for two circuits each.

ONE HERROV & BURY MFG. COMPANY'S AIR COMPRESSOR
Class—CCS
Size 10 x 16 x 10 x 10
Number 326

Three Clutches—The Clutches are in good condition and will transmit at least 400 H.P.

Eight Pedestals with Bearings, Floor type with bearings for 6 inch Shaft.

The above can be seen at our Plant.

The Morgan Engineering Co.
Alliance, Ohio

4500 Ft. Condenser

Worthington with aux'ls.—15T, 71' and 25T, 80' CRANES.

ADDRESS BOX 113-D
care *The Iron Age*, Otis Bldg., Chicago, Ill.

STIRLING BOILERS

823 Horse Power

Class M-30 823 H.P. Babcock and Wilcox Stirling Water Tube Boilers, 200 lbs pressure. Drums double riveted, double strap butt joint. Complete with Westinghouse stokers, forced draft fans, vulcan soot blowers and all accessories. Operated less than 90 days.

Inspection invited.

Send for specification folder.

OLD HICKORY POWDER PLANT
Old Hickory, Tennessee

200-H.P. B & W Boiler, 200-Pounds Pressure Chain Grate Stoker.

PFANNMUELLER ENGINEERING CO.
503—1st National Bank Bldg., Chicago

POWER-PLANT

BOILERS

1—350 H.P., B. & W. water tube, 265 lbs. A.S.M.E. code States, 225 lb. in noncode States, equipped with four retort Taylor Stoker, Diamond Soot Blower, all fittings and fronts, complete.

1—200 H.P., B. & W. cross drum water tube, equipped with Jones underfeed Stoker, complete.

2—250 H.P. B. & W. cross drum water tube, built 200 lb. pressure, complete.

ENGINE AND GENERATOR

1—Buckeye cross compound, condenser, ideal valve Engine, 285 H.P., heavy duty type; direct connected to:

1—200 KW General Electric Generator, 3 phase, 60 cycle, 240 volt. Unit complete with switchboard instruments and exciter.

FIRE PUMPS

1—Laidlaw & Dunn underwriter's Pump, 10 x 8 x 10, capacity 500 GPM.

1—Buffalo Fire Pump, 14 x 7 x 12, capacity 500 GPM.

We have purchased the above plant from the Orr Felt & Blanket Co., of Piqua, Ohio and offer same for immediate delivery. This equipment is all in A-No.-1 operative condition. If interested, Write, Wire or Phone

Industrial Supply and Equipment Company

Nitro West Virginia

BOILERS

3—400 H. P. Heine Water Tube, 200 lbs. ASME, stoker fired.

1—300 H. P. Heine Water Tubes, 150 lbs. Hand fired.

2—175 H. P. 72" x 20' Keeler horizontal return tubular. 125 lbs.

6—150 H. P. 72" x 18' Coateville, 125 lbs. Horizontal return tubular.

1—150 H.P. locomotive type boiler, 125 lbs. pressure ASME.

ELECTRICAL EQUIPMENT

1—300 KW., 2300 volt, 3 phase, 60 cycle Fort Wayne alternator direct connected to 24 x 24 Russell four valve engine. Special price for quick sale.

2—200 H.P. Allis-Chalmers, 2200 volt, 3 phase, 60 cycle slip ring motors, 500 R.P.M.

The O'Brien Machinery Co.

113 N. Third Street, Philadelphia, Pa.

Long Distance 'Phone: Market 6727
Cable Address OBRIEN Philadelphia

2-New 750-H. P. Stokers
$5.00 PER H.P.

Green Chain Grate with Arches, etc. Can be made larger or smaller.

3—NEW 408-H.P. HEINE
4—NEW 1150-H.P. Boilers. 250 lb.
2—NEW 72" x 20' HRT Boilers

60 CYCLE, 3 PHASE TURBOS
NEW 12,500 KVA., TURBO WITH SUR. COND.
NEW 625 KVA., 480-240 V., NON-COND.
1500-1000-650 KW., MIXED PRESS., 240.
A.C. MOTORS—3 PHASE, 60 CYCLE
1000-750-500-400-300 H.P.
Rotaries and Freq Changers.

ROSS POWER EQUIP. CO.
INDIANAPOLIS, IND.

Immediate Delivery

2—66" x 16' Frost Mfg. Co. butt strap quadruple riveted tubular boilers. Full flush fronts, complete with flat grates and all regular fittings. Also one 45" x 110' smoke stack made of ⅜" plate. Complete Y breeching. I beam supports for boilers.

1—7x48x8 duplex boiler feed pump.

1—400 H.P. closed feed water heater.

1—20" x 42" heavy duty Wisconsin corliss engine, complete with all fittings.

1—225 K.W. 125 volt, Direct Current Westinghouse belted generator.

1—2 panel slate switch board for above generator.

All above practically new and in perfect operating condition.

REPUBLIC BOX COMPANY
925 N. Halsted Street
Chicago, Illinois

Real Bargains

BOILERS

[illegible] H.P. Heine Water Tubular, [illegible] lbs. A.S.M.E. code, [illegible] Superheat, new, Murphy Stokers and Diaphragm Arches.

[illegible] H.P. Heine Water Tubular, [illegible] lbs. A.S.M.E. code, Detroit Stokers.

[illegible] H.P. 72" x 18' Heine Boilers, [illegible] lbs. Hand fired.

[illegible] H.P. 72" x 18' Heine Boilers, [illegible] lbs. Hand fired.

6—150 HP. 72x18 HRT. Ohio Std., 125 lbs.

ROTARY CONVERTERS

[illegible] K.W., [illegible] R.P.M., [illegible] V., 3 Ø., 60 cy., [illegible] V. A.C.

[illegible] K.W. G.E. type [illegible] R.P.M., [illegible] V. D.C., [illegible] V. A.C., 3 Ø., 60 cy.

A. C. GENERATORS
3 Phase, 60 Cycle

[illegible] KVA. Allis-Chalmers, 250 w., 120 R.P.M., d.c. Shunt Exciter Engine.

[illegible] KVA. Westinghouse, 2300 v., 150 R.P.M., d.c. 125 V., Hamilton Corliss Engine.

1—500 KW. G.E. 450 v., 2300 R.P.M. condensing Horizontal Turbine.

1—400 KW. G.E. 900 v., 1200 R.P.M. non-condensing Horizontal Turbine.

1—300 KVA. Parks, 440 v., 900 R.P.M. d.c. Shunt Type Field Curless Valve Engine.

1—175 KVA. Parks, 440 v., 720 R.P.M., d.c. 125 V. Skinner Uniflow Automatic Engine.

1—60 KW. Lincoln, 450 v., d.c. 11x12 Chandler & Taylor Engine.

D. C. GENERATORS

1—200 KW. Triumph, 250 v., d.c. 15x28x20 Hamilton Corliss Engine.

1—150 KW. Allis Chalmers, 125 v., d.c. 18x18 Skinner Uniflow. (Also for 250 v.)

2—100 KW. Western Electric, 125 v., d.c. 15x15 Skinner Engines. (Also for 250 v.)

1—75 KW. G.E. 250 v., d.c. 11x14 Ideal Engine.

1—50 KW. Triumph, 125 v., d.c. 11x12 Skinner Engine.

1—150 KW. Triumph, 125 v., d.c. 8x8 Troy Engine.

THE RANDLE MACHINERY COMPANY
1772 Powers Street

Cincinnati Ohio

One Boiler—475 H.P. Babcock & Wilcox Watertube

Modern steel header, 200 lbs. pressure, hand fired for immediate shipment.

Also

One 150 KW Crocker-Wheeler Terry Turbine Generating Set

Generating Speed 600 RPM., 125 Volt, 5 years old.

Price $1000.00

CONTINENTAL MACHINERY CO.
30 Church St. New York, N. Y.

BOILERS (WATER TUBE) IN STOCK

2—554 H.P. each Babcock & Wilcox, built for 200 lb.
1—350 H.P. each Babcock & Wilcox, built for 200 lb.
1—300 H.P. Babcock & Wilcox, built for 200 lb.
1—250 H.P. Babcock & Wilcox, built for 200 lb.
2—207 H.P. each Babcock & Wilcox, built for 160 lb.
1—240 H.P. Babcock & Wilcox, built for 200 lb.
3—120 H.P. each Babcock & Wilcox, built for 200 lb.
1—180 H.P. Babcock & Wilcox, built for 160 lb.
1—274 H.P. Heine, built for 150 lb.
1—250 H.P. Heine, built for 150 lb.

H. P. BREARLEY, 96 West St., N. Y.

Save on the Initial Cost of Electrical Equipment

Our new and properly rebuilt electrical equipment is priced to save you money and is guaranteed against any defects. Your wants can be filled from our stock of over 8000 motors, generators, transformers, etc. Write for Bulletin A-5.

THE FUERST-FRIEDMAN CO.
Cleveland, Ohio
Electrical Equipment bought, sold and exchanged.

GEORGE SACHSENMAIER CO.

930 N. Third Street
Philadelphia, Pa.

TURBINES

1—300 KW, 440 volt, 3 phase, 60 cycle, 3600 rpm Westinghouse generator to a Westinghouse Parsons steam turbine, complete with Wheeler Condenser & Engineering Company's Admiralty tube condenser, also Blue Vermont marble panel for generator unit, three 600 amp. ammeters, one 100 amp. D.C. ammeter, one 600 volt A.C. voltmeter on swinging bracket with exciter switch, main switch and rheostats.

1—300 KW, Westinghouse direct current generator, Serial No. 182619, 900 rpm, 500 amps., 600 volts, direct connected to No. 3232, Westinghouse steam turbine, 6000 rpm. This turbo generator could be used for belt-drive by using pulley in place of generator. A new alternating current generator could be bought to replace the direct current machine and make a very fine unit.

1—375 KVA, 3 phase, 60 cycle, 2300 volt, 900 rpm Westinghouse generator connected thru reduction gear to Westinghouse frame 3-EHC turbine, condensing, with switchboard.

2—500 KVA, 2 phase, 60 cycle, 2400 volt, 3600 rpm, Westinghouse Parsons turbo generators each with No. 4 LeBlanc turbine driven condensers, without switchboards.

1—625 KVA, 3 phase, 60 cycle, 2300 volt, 900 rpm Westinghouse generator connected thru reduction gear to a frame 8-EHC Westinghouse turbine with Westinghouse-LeBlanc condenser, without condenser, with switchboard.

1—6500 KVA, 3 phase, 25 cycle, 6600 volts, 750 rpm Allis-Chalmers generator to Allis-Chalmers turbine, condensing type.

3 PHASE, 60 CYCLE MOTORS

Qu.	HP.	Make	Volts	Type	Speed
1	20	Fairbanks-Morse	220	KBV	1200
1	20	Lincoln	440	CU	1200
1	20	Westinghouse	220	CCL	1130
2	25	Robbins & Myers	220/440	K207	1150
1	25	Westinghouse	440	CS	1150
1	25	Westinghouse	220	CX	1120
1	25	General Electric	220	KT312	1800
1	25	General Electric	220	KT326	1155
4	25	Gen. Elec.—NEW	440	KT322	1200
4	25	General Electric	440	KT326	1200
1	25	Gen. Elec.—NEW	440	IT9	1200
1	25	West. Elec.—NEW	440	KT322	1200
1	25	Crocker-Wheeler	440	118Q	1150
1	25	Fbks.-Morse—vertical	440	UH	900
1	30	Fairbanks-Morse	440	B	900
2	30	Gen. Elec.—NEW	440	KT322	900
1	30	General Electric	550	IK	900
1	30	Wagner—NEW	440	BP	850
1	30	Westinghouse	550	CS	1140
1	30	Westinghouse	440	CCL	850
2	35	Lincoln	440	C13	1200
1	35	General Electric	220	KT336	885
1	35	Wagner	220/440	TBW	1140
1	40	Gen. Elec.—NEW	440	KT336	900
3	40	Gen. Elec.—NEW	440	KT332	1200
1	40	Lincoln	440	C12	1800
1	40	Wagner	550	BP	850
1	50	General Electric	440	IK	900
1	50	Gen. Elec.—NEW	440	IK	900
1	50	Gen. Elec.—NEW	220	IK	600
1	50	General Electric	550	IK	900
1	50	Lincoln	550	IL	900
1	50	Westinghouse	440	C	1200
1	50	Allis-Chalmers	440	AN	865
1	50	Ft. Wayne	440	MC	900
1	60	Wagner—slip ring—30 minute rating drum controller and resistance	440/220	BR	810
1	80	Gen. Elec.—NEW	440	KT343	1200
2	75	Gen. Elec. with magnetic brakes and drum controllers	440	ITC5013	600
1	75	Gen. Elec.—NEW	440	KT356	720
1	75	Gen. Elec. slip ring—drum controller and resistance	220	M	720
1	150	Westinghouse	220	CS	1200
1	150	General Electric	2200/440	L	720
1	150	Lincoln to a 1500 GPM 240 ft. head centrifugal pump	440	IP	1800
1	200	Westinghouse	2200	CCL	600
1	250	Gen. Elec. synchronous — direct connected exciter	600/2200	ATB	600
1	300	Westgh. 3 bearing	2000	C	495
1	300	Allis-Chalmers—synchronous — direct connected exciter	440	.....	600
2	500	Crocker-Wheeler — synchronous	440	.....	1200

Thousands of Motors in Stock.
What Do You Need?
Special Prices on Quantities.

$500,000.00 Worth of Motors

New and Used—Must be SOLD IMMEDIATELY to turn some of our Enormous Stock into CASH. Our Prices will SURPRISE You. All motors GUARANTEED for one year as usual.

NATHAN KLEIN & CO.
MOTORS HOWARD & CENTRE STS., N.Y. DYNAMOS

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Electrical Machinery

3—Shepard "Lift About" Hoists, cap. 500 lb. lift, 230 volts D.C., condition 99% NEW. Price, $180.00 each.

5—35 H.P., 230 volt D.C., CO 1809 General Electric Series Motors.

3—35 H.P., 230 volt D.C., CO 1808 General Electric Series Motors.

1—40 H.P., 230 volt D.C. Westinghouse K10 Series Motor with Brake.

1—50 H.P., 3 phase, 60 cycle, 220/440 V. General Electric Type I, Form "M," 900 R.P.M. Vertical Slip Ring Motor.

ASK FOR STOCK BULLETIN No. 101

Miller-Owen Electric Co., Inc.
PITTSBURGH, PENNA.

30 KW. 125 V., D. C. ENGINE GENERATOR SET

30 KW., 300 RPM., 115/125 Volt, 240 Amperes, Western Electric, D.C. Generator, direct connected to Bates, 60 H.P., vertical automatic steam engine. Bargain price.

V. M. NUSSBAUM & CO.
Ft. Wayne, Ind.

Adjustable Speed Motors

Hp.	Rpm.	Volts	Make	Type
1—100	475/950	230	Westinghouse (NEW)	SK-180
1— 50	450/900	230	General Electric	DLC-8A
1— 50	500/1000	115	Northern	G. E.
2— 35	500/1000	115	Northern	G. E.
2— 30	500/1000	115	Northern	G. E.
2— 30	210/800	230	Electro Dynamic	30S
1— 25	725/1200	230	General Electric	CL
1— 25	300/800	230	Electro Dynamic	25S
1— 20	650/1900	230	Westinghouse (Semi-enc.)	SK-120
5— 20	515/1030	115	Northern	G. E.
1— 14	900/1800	500	General Electric	CQ-C10
5— 10	1000/1500	230	Sprague	LC
1— 10	300/1200	230	Electro Dynamic	S
1— 10	400/1200	230	General Electric	RF
1— 10	850/1700	230	Westinghouse	SK
2— 7½	1000/1500	230	Sprague	LC
3— 7½	850/1700	230	Westinghouse	SK-40
1— 5	400/800	230	General Electric	CR-7½

For Bargain Prices, Write or Wire

BELYEA COMPANY, Inc.
147 West 18th St., New York City

Complete Stock of all Types of Motors and Generating Equipment

300 K.W. D.C. GENERATING SET

125/250 Volt 3 WIRE

Westinghouse Generator direct connected to 16 x 30 x 30 Allis-Chalmers Heavy Duty Corliss Engine 150 R.P.M. with Condenser, f.o.b. Washington, D. C., $3,000.

MARVIN BRIGGS, Inc.
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Motor Generator Sets *and* Rotary Converters

1—500 KW. Gen. Elec. synchronous motor generator set consisting of 1—500 KW., 250 volt comp. wound interpole generator dir. ctd. to 710 HP., 3 ph., 60 cy., 4150/2300 volt synchronous motor, speed 514 RPM., self-contained on iron base. Two bearing type.

1—300 KW. Gen. Elec. synchronous motor generator set consisting of 1—300 KW., 250 volt generator dir. ctd. to 435 HP., 3 ph., 60 cy., 4150/2300 volt synchronous motor, speed, 450 RPM., self-contained on iron base. Two bearing type.

1—200 KW. Westg. Rotary Converter, 3 ph. 60 cy., 180 volts A.C., 250 volts D.C., speed 900 RPM. with transformers for either 13200/6600 or 2300 volts.

ARCHER & BALDWIN, INC.
114-118 Liberty St. New York City
Telephone 4337-8 Rector

Exceptional Bargains

100 K.W. Generators...$650 ea.
Steel Tanks 6' x 24'..... 475 ea.
Large Copper Heaters.. 570 ea.
Boiler Feed Pumps 7½" x 4½" x 10"..... 75 ea.
2" Oil Meters ..... 50 ea.
Anvils ..... .03 per lb.

Altman Purchasing Syndicate
2200 Elmwood Ave., Buffalo, N. Y.

GREGORY REBUILT

USED ELECTRIC MOTORS
RECONDITIONED LIKE NEW

Enormous stock; all kinds; direct current, alternating current; all standard makes. Write us on approval.

110 VOLT D.C. MOTORS

H.P.			Speed
5	¼	Robbins & Myers, comp.	1200
1	¼	G. E., type SI, comp.	1100
1	¼	Electrimotor, comp.	1750
1	½	Roth, shunt	850
1		Peerless	2850
1	1	G. E., type RC, interpole	1450
1	1	Crocker Wheeler, form L	1675
2	1	G. E., type RC-25, interpole, new	600
1	1½	Westinghouse, type CP	1000
1	1½	G. E., type RC-25, interpole	850
1	1½	G. E., type RC-25, interpole, new	850
2	2	G. E., type RC-24, interpole	1750
1	2	G. E., type RC-25, comp., interpole, new	1250
2	2	G. E., type RC-25, interpole	1150
3	2	G. E., type RC-25, new, interpole	850
1	2	G. E., type CVC-111, interpole, back geared S to 1	1100-138
1	2½	Milwaukee, MP, type B	1050
1	2½	Westinghouse, MP, type M	1850
1	3	Fairbanks-Morse, MP	1400
1	3	G. E., type RC-25, comp., interpole	1700
3	3	G. E., RC-25, new, comp., interpole	1700
1	3	Crocker-Wheeler, form L	1550
1	3	G. E., type CVC, interpole	1400
6	3	G. E., type RC-27A (one is comp.), new, interpole	850
1	3	Watson, MP, type AW	800
1	3½	Milwaukee, MP, type B	975
1	3½	Watson, MP, type AW	1050
3	4	Westinghouse, type SK-30, interpole, new	860
1	5	Northern, MP, shunt, buffing and grinding motor, mounted on 30 inch pedestal	2700
1	5	Peerless, MP, comp.	1800
1	5	Sprague (G. E.), type RP, comp.	1200
1	5	G. E., type RC-27A, interpole	1150
1	5	G. E., type CVC, interpole	1100
1	6	Roth, MP	1400
1	7½	Northern, MP, shunt, buffing and grinding, motor, mounted on 30-inch pedestal	2700
3	7½	Westhse., SK-30, interpole, new	1700
1	7½	Western Elec., MP, type E	1500
2	7½	Westinghouse, MP, type S	975
1	7½	Crocker-Wheeler, MP, form I	975
2	7½	G. E., type RC, interpole	850
1	7½	Watson, MP, type AW, comp.	800
1	10	Westinghouse, MP, type S	1525
1	10	Crocker-Wheeler, MP, form I	825
1	15	Peerless, MP, comp.	1200
2	15	G. E., MP, type CE, shunt	1000
1	15	Fairbanks-Morse, MP, comp.	750
1	15	G. E., MP, type CE	600
1	15	Westinghouse, MP, type M	650
1	15	G. E., type CVC, comp., interpole	650
1	18	Western Elec., MP, type GS	500
1	20	G. E., type DLC, interpole	600
1	25	Fairbanks-Morse, MP, comp.	825
1	25	Diehl, MP, type R12, shunt, interpole, variable speed with C-H comp. starter	200-600
1	30	Northern, MP, comp.	850
2	30	Westinghouse, type M, comp.	850
1	30	National, MP, type CS-30	625
2	40	Westinghouse, MP, type SK	600
1	45	Gen. Elec., 6 pole, type CL	975
1	50	Westinghouse, MP, type M	700
1	55	Westinghouse, MP, type S, No. 10L, comp.	700

125 VOLT D.C. GENERATORS

KW			Speed
1	7½	Lincoln, comp., interpole, direct-connected to 15 H.P. Kerr steam turbine (for 100 lbs. steam pressure). Fine condition; used about a month	3600
1	7½	Westinghouse, MP, type M	1200
1	7½	Colonial, MP	1200
1	9½	Westinghouse, type SK, interpole, new	1800
1	10	Lincoln, comp., interpole, direct-connected to 20 H.P. Kerr steam turbine (for 100 lbs. steam pressure). Fine condition—used about a month	3600
1	14	G. E., type CVC, interpole	975
1	15	Western Elec., MP, type E	1000
1	15	Gen. Elec., 6 pole, type MP, comp'd direct-connected on iron sub-base to 8x8 in. Buffalo Forge horizontal center crank automatic steam engine	400
1	20	Fairbanks-Morse, MP	1050
1	22½	Northern, MP, type B	1000
1	25	Peerless, MP	1200
2	25	Westinghouse, MP, type M	975
1	30	Ft. Wayne, 6 pole, type I	1050
1	30	Northern, MP	625
1	35	G. E., 6 pole, type CL	1050
2	35	Westinghouse, type SK, interpole	700
1	35	Western Electric, 6 pole, type L-3-E, comp., direct-connected on iron sub-base to 10x10 in. Chase horizontal, auto. side-crank, self-oiling steam engine	327
1	45	Westinghouse, MP, type M	850
1	45	Westinghouse, MP, type M	850
1	50	Walker, MP	800
1	50	Western Elec., 6 pole, type L-4G	900
1	55	Westinghouse, MP, type S, frame 10L	850
1	65	G and C (Garwood), 6 pole, type MP	825

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GREGORY ELECTRIC CO. CHICAGO, ILLINOIS — 16th and Lincoln Sts.

220-250 Volt Motors

H.P.	Make	Speed
[illegible]	Wagner	1800
5	Westinghouse, Motor Type	1800
7½	Crocker Wheeler	1750
150	Gen. Elec. DLC	750
125	Wagner 4K	600
100	West. Elec. S	675
90	Gen. Elec.	514
75	Wghse. SK	475
75	Gen. Elec.	750
60	Gen. Elec. RC	1000
50	Gen. Elec. type	800
40	Milwaukee	650
30	Wghse. S	600
20	Gen. Elec. DLC	1150
25	Gen. Elec.	720
25	Gen. Elec. Crane Type	800
20	Gen. Elec.	1100

Complete stock of A.C. and D.C. Generators, Motors, Boilers, Corliss Engines, etc.

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Overhead Traveling CRANES

Quick Shipment from Stock

1 to 50 tons capacity.

18 to 80 feet span.

Wire, write or telephone requirements for prompt proposal.

N. B. PAYNE & CO.
25 Church St., New York
Telephones Rector 9455-6
See page 88

LOCOMOTIVE CRANE

7½ ton—No. 29 Osgood

4 Wheel Truck

Crane in excellent condition and is being used daily. Offered for sale on account of Purchasing larger crane.

Chicago Steel Foundry Co.
KEDZIE AVENUE & 37th STREET
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CRANE — SHOVEL

1—20 Ton McMyler Loco Crane.
1—Thew Shovel, ¾ yd.—Caterpillar.
1—[illegible] x 70 ft. Traveling Hoist.
30—Ton 24 ft. Lock Pilling A. W.
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All Steel Derricks

1—60 ft. boom stiff leg
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First class condition

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Rails, Cars, Locomotives, Steel Piling, Etc

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Having purchased the complete HOISTS and DERRICKS from THE ELECTRIC HOIST AND DERRICK COMPANY, including HOIST PARTS and DERRICK FITTINGS, beg to announce that these HOISTS and DERRICKS are equal to any that were in the original purchase from HOG ISLAND SHIPYARD, and we are offering them at the following prices:

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$1500.00 each f.o.b. Baltimore, Maryland
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Baltimore, Md.

CRANES

1—20 ton 4 motor 34' span 220 V.D.C.
1—25 ton 4 motor 3-60-220 V. 80' Span.

HOISTS

2—1½ ton Detroit 3-60-220 V.
1—2 ton Euclid 220 V.D.C. 2 motor.
1—3 ton Northern 220 V.D.C. 2 motor.
2—5 ton P & H 220 V.D.C. 2 motor.
1—3 ton Sprague 3-60-220 V. 2 motor.

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10 x 10 Bury—S x 8 Chicago Pneumatic.
7 x 6 and 4 x 4 Ingersoll-Rand
1—690 cu. ft. Chicago Pneumatic.

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Connersville-Roots-Green.
Nos. 1, 2, 3, 4, 5, 5½, 6, 7.
Sand Blast Pressure Tanks and Sand Blast Barrels.
16—Core Oven Trucks 7' x 10' Platform 20 tons capacity.

Scully-Jones & Co.
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1—15-Ton Brown Locomotive Crane.
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1—54" dia. Cutler Lifting Magnet.
2—Electric Steam Shovels—1- 1½ [illegible] 2½ yard.

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Consolidated Products Co., Inc.
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Locomotive Crane

40 ton, 8 wheel, Brown Hoist No. 7309, 45-60 ft. boom. Boiler approved for Ohio, Pennsylvania, New York, Massachusetts, Michigan and California. Scarcely used. Good as new. Available December 15th.

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1—36" 1—43" 1—52"

All in good condition, attractive prices.

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The Electric Specialist
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Printer's Devil to President,
Every Member of The Iron Age
Organization Sincerely
Wishes You
a

Merry Christmas

and a

Happy and Prosperous New Year

BARGAIN SALE

35–8000 Gallon

Car Tanks

Tested 60 lbs.

Also desirable sizes both used and new. Tanks from 400 to 26,000 gals. in process of manufacture for early delivery.

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STEEL TANKS

9′ 5″ dia. x 12′ long
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First Class Condition

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1,800 ft. B.M. 8 x 10 in., L.L. Yellow Pine
5,000 ft. B.M. 8 x 8 in., L.L. Yellow Pine
30,000 ft. B.M. 4 x 10 in., L.L. Yellow Pine
4,500 ft. B.M. 4 x 12 in., L.L. Yellow Pine
70,000 ft. B.M. 3 x 10 in., 3 x 12 in., 2 x 12 in. Yellow Pine

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Old Hickory Powder Plant
Old Hickory, Tennessee

5000—9x4½x2½

Nonpareil Fire Brick

Bargain

Union Electric Light & Power Co.
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4 Locating "S" Lt. [illegible] Beam, C. R. Steel Shafting
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1 Locating "L" Rt. [illegible] Beam, C. R. Steel Shafting
1 Locating "L" Lt. [illegible] Beam, C. R. Steel Shafting
6 Cross Rods, 4 1/2" Heavy Type Wire Bumpers
8 Only Heavy Type 3 1/2" Dia. Cross Coupling Rods, Complete with Bolts and Cotters
2 Only 3 1/2" Dia. Heavy Type Shaft Couplings
2 Only 3 1/2" Heavy Type Shaft Couplings
1 Only 3 1/2" Reducing Coupling—Extra Heavy
12 Only Drop Hangers with 5 7/16" Ball and Socket Collar Oiling Bearings—Extra Heavy
7 Only 1 7/16" Drop Hangers with 5 7/16" Ball and Socket Collar Oiling Bearings—Extra Heavy
3 Only 4 7/16" Ball Double Cone Vise Compression Couplings
2 Only 4 7/16" Clamp Couplings
3 3 7/16" Double Cone Vise Compression Coupling
10 Only 2 15/16" Clamp Couplings
1 Only 36" S Arm—4 7/16"—2 15/16" Solid Clutch Couplings—Ball Type
1 Only 36" S Arm—4 7/16"—Both Sides Solid Clutch Couplings—Ball Type
1 Only 36" S Arm—4 7/16"—2 15/16" Solid Clutch Couplings—Ball Type
12 Only 2 15/16" Post Hangers with Ball and Socket Collar Oiling Bearings
2 Only 4 7/16" Post Hangers with Ball and Socket Collar Oiling Bearings
15 Only 36" 2 15/16" Drop Type Hangers with Ball and Socket Collar Oiling Bearings
15 Only 22" 2 15/16" Drop Type Hangers with Ball and Socket Collar Oiling Bearings
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7 Only 20" 4 7/16" Drop Type Hangers with Ball and Socket Collar Oiling Bearings
11 Only 28" 4 7/16" Drop Type Hangers with Ball and Socket Collar Oiling Bearings
7 Only 15/16" Pedestals
3 3 7/16" Pedestals

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For Quick Sale will sacrifice at low figure
Prices upon application—Subject to Prior Sale

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NEW GALV. WIRE ROPE
500,000 ft. on original reels.

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All Types and Sizes
2—500 H.P. B. & W. Water Tube Boilers. Mass. Standard.

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71—K. L. Krickman Ohio No. 1 Oil burners. BARGAIN.

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50 tons 20 gauge.
100 tons 22 gauge.
One pass cold rolled box.
Annealed black Sheets now, sizes 24" x 60" and larger, majority 30" x 72" and larger
Price $50.00 net ton, F.O.B. Pittsburgh, Pa. Terms cash

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Galvanized Corrugated Sheet Steel

Carload—Less carload.
Spot shipment below mill prices in 24½" [illegible] Corrugations.
In [illegible] stock lengths or odd lengths [illegible] and under. Gauges from 18 to 28 inclusive.

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Steel Sheet Piling

230 pcs. 50x65 ft. Lackawanna 14" x ⅜" arch web. Will cut to shorter lengths.
1500 pcs. 20-25 ft. Lackawanna 8½".

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Some exceptional bargains in PIPE

Sale of Surplus Stock

[illegible] Bull Dog Clinch at [illegible] cent
10 [illegible] Rod Irons, 3/4" x 36", at 75c each.
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2,000 [illegible] Screen, 48 mesh, 34" wide, [illegible]
1 [illegible] [illegible]
30 Dixon Crucibles, No. 40, at $3.00.
1,500 [illegible] [illegible] Screws, 3/8" to 3/4", at 8c.
4,000 Tinned dripping pan handles with rivets, No. 9, at $5.00 per M.
[illegible] Tinned Rivets at [illegible]
38,000 Cotter Pins, ½ x ¾, at 10c per M.
83,000 RH Tinned Stove Bolts and Nuts, 3" x 3/16", at 60c per C.
8,000 3/16 NC 10-24 Tinned Steel Thumb Nuts at $2.00 per M.
64 gross No. 106 Tinned Screw Eyes at 9c gross.
112 gross No. 105 Tinned Screw Eyes at 8c gross.
66 gross No. 10-24 thread, ¾", RH Brass Machine Screws at 30c gross.
30 gross No. 6, 3/16", FH Machine Screws at 8c gross.
44 gross No. 6, ¾", FH Machine Screws at 8c gross.
636 gross No. 7, ½", FH Bright Wood Screws at 10c gross.
2,616 gross No. 7, ¾", FH Bright Wood Screws at 12c gross.
1,532 gross No. 7, ¾", FH Nickelplated Screws at 14c gross.
3,016 gross No. 7, ¾", OH Bright Wood Screws at 12c gross.
14 Doz. Sargent No. 63 Gem Door Bolts at $2.50 doz.
1 Heavy Duty Corliss Engine 24½x42, at $1500.00.

Full description of engine and samples of stock sent on request.

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Grand Rapids, Michigan

New Structural Steel

32 pcs. 30" Beth. 200 lb. girder sections, approx. 20′ 0″ long
2 pcs. 15" Beth. 78 lb. girder sections, approx. 32′ 0″ long
4 pcs. 14" Beth. 287.5 lb. H sections, approx. 20′ 0″ long
1 pc. 14" Beth. 287.5 lb. H sections, approx. 21′ 6″ long
1 pc. 12" Beth. 161 lb. H sections, approx. 16′ 0″ long

for immediate shipment 2c pound, f.o.b. Philadelphia. Also our regular stock of new and second-hand structural shapes, columns, lumber, bolts, washers, contractors' equipment, etc.

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80 and 90 lbs.
Full complement of Angle Bars
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Any part of 4000 tons, complete with angle bars, bolts, spikes, tie plates, rail braces, frogs, switches, etc.
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30% to 50% below price of new rails
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15 miles 56 lb. section, Virginia delivery
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All in first-class condition. Ready for immediate shipment. Also other weight rails.
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A complete outfit at your service on any of the various operations.

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Complete Specialties Manufactured
We Solicit Your Inquiries
For sale—1500 lbs. ferrules, 13/64" x 7/8"
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SHEET metal work of every description from No. 30 gauge to ¼" thick, boxes, tanks, pipes, vegetable lockers, ship work, special forming and stamping. Prompt deliveries. Large capacity.

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Requests your inquiries.
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Lyons, Iowa

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All Metals—any finish
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Knowing How Since '81
Over 15 Acres of Floor Space Capacity
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Fabricated sheet metal and stampings of all kinds

Our facilities are better than the average and our machinery modern. This enables us to quote you attractive prices. May we estimate on your requirements?

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Capacity up to 3¼" dia.
Prompt service. Accurate workmanship.
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Capacity ⅛ to 2¼ in.
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Screw machine Products
Of all kinds, milled from solid bar, from smallest rod to 5 inch diameter.
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Capacity up to 4¼"
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Large and Small Quantities. Excellently equipped with Acme Screw Machines, hand machines, drill presses and other necessary production machinery.
Let us figure on your requirements.
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Also equipped to do Nickel Plating.

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All kinds Screw Machine and Drill Press Work taken on contract.
Also heat-treating.
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Radial Grinding Done

Also external and internal grinding done to a mighty close tolerance; speedily, economically, and promptly.

Let us figure against your costs.

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Get our estimates for repairs or the building of new machines.
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MACHINE WORK
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A high grade organization and a low cost situation.

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on Contract

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Special Machinery Built to Order

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We offer the facilities of a large Machine shop together with the services of an efficient organization for production on large or small scale.

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Equipped to handle planer work 40" x 20"
Boring capacity 72" turning 40" x 20' and 54" x 12'

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We offer you the services of a completely equipped machine shop, forge shop and grey iron foundry.

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Our equipment includes:

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Send us your inquiries for work adapted to these tools; we can build and assemble complete. Excellent foundry connections also.

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We make a specialty of fine machinery castings, including cylinder and similar castings for gasoline motors.

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MACHINE OR HAND MOULDED
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PRICES RIGHT + SERVICE RIGHT
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GREY IRON CASTINGS

1 lb. to 10 tons

ENGINEERS MACHINISTS

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Established 1847

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SPECIALISTS IN
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Equipped with Modern Power Moulding Machines for Quantity Production.

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Single, gated or plated for production.

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Superior quality, machine or hand moulded, sand blasted, pickled or tumbled. On good tonnage we will make special moulding equipment; that will warrant you the best price and most efficient service. Patterns made of wood, brass, aluminum or iron.

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Iron Castings of all kinds up to 3000 lbs. each
A few of our specialties are:
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Estimates from blue print gladly furnished.
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Having an up-to-date foundry and machine shop, we can handle quantity production of high quality in

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from one pound to three tons. Try us—You'll be satisfied.

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Large Machine and Steel Plate Work
MURRAY IRON WORKS CO. (Inc. 1870)
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Any Size or Shape
Up to 50 Tons

Try us on a difficult casting job, we will prove that we have the skill and the equipment necessary to handle your work with dispatch in the way you expect it to be done.

Send blueprints for our estimate.

See our advertisement in the display section the first issue of each month.

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Automobile Work Especially.
THE EUREKA COMPANY
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Quality HAMMERED STEEL FORGINGS

Axles, Billets, Cranks, Crusher Shafts, Dises, Grinding Balls, Liner Plates, Shafting, Sheet and Dies for Stamp Mills and Forgings for Ore Mines

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Estimates from Blue Print Gladly Furnished.
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MATCH PLATES
PATTERN AND ENGINEERING CO.
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We design special machinery.
Send us your Blue Prints or Models Cardboard. None too small. None too large.
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Time spent in reading the business paper of your industry is time well spent.

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May we estimate on your requirements?
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RUTLAND, VERMONT

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The type of work we are doing has pleased many. Let us take care of your
Butt and Spot Welding
TAYLOR-HALL WELDING CORPORATION
WORCESTER MASS.

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of any description. Attention given to special work from tin, copper and brass. Nickel to manufacturer's requirements.
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We can save you money on fabricated steel products. Our Company has purchased the Milmine plant in Toledo for the manufacture of Hodges Adjustable Shores and have capacity for a large amount of fabrication. Send us your specifications. We'll send you a price that will secure the order.

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Members Up to 45-Ft. Lengths
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QUICKER SERVICE—LOWER COSTS
Write for Prices
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We are particularly well equipped to handle your welding and brazing of the various non-ferrous metals, and have also the latest machinery and finishing.

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Rates for other spaces furnished on request.

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MODERN STEEL CASTING PLANT and MACHINE SHOP

Ready to Operate Located at Green Island Troy, N. Y.

Sale January 24, 1924, at 2 P.M., at the plant. Property sold in parcels or all together.

Parcel No. 1 consists of real estate, leases, trackage rights, option for additional lands and buildings, and to include crane and tools connected therewith, heating apparatus, electric wiring and fixtures and plumbing.

Parcel No. 2 consists of all other property on the plant, which includes the following items:

Foundry

Fully equipped, including three **Electric Melting Furnaces**, sand blast, annealing furnaces, etc.

Machine Shop

With up-to-date individual motor driven machines, over 50 in number, including:
Hendy Lathes
Milwaukee Milling Machines
Cincinnati Grinders
Warner & Swasey Turret Lathes
Blanchard Surface Grinder
Hendy Shapers, Drill Presses, Tool and Cutter Grinders, etc.

Heat Treating

Department consisting of twelve gas fired furnaces for general heat treating and high speed tool work.

Materials

A large quantity of raw materials.

Laboratories

Completely equipped for chemical and physical testing, including metallurgical, microscope, Rihle tensile testing machine of 150,000 lbs. capacity, Brinell tester, Charpy impact testing machine, etc.

Office

Completely furnished in every detail, well lighted and heated.

Parcel No. 3 consists of patents, applications for patents in the United States and foreign countries relative to the production of high speed steel, directly from the molten alloy by casting in the general form for use without the preliminary casting in the ingot and forging to form.

Parcel No. 4 shall consist of all the property above.

The property shall be sold first in separate parcels 1, 2 and 3, and then as a unit under Parcel 4, and whichever produces the largest sum will be accepted, subject to approval of the Court.

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Inspection

Open to, at any time.

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Account death of principal. Fully equipped; capacity 300 tons monthly. Present stockholders will retain interest or retire. Will consolidate and take stock in payment. 5 acres land. Forging billets for sale.

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Of Fully Equipped Modern Steel Foundry

Entire plant of the Hercules Steel Casting Company. Covering 2½ acres. Comprising five buildings and two sheds, including foundry, laboratory, office, pattern shop, storage, sand shed, scrap heap, sand blast room, grab buckets, core ovens, steel and wood flasks, ladles, air hammers, welding torches, scales, shovels, complete foundry equipment. Also $5,000 worth of raw material.

Spur track and close railroad connections. Accessible to Great Lakes traffic through Kinnickinnic River. Capacity 300 tons finished castings per month. Von Bauer Ten Ton Tilting Electric Furnace. Gas fired annealing furnace with Brown 2000° pyrometer. Two P. & H. Ten Ton Four-Motor Type HH electric traveling cranes with Three Ton Auxiliaries. All equipment less than 3 years old. Could be put in operation with few minor repairs. Appraised last year at $260,000.

Bids close 5:00 P. M. Monday, January 21, 1924. For further information address

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Foundry, Machine Shop and Plate Shop in Eastern Pennsylvania. Lehigh Valley and D., L. & W. R. R. sidings. Will consider consolidation with up-to-date concern. Desire to deal direct with persons interested. Appointment can be at New York City.

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FOUNDRY, FORMERLY USED FOR STOVE MANUFACTURING

fully equipped for light and medium work, including Tabor Power Squeezers. Situated eastern Massachusetts. Particularly adapted for jobbing work. For particulars.

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We have an up-to-date Foundry Plant, completely equipped with O.H. Cranes, Sidings, etc. The plant is well built and well situated with respect to material, power, labour and shipping. Having other interests we want to sell this plant. We are willing to help finance responsible parties in the undertaking.

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For Sale:

Manufacturing plant in Jersey City suitable for foundry and machine shop on Central Railroad of New Jersey. About 90,000 square feet under roof on approximately four and one-half acres. Majority buildings recently constructed. For details apply

THE M. W. KELLOGG COMPANY
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A Plant for Sale That's Well Equipped

Up-to-date machinery in it. Dandy machine shop and foundry combined for the production of medium or heavy machinery.

This is a real opportunity for responsible folks. The right party will be helped in financing. It's a modern plant well located with respect to materials, labor and shop. Here's a real opportunity.

Address Box R-982
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"A Clearing House for Consolidations."
Write
The Western United Syndicate
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Legal — Engineering — Financial Service

Old Established Going Concern for Sale

Machine shop, building a product in general demand, fitted up completely with steam heating, electric power and light plant and cranes. Railroad siding on shop floor. Splendid location in Philadelphia, Pa. Terms very reasonable. Detailed information to reliable principals.

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care *The Iron Age*, New York.

Foundry at Auction

Foundry, machine shop and entire equipment of the McNaughton Manufacturing Company will be sold for the high dollar on Saturday, January 5th, 1924, at 11 o'clock at the plant in Maryville, Tennessee. Included in the sale is the patent this Company has on grate bars on which it has built up a large trade. The plant also has a large general foundry trade.

Terms one-half cash, balance in 90 days. For further particulars communicate with R. R. Kramer, Trustee, Maryville, Tennessee.

FOR SALE

Screw Product Plant

Centrally located on Railroad Switch affording good shipping facilities. Labor cheap and plentiful. Manufacture screw products and Automobile Accessories. Will sell as an entirety or would consider selling a substantial interest to a good executive experienced in the Screw Product Business.

ADDRESS BOX W-68
care *The Iron Age*, New York.

Factory Sites With Good Buildings For Sale in Central Michigan

Buildings for
3 good industrial manufacturing plants. One 86,000 square feet on twenty acres —Another 22,000 square feet on four acres—Another 15,000 square feet on two acres — Steam Heated — Electric Power—2 Railways—Situated on main highway. Sacrifice for cash.
Those interested address:
BOX U-941
care *The Iron Age*, New York.

Manufacturer's Agent

Wide acquaintance and long experience in Philadelphia and vicinity offered to reputable progressive maker of iron and steel products, specialties or supplies for the industry. Know iron and steel from pig to plate. References as to ability and dependability. Will finance representation of high-grade account only.

ADDRESS BOX U-925
care *The Iron Age*, New York

WANTED—High grade Salesmen and Sales Agents capable of representing a nationally known quality brand of technical Paint Specialties, exclusively or in conjunction with some other line on a strictly commission basis. Full information as to experience, present connections and references required. Address Box U-873, care The Iron Age, New York.

An old, reliable and well-established wholesale Building Supply House, wishes to represent a manufacturer of metal lath and its accessories.

ADDRESS BOX W-30
care *The Iron Age*, New York

Wanted: To represent you on commission or otherwise in Youngstown, Ohio, territory. Carload lot materials for iron and steel industries. Wide acquaintance and good reputation.
GEO. C. JONES & CO.
705 Stambaugh Bldg., Youngstown, O.

Sales Engineer

Long established Eastern manufacturer has a few unassigned districts to fill. Only those furnishing first class references will be considered. Remuneration on Commission basis only. Very large incomes possible.

ADDRESS BOX U-800
care *The Iron Age*, New York.

"Manufacturing in Canada"

We are desirous of forming connection for the manufacture in Canada of complete Machines, or Machine Parts, in quantity. Present facilities are ample for general line of work, large or small, but would provide special or additional equipment to suit requirements in consideration of long term contract.

The Hydraulic Machinery Co., Ltd.
Montreal, Canada

IF

YOU ARE LOOKING FOR an Additional Line to Manufacture

We can offer complete sets of drawings, patterns, tools, fixtures and parts of a popular

ROW-BOAT MOTOR
(2 H.P. and 3½ H.P.)

manufactured by a reliable concern since 1912—20,000 of them now in use.
Good reason for discontinuing this line.

Wisconsin Machinery & Mfg. Co.
52nd Ave., Milwaukee, Wis.

MANUFACTURERS

Business is excellent in California. Are you getting your share of it? If your lines have merit and prices are right, I will consider handling them on a commission basis. State proposition fully in first letter.

WALLACE H. DOW
Hobart Building, San Francisco, Calif.

Pittsburgh District Sales Organization — Established with iron, steel and allied lines wants to represent reliable manufacturer as exclusive sales agents in this territory.

ADDRESS BOX A-646
care *The Iron Age*, Park Bldg., Pittsburgh, Pa.

Wanted by a Steel Foundry in the Middle West a man to handle a steel casting account on a commission basis in the New York territory. A man already handling accounts in the metal trade lines preferred. In applying state experience and accounts now handled if any.

ADDRESS BOX U-984
care *The Iron Age*, New York

BUSINESS OPPORTUNITIES WANTED

A going metal manufacturing plant having capacity for an additional product which could be manufactured at least in part with any of the following equipment: Forge Shop, Press Shop or Machine Shop. May be located anywhere from the East to and including the Middle West. Box 147, care *The Iron Age*, 1420 Widener Bldg., Philadelphia, Pa.

Manufacturers' Representative

selling machinery and supplies on commission to dealers and industries can handle additional accounts. Address, Sales Engineer, Box 667, Mobile, Ala.

Pacific Coast Representative

Man with considerable mechanical and sales experience now located on the Pacific Coast, acting as manufacturers' representative for some good lines, would like a few more lines of tools to supplement those already handled.

ADDRESS BOX U-737
care *The Iron Age*, New York

SAVE MONEY ON FREIGHT CHARGES

Send us your freight bills to be audited by rate experts. Large savings possible. No advance charges. Our fee is 50 per cent of actual amounts collected. We also specialize in rate applications, complaints and cases before the State and Interstate Commerce Commissions.

TRAFFIC SERVICE BUREAU
Box 1049, Harrisburg, Pa.

Potato Sprayer and Digger

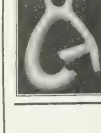
Want to get in touch with manufacturing concern that wishes to add potato sprayer and digger to their line.

ADDRESS BOX U-988
care *The Iron Age*, New York.

PATENTS

Expert on metal products and metallurgical patents. Examiner U. S. Patent Office for 16 years.

JOHN BOYLE, Jr.—Patents
201 Ouray Building Washington, D. C.



Patent for Sale

Safety Hoist Hook. Will sell outright or the right to manufacture on a royalty basis. This hook has proved its worth.

The Smith Forge Co.,
Ft. of Twenty-seventh St.
Camden, N. J.

Any second-hand machinery or equipment for sale?

If so, see advertising rates on first page of Section 51.

THE WEEKLY MEETING PLACE OF EMPLOYER AND EMPLOYEE

HELP WANTED

DISTRICT SALES Manager

We have openings for District Sales Managers in each of the following territories:—New York, Cincinnati, Cleveland and Detroit, also for an assistant District Sales Manager in Chicago.

Our product is patented, widely advertised and has a broad field. Our main outlet at present is through users of industrial furnaces and heat enduring alloys. Some knowledge of combustion will be an assistance but is not absolutely necessary.

We have no use for "arm chair" salesmen. We need men who have a broad acquaintance among the operating executives of the industries in their territory and are accustomed to hustle for business from morning to night.

Our straightforward bonus system will enable the right man to double a liberal salary almost from the start.

ADDRESS BOX W-28
care *The Iron Age*, New York.

Sales Correspondent

We want a live, technical sales correspondent—who likes a good, fair, hard business fight. If you are willing to work hard in order to make good, we've got the job you want. Requirements—technically trained, preferably with metallurgical knowledge, and plant experience and the ability to write a good, clear letter. Pittsburgh District.

ADDRESS BOX W-27
care *The Iron Age*, New York.

The MANAGER of a LARGE PLANT, producing special sheets in the Tristate District, needs an ASSISTANT to work on personal assignments. A man with some operating experience in Sheet Mill and Steel Plant is wanted. He should be able to analyze cost and practice reports; devise clerical systems; investigate manufacturing methods and prepare graphic tabular summarized reports. Address Box W-26, care *The Iron Age*, New York.

MANAGER WANTED.—Manager electrical vessel in all branches of the steam vessel business on a large scale. Apply in letter only. Negotiations confidential, but name will be considered unless the applicant furnishes information in his reply which will show a successful career. An interview will then be arranged. Andrew D. Sharpe, Attorney, 14 Nassau Street, New York.

EXPERIENCED MECHANICAL ENGINEER with technical knowledge, thorough draftsman, familiar with worm gear and machine design. Progressive concern located Baltimore vicinity. State fully prevous experience and salary desired. Address Box W-36, care *The Iron Age*, New York.

EXPERT MACHINE TOOL SALESMAN. Must have experience on medium and heavy tools. State fully qualifications and salary required and where last employed. Vicinity Philadelphia. Address Box W-6, care *The Iron Age*, New York.

HELP WANTED

FOUNDRY FOREMAN to take full charge of plant making cast iron enameled sanitary ware.

Only those who are thoroughly familiar with, and have a good reputation in this line need apply.

No attention paid unless full information given concerning age, nationality, experience, where worked, married or single, references, salary desired, and how soon available.

To the right man, who can make good, this is an excellent opportunity. Address Box W-62, care *The Iron Age*, New York.

ENAMEL MIXER who knows the business thoroughly in making and applying first coat and enamel on cast iron sanitary ware. Only those who are experienced in the line need apply.

No attention paid unless full information given as to age, nationality, experience, where worked, married or single, references, salary desired and how soon available.

Excellent opportunity for the right man. Address Box W-63, care *The Iron Age*, New York.

TWO SALESMEN, experienced in MILL SUPPLIES, one for New England and New York State, one for Pennsylvania and the South, to represent a Manufacturer in a specialty line to dealers and consumers. These men must be up to date, energetic, success, integrity and furnish high grade references. None others need apply. Address Box W-64, care *The Iron Age*, New York.

PRODUCTION MANAGER: For steel foundry in Middle West. Must be moderately young and understand manufacture of electric steel castings in all branches, furnace operation, molding, sand tempering, heat treatment, and have had recent experience in modern steel foundry using electric furnace process. State salary. Address Box W-52, care *The Iron Age*, New York.

SUPERINTENDENT for JOBBING IRON FOUNDRY near BOSTON. Must be practical molder with successful record in jobbing foundries. To a first class man an opportunity to acquire an interest will be given. Give full particulars, age, references, etc. Address Box W-57, care *The Iron Age*, New York.

ENGINEER'S ASSISTANT wanted by Steel Company in the Pittsburgh District. Must be capable to make technical investigations on his own accord. Give full particulars in first letter. Address Box W-37, care *The Iron Age*, New York.

YOUNG MAN who understands the scrap iron and steel business, also new material. All correspondence strictly confidential. Address "Opportunity" Box W-58, care *The Iron Age*, New York.

SITUATIONS WANTED

PLANT ENGINEER, twenty years broad experience design, construction, operation maintenance, development of processes, large industrial plants, desires location change. Address Box U-932, care *The Iron Age*, New York.

MANAGER BUYER capable handling any department manufacturing business. Extensive buying experience: Ore Steel products. Good organizer. Might invest. Address Box U-943, care *The Iron Age*, New York.

SITUATIONS WANTED

MANAGER

works manager, now employed as manager, 22 years' plant and executive experience, especially practical foundry and pattern, on variable classes of work, practical metallurgist, open hearth, converter, crucible, air furnace, cupola, and semi-steel, good organizer, quality, production, low costs. Address Box W-15, care *The Iron Age*, New York.

GENERAL MANAGER: BUILT UP BUSINESS AND AM SUCCESSFULLY OPERATING 500 TON OPEN HEARTH STEEL FOUNDRY MAKING HIGH GRADE MACHINERY AND RAILROAD CASTINGS, EARNING HIGH RATE OF RETURN ON INVESTED CAPITAL. 20 YEARS AS A SUCCESSFUL EXECUTIVE IN CHARGE OF SALES AND ALL OPERATIONS. GOOD SOUND BUSINESS JUDGMENT AND ABILITY. NOTHING SPECTACULAR. AGE 45. PERMANENT CONNECTION DESIRED. ADDRESS BOX U-996, CARE *THE IRON AGE*, NEW YORK.

TECHNICALLY TRAINED YOUNG MAN, eight years' practical experience; five years in full control of production, manufacturing methods and experimental work in connection with purchasing department of small but progressive concern; seeks employment with reputable concern offering opportunity to advance to executive position. At present employed. Address Box U-921, care *The Iron Age*, New York.

MASTER MECHANIC, position desired, 23 years' experience on erection, maintenance and production; 14 years as foreman and superintendent. Knows how to handle help and discharge a large responsibility. Age 38, married, physique A1. Address Box U-991, care *The Iron Age*, New York.

GENERAL OR DISTRICT SALES MANAGER, twenty years' experience with large machinery builders selling to industrials, mines, contractors and engineers. Extensive acquaintance in the trade. A business producer. Address Box W-34, care *The Iron Age*, New York.

MANAGER OR SUPERINTENDENT or similar executive position, by man with advanced knowledge and ability, any mechanical line; record and credentials of a high order. Address Box W-18, care *The Iron Age*, New York.

MACHINE TOOL SALESMAN, 33 years old, wants position in Ohio, working out of Cleveland or Cincinnati. Have wide acquaintance in state. Address Box W-41, care *The Iron Age*, New York.

CHIEF ENGINEER, 46, 20 years' experience as designer and executive in manufacture of general heavy, medium and special machinery, desires change. Address Box W-43, care *The Iron Age*, New York.

BLAST FURNACE SUPERINTENDENT will be available after January First. Fifteen years' experience with large and small plants. Desires connection with a future. Address Box W-42, care *The Iron Age*, New York.

INDUSTRIAL ENGINEER with 15 years' experience increasing production and reducing costs in steel mills and other industries, seeks connection permitting settled home life. Address Box W-7, care *The Iron Age*, New York.

Help Wanted Rates

Set solid minimum 50 words.....$8.00
Each additional word 16c

All capitals, minimum 50 words.....$4.50
Each additional word 9c

All capitals, leaded minimum 50 words...$6.00
Each additional word 12c

Situations Wanted Rates

Set solid minimum 25 words.....$ .75
Each additional word 3c

All capitals, minimum 25 words.....$1.50
Each additional word 6c

All capitals, leaded minimum 25 words...$2.25
Each additional word 9c

Display Advertising Rates Given on Request

COUNT SEVEN WORDS FOR KEYED ADDRESS

Do not send original letters of recommendation in replying to advertisements—duplicates will answer the purpose. Letters forwarded without charge.

THE WEEKLY MEETING PLACE OF EMPLOYER AND EMPLOYEE

SITUATIONS WANTED

WORKS MANAGER OR ASSISTANT. Desire to open negotiations with a company now in operation or about to be formed who needs the services of a first class man. I have a technical education with 20 years' valuable experience in the steel industry both in operation and management. An aggressive, capable, and can handle men and materials efficiently which my past record will record. Am thoroughly familiar with all details connected with open hearth and rolling mill work and can produce satisfactory results. If your plant is not on a paying basis, I would like to have the opportunity to tell you what can be done and base permanent employment on results. Willing to go anywhere. Address Box W-47, care *The Iron Age*, New York.

INDUSTRIAL ENGINEER, AGE 36, IN GOOD HEALTH, 16 YEARS' EXPERIENCE AS DRAFTSMAN, MECHANICAL ENGINEER AND MANAGER ALSO SALES MANAGER, DESIRES, FOR THE BEST OF REASONS TO BE LOCATED IN THE SOUTH, NOW EMPLOYED IN RESPONSIBLE POSITION AND THOROUGHLY FAMILIAR WITH METAL STAMPING AND INDUSTRIAL EQUIPMENT. MEMBER A. S. M. E. ADDRESS BOX W-65, CARE *THE IRON AGE*, NEW YORK.

ELECTRICAL ENGINEER—I have a technical education with 20 years' practical experience in the Steel Industry. Thoroughly experienced in design and construction; also in repair and maintenance work in the operation of large plants. Am a good executive, capable and can produce results that are satisfactory to the management. Can give best of references as to character and ability and standing in the engineering profession. Address Box W-48, care *The Iron Age*, New York.

WORKS MANAGER or SUPERINTENDENT with broad experience covering design and manufacture of machine tools, engines, boilers, tractors, etc., with prominent builders, desires new connection. Thoroughly trained mechanic and executive, well versed in up-to-date management and production methods. Address Box W-50, care *The Iron Age*, New York.

WORKS MANAGER, with an excellent record and wide experience (20 years), A. S. M. E. member, wishes a connection with a company needing a capable general superintendent or works manager, who can supervise machine shop, foundry and other metal-working departments. Address Box W-33, care *The Iron Age*, New York.

WORKS OR PRODUCTION MANAGER, thirteen years manufacturing experience, thoroughly familiar scientific and practical management, and with planning, scheduling and routine of work for maximum output at minimum cost. Address Box U-968, care *The Iron Age*, New York.

UP-TO-DATE FOUNDRY SUPERINTENDENT seeks change where there are demands for high grade man to produce quality cast ings in iron, bronze, steel and semi-steel, light and heavy dry or green sand. Write for references. Address Box U-987, care *The Iron Age*, New York.

PURCHASING AGENT—Five years' experience purchasing department large electrical corporation. Capable of taking charge. Furnish A-1 references. Address Box U-981, care *The Iron Age*, New York.

SITUATIONS WANTED

SALES OR MANAGERIAL EXECUTIVE—[illegible] whose experience and qualifications warrant a connection of highest possibilities, will consider change. Thorough grasp of modern business and finance, backed by broad engineering, [illegible] Pressed [illegible] industry. At present Gen[illegible] known automobile manufacturing [illegible] the past. Will consider [illegible] Sales or Manufacturing [illegible] with concern [illegible] Address Box W-148, care *The Iron Age*, 1[illegible] Widener Bldg., Philadelphia, Pa.

HIGH GRADE EXECUTIVE AVAILABLE, Eighteen years successful record in production of various products involving the manufacture of small interchangeable parts. Unusual success in obtaining quantity production. Thoroughly familiar with planning and cost work. Has directed over $12,000 employees. Present Works Manager automotive Products concern, salary $10,000. Desires new connection of similar caliber. Excellent reasons for change. Record of past performance together with opinions of well known executives furnishes unquestionable references as to production ability. Address Box W-60, care *The Iron Age*, New York.

FOUNDRY MANAGER, WILL SOON BE READY TO PUT ANOTHER FOUNDRY ON A GOOD PAYING BASIS. PRACTICAL FOUNDRY MAN, ENGINEER, EXECUTIVE HAVE DOUBLED PRODUCTION WITHOUT CAPITAL COSTS AND WITH LOWER OPERATING EXPENDITURES. PREFER LARGE FOUNDRIES, STEEL OR IRON. QUICK RESULTS. ADDRESS BOX W-69, CARE *THE IRON AGE*, NEW YORK.

MACHINE TOOL SALESMAN OR ADVERTISING MANAGER. AVAILABLE JANUARY 1st. EIGHT AND ONE-HALF YEARS WITH LARGEST COMPANY IN THIS FIELD. SHOP ADVERTISING AND SALES EXPERIENCE. LOCATION IN EAST PREFERRED. ADDRESS BOX W-45, CARE *THE IRON AGE*, NEW YORK.

DIE CASTING MAN, practical, long experience at bench and as executive. Thorough knowledge of modern machines and methods used for aluminum and white metal. Constructor of excellent aluminum machine for long and big castings, also machines for small work. Address Box W-55, care *The Iron Age*, New York.

FOREMAN, Gray Iron or Converter Steel Foundry, twenty years experience, thoroughly [illegible] large and small castings, gate setting and planning of work for maximum output at minimum costs. Excellent references. Address Box W-61, care *The Iron Age*, New York.

SALESMAN with wide experience as executive and mechanic wants to handle a real proposition in which extensive knowledge of shop problems will be valuable. Salary or [illegible] Western New York preferred. Address Box W-56, care *The Iron Age*, New York.

FOREMAN, experienced in the manufacture of steel and timber derricks, cranes, winches, blocks and general contractors equipment wishes position. Competent and reliable, age 36. Address Box W-54, care *The Iron Age*, New York.

SITUATIONS WANTED

[illegible] mechanical and electrical equipment wants connection with established manufacturer; ten years experience in Eastern Pennsylvania. Address Box W-[illegible], care *The Iron Age*, New York.

STEEL SALESMAN, [illegible] and sale experience. Technical [illegible] Available about January 1st. Married, 29 years of age. Address Box W-[illegible], care *The Iron Age*, New York.

CHEMIST and METALLURGIST, technically trained, 10 years successful practice ferrous and non ferrous metals and alloys, fuels and general work. Address Box W-66, care *The Iron Age*, New York.

Watch the Wanted to Buy Section

Sooner or later there will appear a request for something you can supply—a machine, perhaps, or some material. Get in touch with the advertiser, letting him know all details of what you have—

And Make a Sale

(*See page 202*)

Help Wanted Rates		Situations Wanted Rates		Display Advertising Rates
Set solid, minimum 50 words	$5.00	[illegible]	$ .75	Given on Request
Each additional word	.10	Each additional word	.20	
All capitals, minimum 50 words	$4.50	A-1 capitals, minimum 25 words	$1.50	COUNT SEVEN WORDS FOR KEYED ADDRESS
Each additional word	.10	Each additional word	.06	
All capitals, leaded, minimum 50 words	$6.00	A-1 capitals, leaded, minimum 25 words	$2.25	
Each additional word	.12	Each additional word	.08	

Do not send original letters of recommendation in replying to advertisements—duplicates will answer the purpose. Letters forwarded without charge.

BUYERS INDEX

The firms listed here are also represented with an advertisement in this issue. See the advertisements for further information.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 232-234.

ABRASIVE WHEELS—See Grinding Wheels

ACCUMULATORS
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Elmes, Chas. P., Eng. Wks., Chicago, Ill.
So. Bowan Fdry. & Mach. Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
Wood, R. D., & Co., Philadelphia, Pa.

ACETYLENE—In Tanks
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.

AIR TANKS AND CYLINDERS
Air-Tight Steel Tank Co., Pittsburgh, Pa.
Scaife, William B., & Sons Co., Pitts., Pa.

ALLOYS—Manganese—Copper
Browne, deCourcy, Inc., 120 B'way, N. Y. C.
Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.

ANGLES, BEAMS, CHANNELS AND TEES
Bethlehem Steel Company, Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
De Lon, Richard, Company, Philadelphia, Pa.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lindsay, Jas. G., & Co., Inc., Philadelphia, Pa.
Morris, Wheeler & Company, Philadelphia, Pa.
Phillips, F. R., & Sons Co., Philadelphia, Pa.
Phoenix Iron Co., Philadelphia, Pa.
Pollak Steel Co., Cincinnati, O.
Reynolds Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Shimer, Geo. Line, Inc., 165 B'way, N. Y.
Valley Rolling Mills, 120 Broadway, N. Y. C.

ANTI-FRICTION METALS—See Babbitt Metal

ARMORING SURFACE—For Concrete
Irving Iron Works Co., Long Island City, N. Y.

ARRESTERS—Spark
Harrington & King Perforating Co., Chicago.

ASSEMBLERS—Small Machine Parts
Pulte-Korreck Mach. Co., The, Grand Rapids, Mich.

AXLES—Car and Locomotive
Bethlehem Steel Co., Bethlehem, Pa.
Pollak Steel Co., Cincinnati, O.

BABBITT METAL
Ajax Metal Co., The, Philadelphia, Pa.
Keystone Bearing Co., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

BALL FLOATS
Naugatuck Mfg Co., Naugatuck, Conn.

BALLS—Forged Chrome Steel for Pulverizing
Philadelphia Steel & Iron Co., Phila., Pa.

BALLS—Grinding
Tioga Steel & Iron Co., The, Philadelphia, Pa.

BALLS—Steel, Brass or Bronze
Auburn Ball Bearing Co., Rochester, N. Y.
New Departure Mfg. Co., Bristol, Conn.

BANDS—Steel
Akron Selle Co., Akron, O.
Bethlehem Steel Co., Bethlehem, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Pollak Steel Co., Cincinnati, O.
Valley Rolling Mills, 120 Broadway, N. Y. C.

BAR POINTING MACHINES
National Acme Co., Cleveland, O.

BARGES—Steel
American Bridge Co., 71 B'way, N. Y. C.
Ritter-Conley Co., Pittsburgh, Pa.

BARRELS—Burnishing
Globe Mch. & Stpg. Co., Cleveland, Ohio.

BARRELS—Sand-Blast
Rockel Mfg. Corp., Jersey City, N. J.

BARRELS—Steel Shop
Cleveland Wire Stamping Co., Cleveland, O.

BARRELS, TUMBLING—See Tumbling Barrels

BARS—Alloy
Central Steel Company, The, Massillon, O.
Donner Steel Co., Inc., Buffalo, N. Y.
United Alloy Steel Corp., Canton, O.

BARS—Concrete, Reinforcing
American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Company, Bethlehem, Pa.
Donner Steel Co., Inc., Buffalo, N. Y.
Interstate Iron & Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Morris, Wheeler & Co., Philadelphia, Pa.
Pollak Steel Co., Cincinnati, O.
Potts, Horace T., & Co., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Truscon Steel Co., Youngstown, O.

BARS—Galvanized
Morris, Wheeler & Co., Philadelphia, Pa.

BARS—Iron and Steel
Aitchison, J. & Co., Jersey City, N. J.
Bethlehem Steel Company, Bethlehem, Pa.
Briggs & Turivas, Inc., Chicago, Ill.
Carnegie Steel Co., Pittsburgh, Pa.
De Lon, Richard, Company, Philadelphia, Pa.
Donner Steel Co., Inc., Buffalo, N. Y.
Harvey, Arthur C., Co., Allston 34, Boston.
Illinois Steel Co., Warehouse Dept., Chicago.
Interstate Iron & Steel Co., Chicago, Ill.
Lindsay, Jas. G., & Co., Inc., Philadelphia, Pa.
Margulies, M. J., Philadelphia, Pa.
Morris, Wheeler & Company, Philadelphia, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Philadelphia Steel & Iron Co., Phila., Pa.
Phillips, F. R., & Sons Co., Philadelphia, Pa.
Pollak Steel Co., Cincinnati, O.
Potts, Horace T., & Co., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Valley Rolling Mills, 120 Broadway, N. Y. C.

BEADING AND CRIMPING MACHINES
Quickwork Co., St. Marys, O.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Babbitt
Bunting Brass & Bronze Co., Toledo, O.
Doehler Die Casting Co., Court & Huntington Sts., Brooklyn, N. Y.

BEARINGS—Ball
Aetna Ball Bearing Mfg. Co., Chicago, Ill.
American Roller Bearing Co., Pittsburgh, Pa.
Auburn Ball Bearing Co., Rochester, N. Y.
Fafnir Bearing Company, New Britain, Ct.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
Gurney Ball Bearing Co., Jamestown, N. Y.
Hyatt Roller Bearing Co., Newark, N. J.
New Departure Mfg Co., Bristol, Conn.
Norma Company of America, Anable Ave., Long Island City, N. Y.
Standard Machinery Co., Auburn, R. I.
Torrington Co., Torrington, Conn.
U. S. Ball Bearing Mfg. Co., Chicago, Ill.

BEARINGS—Brass and Bronze
Bunting Brass & Bronze Company, Toledo, O
Lumen Bearing Co., Buffalo, N. Y.
Wellman Bronze Co., Cleveland, Ohio.

BEARINGS—Oilless
Metaline Company, Long Island City, N. Y.

BEARINGS—Roller
American Roller Bearing Co., Pittsburgh, Pa.
Bock Bearing Co., Toledo, O.
Federal Bearings Co., Poughkeepsie, N. Y.
Hyatt Roller Bearing Co., Newark, N. J.
Norma Company of America, Anable Ave., Long Island City, N. Y.
Standard Machinery Co., Auburn, R. I.
U. S. Ball Bearing Mfg. Co., Chicago, Ill.

BEARINGS—Shaft Hanger
Fafnir Bearing Company, New Britain, Ct.

BEARINGS—Thrust
Aetna Ball Bearing Mfg. Co., Chicago, Ill.
Bock Bearing Co., Toledo, O.
Fafnir Bearing Co., New Britain, Ct.
Norma Co. of America, Anable Ave. Long Island City, N. Y.

BELT DRESSING
Gandy Belting Co., Baltimore, Md.
Schieren, Chas. A., Co., 37 Ferry St., N. Y.

BELT FASTENERS
Bristol Co., Waterbury, Ct.
Clipper Belt Lacer Co., Grand Rapids, Mich.
Flexible Steel Lacing Co., Chicago, Ill.

BELTING—Chain
Link-Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.

BELTING—Fabric
Gandy Belting Co., Baltimore, Md.
Stanley Belting Corp., Chicago, Ill.

BELTING—Leather
Chicago Rawhide Mfg. Co., 1313 Elston Ave., Chicago, Ill.
Schieren, Chas. A., Co., 37 Ferry St., N. Y.

BELTING—Leather Link
Schieren, Chas. A., Co., 37 Ferry St., N. Y.

BELTING—Rubber
Goodyear Tire & Rubber Co., Akron, O.
New York Belting & Packing Co., 91-93 Chambers St., N. Y.
Robins Conveying Belt Co., Passaic, N. J.

BENCH LEGS—Steel
Lupton, David, Sons Co., Phila., Pa.
New Britain Mach. Co., New Britain, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.

BENCHES—Draw—See Wire Drawing Machinery

BENDING MACHINES—Angle or Eye
Thomas Spacing Mch. Co., Pittsburgh, Pa.

BENDING MACHINES—Hand and Power
Amplex, Inc., 6 West 32d St., N. Y. C.
Chambersburg Engrg. Co., Chambersburg, Pa.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Dreis & Krump Mfg. Co., Chicago, Ill.
Kane & Roach, Syracuse, N. Y.
McKenna Co., The, Cleveland, O.
Quickwork Co., St. Marys, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Wells, Frank L., Co., Kenosha, Wis.

BENDING AND STRAIGHTENING MACHINES—Rail
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Southwark Fdry. & Mach. Co., Phila., Pa.

BILLETS—Forging
Central Steel Company, The, Massillon, O.
Interstate Iron & Steel Co., Chicago, Ill.
Pacific Coast Steel Co., San Francisco, Cal.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

BILLETS—Nickel Steel
Bethlehem Steel Company, Bethlehem, Pa.
Central Steel Company, The, Massillon, O.
Donner Steel Co., Inc., Buffalo, N. Y.

BILLETS—Steel
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Company, Bethlehem, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Donner Steel Co., Inc., Buffalo, N. Y.
Eddystone Steel Co., Crum Lynne, Pa.
Gulf States Steel Co., Birmingham, Ala.
Margulies, M. J., Philadelphia, Pa.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
United Alloy Steel Corp., Canton, O.
Valley Rolling Mills, 120 Broadway, N. Y. C.
Wheeling Steel Corporation, Wheeling, W. Va.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.
Wood, Alan, Iron & Steel Co., Phila., Pa.

BLANKS—Chisel
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Cleveland Steel Tool Co., Cleveland, O.

BLANKS—Gear and Pinion
Akron Selle Co., Akron, O.
Carnegie Steel Co., Pittsburgh, Pa.
Chicago Rawhide Mfg. Co., 1313 Elston Ave., Chicago, Ill.
National Forge & Tool Co., Irvine, Pa.

BLANKS—Lead Screw
Cumberland Steel Co., Cumberland, Md.

BLANKS—Stamping
American Steel Band Co., N. S. Pittsburgh, Pa.

BLOCKS—Chain
Ford Chain Block Co., Philadelphia, Pa.
Topping Bros., 159 Varick St., N. Y. C.
Wright Mfg. Co., Hixson, O.

BLOWPIPES—Brazing, Cutting and Welding
Oxweld Acetylene Co., 30 E. 42d St., N. Y. C.

BLOWERS—Centrifugal
Sterling Blower Co., Hartford, Conn.
Sturtevant, B. F., Co., Hyde Park, Mass.

BLOWERS—Pressure
American Gas Furnace Co., Elizabeth, N. J.
Buffalo Forge Co., 492 B'way, Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Flexible Shaft Co., Chicago, Ill.
Mahr Mfg. Co., Minneapolis, Minn.
Spencer Turbine Co., Hartford, Ct.
Sturtevant, B. F., Co., Hyde Park, Mass.

BLOWERS—Rotary
Connersville Blower Co., Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.
Sturtevant, B. F., Co., Hyde Park, Mass.

BLUE PRINT MACHINES
Wickes Brothers, Saginaw, Mich.

BOILER BRACES
Lukens Steel Co., Coatesville, Pa.

BOILER HEADS—Flanged and Dished
Bethlehem Steel Co., Bethlehem, Pa.
Lukens Steel Co., Coatesville, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

BOILER SHELLS—Riveted or Welded
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.
Wood, John, Mfg. Co., Conshohocken, Pa.

BOILER TRIMMINGS
Crane Co., Chicago, Ill.

BOILERS—Return Tubular
Frost Mfg. Co., Chicago, Ill.
Sellers Bros., Inc., Pottstown, Pa.

BOILERS—Second-hand
Harris Bros. Co., Chicago, Ill.
Randle Machinery Co., Cincinnati, O.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Wickes Boiler Co., Saginaw, Mich.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 232-234.

BOILERS—Water Tube
Abendroth & Root Mfg. Co., Newburgh, N. Y.
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Erie City Iron Works, Erie, Pa.
Tioga Boiler Mfg. Co., Catawissa, O.
Wickes Boiler Co., Saginaw, Mich.

BOLT AND NUT MACHINERY
Acme Machinery Co., Cleveland, O.
Bethlehem Steel Co. (Detrick & Harvey), Bethlehem, Pa.
Lamb Machine Co., Inc., Waynesboro, Pa.
Manville, E. J., Mach. Co., Waterbury, Ct.
National Machinery Co., Tiffin, O.
Pawtucket Mfg. Co., Pawtucket, R. I.
Waterbury Lathed Parts & Machine Co., Waterbury, Ct.
Williams Tool Corporation, Erie, Pa.

BOLT AND RIVET CLIPPERS
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Porter, H. K., Inc., Everett, Mass.

BOLTS—Expansion
Brohard Co., Philadelphia, Pa.

BOLTS—Special
Pawtucket Mfg. Co., Pawtucket, R. I.

BOLTS—Spring Shackle
Fostoria Screw Co., Fostoria, Ohio.

BOLTS—Toggle
Wrigley, Thomas, Co., Chicago.

BOLTS AND NUTS—Brass and Bronze
Everitt Co., Boston, Mass.
Pawtucket Mfg. Co., Pawtucket, R. I.

BOLTS AND NUTS—Iron and Steel
American Screw Co., Providence, R. I.
Ames, W., & Co., Jersey City, N. J.
Bell Co., Buffalo, N. Y.
Bethlehem Steel Company, Bethlehem, Pa.
Clark Bros. Bolt Co., Milldale, Ct.
Foster, L. B., Co., Inc., Pittsburgh, Pa.
Harrison Bolt & Nut Co., Harrison, N. J.
Ireland & Matthews Mfg. Co., Detroit, Mich.
Kirkhuff Mfg. Co., Cleveland, O.
Maryland Bolt & Nut Co., Baltimore, Md.
Merrill Bros., Maspeth, N. Y.
National Bolt & Nut Company, Pittsburgh, Pa.
Oliver Iron & Steel Corp., Pittsburgh, Pa.
Pawtucket Mfg. Co., Pawtucket, R. I.
Perry-Fay Co., The, Elyria, O.
Rhode Island Tool Co., Providence, R. I.
Rockford Bolt Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Topping Bros., 159 Varick St., N. Y. C.
Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

BORING, DRILLING AND MILLING MACHINES—Horizontal
Bethlehem Steel Co. (Detrick & Harvey), Bethlehem, Pa.
Defiance Mach. Works, Defiance, O.
Hill, Clarke & Co. of Chicago, Chicago, Ill.
Landis Tool Co., Waynesboro, Pa.
Lucas Machine Tool Co., Cleveland, O.
McCabe, J. J., Lathe & Machry. Corp., 149 Broadway, New York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Milwaukee Electric Crane & Mfg. Co., Inc., Milwaukee, Wis.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Universal Boring Machine Co., Hudson, Mass.

BORING, DRILLING AND MILLING MACHINES—Vertical
Baker Bros., Toledo, O.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.

BORING MACHINES—Car Box
Bethlehem Steel Co. (Detrick & Harvey), Bethlehem, Pa.

BORING MACHINES—Car Wheel
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

BORING MACHINES—Cylinder
Baker Bros., Toledo, O.

BORING MACHINES—Vertical
Cincinnati Planer Co., The, Cincinnati, O.
Consolidated Mach. Tool Corp. of America, Rochester, N. Y.
Gisholt Machine Company, Madison, Wis.
McCabe, J. J., Lathe & Machry. Corp., 149 Broadway, New York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Washington Steel & Ordnance Co., Washington, D. C.

BOX STRAPPING AND FASTENERS
Cary Mfg. Co., Manhattan Bridge Plaza, Brooklyn, N. Y.
De Haven Mfg. Co., 50-54 Columbia Heights, Brooklyn, N. Y.

BOXES—Annealing
Blaw-Knox Co., Pittsburgh, Pa.
Union Steel Casting Co., Pittsburgh, Pa.
Wilfong, Millard F., Iron Works Co., Philadelphia, Pa.

BOXES—Journal
Gurney Ball Bearing Co., Jamestown, N. Y.

BOXES—Steel
Cleveland Wire Spring Co., Cleveland, O.
Sterling Wheelbarrow Co., Milwaukee, Wis.

BRAKES—Electric
Electric Controller & Mfg. Co., Cleveland, O.

BRAKES—Metal Forming
[illegible] Co., Cleveland, O.
Lake Erie Engineering Corp., Buffalo, N. Y.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Pittsburgh Iron & Steel Co., Pittsburgh, Pa.
Toledo Machine & Tool Co., Toledo, O.

BRICK—Chrome
Harbison-Walker Refractories Co., Pittsburgh, Pa.

BRICK—Fire
American Brick Co., The, Ashland, Ky.
Beaver Brick Co., Beaver, Pa.
Bessemer Limestone & Cement Co., Inc., Pittsburgh, Pa.
Bettendorf Co., The, Bettendorf, Ia.
Bonnot Co., The, Canton, O.
Bowerston Shale Co., Bowerston, O.
Brown Fireclay & Coal Co., Pittsburgh, Pa.
Buffalo Fire Clay Co., Buffalo, N. Y.
Clearfield Bituminous Coal Corp., Clearfield, Pa.
Connellsville Gas Coal Co., Pittsburgh, Pa.
Connellsville Silica Brick Co., Connellsville, Pa.
Crucible Fuel Co. of America, Pittsburgh, Pa.
Dinsmore Coal Co., Pittsburgh, Pa.
Empire Refractories Co., Mt. Union, Pa.
Glen Rock Coal Co., Pittsburgh, Pa.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Hocking Valley Products Co., Columbus, O.
Kittanning Brick Co., Kittanning, Pa.
Lorain Coal & Dock Co., Cleveland, O.
Mahoning Fire Brick Co., Youngstown, O.
Mt. Savage Fire Brick & Clay Co., Mt. Savage, Md.
Pittsburgh Coal Co., Pittsburgh, Pa.
Pittsburgh Refractories Co., The, Cleveland, O.
Taylor, Chas., Sons Co., Cincinnati, O.
U. S. Refractories Corp., Mt. Union, Pa.

BRICK—Fire Clay
Taylor, Chas., Sons Co., Cincinnati, O.

BRICK—Magnesite
General Refractories Co., Philadelphia, Pa.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Lavino, Jr. & Co., Philadelphia, Pa.

BRICK—Silica
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Lavino, E. J., & Co., Philadelphia, Pa.

BRIDGE BUILDERS
American Bridge Co., 71 Broadway, N. Y. C.
Kennard Bridge Co., Chicago, Ill.
McClintic-Marshall Company, Pittsburgh, Pa.
Phoenix Iron Company, Philadelphia, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Shoemaker Bridge Co., Pottstown, Pa.
Virginia Bridge & Iron Co., Roanoke, Va.

BROACHES
American Broach & Mch. Co., Ann Arbor, Mich.
Lapointe, J. N., Co., New London, Ct.

BROACHING MACHINES
American Broach & Mch. Co., Ann Arbor, Mich.
Chamberlain Engrg. Co., Chambersburg, Pa.
Lapointe, J. N., Co., New London, Ct.
Pawtucket Mfg. Co., Pawtucket, R. I.

BRONZE—Manganese
Wellman Premize Co., Cleveland, Ohio.

BUCKETS—Electric Motor
Hayward Co., 50 Church Street, N. Y. C.

BUCKETS—Elevator
Columbus Conveyor Company, Columbus, Ohio.
Hendrick Mfg. Co., Carbondale, Pa.

BUCKETS—Grab
Blaw-Knox Co., Pittsburgh, Pa.
Brosius, Edgar H., Pittsburgh, Pa.
Brown Hoisting Machy. Co., Cleveland, O.
Browning Co., The, Cleveland, O.
Hayss, Geo., Mfg. Co., The, 142nd St. and Canal Place, New York City.
Hayward Co., 50 Church Street, N. Y. C.
Industrial Works, Bay City, Mich.
Lidgerwood Mfg. Co., Chicago, Ill.
McMyler Interstate Co., Cleveland, O.
Orton & Steinbrenner Co., Chicago, Ill.
Williams, The, Co., Erie, Pa.

BUCKETS—Orange Peel
Hayward Co., 50 Church Street, N. Y. C.
Orton & Steinbrenner Co., Chicago, Ill.

BUCKLES—Bale, Tie
Joliet Wrought Washer Company, Joliet, Ill.

BUILDINGS—Factory
Blaw-Knox Co., Pittsburgh, Pa.
Corrugated Bar Co., Buffalo, N. Y.
McClintic-Marshall Co., Pittsburgh, Pa.

BUILDINGS—Galvanized Sectional
Blaw-Knox Co., Pittsburgh, Pa.

BUILDINGS—Steel
American Bridge Co., 71 Broadway, N. Y. C.
Bessemer Iron Works, Philadelphia, Pa.
Berlin Construction Co., Inc., Berlin, Ct.
Blaw-Knox Co., Pittsburgh, Pa.
Corrugated Bar Co., Buffalo, N. Y.
De Gon, Richard, Company, Philadelphia, Pa.
Erie Steel Construction Co., Erie, Pa.
Kenwood Bridge Co., Chicago, Ill.
McClintic-Marshall Co., Pittsburgh, Pa.
Shoemaker Bridge Co., Pottstown, Pa.
Truscon Steel Co., Youngstown, O.

BULLDOZERS
Beatty Machine & Mfg. Co., Hammond, Ind.
Williams, White & Co., Moline, Ill.

BURNERS—Combination Oil and Gas
Advance Furnace & Engineering Co., Springfield, Mass.
Anthony Co., The, Long Island City, N. Y.
Forest, John & Sons, Bayonne, N. J.
Liquid Fuel Engrg. Co., Detroit, Mich.
Power Specialty Co., 1508 Girard Ave., Philadelphia, Pa.
Tate-Jones & Co., Inc., Pittsburgh, Pa.

BURNERS—Enclosed Flame Gas
Oven Equipment & Mfg. Co., New Haven, Ct.

BURNERS—Oil
Anthony Co., The, Long Island City, N. Y.
Equipment Engineering Co., The, Chicopee, Mass.
Forest, John, & Sons, Bayonne, N. J.
Liquid Fuel Engrg. Co., Detroit, Mich.

BURNERS—Powdered Coal
Grinding Fuel Equipment Co., Harvey, Ill.
Holland Engineering Co., The, Cleveland, O.

BURRS—Steel
[illegible] Mfg. Co., Cleveland, O.

BUSHINGS—Brass and Bronze
[illegible] Co., Cleveland, O.
[illegible] Co., Philadelphia, Pa.

BUSHINGS—Phosphor Bronze
[illegible] Co., Philadelphia, Pa.

CABLING AND ARMORING MACHINES
[illegible] Co., Cleveland, O.

CABLE—Aerial Tramway
[illegible] Co., Trenton, N. J.
[illegible] Co., Buffalo, N. Y.

CABLE—Electric
General Electric Co., Schenectady, N. Y.

CABLEWAYS AND TRAMWAYS—See Tramways

CALIPERS—Micrometer
Starrett, L. S., Co., The, Athol, Mass.

CALORIMETERS—Coal or Gas Recording
Sarco Co. Engineering Co., Boston, O.

CANS—Oil
Gem Mfg. Co., Pittsburgh, Pa.

CARBIDE
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.

CARBONIZING—See Heat Treating

CAR DUMPERS
Wellman Seaver Morgan Co., Cleveland, O.

CARS—Charging
Bridgeport Steel Fdry. & Mch. Co., Bridgeport, Pa.

CARS—Dump
Atlas Car & Mfg. Co., Cleveland, O.
Easton Car & Construction Co., Easton, Pa.

CARS—Industrial and Mine
Atlas Car & Mfg. Co., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Clark, Dunkley & Mfg. Co., Cincinnati, O.
Easton Car & Construction Co., Easton, Pa.
Gregg Co., Ltd., The, Hackensack, N. J.

CARS—Railroad (Second-hand)
Houston Railway Car Co., Houston, Tex.
Shippers Car Line Corp., 165 Broadway, N. Y. C.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
Buffalo Fdry. & Mch. Co., 1545 Fillmore Ave., Buffalo, N. Y.
Hoskins Mfg. Co., Detroit, Mich.

CASTINGS—Aluminum Bronze
Buffalo Bronze Die Cast Corp., Buffalo, N. Y.

CASTINGS—Brass, Bronze or Aluminum
Accurate Brass Casting Company, Inc., 351 Cooper St., Brooklyn, N. Y.
Alox Metal Co., The, Philadelphia, Pa.
Aluminum & Brass Company, Locsport, N. Y.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Bolivar Foundry Co., Bolivar, N. Y.
Buffalo Bronze Die Cast Corp., Buffalo, N. Y.
Buffalo Brass & Bronze Co., Toledo, O.
Cochran Brass Foundry, The, York, Pa.
Cross Engineering Co., Carbondale, Pa.
Doehler Die-Casting Co., Court & Huntington Sts., Brooklyn, N. Y.
Douglas & Lomason Co., Detroit, Mich.
Enterprise Brass Works, Muskegon Heights, Mich.
Eureka Co., North East, Pa.
Everitt Co., Boston, Mass.
Exeter Brass Works, Exeter, N. H.
Fredericksen Company, Saginaw, Mich.
Hayes Brass Foundry, Inc., Syracuse, N. Y.
Keystone Brass Co., Pittsburgh, Pa.
Lebanon Brass Works, Lebanon, Pa.
Lumen Bearing Co., Buffalo, N. Y.
Metalli Metal Co., Valparaiso, Ind.
McKay Fdry. & Mach. Co., Lockport, N. Y.
Metal & Alloy Specialties Co., Inc., Buffalo, N. Y.
Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y.
Nelson Iron Works, Nelsonia, Wis.
Phosphor Bronze Smelting Co., Phila., Pa.
Spencer's, I. N., Sons, Inc., Guilford, Ct.
Spindler, Jos., Brass Foundry, Jersey City, N. J.
Springfield Aluminum Plate & Castings Co., Springfield, O.
Wellman Premize Co., Cleveland, O.

CASTINGS—Die
Accurate Brass Casting Company, Inc., 351 Cooper St., Brooklyn, N. Y.
Buffalo Bronze Die Cast Corp., Buffalo, N. Y.
Doehler Die Casting Co., Court & Huntington Sts., Brooklyn, N. Y.
Franklin Die Casting Corp., Syracuse, N. Y.
Fredericksen Company, Saginaw, Mich.
Metalli Metal Co., Valparaiso, Ind.
Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y.

CASTINGS—Electric Steel
Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
American Steel Foundries, Chicago, Ill.
Bellis City Steel & Malleable Iron Co., Racine, Wis.
Chicago Steel Fdry. Co., Chicago, Ill.
Eastern Steel Castings Co., Newark, N. J.
Farrell-Cheek Steel Fdry. Co., Sandusky, O.
Industrial Steel Casting Co., The, Toledo, O.
Mesabi Electric Steel Casting Co., Milwaukee, Wis.
Monroe Steel Castings Co., Monroe, Mich.
Ohio Steel Fdry. Co., Springfield, O.
Smith, Geo. H., Steel Casting Co., Milwaukee.

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CASTINGS—Gray Iron

Adams, Wm., Foundry Co., Inc. Pluna, Pa.
American Foundry & Mfg. Co., Frederick, Md.
Buck, Jos. Iron Works, Downingtown, Pa.
Bernhart-Davis Co., Warren, Pa.
Berlin Foundry & Mfg. Co., Berlin, Pa.
Bethlehem Steel Company, Bethlehem, Pa.
Brownell Steel Co. & Mch. Co., Bridgeboro, Pa.
Birmingham Iron Foundry, Derby, Ct.
Boston Laundry Co., Bolivar, N. Y.
Bonnot Co., Canton, O.
Buffalo Laundry & Machine Co., 1345 Fillmore Ave., Buffalo, N. Y.
Butler Foundry, The, Butler, O.
Chambersburg Engrg. Co., Chambersburg, Pa.
Chemical Engrg. & Fdry. Co., Atlanta, Ga.
City Foundry Co., Cleveland, O.
Columbiana Foundry Co., McKeesport, Pa.
Commercial Foundry Mach. & Steel Casting Co., Pittsburgh, Pa.
Cooper Brothers, Cortland, N. Y.
Creedon Morris Co., Philadelphia, Pa.
Cuyahoga Foundry Co., Cleveland, O.
Dingwerth Foundry Co., Accident, Pa.
Dayton Globe Iron Works, Dayton, O.
Delfosse Engineering Co., Wilmington, Del.
Emporia Machine Co., Emporia, Va.
Equitable Mfg. Co., Ephrata, Pa.
Fairmount Foundry Co., Philadelphia, Pa.
Franklin Machine Company, Providence, R. I.
Frederick Iron & Steel Co., Frederick, Md.
Geo. Mfg. Co., Albion, Mich.
Gehs Falls Mach. Works, Gehs Falls, N. Y.
Hooven Iron Works, Buffalo, N. Y.
Hubley Mfg. Co., Lancaster, Pa.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Kentucky Wagon Mfg. Co., Louisville, Ky.
Kline Hardware Co., Allentown, Pa.
Laurelton Foundry Co., Laurelton, Pa.
McGann Mfg. Co., Inc., York, Pa.
McKee Fdry. & Mach. Co., Locksport, N. Y.
Mascot Stove Mfg. Co., Chattanooga, Tenn.
Minneapolis Steel & Mchry. Co., Minneapolis, Minn.
Mitsch Co., Kaukauna, Wis.
Murray Iron Works Co., Inc., Burlington, Ia.
National Sewing Machine Co., Belvidere, Ill.
Saxon Bros., Perksgill, N. Y.
Newark Unpolished Iron Works, Louis Sacks, Inc., Newark, N. J.
North Wales Mach. Co., Inc., North Wales, Pa.
Oshkosh Mch. Co., Du Bois, Pa.
Paton, F. R., Manufacturing Co., Rutland, Vt.
Penn Iron & Mfg. Co., Inc., Reading, Pa.
Pennsylvania Engrg. Wks., New Castle, Pa.
Pequonnock Fdry., Bridgeport, Ct.
Pulaski Iron & Mfg. Corp., Cleveland, O.
Rietzy, Browne & Donald, Inc., Maspeth, L. I.
Riverside Fdry. & Gait Co., Kalamazoo, Mich.
St. Louis Malleable Casting Co., St. Louis, Mo.
Sessions Foundry Company, The, Bristol, Ct.
Spencer, J. Sons, Inc., Buffalo, N. Y.
Standard Machinery Co., Mystic, Ct.
Stoney Schmidt Mfg. Co., York, Pa.
Stebbins Fdry. & Mch. Wks., Aurora, Ind.
Stowell Co., The, South Milwaukee, Wis.
Straight Line Engine Co., Inc., The, Syracuse, N. Y.
Swett, A. L., Iron Works, Medina, N. Y.
Taylor-Wilson Mfg. Co., Lewistown, Pa.
Thropp's, John E., Sons Co., Trenton, N. J.
Toledo Mch. & Tool Co., Toledo, O.
Troy Foundry & Mach. Co., Inc., Troy, N. Y.
Turner & Seymour Mfg. Co., Torrington, Ct.
Union Mfg. Co., New Britain, Ct.
U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Utica Steam Engine & Boiler Works, The, Utica, N. Y.
Warren Fdry. & Pipe Co., 11 B'way, N. Y. C.
Waterbury Castings Co., Waterbury, Ct.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.

CASTINGS—Malleable

Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
Belle City Malleable Iron Co., Racine, Wis.
Cadillac Malleable Iron Co., Cadillac, Mich.
Danville Malleable Iron Co., Danville, Ill.
Decatur Malleable Iron Co., Decatur, Ill.
Delta Foundries, Inc., Philadelphia, Pa.
Fort Pitt Malleable Iron Co., Pittsburgh, Pa.
Lakeside Malleable Castings Co., Racine, Wis.
Lancaster Foundry Co., Lancaster, Pa.
Lanyon Iron Works, Inc., Lanyon, Ill.
McDonough, W. R., & Co., Cleveland, O.
Malleable Iron Fittings Co., Branford, Ct.
Meehan, Thomas, Company, Germantown, Pa.
Mosser & Moore, Inc., Reading, Pa.
Newark Malleable Iron Works, Louis Sacks, Inc., Newark, N. J.
Northern Malleable Iron Co., St. Paul, Minn.
Reading-Pratt & Cady Co., Inc., Hartford, Ct.
St. Louis Malleable Castings Co., St. Louis, Mo.
Stowell Co., The, South Milwaukee, Wis.
Tonawanda Malleable Iron Co., Buffalo, N. Y.
Vermilion Malleable Iron Co., Hoopeston, Ill.
Wagner Malleable Iron Co., Decatur, Ill.

CASTINGS—Manganese Steel

Moore & Moore, Inc., Reading, Pa.
Steede & Cassidy, Inc., Jersey City, N. J.

CASTINGS—Open Hearth Steel

Commercial Steel Casting Company, Marion, O.

CASTINGS—Semi-Steel

Buffalo Laundry & Machine Co., 1345 Fillmore Ave., Buffalo, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
Cuyahoga Foundry Co., Cleveland, O.
McGann Mfg. Co., Inc., York, Pa.
Malleable Iron Fittings Co., Branford, Ct.
Troy Foundry & Mach. Co., Inc., Troy, N. Y.

CASTINGS—Steel

Adamson Mach. Co., The, Akron, O.
American Steel Foundries, Chicago, Ill.
Atlantic Steel Castings Co., Chester, Pa.
Bethlehem Steel Company, Bethlehem, Pa.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Chicago Steel Foundry Co., Chicago, Ill.
Commercial Steel Casting Company, Marion, O.
Commercial Foundry Mach. & Steel Casting Co., Pittsburgh, Pa.
Crucible Steel Casting Co., Lansdowne, Pa.
Eastern Steel Castings Co., Newark, N. J.
Emporia Machine Co., Emporia, Va.
Falk Corp., Milwaukee, Wis.
Farrell Cheek Steel Fdry. Co., Sandusky, O.
Federal Steel Fdry. Co., Chester, Pa.
Industrial Steel Casting Co., The, Toledo, O.
McDonough, W. R., & Co., Cleveland, O.
Malleable Iron Fittings Co., Branford, Ct.
Milwaukee Electric Steel Castings Co., Milwaukee, Wis.
Mesta Machine Co., Pittsburgh, Pa.
Modern Steel Casting Co., Montpelier, Ind.
Ohio Steel Fdry. Co., Springfield, O.
Otis Steel Co., Cleveland, O.
Philadelphia Steel & Mach. Co., Phila., Pa.
Pressed Foundry & Mfg. Corp., Cleveland, O.
Reading Steel Casting Co., Inc., Reading, Pa.
Riverside Steel Casting Co., Newark, N. J.
Sharon Foundry Co., Sharon, Pa.
Smith, Geo. H., Steel Casting Co., Milwaukee, Wis.
Strub Steel Hardening Process Co., Pittsburgh, Pa.
Strong Steel Fdry. Co., Buffalo, N. Y.
Temple Malleable Iron & Steel Co., Phila., Pa.
Union Steel Casting Co., Pittsburgh, Pa.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.

CEMENT—Fire Resisting

Harbison-Walker Refractories Co., Pittsburgh, Pa.
Quigley Furnace Specialties Co., Inc., 26 Cortlandt St., New York City.

CEMENT ROOFING TILE

Federal Cement Tile Co., Chicago, Ill.

CENTERING MACHINES

Whitton, D. E., Mach. Co., New London, Ct.

CENTERS—Index

Simmons Mach. Tool Corp., Albany, N. Y.

CHAIN MACHINERY

Baird Machine Co., Bridgeport, Ct.
Vaughn Machinery Co., Cuyahoga Falls, Ohio.

CHAINS—Cable

Morton, Thomas, 245 Centre St., N. Y. C.

CHAINS—Coil

American Chain Co., Inc., Bridgeport, Ct.
Bradlee & Co., Philadelphia, Pa.
Bridgeport Chain Co., Bridgeport, Ct.
Columbus McKinnon Chain Co., Columbus, O.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Conveyor

American Chain Co., Inc., Bridgeport, Ct.
Brown Hoisting Machinery Co., Cleveland, O.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Crane and Hoist

Bradlee & Co., Philadelphia, Pa.
Columbus McKinnon Chain Co., Columbus, O.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Dredge

American Chain Co., Inc., Bridgeport, Ct.

CHAINS—Furnace

Hewitt Chain Co., Bridgeport, Ct.

CHAINS—Jack

Mattatuck Mfg. Co., Waterbury, Ct.

CHAINS—Power Transmission

Baldwin Chain & Mfg. Co., Worcester, Mass.
Link-Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

CHAINS—Rocker-Joint

Morse Chain Co., Ithaca, N. Y.

CHAINS—Sash

Bridgeport Chain Co., Bridgeport, Ct.
Morton, Thos., 245 Centre St., N. Y. C.

CHAINS—Sling

Reading Chain & Block Co., Reading, Pa.

CHAINS—Sprocket Wheel

Cullman Wheel Co., Chicago, Ill.
Jenkins & Sturges, Ft. Stowell Co., The, South Milwaukee, Wis.
Union Chain & Mfg. Co., Sandusky, O.
Whitney Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHAPLETS

Erdle Perforating Co., Rochester, N. Y.

CHASERS

Jones & Lamson Mach. Co., Springfield, Vt.

CHECKS—Metal

Matthews, J. H., & Co., Pittsburgh, Pa.
Schwerdtle Stamp Co., Bridgeport, Ct.

CHROMIUM METAL

Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.

CHUCKS—Drill and Lathe

Cushman Chuck Company, Hartford, Ct.
Horgeon & Pettis Mfg. Co., New Haven, Ct.
Horton, E., & Son Co., Windsor Locks, Ct.
Jacobs Mfg. Co., The, Hartford, Ct.
McCrosky Tool Corp., Meadville, Pa.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Skinner Chuck Co., New Britain, Ct.
Union Mfg. Co., New Britain, Ct.
Whitton, D. E., Mach. Co., New London, Ct.

CHUCKS—Magnetic

Heald Mch. Co., Worcester, Mass.

CHUCKS—Metal

Hoggson & Pettis Mfg. Co., New Haven, Ct.

CLAMPS—Flanging

Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

CLAMPS—Machinists

Danly Mach. Specialties, Inc., Chicago, Ill.

CLAMPS—Steel

Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

CLEANER—Metal

Cowles Detergent Co., The, Lockport, N. Y.
Ford, H. J., Co., Wyandotte Mich.
Oakley Chemical Co., 22 Thames St., N. Y. C.

CLEANING MATERIALS

Cowles Detergent Co., The, Lockport, N. Y.
Ford, H. J., Co., Wyandotte Mich.
Oakley Chemical Co., 22 Thames St., N. Y. C.

CLOCKS—Watchman's

Newman Clock Co., Inc., 428 B'way, N. Y. C.

CLOTHING—Asbestos and Fireproof

Safety Equip. Service Co., Cleveland, O.

CLUTCHES—Friction

Brown Engineering Co., Reading, Pa.
Caldwell, W. E., Co., 260 Brandeis Street, Louisville, Ky.
Conway Clutch Co., 1948 W. 6th St., Cincinnati, O.
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Johnson Gear & Machine Co., Manchester, Ct.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Moore & White Co., Philadelphia, Pa.
Schultz, A. L., & Son, Chicago, Ill.
Wood's, T. B., Sons Co., Chambersburg, Pa.

COAL

Addy, Matthew, Company, The, Cincinnati, O.
Cleveland-Cliffs Iron Company, Cleveland, O.
Hanna, M. A., Co., The, Cleveland, O.
Hickman, Williams & Co., Pittsburgh, Pa.
McKeever, E. W., Philadelphia, Pa.
Pickands, Mather & Co., Cleveland, Ohio.
Pilling & Co., Inc., Philadelphia, Pa.
St. Louis Coke & Iron Co., St. Louis, Mo.
Snyder, W. P., & Co., Pittsburgh, Pa.
Waldo, Egbert, & McClain, Inc., Buffalo, N. Y.

COAL, ORE AND ASH HANDLING MACHINERY

Alliance Machine Co., Alliance, O.
Blaw-Knox Co., Pittsburgh, Pa.
Brown Hoisting Machinery Co., Cleveland, O.
Hunna Engineering Works, Chicago, Ill.
Hayward Co., 50 Church St., New York City.
Link-Belt Co., Chicago, Ill.
McMyler Interstate Co., The, Cleveland, O.
Northern Engineering Works, Detroit, Mich.
Orton & Steinbrenner Co., Chicago, Ill.

COCKS—Air and Gas

Crane Co., Chicago, Ill.

COILING MACHINES — Flexible Shaft, Metallic Tube and Casing

Sleeper & Hartley, Inc., Worcester, Mass

COILS—Pipe

Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Superheater Co., The, 17 E. 42d St., N. Y. C.

COKE—Metallurgical

Addy, Matthew, Company, The, Cincinnati, O.
Bethlehem Steel Company, Bethlehem, Pa.
Cleveland-Cliffs Iron Company, Cleveland, O.
Crooke Smelters, 21 E. 40th St., N. Y. C.
Hanna, M. A., Co., The, Cleveland, O.
Hickman, Williams & Co., Pittsburgh, Pa.
Hillman Coke Co., Pittsburgh, Pa.
Pilling & Co., Inc., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
St. Louis Coke & Iron Co., St. Louis, Mo.
Snyder, W. P., & Co., Pittsburgh, Pa.
Stewart Furnace Company, The, Cleveland, O.
Tutein, E. Arthur, Inc., Boston, Mass.
Waldo, Egbert, & McClain, Inc., Buffalo, N. Y.
Walter-Wallingford & Co., Cincinnati, O.

COKE-OVEN MACHINERY

Alliance Machine Co., Alliance, O.
Allen Car & Mfg. Co., Cleveland, O.

COKE OVENS—By-Products

Smythe, S. R., Co., Pittsburgh, Pa.

COLD DRAWING MACHINES—Bar & Wire

Vaughn Mchry. Co., Cuyahoga Falls, O.

COLLARS—Spacing for Milling Cutters

Detroit Stamping Co., Detroit, Mich.

COLLETS—Spring or Split

Rivett Lathe & Grinder Corp., Boston, Mass.

COMPOUNDS—Case Hardening and Tempering

Anti-Borax Compound Co., Ft. Wayne, Ind.

COMPOUNDS—Welding

Anti-Borax Compound Co., Ft. Wayne, Ind.

COMPRESSORS—Air

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
De Laval Steam Turbine Co., Trenton, N. J.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Company, 11 Broadway, N. Y. C.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 232-234.

Pennsylvania Pump & Comp. Co. [illegible]
Spencer Turbine Co., Hartford, Ct
Sullivan Mchry. Co., Chicago, Ill.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

COMPRESSORS—Gas

Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

CONCRETE MACHINERY

Ideal Concrete Machry. Co., Cincinnati, Ohio.
Knickerbocker Co., Jackson, Mich.

CONCRETE ROOFING TILE

Federal Cement Tile Co., Chicago, Ill.

CONDENSERS

Alberger Pump & Condenser Co., 140 Cedar St., New York City.
Denn Bros. Co., Indianapolis, Ind.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
[illegible]
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

CONDUITS—Flexible Metallic

Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

CONNECTING RODS

Pollak Steel Co., Cincinnati, O.
Standard Gauge Steel Co., Beaver Falls, Pa.

CONTRACTORS' SUPPLIES—Second-hand

Albert & Davidson Pipe Corp., 256-264 Oakland St., Brooklyn, N. Y.
Eagle Pipe Supply Co., Inc., 233 Broadway, New York City.

CONTROLLERS—Electric

Electric Controller & Mfg. Co., Cleveland, O
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Temperature

Taylor Instrument Companies, Rochester, N. Y.

CONVEYING AND ELEVATING MACHINERY

Brown Hoisting Machry. Co., Cleveland, O.
Caldwell, H. W., & Son Co., Chicago, Ill.
Columbus Conveyor Company, Columbus, Ohio.
Holcroft & Co., Detroit, Mich.
Link-Belt Co., Chicago, Ill.
Payne, N. B., & Co., 25 Church St., N. Y. C.
Portable Machinery Company, Passaic, N. J.
Robins Conveying Belt Co., Passaic, N. J.

CONVEYING SYSTEMS—Overhead

Richards-Wilcox Mfg. Co., Aurora, Ill.

CONVEYORS—Portable

Haiss, Geo., Mfg. Co., The, 142nd St. & Canal Place, New York City.
Payne, N. B., & Co., 25 Church St., N. Y. C.
Portable Machinery Company, Passaic, N. J.

COPING MACHINES

Chambersburg Engrg. Co., Chambersburg, Pa.
Cleveland Punch & Shear Works Co., Cleve., O.
Pels, Henry, & Co., 90 West St., N. Y. C.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

CORE BREAKERS—Pneumatic

Sullivan Mchry. Co., Chicago, Ill.

CORNICE BRAKES

Davis & Krump Mfg. Co., Chicago, Ill.

CORUNDUM WHEELS — See Grinding Wheels

COTTERS AND KEYS—Spring

Hindley Mfg. Co., Valley Falls, R. I.
Hubbard Spring Works, Pontiac, Mich.

COUNTERSINKS

National Twist Drill & Tool Co., Detroit, Mich.

COUNTING MACHINES

Durant Mfg. Co., Milwaukee, Wis.
Hart, R. A., Mfg. Co., Buttle Creek, Mich.
Root Co., Bristol, Conn.
Veeder Mfg. Co., Hartford, Ct.

COUPLINGS—Air Hose

Cleveland Pneumatic Tool Co., The, Cleveland, O.

COUPLINGS—Cut-off, Friction

Johnson, Carlyle, Machine Co., Manchester, Ct.
Moore & White Co., Philadelphia, Pa.

COUPLINGS—Flexible Shaft

American Foundry & Mfg. Co., Frederick, Md.
Brown Engineering Co., Reading, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Nuttall, R. D., Co., Pittsburgh, Pa.
Thompson Brothers, Philadelphia, Pa.

COUPLINGS—Friction Clutch

Caldwell, W. E. Co., 260 Brandels Street, Louisville, Ky.
Conway Clutch Co., 1948 W. 6th St., Cincinnati, O.
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Johnson, Carlyle, Machine Co., Manchester, Ct.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.

COUPLINGS—Pipe

New Haven Screw Co., New Haven, Ct.

COUPLINGS—Shaft

Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

CRANES—Crawling Tractor

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DRILLING MACHINES—Multiple Spindle, Horizontal
Detroit Mechanic Tool Co., Detroit, Mich.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle, Vertical
National Automatic Tool Co., Richmond, Ind.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

DRILLING MACHINES—Portable
Cleveland Punch & Shear Wks. Co., Cleve., O.

DRILLING MACHINES—Portable Electric
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll & Smith Electric Tool Co., Cincinnati, O.
U. S. Electrical Tool Co., The, Cincinnati, O.

DRILLING MACHINES—Portable Pneumatic
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Cleveland Pneumatic Tool Co., The, Cleveland, O.
Independent Pneumatic Tool Co., Chicago, Ill.

DRILLING MACHINES—Radial
Ambrosen Tool Works Co., Cincinnati, O.
Cincinnati Bickford Tool Co., Cincinnati, O.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Dreses Machine Tool Co., Cincinnati, O.
Mueller Mach. Tool Co., Cincinnati, O.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Reed-Prentice Co., Worcester, Mass.
Rivetson, Jos. T., & Son, Inc., Chicago, Ill.
Taylor & Fenn Co., Hartford, Ct.
Washington Steel & Ordnance Co., Washington, D. C.
Western Machine Tool Works, Holland, Mich.

DRILLING MACHINES—Rock
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
General Electric Co., Schenectady, N. Y.

DRILLING MACHINES—Second Hand
Harris Bros. Co., Chicago, Ill.

DRILLING MACHINES—Sensitive
Leland-Gifford Co., Worcester, Mass.
Royersford Foundry & Mach. Co., Inc., Royersford, Pa.
Tuttle & Fenn Co., Hartford, Ct.

DRILLING MACHINES—Vertical
Baker Bros., Toledo, O.
Barnes Drill Co., Rockford, Ill.
Buffalo Forge Co., 492 B'way, Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Bickford Tool Co., Cincinnati, O.
Defiance Mach. Works, Defiance, O.
McCabe, J. J., Lathe & Mchy. Corp., 149 Broadway, N. York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Prentiss Henry, & Co., Inc., 149 B'way, N.Y.C.
Rivetson, Jos. T., & Son, Inc., Chicago, Ill.
Sidney Machine Tool Co., Kenton, Ind.
Turner Machine Co., Danbury, Ct.
Western Machine Tool Works, Holland, Mich.

DRILLING MACHINES—Vertical Turret
Turner Machine Co., Danbury, Ct.

DRILLS—Ratchet
Armstrong Bros. Tool Co., Chicago, Ill.

DRINKING FOUNTAINS
Manufacturing Equip. & Engrg. Co., Framingham, Mass.

DROP FORGINGS—See Forgings

DROP HAMMERS—See Hammers, Drop

DROP PRESSES—See Presses, Drop

DRYERS FOR ALL MATERIAL
Bonnet Co., The, Canton, O.
Day Patents Co., Inc., Pittsburgh, Pa.

DRYERS—Rotary, Single and Double Shell
McGann Mfg. Co., Inc., York, Pa.

DUST COLLECTORS
American Foundry Equip. Co., Marlin-Rockwell Bldg., New York City.
Knickerbocker Co., Jackson, Mich.
Sly, Inc., Manufacturing Company, Cleveland, O.
Sterling Blower Co., Hartford, Ct.

ELECTRIC WELDING—See Welding, Electric

ELECTRICAL EQUIPMENT
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY—Second Hand
Belgrea Company, 147 W. 18th St., N. Y. C.
Feldman, Samuel, 214 Centre St., N. Y. C.
Goodman, M. D., Newark, N. J.
Gregory Electric Co., Chicago, Ill.
Power Mchry. Exch., Inc., Jersey City, N. J.
Randle Machinery Co., Cincinnati, O.
Sachsenmaier, Geo., Co., Philadelphia, Pa.

ELECTRICAL WIRES
American Steel & Wire Co., Chicago, Ill.

ELEVATORS—Portable
Lewis-Shepard Co., Boston, Mass.

ELEVATORS—Steam Hydraulic
Ridgway, Craig & Son Co., Contesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENAMELING
Geuder, Paeschke & Frey Co., (Contract Mfg. Division), Milwaukee, Wis.

END MILLS
Cowles Tool Co., Cleveland, O.

ENGINEERS—Consulting
Chase, Frank D., Inc., Chicago, Ill.
Day & Zimmermann, Inc., Philadelphia, Pa.
Eisler, Jacob J., Pittsburgh, Pa.
Freyn, Brassert & Co., Chicago, Ill.
Gathmann Engineering Co., Baltimore, Md.
Lane, Ralph (Consulting), Detroit, Mich.
Mellon, Arthur G., & Co., Cleveland, O.
Moore, William J., Pittsburgh, Pa.
Peirce, C. P., & Marshall, 1107 Broadway, New York City.
Stevens & Wood, Inc., 120 Broadway, N. Y. C.

ENGINEERS—Foundry
Chase, Frank D., Inc., Chicago, Ill.
Lane, R. M., Company, Detroit, Mich.

ENGINEERS—Mechanical
Chemical Engrg. & Equ. Co., Atlanta, Ga.

ENGINEERS—Metallurgical
Gathmann Engineering Co., Baltimore, Md.

ENGINEERS AND CONTRACTORS
Bonnot Co., The, Canton, O.
Brassert, Lopez E., Pittsburgh, Pa.
Chase, Frank D., Inc., Chicago, Ill.
Day & Zimmermann, Inc., Philadelphia, Pa.
Fuller Engineering Co., Fullerton, Pa.
Kennedy, James, Pittsburgh, Pa.
Laughlin, James & Co., Pittsburgh, Pa.
Mellon, Arthur G., & Co., Cleveland, O.
McKee, Willis, Cleveland, O.
Moore, W. J., & Co., Pittsburgh, Pa.
Pennsylvania Engrg. Works, New Castle, Pa.
Shipley, S. R., Co., Pittsburgh, Pa.
Swindell, W., & Bros., Pittsburgh, Pa.

ENGINES—Gas and Gasoline
Chicago Pneumatic Tool Co., 6 E. 44th Street, New York City.
National Transit Pump & Mach. Co., Oil City, Pa.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

ENGINES—Oil
Chicago Pneumatic Tool Co., 6 E. 44th Street, New York City.
De La Vergne Machine Co., 2106 East 138th St., New York City.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
National Transit Pump & Mach. Co., Oil City, Pa.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

ENGINES—Second Hand
Archer & Baldwin, Inc., 124 Liberty St., N.Y.C.
Harris Bros. Co., Chicago, Ill.
Pfannmueller Eng. Co., Chicago, Ill.
Randle Mchry. Co., Cincinnati, Ohio.
Schultz, A. L., & Son, Chicago, Ill.

ENGINES—Steam
Dake Engine Company, Grand Haven, Mich.
Erie City Iron Works, Erie, Pa.
Troy Engine & Mach. Co., Troy, Pa.

ENGINES—Steam (Una Flow Type)
Mesta Machine Co., Pittsburgh, Pa.

EXHAUST HEADS
Sterling Blower Co., Hartford, Ct.

EXHAUSTERS—Gas
Connersville Blower Co., Connersville, Ind.
Spencer Turbine Co., Hartford, Ct.

EYELET MACHINES
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

EYELETS
Platt Bros. & Co., The, Waterbury, Ct.

FACING HEADS
Mummert-Dixon Co., Hanover, Pa.

FANS—Exhaust
Buffalo Forge Co., 492 B'way, Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Mass.

FASTENERS—Corrugated
Cary Mfg. Co., Manhattan Bridge Plaza, Brooklyn, N. Y.

FEED WATER HEATERS AND PURIFIERS
Alberger Pump & Condenser Co., 140 Cedar Street, New York City.
Frost Mfg. Co., Chicago, Ill.
Hall & Boswell Co., Inc., Philadelphia, Pa.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Snyder, William B., & Sons Co., Pitts., Pa.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

FEEDERS—Clay
Hadfield-Penfield Steel Co., The, Bucyrus, O.

FELTS—Wool Mechanical
Booth Felt Co., Inc., The, 477-478 19th St., Brooklyn, N. Y.

FENCES—Chain Link Wire
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

FENCES—Woven Wire
American Steel & Wire Co., Chicago, Ill.

FENCING—Wire
Bethlehem Steel Co., Bethlehem, Pa.

FENCING—Woven
Page Steel & Wire Co., Bridgeport, Ct.

FERRO ALLOYS—Chromium
Agnew, Batteiger & Co., Inc., Philadelphia, Pa.
Browne, deCourcy, Inc., 120 B'way, N. Y. C.
Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.
Lavino, E. J., & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, & Co., Philadelphia, Pa.
U. S. Ferro Alloys Corp., 39 E. 42d St., N.Y.C.

FERRO ALLOYS—Manganese
Agnew, Batteiger & Co., Inc., Philadelphia, Pa.
Crocker Brothers, 21 E. 40th St., N. Y. C.
Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.
Lavino, E. J., & Co., Philadelphia, Pa.
Leavitt, C. W., & Co., 30 Church St., N. Y. C.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, & Co., Philadelphia, Pa.
U. S. Ferro Alloys Corp., 39 East 42nd St., New York City.

FERRO ALLOYS—Molybdenum
Lavino, E. J., & Co., Philadelphia, Pa.

FERRO ALLOYS—Silico Manganese
Southern Ferro-Alloys Co., Chattanooga, Tenn.
U. S. Ferro Alloys Corp., 39 E. 42d St., N.Y.C.

FERRO ALLOYS—Silicon
Agnew, Batteiger & Co., Inc., Philadelphia, Pa.
Crocker Brothers, 21 E. 40th St., N. Y. C.
Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.
Hickman, Williams & Co., Pittsburgh, Pa.
Keokuk Electro-Metals Co., Keokuk, Iowa.
Lavino, E. J., & Co., Philadelphia, Pa.
Pittsburgh Metallurgical Co., Niagara Falls, N. Y.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, & Co., Philadelphia, Pa.
Southern Ferro-Alloys Co., Chattanooga, Tenn.
U. S. Ferro Alloys Corp., 39 E. 42d St., N.Y.C.

FERRO ALLOYS—Spiegeleisen
Crocker Brothers, 21 E. 40th St., N. Y. C.
Rogers, Brown & Co., Cincinnati, O.

FERRO ALLOYS—Titanium
Metal & Thermit Corp., 120 B'way, N. Y. C.

FERRO ALLOYS—Tungsten
Lavino, E. J., & Co., Philadelphia, Pa.

FERRO ALLOYS—Uranium
Standard Alloys Co., Pittsburgh, Pa.

FERRO ALLOYS—Vanadium
Lavino, E. J., & Co., Philadelphia, Pa.
Standard Alloys Co., Pittsburgh, Pa.

FERRULES
Bay State Stpg. Co., Worcester, Mass.
Chicago Screw & Sheet Mtl. Co., Cleve., O.

FIBRE AND FIBRE PRODUCTS—Hard
Wilmington Fibre Specialty Company, Wilmington, Del.

FILES AND RASPS
Disston, Henry, & Sons, Inc., Philadelphia, Pa.

FILES—Precision
American Swiss File & Tool Co., 410-416 Trumbull St., Elizabeth, N. J.

FILING MACHINES
Oliver Instrument Co., Adrian, Mich.

FILTER CLOTH—Metal
Ludlow-Saylor Wire Co., The, St. Louis, Mo.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

FILTERING AND CIRCULATING SYSTEMS—Oil
Bousman Mfg. Co., Grand Rapids, Mich.

FILTERS—Oil
Bousman Mfg. Co., Grand Rapids, Mich.

FILTERS—Pressure or Gravity
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.

FINANCING—Corporation
Lee, Higginson & Co., 43 Exch. Pl., N. Y. C.

FIRE CLAY
Crescent Refractories Co., Curwensville, Pa.
Ironton Fire Brick Co., Ironton, O.
Queenan Refractories Co., Inc., Lock Haven, Pa.
U. S. Refractories Corp., Mt. Union, Pa.

FITTINGS—Hydraulic
Chambersburg Engrg. Co., Chambersburg, Pa.
Southwark Fdry. & Mch. Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

FITTINGS—Steam and Gas Pipe
Devlin, Thomas, Mfg. Co., Philadelphia, Pa.

FLANGED AND DISHED HEADS
Worth Steel Company, Claymont, Delaware.

FLANGES
Adams, Wm., Foundry Co., Inc., Phila., Pa.
Jefferson Union Co., Lexington, Miss.
Philadelphia Steel & Iron Co., Phila., Pa.

FLASKS—Foundry
Diamond Clamp & Flask Co., Richmond, Ind.
Sterling Wheelbarrow Co., Milwaukee, Wis.
Truscon Steel Co., Youngstown, O.

FLOATS—Seamless Copper
Naugatuck Mfg. Co., Naugatuck, Ct.

FLOORING—Creosoted Wood
Jennison-Wright Co., Toledo, O.
Republic Creosoting Co., Indianapolis, Ind.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 232-234.

FLOORING—Metallic Ventilating
Iron Works Co., Long Island City, N. Y.

FLUORSPAR
Hillside Fluor Spar Mines, Chicago, Ill.
Lawino, E. J., & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.

FLUX—Welding
Oxweld Acetylene Co., 30 E. 42d St., New York City.

FORGES—Rivet
Buffalo Forge Co., 192 B'way, Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Mahr Mfg. Co., Minneapolis, Minn.

FORGING MACHINES
Long & Allstatter Co., Hamilton, O.
National Machinery Co., Tiffin, O.

FORGINGS—Alloy Steel
Bethlehem Steel Company, Bethlehem, Pa.
Cann & Saul Steel Co., Inc., Philadelphia, Pa.
Endicott Forging & Mfg. Co., Inc., Endicott, N. Y.
Iroquois Steel Co., Inc., Fulton, N. Y.
National Forge & Tool Co., Irvine, Pa.
Pollak Steel Co., Cincinnati, Ohio.
Schuylkill Forge Co., Philadelphia, Pa.

FORGINGS—Brass, Bronze or Copper
Chicago Forging & Mfg. Co., Chicago, Ill.

FORGINGS—Drop, Iron or Steel
Akron Scale Co., Akron, O.
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem Steel Company, Bethlehem, Pa.
Brooks Forge & Mach. Co., York, Pa.
Cann & Saul Steel Co., Inc., Philadelphia, Pa.
Canton Forge & Axle Co., Canton, Ill.
Champion Machine & Forging Co., Clyde, O.
Clapp, E. D., Mfg. Co., Titusville, N. Y.
Cleveland Hardware Co., The, Cleveland, O.
Drop Forging Co. of New York, J. L., N. J.
Eccles, Richard, Co., Auburn, N. Y.
Endicott Frg. & Mfg. Co., Inc., Endicott, N. Y.
General Drop Forge Co., Buffalo, N. Y.
Indianapolis Drop Forging Co., Indianapolis.
Kentucky Wagon Mfg. Co., Louisville, Ky.
Kilborn & Bishop Co., The, New Haven, Ct.
Laclede Steel Co., St. Louis, Mo.
Ladish Drop Forge Co., Cudahy, Wis.
Laughlin, Thomas, Company, The, Portland, Me.
Lloyd Forge Co., Annville, Pa.
McGeoway & Dailey Co., The, Pittsburgh, Pa.
McMyler Interstate Co., The, Cleveland, O.
McWilliams, John, & Sons, Jersey City, N. J.
Machinery Forging Co., The, Cleveland, O.
Maryland Bolt & Nut Co., Baltimore, Md.
Melling Forging Co., Lansing, Mich.
Midwest Forge & Steel Co., East St. Louis, Ill.
National Forge & Tool Co., Irvine, Pa.
Oliver Iron & Steel Corp., Pittsburgh, Pa.
Philadelphia Steel & Iron Co., Phila., Pa.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.
Pollak Steel Co., Cincinnati, O.
Queen City Forging Co., The, Cincinnati, O.
Rhode Island Tool Co., Providence, R. I.
Richmond Frgs. Corp. (Acca), Richmond, Va.
Schuylkill Forge Co., Philadelphia, Pa.
Scranton Forging Co., Scranton, Pa.
Steel Forgings Co., The, Cincinnati, O.
Storms Drop Forging Co., East Springfield, Mass.
Strieby & Foote Co., Newark, N. J.
Tioga Steel & Iron Co., The, Philadelphia, Pa.
Titusville Forge Co., Titusville, Pa.
Transue & Williams Steel Forging Corp., Alliance, O.
Union Switch & Signal Co., Swissvale, Pa.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y.

FORGINGS—Flat Die
Machinery Forging Co., The, Cleveland, O.

FORGINGS—Hollow
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.

FORGINGS—Hydraulic Press, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem Steel Company, Bethlehem, Pa.
Champion Mach. & Forging Co., Cleveland, O.
Heppenstall Forge & Knife Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Pollak Steel Co., Cincinnati, O.
Tioga Steel & Iron Co., The, Philadelphia, Pa.

FORMS—Steel For Concrete Construction
Blaw-Knox Co., Pittsburgh, Pa.

FOUNDRY EQUIPMENT AND SUPPLIES
American Foundry Equipment Co., Mattin Rockwell Bldg., New York City.
Beardsley & Piper Co., Chicago, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Clifton Pratt Co., Cincinnati, O.
Diamond Chain & Flask Co., Richmond, Ind.
Grimes Molding Mch. Co., Detroit, Mich.
Lowe Mfg. Co., Detroit, Mich.
National Engineering Company, Chicago, Ill.
Paxson, J. W., Co., Philadelphia, Pa.
Pettibone, Geo. P., Philadelphia, Pa.
Sly, W. W., Mfg. Company, Cleveland, O.
Truscon Steel Co., Youngstown, O.
Whiting Corporation, Harvey, Ill.

FROGS AND SWITCHES—Railway
Bethlehem Steel Company, Bethlehem, Pa.
Wharton, Wm., Jr., & Co., Inc., 50 Church St., New York City.

FURNACE APPLIANCES—Water Cooled
Blaw-Knox Co., Pittsburgh, Pa.

FURNACE SYSTEMS—Open Hearth
Blaw-Knox Co., Pittsburgh, Pa.

FURNACES—Annealing or Forge Heating
[illegible] Co., Pa.
[illegible] Co., Pa.

FURNACES—Blast
Roper [illegible] & Co., Chicago, Ill.
[illegible] Co., Pa.
[illegible] Co., Pa.

FURNACES—Crucible
American Gas Furnace Co., Elizabeth, N. J.
Swindell, W. & Bros., Pittsburgh, Pa.

FURNACES—Electric Steel Melting
American Engineering Co., 71 Broadway, N. Y. C.
[illegible] Co., Pa.
[illegible] Co., Pa.
[illegible] Co., N. Y.
[illegible] Co., Pa.
Swindell, W. & Bros., Pittsburgh, Pa.

FURNACES—Forging
American Gas Furnace Co., Elizabeth, N. J.
American Long Flame Co., N. Y.
Chicago Flexible Shaft Co., Chicago, Ill.
Ferguson Furnace Co., Toledo, O.
Holcroft Engineering Co., Detroit, Mich.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Standard Fuel Engrg. Co., Detroit, Mich.
Stroke Carlisle & Hammond Co., The, Cleveland, O.
Swindell, W. & Bros., Pittsburgh, Pa.
Wharton, Wm., Jr., & Co., Inc., Pittsburgh, Pa.

FURNACES—Heat Treating, Automatic
Ferguson Furnace Co., Toledo, Ohio.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Standard Fuel Engrg. Co., Detroit, Mich.

FURNACES—Heat Treating, Cyanide or Lead
American Gas Furnace Co., Elizabeth, N. J.
Beeman & Broughton Co., Detroit, Mich.
Bellevue Industrial Furnace Co., Detroit, Mich.
Chicago Flexible Shaft Co., Chicago, Ill.
Ferguson Furnace Co., Toledo, O.
Standard Fuel Engrg. Co., Detroit, Mich.

FURNACES—Heat Treating, Electric
American Industrial Furnace Corp., Boston, Mass.
Electric Furnace Co., Salem, O.
Electric Furnace Construction Co., Phila., Pa.
General Electric Co., Schenectady, N. Y.
Hagan, Geo. J., Co., Pittsburgh, Pa.
Holcroft & Company, Detroit, Mich.
Leeds & Northrup Co., Detroit, Mich.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Strong Carlisle & Hammond Co., The, Cleveland, O.
Swindell, W., & Bros., Pittsburgh, Pa.

FURNACES—Heat Treating, Oil, Gas or Coal Fired
Advance Furnace & Engrg. Co., Springfield, Mass.
American Gas Furnace Co., Elizabeth, N. J.
American Indus. Furnace Corp., Boston, Mass.
Anthony Company, The, Long Island City, N. Y.
Beeman & Broughton Co., Detroit, Mich.
Bellevue Industrial Furnace Co., Detroit, Mich.
Chicago Flexible Shaft Co., Chicago, Ill.
Bronner Furnace Co., The, Chicago, Mass.
Ferguson Furnace Co., Toledo, Ohio.
Fuller Engineering Co., Fullerton, Pa.
Mahr Mfg. Co., Minneapolis, Minn.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Standard Fuel Co., Pittsburgh, Pa.
Standard Fuel Engineering Co., Detroit, Mich.
Strong Carlisle & Hammond Co., The, Cleveland, O.
Surface Combustion Co., 366-368 Gerard Ave., Bronx, N. Y.
Swindell, W. & Bros., Pittsburgh, Pa.
Wharton, Wm., Jr., & Co., Inc., Pittsburgh, Pa.

FURNACES—High-Speed Steel
American Gas Furnace Co., Elizabeth, N. J.
Beeman & Broughton Co., Detroit, Mich.
Chicago Flexible Shaft Co., Chicago, Ill.
Ferguson Furnace Co., Toledo, O.
Standard Fuel Engineering Co., Detroit, Mich.
Swindell, W. & Bros., Pittsburgh, Pa.

FURNACES—Industrial Heating
Skinner Brothers Mfg. Co., Inc., St. Louis, Mo.

FURNACES—Malleable Melting
Holcroft & Co., Detroit, Mich.

FURNACES—Non-Ferrous Melting
American Gas Furnace Co., Elizabeth, N. J.
Detroit Electric Furnace Co., Detroit, Mich.
Electric Furnace Co., Salem, O.
Electric Furnace Construction Co., Phila., Pa.
Hawley Down Draft Furnace Co., Easton, Pa.
Pittsburgh Electric Furnace Corp., Pitts., Pa.
Standard Fuel Engineering Co., Detroit, Mich.
Strong Carlisle & Hammond Co., The, Cleveland, O.

FURNACES—Open Hearth
Holcroft & Company, Detroit, Mich.
Swindell, W., & Bros., Pittsburgh, Pa.

FURNACES—Rivet Heating
American Gas Furnace Co., Elizabeth, N. J.
General Electric Co., Schenectady, N. Y.
Standard Fuel Engrg. Co., Detroit, Mich.

FURNACES—Wire, Annealing & Galvanizing
General Electric Co., Schenectady, N. Y.
Vaughan Mchry. Co., Cuyahoga Falls, Ohio.

FUSE METAL
Platt Bros. & Co., The, Waterbury, Ct.

GALVANIZING
International Derrick & Equipment Co., Columbus, O.
Ironsides Fdry. & Galv. Co., Kalamazoo, Mich.

GALVANIZING PLANTS
[illegible] Co., Pa.
Wilfong, Millard [illegible] Co., Pa.

GALVANIZING PLANTS—For Sheets
[illegible] Co., Pa.

GALVANIZING & TINNING EQUIPMENT
[illegible] Co., Pa.
Vaughan Machinery Co., Cuyahoga Falls, Ohio.

GAS CLEANING PLANTS
Flinn & Dreffein Co., Chicago, Ill.
Structural Engineering Co., Dayton, O.

GAS HOLDERS
[illegible] Co., Ambler, Pa.

GAS PRODUCERS
Chapman Engrg. Co., Division of the C. & G. Cooper Co., Mt. Vernon, O.
Duff Patent Co., Inc., Pittsburgh, Pa.
Flinn & Dreffein Co., Chicago, Ill.
Hagan, Geo. J., Co., Pittsburgh, Pa.
Hughes, John, Inc., Pittsburgh, Pa.
Laughlin, Alex., & Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Semet-Solvay Co., Pittsburgh, Pa.
Swindell, W. & Bros., Pittsburgh, Pa.
U. S. Steel Hose Pipe & Tube Co., Sterling Bldg., Chicago, Ill.
Wellman, Seaver-Morgan Co., Cleveland, O.
Wood, R. D., & Co., Philadelphia, Pa.

GASKETS—Felt
Booth Felt Co., Inc., The, 177-178 10th St., Brooklyn, N. Y.

GASOLINE
Sloan and Zook Company, The, Bradford, Pa.

GATES—Blast
Rockwell, W. S., Co., 50 Church St., N. Y. C.

GATES—Fence
American Steel & Wire Co., Chicago, Ill.

GAUGES—Dial
Ames, B. C., Co., Waltham, Mass.

GAUGES—Pressure and Vacuum
Marshalltown Mfg. Co., Marshalltown, Iowa.
Taylor Instrument Companies, Rochester, N. Y.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

GAUGES—Snap, Thread, Cylindrical, Etc.
Starrett, L. S., Co., The, Athol, Mass.

GAUGES—Thread Lead
Jones & Lamson Machine Co., Springfield, Vt.

GEAR CUTTING
Acme Gear Co., Philadelphia, Pa.
Akron Gear & Engineering Co., Akron, O.
Albaugh-Dover Co., Chicago, Ill.
Atlantic Elevator Co., Inc. (Albro-Clem Wks.), Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Boston Gear Works, Norfolk Downs, Mass.
Caldwell, H. W., & Son Co., Chicago, Ill.
Cincinnati Gear Co., The, Cincinnati, O.
Cresson-Morris Co., Philadelphia, Pa.
Earle Gear & Machine Co., Philadelphia, Pa.
Gleason Works, Rochester, N. Y.
Hindley Gear Co., Philadelphia, Pa.
Horsburgh & Scott Co., Cleveland, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Machine Prod. Co., Cleveland, O.
Meisel Press Mfg. Company, Boston, Mass.
Messenger-Chattanooga Co., Inc., Newark, N. J.
Morgan Construction Co., Worcester, Mass.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Nilson-Miller Corp., Hoboken, N. J.
Perkins Gear Company, Springfield, Mass.
Philadelphia Gear Works, Philadelphia, Pa.
Pittsburgh Rolls Corp., Pittsburgh, Pa.
Taylor-Wilson Mfg. Co., Three Rocks, Pa.

GEAR CUTTING MACHINES
Gleason Works, Rochester, New York.
Gould & Eberhardt, Newark, N. J.
Newark Gear Cutting Mch. Co., Newark, N. J.

GEAR DRIVES—Herringbone
Lewis Fdry. & Mach. Co., Pittsburgh, Pa.

GEAR HOBBING MACHINES
Barber-Colman Co., Rockford, Ill.
Gould & Eberhardt, Newark, N. J.
Newark Gear Cutting Mch. Co., Newark, N. J.

GEAR PLANING MACHINES
Gleason Works, Rochester, N. Y.

GEARS—Bevel
Acme Gear Co., Philadelphia, Pa.
Cincinnati Gear Co., The, Cincinnati, O.
Earle Gear & Machine Co., Philadelphia, Pa.
Fawcus Machine Co., Pittsburgh, Pa.
Horsburgh & Scott Co., Cleveland, O.
Jones, W. A., Fdry. & Mach. Co., 4434 West Roosevelt Road, Chicago, Ill.
Perkins Appliance Company, Springfield, Mass.
Philadelphia Gear Works, Philadelphia, Pa.
Poole Engineering & Mach. Co., Baltimore, Md.
Turner Machine Co., Danbury, Ct.

GEARS—Cast
Stroh Steel Hardening Process Co., Pittsburgh, Pa.

GEARS—Double Helical Cut
De Laval Steam Turbine Co., Trenton, N. J.

GEARS—Enclosed Herringbone Transmission
Fawcus Machine Co., Pittsburgh, Pa.

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GEARS—Heat Treated
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS—Herringbone
Bethlehem Steel Co., Bethlehem, Pa.
Lima Gear & Machine Co., Philadelphia, Pa.
Lima Gear Co., Milwaukee, Wis.
Lawson Machine Co., Pittsburgh, Pa.
Osmond Works, Rochester, N. Y.
Nuttall Gear Co., 111 B'way, N. Y. C.
Philadelphia Gear Works, Philadelphia, Pa.

GEARS—Machine Cut
Lima Gear & Mach. Co., Philadelphia, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Meisel Press Mfg. Company, Boston, Mass.
Nuttall, R. D., Co., Pittsburgh, Pa.

GEARS—Machine Molded
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Poole Engineering & Mach. Co., Baltimore, Md.

GEARS—Non-Metallic
Akron Gear & Engineering Co., Akron, O.
General Electric Co., Schenectady, N. Y.
Meisel Press Mfg. Company, Boston, Mass.
Philadelphia Gear Works, Philadelphia, Pa.

GEARS—Rawhide
Albaugh-Dover Co., Chicago, Ill.
Chicago Rawhide Mfg. Co., 1213 Elston Ave., Chicago, Ill.
Hotsburg & Scott Co., Cleveland, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Mendenhall Gear Company, Syracuse, N. Y.
Philadelphia Gear Wks., Philadelphia, Pa.

GEARS—Speed Reducing
Hindley Gear Co., Philadelphia, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.

GEARS—Spiral
Boston Gear Works, Norfolk Downs, Mass.

GEARS—Spur
Cincinnati Gear Co., The, Cincinnati, O.
Electric Gear & Mach. Co., Philadelphia, Pa.
Lawson Machine Co., Pittsburgh, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Nuttall Gear Co., 111 B'way, N. Y. C.
Poole Engineering & Mach. Co., Baltimore, Md.

GEARS—Worm
Akron Gear & Engineering Co., Akron, O.
Albaugh-Dover Co., Chicago, Ill.
Atlantic Elevator Co., Inc. (Albro-Clem Wks.), Philadelphia, Pa.
Cincinnati Gear Co., The, Cincinnati, O.
Fawcus Mach. Co., Pittsburgh, Pa.
Hindley Gear Co., Philadelphia, Pa.
Hotsburg & Scott Co., Cleveland, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Philadelphia Gear Works, Philadelphia, Pa.

GENERATORS—Acetylene
Air Reduction Sales Co., 342 Madison Ave., New York City.
Davis-Bournonville Co., 342 Madison Ave., New York City.
Imperial Brass Mfg. Co., Chicago, Ill.
Oxweld Acetylene Co., 30 E. 42d St., N. Y. C.

GENERATORS—Electric
Archer & Baldwin, Inc., 114 Liberty St., New York City.
Crocker-Wheeler Co., Ampere, N. J.
Klein, Nathan, & Co., Centre & Howard Sts., New York City.
Wagner Electric Corp., St. Louis, Mo.

GENERATORS—Electric, Second Hand
Gregory Electric Co., Chicago, Ill.
Harris Brothers Co., Chicago, Ill.
Klein, Nathan, & Co., Centre & Howard Sts., New York City.
McCoy-Brandt Machinery Co., Pittsburgh, Pa.
Miller-Owen Electric Co., Inc., Philadelphia, Pa.
Wood, Henry Electric, Inc., Jersey City, N. J.

GLOVES—Asbestos and Fireproof
Safety Equip. Service Co., Cleveland, O.

GLUE HEATERS
Dart, E. M., Mfg. Co., Providence, R. I.

GOGGLES—Grinding and Chipping
Safety Equip. Service Co., Cleveland, O.

GOGGLES—Welding
Safety Equip. Service Co., Cleveland, O.

GRAPHITE
Pettinos, Geo. F., Philadelphia, Pa.

GRATING—Flooring
Irving Iron Works Co., Long Island City, N. Y.

GREASE AND OIL CUPS
Bay State Stpg. Co., Worcester, Mass.

GREASES
Ohio Grease Co., Loudonville, O.

GRINDING AND POLISHING MACHINES
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.
Calder Gen. H., Lancaster, Pa.
Cleveland Armature Works, Inc., Cleveland, O.
Cleveland Stone Co., The, Cleveland, O.
Hanson & Van Winkle Co., The, Newark, N. J.
Hill Curtis Co., Kalamazoo, Mich.
Landis Tool Co., Waynesboro, Pa.
Marschke Mfg. Co., Indianapolis, Ind.
Ransom Mfg. Co., Oshkosh, Wis.
Springfield Mfg. Co., Bridgeport, Ct.
Sterling Grinding Wheel Co., Cleveland, O.
U. S. Electrical Tool Co., Cincinnati, O.

GRINDING MACHINES—Aerial and Snagging
U. S. Electrical Tool Co., The, Cincinnati, O.

GRINDING MACHINES—Camshaft
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Centerless
Detroit Machine Tool Co., Detroit, Mich.

GRINDING MACHINES—Cutter and Reamer
Thompson Grinder Co., Springfield, O.
Wilmarth & Mormon Co., Grand Rapids, Mich.

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R. I.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Prentiss, Henry, & Co., 149 Broadway, N. Y.

GRINDING MACHINES—Die
Bignall & Keeler Mch. Wks., Edwardsville, Ill.
La Salle Tool Co., La Salle, Ill.
Wilmarth & Mormon Co., Grand Rapids, Mich.

GRINDING MACHINES—Drill
Landis Tool Co., Waynesboro, Pa.
Oliver Instrument Co., Adrian, Mich.
Wilmarth & Mormon Co., Grand Rapids, Mich.

GRINDING MACHINES—Flexible Shaft
Strand, N. A., & Company, Chicago, Ill.

GRINDING MACHINES—Internal
Greenfield Tap & Die Corp., Greenfield, Mass.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Lansing Stamping Co., Lansing, Mich.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.
Rivett Lathe & Grinder Corp., Boston, Mass.

GRINDING MACHINES—Machine Knives
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.

GRINDING MACHINES—Portable Electric
Neil & Smith Electric Tool Co., Cincinnati, O.
U. S. Electrical Tool Co., The, Cincinnati, O.

GRINDING MACHINES—Portable Pneumatic
Independent Pneumatic Tool Co., Chicago, Ill.

GRINDING MACHINES—Portable, Radial Swing
Mummert-Dixon Co., Hanover, Pa.

GRINDING MACHINES—Portable Surface
U. S. Electrical Tool Co., The, Cincinnati, O.

GRINDING MACHINES—Second Hand
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co., Inc., Boston, Mass.
Morey & Co., Inc., 410 Broome St., N. Y. C.

GRINDING MACHINES—Snagging
Marschke Mfg. Co., Indianapolis, Ind.

GRINDING MACHINES—Surface
Blanchard Mach. Co., Cambridge, Mass.
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.
Heald Machine Co., Worcester, Mass.
La Salle Tool Co., La Salle, Ill.
New Jersey Machry. Exchange, Newark, N. J.
Wilmarth & Mormon Co., Grand Rapids, Mich.

GRINDING MACHINES—Swing Frame
Cleveland Stone Co., The, Cleveland, O.
Pittsburgh Grinding Wheel Co., Rochester, Pa.
Sterling Grinding Wheel Co., Cleveland, O.

GRINDING MACHINES—Tool
Baird Machine Co., Bridgeport, Ct.
Landis Tool Co., Waynesboro, Pa.
Ransom Mfg. Co., Oshkosh, Wis.
Taylor & Penn Co., Hartford, Conn.
Wilmarth & Mormon Co., Grand Rapids, Mich.

GRINDING MACHINES—Universal
Landis Tool Co., Waynesboro, Pa.
Simonds Rolling Mch. Corp., Albany, N. Y.
Thompson Grinder Co., Springfield, O.
Wilmarth & Mormon Co., Grand Rapids, Mich.

GRINDING MACHINES—Valve
Defiance Mach. Works, Defiance, O.

GRINDING MACHINES—Vertical Surface
Blanchard Mach. Co., Cambridge, Mass.

GRINDING STONES
Cleveland Stone Company, The, Cleveland, O.

GRINDING WHEEL DRESSERS AND CUTTERS
Calder, Geo. H., Lancaster, Pa.
Desmond-Stephan Mfg. Co., Urbana, O.
Dickinson, Thos. L., 34 Gold St., N. Y. C.
Wrigley, Thomas, Co., Chicago, Ill.

GRINDING WHEEL STANDS—Bench and Floor
Cleveland Punch & Shear Wks. Co., Cleve., O.

GRINDING WHEELS
Cleveland Stone Co., The, Cleveland, O.
New York Belting & Packing Co., 91-93 Chambers Street, New York City.
Pittsburgh Grinding Wheel Co., Rochester, Pa.
Springfield Mfg. Co., Bridgeport, Ct.
Sterling Grinding Wheel Co., Cleveland, O.

GUARDS—Lamp
Flexible Steel Lacing Co., Chicago, Ill.
Hubbell, Harvey, Inc., Bridgeport, Conn.

GUARDS—Machinery
Buffalo Wire Works Co., Inc., Buffalo, N. Y.

HACK SAW BLADES—See Saws—Hack Saw Blades

HACK SAW MACHINES
Armstrong Blum Mfg. Co., Chicago, Ill.
Diamond Saw & Stpg. Works, Buffalo, N. Y.
Hanna Engineering Works, Chicago, Ill.
Millers Falls Co., Millers Falls, Mass.
Peerless Mach. Co., Racine, Wis.
Racine Tool & Machine Co., Racine, Wis.
Victor Saw Works, Springfield, Mass.

HAMMERS—Air
Nazel Engrg. & Mch. Wks., Philadelphia, Pa.

HAMMERS—Belt and Motor Driven
Beaudry Co., Inc., Everett, Mass.
Bradley, C. B., Co., Inc., Syracuse, N. Y.
Long & Allstatter Co., Hamilton, O.
Nazel Engrg. & Mch. Wks., Phila., Pa.
Syerson, Joe T., & Son, Inc., Chicago, Ill.
Toledo Mach. & Tool Co., Toledo, O.

HAMMERS—Board Drop
Chambersburg Engrg. Co., Chambersburg, Pa.

HAMMERS—Drop
Chambersburg Engrg. Co., Chambersburg, Pa.
Erie Foundry Company, Erie, Pa.
Merrill Bros., Maspeth, N. Y.
Miner & Peck Mfg. Co., Derby, Conn.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Standard Machinery Co., Auburn, R. I.
Williams, White & Co., Moline, Ill.

HAMMERS—Pneumatic
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Cleveland Pneumatic Tool Co., The, Cleveland, O.
Independent Pneumatic Tool Co., Chicago, Ill.

HAMMERS—Pneumatic Forging
Chambersburg Engrg. Co., Chambersburg, Pa.
Nazel Engrg. & Mach. Wks., Philadelphia, Pa.
Sullivan Machinery Co., Chicago, Ill.

HAMMERS—Power
Beaudry Co., Inc., Everett, Mass.
Moloch Company, Kaukauna, Wis.
Nazel Engrg. & Mach. Wks., Philadelphia, Pa.

HAMMERS—Sheet Metal
Quickwork Co., St. Marys, O.

HAMMERS—Steam
Chambersburg Engrg. Co., Chambersburg, Pa.
Erie Foundry Company, Erie, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

HANGERS—Ball Bearing
Garner Roll Bearing Co., Jamestown, N. Y.
Medart Company, The, St. Louis, Mo.

HANGERS—Factory Door
Myers, F. E., & Bro. Co., Ashland, O.

HANGERS—Shaft
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Hyatt Roller Bearing Co., Newark, N. J.
Hymus, Joseph, & Sons, Philadelphia, Pa.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
Wood's, T. B., Sons Co., Chambersburg, Pa.

HARDNESS TESTING MACHINES
Shore Instrument & Mfg. Co., Inc., Jamaica, L. I., N. Y.
Wilson-Maeulen Co., 738 E. 143d St., N. Y. C.

HARDWARE—Wagon
Cleveland Hardware Co., Cleveland, Ohio.

HEAT TREATING
General Mach. Works, York, Pa.
Machine Tool Co., The, Cleveland, O.

HEATERS—Direct Fired
Sturtevant, B. F., Co., Hyde Park, Mass.

HEATING AND VENTILATING APPARATUS
Buffalo Forge Co., 492 B'way, Buffalo, N. Y.
Skinner Brothers Mfg. Co., Inc., St. Louis, Mo.
Sturtevant, B. F., Co., Hyde Park, Mass.

HELMETS—Sand Blast and Welding
Safety Equip. Service Co., Cleveland, O.

HINGES—Wrought Brass Butt
Root Co., Bristol, Conn.

HOBS—Formed and Ground
Butler-Colman Co., Rockford, Ill.

HOISTS—Air
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Curtis Pneumatic Mchry. Co., St. Louis, Mo.
Duke Engine Company, Grand Haven, Mich.
Detroit Hoist & Mach. Co., Detroit, Mich.
Hanna Eng. Works, Chicago, Ill.
Northern Engineering Works, Detroit, Mich.
Whiting Corporation, Harvey, Ill.

HOISTS—Chain
Box, Alfred, & Co., Inc., Philadelphia, Pa.
Ford Chain Block Co., Philadelphia, Pa.
Morris, Herbert, Inc., 7 Lawrence Place, Buffalo, N. Y.
Motorbloc Corp., Summerdale, Phila., Pa.
Reading Chain & Block Co., Reading, Pa.
Wright Mfg. Co., Lisbon, O.

HOISTS—Electric
American Engineering Co., Philadelphia, Pa.
Barber-Foster Eng. Co., Cleveland, O.
Box, Alfred, & Co., Inc., Philadelphia, Pa.
Detroit Hoist & Mach Co., Detroit, Mich.
Drake Mfg. Company, Inc., Philadelphia, N. Y.
Euclid Crane & Hoist Co., Euclid, O.
Link-Belt Co., Chicago, Ill.

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Mallory Machry. Corp., Primos, Pa.
Milwaukee Electric Crane & Mfg. Co., Inc., Milwaukee, Wis.
Moorehine Corp., Summerdale, Phila., Pa.
Mundy, J. S., Hoisting Engine Co., Newark, N. J.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Reading Chain & Block Co., Reading, Pa.
Reeves Crane & Hoist Works, Inc., Long Island City, N. Y.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Stang Electric Hoist Co., Cleveland, O.

HOISTS—Electric Traveling

Drake Mfg. Company, Inc., Erieau, Ont., Can.
Euclid Crane & Hoist Co., Euclid, Ohio.
Marks Brothers, Inc., Philadelphia, Pa.
Niles-Bement-Pond Co., 111 Broadway, N. Y. C.
Northern Engineering Works, Detroit, Mich.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

HOISTS—Hydraulic

Watson-Stillman Co., 190 Fulton St., N. Y. C.

HOISTS—Mono-rail

American Engineering Co., Philadelphia, Pa.
Armington Engineering Co., Euclid, O.
Niles-Bement-Pond Co., 111 Broadway, N. Y. C.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

HOISTS—Second Hand

Harris Bros. Co., Chicago, Ill.
Mallory Machry. Corp., Primos, Pa.
Payne, N. B., & Co., 25 Church St., N. Y. C.

HOISTS—Steam

Mundy, J. S., Hoisting Engine Co., Newark, N. J.

HOLDERS—Nipple

Curtis & Curtis Co., Bridgeport, Ct.

HOOKS—Hoist

Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y.

HOOP FORMING AND COILING MACHINES

Yoder Co., The, Cleveland, O.

HOOPS—Wire

American Steel & Wire Co., Chicago, Ill.

HOOPS AND BANDS

Cary Mfg. Co., Manhattan Bridge Plaza, Brooklyn, N. Y.
De Haven Mfg. Co., 50-54 Columbia Heights, Brooklyn, N. Y.
Morris, Wheeler & Co., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

HORSE SHOES AND CALKS

American Steel & Wire Co., Chicago, Ill.

HOSE—Air, Oil, Steam and Water

American Metal Hose Co., Waterbury, Ct.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
New York Belting & Packing Co., 91-93 Chambers Street, New York City.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

HOSE—Flexible Metallic

American Metal Hose Co., Waterbury, Ct.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

HOSE—Rubber

New York Belting & Packing Co., 91-93 Chambers Street, New York City.

HYDRANTS

Wood, R. D., & Co., Philadelphia, Pa.

HYDRAULIC MACHINERY

Bethlehem Steel Company, Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Niles-Bement-Pond Co., 111 Broadway, N. Y. C.
Southwark Fdry. & Mch. Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
Wood, R. D., & Co., Philadelphia, Pa.

HYDRAULIC TOOLS

Watson-Stillman Co., 190 Fulton St., N. Y. C.

HYDROGEN

International Oxygen Co., Newark, N. J.

HYPODERMIC NEEDLE

Summerill Tubing Co., Bridgeport, Montgomery County, Pa.

ICE MACHINERY

American Engineering Co., Philadelphia, Pa.
De La Vergne Machine Co., 2106 East 138th St., New York City.

INFUSORIAL EARTH

Celite Products Co., Chicago, Ill.

INGOT MOLDS

Bethlehem Steel Company, Bethlehem, Pa.
Penn Mold & Mfg. Co., The, Wheeling, W. Va.
Valley Mould & Iron Corp., Sharpsville, Pa.

INGOTS—Aluminum

Erdle Perforating Co., Rochester, N. Y.
Leavitt, C. W., & Co., 30 Church St., N. Y. C.
Rogers, Brown & Co., New York City.

INGOTS—Forging

Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.

INGOTS—Steel

Belle City Malleable Iron Co., Racine, Wis.
McConway & Torley Co., The, Pittsburgh, Pa.

INSTRUMENTS—Electric Indicating

Wagner Electric Corp., St. Louis, Mo.

INSTRUMENTS—Hardness and Temperature Measuring

Shore Instrument & Mfg. Co., Inc., Jamaica, L. I., N. Y.

INSTRUMENTS—Recording

Bristol Co., Waterbury, Ct.
[illegible], N. Y. C.

INSULATION—Boiler, Furnace, etc

[illegible] Co., Chicago, Ill.
[illegible] Co., [illegible]

INSURANCE—Industrial and Group

[illegible], Pa.

IRON—Bar

Interstate Iron & Steel Co., Chicago, Ill.

IRON—Chain

Bethlehem Steel Company, Bethlehem, Pa.

IRON—Staybolt

Bethlehem Steel Company, Bethlehem, Pa.
Reading Iron Co., [illegible], Chicago, Ill.

IRON AND STEEL—Swedish

Federal Iron & Axle Steel Corp., 66 Rutledge St., Brooklyn, N. Y.
Hagan Corporation, Albany Bldg., Pittsburgh.
Lilnes-Woxna Co., Ltd., Lilnes, Sweden.
[illegible]

IRONWORK—Ornamental

Sterrett Architectural Iron Wks., Louisville, Ky.

JACKS—Hydraulic

Watson-Stillman Co., 190 Fulton St., N. Y. C.

JIGS, FIXTURES, TOOLS, ETC.

Grand Rapids Tool & Die Co., Grand Rapids, Mich.
Greenberg Tool & Mach. Co., Greensburg, Pa.
Koehring Mfg. Co., The, Machine Shop.
Lucas Tool & Stamp Co., Wheeling, W. Va.
Mfg. Machine Tool & Die Co., Rahway, N. J.
Modern Manufacturing Co., Pittsburgh, Pa.
Morris Tool & Die Co., Dayton, O.
Screw Machine Productions Corp., Providence, R. I.
Somers & Schmaltz Co., Inc., 51-53 Wyckoff St., Brooklyn, N. Y.
Tobin Tool & Die Co., Fond du Lac, Wis.
U. S. Tool Co., Inc., The, Newark, N. J.

JOINTS—Expansion

Howard Iron Works, Buffalo, N. Y.

KETTLES—Galvanizing

Wilfong, Millard F., Iron Works Co., Philadelphia, Pa.

KETTLES—Steam Jacketed

Lancaster Iron Works, Inc., Lancaster, Pa.

KEY SEATING MACHINES

Baker Bros., Toledo, O.
Morris Mfg. Co., Muskegon, Mich.
Pawtucket Mfg. Co., Pawtucket, R. I.

KEYS—Machine

Moltrup Steel Products Co., Beaver Falls, Pa.
Morton Mfg. Co., Muskegon, Mich.

KEYS—Riveted

Hindley Mfg. Co., Valley Falls, R. I.

KEYWAY INTERNAL CUTTING ATTACHMENTS

Cope Machinery Corp., Lansdowne, Pa

KILNS—Shaft and Rotary

McGann Mfg. Co., Inc., York, Pa.

KNIVES—Machine

Cleveland Knife & Forge Co., Cleveland, O.
Pels, Henry, & Co., 101 West St., N. Y. C.
Stroh Steel Hardening Process Co., Pittsburgh, Pa.
Wapakoneta Machine Company, Wapakoneta, O.

LACING—Belt, Rawhide

Chicago Rawhide Mfg. Co., 1312 Elston Ave., Chicago, Ill.
Clipper Belt Lacer Co., Grand Rapids, Mich.
Somerset, Chas. A., Co., 37 Ferry St., N. Y. C.

LACING—Belt Steel

Flexible Steel Lacing Co., Chicago, Ill.

LADLES

Riter-Conley Co., Pittsburgh, Pa.
Whiting Corporation, Harvey, Ill.

LATH—Metal

Truscon Steel Co., Youngstown, O.

LATHE ACCESSORIES AND ATTACHMENTS

Sterrett Lathe Works, South Bend, Ind.
Steptoe Lathe Machine Co., Madison, Wis.

LATHE DOGS

Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

LATHE SPINDLES—Solid and Hollow Bored

National Forge & Tool Co., Irvine, Pa.

LATHES—Automatic

Jonesand Lamson Machine Co., Springfield, Vt.
National Acme Co., Cleveland, O.

LATHES—Bench

Ames, B. C., Co., Waltham, Mass.
Johnston Mfg. Co., Minneapolis, Minn.
Rivett Lathe & Grinder Corp., Boston, Mass.
South Bend Lathe Works, South Bend, Ind.

LATHES—Brass

Foster Machine Co., Elkhart, Ind.
Warner & Swasey Co., Cleveland, O.

LATHES—Buffing and Polishing

Hill-Curtis Co., Kalamazoo, Mich.

LATHES—[illegible]

[illegible]

LATHES—Engine

[illegible]
Hamilton Machine Tool Co., Hamilton, O.
[illegible]
New Jersey Machry. Exchange, Newark, N. J.
Osborne & Sexton Mchry. Co., Columbus, O.
[illegible] Co., The, Cincinnati, O.
Reed-Prentice Co., Worcester, Mass.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Sidney Machine Tool Co., Sidney, O.
Warner & Swasey Co., Cleveland, O.
Washington Machine Tool Co., Washington, D. C.
Weaver Brothers, Saginaw, Mich.

LATHES—Extension Gap

Rivett Lathe & Grinder Corp., Boston, Mass.
Ruh, Julius, Co., The, Cincinnati, O.
South Bend Lathe Works, South Bend, Ind.

LATHES—Foot Power

Barnes, W. F. & John Co., Rockford, Ill.

LATHES—Roll

Lewis Foundry & Mach. Co., Pittsburgh, Pa.
[illegible], Pittsburgh, Pa.

LATHES—Screw-Cutting

Automatic Machine Co., The, Bridgeport, Ct.
Rivett Lathe & Grinder Corp., Boston, Mass.
South Bend Lathe Works, South Bend, Ind.

LATHES—Second-Hand

Bodwell Group, New Haven, Ct.
Erie Mfg. & Supply Co., Erie, Pa.
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co., Inc., Boston, Mass.
Industrial Plants Corp., 25 Church St., N. Y. C.
Lansing, A., & Co., 241 Centre St., N. Y. C.
Meade & J. J. Lathe & Mach. Corp., 149 Broadway, New York City.
Monroe & Sherman Machry. Exc., Room 182 50 Church St., New York City.
Morey & Co., Inc., 110 Reade St., N. Y. C.
Russell Machine Co., Pittsburgh, Pa.
Simmons Mach. Tool Corp., Albany, N. Y.
Stokais, E. S., & Sons, Inc., 17 Battery Pl., New York City.

LATHES—Spinning

Advance Mach. Works, Inc., 82 Richards St., Brooklyn, N. Y.

LATHES—Turret

Acme Machine Tool Company, Cincinnati, O.
De La Vergne Machine Co., Cincinnati, O.
Foster Machine Co., Elkhart, Ind.
Gisholt Machine Co., Madison, Wis.
International Machine Tool Co., 2nd, Ind.
Jones & Lamson Mach. Co., Springfield, Vt.
Steptoe Turret Mach. Co., Madison, Wis.
Warner & Swasey Co., Cleveland, O.

LATHES—Wood

Barnes, W. F., & John Co., Rockford, Ill.

LEATHER—Cup

Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

LEATHER—Hydraulic

Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

LEGGINS—Foundry

Safety Equip. Service Co., Cleveland, O.

LEVELS—Precision Machine Aligning

Universal Boring Mch. Co., Hudson, Mass.

LIGHTING AND POWER APPARATUS—Electric

Wagner Electric Corp., St. Louis, Mo.

LIMESTONE DRYERS AND PULVERIZERS

Bonnot Co., The, Canton, O.

LINING—Convertor

Edge Hill Silica Rock Co., New Brunswick, N. J.

LINING—Cupola

Crescent Refractories Co., Curwensville, Pa.
Edge Hill Silica Rock Co., New Brunswick, N. J.

LINKS—Chain

Laughlin, Thomas, Company, The, Portland, Me.

LOADERS—Wagon, Coal, Crushed Stone

Hulett, Geo., Mfg. Co., The, 142d St. & Canal Place, New York City.

LOCKERS

Manufacturing Equip. & Engrg. Co., Framingham, Mass.

LOCOMOTIVES—Electric

Atlas Car Mfg. Co., Cleveland, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 232-234.

LOCOMOTIVES—Gasoline
Fate-Root-Heath Co., Plymouth, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES—Industrial
Fate-Root-Heath Co., Plymouth, O.
Porter, H. K., Co., Pittsburgh, Pa.

LOCOMOTIVES—Steam
Porter, H. K., Co., Pittsburgh, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., Cleveland, O.
Baker R. & L. Co., Cleveland, O.

LUBRICANTS
Ohio Grease Co., Loudonville, O.
Cincinnati Ball Crank Co., The, Cincinnati, O.

LUBRICATORS—Oil Cups
Gits Bros. Mfg. Co., Chicago, Ill.

LUMBER—Creosoted
Jennison-Wright Co., Toledo, O.

MACHINE WORK
Adamson Mach. Co., The, Akron, O.
Baker Mfg. Co., Saratoga Springs, N. Y.
Binghamton Fdry. & Mach. Co., Inc., Binghamton, N. Y.
Blake Pump Co., Fitchburg, Mass.
Brother-Smith Co., The, East Liverpool, O.
Cincinnati Dies & Fdry. Co., Atlanta, Ga.
Columbiana Foundry Co., McKeesport, Pa.
Consolidated Shipbuilding Corp., Morris Heights, New York City.
Dayton Globe Iron Works, Dayton, O.
Diehl Machine Works, Philadelphia, Pa.
Emporium Machine Co., Emporia, Va.
Fay & Scott, Dexter, Me.
Frederick Iron & Steel Co., Frederick, Md.
Garvin Mch. Co., The, 255 Spring St., N. Y. C.
General Mach. Works, York, Pa.
Hanna Engineering Works, Chicago, Ill.
Hartford Special Machinery Co., The, Hartford, Ct.
Hepworth, S. S., Co., 342 W. 92d St., N. Y. C.
Johnson, Carlyle, Machine Co., Manchester, Ct.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Lambert & Todd Mach. Co., Camden, N. J.
Landis A. B. & Sons, Philadelphia, Pa.
McKiny Fdry. & Machine Co., Lockport, N. Y.
Massillon Fdry. & Mach. Co., The, Massillon, O.
Matthews Bldg. 5th & Washington Sts., Kansas City, Mo.
Matthews, H. A., Mfg. Co., Seymour, Ct.
Milwaukee Metal Working Co., Milwaukee, Wis.
Minneapolis Steel & Mchry. Co., Minneapolis, Minn.
Mohrhusen, Kaukauna, Wis.
Monson Mill Machry. Co., Inc., Utica, N. Y.
Myrick Machine Co., Ocean, N. J.
New York Ingrg. Co., 2 Rector St., N. Y. C.
Osborn Mch. Co., Du Bois, Pa.
Porter Machine Co., Inc., Jersey City, N. J.
Powell Mfg. Co., Baltimore, Md.
Pulaski Foundry & Mfg. Corp., Cleveland, O.
Reed, Chas. H., & Son, Trenton, N. J.
Reynolds Engineering Co., Moline, Ill.
Steger-Schmidt Mfg. Co., York, Pa.
Stedtfeld Foundry & Mch. Wks., Aurora, Ind.
Superior Machine Tool Co., Kokomo, Ind.
Sweet & Doyle Foundry & Mach. Co., Troy (Grove Hill), N. Y.
Thompson Brothers, Philadelphia, Pa.
Thropp's, John E., Sons Co., Trenton, N. J.
Triumph Electric Co., Cincinnati, O.
Troy Foundry & Mach. Co., Inc., Troy, N. Y.
Wheeling Machine Products Co., Wheeling, W. Va.

MACHINERY DEALERS
Altman Purchasing Syndicate, Buffalo, N. Y.
Brown, Richard M., Dayton, O.
Consolidated Machine Tool Co., Inc., 15 Park Row, New York City.
Crawford, F. H., & Co., 299 B'way., N. Y. C.
Dunphee Steel Products Co., Chicago, Ill.
Eastern Machry. Co., Cincinnati, O.
Erie Mfg. & Supply Co., Erie, Pa.
Fessler Machinery Co., Chicago, Ill.
Fitzgerald, W. H. J., & Co., Boston, Mass.
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co. of Chicago, Chicago, Ill.
Hilmer's, Henry A., Sons, Inc., Phila., Pa.
Industrial Machry. Corp., Jersey City, N. J.
Industrial Plant Corp., 271 Church St., N. Y. C.
Jones Machine Tool Co., Cincinnati, O.
Lansing Co., The, 241 Centre St., N. Y. C.
Larkin, M. D., Supply Co., Dayton, O.
Leach, H., Providence, R. I.
Lucas, J. A., & Son, Inc., Bridgeport, Conn.
McCabe & Sheeran Mchry. Corp., Room 482, 50 Church St., New York City.
McCabe, J. J., Lathe & Machry. Corp., 149 Broadway, New York City.
McMullen Machinery Co., Grand Rapids, Mich.
Machine Parts Co., 74 Grand St., N. Y. C.
Machinery Dealers, Inc., New Haven, Ct.
Master Lake Zeiger Co., Detroit, Mich.
Marr-Gaibreath Mchry. Co., Pittsburgh, Pa.
Morey & Co., Inc., 110 Broome St., N. Y. C.
New Jersey Machry. Exchange, Newark, N. J.
Nussbaum, V. M., & Co., Fort Wayne, Ind.
O'Brien Machry. Co., Philadelphia, Pa.
Pearson, Jos. T., & Son, Inc., 149 B'way, N.Y.C.
Randle Machinery Co., Cincinnati, O.
Reece-Pratts Co., The, Chicago, Ill.
Reed-Prentice Co., Worcester, Mass.
Simmons Mach. Tool Corp., Albany, N. Y.
Stebvis, R. S., & Sons, Inc., 17 Battery Pl., New York City.
Sun Mchry. Co., Inc., Newark, N. J.
U. S. Equipment Corp., The, Detroit, Mich.
Ward, Wm. Mchry. Co., Pittsburgh, Pa.
White, A. D., Machinery Co., Chicago, Ill.

MACHINISTS—Contracting
Tonjslow, Otto, Mfg. Co., Cleveland, O.

MACHINISTS' TOOLS AND SUPPLIES—
See Tools

MAGNESITE—Dead Burnt
Lavino, E. J., & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.

MAGNETS—Lifting
Electric Controller & Mfg. Co., Cleveland, O.
Ohio Electric & Controller Co., Cleveland, O.

MANDRELS—Expanding
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

MANDRELS—Solid
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

MANGANESE METAL
Electro Metallurgical Sales Corporation, 30 East 42nd Street, New York City.

MARINE AUXILIARIES
American Engineering Co., Philadelphia, Pa.

MARKING DEVICES—Steel Stampings
Matthews, J. H. & Co., Pittsburgh, Pa.
Pfanmer Bros. Stamp Co., Pittsburgh, Pa.

METAL SPECIALTIES
Autoyre Co., Oakville, Ct.
Bessler Perforating Co., Garwood, N. J.
Budd, Edw. G., Mfg. Co., Philadelphia, Pa.
Cuyahoga Spring Co., Cleveland, O.
Fischer, Chas., Spring Co., 240 Kent Ave., Brooklyn, N. Y.
Gemmer, Tuschhoff & Frey Co. (Contract Mfg. Department), Milwaukee, Wis.
Globe Mch. & Stpg. Co., Cleveland, Ohio.
Matthews Mfg. Co., Worcester, Mass.
New England Nut & Stpg. Co., Inc., West Haven, Ct.
Newton Mfg. Co., Plainville, Conn.
Rome-Strip Steel Co., Rome, N. Y.
Spindler & Deringer, Jersey City, N. J.
Thorn, J. S., Co., Philadelphia, Pa.
Trowson Steel Co., Youngstown, O.
Worcester Stamped Metal Co., Worcester, Mass.

METAL—Bearing
Ajax Metal Co., The, Philadelphia, Pa.
Bunting Brass & Bronze Co., Toledo, O.

MICA SCHIST
Edge Hill Silica Rock Co., New Brunswick, N. J.

MILLING MACHINE ACCESSORIES AND ATTACHMENTS
Garvin Mch. Co., The, 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Providence, R. I.
Consolidated Mach. Tool Corp. of America, Rochester, N. Y.
Defiance Machine Works, Defiance, O.
Garvin Mch. Co., The, 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

MILLING MACHINES—Manufacturing
Kearney & Trecker Corp., Milwaukee, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.

MILLING MACHINES—Plain
Garvin Mch. Co., The, 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
McCabe & Sheeran Machinery Corp., Room 482, 50 Church St., New York City.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

MILLING MACHINES—Second Hand
Botwink Bros., New Haven, Ct.
Huron Machine Co., Chicago, Ill.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
McCabe & Sheeran Mchry. Corp., Room 482, 50 Church St., New York City.
McCabe, J. J., Lathe & Machry. Corp., 149 Broadway, New York City.
Russell Machine Co., Springfield, Pa.
Simmons Mach. Tool Corp., Albany, N. Y.
Washington Steel & Ordnance Co., Washington, D. C.

MILLING MACHINES—Universal
Garvin Mch. Co., The, 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

MILLING MACHINES—Vertical
Automatic Machine Co., The, Bridgeport, Ct.
Garvin Mch. Co., The, 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Reed-Prentice Co., Worcester, Mass.

MILLS—Wire Flattening
Torrington Mfg. Co., Torrington, Ct.

MIXING MACHINES—Sand
National Engineering Co., Chicago, Ill.

MIXING MACHINES—Sand and Ore
Hadfield-Penfield Steel Co., The, Bucyrus, O.

MOLDING MACHINES—Combination
American Foundry Equipment Co., Marlin-Rockwell Bldg., New York City.

MOLDING MACHINES—Jarring (Air)
Arcade Mfg. Co., Freeport, Ill.
Hanna Eng. Works, Chicago, Ill.
Nicholls, Wm. H., Co., Inc., 4 College Place, Brooklyn, N. Y.

MOLDING MACHINES — Rollover (Hand and Power Operated)
Arcade Mfg. Co., Freeport, Ill.
Grimes Molding Mch. Co., Detroit, Mich.

MOLDING MACHINES — Squeezer (Hand and Power)
Hanna Eng. Works, Chicago, Ill.

MOLDING MACHINES—Stripping Plate
Nicholls, Wm. H., Co., Inc., 4 College Place, Brooklyn, N. Y.

MONEL METAL
International Nickel Co., 67 Wall St., N. Y. C.

MOTORS—Electric
Crocker-Wheeler Co., Ampere, N. J.
Electric Controller & Mfg. Co., Cleveland, O.
Klein, Nathan, & Co., Centre & Howard Sts., New York City.
Ohio Electric & Controller Co., Cleveland, O.
Vonnegut Machry. Co., Indianapolis, Ind.
Wagner Electric Corp., St. Louis, Mo.

MOTORS—Electric, Second Hand
Archer & Baldwin, Inc., 114 Liberty St., N. Y.
Belyea Company, 147 W. 18th St., N. Y. C.
Botwink Bros., New Haven, Ct.
Figetel-Finney Co., Cleveland, O.
Gregory Electric Co., Chicago, Ill.
Harris Bros. Co., Chicago, Ill.
Klein, Nathan, & Co., Centre & Howard Sts., New York City.
Mc'Vay-Hunt Machinery Co., Pittsburgh, Pa.
Machinery Dealers, Inc., New Haven, Ct.
Miller-Owen Electric Co., Inc., Pittsburgh, Pa.
O'Brien Machry. Co., Philadelphia, Pa.
Power Machry. Exch., Inc., Jersey City, N. J.
Randle Machinery Co., Cincinnati, O.
Sachnaman, Geo., Co., Philadelphia, Pa.

NAILS—Cement Coated
American Steel Co., Pittsburgh, Pa.
American Steel & Wire Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.

NAILS—Cut
Interstate Iron & Steel Co., Chicago, Ill.
Norton Iron Works, Ashland, Ky.

NAILS—Galvanized
American Steel Co., Pittsburgh, Pa.

NAILS—Special
Townsend Co., New Brighton, Pa.

NAILS—Wire
American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Norton Iron Works, Ashland, Ky.
Titchener, E. H., & Co., Binghamton, N. Y.
Townsend Co., New Brighton, Pa.
Wickwire Bros., Cortland, N. Y.

NICKEL
American Nickel Corp., Pittsburgh, Pa.
International Nickel Co., 67 Wall St., N. Y. C.
U. S. Bolt Co., New Brunswick, N. J.

NICKEL ANODES—Rolled and Cast
Seymour Mfg. Co., Seymour, Ct.

NITROGEN
Air Reduction Sales Co., 342 Madison Ave., N. Y.

NUTS—Castellated
National Acme Co., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Western Automatic Mach. Screw Co., Elyria, O.
Western Machine Screw Co., St. Louis, Mo.

NUTS—Cold Punched
Garland Mfg. Co., West Pittsburgh, Pa.
Pawtucket Mfg. Co., Pawtucket, R. I.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Hot Pressed
Ames, W., & Co., Jersey City, N. J.
Harrison Bolt & Nut Co., Harrison, N. J.

NUTS—Lock
Blake Nut-Lock Corp., Buffalo, N. Y.
Reliance Mfg. Co., Massillon, O.

NUTS—Milled
Brightman Mfg. Co., Columbus, Ohio
Perry-Foy Co., The, Elyria, O.
Western Automatic Mach. Screw Co., Elyria, O.

NUTS—Semi-Finished
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Victor-Peninsular Company, Detroit, Mich.
Western Automatic Mach. Screw Co., Elyria, O.
Western Machine Screw Co., St. Louis, Mo.

NUTS—Thumb Malleable
Doylin, Thomas, Mfg Co., Phila., Pa.

OILS—Fuel
Craig Oil Co., Toledo, Ohio.
Pure Oil Co., Columbus, O.
Sloan and Zook Company, The, Bradford, Pa.

OILS—Lubricating
Sloan and Zook Company, The, Bradford, Pa.

ORES—Chrome, Lump and Ground
Lavino, E. J., & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
U. S. Nickel Co., New Brunswick, N. J.

ORES—Iron
Agnew, Battelger & Co., Inc., Philadelphia, Pa.
Cleveland Cliffs Iron Company, Cleveland, O.
Hanna, M. A., Co., The, Cleveland, O.
Park & Williams, Inc., Philadelphia, Pa.
Pickands, Mather & Co., Cleveland, O.

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Pilling & Co., Inc., Philadelphia, Pa
Rogers, Brown & Co., Cincinnati, O.
Savage, John A., & Co., Duluth, Minn.
Sinnet, W. P., & Co., Pittsburgh, Pa.
Tod Stamping Co., Cleveland, O.
Turtin, L., Arthur, Inc., Boston, Mass
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.
Wilderhee, Sherman & Co., 2 Rector St., N.Y.C.

ORES—Manganese

Lavino, E. J., & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
Savage, John A., & Co., Duluth, Minn.

OVENS—Baking

Genrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
Maehler, Paul, Co., The, Chicago, Ill.
Oven Equipment & Mfg. Co., New Haven, Ct.
Steiner, Emil E., & Co., Inc., Newark, N. J.
Young Bros. Co., Detroit, Mich.

OVENS—Core

Genrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
Hoderoft & Company, Detroit, Mich.
Maehler, Paul, Co., The, Chicago, Ill.
Sly, W. Wis. Mfg. Co., Cleveland, Ohio.
Steiner, E. E., & Co., Inc., Newark, N. J.
Whiting Corporation, Harvey, Ill.
Young Bros. Co., Detroit, Mich.

OVENS—Drying

Genrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
Maehler, Paul, Co., The, Chicago, Ill.
Steiner, E. E., & Co., Inc., Newark, N. J.
Young Bros. Co., Detroit, Mich.

OVENS—Enameling and Japanning

Genrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
Maehler, Paul, Co., The, Chicago, Ill.
Oven Equipment & Mfg. Co., New Haven, Ct.
Steiner, Emil E., & Co., Inc., Newark, N. J.
Young Bros. Co., Detroit, Mich.

OVENS—Lacquering

Young Bros. Co., Detroit, Mich.

OXYGEN

Air Reduction Sales Co., 342 Madison Ave., N.Y.
International Oxygen Co., Newark, N. J.

PACKING—Leather

Chicago Rawhide Mfg. Co., 1313 Elston Ave., Chicago, Ill.
Schieren, Chas. A., Co., 37 Ferry St., New York City.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PACKING—Rubber

Goodyear Tire & Rubber Co., Akron, Ohio.
Jenkins Bros., 80 White Street, N. Y. C.
New York Belting & Packing Co., 91-93 Chambers Street, New York City.

PANS—Foundry

National Engineering Co., Chicago, Ill.

PANS—Grinding

Hadfield-Penfield Steel Co., The, Bucyrus, O.
National Engineering Co., Chicago, Ill.

PARTITIONS—Interior Wire

Buffalo Wire Works, Co., Inc., Buffalo, N. Y.
Page Steel & Wire Co., Bridgeport, Conn.

PATENT ATTORNEYS

Boyle, John, Jr., Washington, D. C.

PATTERNS—Wood and Metal

Baker Mfg. Corp., Saratoga Springs, N. Y.
Pattern & Engrg. Co., Williamsport, Pa.

PERFORATED METAL

Beckley Perforating Co., Garwood, N. J.
Chicago Perforating Co., Chicago, Ill.
Cross Engineering Co., Carbondale, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Manufacturing Co., Carbondale, Pa.
Mundt, Chas., & Sons, Jersey City, N. J.

PHOSPHOR BRONZE

Bunting Brass & Bronze Company, Toledo, O.
Phosphor Bronze Smelting Co., Phila., Pa.

PHOSPHORIZERS

McCulloush-Dalzell Crucible Co., Pitts., Pa.

PICKLING MACHINES

Mesta Machine Co., Pittsburgh, Pa.

PIG IRON

Addy, Matthew, Company, The, Cincinnati, O.
Bethlehem Steel Company, Bethlehem, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Cleveland Cliffs Iron Company, Cleveland, O.
Crocker Bros., 21 E. 40th St., N. Y. C.
Donner Steel Co., Inc., Buffalo, N. Y.
Hanna, M. A., Co., The, Cleveland, O.
Hickman, Williams & Co., Pittsburgh, Pa.
Lavino, E. J., & Co., Philadelphia, Pa.
Lyons-Waxma Co., Ltd., Montreal, Canada.
McKeefrey & Co., Leetonia, O.
Park & Williams, Inc., Philadelphia, Pa.
Pickands, Mather & Co., Cleveland O
Pilling & Co., Inc., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
Runyon, W. C., & Co., 350 Madison Ave., New York City.
St. Louis Coke & Iron Co., St. Louis, Mo.
Savage, John A., & Co., Cincinnati, O.
Snyder, W. P., & Co., Pittsburgh, Pa.
Southern Ferro Alloys Co., Chattanooga, Tenn.
Stewart Furnace Company, The, Cleveland, O.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
Turtin, L. Arthur, Inc., Boston, Mass.
Waldo, Egbert, & McClain, Inc., Buffalo, N. Y.
Walter-Wallingford & Co., Cincinnati, O.

PILE DRIVERS

McMyler Interstate Co., Cleveland, O.

PILING—Sheet Steel

Bethlehem Steel Company, Bethlehem, Pa.

PINIONS—Rawhide

Machine Gear Corp., Syracuse, N. Y.

PINS—Piston

Fostoria Screw Co., Fostoria, Ohio

PINS—Taper

Belvidere Screw & Machine Co., Belvidere, Ill.

PIPE—Butt-Welded Steel

National Tube Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE—Cast Iron, B. & S. and Flanged

U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Co., 11 B'way, N. Y. C.

PIPE—Genuine Wrought Iron

Keating, E. F., Co., 452 Water St., N. Y. C.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE—Hammer Welded

National Tube Co., Pittsburgh, Pa.

PIPE—Lap-Welded Steel

American Spiral Pipe Works, Chicago, Ill.
Keating, E. F., Co., 452 Water St., N. Y. C.
National Tube Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Whiting Steel Corporation, Whiting, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE—New and Second-Hand

Albert & Davidson Pipe Corp., 256-264 Oakland St., Brooklyn, N. Y.
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Brooklyn, N. Y.
Davidson Pipe & Iron Corp., 478-440 Kent Ave., Brooklyn, N. Y.
Eagle Pipe Supply Co., Inc., 233 Broadway, New York City.
Flower City Pipe & Iron Corp., Rochester, N. Y.
Greenpoint Iron & Pipe Co., Inc., 309-332 Greenpoint Ave., Brooklyn, N. Y.
Hudson Pipe & Supply Co., Bayonne, N. J.
L. & D. Pipe Supply Co., Inc., 1026 Flush Ave., Brooklyn, N. Y.
McDowell & Co., Pittsburgh, Pa.
Schreer & Foster, Inc., 211-217 Kent Ave., Brooklyn, N. Y.

PIPE—Riveted Steel

Abendroth & Root Mfg. Co., Newburgh, N. Y.
American Spiral Pipe Works, Chicago, Ill.
Petroleum Iron Works Co., Sharon, Pa.

PIPE—Wrought Iron

Crane Co., Chicago, Ill.
Keating, E. F., Co., 452 Water St., N. Y. C.

PIPE CUTTING AND THREADING MACHINES

Bignall & Keeler Mch. Wks., Edwardsville, Ill.
Curtis & Curtis Co., Bridgeport, Ct.
Jarvis Mfg. Co., Erie, Pa.
Landis Mach. Co., Inc., Waynesboro, Pa.
Merrell Mfg. Co., Toledo, O.
Murray Mach. & Tool Co., Detroit, Mich.
Oster Mfg. Co., Cleveland, O.
Pipe Machry. Co., The, Cleveland, O.
Saunders, D., Sons, Yonkers, N. Y.
Standard Engineering Co., Ellwood City, Pa.
Taylor Wilson Mfg. Co., McKees Rocks, Pa.
Williams Tool Corporation, Erie, Pa.

PIPE FITTINGS

Crane Co., Chicago, Ill.
Jarvis Mfg. Co., Erie, Pa.
Manufacturers Iron Fitting Co., Branford, Ct.
Pittsburgh Valve, Fdry. & Construction Co., Pittsburgh, Pa.

PISTON AND PISTON RING MACHINES

National Acme Co., Cleveland, O.

PLANING MACHINES—Metal

American Tool Works Co., Cincinnati, O.
Bethlehem Steel Co. (Detrick & Harvey), Bethlehem, Pa.
Cincinnati Planer Co., The, Cincinnati, O.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Consolidated Mach. Tool Corp. of America, Rochester, N. Y.
Gray, G. A., Co., Cincinnati, O.
Hamilton Machine Tool Co., Hamilton, O.
Morton Mfg. Co., Muskegon, Mich.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Ohio Machine Tool Co., Kenton, Ohio.
Reed-Prentice Co., Worcester, Mass.
Riverson, Jos. T., & Son, Inc., Chicago, Ill.

PLANING MACHINES—Open Side

Automatic Machine Co., The, Bridgeport, Ct.
Bethlehem Steel Co. (Detrick & Harvey), Bethlehem, Pa.
Cincinnati Planer Co., The, Cincinnati, O.

PLATERS' CLEANING COMPOUND

Cowles Detergent Co., The, Lockport, N. Y.
Oakley Chemical Co., 22 Thames St., N. Y. C.

PLATES—Alloy Steel

Edgstone Steel Co., Crum Lynne, Pa.

PLATES—Bullet Proof

Edgstone Steel Co., Crum Lynne, Pa.

PLATES—Cellar Door and Floor

American Pressed Steel Co., Philadelphia, Pa.
Morris, Wheeler & Co., Philadelphia, Pa.
Wood, Alan, Iron & Steel Co., Phila., Pa.

PLATES—Felloe

Wrought Washer Mfg. Co., Milwaukee, Wis.

PLATE Iron and Steel

Illinois Steel Co., Warehouse Dept., Chicago.

Otis Steel Co., Cleveland, O.
Phillips, F. R., & Sons Co., Philadelphia, Pa.
Ryerson, J. T., & Son, Inc., Chicago, Ill.

Wheeling Steel Corp., Wheeling, W. Va.
Worth Steel Company, Claymont, Delaware.
Youngstown Sheet & Tube Co., Youngstown, O.

PLATING

Meaker Galvanizing Co., Chicago, Ill.

PLUGS—Core Hole

PLUMBERS SUPPLIES

Riverside Fdry. & Galv. Co., Kalamazoo, Mich.

PLUMBING FIXTURES—Brass

Ireland & Matthews Mfg. Co., Detroit, Mich.

PLUMBING FIXTURES—Factory

Crane Co., Chicago, Ill.

PNEUMATIC TOOLS

Chicago Pneumatic Tool Co., 6 E. 44th St., N.Y.
Cleveland Pneumatic Tool Co., The, Cleveland, O.
Ingersoll-Rand Co., 11 B'way, N. Y. C.
Rivet Cutting Gun Co., Cincinnati, Ohio.

POSTS—Steel Fence

American Steel & Wire Co., Chicago, Ill.

POTS—Lead, Cyanide or Carbonizing

Monroe Steel Castings Co., Monroe, Mich.

POWDERED COAL EQUIPMENT — See Pulverized Coal Equipment

POWER TRANSMITTING MACHINERY

American Pulley Co., Philadelphia, Pa.
Caldwell, H. W., & Son Co., Chicago, Ill.
Cresson-Morris Co., Philadelphia, Pa.
Falk Corp., The, Milwaukee, Wis.
Fairs Clutch & Machinery Co., Cuyahoga Falls, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Schultz, A. L., & Son, Chicago, Ill.
Woods, T. B., Sons Co., Chambersburg, Pa.

PRESSED STEEL PARTS

Ireland & Matthews Mfg. Co., Detroit, Mich.
Truscon Steel Co., Youngstown, O.

PRESSES—Arbor

Nicholson, H., & Co., Wilkes-Barre, Pa.

PRESSES—Drop

Miner & Peck Mfg. Co., Derby, Ct.

PRESSES—Foot

Adriance Mach. Works, Inc., 82 Richards St., Brooklyn, N. Y.
Shuster, F. B., & Co., New Haven, Ct.
Taylor & Fenn Co., Hartford, Ct.

PRESSES—Forging

Bethlehem Steel Co., Bethlehem, Pa.
Toledo Machine & Tool Co., Toledo, O.
United Engineering & Foundry Co., Pitts., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PRESSES—Hydraulic

Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Elmes, Chas. F., Engrg. Wks., Chicago, Ill.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Southwark Fdry. & Mach. Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
Washington Steel & Ordnance Co., Washington, D. C.

PRESSES—Hydraulic, Portable

Vulcan Iron Works, Chicago, Ill.

PRESSES—Power

Adriance Machine Works, Inc., 82 Richards St., Brooklyn, N. Y.
Page Machine Co., Bridgeport, Ct.
Cincinnati Shaper Co., The, Cincinnati, O.
Elmes, Chas. F., Engrg. Wks., Chicago, Ill.
Perfection Machine Co., Bridgeton, N. J.
General Mfg. Co., Detroit, Mich.
Hydraulic Jacks & Sons, Philadelphia, Pa.
Leffler, Chas., & Co., 61 Clymer St., Brooklyn, N. Y.
Manville, E. J., Mach. Co., Waterbury, Ct.
Niagara Machine & Tool Works, Buffalo, N. Y.
Robinson, J. H., Mfg. Co., Cincinnati, O.
Rodney Iron Works, Hartford, Ct.
Rothschild, R., Inc., 207 Norman Ave., Brooklyn, N. Y.
Standard Machinery Co., Auburn, R. I.
Stull, D. H., Co., Inc., Buffalo, N. Y.
Thomas Spring Machine Co., Pittsburgh, Pa.
Toledo Mach. & Tool Co., Toledo, O.
Watertown Patrel Fdry. & Machine Co., Watertown, Ct.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Power Forcing

General Mfg. Co., Detroit, Mich.
Lucas Mach. Tool Co., Cleveland, O.

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PRESSES—Roofing and Corrugating
Stone Iron & Mfg Co., New Bremen, Ohio.

PRESSES—Scrap Bundling
Cleveland Machinery Co., Auburn, R. I.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PRESSES—Straightening
Chambersburg Engrg. Co., Chambersburg, Pa.
General Mfg. Co., Detroit, Mich.

PRESSES—Sub
[illegible] Tool Co., Inc., The, Newark, N. J.

PRESSES—Wheel
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Southwark Foundry & Machine Co., Phila., Pa.

PULLEYS—Friction Clutch
Caldwell, W. E. Co., 260 Brandeis Street, Louisville, Ky.
Conway Clutch Co., 1948 W. 6th St., Cincinnati, O.
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.

PULLEYS—Iron, Solid and Split
Caldwell, W. E. Co., 260 Brandeis Street, Louisville, Ky.
Parke, Smith & Mchry. Co., Cuyahoga Falls, O.
Jones, W. A., Fdry. & Mach. Co., 4434 West Roosevelt Road, Chicago, Ill.
Medart Company, The, St. Louis, Mo.
Naylor Bros., Peekskill, N. Y.
Wood, S. H. & Sons Co., Chambersburg, Pa.

PULLEYS—Steel, Rim Solid and Split
American Pulley Co., Philadelphia, Pa.
Hyams, Joseph, & Sons, Philadelphia, Pa.

PULVERIZED COAL EQUIPMENT
Combustion Engineering Corp., 43 Broad St., New York City.
Fuller Engineering Co., Fullerton, Pa.
Grindle Fuel Equip. Co., Harvey, Ill.
Hagan, C. J., Co., Pittsburgh, Pa.
Holbeck Engineering Co., The, Cleveland, O.
Quigley Furnace Specialties Co., Inc., 26 Cortlandt St., New York City.

PULVERIZERS—Coal
American Pulverizer Co., St. Louis, Mo.
Holbeck Engineering Co., The, Cleveland, O.

PUMPS—Boiler Feed
Dean Bros. Co., Indianapolis, Ind.
Lecourtenay Co., Newark, N. J.
Manistee Iron Works Co., Manistee, Mich.
Morris Machine Works, Baldwinsville, N. Y.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

PUMPS—Centrifugal
Alberger Pump & Condenser Co., 140 Cedar Street, New York City.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., 492 B'way, Buffalo, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Earle Gear & Mach. Co., Philadelphia, Pa.
Frederick Iron & Steel Co., Frederick, Md.
Ingersoll Rand Co., 11 Broadway, N. Y. C.
Kane & Roach, Syracuse, N. Y.
Lecourtenay Co., Newark, N. J.
Manistee Iron Works Co., Manistee, Mich.
Morris Machine Works, Baldwinsville, N. Y.
Pennsylvania Pump & Comp. Co., Easton, Pa.
Platt Iron Works, Dayton, Ohio.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

PUMPS—Electric
Byers, Jas. P. & Co., Connellsville, Pa.
McGowan, John H., Co., Cincinnati, O.
Myers, T. E. & Bro. Co., Ashland, O.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

PUMPS—Hand and Power
Myers, F. E., & Bro. Co., Ashland, O.

PUMPS—Hydraulic
Bethlehem Steel Co., Bethlehem, Pa.
Dean Bros. Co., Indianapolis, Ind.
Elmes, Chas. F., Engrg. Works, Chicago, Ill.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

PUMPS—Mine
McGowan, John H., Co., Cincinnati, O.

PUMPS—Pneumatic Air Lift
Sullivan Machinery Co., Chicago, Ill.

PUMPS—Rotary
Connersville Blower Co., Connersville, Ind.
Root, P. H. & F. M., Co., Connersville, Ind.

PUMPS—Steam
American Steam Pump Co., Battle Creek, Mich.
Byers, Porter A. Co., Connellsville, Pa.
Buffalo Steam Pump Co., 492 B'way, Buffalo, N. Y.
Dean Bros. Co., Indianapolis, Ind.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
McGowan, John H., Co., Cincinnati, O.
Nat'l Transit Pump & Mch. Co., Oil City, Pa.
Platt Iron Works, Dayton, Ohio.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

PUMPS—Vacuum
Burr Compressor Co., Erie, Pa.
Sullivan Machinery Co., Chicago, Ill.
Worthington Pump & Mchry. Corp., 115 Broadway, New York City.

PUNCHES AND DIES
Cleveland Punch & Shear Wks. Co., Cleve., O.
Cleveland Steel Tool Co., Cleveland, O.
Marchant, Geo. F., Co., Chicago, Ill.
Wells, Frank L., Co., Kenosha, Wis.

PUNCHING AND SHEARING MACHINES
Angelex, Inc., 6 West 32nd Street, N. Y. C.
Armstrong-Blum Mfg. Co., Chicago, Ill.
Beatty Machine & Mfg. Co., Hammond, Ind
Bertsch & Co., Cambridge City, Ind.
Buffalo Forge Co., 492 B'way, Buffalo, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Consolidated Mach. Tool Corp. of America, Rochester, N. Y.
Hendley & Whittemore Co., Beloit, Wis.
Ironton Punch & Shear Co., Ironton, O.
Long & Allstatter Co., Hamilton, O.
Newbold, R. S., & Son Co., Norristown, Pa.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry, & Co., 90 West St., N. Y. C.
Royersford Fdry. & Mch. Co., Inc., Royersford, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Southwark Fdry. & Mch. Co., Phila., Pa.
Thomas Sigoing Machine Co., Pittsburgh, Pa.
Watson Stillman Co., 190 Fulton St., N. Y. C.
Wells, Frank L., Co., Kenosha, Wis.
Whitney Metal Tool Co., Rockford, Ill.
Wickes Brothers, Saginaw, Mich.
Williams, White & Co., Moline, Ill.

PYROMETERS
Bristol Co., Waterbury, Ct.
Hoskins Mfg. Co., Detroit, Mich
Taylor Instrument Companies, Rochester, N. Y.
Wilson-Maeulen Co., 738 E. 143d St., N. Y. C.

RAIL BONDS
American Steel & Wire Co., Chicago, Ill.

RAIL SPLICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Briddell, W. C., Co., Inc., Baltimore, Md.
Central Iron & Metal Co., Chicago, Ill.
Cohen, Louis, & Son, Wilkes-Barre, Pa.
Continental Iron & Steel Co., 33 Rector St., New York City.
Foster, H. M., Co., Baltimore, Md.
Foster, L. B., Co., Inc., Pittsburgh, Pa.
Green, L. A., Rail & Machy. Co., Pittsburgh, Pa.
Hyman Michaels Company, Chicago, Ill.
Lindheimer, S. W., Chicago, Ill.
Lindsay, Jos. G. & Co., Inc., Philadelphia, Pa.
Luria Bros. & Co., Inc., Butterworth Bldg., New York City.
Morris, Wheeler & Co., Philadelphia, Pa.
Morrison & Risman Co., Inc., The, Buffalo, N. Y.
Richardson & Co., Inc., Pittsburgh, Pa.
Robinson & Orr, Pittsburgh, Pa.
Sherwood, E. C., 50 Church St., N. Y. C.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala
Zeinicker, Walter A., Supply Co., St. Louis, Mo.

RAILWAY EQUIPMENT AND SUPPLIES
Briddell, W. C., Co., Inc., Baltimore, Md.
Fort Pitt Malleable Iron Co., Pittsburgh, Pa.
Foster, L. B., Co., Inc., Pittsburgh, Pa.
Hyman Michaels Co., Chicago, Ill.
Pidgeon Thomas Iron Co., Memphis, Tenn.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.
Thack Specialties Co., 29 Broadway, N. Y. C.
Zeinecker, Walter A., Supply Co., St. Louis, Mo.

REAMERS—Adjustable and Expansion
Alvord Reamer & Tool Co., Millersburg, Pa.
Brown & Sharpe Mfg. Co., Detroit, Mich
Brubaker, W. L., & Bros. Co., 50 Church St., New York City.
Buckeye Twist Drill Co., The, Alliance, O.
Butterfield & Co., Division, Union Twist Drill Co., Derby Line, Vt.
McCrosky Tool Corp., Meadville, Pa.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Wayne Tool Mfg. Company, Waynesboro, Pa.

REAMERS—Solid
National Twist Drill & Tool Co., Detroit, Mich.

REFLECTORS—Lamp
Hubbell, Harvey, Inc., Bridgeport, Ct.

REFRIGERATING MACHINERY
American Engineering Co., Philadelphia, Pa.

REGULATORS—Compressed Gas
Oxweld Acetylene Co., 30 E. 42d St., N. Y. C.

REGULATORS—Pressure
Crane Co., Chicago, Ill.

REINFORCING METAL FOR CONCRETE WORK
Truscon Steel Co., Youngstown, O.

RESPIRATORS AND GAS MASKS
Safety Equip. Service Co., Cleveland, O.

RHEOSTATS
Electric Controller & Mfg. Co., Cleveland, O.

RIDDLES—Foundry
Buffalo Wire Works Co., Inc., Buffalo, N. Y.
Lodi Sieve Wire Co., The, St. Louis, Mo
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

RINGS—Hardened Tool Steel
Auburn Ball Bearing Co., Rochester, N. Y.

RINGS—Iron and Steel
Akron Selle Co., Akron, O.
Crane & Saul Steel Co., Inc., Philadelphia, Pa.

RIVET CUTTING GUNS
Rivet Cutting Gun Co., Cincinnati, O.

RIVET MAKING MACHINERY
Acme Machinery Co., Cleveland, O.
Cooke, Asa S., Co., Hartford, Ct.
Manville, E. J., Mach. Co., Waterbury, Ct.
National Mchry Co., Tiffin, O.

RIVET SETS AND STANDS
Chicago Pneumatic Tool Co., G. E. 44th St., New York City.
Cleveland Punch & Shear Wks. Co. Cleve., O.
Cleveland Steel Tool Co., Cleveland, O.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Marchant, Geo. F., Co., Chicago, Ill.

RIVETING MACHINES
Allen, John F., Co., 372 Gerard Ave., N. Y. C.
Bethlehem Steel Co., Bethlehem, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Hanna Engrg. Works, Chicago, Ill.
Shuster, F. B., Co., New Haven, Ct.
Southwark Foundry & Machine Co., Phila., Pa.

RIVETS
American Screw Co., Providence, R. I.
Bethlehem Steel Company, Bethlehem, Pa.
Champion Rivet Co., Cleveland, O.
Clark Bros. Bolt Co., Milldale, Ct.
Cobb & Drew, Inc., Plymouth, Mass.
Continental Mfg. Co., West Pittsburgh, Pa.
Hubbell, Harvey, Inc., Bridgeport, Ct.
Interstate Iron & Steel Co., Chicago, Ill
Ireland & Matthews Mfg. Co., Detroit, Mich.
Kirk-Latty Mfg. Co., Cleveland, O.
National Bolt & Nut Company, Pittsburgh, Pa.
Oliver Iron & Steel Corp., Pittsburgh, Pa.
Progressive Mfg. Co., Torrington, Ct.
Rockford Bolt Co., Rockford, Ill.
Rome Bros. & Copper Co., Rome, N. Y.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Severance, S., Mfg. Co., Glassport, Pa.
Topping Bros., 159 Varick St., N. Y. C.
Townsend, A., New Brighton, Pa.

ROD COILING MACHINES
Yoder Co., The, Cleveland, O.

ROD MILL MACHINERY
Vaughn Mchry. Co., Cuyahoga Falls, O.

RODS—Brass and Copper
Chase Metal Works, Waterbury, Ct.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.

RODS—Drill
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Ward's, Thos. T., Sons Co., Newark, N. J.

RODS—Nickel
Seymour Mfg. Co., Seymour, Ct.

RODS—Nickel Silver
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Co., Seymour, Ct.

RODS—Phosphor Bronze
Seymour Mfg. Co., Seymour, Ct.

RODS—Piston
Pollak Steel Co., Cincinnati, O.

RODS—Welding
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.
Morris, Wheeler & Co., Philadelphia, Pa.
Oxweld Acetylene Co., 30 E. 42d St., N. Y. C.
Roebling's John A., Sons Co., Trenton, N. J.

RODS—Wire
American Steel & Wire Co., Chicago, Ill.
Fitzsimons Co., Youngstown, O.
Gulf Steel Steel Co., Birmingham, Ala.
Interstate Iron & Steel Co., Chicago, Ill.
Page Steel & Wire Co., Bridgeport, Ct.
Washburn Co., 118th St. & Harlem River, N. Y. C.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

ROLLING MACHINERY—Cold Rolling
Broden & Duley Construction Co., Cleve., O.
Lewis Foundry & Mach. Co., Pittsburgh, Pa.
Streine Tool & Mfg. Co., New Bremen, Ohio.
Yoder Co., The, Cleveland, O.

ROLLING MACHINERY—Corrugating
Streine Tool & Mfg. Co., New Bremen, Ohio.

ROLLING MACHINES—Sheet Metal
Lewis Foundry & Mach. Co., Pittsburgh, Pa.
Quickwork Co., St. Marys, O.
Streine Tool & Mfg. Co., New Bremen, Ohio.

ROLLING MILL MACHINERY
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Birmingham Iron Foundry, Derby, Ct.
Blake & Johnson Co., Waterbury, Ct.
Carbon Steel Co., Pittsburgh, Pa.
Erie Foundry Co., Erie, Pa.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Foundry & Mach. Co., Pittsburgh, Pa.
Long & Allstatter Co., Hamilton, O.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Newbold, R. S., & Son Co., Norristown, Pa.
Phoenix Iron & Steel Co., Phoenixville, Pa.
Standard Engineering Co., Ellwood City, Pa.
Standard Machinery Co., Auburn, R. I.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
Waterbury Farrel Fdry. & Machine Co., Waterbury, Ct.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.

ROLLS—Alloy Steel
Pittsburgh Rolls Corp., Pittsburgh, Pa.
Pollak Steel Co., Cincinnati, O.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

ROLLS—Bending and Straightening
Bertsch & Co., Cambridge City, Ind.
Bethlehem Steel Company, Bethlehem, Pa.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Consolidated Mach. Tool Corp. of America, Rochester, N. Y.
Hendley & Whittemore Co., Beloit, Wis.
Ironton Punch & Shear Co., Ironton, O.
McCabe, J. J., Lathe & Machry. Corp., 149 Broadway, New York City.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 232-234.

McCabe & Sheeran Machy. Corp., Room 482, 50 Church St., New York City.
Marshalltown Mfg. Co., Marshalltown, Ia.
Newbold, R. S. & Son Co., Bridgeport, Pa.
Niagara Machine & Tool Works, Buffalo, N. Y.
Niles-Bement-Pond Co., 111 Broadway, N. Y. C.
Pollak Steel Co., Cincinnati, O.
Southwark Foundry & Machine Co., Phila., Pa.
Wickes Brothers, Saginaw, Mich.

ROLLS—Hollow Steel

Murray, Wm., Jr., & Co., Inc., [illegible] St., New York City.

ROLLS—Sand Chilled and Steel

American Steel Foundries, Chicago, Ill.
Baldwin Steel Fdy. & Mch. Co., Rockledge, Pa.
Birmingham Iron Foundry, Derby, Ct.
Hyde Park Iron & Mch. Co., Hyde Park, Pa.
Lewis Foundry & Mach. Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Philadelphia Roll & Mch. Co., Phila., Pa.
Pittsburgh Rolls Corp., Pittsburgh, Pa.
Standard Engineering Co., Ellwood City, Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.

ROLLS—Special Hardened

Bethlehem Steel Company, Bethlehem, Pa.

ROLLS—Steel

Pollak Steel Co., Cincinnati, O.

ROOFING—Cement Tile

Federal Cement Tile Co., Chicago, Ill.

ROOFING AND SIDING—Corrugated and Plain

American Sheet & Tin Plate Co., Pitts., Pa.
Morris, Wheeler & Co., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

ROOFING AND SIDING—Iron and Steel

Newport Rolling Mill Co., Newport, Ky.
Wheeling Steel Corporation, Wheeling, W. Va.

ROPE AND CORDAGE

Broderick & Bascom Rope Co., St. Louis, Mo.
Leschen, A., & Sons Rope Co., St. Louis, Mo.

RUST PREVENTATIVES

Oakley Chemical Co., 22 Thames St., N. Y. C.

SAFETY DEVICES AND SUPPLIES

Safety Equip. Service Co., Cleveland, O.
Weldit Acetylene Co., Chicago, Ill.

SAFETY DEVICES—Power Press

Wiesman Mfg. Co., Dayton, O.

SAND—Molding

Pettinos, Geo. F., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, Ohio.

SAND—Sand Blast

Cape May Sand Co., Cape May, N. J.
Paxson, J. W., Co., Philadelphia, Pa.
Pettinos, Geo. F., Philadelphia, Pa.
Portage Silica Co., The, Youngstown, O.
U. S. Silica Co., Chicago, Ill.

SAND—Silica

U. S. Silica Co., Chicago, Ill.

SAND—Steel Molding

Cape May Sand Co., Cape May, N. J.
Portage Silica Co., The, Youngstown, O.

SAND BLAST EQUIPMENT & MACHINES

American Fdry. Equip. Co., Marlin-Rockwell Bldg., New York City.
Hoerle Mfg. Corp., Jersey City, N. J.
Pangborn Corporation, Hagerstown, Md.
Paxson, J. W., Co., Philadelphia, Pa.
Sly, W. W. Mfg. Co., Cleveland, O.

SAND BLAST SHOT AND GRIT

Globe Steel Abrasive Co., The, Mansfield, O.
Pangborn Corporation, Hagerstown, Md.

SAND CUTTING AND SCREENING MACHINES

American Fdry. Equip. Co., Marlin-Rockwell Bldg., New York City.
Beardsley & Piper Co., Chicago, Ill.
Wheeling Corporation, Harvey, Ill.

SAND MILLS

Frost Mfg. Co., Chicago, Ill.
National Engineering Co., Chicago, Ill.

SAND RAMMERS

Beardsley & Piper Co., Chicago, Ill.
Chicago Pneumatic Tool Co., G. E. 44th St., New York City.

SAND SIFTING MACHINES

Hunan Eng. Works, Chicago, Ill.
Long Co., Detroit, Mich.
Vibrating Machry. Co., Inc., Chicago, Ill.

SASH—Steel

Underhill, David, Sons Co., Philadelphia, Pa.
Tyscon Steel Co., Youngstown, O.

SASH OPERATING DEVICES

Tyscon Steel Co., Youngstown, O.

SAWING MACHINES—Band for Wood and Metal

Diamond Saw & Stge. Wks., Buffalo, N. Y.
Victor Saw Works, Springfield, Mass.

SAWING MACHINES—Metal

Espen-Lucas Mach. Works, Philadelphia, Pa.

SAWING MACHINES—Rail

Vandyck Churchill Co., 52 Vesey St., N. Y. C.

SAWS—Bands for Metal

Armstrong Blum Mfg. Co., Chicago, Ill.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Simonds Saw & Steel Co., Fitchburg, Mass.

SAWS—Circular Metal

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
P. P. Screw Co., Cleveland, Ohio.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Simonds Saw & Steel Co., Fitchburg, Mass.

SAWS—Cold Metal

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
[illegible]

SAWS—Friction

[illegible]

SAWS—Hack Saw Blades

[illegible]
Millers Falls Co., Millers Falls, Mass.
Peerless Machine Co., Racine, Wis.
[illegible]

SAWS—Hot Metal

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.

SAWS—Inserted Tooth, Cold

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.

SAWS—Metal Slitting

Cowles Tool Co., Cleveland, Ohio.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.

SAWS—Screw Slotting

Disston, Henry, & Sons, Inc., Philadelphia, Pa.

SAWS—Sliding Frame

United Engrg. & Fdry. Co., Pittsburgh, Pa.

SCRAP—Iron and Steel

Agnew, Batteiger & Co., Inc., Philadelphia, Pa.
Andrus, Frank H., Waterbury, Conn.
Briddell, W. C., Co., Inc., Baltimore, Md.
Briggs & Turivas, Inc., Chicago, Ill.
Hilton-Long Co., Scranton, Pa.
Judd, L. C., Co., Philadelphia, Pa.
Lupin Brothers Co., Inc., Woolworth Bldg., New York City.
Penn, Euston, Doane Co., Boston, Mass.
Potts, Henry, & Co., Philadelphia, Pa.
Smith, Morton B., Co., 243 Front St., N. Y. C.

SCREENS—Perforated Metal

Beckley Perforating Co., Garwood, N. J.
Chicago Perforating Co., Chicago, Ill.
Cleves Engineering Co., Cincinnati, O.
Eadie Perforating Co., Rochester, N. Y.
Huntington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, Jersey City, N. J.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

SCREENS—Woven Wire

Audubon Wire Cloth Co., Inc., Audubon, N. J.
Lindon Sawyer Wire Co., The St. Louis, Mo.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

SCREW MACHINE PRODUCTS

Barnes, Wallace, Co., The, Bristol, Ct.
Bee Line Co., The, Buffalo, N. Y.
Belvidere Screw & Mach. Co., Belvidere, Ill.
Bliss & Johnson Co., Waterbury, Ct.
Bridgeport Metal Goods Mfg. Co., Bridgeport, Ct.
Brown Bag Filling Machine Co., The, Fitchburg, Mass.
Brown-McLaren Mfg. Co., Detroit, Mich.
Cincinnati Screw Co., Loveland, O.
Clark, Cadle Harmon Corp., Rochester, N. Y.
Connecticut Screw Co., Worcester, Mass.
Doson Elec. Electrical Co., Hamilton, O.
Eastern Manufacturing Corp., New Haven, Ct.
Eastern Screw Co., Fostoria, O.
Hartford Machine Screw Co., Hartford, Conn.
Lakeman Mch. Screw Co., Lebanon, Pa.
Link Belt Co., Chicago, Ill.
Mechanics Mfg. Co., Waterbury, Ct.
Miles & Co., Philadelphia, Pa.
Milford Mfg. Co., Milford, Ct.
Morrison Mach. Prod., Inc., Rochester, N. Y.
National Auto. Co., Cleveland, O.
National Screw & Machine Co., Belvidere, Ill.
New Britain Machine Co., New Britain, Ct.
New Haven Screw Co., New Haven, Ct.
Newton Mfg. Co., Plainville, Ct.
Otterbein, W. H., Co., Inc., York, Pa.
Park Mfg. Company, Worcester, Mass.
Parker & Harper Mfg. Co., Worcester, Mass.
Pfaff, Albert, & Machine Co., Reading, Pa.
Perry Pipe Co., The, Elyria, O.
Progressive Mfg. Co., Torrington, Ct.
Rhode Island Tool Co., Providence, R. I.
Sly, W. W., Mfg. Co., Cleveland, O.
Screw Machine Products Co., Bridgeport, Ct.
Screw Machine Products Co., Inc., Milton, Pa.
Standard Steel & Tool Co., Jonkhoff, Pa.
Swedish Steel Co., Worcester, Mass.
Taylor-Winfield Corporation, Warren, O.
Union Screw Co., Detroit, Mich.
Waterbury Screw Co., Waterbury, Ct.
Weaver Mfg. Co., Huntingdon, Pa.
Weed Tool & Drill Co., Inc., Bridgeport, Ct.
Weiss, Geo. J., Mfg. Co., Inc., Philadelphia, Pa.
Wells Bros. Co., Greenfield, Mass.
Weight Machine Co., Worcester, Mass.

SCREW MACHINERY—Automatic

Brown & Sharpe Mfg. Co., Providence, R. I.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
[illegible]

SCREW MACHINERY—Automatic Wood

[illegible]

SCREW MACHINERY—Hand

Garvin Mch. Co., The, 255 Spring St., N. Y. C.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., Cleveland, O.

SCREW MACHINERY—Multiple Spindle

[illegible]
National Screw Co., Cleveland, O.

SCREW MACHINERY—Second-Hand

[illegible]
Hill, Clarke & Co., Inc., Boston, Mass.
[illegible]

SCREW PLATES

[illegible]

SCREWS—Cap

[illegible]
Shimer, Samuel J., & Sons, Inc., Milton, Pa.
[illegible]
Wright Machine Co., Worcester, Mass.

SCREWS—Coach and Lag

[illegible]

SCREWS—Cold Headed

Cleveland Cap Screw Co., The, Cleveland, O.

SCREWS—Machine

American Screw Co., Providence, R. I.
Brown-McLaren Mfg. Co., Detroit, Mich.
Hobbins, Barnes, & Pettengill Co., Meadville, Pa.
Progressive Mfg. Co., Torrington, Ct.
Standard Mfg. Co., Watertury, Conn.

SCREWS—Safety Set

Allen Mfg. Co., The, Hartford, Ct.
Hartford Mach. Screw Co., Hartford, Ct.
Progressive Mfg. Co., Torrington, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.
Strong, Carlisle & Hammond Co., The, Cleveland, O.

SCREWS—Set

Hartford Mach. Screw Co., Hartford, Ct.
National Acme Co., Cleveland, O.
Otterbein, W. H., Co., Inc., York, Pa.
Shimer, Samuel J., & Sons, Inc., Milton, Pa.
Strong, Carlisle & Hammond Co., The, Cleveland, O.
Victor Pneumatic Company, Detroit, Mich.

SCREWS—Thumb Malleable

Devlin, Thomas, Mfg. Co., Phila., Pa.

SCREWS—Wood

American Screw Co., Providence, R. I.
Bridgeport Screw Co., Bridgeport, Ct.
Topping Bros., 120 Varick St., N. Y. C.

SEAMING MACHINES

Quickwork Co., St. Marys, O.

SECOND-HAND MACHINERY—See Clearing House Section

Altman Purchasing Syndicate, Buffalo, N. Y.
Botterill & Morse, New Haven, Ct.
Brierley, H. P., 90 West St., New York City.
Brenholts, Rot, Columbus, O.
Briggs, Marcus, 167 Sixth St., Brooklyn, N. Y.
Clarkson, D. R., & Co., Inc., Rochester, N. Y.
Consolidated Products Co., Inc., 15 Park Row, New York City.
Continental Machy. Co., 30 Church St., N. Y. C.
Crawford, F. C., & Co., 220 B'way., N. Y. C.
Donahue Steel Products Co., Chicago, Ill.
Eastern Machy. Co., Chicago, Ill.
Erie Mfg. & Supply Co., Erie, Pa.
Essley, J. V., Machy. Co., Chicago, Ill.
Fuerst & Kuhn, 149 Centre St., New York City.
Fitzgerald, W. H., Jr., & Co., Boston, Mass.
Garvin Mch. Co., The, 255 Spring St., N. Y. C.
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co., of Chicago, Chicago, Ill.
Hill, Clarke & Co., Cincinnati, O.
Hirsch, H., & Co., 50 American & British Mfg. Co., Bridgeport, Conn.
Hilmer & Hilmer, 2008 Co., Phila., Pa.
Ideal Machry. Co., Plainville, Ct.
Industrial Machy. Corp., Jersey City, N. J.
Industrial Plant Co., 25 Church St., N. Y. C.
Industrial Sup. & Equip. Co., New York City.
Jamison, Wm. C., & Sons, Philadelphia, Pa.
Klein, Nathan, & Co., Centre & Howard Sts., New York City.
Lange & Co., 241 Centre St., N. Y. C.
Leach, H., Providence, R. I.
Lodge & Shipley Machine Tool Co., Cincinnati, O.
Lucas, J. L., & Son, Inc., Bridgeport, Conn.
Maehr, J. L., Last & Heel Co., Camden, N. J.
Manufacturers Sales Co., Detroit, Mich.
Marcus & Shenker Machinery Co., Room 482, 50 Church St., N. Y. C.
Marsh, A. [illegible]
Mayer & Schmidt, 175 Centre St., N. Y. C.
McCabe & Sheeran Machy. Co., Room 482, 50 Church St., N. Y. C.
Meinhard, Chas., & Co., Inc., Boston, Mass.
Metal Working Machy. Co., Chicago, Ill.
Miller, Frank, Machy. Co., Chicago, Ill.
Mundt, Chas., & Sons, Jersey City, N. J.
Murray, Wm., Jr., & Co., Inc., 50 Church St., New York City.
Nelson, A. H., Mach. Co., Bridgeport, Ct.
O'Brien Machry. Co., Philadelphia, Pa.
Old Hickory Powder Plant, Jacksonville, Tenn.
Osborne & Stoddard, Meriden, Ct.
Prentiss, Bester & Co., Inc., 140 Broadway, New York City.
Prichard, C. W., Co., Inc., 50 Church St., New York City.
Randle Machy. Co., Cincinnati, Ohio.
Reece Tritle Co., The, Chicago, Ill.
Reliance Machine Sales Co., Pittsburgh, Pa.
Riverside Machry. Depot, Detroit, Mich.
Ross Power Equipment Co., Indianapolis, Ind.

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Ingersoll-Rand Co., 27 Nassau Ave., Brooklyn, N. Y.
Rand Mfg. Co., Pittsburgh, Pa.
Rand Drill Co., 27 Nassau Ave., Brooklyn, N. Y.
Sanford Machry. Co., Philadelphia, Pa.
Sandvik Asea A.B., Sandviken, Sweden
Sanford Tool Corp., Albany, N. Y.
Sanford R. R. Machy. Co., Detroit, Mich.
Schaefer Machine Co., Chicago, Ill.
Schaffer Machine Co., Inc., Newark, N. J.
Scott Equipment Corp., The, Detroit, Mich.
Security Signal Board Emergency Fleet Corp., Washington, D. C.
Sellers Machine Co., Indianapolis, Ind.
Waldo A. D. Seward, Inc., Chicago, Ill.

SEPARATORS—Oil from Chips
Iden, Concrete Machry. Co., Cincinnati, O.

SHAFT TURNING MACHINES
Brightman Mfg. Co., Columbus, O.

SHAFTING—Cam, Worm, Turbine and Crusher
National Pedge & Tool Co., Irvine, Pa.
Pollak Steel Co., Cincinnati, O.

SHAFTING—Cold Drawn
Bethlehem Steel Company, Bethlehem, Pa.
Brightman Mfg. Co., Columbus, O.
Cumberland Steel Co., Cumberland, Md.
Maddock Steel Prod. Co., Beaver Falls, Pa.
Morgan Machy. & Equip. Co., Canton, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., Newark, N. J.

SHAFTING—Flexible
Chicago Flexible Shaft Co., Chicago, Ill.
Fischer, Chas., Spring Co., 240 Kent Ave., Brooklyn, N. Y.
Gem Mfg. Co., Pittsburgh, Pa.
Stow Manufacturing Co., Binghamton, N. Y.
Strand, N. A., & Company, Chicago, Ill.

SHAFTING—Ground
Cumberland Steel Co., Cumberland, Md.

SHAFTING—Steel
Cumberland Steel Co., Cumberland, Md.
Pollak Steel Co., Cincinnati, O.

SHAFTING—Tubular Material for
National Tube Co., Pittsburgh, Pa.

SHAFTING—Turned and Polished
Brightman Mfg. Co., Columbus, Ohio.
Cumberland Steel Co., Cumberland, Md.
Fitzsimmons & Youngstown, O.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

SHAPES—Cold Drawn
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Ward's, Edgar T., Sons Co., Newark, N. J.

SHAPES—Cold Rolled
Corrugated Bar Co., Buffalo, N. Y.

SHAPES—Steel
Phoenix Iron Co., Philadelphia, Pa.
Pollak Steel Co., Cincinnati, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.

SHAPING MACHINES—Horizontal
American Tool Works Co., Cincinnati, O.
Cincinnati Shaper Co., The, Cincinnati, O.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Gould & Eberhardt, Newark, N. J.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Ohio Machine Tool Co., Kenton, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Smith & Mills Company, Cincinnati, O.
Stockbridge Machine Co., Worcester, Mass.
Washington Steel & Ordnance Co., Washington, D. C.

SHEAR BLADES
Cleveland Knife & Forge Co., Cleveland, O.
Heppenstall Forge & Knife Co., Pitts., Pa.
Pels, Henry, & Co., 90 West St., N. Y. C.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.
Wapakoneta Machine Company, Wapakoneta, O.

SHEARING MACHINES—Alligator
Doelger & Kirsten, Milwaukee, Wis.
Hendey & Whitehurst Co., Toledo, O.
Newbold, R. S., & Son Co., Norristown, Pa.
Pels, Henry, & Co., 90 West St., N. Y. C.
Stoll, D. H., Co., Inc., Buffalo, N. Y.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

SHEARING MACHINES—Angle, Hand and Power
Federal Bearing Co., Inc., Poughkeepsie, N. Y.
Loy & Nawrath Division Birmingham Iron Foundry, Derby, Ct.
Pels, Henry, & Co., 90 West St., N. Y. C.

SHEARING MACHINES—Automatic Alligator
Doelger & Kirsten, Milwaukee, Wis.

SHEARING MACHINES—Bar
Angles, Inc., 6 West 22nd St., N. Y. C.
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Pawtucket Mfg. Co., Pawtucket, R. I.
Pels, Henry, & Co., 90 West St., N. Y. C.

SHEARING MACHINES—Bar (Hand)
McKenna Co., The, Cleveland, O.

SHEARING MACHINES—Beam and Channel
Angles, Inc., 6 West 22nd Street, N. Y. C.
Pels, Henry, & Co., 90 West St., N. Y. C.

SHEARING MACHINES—Billet
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Pels, Henry, & Co., 90 West St., N. Y. C.
Thomas Spacing Machine Co., Pittsburgh, Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

SHEARING MACHINES—Doubling and Squaring
Loy & Nawrath Division Birmingham Iron Foundry, Derby, Ct.
Streine Tool & Mfg. Co., New Bremen, Ohio.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

SHEARING MACHINES—Metal Slitting
Hendey & Whitehurst Co., Beloit, Wis.
Hoefer Punch & Shear Co., Hamilton, O.
Quicksteel Company, St. Marys, O.
Streine Tool & Mfg. Co., New Bremen, Ohio.
Yoder Co., The, Cleveland, O.

SHEARING MACHINES—Metal Slitting Gang
Adriance Mach. Works, Inc., 82 Richards St., Brooklyn, N. Y.
Yoder Co., The, Cleveland, O.

SHEARING MACHINES—Plate
Angles, Inc., 6 West 22nd Street, N. Y. C.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Forge Co., 492 B'way, Buffalo, N. Y.
Cleveland Punch & Shear Wks., Cleveland, O.
Long & Allstatter Co., Hamilton, O.
Massasoit Mfg. Co., Massillon, Ohio.
Newbold, R. S., & Son Co., Norristown, Pa.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Pels, Henry, & Co., 90 West St., N. Y. C.
Quicksteel Company, St. Marys, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Streine Tool & Mfg. Co., New Bremen, Ohio.
Thomas Spacing Machine Co., Pittsburgh, Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
Yoder Co., The, Cleveland, O.

SHEARING MACHINES—Plate Slitting
Yoder Co., The, Cleveland, O.

SHEARING MACHINES—Rotary
Newbold, R. S., & Son Co., Norristown, Pa.
Quicksteel Co., St. Marys, O.

SHEET METAL MACHINERY
Adriance Machine Works, Inc., 82 Richards St., Brooklyn, N. Y.
Dreis & Krump Mfg. Co., Chicago, Ill.
Federal Machine Co., Bridgeton, N. J.
Kane & Roach, Syracuse, N. Y.
Leffler, Chas., & Co., 61 Clymer St., Brooklyn, N. Y.
Loy & Nawrath Division Birmingham Iron Foundry, Derby, Ct.
Niagara Machine & Tool Works, Buffalo, N. Y.
Quicksteel Company, St. Marys, Ohio
Robinson, J. M., Mfg. Co., Toledo, O.
Southwark Fdry. & Mach. Co., Phila., Pa.
Streine Tool & Mfg. Co., New Bremen, O.
Toledo Machine & Tool Co., Toledo, O.
Yoder Co., The, Cleveland, O.

SHEETS—Aluminum
Eddie Perforating Co., Rochester, N. Y.

SHEETS—Black
American Sheet & Tin Plate Co. Pittsburgh, Pa.
Apollo Steel & Iron Co., Detroit, Mich.
Bethlehem Steel Company, Bethlehem, Pa.
Inland Steel Co., Chicago, Ill.
Lindsay, Jas. G. & Co., Inc., Philadelphia, Pa.
Marks-Fiske-Zeiger Co., Detroit, Mich.
Morris, Wheeler & Co., Philadelphia, Pa.
Otis Steel Co., Cleveland, O.
Phillips, F. R., & Sons Co., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Trumbull Steel Co., Warren, O.
Wheeling Steel Corporation, Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

SHEETS—Blue Annealed
Bethlehem Steel Company, Bethlehem, Pa.
Central Steel Company, The, Massillon, O.
Follansbee Steel Co., Toronto, Can.
Inland Steel Co., Chicago, Ill.
Lindsay, Jas. G. & Co., Inc., Philadelphia, Pa.
Morris, Wheeler & Co., Philadelphia, Pa.
Newport Rolling Mill Co., Newport, Ky.
Otis Steel Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Trumbull Steel Company, The, Warren, O.
Wheeling Steel Corporation, Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Phila., Pa.

SHEETS—Brass and Copper
Chase Metal Works, Waterbury, Ct.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Ct.

SHEETS—Electrical
American Sheet & Tin Plate Co., Pitts., Pa.
Trumbull Steel Company, The, Warren, O.
Wheeling Steel Corporation, Wheeling, W. Va.

SHEETS—For Drawing and Stamping
Allegheny Steel Co., Brackenridge, Pa.
Apollo Steel & Iron Co., Detroit, Mich.
Central Steel Company, The, Massillon, O.
Firth Sterling Steel Co., McKeesport, Pa.
Lindsay, Jas. G. & Co., Inc., Philadelphia, Pa.
Otis Steel Co., Cleveland, O.
Seneca Iron & Steel Co., Buffalo, N. Y.
Ward's, Edgar T., Sons Co., Newark, N. J.

SHEETS—Galvanized, Flat and Corrugated
American Sheet & Tin Plate Co., Pitts., Pa.
Bethlehem Steel Company, Bethlehem, Pa.
Inland Steel Co., Chicago, Ill.
Morris, Wheeler & Company, Philadelphia, Pa.
Newport Rolling Mill Co., Newport, Ky.
Phillips, F. R. & Sons Co., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Trumbull Steel Co., The, Warren, O.
Wheeling Steel Corporation, Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS—Nickel Silver
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Co., Seymour, Ct.

SHEETS—Phosphor Bronze
Phosphor Bronze Smelting Co., Phila., Pa.
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Co., Seymour, Ct.

SHELVING—Steel
Cleveland Wire Spring Co., Cleveland, O.
Lupton's, David, Sons Co., Philadelphia, Pa.
Manufacturing Equip. & Engrg. Co., Framingham, Mass.
United Alloy Steel Corp., Canton, O.

SHIP BUILDERS' MATERIAL
Bethlehem Steel Company, Bethlehem, Pa.
Topping Bros., 159 Varick St., N. Y. C.

SHOP FURNITURE
New Britain Mach. Co., New Britain, Ct.

SHOT FOR SAND BLAST—See Sand Blast Shot and Grit

SHOVELS—Crawler Tractor
Northwest Engineering Co., Chicago, Ill.

SHUTTERS—Steel and Wood Bi-Folding
Kinnear Mfg. Co., Columbus, O.

SIFTING MACHINES
Vibrating Machry. Co., Inc., Chicago, Ill.

SIGNS—Safety and Danger
Safety Equip. Service Co., Cleveland, O.

SKIM GATES
Sterling Wheelbarrow Co., Milwaukee, Wis.

SKYLIGHTS—Guards
Buffalo Wire Works Co., Inc., Buffalo, N. Y.

SLABS—Cement Roofing
Federal Cement Tile Co., Chicago, Ill.

SLINGS—Wire Rope
Roebling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES
Consolidated Mach. Tool Corp. of America, Rochester, N. Y.
Garvin Mach. Co., The, 255 Spring St., N. Y. C.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

SOCKETS—Wire Rope
Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y.

SPACING TABLES—Punching and Shearing
Thomas Spacing Machine Co., Pittsburgh, Pa.

SPARK PLUGS
Belvidere Screw & Mach. Co., Belvidere, Ill.

SPECIAL MACHINERY
Allen Iron & Steel Co., The, Philadelphia, Pa.
American Foundry & Mfg. Co., Frederick, Md.
Automatic Machine Co., The, Bridgeport, Ct.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Burr Company, The, Champaign, Ill.
Consolidated Shipbuilding Corp., Morris Heights, New York City.
Cortland Mach. & Tool Works, Cortland, N. Y.
Doelger & Kirsten, Milwaukee, Wis.
DuPont Engineering Co., Wilmington, Del.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Fawcett Mach. Co., Pittsburgh, Pa.
Hanna Engrg. Works, Chicago, Ill.
Hartford Special Machinery Co., The, Hartford, Ct.
Koehler Mfg. Co., Marlboro, Mass.
Leffler, Charles, & Co., 61 Clymer St., Brooklyn, N. Y.
Mehl Machine Tool & Die Co., Roselle, N. J.
Milford Mfg. Co., The, Milford, Ct.
Milwaukee Metal Working Co., Milwaukee, Wis.
Reichel & Drews, Chicago, Ill.
Southwark Foundry & Machine Co., Phila., Pa.
Stoney Schmidt Mfg. Co., York, Pa.
Steele & Cundict, Inc., Jersey City, N. J.
Torrington Mfg. Co., Torrington, Ct.
U. S. Tool Co., Inc., The, Newark, N. J.
Utica Steam Engine & Roller Works, The, Utica, N. Y.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Yoder Co., The, Cleveland, O.
York Electric & Mach. Co., York, Pa.

SPEED REDUCERS
Jones, W. A., Fdry. & Mch. Co., 4434 West Roosevelt Road, Chicago, Ill.

SPELTER
United Metals Selling Co., 25 B'way, N. Y. C.

SPIEGELEISEN
Rogers, Brown & Co., Cincinnati, O.

SPIKES
American Steel & Wire Co., Chicago, Ill.
Ames, W., & Co., Jersey City, N. J.
Bethlehem Steel Company, Bethlehem, Pa.
Foster, H. B., Co., Inc., Pittsburgh, Pa.
Severance, S., Mfg. Co., Glassport, Pa.
Topping Bros., 159 Varick St., N. Y. C.

SPRING MAKING MACHINERY
Baird Machine Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS—Wire, Coil or Flat
Advance Spring & Wire Co., Chicago, Ill.
American Steel & Wire Co., Chicago, Ill.
Barnes-Gibson-Raymond, Inc., Detroit, Mich.
Barnes, Wallace, Co., The, Bristol, Ct.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Chain Co., Bridgeport, Ct.
Cleveland Wire Spring Co., Cleveland, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 232-234.

Cook Spring Co., Ann Arbor, Mich.
Dunbar Bros. Co., Bristol, Ct.
Fischer, Chas., Spring Co., 240 Kent Ave., Brooklyn, N. Y.
Gibson, C. L., Chicago, Ill.
Hebb, Geo. A., Spring Works, Newark, N. J.
Holland & Son, [illegible]
Kollsman Spring Co., Kollsman, Ill.
Lee Spring Co., 349 Classon Ave., Brooklyn, N. Y.
Mack & Bell, Worcester, Mass.
Miller & Van Winkle, Inc., 75 Duffield St., Brooklyn, N. Y.
Newcomb Spring Corp., 234 10th St., Brooklyn, N. Y.
Page Steel & Wire Co., Bridgeport, Ct.
Peterson Spring Co., Detroit, Mich.
Gerrard Mfg. Co., [illegible]
Superior Spring Co., The, Springfield, O.
Washburn Wire Co., 185th St. & Harlem River, New York City.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

SPROCKETS

Baldwin Chain & Mfg. Co., Worcester, Mass.
Cullman Wheel Co., Chicago, Ill.
Link Belt Co., Chicago, Ill.
Tilton Chain & Mfg. Co., Sandusky, O.

SPRUE CUTTERS

Hinton Ling, Works, Chicago, Ill.

STACKS—Steel

Heltzel Steel Form & Iron Co., Warren, O.
Hendrick Manufacturing Co., Carbondale, Pa.
Lancaster Iron Works, Inc., Lancaster, Pa.
Newbold, R. S., & Son Co., Norristown, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pittsburgh Des Moines Steel Co., Pitts., Pa.

STAMPINGS OR DRAWINGS—Metal

A. B. & B. Sheet Metal Works, Milwaukee, Wis.
Acme Stpg. & Mfg. Co., Pittsburgh, Pa.
Affa Specialty Co., Worcester, Mass.
Allegan Metal Co., Bridgeport, Pa.
Ansonia Novelty Company, Ansonia, Ct.
Apex Tool & Stamping Corp., Louisville, Ky.
Autoyre Company, Oakville, Ct.
Barnes, Wallace, Co., The, Bristol, Ct.
Bay State Stpg. Co., Worcester, Mass.
Blake & Johnson Co., Waterbury, Ct.
Bossert Corp., The, Utica, N. Y.
Bridgeport Chain Co., Bridgeport, Ct.
Bridgeport Metal Goods Mfg. Co., Bridgeport, Ct.
Budd, Edw. G., Mfg. Co., Philadelphia, Pa.
Burgess-Norton Mfg. Co., Geneva, Ill.
Crosby Co., The, Buffalo, N. Y.
Cuyahoga Spring Co., Cleveland, O.
Detroit Stamping Co., Detroit, Mich.
Dongan & Solomon Co., Detroit, Mich.
Eadie Manufacturing Co., Rochester, N. Y.
G. G. G. Metal Stpg. Co., Warren, Pa.
General Machine & Mfg. Co., The, Bridgeport, Conn.
Gender, Paeschke & Frey Co. (Contract Mfg. Division), Milwaukee, Wis.
Globe Mach. & Stamping Co., Cleveland, O.
Gray, Peter, & Sons, Inc., Cambridge, Mass.
Great Lakes Pressed Steel Corp., Buffalo, N. Y.
Guarantee Specialty Mfg. Co., Cleveland, O.
Heintz Mfg. Co., Philadelphia, Pa.
Hudson Sporting Works, Dodtown, Mich.
Ireland & Matthews Mfg. Co., Detroit, Mich.
Jenkinson, R. C., & Co., Newark, N. J.
Kirby Metal Co., The, Middletown, N. Y.
Koehler Mfg. Co., Inc., Marlboro, Mass.
Konigslow, E., Stamping & Tool Co., The, Cleveland, O.
Konigslow, Otto, Mfg. Co., Cleveland, O.
Lansing Stpg. Co., Lansing, Mich.
Larson Tool & Stamping Co., Attleboro, Mass.
Lindsay Chaplet & Mfg. Co., Philadelphia, Pa.
Lyons Mch. & Stpg. Wks., Dunlap, Iowa.
Matuntuck Mfg. Co., Waterbury, Ct.
Matthews, H. A., Mfg. Co., Seymour, Ct.
Matthews Mfg. Co., Worcester, Mass.
Metal Specialty Co., Cincinnati, O.
Milwaukee Metal Working Co., Milwaukee, Wis.
National Marine Lamp Co., Forestville, Conn.
National Umbrella Frame Co., Philadelphia, Pa.
New England Pressed Steel Co., Worcester, Mass.
New England Tube & Stpg. Co., Inc., West Haven, Ct.
New York Energ. Co., 2 Rector St., N. Y. C.
Oakes Co., The, Indianapolis, Ind.
Parker, R. E., Mfg. Co., Reading, Mass.
Pennsylvania Stamping Company, York, Pa.
Pressed Metal Co., Inc., Springdale, Pa.
Pulte Konrack Mach. Co., The, Grand Rapids, Mich.
Reliable Machine Co., 400 W. 23d St., N. Y. C.
Robinson Tool Works, Inc., Waterbury, Conn.
Rockford Iron Works, Rockford, Ill.
Rome Mfg. Company, Rome, N. Y.
Root Co., Bristol, Conn.
Sewell Mfg. Co., Waterbury, Conn.
Sessions, J. H., & Son, Bristol, Ct.
Seymour Metal Goods Co., Seymour, Ct.
Sterling Aluminum Co., Erie, Pa.
Superior Metal Products Co., Elyria, O.
Titchener Dodd Co., Chicago, Ill.
Torrington Co., Torrington, Ct.
Transue & Williams Steel Forging Corp., Alliance, O.
Truscon Steel Co., Youngstown, O.
Waterbury Buckle Co., Waterbury, Conn.
Williams Tool Chuck Company, Cleveland, O.
Worcester Pressed Steel Co., Worcester, Mass.
Worcester Stamped Metal Co., Worcester, Mass.
Wright Machine Co., Worcester, Mass.
Zeigler Mfg. Co., Alexandria, Ind.

STAMPS—Steel Alphabets and Figures

Matthews, J. H., & Co., Pittsburgh, Pa.
Pannier Bros. Stamp Co., Pittsburgh, Pa.
Schober & Lombard Co., 202-204 Centre St., New York City.
Schwedtle Stamp Co., Bridgeport, Ct.

STANDPIPES

Lancaster Iron Works, Inc., Lancaster, Pa.

STAPLE MACHINES

Spencer & Hastings, Inc., Worcester, Mass.

STAPLES

American Fence & Wire Co., Chicago, Ill.
Bridgeport Chain Co., Bridgeport, Ct.
Eberhardt, F. H., & Bergenthal, N. Y.
Gerrard Mfg. Co., [illegible]
New York City.

STEEL—Alloy

Bethlehem Steel Company, Bethlehem, Pa.
Crucible Steel Co. of America, New York City.
Empire Steel Co., The, Mansfield, O.
Illinois Steel Co., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Midvale Steel & Ordnance Co., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Standard Steel Works, Inc., Burnham, Pa.
Universal Steel Co., Pittsburgh, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Ward's, Edgar T., Sons Co., Newark, N. J.

STEEL—Bright Finished

Union Drawn Steel Co., Beaver Falls, Pa.

STEEL—Carbon

Carnegie Steel Co., Pittsburgh, Pa.
Pittsburgh Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., Chicago, Ill.

STEEL—Chrome

Andrews Steel Co., Newport, Ky.
Central Steel Company, The, Massillon, O.

STEEL—Chrome Nickel

Central Steel Company, The, Massillon, O.
Interstate Iron & Steel Co., Chicago, Ill.

STEEL—Chrome Vanadium

Central Steel Company, The, Massillon, O.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Cold Drawn

American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Company, Bethlehem, Pa.
Fairfield Mfg. Co., Fairfield, Ind.
Interstate Iron & Steel Co., Chicago, Ill.
Montage Steel Products Co., Beaver Falls, Pa.
Pittsburgh Tube & Steel Co., Monessen, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., Newark, N. J.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips

Acme Steel Goods Co., Chicago, Illinois.
American Steel & Wire Co., Chicago, Ill.
American Tube & Stpg. Co., Bridgeport, Ct.
Athenia Steel Co., 135 William St., N. Y. C.
Cuttle Steel Co., Pittsburgh, Pa.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Griffin Mfg. Company, Erie, Pa.
Morris & Bailey Dillon Oliver Iron & Steel Corp., Pittsburgh, Pa.
National Umbrella Frame Co., Philadelphia, Pa.
Superior Steel Corp., Penn Traffic Bldg., Pittsburgh, Pa.
Trumbull Steel Company, The, Warren, O.
Ward's, Edgar T., Sons Co., Newark, N. J.
Washburn Wire Co., 185th St. & Harlem River, N. Y. C.
Weirton Steel Co., Weirton, W. Va.
West Leechburg Steel Co., Pittsburgh, Pa.
Wetherell Bros. Co., Cambridge, 39, Mass.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.
Worcester Pressed Steel Co., Worcester, Mass.

STEEL—Crucible

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Ward's, Edgar T., Sons Co., Newark, N. J.

STEEL—Cutlery

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Wardlaw S. & C. 278 Pearl St., N. Y. C.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Die

Bethlehem Steel Company, Bethlehem, Pa.
Central Steel Company, The, Massillon, O.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Drill

Zinc Steel & Wire Company, Chicago, Ill.

STEEL—Electric

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Ludlum Steel Co., Watervliet, N. Y.
United Steel Corp., Canton, O.

STEEL—High Speed

Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop, Wm., & Sons, Inc., 91 John St., New York City.
Ludlum Steel Co., Watervliet, N. Y.
Rossman, Jos. T., & Son, Inc., Chicago, Ill.
Simonds Saw & Steel Co., Lockport, N. Y.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Hot Rolled Strips

Acme Steel Goods Co., Chicago, Ill.
American Tube & Stpg. Co., Bridgeport, Ct.
Barnes, Wallace, C., The, Bristol, Ct.
Central Steel Co., The, Massillon, O.
Cuttle Mfg. Company, Erie, Pa.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Laclede Steel Co., St. Louis, Mo.
Pollak Steel Co., Cincinnati, O.
Superior Steel Corp., Penn Traffic Arcade, Pittsburgh, Pa.
Trumbull Steel Company, The, Warren, O.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL—Importers

Jessop, Wm., & Sons, Inc., 91 John St., New York City.

STEEL—Magnet

Ludlum Steel Co., Watervliet, N. Y.

STEEL—Nickel

Bethlehem Steel Co., Bethlehem, Pa.
Interstate Iron & Steel Co., Chicago, Ill.

STEEL—Open Hearth

Acme Steel Co., Chicago, Ill.
Alan Wood Iron & Steel Co., Philadelphia, Pa.
Bethlehem Steel Company, Bethlehem, Pa.
Central Steel Co., The, Massillon, O.
Colonial Steel Co., Pittsburgh, Pa.
Empire Steel Co., The, Mansfield, O.
Illinois Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Midvale Steel & Ordnance Co., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Standard Steel Works, Inc., Burnham, Pa.
Universal Steel Co., Pittsburgh, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Ward's, Edgar T., Sons Co., Newark, N. J.

STEEL—Screw

Acme Steel Co., Chicago, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Special Analysis

American Tool & Stpg. Co., Bridgeport, Ct.
Central Steel Co., The, Massillon, O.
Interstate Iron & Steel Co., Chicago, Ill.
Simonds Saw & Steel Co., Lockport, N. Y.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL—Spring

Atlantic Steel Co., 155 William St., N. Y.
Bethlehem Steel Company, Bethlehem, Pa.
Central Steel Co., The, Massillon, O.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Park Drop Forge Co., Cleveland, O.
Pittsburgh Des Moines Steel Co., Pitts., Pa.
Pittsburgh Steel Co., McKeesport, Pa.
Standard Steel Works, Inc., Burnham, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Universal Steel Co., Pittsburgh, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Ward's, Edgar T., Sons Co., Newark, N. J.
Wetherell Bros. Co., Cambridge, 39, Mass.
Zinc Steel & Wire Company, Chicago, Ill.

STEEL—Uranium

Standard Alloys Co., Pittsburgh, Pa.

STEEL—Welding

Federal Tool & Alloy Steel Corp., 66 Rutledge St., Brooklyn, N. Y.

STEEL PLANTS AND ROLLING MILLS

Frogs, Brasert & Co., Chicago, Ill.

STEEL PLATE CONSTRUCTION

Blaw-Knox Co., Pittsburgh, Pa.
Cruse-Kemper Co., Ambler, Pa.
Hammond Iron Works, Warren, Pa.
Heltzel Steel Form & Iron Co., Warren, O.
Hendrick Mfg. Co., Carbondale, Pa.
Newbold, R. S., & Son Co., Norristown, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pershouni Iron Works Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Riter-Conley Company, Pittsburgh, Pa.
Sotter Bridge Co., Pottstown, Pa.
Steel Plate Products Co., Pottstown, Pa.
Tippett & Wood, Phillipsburg, N. J.

STEPS—Safety

Irving Iron Works Co., Long Island City, N. Y.

STILLS—Gasoline

Bousman Mfg. Co., Grand Rapids, Mich.

STOCKS AND DIES

Jarecki Mfg. Co., Erie, Pa.
Jones & Lamson Mach. Co., Springfield, Vt.
Oster Mfg. Co., Cleveland, O.
Saunders', D., Sons, Yonkers, N. Y.

STOKERS

American Engineering Co., Philadelphia, Pa.
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Connecticut Engineering Corp., 43 Broad St., New York City.
Riley, Sanford Stoker Co., Worcester, Mass.

STOPPERS—Open Hearth, Bessemer or Electric

Ross-Tacony Crucible Co., Philadelphia, Pa.

STOPPERS—Open-Hearth Furnace

McCullough-Dalzell Crucible Co., Pitts., Pa.

STOVE TRIMMINGS

Ireland & Matthews Mfg. Co., Detroit, Mich.
Matthews, H. A., Mfg. Co., Worcester, Mass.

STOVES—Hot Blast

Smythe, S. R., Co., Pittsburgh, Pa.

STRAIGHTENING AND CUTTING MACHINES

Shuster, F. B., Co., New Haven, Conn.
Wells, Frank L., Co., Kenosha, Wis.

STRAIGHTENING MACHINES

Brightman Mfg. Co., Columbus, O.
Chambersburg Engg. Co., Chambersburg, Pa.
Kane & Roach, Syracuse, N. Y.
Medart Company, The, St. Louis, Mo.
Whitney Metal Tool Co., Rockford, Ill.

STRUCTURAL IRON AND STEEL WORK

American Bridge Co., 71 Broadway, N. Y. C.
Belmont Iron Works, Philadelphia, Pa.
Berlin Construction Co., Inc., Berlin, Ct.
Bethlehem Steel Company, Bethlehem, Pa.
Blaw-Knox Co., Pittsburgh, Pa.

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Bamlage Products Co., The, Toledo, O.
Cunningham Crane Co., Erie, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Minneapolis Steel & Machy. Co., Minneapolis, Minn.
Morgan Engineering Co., Alliance, O.
Morgan Engineering Co., Philadelphia, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Sewell Manufacturing Bain Wks., Louisville, Ky.
Virginia Bridge & Iron Co., Roanoke, Va.

STRUCTURAL STEEL—See Angles, Beams, Channels and Tees

SULPHATE OF IRON
American Steel & Wire Co., Chicago, Ill.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Superheater Co., The, 17 E. 42d St., N. Y. C.

SWAGING MACHINES
Etna Machine Co., The, Toledo, O.
Standard Machinery Co., Auburn, R. I.
Torrington Co., Torrington, Ct.

SWITCHBOARDS
Electric Controller & Mfg. Co., Cleveland, O.

SWITCHES—Electric
Electric Controller & Mfg. Co., Cleveland, O.

SWITCHES—Railroad
Gregg Co., Ltd., The, Hackensack, N. J.

TACKS
American Steel & Wire Co., Chicago, Ill.
Independent Lock & Screw Co., Chicago, Ill.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

TANKS—Compressed Air, Gas, Oil and Water
Air-Tight Steel Tank Co., Pittsburgh, Pa.
Caldwell, W. E. Co., 1940 Brook St., Louisville, Ky.
Crew-Fixtures Co., Ambler, Pa.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Hammond Iron Works, Warren, Pa.
Lancaster Iron Works, Inc., Lancaster, Pa.
Newsboard, R. S., & Son Co., Norristown, Pa.
Pennsylvania Tank & Pipe Co., Warren, Pa.
Pittsburgh Iron Works Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Smith, Alex. H., & Sons Co., Pittsburgh, Pa.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.
Sotter Bros., Inc., Pottstown, Pa.
Tippett & Wood, Philipsburg, N. J.
Tuthill Boiler Mfg. Co., Cincinnati, O.
Wm. Iron Mfg. Co., Conshohocken, Pa.

TANKS—Elevated Water
Caldwell, W. E. Co., 1940 Brook St., Louisville, Ky.
Chicago Bridge & Iron Works, Chicago, Ill.
Kalamazoo Tank & Silo Co., Kalamazoo, Mich.

TANKS—Gasoline and Oil
Blaw-Knox Co., Pittsburgh, Pa.

TANKS—Iron and Steel
Blaw-Knox Co., Pittsburgh, Pa.
Caldwell, W. E. Co., 1940 Brook St., Louisville, Ky.
Chicago Bridge & Iron Works, Chicago, Ill.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Lancaster Iron Works, Inc., Lancaster, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.
Steel Plate Products Co., Pottstown, Pa.

TANKS—Pickling
Hauser-Stander Tank Co., Cincinnati, O.
Kalamazoo Tank & Silo Co., Kalamazoo, Mich.

TANKS—Rubber Lined
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Second-Hand
Shippers' Car Line, Inc., 165 B'way, N. Y. C.

TANKS—Seamless Steel
National Tube Co., Pittsburgh, Pa.

TANKS—Water
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Welded
Air-Tight Steel Tank Co., Pittsburgh, Pa.
Blaw-Knox Co., Pittsburgh, Pa.
Bossert Corp., The, Utica, N. Y.
Hamburg Iron Co., Rutland, Vt.

TANKS—Wood
Caldwell, W. E. Co., 1940 Brook St., Louisville, Ky.
Pennsylvania Tank & Pipe Co., Cincinnati, O.
Kalamazoo Tank & Silo Co., Kalamazoo, Mich.

TAPES—Steel
Starrett, L. S., Co., The, Athol, Mass.

TAPPING MACHINES
Baker Bros., Toledo, O.
Defiance Machine Works, Defiance, O.
National Automatic Tool Co., Richmond, Ind.
Whitney Metal Tool Co., Rockford, Ill.

TAPS AND DIES
American Tap & Die Co., Greenfield, Mass.
Brubaker W. L. & Bros. Company, 50 Church St., New York City.
Butterfield & Co., Division, Union Twist Drill Co., Derby Line, Vt.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Murchey Mach. & Tool Co., Detroit, Mich.
National Acme Co., Cleveland, O.
Pipe Machinery Co., The, Cleveland, O.

TAR EXTRACTORS
Gas Producer & Engrg. Corp. of N. J., 30 Church St., New York City.

TEES—See Angles, Beams, Channels and Tees

TELEGRAPH AND TELEPHONE LINE MATERIAL
Oliver Iron & Steel Corp., Pittsburgh, Pa.

TELEPHONE—Interior
Screw Machine Products Corp., Providence, R. I.

TERNE PLATES
American Sheet & Tin Plate Co., Pitts., Pa.

THREAD ROLLING MACHINES
National Machinery Co., Tiffin, O.
Nilson, A. L., Mach. Co., Bridgeport, Ct.
Waterbury Farrel Foundry & Machine Co., Waterbury, Ct.

THREADING MACHINES—Bolt and Stud
National Acme Co., Cleveland, O.

TIE PLATES
Interstate Iron & Steel Co., Chicago, Ill.
Joliet Wrought Washer Company, Joliet, Ill.

TIES—Bale
American Steel & Wire Co., Chicago, Ill.

TIES—Creosoted
Jennison-Wright Co., Toledo, O.

TIME RECORDING MACHINES
Newman Clock Co., Inc., 428 B'way, N. Y. C.

TIN PLATE
American Sheet & Tin Plate Co., Pitts., Pa.
Lindsay, Bro. & Co., Inc., Philadelphia, Pa.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corporation, Wheeling, W. Va.

TINNERS' TOOLS AND MACHINES
Niagara Machine & Tool Works, Buffalo, N. Y.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago, Ill.
Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

TOOL STANDS
Lupton's, David, Sons Co., Philadelphia, Pa.

TOOLS, JIGS, FIXTURES, ETC.—See Jigs, Tools, Etc.

TOOLS—Carpenters
Starrett, L. S., Co., The, Athol, Mass.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago, Ill.

TOOLS—Machinists
Starrett, L. S., Co., The, Athol, Mass.
Toppan Bros., 159 Varick St., N. Y. C.

TOOLS—Screw Machine
Foster Machine Co., Elkhart, Ind.

TOOLS—Steam and Gas Fitters
Saunders', D., Sons, Yonkers, N. Y.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 342 Madison Ave., N. Y.
Oxweld Acetylene Co., 30 E. 42d St., N. Y. C.

TOWERS—Steel
Caldwell, W. E. Co., 1940 Brook St., Louisville, Ky.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.

TOWERS—Transmission
American Bridge Co., 71 Broadway, N. Y. C.
Blaw-Knox Co., Pittsburgh, Pa.

TOWERS—Water—See Tanks—Elevated

TRACK—Industrial
Bethlehem Steel Company, Bethlehem, Pa.
Chase Body & Mfg. Co., Columbus, O.
Gregg Co., Ltd., The, Hackensack, N. J.

TRACTORS—Industrial
Towmotor Co., Cleveland, Ohio.

TRACTORS—Storage Battery
Atlas Car & Mfg. Co., Cleveland, O.
Baker R. & L. Co., Cleveland, O.
Elwell-Parker Electric Co., Cleveland, O.

TRAMRAILS—Overhead Systems
Armington Engineering Co., Euclid, O.
Cleveland Crane & Engrg. Co., Wickliffe, Ohio.
Dreis & Krump Mfg. Co., Chicago, Ill.

TRAMWAYS—Wire Rope
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Lowdon, A. & Sons Rope Co., St. Louis, Mo.

TRANSFORMERS—Lighting and Power
Wagner Electric Corp., St. Louis, Mo.

TRAPS—Steam
Nicholson, W. H., & Co., Wilkes Barre, Pa.
Strong, Carlisle & Hammond Co., The, Cleveland, O.

TROLLEYS
Armington Engineering Co., Euclid, O.
Conkey, H. D., & Company, Mendota, Ill.
Ford Chain Block Co., Philadelphia, Pa.
Hayes Engineering Works, Chicago, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Wright Mfg. Co., Lisbon, O.

TRUCKS—Electric Storage Battery
Baker R. & L. Co., Cleveland, O.
Elwell-Parker Electric Co., Cleveland, O.

TRUCKS—Elevating
Baker R. & L. Co., Cleveland, O.
Lewis-Shepard Co., Boston, Mass.

TRUCKS—Industrial
Sterling Wheelbarrow Co., Milwaukee, Wis.

TUBE MILL MACHINERY
Standard Engineering Co., Ellwood City, Pa.
United Engrg. & Fdry. Co., Pittsburgh, Pa.

TUBES—Boiler
Allegheny Steel Co., Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Detroit Seamless Steel Tubes Co., Detroit.
Johnson-Peter Co., Pittsburgh, Pa.
Keating, E. F., Co., 452 Water St., N. Y. C.
Morgan, Harcus & Co., Philadelphia, Pa.
National Tube Co., Pittsburgh, Pa.
Potts, Homer L., & Co., Philadelphia, Pa.
Reynolds, Jos. T., & Son, Inc., Chicago, Ill.

TUBES—Boiler, Charcoal Iron
Bethlehem Steel Co., Bethlehem, Pa.
Keating, E. F., Co., 452 Water St., N. Y. C.

TUBES—Nickel Silver
Mohegan Tube Co., The, 300-400 Scott Ave., Brooklyn, N. Y.
Seymour Mfg. Co., Seymour, Ct.

TUBING—Condenser
Chase Metal Works, Waterbury, Ct.
Scovill Mfg. Co., Waterbury, Conn.

TUBING—Flexible Metallic
American Metal Hose Co., Waterbury, Ct.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Superior Spring Co., Springfield, Ohio

TUBING—Lock Seamed
Stolp Company, Inc., Geneva, N. Y.

TUBING—Monel Metal
Mohegan Tube Co., The, 300-400 Scott Ave., Bro. N. Y.

TUBING—Nichrome
Mohegan Tube Co., The, 300-400 Scott Ave., Brooklyn, N. Y.

TUBING—Open-Seam
Mohegan Tube Co., The, 300-400 Scott Ave., Brooklyn, N. Y.

TUBING—Seamless Aluminum
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.

TUBING—Seamless Brass and Copper
Chase Metal Works, Waterbury, Ct.
Rome Brass & Copper Co., Rome, N. Y.
Rome Mfg. Company, Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Service Steel Company, Detroit, Mich.
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.

TUBING—Seamless Steel
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bellmore Seamless Tube Co., Auburn, Pa.
Detroit Seamless Steel Tubes Co., Detroit
Keating, E. F., Co., 452 Water St., N. Y. C.
Mohegan Tube Co., The, 300-400 Scott Ave., Brooklyn, N. Y.
National Tube Co., Pittsburgh, Pa.
Service Steel Company, Detroit, Mich.
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.
Ward, Edgar T., Sons Co., Newark, N. J.
Wharton, Wm., Jr., & Co., Inc., 30 Church St., New York City.

TUBING—Square and Rectangular
Mohegan Tube Co., The, 300-400 Scott Ave., Brooklyn, N. Y.
National Tube Co., Pittsburgh, Pa.
Summerill Tubing Co., Bridgeport, Montgomery Co., Pa.

TUBING—Welded Steel
Johnson-Peter Co., Pittsburgh, Pa.
Mohegan Tube Co., The, 300-400 Scott Ave., Brooklyn, N. Y.
National Tube Co., Pittsburgh, Pa.

TUBING MACHINERY—Brazed
Etna Machine Co., The, Toledo, O.

TUBING MACHINES—Lock Seaming
Stolp Company, Inc., Geneva, N. Y.

TUMBLING BARRELS
Globe Machine & Stamping Co., Cleveland, O.
Ideal Concrete Machry. Co., Cincinnati, O.
Parker, J. Wm., & Co., Philadelphia, Pa.
Sly, W. W., Mfg. Company, Cleveland, O.
Whiting Corporation, Harvey, Ill.

TURBINES
De Laval Steam Turbine Co., Trenton, N. J.

TURNBUCKLES
Lloyd Forge Co., Annville, Pa.
Merrill Bros., Maspeth, N. Y.

TURNTABLES
Gregg Co., Ltd., The, Hackensack, N. J.
Whiting Corporation, Harvey, Ill.

TUYERES—Coolers, Etc., Blast Furnace
Keystone Bronze Co., Pittsburgh, Pa.

TWIST DRILLS
Buckeye Twist Drill Co., The, Alliance, O.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Twist Drill & Tool Co., Detroit, Mich.

TYPE—Steel
Schoder & Lombard Co., 202-204 Centre St., New York City.

UNIONS
Crane Co., Chicago, Ill.
Dart, E. M., Mfg. Co., Providence, R. I.
Jefferson Union Co., Lexington, Miss.

UPSETTING AND FORGING MACHRY
Acme Machinery Co., Cleveland, O.
National Machinery Co., Tiffin, O.

VALVES—Air
Homestead Valve Mfg. Co., Homestead, Pa.
Powell, William, Company, Cincinnati, O.

VALVES—Back Pressure and Automatic Relief
Crane Co., Chicago, Ill.
Oxweld Acetylene Co., 30 E. 42d St., N. Y. C.

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Merrill Company, The, San Francisco, Cal.
Morgan Construction Co., Worcester, Mass.
Smythe, S. R., Co., Pittsburgh, Pa.
Swindell, W., & Bros., Pittsburgh, Pa.

VALVES—Gas, Water and Steam
Homestead Valve Mfg. Co., Homestead, Pa.
Jenkins Bros., 80 White St., New York City.
Merrill Company, The, San Francisco, Cal.
Pittsburgh Valve, Fdry. & Construction Co., Pittsburgh, Pa.
Powell, William, Co., Cincinnati, O.
Wood, R. D., & Co., Philadelphia, Pa.

VALVES—Gate
Crane Co., Chicago, Ill.

VALVES—Globe, Angle and Cheek
Crane Co., Chicago, Ill.

VALVES—Hydraulic
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Crane Co., Chicago, Ill.
Homestead Valve Mfg. Co., Homestead, Pa.
Powell, William, Company, Cincinnati, O.
Southwark Fdry. & Mch. Co., Philadelphia, Pa.
Watson-Stillman Co., 190 Fulton St., N. Y.
Wood, R. D., & Company, Philadelphia, Pa.

VALVES—Lubricated
Homestead Valve Mfg. Co., Homestead, Pa.

VALVES—Pop, Safety and Relief
Crane Co., Chicago, Ill.

VALVES—(Pressure Seated) Pneumatic
Cleveland Pneumatic Tool Co., The, Cleveland, O.

VALVES—Radiator
Crane Co., Chicago, Ill.

VALVES—Water Cooled
Blaw-Knox Co., Pittsburgh, Pa.

VIBRATORS
Hanna Engr. Works, Chicago, Ill.
Vibrating Machry. Co., Inc., Chicago, Ill.

VISES
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Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

WASH BOWLS
Manufacturing Equip. & Engrg. Co., Framingham, Mass.

WASHERS—Ball Bearing Race
Auburn Ball Bearing Co., Rochester, N. Y.

WASHERS—Brass and Bronze
Ensign Co., Boston, Mass.

WASHERS—Brass and Copper
Hobbs Mfg. Co., Worcester, Mass.

WASHERS—Iron and Steel
Ames, W., & Co., Jersey City, N. J.
Bethlehem Steel Company, Bethlehem, Pa.
Hobbs Mfg. Co., Worcester, Mass.
Joliet Wrought Washer Company, Joliet, Ill.
Positive Lock Washer Co., Newark, N. J.
Sessions, E. H., & Son, Bristol, Ct.
Topping Bros., 159 Varick St., N. Y. C.
Wrought Washer Mfg. Co., Milwaukee, Wis.

WASHERS—Leather
Chicago Rawhide Mfg. Co., 1313 Elston Ave., Chicago, Ill.
Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

WASHERS—Lock
Hobbs Mfg. Co., Worcester, Mass.
National Umbrella Frame Co., Philadelphia, Pa.
Positive Lock Washer Co., Newark, N. J.
Reliance Manufacturing Co., Massillon, O.

WASHERS—Spring Steel
Dunbar Bros. Co., Bristol, Ct.
Hobbs Mfg. Co., Worcester, Mass.
Positive Lock Washer Co., Newark, N. J.
Reliance Manufacturing Co., Massillon, O.

WASHERS—Tempered
Barnes, Wallace, Co., The, Bristol, Ct.
Positive Lock Washer Co., Newark, N. J.

WASHERS—Wrought
Wrought Washer Mfg. Co., Milwaukee, Wis.

WASHING MACHINES—For Metal Parts
Colt's Patent Fire Arms Mfg. Co., Hartford, Ct.
Ideal Concrete Machry. Co., Cincinnati, O.
Meaker Galvanizing Co., Chicago, Ill.

WATER SOFTENING AND PURIFYING
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.

WEDGES—Foundry
Sterling Wheelbarrow Co., Milwaukee, Wis.

WELDING—Electric
American Electric Fusion Corp., Chicago, Ill.
Bossert Corp., The, Utica, N. Y.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Mch. & Welder Co., Warren, O.
Gibb Instrument Co., Bay City, Mich.
Hoebling's, John A., Sons Co., Trenton, N. J.
Taylor-Hall Welding Corp., Worcester, Mass.

WELDING—Forge and Hammer
Blaw-Knox Co., Pittsburgh, Pa.

WELDING—Oxy-Acetylene
Baumann Bros., Inc., North Bergen, N. J.
Roebling's, John A., Sons Co., Trenton, N. J.
Weldit Acetylene Co., Detroit, Mich.

WELDING—Thermit
Metal & Thermit Corp., 120 Broadway, N.Y.C.

WELDING AND CUTTING APPARATUS AND SUPPLIES
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.
Davis-Bournonville Co., 342 Madison Ave., New York City.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Mch. & Welder Co., Warren, O.
Imperial Brass Mfg. Co., Chicago, Ill.
International Oxygen Co., New York City.
Oxweld Acetylene Co., 30 E. 42d St., N. Y. C.
Weldit Acetylene Co., Detroit, Mich.

WELDING MACHINES—Butt
Federal Mch. & Welder Co., Warren, O.

WELDING MACHINES—Electric
Acme Electric Welder Co., Los Angeles, Cal.
American Electric Fusion Corp., Chicago, Ill.
Federal Mch. & Welder Co., Warren, O.
Gibb Instrument Co., Bay City, Mich.
Taylor-Welder Co., Warren, O.

WELDING MACHINES—Seam
American Electric Fusion Corp., Chicago, Ill.
Federal Mch. & Welder Co., Warren, O.
Gibb Instrument Co., Bay City, Mich.

WELDING MACHINES—Spot
Acme Electric Welder Co., Los Angeles, Cal.
American Electric Fusion Corp., Chicago, Ill.
Federal Mch. & Welder Co., Warren, O.
Taylor-Welder Co., Warren, O.
Thomson Spot Welder Co., Lynn, Mass.

WHEELBARROWS—Foundry
Sterling Wheelbarrow Co., Milwaukee, Wis.

WHEELS—Cast
Stook Steel Hardening Process Co., Pittsburgh, Pa.

WHEELS—Grinding and Polishing
Hanson & Van Winkle Co., The, Newark, N. J.

WHEELS—Rolled Steel
Bethlehem Steel Company, Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.

WINDOWS—Steel
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Lupton's, David, Sons Co., Philadelphia, Pa.
Truscon Steel Co., Youngstown, O.

WIRE—Barb
American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.

WIRE—Brass and Copper
Chase Metal Works, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.

WIRE—Broom
American Steel & Wire Co., Chicago, Ill.
Spencer Wire & Mfg. Co., Fostoria, O.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE—Flat, Round and Square
American Steel Co., Pittsburgh, Pa.
American Steel & Wire Co., Chicago, Ill.
De Haven Mfg. Co., 50-54 Columbia Heights, Brooklyn, N. Y.
Gulf States Steel Co., Birmingham, Ala.
Interstate Iron & Steel Co., Chicago, Ill.
Millholland, Wm. Wylie, Inc., 15 Bridge St., Brooklyn, N. Y.
Phillips, F. R., & Sons Co., Philadelphia, Pa.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
Townsend Co., New Brighton, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York City.
Webb Wire Works, New Brunswick, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE—Mattress
American Steel & Wire Co., Chicago, Ill.
Spencer Wire & Mfg. Co., Fostoria, O.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE—Netting
American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Ludlow-Saylor Wire Co., St. Louis, Mo.
New Jersey Wire Cloth Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE—Nickel
Seymour Mfg. Co., Seymour, Ct.

WIRE—Nickel Silver
Seymour Mfg. Co., Seymour, Ct.

WIRE—Phosphor Bronze
Phosphor Bronze Smelting Co., Phila., Pa.
Seymour Mfg. Co., Seymour, Ct.

WIRE—Piano and Music
American Steel & Wire Co., Chicago, Ill.
Ward's, Edgar T., Sons Co., Newark, N. J.
Washburn Wire Co., 118th St. & Harlem River, New York City.
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE—Plain, Galvanized and Coppered
Page Steel & Wire Co., Bridgeport, Ct.

WIRE—Rubber Covered
American Steel & Wire Co., Chicago, Ill.
Hazard Mfg. Co., Wilkes-Barre, Pa.

WIRE—Spoke and Crimping
American Steel & Wire Co., Chicago, Ill.
Prentiss, Geo. W., & Co., Holyoke, Mass.

WIRE—Spring Steel
American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE—Strand
Page Steel & Wire Co., Bridgeport, Conn.

WIRE—Telephone and Telegraph
American Steel & Wire Co., Chicago, Ill.
Page Steel & Wire Co., Bridgeport, Conn.

WIRE—Welding
Acme Electric Welder Co., Los Angeles, Cal.
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.
Davis-Bournonville Co., 342 Madison Ave., New York City.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Mch. & Welder Co., Warren, O.
Imperial Brass Mfg. Co., Chicago, Ill.
International Oxygen Co., New York City.
Oxweld Acetylene Co., 30 E. 42d St., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N. J.
Weldit Acetylene Co., Detroit, Mich.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE CLOTH
Audubon Wire Cloth Co., Inc., Audubon, N. J.
Bell Wire Works Co., Inc., Brooklyn, N. Y.
Ludlow-Saylor Wire Co., The, St. Louis, Mo.
N. J. Wire Cloth Co., Bordentown, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE FORMING
American Steel & Wire Co., Chicago, Ill.
Autoyre Company, Oakville, Ct.
Bridgeport Chain Co., Bridgeport, Ct.
Cleveland Wire Spring Co., Cleveland, O.
Cuyahoga Spring Co., Cleveland, O.
Eberhardt Mfg. Co., Brooklyn, N. Y.
Hadley Mfg. Co., Valley Falls, R. I.
Jenkinson, R. C., & Co., Newark, N. J.
Litchfield, E. H., & Co., Binghamton, N. Y.
Litchfield-Diehl Co., Chicago, Ill.
Lovejoy Co., Farmington, Ct.
Townsend Co., New Brighton, Pa.
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Wickwire Spencer Steel Corp., 41 E. 42d St., New York City.

WIRE COILING MACHINERY
Baird Machine Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.
Wells, Frank C., Co., Kenosha, Wis.

WIRE DRAWING MACHINERY
Morgan Construction Co., Worcester, Mass.
New England Wire Machinery Co., New Haven, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machry. Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Ct.

WIRE FORMING MACHINERY
Baird Machine Co., Bridgeport, Ct.
Manville, E. J., Mach. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE MILL MACHINERY AND EQUIPMENT
Broden & Dailey Construction Co., Cleve., O.
Morgan Construction Co., Worcester, Mass.
New England Wire Machinery Co., New Haven, Conn.
Shuster, F. B., Co., New Haven, Ct.
Vaughn Machry. Co., Cuyahoga Falls, O.

WIRE NAIL MACHINERY
National Machinery Co., Tiffin, O.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE ROPE
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Hazard Mfg. Co., Wilkes-Barre, Pa.
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Page Steel & Wire Co., Bridgeport, Ct.
Roebling's, John A., Sons Co., Trenton, N. J.
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WIRE ROPE FITTINGS
American Steel & Wire Co., Chicago, Ill.
Laughlin, Thomas, Company, The, Portland, Me.

WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Nilson, A. H., Machine Co., Bridgeport, Ct.
Shuster, F. B., Co., New Haven, Ct.
Simonds Herbert, Inc., Worcester, Mass.

WORTHINGTON PUMPS
Worthington Pump & Machry. Co., 115 Broadway, New York City.

WIRE STRANDING & CLOSING MACHINES
New England Wire Machinery Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE WORK
Brooks Wire Works Co., Inc., Buffalo, N. Y.
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WRENCHES
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Rockford Malleable Iron Works
Rockwell, W. S., Co.
Roebling's, J. A., Sons Co.
Roeper Crane & Hoist Works
Rogers, Brown & Co.
Rome Brass & Copper Co.
Rome Mfg. Co.
Root Co.
Roots, P. H. & F. M., Co.
Ross Power Equip. Co.
Ross-Tacony Crucible Co.
Rothschild, R., Inc.
Royersford Fdry. & Mch. Co., Inc.
Runyon, Walter & Co.
Russell, Burdsall & Ward Bolt & Nut Co.
Russell Mach. Co.
Ryerson, Jos. T., & Son, Inc.

S

Sachs-Collamer Co.
Safety Boiler Specialty
St. Louis Coke & Iron Co.
St. Louis Malleable Casting Co.
Samuel, Frank, & Co.
Samuel Machry. Co.
Sanders, D. S.
Sauger, John A. & Sons
Scaife, Wm. B., & Sons Co.
Schaefer, Wm. H.
Schaub & Lombard
Schreer & Foster, Inc.
Schultz, A. L., & Son
Schuylkill Forge Co.
Schwerdtle Stamp Co.
Sawvill Mfg. Co.
Scranton Forging Co.
Screw Mach. Products Corp.
Scully, Jones & Co.
Seneca Iron & Steel Co.
Seneca Wire & Mfg. Co.
Service Steel Co.
Sessions Foundry Co., The
Seward, J. H., Inc.
Severance, S. Mfg. Co.
Seymour Mfg. Co., The
Shafer Bearing Corporation, The
Sharon Foundry Co.
Shepard Elec. Crane & Hoist Co.
Shepherd Machy. Co.
Shimer, Samuel J., & Sons, Inc.
Shipper's Car Line, Inc.
Shipstakes Bridge Co.
Shore Instrument & Mfg. Co., Inc.
Shuster, F. B., Co., The
Simmons Mach. Tool Corp.
Simonds Saw & Steel Co., Fitchburg, Mass.
Simonds Saw & Steel Co., Lockport, N. Y.
Simons & Schmadeke Co., Inc.
Skinner Bros. Mfg. Co.
Skinner Chuck Co.
Sleeper & Hartley, Inc.
Slocan Sash Co., The
Sly, W. & W. Mfg. Co.
Smith Gas Engineering Co.
Smith, Geo. H. Steel Casting Co.
Smith, Morton B. Co.
Smith & Mills Co., The
Smythe, S. C., Inc.
Snead Architectural Iron Works
Snyder, W. P. & Co.
Softer Bros., Inc.
South Bend Lathe Works
Southern Ferro Alloys Co.
Southwark Fdry. & Mach. Co.
Spencer Turbine Co., The
Spencer, S., Sons, Inc.
Spindler & Deininger
Springfield Aluminum Plate & Castings Co.
Springfield Mfg. Co., The
Stamp Electric Hoist Co.
Standard Conveyor Co.
Standard Engrg. Co.
Standard Fuel Engrg. Co.
Standard Game Steel Co.
Standard Machry. Co., Auburn, N. Y.
Standard Machinery Co., Mystic, Conn.
Standard Pressed Steel Co.
Stanley Belting Corp.
Starrett, L. S., Co., The
Steacy-Schmidt Mfg. Co.
Stedman's Fdry. & Mch. Wks.
Steel Forgings Co., The
Steel Plate Products Co.
Steele & Conklet, Inc.
Steiner, Emil E., & Co., Inc.
Steinle Turret Mach. Co.
Sterling Aluminum Co.
Sterling Blower Co.
Sterling Grinding Wheel Co.
Sterling Wheelbarrow Co.
Stevens & Wood, Inc.
Stewart Furnace Co., The
Stickley, E. B., Machy. Co.
Stockbridge Machine Co.
Stocker-Rumely-Wachs Co.
Stokvis, R. S., & Sons, Inc.
Stoll, D. H., Co., Inc.
Stolp Co., Inc.
Storms Drop Forging Co.
Stow Manufacturing Co.
Stowe-Fuller Refractories Co., The
Stowell Co., The
Straight Line Engine Co., The
Strand, N. A., & Co.
Streine Tool & Mfg. Co.
Strong & Foote Co.
Strong, Carlisle & Hammond Co., The
Strong Steel Fdry. Co.
Sturtevant, B. F., Co.
Sullivan Machinery Co.
Summerill Tube Co.
Sun Machry. Co., Inc.
Superheater Co., The
Superior Mach. Tool Co.
Superior Metal Products Co.
Superior Spring Co.
Superior Steel Corp.
Surface Combustion Co.
Sweet & Doyle Fdry. & Mach. Co.
Sweets Catalogue Service, Inc.
Swett, A. L., Iron Works
Swindell, Wm., & Bros.

T

Tate-Jones & Co., Inc.
Taylor, Chas. Sons Co.
Taylor & Fenn Co., The
Taylor-Ball Welding Corp.
Taylor Instrument Companies
Taylor-Welder Co., The
Taylor-Wilson Mfg. Co.
Temple Malleable Iron & Steel Co.
Tennessee Coal, Iron & R. R. Co.
Thomas Spacing Mach. Co.
Thompson Co.
Thompson Grinder Co.
Thomson Steel Welder Co.
Thorn, J. S., Co.
Thropp's, John E., Sons, Co.
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Tippett & Wood
Titchener Co., The
Titchener-Diehl Co.
Titusville Forge Co.
Tobin Tool & Die Co.
Tod-Stambaugh Co.
Toledo Co., The
Toledo Machine & Tool Co.
Topping Bros.
Torbensen Gear & Axle Co.
Torrington Mfg. Co.
Towmotor Co.
Townsend Co.
Track Specialties Co.
Tregurtha Boiler Co.
Transue & Williams Steel Forging Corp.
Triumph Electric Co.
Troy Engine & Mch. Co.
Troy Fdry. & Mch. Co., Inc.
Trumbull Steel Co., The
Truscon Steel Co.
Tudor Boiler Mfg. Co.
Turner Machine Co.
Turner & Seymour Mfg. Co.
Tuteln, E. Arthur, Inc.

U

Union Chain & Mfg. Co., The
Union Drawn Steel Co.
Union Mfg. Co.
Union Steel Casting Co.
Union Switch & Signal Co.
United Alloy Steel Corp.
United Engineering & Fdry. Co.
United Metals Selling Co.
U. S. Ball Bearing Mfg. Co.
U. S. Cast Iron Pipe & Fdry. Co.
U. S. Electrical Tool Co.
U. S. Equipment Corp.
U. S. Ferro Alloys Corp.
U. S. Nickel Co.
U. S. Refractories Corp.
U. S. Shipping Board Emergency Fleet Corp.
U. S. Silica Co.
U. S. Tool Co., Inc., The
Universal Boring Mach. Co.
Utica Steam Engine & Boiler Works, The

V

Valley Mould & Iron Corp.
Vallen Rolling Mills, Inc.
Vanadium Alloys Steel Co.
Vandyck Churchill Co.
Vaughn Machinery Co., The
Veeder Mfg. Co.
Vermillion Malleable Iron Co.
Vibrating Mchry. Co.
Victor-Peninsular Co.
Victor Saw Works
Victoria Metal Co.
Virginia Bridge & Iron Co.
Vonnegut Machry. Co.
Vulcan Crucible Steel Co.
Vulcan Iron Works, Chicago, Ill.
Vulcan Iron Works, Wilkes-Barre, Pa.

W

Wagner Electric Corporation
Wagner Malleable Iron Co.
Waldo, Egbert & McClain, Inc.
Walter-Wallingford & Co.
Waltham Screw Co.
Wanted Section
Wapakoneta Mach. Co.
Ward, Wm., Mchry. Co.
Wardlow, S. & C.
Ward's Edgar T., Sons Co.
Warner & Swasey Company
Warren Foley & Pipe Co.
Washburn Wire Co., N. Y. C.
Washington Steel & Ordnance Co.
Waterbury Buckle Co.
Waterbury Castings Co.
Waterbury Farrel Fdry. & Mach. Co.
Watson-Stillman Co.
Wayne Tool Mfg. Co.
Weld Wire Works, The
Weirton Steel Co.
Weldit Acetylene Co.
Wellman Bronze Co., The
Wellman-Seaver-Morgan Co., The
Wells, Frank L., Co.
West Leechburg Steel Co.
Western Automatic Mach. Screw Co.
Western Machy. Co.
Western Screw Prod. Co.
Wetherell Bros. Co.
Wharton, Wm., Jr., & Co., Inc.
Wheeling Mch. Prod. Co.
Wheeling Mold & Fdry. Co.
Wheeling Steel Corporation
White & Ito Machinery Co.
Whiting Corp.
Whitney Mfg. Co., The
Whitney Metal Tool Co.
Whitney, D. E., Mach. Co.
Wickes Boiler Co., The
Wickes Bros.
Wiedeke Bros.
Wickwire Spencer Steel Corp.
Wiesman Mfg. Co.
Wilcox, D. Mfg. Co.
Wilfong, M. F., Iron Works Co.
Williams, G. H., Co.
Williams, J. H., & Co.
Williams Test Clamp Co.
Wilson Mfg. Corp.
Williams, White & Co.
Wilmarth & Morman Co.
Wilmington Fibre Specialty Co.
Wilson-Maeulen Co.
Witherbee, Sherman & Co.
Wood, Alex. Iron & Steel Co.
Wood, John, Mfg. Co.
Wood, R. D., & Co.
Woodlawn Works
Woods, T. B., Sons Co.
Worcester Pressed Steel Co.
Worcester Stamped Metal Co.
Worth Steel Co.
Worthington Pump & Machry. Corp.
Wright Machine Co.
Wright Mfg. Co.
Wrigley, Thomas Co.
Wrought Washer Mfg. Co.

Y

Yoder Co., The
York Elec. & Mach. Co.
Young Bros. Co.
Youngstown Sheet & Tube Co.

Z

Zeh & Hahnemann
Zeigler Mfg. Co.
Zelnicker, Walter A., Supply Co.
Ziv Steel & Wire Co.

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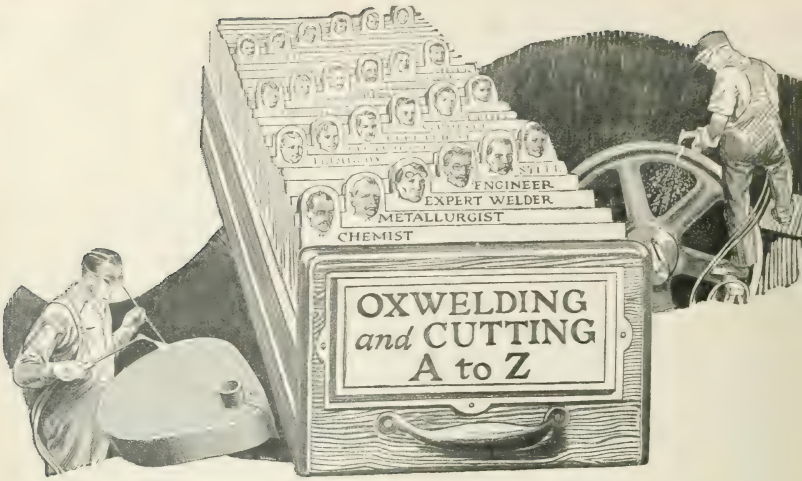
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